LEGISLATIVE SUMMARY SHEET
Tracking No. 0232-21

DATE: October 18, 2021

TITLE OF RESOLUTION: PROPOSED NAVAJO NATION COUNCIL RESOLUTION; AN ACTION RELATING TO RESOURCES AND DEVELOPMENT COMMITTEE, NAABIK'ÍYÁTI' COMMITTEE, AND THE NAVAJO NATION COUNCIL; APPROVING OIL AND GAS OPERATING AGREEMENTS BETWEEN THE NAVAJO NATION AND NAVAJO NATION OIL AND GAS COMPANY FOR TOHACHEE WASH, BEAUTIFUL MOUNTAIN, AND PORCUPINE DOME

PURPOSE: The purpose of this legislation to approve Tohachee Wash , Beautiful Mountain, and Porcupine Dome Oil and Gas Operating Agreements between the Navajo Nation and the Navajo Nation Oil and Gas Company.

This written summary does not address recommended amendments as may be provided by the standing committees. The Office of Legislative Counsel requests each Council Delegate to review each proposed resolution in detail.

5-DAY BILL HOLD PERIOD: VSreadverse
Website Posting Time/Date: Nov. 4, 2021 @ 16:39 pm
Posting End Date: November 9, 2021
Eligible for Action: November 10, 2021

Resources & Development Committee
Thence
Naabik'íyáti' Committee
Thence
Navajo Nation Council

PROPOSED NAVAJO NATION COUNCIL RESOLUTION

24th NAVAJO NATION COUNCIL—Third Year, 2021

INTRODUCED BY

Primary Sponsor

TRACKING NO. 0232-21

AN ACTION

RELATING TO RESOURCES AND DEVELOPMENT COMMITTEE, NAABIK'ÍYÁTI' COMMITTEE, AND THE NAVAJO NATION COUNCIL; APPROVING OIL AND GAS OPERATING AGREEMENTS BETWEEN THE NAVAJO NATION AND NAVAJO NATION OIL AND GAS COMPANY FOR TOHACHEE WASH, BEAUTIFUL MOUNTAIN, AND PORCUPINE DOME

BE IT ENACTED:

SECTION ONE. AUTHORITY

A. The Navajo Nation Council is the governing body of the Navajo Nation. 2 N.N.C §102(A).

B. The Naabik'iyati' Committee is a standing committee of the Navajo Nation Council and is authorized to assign proposed resolutions that require final action by the Navajo Nation Council. 2 N.N.C. §§ 164 (A)(9) and 700(A).

C. The Resources and Development Committee is a standing committee of the Navajo Nation Council and is authorized to make recommendations to the Navajo Nation Council for final approval for mineral agreements. 2 N.N.C. §§ 500 (A), and 501(B)(4)(a).

SECTION TWO. FINDINGS

A. The Navajo Nation is blessed with abundant energy resources.

B. Historically, these resources were leased to non-Navajo entities, and the Navajo Nation benefited appropriately from the development of those resources but hoped to include Navajo entities in also benefitting from the development of those resources.

C. In 1998, the Navajo Nation Council addressed this crucial matter, by ratifying unanimously the federal Charter of Incorporation for the Navajo Nation Oil and Gas Company ("NNOGC"), a wholly owned Navajo Nation corporation organized under section 17 of the Indian Reorganization Act, as amended, 25 U.S.C. § 5124 (formerly 25 U.S.C. § 477). See Resolution No. CF-22-98, and subsequently amended such Charter to ensure experienced corporate leadership, and Resolution No. CO-40-15.

D. One of NNOGC's principal objectives assigned by the Navajo Nation Council has been to regain for the Navajo Nation mineral lands that had been leased to others, so that those resources could be developed, the life of the resource extended, and the Navajo Nation take part in the risks and rewards of being a part of the energy business. NNOGC has done so, acquiring with partners lands formerly leased to Chevron Texaco, Exxon Mobil and other companies; investing over $390 million of NNOGC's own proceeds in the acquisition and development of the Aneth and other oil fields within the Navajo Nation; reversing the decline in oil and gas production on the Navajo Indian Reservation through those investments; and managing and growing a successful business that the Nation owns.

E. It is in the best interest of NNOGC and the Navajo Nation for NNOGC to continue exploration and production of Navajo Nation oil and gas resources, including the Nation's world class helium resources, by approving new oil and gas operating agreements for NNOGC, and by NNOGC's investing in development of Navajo Nation resources pursuant to such agreements.

F. NNOGC and the Navajo Nation now desire to enter into Oil and Gas Operating Agreements.

G. The Navajo Nation Oil and Gas Operating Agreement for Tohachee Wash is attached as **Exhibit A**; the Programmatic Environmental Assessment of the Tohache Wash

Project for the Navajo Nation Oil and Gas Company, Apache Country, Arizona with appendices is attached as **Exhibit A-1**; the survey and legal description of the Tohache Wash Project is attached as **Exhibit A-2**.

H. The Navajo Nation Oil and Gas Operating Agreement for Beautiful Mountain is attached as **Exhibit B**; the Programmatic Environmental Assessment of the Beautiful Mountain Project for the Navajo Nation Oil and Gas Company, Apache Country, Arizona with appendices is attached as **Exhibit B-1;** and the survey and legal description of the Beautiful Mountain Project is attached as **Exhibit B-2**.

I. The Navajo Nation Oil and Gas Operating Agreement for Porcupine Dome is attached as **Exhibit C**; the Programmatic Environmental Assessment of the Porcupine Dome Project for the Navajo Nation Oil and Gas Company, Apache Country, Arizona with appendices is attached as Exhibit **C-1**; and the survey and legal description of the Porcupine Dome Project is attached as **Exhibit C-2**.

J. Supporting Chapter Resolutions Teec Nos Pos Chapter Resolution No. TNPCH 07-09-17 R61, Teec Nos Pos Chapter Resolution No. TNPCH 06-13-2019 R-76, and Tsé Ałnaozti'í Chapter Resolution No. TAT-19-06-66 are attached as **Exhibits D**, **E** and **F** respectively.

K. The Executive Official Review Document No. 016149 is attached as **Exhibit G.**

SECTION THREE. APPROVAL AND AUTHORIZATION

A. The Navajo Nation hereby approves the Oil and Gas Operating Agreement between the Navajo Nation and Navajo Nation Oil and Gas Company for Tohachee Wash, **Exhibit A**

B. The Navajo Nation hereby approves the Oil and Gas Operating Agreement between the Navajo Nation and Navajo Nation Oil and Gas Company for Beautiful Mountain, and Porcupine Dome, attached hereto respectively as**, Exhibit B**,

C. The Navajo Nation hereby approves the Oil and Gas Operating Agreement between the Navajo Nation and Navajo Nation Oil and Gas Company for and **Exhibit C**.

D. The Navajo Nation hereby authorizes the President of the Navajo Nation to execute any and all documents necessary to affect the intent and purpose of this resolution.

EXHIBIT
A

NAVAJO NATION
OIL AND GAS OPERATING AGREEMENT

This Oil and Gas Operating Agreement ("OA" or the "Agreement") is made and entered into this _____ day of _____, 2021, by and between the Navajo Nation ("Nation" or "Lessor") and the Navajo Nation Oil and Gas Company ("NNOGC" or "Operator"), each a "Party" and collectively the "Parties," on the terms and conditions set forth herein.

RECITALS

WHEREAS, the Nation is a sovereign Indian Nation and the beneficial owner of certain surface land and mineral estates located on the Navajo Nation in the States of Arizona, Utah and New Mexico; and

WHEREAS, NNOGC is a wholly owned arm and instrumentality of the Nation organized under Section 17 of the Indian Reorganization Act, 25 U.S.C. § 5124 (formerly 25 U.S.C. § 477), and charged by the Nation pursuant to its corporate Charter, approved by the Navajo Nation Council, with, among other purposes, conducting oil and gas exploration and production on behalf of the Nation, for the benefit of the Navajo Nation, and to return all dividends and distributions of profit to the Navajo Nation government; and

WHEREAS, NNOGC and the Nation intend that all activities authorized hereunder will be conducted in a manner consistent with NNOGC's Charter and other applicable Navajo law, and with NNOGC's obligation to maximize the value of the Nation's oil and gas resources for the benefit of the Navajo Nation.

NOW, THEREFORE, for and in consideration of the foregoing recitals and the mutual covenants and obligations set forth herein, the Parties agree as follows:

I. DEFINITIONS.

A. "Affiliate" means any entity as defined in 30 Code of Federal Regulations (CFR) § 1206.51 or any applicable substitute future regulations.

B. "Anniversary Date" means the date one year after the Effective Date of this Agreement and each subsequent date one year after the Anniversary Date thereafter.

C. "Conducting operations" means any work undertaken or commenced in good faith for the purpose of carrying out the rights, privileges or duties of NNOGC under this OA, including the construction of necessary structures for the drilling of an oil or gas well, and by the actual

operation of drilling in the ground, and which shall include all activities common in the industry, unless otherwise prohibited by law.

D. "Crude Helium" means the grade of helium produced or extracted at any facility other than a gas plant, and which is less than 99.995 percent helium by volume.

E. "Effective Date" means the date that this Agreement is approved by the U.S. Bureau of Indian Affairs (BIA).

F. "Gas" or "gas" shall be defined pursuant to 30 C.F.R. Part 1206, Subpart E, § 1206.171.

G. "Gathering" means the movement of OA production to a central accumulation or treatment point on the OA Area; or a central accumulation or treatment point off the OA Area.

H. "Gross Proceeds" for royalty payment purposes means: for gas royalties, except for helium royalties, the definition contained at 30 C.F.R. § 1206.171, or any applicable substitute future regulation; for oil royalties, the definition contained at 30 C.F.R. § 1206.51 or any applicable substitute future regulation. For purposes of determining royalties as provided herein, except for royalties taken in-kind by the Nation, the point of valuation of hydrocarbons shall be the Bureau of Land Management facility measurement point.

I. "Hydrocarbons" or "hydrocarbons" means naturally occurring hydrocarbon oil, gas, casing head gas, coal bed methane, distillate, condensate, liquid hydrocarbons and each of their respective constituent vapors and liquids, and including without limitation, helium and carbon dioxide, and all other non-hydrocarbon gases within the OA Area. Hydrocarbons do not include coal matrix material or the in-situ synthetic gasification of coal matrix material.

J. "Oil" or "oil" means petroleum or liquid hydrocarbons originally existing in a reservoir in a liquid state.

K. "Payment in Lieu of Tax" or "PILT" means a payment made by NNOGC pursuant to this Agreement in lieu of the Possessory Interest Tax and the Oil and Gas Severance Tax, from which NNOGC is statutorily exempt.

L. "Primary Term" means the initial term of the OA which shall be for a period of up to ten (10) years, which may be automatically extended for one (1) additional year as provided in this OA, during which NNOGC has exclusive rights and privileges in the Properties for Oil and Gas exploration and development, such rights and privileges which are held by the Bonus, as defined in Section II(A), and by the Delay Rentals, as defined in Section IV(A). Acreage of the Properties moves from the Primary Term to the Secondary Term effective upon NNOGC's development of a well that is producing Oil or Gas in paying quantities. Any portion of the Properties may be relinquished to the Nation during the Primary Term as provided in this OA.

M. "Produced, producing, or production in paying quantities" or "held by production" means sufficient net income from production to: (a) operate and maintain the Properties or a portion thereof, as provided herein; (b) market the production; and (c) result in a net income to Operator greater than zero dollars ($0.00).

N. "Properties" or "OA Area" shall have the meaning set forth in Section II(A) of this Agreement.

O. "Regulations" means the Code of Federal Regulations (CFR).

P. "Secondary Term" means, for any portion of the Properties or all of the Properties held by production, the period of time after the Primary Term ends during which the Properties or any portion thereof are producing oil or gas in paying quantities, as defined and provided for herein, and during which NNOGC has exclusive rights and privileges in such Properties for oil and gas exploration, development, and production.

Q. "Secretary" means the Secretary of the Department of Interior or his/her designee.

II. PROPERTIES; BONUS; TERM.

A. The Nation, in consideration of a cash bonus of $25.00 per acre, for a total bonus of $276,000.00 (the "Bonus"), to be paid within 60 days of the Effective Date, which Bonus shall hold the Properties, as defined herein, for the first year of the Primary Term, and in consideration of the Delay Rentals and royalties to be paid, and the covenants to be observed as herein set forth, does hereby grant and lease to NNOGC the exclusive right and privilege to drill for, extract, remove, and dispose of all the oil and gas deposits, including helium gas, carbon dioxide gas, and sulphur gas, at all depths in or under the following-described tracts of land situated in the County of _San Juan_, State of _New Mexico_, and more particularly described as follows:

Township 24 North, Range 19 West
Section 2: NW/4
Section 3: N/2
Section 4: N/2

Township 25 North, Range 19 West
Section 8: E/2
Section 17: E/2
Section 26: W/2
Section 35: W/2
All of Sections 9, 10, 15, 16, 27, 28, 33, 34

Township 26 North, Range 19 West
All of Sections 20, 21, 28, 29, 34
Section 27: W/2
Section 33: E/2

containing 11,040 acres more or less (the "Properties" or the "OA Area"), together with the right to construct and maintain on the Properties such structures necessary for the development and operation of the Properties. The Properties are shown on the Map attached hereto as Attachment "A."

B. NNOGC's exclusive right and privilege under this OA during the Secondary Term shall continue for so long as oil and/or gas is produced in paying quantities from the Properties, *i.e.*, while the Properties are "held by production". For purposes of the Secondary Term, a single producing gas well shall hold 640 acres and a single producing oil well shall hold 160 acres of the Properties.

C. The Primary Term for any portion of the Properties not held by production or extended as provided herein will expire at midnight on the 364th day after the 9-year anniversary of the Effective Date (or on the 365th day after the 9 year anniversary of the Effective Date if the year is a Leap Year). If necessary, the Primary Term may be automatically extended for such time as it takes NNOGC to complete conducting operations on such acreage, not to exceed a period of twelve (12) months.

D. If, at any time during the Primary Term, NNOGC determines, in its sole discretion, that development of all or any portion of the Properties is not economically feasible, NNOGC may relinquish any such uneconomic portion of the Properties back to the Nation at no additional cost to NNOGC and which shall not affect in any manner NNOGC's right to develop and operate the Properties remaining under the OA. Delay rentals shall not be paid on relinquished acres.

E. For any Properties that are not relinquished by NNOGC to the Nation during or at the expiration of the Primary Term, this OA shall continue in effect for so long as there are oil or gas wells producing in paying quantities. During the Secondary Term, production may be interrupted periodically, *e.g.*, where there is a mechanical breakdown or on a good-faith market basis, so long as production is resumed by NNOGC within a reasonable time after well work, facility repairs, or market pricing enables wells to return to paying quantities.

III. SURFACE USE AUTHORIZATION; EASEMENTS.

A. Without limitation, the Nation hereby grants to and gives its consent for NNOGC access to the Properties for the purpose of conducting environmental, archaeological, biological and seismic studies preparatory to operations on the OA, and the right to build and maintain pipelines, transmission lines, and other lines, including without limitation oil, gas, power and water lines incidental to the operations authorized hereunder ("Lines"). As of the Effective Date, NNOGC is hereby authorized to conduct geophysical surveys on all, or any part of the Properties, which shall be without charge for surface damages and/or permit fees in favor of the Nation. The Nation, through its Land, Minerals, General Land Development Department and other Departments, further agrees to promptly review and approve reasonable requests of NNOGC, from

time to time, of all such additional permits or authorizations as are necessary or incidental to the conduct of NNOGC's authorized activities hereunder, including without limitation permits for seismic and other studies, water usage, easements, and for the use of existing or expired rights-of-way in order that the Purposes of this Agreement, express or implied, can be fully accomplished without unnecessary or unusual delays. For all authorizations provided in this entire Section III(A), NNOGC shall comply with Navajo Nation laws governing environmental resources, including water, and cultural resources, and shall obtain the appropriate Navajo Nation environmental and cultural resource clearances, and grazing clearances, prior to any disturbance of the Properties.

IV. NNOGC'S OBLIGATIONS.

A. Delay Rental Payments. Properties for the first year of the Primary Term are held by NNOGC by payment of the Bonus, as set forth in Section II(A). As consideration to the Nation for NNOGC's holding non-producing acreage of the Properties and non-relinquished acreage of the Properties after the first year of the Primary Term, (beginning on the one-year anniversary of the Effective Date, and on each one-year anniversary thereafter for the duration of the Primary Term, NNOGC shall pay an advance annual delay rental of **$10.00 per acre** (the "Delay Rental") for any acreage of the Properties not held by a producing well and not relinquished by NNOGC prior to the Delay Rental payment date. For purposes of this Section IV(A), a single producing gas well shall hold 640 acres and a single producing oil well shall hold 160 acres of the Properties. For the sake of clarity, in no event shall NNOGC pay a Delay Rental for acreage of the Properties that are held by a producing well or for acreage of the Properties that have been relinquished by NNOGC prior to the Delay Rental payment date, nor shall NNOGC pay a Delay Rental for acreage of the Properties that has passed out of the Primary Term. Annual Delay Rental payments will be due on the Anniversary Date and shall include a complete listing and location of producing oil and gas wells within the OA Area. Delay rental payments are not recoupable against any royalty payments. Any Delay Rental not paid within ten (10) days of the Anniversary Date will be deemed late in accordance with Section IV(I) of this Agreement.

B. Annual OA Rental Payments. Beginning on the one-year anniversary of the effective date of the Secondary Term, and on each one-year anniversary thereafter for the duration of the Secondary Term, NNOGC shall pay an advance annual rental of $2.00 per acre (the "Annual OA Rental Payment") for any acreage of the Properties held by a producing well. Such Annual OA Rental Payment is due on or before the Anniversary Date and is recoupable against royalty payments. Recoupment of the Annual OA Rental Payment must be made at least one sales month after the rental is paid.

C. Oil Royalty. The Nation's royalty share of oil produced within the OA Area will be determined by applying a 20 percent royalty to the value as determined under this paragraph. The sales value of oil for royalty purposes shall be determined using the higher of the Gross Proceeds received by Operator or the oil major portion index price approved by the United States,

Office of Natural Resources Revenue (or "ONRR") for the field or area ("ONRR Oil Index Based Major Portion Price") to determine the monthly weighted average oil price per barrel ("$/Barrel"), pursuant to the provisions of 30 C.F. R. § 1206.51 or any applicable substitute future regulations.

D. Gas Royalty. The Nation's royalty share of natural gas produced within the OA Area, except for helium and gases produced and sold in association therewith, will be determined by applying a 20 percent royalty to the value as determined under this paragraph. The sales value of natural gas for royalty purposes shall be the higher of the Gross Proceeds received by Operator or the gas index zone price approved by the ONRR for natural gas produced and sold from the Properties. The Operator will use the index zone price for natural gas approved by ONRR for the field or area (ONRR Gas Index Zone Price) to determine the monthly weighted average gas price ($/MMBtu), pursuant to the provisions of 30 CFR § 1206.170 or any applicable substitute future regulations.

E. Royalty In-Kind. The Nation may elect to take its royalty share of oil in-kind. If the Navajo Nation elects to take its royalty share of oil in-kind, Operator will continue to follow all Federal and Navajo Nation reporting requirements. If the Nation's share of oil taken in-kind is subject to a crude oil sale agreement between the Nation and Operator, payment for the Nation's share of oil taken in-kind shall be calculated in accordance with such agreement.

F. Helium Royalty. The Nation's royalty share of helium produced within the OA Area will be determined by applying a 20 percent royalty to the value as determined under this paragraph. The value of helium for royalty purposes shall be the gross proceeds price received by Operator for the first arm's-length sale of Crude Helium. For purposes of determining royalties, there shall be no deductions from the gross proceeds price received. If gross proceeds for royalty valuation purposes have been reduced by any costs including but not limited to marketable condition costs, marketing costs, transportation or processing costs, by the purchaser, or any other person, that value will be added back to gross proceeds for purposes of determining royalties. For purposes of determining royalties as provided herein, the point of valuation shall be the Bureau of Land Management facility measuring point.

G. NGLs, Argon, and Other Gas Production. The Nation's royalty share of natural gas liquids ("NGLs)", argon, and other gases produced within the OA Area that are not covered by Paragraphs D or F above, will be determined by applying a 20 percent royalty to the value as determined under this paragraph. The sales value of NGLs, argon and other gases produced shall be determined pursuant to the provisions of 30 C.F.R. § 1206.174.

H. Navajo Scholarship. Within ten (10) days after the Parties have fully executed this Agreement and annually thereafter until the effective date of the Secondary Term, Operator shall pay $10,000.00 annually to the Navajo Nation Scholarship Office for its general scholarship fund. Within ten (10) days after the effective date of the Secondary Term, Operator shall pay to the Navajo Nation Scholarship Office for its general scholarship fund $2,000.00 per producing well,

as defined herein, such payment which shall not be less than $15,000.00 annually (the scholarship payment "floor") nor greater than $50,000.00 annually (the scholarship payment "ceiling").

I. Payment in Lieu of Navajo Nation Taxes. Operator shall pay all applicable Navajo Nation taxes. Operator and the Navajo Nation hereby agree that for the purpose and intent of this OA, Operator shall make payments in lieu of Navajo Nation taxes related to its operation and activities, at the following rate determined to be appropriate by the Navajo Nation Minerals Department: the PILT payment will be 5%, shall be determined on the same basis upon which royalties are determined, and is not included in the 20% royalty rate established for each product under Section IV, Paragraphs C, D, F and G. However, if in the future Operator is required to pay Navajo Nation taxes pursuant to a Navajo Nation Tax Code amendment approved by the Navajo Tax Commission and Navajo Nation Council, or alternative agreement, the 5% PILT shall cease, and the royalty rate in Section IV, Paragraphs C, D, F and G shall remain 20%.

J. Late Payments. Any payment, including but without limitation, bonus, royalty, rental, damages, and taxes, not received by the Nation in a timely manner shall bear interest and applicable penalty from the date payment was due to the date payment was received by the Nation at the rate then being assessed by the ONRR.

V. COMPLIANCE WITH NAVAJO NATION AND FEDERAL REQUIREMENTS.

A. Governing Law. The rights and the obligations of the Parties shall be governed by Federal and Navajo Nation laws, specifically including the Indian Mineral Development Act of 1982, 25 U.S.C. § 2101 *et seq.*, and applicable regulations pertaining thereto. Operator agrees that the performance of this OA within the Nation is subject to the supervision, monitoring and regulations of the Nation and of any Federal agency with jurisdiction over Operator's performance of this OA. Any matter not subject to exclusive Federal regulation shall be subject to Nation regulations. Operator agrees to strictly observe all Nation laws and regulations, unless specifically waived by the Navajo Nation Council. Operator shall comply with applicable Navajo and Federal laws and regulations prior to commencement of operations and, with respect to any well plugged and abandoned by it hereunder, shall restore the surface pursuant to such regulations.

B. General Requirements. The Operator shall comply with all applicable Nation and Federal rules, regulations, permits, and laws including without limitation, the following:

Navajo preference in employment and business laws;
Environmental protection rules and regulations;
The Navajo Nation Tax Code;
Cultural resources and antiquities laws and regulations; and
The Navajo Nation Water Code.

C. Permits and Licenses. The Operator shall obtain such permits and licenses as may be required by applicable Nation and/or Federal authorities for the exploration, development, production and sale of all hydrocarbons and any related activity including the production or

disposal of produced water. Operator shall not be subject to any liability, loss or forfeiture of any rights under this OA for failure to perform any obligation under this OA during the time and to the extent that the failure to do so is caused by the unreasonable withholding of approval by any such governmental agency.

D. Successors. The covenants contained in this Agreement shall extend to and be binding upon the successors and assigns of the Parties to this OA. . While the lands of the Nation are in trust or restricted status, all obligations of the Operator under this Agreement are to the United States as well as to the Nation.

E. Access to Land. Operator shall not deny access to the Operator's operations under this Agreement at any time to duly authorized employees or agents of the Nation or appropriate Federal agencies.

F. Applications for a permit to drill (APD). All APDs will be approved by the Nation and appropriate Federal agencies in a timely manner prior to the commencement of drilling operations.

G. Prudent Operator Standards. Operator shall exercise diligence at all times in the exploration, drilling, completing and operating of all wells and all associated facilities constructed in accordance with this Agreement and shall carry on all operations in a workmanlike and prudent manner, having due regard for preventing waste or destruction of hydrocarbons, contamination of surface or groundwater, contamination of soils, pollution of air, injury to workmen and the public.

H. Water Resource Protection. All water used or encountered by Operator in connection with oil and gas exploration and development under this Agreement shall be in accordance with applicable Nation and Federal laws and regulations.

I. Dry Holes. Subject to applicable Nation and Federal regulations, Operator shall have the right to use for disposal, injection, or water production any well it drills that is determined to be incapable of producing hydrocarbons in paying quantities. Operator shall plug and abandon any dry hole in accordance with applicable Nation and Federal laws and regulations.

J. Dewatering. Dewatering of any geologic formation by a well or wells drilling the OA Area by Operator in conjunction with hydrocarbon testing or production shall be in accordance with applicable Nation and Federal laws and regulations.

K. Protection of Coal and Other Mineral Resources. Operator shall conduct all oil and gas exploration and development activities in a manner that minimizes the damage to coal deposits or other mineral deposits within the OA Area. Operator has no rights to coal matrix material, water (except for water produced, removed, re-injected or disposed of as a result of hydrocarbon production), or to other mineral resources within the OA Area.

L. Surface Protection. Operator shall comply with applicable Nation and Federal laws and regulations concerning use of the surface of the OA Area, location of wells, production facilities, access and production equipment rights-of-way in the OA Area and across other lands of the Nation. Before any surface-disturbing activities commence, Operator shall obtain the necessary Nation and Federal approvals, including but not limited to payment of the project review processing fee, surface damage payments, archeological/cultural and environmental surveys and/or assessments, customary land user consent, required surety bonds and consideration to the Nation. Operator shall not be required to pay right-of-way consideration to the Nation for oil and gas production-related rights-of-way within the OA Area.

VI. GENERAL REPORTING PROCEDURES.

A. Periodic Drilling Reports. Operator shall notify the Navajo Nation Minerals Department prior to the commencement of any well drilling operation, and thereafter shall provide drilling reports showing the progress of said well. Operator shall also provide notification of testing of any well and/or geologic formation at least forty-eight (48) hours prior to such testing in order that a representative of the Nation has the opportunity to witness such testing.

B. Copies of Reports and Tests. Operator shall provide the Navajo Nation Minerals Department with copies of all log runs, drill stem tests, geological reports, and other related documentation in connection with the well within thirty (30) days of conducting such log runs and tests. In addition, Operator shall provide on a quarterly basis all data, including but not limited to maps, drill logs, core analyses, surveys, production records, and seismic data obtained by Operator for the OA Area.

C. Production and Royalty Reports. Operator shall submit all required monthly production and royalty reports to the Navajo Nation Minerals Department and Federal government in accordance with Nation and Federal regulations. All OA rental and royalty payments shall be submitted to the Navajo Nation's Royalty Lockbox Account with a corresponding Form ONRR-2014, Report of Sales and Royalty Remittance submitted to the Office of Natural Resources Revenue. Operator shall notify the Navajo Nation Minerals Department and the Bureau of Land Management in writing if any extraordinary events occur, including but not limited to, the shutting-in of any well for a period of thirty (30) days or longer.

D. Well Information. Operator will provide the Navajo Nation Minerals Department the following information if obtained by Operator for each well drilled, completed, reworked, or plugged and abandoned pursuant to the OA:

Logs
Core Analysis
Drill Stem Tests
Revised Structure and Isopach Maps, if available
Location Plat & Schematics

Drilling Summary
Directional Survey
Geological Report
Production Test Data
Bottom Hole Pressure Surveys
Gas, Oil and/or Water Analyses
Completion Reports
Work Over Reports
Plugging and Abandonment Reports
Monthly Production and Sales Reports

E. Seismic Data. Operator shall provide the Navajo Nation Minerals Department with copies of all data, conclusions, and interpretations generated by or resulting from seismic surveys upon completion of the survey within the OA Area.

F. Sole Owner of Seismic Data; Operator License. The Navajo Nation is the sole owner of all seismic data. Operator shall deliver all originals and copies of seismic data, interpretations therefrom, including all such information in digital form, to the Nation, if such data and information is obtained by Operator. The Nation hereby grants Operator a free non-revocable license to access and use all data and information pertaining to the OA Area for the duration of the OA. The Nation also hereby grants Operator a three (3) year non-revocable and exclusive license for Operator to use all data and information obtained or generated by Operator, its agents, and its consultants, including but not limited to maps, drill logs, core analyses, surveys, production records, and seismic data, during which three (3) year period such data and information shall be kept in strict confidence by the Navajo Nation Minerals Department and shall not be disclosed by the Nation to any third party; provided, however, that during such three (3) year license period, Operator shall have an exclusive right to exchange or trade such data or information with third parties under a sublicense, which sublicense shall not be longer than the three (3) year license period. Such three (3) year license period shall commence on the date that Operator delivers the data and/or information to the Nation.

VII. GENERAL PROVISIONS.

A. Indemnification and Insurance.

1. Indemnification. Operator assumes all risk of personal injury to or death of its employees. Operator agrees to indemnify and hold the Nation and the Secretary and their agents, employees, licensees, customary land users, permittees and tenants harmless from all claims, liability and causes of action alleging bodily injury or property damage asserted against the Operator, its agents, employees and subcontractors or any third-party which may arise by reason of the operations of the Operator, its agents, employees and subcontractors, including any negligent omissions in connection with such operations.

2. Minimum Insurance Requirements. The Operator shall maintain and shall require its contractors and subcontractors to maintain all insurance required under all applicable laws and regulations. Operator shall carry the following minimum insurance naming both the Nation and the Operator as insured:

a. Comprehensive public liability insurance with limits of not less than $300,000.00 for each accident and $1,000,000.00 for death or injury of one person.
b. Comprehensive public liability property damage insurance with limits of not less than $1,000,000.00 for each accident and $5,000,000.00 aggregate per policy.
c. Automobile public liability insurance with limits of $300,000.00 for the death or injury of one person and $1,000,000.00 for each accident.
d. Workers' compensation insurance in the Operator's name in the amount established by Navajo law.

3. Certificates of Insurance. Certificates of insurance naming the Nation and the Secretary as additional insured for all said policies will be furnished the Nation within a reasonable time after receipt.

B. Dispute Resolution and Navajo Nation Jurisdiction.

1. Sovereignty of the Nation. Nothing contained herein shall be interpreted as constituting a waiver, express or implied, of the sovereign immunity of the Nation or NNOGC.

2. Royalties. Any dispute between the Parties involving royalties due under Section IV, Paragraphs C, D, F and G of the OA shall be resolved in accordance with the requirements and procedures contained in ONRR's regulations, including 30 C.F.R. Part 1241, or any applicable substitute future regulations. Any other dispute between the Parties concerning the OA shall be resolved in accordance with this Section VII, Paragraph B.

3. Negotiation. In the event of any dispute, the Parties shall use their good faith efforts to resolve the dispute, and each Party shall continue to perform in accordance with the other provisions of this OA during the pendency of the dispute. As a first step to resolving any dispute, the Parties shall attempt to negotiate a just and equitable settlement thereof. Each Party will communicate and/or meet with the other in good faith and attempt to reach a solution satisfactory to both Parties. If either Party fails or refuses to participate in such negotiations or such negotiations do not result in the Parties resolving the dispute within twenty (20) working days after one Party has requested that negotiation begin (and the period is not extended with the consent of the Parties), then either Party may cause the dispute to be referred to arbitration.

4. Arbitration. If such efforts in Section VII(B)(2) are unsuccessful in reaching a resolution of the Parties' dispute within 60 calendar days of commencement of the negotiations,

then either party may invoke arbitration according to the procedures referenced in the Navajo Sovereign Immunity Act, as amended, at 1 N.N.C. §554(J) and §554(K), and as set forth in the Navajo Nation Arbitration Act, as amended, at 7 N.N.C. §§1101 *et seq.* Such arbitration shall be conducted in accordance with the Commercial Arbitration Rules of the American Arbitration Association, except to the extent such rules are modified by the following:

a. unless otherwise agreed to in writing by the Parties, all arbitration procedures shall be held in Window Rock, Arizona; and
b. the arbitration shall be conducted by a single arbitrator selected by the Navajo Nation, unless any claim, individually, or in the aggregate, exceeds $1,000,000.00, exclusive of interests, costs and fees; in such case the arbitration shall be conducted by a panel of three (3) arbitrators, each party selecting one (1) arbitrator, with the two arbitrators choosing the third; at least one arbitrator shall possess at least ten (10) years' experience in Federal Indian Law; and
c. notice of intent to invoke arbitration shall be filed in strict compliance with the notice requirements of the Navajo Sovereign Immunity Act, 1 N.N.C. § 555; and
d. whether as a result of an arbitration provided for herein or of any judicial action to enforce an arbitration award resulting from such arbitration, any award against the Nation shall be in strict conformance with the provisions of 1 N.N.C. § 554(K)(1-6); and
e. whether in the context of an arbitration provided for herein or of any judicial action to enforce an arbitration award resulting from such arbitration, the laws of the Nation shall exclusively govern the interpretation of this OA, the arbitration provisions set forth herein and the arbitration procedures conducted pursuant thereto, and the application of all the provisions herein to the Operator and its subcontractors, agents, representatives, employees, or consultants; and
f. pursuant to 1 N.N.C. §554(K) and 7 N.N.C. §1102, the appropriate Navajo Nation District Court shall have exclusive jurisdiction to compel the Nation's participation in an arbitration, and shall have exclusive jurisdiction to enforce, modify, or vacate an arbitration award resulting from such arbitration; neither Party may recover from the other any attorneys fees or costs.

5. Jurisdiction. There is expressly reserved to the Nation full territorial legislative, executive and judicial jurisdiction over the OA area under the OA and all lands burdened by the OA, including without limitation over all persons, including the public, and all activities conducted or otherwise occurring within the OA area under the OA and all lands burdened by the OA shall be and forever remain Navajo Indian Country for purposes of Nation jurisdiction.

6. Waiver of suit: The negotiation and arbitration provisions herein shall constitute the sole and exclusive procedural remedy to any dispute or controversy arising out of this Contract. Commencement of negations or arbitration shall be a complete defense to any suit, claim, action or proceeding instituted in any Federal, state, or tribal court or any administrative tribunal, with

respect to any dispute or controversy arising out of this Agreement that is negotiated or arbitrated as set forth herein.

7. Post-termination; post-expiration: The dispute resolution provisions of this Agreement shall, with respect to such any dispute or controversy arising out of this Agreement, survive the termination or expiration of this Agreement.

8. Challenges limited. By entering into this Agreement, NNOGC expressly covenants and agrees that it shall not contest or challenge the territorial, administrative, legislative, executive or judicial jurisdiction of the Navajo Nation on the basis that such jurisdiction is inconsistent with the status of the Navajo Nation as an Indian tribal Nation, or that the Navajo Nation government is not a government of general jurisdiction, or that the Navajo Nation government does not possess full police power (i.e. the power to legislate and regulate for the public's general health and welfare) over all lands, persons, activities, transactions, or occurrences within its territorial boundaries, or on any other basis not generally applicable in a similar challenge to the jurisdiction of a state government.

C. Force Majeure.

1. Force Majeure Defined. For purposes of this OA, Force Majeure is defined to include strikes, insurrections, demonstrations, terrorist activities, explosions, acts of God, floods, storms, fires, epidemics and unavoidable accidents.

2. Effect of Force Majeure. Operator shall not be deemed to be in violation or breach of any obligation under this OA during the time and to the extent that it is prevented from or delayed in performing such obligation by Force Majeure.

3. Situations Exempt from this Section. Nothing in this Section shall be construed as compelling Operator to settle any labor dispute contrary to its wishes, or as preventing Operator from testing the validity of any local, tribal, or Federal order, regulation or law through available administrative, arbitral, or judicial proceedings.

D. Assignment Procedures.

1. Approval of the Nation and Secretary. Operator shall not assign, sell, exchange, lease or otherwise dispose of all or any part of its interests under this OA without the prior written approval of the Nation as provided in 18 N. N. C. § 605 and the Secretary in accordance with applicable Nation and Federal laws and regulations. Any successor or assign shall agree in the applicable assignment or other appropriate agreement to be bound by all the terms and conditions of this OA. Among other things, the assignee shall be required to comply with all Navajo Nation tax laws. For the avoidance of doubt, Section IV(I) of the OA does not apply to any assignee of the Operator. If the OA is to be assigned, Operator also understands that the assignee shall

negotiate new royalty rates with the Navajo Nation Minerals Department prior to the Nation's approval of the assignment.

2. Unconsented Assignment Void. Any assignment, sale, exchange, lease or other transfer of Operator's interest without the Nation's prior written approval shall be null and void.

3. Operator Retains a Majority Interest. Operator will always retain at least an undivided fifty-one (51) percent interest in the OA Area and this OA for so long as this OA remains in full force and effect. Any attempt by Operator to assign, sell, exchange, lease or otherwise dispose of more than an undivided cumulative forty-nine percent (49%) interest in the OA Area and this OA at any time during the Primary or Secondary Terms shall be null and void.

4. Navajo Nation Right of First Refusal. Should Operator desire to assign or sell all or part of its operating interests under this OA, it shall comply with applicable Navajo laws, including, but not limited to, 18 N.N.C. § 605 as such law may be amended from time to time.

E. Notices. All notices and communications required or permitted hereunder shall be in writing and shall be deemed to have been duly made if actually delivered to, or mailed by registered or certified mail, postage prepaid, addressed to the parties at the following addresses. Written notice may also be given by facsimile transmission and shall be effective upon receipt of the transmission. Either party may, by written communication so delivered to the other, change the name or address to which delivery thereafter shall be made.

To or upon the Nation:

Navajo Nation
Attn: Office of the President
P.O. Box 9000
Window Rock, AZ 86515
Phone: 928-871-6352
Fax: 928-871-4025

Navajo Nation Minerals Department
Attn: Department Director
P.O. Box 1910
Window Rock, AZ 86515
Phone: 928-871-6587
Fax: 928-871-7095

To or upon the Secretary:

Regional Director
Navajo Region
Bureau of Indian Affairs
United States Department of Interior
301 West Hill Street
Post Office Box 1060
Gallup, New Mexico 87305
Phone: 505-863-8314
Fax: 505-863-8324

To or upon the Operator:

Navajo Nation Oil and Gas Company
Attn: Chief Executive Officer
P.O. Box 4439
Window Rock, AZ 86515
Phone: (928) 871-4880
Fax: (928) 871-4882

F. Severability. The invalidity of any term or provision of this OA shall not affect the validity of any other provision herein, and the parties shall negotiate in good faith to enter into an agreement amending any such provision in a manner to make it valid, legal and enforceable while retaining the original intent of the parties with regard to such term or provision.

G. Bankruptcy. In the event of insolvency, bankruptcy or receivership of the Operator, or its successors, devisees, and assignees, this OA and all other agreements, easements, permits, and approvals pertinent hereto shall be voidable at the sole discretion of the Nation as to any lands not held by oil and gas production within the OA Area pursuant to Section II.

H. Navajo Nation Court Jurisdiction. Except to the extent specifically committed to arbitration by this OA, the courts of the Navajo Nation shall have jurisdiction over all disputes between the Nation and Operator relating to this OA.

I. Default and Termination.

1. Default by Operator. In the event of any material default by Operator in the performance of its obligations under this OA, the Nation shall give Operator notice specifying the default. If Operator does not, within thirty (30) days of receipt of the notice, correct the default or initiate diligent efforts to correct the default, the Nation may terminate this OA by delivering a termination notice to Operator, subject to Operator's rights as provided in paragraph (4), below, and subject to Section VII(B).

2. Reclamation. Upon expiration or termination of this OA or partial or complete relinquishment of lands within the OA Area, Operator shall surrender the OA Area or a portion of the OA Area, as applicable, in a condition that complies with applicable Nation and Federal laws. It shall be the obligation of Operator to restore those areas within the OA Area disturbed by Operator or its subcontractors, pursuant to approved reclamation plans and in compliance with all applicable laws, statutes, regulations and administrative orders.

3. Final Data. Upon expiration or termination of this OA or of the partial or total relinquishment of lands within the OA Area, the Nation shall become the owner of all data in Operator's possession or control relating to the expired, terminated, or relinquished lands. Within sixty (60) days after the expiration or termination of this OA of partial relinquishment of lands within the OA Area, Operator shall deliver to the Nation all such data that Operator has not previously furnished to the Nation. Operator may retain access to all such data for area studies and further evaluation for use in future exploration for as long as this OA remains in-force.

4. Removal of Improvements, Equipment, and Stockpiled Products. Operator shall have the right of ingress and egress for ninety (90) days after expiration or termination of this OA or after partial or total relinquishment of lands within the OA Area, to remove its property from the affected portions of the OA Area, subject to the following restrictions:

a. Operator may not remove casing in wells and other material, equipment and structures necessary for the continued operation of wells producing or capable of producing Hydrocarbons in paying quantities as determined by the Navajo Nation Minerals Department and the Secretary. Unless refused by the Nation, all such casing in wells, material, structures and equipment shall be and become the property of the Nation when this OA expires.
b. Operator may not remove any property from the OA Area if Operator has outstanding financial obligations to the Nation related to this OA.

J. Department of Justice Approval. Pursuant to 1 N.N.C. § 554(J)(2) and (K)(2), Navajo Nation Department of Justice Approval is required for all agreements that include a limited waiver of sovereign immunity to compel or enforce arbitration under the Navajo Nation Arbitration Act, as amended, 7 N.N.C. § 1101 et seq.

Navajo Nation Department of Justice

7/20/21
Date

[SIGNATURES ON NEXT PAGE]

SIGNATURES

NAVAJO NATION (LESSOR)

By: _____ _____
Jonathan Nez, President Date

NAVAJO NATION OIL AND GAS COMPANY (OPERATOR)

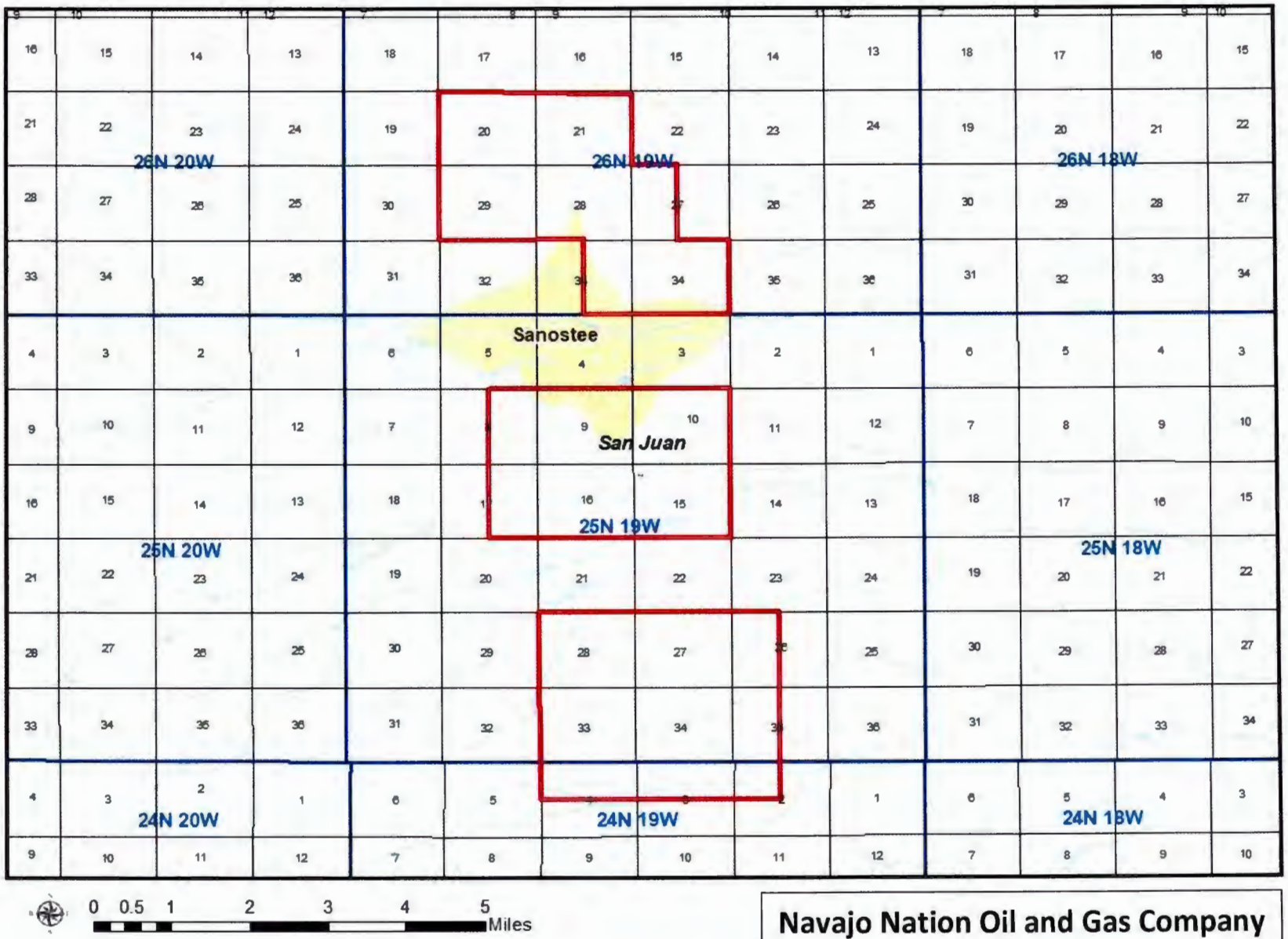
By: _____ 6/29/21
James R. McClure, Chief Executive Officer Date

CERTIFICATE OF APPROVAL

APPROVED PURSUANT TO THE INDIAN MINERAL DEVELOPMENT ACT OF 1982:

By: _____
Regional Director
Navajo Region
Bureau of Indian Affairs
U.S. Department of the Interior

Date: _____



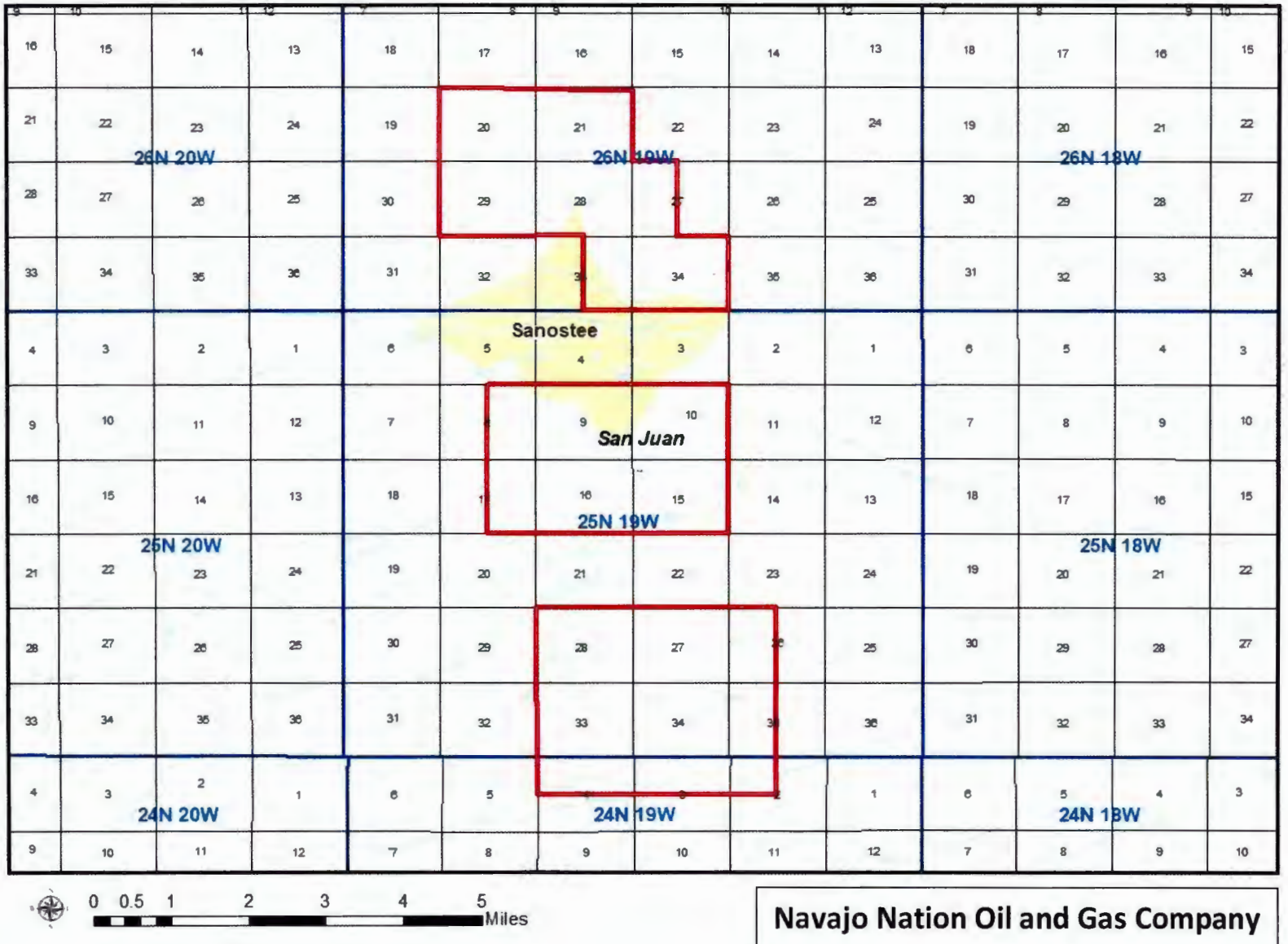
Navajo Nation Oil and Gas Company

Porcupine Dome

Exhibit A - Reference Map

May 27, 2021

Attachment A



Navajo Nation Oil and Gas Company

Porcupine Dome

Exhibit A - Reference Map

May 27, 2021

EXHIBIT
A-1

PROGRAMMATIC ENVIRONMENTAL ASSESSMENT OF THE PORCUPINE DOME PROJECT FOR NAVAJO NATION OIL & GAS COMPANY SAN JUAN COUNTY, NEW MEXICO

SUBMITTED TO THE
DEPT. OF INTERIOR FOR NEPA REVIEW

LEAD OFFICE: BUREAU OF INDIAN AFFAIRS
AGENCY: SHIPROCK
CHAPTER: SANOSTEE

TOPOGRAPHIC MAPS:
SANOSTEE EAST & TSIN-NAS-KID

Proposed By:
NAVAJO NATION OIL & GAS COMPPANY
50 NARBONO CIRCLE WEST
ST. MICHAELS AZ 86511

Prepared by
BRIAN WOOD

JUNE 14, 2021

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1.0 PURPOSE OF AND NEED FOR ACTION

1.1 SUMMARY OF PROPOSED ACTION

Navajo Nation Oil & Gas Company (NNOGC) of 50 Narbono Circle West, St. Michaels, AZ 86511 has negotiated a Minerals Agreement ("Agreement") with the Navajo Nation as allowed under the Indian Mineral Development Act of 1982. Bureau of Indian Affairs (BIA) approval of the Agreement would give NNOGC the exclusive right to explore for and produce oil and gas on 13,275.187 acres ("Acreage") in San Juan County, New Mexico. Land details are:

T. 24 N., R. 19 W.
NW4 Section 2
N2 Section 3
N2 Section 4

T. 25 N., R. 19 W.
all Sections 3 & 4
E2 Section 5
E2 Section 8
all Sections 9 & 10
all Sections 15 & 16
E2 Section 17
W2 Section 26
all Sections 27 & 28
all Sections 33 & 34
W2 Section 35

T. 26 N., R. 19 W.
all Sections 20 & 21
W2 Section 27
all Sections 28 & 29
E2 Section 32
all Sections 33 & 34

The Acreage is divided into two tracts a mile apart. The north tract covers 9,274.985 acres. The south tract covers 4,000.202 acres.

The next step in the process is BIA approval or disapproval of the agreement, in whole or in part. This constitutes a Federal action under the National Environmental Policy Act. BIA approval, whether in whole or in part, will not be a blanket approval. Subsequent actions (e. g., geophysical projects, wells, pipelines, etc.) will require project specific applications, archaeology and biology inspections, NEPA reviews, and Tribal and Federal approvals.

This document was developed, and future documents will be developed, in accordance with the National Environmental Policy Act (NEPA). Numerous government agencies, depending on the project, may be involved before ground disturbance can be approved. These agencies include the Navajo Nation (Environmental Protection Agency, Historic Preservation Department, Fish and Wildlife Department, Natural Heritage Program, Minerals Department, Department of Justice, General Land Development, Project Review Office, Resources Committee), Bureau of Land Management, Bureau of Indian Affairs, U. S. Army Corps of Engineers, San Juan County, New Mexico Oil Conservation Division, etc.

Other national and Tribal statutes, regulations, and executive orders considered in the preparation of this Programmatic Environmental Assessment and future NEPA documents include:

- Indian Minerals Development Act of 1982 (25 USC 2101-2108)
- Resource Conservation and Recovery Act of 1976, as amended by the Hazardous and Solid Waste Amendments of 1984 (42 USC 3251)
- Environmental Justice (Executive Order 12898)
- Floodplain Management (EO 11988)
- Protection of Wetlands (EO 11990)
- Endangered Species Act (42 USC 1531)
- Migratory Bird Treaty Act of 1918
- National Historic Preservation Act (16 USC 470)
- Protection of Historic Properties (36 CFR 800)
- Navajo Nation Cultural Resources Protection Act (NNCRPA CMY-19-88)
- Navajo Nation Policy of Protection of Jischaá: Graves, Human Remains, and Funerary Items

- Navajo Nation Policy to Protect Traditional Cultural Properties
- Clean Air Act (42 USC 7401)
- Clean Water Act (33 USC 12510

The preceding list is not exclusive. However, it does list the more significant laws, regulations, and executive orders that would be considered for future actions associated with exploration and development.

The issuance of a "Finding of No Significant Impact" statement for the Programmatic Environmental Assessment from the BIA does not authorize the applicant to engage in ground disturbing activities. This cannot happen until further site-specific NEPA analysis is completed. This would include site-specific cultural and biological surveys in compliance with the National Historic Preservation Act and the Endangered Species Act, respectively. The proposed action outlined in this environmental analysis will merely encumber the land for potential oil and gas development through a lease.

BIA approval of the Agreement will give NNOGC the right and obligation to explore for and produce oil and gas. Some of the acreage has previously been leased (14-20-603-515, 14-20-603-516, 14-20-0603-8380, 14-20-0603-8383, 14-20-0603-2971 N00-C-14-20-4155s, and NOG-8202-1116) for oil and gas. NOG-8202-1116 was a 252,625 acre Agreement approved in 1988. None of the 13,275.187 acres is currently leased for oil and gas.

Seven oil and gas wells have been drilled on the Acreage. Two found oil and/or gas. First well was drilled in 1959. The last well was plugged in 1982. All targeted the Cretaceous (≈350′ deep) or deeper formations. Deepest well was 6,850′, which bottomed in the Devonian. A 6,298′ deep well bottomed in the Pre-Cambrian granite. Age of productive formation was the Devonian. The Acreage overlaps one NM Oil Conservation Division designated oil and gas field – Tom Devonian.

Maximum projected development will be 1 well pad per quarter section, or 83 well pads for the 13,275.187 acres. Spacing is a function of pressure, production history, time, depth, and other factors (e. g., terrain, archaeology, land use, special flora or fauna species).

A well can be completed in multiple zones. This is called a dual completion and results in fewer wells. However, due to reservoir characteristics (e. g., different pressures, temperatures, or fluids), it is not possible to complete all wells as dual producers.

To best assess cumulative impacts, it will be assumed 83 well pads and 1 compressor pad may eventually be built on the Acreage. There could be multiple wells on each pad (i. e., two or more well bores on one pad), but a maximum of 83 well pads are projected. Well pads will be ≈2.24 acres depending on depth, type (horizontal or directional well will need

more space than a vertical well), drill rig, and the number of wells on each pad. The wells could be dual completions (i. e., 2 zones in 1 well bore).

Seven oil or gas wells have been drilled to date on the acreage. Five failed to find any oil or gas. All the wells are now plugged and abandoned (P & A). Therefore, the 83 well pads projected should be viewed as a maximum, rather than as a minimum. The location of the well pads will be a function of geology, terrain, cultural resources, biological resources, etc. The number of wells drilled is a dynamic function of gas and oil prices, competing energy prices, price stability, demand (local, national, and international), taxes (energy, severance, property, sales, income), funding and capital, attraction of competing investments (bonds, stocks), attraction of competing lands (other Trust lands, states, or countries) for investment, fluid quality (waxy crude and high water volumes raise costs), reservoir extent, technology, regulatory practices, success rate, terrain, cultural and biological resources, etc.

EXPLORATION

Exploration starts by reviewing maps, well histories, geochemical and geophysical data, well logs, geology studies, and other research. Using this data, scientists develop maps to describe strata and structures which may be found while drilling. Plan and profile view maps show the relative position, area, and depth of underground strata. A model may be made from the data to indicate the most promising site(s) to drill.

Based on past results in the Acreage, the most likely target are Devonian age (≈390 million years ago) rocks. They are composed of limestone and dolomite and have produced helium, methane, and oil.

A well which finds small amounts of oil may not be economic to operate if large volumes of water must be pumped and disposed. For example, 51 barrels of water were produced for each barrel of oil in the Beautiful Mountain Field.

Geophysical (aka, seismic) data may provide the information which will indicate where, if any, stratigraphic reservoir rock may be found. Terrain, geology, land uses, economics, and technology determine which seismic energy source will yield the best data under given circumstances.

Seismic lines may be run to provide a two or three-dimensional view of the subsurface. Two-D seismic lines have the source and receivers in line. Three-D seismic lines have the source and receiver lines at right angles. Seismic data can map a possible reservoir, but only drilling will reveal what is actually in a reservoir.

An application package detailing where and how seismic lines will be run must be approved before seismic data acquisition operations start. Typical requirements include conducting archaeology and Threatened & Endangered (T & E) species surveys, writing an environmental assessment (EA), obtaining the consent of the grazing permittees, and paying

fees. The application package will be submitted to the Navajo Nation and BIA for review and approval.

First action on the ground is to survey (flag, stake, and measure with GPS) the source lines, receiver lines, and access routes to the lines for archaeologists and biologists to inspect. This is authorized by the Navajo Nation via a Walk-On Permit.

A survey crew can include a dozen or more people and half a dozen pick-up trucks or all-terrain vehicles (ATVs). ATVs and any other off-road vehicles will be power washed off the reservation at a commercial car wash to avoid the introduction of noxious weeds. Surveyors flag the lines, specific points on the lines, and off-line access routes. This phase is only to map source and receiver line routes and show archaeologists and biologists where to inspect. They will inspect the lines, routes, and buffer zones on each side of the lines and routes. Actual seismic data acquisition operations will not occur until after full project approval by the Navajo Nation and BIA.

This is a dynamic process. Archaeologists and biologists follow the surveyors and move lines or routes around any significant locations. After a line or route is moved, then the survey crew flags the new line or route. Once all inspections and flagging are complete, then the survey crew generates a map and measures the length of each line or route. Archaeologists and biologists then use the surveyors' map and measurements to prepare their reports. The same information is used in the preparation of the application and EA.

An archaeology report is submitted to the Navajo Nation Historic Preservation Department and a biological assessment (BA) is submitted to the Navajo Natural Heritage Program at the completion of the flagging and inspections. An EA, including the archaeology report and BA, is prepared. Surface disturbance is not allowed until the EA is reviewed, a FONSI (Finding of No Significant Impact) issued, and the permit approved by the Navajo Nation and BIA.

Seismographs record variations in how rocks reflect energy waves. Reflections vary with energy source and rock type, depth, density, and dip. Underground explosions or vibrations generate the energy waves.

The reflected waves are received at the surface by fist size devices called geophones. Geophones convert sound waves into electric signals that, via cables, are recorded. The data is processed by computers to display graphs of geologic structures and strata below and around a seismic line.

Energy wave source will be determined by target depth, terrain, proximity to homes and utility lines, environmental concerns, and type of data sought. Vibrators and controlled underground detonations are the most common sound wave sources. Vibrators are usually cheaper, but can have poorer resolution. On the other hand, vibrators may be preferable to drilling shot holes in a developed area where underground utilities could be cut by a drill.

Vibrators also offer more operational flexibility during data acquisition than shot holes.

Vibrator trucks emit energy waves by vibrating a heavy plate set on the ground. (The plate is not dropped.) They normally travel in groups of three or more. The plates are simultaneously vibrated. A truck can hydraulically exert more than 30,000 pounds of energy to send a sound pulse into the ground.

Shot holes are another source of energy waves. Five-inch diameter holes are drilled to bedrock and loaded with dynamite. Holes are drilled 110' to 330' apart by a truck mounted drill. The truck minimizes impacts by being self-leveling. A pad is not bladed. Fewer drill trucks can be used than vibrator trucks for a similar project. NNOGC ran a 3-D seismic project at Desert Creek, Utah in 2019. Three percent of the source point were shot holes.

One shot hole is electrically detonated at a time. The detonation, if audible at all, is a muffled thump at the surface. The only evidence of a shot hole is the blasting cap wire. No crater results. Blasting cap wires are cut off below grade and the hole filled with soil and rock to the surface. If water is encountered, then the hole is plugged with bentonite (clay that expands when wet). If artesian water is encountered, then the hole is plugged with cement. Dynamite is kept in a federally (Bureau of Alcohol, Tobacco, and Firearms) approved locked, guarded, and fire and bulletproof steel box posted with warning signs. The location could be on or off the Acreage. Tribal, county, and state police are notified of its location.

Once an area is ready to be shot or vibrated, geophones and cables are strung along the lines to be recorded. Cables connect seismic recorders in a truck or portable hut (aka, the doghouse) with geophones. The doghouse is in the center of as much as a four-mile long line.

Geophones are jug shaped plastic cases containing a magnet, wire coil, and spring. Wires lead from the geophone to the doghouse. The difference in movement between the coil and magnet created by a reflected signal generates an electric current. The electric current is recorded as a series of lines on the seismic display in the doghouse.

A geophone crew lays out the cables. The cable, similar to a TV cable, is a half inch in diameter and can be over two miles long. Once a record had been made of the reflected signal, then geophones and cables are moved along the line. This procedure is repeated until the survey is complete.

After all the data has been recorded, a crew collects the cables, geophones, and survey markers. A reclamation crew contours, harrows, water bars, rakes out ruts, and seeds to BIA or Tribal specifications. A botanist approved by the Navajo Natural Heritage Program will make an inspection within one month of the completion of operations and an annual inspection until reclamation and weed control are satisfactory. If weed control is necessary, then NNOGC will contract with a Tribally approved herbicide applicator.

NAVAJO PETROLEUM

WELL CONSTRUCTION & DRILLING

Once a potential well site is determined, NNOGC will notify the Navajo Nation of its intent to survey. A registered land surveyor will locate the well site and mark it with a T-post (steel fence post), wood stakes, and flagging.

NNOGC will then schedule an on-site inspection. Representatives from the Navajo Nation, NNOGC, and BIA will inspect the project together. The on-site goal is to form a consensus on the suitability of the project and how to avoid or mitigate impacts. This may cause a well, road, pipeline, or power line to be moved.

The project will also be inspected for archaeology, special species, and special species habitat. A minimum 50′ buffer zone beyond the construction footprint will be inspected. Raptor surveys will cover a mile radius. The archaeologist submits a report for approval by the Historic Preservation Department and BIA. Biologists submit reports or a BA for approval by the Navajo Natural Heritage Program.

Mitigation measures identified at or after the on-site inspection are included in a site-specific EA, Application for Permit to Drill (APD), or attached to the APD as conditions of approval by the Navajo Nation, BIA, or BLM. An APD has two parts, down hole program and surface use program.

A down hole program describes at what depth formations will be found; whether they hold water, oil, gas, or other minerals; how aquifers will be protected; how much pressure will be found and how it will be controlled; what type of casing and cement will be used to guarantee well bore integrity and protect aquifers; and what evaluations will be used to detect oil or gas.

A surface use program describes roads and how they will be built, upgraded, and maintained; where and what type of production equipment will be installed; water source; construction methods and material for the road, pad, and reserve pit; waste disposal; and reclamation.

Maximum use will be made of existing roads to minimize disturbance. Travel surface must be ≥12′ wide to permit drill rig passage. A 20′ wide construction corridor allows for crowning, ditching, and culvert installation. The road may be flat bladed for drilling, and crowned and ditched if production results. The latter is usually postponed until production results to justify the extra land use. Gates and cattle guards will be installed in functional fences.

Typically, ≈25 trucks travel to a well daily during drilling. One to two trucks visit a well daily during production. Roads will be maintained and repaired as needed. Sandy or clay roads may require rock surfacing. Rock would be hauled from existing gravel pits near Kirtland.

NAVAJO PETROLEUM

Well site construction starts by grading and stockpiling topsoil for reclamation. Construction will stop when wet soil results in ruts ≥6" deep. Well site (pad and pit) size depends on well depth and type, rig size, drill fluid, and completion plan. Largest well site built on the acreage will be ≈300' x ≈325' (2.24 acres). Deeper wells need larger sites because the drill rig is larger and more material is used. For example, a Devonian well would need more than 6,000' of drill pipe, more than 6,000' of casing, and more than 6,000' of tubing. Completion operations (well stimulation) can use more space than a drilling.

Camp trailers for a drilling supervisor, tool pusher, mud logger, and other service company personnel and equipment will also be on site. Sewage is disposed of in chemical toilets and holding tanks and hauled to the Farmington waste water treatment plant. Trash is placed in a portable metal trash cage and hauled to a county transfer station in Kirtland, NM.

A reserve pit will be dug within the well site perimeter. Pit size is a function of well depth (deeper well needs a larger pit), drilling medium (air drilling uses a smaller pit), and geology (water producing zones may need a larger pit). A shallow well pit can be 10' x 65' x 140'. A deeper well may need a 12' x 100' x 200' pit. A horizontal well will need an even larger pit (e. g., 12' x 125' x 250') to handle the increased volume of mud. Pit will be within the 300' x 325' well site perimeter.

The pit holds drilling mud, rock cuttings, and water found while drilling. A pit usually has half of its capacity dug below original ground level for structural integrity. The pit will be lined with commercial bentonite and/or ≥20 mil plastic. The pit will be fenced to keep out livestock and wildlife.

A flare or blow pit may be built near the reserve pit and ≥100' from the well head if gas is expected. This pit is ≈5' deep and ≈12' x ≈12'. Gas is piped into it and ignited to prevent an uncontrolled fire during drilling, completion, or testing. Air drill cuttings are also blown into it.

The drill rig moves in when the road, pad, and pit are ready. A shallow Dakota well can take a day or two to drill and a week to complete. A deep Devonian well can take two weeks to drill and a week to complete. A horizontal well takes longer to drill than a vertical well of the same depth. Drilling takes longer if there is a problem (e. g., drill bit twists off). Drilling goes on around the clock until total depth is reached. Otherwise, drilling mud can deteriorate and lose its effectiveness.

All wells drilled to date on the Acreage were vertical. Directional drilling may be used on the Acreage due to the terrain, houses, and development needs. Horizontal drilling can expose more of a reservoir. For example, the average perforated interval on the Acreage is 5'. If a reservoir had a 5' thick pay zone, then a vertical well would expose 5'. However, a horizontal well could expose hundreds or thousands of feet of that pay zone. Horizontal

wells are not as common as vertical wells because of geology, greater cost, and drilling difficulty.

A diesel-powered drill rig is ≈120′ tall. While drilling a ≤20″ diameter hole, a rig pump circulates mud down the drill pipe and back out the top of the well and into the reserve pit. Drilling mud is a fresh water based mix of clay, bentonite, barite, and other material (e. g., cedar bark to control lost circulation) blended in steel tanks at the drill rig.

Approximately one barrel of water is used for each foot of well depth. Thus, a 6,500′ deep well needs ≈6,500 barrels (0.83 acre-foot). Water will be trucked from NTUA or existing state approved water wells on private land at Waterflow.

If a salt zone is expected, then a brine based mud system may be used. Brine would be hauled from an existing lined saltwater evaporation pond northeast of Bluff Utah, brine wells near Moab, or mixed on site.

Drilling mud has four main functions. It lubricates the drill bit, lines well walls to hinder sloughing, transports drill cuttings up and out of the hole, and counteracts formation pressures. Mud is pumped back to the surface and into the reserve pit where it drops the drill cuttings. Cuttings are rock fragments. After drilling is finished, the reserve pit is fenced on the fourth side and allowed to evaporate before it is filled and reclaimed. Complete evaporation can take a year.

In a delicate zone (e. g., shale), compressed air or nitrogen is used instead of mud to minimize formation damage. Unlike mud, gases will not cause shale or clay to swell. Swelling can plug a zone. Air drilling uses compressors and a mister. Compressors increase pressure enough to push cuttings to the surface. A mister sprays water on the cuttings to control dust as the cuttings blow into a pit.

If a reserve pit cannot be built, then steel mud tanks will be used instead. Tank contents will be hauled to a state approved disposal site near Bloomfield.

A drill rig periodically stops to set and cement casing. Casing is steel pipe which lines the well bore. Cement is pumped down the interior of the casing and back up and between the casing and well bore walls. Casing prevents rock from sloughing into the well bore. Cement holds casing in place and prevents fluids and gases in different zones from mixing. Fresh water zones are cemented off to prevent contamination.

Surface casing (8.625″ – 13.375″ outside diameter) is set from the surface through all shallow fresh water zones. Surface casing setting depth of the wells drilled to date on the Acreage ranged from 50′ to 388′. The entire surface casing interval will be cemented to the surface. Two wells set intermediate casing. Depths were 1120′ and 1724′. Intermediate casing is typically cemented to the surface. Production casing will be cemented to the surface, or cement will be circulated to cover at least the bottom 200′ of the casing above it.

Once total depth is reached, a decision is made to complete the well or plug and abandon (P & A) it. The decision is based on an evaluation of cuttings, cores, and logs. Logs are cylindrical devices which are lowered into the well bore and measure rock and reservoir characteristics.

If the decision is made to P & A, then the well is cemented 50′ above, through, and 50′ below all water or petroleum zones. A 4′ tall steel pipe marks the well bore. Once the pit dries; then the pad, pit, and new road are contoured, topsoil spread, harrowed, water barred, and seeded in accordance with stipulations.

On occasion, artesian pressure flows fresh water to the surface. If requested in writing in advance, such a well can be plugged to just below the bottom of the fresh water zone (i. e., seal off any potential hydrocarbon zones). Two "dry" holes were converted to water wells. Navajo 3 (30-045-05466) was converted to a windmill. Navajo 1 (30-045-05552) was converted to an NTUA water well.

If a well is to be completed as a producer, then a string of ≈5.5″ diameter casing is run. This is called the long string or production string. It is usually cemented back to the surface, or at least to overlap the bottom 200′ of the surface or intermediate casing. At a minimum, enough cement will be run to cover all water and hydrocarbon bearing zones.

Casing and cement are perforated where they cross potentially productive zones. Such zones are identified from logs and drill cuttings. After perforating, the zone is acidized or hydraulically fractured. Such a procedure is called stimulation.

Acidizing uses a ≈15% HCl acid solution (vinegar is 5-10% acetic acid) to partially dissolve limestone, enlarge pore space, and increase oil and gas flow. Fracturing pumps propping material (e. g., special sand or ceramic beads) under high pressure into sandstone or shale. High pressures fracture the rock. Propping agents keep fractures open and allow more flow. Well stimulation in the Acreage historically has been acid.

Tubing is next lowered into the well. Tubing is ≈2.5″ diameter steel pipe through which an oil-gas-water emulsion comes to the surface. A rubber doughnut shape device called a packer is placed around tubing to prevent gas or fluids from traveling up the inside of the casing. From outside to inside are rock, cement, casing, packer, and tubing. There can be multiple layers of casing and cement where different casing strings overlap.

If there is enough natural pressure, the gas-oil-water emulsion flows to the surface on its own. Otherwise, a pump is installed. Pumps will ultimately be needed as reservoir pressure declines over time. Pumps will be powered by electricity, propane, or gas from the well.

POWER LINES

Electric lines (three and single-phase distribution) already cross the Acreage. NNOGC could tie into the lines to power pumps. The same approval process (archaeology and biology inspections, EA, etc.) used for an APD applies to power lines.

Power lines will be either be buried or strung overhead on ≈35′ high wood poles. Anchors will be set at ends and angles. Construction will use four-wheel drive trucks and six workers. No access will be bladed. All travel will be on existing roads or cross country on the power line corridor.

Six-foot deep holes will be bored with a truck mounted auger. The auger is on a ≈20′ long boom. The boom extends from a truck so it need not park directly over a hole. Cross pieces and insulators will be mounted on poles in the field. Once assembled, the raptor safe structure will be set in its hole with a truck mounted crane. The hole is filled and tamped.

Next, a pull line will be strung along the route by a truck. Workers run the pull line through pulleys on the cross piece. Finally, conductor or ground wire is attached to a pull line and pulled through the pulleys from a reel truck by a winch truck. The route is cleaned and reclaimed as needed.

PIPELINES

Once on the surface, the emulsion will be piped to a separator or heater-treater on the well pad that uses heat, turbulence, and gravity to break apart the emulsion into its water, oil, and gas constituent parts.

Gas next goes to a dehydrator or meter. Exact sequence and equipment depend on the gas character. After metering, gas will be compressed and piped to market. NNOGC has a ≈4″ O. D. gas line at the Tocito Field. That field is ≈4-1/4 miles northeast of the Acreage. It could be used to pipe methane east to Enterprise or other markets.

Oil will be piped to and stored in steel tanks on a well pad. From the pad, the oil will be trucked from the pad to a tank farm in NAPI. A crude oil pipeline leads southeast from the tank farm to Jal, NM.

Produced water is too salty (61,215 - 217,727 ppm TDS in 5 wells at Beautiful Mountain) for surface discharge. Water will be pumped into saltwater disposal (SWD) wells. There are 80 active SWD wells in San Juan County, NM. NNOGC has a disposal well 5.4 miles east of the north Acreage tract. Over 478,000 barrels have been disposed in the >6,200′ deep zone since 1994.

A SWD well is the reverse of a producing well. Water is pumped into a formation, instead of out. If water is pumped into the same formation from which it came, then it can increase oil production. Or, produced water may be injected into an unproductive zone. In any event, fresh water zones are protected, casing strings are run and cemented, target zone(s) perforated, packer set, and tubing hung. The Navajo Nation Environmental

Protection Agency Underground Injection Control Program has primacy in approving SWD and injection wells.

If NNOGC builds a pipeline or power line on the Acreage, then it will be authorized by an APD or Sundry Notice. If it is built by another company or off the Acreage, then it will be authorized by a right-of-way. The same approval process (archaeology and biology inspections, EA, etc.) used for an APD applies for off Acreage or non-NNOGC lines.

Pipelines will be ≤8" diameter. They will be buried ≥36" deep if freezing is a problem, or deeper if crossing a road, pipeline, or wash. Disturbed width will be ≤40'. Pipelines can be steel, fiberglass, composite, coiled tubing, or high-density polyethylene (HDPE). HDPE pipes can be installed by plowing.

Surface pipes can be laid if freezing (paraffin in oil and liquids in gas) or vandalism is not a problem. Oil and gas composition vary from well to well, even in the same field. Surface pipelines disturb less area less intensively.

Surface line construction is simple. Pipe is trucked, unloaded, and joined along its route. If the terrain is too rugged, then pipe will be strung together and joined at intervals. Joined sections are then pulled into place by a winch. Wood four by fours may be set under steel pipe in rocky areas to protect the pipe. A surface line disturbs less area than a buried line. Maximum disturbed width can be ≤25'. By contrast, buried lines need a ≥35' wide working area.

Burying pipe is more complex. Construction begins by blading a corridor to create a safe flat work surface so equipment does not roll over. Once a way has been bladed clear, a trenching machine excavates a ≈18" wide by ≈42" deep ditch. If it cannot dig effectively, a tracked backhoe can assist. If the backhoe slows, a bulldozer ripper or rock saw can loosen a trench.

When the corridor is ready, the pipe will be unloaded and joined. After joining, the pipe will be lowered into the trench. Dirt or sand may be used to pad pipe in rocky areas. A typical source of padding dirt is dry silt from a stock pond. The pipe will then be flanged up and tested. If there are no leaks, then the trench will be filled and compacted.

Pipelines may be placed (cased) inside steel pipe to cross BIA Roads. Casing top will be ≥36" below the bottom of the borrow ditch. Casing vent pipes and warning signs will be outside the borrow ditch back slope. Or, instead of casing, thicker wall pipe may be used at the crossing. Detours around open trenches will be provided during construction.

Once installed, pipelines are pressure tested for leaks. Trucked in fresh water, gas from a well, or nitrogen delivered by tank truck will be pumped under pressure into the pipe. (Nitrogen, an inert gas, is ≈80% of the atmosphere.) Water will be hauled from NTUA. (Water from an arroyo would be too dirty.) Water will be discharged into an NNOGC reserve pit. Gas will flow to market. Nitrogen will be vented to the atmosphere.

After pipe testing is completed, the corridor will be reclaimed. Surface lines may need nothing more than gathering wood braces. Buried pipeline corridors must be cleaned, contoured, water bars built, harrowed, seeded (mix and method determined by the Navajo Nation or BIA), and stockpiled brush and rock spread on disturbed areas to control erosion.

Pipeline warning markers with emergency phone numbers will be installed as the final step. Markers will be inter-visible on buried lines and placed on both shoulders of all road crossings. The ≈48" high markers are usually fiberglass.

Pipelines may have pig launchers and catchers, which are above ground extensions of the pipe. A pig cleans and/or analyzes the inside of a pipeline. An example of a pig is a hard rubber ball. It can be pushed through by pressure.

SECONDARY & TERTIARY RECOVERY

Production and pressure declines as a field ages. For example, the peak production year for the Aneth Field in Utah was 1958 when 10,026,375 barrels of oil were produced. Production in 2020 was 3,137,411 barrels.

Decline rates can be slowed or reversed by secondary and tertiary recovery. Secondary recovery injects gas or water into perimeter wells to push oil to a central well. Water has been injected in the Aneth Field since the 1960s. Tertiary follows secondary and injects a different medium, e. g., carbon dioxide. Carbon dioxide has been injected in the Aneth Field since the 1980s.

When a well is finally depleted, it will be P & A and reclaimed as previously described. Depletion can happen in days or take decades. The one producer on the Acreage had a 4-year life span.

REGULATORY COMPLIANCE

This document was developed in accordance with the National Environmental Policy Act (NEPA). In addition, consultation was sought with the Navajo Nation Natural Heritage Program, Navajo Nation Historic Preservation Program, and Navajo Nation Minerals Department. Other national statutes, regulations and executive orders considered in the preparation of this Programmatic Environmental Assessment include:

- Indian Minerals Development Act of 1982 (25 USC 2101-2108)
- Resource Conservation and Recovery Act of 1976, as amended by the Hazardous and Solid Waste Amendments of 1984 (42 USC 3251)
- Environmental Justice (Executive Order 12898)
- Floodplain Management (EO 11988)
- Protection of Wetlands (EO 11990)

- Endangered Species Act (42 USC 1531)
- Migratory Bird Treaty Act of 1918
- National Historic Preservation Act (16 USC 470)
- Protection of Historic Properties (36 CFR 800)
- Navajo Nation Cultural Resources Protection Act (NNCRPA CMY-19-88)
- Navajo Nation Policy of Protection of Jischaá: Graves, Human Remains, and Funerary Items
- Navajo Nation Policy to Protect Traditional Cultural Properties
- Clean Air Act (42 USC 7401)
- Clean Water Act (33 USC 12510

This list is not exclusive. However, it does list the more significant laws, regulations, and executive orders that would be considered for future actions associated with exploration and development. The issuance of a "Finding of No Significant Impact" statement for the Programmatic Environmental Assessment from the Bureau of Indian Affairs does not authorize the applicant to engage in ground disturbing activities until further site specific NEPA analysis is completed. This would include site specific cultural surveys and biological in compliance with the National Historic Preservation Act and the Endangered Species Act, respectively. The proposed action outlined in this environmental analysis will merely encumber the land for potential oil and gas development through a lease.

1.2 PURPOSE AND NEED FOR ACTION

The purpose of the project is to explore for and develop oil and natural gas. Existing production liquidates itself if it is not replaced. This applies as much to America, the Navajo Nation, and State of New Mexico, as it does to NNOGC.

The primary need is for NNOGC to grow its production. NNOGC produced 7,005 barrels of oil and 7,233 Mcf of gas in New Mexico in 2020. This is 77% less oil than NNOGC's peak New Mexico year in 1995 and 96% less gas than its peak New Mexico gas year in 1996. Oil and gas have been found on the Acreage. NNOGC believes its expertise and new technology will allow it to find more oil and gas.

The global need is based on increasing demand for oil and gas. More people are living longer and using more energy on a per capita basis. There is a positive correlation between energy use, life span, and living standards.

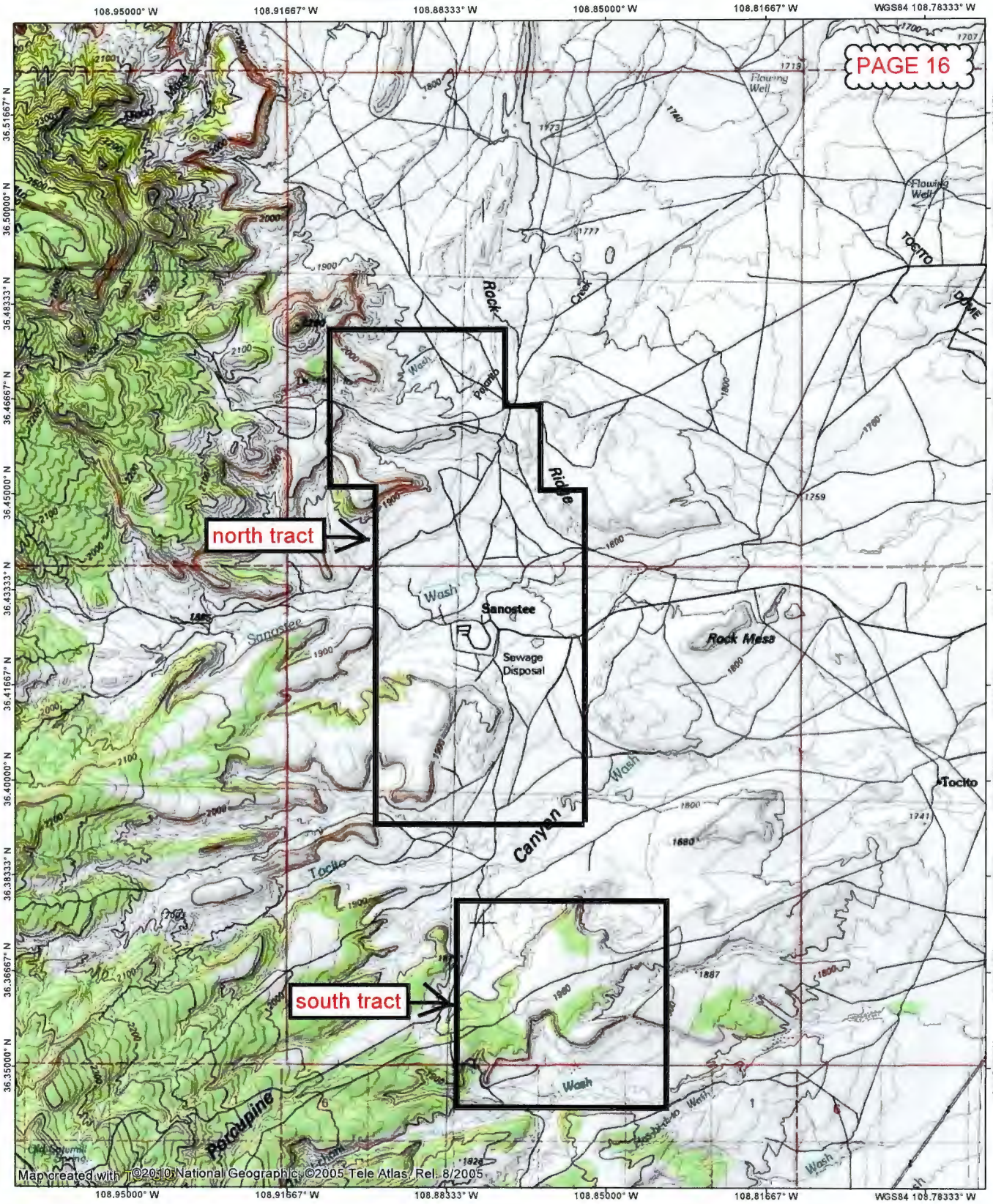
1.3 VICINITY MAPS

The project extends 4 miles north and 5-1/2 miles south of Sanostee. It is 7 to 10 miles west of US 491 in western San Juan County, New Mexico. PAGE 17 is a 1" = 10 miles scale map showing the project in relation to state lines. PAGE 18 is a 1" = 1.5 miles scale map showing the project in relation to township lines. PAGES 19 and 20 are 1-1/2" = 1 mile scale composite maps of the 1966 USGS Sanostee East and Tsin-nas-kid, NM quads showing the Acreage boundaries and wells drilled to date. PAGES 21 and 22 are a survey plat showing the distances and bearings of the Acreage perimeter.

1.4 LOCATION

Northwest corner of the north tract is 36.48088°, -108.89874°, NAD 83. Northeast corner of the south tract is 36.37939°, -108.83586°, NAD 83.

TOPO! map printed on 06/12/21 from "Untitled.tpo"



NATIONAL GEOGRAPHIC

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0 1 2 3 4 5 km

TN MN
9°
06/12/21


PAGE 17
north tract
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ROCK
RIDGE
LEGEND
New
Active
HRZ
BHL
P&A
INJ
SWD
Brine
Water
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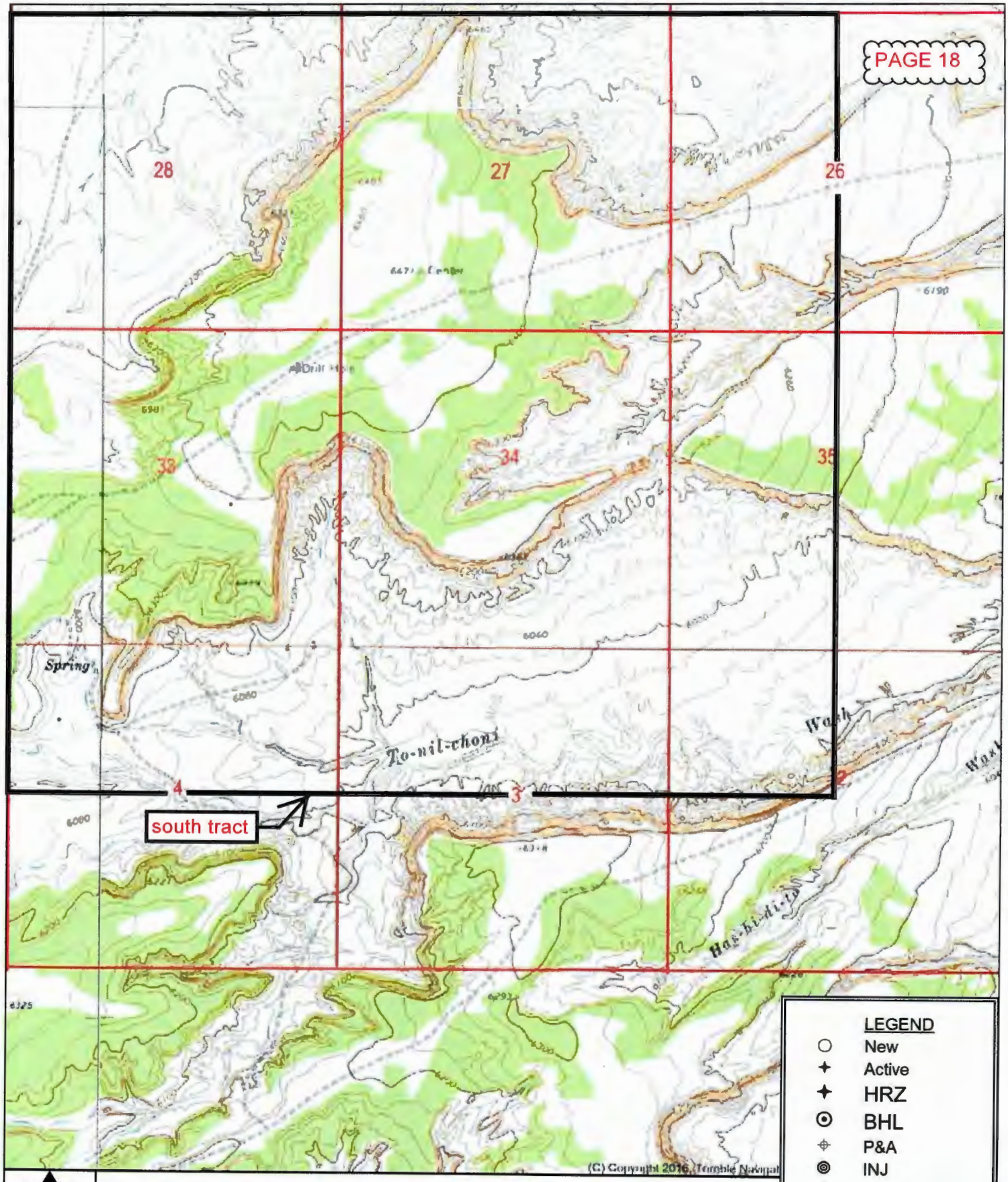
Quad: SANOSTEE EAST
Scale: 1 inch = 2,583 ft.


PAGE 18
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Spring
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south tract
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(C) Copyright 2016 Tomble Navigat
LEGEND
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Active
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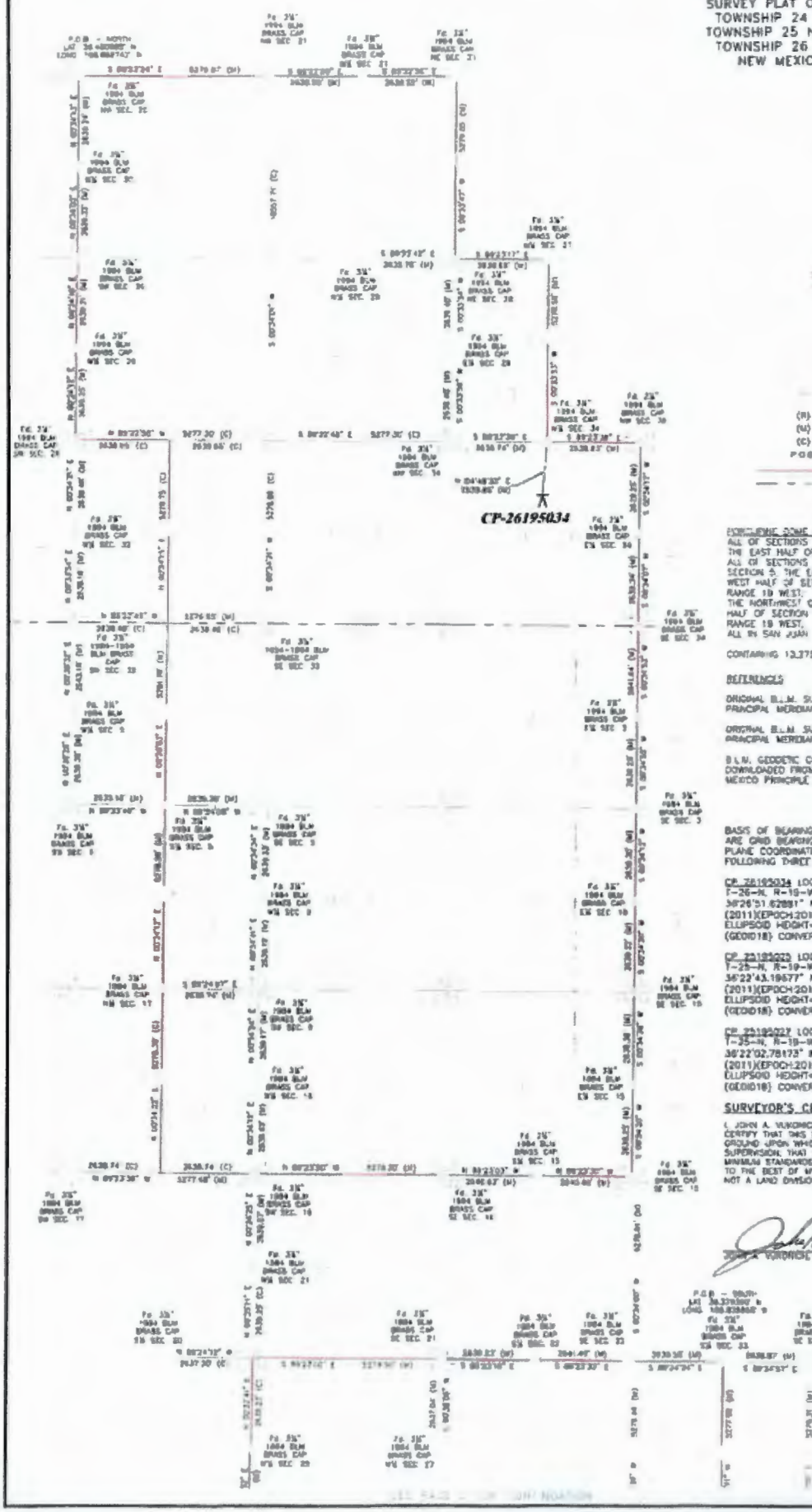
Quad: TSINNASKID
Scale: 1 inch = 2,000 ft.

NAVAJO NATION OIL & GAS COMPANY

SURVEY PLAT OF PORCUPINE DOME LEASE
TOWNSHIP 24 NORTH, RANGE 19 WEST,
TOWNSHIP 25 NORTH, RANGE 19 WEST, &
TOWNSHIP 26 NORTH, RANGE 19 WEST,
NEW MEXICO PRINCIPLE MERIDIAN

PAGE 19



LEGEND

- = FOUND MONUMENT AS NOTED
- = CALCULATED CORNER – NOT FOUND, NOT SET
- = LOCATION SHOWN TAKEN FROM BLM GCDB (TOWNSHIP NOT SURVEYED)
- (R) = RECORD
- (M) = MEASURED
- (C) = CALCULATED
- P.O.B. = POINT OF BEGINNING
- = SUBJECT PARCEL BOUNDARY
- = TOWNSHIP LINE
- = SECTION LINE
- = ONE QUARTER LINE

PORCUPINE DOME LEASE LEGAL DESCRIPTION:
ALL OF SECTIONS 20, 21, 28, 29, 33, 34 THE WEST HALF OF SECTION 27, AND THE EAST HALF OF SECTION 32, TOWNSHIP 26 NORTH, RANGE 19 WEST, ALL OF SECTIONS 3, 4, 9, 10, 15, 16, 27, 28, 33, 34 THE EAST HALF OF SECTION 5, THE EAST HALF OF SECTION 8, THE EAST HALF OF SECTION 17, THE WEST HALF OF SECTION 26, THE WEST HALF OF SECTION 35, TOWNSHIP 25 NORTH, RANGE 19 WEST;
THE NORTHWEST QUARTER OF THE NORTHWEST QUARTER OF SECTION 2, THE NORTH HALF OF SECTION 3, AND THE NORTH HALF OF SECTION 4, TOWNSHIP 24 NORTH, RANGE 19 WEST,
ALL IN SAN JUAN COUNTY, NEW MEXICO, ALL ON NAVAJO TRIBAL TRUST LAND

CONTAINING 13,278.187 ACRES MORE OR LESS

REFERENCES

ORIGINAL B.L.M. SURVEY OF TOWNSHIP 26 NORTH, RANGE 19 WEST, NEW MEXICO PRINCIPAL MERIDIAN AND ASSOCIATED FIELD NOTES DATED APRIL 14, 1897

ORIGINAL B.L.M. SURVEY OF TOWNSHIP 25 NORTH, RANGE 19 WEST, NEW MEXICO PRINCIPAL MERIDIAN AND ASSOCIATED FIELD NOTES DATED JULY 11, 1888

B.L.M. GEODETIC COORDINATE DATA BASE FOR THE STATE OF NEW MEXICO DOWNLOADED FROM WWW.DATA.GOV FOR TOWNSHIP 24 NORTH, RANGE 19 WEST, NEW MEXICO PRINCIPLE MERIDIAN.

BASIS OF BEARING: ALL BEARINGS, DISTANCES, AND ACRES SHOWN HEREON ARE GRID BEARINGS AND DISTANCES FOR THE NAD83, NEW MEXICO STATE PLANE COORDINATE SYSTEM-WEST ZONE-U.S. SURVEY FEET BASED ON THE FOLLOWING THREE OPUS ADJUSTED BASE POINTS:

CP 26195034 LOCATED IN THE NORTHWEST QUARTER OF SECTION 34, T-26-N, R-19-W, N.M.P.M., SAN JUAN COUNTY, NEW MEXICO. LATITUDE 36°26'51.62881" N, LONGITUDE: 108°51'15.22422" W, NAD_83 (2011)(EPOCH:2010.0000)
ELLIPSOID HEIGHT=6100.785 SFT., ELEVATION = 6167.845 SFT. NAVD 88, (GEOID18) CONVERGENCE ANGLE -0°36'23.5800"

CP 25195025 LOCATED IN THE NORTHEAST QUARTER OF SECTION 25, T-25-N, R-19-W, N.M.P.M., SAN JUAN COUNTY, NEW MEXICO LATITUDE 36°22'43.19677" N, LONGITUDE: 108°48'48.86478" W, NAD_83 (2011)(EPOCH:2010.0000).
ELLIPSOID HEIGHT=6037.324 SFT., ELEVATION = 6104.537 SFT. NAVD 88, (GEOID18) CONVERGENCE ANGLE -0°34'53.1700"

CP 25195027 LOCATED IN THE SOUTHWEST QUARTER OF SECTION 27, T-25-N, R-19-W, N.M.P.M., SAN JUAN COUNTY, NEW MEXICO. LATITUDE 36°22'02.78173" N, LONGITUDE: 108°51'30.34307" W, NAD_83 (2011)(EPOCH:2010.0000)
ELLIPSOID HEIGHT=6405.214 SFT., ELEVATION = 6471.677 SFT. NAVD 88, (GEOID18) CONVERGENCE ANGLE -0°36'28.3800"

SURVEYOR'S CERTIFICATION

I, JOHN A. VUKONICH, NEW MEXICO PROFESSIONAL SURVEYOR NO. 14831, DO HEREBY CERTIFY THAT THIS LEASE SURVEY SHOWN HEREON AND THE ACTUAL SURVEY ON THE GROUND UPON WHICH IT IS BASED WERE PERFORMED BY ME OR UNDER MY DIRECT SUPERVISION; THAT I AM RESPONSIBLE FOR THIS SURVEY; THAT THIS SURVEY MEETS THE MINIMUM STANDARDS FOR SURVEYING IN NEW MEXICO; AND THAT IT IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF. I FURTHER CERTIFY THAT THIS SURVEY IS NOT A LAND DIVISION OR SUBDIVISION AS DEFINED IN THE NEW MEXICO SUBDIVISION ACT

JOHN A. VUKONICH, N.M.P.S. NO. 14831 — DATE 6/8/2021

JOHN A. VUKONICH, NEW MEXICO, 14831, PROFESSIONAL SURVEYOR

PAGE 1 OF 2

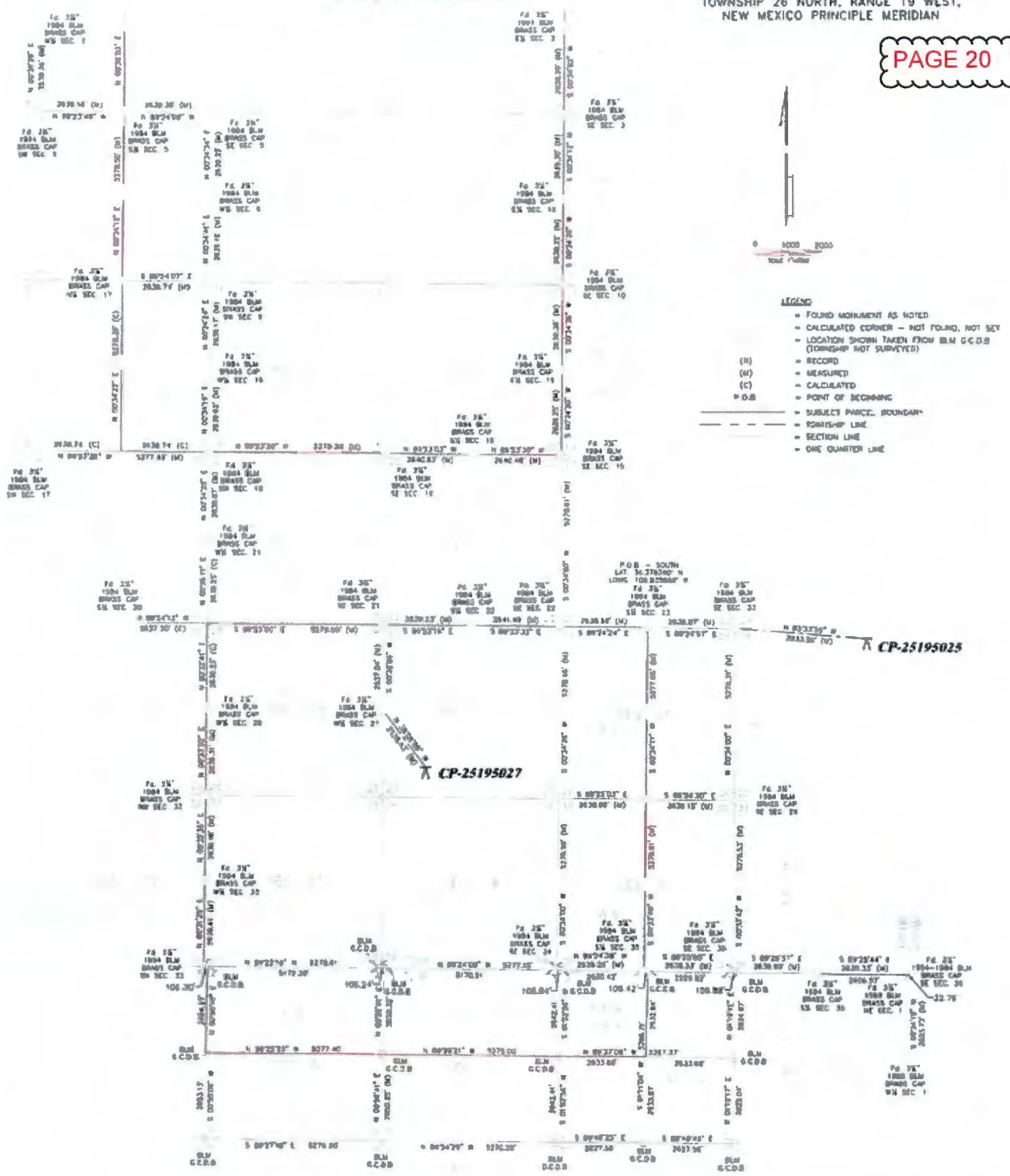
NAVAJO NATION OIL & GAS COMPANY

UNITED FIELD SERVICES INC.

NAVAJO NATION OIL & GAS COMPANY

SURVEY PLAT OF PORCUPINE DOME LEASE
TOWNSHIP 24 NORTH, RANGE 19 WEST,
TOWNSHIP 25 NORTH, RANGE 19 WEST, &
TOWNSHIP 26 NORTH, RANGE 19 WEST,
NEW MEXICO PRINCIPLE MERIDIAN

PAGE 20



PAGE 2 OF 2

NAVAJO NATION OIL & GAS COMPANY

UNITED FIELD SERVICES INC.

2.0 ALTERNATIVES

No action will prevent agreement issuance and subsequent exploration and production. This will deny NNOGC and the Navajo Nation the opportunity to develop oil and gas resources and improve the economy. Opportunity costs include a loss of wages, income, taxes, bonus, rent, royalties, jobs, and other ancillary benefits.

Two wells reported production on the Acreage. If their first day results are typical, then NNOGC would produce the following volumes and generate the following gross revenue on its first day of producing each successful new well. Oil and methane prices are as of May 24, 2021. Helium price is as of 2019.

20 barrels of oil x $62.05/bbl = $1,241.00
73 Mcf helium x $86/Mcf = $6,278.00
+ 83 Mcf methane x $2.89/Mcf = $239.87
first day revenue from 1 well = $7,758.87

If a 12.5% royalty were paid, then the Navajo Nation would receive $969.85 from that first day of production from that one well. (One-eighth (12.5%) royalty is typical BLM rate. Actual Tribal royalty rate is confidential.)

Exploration and production will be geographically or seasonally limited on some parts of the acreage depending on land use (e. g., BIA has a 500' setback from homes and there many family compounds), archaeology, steep slopes (Rock Ridge), drainages (Pajarito, Sanostee, Tocito, To-nil-choni Washes), and biology (Mesa Verde cactus was found in April 2021 in multiple locations). The appropriate limits can be determined during the on-site inspection process. Government review will provide opportunities for site specific mitigation after agreement approval.

Oil and gas exploration and production have occurred on and around the Acreage since 1959 and proven to be compatible.

The proposed action is to approve an agreement that will allow oil and gas exploration and production, following subsequent project specific NEPA analysis, on 13,275.187 acres.

3.0 AFFECTED ENVIRONMENT

3.1. LAND RESOURCES

3.1.1. Topography

There is ≈805′ of relief. High point on the Acreage is ≈6,650′ and the low point is ≈5,845′. Aspect is to the east. Slopes range from flat to vertical. Over half of the Acreage is in the valley of Sanostee Wash. The remainder is in the valleys of Pajarito, Tocito, and To-nil-choni Washes. Shiprock is visible to the north. Rock Ridge marks the northeast side. Chuska Mountain foothills form the west side

3.1.2. Soils

Three main soil units are in the Acreage. Erosion is active and runoff is rapid. While farming occurs in the valley bottoms, none are prime farmlands as classified by the NRCS. Principle soil units are (from high to low):

Weska-Travessilla-Rockoutcrop-Oelop Soil Unit

The Travessilla series consists of very shallow and shallow, well drained soils that formed in calcareous aeolian sediments and material weathered from sandstone. They are found on hills, cuestas, scarps, and mesas. Slopes are 0 - 75%. These soils are comprised of stony sandy loams and channery loams, are well drained, and have high runoff. Permeability is moderately rapid. The Weska series consist of shallow and very shallow, well drained soils that formed in residuum from shale and upland hills, breaks, and mesas, and are comprised of silty clay and clay loams overlying gray brown soft shale. Slopes are 0 - 40%. These soils are well drained with rapid to very rapid runoff and moderately slow permeability. The Oelop series consists of very deep, well drained soils that formed in alluvium and aeolian material derived from sandstone and shale. Oelop soils are found on stream terraces, mesas, plateaus, and alluvial fans. Slopes are 0 - 10%. They are comprised of loams and clay loams, are well drained with medium runoff, and moderately slow permeability.

Persayo-Nataani-Littlehat-Awet Soil Unit

The Littlehat series consists of well drained, moderately permeable saline-sodic soils which are moderately deep to soft bedrock. These soils formed in alluvium and residuum derived from siltstone and shale on summits, footslopes, and backslopes of undulating plateaus. Slopes are 1 - 45 %. These soils are comprised of silt loams, with a soil depth of 20″ – 40″ and rapid runoff. The Persayo series consists of shallow, well-drained soils that formed in

slope alluvium or colluvium over residuum derived from soft sedimentary bedrock. These soils are on hills, basin floor remnants, fan remnants, dip slopes, scarp slopes and escarpments. Slopes are 0 - 65%. They are comprised of silty clay loams have a moderately slow permeability. The Lawet series consists of very deep, poorly drained and very poorly drained soils formed in loamy alluvium on floodplains. Slopes are 0 - 2%. These soils are made up of sandy clay loams and have slow runoff. The Nataani series consists of well drained, moderately permeable soils which are moderately deep to soft bedrock. Nataani soils formed in alluvium, slope alluvium, and residuum derived from siltstone and sandstone on toes of undulating plateaus and structural benches. Slopes are 1 - 9%. They are comprised of fine sandy loams, loams, and gypsiferous silt loams and have slow runoff.

Kimbeto-Farb-Denazar Soil Unit

The Kimbeto series consists of deep and very deep, well drained soils that formed in eolian material, alluvium, slope alluvium, and residuum derived dominantly from sandstone. Kimbeto soils are on summits of plateaus and structural benches, dip slopes of cuestas, and treads of high stream terraces. Slopes are 0 – 5%. These soils are comprised of loamy fine sands, fine sandy loams, and sandy clay loams. Kimbeto soils are well drained with slow runoff and moderate permeability. The Denazar series consists of deep and very deep, somewhat excessively drained soils that formed in eolian material, alluvium, and residuum derived from sandstone. Permeability is rapid or moderately rapid. Denazar soils are on eolian-mantled summits of plateaus and structural benches, and on treads of high stream terraces. Slopes are 0 – 5%. These soils are comprised of fine sands and loam fine sands. They have very slow runoff and rapid or moderately rapid permeability. The Farb series consists of shallow and very shallow, excessively drained soils that formed in residuum, eolian material, colluvium and slope alluvium derived from sandstone and shale. Farb soils are on hills, mesas, cuestas, escarpments, canyons and structural benches. Slopes are 2 – 40%. These soils are comprised of fine sandy loams and sandy loams. Permeability is moderately rapid and runoff is very low to very high.

3.1.3. <u>Geology</u>

The project is on the east side of the Defiance Uplift in the Colorado Plateau Physiographic Province. There is no evidence of large scale mass wasting from landslides or mudflows. Talus slopes are common to the south and west. Most of the Acreage surface is the gray Mancos shale. It was deposited as mud in a marine environment in the Cretaceous Age, ≈100 million years ago. East side of the Acreage is the tan Gallup sandstone that comprises Rock Ridge. It is a marine sandstone of the late Cretaceous (≈75 million years ago

Seven wells have been drilled on the Acreage. The earliest well was drilled in 1959. The last well was drilled in 1970. Depths ranged from 367′ to 6,850′. The average depth was 3,420′. Wells tested Cretaceous, Jurassic, Permian, and Devonian ages. One well bottomed in Pre-Cambrian granite, basement rock, at 6,298′. Two of the wells produced oil or gas, although only one (30-045-05205) produced long enough to be designated a field (Tom Devonian). All seven wells are now plugged, the last in 1982.

There is no other mineral development present on the Acreage.

3.2. WATER RESOURCES

Given the arid climate (6″ annual total precipitation at Newcomb, a dozen miles southeast), most water is sourced from ground water. The Navajo-Gallup 42″ O. D. main line is now under construction along US 491 and will provide more supply.

3.2.1. Surface Water

Half of the Acreage is in Sanostee Wash watershed. The remainder is in the Pajarito, Tocito, and To-nil-choni watershed. All ultimately flow into the Chaco River >13 miles east of the Acreage. Only perennial water present on the Acreage is a spring fed pond in NW4 4-24n-19w.

The U. S. Fish and Wildlife Service National Wetlands Inventory shows Freshwater Forested / Shrub Wetlands along Sanostee and Tocito Washes.

The Acreage is in an area that has not been delineated on the Federal Emergency Management Agency Flood Insurance Rate Map for the 100-year flood plain. Impacts on flood plains typically occur when the topography within a flood plain is substantially modified either by placement or removal of materials within the flood plain. Because approval of the agreement does not authorize construction, the agreement will not substantially modify topography in the permit activity area. Therefore, no impacts on flood plains are anticipated by approval of the agreement.

3.2.2. Ground Water

Cretaceous and Jurassic age sandstones are the main aquifers in the Acreage. Their water is more plentiful and of better quality than more alkaline surface waters and alluvial aquifers. The sandstones had artesian flows due to their recharge area in the higher Chuska Mountains to the west. NTUA has water infrastructure (wells, tanks, and pipelines) on the Acreage.

3.3. AIR RESOURCES

3.3.1. Quality

The acreage is in the Four Corners Interstate Air Quality Control Region. Air quality is classified into one of four categories (I, IA II, or III) for each type of emission. These categories are:

I = Significant violation of Federal standard from several sources exist for part of the region. Special emission controls needed.
IA = Significant violation of Federal standard from a single source (coal fired power plant) exist for part of the region.
II = Better air quality.
III = Best air quality.

San Juan County is in the Class II category for the prevention of significant deterioration of air quality. Air quality parameters range from Class IA for sulfur oxides and particulates to Class III for nitrogen dioxide, carbon monoxide, and photochemical oxidants. These categories indicate air quality is good to very good, with some deterioration allowed.

Closest Class I area is Mesa Verde National Park, ≈50 miles north-northeast. No deterioration is allowed in a Class I area. Overall air quality is good. Nitrogen dioxide, carbon monoxide, and photochemical oxidants are rated best. Violations of particulate and sulfur oxide levels can occur due to coal fired power plants near Waterflow.

Major local pollution sources are wind blowing across bare soil, fallow farms, silty arroyos, and dirt roads.

3.3.2. Visibility

Visibility is usually limited only by the horizon. Most prominent landmarks are Chuska Mountains (≥4 miles west), Shiprock (≥14 miles north-northeast), and Bennett Peak (≥5 miles east). Visibility is most likely to be impaired during spring dust storms.

3.3.3. Climate

The following data were recorded from 1948 - 1971 at Newcomb.

MONTH	PRECIPITATION	SNOWFALL
January	0.22"	0.4"
February	0.16"	---
March	0.31"	---
April	0.26"	---
May	0.34"	---
June	0.29"	---

July	0.92"	---
August	1.13"	---
September	0.72"	---
October	0.81"	---
November	0.36"	---
December	0.44"	0.1"
ANNUAL	5.97"	0.5"

January is the coldest month with an average low of 14° F. Lowest recorded temperate is -26° F. July is the hottest month with an average high of 94° F. Highest recorded temperature is 106° F. Average daily high temperature is 69° F. Average daily low temperature is 36° F.

Prevailing winds, usually <20 mph, are out of the southwest. Spring is the windy season. Evaporation exceeds precipitation by 7:1. Flash floods are most likely to happen after thunderstorms in July through October.

3.4. BIOTIC RESOURCES

3.4.1. Ecosystem

The project is in the Plains and Great Basin Grassland biotic community.

3.4.2. Wildlife

The Navajo Natural Heritage Program believes (see Appendix) nine important wildlife species may be in the project area (21perm104). The Eagle Protection Act (EPA), Endangered Species Act (ESA), Migratory Bird Treaty Act (MBTA), and the Navajo Endangered Species List (NESL) provide protection. Species marked "Yes" for the EPA, ESA, or MBTA are protected by Federal law. FESA candidate species have been formally proposed for protection. NESL group 2 and 3 species are protected by Tribal law. NESL group 4 or unnumbered species have no legal protection under the Federal Endangered Species Act or Tribal laws, but information is being gathered to decide whether they merit protection.

Species	EPA	ESA	MBTA	NESL
burrowing owl	-	-	Yes	4
ferruginous hawk	-	-	Yes	3
golden eagle	-	-	Yes	3
kit fox	-	-	-	4
Mexican spotted owl	-	Threatened	Yes	3
mountain plover	-	-	Yes	4
northern leopard frog	-	-	-	2

peregrine falcon	-	-	Yes	4
southwestern willow flycatcher	-	Endangered	Yes	2

The Acreage was inspected by biologist Celia Cook on April 26 and 27, 2021. None of the above nine animals were seen. No riparian or aquatic animals were seen. No Threatened and Endangered species were seen. She saw, heard, or found sign of one reptile species, four mammal species, and eleven bird species. Her report is in the Appendix. Various habitats are present: mesa tops, talus slopes, sand dunes, desert shrub land, pinyon-juniper forest, and manmade perches (poles, water tanks, and buildings). As is typical of arid regions, there were few wild ungulates, herbivores, or carnivores. Over grazing and feral dogs and cats impact wildlife.

3.4.3. Vegetation

The Navajo Natural Heritage Program believes (see 21perm104 in Appendix) three important species are or may be in the project area. Protection is provided by the Endangered Species Act (ESA) and Navajo Endangered Species List (NESL). Species marked "Yes" for the ESA are protected by Federal law. FESA candidate species have been formally proposed for protection. NESL group 2 and 3 species are protected by Tribal law. NESL group 4 or unnumbered species have no legal protection under the Federal Endangered Species Act or Tribal laws, but information is being gathered to decide whether they merit protection.

Species	ESA	NESL
Mesa Verde Cactus	Threatened	2
Parish's Alkali Grass	---	4
Yellow Lady's Slipper	---	4

Celia Cook inspected the project area on April 26 and 27, 2021. Two populations of Mesa Verde cactus were found. Habitat for the cactus is common throughout the Acreage. Marginal habitat for Parish's alkali grass was found, but not the plant. No habitat for the Yellow Lady's Slipper was found.

The Acreage is a sparsely vegetated grassland. Trees are found along Sanostee Wash, around houses, and on mesa tops. Celia found 55 species (18 trees, shrubs, and subshrubs + 2 cacti + 26 forbs and wildflowers + 9 grasses). Extensive flora changes have occurred from over a century of intensive year-round grazing, down cutting arroyos which drain soil moisture, and weeds. Four (halogeton, Russian olive, salt cedar, Siberian elm) of the forty-six species listed on the Navajo Nation Integrated Weed Management Plan were found in the project area.

3.4.4. Agriculture

Fallow farm fields are found along Sanostee, Tocito, and To-nil-choni Washes. Livestock (sheep, goats, horses, cattle) graze year-round. Range improvements include corrals, windmills, and stock ponds and tanks.

3.5. CULTURAL RESOURCES

3.5.1. Traditional

Shiprock (≥14 miles north-northeast), a sacred site, is visible from the Acreage. A confidential traditional cultural property is on the Acreage.

3.5.2 Archaeological

Lone Mountain Archaeological Services reviewed (LMAS Report 3514b) Navajo Nation Historic Preservation Department and State records for the Acreage. One hundred twenty archaeology sites and one traditional cultural properties have been found to date. Much of the Acreage remains to be inspected, especially the south tract. Site types include petroglyphs, pictograph, Chacoan road, middens, burials, tower, kivas, pit houses, room blocks, hogans, hornos, ramada, sweat lodge, and lithic and ceramic scatters. Cultural affiliations include Navajo, Anasazi, Basketmaker, Archaic, and Aboriginal. Anasazi components were present at 96 of the 120 sites. Sites ages could be as much as 9,500 years B. C. NTUA power lines, IHS water lines, phone lines, NMDOT roads, and home sites drove the need for archaeology inspections.

3.6. SOCIOECONOMICS

3.6.1. Employment & Income

The April 2021 county unemployment rate was 8.9%, compared to a statewide rate of 7.6%. Average weekly wage in the county was $978 compared to the state rate of $942. Leading employment sectors in the county in 2018 were: #1 education, health care, and social assistance; #2 retail; and #3 mining, quarrying, and oil & gas extraction. The latter was the second highest paying ($65,135) sector in the county. County poverty rate was 21.3% vs statewide rate of 20% in 2018.

3.6.2. Demographics & Trends

County population (127,000) declined 0.597% from 2017 to 2018 versus a statewide increase of 0.352%. County population is younger (35.0 years median age) than statewide (38.1 years). Median household income is higher in the county ($50,582) than the state

($47,169). Median property value is lower in the county ($150,400) than the state $174,700). Number of employees in the county dropped 1.26% versus 5.59% increase statewide in 2018. Largest ethnic group in the county in 2018 was white non-Hispanic (38.7%), closely followed by Native American (38.1%).

3.6.3. Life Styles, Cultural Values, Attitudes, & Expectations

San Juan County is a rural county outside the three river valleys. Population density in 2010 was 23.6 people per square mile (39% above the state average of 17.0). Higher education attainment for the county (14.9% have a bachelor's degree or higher) was almost half lower than the state figure (27.3%).

Residents are familiar with oil and gas development. The Rattlesnake Field is 20 miles north and was discovered in 1924. Drives to the largest nearby retail center (Farmington), BIA Agency (Shiprock), or county seat (Aztec) all pass oil or gas wells. They have seen the full range of exploration and production from geophysical activity to refineries. Pipelines transport oil, gas, and carbon dioxide to other states. People bridge contemporary and traditional lifestyles by working in towns or the oil field and tending livestock in the evenings and weekends. They work and hope for a better future for their children.

3.6.4. Community Infrastructure

The project is in the Sanostee (Tse anaozt'ii) Chapter and BIA's Shiprock Agency. The chapter house is in the middle the Acreage and is a community center for meetings, senior citizen meals, and recreation. Closest gas station and convenience store is a 15-mile drive east and south. Closest full-service town is Shiprock, a 35-mile drive east and north.

No paved road crosses the Acreage. One intermittently lightly graveled road and numerous dirt roads cross the Acreage. There is school bus service, baseball field, package delivery service, NTUA water lines, cell phone service, and single-phase and three-phase power lines on the Acreage. Sewage disposal is via septic tanks and lagoons. A day school is 3 miles east of the Acreage.

3.7. ENVIRONMENTAL JUSTICE

Executive Order 12898 requires Federal agencies to identify and evaluate actions which may disproportionately and negatively impact low income or minority populations. The Navajo Nation is such a population. Unemployment increased from 48.54% in the 2000 census to 55.9% in the 2010 census. Environmental justice is an issue because the Navajo Nation wants an opportunity for prosperity. The Navajo Nation has freely chosen to enter in

an agreement with the expectation that wells will be drilled and produce. Revenue from minerals has declined with closure of coal mines and decreased oil and gas production.

One housing development and dozens of family compounds are on the Acreage.

3.7.1. Trust Resources

Besides oil and gas, the only other trust resource present is range land. The range is grazed year-round.

3.8. ENVIRONMENTAL MODULE

NNOGC will comply with all environmental statutes including, but not limited to, the Clean Water Act, Resources Conservation and Recovery Act, Comprehensive Environmental Response Compensation and Liability Act, and Toxic Substances Control Act. No underground tanks are planned.

3.9. RESOURCE & LAND USE PATTERNS

There is no fishing or farming. Deer hunting and pine nut gathering occur several miles west in the Chuska Mountains. Grazing is the oldest use. It dates to ≈1600 when the Navajo (Dine) acquired livestock in trade with Spanish settlers along the Rio Grande. Cattle, goats, sheep, horses, burros, and mules were then driven northwest. Livestock is the dominant land use on the Acreage. There is no county zoning.

3.10. OTHER VALUES

The project will not impact any wilderness, wilderness study, or primitive area. Sound and noise sensitive areas are houses. Along with NNOGC employees and contractors, the residents of those houses are of the most health and safety concern.

There are no units of the Wild & Scenic River System, State Parks, Tribal Parks, or National Park Service on the Acreage. Closest such land is the Four Corners Monument, a Tribal Park ≈37 air miles northwest.

4.0. ENVIRONMENTAL CONSEQUENCES (IMPACTS & MITIGATION)

The agreement will mandate diligent development. Evaluation of impacts and mitigation will be based on a maximum development model of one well pad per quarter section (= 83 well pads). There could be multiple wells on each well pad due to different producing zones or directional drilling.

If each well pad is located in the center of each quarter section (see map on the next page), then a total of **23.9 miles** of new road would be built to serve those well pads. Pipe and power lines would parallel roads. Maximum disturbed width for road construction will be 20'. Together, this could result in:

400' x 500' compressor site = 4.59 acres
83 well sites x 2.24 acres each = 185.92 acres
+ 53.5 miles of new road pipe power line corridors x 50' wide = 324.24 acres
514.75 acres

Thus, maximum development could use 514.75 acres or 3.88% of the acreage. It is unlikely that maximum development would occur. Five of the seven wells drilled to date on the Acreage were dry holes. Furthermore, NNOGC will reclaim the pipe and power line portions (30') of the corridors. That is 324.24 acres, or 62.99% of the overall 514.75 acres.

Mitigation measures in this EA should be viewed as a minimum. As archaeologists, biologists, residents, and government agencies (e. g., BIA, BLM, Navajo Nation) review site-specific projects, more mitigation (e. g., directional drilling) may be required. Their stipulations will supplement any in this EA. Site and project specific mitigation measures will be developed at on-site inspections with the Navajo Nation and BIA. The sum of the mitigation becomes the cumulative mitigation measures. Duration could be decades.

4.1. LAND RESOURCES

There is potential for cuts and fills of as much as 30'. Reclamation will return the land to natural contours. Manmade slopes will be reduced to no steeper than 3 to 1. Topographic impacts will be mitigated, where practical, by avoiding grading when running seismic lines, using existing roads, terracing reserve pits, building pipelines and power lines along roads, laying pipelines on the surface on steep or rocky slopes; avoiding running pipelines, power lines, and roads along ridge lines; back filling, and contouring to a natural shape.

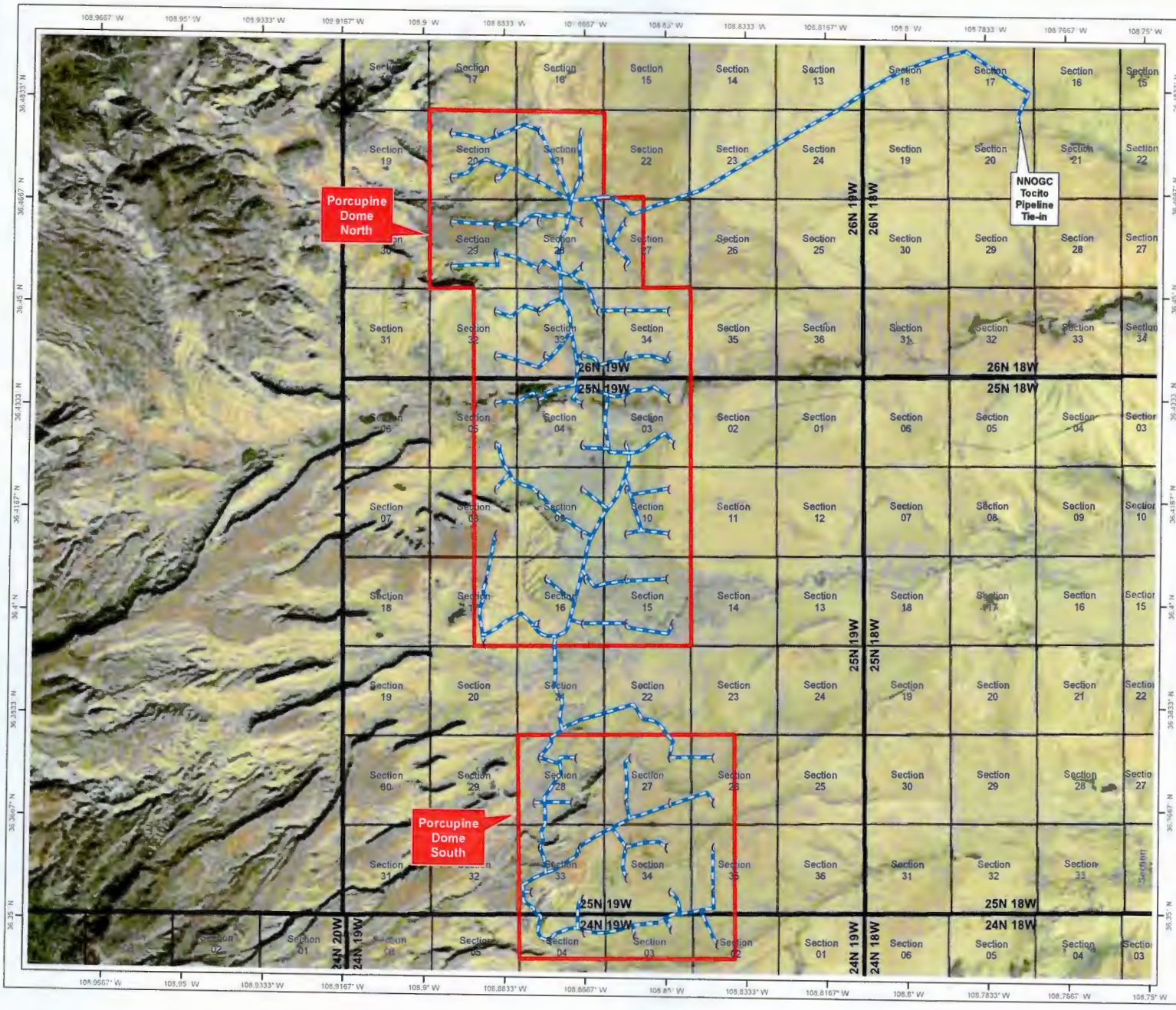
Project grading will disturb a maximum of 514.75 acres. If all 83 well pads produce and 1 compressor site is built; then 248.45 acres would be in long term use (e. g., not available for grazing) during production due to well pads (185.92 acres), compressor pad (4.59 acres), and 20' wide roads (57.94 acres).

The 248.45 acres would be 48.27% of the land bladed by NNOGC, or 1.87% of the agreement Acreage. Compressor site, each well pad, and all new roads will be reclaimed as each well is plugged (unless residents want a pad or road left for a home site or access).

Navajo Nation Oil & Gas Company

Porcupine Dome Proposed Well Pad and Pipeline Layout Map

Navajo Nation,
San Juan County, New Mexico



Proposed Well Pad

Proposed Gas Pipeline

1:65,000

0 0.25 0.5 1
Miles

NAD 1983 Arizona State Plane East
Feet

N

PERMITS WEST

Prepared by Permits West, Inc., June 14, 2021
for Navajo Nation Oil & Gas Company

Soil can be damaged by erosion. Erosion results from a lack of plant cover, soil compaction, grading which mixes soil layers, fertility loss as minerals are leached, and water concentrating in vehicle ruts. Any or all can increase water runoff rates. Soil impacts will be minimal, temporary, and short term if the recommended mitigation is followed. Mancos shale is particularly prone to erosion.

Impacts to soil will be mitigated by not blading seismic lines, building overhead power lines instead of buried lines, postponing construction when wet weather leads to ruts >6" deep; building diversion ditches above well pads, having pipeline corridors double as roads during construction; laying surface pipelines where practical; using existing roads where feasible to minimize new disturbance; installing road drainage control (crown and ditch, borrow ditch turnouts, culverts, water bars, surfacing) as needed if production results; storing topsoil separate from subsoil to maintain soil fertility; seeding and mulching topsoil piles; compacting filled trenches; building water bars to stop gullies; digging water bars in cut and skewing them to drain; thoroughly spreading stockpiled soil; spreading removed brush to deflect rain, reduce evaporation, interfere with off road travel, and minimize erosion; and scarifying and reseeding to accelerate re-vegetation which provides soil cover.

Seed mix should include grass, shrub, and forb seeds for a more natural appearing plant cover and to increase re-vegetation success. Four wing saltbush and wild sunflower are especially recommended. They grow fast, provide seed for birds, and their height shelters bare soil.

Geology will be impacted by the production of oil and gas - which is the project goal. Wells will comply with state spacing and drilling rules to prevent drainage. Casing and cement will prevent water or hydrocarbons from commingling or damaging other mineral zones. Pressure loss will be prevented by using and testing blowout preventers and drilling with weighted mud or compressed air or gas. (Premature pressure loss can decrease the amount of oil or gas ultimately recovered.) Geophysical logs will be run to record hydrocarbon bearing strata. If cores are cut or drill stem tests run, their data will be recorded too. Seismic data will be provided to the Navajo Nation. Well records will be provided to the Navajo Nation, BLM, BIA, and the New Mexico Oil Conservation Division. No slope will be undercut or overburdened. All holes and excavations will be filled. Wells will be plugged with cement once they are abandoned.

4.2. WATER RESOURCES

Construction could impact surface water. There could be a temporary increase in sediment from grading vegetation, compacting soil, fertility loss, and runoff concentrating in vehicle ruts. Seeding, building wells adjacent to existing roads to minimize new

disturbance, contouring, scarifying, seeding; spreading removed brush and rocks to act as a mulch; and installing water bars will prevent a short-term impact from becoming a significant long-term impact.

Surface water impacts will be mitigated by controlling erosion. Those measures which mitigate soil impacts will also control erosion. Tanks will be surrounded by impermeable dirt berms of sufficient size to hold all of the tanks' volume + 10%.

The Federal Emergency Management Agency has not mapped the Acreage. Impacts on flood plains typically occur when the topography within a flood plain is substantially modified, either by placement or removal of materials within the flood plain. NNOGC will not impede the flow of floodwaters (no structures will be built above grade in the flood plain) nor impair the flood holding capacity (by not substantially modifying the topography in the flood plain). Therefore, no impacts on flood plains are anticipated. Wetlands will be avoided.

Groundwater will be protected since all aquifers will be behind casing and cement. Produced water will be trucked or piped to an approved disposal well. NNOGC's Navajo Tribe AR 8 saltwater disposal well is a $\geq$12-mile one way trip from the Acreage. Disposal is in the Barker Creek Formation, >6,200' deep.

Injection wells will not adversely impact aquifers. The Navajo Nation, BIA, BLM, and the state will approve injection only if the disposal zone is too mineralized or too deep for use. Anticipated disposal zones are the Pennsylvanian or Mississippian. These zones are too saline or hydrocarbon bearing for human or animal use. The agencies will review the volume of water, injection pressure, and well bore integrity.

Reserve pits will be built at least half in cut for structural integrity and lined with $\geq$20 mil plastic and/or commercial bentonite to prevent leaks. Chemical toilets and camper trailers with holding tanks will be used for human waste. No mercury or PCBs will be used.

Approximately 0.84 acre-foot of water would be used to drill a 6,500' deep well. For comparison, this will be 0.00002 (2/100,000) of the water transported by the Navajo-Gallup main line each year. The water used for drilling is a one-time event, not a continuous event. Water used for drilling will be bought, pumped, and trucked from NTUA. Surface water is not sufficiently clean for drilling.

4.3. AIR RESOURCES

Dust (particulates), noise, and emissions (carbon monoxide, ozone, nitrogen oxides, hydrogen sulfide, and sulfur dioxide) will temporarily increase due to traffic, construction, flaring, venting, or compressors. (The latter three occur only if gas is found.) All will be

reduced once each well is completed. (BLM rules ban flaring or venting after 30 days or 50 million cubic feet, whichever comes first.) Engines will comply with regulatory requirements.

Hydrogen sulfide could be found in the Mississippian zones. If hydrogen sulfide (H2S) is expected or encountered, then H2S contingency plans will be created and followed in accordance with BLM's Onshore Order 6. The plans describe safety procedures and equipment.

Traffic at each well pad will drop from two-dozen vehicles per day during drilling to 1 to 2 vehicles daily if production is established. Revegetation, gravel, and dust suppressants (e. g., magnesium chloride), will control dust.

Piping gas instead of trucking, flaring, or venting will benefit air quality. Water misters will control dust from air drilling. Engines and compressors will be equipped and operated to meet emission standards. Gas leaks will be avoided by padding pipe in rocky areas, pressure testing, installing shut off valves, and posting warning signs. Laying pipe parallel to a road minimizes blading which creates dust. No trash will be burned. Well site equipment will be painted a flat earth tone color to reduce visibility.

Weather can impact the project by increasing costs if operations are shut down or if roads must be graveled.

The Navajo Nation Air Quality Control Program is responsible for regulating air quality in the project area. Air quality is determined by atmospheric pollutants and chemistry, dispersion meteorology and terrain, and also includes applications of noise, smoke management, and visibility.

BLM's shared jurisdiction over production operations has resulted in the development of "Best Management Practices" (BMPs) designed to reduce impacts to air quality. Typical measures may include: flare hydrocarbon and gases at high temperatures in order to reduce emissions of incomplete combustion; water dirt roads during periods of high use in order to reduce fugitive dust emissions; require vapor recovery systems to be maintained and functional in areas where petroleum liquids are stored; revegetate areas of the pad not required for production facilities to reduce the amount of dust from the pad; and compressor engines 300 horsepower or less must have NOx emissions limited to 2 grams per horsepower hour.

EPA data show that improved practices and technology and changing economics have reduced emissions from oil and gas exploration and development (Inventory of US Greenhouse Gas Emissions and Sinks: 1990-2006). One of the factors in this improvement is the adoption by industry of best management practices proposed by the EPA's Natural Gas Energy Star program.

4.4. BIOTIC RESOURCES

There will be no widespread ecosystem change. Brushy or forested areas will become weedy and grassy. Grass will benefit grazing permittees. Livestock prefer grass to sagebrush. Ecosystem mitigation will consist of the aforementioned physical and biotic mitigation measures.

Wildlife will be briefly displaced by increased activity during seismic operations, construction, and drilling. Wildlife will also incur forage loss due to vegetation removal. Vegetation (cover) loss makes prey more vulnerable to predators. Forage loss will be minimized by seeding disturbed areas. Seeding with species (e. g., sunflower) favored by wildlife can benefit wildlife as more diverse plants are introduced. These species can be used to further other goals (e. g., rapid ground cover) too. Reserve pits will be netted while drying to keep out birds.

There will be no effect on listed T & E wildlife species. The project will not impact the continued existence of any listed T & E species; nor reduce its habitat, reproductive ability, numbers, or distribution. Wildlife impacts can be mitigated by conducting T & E inspections, seasonal or spatial avoidance of T & E species if found, avoiding loop roads which disrupt wildlife movement and cover; minimizing tree loss which provide perches, cover, nest sites, and insects for food; spreading bladed brush back onto reclaimed areas to provide cover; seeding to speed re-vegetation; seeding with some native species to replicate the native environment; seeding with some nonnative species (e. g., yellow sweet clover) and including at least a forb, grass, and shrub in each seed mix to quickly stabilize soil and speed diverse plant succession; seeding with species favored by wildlife; using existing roads to minimize new disturbance; fencing and netting reserve pits; banning workers from bringing guns and dogs to the job; screening open tanks; and minimizing the length of time and distance for open trench so as to not unduly interfere with wildlife movement.

Pump jacks, tanks, fences, P & A markers, and power poles will provide perches for birds.

The Migratory Bird Treaty, Endangered Species Act, and Eagle Protection Act provide penalties which act as an incentive for protection.

The project would directly and temporarily impact vegetation by grading vegetation. A maximum of 514.75 acres of vegetation would be bladed, which is 3.88% of the Acreage. Reserve pits and utility line corridors would be seeded within a year of being bladed. Wells and their roads will be reclaimed once the wells are plugged.

The project could indirectly impact adjacent vegetation. Sediment can bury plants. Erosion exposes plant roots. Noxious weeds can crowd out native flora. Seeding, contouring, scarifying, and water bars will prevent indirect impacts from becoming significant long-term impacts.

If noxious weeds invade, then they will be controlled. The Navajo Nation EPA Pesticide Enforcement and Development Program will be contacted for lists of approved herbicides and applicators.

The project will not impact the continued existence of any listed T & E flora species; nor reduce its habitat, reproductive ability, numbers, or distribution.

Vegetation impacts will be mitigated by the same measures which mitigate soil impacts. Seed mixes should include both native and nonnative grass, shrub, and forb seeds to increase the diversity and speed of re-vegetation. Actual seed species, quantities, and method and time of sowing will be specified by the Navajo Nation, BIA, or BLM. Reclamation will start once a reserve pit is dry. All disturbed areas will be contoured to a natural shape to blend with the surrounding topography. Compacted areas will be plowed or ripped 12" deep and harrowed 6" deep before seeding.

No seeding will be done when soil is muddy or frozen. The seed mix bag tag will be kept. Disturbed areas will be harrowed and broadcast seeded with the Navajo Department of Agriculture recommended desert grassland mix of 1.5 pounds per acre alkali sacaton, 1.5 pounds per acre curly grass, 2 pounds per acre Indian ricegrass, 1.5 pounds per acre sand dropseed, 3 pounds per acre western wheatgrass, 2 pounds per acre four wing saltbush, 1.5 pound per acre shadscale, and 1/2 pound per acre bandera penstemon. Seeded areas will be drug with a chain or bed spring to cover the seed.

Once a well is plugged, the road will be blocked and reclaimed as previously described. If a well produces, then the reserve pit and any other area not needed for maintenance or production will be reclaimed the same way.

One listed T & E species is known to now be in the project area. It is the Mesa Verde cactus and is listed as Threatened. Botanical surveys will be conducted before any ground disturbing actions and the plant will be avoided if found. If new facts arise in the future and other T & E species may be affected by site specific projects, then impacts will be mitigated by space or time avoidance, habitat manipulation, surveys, directional drilling, or otherwise as deemed appropriate through consultation.

The Navajo Natural Heritage Program will be consulted prior to any ground disturbing project. They have the most complete and current information on T & E species, T & E habitat, and other species of concern on the Navajo Nation.

There may be a short term insignificant impact as livestock move away from activity. Reclamation will revegetate pipeline and power line corridors within one year even if a well is productive. This is ≈62.9% of the bladed area. When the wells are plugged, then all bladed areas will be reclaimed and re-vegetated.

Impacts to the livestock industry will be mitigated by reclamation. Cattle guards and/or gates will be installed if functional fences are crossed with roads. Reserve pits will be

fenced. Grazing permittees will be paid compensation in excess of the fair market forage value. Workers' dogs and guns will be prohibited from the project area to avoid harassment of stock.

4.5. CULTURAL RESOURCES

Traditional cultural properties and archaeology sites will not be significantly impacted. A BIA approved archaeologist will inspect proposed surface disturbing projects prior to disturbance. Surveys will include the area of proposed disturbance plus a minimum 50' buffer zone. The archaeologist will interview residents to verify that nonphysical sacred sites are also avoided. The archaeology report will be approved by HPD before disturbance occurs. All significant sites will be avoided by at least 100', have their research potential exhausted, or will otherwise be mitigated.

Significant sites (cultural, religious, sacred, historic, or archaeology) which are found will be avoided by detouring projects around them. If the site is in close proximity, then monitoring or fencing may be implemented. If avoidance is impossible, then Section 106 consultation will be followed and mitigation by data recovery (collection and/or excavation) will be done. Should sites be found during construction (e. g., buried site without surface evidence), work will stop in that area and BIA will be notified. Mitigation will be assured by warning project personnel that disturbing sites or collecting artifacts is illegal.

4.6. SOCIOECONOMICS

The maximum development model could create ≈26,680 person-days of labor:

2 people to build a well pad x 5 days/pad x 83 pads = 830 person-days
15 people/day to drill a deep well x 14 days/well x 83 wells = 17,430 person-days
5 people/day to complete a well x 10 days x 83 wells = 4,150 person-days
5 people/day to install pipeline for each pad x 5 days/pad x 83 pads = 2,075 person days
5 people/day to install compressor x 20 days/compressor x 1 compressor = 100 person-days
4 people/day to remove compressor x 5 days/compressor x 1 compressor = 20 person-days
4 people/day to plug well x 5 days/well x 83 wells = 1,660 person-days
+ 1 person/day to reclaim pad & road x 5 days/pad x 83 pads = 415 person-days
Total = 26,680 person-days

The 26,680 person-days would be the equivalent of ≈105 full time jobs for one year. If all 83 wells are successful, and each pumper spends ≈15 minutes per day per well, then 3 full time pumper job could be created. An increased tax base may allow for more services or lower taxes.

Approval of the Porcupine Dome Project will allow NNOGC to explore and produce, which will:

a) Maintain employment for people working in allied service sectors.

b) Pay royalties which are foregone if fields are not found and developed. Two wells reported production on the Acreage. If their first day results are typical, then NNOGC would produce the following volumes and generate the following gross revenue on its first day of producing each successful new well. Rates are May 24, 2021 prices (NYMEX & Henry Hub).

20 barrels of oil x $62.05/bbl = $1,241.00
73 Mcf helium x $86/Mcf = $6,278.00
+ 83 Mcf methane x $2.89/Mcf = $239.87
first day revenue from 1 well = $7,758.87

If a 12.5% royalty were paid, then the Navajo Nation would receive $969.85 from that first day of production. (One-eighth (12.5%) royalty is typical BLM rate. Actual Tribal rate is confidential.) These figures are not guaranteed since volumes change, success and geology vary, and prices fluctuate.

c) Increase the incentive for companies to invest more. According to a University of New Mexico School of Business study, each dollar spent on drilling or related activities generates ≈$2.50 in the local economy. Each well will cost ≥$1,000,000 to drill, complete, and connect - which can generate ≥$2,500,000 more in benefits per well.

d) Jobs directly created by development indirectly create more jobs as workers buy food, clothes, housing, etc. There is a 1.44 multiplier for jobs in a rural area. If the maximum development model happens, then ≈26,680 person-days of direct labor can create ≈38,491 person-days of labor.

e) Decreasing America's dependence on foreign oil and its negative impact on America's balance of payments and security. America imports more than 50% of its oil.

f) Paying grazing permittees compensation for surface damages (e. g., $3,000 per well site) which exceeds the fair market value of damages provides discretionary income.

Local income means families no longer have to leave home for economic reasons. One author said the, "... influx of federal money through health, education, housing, employment ... has probably had a greater impact on reservation life than energy resource development."

There are serendipitous benefits. Families can take advantage of flat land to build homes on P & A well sites.

The project can negatively impact socioeconomics by temporarily increasing the number of people in the area during seismic, construction, and drilling. That may increase the demand and price for goods and services in an area of low wages. However, there is excess capacity in the labor pool. Feelings can suffer if people are not familiar with or sensitive to Navajo culture. This should not be a problem. Most workers will come from the Four Corners which has a large Navajo population. Others may envy permittees who receive money.

Government survey section corners will be marked and avoided. Project personnel will be forbidden to bring firearms, drugs, dogs, or alcohol to the project area. Residents will be treated with courtesy and respect. NNOGC will pay for its road construction and maintenance (which benefits other road users), environmental assessments, archaeology and biology surveys, and a $500 per well application fee. By paying these project costs, NNOGC minimizes the impact on government budgets and increases government data bases.

All well bores will be at least 500' from the closest house unless the occupants consent in writing to a closer location. Wells drilled that close will have all production engines equipped with electric engines or dual dissipative (aka, hospital quiet) mufflers. Mufflers will be pointed away from occupied homes. Insulated buildings may be used on compressors if needed.

Paying surface damages to the permittees will exceed the cost of the loss of livestock forage and feed.

Impacts to the energy industry will be mitigated by following state spacing rules so no other lease or unleased land is drained. Pipeline operators will be contacted before crossing their lines with roads or pipelines to prevent damage. New Mexico One Call (811) will be notified >2 business days before construction to verify there are no unmarked buried utility lines present. Roads will have at least one lane kept open or a detour provided when pipeline construction crosses.

Light smooth bare ground will contrast with the darker rough brush covered surroundings. The linear shape of pipelines, power lines, and roads will appear unnatural. Vertical tanks stand out in an area of few trees. Impacts will be reduced by reclamation, paralleling other linear features where practical, and painting equipment flat earth tone colors.

4.7. ENVIRONMENTAL MODULE

A trash cage will be used for garbage at each compressor or drilling well. Cage will be hauled to a state approved county transfer station or landfill. Chemical toilets will be used for human waste. Toilet contents will be hauled to a state approved dump station. Well treating chemical containers will have secondary above ground containment (e. g., fiberglass or galvanized steel tank). Obsolete pipe and tubing will be recycled as fence posts and braces or trucked to a salvage yard. Waste handling is described below.

Solid Waste Management Plan

Typical Field Waste
Meter charts, welding rods, wrapping tape, broken wood four by four supports
Laths, stakes, flagging, nylon rope
Lunch trash, cardboard
Collection Method: Trash cage at well pad
Disposal Point: All waste hauled to county landfill for disposal

Miscellaneous Waste
Humans waste in chemical toilets
Disposed of at state approved dump stations

Other Waste Considered, but not Generated in Field
Vehicle Fluids and Parts
Maintenance done in garage on private land or at service station off reservation

4.8. CUMULATIVE IMPACTS

Impacts will not be individually or cumulatively significant. Regional infrastructure (interstate pipelines, power line grid, paved roads, county roads, disposal ponds, landfill, dump stations, service firms, hospitals, schools, lodging, restaurants and grocery stores) is already in place. Any future ground disturbing project will require a project specific EA.

BLM evaluated cumulative impacts from oil and gas leases in northwest New Mexico in 2003 and in southeast Utah in 2008. While BLM did not examine Indian minerals, BLM's scale of analysis provides a point of reference. BLM's documents approved 29,739 acres of disturbance from oil and gas activity. The Porcupine project will result in a maximum of 514.75 acres of land use, or ≈1.73% of BLM's figure.

This environmental assessment provides a more site-specific description of a proposed action, alternatives, impacts, and mitigation measures which fit within the scale of BLM's environmental impact statements.

5.0. PREPARER

This EA was prepared by Brian Wood. His experience includes:

1. He has written EAs for 1,500+ miles of power lines, pipelines, roads, and seismic lines, and 448,000+ acres of tribal and allotted oil and gas leases. He designed and permitted the first plastic lined commercial brine disposal pond in Utah, worked on 26 reservations or pueblos in seven states, and permitted wells and rights-of-way from Texas to North Dakota and Arkansas to Nevada. He has been published in the Oil & Gas Journal and Western Oil World.
2. Three years as a Natural Resource Specialist for BLM in Monticello, Utah. He served as a team leader on EAs for wilderness wells, construction on a National Historic Trail, and geophysical exploration. He assisted on other EAs, including the Dept. of Energy's Nuclear Waste Repository. His experience includes supervising 150 oil and gas wells; processing 200+ APDs and 50+ rights-of-way; and inspecting construction, drilling, and reclamation. The latter included assessing environmental impacts, avoiding impacts, and formulating mitigation plans where impacts could not be avoided.
3. Two years as a Range Technician for the Medicine Bow National Forest in Laramie, Wyoming. Experience included supervising work crews planting trees, building trails, repairing campgrounds, fighting forest fires, spraying noxious weeds, fence building, reclaiming 120 miles of roads, and installing watershed improvements for trout streams. He also designed a computer system for measuring winter recreation use.
4. Two and one-half years as a Staff Assistant in the Environmental Health Division of the West Virginia Health Department in Charleston, WV. He conducted a statewide survey of solid waste gathering and disposal systems, inspected fly ash and sanitary landfills, assisted in an EPA hazardous waste inventory, and designed and taught safety and landfill operation courses.

His education includes:
1. Master of Science degree in Recreation and Park Administration from the University of Wyoming, including 12 semester hours in geology.
2. Met half the requirements for a Master of Science degree in Environmental Studies from the West Virginia College of Graduate Studies.
3. Bachelor of Arts degree from the University of Virginia, with a major in Sociology and minors in Environmental Science and Government.

6.0. To Whom EA Will be Sent

- Bureau of Indian Affairs Navajo Regional Office Division of Environmental, Cultural and Safety Management

7.0. CONSULTATION AND COORDINATION

The following were consulted with in the preparation of this EA:

Racheal Dahozy, Land Manager
Navajo Nation Oil & Gas Company, St. Michaels AZ
Dexter Prall, GIS Supervisor
Natural Heritage Program, Window Rock, AZ

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Botanical Species of Concern Habitat Assessment Report

Porcupine Dome Lease Area
Navajo Nation Oil & Gas Company
Sanostee and Two Grey Hills Chapters

Prepared for:
Navajo Natural Heritage Program – Navajo Nation Department of Fish and Wildlife

Prepared by:
Celia Cook,
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June 9, 2021

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Appendices:

Appendix A- Navajo Nation Natural Heritage Program Letter of Correspondence (21perm104).
Appendix B – USFWS IPaC Species List

Attachment A: Mesa Verde Cactus Locations and Photos

1.0 Introduction

The Navajo Nation Oil & Gas Company (NNOGC) is proposing to develop oil and gas resources in their Porcupine Dome Mineral Lease area (Lease). The Porcupine Dome Lease is sparsely populated region on the Navajo Nation approximately 27 miles southwest of Shiprock, San Juan County, New Mexico and within the Red Valley and Sanostee Chapters. The small village of Sanostee is located in the west central portion of the Lease. The Lease area lies within topographically diverse area of ephemeral washes, bluffs, sandstone cliffs and cuestas, and basin grasslands. Approximately 13,275.19 acres in size, it occupies all or portions of Sections 20, 21, 27, 28, 29, 32, 33, and 34 of Township 26 North, Range 19 West, Sections 3, 4, 5, 8, 9, 10, 15, 16, 17, 26, 27, 28, 33, 34, and 35 of Township 25 North, Range 19 West, and Sections 2, 3, and 4 of Township 24 North, Range 19 West (Figure 1).

NNOGC is in the initial stages of oil, gas, and helium minerals exploration of the Porcupine Dome lease. This report provides an overview of the ecological conditions of the Lease area as they pertain to botanical resources and is the first step in ensuring that industry impacts to sensitive botanical resources are avoided or mitigated during any future minerals development of the lease.

2.0 Methods

Regulatory laws applicable to the Porcupine Dome Lease development include, but are not limited to:

- Navajo Endangered Species Act. 17 NNC § 507.
- U.S. Endangered Species Act (ESA) [1973 as amended]
- Navajo Nation Golden and Bald Eagle Nest Protection Regulations (NNC, 2008)
- Migratory Bird Treaty Act (MBTA)
- Bald and Golden Eagle Protection Act (BGEPA) [USFWS, 2004]

Prior to any field surveys, a written request for information on was submitted to Navajo Nation Natural Heritage Program (NNHP) for information on Navajo Nation botanical species of concern with known or potential occurrence in the project area as well as Biological Resource Land Use Clearance Policies and Procedures (RCP) Sensitive areas present in the project area. A response was received April 8, 2021 (Appendix A, 21perm104). In addition, U.S. Fish and Wildlife Information for Planning and Consultation (USFWS-IPaC) database for federally listed species in San Juan County, New Mexico was accessed online and reviewed (Appendix B). Google Earth imagery, as well as topographic maps were used to determine potential sites for on the ground surveys and the NNHP wildlife biologist and botanist were notified of pending surveys via email correspondence.

Celia Cook, Biologist for Permits West, Inc. conducted pedestrian and driving surveys in the Porcupine Dome Lease area April 26 and 27, 2021. The project area was surveyed for floral and faunal species, with an emphasis on inspecting the area for suitable habitat and/or the presence of Navajo Endangered Species List (NESL) or Federal listed botanical species. Several areas were surveyed on foot while other areas

were surveyed by driving and stopping along roads to identify plants and evaluate habitat. Habitat and existing conditions were evaluated, and plants and animals were identified and recorded. Field equipment including Avenza Maps application for recording tracks and gps points. Photographs of representative habitat were taken (Section 11.0). Weather conditions during the surveys where not unseasonal and varied from moderate12-15 mph winds to no wind, cloudy skies with light precipitation and cool temperatures, and partly cloudy skies with warm, mild temperatures.

3.0 Project Description

Navajo Nation Oil and Gas Company proposes to develop the Porcupine Dome Minerals Agreement area of approximately 13,275.19 acres. The proposed development is at its exploratory and preliminary stages and would include oil, gas, and/or helium extraction; specific areas of development have not been selected at this time.

4.0 Location

The proposed Porcupine Dome lease is located within the Sanostee and Two Grey Hills Chapters of the Navajo Nation on Tribal Trust lands approximately 27 miles southwest of Shiprock San Juan County, New Mexico. The village of Sanostee is located within the Lease area.

The proposed Porcupine Dome lease is within the Sanostee East and Sanostee West 7.5-minute quadrangle maps within Sections 20, 21, 27, 28, 29, 32, 33, and 34 of Township 26 North, Range 19 West, Sections 3, 4, 5, 8, 9, 10, 15, 16, 17, 26, 27, 28, 33, 34, and 35 of Township 25 North, Range 19 West, and Sections 2, 3, and 4 of Township 24 North, Range 19 West (Figure 1).

5.0 General Environmental Setting

The Porcupine Dome Lease area is within the Colorado Plateau physiographic region. This area is characterized by sedimentary rock formations, including mesas, buttes, cuestas, sandstone ridges, and badlands. Shallow valleys and deeply incised ephemeral washes are found in lower lying areas. Beautiful Mountain, part of the Chuska Mountain Range, borders the lease to the northwest. It is the highest mountain of this range at 9,388 feet above sea level. Cliffs, buttes, and bluffs are present throughout the Lease providing topographic relief in an otherwise flat landscape. Vegetation is sparse due to persistent drought, historic grazing pressure, and highly erosive soils. Primary overstory vegetation includes shrubs such as shadscale (*Atriplex confertifolia*), greasewood (*Sarcobatus vermiculatus*), and four-wing saltbush (*Atriplex canescens*). There are very few trees in the lease area, most of them concentrated along ephemeral washes; these consisting of non-native, invasive saltcedar (*Tamarix* sp.) and Russian olive (*Elaeagnus angustifolia*). Sparse and scattered juniper trees (*Juniperus* spp.) are present along ridges, side-slopes and escarpments.

The climate is a semiarid climate characterized by hot summers and cold winters with little precipitation. The average annual high temperature is 69.8°F and the average annual low temperature is 36.4°F. The average annual precipitation (from 1926 to 2007) is 7 inches (WRCC, 2021).

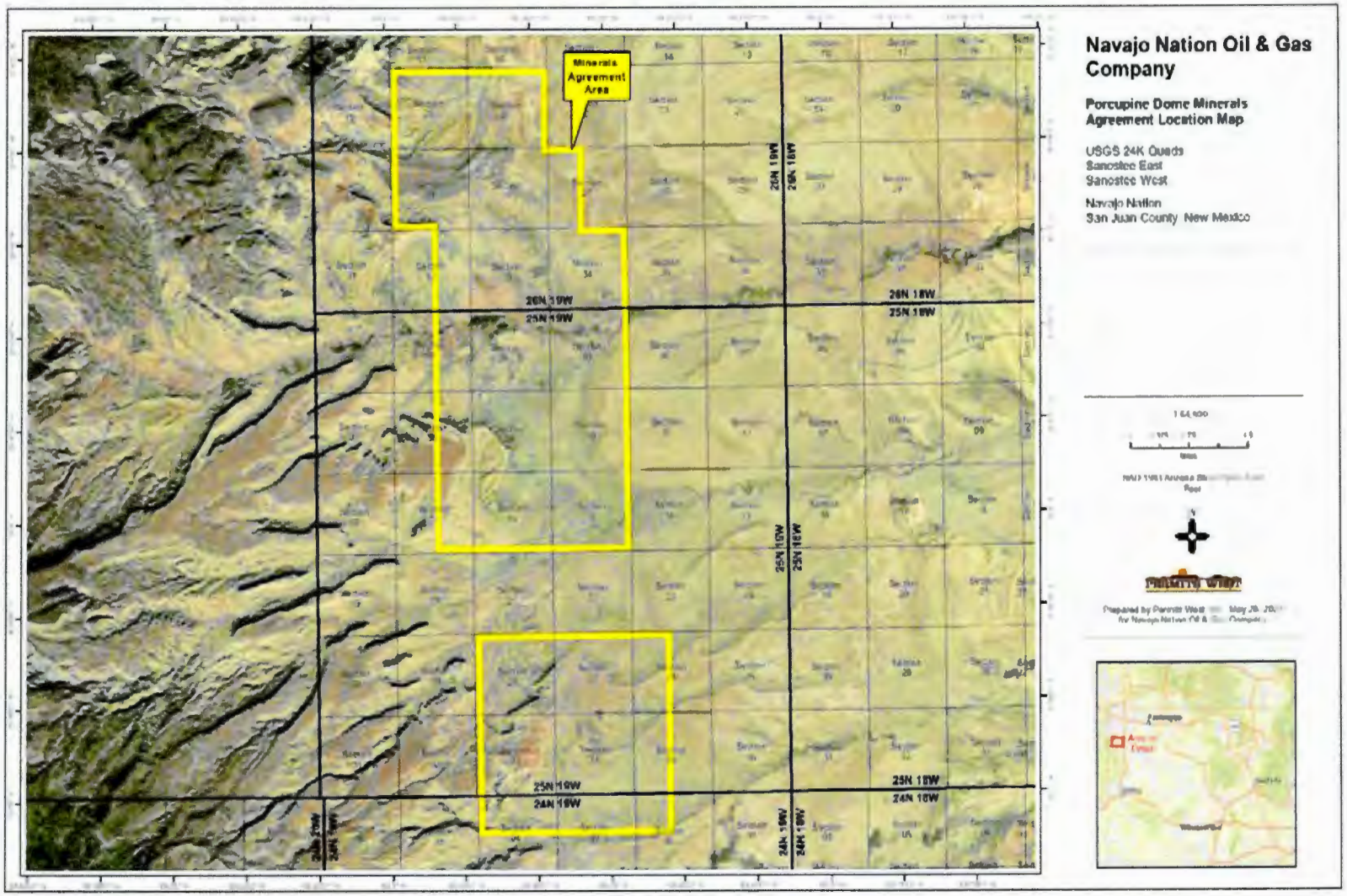

Figure 1. Porcupine Dome Minerals Agreement Lease boundary.

5.1 Geology

The lower elevation areas of the Porcupine Dome Lease are mapped as Mancos Shale, lower part. Major lithologic constituents are sedimentary, limestone, mudstone, and shale. The western and eastern portions of the lease have areas mapped as Gallup Sandstone; a small area in the southeast portion of the lease is mapped as Mesa Verde Group. The Mesa Verde Group has major lithologic constituents of siltstone, sandstone, and mudstone (Green et al, 1997).

5.2 Soils

Major soil units within the Porcupine Dome Lease area are mapped as Persayo-Nataani-Littlehat-Awet, Kimbeto-Farb-Denazar, and Weska-Travessilla-Rockoutcrop-Oelop (USDA Soil Web, 2021).

Persayo-Nataani-Littlehat-Awet Soil Unit

The Littlehat series consists of well drained, moderately permeable saline-sodic soils which are moderately deep to soft bedrock. These soils formed in alluvium and residuum derived from siltstone and shale on summits, footslopes, and backslopes of undulating plateaus. Slopes are 1-45 percent. These soils are comprised of silt loams, with a soil depth of 20 to 40 inches and rapid runoff. The Persayo series consists of shallow, well-drained soils that formed in slope alluvium or colluvium over residuum derived from soft sedimentary bedrock. These soils are on hills, basin floor remnants, fan remnants, dipslopes, scarp slopes and escarpments. Slopes are 0 to 65 percent. These soils are comprised of silty clay loams have a moderately slow permeability. The Lawet series consists of very deep, poorly drained and very poorly drained soils formed in loamy alluvium on floodplains. Slopes range from 0 to 2 percent. These soils are made up of sandy clay loams and have slow runoff. The Nataani series consists of well drained, moderately permeable soils which are moderately deep to soft bedrock. Nataani soils formed in alluvium, slope alluvium, and residuum derived from siltstone and sandstone on toeslopes of undulating plateaus and structural benches. Slopes are 1 to 9 percent. These soils are comprised of fine sandy loams, loams, and gypsiferous silt loams and have slow runoff.

Weska-Travessilla-Rockoutcrop-Oelop Soil Unit

The Travessilla series consists of very shallow and shallow, well drained soils that formed in calcareous eolian sediments and material weathered from sandstone. These soils are found on hills, cuestas, scarps, and mesas with slopes ranging from 0 to 75 percent. These soils are comprised of stony sandy loams and channery loams, are well drained and have high runoff. Permeability is moderately rapid. The Weska series consist of shallow and very shallow, well drained soils that formed in residuum from shale and upland hills, breaks and mesas and are comprised of silty clay and clay loams overlying grayish brown soft shale. Slopes are 0 to 40 percent. These soils are well drained with a rapid to very rapid runoff and moderately slow permeability. The Oelop series consists of very deep, well drained soils that formed in alluvium and eolian material derived from sandstone and shale. Oelop soils are on stream terraces, mesas, plateaus and alluvial fans. Slopes are 0-10 percent. These soils are comprised of loams and clay loams and are well drained with medium runoff and moderately slow permeability.

Kimbeto-Farb-Denazar Soil Unit

The Kimbeto series consists of deep and very deep, well drained soils that formed in eolian material, alluvium, slope alluvium, and residuum derived dominantly from sandstone. Kimbeto soils are on summits of plateaus and structural benches, dipslopes of cuestas, and treads of high stream terraces.

Slopes are 0 to 5 percent. These soils are comprised of loamy fine sands, fine sandy loams, and sandy clay loams. Kimbeto soils are well drained with slow runoff and moderate permeability. The Denazar series consists of deep and very deep, somewhat excessively drained soils that formed in eolian material, alluvium, and residuum derived from sandstone. Permeability is rapid or moderately rapid. Denazar soils are on eolian-mantled summits of plateaus and structural benches, and on treads of high stream terraces. Slopes range from 0 to 5 percent. These soils are comprised of fine sands and loam fine sands. They have very slow runoff and rapid or moderately rapid permeability. The Farb series consists of shallow and very shallow, excessively drained soils that formed in residuum, eolian material, colluvium and slope alluvium derived from sandstone and shale. Farb soils are on hills, mesas, cuestas, escarpments, canyons and structural benches. Slopes range from 2 to 40 percent. These soils are comprised of fine sandy loams and sandy loams. Permeability is moderately rapid and runoff is very low to very high.

5.3 Surface Waters and Floodplains

The proposed project area is located within the Chaco watershed (14080106) which drains towards the San Juan River, located approximately 26 miles northeast of the proposed lease (NRCS, 2012). According to the Federal Emergency Management FEMA Flood Map Service Center, the Porcupine Dome Lease area does not have a printed flood map to reference. Flooding in the area is likely minimal because of the lack of perennial surface waters and low precipitation events in the region; particularly over the last 15 to 20 years where climate change has resulted in rising temperatures and less precipitation. There are four major ephemeral drains in the Lease area: Tse Clani-To Wash is located in the north portion, Sanostee wash is located in the middle portion, and Tocito and To-Nil-Choni washes are located in the southern portion of the Lease. These washes are deeply incised dry channels that support sometimes dense stands of Russian olive (*Elaeagnus angustifolia*) and saltcedar (*Tamarix* sp.), as well as Siberian elm (*Ulmus pumila*) all three of which are recognized by the Navajo Nation as Category B noxious weeds (BIA Navajo Integrated Weed Management Plan). Native riparian species such as Rio Grande cottonwood (*Populus* sp.) are rare but present as individual holdouts in some places. These major washes and corresponding banks and floodplains were observed to be frequented by local wildlife and birds, as well as livestock as compared to other areas of the Lease.

5.4 Ecoregions and Vegetation Communities

The majority of the Porcupine Dome Lease area lies within the San Juan/Chaco Tablelands and mesas level IV Ecoregion (Griffith et al, 2006). Vegetation is mapped as Desert Grassland ecotone and Great Basin Desert Scrub (Dick-Peddie, 1993). Representative grass species included alkali sacaton (*Sporobolus airoides*), galleta (*Pleuraphis jamesii*), and foxtail barley (*Hordeum jubatum*). Annual wheatgrass (*Eremopyrum triticeum*) is common in wash bottoms and flats. Some areas, particularly along escarpments, side slopes, and at the summits of hills and mesas, supported a few healthy grasslands; however, most accessible, low-lying areas lacked grasses or supported only heavily grazed grasses. Dominant shrubs throughout the lease area are represented by four-wing saltbush, shadscale, and greasewood. Wildflowers and forbs, some of which were blooming included stemless evening primrose (*Oenothera albicaulis*), scorpion weed (*Phacelia* sp.), sand verbena (*Abronia fragans*), and Astragalus (*Astragalus* spp.), among others.

Four noxious weeds were observed during the surveys: saltcedar, Russian olive, Siberian elm and halogeton (*Halogeton glomeratus*). All three of these species are recognized as noxious weeds by the

New Mexico Department of Agriculture and the Navajo Nation (NMDA, 2020) (BIA Navajo Nation Integrated Weed Management Plan), Many areas were inundated with weedy and invasive species, including Russian tumbleweed and kochia (*Kochia scoparia*).

There are no wetlands, wetland vegetation or established native riparian vegetation present within the proposed Porcupine Dome Lease area (USFWS-NWI, 2021).

6.0 NESL and USFWS Listed Plant Species with Potential to Occur in Project Area

The Porcupine Dome Lease area overlaps with NNHP RCP Areas 1, 2, and 3. Area 1 is defined as a highly sensitive area with regards to wildlife or plant resources and few exceptions on development are granted. Area 2 has moderately sensitive wildlife or plant resources and moderate restrictions on development to avoid sensitive species and habitats. Area 3 has low sensitivity wildlife or plant resources and fewest restrictions on development.

Correspondence with NNDFW-NNHP indicates that there is one "Known" NESL plant species and two "Potential" plant species as present or potentially present within 1 to 3 miles of the project area based on their analysis of the Sanostee East and Sansotee West, New Mexico 7.5-minute quadrangles. These NESL plant Species of Concern are discussed in Table 1.

The U.S. Fish and Wildlife Services Information, Planning, and Consultation website lists three species of plants that are federally listed as Threatened or Endangered in San Juan County, New Mexico (USFWS-IPaC, 2021). These federally listed plant species are discussed in Table 1. Habitat information in Table 1 is taken from NESL Species Accounts Version 4.20 (NNDFW-NNHP, 2020) and New Mexico Rare Plant Technical Council (NMRPTC, 1999, updated 14 May 2021).

Table 1. NESL and USFWS Listed Plant Species with Known or Potential Occurrence in Project Area.

Species Name	Status*	Habitat	Comments
Mesa Verde Cactus *Sclerocactus mesae-verdae*	ESA Threatened NESL Group 2	Salt-desert scrub communities, typically in the Fruitland and Mancos shale formations, but also in the Menefee Formation overlaying Mancos shale. It is most frequently found on the tops of hills or benches and along slopes.	Most of the Porcupine Dome Lease area is mapped as Manco Shale, lower part geologic formation (NMBGMR, 2003). NNHP has mapped multiple known Mesa Verde Cactus locations within the Lease area (Talkington, 2021). Two of these areas were inspected during the April 2021 surveys and multiple Mesa Verde cacti were observed at one of the locations. An additional site not mapped by NNHP and supporting Mesa Verde cactus was also found. Habitat for this species is present throughout the Lease area. **Attachment 1 provides locations and photos of the Mesa Verde cacti observed during the April 26 and 27, 2021 botanical surveys.**

Species Name	Status*	Habitat	Comments
Knowlton's cactus *Pediocactus knowltonii*	ESA Endangered	Found on rolling gravelly hills in pinyon-juniper-sagebrush communities.	There are no pinyon-juniper-sagebrush communities within the Porcupine Dome Lease area. This species would not be expected to occur due to lack of suitable habitat.
Mancos Milkvetch *Astragalus humillimus*	ESA Endangered	Cracks or eroded depressions on sandstone rimrock ledges and mesa tops in Point Lookout sandstone.	The sandstone formations within the Porcupine Dome Lease area are mapped as Gallup Sandstone (NMBGMR, 2003); therefore, this species would not be expected to occur in the project area.
Parish's Alkali Grass *Puccinellia parishii*	NESL Group 4	This species occurs in alkaline springs, seeps, and seasonally wet areas that occur at heads of drainages or on gently slopes and requires continuously damp soils during its late winter to spring growing period.	Inspected potential habitat for this species was completely dry during the April 26 and 27, 2021 surveys. Unless seasonal moisture improves conditions for this area, this species would not be expected to occur in the Porcupine Dome Lease area.
Yellow Lady's Slipper *Cypripedium parviflorum* var. *pubescens*	NESL Group 4	Mesic deciduous and coniferous forest, openings, thickets, prairies, meadows, and fens.	This species would not be expected to occur in the project area due to lack of mesic deciduous and coniferous forests and associated habitats.

*NESL: Navajo Endangered Species List

Group 1: Species or subspecies that no longer occur on Navajo Land.

Group 2: "Endangered" species or subspecies that are in danger of being eliminated from all or a significant portion of their ranges on the Navajo Nation.

Group 3: Species or subspecies that are considered likely to become endangered throughout all or a significant portion of their ranges on the Navajo Nation within the foreseeable future

Group 4: Species or subspecies for which NDFW does not currently have sufficient information for inclusion in Group 2 or 3, but which are being considered

USFWS ESA: U.S. Fish and Wildlife Service Endangered Species Act

Endangered: A species which is in danger of extinction throughout all or a significant portion of its range.

Threatened: A species which is likely to become an Endangered species within the foreseeable future.

7.0 Survey Results

The April 26 and 27, 2021 surveys of the Porcupine Dome Lease area occurred during the initial growing and flowering season for many species of grasses, forbs, wildflowers, and shrubs (Section 11.0). Flowering species aided in identification. Despite grazing pressure and persistent drought in the region, many species of plants were recorded. Plant species observed are presented in Table 2.

Table 2. Plants observed during the Porcupine Dome Lease Area April 26 and 27, 2021 survey

Species Name	Common Name
Trees, shrubs, and subshrubs	
Juniperus monosperma.	Oneseed juniper
Populus deltoides spp.	Rio Grande cottonwood (very few)
Tamarix sp.	Saltcedar (Navajo Nation Category B noxious weed)
Ulmus pumila	Siberian elm (Navajo Nation Category B noxious weed)
Elaeagnus angustifolia	Russian olive (Navajo Nation Category B noxious weed)

Sarcobatus vermiculatus	Greasewood
Ericameria nauseosus sp.	Rubber rabbitbrush
Atriplex canescens	Fourwing saltbush
Atriplex confertifolia	Shadscale
Artemisia tridentata	Big sagebrush
Artemisia bigelovii	Bigelow's sagebrush
Yucca angustissima	Narrowleaf yucca
Yucca baccata	Banana yucca
Ephedra torreyana	Torrey's ephedra
Atriplex corrugata	Mat saltbush
Brickellia sp.	Bricklebrush
Lycium pallidum	Pale wolfberry
Gutierrezia sarothrae	Broom snakeweed
Coleogyne ramosissima	Blackbrush
Cacti	
Sclerocactus mesae verdae	Mesa Verde cactus
Cylindropuntia whipplei	Whipple cholla
Forbs and Wildflowers	
Townsendia annua	Annual easter daisy
Stanleya pinnata	Prince's plume
Lesquerella sp.	Bladderpod
Descurainia pinnata	Western tansymustard
Cymopterus glomeratus var. *fendleri*	Plain's spring parsley
Cymopterus sp.	Spring parsley
Sphaeralcea coccinea	Scarlet globemallow
Phacelia sp.	Scorpion weed
Oenothera albicaulis	Stemless evening primrose
Halogeton glomeratus	Halogeton (Navajo Nation Category B noxious weed)
Salsola tragus	Russian thistle
Kochia scoparia	Kochia
Helianthus anuus	Annual sunflower
Eriogonum annuum	Annual buckwheat
Senecio flaccidus	Threadleaf ragwort
Thermopsis sp.	Golden banner
Astragalus missouriensis or amphioxys	Astragalus
Descurainia sophia	Flixweed
Malcomia africana	African mustard
Mentzelia albicaulis	Blazing star
Lappula redowskii	Lappula
Calochortus nuttallii	Sego lilly
Abronia fragrans	Sand verbena
Androstephium breviflorum	Small flowered-androstephium
Camissonia scapoidea	Leafless suncups
Cryptantha sp. (*crassisepala*)	Hiddenflower
Grasses	
Bouteloua gracilis	Blue grama
Oryzopsis hymenoides	Indian ricegrass
Muhlenbergia porteri	Bush muhly
Aristida sp.	Threeawn
Sporobolus airoides	Alkali sacaton

Sporobolus cryptandrus	Sand dropseed
Pleuraphis jamesii	Galleta
Hordeum jubatum	Foxtail barley
Eremopyrum triticeum	Annual wheatgrass

8.0 Recommendations

As the development of the Porcupine Dome Lease progresses, NNDFW-NNHP may request further surveys to ensure that impacts to sensitive and listed plant resources and sensitive habitats are avoided or mitigated. Permits West, Inc. agrees with the need for further surveys should areas proposed for development include suitable habitat for any NESL listed plant species and/or sensitive habitats. NNHP would need to be consulted for final decisions on impacts to botanical resources prior to breaking ground on development within the lease.

9.0 Certification

Results contained in this report represent my best professional judgement and are based on field investigations, research and review of pertinent information sources, information provided by the project proponent, and information provided by the the Navajo Natural Heritage Program.

Celia Cook
Wildlife Biologist
Permits West, Inc.

June 8, 2021

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11.0 Photos from April 26 and 27, 2021 Surveys of the Porcupine Dome Lease Area.

Photo 1. Coppice formations with stabilizing vegetation along south bank of Tocito Wash. Photo taken facing west from Lat. 36.398148°, Long. -108.846317° (NAD 83).

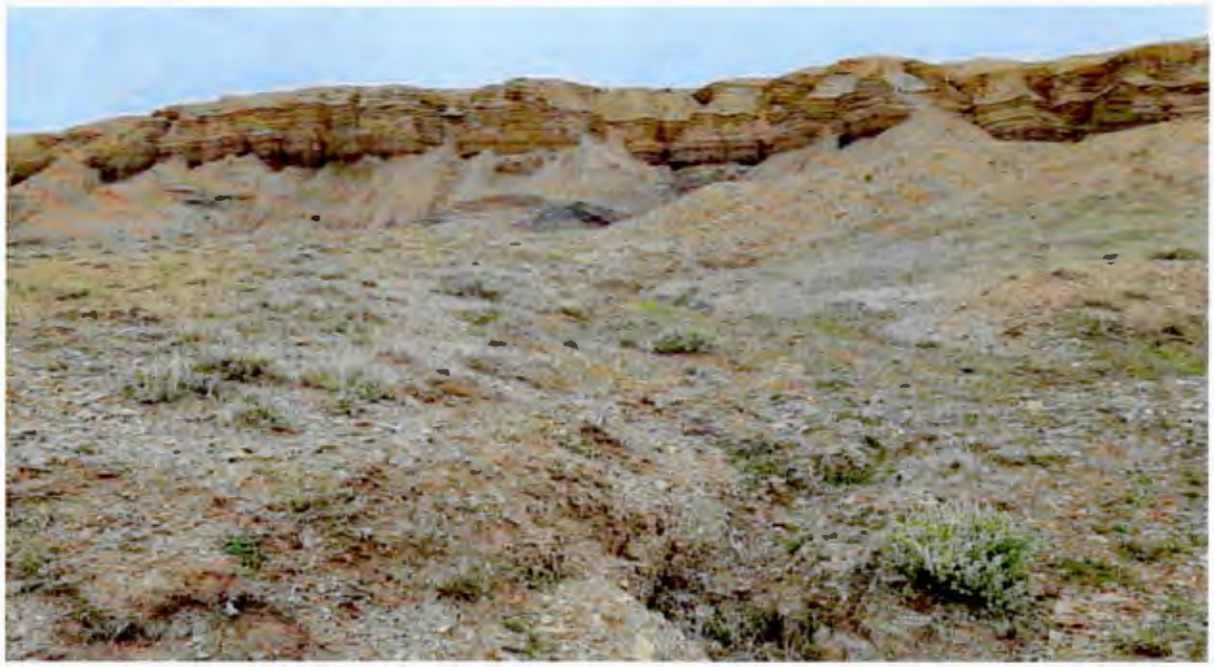

Photo 2. Bluffs and grassland south of Sanostee. Facing west towards from Lat. 36.410274°, Long. -108.870368° (NAD 83).

Photo 3. Mature Russian olive overstory in Sanostee Wash. Photo facing east from Lat. 36.439032°, Long. -108.810352° (NAD 83). This photo is taken outside Lease boundary but is representative of habitat along portions of Sanostee Wash.

Photo 4. Sparsely vegetated Mancos shale formation. Photo facing northwest from Lat. 36.410377°, Long. -108.849916° (NAD 83).

Photo 5. Sparsely vegetated Mancos shale formation with mesa in distance. Photo facing north from Lat. 36.414000°, Long. -108.850692° (NAD 83).

Appendix A: NNHP Correspondence 21perm104 (9 pages) follows

NNHP
Navajo Natural Heritage Program

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Window Rock, AZ 86515

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21perm104

08-April-2021

Cari Eggleston
Permit's West, Inc
37 Verano Loop
Santa Fe, NM 87508
cari@permitswest.com

SUBJECT: Navajo Nation Oil and Gas Company - Tohache Wash / Porcupine Dome Project

Cari Eggleston,

NNHP has performed an analysis of your project in comparison to known biological resources of the Navajo Nation and has included the findings in this letter. The letter is composed of seven parts. The sections as they appear in the letter are:

1. **Known Species** – a list of all species within relative proximity to the project
2. **Potential Species** – a list of potential species based on project proximity to respective suitable habitat
3. **Quadrangles** – an exhaustive list of quads containing the project
4. **Project Summary** – a categorized list of biological resources within relative proximity to the project grouped by individual project site(s) or quads
5. **Conditional Criteria Notes** – additional details concerning various species, habitat, etc.
6. **Personnel Contacts** – a list of employee contacts
7. **Resources** – identifies sources for further information

Known Species lists "species of concern" known to occur within proximity to the project area. Planning for avoidance of these species is expected. If no species are displayed then based upon the records of the Navajo Nation Department of Fish and Wildlife (NNDFW) there are no "species of concern" within proximity to the project. Refer to the Navajo Endangered Species List (NESL) Species Accounts for recommended avoidance measures, biology, and distribution of NESL species on the Navajo Nation (https://www.nndfw.org/nnhp/sp_account.htm).

Potential Species lists species that are potentially within proximity to the project area and need to be evaluated for presence/absence. If no species are found within the Known or Potential Species lists, the project is not expected to affect any federally listed species, nor significantly impact any tribally listed species or other species of concern. Potential for species has been determined primarily on habitat characteristics and species range information. A thorough habitat analysis, and if necessary, species specific surveys, are required to determine the potential for each species.

Species of concern include protected, candidate, and other rare or otherwise sensitive species, including certain native species and species of economic or cultural significance. For legally protected species, the following tribal and federal statuses are indicated: NESL, federal Endangered Species Act (ESA), Migratory

Bird Treaty Act (MBTA), and Eagle Protection Act (EPA). No legal protection is afforded species with only ESA candidate, NESL group 4 status, and species listed on the Sensitive Species List. Please be aware of these species during surveys and inform the NNDFW of observations. Reported observations of these species and documenting them in project planning and management is important for conservation and may contribute to ensuring they will not be up listed in the future.

In any and all correspondence with NNDFW or NNHP concerning this project please cite the Data Request Code associated with this document. It can be found in this report on the top right corner of the every page. Additionally please cite this code in any biological evaluation documents returned to our office.

1. Known Species *(NESL=Navajo Endangered Species List, FE=Federally Endangered, FT=Federally Threatened, FC=Federal Candidate)*

Species

AQCH = Aquila chrysaetos / Golden Eagle NESL G3
SCMEVE = Sclerocactus mesae-verdae / Mesa Verde Cactus NESL G2 FT
**All or parts of this project currently are within areas protected by the Golden and Bald Eagle Nest Protection Regulations; consult with NNDFW zoologist or EA Reviewer for more information and recommendations.

2. Potential Species

Species

AQCH = Aquila chrysaetos / Golden Eagle NESL G3
ATCU = Athene cunicularia / Burrowing Owl NESL G4
BURE = Buteo regalis / Ferruginous Hawk NESL G3
CHMO = Charadrius montanus / Mountain Plover NESL G4
CYPAPU = Cypripedium parviflorum var. pubescens / Yellow Lady's Slipper NESL G4
EMTREX = Empidonax traillii extimus / Southwestern Willow Flycatcher NESL G2 FE
FAPE = Falco peregrinus / Peregrine Falcon NESL G4
LIPI = Lithobates pipiens / Northern Leopard Frog NESL G2
PUPA = Puccinellia parishii / Parish's Alkali Grass NESL G4
SCMEVE = Sclerocactus mesae-verdae / Mesa Verde Cactus NESL G2 FT
STOCLU = Strix occidentalis lucida / Mexican Spotted Owl NESL G3 FT
VUMA = Vulpes macrotis / Kit Fox NESL G4

3. Quadrangles (7.5 Minute)

Quadrangles

Sanostee East (36108-D7) / NM
Sanostee West (36108-D8) / NM

4. Project Summary *(EO1 Mile/EO 3 Miles=elements occuring within 1 & 3 miles., MSO=mexican spotted owl PACs, POTS=potential species, RCP=Biological Areas)*

SITE	EO1MI	EO3MI	QUAD	MSO	POTS	RCP

21perm104

SITE	EO1MI	EO3MI	QUAD	MSO	POTS	RCP
Porcupine Dome Project Area	SCMEVE	AQCH, SCMEVE	Sanostee East (36108-D7) / NM	None	AQCH, ATCU, BURE, CHMO, EMTREX, PUPA, SCMEVE, STOCLU, VUMA	Area 1, Area 2, Area 3
Porcupine Dome Project Area	AQCH, SCMEVE	AQCH, SCMEVE	Sanostee West (36108-D8) / NM	None	AQCH, ATCU, BURE, CHMO, CYPAPU, EMTREX, FAPE, LIPI, PUPA, SCMEVE, STOCLU	Area 1, Area 2, Area 3

5. Conditional Criteria Notes *(Recent revisions made please read thoroughly. For certain species, and/or circumstances, please read and comply)*

A. Biological Resource Land Use Clearance Policies and Procedures (RCP) - The purpose of the RCP is to assist the Navajo Nation government and chapters ensure compliance with federal and Navajo laws which protect, wildlife resources, including plants, and their habitat resulting in an expedited land use clearance process. After years of research and study, the NNDFW has identified and mapped wildlife habitat and sensitive areas that cover the entire Navajo Nation.
The following is a brief summary of six (6) wildlife areas:
1. **Highly Sensitive Area** – recommended no development with few exceptions.
2. **Moderately Sensitive Area** -- moderate restrictions on development to avoid sensitive species/habitats.
3. **Less Sensitive Area** – fewest restrictions on development.
4. **Community Development Area** – areas in and around towns with few or no restrictions on development.
5. **Biological Preserve** -- no development unless compatible with the purpose of this area.
6. **Recreation Area** – no development unless compatible with the purpose of this area.
None - outside the boundaries of the Navajo Nation
This is not intended to be a full description of the RCP please refer to the our website for additional information at https://www.nndfw.org/clup.htm.

B. Raptors – If raptors are known to occur within 1 mile of project location: Contact the NNHP zoologist at 871-7070 regarding your evaluation of potential impacts and mitigation.
Golden and Bald Eagles- If Golden or Bald Eagle are known to occur within 1 mile of the project, decision makers need to ensure that they are not in violation of the *Golden and Bald Eagle Nest Protection Regulations* found at https://www.nndfw.org/nnhp/docs_reps/gben.pdf.
Ferruginous Hawks – Refer to *Navajo Nation Department of Fish and Wildlife's Ferruginous Hawk Management Guidelines for Nest Protection* (https://www.nndfw.org/nnhp/docs_reps.htm) for relevant information on avoiding impacts to Ferruginous Hawks within 1 mile of project location.
Mexican Spotted Owl - Please refer to the Navajo Nation Mexican Spotted Owl Management Plan (https://www.nndfw.org/nnhp/docs_reps.htm) for relevant information on proper project planning near/within spotted owl protected activity centers and habitat.

C. Surveys – Biological surveys need to be conducted during the appropriate season to ensure they are complete and accurate please refer to NN Species Accounts https://www.nndfw.org/nnhp/sp_account.htm. Surveyors on the Navajo Nation must be permitted by the Director, NNDFW. Contact Jeff Cole at (928) 871-6450 for permitting procedures. Questions pertaining to surveys should be directed to the NNDFW the NNHP Zoologist for animals, and the NNHP Botanist for plants. Questions regarding biological evaluation should be directed to Jeff Cole at 871-6450.

21perm104

D. Oil/Gas Lease Sales – Any settling or evaporation pits that could hold contaminants should be lined and covered. Covering pits, with a net or other material, will deter waterfowl and other migratory bird use. Lining pits will protect ground water quality.

E. Power line Projects – These projects need to ensure that they do not violate the regulations set forth in the *Navajo Nation Raptor Electrocution Prevention Regulations* found at https://www.nndfw.org/nnhp/docs_reps/repr.pdf.

F. Guy Wires – Does the project design include guy wires for structural support? If so, and if bird species may occur in relatively high concentrations in the project area, then guy wires should be equipped with highly visual markers to reduce the potential mortality due to bird-guy wire collisions. Examples of visual markers include aviation balls and bird flight diverters. Birds can be expected to occur in relatively high concentrations along migration routes (e.g., rivers, ridges or other distinctive linear topographic features) or where important habitat for breeding, feeding, roosting, etc. occurs. The U.S. Fish and Wildlife Service recommends marking guy wires with at least one marker per 100 meters of wire.

G. San Juan River – On 21 March 1994 (Federal Register, Vol. 59, No. 54), the U.S. Fish and Wildlife Service designated portions of the San Juan River (SJR) as critical habitat for Ptychocheilus lucius (Colorado pikeminnow) and Xyrauchen texanus (Razorback sucker). Colorado pikeminnow critical habitat includes the SJR and its 100-year floodplain from the State Route 371 Bridge in T29N, R13W, sec. 17 (New Mexico Meridian) to Neskahai Canyon in the San Juan arm of Lake Powell in T41S, R11E, sec. 26 (Salt Lake Meridian) up to the full pool elevation. Razorback sucker critical habitat includes the SJR and its 100-year floodplain from the Hogback Diversion in T29N, R16W, sec. 9 (New Mexico Meridian) to the full pool elevation at the mouth of Neskahai Canyon on the San Juan arm of Lake Powell in T41S, R11E, sec. 26 (Salt Lake Meridian). All actions carried out, funded or authorized by a federal agency which may alter the constituent elements of critical habitat must undergo section 7 consultation under the Endangered Species Act of 1973, as amended. Constituent elements are those physical and biological attributes essential to a species conservation and include, but are not limited to, water, physical habitat, and biological environment as required for each particular life stage of a species.

H. Little Colorado River - On 21 March 1994 (Federal Register, Vol. 59, No. 54) the U.S. Fish and Wildlife Service designated Critical Habitat along portions of the Colorado and Little Colorado Rivers (LCR) for Gila cypha (humpback chub). Within or adjacent to the Navajo Nation this critical habitat includes the LCR and its 100-year floodplain from river mile 8 in T32N R6E, sec. 12 (Salt and Gila River Meridian) to its confluence with the Colorado River in T32N R5E sec. 1 (S&GRM) and the Colorado River and 100-year floodplain from Nautuloid Canyon (River Mile 34) T36N R5E sec. 35 (S&GRM) to its confluence with the LCR. All actions carried out, funded or authorized by a federal agency which may alter the constituent elements of Critical Habitat must undergo section 7 consultation under the Endangered Species Act of 1973, as amended. Constituent elements are those physical and biological attributes essential to a species conservation and include, but are not limited to, water, physical habitat, and biological environment as required for each particular life stage of a species.

I. Wetlands – In Arizona and New Mexico, potential impacts to wetlands should also be evaluated. The U.S. Fish & Wildlife Service's National Wetlands Inventory (NWI) maps should be examined to determine whether areas classified as wetlands are located close enough to the project site(s) to be impacted. In cases where the maps are inconclusive (e.g., due to their small scale), field surveys must be completed. For field surveys, wetlands identification and delineation methodology contained in the "Corps of Engineers Wetlands Delineation Manual" (Technical Report Y-87-1) should be used. When wetlands are present, potential impacts must be addressed in an environmental assessment and the Army Corps of Engineers, Phoenix office, must be contacted. NWI maps are available for examination at the Navajo Natural Heritage Program (NNHP) office, or may be purchased through the U.S. Geological Survey (order forms are available through the NNHP). The NNHP has complete coverage of the Navajo Nation, excluding Utah, at 1:100,000 scale; and coverage at 1:24,000 scale in the southwestern portion of the

Navajo Nation. In Utah, the U.S. Fish & Wildlife Service's National Wetlands Inventory maps are not yet available for the Utah portion of the Navajo Nation, therefore, field surveys should be completed to determine whether wetlands are located close enough to the project site(s) to be impacted. For field surveys, wetlands identification and delineation methodology contained in the "Corps of Engineers Wetlands Delineation Manual" (Technical Report Y-87-1) should be used. When wetlands are present, potential impacts must be addressed in an environmental assessment and the Army Corps of Engineers, Phoenix office, must be contacted. For more information contact the Navajo Environmental Protection Agency's Water Quality Program.

J. Life Length of Data Request – The information in this report was identified by the NNHP and NNDFW's biologists and computerized database, and is based on data available at the time of this response. If project planning takes more than two (02) years from the date of this response, verification of the information provided herein is necessary. It should not be regarded as the final statement on the occurrence of any species, nor should it substitute for on-site surveys. Also, because the NNDFW information is continually updated, any given information response is only wholly appropriate for its respective request.

K. Ground Water Pumping - Projects involving the ground water pumping for mining operations, agricultural projects or commercial wells (including municipal wells) will have to provide an analysis on the effects to surface water and address potential impacts on all aquatic and/or wetlands species listed below. NESL Species potentially impacted by ground water pumping: Carex specuicola (Navajo Sedge), Cirsium rydbergii (Rydberg's Thistle), Primula specuicola (Cave Primrose), Platanthera zothecina (Alcove Bog Orchid), Puccinellia parishii (Parish Alkali Grass), Zigadenus vaginatus (Alcove Death Camas), Perityle specuicola (Alcove Rock Daisy), Symphyotrichum welshii (Welsh's American-aster), Coccyzus americanus (Yellow-billed Cuckoo), Empidonax traillii extimus (Southwestern Willow Flycatcher), Rana pipiens (Northern Leopard Frog), Gila cypha (Humpback Chub), Gila robusta (Roundtail Chub), Ptychocheilus lucius (Colorado Pikeminnow), Xyrauchen texanus (Razorback Sucker), Cinclus mexicanus (American Dipper), Speyeria nokomis (Western Seep Fritillary), Aechmophorus clarkia (Clark's Grebe), Ceryle alcyon (Belted Kingfisher), Dendroica petechia (Yellow Warbler), Porzana carolina (Sora), Catostomus discobolus (Bluehead Sucker), Cottus bairdi (Mottled Sculpin), Oxyloma kanabense (Kanab Ambersnail)

21perm104

6. Personnel Contacts

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7. Resources

Navajo Endangered Species List:
https://www.nndfw.org/nnhp/endangered.htm

Species Accounts:
https://www.nndfw.org/nnhp/sp_account.htm

Biological Investigation Permit Application
https://www.nndfw.org/nnhp/study_permit.htm

Navajo Nation Sensitive Species List
https://www.nndfw.org/nnhp/trackinglist.htm

Various Species Management and/or Document and Reports
https://www.nndfw.org/nnhp/docs_reps.htm

Consultant List
https://www.nndfw.org/bi_consult_list_2014.pdf

Dexter D Prall, GIS Supervisor - Natural Heritage Program
Navajo Nation Department of Fish and Wildlife

IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

Location

San Juan County, New Mexico

Local office

New Mexico Ecological Services Field Office

(505) 346-2525
(505) 346-2542

2105 Osuna Road Ne
Albuquerque, NM 87113-1001

http://www.fws.gov/southwest/es/NewMexico/
http://www.fws.gov/southwest/es/ES_Lists_Main2.html

Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species[1] and their critical habitats are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries[2]).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact NOAA Fisheries for species under their jurisdiction.

1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information. IPaC only shows species that are regulated by USFWS (see FAQ).
2. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following species are potentially affected by activities in this location:

Mammals

NAME	STATUS

Canada Lynx Lynx canadensis — Threatened

There is **final** critical habitat for this species. The location of the critical habitat is not available.
https://ecos.fws.gov/ecp/species/3652

New Mexico Meadow Jumping Mouse Zapus hudsonius luteus — Endangered

Wherever found

This species only needs to be considered if the following condition applies:

- If project affects dense herbaceous riparian vegetation along waterways (stream, seep, canal/ditch).

There is **final** critical habitat for this species. The location of the critical habitat is not available.
https://ecos.fws.gov/ecp/species/7965

Birds

NAME	STATUS
Southwestern Willow Flycatcher Empidonax traillii extimus Wherever found There is **final** critical habitat for this species. The location of the critical habitat is not available. https://ecos.fws.gov/ecp/species/6749	Endangered
Yellow-billed Cuckoo Coccyzus americanus There is **final** critical habitat for this species. The location of the critical habitat is not available. https://ecos.fws.gov/ecp/species/3911	Threatened

Fishes

NAME	STATUS
Colorado Pikeminnow (=squawfish) Ptychocheilus lucius There is **final** critical habitat for this species. Your location overlaps the critical habitat. https://ecos.fws.gov/ecp/species/3531	Endangered
Razorback Sucker Xyrauchen texanus Wherever found There is **final** critical habitat for this species. Your location overlaps the critical habitat. https://ecos.fws.gov/ecp/species/530	Endangered

Zuni Bluehead Sucker Catostomus discobolus yarrowi — Endangered
Wherever found
There is **final** critical habitat for this species. The location of the critical habitat is not available.
https://ecos.fws.gov/ecp/species/3536

Flowering Plants

NAME	STATUS
Knowlton's Cactus Pediocactus knowltonii Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/1590	Endangered
Mancos Milk-vetch Astragalus humillimus Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/7483	Endangered
Mesa Verde Cactus Sclerocactus mesae-verdae Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/6005	Threatened

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

This location overlaps the critical habitat for the following species:

NAME	TYPE
Colorado Pikeminnow (=squawfish) Ptychocheilus lucius https://ecos.fws.gov/ecp/species/3531#crithab	Final
Razorback Sucker Xyrauchen texanus https://ecos.fws.gov/ecp/species/530#crithab	Final

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.

Additional information can be found using the following links:

- Birds of Conservation Concern http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php
- Measures for avoiding and minimizing impacts to birds http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php
- Nationwide conservation measures for birds http://www.fws.gov/migratorybirds/pdf/management/nationwidestandardconservationmeasures.pdf

The birds listed below are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ below. This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the E-bird data mapping tool (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found below.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON (IF A BREEDING SEASON IS INDICATED FOR A BIRD ON YOUR LIST, THE BIRD MAY BREED IN YOUR PROJECT AREA SOMETIME WITHIN THE TIMEFRAME SPECIFIED, WHICH IS A VERY LIBERAL ESTIMATE OF THE DATES INSIDE WHICH THE BIRD BREEDS ACROSS ITS ENTIRE RANGE. "BREEDS ELSEWHERE" INDICATES THAT THE BIRD DOES NOT LIKELY BREED IN YOUR PROJECT AREA.)

Bald Eagle Haliaeetus leucocephalus — Breeds Dec 1 to Aug 31
This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.
https://ecos.fws.gov/ecp/species/1626

Bendire's Thrasher Toxostoma bendirei — Breeds Mar 15 to Jul 31
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9435

Black Swift Cypseloides niger — Breeds Jun 15 to Sep 10
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/8878

Brewer's Sparrow Spizella breweri — Breeds May 15 to Aug 10
This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA
https://ecos.fws.gov/ecp/species/9291

Burrowing Owl Athene cunicularia — Breeds Mar 15 to Aug 31
This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA
https://ecos.fws.gov/ecp/species/9737

Clark's Grebe Aechmophorus clarkii — Breeds Jan 1 to Dec 31
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Golden Eagle Aquila chrysaetos — Breeds Jan 1 to Aug 31
This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA
https://ecos.fws.gov/ecp/species/1680

Grace's Warbler Dendroica graciae — Breeds May 20 to Jul 20
This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA

Gray Vireo Vireo vicinior — Breeds May 10 to Aug 20
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/8680

Lesser Yellowlegs Tringa flavipes — Breeds elsewhere
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9679

Lewis's Woodpecker Melanerpes lewis — Breeds Apr 20 to Sep 30
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9408

Long-billed Curlew Numenius americanus — Breeds Apr 1 to Jul 31
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/5511

Long-eared Owl asio otus — Breeds Mar 1 to Jul 15
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/3631

Marbled Godwit Limosa fedoa — Breeds elsewhere
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9481

Olive-sided Flycatcher Contopus cooperi — Breeds May 20 to Aug 31
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/3914

Pinyon Jay Gymnorhinus cyanocephalus — Breeds Feb 15 to Jul 15
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9420

Rufous Hummingbird selasphorus rufus — Breeds elsewhere
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/8002

Virginia's Warbler Vermivora virginiae — Breeds May 1 to Jul 31
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9441

Willet Tringa semipalmata — Breeds elsewhere
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Willow Flycatcher Empidonax traillii — Breeds May 20 to Aug 31
This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA
https://ecos.fws.gov/ecp/species/3482

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

Breeding Season (■)
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)

Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

To see a bar's survey effort range, simply hover your mouse cursor over the bar.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.

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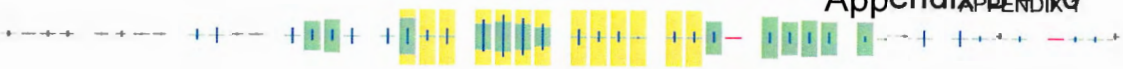
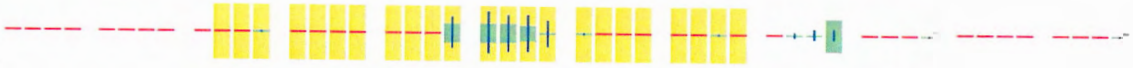
Brewer's Sparrow BCC - BCR (This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA)



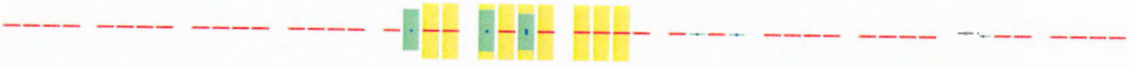
Burrowing Owl BCC - BCR (This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA)



Clark's Grebe BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Golden Eagle BCC - BCR (This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA)

Grace's Warbler BCC - BCR (This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA)



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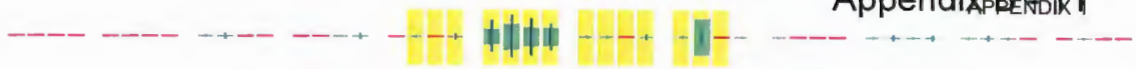
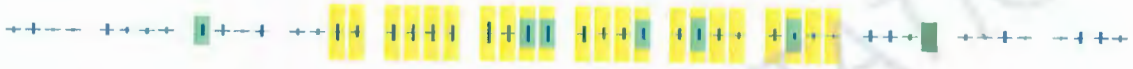
APPENDIX 1

Gray Vireo BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)



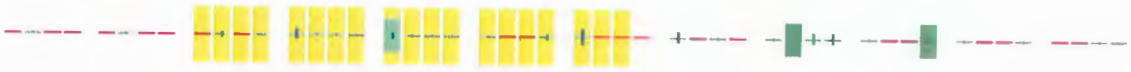
Lesser Yellowlegs BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Lewis's Woodpecker BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)



Long-billed Curlew BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

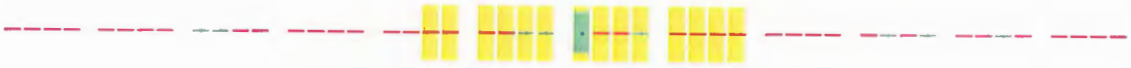
SPECIES	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Long-eared Owl BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)												



Appendix B – 12

Marbled Godwit BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

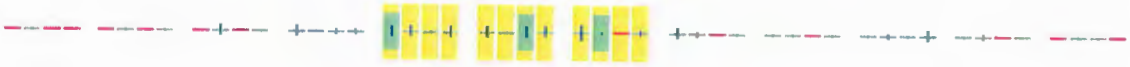
Olive-sided Flycatcher BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)



Pinyon Jay BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Rufous Hummingbird BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Virginia's Warbler BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)



Willet BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Willow Flycatcher BCC - BCR (This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA)

Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the migratory birds potentially occurring in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the AKN Phenology Tool.

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets .

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering, migrating or present year-round in my project area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may refer to the following resources: The Cornell Lab of Ornithology All About Birds Bird Guide, or (if you are unsuccessful in locating the bird of interest there), the Cornell Lab of Ornithology Neotropical Birds guide. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting

point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

Facilities

National Wildlife Refuge lands

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS AT THIS LOCATION.

Fish hatcheries

THERE ARE NO FISH HATCHERIES AT THIS LOCATION.

Wetlands in the National Wetlands Inventory

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

This location overlaps the following wetlands:

The area of this project is too large for IPaC to load all NWI wetlands in the area. The list below may be incomplete. Please contact the local U.S. Fish and Wildlife Service office or visit the NWI map for a full list.

FRESHWATER EMERGENT WETLAND

PEM1A

PEM1/SS1A
PEM1/SS2A
PEM1/SS1C
PEM1/SS2Jh
PEM1/SS1Ah
PEM1/SS1Ch

FRESHWATER POND

PAB4Hh
PAB4Fh
PAB4Fx

LAKE

L1UBHh
L
L2UBF
L2UBFx
L2UBFh
L2USAh
L2EM2F
L2USCh

A full description for each wetland code can be found at the National Wetlands Inventory website

Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

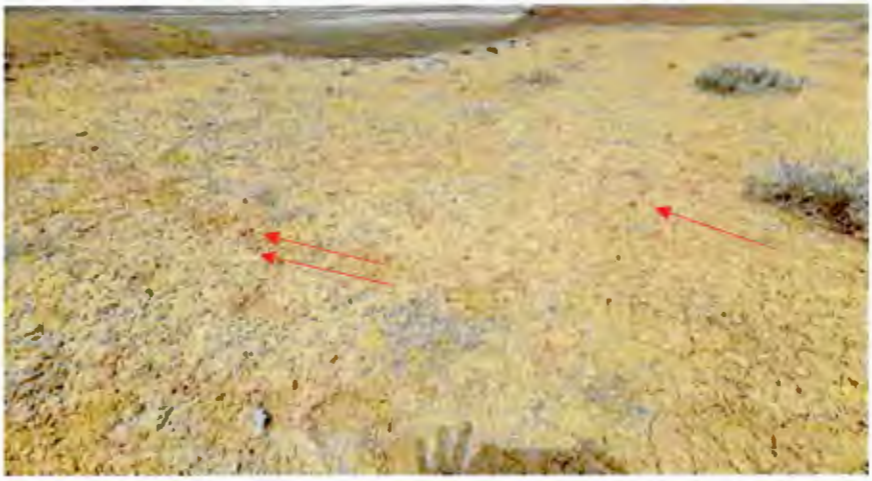
Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish

the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

Attachment A

Porcupine Dome Lease Area Mesa Verde Cacti Locations and Photos

Site	Quantity	Latitude	Longitude
1	3	36.414073	-108.850663
2	11	36.410657	-108.851653
3	1	36.413288	-108.850864
4	1	36.4133	-108.851244
5	1	36.410812	-108.871058



Site 1. 3 cacti indicated by red arrows.

Site 2. 11 cacti indicated by red arrows.

Site 3.

Site 4.

Site 5.

Wildlife
Species of Concern
Habitat Assessment Report

Porcupine Dome Lease Area
Navajo Nation Oil & Gas Company
Sanostee and Two Grey Hills Chapters

Prepared for:
Navajo Natural Heritage Program – Navajo Nation Department of Fish and Wildlife

Prepared by:
Celia Cook,
Permits West, Inc

PERMITS WEST
PROVIDING PERMITS for LAND USERS
37 Verano Loop, Santa Fe, New Mexico 87508 505-466-8120

June 9, 2021

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Appendix A - NNHP Consultation
Appendix B - USFWS Consultation

1.0 Introduction

The Navajo Nation Oil & Gas Company (NNOGC) is proposing to develop oil and gas resources in their Porcupine Dome Mineral Lease area (Lease). The Porcupine Dome Lease is sparsely populated region on the Navajo Nation approximately 27 miles southwest of Shiprock, San Juan County, New Mexico and within the Red Valley and Sanostee Chapters. The small village of Sanostee is located in the west central portion of the Lease. The Lease area lies within topographically diverse area of ephemeral washes, bluffs, sandstone cliffs and cuestas, and basin grasslands. Approximately 13,275.19 acres in size, it occupies all or portions of Sections 20, 21, 27, 28, 29, 32, 33, and 34 of Township 26 North, Range 19 West, Sections 3, 4, 5, 8, 9, 10, 15, 16, 17, 26, 27, 28, 33, 34, and 35 of Township 25 North, Range 19 West, and Sections 2, 3, and 4 of Township 24 North, Range 19 West (Figure 1).

NNOGC is in the initial stages of oil, gas, and helium minerals exploration of the Porcupine Dome lease. This report provides an overview of the ecological conditions of the Lease area as they pertain to wildlife resources and is the first step in ensuring that industry impacts to sensitive wildlife resources are avoided or mitigated during any future minerals development of the lease.

2.0 Methods

Regulatory laws applicable to the Porcupine Dome Lease development include, but are not limited to:

- Navajo Endangered Species Act. 17 NNC § 507.
- U.S. Endangered Species Act (ESA) [1973 as amended]
- Navajo Nation Golden and Bald Eagle Nest Protection Regulations (NNC, 2008)
- Migratory Bird Treaty Act (MBTA)
- Bald and Golden Eagle Protection Act (BGEPA) [USFWS, 2004]

Prior to any field surveys, a written request for information on was submitted to Navajo Nation Natural Heritage Program (NNHP) for information on Navajo Nation wildlife species of concern with known or potential occurrence in the project area as well as Biological Resource Land Use Clearance Policies and Procedures (RCP) wildlife areas present in the project area. A response was received April 8, 2021 (Appendix A, 21perm104). In addition, U.S. Fish and Wildlife Information for Planning and Consultation (USFWS-IPaC) database for federally listed species in San Juan County, New Mexico was accessed online and reviewed (Appendix B). Google Earth imagery, as well as topographic maps were used to determine potential sites for on the ground surveys and the NNHP wildlife biologist and botanist were notified of pending surveys via email correspondence.

Celia Cook, Wildlife Biologist for Permits West, Inc. conducted pedestrian and driving surveys in the Porcupine Dome lease area April 26 and 27, 2021. The project area was surveyed for flora and fauna species, with an emphasis on inspecting the area for suitable habitat and/or the presence of Navajo Endangered Species List (NESL) or Federal listed wildlife species. Several areas were surveyed on foot while other areas were surveyed by driving and stopping along roads to scan for wildlife. Habitat and existing conditions were evaluated, and plants and animals were identified and recorded. Field equipment

including Avenza Maps application for recording tracks and gps points. Cliffs and other topographic features were scanned with 12 x 50 binoculars to search for raptor or migratory bird activity. Wildlife species were recorded from direct observation, tracks, scat, and other sign (Section 7.0). Photographs of representative habitat were taken (Section 11.0). Weather conditions during the surveys were not unseasonal and varied from moderate12-15 mph winds to no wind, cloudy skies with light precipitation and cool temperatures, and partly cloudy skies with warm, mild temperatures.

3.0 Project Description

Navajo Nation Oil and Gas Company proposes to develop the Porcupine Dome Minerals Agreement area of approximately 13,275.19 acres. The proposed development is at its exploratory and preliminary stages and would include oil, gas, and/or helium extraction; specific areas of development have not been selected at this time.

4.0 Location

The proposed Porcupine Dome lease is located within the Sanostee and Two Grey Hills Chapters of the Navajo Nation on Tribal Trust lands approximately 27 miles southwest of Shiprock San Juan County, New Mexico. The village of Sanostee is located within the Lease area.

The proposed Porcupine Dome lease is within the Sanostee East and Sanostee West 7.5-minute quadrangle maps within Sections 20, 21, 27, 28, 29, 32, 33, and 34 of Township 26 North, Range 19 West, Sections 3, 4, 5, 8, 9, 10, 15, 16, 17, 26, 27, 28, 33, 34, and 35 of Township 25 North, Range 19 West, and Sections 2, 3, and 4 of Township 24 North, Range 19 West (Figure 1).

5.0 General Environmental Setting

The Porcupine Dome Lease area is within the Colorado Plateau physiographic region. This area is characterized by sedimentary rock formations, including mesas, buttes, cuestas, sandstone ridges, and badlands. Shallow valleys and deeply incised ephemeral washes are found in lower lying areas. Beautiful Mountain, part of the Chuska Mountain Range, borders the lease to the northwest. It is the highest mountain of this range at 9,388 feet above sea level. Cliffs, buttes, and bluffs are present throughout the Lease providing topographic relief in an otherwise flat landscape. Vegetation is sparse due to persistent drought, historic grazing pressure, and highly erosive soils. Primary overstory vegetation includes shrubs such as shadscale (*Atriplex confertifolia*), greasewood (*Sarcobatus vermiculatus*), and four-wing saltbush (*Atriplex canescens*). There are very few trees in the lease area, most of them concentrated along ephemeral washes; these consisting of non-native, invasive saltcedar (*Tamarix* sp.) and Russian olive (*Elaeagnus angustifolia*). Sparse and scattered juniper trees (*Juniperus* spp.) are present along ridges, side-slopes and escarpments.

The climate is a semiarid climate characterized by hot summers and cold winters with little precipitation. The average annual high temperature is 69.8°F and the average annual low temperature is 36.4°F. The average annual precipitation (from 1926 to 2007) is 7 inches (WRCC, 2021).

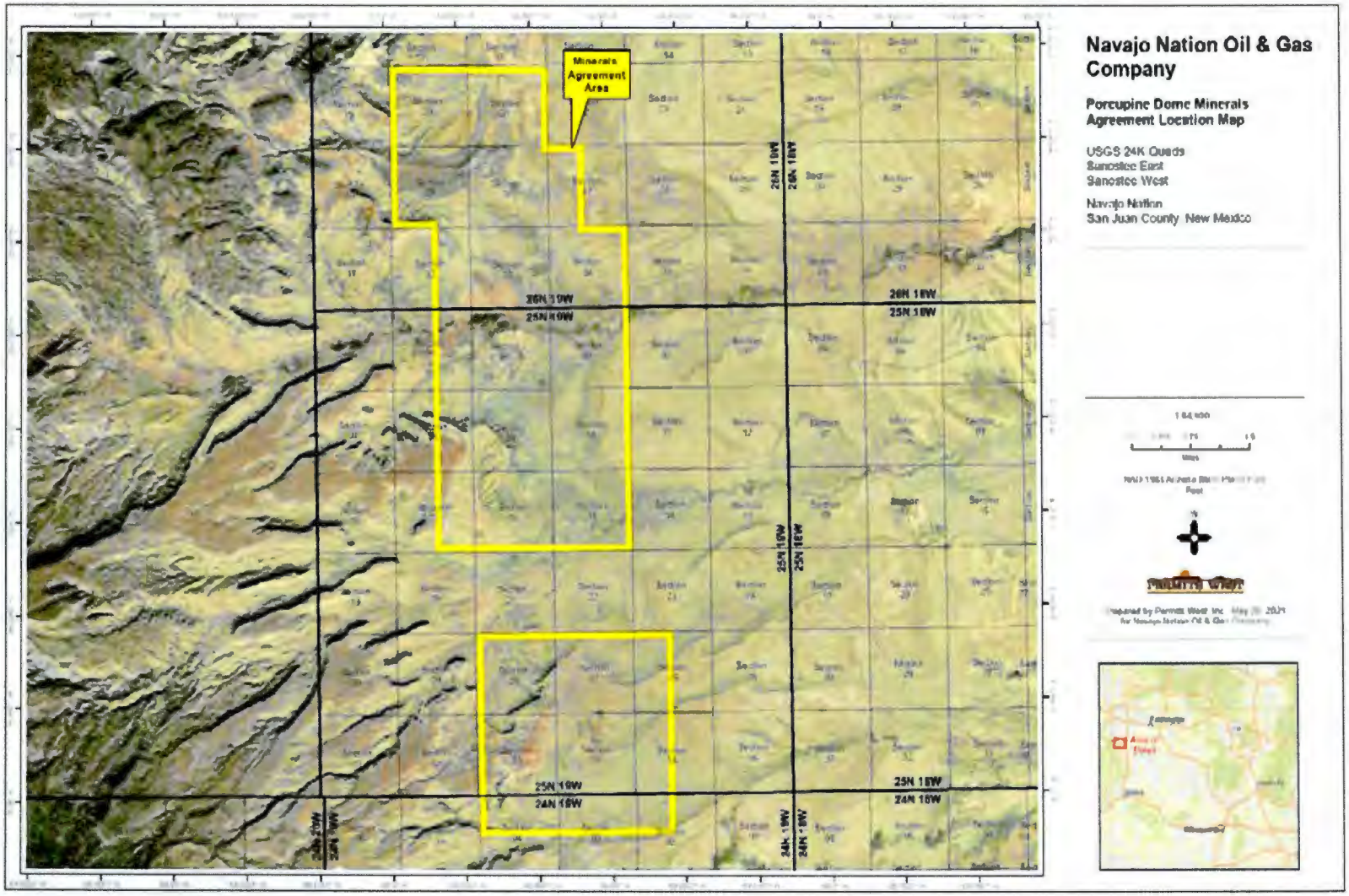

Figure 1. Porcupine Dome Minerals Agreement Lease boundary.

5.1 Geology

The lower elevation areas of the Porcupine Dome Lease are mapped as Mancos Shale, lower part. Major lithologic constituents are sedimentary, limestone, mudstone, and shale. The western and eastern portions of the lease have areas mapped as Gallup Sandstone; a small area in the southeast portion of the lease is mapped as Mesa Verde Group. The Mesa Verde Group has major lithologic constituents of siltstone, sandstone, and mudstone (Green et al, 1997).

5.2 Soils

Major soil units within the Porcupine Dome Lease area are mapped as Persayo-Nataani-Littlehat-Awet, Kimbeto-Farb-Denazar, and Weska-Travessilla-Rockoutcrop-Oelop (USDA Soil Web, 2021).

Persayo-Nataani-Littlehat-Awet Soil Unit

The Littlehat series consists of well drained, moderately permeable saline-sodic soils which are moderately deep to soft bedrock. These soils formed in alluvium and residuum derived from siltstone and shale on summits, footslopes, and backslopes of undulating plateaus. Slopes are 1-45 percent. These soils are comprised of silt loams, with a soil depth of 20 to 40 inches and rapid runoff. The Persayo series consists of shallow, well-drained soils that formed in slope alluvium or colluvium over residuum derived from soft sedimentary bedrock. These soils are on hills, basin floor remnants, fan remnants, dipslopes, scarp slopes and escarments. Slopes are 0 to 65 percent. These soils are comprised of silty clay loams have a moderately slow permeability. The Lawet series consists of very deep, poorly drained and very poorly drained soils formed in loamy alluvium on floodplains. Slopes range from 0 to 2 percent. These soils are made up of sandy clay loams and have slow runoff. The Nataani series consists of well drained, moderately permeable soils which are moderately deep to soft bedrock. Nataani soils formed in alluvium, slope alluvium, and residuum derived from siltstone and sandstone on toeslopes of undulating plateaus and structural benches. Slopes are 1 to 9 percent. These soils are comprised of fine sandy loams, loams, and gypsiferous silt loams and have slow runoff.

Weska-Travessilla-Rockoutcrop-Oelop Soil Unit

The Travessilla series consists of very shallow and shallow, well drained soils that formed in calcareous eolian sediments and material weathered from sandstone. These soils are found on hills, cuestas, scarps, and mesas with slopes ranging from 0 to 75 percent. These soils are comprised of stony sandy loams and channery loams, are well drained and have high runoff. Permeability is moderately rapid. The Weska series consist of shallow and very shallow, well drained soils that formed in residuum from shale and upland hills, breaks and mesas and are comprised of silty clay and clay loams overlying grayish brown soft shale. Slopes are 0 to 40 percent. These soils are well drained with a rapid to very rapid runoff and moderately slow permeability. The Oelop series consists of very deep, well drained soils that formed in alluvium and eolian material derived from sandstone and shale. Oelop soils are on stream terraces, mesas, plateaus and alluvial fans. Slopes are 0-10 percent. These soils are comprised of loams and clay loams and are well drained with medium runoff and moderately slow permeability.

Kimbeto-Farb-Denazar Soil Unit

The Kimbeto series consists of deep and very deep, well drained soils that formed in eolian material, alluvium, slope alluvium, and residuum derived dominantly from sandstone. Kimbeto soils are on summits of plateaus and structural benches, dipslopes of cuestas, and treads of high stream terraces.

Slopes are 0 to 5 percent. These soils are comprised of loamy fine sands, fine sandy loams, and sandy clay loams. Kimbeto soils are well drained with slow runoff and moderate permeability. The Denazar series consists of deep and very deep, somewhat excessively drained soils that formed in eolian material, alluvium, and residuum derived from sandstone. Permeability is rapid or moderately rapid. Denazar soils are on eolian-mantled summits of plateaus and structural benches, and on treads of high stream terraces. Slopes range from 0 to 5 percent. These soils are comprised of fine sands and loam fine sands. They have very slow runoff and rapid or moderately rapid permeability. The Farb series consists of shallow and very shallow, excessively drained soils that formed in residuum, eolian material, colluvium and slope alluvium derived from sandstone and shale. Farb soils are on hills, mesas, cuestas, escarpments, canyons and structural benches. Slopes range from 2 to 40 percent. These soils are comprised of fine sandy loams and sandy loams. Permeability is moderately rapid and runoff is very low to very high.

5.3 Surface Waters and Floodplains

The proposed project area is located within the Chaco watershed (14080106) which drains towards the San Juan River, located approximately 26 miles northeast of the proposed lease (NRCS, 2012). According to the Federal Emergency Management FEMA Flood Map Service Center, the Porcupine Dome Lease area does not have a printed flood map to reference. Flooding in the area is likely minimal because of the lack of perennial surface waters and low precipitation events in the region; particularly over the last 15 to 20 years where climate change has resulted in rising temperatures and less precipitation. There are four major ephemeral drains in the Lease area: Tse Clani-To Wash is located in the north portion, Sanostee wash is located in the middle portion, and Tocito and To-Nil-Choni washes are located in the southern portion of the Lease. These washes are deeply incised dry channels that support sometimes dense stands of Russian olive (*Elaeagnus angustifolia*) and saltcedar (*Tamarix* sp.), as well as Siberian elm (*Ulmus pumila*) all three of which are recognized by the Navajo Nation as Category B noxious weeds (BIA Navajo Integrated Weed Management Plan). Native riparian species such as Rio Grande cottonwood (*Populus* sp.) are rare but present as individual holdouts in some places. These major washes and corresponding banks and floodplains were observed to be frequented by local wildlife and birds, as well as livestock as compared to other areas of the Lease. The relatively well vegetated areas along the washes are used for nesting, foraging, travel corridors, and thermal cover.

5.4 Ecoregions and Vegetation Communities

The majority of the Porcupine Dome Lease area lies within the San Juan/Chaco Tablelands and mesas level IV Ecoregion (Griffith et al, 2006). Vegetation is mapped as Desert Grassland ecotone and Great Basin Desert Scrub (Dick-Peddie, 1993). Representative grass species included alkali sacaton (*Sporobolus airoides*), galleta (*Pleuraphis jamesii*), and foxtail barley (*Hordeum jubatum*). Annual wheatgrass (*Eremopyrum triticeum*) is common in wash bottoms and flats. Some areas, particularly along escarpments, side slopes, and at the summits of hills and mesas, supported a few healthy grasslands; however, most accessible, low-lying areas lacked grasses or supported only heavily grazed grasses. Dominant shrubs throughout the lease area are represented by four-wing saltbush, shadscale, and greasewood. Wildflowers and forbs, some of which were blooming included stemless evening primrose (*Oenothera albicaulis*), scorpion weed (*Phacelia* sp.), sand verbena (*Abronia fragans*), and Astragalus (*Astragalus* spp.), among others.

Four noxious weeds were observed during the surveys: saltcedar, Russian olive, Siberian elm and halogeton (*Halogeton glomeratus*). All three of these species are recognized as noxious weeds by the New Mexico Department of Agriculture and the Navajo Nation (NMDA, 2020) (BIA Navajo Nation Integrated Weed Management Plan), Many areas were inundated with weedy and invasive species, including Russian tumbleweed and Kochia (*Kochia scoparia*).

There are no wetlands, wetland vegetation or established native riparian vegetation present within the proposed Porcupine Dome Lease area (USFWS-NWI, 2021).

6.0 NESL and USFWS Listed Species with Potential to Occur in Project Area

The Porcupine Dome Lease area overlaps with NNHP RCP Areas 1, 2, and 3. Area 1 is defined as a highly sensitive area with regards to wildlife or plant resources and few exceptions on development are granted. Area 2 has moderately sensitive wildlife or plant resources and moderate restrictions on development to avoid sensitive species and habitats. Area 3 has low sensitivity wildlife or plant resources and fewest restrictions on development.

Correspondence with NNDFW-NNHP indicates that there is one "Known" wildlife species and nine "Potential" wildlife species as present or potentially present within 1 to 3 miles of the project area based on their analysis of the Sanostee East and Sansotee West, New Mexico 7.5-minute quadrangles. These NESL wildlife Species of Concern are discussed in Table 1.

The U.S. Fish and Wildlife Services Information, Planning, and Consultation website, lists seven species of wildlife that are federally listed as Threatened or Endangered in San Juan County, New Mexico (USFWS-IPaC, 2021). These federally listed species are discussed in Table 1. Habitat information in Table 1 is taken from NESL Species Accounts Version 4.20 (NNDFW-NNHP, 2020) and U.S. Fish and Wildlife Service Environmental Conservation Online system (USFWS-ECOS, 2021).

Table 1. NESL and USFWS Listed Wildlife Species with Known or Potential Occurrence in Project Area.

Species Name	Status*	Habitat	Comments
Birds			
Burrowing owl *Athene cunicularia*	NESL Group 4	Nests in ground burrows (often deserted prairie-dog burrows) typically in dry, open grasslands or desert scrub. Grasslands with sparse junipers may also be used on the Navajo Nation; presence of suitable nest burrow is critical requisite.	No burrowing owls or burrowing owl habitat burrows were observed during the April 26 and 27, 2021 surveys of the project area. No prairie dog colonies were observed during walking and driving of areas surveyed; however, not all areas of suitable habitat were surveyed. Future development plans may require additional surveys for this species.

Species Name	Status*	Habitat	Comments
Ferruginous hawk *Buteo regalis*	NESL Group 3	Nests in badlands, flat or rolling desert grasslands, and desert shrub. Most nests on Navajo Nation are on pinnacles, small buttes, or short cliffs.	Potential nesting habitat does occur within the project area. However, drought and disease have resulted in decreases in available prey base. Scant evidence of rodents and only one cottontail (*Sylvilagus* sp.) were observed during the April 26 and 27, 2021 surveys. No ferruginous hawks or ferruginous hawk nests were observed during the surveys.
Golden eagle *Aquila chrysaetos*	NESL Group 3	Nests on steep cliffs typically adjacent to foraging habitat. Foraging habitat includes desert grasslands, sagebrush scrub, or desert scrub; shrubs, if present, are sparse.	Cliffs suitable for nesting are present in the lease area particularly in the southern portions. These areas were scanned for golden eagle nests. No golden eagles or eagle nests were observed during the April 26 and 27, 2021 survey. Lack of available prey base may be influencing golden eagle presence in the area.
Mexican spotted owl *Strix occidentalis lucida*	NESL Group 3 ESA Threatened	This species is found within three distinct habitat types: 1) mid-aged to mature mixed-conifer stands dominated by Douglas-fir, typically on mountain slopes, with moderate to dense canopies and multiple canopy layers; and 2) steep-walled, narrow canyons often with riparian vegetation and cool microclimates and 3) moderately sloped drainages with Douglas fir, in piñon-juniper woodland. Not known to nest in ponderosa pine-oak forests on the Navajo Nation, but will use a variety of habitats, including piñon-juniper woodland and clearings when foraging.	The Mexican spotted owl would not be expected to occur in the Porcupine Dome Leas area due to lack of suitable habitat.
Mountain plover *Charadrius montanus*	NESL Group 4	Typically nests in flat to slightly rolling expanses of grassland, semi-desert, or badland, in an area with short, sparse vegetation; with large bare areas; and that is typically disturbed. Grasslands between the Chuska Mountains and Black Mesa, and southwest of Black Mesa to the Little Colorado River are potential habitat.	No mountain plover or evidence of mountain plover were observed during the April 26 and 27 surveys of the Porcupine Dome Lease area. Habitat for this species occurs in the project area, particularly around Sanostee and the southcentral portions of the lease. Additional surveys are recommended for this species if development is to occur in suitable habitat during the breeding season for this species.

Species Name	Status*	Habitat	Comments
Peregrine falcon *Falco peregrinus*	NESL Group 4	Nests on steep cliffs > 100 feet high (typically ≥ 150 feet) in a scrape on sheltered ledges or potholes. Foraging habitat quality is an important factor; often, but not always, extensive wetland and/or forest habitat is within the falcon's hunting range of 7 miles.	Cliffs high enough for nesting do not occur within the Porcupine Dome Lease area; however, an adult peregrine falcon was observed April 27, 2021 at Table Mesa approximately 11 miles northwest of the lease boundary. This species may forage in the lease area.
Southwestern willow flycatcher *Empidonax traillii extimus*	NESL Group 2 ESA Endangered	Dense, multi-tiered riparian vegetation near surface water.	The southwestern willow flycatcher would not be expected to occur in the project area due to lack of suitable riparian habitat, saturated soils, and surface water.
Yellow-billed cuckoo *Coccyzus americanus*	ESA Threatened	Wooded habitat with dense cover and water nearby, including woodlands with low scrubby vegetation and dense thickets along streams rivers and marshes (CLA, 2021).	The yellow-billed cuckoo would not be expected to occur in the project area due to lack of suitable woodland riparian habitat and surface water.
Mammals			
Canada lynx *Lynx canadensis*	ESA Threatened	High elevation and subalpine forests with heavy snowfall.	This species would not be expected to occur in the project area due to lack of high elevation forests.
New Mexico meadow jumping mouse *Zapus hudsonius luteus*	ESA Endangered	Wet meadows, riparian corridors, and wetland areas with dense herbaceous vegetation.	This species would not be expected to occur in the project area due to lack of water features supporting wetland or riparian vegetation.
Kit fox *Vulpes macrotis*	NESL Group 4	Occupies desert scrub and desert grasslands with soft, alluvial or silty-clay soils and often with sparse saltbush, shadscale, greasewood, or sagebrush and grasses.	No kit foxes or evidence of kit foxes were observed during the April 26 and 27 surveys of the Porcupine Dome Lease area. Habitat for this species occurs in the project area. Additional surveys are recommended for this species if development is to occur in suitable habitat.
Fish			
Colorado pikeminnow *Ptchocheilus lucius*	ESA Endangered	Adults use backwaters and flooded riparian areas during spring runoff and migrate to spawn in riffle-run areas with cobble/gravel substrates. Post-spawning adults primarily use run habitats, with eddies and slackwater also being important.	This species would not be expected to occur in the project area due to lack of rivers and streams.

Species Name	Status*	Habitat	Comments
Razorback sucker *Xyrauchen texanus*	ESA Endangered	Inhabits backwaters over sand/silt substrate, deep eddies, and impoundments, shallow to deep runs over sandbars and seasonally flooded shorelines and bottomlands.	This species would not be expected to occur in the project area due to lack of rivers, lakes and streams.
Zuni bluehead sucker *Catostomus discobolus yarrowi*	ESA Endangered	Adults inhabit permanent water in cool to warm water mid-elevation streams, typically using pools and eddies adjacent to rapids and boulders.	This species would not be expected to occur in the project area due to lack of rivers and streams.
Amphibians			
Northern leopard frog *Lithobetes pipens*	NESL Group 2	Found in wetlands usually with permanent water and aquatic vegetation (especially cattails), ranging from irrigation ditches and small streams to rivers, and small ponds and marshes to lakes or reservoirs.	This species could potentially occur in stock ponds/cattle tanks within the project area. Surveys for this species should occur if lease development has the potential to impact any stock ponds/cattle tanks.

*NESL: Navajo Endangered Species List

Group 1: Species or subspecies that no longer occur on Navajo Land.

Group 2: "Endangered" species or subspecies that are in danger of being eliminated from all or a significant portion of their ranges on the Navajo Nation.

Group 3: Species or subspecies that are considered likely to become endangered throughout all or a significant portion of their ranges on the Navajo Nation within the foreseeable future

Group 4: Species or subspecies for which NDFW does not currently have sufficient information for inclusion in Group 2 or 3, but which are being considered

USFWS ESA: U.S. Fish and Wildlife Service Endangered Species Act

Endangered: A species which is in danger of extinction throughout all or a significant portion of its range.

Threatened: A species which is likely to become an Endangered species within the foreseeable future.

7.0 Survey Results

Wildlife potentially occurring in the proposed project area includes a variety of mammals, birds, and reptiles common to the Navajo Nation; however, persistent drought and climate change are likely impacting wildlife across the southwest in various ways, reducing population numbers, impacting reproductive success, and influencing distribution across ranges. These impacts are possibly implicated in the astonishing numbers of deceased birds observed during the fall of 2020 and spring 2021 migration events, rabbit hemorraghic disease, plague and tularemia, declines in insect populations, and other factors. The Porcupine Dome Lease area is remote and sparsely populated and the spring is usually a good time to witness many species of wildlife; however, few species of wildlife were observed during the April 26 and 27, 2021 surveys. Species observed are presented in Table 2.

7.1 Migratory Birds and Raptors

Eleven (11) species of migratory birds and two raptors were observed during two days of survey of Porcupine Dome Lease area (Table 2). Birds were observed in grasslands and shrubland areas, along cliffs and bluffs, and in ephemeral washes. One active great-horned owl (*Bubo virginianus*) and one active common raven (*Corvus corax*) nest were observed along escarpments in the southern portions of

the Lease area. Future development plans of the Porcupine Dome Lease area should consider impacts to nesting migratory birds.

7.2 Species of Concern

No NESL species were observed during the surveys of the Porcupine Dome Lease area. One NESL Group 4 species, peregrine falcon, was observed within 11 miles of the survey area. Habitat for three NESL Group 4 species, mountain plover, kit fox, and ferruginous hawk was observed in the project area and habitat for one NESL Group 2 species, the northern leopard frog may be present in the form of cattle tanks and ponds in the project area. Future development of the lease should consider impacts to these species.

Table 2. Wildlife recorded during the Porcupine Dome Lease Area April 26 and 27, 2021 survey

Species Name	Common Name
Birds	
Cathartes aura	Turkey vulture
Bubo virginianus	Great horned owl (active nest located at approximately Lat. 36.393375°, Long. -108.826196°; another adult observed in Sanostee Wash).
Corvus corax	Common raven (at least one active nest along cliff areas)
Colaptes auratus	Northern flicker
Sayornis saya	Say's phoebe
Catharus guttatus	Hermit thrush (migrant)
Salpinctes obsoletus	Rock wren
Eremophila alpestris	Horned lark
Haemorhous mexicanus	House finch
Spizella passerina	Chipping sparrow
Tachycineta thalassina	Violet-green swallow
Mammals	
Bos taurus	Cattle
Equus caballus	Horse
Ovis sp.	Sheep
Neotoma sp.	Woodrat (along rocky/cliff areas only)
Reptiles	
Crotalus viridis	Prairie rattler

8.0 Recommendations

As the development of the Porcupine Dome Leas area progresses, NNDFW-NNHP may request further surveys to ensure that impacts to wildlife resources, including NESL listed species, migratory birds, or sensitive habitats are avoided or mitigated. Permits West, Inc. agrees with the need for further surveys should areas proposed for development include suitable habitat for any NESL listed species, migratory birds or raptors, and/or sensitive habitats. Some areas of the Porcupine Dome Lease area may be developed without the need for further surveys based on initial results from the April 26 and 27, 2021 surveys and proposed time of year for development. In any case, NNHP would need to be consulted for final decisions on impacts to wildlife resources prior to breaking ground on development within the lease.

9.0 Certification

Results contained in this report represent my best professional judgement and are based on field investigations, research and review of pertinent information sources, information provided by the project proponent, and information provided by the the Navajo Natural Heritage Program.

Celia Cook
Wildlife Biologist
Permits West, Inc.

June 8, 2021

10.0 References

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11.0 Photos from April 26 and 27, 2021 Field Surveys of the Porcupine Dome Lease area.

Photo 1. Coppice formations with stabilizing vegetation along south bank of Tocito Wash. Photo taken facing west from Lat. 36.398148°, Long. -108.846317° (NAD 83).

Photo 2. Bluffs and grassland south of Sanostee. Facing west towards from Lat. 36.410274°, Long. -108.870368° (NAD 83).

Photo 3. Mature Russian olive overstory in Sanostee Wash. Photo facing east from Lat. 36.439032°, Long. -108.810352° (NAD 83). This photo is taken outside Lease boundary but is representative of habitat along portions of Sanostee Wash.

Photo 3. Sparsely vegetated Mancos shale formation. Photo facing northwest from Lat. 36.410377°, Long. -108.849916° (NAD 83).

Photo 5. Sparsely vegetated Mancos shale formation with mesa in distance. Photo facing north from Lat. 36.414000°, Long. -108.850692° (NAD 83).

Photo 6. Cliff habitat. Photo facing south from Lat. 36.400105°, Long. -108.826020° (NAD 83). This photo is taken outside the Lease area but is representative of cliff habitat in the project area.

Appendix A: NNHP Correspondence 21perm103 (9 pages) follows:

NNHP
Navajo Natural Heritage Program

PO BOX 1480
Window Rock, AZ 86515

P 928.871.6472
F 928.871.7603

www.nndfw.org

21perm104

08-April-2021

Cari Eggleston
Permit's West, Inc
37 Verano Loop
Santa Fe, NM 87508
cari@permitswest.com

SUBJECT: Navajo Nation Oil and Gas Company - Tohache Wash / Porcupine Dome Project

Cari Eggleston,

NNHP has performed an analysis of your project in comparison to known biological resources of the Navajo Nation and has included the findings in this letter. The letter is composed of seven parts. The sections as they appear in the letter are:

1. **Known Species** – a list of all species within relative proximity to the project
2. **Potential Species** – a list of potential species based on project proximity to respective suitable habitat
3. **Quadrangles** – an exhaustive list of quads containing the project
4. **Project Summary** – a categorized list of biological resources within relative proximity to the project grouped by individual project site(s) or quads
5. **Conditional Criteria Notes** – additional details concerning various species, habitat, etc.
6. **Personnel Contacts** – a list of employee contacts
7. **Resources** – identifies sources for further information

Known Species lists "species of concern" known to occur within proximity to the project area. Planning for avoidance of these species is expected. If no species are displayed then based upon the records of the Navajo Nation Department of Fish and Wildlife (NNDFW) there are no "species of concern" within proximity to the project. Refer to the Navajo Endangered Species List (NESL) Species Accounts for recommended avoidance measures, biology, and distribution of NESL species on the Navajo Nation (https://www.nndfw.org/nnhp/sp_account.htm).

Potential Species lists species that are potentially within proximity to the project area and need to be evaluated for presence/absence. If no species are found within the Known or Potential Species lists, the project is not expected to affect any federally listed species, nor significantly impact any tribally listed species or other species of concern. Potential for species has been determined primarily on habitat characteristics and species range information. A thorough habitat analysis, and if necessary, species specific surveys, are required to determine the potential for each species.

Species of concern include protected, candidate, and other rare or otherwise sensitive species, including certain native species and species of economic or cultural significance. For legally protected species, the following tribal and federal statuses are indicated: NESL, federal Endangered Species Act (ESA), Migratory

Bird Treaty Act (MBTA), and Eagle Protection Act (EPA). No legal protection is afforded species with only ESA candidate, NESL group 4 status, and species listed on the Sensitive Species List. Please be aware of these species during surveys and inform the NNDFW of observations. Reported observations of these species and documenting them in project planning and management is important for conservation and may contribute to ensuring they will not be up listed in the future.

In any and all correspondence with NNDFW or NNHP concerning this project please cite the Data Request Code associated with this document. It can be found in this report on the top right corner of the every page. Additionally please cite this code in any biological evaluation documents returned to our office.

1. Known Species *(NESL=Navajo Endangered Species List, FE=Federally Endangered, FT=Federally Threatened, FC=Federal Candidate)*

Species

AQCH = Aquila chrysaetos / Golden Eagle NESL G3
SCMEVE = Sclerocactus mesae-verdae / Mesa Verde Cactus NESL G2 FT
**All or parts of this project currently are within areas protected by the Golden and Bald Eagle Nest Protection Regulations; consult with NNDFW zoologist or EA Reviewer for more information and recommendations.

2. Potential Species

Species

AQCH = Aquila chrysaetos / Golden Eagle NESL G3
ATCU = Athene cunicularia / Burrowing Owl NESL G4
BURE = Buteo regalis / Ferruginous Hawk NESL G3
CHMO = Charadrius montanus / Mountain Plover NESL G4
CYPAPU = Cypripedium parviflorum var. pubescens / Yellow Lady's Slipper NESL G4
EMTREX = Empidonax traillii extimus / Southwestern Willow Flycatcher NESL G2 FE
FAPE = Falco peregrinus / Peregrine Falcon NESL G4
LIPI = Lithobates pipiens / Northern Leopard Frog NESL G2
PUPA = Puccinellia parishii / Parish's Alkali Grass NESL G4
SCMEVE = Sclerocactus mesae-verdae / Mesa Verde Cactus NESL G2 FT
STOCLU = Strix occidentalis lucida / Mexican Spotted Owl NESL G3 FT
VUMA = Vulpes macrotis / Kit Fox NESL G4

3. Quadrangles (7.5 Minute)

Quadrangles

Sanostee East (36108-D7) / NM
Sanostee West (36108-D8) / NM

4. Project Summary *(EO1 Mile/EO 3 Miles=elements occuring within 1 & 3 miles., MSO=mexican spotted owl PACs, POTS=potential species, RCP=Biological Areas)*

SITE	EO1MI	EO3MI	QUAD	MSO	POTS	RCP

21perm104

SITE	EO1MI	EO3MI	QUAD	MSO	POTS	RCP
Porcupine Dome Project Area	SCMEVE	AQCH, SCMEVE	Sanostee East (36108-D7) / NM	None	AQCH, ATCU, BURE, CHMO, EMTREX, PUPA, SCMEVE, STOCLU, VUMA	Area 1, Area 2, Area 3
Porcupine Dome Project Area	AQCH, SCMEVE	AQCH, SCMEVE	Sanostee West (36108-D8) / NM	None	AQCH, ATCU, BURE, CHMO, CYPAPU, EMTREX, FAPE, LIPI, PUPA, SCMEVE, STOCLU	Area 1, Area 2, Area 3

5. Conditional Criteria Notes *(Recent revisions made please read thoroughly. For certain species, and/or circumstances, please read and comply)*

A. Biological Resource Land Use Clearance Policies and Procedures (RCP) - The purpose of the RCP is to assist the Navajo Nation government and chapters ensure compliance with federal and Navajo laws which protect, wildlife resources, including plants, and their habitat resulting in an expedited land use clearance process. After years of research and study, the NNDFW has identified and mapped wildlife habitat and sensitive areas that cover the entire Navajo Nation.
The following is a brief summary of six (6) wildlife areas:
1. **Highly Sensitive Area** – recommended no development with few exceptions.
2. **Moderately Sensitive Area** – moderate restrictions on development to avoid sensitive species/habitats.
3. **Less Sensitive Area** – fewest restrictions on development.
4. **Community Development Area** – areas in and around towns with few or no restrictions on development.
5. **Biological Preserve** – no development unless compatible with the purpose of this area.
6. **Recreation Area** – no development unless compatible with the purpose of this area.

None - outside the boundaries of the Navajo Nation
This is not intended to be a full description of the RCP please refer to the our website for additional information at https://www.nndfw.org/clup.htm.

B. Raptors – If raptors are known to occur within 1 mile of project location: Contact the NNHP zoologist at 871-7070 regarding your evaluation of potential impacts and mitigation.
Golden and Bald Eagles- If Golden or Bald Eagle are known to occur within 1 mile of the project, decision makers need to ensure that they are not in violation of the *Golden and Bald Eagle Nest Protection Regulations* found at https://www.nndfw.org/nnhp/docs_reps/gben.pdf.
Ferruginous Hawks – Refer to *Navajo Nation Department of Fish and Wildlife's Ferruginous Hawk Management Guidelines for Nest Protection* (https://www.nndfw.org/nnhp/docs_reps.htm) for relevant information on avoiding impacts to Ferruginous Hawks within 1 mile of project location.
Mexican Spotted Owl - Please refer to the *Navajo Nation Mexican Spotted Owl Management Plan* (https://www.nndfw.org/nnhp/docs_reps.htm) for relevant information on proper project planning near/within spotted owl protected activity centers and habitat.

C. Surveys – Biological surveys need to be conducted during the appropriate season to ensure they are complete and accurate please refer to NN Species Accounts https://www.nndfw.org/nnhp/sp_account.htm. Surveyors on the Navajo Nation must be permitted by the Director, NNDFW. Contact Jeff Cole at (928) 871-6450 for permitting procedures. Questions pertaining to surveys should be directed to the NNDFW the NNHP Zoologist for animals, and the NNHP Botanist for plants. Questions regarding biological evaluation should be directed to Jeff Cole at 871-6450.

D. Oil/Gas Lease Sales – Any settling or evaporation pits that could hold contaminants should be lined and covered. Covering pits, with a net or other material, will deter waterfowl and other migratory bird use. Lining pits will protect ground water quality.

E. Power line Projects – These projects need to ensure that they do not violate the regulations set forth in the *Navajo Nation Raptor Electrocution Prevention Regulations* found at https://www.nndfw.org/nnhp/docs_reps/repr.pdf.

F. Guy Wires – Does the project design include guy wires for structural support? If so, and if bird species may occur in relatively high concentrations in the project area, then guy wires should be equipped with highly visual markers to reduce the potential mortality due to bird-guy wire collisions. Examples of visual markers include aviation balls and bird flight diverters. Birds can be expected to occur in relatively high concentrations along migration routes (e.g., rivers, ridges or other distinctive linear topographic features) or where important habitat for breeding, feeding, roosting, etc. occurs. The U.S. Fish and Wildlife Service recommends marking guy wires with at least one marker per 100 meters of wire.

G. San Juan River – On 21 March 1994 (Federal Register, Vol. 59, No. 54), the U.S. Fish and Wildlife Service designated portions of the San Juan River (SJR) as critical habitat for Ptychocheilus lucius (Colorado pikeminnow) and Xyrauchen texanus (Razorback sucker). Colorado pikeminnow critical habitat includes the SJR and its 100-year floodplain from the State Route 371 Bridge in T29N, R13W, sec. 17 (New Mexico Meridian) to Neskahai Canyon in the San Juan arm of Lake Powell in T41S, R11E, sec. 26 (Salt Lake Meridian) up to the full pool elevation. Razorback sucker critical habitat includes the SJR and its 100-year floodplain from the Hogback Diversion in T29N, R16W, sec. 9 (New Mexico Meridian) to the full pool elevation at the mouth of Neskahai Canyon on the San Juan arm of Lake Powell in T41S, R11E, sec. 26 (Salt Lake Meridian). All actions carried out, funded or authorized by a federal agency which may alter the constituent elements of critical habitat must undergo section 7 consultation under the Endangered Species Act of 1973, as amended. Constituent elements are those physical and biological attributes essential to a species conservation and include, but are not limited to, water, physical habitat, and biological environment as required for each particular life stage of a species.

H. Little Colorado River - On 21 March 1994 (Federal Register, Vol. 59, No. 54) the U.S. Fish and Wildlife Service designated Critical Habitat along portions of the Colorado and Little Colorado Rivers (LCR) for Gila cypha (humpback chub). Within or adjacent to the Navajo Nation this critical habitat includes the LCR and its 100-year floodplain from river mile 8 in T32N R6E, sec. 12 (Salt and Gila River Meridian) to its confluence with the Colorado River in T32N R5E sec. 1 (S&GRM) and the Colorado River and 100-year floodplain from Nautuloid Canyon (River Mile 34) T36N R5E sec. 35 (S&GRM) to its confluence with the LCR. All actions carried out, funded or authorized by a federal agency which may alter the constituent elements of Critical Habitat must undergo section 7 consultation under the Endangered Species Act of 1973, as amended. Constituent elements are those physical and biological attributes essential to a species conservation and include, but are not limited to, water, physical habitat, and biological environment as required for each particular life stage of a species.

I. Wetlands – In Arizona and New Mexico, potential impacts to wetlands should also be evaluated. The U.S. Fish & Wildlife Service's National Wetlands Inventory (NWI) maps should be examined to determine whether areas classified as wetlands are located close enough to the project site(s) to be impacted. In cases where the maps are inconclusive (e.g., due to their small scale), field surveys must be completed. For field surveys, wetlands identification and delineation methodology contained in the "Corps of Engineers Wetlands Delineation Manual" (Technical Report Y-87-1) should be used. When wetlands are present, potential impacts must be addressed in an environmental assessment and the Army Corps of Engineers, Phoenix office, must be contacted. NWI maps are available for examination at the Navajo Natural Heritage Program (NNHP) office, or may be purchased through the U.S. Geological Survey (order forms are available through the NNHP). The NNHP has complete coverage of the Navajo Nation, excluding Utah, at 1:100,000 scale; and coverage at 1:24,000 scale in the southwestern portion of the

Navajo Nation. In Utah, the U.S. Fish & Wildlife Service's National Wetlands Inventory maps are not yet available for the Utah portion of the Navajo Nation, therefore, field surveys should be completed to determine whether wetlands are located close enough to the project site(s) to be impacted. For field surveys, wetlands identification and delineation methodology contained in the "Corps of Engineers Wetlands Delineation Manual" (Technical Report Y-87-1) should be used. When wetlands are present, potential impacts must be addressed in an environmental assessment and the Army Corps of Engineers, Phoenix office, must be contacted. For more information contact the Navajo Environmental Protection Agency's Water Quality Program.

J. Life Length of Data Request – The information in this report was identified by the NNHP and NNDFW's biologists and computerized database, and is based on data available at the time of this response. If project planning takes more than two (02) years from the date of this response, verification of the information provided herein is necessary. It should not be regarded as the final statement on the occurrence of any species, nor should it substitute for on-site surveys. Also, because the NNDFW information is continually updated, any given information response is only wholly appropriate for its respective request.

K. Ground Water Pumping - Projects involving the ground water pumping for mining operations, agricultural projects or commercial wells (including municipal wells) will have to provide an analysis on the effects to surface water and address potential impacts on all aquatic and/or wetlands species listed below. NESL Species potentially impacted by ground water pumping: Carex specuicola (Navajo Sedge), Cirsium rydbergii (Rydberg's Thistle), Primula specuicola (Cave Primrose), Platanthera zothecina (Alcove Bog Orchid), Puccinellia parishii (Parish Alkali Grass), Zigadenus vaginatus (Alcove Death Camas), Perityle specuicola (Alcove Rock Daisy), Symphyotrichum welshii (Welsh's American-aster), Coccyzus americanus (Yellow-billed Cuckoo), Empidonax traillii extimus (Southwestern Willow Flycatcher), Rana pipiens (Northern Leopard Frog), Gila cypha (Humpback Chub), Gila robusta (Roundtail Chub), Ptychocheilus lucius (Colorado Pikeminnow), Xyrauchen texanus (Razorback Sucker), Cinclus mexicanus (American Dipper), Speyeria nokomis (Western Seep Fritillary), Aechmophorus clarkia (Clark's Grebe), Ceryle alcyon (Belted Kingfisher), Dendroica petechia (Yellow Warbler), Porzana carolina (Sora), Catostomus discobolus (Bluehead Sucker), Cottus bairdi (Mottled Sculpin), Oxyloma kanabense (Kanab Ambersnail)

21perm104

6. Personnel Contacts

Wildlife Manager
Leanna Begay
928.871.6450
lbegay@nndfw.org

Zoologist
Brent Powers
928.871.7070
bpowers@nndfw.org

Botanist
Nora Talkington
ntalkington@nndfw.org

Biological Reviewer (Interim)
Taylor Greene
928.871.6450
tgreene@nndfw.org

GIS Supervisor
Dexter D Prall
928.645.2898
prall@nndfw.org

7. Resources

Navajo Endangered Species List:
https://www.nndfw.org/nnhp/endangered.htm

Species Accounts:
https://www.nndfw.org/nnhp/sp_account.htm

Biological Investigation Permit Application
https://www.nndfw.org/nnhp/study_permit.htm

Navajo Nation Sensitive Species List
https://www.nndfw.org/nnhp/trackinglist.htm

Various Species Management and/or Document and Reports
https://www.nndfw.org/nnhp/docs_reps.htm

Consultant List
https://www.nndfw.org/bi_consult_list_2014.pdf

Dexter D Prall, GIS Supervisor - Natural Heritage Program
Navajo Nation Department of Fish and Wildlife

IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

Location

San Juan County, New Mexico

Local office

New Mexico Ecological Services Field Office

(505) 346-2525
(505) 346-2542

2105 Osuna Road Ne
Albuquerque, NM 87113-1001

http://www.fws.gov/southwest/es/NewMexico/
http://www.fws.gov/southwest/es/ES_Lists_Main2.html

Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species[1] and their critical habitats are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries[2]).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact NOAA Fisheries for species under their jurisdiction.

1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information. IPaC only shows species that are regulated by USFWS (see FAQ).
2. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following species are potentially affected by activities in this location:

Mammals

NAME	STATUS

Canada Lynx Lynx canadensis — Threatened

There is **final** critical habitat for this species. The location of the critical habitat is not available.
https://ecos.fws.gov/ecp/species/3652

New Mexico Meadow Jumping Mouse Zapus hudsonius luteus — Endangered
Wherever found

This species only needs to be considered if the following condition applies:

- If project affects dense herbaceous riparian vegetation along waterways (stream, seep, canal/ditch).

There is **final** critical habitat for this species. The location of the critical habitat is not available.
https://ecos.fws.gov/ecp/species/7965

Birds

NAME	STATUS
Southwestern Willow Flycatcher Empidonax traillii extimus Wherever found There is **final** critical habitat for this species. The location of the critical habitat is not available. https://ecos.fws.gov/ecp/species/6749	Endangered
Yellow-billed Cuckoo Coccyzus americanus There is **final** critical habitat for this species. The location of the critical habitat is not available. https://ecos.fws.gov/ecp/species/3911	Threatened

Fishes

NAME	STATUS
Colorado Pikeminnow (=squawfish) Ptychocheilus lucius There is **final** critical habitat for this species. Your location overlaps the critical habitat. https://ecos.fws.gov/ecp/species/3531	Endangered
Razorback Sucker Xyrauchen texanus Wherever found There is **final** critical habitat for this species. Your location overlaps the critical habitat. https://ecos.fws.gov/ecp/species/530	Endangered

Zuni Bluehead Sucker Catostomus discobolus yarrowi — Endangered
Wherever found
There is **final** critical habitat for this species. The location of the critical habitat is not available.
https://ecos.fws.gov/ecp/species/3536

Flowering Plants

NAME	STATUS
Knowlton's Cactus Pediocactus knowltonii Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/1590	Endangered
Mancos Milk-vetch Astragalus humillimus Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/7483	Endangered
Mesa Verde Cactus Sclerocactus mesae-verdae Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/6005	Threatened

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

This location overlaps the critical habitat for the following species:

NAME	TYPE
Colorado Pikeminnow (=squawfish) Ptychocheilus lucius https://ecos.fws.gov/ecp/species/3531#crithab	Final
Razorback Sucker Xyrauchen texanus https://ecos.fws.gov/ecp/species/530#crithab	Final

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Appendix B - 5

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.

Additional information can be found using the following links:

- Birds of Conservation Concern http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php
- Measures for avoiding and minimizing impacts to birds http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php
- Nationwide conservation measures for birds http://www.fws.gov/migratorybirds/pdf/management/nationwidestandardconservationmeasures.pdf

The birds listed below are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ below. This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the E-bird data mapping tool (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found below.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON (IF A BREEDING SEASON IS INDICATED FOR A BIRD ON YOUR LIST, THE BIRD MAY BREED IN YOUR PROJECT AREA SOMETIME WITHIN THE TIMEFRAME SPECIFIED, WHICH IS A VERY LIBERAL ESTIMATE OF THE DATES INSIDE WHICH THE BIRD BREEDS ACROSS ITS ENTIRE RANGE. "BREEDS ELSEWHERE" INDICATES THAT THE BIRD DOES NOT LIKELY BREED IN YOUR PROJECT AREA.)

Bald Eagle Haliaeetus leucocephalus — Breeds Dec 1 to Aug 31
This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.
https://ecos.fws.gov/ecp/species/1626

Bendire's Thrasher Toxostoma bendirei — Breeds Mar 15 to Jul 31
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9435

Black Swift Cypseloides niger — Breeds Jun 15 to Sep 10
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/8878

Brewer's Sparrow Spizella breweri — Breeds May 15 to Aug 10
This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA
https://ecos.fws.gov/ecp/species/9291

Burrowing Owl Athene cunicularia — Breeds Mar 15 to Aug 31
This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA
https://ecos.fws.gov/ecp/species/9737

Clark's Grebe Aechmophorus clarkii — Breeds Jan 1 to Dec 31
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Golden Eagle Aquila chrysaetos — Breeds Jan 1 to Aug 31
This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA
https://ecos.fws.gov/ecp/species/1680

Grace's Warbler Dendroica graciae — Breeds May 20 to Jul 20
This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA

Gray Vireo Vireo vicinior — Breeds May 10 to Aug 20
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/8680

Lesser Yellowlegs Tringa flavipes This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9679	Breeds elsewhere
Lewis's Woodpecker Melanerpes lewis This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9408	Breeds Apr 20 to Sep 30
Long-billed Curlew Numenius americanus This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/5511	Breeds Apr 1 to Jul 31
Long-eared Owl asio otus This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/3631	Breeds Mar 1 to Jul 15
Marbled Godwit Limosa fedoa This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9481	Breeds elsewhere
Olive-sided Flycatcher Contopus cooperi This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/3914	Breeds May 20 to Aug 31
Pinyon Jay Gymnorhinus cyanocephalus This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9420	Breeds Feb 15 to Jul 15
Rufous Hummingbird selasphorus rufus This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/8002	Breeds elsewhere
Virginia's Warbler Vermivora virginiae This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9441	Breeds May 1 to Jul 31

Willet Tringa semipalmata This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds elsewhere
Willow Flycatcher Empidonax traillii This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/3482	Breeds May 20 to Aug 31

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence ( )

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

Breeding Season ( )
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

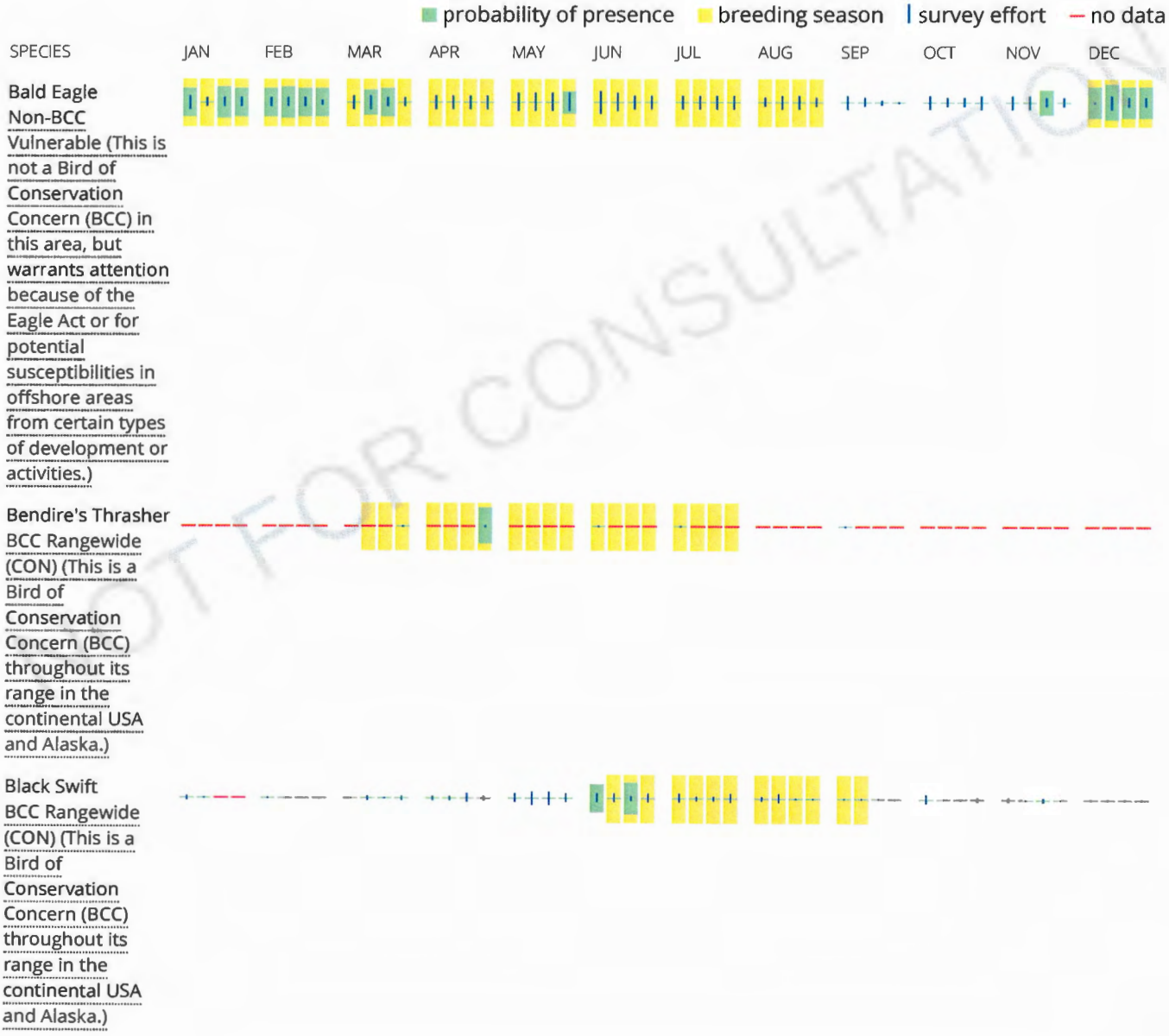
Survey Effort (|)

Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

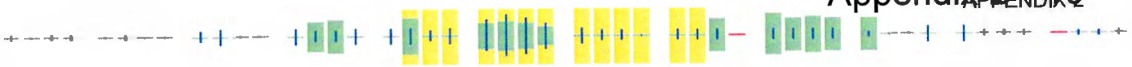
To see a bar's survey effort range, simply hover your mouse cursor over the bar.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

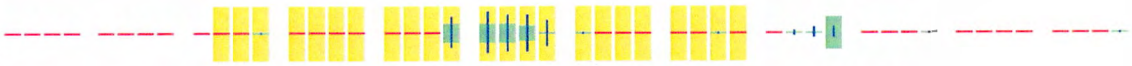
Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.



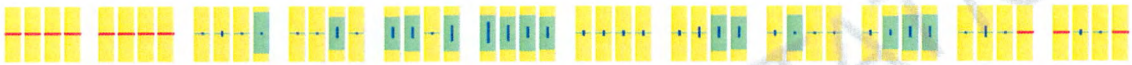
Brewer's Sparrow BCC - BCR (This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA)



Burrowing Owl BCC - BCR (This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA)



Clark's Grebe BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)



Golden Eagle BCC - BCR (This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA)

Grace's Warbler BCC - BCR (This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA)

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Gray Vireo BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Lesser Yellowlegs BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Lewis's Woodpecker BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

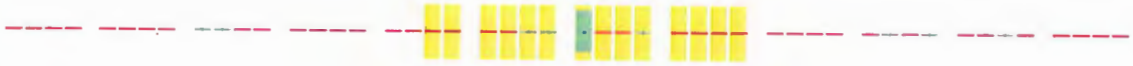
Long-billed Curlew BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

SPECIES JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC

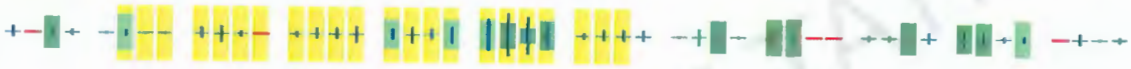
Long-eared Owl BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Marbled Godwit BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

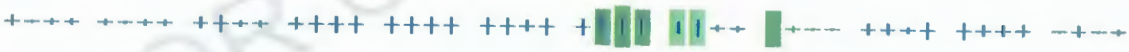
Olive-sided Flycatcher BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)



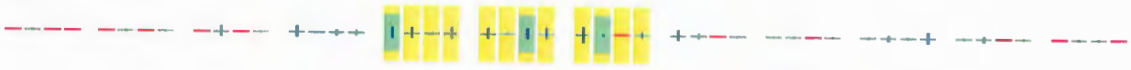
Pinyon Jay BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)



Rufous Hummingbird BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

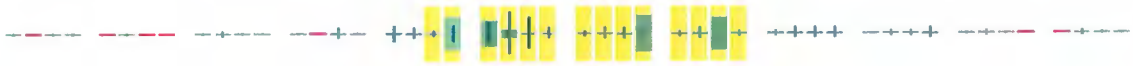


Virginia's Warbler BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)



Willet BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Willow Flycatcher BCC - BCR (This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA)



Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the migratory birds potentially occurring in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the AKN Phenology Tool.

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets .

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering, migrating or present year-round in my project area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may refer to the following resources: The Cornell Lab of Ornithology All About Birds Bird Guide, or (if you are unsuccessful in locating the bird of interest there), the Cornell Lab of Ornithology Neotropical Birds guide. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii), the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting

point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

Facilities

National Wildlife Refuge lands

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS AT THIS LOCATION.

Fish hatcheries

THERE ARE NO FISH HATCHERIES AT THIS LOCATION.

Wetlands in the National Wetlands Inventory

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

This location overlaps the following wetlands:

The area of this project is too large for IPaC to load all NWI wetlands in the area. The list below may be incomplete. Please contact the local U.S. Fish and Wildlife Service office or visit the NWI map for a full list.

FRESHWATER EMERGENT WETLAND

PEM1A

PEM1/SS1A
PEM1/SS2A
PEM1/SS1C
PEM1/SS2Jh
PEM1/SS1Ah
PEM1/SS1Ch

FRESHWATER POND

PAB4Hh
PAB4Fh
PAB4Fx

LAKE

L1UBHh
L
L2UBF
L2UBFx
L2UBFh
L2USAh
L2EM2F
L2USCh

A full description for each wetland code can be found at the National Wetlands Inventory website

Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish

the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

A REVIEW OF NNHPD AND NMCRIS SITE RECORDS FOR NAVAJO NATION OIL & GAS COMPANY'S PORCUPINE DOME LEASE AREA, SANOSTEE AND RED VALLEY CHAPTERS, SAN JUAN COUNTY, NEW MEXICO

Prepared by
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and Beth McCormack
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Submitted by
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Prepared for
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St. Michaels, Arizona 86511

LONE MOUNTAIN ARCHAEOLOGICAL SERVICES, INC.

Lone Mountain Report No. 3514b
June 9, 2021

Navajo Nation Oil & Gas Company proposes to design and place oil and gas production facilities in the Porcupine Dome Lease Area on Navajo Nation lands, Sanostee and Red Valley Chapters, San Juan County, New Mexico. Planning locations and designs for any proposed facilities will depend on environmental and cultural conditions within the Porcupine Dome Lease Area, including the location of previously-identified archaeological sites and Traditional Cultural Properties.

In anticipation of this undertaking, Lone Mountain Archaeologist, Douglas Boggess, performed a records search of the 13,275.187-acre Porcupine Dome Lease Area on April 7, 2021 at the offices of the Navajo Nation Heritage and Historic Preservation Department in Window Rock, Arizona and between June 1 and June 7, 2021 with NMCRIS records maintained by the State of New Mexico.

Lands in the lease area are administered by the Navajo Nation Heritage and Historic Preservation Department, which will serve as lead agency for any development within the lease area. The lease area is within San Juan County on the Old Pine Spring, NM; Sanostee East, NM; Sanostee West, NM; and Tsin-nas-kid, NM 7.5' USGS quadrangles. The lease area falls within Township 24 North, Range 19 West, Sections 2 to 4; Township 25 North, Range 19 West, Sections 3 to 5, 8 to 10, 15 to 17, 26 to 28, and 33 to 35; and 26 North, Range 19 West, Sections 20, 21, 27 to 29, and 32 to 34.

Lone Mountain identified one previously-reported Traditional Cultural Property and 120 archaeological sites listed within or adjacent to the lease area. Development should be designed to avoid all NRHP-eligible sites by at least 100 ft.

ABSTRACT ii

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Lone Mountain Archaeologist, Douglas Boggess, performed a records search of the 13,275.187-acre Porcupine Dome Lease Area on April 7, 2021.

DESCRIPTION OF UNDERTAKING

Navajo Nation Oil & Gas Company proposes to design and place oil and gas production facilities in the Porcupine Dome Lease Area on Navajo Nation lands, Sanostee and Red Valley Chapters, San Juan County, New Mexico. Planning locations and designs for any proposed facilities will depend on environmental and cultural conditions within the Porcupine Dome Lease Area, including the location of previously-identified archaeological sites and Traditional Cultural Properties.

PROJECT LOCATION

The 13,275.187-acre lease area falls within Township 24 North, Range 19 West, Sections 2 to 4; Township 25 North, Range 19 West, Sections 3 to 5, 8 to 10, 15 to 17, 26 to 28, and 33 to 35; and 26 North, Range 19 West, Sections 20, 21, 27 to 29, and 32 to 34 (Figures 1.1 through 1.7).

ENVIRONMENTAL SETTING

The Porcupine Lease Area comprises a northern and a southern block located in the northern Chuska Valley in the San Juan Basin to the east of the Chuska Mountains. Tocito Wash passes between the two blocks and Sanostee and Pajarito Washes pass through the northern block. The town of Sanostee is located within the northern block. The lease area overlies Mancos shale, upper part; Mancos shale, lower part; and Gallup sandstone, all Cretaceous-period formations. Elevations are between 6,000 ft and 6,480 ft amsl.

Brown (1994) characterizes the area as Plains and Great Basin Grassland and Great Basin Conifer Woodland. Local vegetation includes juniper, sand sage, snakeweed, and various forbs and grasses.

CULTURAL BACKGROUND

The presence, nature, and spatial organization of prehistoric, protohistoric, and historic resources in the project area have been studied sporadically since the mid 1980s. As described below, much of the previous work within the Beautiful Mountain area has consisted of literature reviews and linear surveys for powerlines and pipelines. Archaeological sites, including prehistoric and possibly protohistoric sites, have been found in moderate density in this area. Resources can be expected to represent much of antiquity, spanning a 6,000- to 7,000-year period of use. In the following paragraphs, a brief outline of these resource types is presented to provide a background for the study of the prehistoric, protohistoric, and historic resources found in the lease area.

PALEOINDIAN PERIOD (CA. 10,500 B.C.+ TO 5,500 B.C.)

Despite some controversial evidence indicating a human presence in the New World earlier than 10,500 B.C., Anderson and Faught (2000) argue that current evidence is insufficient to describe any cultural trends prior to the appearance of the Clovis complex at around 10,500 B.C., notwithstanding Hayden's (1976) arguments for the Malpais pre-San Dieguito/San Dieguito material (Heilen 2004). The earliest documented human use of the region was during the Paleoindian Period (ca. 10,500 B.C. to 5.500 B.C.). This period is generally divided into three temporally-distinct complexes based on changes in material culture and adaptation: the Clovis, Folsom, and Plano phases.

Paleoindian settlement and subsistence strategies are best described as primarily focused on the hunting of Pleistocene megafauna, most notably mammoth and bison. Given the nature of these animals and their wide distribution across the landscape, it has been assumed that Paleoindians were highly mobile hunters. This is supported by tools manufactured of raw materials procured from sources that are at great distances from sites.

The Clovis complex (ca. 10,500 B.C. to 9000 B.C.) is defined by the presence of Clovis points and a hunting economy focused on the exploitation of megafauna, particularly the mammoth. Clovis points are large, bifacially flaked lanceolate projectile points that are distinctively fluted. These points have a concave base and the scar of a flute or channel flake that has been removed from each side of the point base extending upward and parallel to the blade margins. Other artifacts found in the Clovis assemblage include transverse end scrapers, side scrapers, bifacial knives, perforators, gravers, and hammerstones (Stuart and Gauthier 1988). These tools tend to be quite distinct in the fineness of their manufacture and the quality of materials used.

The Folsom complex (ca. 9000 B.C. to 8200 B.C.) is defined by the presence of Folsom points and an economy that was largely based on the exploitation of Bison antiquus. Folsom points were also fluted, but a change in technology and craftsmanship from the Clovis period makes these points distinctive. Folsom points are characterized by highly skilled lateral flaking and a broader, longer channel flake scar than on Clovis points. Midland-style points are also associated with the Folsom phase and are similar to Folsom points, but without the fluting. Other tools associated with the Folsom assemblage include end scrapers, perforators, knives, drills, choppers, and awls.

The Plano complex is generally used to describe the Late Paleoindian Period, dating from 8200 B.C. to 5500 B.C. This phase includes a number of complexes characterized by large unfluted lanceolate points. These include Plainview, Frederick, Agate Basin, Hell Gap, Firstview, Alberta, and Cody. Very few Paleoindian remains have been found thus far in the Chuska Valley, with the exception of the Peach Springs site in the southern Chuska Valley.

ARCHAIC PERIOD (5500 B.C. TO 1500 B.C.)

Archaic-period sites date between 5500 and 1500 B.C. The Archaic Period may be subdivided into the Early, Middle, and Late Archaic phases. The beginning of the Archaic Period, the Early Archaic, corresponds to climatic changes that brought warmer, drier conditions. These environmental changes required different subsistence strategies than those practiced during the preceding Paleoindian Period. Subsistence procurement shifted from a strategy focused on hunting to the exploitation of a broad spectrum of faunal and floral resources. Archaic populations responded to the discontinuous spatial and seasonal availability of resources through a serial foraging settlement system employing a high degree of residential mobility. During the terminal Archaic, maize (corn) is introduced and horticulture becomes the dominant subsistence mode in the Glen Canyon area (Geib 1996).

Artifact assemblages from the Archaic Period exhibit a greater diversity than that of the preceding Paleoindian Period. Projectile points decreased in size, indicating that smaller animal species were being hunted. The introduction of groundstone tools indicates an increased emphasis on vegetable foods in the diet. Studies of Archaic-period cultural remains in the region indicate that projectile points include a variety of stemmed, corner-notched, and side-notched forms (e.g., Geib 1996; Irwin 1999). Open-twined and plain-weave sandals and close-coiled basketry are typical of this period (Geib 1996).

Archaic sites dating to the Early, Middle, and Late Archaic have been documented in the region, though not within the lease area. These occur primarily in higher-altitude settings where game and wild plant resources are abundant. Maize was introduced to this region during the Late Archaic. This resource may have been used differentially by various dispersed Archaic groups. Some groups may have depended almost entirely on wild plant resources, while others may have adopted maize as a supplement to their diet. These differences resulted in divergences in the settlement and subsistence systems employed by Archaic groups in the San Juan Basin and Northern Colorado Plateau. Vierra and Doleman (1994) have suggested that San Juan Basin Archaic groups may have practiced a mixed collector-forager strategy wherein they aggregated into winter base camps and dispersed into small groups utilizing a foraging strategy during spring, summer, and fall.

Groups wintered in higher altitude settings, subsisting on stored foods, piñon nuts, and game resources. During the spring and summer, San Juan Basin groups migrated to lower-altitude settings where grasses and other resources were bountiful.

BASKETMAKER II PERIOD (1500 B.C. TO A.D. 500; A.D. 1 TO 400)

Although the Pecos Classification indicates the Basketmaker II Period dates to between 1500 B.C. and A.D. 500, most Basketmaker II sites in the Four Corners Region date between A.D. 1 and A.D. 400 (Fuller 1989; Gregg and Smiley 1995; Matson et al. 1988; Morris and Burgh 1954). The Basketmaker II period marks a transition toward a greater reliance on maize agriculture, increased sedentism, and the initiation of the Anasazi way of life.

Some researchers (Kidder and Guernsey 1919, 1922; Matson 1991) assert that the Basketmaker II Period marks the intrusion of farmers known as the White Dog variant of the Basketmaker II culture. Excavations at cave sites in southeastern Utah (Blackburn and Williamson 1997; Geib 1996; Geib and Davidson 1994) indicate that White Dog Basketmaker material culture is distinct from the preceding Archaic Period and includes weft-twined cord bags, weft-face plain-weave sandals, White Dog projectile points, S-shaped sticks, and close-coiled basketry. Projectile points are large and similar to the dart points of the Archaic Period, but typically have wider, shallower notches than Archaic point types.

BASKETMAKER III PERIOD (A.D. 575 TO 750)

The Basketmaker III (A.D. 575 to 750) Period is distinguished from the preceding period by the introduction of ceramics and the bow and arrow. This corresponds with a decrease in the size of projectile points. Beans were added to the subsistence regime. An increased reliance on maize agriculture and decreased use of faunal and wild plant resources is reflected in settlement patterns and in the nature of artifact assemblages.

A distinctive Chuska Valley ceramic series with trachyte temper begins to appear at this time with Bennet Gray and Theodore Black-on-white being the earliest types identified in this series. Small stemmed and corner-notched arrow points are typical of this period. Lithic technology became increasingly focused on core reduction and the production of simple flake tools. Groundstone tools increased in frequency and trough metates were introduced, reflecting the importance of maize in the Basketmaker III diet.

Shallow pit structures with antechambers, banquettes, central clay-lined hearths, wing walls, four-post roof supports, and storage pits typify the Basketmaker III Period. Storage facilities became more common, again reflecting the importance of domesticated crops. Evidence has been found of village life and community formation during the Basketmaker III period, although such aggregations may have been seasonal prior to the Pueblo I period.

PUEBLO I PERIOD (A.D. 750 TO 900)

The Pueblo I Period in northwestern New Mexico dates between A.D. 750 and A.D. 900. It is during this period that a distinctive architectural layout and the formation of large village settlements were introduced. Habitation sites were generally composed of square subterranean, pit structures backed by one or two rows of contiguous rectangular surface rooms constructed of jacal and slab-lined walls. Graywares (Bennet Gray, Sheep Springs Gray, and Tocito Gray) Neck-banded graywares (Gray Hills Banded); redwares (Sanostee Red-on-orange); and whitewares (Pena, Crozier, Tunicha, and Drolet Black-on-whites) characterize Pueblo I-period ceramic assemblages.

Regionally, Pueblo I settlements range from isolated pit structures to large villages comprised of multiple pit structures and arcs of surface rooms. Most sites identified thus far in the Beautiful Mountain area are Pueblo I at the oldest.

PUEBLO II PERIOD (A.D. 900 TO 1100)

The Pueblo II Period dates between A.D. 900 and A.D. 1100. Pueblo II subsistence became increasingly dependent on maize agriculture. A marked increase in the frequency and diversity of groundstone tools and a concurrent decrease in flaked-stone tools associated with hunting reflect this trend. Ceramic types in the Chuska Valley became more diverse and include corrugated and indented corrugated graywares (e.g. Newcomb Cor-

rugated, Captain Tom Corrugated, and Hunter Corrugated), and whitewares occurring both as organic and mineral painted variants (Newcomb and Naschitti, Toadlena and Taylor, and Burnham, Chuska, and Brimhall Black-on-whites).

Regionally, the Pueblo II Period marks the transition to stone masonry architectural units and the development of new forms of community organization. Habitation sites from this period typically consist of unit pueblos (Prudden 1903) comprised of surface masonry rooms, an earthen pit structure or kiva, and a trash midden. During the early Pueblo II Period, surface rooms had stone masonry lower walls with jacal construction. Later in the period, full-height masonry walls became common. Kivas were generally round, with a surrounding bench, six masonry pilasters, a hearth, ventilator shaft, and sipapu (Cordell 1997). Recent research in the region suggests that subterranean or semi-subterranean mealing rooms are frequently associated with kiva facilities (Mobley-Tanaka 1993).

While much of the population occupied small, dispersed habitations, the Chacoan form of community organization emerged in the Chuska Valley, indicating higher levels of community integration and interaction relative to the preceding period. Great houses, road segments, and great kivas formed the central elements to the community of households and farmsteads. The introduction of the Chacoan form of organization along drainages in the Anasazi region marked an era of agricultural intensification, increased economic specialization and community interaction, and social differentiation.

Late Pueblo II- to Early Pueblo III-period sites are common along drainages throughout the region and include habitations, field houses, and artifact scatters. These great house sites appear to have served as central places for the Pueblo II and Pueblo III community and are found across the region.

PUEBLO III PERIOD (A.D. 1100 TO 1350)

The Pueblo III Period dates between A.D. 1100 and A.D. 1350. The early Pueblo III Period witnessed a reorganization of the community in the post-Chacoan era, leading to the development of communities focused on nucleated pueblos within defensible locations dwell while small family group sites began to appear in the southern Chuska Valley. This form of organization continued until Pueblo sites were abandoned in the early 1300s.

During the Pueblo III Period, there was a notable increase in site size. Sites are found in a variety of areas, including canyon rims, rockshelters, talus slopes, and canyon bottoms (Cordell 1997). Multi-story habitations with kivas, wholly or partially enclosed by rooms or walls, became more frequent and Mesa Verde keyhole-shaped kivas tended to replace the circular forms found during the preceding period. New site types and features were also introduced, including tri-wall structures, towers, plazas, shrines, reservoirs, stone check dams, and field houses (Cordell 1997). These developments signal a change in social organization, increased ceremonialism, and an intensification of the agricultural subsistence base.

Pueblo III ceramic assemblages in the Chuska Valley include Hunter Corrugated, Nava Black-on-white, and Crumbled House Black-on-white.

PROTOHISTORIC PERIOD (A.D. 1350 TO 1700)

While the Rio Grande and the Little Colorado drainages continued to be utilized into the early Protohistoric (Pueblo IV) Period by Puebloan groups, the San Juan Region was abandoned by Pueblo people following the Pueblo III Period, between A.D. 1350 and A.D. 1500.

Archaeological remains that are identifiably Navajo have dates between A.D. 1350 and A.D. 1700. The Navajo likely adopted or otherwise absorbed any remaining Anasazi. Little is known regarding these occupations in the Northern San Juan Region, partly because these groups employed a hunter- gatherer economy similar to Archaic groups. A fortification wall made of unshaped sandstone slabs found on McCracken Mesa in southeastern Utah has been dated to A.D. 1380 and identified as a Navajo structure (personal communication, Ron Maldonado to Douglas Boggess, August 8, 2005). High residential mobility, the use of temporary structures, and the paucity of sherds and other datable materials frequently confound our ability to recognize Protohis-

toric Navajo sites in the region, although Navajo oral history confirms that the Navajo have always been here. Datable material culture items associated with the Protohistoric Period include Dinétah Grayware, Gobernador Polychrome, micaceous-tempered grayware, and Desert Side-notched projectile points.

HISTORIC PERIOD

As early as the 1600s, Spanish soldiers were dispatched into the area that would become the Four Corners to destroy Navajo crops and homes. These forays came at least as far north as the San Juan River. By the time Frays Dominguez and Escalante traveled through the area along what would later become the Old Spanish Trail in 1776, they identified the San Juan River as the boundary between Navajo territory to the south and Ute territory to the north (McPherson 1995:77).

Remote locations, such as Elk Ridge and the rugged tributary canyons of the San Juan River, were sanctuary areas sought out by the Navajo, Paiute, and Ute people when military pressures increased in other parts of their homelands. One example is provided by K'aayelii, a Navajo who in 1860 established a small settlement at Kigalia Springs on the south end of Elk Ridge. In such an isolated location, K'aayelii's band was undisturbed by Kit Carson and his soldiers (McPherson 1992:39). Conflicts between Indians and Anglos eventually led to the reservation system. On May 28, 1868, the Navajo signed a treaty (McPherson 1995:67). Numerous historical reports state that Navajo people continued to use their lands outside the reservation boundaries. The US Army reported irrigated farms at Sanostee by 1892 and a trading post was present by 1899. The area around Sanostee produced uranium up until the 1980s.

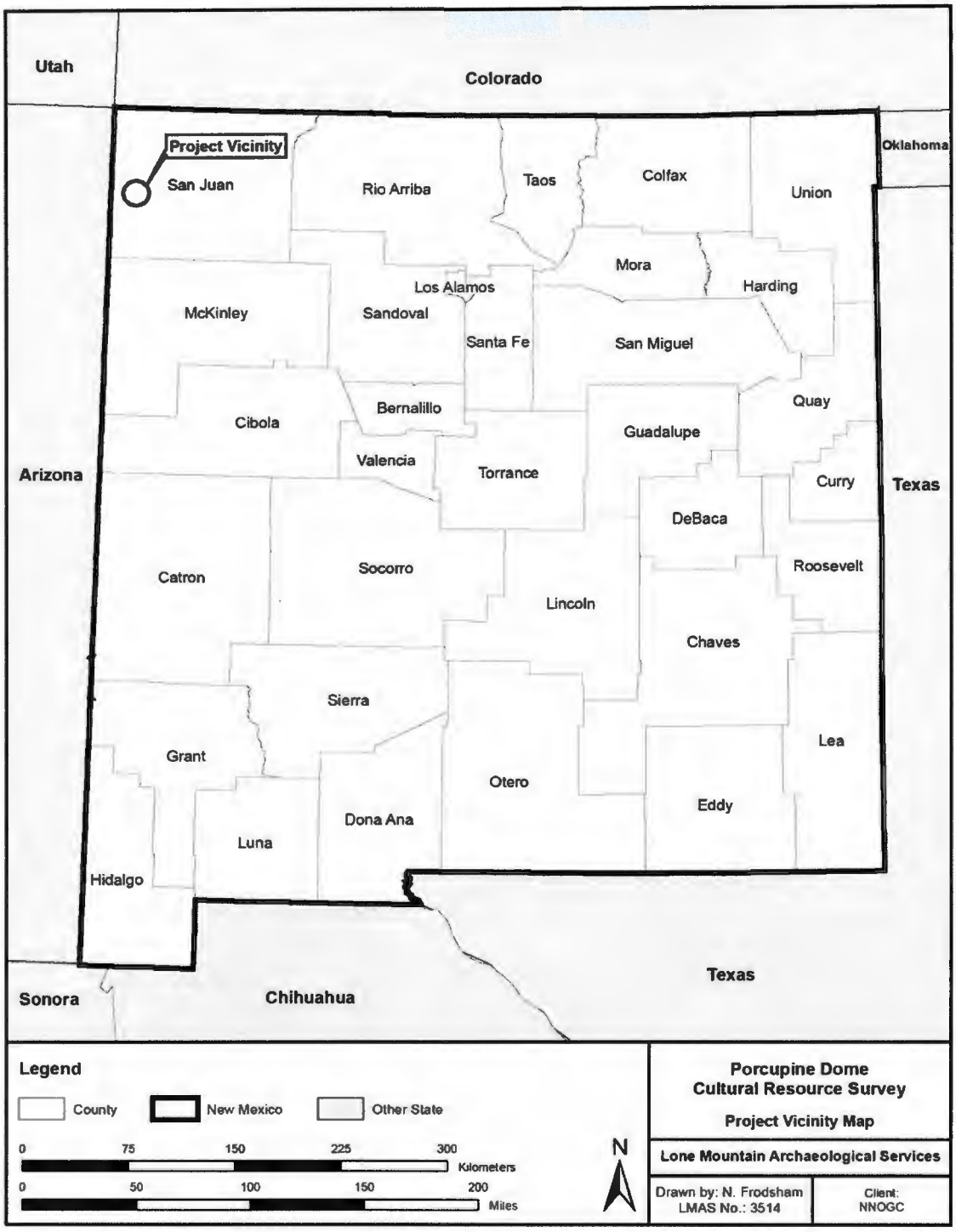

Figure 1.1: Project Vicinity.

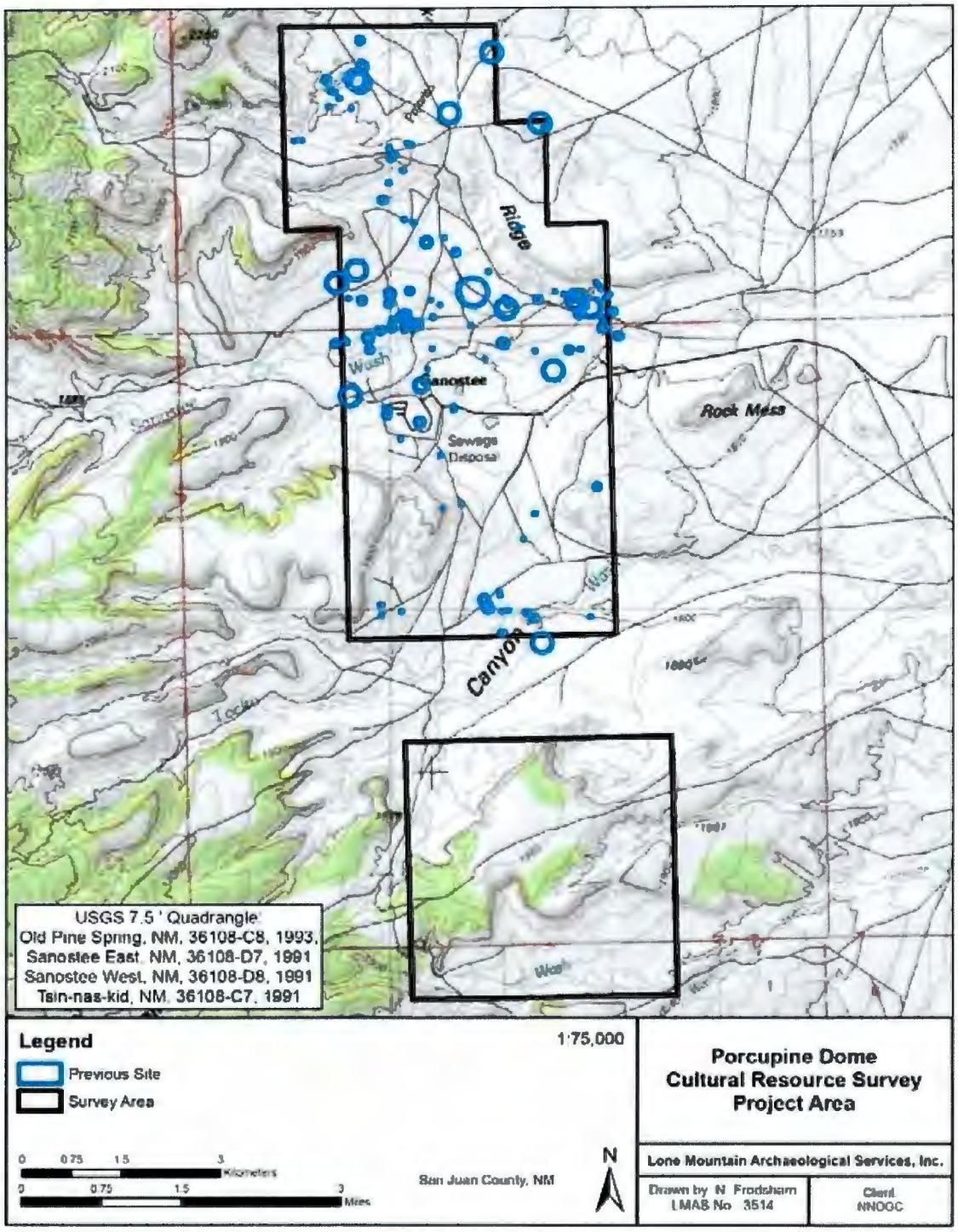

Figure 1.2: Project Area Overview.

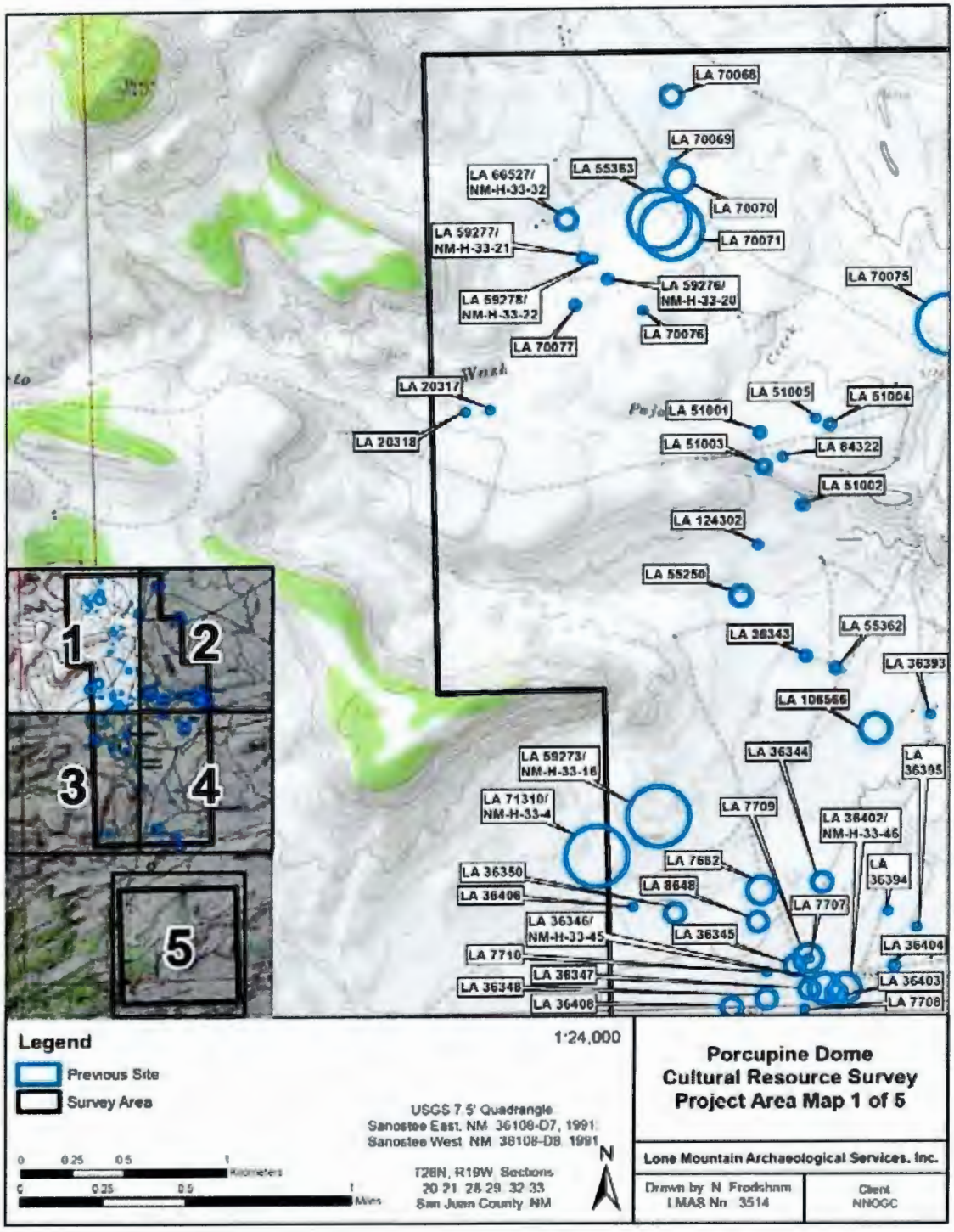

Figure 1.3: Project Area (1 of 5).

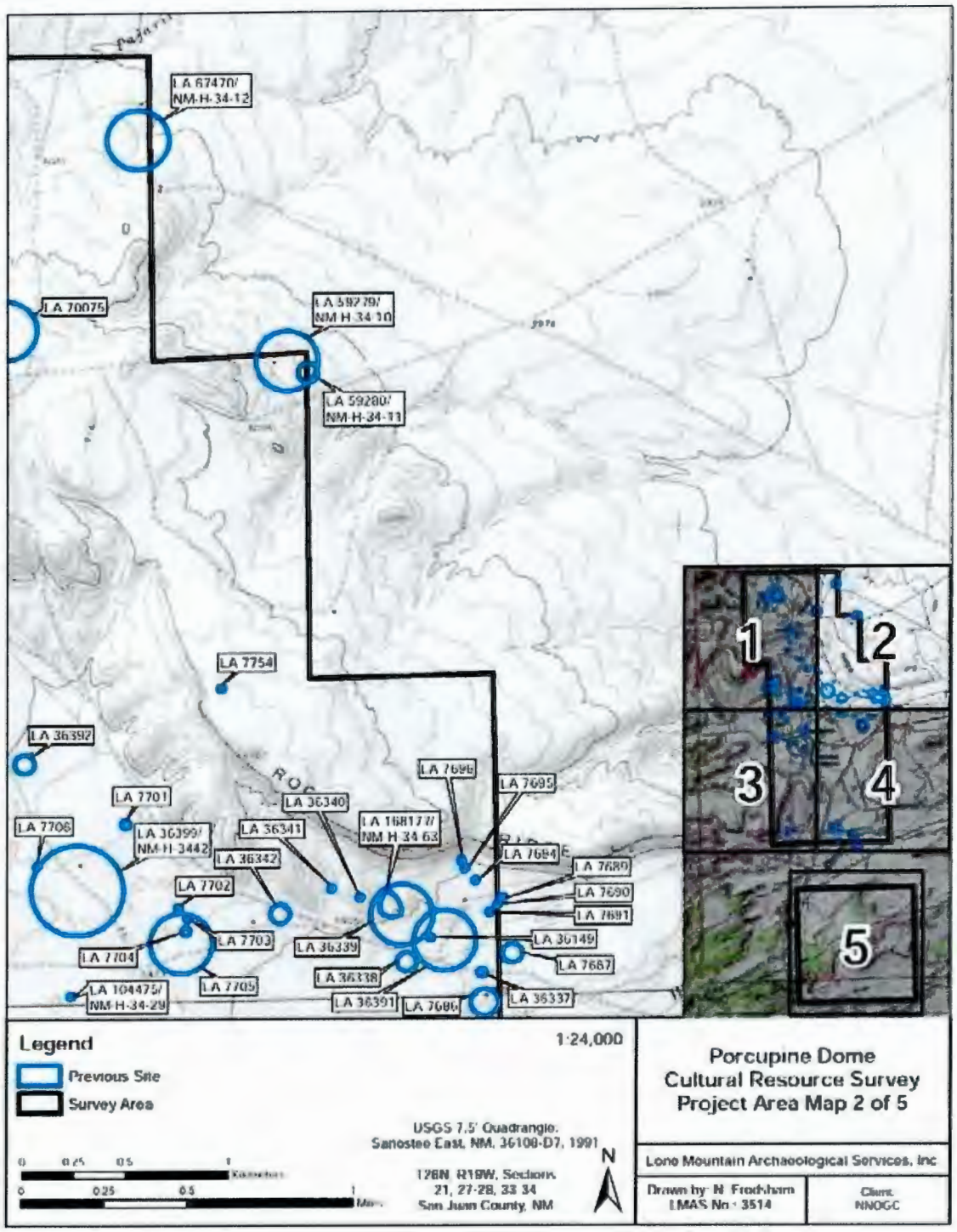

Figure 1.4: Project Area (2 of 5).

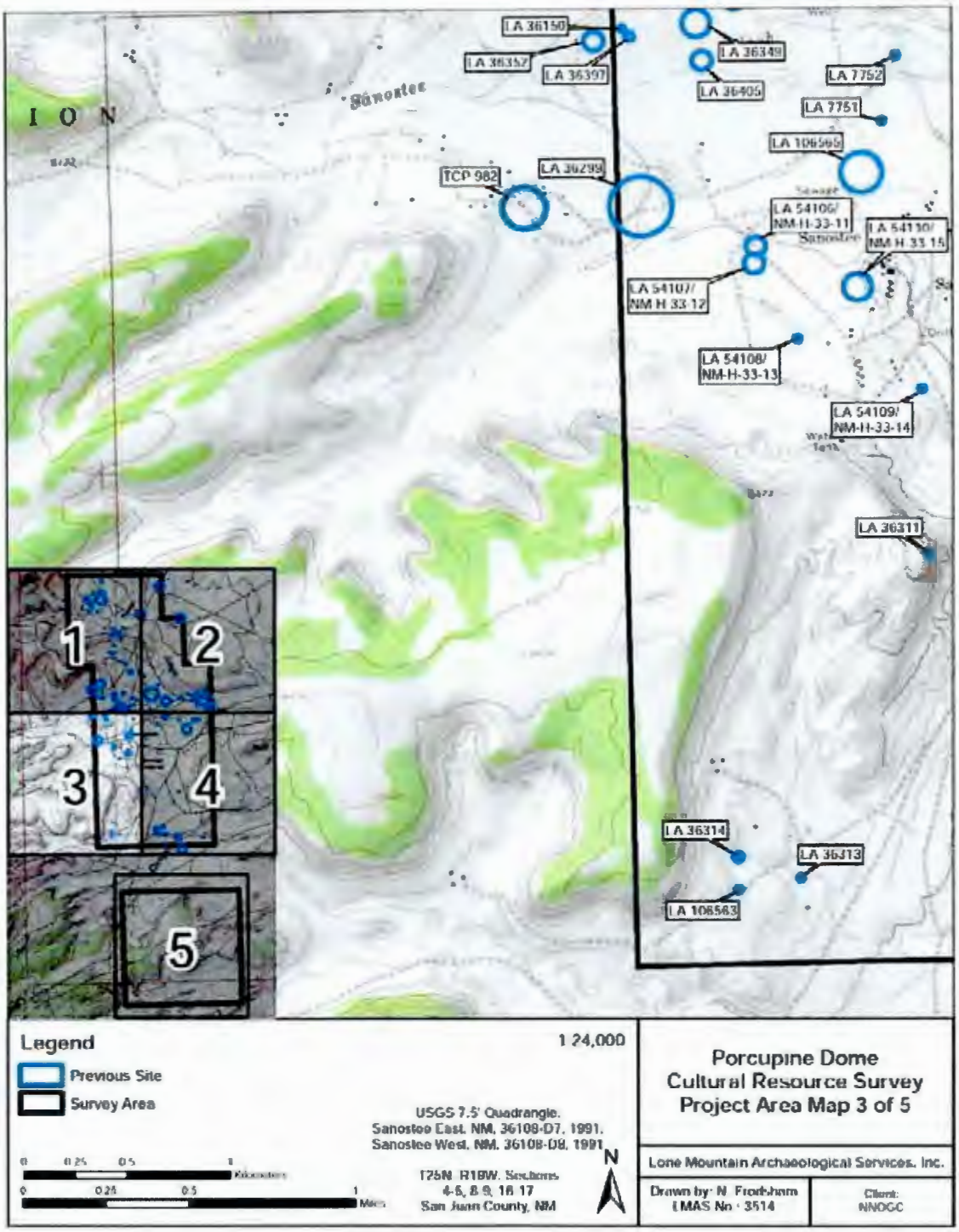

Figure 1.5: Project Area (3 of 5).

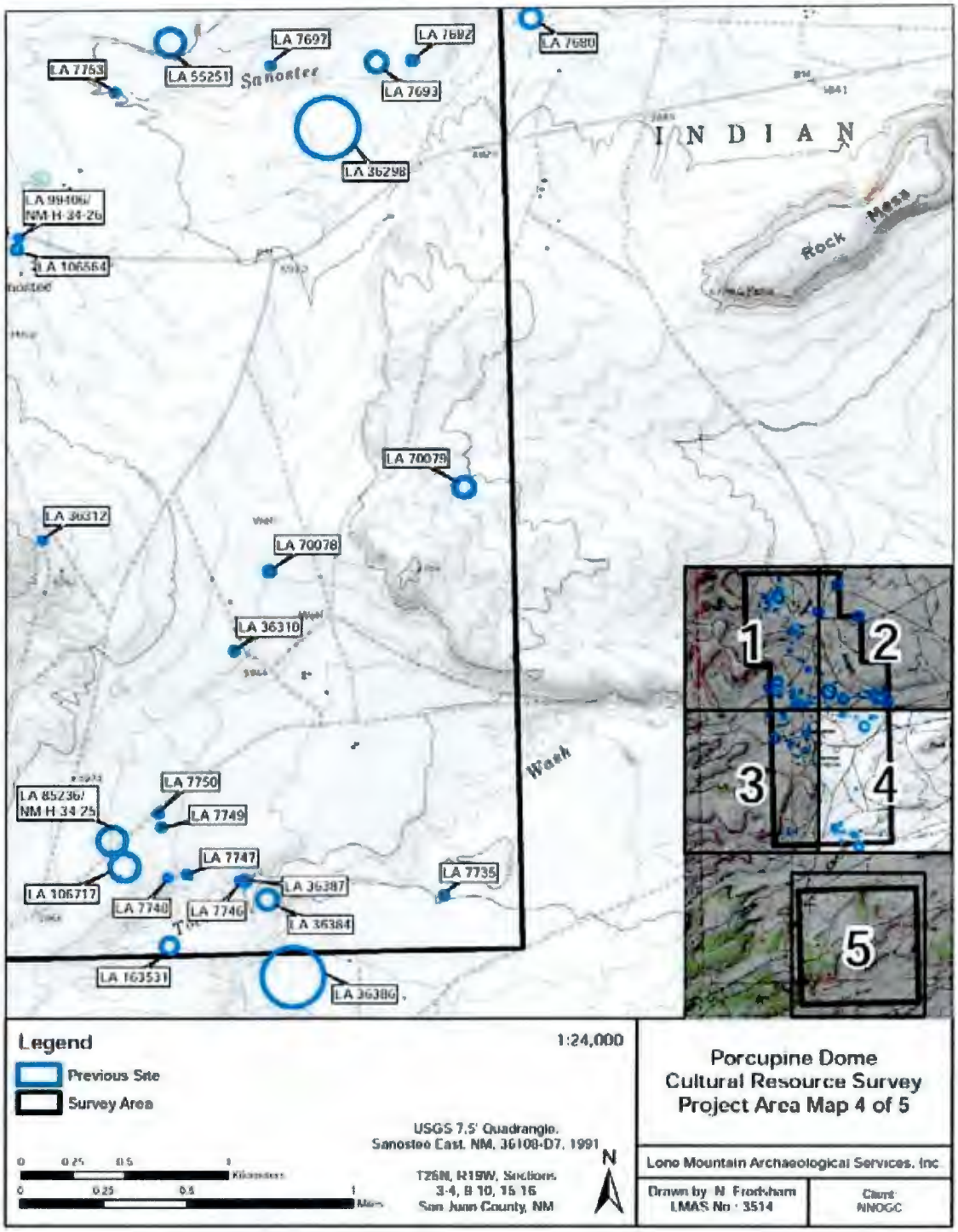

Figure 1.6: Project Area (4 of 5).

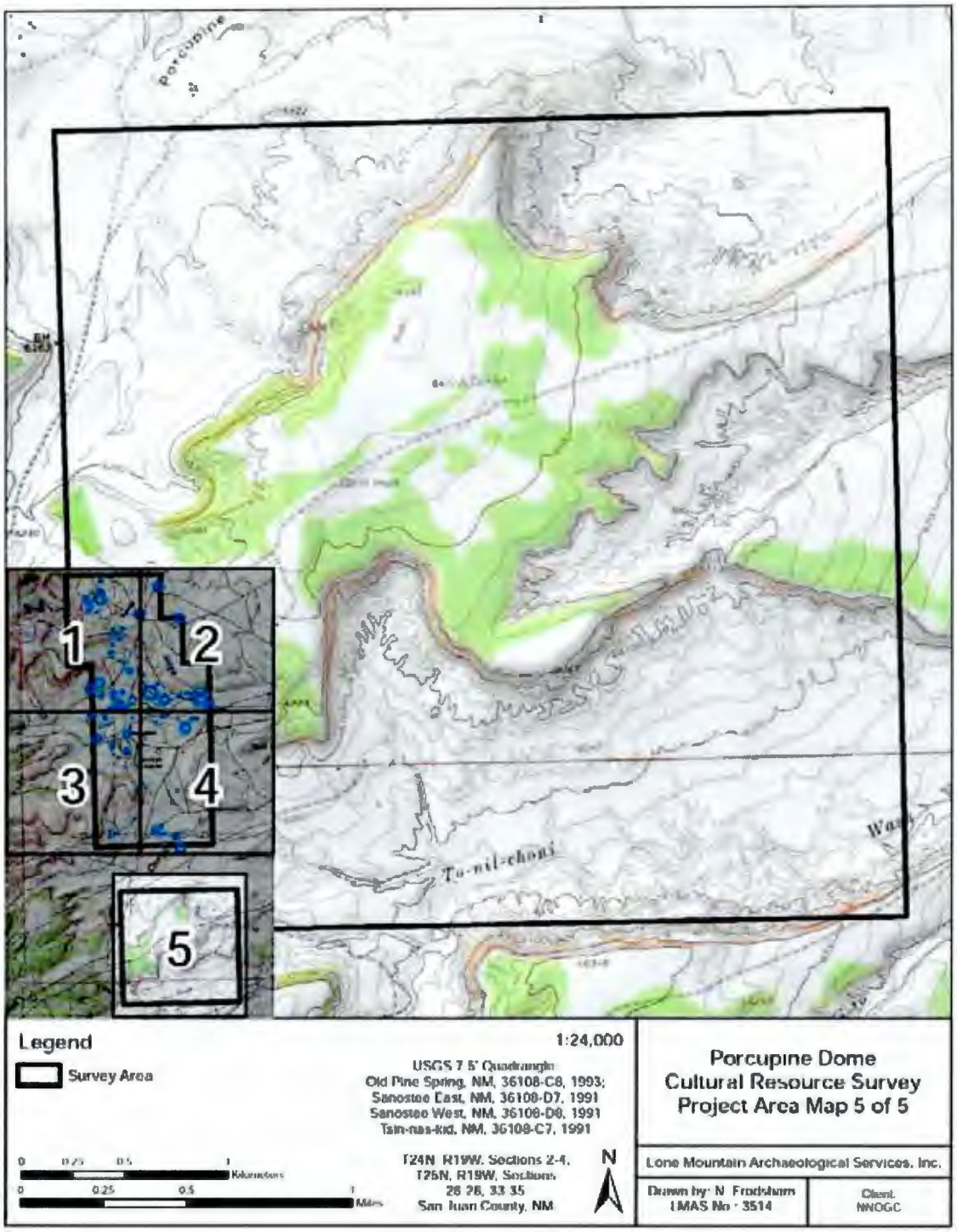

Figure 1.7: Project Area (5 of 5).

Lone Mountain Archaeologist, Douglas Boggess, performed a records search of the 13,275.187-acre Porcupine Dome Lease Area on April 7, 2021.

RESEARCH METHODS

On April 7, 2021, a site files review was conducted of the Navajo Nation Historic Preservation Division (NNHPD) site records in Window Rock to identify previously-recorded cultural resources and previously-conducted surveys within the lease area. This work took place during the Covid 19 pandemic. The hours available for files searches were limited and only a few people could be in the NNHPD offices at any time. For this reason, only those reports postdating 2005 were sought, as records predating that year can be found in the NMCRIS system. An electronic files search of the NMCRIS system was completed on June 7, 2021.

At the time of this files-search, NNHPD records consisted of scanned images of USGS maps with handwritten notations identifying sites and surveys. For the most part, these are legible. NMCRIS records predating recent years did not digitize specific site shapes. Sites appear in those records as circles reflecting the largest measurement. A 20-m by 50-m site may, therefore, appear as a 50-m diameter circle.

LOCATED RESOURCES

Lone Mountain identified one Traditional Cultural Property in the confidential Sacred Places Database at the NNHPD offices in Window Rock (TCP 782) and 120 archaeological sites in NMCRIS records within the Porcupine Dome Lease Area. The sites are summarized Table 2.1 below.

The review of NNHPD's Cultural Resources Compliance Section files revealed that several cultural resource surveys are plotted on NNHPD maps as having taken place within the lease area. The earliest archaeological work known in the lease area was performed in 1967 and identified 34 of the sites reported to be in the lease area (Table 2.2). Given the age of the site records, the reported site locations may not be entirely accurate according to current standards. Most compliance related surveys appear to be highway-related, powerlines and, homesites.

Table 2.1: Summary of Previously-recorded Sites.

NN No.	LA No.	NMCRIS	NNHPD Rpt No.	Component	Description	Eligibility	ARPA
	36338	146		Anasazi Basketmaker III (A.D. 500 to 700), Pueblo II (A.D. 900 to 1100)	Ceramic scatter	N/A	Yes
	36310	180		Unspecific Navajo (A.D. 1500 to 1993)	Dump	N/A	Unk
	7709	21545, 31033		Anasazi Basketmaker to Pueblo I (A.D. 500 to 900)	Five masonry roomblocks and two pithouses	N/A	Yes
	7705	21545, 31033		Anasazi Pueblo II to Pueblo III (A.D. 900 to 1300), Unspecific Historic (A.D. 1539 to 1993)	Five to seven kivas, one road/trail, and two masonry roomblocks	N/A	Yes
	36350	146		Anasazi Pueblo I (A.D. 700 to 900)	Four depressions and two middens	N/A	Yes
	36313	180		Unspecific Navajo (A.D. 1500 to 1993)	Hearth and house foundation	N/A	Unk
	36150	19776		Recent Navajo (A.D. 1945 to 1993)	Horno Oven	N/A	No

Table 2.1: Summary of Previously-recorded Sites. (Continued)

NN No.	LA No.	NMCRIS	NNHPD Rpt No.	Component	Description	Eligibility	ARPA
	36298	189		Anasazi Basketmaker III to Pueblo I (A.D. 500 to 900), Unspecific Navajo (A.D. 1500 to 1993) and Unknown (9500 B.C. to A.D. 1993)	Lithic and ceramic scatter	N/A	Yes
	36299	189		Anasazi Basketmaker III to Pueblo I (A.D. 500 to 900), and Unknown (9500 B.C. to A.D. 1993)	Mound	N/A	Yes
	7693	21545, 31033		Anasazi Pueblo I (A.D. 700 to 900), Pueblo III (A.D. 1100 to 1300), Unspecific Navajo (A.D. 1500 to 1993)	One burial, one masonry roomblock, one kiva, an unspecified number of mounds, and one tower	N/A	Yes
	7682	146, 21545, 31033		Anasazi Basketmaker III to Pueblo I (A.D. 500 to 900), Pueblo III (A.D. 1100 to 1300), Unspecific Navajo (A.D. 1500 to 1993)	One burial, two isolated masonry rooms, two kivas, one midden, four mounds, five pithouses, and one masonry roomblock	N/A	Yes
	7697	21545, 31033		Anasazi Pueblo I (A.D. 700 to 900), Pueblo III (A.D. 1100 to 1300), Navajo Middle Reservation (A.D. 1880 to 1920)	One corral, one hogan, one kiva, one midden, and one masonry roomblock	N/A	Yes
	36337	146		Anasazi Pueblo II (A.D. 900 to 1100), Navajo Pre-Reservation (A.D. 1753 to 1868), Navajo Middle Reservation to WWII (A.D. 1880 to 1920)	One depression and two mounds	N/A	Yes
	36341	146		Anasazi Pueblo I to Pueblo III (A.D. 700 to 1300), Unknown Historic (A.D. 1539 to 1993)	One depression, one midden, two mounds, and one water control device	N/A	Yes
	36345	146		Anasazi Pueblo I (A.D. 700 to 900)	One depression, one mound and one masonry roomblock	N/A	Yes
	36386	146		Anasazi Pueblo I (A.D. 700 to 900), Pueblo II (A.D. 900 to 1100)	One hearth and one masonry roomblock	N/A	Yes
	7710	21545, 31033		Anasazi Pueblo I (A.D. 700 to 900)	One hearth, one pithouse, and one masonry roomblock	N/A	Yes
	36349	146		Unspecific Anasazi (A.D. 1 to 1600), Navajo Middle Reservation to WWII (A.D. 1880 to 1920)	One hogan, three house foundations, and one log cabin	N/A	Yes
	36342	146		Anasazi Pueblo II to Pueblo III (A.D. 900 to 1300), Navajo Later Reservation to WWII (A.D. 1920 to 1945)	One hogan, two hornos, two house foundations, and one mound	N/A	Yes

Table 2.1: Summary of Previously-recorded Sites. (Continued)

NN No.	LA No.	NMCRIS	NNHPD Rpt No.	Component	Description	Eligibility	ARPA
	36391	146		Anasazi Pueblo II (A.D. 900 to 1300) Navajo Middle Reservation to WWII (A.D. 1920 to 1945)	One hogan, two hornos, one house foundation, and an unknown number of mounds	N/A	Yes
	7702	21545, 31033		Anasazi Pueblo I (A.D. 750 to 800)	One isolated room and masonry slab, one pithouse	N/A	Yes
	36343	146, 14281		Anasazi Basketmaker Pueblo II (A.D. 900 to 1100)	One isolated room and midden	N/A	Yes
	7703	21545, 31033		Anasazi Pueblo I to Pueblo II (A.D. 700 to 1100), Unknown Historic (A.D. 1539 to 1993)	One kiva, one masonry roomblock, and one agricultural field	N/A	Yes
	36352	146		Anasazi Basketmaker Pueblo III (A.D. 1100 to 1300)	One kiva, one midden and one roomblock	N/A	Yes
	7689	21545, 31033		Anasazi Pueblo II to Pueblo III (A.D. 900 to 1300)	One kiva, one midden, and one masonry roomblock	N/A	Yes
	7708	21545, 31033		Anasazi Pueblo I to Pueblo III (A.D. 700 to 1300), Unspecific Navajo (A.D. 1500 to 1993)	One kiva, one midden, and one masonry roomblock	N/A	Yes
	7735	21545, 31033		Anasazi Pueblo II (A.D. 900 to 1100)	One kiva, one midden, and one masonry roomblock	N/A	Yes
	7746	21545, 31033		Anasazi Pueblo III (A.D. 1100 to 1300)	One kiva, one midden, and one masonry roomblock	N/A	Yes
	7694	21545, 31033		Anasazi Pueblo III (A.D. 1100 to 1300)	One kiva, one midden, and one roomblock	N/A	Yes
	7695	21545, 31033		Anasazi Pueblo II to Pueblo III (A.D. 900 to 1300)	One kiva, one midden, and one roomblock	N/A	Yes
	7696	21545, 31033		Anasazi Pueblo II to Pueblo III (A.D. 900 to 1300)	One kiva, one midden, and one roomblock	N/A	Yes
	7701	21545, 31033		Anasazi Pueblo II to Pueblo III (A.D. 900 to 1300),	One kiva, one midden, and one roomblock	N/A	Yes
	7691	21545, 31033		Anasazi Pueblo II to Pueblo III (A.D. 900 to 1300), Unspecific Historic (A.D. 1539 to 1993)	One kiva, one middens, one road/trail, and one masonry roomblocks	N/A	Yes
	7692	21545, 31033		Anasazi Basketmaker III (A.D. 500 to 700), Pueblo III (A.D. 1100 to 1300), Unspecific Navajo (A.D. 1500 to 1993)	One kiva, three middens, and one masonry roomblocks	N/A	Yes

Table 2.1: Summary of Previously-recorded Sites. (Continued)

NN No.	LA No.	NMCRIS	NNHPD Rpt No.	Component	Description	Eligibility	ARPA
NM-H-33-45	36346	146		Anasazi Pueblo II to Pueblo III (A.D. 900 to 1300)	one masonry roomblock	Yes, D	Yes
	7706	21545, 31033		Anasazi Pueblo III (A.D. 1100 to 1300)	One midden and one roomblock	N/A	Yes
	7747	21545, 31033		Anasazi Pueblo II to Pueblo III (A.D. 900 to 1300)	One midden and one roomblock	N/A	Yes
	7748	21545, 31033		Anasazi Pueblo II to Pueblo III (A.D. 900 to 1300), Unspicific Historic (A.D. 1539 to 1993)	One midden, one fence, one agricultural field, and one roomblock	N/A	Yes
	7749	21545, 31033		Anasazi Pueblo II to Pueblo III (A.D. 900 to 1300)	One midden, one kiva and one roomblock	N/A	Yes
	7752	21545, 31033		Anasazi Pueblo III (A.D. 1100 to 1300)	One midden, one kiva and one roomblock	N/A	Yes
	7753	21545, 31033		Anasazi Pueblo III (A.D. 1100 to 1300)	One midden, one kiva and one roomblock	N/A	Yes
	7707	21545, 31033		Anasazi Pueblo I (A.D. 700 to 900)	One midden, two pithouses, and one roomblock	N/A	Yes
	36340	146		Anasazi Basketmaker Pueblo II to Pueblo III (A.D. 900 to 1300)	One mound	N/A	Yes
	7754	21545, 31033		Anasazi Pueblo II to Pueblo III (A.D. 900 to 1300), Navajo Middle Reservation to WWII (A.D. 1880 to 1920)	One rockshelter	N/A	Yes
	7751	21545, 31033		Unspecific Navajo (A.D. 1500 to 1993)	Pictograph	N/A	Unk
	36149	19776		Anasazi Basketmaker III to Pueblo I (A.D. 500 to 900)	Pithouse	N/A	Yes
	36314	180		Anasazi Basketmaker III to Pueblo I (A.D. 500 to 900), and Unknown (9500 B.C. to A.D. 1993)	Pithouse	N/A	Yes
	36312	180		Unspecific Navajo (A.D. 1500 to 1993)	Rock alignment	N/A	Unk
	36384	146		Anasazi Basketmaker III (A.D. 500 to 700)	Six hearths and one depression	N/A	Yes
	7680	21545, 31033		Anasazi Pueblo II (A.D. 900 to 1100), Unspecific Historic (A.D. 1539 to 1993)	Three kivas, two middens, one road/trail, and two masonry roomblocks	N/A	Yes
	8648	146, 21545, 31033		Anasazi Pueblo I (A.D. 700 to 900)	Three pithouses and two roomblocks	N/A	Yes

Table 2.1: Summary of Previously-recorded Sites. (Continued)

NN No.	LA No.	NMCRIS	NNHPD Rpt No.	Component	Description	Eligibility	ARPA
	20317	15684		Unknown (9500 B.C. to A.D. 1993)	Three rock alignments	N/A	Unk
	36387	146		Unspecific Anasazi (A.D. 1 to 1600), Unspecific Navajo (A.D. 1500 to 1993)	Two burials and one hogan	N/A	Yes
	36344	146		Anasazi Pueblo II (A.D. 900 to 1100)	Two depressions and one masonry roomblock	N/A	Yes
	36348	146		Anasazi Pueblo I (A.D. 700 to 900)	Two depressions and six rock alignments	N/A	Yes
	7686	21545, 31033		Anasazi Pueblo II (A.D. 900 to 1100), Navajo Middle Reservation (A.D. 1880 to 1920), Unknown (9500 B.C to A.D. 1920)	Two hearths	N/A	Yes
	7687	21545, 31033		Navajo Middle Reservation (A.D. 1880 to 1920)	Two hearths	N/A	Yes
	36347	146		Unspecific Navajo (A.D. 1500 to 1993)	Two hogans, one horno, and one house foundation	N/A	Unk
	7704	21545, 31033		Anasazi Pueblo III (A.D. 1100 to 1300)	Two kivas and one roomblock	N/A	Yes
	7690	21545, 31033		Anasazi Pueblo II to Pueblo III (A.D. 900 to 1300), Unspecific Historic (A.D. 1539 to 1993)	Two kivas, two middens, two road/trails, and one masonry roomblocks	N/A	Yes
	7750	21545, 31033		Anasazi Pueblo II (A.D. 900 to 1100)	Two middens, one kiva and one roomblock	N/A	Yes
	36339	146		Anasazi Pueblo II to Pueblo III (A.D. 900 to 1300)	Two mounds and three roomblocks	N/A	Yes
	20318	15684		Unknown (9500 B.C. to A.D. 1993)	Unknown number of rock alignments	N/A	Unk
	36311	180		Unknown Recent Historic (A.D. 1945 to 1993)	Water catchment device and a windmill	N/A	No
	36392	146, 106314		Anasazi Pueblo I (A.D. 700 to 1100) Navajo Middle Reservation to WWII (A.D. 1900 to 1920)	corral, one hogan, one isolated masonry roomblock, and one pithouse	N/A	Yes
	36394	146		Anasazi Basketmaker III (A.D. 500 to 700)	Ceramic scatter	N/A	Yes
	36395	146		Unknown (9500 B.C. to A.D. 1993)	10 rock alignments	N/A	Unk
	36397	146		Anasazi Basketmaker III (A.D. 500 to 700), Anasazi Pueblo III (A.D. 1100 to 1300) and Unspecific Anasazi (A.D. 1 to 1600)	Lithic and ceramic Scatter	N/A	Yes

Table 2.1: Summary of Previously-recorded Sites. (Continued)

NN No.	LA No.	NMCRIS	NNHPD Rpt No.	Component	Description	Eligibility	ARPA
NM-H-3442	36399	146, 52609		Anasazi Pueblo I to Pueblo III (A.D. 850 to 1150) Navajo Middle Reservation to WWII (A.D. 1880 to 1945)	Two charcoal stains, one trash dump, one hogan, one horno, one midden, one mound, two masonry roomblocks, and a pithouse	Yes, D	Yes
NM-H-33-46	36402	146, 49517		Anasazi Pueblo I to Pueblo III (A.D. 875 to 1150) Navajo Late Reservation to Recent Navajo (A.D. 1940 to 1959)	One corral, two dumps, one hearth, one horno, one house foundation, one wood chopping concentration	Yes, D	Yes
	36403	146		Anasazi Basketmaker III (A.D. 500 to 700), Anasazi Pueblo III (A.D. 1100 to 1300), Unspecific Anasazi (A.D. 1 to 1600)	One masonry room and eight pithouses	N/A	Yes
	36404	146		Recent Navajo (A.D. 1945 to 1993)	One horno, one ramada, and three rock alignments	N/A	No
	36405	146		Anasazi Basketmaker III (A.D. 500 to 700), Anasazi Pueblo II (A.D. 900 to 1100), Unspecific Anasazi (A.D. 1 to 1600)	One masonry room, one masonry roomblock, and five pithouses	N/A	Yes
	36406	146		Anasazi Pueblo II (A.D. 900 to 1100)	Isolated masonry room	N/A	Yes
	36408	146		Anasazi Basketmaker III (A.D. 500 to 700), Anasazi Pueblo I to Pueblo II (A.D. 700 to 1300)	Lithic and ceramic Scatter	N/A	Yes
	36393	146		Navajo Early Reservation (A.D. 1868-1880)	Hogan, historic artifacts	N/A	Yes
	51001	287, 10979, 62544		Anasazi Pueblo II to Pueblo III (A.D. 1100 to 1170)	One Chacoan road/trail segnment	N/A	Yes
	51002	287, 10979, 62544		Anasazi Pueblo II to Pueblo III (A.D. 1100 to 1170)	One Chacoan road/trail segment	N/A	Yes
	51003	287, 10979, 62544		Anasazi Pueblo II to Pueblo III (A.D. 1000 to 1200)	One road and one wall	N/A	Yes
	51004	287, 10979		Anasazi Pueblo II to Pueblo III (A.D. 1000 to 1200)	One hearth and one rock alignment	N/A	Yes
	51005	287, 10979		Unknown (9500 B.C. to A.D. 1979)	Rock alignment	N/A	Yes

Table 2.1: Summary of Previously-recorded Sites. (Continued)

NN No.	LA No.	NMCRIS	NNHPD Rpt No.	Component	Description	Eligibility	ARPA
NM-H-33-11	54106	10976		Anasazi Pueblo II to Pueblo III (A.D. 900 to 1300)	Two mounds	N/A	Yes
NM-H-33-12	54107	10976		Anasazi Pueblo I to Pueblo III (A.D. 700 to 1300)	One mound	N/A	Yes
NM-H-33-13	54108	10976		Anasazi Pueblo I to Pueblo III (A.D. 700 to 1300)	One hearth	N/A	Yes
NM-H-33-14	54109	10976, 55243		Anasazi Pueblo I to Pueblo III (A.D. 700 to 1100)	Lithic and ceramic Scatter	Yes, D	Yes
NM-H-33-15	54110	10976		Anasazi Pueblo II to Pueblo III (A.D. 900 to 1300)	Lithic and ceramic Scatter	N/A	Yes
	55250	15782		Navajo Late Reservation (A.D. 1920 to 1945)	Two corrals, one hogan, and three hornos	N/A	No
	55251	15782		Anasazi Pueblo II (A.D. 900 to 1100), Navajo Late Reservation (A.D. 1920 to 1945)	One hearth, one hogan and one Adobe Roomblock	N/A	Yes
	55362	14281		Anasazi Pueblo I (A.D. 700 to 900)	Three hearths	N/A	Yes
	55363	14281		Anasazi Pueblo I (A.D. 700 to 900), Unspecific Navajo (A.D. 1500 to 1993)	One hogan, one horno, and one ramada	N/A	Yes
NM-H-33-16	59273	17462		Anasazi Pueblo I to Pueblo III (A.D. 700 to 1300), Navajo Middle Reservation to WWII (A.D. 1880 to 1920)	One hogan, three hornos, one mound, and one rock alignment	N/A	Yes
NM-H-33-20	59276	17462		Anasazi Pueblo I to Pueblo III (A.D. 700 to 1300)	One hearth	N/A	Yes
NM-H-33-21	59277	17462		Anasazi Pueblo I to Pueblo II (A.D. 700 to 1100)	Three stone circles	N/A	Yes
NM-H-33-22	59278	17462		Unspecific Anasazi (A.D. 1 to 1600)	Lithic and ceramic Scatter	N/A	Yes
NM-H-34-10	59279	17462		Recent Navajo (A.D. 1945 to 1993)	One horno and one house foundation	N/A	No
NM-H-34-11	59280	17462		Recent Navajo (A.D. 1945 to 1993)	One horno, one corral, and one log cabin	N/A	No
NM-H-33-32	66527	20446		Recent Navajo (A.D. 1945 to 1993)	Two hogans, and two hornos	N/A	Yes
NM-H-34-12	67470	20910		Anasazi Pueblo II (A.D. 900 to 1100)	One midden and one roomblock	N/A	Yes
	70068	24211		Anasazi Pueblo II to Pueblo III (A.D. 900 to 1300)	One midden and one mound	N/A	Yes
	70069	24211		Unspecific Navajo (A.D. 1500 to 1993)	Sweat lodge	N/A	Unk

Table 2.1: Summary of Previously-recorded Sites. (Continued)

NN No.	LA No.	NMCRIS	NNHPD Rpt No.	Component	Description	Eligibility	ARPA
	70070	24211		Anasazi Pueblo I (A.D. 700 to 900)	One kiva and one roomblock	N/A	Yes
	70071	24211		Anasazi Pueblo I to Pueblo III (A.D. 700 to 1300), Recent Navajo (A.D. 1945 to 1993)	Two hornos, one kiva, and 8 ramadas	N/A	Yes
	70075	24211		Unspecific Archaic (5500 B.C. to A.D. 900), Pueblo I to Pueblo III (A.D. 700 to 1300), and Unspecific Navajo (A.D. 1500 to 1993)	One hogan and one rock alignment	N/A	Yes
	70076	24211		Recent Navajo (A.D. 1945 to 1993)	Rock carin	N/A	Yes
	70077	24211		Anasazi Pueblo I to Pueblo III (A.D. 700 to 1100)	Lithic and ceramic Scatter	N/A	No
	70078	24211		Anasazi Pueblo I (A.D. 700 to 900)	Lithic and ceramic Scatter	N/A	Yes
	70079	24211		Anasazi Basketmaker III (A.D. 500 to 700)	One mound and two pithouses	N/A	Yes
NM-H-33-4	71310	24494		Anasazi Pueblo I (A.D. 700 to 900)	Lithic and ceramic Scatter	N/A	Yes
	84322	287		Anasazi Pueblo III (A.D. 900 to 1100)	Prehistoric road	N/A	Yes
NM-H-34-25	85236	47504		Recent Navajo (A.D. 1953 to 1969)	One corral, one depression, one dugout, six trash dumps, one hogan, one hornos, and one house foundation	N/A	No
NM-H-34-26	99406	45194, 73620		Anasazi Basketmaker III to Pueblo I (A.D. 500 to 810)	One pithouse	Yes, D	Yes
NM-H-34-29	104475	45541, 47244		Anasazi Basketmaker III to Pueblo IIII (A.D. 500 to 1300), Navajo Late Reservation (A.D. 1922 to 1990)	One fence, one fire-cracked rock concentration, one hearth, and one horno	Not evaluated	Yes
	106563	47244		Anasazi Basketmaker III (A.D. 500 to 700)	One mound	Yes, D	Yes
	106564	47244, 61513		Anasazi Basketmaker III (A.D. 500 to 700)	One rock alignment	Yes, D	Yes
	106565	47244		Anasazi Pueblo I (A.D. 700 to 900), Pueblo II (A.D. 1000 to 1100), and Recent Navajo (A.D. 1970 to 1979)	Two corral, two dumps, one hogan, and one mound	Yes, D	Yes
	106566	47244		Anasazi Basketmaker III to Pueblo I (A.D. 500 to 900)	Lithic and ceramic Scatter	Not evaluated	Yes

Table 2.1: Summary of Previously-recorded Sites. (Continued)

NN No.	LA No.	NMCRIS	NNHPD Rpt No.	Component	Description	Eligibility	ARPA
	106717	47244		Anasazi Pueblo II to Pueblo III (A.D. 1000 to 1200), and Recent Navajo (A.D. 1950 to 1970)	One dump, one hogan, one horno, and one rock alignment	Yes, D	Yes
NM-H-38-48	124302	62212		Anasazi Pueblo II (A.D. 900 to 1100)	Possible Chacoan road	N/A	Yes
	163531			N/A	No details entered	N/A	Unk
NM-H-34-63	168177	117238		Anasazi Pueblo I to Pueblo III (A.D. 800 to 1800), and Navajo Late Reservation (A.D. 1938 to 1948)	One hogan, one ramada, and one roomblock	N/A	Yes

Table 2. Summary of Previous Reports.

NNHPD Rpt No	NMCRIS	Performing Agency	End Date of Investigation	Acres Surveyed	Resources Visited	Reference
	146	Northern Arizona University	31-Aug-80	263.68	90	Andrews, Michael J, 1980 Archaeological Investigations in the West-Central Chuska Valley: The Sanostee North Waterline Project.
	180	Northern Arizona University	31-Dec-79	35.93	12	Andrews, Michael J, 1979 Anostee South Water Line Proj For OEH/PHS.
	189	Northern Arizona University	31-Dec-81	18.97	3	Suglia, M. T., 1981 Investigations Near The Community Of Sanostee For OEH/PHS.
	287	San Juan College	6-May-85	0	6	Watson, Richard P., 1985 An Archaeological Monitoring Report of the Proposed Fencing of a Borrow Pit and Crusher Site in San Juan County, New Mexico Conducted for M. M. Sundt Construction.
NNCRMP-85-005	10976	NNCRMP	31-Dec-85	95.9	5	Martin, R., 1985 BIA Sanostee Boarding School Compound For Branch Of Facility BIA.
	10979	NM State Highway & Transportation Dept	13-Jun-79	123.54 acres	5	Hoagland, Steven R., 1979 Archaeological Clearance Investigation of Surfacing Pit 78-18-S and Borrow Pits A, B, and C for NMSHD Project FLH-12(19), US 666, 3.3 Miles North of Newcomb - North.
	14281	Not specified	31-Dec-82	26.42	3	Stewart, P., 1982 Power Line Distribution Near Sanostee for Navajo Tribal Utility Authority.
	15684	NM State Highway & Transportation Dept	14-Sep-79	6.1	2	Hoagland, Steven R., 1979 Archaeological Clearance Investigations of Crusher and Trailer Sites for New Mexico State Highway Department Project FLH-12(19), U.S. 666, 3.3 Miles North of Newcomb-North.

Table 2. Summary of Previous Reports. (Continued)

NNHPD Rpt No	NMCRIS	Performing Agency	End Date of Investigation	Acres Surveyed	Resources Visited	Reference
NNAD-86-357	17462/ 20910	NNAD	31-Dec-86	146.9	14	Werito, L., 1986 12 Miles Water Line, 21 Homesites & Facilities In Sanostee For HIS.
	19776	U. H. Jeffers	31-Dec-81	0	2	Jeffers, U H 1981 Monitoring Of Construction Activities On The Sanostee North Water Line For OEH/P.
NNAD-87-185	20317	NNAD	31-Dec-87	167.08	1	Martin, R., 1987 100 Scattered Homestire Areas & Service Lines For IHS.
NNAD-87-084	20446	NNAD	31-Dec-87	Not entered	5	Werito, L., 1987 Power Lines Near Red Valley For Navajo Tribal Utility Authority.
	21545/ 31033	MNM-LA	31-Dec-67	0	960	Harris, Arthur H. James Schoenwetter and A.H. Warren 1967 An Archaeological Survey of the Chuska Valley and the Chaco Plateau New Mexico Parts I and II.
NNAD-88-282	24211	NNAD	31-Dec-88	276.7	25	Langenfeld, K., 1988 10 Seismic Lines For Chuska Energy.
NNAD-84-116	24494	NNAD	31-Dec-84	0	3	Brancard, W. R., 1984 Erosion Control & Cultural Resources Management: Jobs Bill Proj For BIA-NAO.
NNAD-94-086	45541	NNAD	4-May-94	3.38	1	Pino, Genevieve 1994 An Archaeological Survey of the Proposed Virgil F. and Bertha Wood Homesite Near Sanostee, San Juan County, New Mexico.
	47244	CASA	10-Nov-94	116.9	9	Errickson, Mary 1994 Cultural Resource Inventory NAIHS Project NA-94-L27 34 Scattered Homesites and Associated Waterline Extensions in the Sanostee Area, San Juan County, New Mexico Shiprock IHS Chapter.
NNAD-91-212	47504	NNAD	29-Aug-91	3.2	1	Seeley, Laverne 1991 An Archaeological Survey of the Proposed George Washburn Jr. Homesite near Sanostee, San Juan County, New Mexico.
	47598	CASA	20-Feb-95	273.9	7	Hammack, Laurens, C. 1995 Cultural Resource Inventory NAIHS Project NA 94-L01 72 Scattered Homesites and Associated Waterline Extensions Shiprock IHS District San Juan County, New Mexico; Apache County, Arizona; and San Juan County, Utah.
NNAD-95-004	49517	NNAD	2-Feb-95	3.88	2	Cleveland, Elaine 1995 An Archaeological Survey of the Proposed Berlinda Dickson Homesite in Sanostee, San Juan County, New Mexico.

Table 2. Summary of Previous Reports. (Continued)

NNHPD Rpt No	NMCRIS	Performing Agency	End Date of Investigation	Acres Surveyed	Resources Visited	Reference
	52609	San Juan College	11-Jun-96	14	1	Metthews, Meredith 1996 A Cultural Resources Inventory for the Proposed Jeffery Begay Homesite in the Area of Sanostee, San Juan County, New Mexico.
	61513	Cibola Research C onsultants	28-Jul-98	62.3	5	Marshall, Michael 1998 A Cultural Resource Survey for Proposed Navajo Communications Telephone Line Improvements on Navajo Nation Lands inorthwestern New Mexico and Northeastern Arizona: The Whitehorse, Sanostee,Navajo-Red Lake, and Tsaile-Lukachukai Telephone Systems.
	62212	CASA	29-Sep-98	49.08	1	"Hammack, Laurens C., 1998 Cultural Resource Inventory Souers Construction Inc. Sanostee Gravel Pit Sanostee Chapter, Navajo Nation, San Juan County, New Mexico.
	62544	San Juan College	29-Aug-85	0	3	"Watson, Richard P. 1985 Letter Report: Addendum to Report #87-SJC-034, Re-examination of Sites Associated with Surfacing Pit #78-18-5.
NNAD-99-063	67271	NNAD	18-Mar-99	2.88	0	Clyde, Stella 1999 An Archaeological Survey of the Proposed Wallace, Jr. and Mary Duncan, Homesite Located near Sanostee, San Juan County, New Mexico.
NNAD-99-057	67273	NNAD	12-Mar-99	2.88	0	Clyde, Stella 1999 An Archaeological Survey of the Proposed Paul and Susan Dempsey Homesite in Sanostee Chap ter, San Juan County, New Mexico.
HPD-00-134	95462	NNCIP	23-Sep-99	3.09	0	Copeland, Denise R. E. , 2000 A Cultural Resource Inventory of the NTUA Extension for Annie Bidah, Part of the Sanostee Scattered Powerline Project, Sanostee Chapter, San Juan County, New Mexico.
HPD-00-135	95464	NNCIP	23-Sep-99	0.56	0	Copeland, Denise R. E. , 2000 A Cultural Resource Inventory of the NTUA Extensions for Jonathan John and Larry John, Jr., Part of the Sanostee Scattered Powerline Project, Sanostee Chapter, San Juan County, New Mexico.
HPD-00-140	95468	NNCIP	23-Sep-99	4.63	0	Copeland, Denise R. E., 2000 A Cultural Resource Inventory of the NTUA Extension for Melvin Smith, Part of the Sanostee Scattered Powerline Project, Sanostee Chapter, San Juan County, New Mexico.

Table 2. Summary of Previous Reports. (Continued)

NNHPD Rpt No	NMCRIS	Performing Agency	End Date of Investigation	Acres Surveyed	Resources Visited	Reference
HPD-00-342	95586	NNCIP	5-Nov-99	0.25	0	Copeland, Denise R. E., 2000 A Cultural Resource Inventory of the NTUA Extension for Emogene Yazzie, Part of the Sanostee Scattered Powerline Project, Sanostee Chapter, San Juan County, New Mexico.
HPD-01-374	95895	NNCIP	11-Feb-00	0.28	0	Copeland, Denise, R. E., 2001 A Cultural Resource Inventory of the NTUA Extension for Yolanda Harry, Part of the Sanostee Scattered Powerline Project, Sanostee Chapter, San Juan County, New Mexico.
HPD-01-1003	96118	NNCIP	2-Jul-00	0.52	0	Copeland, Denise, R. E., 2001 A Cultural Resource Inventory of the NTUA Extension for Lamae Klah, Part of the Sanostee Scattered Powerline Project, Sanostee Chapter, San Juan County, New Mexico.
	96370	Nasha Cultural Resource Consultants	15-Oct-00	1	0	Morgan, Grace 2000 An Archaeological Survey of a Proposed Homesite for Grace Chee Yazzie in Sanostee, San Juan County, New Mexico.
HPD-03-157	97569	NNAD	11-Dec-02	2.88	0	Tsosie, Lenora 2003 A Cultural Resources Inventory of the Proposed Harvey G. Sr., and Linda Ann Johnson Homesite near Sanostee, San Juan County, New Mexico.
HPD-03-178	97575	NNAD	30-Jan-03	2.88	0	Vogler, Lawrence E., 2003 A Cultural Resource Inventory of the Proposed Helen M. Begaye Homesite near Sanostee, San Juan County, New Mexico.
HPD-03-384	97770	NNAD	31-Mar-03	2.88	0	Tsosie, Lenora 2003 A Cultural Resources Inventory of the Proposed Amelia Naswood Homesite near Sanostee, San Juan County, New Mexico.
HPD-03-1347	98219	NNCIP	29-Apr-03	0.61	0	Copeland, Denise R. E., 2003 A Cultural Resource Inventory of the N.T.U.A. Powerline Extension for Hurley and Mae Jean Henderson, part of the Sanostee Phase III Scattered Powerline Project, Sanostee Chapter, San Juan County, New Mexico.
HPD-04-755	98450	NNAD	10-Oct-00	2.88	0	Clyde, Stella 2004 A Cultural Resources Inventory of the Proposed Emerson and Geraldine Sam Homesite near Sanostee, San Juan County, New Mexico.

Table 2. Summary of Previous Reports. (Continued)

NNHPD Rpt No	NMCRIS	Performing Agency	End Date of Investigation	Acres Surveyed	Resources Visited	Reference
HPD-04-1276	105290	"Dinetahdoo	1-Dec-04	5	0	Topaha, Carmelita and Loretta Holyan 2004 A Cultural Resources Inventory of the Proposed Helen Frank, David Nez, Robert/Mae Bedah, Bernita Bedah/Geoffrey Levine Johnson, and Wilson/Sadie Yazzie Ned Barber 1-Acre Homsite in Sanostee, San Juan County, New Mexico.
HPD-05-742	105342	"Dinetahdoo "	2-Jun-05	2	0	Tophaha, Carmelita M., 2005 A Cultural Resources Inventory of the Proposed Jimmy and Annie Lou Johnson and Corina Yazzie 1-Acre Homesite in Sanostee, San Juan County, New Mexico.
HPD-05-1106	105367	"Dinetahdoo"	31-Dec-05	2	0	Wero, Shane V. and Tyrone Trujilllo 2005 A Cultural Resource Inventory of Two Proposed Homesites for Betsy Taliwood and Angeline Tso Begay in the Shiprock Chapter Vicinity, San Juan County, New Mexico.
	117238	Dinetahdoo	8-Aug-08	16.78	4	Chavez, Loretta, Rena mArtin, and Clifford Werino 2008 The Navajo Nation Electrification Demonstration Program-Phase V-DCRM 2008-60: A Cultural Rsources Inventory of Seven Proposed Electrical Tap-Lines, San Juan & McKinley Counties, New Mexico, Apache County, and San Juan County, Utah for the Navajo Tribal Utility Authority.
HPD-09-381	120760	NNAD	16-Apr-09	2.88	0	Myerson, Aleda 2009 A Cultural Resource Inventory of the Proposed Raynette Nahkai 1-Acre Homesite near Sanostee, San Juan County, New Mexico.
HPD-09-503	120916	NNAD	15-May-09	2.88	0	Pettigrew, Matthew 2009 A Cultural Resource Inventory of the Proposed Dewayne Johnhat and Jaque Lee Smith 1-acre Homesite near Sanostee, San juan County, New Mexico
HPD-10-155	122550	"Dinetahdoo"	26-Feb-10	1	0	Werito, Clifford 2010 A Cultural Resources Inventory of Proposed Amended 1-Acre Homesites for Blanche Prettyboy and Mary Ann Prettyboy in Sanostee, San Juan county, New Mexico.
HPD-10-191	122564	Dinetahdoo	7-Apr-10	1	0	Ignacio, Natasha R. and Clifford Werito 2010 A Cultural Resource Inventory of the Proposed Rita Nez 1.00 Acre Homesite in Sanostee, San Juan County, New Mexico.

Most sites are Anasazi or historic Navajo, with many Anasazi sites appearing to be contemporary with Chaco Canyon to the east. There are several Chacoan road segments or possible road segments identified within the lease area, and these sites may extend beyond the boundaries identified for them in the records. Most sites have no determination of NRHP eligibility listed. Ten sites have an undetermined ARPA significance and may or

may not be 100 years old, eight sites appear to be less than 100 years old, and the remaining sites have ARPA significance. It is recommended that sites be reevaluated and locations confirmed prior to oil and gas development and this development be designed to avoid known NRHP-eligible sites by at least 100 feet. Many parts of the lease area have not been surveyed; any new development should be surveyed and subject to ethnographic study according to NNHPD standards.

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1994 *Biotic Communities: Southwestern United States and Northwestern Mexico.* University of Utah Press, Salt Lake City.

Cordell, Linda S.
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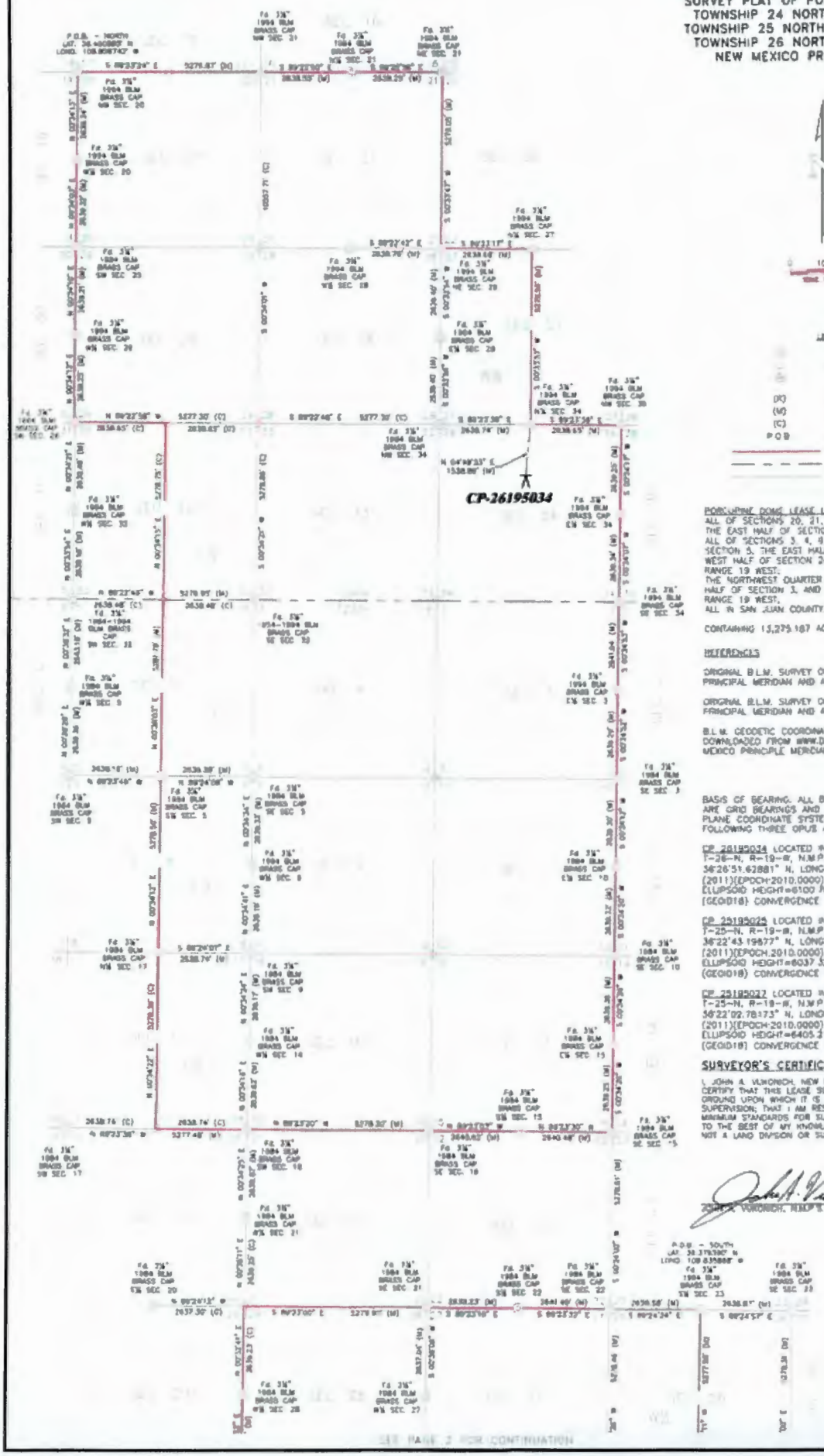
Surveyor's Plats

NAVAJO NATION OIL & GAS COMPANY

SURVEY PLAT OF PORCUPINE DOME LEASE
TOWNSHIP 24 NORTH, RANGE 19 WEST,
TOWNSHIP 25 NORTH, RANGE 19 WEST, &
TOWNSHIP 26 NORTH, RANGE 19 WEST,
NEW MEXICO PRINCIPLE MERIDIAN



LEGEND

- FOUND MONUMENT AS NOTED
- CALCULATED CORNER – NOT FOUND NOT SET
- LOCATION SHOWN TAKEN FROM BLM G.C.D.B. (TOWNSHIP NOT SURVEYED)
- (R) = RECORD
- (M) = MEASURED
- (C) = CALCULATED
- P.O.B. = POINT OF BEGINNING
- SUBJECT PARCEL BOUNDARY
- TOWNSHIP LINE
- SECTION LINE
- ONE QUARTER LINE

PORCUPINE DOME LEASE LEGAL DESCRIPTION

ALL OF SECTIONS 20, 21, 28, 29, 33, 34, THE WEST HALF OF SECTION 27, AND THE EAST HALF OF SECTION 32, TOWNSHIP 26 NORTH, RANGE 19 WEST,
ALL OF SECTIONS 3, 4, 9, 10, 15, 16, 27, 28, 33, 34 THE EAST HALF OF SECTION 5, THE EAST HALF OF SECTION 8, THE EAST HALF OF SECTION 17, THE WEST HALF OF SECTION 26, THE WEST HALF OF SECTION 35, TOWNSHIP 25 NORTH RANGE 19 WEST,
THE NORTHWEST QUARTER OF THE NORTHWEST QUARTER OF SECTION 2, THE NORTH HALF OF SECTION 3, AND THE NORTH HALF OF SECTION 4, TOWNSHIP 24 NORTH, RANGE 19 WEST,
ALL IN SAN JUAN COUNTY NEW MEXICO, ALL ON NAVAJO TRIBAL TRUST LAND

CONTAINING 13,275.187 ACRES MORE OR LESS

REFERENCES

ORIGINAL B.L.M. SURVEY OF TOWNSHIP 26 NORTH, RANGE 19 WEST, NEW MEXICO PRINCIPAL MERIDIAN AND ASSOCIATED FIELD NOTES DATED APRIL 14, 1897

ORIGINAL B.L.M. SURVEY OF TOWNSHIP 25 NORTH, RANGE 19 WEST, NEW MEXICO PRINCIPAL MERIDIAN AND ASSOCIATED FIELD NOTES DATED JULY 11, 1866

B.L.M. GEODETIC COORDINATE DATA BASE FOR THE STATE OF NEW MEXICO DOWNLOADED FROM WWW.DATA.GOV FOR TOWNSHIP 24 NORTH, RANGE 19 WEST, NEW MEXICO PRINCIPLE MERIDIAN

BASIS OF BEARING: ALL BEARINGS, DISTANCES, AND ACRES SHOWN HEREON ARE GRID BEARINGS AND DISTANCES FOR THE NAD83, NEW MEXICO STATE PLANE COORDINATE SYSTEM-WEST ZONE-U.S. SURVEY FEET BASED ON THE FOLLOWING THREE OPUS ADJUSTED BASE POINTS:

CP 26195034 LOCATED IN THE NORTHWEST QUARTER OF SECTION 34, T-26-N, R-19-W, N.M.P.M., SAN JUAN COUNTY, NEW MEXICO LATITUDE 36°26'51.62881" N, LONGITUDE 108°51'15.22422" W, NAD_83 (2011)(EPOCH:2010.0000)
ELLIPSOID HEIGHT=6100.785 SFT., ELEVATION = 6167.845 SFT NAVD 88 (GEOID18) CONVERGENCE ANGLE -0°36'23.3600"

CP 26195025 LOCATED IN THE NORTHEAST QUARTER OF SECTION 25, T-25-N, R-19-W, N.M.P.M., SAN JUAN COUNTY, NEW MEXICO. LATITUDE 36°22'43.19877" N, LONGITUDE 108°48'48.86478" W, NAD_83 (2011)(EPOCH:2010.0000)
ELLIPSOID HEIGHT=6037.324 SFT., ELEVATION = 6104.532 SFT NAVD 88 (GEOID18) CONVERGENCE ANGLE -0°34'53.1700"

CP 26195022 LOCATED IN THE SOUTHWEST QUARTER OF SECTION 27, T-25-N, R-19-W, N.M.P.M., SAN JUAN COUNTY, NEW MEXICO LATITUDE 36°22'02.78173" N, LONGITUDE 108°51'30.34307" W, NAD_83 (2011)(EPOCH:2010.0000)
ELLIPSOID HEIGHT=6405.214 SFT., ELEVATION = 6471.677 SFT NAVD 88 (GEOID18) CONVERGENCE ANGLE -0°36'28.3800"

SURVEYOR'S CERTIFICATION

I, JOHN A. VUKONICH, NEW MEXICO PROFESSIONAL SURVEYOR NO. 14831, DO HEREBY CERTIFY THAT THIS LEASE SURVEY SHOWN HEREON AND THE ACTUAL SURVEY ON THE GROUND UPON WHICH IT IS BASED WERE PERFORMED BY ME OR UNDER MY DIRECT SUPERVISION; THAT I AM RESPONSIBLE FOR THIS SURVEY; THAT THIS SURVEY MEETS THE MINIMUM STANDARDS FOR SURVEYING IN NEW MEXICO, AND THAT IT IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF. I FURTHER CERTIFY THAT THIS SURVEY IS NOT A LAND DIVISION OR SUBDIVISION AS DEFINED IN THE NEW MEXICO SUBDIVISION ACT

JOHN A. VUKONICH, N.M.P.S. NO. 14831 — DATE

JOHN A VUKONICH NEW MEXICO 14831 PROFESSIONAL SURVEYOR

SEE PAGE 2 FOR CONTINUATION

NAVAJO NATION OIL & GAS COMPANY

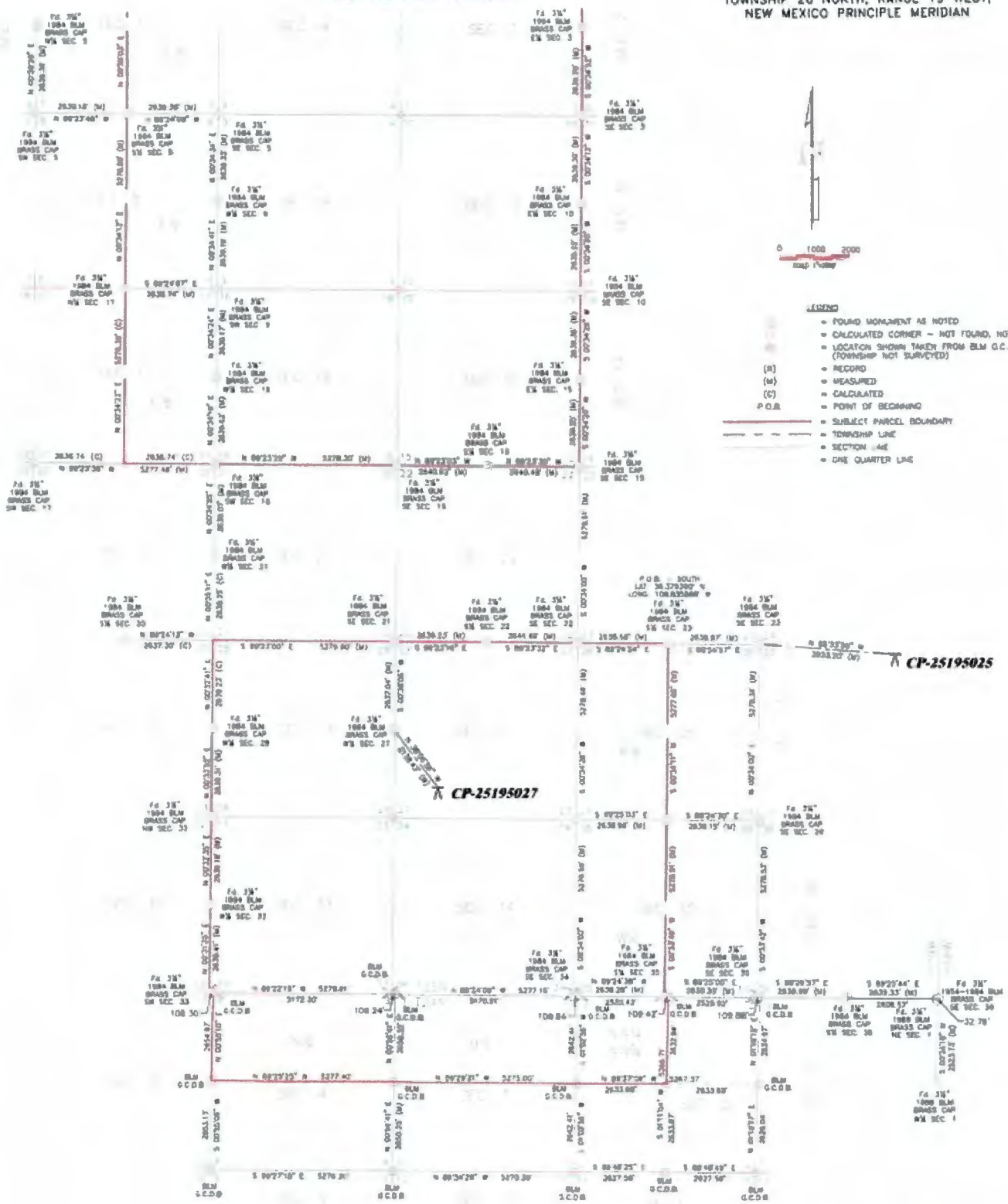
UNITED FIELD SERVICES INC.

APPENDIX 1

NAVAJO NATION OIL & GAS COMPANY

SURVEY PLAT OF PORCUPINE DOME LEASE
TOWNSHIP 24 NORTH, RANGE 19 WEST,
TOWNSHIP 25 NORTH, RANGE 19 WEST, &
TOWNSHIP 26 NORTH, RANGE 19 WEST,
NEW MEXICO PRINCIPLE MERIDIAN

SEE PAGE 1 FOR CONTINUATION



NAVAJO NATION OIL & GAS COMPANY

UNITED FIELD SERVICES INC.

APPENDIX 3

Looking East toward Bennett Peak from Section 9 (25n-19w)

Looking Southwest in Section 33 (26n-19w)

Looking East toward spring fed pond in Section 4 (24n-19w)

Looking Southeast at farm below pond

Looking Northwest at NTUA water well & tank in Section 9 (25n-19w)

Looking Northeast along paved N-34 in Section 3 (25n-19w)

Looking North at gravel N-5012 in Section 21 (26n-19w)

Looking North at reclaimed well in Section 21 (26n-19w)

Looking West at gravel N-5016 in Section 28 (26n-19w)

Looking South along N-5010 in Section 28 (26n-19w)

Looking Northwest toward houses from N-5005 in Section 28 (26n-19w)

Looking Northwest at Sanostee Wash in Section 4 (25n-19w)

Navajo Nation Oil & Gas Company
June 8, 2021

Legal description – Porcupine Dome Lease
All of Sections 20, 21, 28, 29, 33, 34, the West Half of Section 27, and the East Half of Section 32, Township 26 North, Range 19 West;
All of Sections 3, 4, 9, 10, 15, 16, 27, 28, 33, 34, the East Half of Section 5, the East Half of Section 8, the East Half of Section 17, the West Half of Section 26, and the West Half of Section 35, Township 25 North, Range 19 West;
The Northwest Quarter of the Northwest Quarter of Section 2, the North Half of Section 3, and the North Half of Section 4, Township 24 North, Range 19 West, ALL of the New Mexico Principal Meridian, in San Juan County, New Mexico, on Navajo Tribal Lands, being also more particularly described as follows:

North Tract

Beginning at the northwest corner of said Section 20, Township 26 North, Range 19 West, being a found 1994, 3¼ inch BLM Brass Cap, being the Point of Beginning (POB) for this description;

Thence along the north line thereof, South 89°23'24" East, 5276.87 feet to the northwest corner of said Section 21, Township 26 North, Range 19 West, being a found 1994, 3¼ inch BLM Brass Cap;

Thence along the north line of the Northwest Quarter thereof, South 89°22'50" East, 2638.55 feet to the North Quarter corner thereof being a found 1994, 3¼ inch BLM Brass Cap;

Thence along the north line of the Northeast Quarter thereof, South 89°22'56" East, 2638.25 feet to the Northeast corner thereof being a found 1994, 3¼ inch BLM Brass Cap;

Thence along the east line thereof, South 00°33'47" West, 5279.05 feet to the Northwest corner of said Section 27, Township 26 North, Range 19 West, being a found 1994, 3¼ inch BLM Brass Cap;

Thence along the north line of the Northwest Quarter thereof, South 89°23'17" East, 2638.68 feet to the North Quarter corner thereof, being a found 1994, 3¼ inch BLM Brass Cap;

Thence along the north-south center of section line thereof, South 00°33'53" West, 5278.56 feet to the South Quarter corner thereof, being a found 1994, 3¼ inch BLM Brass Cap;

Thence along the south line of the Southeast Quarter thereof, South 89°23'38" East, 2638.65 feet to the northeast corner of said Section 34, Township 26 North, Range 19 West, being a found 1994, 3¼ inch BLM Brass Cap;

Thence along the east line of the Northeast Quarter thereof, South 00°34'17" West, 2639.25 feet to the East Quarter corner thereof, being a found 1994, 3¼ inch BLM Brass Cap;

Thence along the east line of the Southeast Quarter thereof, South 00°34'07" West, 2639.34 feet to the Northeast corner of said Section 3, Township 25 North, Range 19 West, being a found 1994, 3¼ inch BLM Brass Cap;

Thence along the east line of the Northeast Quarter thereof, South 00°34'53" West, 2641.64 feet to the East Quarter corner thereof, being a found 1994, 3¼ inch BLM Brass Cap;

Thence along the east line of the Southeast Quarter thereof, South 00°34'52" West, 2639.29 feet to the Northeast corner of said Section 10, Township 25 North, Range 19 West, being a found 1984, 3¼ inch BLM Brass Cap;

Thence along the east line of the Northeast Quarter thereof, South 00°34'12" West, 2639.30 feet to the East Quarter corner thereof being a found 1984, 3¼ inch BLM Brass Cap;

Thence along the east line of the Southeast Quarter thereof, South 00°34'20" West, 2639.22 feet to the Northeast corner of said Section 15, Township 25 North, Range 19 West, being a found 1984, 3¼ inch BLM Brass Cap;

Thence along the east line of the Northeast Quarter thereof, South 00°34'26" West, 2639.36 feet to the East Quarter corner thereof, being a found 1984, 3¼ inch BLM Brass Cap;

Thence along the east line of the Southeast Quarter thereof, South 00°34'20" West, 2639.25 feet to the southeast corner thereof, being a found 1984, 3¼ inch BLM Brass Cap;

Thence along the south line of the Southeast Quarter thereof, North 89°23'30" West, 2640.48 feet to the South Quarter corner thereof being a found 1984, 3¼ inch BLM Brass Cap;

Thence along the south line of the Southwest Quarter thereof, North 89°23'03" West, 2640.62 feet to the southeast corner of said Section 16, Township 25 North, Range 19 West, being a found 1984, 3¼ inch BLM Brass Cap;

Thence along the south line thereof, North 89°23'20" West, 5278.30 feet to the southeast corner of said Section 17, Township 25 North, Range 19 West, being a found 1984, 3¼ inch BLM Brass Cap;

Thence along the south line of the Southeast Quarter thereof, North 89°23'36" West, 2638.74 feet to the calculated South Quarter corner thereof;

Thence along the north-south center of section line thereof, North 00°34'22" East, 5278.39 feet to the South Quarter corner of said Section 8, Township 25 North, Range 19 West, being a found 1984, 3¼ inch BLM Brass Cap;

Thence along the north-south center of section line thereof, North 00°34'12" East, 5278.50 feet to the South Quarter corner of said Section 5 Township 25 North, Range 19 West, being a found 1984, 3¼ inch BLM Brass Cap;

Thence along the north-south center of section line thereof, North 00°38'03" East, 5281.78 feet to the calculated South Quarter corner of said Section 32, Township 26 North, Range 19 West;

Thence along the north-south center of section line thereof, North 00°34'15" East, 5278.75 feet to the calculated South Quarter corner of said Section 29, Township 26 North, Range 19 West;

Thence along the south line of the Southwest Quarter thereof, North 89°22'58" West, 2638.65 feet to the southwest corner thereof, being a found 1994, 3¼ inch BLM Brass Cap;

Thence along the west line of the Southwest Quarter thereof, North 00°34'12" East, 2639.25 feet to the West Quarter corner thereof being a found 1994, 3¼ inch BLM Brass Cap;

Thence along the west line of the Northwest Quarter thereof, North 00°34'10" East, 2639.21 feet to the southwest corner of said Section 20, Township 26 North, Range 19 West, being a found 1994, 3¼ inch BLM Brass Cap;

Thence along the west line of the Southwest Quarter thereof, North 00°34'03" East, 2639.32 feet to the West Quarter corner thereof being a found 1994, 3¼ inch BLM Brass Cap;

Thence along the west line of the Northwest Quarter thereof, North 00°34'13" East, 2639.24 feet to the POINT OF BEGINNING.

The above described parcel of land containing 9,274.985 acres of land, more or less.

South Tract

Beginning at the North Quarter corner of said Section 26, Township 25 North, Range 19 West, being a found 1984, 3¼ inch BLM Brass Cap, being the Point of Beginning (POB) for this description;

Thence along the north-south center of section line thereof, South 00°34'11" West, 5277.96 feet to the North Quarter corner of said Section 35, Township 25 North, Range 19 West, being a found 1984, 3¼ inch BLM Brass Cap;

Thence along the north-south center of section line thereof, South 00°33'49" West, 5278.91 feet to the South Quarter corner thereof being a found 1984, 3¼ inch BLM Brass Cap Standard Corner;

Thence along the south line of the Southeast Quarter thereof, South 89°25'00" East, 109.42 feet to the BLM Geodetic Coordinate Data Base location for the North Quarter corner of the un-surveyed said Section 2, Township 24 North, Range 19 West;

Thence along the north-south center of section line thereof, South 01°11'04" West, 2632.84 feet to calculated Center Quarter corner thereof;

Thence along the east-west center of section line thereof, North 89°37'08" West, 2633.68 feet to the BLM Geodetic Coordinate Data Base location for the East Quarter corner of the un-surveyed said Section 3, Township 24 North, Range 19 West;

Thence along the east-west center of section line thereof, North 89°29'21" West, 5275.00 feet to the BLM Geodetic Coordinate Data Base location for the East Quarter corner of the un-surveyed said Section 4, Township 24 North, Range 19 West;

Thence along the east-west center of section line thereof, North 89°25'25" West, 5277.40 feet to the BLM Geodetic Coordinate Data Base location for the West Quarter therof;

Thence along the west line of the Northwest Quarter thereof, North 00°55'10" East, 2654.97 feet to the BLM Geodetic Coordinate Data Base location for the northwest corner thereof;

Thence along the south line of the Southwest Quarter of said Section 33, Township 25 North, Range 19 West, North 89°22'19" West, 106.30 feet to the southwest corner thereof being a found 1984, 3¼ inch BLM Brass Cap Standard Corner;

Thence along the west line of the Southwest Quarter thereof, North 00°31'25" East, 2639.41 feet to the East Quarter corner thereof being a found 1984, 3¼ inch BLM Brass Cap;

Thence along the west line of the Northwest Quarter thereof, North 00°32'35" East, 2639.18 feet to the Southwest corner of said Section 28, Township 25 North, Range 19 West, being a found 1984, 3¼ inch BLM Brass Cap;

Thence along the west line of the Southwest Quarter thereof, North 00°33'52" East, 2639.31 feet to the East Quarter corner thereof being a found 1984, 3¼ inch BLM Brass Cap;

Thence along the west line of the Northwest Quarter thereof, North 00°32'41" East, 2639.23 feet to the calculated northwest corner of said Section 28, Township 25 North, Range 19 West, being a found 1984, 3¼ inch BLM Brass Cap;

Thence along the north line thereof, South 89°23'00" East, 5279.90 feet to the northwest of said Section 27, Township 25 North, Range 19 West, being a found 1984, 3¼ inch BLM Brass Cap;

Thence along the north line of the Northwest Quarter thereof, South 89°23'16" East, 2639.23 feet to the North Quarter corner thereof being a found 1984, 3¼ inch BLM Brass Cap;

Thence along the north line of the Northeast Quarter thereof, South 89°23'32" East, 2641.49 feet to the northwest corner of said Section 26, Township 25 North, Range 19 West, being a found 1984, 3¼ inch BLM Brass Cap;

Thence along the north line of the Northwest Quarter thereof, South 89°24'24" East, 2638.58 feet to the POINT OF BEGINNING.

The above described parcel of land containing 4,000.202 acres of land, more or less.

The total area of North and South parcels as described above is 13,275.187 acres more or less all located on Navajo Tribal Trust land.

All bearings, distances and acres in this description are based upon the New Mexico State Plane Coordinate System of 1983, West Zone, in U.S. Feet. A plat of the same date accompanies this description.

I hereby certify that the survey represented in this description was made by me or under my direct supervision and accurately represents the survey to the best of my knowledge and belief.

John A. Vukonich 6/8/2021

JOHN A. VUKONICH, P.S. NO. 14831

JOHN A VUKONICH
NEW MEXICO
14831
PROFESSIONAL SURVEYOR

Navajo Nation Oil & Gas Company
June 8, 2021

Legal description – Porcupine Dome Lease
All of Sections 20, 21, 28, 29, 33, 34, the West Half of Section 27, and the East Half of Section 32, Township 26 North, Range 19 West;
All of Sections 3, 4, 9, 10, 15, 16, 27, 28, 33, 34, the East Half of Section 5, the East Half of Section 8, the East Half of Section 17, the West Half of Section 26, and the West Half of Section 35, Township 25 North, Range 19 West;
The Northwest Quarter of the Northwest Quarter of Section 2, the North Half of Section 3, and the North Half of Section 4, Township 24 North, Range 19 West, ALL of the New Mexico Principal Meridian, in San Juan County, New Mexico, on Navajo Tribal Lands, being also more particularly described as follows:

North Tract

Beginning at the northwest corner of said Section 20, Township 26 North, Range 19 West, being a found 1994, 3¼ inch BLM Brass Cap, being the Point of Beginning (POB) for this description;

Thence along the north line thereof, South 89°23'24" East, 5276.87 feet to the northwest corner of said Section 21, Township 26 North, Range 19 West, being a found 1994, 3¼ inch BLM Brass Cap;

Thence along the north line of the Northwest Quarter thereof, South 89°22'50" East, 2638.55 feet to the North Quarter corner thereof being a found 1994, 3¼ inch BLM Brass Cap;

Thence along the north line of the Northeast Quarter thereof, South 89°22'56" East, 2638.25 feet to the Northeast corner thereof being a found 1994, 3¼ inch BLM Brass Cap;

Thence along the east line thereof, South 00°33'47" West, 5279.05 feet to the Northwest corner of said Section 27, Township 26 North, Range 19 West, being a found 1994, 3¼ inch BLM Brass Cap;

Thence along the north line of the Northwest Quarter thereof, South 89°23'17" East, 2638.68 feet to the North Quarter corner thereof, being a found 1994, 3¼ inch BLM Brass Cap;

Thence along the north-south center of section line thereof, South 00°33'53" West, 5278.56 feet to the South Quarter corner thereof, being a found 1994, 3¼ inch BLM Brass Cap;

Thence along the south line of the Southeast Quarter thereof, South 89°23'38" East, 2638.65 feet to the northeast corner of said Section 34, Township 26 North, Range 19 West, being a found 1994, 3¼ inch BLM Brass Cap;

Thence along the east line of the Northeast Quarter thereof, South 00°34'17" West, 2639.25 feet to the East Quarter corner thereof, being a found 1994, 3¼ inch BLM Brass Cap;

Thence along the east line of the Southeast Quarter thereof, South 00°34'07" West, 2639.34 feet to the Northeast corner of said Section 3, Township 25 North, Range 19 West, being a found 1994, 3¼ inch BLM Brass Cap;

Thence along the east line of the Northeast Quarter thereof, South 00°34'53" West, 2641.64 feet to the East Quarter corner thereof, being a found 1994, 3¼ inch BLM Brass Cap;

Thence along the east line of the Southeast Quarter thereof, South 00°34'52" West, 2639.29 feet to the Northeast corner of said Section 10, Township 25 North, Range 19 West, being a found 1984, 3¼ inch BLM Brass Cap;

Thence along the east line of the Northeast Quarter thereof, South 00°34'12" West, 2639.30 feet to the East Quarter corner thereof being a found 1984, 3¼ inch BLM Brass Cap;

Thence along the east line of the Southeast Quarter thereof, South 00°34'20" West, 2639.22 feet to the Northeast corner of said Section 15, Township 25 North, Range 19 West, being a found 1984, 3¼ inch BLM Brass Cap;

Thence along the east line of the Northeast Quarter thereof, South 00°34'26" West, 2639.36 feet to the East Quarter corner thereof, being a found 1984, 3¼ inch BLM Brass Cap;

Thence along the east line of the Southeast Quarter thereof, South 00°34'20" West, 2639.25 feet to the southeast corner thereof, being a found 1984, 3¼ inch BLM Brass Cap;

Thence along the south line of the Southeast Quarter thereof, North 89°23'30" West, 2640.48 feet to the South Quarter corner thereof being a found 1984, 3¼ inch BLM Brass Cap;

Thence along the south line of the Southwest Quarter thereof, North 89°23'03" West, 2640.62 feet to the southeast corner of said Section 16, Township 25 North, Range 19 West, being a found 1984, 3¼ inch BLM Brass Cap;

Thence along the south line thereof, North 89°23'20" West, 5278.30 feet to the southeast corner of said Section 17, Township 25 North, Range 19 West, being a found 1984, 3¼ inch BLM Brass Cap;

Thence along the south line of the Southeast Quarter thereof, North 89°23'36" West, 2638.74 feet to the calculated South Quarter corner thereof;

Thence along the north-south center of section line thereof, North 00°34'22" East, 5278.39 feet to the South Quarter corner of said Section 8, Township 25 North, Range 19 West, being a found 1984, 3¼ inch BLM Brass Cap;

Thence along the north-south center of section line thereof, North 00°34'12" East, 5278.50 feet to the South Quarter corner of said Section 5 Township 25 North, Range 19 West, being a found 1984, 3¼ inch BLM Brass Cap;

Thence along the north-south center of section line thereof, North 00°38'03" East, 5281.78 feet to the calculated South Quarter corner of said Section 32, Township 26 North, Range 19 West;

Thence along the north-south center of section line thereof, North 00°34'15" East, 5278.75 feet to the calculated South Quarter corner of said Section 29, Township 26 North, Range 19 West;

Thence along the south line of the Southwest Quarter thereof, North 89°22'58" West, 2638.65 feet to the southwest corner thereof, being a found 1994, 3¼ inch BLM Brass Cap;

Thence along the west line of the Southwest Quarter thereof, North 00°34'12" East, 2639.25 feet to the West Quarter corner thereof being a found 1994, 3¼ inch BLM Brass Cap;

Thence along the west line of the Northwest Quarter thereof, North 00°34'10" East, 2639.21 feet to the southwest corner of said Section 20, Township 26 North, Range 19 West, being a found 1994, 3¼ inch BLM Brass Cap;

Thence along the west line of the Southwest Quarter thereof, North 00°34'03" East, 2639.32 feet to the West Quarter corner thereof being a found 1994, 3¼ inch BLM Brass Cap;

Thence along the west line of the Northwest Quarter thereof, North 00°34'13" East, 2639.24 feet to the POINT OF BEGINNING.

The above described parcel of land containing 9,274.985 acres of land, more or less.

South Tract

Beginning at the North Quarter corner of said Section 26, Township 25 North, Range 19 West, being a found 1984, 3¼ inch BLM Brass Cap, being the Point of Beginning (POB) for this description;

Thence along the north-south center of section line thereof, South 00°34'11" West, 5277.96 feet to the North Quarter corner of said Section 35, Township 25 North, Range 19 West, being a found 1984, 3¼ inch BLM Brass Cap;

Thence along the north-south center of section line thereof, South 00°33'49" West, 5278.91 feet to the South Quarter corner thereof being a found 1984, 3¼ inch BLM Brass Cap Standard Corner;

Thence along the south line of the Southeast Quarter thereof, South 89°25'00" East, 109.42 feet to the BLM Geodetic Coordinate Data Base location for the North Quarter corner of the un-surveyed said Section 2, Township 24 North, Range 19 West;

Thence along the north-south center of section line thereof, South 01°11'04" West, 2632.84 feet to calculated Center Quarter corner thereof;

Thence along the east-west center of section line thereof, North 89°37'08" West, 2633.68 feet to the BLM Geodetic Coordinate Data Base location for the East Quarter corner of the un-surveyed said Section 3, Township 24 North, Range 19 West;

Thence along the east-west center of section line thereof, North 89°29'21" West, 5275.00 feet to the BLM Geodetic Coordinate Data Base location for the East Quarter corner of the un-surveyed said Section 4, Township 24 North, Range 19 West;

Thence along the east-west center of section line thereof, North 89°25'25" West, 5277.40 feet to the BLM Geodetic Coordinate Data Base location for the West Quarter therof;

Thence along the west line of the Northwest Quarter thereof, North 00°55'10" East, 2654.97 feet to the BLM Geodetic Coordinate Data Base location for the northwest corner thereof;

Thence along the south line of the Southwest Quarter of said Section 33, Township 25 North, Range 19 West, North 89°22'19" West, 106.30 feet to the southwest corner thereof being a found 1984, 3¼ inch BLM Brass Cap Standard Corner;

Thence along the west line of the Southwest Quarter thereof, North 00°31'25" East, 2639.41 feet to the East Quarter corner thereof being a found 1984, 3¼ inch BLM Brass Cap;

Thence along the west line of the Northwest Quarter thereof, North 00°32'35" East, 2639.18 feet to the Southwest corner of said Section 28, Township 25 North, Range 19 West, being a found 1984, 3¼ inch BLM Brass Cap;

Thence along the west line of the Southwest Quarter thereof, North 00°33'52" East, 2639.31 feet to the East Quarter corner thereof being a found 1984, 3¼ inch BLM Brass Cap;

Thence along the west line of the Northwest Quarter thereof, North 00°32'41" East, 2639.23 feet to the calculated northwest corner of said Section 28, Township 25 North, Range 19 West, being a found 1984, 3¼ inch BLM Brass Cap;

Thence along the north line thereof, South 89°23'00" East, 5279.90 feet to the northwest of said Section 27, Township 25 North, Range 19 West, being a found 1984, 3¼ inch BLM Brass Cap;

Thence along the north line of the Northwest Quarter thereof, South 89°23'16" East, 2639.23 feet to the North Quarter corner thereof being a found 1984, 3¼ inch BLM Brass Cap;

Thence along the north line of the Northeast Quarter thereof, South 89°23'32" East, 2641.49 feet to the northwest corner of said Section 26, Township 25 North, Range 19 West, being a found 1984, 3¼ inch BLM Brass Cap;

Thence along the north line of the Northwest Quarter thereof, South 89°24'24" East, 2638.58 feet to the POINT OF BEGINNING.

The above described parcel of land containing 4,000.202 acres of land, more or less.

The total area of North and South parcels as described above is 13,275.187 acres more or less all located on Navajo Tribal Trust land.

All bearings, distances and acres in this description are based upon the New Mexico State Plane Coordinate System of 1983, West Zone, in U.S. Feet. A plat of the same date accompanies this description.

I hereby certify that the survey represented in this description was made by me or under my direct supervision and accurately represents the survey to the best of my knowledge and belief.

John A. Vukonich 6/8/2021

JOHN A. VUKONICH, P.S. NO. 14831

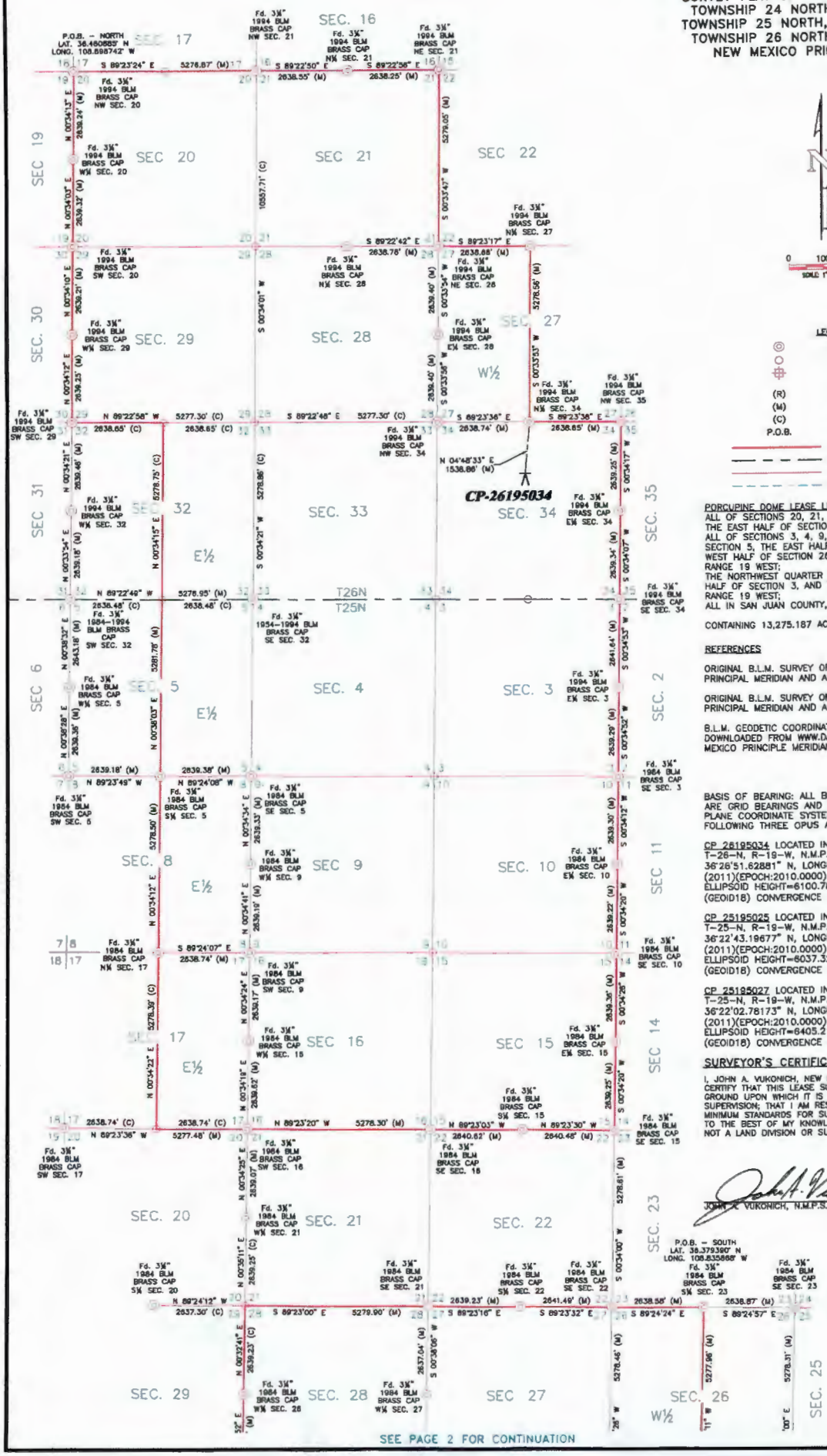
JOHN A VUKONICH
NEW MEXICO
14831
PROFESSIONAL SURVEYOR

EXHIBIT

A-2

NAVAJO NATION OIL & GAS COMPANY

SURVEY PLAT OF PORCUPINE DOME LEASE
TOWNSHIP 24 NORTH, RANGE 19 WEST,
TOWNSHIP 25 NORTH, RANGE 19 WEST, &
TOWNSHIP 26 NORTH, RANGE 19 WEST,
NEW MEXICO PRINCIPLE MERIDIAN



LEGEND

- ◎ = FOUND MONUMENT AS NOTED
- ○ = CALCULATED CORNER – NOT FOUND, NOT SET
- ⊕ = LOCATION SHOWN TAKEN FROM BLM G.C.D.B. (TOWNSHIP NOT SURVEYED)
- (R) = RECORD
- (M) = MEASURED
- (C) = CALCULATED
- P.O.B. = POINT OF BEGINNING
- = SUBJECT PARCEL BOUNDARY
- = TOWNSHIP LINE
- = SECTION LINE
- = ONE QUARTER LINE

PORCUPINE DOME LEASE LEGAL DESCRIPTION

ALL OF SECTIONS 20, 21, 28, 29, 33, 34, THE WEST HALF OF SECTION 27, AND THE EAST HALF OF SECTION 32, TOWNSHIP 26 NORTH, RANGE 19 WEST;
ALL OF SECTIONS 3, 4, 9, 10, 15, 16, 27, 28, 33, 34, THE EAST HALF OF SECTION 5, THE EAST HALF OF SECTION 8, THE EAST HALF OF SECTION 17, THE WEST HALF OF SECTION 26, THE WEST HALF OF SECTION 35, TOWNSHIP 25 NORTH, RANGE 19 WEST;
THE NORTHWEST QUARTER OF THE NORTHWEST QUARTER OF SECTION 2, THE NORTH HALF OF SECTION 3, AND THE NORTH HALF OF SECTION 4, TOWNSHIP 24 NORTH, RANGE 19 WEST;
ALL IN SAN JUAN COUNTY, NEW MEXICO, ALL ON NAVAJO TRIBAL TRUST LAND.

CONTAINING 13,275.187 ACRES MORE OR LESS.

REFERENCES

ORIGINAL B.L.M. SURVEY OF TOWNSHIP 26 NORTH, RANGE 19 WEST, NEW MEXICO PRINCIPAL MERIDIAN AND ASSOCIATED FIELD NOTES DATED APRIL 14, 1997.

ORIGINAL B.L.M. SURVEY OF TOWNSHIP 25 NORTH, RANGE 19 WEST, NEW MEXICO PRINCIPAL MERIDIAN AND ASSOCIATED FIELD NOTES DATED JULY 11, 1988.

B.L.M. GEODETIC COORDINATE DATA BASE FOR THE STATE OF NEW MEXICO DOWNLOADED FROM WWW.DATA.GOV FOR TOWNSHIP 24 NORTH, RANGE 19 WEST, NEW MEXICO PRINCIPLE MERIDIAN.

BASIS OF BEARING: ALL BEARINGS, DISTANCES, AND ACRES SHOWN HEREON ARE GRID BEARINGS AND DISTANCES FOR THE NAD83, NEW MEXICO STATE PLANE COORDINATE SYSTEM–WEST ZONE–U.S. SURVEY FEET BASED ON THE FOLLOWING THREE OPUS ADJUSTED BASE POINTS:

CP 26195034 LOCATED IN THE NORTHWEST QUARTER OF SECTION 34, T-26-N, R-19-W, N.M.P.M., SAN JUAN COUNTY, NEW MEXICO. LATITUDE: 36°26'51.62881" N, LONGITUDE: 108°51'15.22422" W, NAD_83 (2011)(EPOCH:2010.0000).
ELLIPSOID HEIGHT=6100.785 SFT., ELEVATION = 6167.845 SFT., NAVD 88, (GEOID18) CONVERGENCE ANGLE –0°36'23.5600".

CP 25195025 LOCATED IN THE NORTHEAST QUARTER OF SECTION 25, T-25-N, R-19-W, N.M.P.M., SAN JUAN COUNTY, NEW MEXICO. LATITUDE: 36°22'43.19677" N, LONGITUDE: 108°48'48.86478" W, NAD_83 (2011)(EPOCH:2010.0000).
ELLIPSOID HEIGHT=6037.324 SFT., ELEVATION = 6104.532 SFT., NAVD 88, (GEOID18) CONVERGENCE ANGLE –0°34'53.1700".

CP 25195027 LOCATED IN THE SOUTHWEST QUARTER OF SECTION 27, T-25-N, R-19-W, N.M.P.M., SAN JUAN COUNTY, NEW MEXICO. LATITUDE: 36°22'02.78173" N, LONGITUDE: 108°51'30.34307" W, NAD_83 (2011)(EPOCH:2010.0000).
ELLIPSOID HEIGHT=6405.214 SFT., ELEVATION = 6471.877 SFT., NAVD 88, (GEOID18) CONVERGENCE ANGLE –0°36'28.3800".

SURVEYOR'S CERTIFICATION

I, JOHN A. VUKONICH, NEW MEXICO PROFESSIONAL SURVEYOR NO. 14831, DO HEREBY CERTIFY THAT THIS LEASE SURVEY SHOWN HEREON AND THE ACTUAL SURVEY ON THE GROUND UPON WHICH IT IS BASED WERE PERFORMED BY ME OR UNDER MY DIRECT SUPERVISION; THAT I AM RESPONSIBLE FOR THIS SURVEY; THAT THIS SURVEY MEETS THE MINIMUM STANDARDS FOR SURVEYING IN NEW MEXICO; AND THAT IT IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF. I FURTHER CERTIFY THAT THIS SURVEY IS NOT A LAND DIVISION OR SUBDIVISION AS DEFINED IN THE NEW MEXICO SUBDIVISION ACT.

John A. Vukonich 6/8/21

JOHN A. VUKONICH, N.M.P.S. NO. 14831 DATE

JOHN A VUKONICH NEW MEXICO 14831 PROFESSIONAL SURVEYOR

NAVAJO NATION OIL & GAS COMPANY

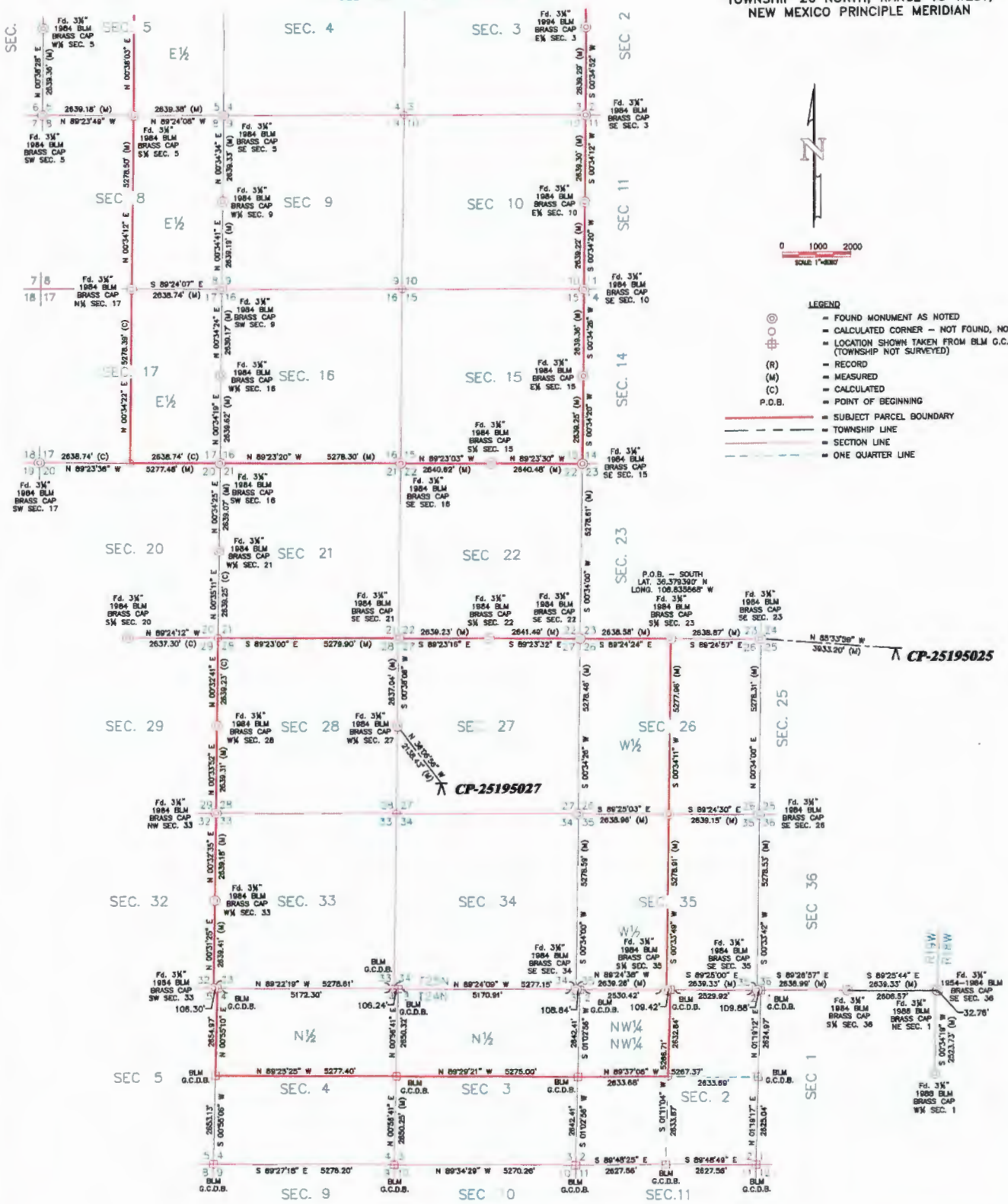
UNITED FIELD SERVICES INC.

SURVEYED: 4/28/21	REV DATE: 6/7/21	APP BY: J.A.V.
DRAWN BY: D.E.H.	DATE DRAWN: 5/7/21	FILE NAME: 11550 PORCUPINE

NAVAJO NATION OIL & GAS COMPANY

SURVEY PLAT OF PORCUPINE DOME LEASE
TOWNSHIP 24 NORTH, RANGE 19 WEST,
TOWNSHIP 25 NORTH, RANGE 19 WEST, &
TOWNSHIP 26 NORTH, RANGE 19 WEST,
NEW MEXICO PRINCIPLE MERIDIAN

SEE PAGE 1 FOR CONTINUATION



LEGEND

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- = SECTION LINE
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NAVAJO NATION OIL & GAS COMPANY

UNITED FIELD SERVICES INC.

SURVEYED: 4/26/21	REV DATE: 6/7/21	APP BY: J.A.V.
DRAWN BY: D.E.H.	DATE DRAWN: 3/7/21	FILE NAME: 11350 PORCUPINE

Navajo Nation Oil & Gas Company
June 8, 2021

Legal description – Porcupine Dome Lease
All of Sections 20, 21, 28, 29, 33, 34, the West Half of Section 27, and the East Half of Section 32, Township 26 North, Range 19 West;
All of Sections 3, 4, 9, 10, 15, 16, 27, 28, 33, 34, the East Half of Section 5, the East Half of Section 8, the East Half of Section 17, the West Half of Section 26, and the West Half of Section 35, Township 25 North, Range 19 West;
The Northwest Quarter of the Northwest Quarter of Section 2, the North Half of Section 3, and the North Half of Section 4, Township 24 North, Range 19 West, ALL of the New Mexico Principal Meridian, in San Juan County, New Mexico, on Navajo Tribal Lands, being also more particularly described as follows:

North Tract

Beginning at the northwest corner of said Section 20, Township 26 North, Range 19 West, being a found 1994, 3¼ inch BLM Brass Cap, being the Point of Beginning (POB) for this description;

Thence along the north line thereof, South 89°23'24" East, 5276.87 feet to the northwest corner of said Section 21, Township 26 North, Range 19 West, being a found 1994, 3¼ inch BLM Brass Cap;

Thence along the north line of the Northwest Quarter thereof, South 89°22'50" East, 2638.55 feet to the North Quarter corner thereof being a found 1994, 3¼ inch BLM Brass Cap;

Thence along the north line of the Northeast Quarter thereof, South 89°22'56" East, 2638.25 feet to the Northeast corner thereof being a found 1994, 3¼ inch BLM Brass Cap;

Thence along the east line thereof, South 00°33'47" West, 5279.05 feet to the Northwest corner of said Section 27, Township 26 North, Range 19 West, being a found 1994, 3¼ inch BLM Brass Cap;

Thence along the north line of the Northwest Quarter thereof, South 89°23'17" East, 2638.68 feet to the North Quarter corner thereof, being a found 1994, 3¼ inch BLM Brass Cap;

Thence along the north-south center of section line thereof, South 00°33'53" West, 5278.56 feet to the South Quarter corner thereof, being a found 1994, 3¼ inch BLM Brass Cap;

Thence along the south line of the Southeast Quarter thereof, South 89°23'38" East, 2638.65 feet to the northeast corner of said Section 34, Township 26 North, Range 19 West, being a found 1994, 3¼ inch BLM Brass Cap;

Thence along the east line of the Northeast Quarter thereof, South 00°34'17" West, 2639.25 feet to the East Quarter corner thereof, being a found 1994, 3¼ inch BLM Brass Cap;

Thence along the east line of the Southeast Quarter thereof, South 00°34'07" West, 2639.34 feet to the Northeast corner of said Section 3, Township 25 North, Range 19 West, being a found 1994, 3¼ inch BLM Brass Cap;

Thence along the east line of the Northeast Quarter thereof, South 00°34'53" West, 2641.64 feet to the East Quarter corner thereof, being a found 1994, 3¼ inch BLM Brass Cap;

Thence along the east line of the Southeast Quarter thereof, South 00°34'52" West, 2639.29 feet to the Northeast corner of said Section 10, Township 25 North, Range 19 West, being a found 1984, 3¼ inch BLM Brass Cap;

Thence along the east line of the Northeast Quarter thereof, South 00°34'12" West, 2639.30 feet to the East Quarter corner thereof being a found 1984, 3¼ inch BLM Brass Cap;

Thence along the east line of the Southeast Quarter thereof, South 00°34'20" West, 2639.22 feet to the Northeast corner of said Section 15, Township 25 North, Range 19 West, being a found 1984, 3¼ inch BLM Brass Cap;

Thence along the east line of the Northeast Quarter thereof, South 00°34'26" West, 2639.36 feet to the East Quarter corner thereof, being a found 1984, 3¼ inch BLM Brass Cap;

Thence along the east line of the Southeast Quarter thereof, South 00°34'20" West, 2639.25 feet to the southeast corner thereof, being a found 1984, 3¼ inch BLM Brass Cap;

Thence along the south line of the Southeast Quarter thereof, North 89°23'30" West, 2640.48 feet to the South Quarter corner thereof being a found 1984, 3¼ inch BLM Brass Cap;

Thence along the south line of the Southwest Quarter thereof, North 89°23'03" West, 2640.62 feet to the southeast corner of said Section 16, Township 25 North, Range 19 West, being a found 1984, 3¼ inch BLM Brass Cap;

Thence along the south line thereof, North 89°23'20" West, 5278.30 feet to the southeast corner of said Section 17, Township 25 North, Range 19 West, being a found 1984, 3¼ inch BLM Brass Cap;

Thence along the south line of the Southeast Quarter thereof, North 89°23'36" West, 2638.74 feet to the calculated South Quarter corner thereof;

Thence along the north-south center of section line thereof, North 00°34'22" East, 5278.39 feet to the South Quarter corner of said Section 8, Township 25 North, Range 19 West, being a found 1984, 3¼ inch BLM Brass Cap;

Thence along the north-south center of section line thereof, North 00°34'12" East, 5278.50 feet to the South Quarter corner of said Section 5 Township 25 North, Range 19 West, being a found 1984, 3¼ inch BLM Brass Cap;

Thence along the north-south center of section line thereof, North 00°38'03" East, 5281.78 feet to the calculated South Quarter corner of said Section 32, Township 26 North, Range 19 West;

Thence along the north-south center of section line thereof, North 00°34'15" East, 5278.75 feet to the calculated South Quarter corner of said Section 29, Township 26 North, Range 19 West;

Thence along the south line of the Southwest Quarter thereof, North 89°22'58" West, 2638.65 feet to the southwest corner thereof, being a found 1994, 3¼ inch BLM Brass Cap;

Thence along the west line of the Southwest Quarter thereof, North 00°34'12" East, 2639.25 feet to the West Quarter corner thereof being a found 1994, 3¼ inch BLM Brass Cap;

Thence along the west line of the Northwest Quarter thereof, North 00°34'10" East, 2639.21 feet to the southwest corner of said Section 20, Township 26 North, Range 19 West, being a found 1994, 3¼ inch BLM Brass Cap;

Thence along the west line of the Southwest Quarter thereof, North 00°34'03" East, 2639.32 feet to the West Quarter corner thereof being a found 1994, 3¼ inch BLM Brass Cap;

Thence along the west line of the Northwest Quarter thereof, North 00°34'13" East, 2639.24 feet to the POINT OF BEGINNING.

The above described parcel of land containing 9,274.985 acres of land, more or less.

South Tract

Beginning at the North Quarter corner of said Section 26, Township 25 North, Range 19 West, being a found 1984, 3¼ inch BLM Brass Cap, being the Point of Beginning (POB) for this description;

Thence along the north-south center of section line thereof, South 00°34'11" West, 5277.96 feet to the North Quarter corner of said Section 35, Township 25 North, Range 19 West, being a found 1984, 3¼ inch BLM Brass Cap;

Thence along the north-south center of section line thereof, South 00°33'49" West, 5278.91 feet to the South Quarter corner thereof being a found 1984, 3¼ inch BLM Brass Cap Standard Corner;

Thence along the south line of the Southeast Quarter thereof, South 89°25'00" East, 109.42 feet to the BLM Geodetic Coordinate Data Base location for the North Quarter corner of the un-surveyed said Section 2, Township 24 North, Range 19 West;

Thence along the north-south center of section line thereof, South 01°11'04" West, 2632.84 feet to calculated Center Quarter corner thereof;

Thence along the east-west center of section line thereof, North 89°37'08" West, 2633.68 feet to the BLM Geodetic Coordinate Data Base location for the East Quarter corner of the un-surveyed said Section 3, Township 24 North, Range 19 West;

Thence along the east-west center of section line thereof, North 89°29'21" West, 5275.00 feet to the BLM Geodetic Coordinate Data Base location for the East Quarter corner of the un-surveyed said Section 4, Township 24 North, Range 19 West;

Thence along the east-west center of section line thereof, North 89°25'25" West, 5277.40 feet to the BLM Geodetic Coordinate Data Base location for the West Quarter therof;

Thence along the west line of the Northwest Quarter thereof, North 00°55'10" East, 2654.97 feet to the BLM Geodetic Coordinate Data Base location for the northwest corner thereof;

Thence along the south line of the Southwest Quarter of said Section 33, Township 25 North, Range 19 West, North 89°22'19" West, 106.30 feet to the southwest corner thereof being a found 1984, 3¼ inch BLM Brass Cap Standard Corner;

Thence along the west line of the Southwest Quarter thereof, North 00°31'25" East, 2639.41 feet to the East Quarter corner thereof being a found 1984, 3¼ inch BLM Brass Cap;

Thence along the west line of the Northwest Quarter thereof, North 00°32'35" East, 2639.18 feet to the Southwest corner of said Section 28, Township 25 North, Range 19 West, being a found 1984, 3¼ inch BLM Brass Cap;

Thence along the west line of the Southwest Quarter thereof, North 00°33'52" East, 2639.31 feet to the East Quarter corner thereof being a found 1984, 3¼ inch BLM Brass Cap;

Thence along the west line of the Northwest Quarter thereof, North 00°32'41" East, 2639.23 feet to the calculated northwest corner of said Section 28, Township 25 North, Range 19 West, being a found 1984, 3¼ inch BLM Brass Cap;

Thence along the north line thereof, South 89°23'00" East, 5279.90 feet to the northwest of said Section 27, Township 25 North, Range 19 West, being a found 1984, 3¼ inch BLM Brass Cap;

Thence along the north line of the Northwest Quarter thereof, South 89°23'16" East, 2639.23 feet to the North Quarter corner thereof being a found 1984, 3¼ inch BLM Brass Cap;

Thence along the north line of the Northeast Quarter thereof, South 89°23'32" East, 2641.49 feet to the northwest corner of said Section 26, Township 25 North, Range 19 West, being a found 1984, 3¼ inch BLM Brass Cap;

Thence along the north line of the Northwest Quarter thereof, South 89°24'24" East, 2638.58 feet to the POINT OF BEGINNING.

The above described parcel of land containing 4,000.202 acres of land, more or less.

The total area of North and South parcels as described above is 13,275.187 acres more or less all located on Navajo Tribal Trust land.

All bearings, distances and acres in this description are based upon the New Mexico State Plane Coordinate System of 1983, West Zone, in U.S. Feet. A plat of the same date accompanies this description.

I hereby certify that the survey represented in this description was made by me or under my direct supervision and accurately represents the survey to the best of my knowledge and belief.

John A. Vukonich 6/8/2021

JOHN A. VUKONICH, P.S. NO. 14831

JOHN A VUKONICH
NEW MEXICO
14831
PROFESSIONAL SURVEYOR

EXHIBIT B

NAVAJO NATION
OIL AND GAS OPERATING AGREEMENT

This Oil and Gas Operating Agreement ("OA" or the "Agreement") is made and entered into this _____ day of _____, 2021, by and between the Navajo Nation ("Nation" or "Lessor") and the Navajo Nation Oil and Gas Company ("NNOGC" or "Operator"), each a "Party" and collectively the "Parties," on the terms and conditions set forth herein.

RECITALS

WHEREAS, the Nation is a sovereign Indian Nation and the beneficial owner of certain surface land and mineral estates located on the Navajo Nation in the States of Arizona, Utah and New Mexico; and

WHEREAS, NNOGC is a wholly owned arm and instrumentality of the Nation organized under Section 17 of the Indian Reorganization Act, 25 U.S.C. § 5124 (formerly 25 U.S.C. § 477), and charged by the Nation pursuant to its corporate Charter, approved by the Navajo Nation Council, with, among other purposes, conducting oil and gas exploration and production on behalf of the Nation, for the benefit of the Navajo Nation, and to return all dividends and distributions of profit to the Navajo Nation government; and

WHEREAS, NNOGC and the Nation intend that all activities authorized hereunder will be conducted in a manner consistent with NNOGC's Charter and other applicable Navajo law, and with NNOGC's obligation to maximize the value of the Nation's oil and gas resources for the benefit of the Navajo Nation.

NOW, THEREFORE, for and in consideration of the foregoing recitals and the mutual covenants and obligations set forth herein, the Parties agree as follows:

I. DEFINITIONS.

A. "Affiliate" means any entity as defined in 30 Code of Federal Regulations (CFR) § 1206.51 or any applicable substitute future regulations.

B. "Anniversary Date" means the date one year after the Effective Date of this Agreement and each subsequent date one year after the Anniversary Date thereafter.

C. "Conducting operations" means any work undertaken or commenced in good faith for the purpose of carrying out the rights, privileges or duties of NNOGC under this OA, including the construction of necessary structures for the drilling of an oil or gas well, and by the actual

operation of drilling in the ground, and which shall include all activities common in the industry, unless otherwise prohibited by law.

D. "Crude Helium" means the grade of helium produced or extracted at any facility other than a gas plant, and which is less than 99.995 percent helium by volume.

E. "Effective Date" means the date that this Agreement is approved by the U.S. Bureau of Indian Affairs (BIA).

F. "Gas" or "gas" shall be defined pursuant to 30 C.F.R. Part 1206, Subpart E, § 1206.171.

G. "Gathering" means the movement of OA production to a central accumulation or treatment point on the OA Area; or a central accumulation or treatment point off the OA Area.

H. "Gross Proceeds" for royalty payment purposes means: for gas royalties, except for helium royalties, the definition contained at 30 C.F.R. § 1206.171, or any applicable substitute future regulation; for oil royalties, the definition contained at 30 C.F.R. § 1206.51 or any applicable substitute future regulation. For purposes of determining royalties as provided herein, except for royalties taken in-kind by the Nation, the point of valuation of hydrocarbons shall be the Bureau of Land Management facility measurement point.

I. "Hydrocarbons" or "hydrocarbons" means naturally occurring hydrocarbon oil, gas, casing head gas, coal bed methane, distillate, condensate, liquid hydrocarbons and each of their respective constituent vapors and liquids, and including without limitation, helium and carbon dioxide, and all other non-hydrocarbon gases within the OA Area. Hydrocarbons do not include coal matrix material or the in-situ synthetic gasification of coal matrix material.

J. "Oil" or "oil" means petroleum or liquid hydrocarbons originally existing in a reservoir in a liquid state.

K. "Payment in Lieu of Tax" or "PILT" means a payment made by NNOGC pursuant to this Agreement in lieu of the Possessory Interest Tax and the Oil and Gas Severance Tax, from which NNOGC is statutorily exempt.

L. "Primary Term" means the initial term of the OA which shall be for a period of up to ten (10) years, which may be automatically extended for one (1) additional year as provided in this OA, during which NNOGC has exclusive rights and privileges in the Properties for Oil and Gas exploration and development, such rights and privileges which are held by the Bonus, as defined in Section II(A), and by the Delay Rentals, as defined in Section IV(A). Acreage of the Properties moves from the Primary Term to the Secondary Term effective upon NNOGC's development of a well that is producing Oil or Gas in paying quantities. Any portion of the Properties may be relinquished to the Nation during the Primary Term as provided in this OA.

M. "Produced, producing, or production in paying quantities" or "held by production" means sufficient net income from production to: (a) operate and maintain the Properties or a portion thereof, as provided herein; (b) market the production; and (c) result in a net income to Operator greater than zero dollars ($0.00).

N. "Properties" or "OA Area" shall have the meaning set forth in Section II(A) of this Agreement.

O. "Regulations" means the Code of Federal Regulations (CFR).

P. "Secondary Term" means, for any portion of the Properties or all of the Properties held by production, the period of time after the Primary Term ends during which the Properties or any portion thereof are producing oil or gas in paying quantities, as defined and provided for herein, and during which NNOGC has exclusive rights and privileges in such Properties for oil and gas exploration, development, and production.

Q. "Secretary" means the Secretary of the Department of Interior or his/her designee.

II. PROPERTIES; BONUS; TERM.

A. The Nation, in consideration of a cash bonus of $25.00 per acre, for a total bonus of $212,000.00 (the "Bonus"), to be paid within 60 days of the Effective Date, which Bonus shall hold the Properties, as defined herein, for the first year of the Primary Term, and in consideration of the Delay Rentals and royalties to be paid, and the covenants to be observed as herein set forth, does hereby grant and lease to NNOGC the exclusive right and privilege to drill for, extract, remove, and dispose of all the oil and gas deposits, including helium gas, carbon dioxide gas, and sulphur gas, at all depths in or under the following-described tracts of land situated in the County of San Juan, State of New Mexico, and more particularly described as follows:

Township 27 North, Range 19 West
All of Sections 20, 21, 28, 29, 32, and 33
Section 30: E/2
Section 31: E/2

Township 26 North, Range 19 West
All of Sections 4, 5, 8, and 17
Section 6; E/2
Section 7: E/2
Section 9: W/2 and NE/4
Section 18: E/2

containing 8,480 acres more or less (the "Properties" or the "OA Area"), together with the right to construct and maintain on the Properties such structures necessary for the development and

operation of the Properties. The Properties are shown on the Map attached hereto as Attachment "A."

B. NNOGC's exclusive right and privilege under this OA during the Secondary Term shall continue for so long as oil and/or gas is produced in paying quantities from the Properties, *i.e.*, while the Properties are "held by production". For purposes of the Secondary Term, a single producing gas well shall hold 640 acres and a single producing oil well shall hold 160 acres of the Properties.

C. The Primary Term for any portion of the Properties not held by production or extended as provided herein will expire at midnight on the 364th day after the 9-year anniversary of the Effective Date (or on the 365th day after the 9 year anniversary of the Effective Date if the year is a Leap Year). If necessary, the Primary Term may be automatically extended for such time as it takes NNOGC to complete conducting operations on such acreage, not to exceed a period of twelve (12) months.

D. If, at any time during the Primary Term, NNOGC determines, in its sole discretion, that development of all or any portion of the Properties is not economically feasible, NNOGC may relinquish any such uneconomic portion of the Properties back to the Nation at no additional cost to NNOGC and which shall not affect in any manner NNOGC's right to develop and operate the Properties remaining under the OA. Delay rentals shall not be paid on relinquished acres.

E. For any Properties that are not relinquished by NNOGC to the Nation during or at the expiration of the Primary Term, this OA shall continue in effect for so long as there are oil or gas wells producing in paying quantities. During the Secondary Term, production may be interrupted periodically, *e.g.*, where there is a mechanical breakdown or on a good-faith market basis, so long as production is resumed by NNOGC within a reasonable time after well work, facility repairs, or market pricing enables wells to return to paying quantities.

III. <u>SURFACE USE AUTHORIZATION; EASEMENTS</u>.

A. Without limitation, the Nation hereby grants to and gives its consent for NNOGC access to the Properties for the purpose of conducting environmental, archaeological, biological and seismic studies preparatory to operations on the OA, and the right to build and maintain pipelines, transmission lines, and other lines, including without limitation oil, gas, power and water lines incidental to the operations authorized hereunder ("Lines"). As of the Effective Date, NNOGC is hereby authorized to conduct geophysical surveys on all, or any part of the Properties, which shall be without charge for surface damages and/or permit fees in favor of the Nation. The Nation, through its Land, Minerals, General Land Development Department and other Departments, further agrees to promptly review and approve reasonable requests of NNOGC, from time to time, of all such additional permits or authorizations as are necessary or incidental to the conduct of NNOGC's authorized activities hereunder, including without limitation permits for

seismic and other studies, water usage, easements, and for the use of existing or expired rights-of-way in order that the Purposes of this Agreement, express or implied, can be fully accomplished without unnecessary or unusual delays. For all authorizations provided in this entire Section III(A), NNOGC shall comply with Navajo Nation laws governing environmental resources, including water, and cultural resources, and shall obtain the appropriate Navajo Nation environmental and cultural resource clearances, and grazing clearances, prior to any disturbance of the Properties.

IV. NNOGC'S OBLIGATIONS.

A. Delay Rental Payments. Properties for the first year of the Primary Term are held by NNOGC by payment of the Bonus, as set forth in Section II(A). As consideration to the Nation for NNOGC's holding non-producing acreage of the Properties and non-relinquished acreage of the Properties after the first year of the Primary Term, (beginning on the one-year anniversary of the Effective Date, and on each one-year anniversary thereafter for the duration of the Primary Term, NNOGC shall pay an advance annual delay rental of **$10.00 per acre** (the "Delay Rental") for any acreage of the Properties not held by a producing well and not relinquished by NNOGC prior to the Delay Rental payment date. For purposes of this Section IV(A), a single producing gas well shall hold 640 acres and a single producing oil well shall hold 160 acres of the Properties. For the sake of clarity, in no event shall NNOGC pay a Delay Rental for acreage of the Properties that are held by a producing well or for acreage of the Properties that have been relinquished by NNOGC prior to the Delay Rental payment date, nor shall NNOGC pay a Delay Rental for acreage of the Properties that has passed out of the Primary Term. Annual Delay Rental payments will be due on the Anniversary Date and shall include a complete listing and location of producing oil and gas wells within the OA Area. Delay rental payments are not recoupable against any royalty payments. Any Delay Rental not paid within ten (10) days of the Anniversary Date will be deemed late in accordance with Section IV(I) of this Agreement.

B. Annual OA Rental Payments. Beginning on the one-year anniversary of the effective date of the Secondary Term, and on each one-year anniversary thereafter for the duration of the Secondary Term, NNOGC shall pay an advance annual rental of $2.00 per acre (the "Annual OA Rental Payment") for any acreage of the Properties held by a producing well. Such Annual OA Rental Payment is due on or before the Anniversary Date and is recoupable against royalty payments. Recoupment of the Annual OA Rental Payment must be made at least one sales month after the rental is paid.

C. Oil Royalty. The Nation's royalty share of oil produced within the OA Area will be determined by applying a 20 percent royalty to the value as determined under this paragraph. The sales value of oil for royalty purposes shall be determined using the higher of the Gross Proceeds received by Operator or the oil major portion index price approved by the United States, Office of Natural Resources Revenue (or "ONRR") for the field or area ("ONRR Oil Index Based Major Portion Price") to determine the monthly weighted average oil price per barrel ("$/Barrel"), pursuant to the provisions of 30 C.F. R. § 1206.51 or any applicable substitute future regulations.

D. Gas Royalty. The Nation's royalty share of natural gas produced within the OA Area, except for helium and gases produced and sold in association therewith, will be determined by applying a 20 percent royalty to the value as determined under this paragraph. The sales value of natural gas for royalty purposes shall be the higher of the Gross Proceeds received by Operator or the gas index zone price approved by the ONRR for natural gas produced and sold from the Properties. The Operator will use the index zone price for natural gas approved by ONRR for the field or area (ONRR Gas Index Zone Price) to determine the monthly weighted average gas price ($/MMBtu), pursuant to the provisions of 30 CFR § 1206.170 or any applicable substitute future regulations.

E. Royalty In-Kind. The Nation may elect to take its royalty share of oil in-kind. If the Navajo Nation elects to take its royalty share of oil in-kind, Operator will continue to follow all Federal and Navajo Nation reporting requirements. If the Nation's share of oil taken in-kind is subject to a crude oil sale agreement between the Nation and Operator, payment for the Nation's share of oil taken in-kind shall be calculated in accordance with such agreement.

F. Helium Royalty. The Nation's royalty share of helium produced within the OA Area will be determined by applying a 20 percent royalty to the value as determined under this paragraph. The value of helium for royalty purposes shall be the gross proceeds price received by Operator for the first arm's-length sale of Crude Helium. For purposes of determining royalties, there shall be no deductions from the gross proceeds price received. If gross proceeds for royalty valuation purposes have been reduced by any costs including but not limited to marketable condition costs, marketing costs, transportation or processing costs, by the purchaser, or any other person, that value will be added back to gross proceeds for purposes of determining royalties. For purposes of determining royalties as provided herein, the point of valuation shall be the Bureau of Land Management facility measuring point.

G. NGLs, Argon, and Other Gas Production. The Nation's royalty share of natural gas liquids ("NGLs)", argon, and other gases produced within the OA Area that are not covered by Paragraphs D or F above, will be determined by applying a 20 percent royalty to the value as determined under this paragraph. The sales value of NGLs, argon and other gases produced shall be determined pursuant to the provisions of 30 C.F.R. § 1206.174.

H. Navajo Scholarship. Within ten (10) days after the Parties have fully executed this Agreement and annually thereafter until the effective date of the Secondary Term, Operator shall pay $10,000.00 annually to the Navajo Nation Scholarship Office for its general scholarship fund. Within ten (10) days after the effective date of the Secondary Term, Operator shall pay to the Navajo Nation Scholarship Office for its general scholarship fund $2,000.00 per producing well, as defined herein, such payment which shall not be less than $15,000.00 annually (the scholarship payment "floor") nor greater than $50,000.00 annually (the scholarship payment "ceiling").

I. Payment in Lieu of Navajo Nation Taxes. Operator shall pay all applicable Navajo Nation taxes. Operator and the Navajo Nation hereby agree that for the purpose and intent of this OA, Operator shall make payments in lieu of Navajo Nation taxes related to its operation and activities, at the following rate determined to be appropriate by the Navajo Nation Minerals Department: the PILT payment will be 5%, shall be determined on the same basis upon which royalties are determined, and is not included in the 20% royalty rate established for each product under Section IV, Paragraphs C, D, F and G. However, if in the future Operator is required to pay Navajo Nation taxes pursuant to a Navajo Nation Tax Code amendment approved by the Navajo Tax Commission and Navajo Nation Council, or alternative agreement, the 5% PILT shall cease, and the royalty rate in Section IV, Paragraphs C, D, F and G shall remain 20%.

J. Late Payments. Any payment, including but without limitation, bonus, royalty, rental, damages, and taxes, not received by the Nation in a timely manner shall bear interest and applicable penalty from the date payment was due to the date payment was received by the Nation at the rate then being assessed by the ONRR.

V. COMPLIANCE WITH NAVAJO NATION AND FEDERAL REQUIREMENTS.

A. Governing Law. The rights and the obligations of the Parties shall be governed by Federal and Navajo Nation laws, specifically including the Indian Mineral Development Act of 1982, 25 U.S.C. § 2101 *et seq.*, and applicable regulations pertaining thereto. Operator agrees that the performance of this OA within the Nation is subject to the supervision, monitoring and regulations of the Nation and of any Federal agency with jurisdiction over Operator's performance of this OA. Any matter not subject to exclusive Federal regulation shall be subject to Nation regulations. Operator agrees to strictly observe all Nation laws and regulations, unless specifically waived by the Navajo Nation Council. Operator shall comply with applicable Navajo and Federal laws and regulations prior to commencement of operations and, with respect to any well plugged and abandoned by it hereunder, shall restore the surface pursuant to such regulations.

B. General Requirements. The Operator shall comply with all applicable Nation and Federal rules, regulations, permits, and laws including without limitation, the following:

Navajo preference in employment and business laws;
Environmental protection rules and regulations;
The Navajo Nation Tax Code;
Cultural resources and antiquities laws and regulations; and
The Navajo Nation Water Code.

C. Permits and Licenses. The Operator shall obtain such permits and licenses as may be required by applicable Nation and/or Federal authorities for the exploration, development, production and sale of all hydrocarbons and any related activity including the production or disposal of produced water. Operator shall not be subject to any liability, loss or forfeiture of any rights under this OA for failure to perform any obligation under this OA during the time and to the

extent that the failure to do so is caused by the unreasonable withholding of approval by any such governmental agency.

D. Successors. The covenants contained in this Agreement shall extend to and be binding upon the successors and assigns of the Parties to this OA. . While the lands of the Nation are in trust or restricted status, all obligations of the Operator under this Agreement are to the United States as well as to the Nation.

E. Access to Land. Operator shall not deny access to the Operator's operations under this Agreement at any time to duly authorized employees or agents of the Nation or appropriate Federal agencies.

F. Applications for a permit to drill (APD). All APDs will be approved by the Nation and appropriate Federal agencies in a timely manner prior to the commencement of drilling operations.

G. Prudent Operator Standards. Operator shall exercise diligence at all times in the exploration, drilling, completing and operating of all wells and all associated facilities constructed in accordance with this Agreement and shall carry on all operations in a workmanlike and prudent manner, having due regard for preventing waste or destruction of hydrocarbons, contamination of surface or groundwater, contamination of soils, pollution of air, injury to workmen and the public.

H. Water Resource Protection. All water used or encountered by Operator in connection with oil and gas exploration and development under this Agreement shall be in accordance with applicable Nation and Federal laws and regulations.

I. Dry Holes. Subject to applicable Nation and Federal regulations, Operator shall have the right to use for disposal, injection, or water production any well it drills that is determined to be incapable of producing hydrocarbons in paying quantities. Operator shall plug and abandon any dry hole in accordance with applicable Nation and Federal laws and regulations.

J. Dewatering. Dewatering of any geologic formation by a well or wells drilling the OA Area by Operator in conjunction with hydrocarbon testing or production shall be in accordance with applicable Nation and Federal laws and regulations.

K. Protection of Coal and Other Mineral Resources. Operator shall conduct all oil and gas exploration and development activities in a manner that minimizes the damage to coal deposits or other mineral deposits within the OA Area. Operator has no rights to coal matrix material, water (except for water produced, removed, re-injected or disposed of as a result of hydrocarbon production), or to other mineral resources within the OA Area.

L. Surface Protection. Operator shall comply with applicable Nation and Federal laws and regulations concerning use of the surface of the OA Area, location of wells, production

facilities, access and production equipment rights-of-way in the OA Area and across other lands of the Nation. Before any surface-disturbing activities commence, Operator shall obtain the necessary Nation and Federal approvals, including but not limited to payment of the project review processing fee, surface damage payments, archeological/cultural and environmental surveys and/or assessments, customary land user consent, required surety bonds and consideration to the Nation. Operator shall not be required to pay right-of-way consideration to the Nation for oil and gas production-related rights-of-way within the OA Area.

VI. GENERAL REPORTING PROCEDURES.

A. Periodic Drilling Reports. Operator shall notify the Navajo Nation Minerals Department prior to the commencement of any well drilling operation, and thereafter shall provide drilling reports showing the progress of said well. Operator shall also provide notification of testing of any well and/or geologic formation at least forty-eight (48) hours prior to such testing in order that a representative of the Nation has the opportunity to witness such testing.

B. Copies of Reports and Tests. Operator shall provide the Navajo Nation Minerals Department with copies of all log runs, drill stem tests, geological reports, and other related documentation in connection with the well within thirty (30) days of conducting such log runs and tests. In addition, Operator shall provide on a quarterly basis all data, including but not limited to maps, drill logs, core analyses, surveys, production records, and seismic data obtained by Operator for the OA Area.

C. Production and Royalty Reports. Operator shall submit all required monthly production and royalty reports to the Navajo Nation Minerals Department and Federal government in accordance with Nation and Federal regulations. All OA rental and royalty payments shall be submitted to the Navajo Nation's Royalty Lockbox Account with a corresponding Form ONRR-2014, Report of Sales and Royalty Remittance submitted to the Office of Natural Resources Revenue. Operator shall notify the Navajo Nation Minerals Department and the Bureau of Land Management in writing if any extraordinary events occur, including but not limited to, the shutting-in of any well for a period of thirty (30) days or longer.

D. Well Information. Operator will provide the Navajo Nation Minerals Department the following information if obtained by Operator for each well drilled, completed, reworked, or plugged and abandoned pursuant to the OA:

Logs
Core Analysis
Drill Stem Tests
Revised Structure and Isopach Maps, if available
Location Plat & Schematics
Drilling Summary
Directional Survey

Geological Report
Production Test Data
Bottom Hole Pressure Surveys
Gas, Oil and/or Water Analyses
Completion Reports
Work Over Reports
Plugging and Abandonment Reports
Monthly Production and Sales Reports

E. Seismic Data. Operator shall provide the Navajo Nation Minerals Department with copies of all data, conclusions, and interpretations generated by or resulting from seismic surveys upon completion of the survey within the OA Area.

F. Sole Owner of Seismic Data; Operator License. The Navajo Nation is the sole owner of all seismic data. Operator shall deliver all originals and copies of seismic data, interpretations therefrom, including all such information in digital form, to the Nation, if such data and information is obtained by Operator. The Nation hereby grants Operator a free non-revocable license to access and use all data and information pertaining to the OA Area for the duration of the OA. The Nation also hereby grants Operator a three (3) year non-revocable and exclusive license for Operator to use all data and information obtained or generated by Operator, its agents, and its consultants, including but not limited to maps, drill logs, core analyses, surveys, production records, and seismic data, during which three (3) year period such data and information shall be kept in strict confidence by the Navajo Nation Minerals Department and shall not be disclosed by the Nation to any third party; provided, however, that during such three (3) year license period, Operator shall have an exclusive right to exchange or trade such data or information with third parties under a sublicense, which sublicense shall not be longer than the three (3) year license period. Such three (3) year license period shall commence on the date that Operator delivers the data and/or information to the Nation.

VII. GENERAL PROVISIONS.

A. Indemnification and Insurance.

1. Indemnification. Operator assumes all risk of personal injury to or death of its employees. Operator agrees to indemnify and hold the Nation and the Secretary and their agents, employees, licensees, customary land users, permittees and tenants harmless from all claims, liability and causes of action alleging bodily injury or property damage asserted against the Operator, its agents, employees and subcontractors or any third-party which may arise by reason of the operations of the Operator, its agents, employees and subcontractors, including any negligent omissions in connection with such operations.

2. Minimum Insurance Requirements. The Operator shall maintain and shall require its contractors and subcontractors to maintain all insurance required under all applicable laws and

regulations. Operator shall carry the following minimum insurance naming both the Nation and the Operator as insured:

a. Comprehensive public liability insurance with limits of not less than $300,000.00 for each accident and $1,000,000.00 for death or injury of one person.
b. Comprehensive public liability property damage insurance with limits of not less than $1,000,000.00 for each accident and $5,000,000.00 aggregate per policy.
c. Automobile public liability insurance with limits of $300,000.00 for the death or injury of one person and $1,000,000.00 for each accident.
d. Workers' compensation insurance in the Operator's name in the amount established by Navajo law.

3. Certificates of Insurance. Certificates of insurance naming the Nation and the Secretary as additional insured for all said policies will be furnished the Nation within a reasonable time after receipt.

B. Dispute Resolution and Navajo Nation Jurisdiction.

1. Sovereignty of the Nation. Nothing contained herein shall be interpreted as constituting a waiver, express or implied, of the sovereign immunity of the Nation or NNOGC.

2. Royalties. Any dispute between the Parties involving royalties due under Section IV, Paragraphs C, D, F and G of the OA shall be resolved in accordance with the requirements and procedures contained in ONRR's regulations, including 30 C.F.R. Part 1241, or any applicable substitute future regulations. Any other dispute between the Parties concerning the OA shall be resolved in accordance with this Section VII, Paragraph B.

3. Negotiation. In the event of any dispute, the Parties shall use their good faith efforts to resolve the dispute, and each Party shall continue to perform in accordance with the other provisions of this OA during the pendency of the dispute. As a first step to resolving any dispute, the Parties shall attempt to negotiate a just and equitable settlement thereof. Each Party will communicate and/or meet with the other in good faith and attempt to reach a solution satisfactory to both Parties. If either Party fails or refuses to participate in such negotiations or such negotiations do not result in the Parties resolving the dispute within twenty (20) working days after one Party has requested that negotiation begin (and the period is not extended with the consent of the Parties), then either Party may cause the dispute to be referred to arbitration.

4. Arbitration. If such efforts in Section VII(B)(2) are unsuccessful in reaching a resolution of the Parties' dispute within 60 calendar days of commencement of the negotiations, then either party may invoke arbitration according to the procedures referenced in the Navajo Sovereign Immunity Act, as amended, at 1 N.N.C. §554(J) and §554(K), and as set forth in the

Navajo Nation Arbitration Act, as amended, at 7 N.N.C. §§1101 *et seq.* Such arbitration shall be conducted in accordance with the Commercial Arbitration Rules of the American Arbitration Association, except to the extent such rules are modified by the following:

a. unless otherwise agreed to in writing by the Parties, all arbitration procedures shall be held in Window Rock, Arizona; and
b. the arbitration shall be conducted by a single arbitrator selected by the Navajo Nation, unless any claim, individually, or in the aggregate, exceeds $1,000,000.00, exclusive of interests, costs and fees; in such case the arbitration shall be conducted by a panel of three (3) arbitrators, each party selecting one (1) arbitrator, with the two arbitrators choosing the third; at least one arbitrator shall possess at least ten (10) years' experience in Federal Indian Law; and
c. notice of intent to invoke arbitration shall be filed in strict compliance with the notice requirements of the Navajo Sovereign Immunity Act, 1 N.N.C. § 555; and
d. whether as a result of an arbitration provided for herein or of any judicial action to enforce an arbitration award resulting from such arbitration, any award against the Nation shall be in strict conformance with the provisions of 1 N.N.C. § 554(K)(1-6); and
e. whether in the context of an arbitration provided for herein or of any judicial action to enforce an arbitration award resulting from such arbitration, the laws of the Nation shall exclusively govern the interpretation of this OA, the arbitration provisions set forth herein and the arbitration procedures conducted pursuant thereto, and the application of all the provisions herein to the Operator and its subcontractors, agents, representatives, employees, or consultants; and
f. pursuant to 1 N.N.C. §554(K) and 7 N.N.C. §1102, the appropriate Navajo Nation District Court shall have exclusive jurisdiction to compel the Nation's participation in an arbitration, and shall have exclusive jurisdiction to enforce, modify, or vacate an arbitration award resulting from such arbitration; neither Party may recover from the other any attorneys fees or costs.

5. Jurisdiction. There is expressly reserved to the Nation full territorial legislative, executive and judicial jurisdiction over the OA area under the OA and all lands burdened by the OA, including without limitation over all persons, including the public, and all activities conducted or otherwise occurring within the OA area under the OA and all lands burdened by the OA shall be and forever remain Navajo Indian Country for purposes of Nation jurisdiction.

6. Waiver of suit: The negotiation and arbitration provisions herein shall constitute the sole and exclusive procedural remedy to any dispute or controversy arising out of this Contract. Commencement of negations or arbitration shall be a complete defense to any suit, claim, action or proceeding instituted in any Federal, state, or tribal court or any administrative tribunal, with respect to any dispute or controversy arising out of this Agreement that is negotiated or arbitrated as set forth herein.

7. Post-termination; post-expiration: The dispute resolution provisions of this Agreement shall, with respect to such any dispute or controversy arising out of this Agreement, survive the termination or expiration of this Agreement.

8. Challenges limited. By entering into this Agreement, NNOGC expressly covenants and agrees that it shall not contest or challenge the territorial, administrative, legislative, executive or judicial jurisdiction of the Navajo Nation on the basis that such jurisdiction is inconsistent with the status of the Navajo Nation as an Indian tribal Nation, or that the Navajo Nation government is not a government of general jurisdiction, or that the Navajo Nation government does not possess full police power (i.e. the power to legislate and regulate for the public's general health and welfare) over all lands, persons, activities, transactions, or occurrences within its territorial boundaries, or on any other basis not generally applicable in a similar challenge to the jurisdiction of a state government.

C. Force Majeure.

1. Force Majeure Defined. For purposes of this OA, Force Majeure is defined to include strikes, insurrections, demonstrations, terrorist activities, explosions, acts of God, floods, storms, fires, epidemics and unavoidable accidents.

2. Effect of Force Majeure. Operator shall not be deemed to be in violation or breach of any obligation under this OA during the time and to the extent that it is prevented from or delayed in performing such obligation by Force Majeure.

3. Situations Exempt from this Section. Nothing in this Section shall be construed as compelling Operator to settle any labor dispute contrary to its wishes, or as preventing Operator from testing the validity of any local, tribal, or Federal order, regulation or law through available administrative, arbitral, or judicial proceedings.

D. Assignment Procedures.

1. Approval of the Nation and Secretary. Operator shall not assign, sell, exchange, lease or otherwise dispose of all or any part of its interests under this OA without the prior written approval of the Nation as provided in 18 N. N. C. § 605 and the Secretary in accordance with applicable Nation and Federal laws and regulations. Any successor or assign shall agree in the applicable assignment or other appropriate agreement to be bound by all the terms and conditions of this OA. Among other things, the assignee shall be required to comply with all Navajo Nation tax laws. For the avoidance of doubt, Section IV(I) of the OA does not apply to any assignee of the Operator. If the OA is to be assigned, Operator also understands that the assignee shall negotiate new royalty rates with the Navajo Nation Minerals Department prior to the Nation's approval of the assignment.

2. Unconsented Assignment Void. Any assignment, sale, exchange, lease or other transfer of Operator's interest without the Nation's prior written approval shall be null and void.

3. Operator Retains a Majority Interest. Operator will always retain at least an undivided fifty-one (51) percent interest in the OA Area and this OA for so long as this OA remains in full force and effect. Any attempt by Operator to assign, sell, exchange, lease or otherwise dispose of more than an undivided cumulative forty-nine percent (49%) interest in the OA Area and this OA at any time during the Primary or Secondary Terms shall be null and void.

4. Navajo Nation Right of First Refusal. Should Operator desire to assign or sell all or part of its operating interests under this OA, it shall comply with applicable Navajo laws, including, but not limited to, 18 N.N.C. § 605 as such law may be amended from time to time.

E. Notices. All notices and communications required or permitted hereunder shall be in writing and shall be deemed to have been duly made if actually delivered to, or mailed by registered or certified mail, postage prepaid, addressed to the parties at the following addresses. Written notice may also be given by facsimile transmission and shall be effective upon receipt of the transmission. Either party may, by written communication so delivered to the other, change the name or address to which delivery thereafter shall be made.

To or upon the Nation:

Navajo Nation
Attn: Office of the President
P.O. Box 9000
Window Rock, AZ 86515
Phone: 928-871-6352
Fax: 928-871-4025

Navajo Nation Minerals Department
Attn: Department Director
P.O. Box 1910
Window Rock, AZ 86515
Phone: 928-871-6587
Fax: 928-871-7095

To or upon the Secretary:

Regional Director
Navajo Region
Bureau of Indian Affairs
United States Department of Interior
301 West Hill Street
Post Office Box 1060
Gallup, New Mexico 87305
Phone: 505-863-8314
Fax: 505-863-8324

To or upon the Operator:

Navajo Nation Oil and Gas Company
Attn: Chief Executive Officer
P.O. Box 4439
Window Rock, AZ 86515
Phone: (928) 871-4880
Fax: (928) 871-4882

F. Severability. The invalidity of any term or provision of this OA shall not affect the validity of any other provision herein, and the parties shall negotiate in good faith to enter into an

agreement amending any such provision in a manner to make it valid, legal and enforceable while retaining the original intent of the parties with regard to such term or provision.

G. Bankruptcy. In the event of insolvency, bankruptcy or receivership of the Operator, or its successors, devisees, and assignees, this OA and all other agreements, easements, permits, and approvals pertinent hereto shall be voidable at the sole discretion of the Nation as to any lands not held by oil and gas production within the OA Area pursuant to Section II.

H. Navajo Nation Court Jurisdiction. Except to the extent specifically committed to arbitration by this OA, the courts of the Navajo Nation shall have jurisdiction over all disputes between the Nation and Operator relating to this OA.

I. Default and Termination.

1. Default by Operator. In the event of any material default by Operator in the performance of its obligations under this OA, the Nation shall give Operator notice specifying the default. If Operator does not, within thirty (30) days of receipt of the notice, correct the default or initiate diligent efforts to correct the default, the Nation may terminate this OA by delivering a termination notice to Operator, subject to Operator's rights as provided in paragraph (4), below, and subject to Section VII(B).

2. Reclamation. Upon expiration or termination of this OA or partial or complete relinquishment of lands within the OA Area, Operator shall surrender the OA Area or a portion of the OA Area, as applicable, in a condition that complies with applicable Nation and Federal laws. It shall be the obligation of Operator to restore those areas within the OA Area disturbed by Operator or its subcontractors, pursuant to approved reclamation plans and in compliance with all applicable laws, statutes, regulations and administrative orders.

3. Final Data. Upon expiration or termination of this OA or of the partial or total relinquishment of lands within the OA Area, the Nation shall become the owner of all data in Operator's possession or control relating to the expired, terminated, or relinquished lands. Within sixty (60) days after the expiration or termination of this OA of partial relinquishment of lands within the OA Area, Operator shall deliver to the Nation all such data that Operator has not previously furnished to the Nation. Operator may retain access to all such data for area studies and further evaluation for use in future exploration for as long as this OA remains in-force.

4. Removal of Improvements, Equipment, and Stockpiled Products. Operator shall have the right of ingress and egress for ninety (90) days after expiration or termination of this OA or after partial or total relinquishment of lands within the OA Area, to remove its property from the affected portions of the OA Area, subject to the following restrictions:

a. Operator may not remove casing in wells and other material, equipment and structures necessary for the continued operation of wells producing or capable

of producing Hydrocarbons in paying quantities as determined by the Navajo Nation Minerals Department and the Secretary. Unless refused by the Nation, all such casing in wells, material, structures and equipment shall be and become the property of the Nation when this OA expires.

b. Operator may not remove any property from the OA Area if Operator has outstanding financial obligations to the Nation related to this OA.

J. Department of Justice Approval. Pursuant to 1 N.N.C. § 554(J)(2) and (K)(2), Navajo Nation Department of Justice Approval is required for all agreements that include a limited waiver of sovereign immunity to compel or enforce arbitration under the Navajo Nation Arbitration Act, as amended, 7 N.N.C. § 1101 et seq.

Navajo Nation Department of Justice

7/20/21
Date

[SIGNATURES ON NEXT PAGE]

SIGNATURES

NAVAJO NATION (LESSOR)

By: _____ _____
Jonathan Nez, President Date

NAVAJO NATION OIL AND GAS COMPANY (OPERATOR)

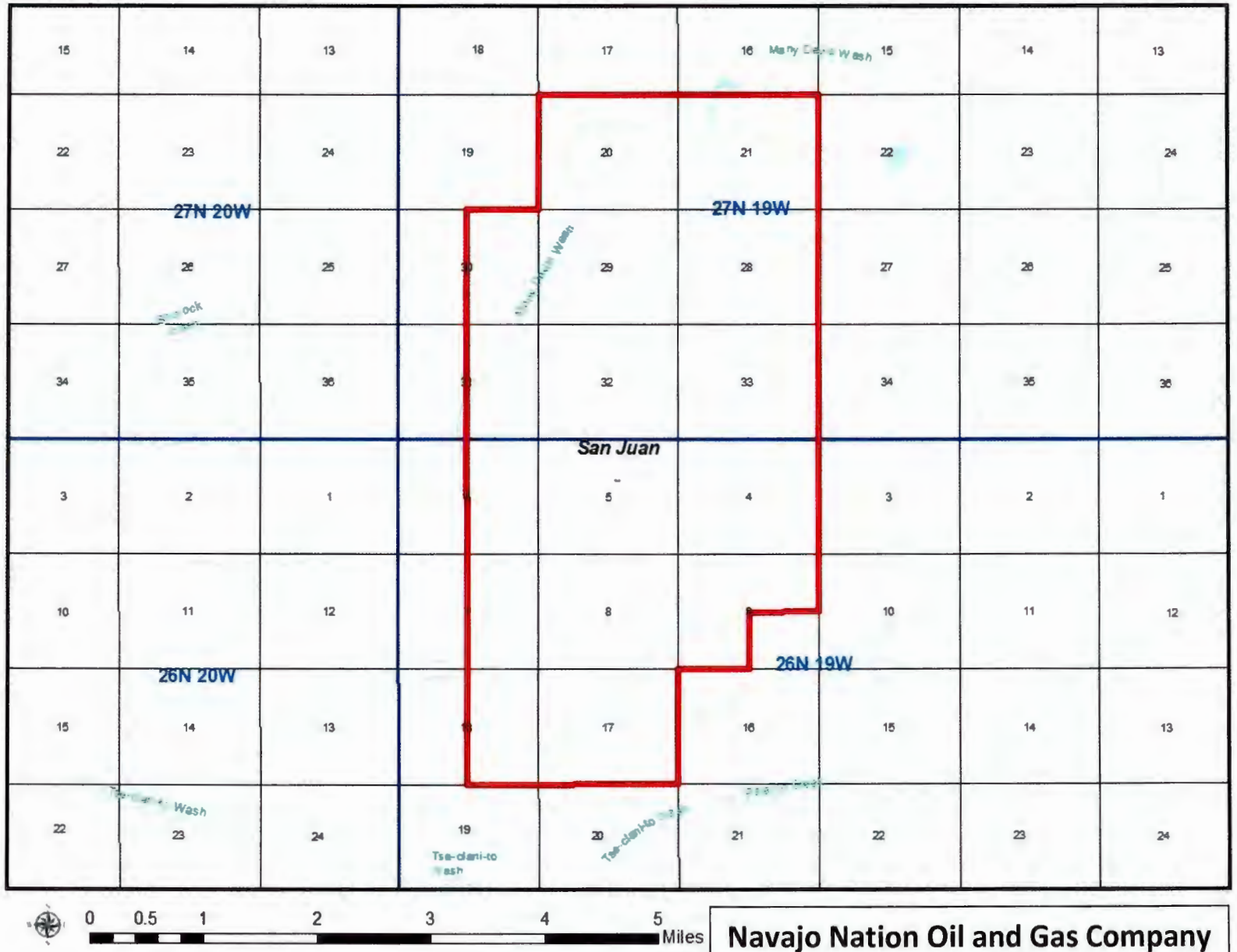
By: _____ 6/29/21
James R. McClure, Chief Executive Officer Date

CERTIFICATE OF APPROVAL

APPROVED PURSUANT TO THE INDIAN MINERAL DEVELOPMENT ACT OF 1982:

By: _____
Regional Director
Navajo Region
Bureau of Indian Affairs
U.S. Department of the Interior

Date: _____



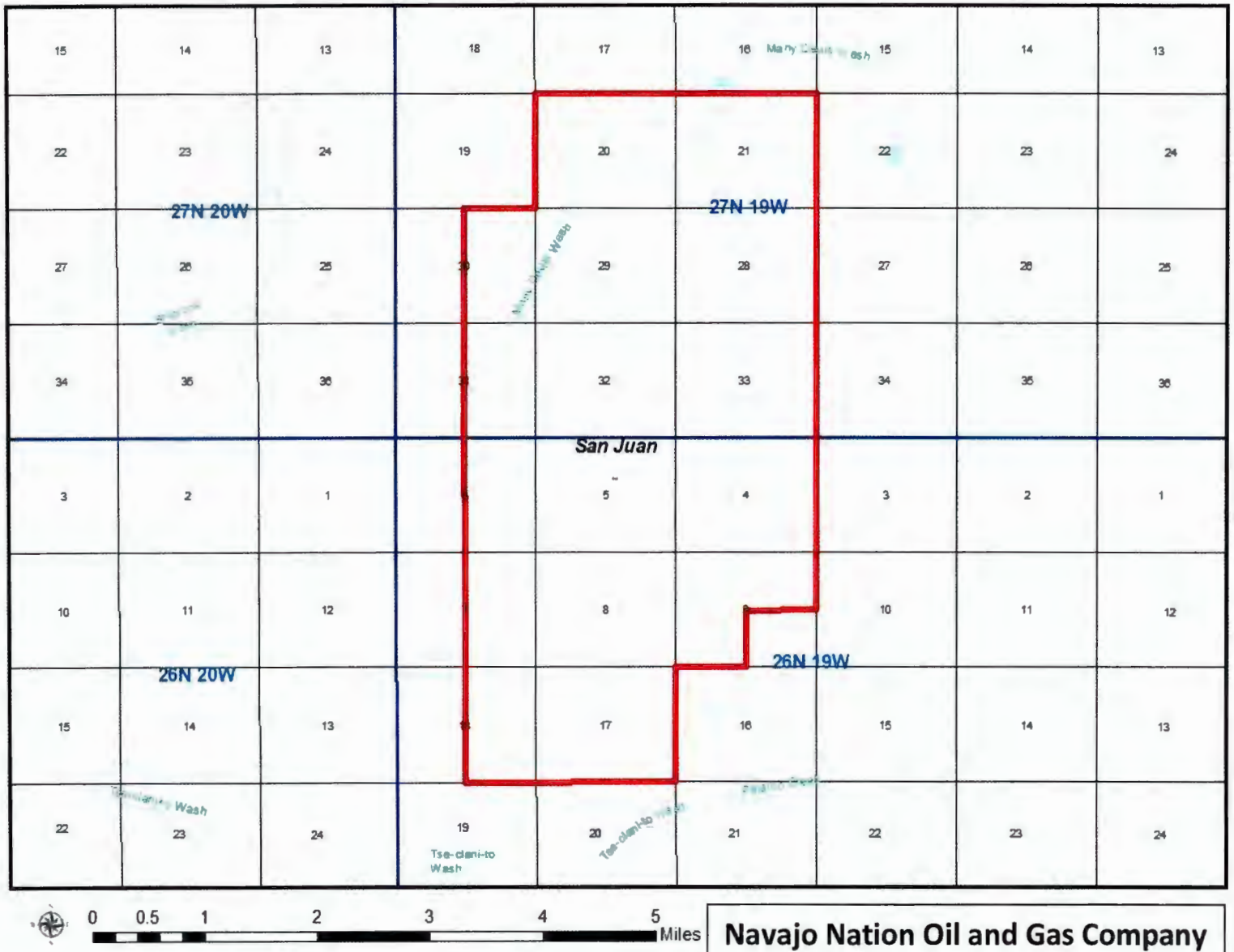
Navajo Nation Oil and Gas Company

Beautiful Mountain

Exhibit A - Reference Map

May 27, 2021

Attachment A



Navajo Nation Oil and Gas Company

Beautiful Mountain

Exhibit A - Reference Map

May 27, 2021

EXHIBIT
B-1

PROGRAMMATIC ENVIRONMENTAL ASSESSMENT OF THE BEAUTIFUL MOUNTIAN PROJECT FOR NAVAJO NATION OIL & GAS COMPANY SAN JUAN COUNTY, NEW MEXICO

SUBMITTED TO THE
DEPT. OF INTERIOR FOR NEPA REVIEW

LEAD OFFICE: BUREAU OF INDIAN AFFAIRS
AGENCY: SHIPROCK
CHAPTER: SANOSTEE

TOPOGRAPHIC MAPS:
MITTEN ROCK & SANOSTEE WEST

Proposed By:
NAVAJO NATION OIL & GAS COMPPANY
50 NARBONO CIRCLE WEST
ST. MICHAELS AZ 86511

Prepared by
BRIAN WOOD
JUNE 7, 2021

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1.0 PURPOSE OF AND NEED FOR ACTION

1.1 SUMMARY OF PROPOSED ACTION

Navajo Nation Oil & Gas Company (NNOGC) of 50 Narbono Circle West, St. Michaels, AZ 86511 has negotiated a Minerals Agreement ("Agreement") with the Navajo Nation as allowed under the Indian Mineral Development Act of 1982. Bureau of Indian Affairs (BIA) approval of the Agreement would give NNOGC the exclusive right to explore for and produce oil and gas on 8,473.707 acres ("acreage") in San Juan County, New Mexico. Land details are:

T. 26 N., R. 19 W.
all Sections 4 & 5
E2 Section 6
E2 Section 7
all Section 8
N2 & SW4 Section 9
all Section 17
E2 Section 18

T. 27 N., R. 19 W.
all Sections 20, 21, 28, & 29
E2 Section 30
E2 Section 31
all Sections 32 & 33

The next step in the process is BIA approval or disapproval of the agreement, in whole or in part. This constitutes a Federal action under the National Environmental Policy Act. BIA approval, whether in whole or in part, will not be a blanket approval. Subsequent actions (e. g., geophysical projects, wells, pipelines, etc.) will require project specific applications, archaeology and biology inspections, NEPA reviews, and Tribal and Federal approvals.

This document was developed, and future documents will be developed, in accordance with the National Environmental Policy Act (NEPA). Numerous government agencies, depending on the project, will be involved before ground disturbance can be approved. These agencies include the Navajo Nation (Environmental Protection Agency, Historic Preservation Department, Fish and

Wildlife Department, Natural Heritage Program, Minerals Department, Department of Justice, General Land Development, Project Review Office, Resources Committee), Bureau of Land Management, Bureau of Indian Affairs, U. S. Army Corps of Engineers, San County, New Mexico Oil Conservation Division, etc.

Other national and Tribal statutes, regulations, and executive orders considered in the preparation of this Programmatic Environmental Assessment and future NEPA documents include:

- Indian Minerals Development Act of 1982 (25 USC 2101-2108)
- Resource Conservation and Recovery Act of 1976, as amended by the Hazardous and Solid Waste Amendments of 1984 (42 USC 3251)
- Environmental Justice (Executive Order 12898)
- Floodplain Management (EO 11988)
- Protection of Wetlands (EO 11990)
- Endangered Species Act (42 USC 1531)
- Migratory Bird Treaty Act of 1918
- National Historic Preservation Act (16 USC 470)
- Protection of Historic Properties (36 CFR 800)
- Navajo Nation Cultural Resources Protection Act (NNCRPA CMY-19-88)
- Navajo Nation Policy of Protection of Jischaá: Graves, Human Remains, and Funerary Items
- Navajo Nation Policy to Protect Traditional Cultural Properties
- Clean Air Act (42 USC 7401)
- Clean Water Act (33 USC 12510

The preceding list is not exclusive. However, it does list the more significant laws, regulations, and executive orders that would be considered for future actions associated with exploration and development.

The issuance of a "Finding of No Significant Impact" statement for the Programmatic Environmental Assessment from the BIA does not authorize the

applicant to engage in ground disturbing activities until further site-specific NEPA analysis is completed. This would include site-specific cultural surveys and biological surveys in compliance with the National Historic Preservation Act and the Endangered Species Act, respectively. The proposed action outlined in this environmental analysis will merely encumber the land for potential oil and gas development through a lease.

BIA approval of the Agreement will give NNOGC the right and obligation to explore for and produce oil and gas. Most (2/3) of the acreage has previously been leased (14-20-0603-0507, 14-20-603-2976, 14-20-0603-2977, 14-20-0603-8510, NOO-C-14-20-2977, NOO-C-14-20-2978, NOO-C-14-20-4157, NOO-C-14-20-4158, NOO-G-8104-1117, & NOG-8202-1116) for oil and gas. NOG-8202-1116 was a 252,625 acre Agreement approved in 1988. None of the 8,473.707 acres is currently leased for oil and gas.

Fifteen oil and gas wells have been drilled within the 8,473.707 acres. Ten found oil and/or gas. First well was drilled in 1963. The last well was plugged in 2012. All targeted the Entrada (≈1,200' deep) or deeper formations. Deepest well was 7,587', which bottomed in Pre-Cambrian granite. Age of productive formations ranged from Permian-Pennsylvanian through Mississippian.

The acreage overlaps three NM Oil Conservation Division designated oil and gas fields – Beautiful Mountain Miss (Gas), Big Gap Organ Rock (Gas), and Big Gap Pennsylvanian. Beautiful Mountain produced 449 barrels of oil and 196,531 Mcf of gas from 1994 to 2010 before being plugged. Big Gap produced no oil and 699,467 Mcf of gas from 1994 to 2010 before being plugged. (State on line records start in 1994. Gas production included both methane and helium.

Maximum projected development will be 1 well pad per quarter section, or 53 well pads for the 8,473.707 acres. Spacing is a function of pressure, production history, time, depth, and other factors (e. g., terrain, archaeology, land use, special flora or fauna species).

A well can be completed in multiple zones. For example, the Navajo 5-2 (30-045-2816) produced from both the Organ Rock and Mississippian zones through 2 tubing strings in 1 well bore. This is called a dual completion and results in fewer wells. However, due to reservoir characteristics (e. g., different pressures, temperatures, or fluids), it is not possible to complete all wells as dual producers.

To best assess cumulative impacts, it will be assumed 53 well pads and 1 compressor pad may eventually be built on the Acreage. There could be multiple wells on each pad (i. e., two or more well bores on one pad), but a maximum of 53 well pads are projected. Well pads will be ≈2.24 acres depending on depth, type

(horizontal or directional well will need more space than a vertical well), drill rig, and the number of wells on each pad. The wells could be dual completions (i. e., 2 zones in 1 well bore).

Fifteen oil or gas wells have been drilled to date on the acreage. All the wells were plugged and abandoned (P & A). Therefore, the 53 well pads projected should be viewed as a maximum, rather than as a minimum. The location of the well pads will be a function of geology, terrain, cultural resources, biological resources, etc. The number of wells drilled is a dynamic function of gas and oil prices, competing energy prices, price stability, demand (local, national, and international), taxes (energy, severance, property, sales, income), funding and capital, attraction of competing investments (bonds, stocks), attraction of competing lands (other Trust lands, states, or countries) for investment, fluid quality (waxy crude and high water volumes raise costs), reservoir extent, technology, regulatory practices, success rate, terrain, cultural and biological resources, etc.

EXPLORATION

Exploration starts by reviewing maps, well histories, geochemical and geophysical data, well logs, geology studies, and other research. Using this data, scientists develop maps to describe strata and structures which may be found while drilling. Plan and profile view maps show the relative position, area, and depth of underground strata. A model may be made from the data to indicate the most promising site(s) to drill. Based on past production in the two townships, there are three likely geologic targets.

Organ Rock Formation is ≈3,500' deep. Its lithology includes conglomerate, mudstone, sandstone, and siltstone. The variety is due to the different depositional environments - aeolian, alluvial, and marine. Its age is early Permian to late Pennsylvanian (≈300 million years ago).

Pennsylvanian age (≈315 million years ago) lithology is carbonate rocks deposited in a marine environment. Reservoirs are generally stratigraphic traps, not structural. Stratigraphic traps are not visible on the surface, unlike structural traps (e. g., anticline). Stratigraphic traps are due to subtle changes in rock type caused by different porosity and permeability. Depth is ≈5,200'

Mississippian (≈340 million years ago) reservoirs are structural traps and marine deposits that are ≈5,700' deep. Reservoir rock is naturally fractured limestone. Seismic data was used to discover the field.

A well which finds small amounts of oil may not be economic to operate if large volumes of water must be pumped and disposed. For example, 51 barrels of

water were produced for each barrel of oil in the Beautiful Mountain Field. One well (30-045-23004) was previously approved for disposal in the Barker Creek from 5589' to 5594'. However, the well operator never converted the well to disposal and instead deepened it. It became a gas well

Geophysical (aka, seismic) data may provide the information which will indicate where, if any, stratigraphic reservoir rock may be found. Terrain, geology, land uses, economics, and technology determine which seismic energy source will yield the best data under given circumstances.

Seismic lines may be run to provide a two or three-dimensional view of the subsurface. Two-D seismic lines have the source and receivers in line. Two-D seismic lines were run on the Acreage as early as 1975. Three-D seismic lines have the source and receiver lines at right angles. Seismic data can map a possible reservoir, but only drilling will reveal what is actually in a reservoir.

An application package detailing where and how seismic lines will be run must be approved before seismic data acquisition operations start. Typical requirements include conducting archaeology and Threatened & Endangered (T & E) species surveys, writing an environmental assessment (EA), obtaining the consent of the grazing permittees, and paying fees. The application package will be submitted to the Navajo Nation and BIA for review and approval.

First action on the ground is to survey (flag, stake, and measure with GPS) the source lines, receiver lines, and access routes to the lines for archaeologists and biologists to inspect. This is authorized by the Navajo Nation via a Walk-On Permit.

A survey crew can include a dozen or more people and half a dozen pick-up trucks or all-terrain vehicles (ATVs). ATVs and any other off-road vehicles will be power washed off the reservation at a commercial car wash to avoid the introduction of noxious weeds. Surveyors flag the lines, specific points on the lines, and off-line access routes. This phase is only to map source and receiver line routes and show archaeologists and biologists where to inspect. They will inspect the lines, routes, and buffer zones on each side of the lines and routes. Actual seismic data acquisition operations will not occur until after full project approval by the Navajo Nation and BIA.

This is a dynamic process. Archaeologists and biologists follow the surveyors and move lines or routes around any significant locations. After a line or route is moved, then the survey crew flags the new line or route. Once all inspections and flagging are complete, then the survey crew generates a map and measures the length of each line or route. Archaeologists and biologists then use the surveyors'

map and measurements to prepare their reports. The same information is used in the preparation of the application and EA.

An archaeology report is submitted to the Navajo Nation Historic Preservation Department and a biological assessment (BA) is submitted to the Navajo Natural Heritage Program at the completion of the flagging and inspections. An EA, including the archaeology report and BA, is prepared. Surface disturbance is not allowed until the EA is reviewed, a FONSI (Finding of No Significant Impact) issued, and the permit approved by the Navajo Nation and BIA.

Seismographs record variations in how rocks reflect energy waves. Reflections vary with energy source and rock type, depth, density, and dip. Underground explosions or vibrations generate the energy waves.

The reflected waves are received at the surface by fist size devices called geophones. Geophones convert sound waves into electric signals that, via cables, are recorded. The data is processed by computers to display graphs of geologic structures and strata below and around a seismic line.

Energy wave source will be determined by target depth, terrain, proximity to homes and utility lines, environmental concerns, and type of data sought. Vibrators and controlled underground detonations are the most common sound wave sources. Vibrators are usually cheaper, but can have poorer resolution. On the other hand, vibrators may be preferable to drilling shot holes in a developed area where underground utilities could be cut by a drill. Vibrators also offer more operational flexibility during data acquisition than shot holes.

Vibrator trucks emit energy waves by vibrating a heavy plate set on the ground. (The plate is not dropped.) They normally travel in groups of three or more. The plates are simultaneously vibrated. A truck can hydraulically exert more than 30,000 pounds of energy to send a sound pulse into the ground.

Shot holes are another source of energy waves. Five-inch diameter holes are drilled to bedrock and loaded with dynamite. Holes are drilled 110' to 330' apart by a truck mounted drill. The truck minimizes impacts by being self-leveling. A pad is not bladed. Fewer drill trucks can be used than vibrator trucks for a similar project. NNOGC ran a 3-D seismic project at Desert Creek, Utah in 2019. Three percent of the source point were shot holes.

One shot hole is electrically detonated at a time. The detonation, if audible at all, is a muffled thump at the surface. The only evidence of a shot hole is the blasting cap wire. No crater results. Blasting cap wires are cut off below grade and the hole filled with soil and rock to the surface. If water is encountered, then the hole is plugged with bentonite (clay that expands when wet). If artesian water is

encountered, then the hole is plugged with cement. Dynamite is kept in a federally (Bureau of Alcohol, Tobacco, and Firearms) approved locked, guarded, and fire and bulletproof steel box posted with warning signs. The location could be on or off the Acreage. Tribal, county, and state police are notified of its location.

Once an area is ready to be shot or vibrated, geophones and cables are strung along the lines to be recorded. Cables connect seismic recorders in a truck or portable hut (aka, the doghouse) with geophones. The doghouse is in the center of as much as a four-mile long line.

Geophones are jug shaped plastic cases containing a magnet, wire coil, and spring. Wires lead from the geophone to the doghouse. The difference in movement between the coil and magnet created by a reflected signal generates an electric current. The electric current is recorded as a series of lines on the seismic display in the doghouse.

A geophone crew lays out the cables. The cable, similar to a TV cable, is a half inch in diameter and can be over two miles long. Once a record had been made of the reflected signal, then geophones and cables are moved along the line. This procedure is repeated until the survey is complete.

After all the data has been recorded, a crew collects the cables, geophones, and survey markers. A reclamation crew contours, harrows, water bars, rakes out ruts, and seeds to BIA or Tribal specifications. A botanist approved by the Navajo Natural Heritage Program will make an inspection within one month of the completion of operations and an annual inspection until reclamation and weed control are satisfactory. If weed control is necessary, then NNOGC will contract with a Tribally approved herbicide applicator.

WELL CONSTRUCTION & DRILLING

Once a potential well site is determined, NNOGC will notify the Navajo Nation of its intent to survey. A registered land surveyor will locate the well site and mark it with a steel post, wood stakes, and flagging.

NNOGC will then schedule an on-site inspection. Representatives from the Navajo Nation, NNOGC, and BIA will inspect the project together. The on-site goal is to form a consensus on the suitability of the project and how to avoid or mitigate impacts. This may cause a well, road, pipeline, or power line to be moved.

The project will also be inspected for archaeology, special species, and special species habitat. A minimum 50' buffer zone beyond the construction footprint will be inspected. Raptor surveys will cover a mile radius. The archaeologist submits a

report for approval by the Historic Preservation Department and BIA. Biologists submit reports or a BA for approval by the Navajo Natural Heritage Program.

Mitigation measures identified at or after the on-site inspection are included in a site-specific EA, Application for Permit to Drill (APD), or attached to the APD as conditions of approval by the Navajo Nation, BIA, or BLM. An APD has two parts, down hole program and surface use program.

A down hole program describes at what depth formations will be found; whether they hold water, oil, gas, or other minerals; how aquifers will be protected; how much pressure will be found and how it will be controlled; what type of casing and cement will be used to guarantee well bore integrity and protect aquifers; and what evaluations will be used to detect oil or gas.

A surface use program describes roads and how they will be built, upgraded, and maintained; where and what type of production equipment will be installed; water source; construction methods and material for the road, pad, and reserve pit; waste disposal; and reclamation.

Maximum use will be made of existing roads to minimize disturbance. Travel surface must be ≥12' wide to permit drill rig passage. A 20' wide construction corridor allows for crowning, ditching, and culvert installation. The road may be flat bladed for drilling, and crowned and ditched if production results. The latter is usually postponed until production results to justify the extra land use. Gates and cattle guards will be installed in functional fences.

Typically, ≈25 trucks travel to a well daily during drilling. One to two trucks visit a well daily during production. Roads will be maintained and repaired as needed. Sandy roads may require rock surfacing. Rock would be hauled from pits near Kirtland.

Well site construction starts by grading and stockpiling topsoil for reclamation. Construction will stop when wet soil results in ruts ≥6" deep. Well site (pad and pit) size depends on well depth and type, rig size, drill fluid, and completion plan. Largest well site built on the acreage was 300' x 325' (2.24 acres). Deeper wells need larger sites because the drill rig is larger and more material is used. For example, a Mississippian well would need more than 6,000' of drill pipe, more than 6,000' of casing, and more than 6,000' of tubing. Completion operations (well stimulation) can use more space than a drilling.

Space is needed so a drill rig can lay down its derrick and tractor-trailers can safely turn around. Storing and handling tubular goods requires ample space. For example, a Mississippian well would need more than 6,000' of drill pipe, more than 6,000' of casing, and more than 6,000' of tubing.

Camp trailers for a drilling supervisor, tool pusher, mud logger, and other service company personnel and equipment will also be on site. Sewage is disposed of in chemical toilets and holding tanks and hauled to the Farmington waste water treatment plant. Trash is placed in a portable metal trash cage and hauled to a county transfer station in Kirtland, NM.

A reserve pit will be dug within the well site perimeter. Pit size is a function of well depth (deeper well needs a larger pit), drilling medium (air drilling uses a smaller pit), and geology (water producing zones may need a larger pit). A shallow well pit can be 10' x 65' x 140'. A deeper well may need a 12' x 100' x 200' pit. A horizontal well will need an even larger pit (e. g., 12' x 125' x 250') to handle the increased volume of mud. Pit will be within the 300' x 325' well site perimeter.

The pit holds drilling mud, rock cuttings, and water found while drilling. A pit usually has half of its capacity dug below original ground level for structural integrity. The pit will be lined with commercial bentonite and/or ≥20 mil plastic. The pit will be fenced to keep out livestock and wildlife.

A flare or blow pit may be built near the reserve pit and ≥100' from the well head if gas is expected. This pit is ≈5' deep and ≈12' x ≈12'. Gas is piped into it and ignited to prevent an uncontrolled fire during drilling, completion, or testing. Air drill cuttings are also blown into it.

The drill rig moves in when the road, pad, and pit are ready. An Organ Rock well can take a week to drill (around the clock) and a week (daylight) to complete. A Mississippian well can take two weeks to drill and a week to complete. A horizontal well takes longer to drill than a vertical well of the same depth. Drilling takes longer if there is a problem (e. g., drill bit twists off). Drilling goes on around the clock until total depth is reached. Otherwise, drilling mud can deteriorate and lose its effectiveness.

All wells drilled to date on the Acreage were vertical. Directional drilling may be used on the Acreage due to the terrain and development needs. Horizontal drilling can expose more of a reservoir. For example, the average perforated interval per well to date on the Acreage is 14'. If a reservoir had a 14' thick pay zone, then a vertical well would expose 14'. However, a horizontal well could expose hundreds or thousands of feet of that pay zone. Horizontal wells are not as common as vertical wells because of geology, greater cost, and drilling difficulty.

A diesel-powered drill rig is ≈120' tall. While drilling a ≤20" diameter hole, a rig circulates mud down the drill pipe and back out the top of the well and into the reserve pit. Drilling mud is a fresh water based mix of clay, bentonite, barite, and

other material (e. g., cedar bark to control lost circulation) blended in steel tanks at the drill rig.

Approximately one barrel of water is used for each foot of well depth. Thus, a 5,500' deep well needs ≈5,500 barrels (0.7 acre-foot). Water will be trucked from NTUA or existing state approved water wells on private land at Waterflow.

If a salt zone is expected, then a brine based mud system may be used. Brine would be hauled from an existing lined saltwater evaporation pond northeast of Bluff Utah, brine wells near Moab, or mixed on site.

Drilling mud has four main functions. It lubricates the drill bit, lines well walls to hinder sloughing, transports drill cuttings up and out of the hole, and counteracts formation pressures. Mud is pumped back to the surface and into the reserve pit where it drops the drill cuttings. Cuttings are rock fragments. After drilling is finished, the reserve pit is fenced on the fourth side and allowed to evaporate before it is filled and reclaimed. Complete evaporation can take a year.

In a delicate zone (e. g., shale), compressed air or nitrogen is used instead of mud to minimize formation damage. Unlike mud, gases will not cause shale or clay to swell. Swelling can plug a zone. Air drilling uses compressors and a mister. Compressors increase pressure enough to push cuttings to the surface. A mister sprays water on the cuttings to control dust as the cuttings blow into a pit.

If a reserve pit cannot be built, then steel mud tanks will be used instead. Tank contents will be hauled to a state approved disposal site near Bloomfield.

A drill rig periodically stops to set and cement casing. Casing is steel pipe which lines the well bore. Cement is pumped down the interior of the casing and back up and between the casing and well bore walls. Casing prevents rock from sloughing into the well bore. Cement holds casing in place and prevents fluids and gases in different zones from mixing. Fresh water zones are cemented off to prevent contamination.

Surface casing (8.625" - 13.375" outside diameter) is set from the surface through all shallow fresh water zones. Surface casing setting depth of the wells drilled to date ranged from 60' (3 casing strings) to 1491' (2 casing strings). The entire surface casing interval will be cemented to the surface.

Most wells drilled on the Acreage had 3 casing strings (surface, intermediate, and production). Intermediate casing is typically cemented to the surface. Production casing will be cemented to the surface, or cement will be circulated to cover at least the bottom 200' of intermediate casing above it.

Once total depth is reached, a decision is made to complete the well or plug and abandon (P & A) it. The decision is based on an evaluation of cuttings, cores,

and logs. Logs are cylindrical devices which are lowered into the well bore and measure rock and reservoir characteristics.

If the decision is made to P & A, then the well is cemented 50' above, through, and 50' below all water or petroleum zones. A 4' tall steel pipe marks the well bore. Once the pit dries; then the pad, pit, and new road are contoured, topsoil spread, harrowed, water barred, and seeded in accordance with stipulations.

On occasion, artesian pressure flows fresh water to the surface. If requested in writing in advance, such a well can be plugged to just below the bottom of the fresh water zone (i. e., seal off any potential hydrocarbon zones). Beautiful Mountain 1 (30-045-06303) was unproductive. It was plugged back to 600' and completed as a water well in 1963. Probable producing zone is the Morrison and and/or Dakota. GoogleEarth last shows water in 2005.

If a well is to be completed as a producer, then a string of ≈5.5" diameter casing is run. This is called the long string or production string. It is usually cemented back to the surface, or at least to overlap the bottom 200' of the surface or intermediate casing. At a minimum, enough cement will be run to cover all water and hydrocarbon bearing zones.

Casing and cement are perforated where they cross potentially productive zones. Such zones are identified from logs and drill cuttings. After perforating, the zone is acidized or hydraulically fractured. Such a procedure is called stimulation.

Acidizing uses a ≈15% HCl acid solution (vinegar is 5-10% acetic acid) to partially dissolve limestone, enlarge pore space, and increase oil and gas flow. Fracturing pumps propping material (e. g., special sand or ceramic beads) under high pressure into sandstone or shale. High pressures fracture the rock. Propping agents keep fractures open and allow more flow. Well stimulation in the Acreage historically has been acid.

Tubing is next lowered into the well. Tubing is ≈2.5" diameter steel pipe through which an oil-gas-water emulsion comes to the surface. A rubber doughnut shape device called a packer is placed around tubing to prevent gas or fluids from traveling up the inside of the casing. From outside to inside are rock, cement, casing, packer, and tubing. There can be multiple layers of casing and cement where different casing strings overlap.

If there is enough natural pressure, the gas-oil-water emulsion flows to the surface on its own. Otherwise, a pump is installed. Pumps will ultimately be needed as reservoir pressure declines over time. Pumps will be powered by propane or gas from the well. No 3-phase power lines are present on the Acreage.

POWER LINES

Electric lines (transmission and single-phase distribution) already cross the Acreage. If NTUA extends 3-phase lines onto the Acreage, NNOGC could tap into them to power pumps. The same approval process (archaeology and biology inspections, EA, etc.) used for an APD applies to power lines.

Power lines will be either be buried or strung overhead on ≈35' high wood poles. Anchors will be set at ends and angles. Construction will use four-wheel drive trucks and six workers. No access will be bladed. All travel will be on existing roads or cross country.

Six-foot deep holes will be bored with a truck mounted auger. The auger is on a ≈20' long boom. The boom extends from a truck so it need not park directly over a hole. Cross pieces and insulators will be mounted on poles in the field. Once assembled, the raptor safe structure will be set in its hole with a truck mounted crane. The hole is filled and tamped.

Next, a pull line will be strung along the route by a truck. Workers run the pull line through pulleys on the cross piece. Finally, conductor or ground wire is attached to a pull line and pulled through the pulleys from a reel truck by a winch truck. The route is cleaned and reclaimed as needed.

PIPELINES

Once on the surface, the emulsion will be piped to a separator or heater-treater that uses heat, turbulence, and gravity to break apart the emulsion into its water, oil, and gas constituent parts.

Gas next goes to a dehydrator or meter. Exact sequence and equipment depend on the gas character. After metering, gas will be compressed and piped to market. An idle 8" O. D. gas line is ≈1.3 miles north of the Acreage. It could be used to pipe helium west to the DBK Field helium plant and/or methane east to NTUA or other markets.

Oil will be piped to and stored in steel tanks on a well pad. From the pad, the oil will be trucked from the pad to a tank farm in NAPI. A crude oil pipeline leads southeast from the tank farm to Jal, NM.

Produced water is too salty (61,215 - 217,727 ppm TDS in 5 wells on the Acreage) for surface discharge. Water will be pumped into saltwater disposal (SWD) wells. (There are 80 active SWD wells in San Juan County, NM.) A SWD well is the reverse of a producing well. Water is pumped into a formation, instead of out. If water is pumped into the same formation from which it came, then it can increase

oil production. Or, produced water may be injected into an unproductive zone. In any event, fresh water zones are protected, casing strings are run and cemented, target zone(s) perforated, packer set, and tubing hung. The Navajo Nation Environmental Protection Agency Underground Injection Control Program has primacy in approving SWD and injection wells.

If NNOGC builds a pipeline or power line on the Acreage, then it will be authorized by an APD or Sundry Notice. If it is built by another company or off the Acreage, then it will be authorized by a right-of-way. The same approval process (archaeology and biology inspections, EA, etc.) used for an APD applies for off Acreage or non-NNOGC lines.

Pipelines will be ≤8" diameter. They will be buried ≥36" deep if freezing is a problem, or deeper if crossing a road, pipeline, or wash. Disturbed width will be ≤40'. Pipelines can be steel, fiberglass, composite, coiled tubing, or high-density polyethylene (HDPE). HDPE pipes can be installed by plowing.

Surface pipes can be laid if freezing (paraffin in oil and liquids in gas) or vandalism is not a problem. Oil and gas composition vary from well to well, even in the same field. Surface pipelines disturb less area less intensively.

Surface line construction is simple. Pipe is trucked, unloaded, and joined along its route. If the terrain is too rugged, then pipe will be strung together and joined at intervals. Joined sections are then pulled into place by a winch. Wood four by fours may be set under steel pipe in rocky areas to protect the pipe. A surface line disturbs less area than a buried line. Maximum disturbed width can be ≤25'. By contrast, buried lines need a ≥35' wide working area.

Burying pipe is more complex. Construction begins by blading a corridor to create a safe flat work surface so equipment does not roll over. Once a way has been bladed clear, a trenching machine excavates a ≈18" wide by ≈42" deep ditch. If it cannot dig effectively, a tracked backhoe can assist. If the backhoe slows, a bulldozer ripper or rock saw can loosen a trench.

When the corridor is ready, the pipe will be unloaded and joined. After joining, the pipe will be lowered into the trench. Dirt or sand may be used to pad pipe in rocky areas. A typical source of padding dirt is dry silt from a stock pond. The pipe will then be flanged up and tested. If there are no leaks, then the trench will be filled and compacted.

Pipelines may be placed (cased) inside steel pipe to cross BIA Roads. Casing top will be ≥36" below the bottom of the borrow ditch. Casing vent pipes and warning signs will be outside the borrow ditch back slope. Or, instead of casing,

thicker wall pipe may be used at the crossing. Detours around open trenches will be provided during construction.

Once installed, pipelines are pressure tested for leaks. Trucked in fresh water, gas from a well, or nitrogen delivered by tank truck will be pumped under pressure into the pipe. (Nitrogen, an inert gas, is ≈80% of the atmosphere.) Water will be hauled from NTUA. (Water from an arroyo would be too dirty.) Water will be discharged into an NNOGC reserve pit. Gas will flow to market. Nitrogen will be vented to the atmosphere.

After pipe testing is completed, the corridor will be reclaimed. Surface lines may need nothing more than gathering wood braces. Buried pipeline corridors must be cleaned, contoured, water bars built, harrowed, seeded (mix and method determined by the Navajo Nation or BIA), and stockpiled brush and rock spread on disturbed areas to control erosion.

Pipeline warning markers with emergency phone numbers will be installed as the final step. Markers will be inter-visible on buried lines and placed on both shoulders of all road crossings. The ≈48" high markers are usually fiberglass.

Pipelines may have pig launchers and catchers, which are above ground extensions of the pipe. A pig cleans and/or analyzes the inside of a pipeline. An example of a pig is a hard rubber ball. It can be pushed through by pressure.

SECONDARY & TERTIARY RECOVERY

Production and pressure declines as a field ages. For example, the peak production year for the Aneth Field in Utah was 1958 when 10,026,375 barrels of oil were produced. Production in 2020 was 3,137,411 barrels.

Decline rates can be slowed or reversed by secondary and tertiary recovery. Secondary recovery injects gas or water into perimeter wells to push oil to a central well. Water has been injected in the Aneth Field since the 1960s. Tertiary follows secondary and injects a different medium, e. g., carbon dioxide. Carbon dioxide has been injected in the Aneth Field since the 1980s.

When a well is finally depleted, it will be P & A and reclaimed as previously described. Depletion can happen in days or take decades. The average producer on the Acreage had a 28-year life span. Producer life spans ranged from 6 to 37 years.

REGULATORY COMPLIANCE

This document was developed in accordance with the National Environmental Policy Act (NEPA). In addition, consultation was sought with the Navajo Nation Natural Heritage Program, Navajo Nation Historic Preservation Program, and Navajo

Nation Minerals Department. Other national statutes, regulations and executive orders considered in the preparation of this Programmatic Environmental Assessment include:

- Indian Minerals Development Act of 1982 (25 USC 2101-2108)
- Resource Conservation and Recovery Act of 1976, as amended by the Hazardous and Solid Waste Amendments of 1984 (42 USC 3251)
- Environmental Justice (Executive Order 12898)
- Floodplain Management (EO 11988)
- Protection of Wetlands (EO 11990)
- Endangered Species Act (42 USC 1531)
- Migratory Bird Treaty Act of 1918
- National Historic Preservation Act (16 USC 470)
- Protection of Historic Properties (36 CFR 800)
- Navajo Nation Cultural Resources Protection Act (NNCRPA CMY-19-88)
- Navajo Nation Policy of Protection of Jischaá: Graves, Human Remains, and Funerary Items
- Navajo Nation Policy to Protect Traditional Cultural Properties
- Clean Air Act (42 USC 7401)
- Clean Water Act (33 USC 12510

This list is not exclusive. However, it does list the more significant laws, regulations, and executive orders that would be considered for future actions associated with exploration and development.

Futhermore, the issuance of a "Finding of No Significant Impact" statement for the Programmatic Environmental Assessment from the Bureau of Indian Affairs does not authorize the applicant to engage in ground disturbing activities until further site specific NEPA analysis is completed. This would include site specific cultural surveys and biological in compliance with the National Historic Preservation Act and the Endangered Species Act, respectively. The proposed action outlined in this environmental analysis will merely encumber the land for potential oil and gas development through a lease.

1.2 PURPOSE AND NEED FOR ACTION

The purpose of the project is to explore for and develop oil and natural gas. Existing production liquidates itself if it is not replaced. This applies as much to America, the Navajo Nation, and State of New Mexico, as it does to NNOGC.

The primary need is for NNOGC to grow its production. NNOGC produced 7,005 barrels of oil and 7,233 Mcf of gas in New Mexico in 2020. This is 77% less oil than NNOGC's peak New Mexico year in 1995 and 96% less gas than its peak New Mexico gas year in 1996. Three known oil and gas fields are on the Acreage. NNOGC believes its expertise and new technology will allow it to find more oil and gas.

The global need is based on increasing demand for oil and gas. More people are living longer and using more energy on a per capita basis. There is a positive correlation between energy use, life span, and living standards.

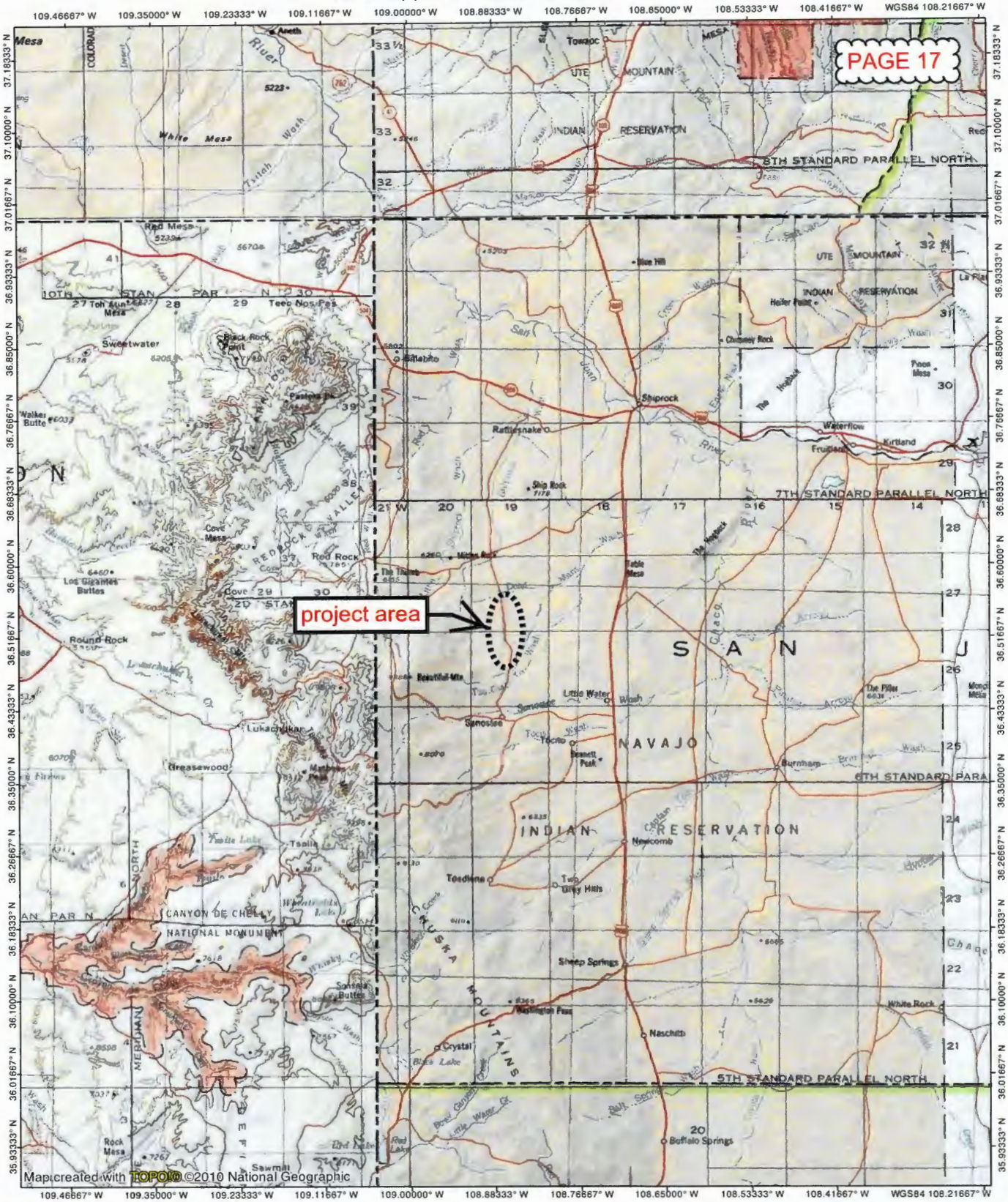
1.3 VICINITY MAPS

The project is 4 to 10 miles north of Sanostee and 7-1/2 to 10 miles west of US 491 in western San Juan County, New Mexico. PAGE 17 is a 1" = 10 miles scale map showing the project in relation to state lines. PAGE 18 is a 1" = 1.5 miles scale map showing the project in relation to township lines. PAGE 19 is a 1-1/2" = 1 mile scale composite map of the USGS Mitten Rock and Sanostee West, NM quads showing the Acreage boundary and wells drilled to date. PAGE 20 is a survey plat showing the distances and bearings of the Acreage perimeter.

1.4 LOCATION

Southwest corner of Section 32, T. 27 N., R. 19 W., NMPM is approximately 36.52426, -108.89882, NAD 83.

TOPO! map printed on 05/31/21 from "Untitled.tpo"

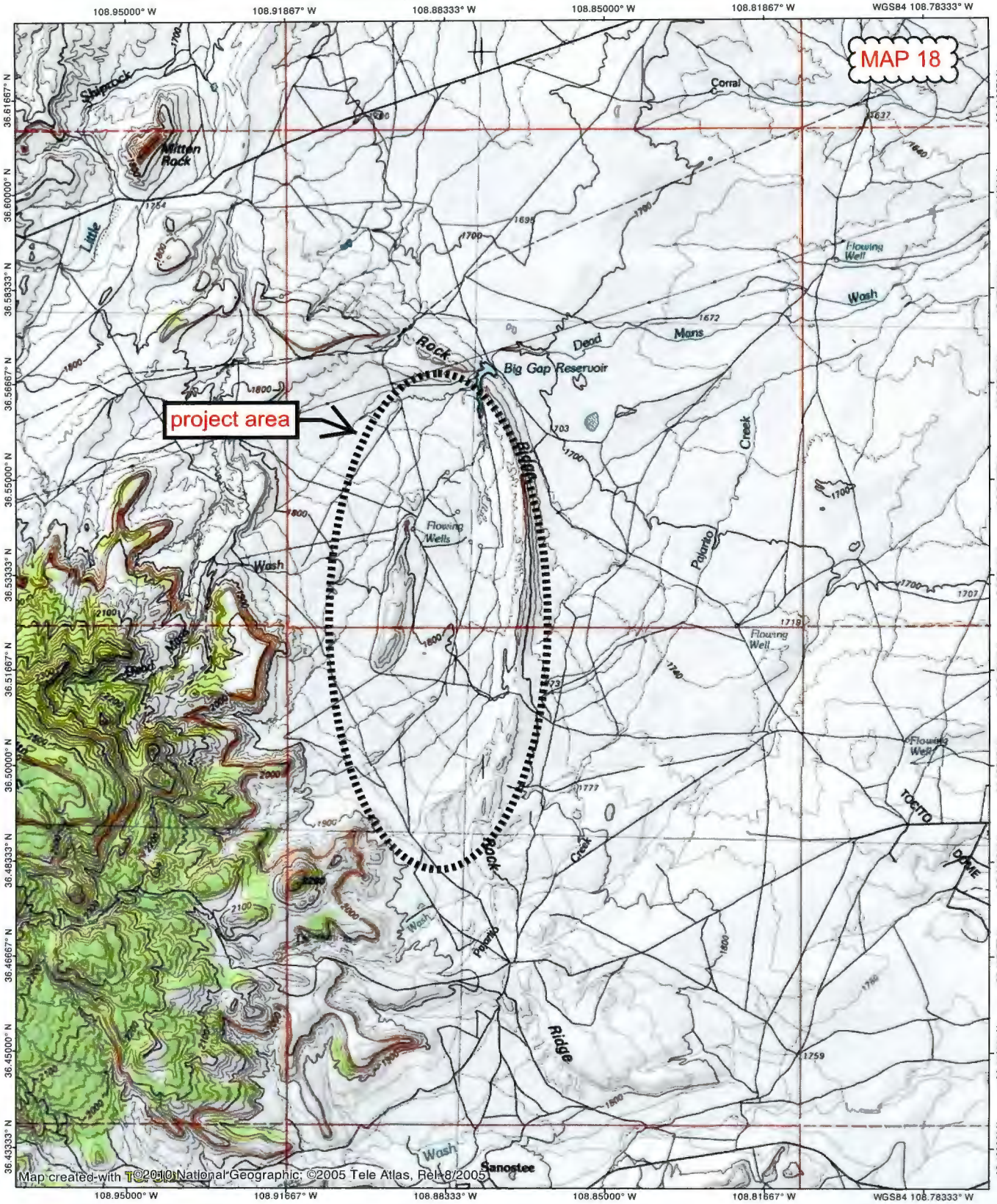


NATIONAL GEOGRAPHIC

0 5 10 15 20 miles
0 5 10 15 20 25 30 km

TN MN
9°
05/31/21

TOPO! map printed on 05/31/21 from "Untitled.tpo"



NATIONAL GEOGRAPHIC

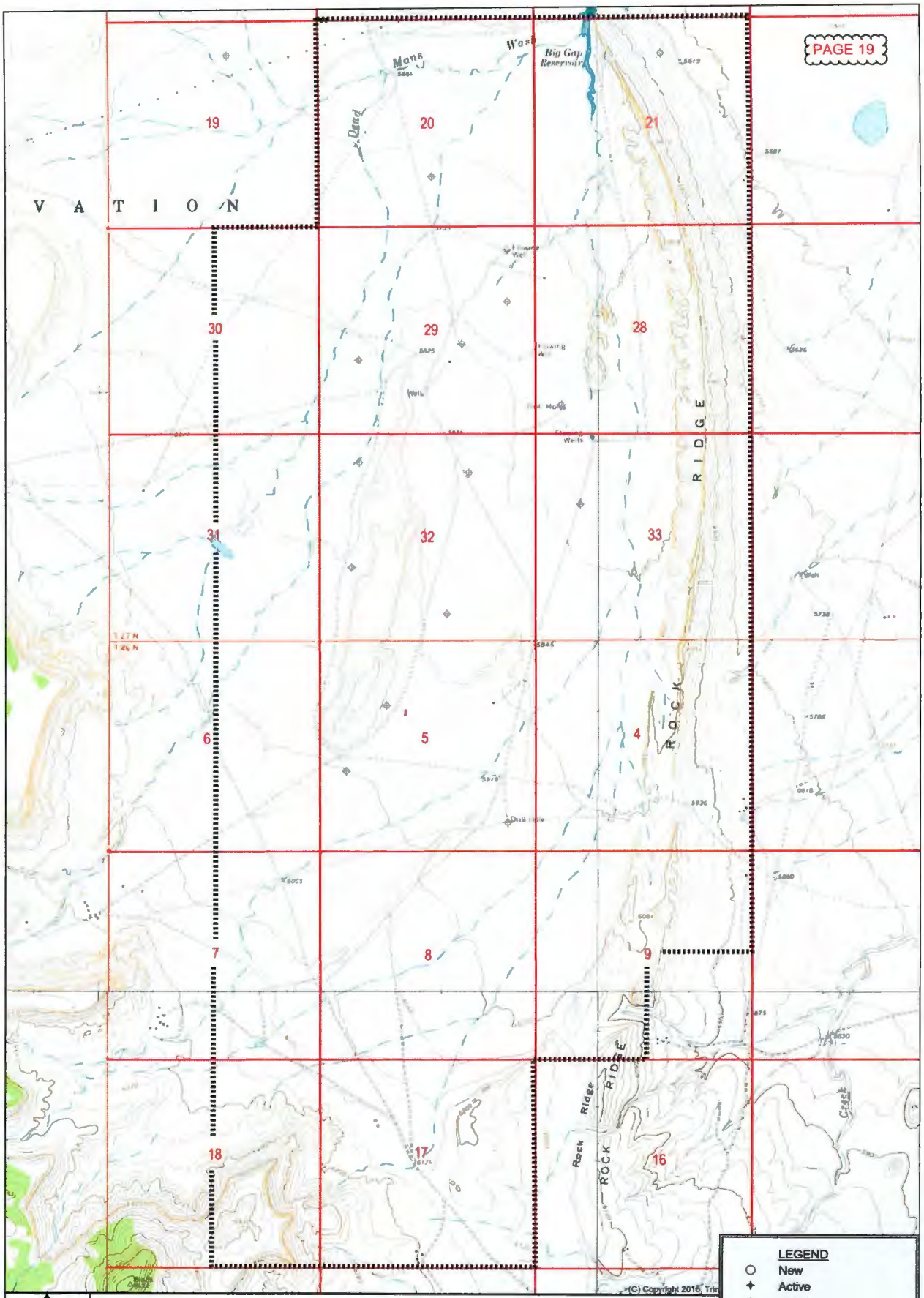
0.0 0.5 1.0 1.5 2.0 2.5 3.0 miles

0 1 2 3 4 5 km

TN + MN

8°

05/31/21



Quad: MITTEN ROCK
Scale: 1 inch = 2,166 ft.

N

LEGEND
- New
- Active
- HRZ
- BHL
- P&A
- INJ
- SWD

NAVAJO NATION OIL & GAS COMPANY

SURVEY PLAT OF
BEAUTIFUL MOUNTAIN LEASE
TOWNSHIP 27 NORTH, RANGE 19 WEST &
TOWNSHIP 26 NORTH, RANGE 19 WEST,
NEW MEXICO PRINCIPLE MERIDIAN

LEGEND

- = FOUND MONUMENT AS NOTED
- = SET 5/8" REBAR W/ 2" ALUM. CAP MARKED – UNITED FIELD SERVICES NMPS #14831 2020
- = CALCULATED CORNER – NOT FOUND, NOT SET
- (R) = RECORD
- (M) = MEASURED
- (C) = CALCULATED
- P.O.B. = POINT OF BEGINNING
- = SUBJECT PARCEL BOUNDARY
- = TOWNSHIP LINE
- = SECTION LINE
- = ONE QUARTER LINE

BEAUTIFUL MOUNTAIN LEASE LEGAL DESCRIPTION

ALL OF SECTIONS 20, 21, 28, 29, 32, 33, THE EAST HALF OF SECTION 30, THE EAST HALF OF SECTION 31, TOWNSHIP 27 NORTH; ALL OF SECTIONS 4, 5, 8, 17, THE EAST HALF OF SECTION 6, THE EAST HALF OF SECTION 7, THE WEST HALF AND THE NORTHEAST QUARTER OF SECTION 9, THE EAST HALF OF SECTION 18, TOWNSHIP 26 NORTH, ALL IN RANGE 19 WEST, SAN JUAN COUNTY, NEW MEXICO, ALL ON NAVAJO TRIBAL TRUST LAND.

CONTAINING 8,473.707 ACRES MORE OR LESS.

BASIS OF BEARING: ALL BEARINGS, DISTANCES, AND ACRES SHOWN HEREON ARE GRID BEARINGS AND DISTANCES FOR THE NAD83, NEW MEXICO STATE PLANE COORDINATE SYSTEM–WEST ZONE–U.S. SURVEY FEET BASED ON THE FOLLOWING TWO OPUS ADJUSTED BASE POINTS:

CP 2719253 LOCATED IN THE NORTHEAST QUARTER OF SECTION 25, T–27–N, R–20–W, N.M.P.M., SAN JUAN COUNTY, NEW MEXICO. LATITUDE: 36°32'52.43590" N, LONGITUDE: 108°55'19.15460" W, NAD_83 (2011)(EPOCH:2010.0000). ELLIPSOID HEIGHT=6084.827 SFT., ELEVATION = 6152.084 SFT., NAVD 88, (GEOID18) CONVERGENCE ANGLE –0°38'54.0200".

CP 26195017 LOCATED IN THE SOUTHEAST QUARTER OF SECTION 17, T–26–N, R–20–W, N.M.P.M., SAN JUAN COUNTY, NEW MEXICO. LATITUDE: 36°29'08.97828" N, LONGITUDE: 108°53'11.29862" W, NAD_83 (2011)(EPOCH:2010.0000). ELLIPSOID HEIGHT=6124.578 SFT., ELEVATION = 6191.497 SFT., NAVD 88, (GEOID18) CONVERGENCE ANGLE –0°37'34.5600".

REFERENCES

(R–1) ORIGINAL B.L.M. SURVEY OF TOWNSHIP 27 NORTH, RANGE 19 WEST, NEW MEXICO PRINCIPAL MERIDIAN AND ASSOCIATED FIELD NOTES DATED APRIL 14, 1997.

(R–2) ORIGINAL B.L.M. SURVEY OF TOWNSHIP 26 NORTH, RANGE 19 WEST, NEW MEXICO PRINCIPAL MERIDIAN AND ASSOCIATED FIELD NOTES DATED APRIL 14, 1997.

SURVEYOR'S CERTIFICATION

I, JOHN A. VUKONICH, NEW MEXICO PROFESSIONAL SURVEYOR NO. 14831, DO HEREBY CERTIFY THAT THIS LEASE SURVEY SHOWN HEREON AND THE ACTUAL SURVEY ON THE GROUND UPON WHICH IT IS BASED WERE PERFORMED BY ME OR UNDER MY DIRECT SUPERVISION; THAT I AM RESPONSIBLE FOR THIS SURVEY; THAT THIS SURVEY MEETS THE MINIMUM STANDARDS FOR SURVEYING IN NEW MEXICO; AND THAT IT IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF. I FURTHER CERTIFY THAT THIS SURVEY IS NOT A LAND DIVISION OR SUBDIVISION AS DEFINED IN THE NEW MEXICO SUBDIVISION ACT.

JOHN A. VUKONICH NEW MEXICO 14831 PROFESSIONAL SURVEYOR

5/5/2021

JOHN A. VUKONICH, N.M.P.S. NO. 14831 — DATE

NAVAJO NATION OIL & GAS COMPANY

UNITED FIELD SERVICES INC.

SURVEYED: 4/3/21	REV DATE: 5/4/21	APP BY: J.A.V.
DRAWN BY: D.E.H.	DATE DRAWN: 4/26/21	FILE NAME: 11348 BEAUMTN

2.0 ALTERNATIVES

No action will prevent agreement issuance and subsequent exploration and production. This will deny NNOGC and the Navajo Nation the opportunity to develop oil and gas resources and improve the economy. Opportunity costs include a loss of wages, income, taxes, bonus, rent, royalties, jobs, and other ancillary benefits.

Ten wells reported production on the Acreage. If their first day results are typical, then NNOGC would produce the following volumes and generate the following gross revenue on its first day of producing each successful new well. Rates are May 24 prices.

47 barrels of oil x $62.05/bbl = $2,916.35
+ 717 Mcf gas x $2.89/Mcf* = $2,072.13
first day revenue from 1 well = $4,988.48

*price of natural gas
(helium price was ≥$86/Mcf in FY 2019)

If a 12.5% royalty were paid, then the Navajo Nation would receive $623.56 from that first day of production from that one well. (One-eighth (12.5%) royalty is typical BLM rate. Actual Tribal rate is confidential.)

Exploration and production will be geographically or seasonally limited on some parts of the acreage depending on land use (e. g., BIA has a 500' setback from homes and there a dozen family compounds), archaeology, steep slopes (Rock Ridge), drainages (Dead Man's Wash), and biology (Mesa Verde cactus has been found). The appropriate limits can be determined during the on-site inspection process. Government review will provide opportunities for site specific mitigation after agreement approval.

Oil and gas exploration and production have occurred on and around the Acreage since 1963 and proven to be compatible.

The proposed action is to approve an agreement that will allow oil and gas exploration and production, following subsequent project specific NEPA analysis, on 8,473.707 acres.

3.0 AFFECTED ENVIRONMENT

3.1. LAND RESOURCES

3.1.1. Topography

There is ≈1,340' of relief. High point on the Acreage is ≈6,930' and the low point is ≈5,590'. Aspect is to the northeast. Slopes range from flat to vertical. Over 90% of the Acreage is in the valley of Dead Man Wash. The remainder is in the valley of Pajarito Wash. Shiprock is visible to the north. Rock Ridge delineates the east side. Foothills of Beautiful Mountain form the west side. An unnamed igneous dike ridge is a landmark in the center of the Acreage.

3.1.2. Soils

There are over a dozen soil types in the Acreage. They are derived from igneous rock in the Chuska Mountains and the lower softer sedimentary Mancos shale. Erosion is active and runoff is rapid. None are prime farmlands. Principle soil types are:

Persayo-Nataani-Littlehat-Awet comprises ≈85% of the Acreage and is found in the valley between Beautiful Mountain and Rock Ridge. Its Tewa component is a fine sandy loam, well drained, medium runoff class, and is slightly to moderately saline. Typical profile is 66" deep.

Kimbeto-Farb-Denaza comprises ≈10% of the Acreage and is found on and east of Rock Ridge. Its Farb-Rock outcrop-Badland complex is well drained, low runoff class, and is very slightly saline to slightly saline. Typical profile is 18" deep.

Weska-Travesilla-Rock outcrop comprises ≈5% of the Acreage and is found in the high southwest corner of the Acreage. Its Sanostee component is loamy fine sand, well drained, medium runoff class, and is slightly to moderately saline. Typical profile is 42" deep.

3.1.3. Geology

The project is on the east side of the Defiance Uplift in the Colorado Plateau Physiographic Province. There is no evidence of large scale mass wasting from landslides or mudflows. There are talus slopes in the steep southwest corner of the Acreage. Most of the Acreage surface is the gray Mancos shale. It was deposited as mud in a marine environment in the Cretaceous Age, ≈100 million years ago. East

side of the Acreage is the tan Gallup sandstone that comprises Rock Ridge. It is a marine sandstone of the late Cretaceous (≈75 million years ago). An igneous dike bisects the center of the Acreage in a north-south direction. Its igneous rock is obscured by blow sand on its flanks.

Fifteen wells have been drilled on the Acreage. The earliest well was drilled in 1963. The last well was drilled in 1985. Depths ranged from 1,305' to 7,587'. The average depth was 4,641'. Wells tested Jurassic, Permian, Pennsylvanian, Mississippian, or Devonian ages. Three of the wells bottomed in Pre-Cambrian granite, basement rock. Ten of the wells produced oil or gas. All fifteen wells are now plugged, the last in 1986. Three fields (Beautiful Mountain Miss (Gas), Big Gap Organ Rock (Gas), and Big Gap Pennsylvanian) were designated by the NM Oil Conservation Division. Cumulative production from 1994 (first year of on-line records) through 2012 (year last well was plugged) was 449 barrels of oil and 895,998 Mcf of gas. This understates production. A well typically produces more in its first year. All of the wells were drilled before 1986.

There is no other mineral development present on the Acreage.

3.2. WATER RESOURCES

Given the arid climate (6" annual total precipitation at Newcomb, 19 miles southeast), most water is sourced from ground water.

3.2.1. Surface Water

Most (≈90%) of the Acreage is in Dead Mans Wash watershed. The remainder is in the Pajarito Creek watershed. Pajarito flows into Dead Mans, which flows into the Chaco River >18 miles northeast of the Acreage. Big Gap Reservoir shows on USGS maps, but the earth fill dam is breeched and no longer holds water. No perennial water is present on the Acreage.

The U. S. Fish and Wildlife Service National Wetlands Inventory shows a Freshwater Emergent Wetland at Big Gap Reservoir and at an artesian well in Section 33. Water was seen at the latter in GoogleEarth images from 1985 to 2016, but not in 2017 images.

The Acreage is in an area that has not been delineated on the Federal Emergency Management Agency Flood Insurance Rate Map for the 100-year flood plain. Impacts on flood plains typically occur when the topography within a flood plain is substantially modified either by placement or removal of materials within the flood plain. Because approval of the agreement does not authorize construction,

the agreement will not substantially modify topography in the permit activity area. Therefore, no impacts on flood plains are anticipated by approval of the agreement.

3.2.2. Ground Water

Dakota and Morrison sandstones are the main aquifers in the Acreage. Their water is more plentiful and of better quality than more alkaline surface waters and alluvial aquifers. The sandstones had artesian flows due to their recharge area in the higher Chuska Mountains to the west. USGS maps show three flowing wells on the Acreage. El Paso's Beautiful Mountain 1 (30-045-06303) was converted to a water well. None of the four wells currently flow to the surface unaided. NTUA has water lines to houses on the Acreage.

3.3. AIR RESOURCES

3.3.1. Quality

The acreage is in the Four Corners Interstate Air Quality Control Region. Air quality is classified into one of four categories (I, IA II, or III) for each type of emission. These categories are:

I = Significant violation of Federal standard from several sources exist for part of the region. Special emission controls needed.
IA = Significant violation of Federal standard from a single source (coal fired power plant) exist for part of the region.
II = Better air quality.
III = Best air quality.

San Juan County is in the Class II category for the prevention of significant deterioration of air quality. Air quality parameters range from Class IA for sulfur oxides and particulates to Class III for nitrogen dioxide, carbon monoxide, and photochemical oxidants. These categories indicate air quality is good to very good, with some deterioration allowed.

Closest Class I area is Mesa Verde National Park, ≈45 miles north-northeast. No deterioration is allowed in a Class I area. Overall air quality is good. Nitrogen dioxide, carbon monoxide, and photochemical oxidants are rated best. Violations of particulate and sulfur oxide levels can occur due to coal fired power plants near Waterflow.

Major local pollution sources are wind blowing across bare soil and dirt roads.

3.3.2. Visibility

Visibility is usually limited only by the horizon. Most prominent landmarks on are Beautiful Mountain (3 miles to the west), Shiprock (8 miles to the northeast), and Rock Ridge (on the east Acreage boundary). Visibility is most likely to be impaired during spring dust storms.

3.3.3. Climate

The following data were recorded from 1948 - 1971 at Newcomb.

MONTH	PRECIPITATION	SNOWFALL
January	0.22"	0.4"
February	0.16"	---
March	0.31"	---
April	0.26"	---
May	0.34"	---
June	0.29"	---
July	0.92"	---
August	1.13"	---
September	0.72"	---
October	0.81"	---
November	0.36"	---
December	0.44"	0.1"
ANNUAL	5.97"	0.5"

January is the coldest month with an average low of 14° F. Lowest recorded temperate is -26° F. July is the hottest month with an average high of 94° F. Highest recorded temperature is 106° F. Average daily high temperature is 69° F. Average daily low temperature is 36° F.

Prevailing winds, usually <20 mph, are out of the southwest. Spring is the windy season. Evaporation exceeds precipitation by 7:1. Flash floods are most likely to happen after thunderstorms in July through October.

3.4. BIOTIC RESOURCES

3.4.1. Ecosystem

The project is in the Plains and Great Basin Grassland biotic community.

3.4.2. Wildlife

The Navajo Natural Heritage Program believes (see Appendix) nine important species may be in the project area (21perm103). The Eagle Protection Act (EPA), Endangered Species Act (ESA), Migratory Bird Treaty Act (MBTA), and the Navajo Endangered Species List (NESL) provide protection. Species marked "Yes" for the EPA, ESA, or MBTA are protected by Federal law. FESA candidate species have been formally proposed for protection. NESL group 2 and 3 species are protected by Tribal law. NESL group 4 or unnumbered species have no legal protection under the Federal Endangered Species Act or Tribal laws, but information is being gathered to decide whether they merit protection.

Species	EPA	ESA	MBTA	NESL
burrowing owl	-	-	Yes	4
ferruginous hawk	-	-	Yes	3
golden eagle	-	-	Yes	3
kit fox	-	-	-	4
Mexican spotted owl	-	Threatened	Yes	3
mountain plover	-	-	Yes	4
northern leopard frog	-	-	-	2
peregrine falcon	-	-	Yes	4
southwestern willow flycatcher	-	Endangered	Yes	2

The project area was inspected by biologist Celia Cook on April 27 and 28, 2021. None of the above cited nine animals were seen. No riparian or aquatic animals were seen. No Threatened and Endangered species were seen. She saw, heard, or found sign of two reptile species, five mammal species, and ten bird species. Her report is the Appendix. A variety of habitats are present: mesa tops, talus slopes, sand dunes, desert shrub land, scattered pinyon-juniper, manmade raptor perches (power line poles), and buildings. As is typical of arid regions, there were few wild ungulates, herbivores, or carnivores. Over grazing and free roaming dogs and cats impact wildlife.

3.4.3. Vegetation

The Navajo Natural Heritage Program believes (see 21perm103 in Appendix) three important species are or may be in the project area. Protection is provided by the Endangered Species Act (ESA) and Navajo Endangered Species List (NESL). Species marked "Yes" for the ESA are protected by Federal law. FESA candidate species have been formally proposed for protection. NESL group 2 and 3 species

are protected by Tribal law. NESL group 4 or unnumbered species have no legal protection under the Federal Endangered Species Act or Tribal laws, but information is being gathered to decide whether they merit protection.

Species	ESA	NESL
Mesa Verde Cactus	Threatened	2
Parish's Alkali Grass	---	4
Yellow Lady's Slipper	Threatened	4

Celia Cook inspected the project area on April 27 and 28, 2021. Habitat for Mesa Verde cactus was found, but the plant itself was not found. Marginal habitat for Parish's alkali grass was found, but not the plant. No habitat for the Yellow Lady's Slipper was found.

The Acreage is a sparsely vegetated grassland with a few widely scattered juniper and Russian olives. Celia found 50 species (16 trees, shrubs, and subshrubs + 25 forbs and wildflowers + 9 grasses). Extensive flora changes have occurred from over a century of intensive year-round grazing, down cutting arroyos which drain soil moisture, and weeds. Three (halogeton, Russian olive, salt cedar) of the 46 species listed on the Navajo Nation Integrated Weed Management Plan were found in the project area.

3.4.4. Agriculture

No farming occurs on the Acreage. Livestock (sheep, goats, horses, cattle) graze year-round. Range improvements include corrals, windmills, and stock ponds and tanks.

3.5. CULTURAL RESOURCES

3.5.1. Traditional

Shiprock (8 miles northeast), a sacred site, is visible from the Acreage.

3.5.2 Archaeological

Lone Mountain Archaeological Services reviewed (LMAS Report 3509) Navajo Nation Historic Preservation Department and State records for the Acreage. Seventy-eight archaeology sites and no traditional cultural properties have been found to date. Much of the Acreage remains to be inspected. Site types include petroglyphs, middens, kivas, pit houses, room blocks, hogans, hornos, and lithic and

ceramic scatters. Cultural affiliations include Navajo, Anasazi, Basketmaker, Archaic, and Aboriginal. Anasazi components were present at 66 of the 78 sites. Sites ages could be as much as 9,500 years B. C. NTUA power lines, IHS water lines, energy development, NNDOT roads, and home sites drove the need for archaeology inspections.

3.6. SOCIOECONOMICS

3.6.1. Employment & Income

The April 2021 county unemployment rate was 8.9%, compared to a statewide rate of 7.6%. Average weekly wage in the county was $978 compared to the state rate of $942. Leading employment sectors in the county in 2018 were: #1 education, health care, and social assistance; #2 retail; and #3 mining, quarrying, and oil & gas extraction. The latter was the second highest paying ($65,135) sector in the county. County poverty rate was 21.3% vs statewide rate of 20% in 2018.

3.6.2. Demographics & Trends

County population (127,000) declined 0.597% from 2017 to 2018 versus a statewide increase of 0.352%. County population is younger (35.0 years median age) than statewide (38.1 years). Median household income is higher in the county ($50,582) than the state ($47,169). Median property value is lower in the county ($150,400) than the state $174,700). Number of employees in the county dropped 1.26% versus 5.59% increase statewide in 2018. Largest ethnic group in the county in 2018 was white non-Hispanic (38.7%), closely followed by Native American (38.1%).

3.6.3. Life Styles, Cultural Values, Attitudes, & Expectations

San Juan County is a rural county outside the three river valleys. Population density in 2010 was 23.6 people per square mile (39% above the state average of 17.0). Higher education attainment for the county (14.9% have a bachelor's degree or higher) was almost half lower than the state figure (27.3%).

Residents are familiar with oil and gas development. The Rattlesnake Field is a dozen miles north and was discovered in 1924. Drives to the largest nearby retail center (Farmington) or county seat (Aztec) all pass oil or gas wells. They have seen the full range of exploration and production from geophysical activity to refineries. Pipelines transport oil, gas, and carbon dioxide to other states. People bridge

contemporary and traditional lifestyles by working in towns or the oil field and tending livestock in the evenings and weekends. They work and hope for a better future for their children.

3.6.4. Community Infrastructure

The project is in the Sanostee (Tse anaozt'ii) Chapter and BIA's Shiprock Agency. The chapter house is ≈4 miles south of the Acreage and is a community center for meetings, senior citizen meals, and recreation. Closest gas station and convenience store is a 25-mile drive southeast to Newcomb. Closest full-service town is Shiprock, a 30-mile drive northeast.

No paved road crosses the Acreage. One intermittently lightly graveled road and numerous dirt roads cross the Acreage. There is school bus service, package delivery service, NTUA water lines, cell phone service, and single-phase and interstate transmission power lines on the Acreage. Sewage disposal is via septic tanks.

3.7. ENVIRONMENTAL JUSTICE

Executive Order 12898 requires Federal agencies to identify and evaluate actions which may disproportionately and negatively impact low income or minority populations. The Navajo Nation is such a population. Unemployment increased from 48.54% in the 2000 census to 55.9% in the 2010 census. Environmental justice is an issue because the Navajo Nation wants an opportunity for prosperity. The Navajo Nation has freely chosen to enter in an agreement with the expectation that wells will be drilled and produce. Revenue from minerals has declined with closure of coal mines and decreased oil and gas production.

A dozen family compounds are on the Acreage. Most compounds are on the perimeter of the Acreage.

3.7.1. Trust Resources

Besides oil and gas, the only other trust resource present is range land. The range is grazed year-round.

3.8. ENVIRONMENTAL MODULE

NNOGC will comply with all environmental statutes including, but not limited to, the Clean Water Act, Resources Conservation and Recovery Act, Comprehensive

Environmental Response Compensation and Liability Act, and Toxic Substances Control Act. No underground tanks are planned.

3.9. RESOURCE & LAND USE PATTERNS

There is no fishing or farming. Deer hunting and pine nut gathering occur several miles west in the Chuska Mountains. Grazing is the oldest use. It dates to ≈1600 when the Navajo (Dine) acquired livestock in trade with Spanish settlers along the Rio Grande. Cattle, goats, sheep, horses, burros, and mules were then driven northwest. Livestock is the dominant land use on the Acreage. There is no county zoning.

3.10. OTHER VALUES

The project will not impact any wilderness, wilderness study, or primitive area. Sound and noise sensitive areas are houses. Along with NNOGC employees and contractors, the residents of those houses are of the most health and safety concern.

There are no units of the Wild & Scenic River System, State Parks, Tribal Parks, or National Park Service on the Acreage. Closest such land is the Four Corners Monument, a Tribal Park ≈31 air miles northwest.

4.0. ENVIRONMENTAL CONSEQUENCES (IMPACTS & MITIGATION)

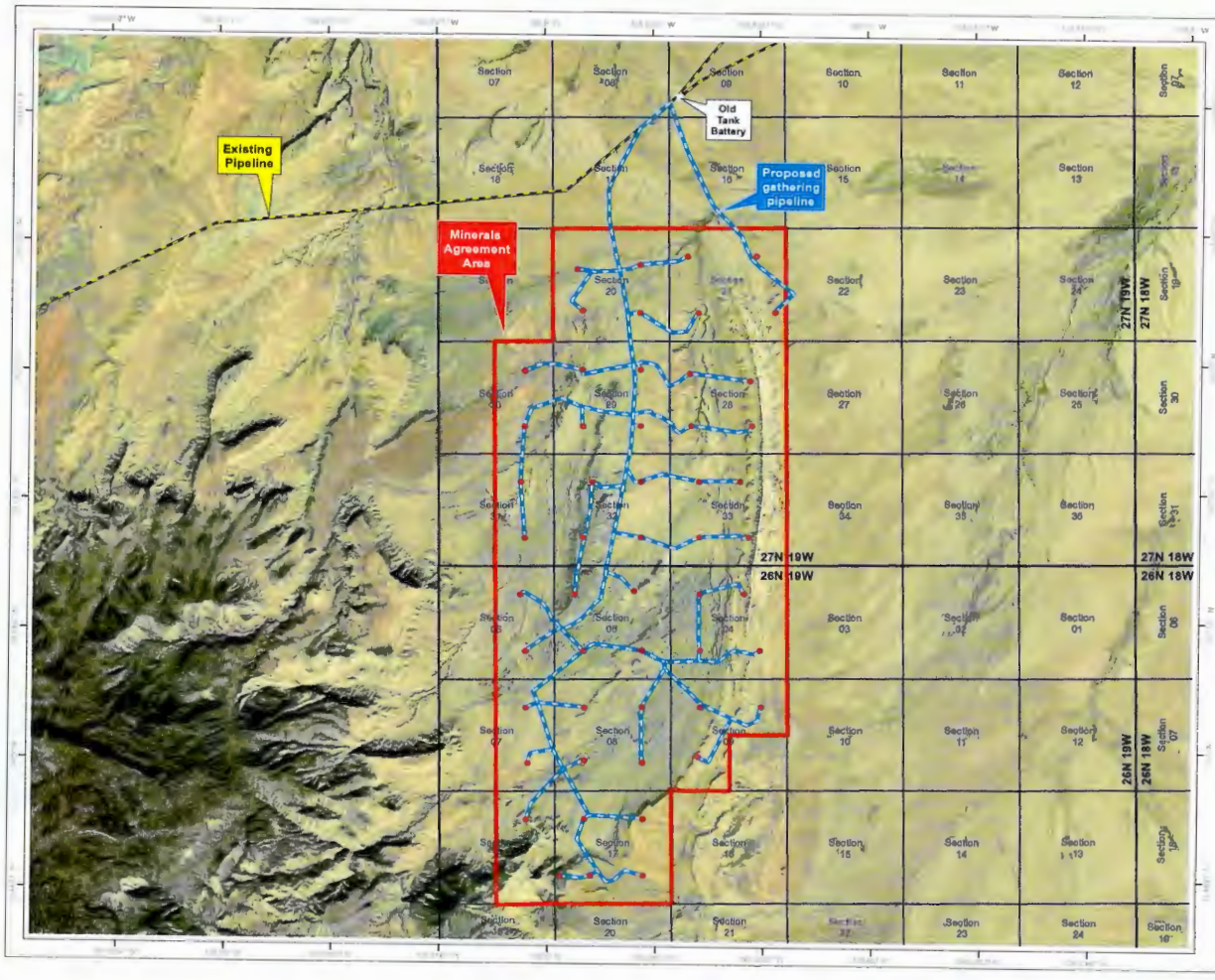
The agreement will mandate diligent development. Evaluation of impacts and mitigation will be based on a maximum development model of one well pad per quarter section (= 53 well pads). There could be multiple wells on each well pad due to different producing zones or directional drilling.

If each well pad is located in the center of each quarter section (see map on the next page), then a total of 30.7 miles of new road would be built to serve those well sites. Pipelines and power lines would parallel roads. Maximum disturbed width for road construction will be 20'. Together, this could result in:

400' x 500' compressor = 4.59 acres
53 well sites x 2.24 acres each = 118.72 acres
+ 30.7 miles of new road pipe power line corridors x 50' wide = 186.06 acres
309.37 acres

Thus, maximum development could use 309.37 acres or 3.6% of the acreage. It is unlikely that maximum development would occur. Five of the fifteen wells drilled to date on the Acreage were dry holes. Furthermore, NNOGC will reclaim the pipe and power line portions (30') of the corridors. That is 111.64 acres, or 36% of the overall 309.37 acres.

Mitigation measures in this EA should be viewed as a minimum. As archaeologists, biologists, residents, and government agencies (e. g., BIA, BLM, Navajo Nation) review site-specific projects, more mitigation (e. g., directional drilling) may be required. Their stipulations will supplement any in this EA. Site and project specific mitigation measures will be developed at on-site inspections with the Navajo Nation and BIA. The sum of the mitigation becomes the cumulative mitigation measures. Based on the local well history, duration could be 37 or more years.



Navajo Nation Oil & Gas Company

Beautiful Mountain Minerals Agreement Location Map

USGS 24K Quads:
Mitten Rock
Yellow Hill
Sanostee West

Navajo Nation,
San Juan County, New Mexico

● Proposed Surface Hole Location

1:50,000

0 0.25 0.5 1
Miles

NAD 1983 Arizona State Plane East
Feet

N

PERMITS WEST

Prepared by Permits West, Inc., June 3, 2021
for Navajo Nation Oil & Gas Company

4.1. LAND RESOURCES

There is potential for cuts and fills of as much as 30'. Reclamation will return the land to natural contours. Manmade slopes will be reduced to no steeper than 3 to 1. Topographic impacts will be mitigated, where practical, by avoiding grading when running seismic lines, using existing roads, terracing reserve pits, building pipelines and power lines along roads, laying pipelines on the surface on steep or rocky slopes; avoiding running pipelines, power lines, and roads along ridge lines; back filling, and contouring to a natural shape.

Project grading will disturb a maximum of 309.37 acres. If all 53 well pads produce and 1 compressor site is built; then 197.73 acres would be in long term use (e. g., not available for grazing) during production due to pads (118.72 acres), compressor (4.59 acres), and 20' wide roads (74.42 acres).

The 197.73 acres would be 64% of the land bladed by NNOGC, or 2.3% of the agreement Acreage. Compressor site, each well pad, and all new roads will be reclaimed as each well is plugged (unless residents want a pad or road left for a home site or access).

Soil can be damaged by erosion. Erosion results from a lack of plant cover, soil compaction, grading which mixes soil layers, fertility loss as minerals are leached, and water concentrating in vehicle ruts. Any or all can increase water runoff rates. Soil impacts will be minimal, temporary, and short term if the recommended mitigation is followed. Mancos shale is particularly prone to erosion.

Impacts to soil will be mitigated by not blading seismic lines, building overhead power lines instead of buried lines, postponing construction when wet weather leads to ruts >6" deep; building diversion ditches above well pads, having pipeline corridors double as roads during construction; laying surface pipelines where practical; using existing roads where feasible to minimize new disturbance; installing road drainage control (crown and ditch, borrow ditch turnouts, culverts, water bars, surfacing) as needed if production results; storing topsoil separate from subsoil to maintain soil fertility; seeding and mulching topsoil piles; compacting filled trenches; building water bars to stop gullies; digging water bars in cut and skewing them to drain; thoroughly spreading stockpiled soil; spreading removed brush to deflect rain, reduce evaporation, interfere with off road travel, and minimize erosion; and scarifying and reseeding to accelerate re-vegetation which provides soil cover.

Seed mix should include grass, shrub, and forb seeds for a more natural appearing plant cover and to increase re-vegetation success. Four wing saltbush and wild sunflower are especially recommended. They grow fast, provide seed for birds, and their height shelters bare soil.

Geology will be impacted by the production of oil and gas - which is the project goal. Wells will comply with state spacing and drilling rules to prevent drainage. Casing and cement will prevent water or hydrocarbons from commingling or damaging other mineral zones. Pressure loss will be prevented by using and testing blowout preventers and drilling with weighted mud or compressed air or gas. (Premature pressure loss can decrease the amount of oil or gas ultimately recovered.) Geophysical logs will be run to record hydrocarbon bearing strata. If cores are cut or drill stem tests run, their data will be recorded too. Seismic data will be provided to the Navajo Nation. Well records will be provided to the Navajo Nation, BLM, BIA, and the New Mexico Oil Conservation Division. No slope will be undercut or overburdened. All holes and excavations will be filled. Wells will be plugged with cement once they are abandoned.

4.2. WATER RESOURCES

Construction could impact surface water. There could be a temporary increase in sediment from grading vegetation, compacting soil, fertility loss, and runoff concentrating in vehicle ruts. Seeding, building wells adjacent to existing roads to minimize new disturbance, contouring, scarifying, seeding; spreading removed brush and rocks to act as a mulch; and installing water bars will prevent a short-term impact from becoming a significant long-term impact.

Surface water impacts will be mitigated by controlling erosion. Those measures which mitigate soil impacts will also control erosion. Tanks will be surrounded by impermeable dirt berms of sufficient size to hold all of the tanks' volume + 10%.

The Federal Emergency Management Agency has not mapped the Acreage. Impacts on flood plains typically occur when the topography within a flood plain is substantially modified, either by placement or removal of materials within the flood plain. NNOGC will not impede the flow of floodwaters (no structures will be built above grade in the flood plain) nor impair the flood holding capacity (by not substantially modifying the topography in the flood plain). Therefore, no impacts on flood plains are anticipated.

Groundwater will be protected since all aquifers will be behind casing and cement. Produced water will be trucked or piped to an approved disposal well. NNOGC's Navajo Tribe AR 8 saltwater disposal well is a 20-mile one way trip from the Acreage. Disposal is in the Barker Creek, >6,200' deep.

Injection wells will not adversely impact aquifers. The Navajo Nation, BIA, BLM, and the state will approve injection only if the disposal zone is too mineralized or too deep for use. Anticipated disposal zones are the Pennsylvanian or Mississippian. These zones are too saline or hydrocarbon bearing for human or animal use. The agencies will review the volume of water, injection pressure, and well bore integrity.

Reserve pits will be built at least half in cut for structural integrity and lined with ≥20 mil plastic and/or commercial bentonite to prevent leaks. Chemical toilets and camper trailers with holding tanks will be used for human waste. No mercury or PCBs will be used.

Approximately 0.7 acre-foot of water would be used to drill a 5,500' deep well. (As a point of comparison only, the San Juan River at Bluff was flowing at a rate of 570 cubic feet (0.013 acre-feet) per second on May 2, 2021. Thus, all the water needed to drill a 5,500' well would be the equivalent to 54 seconds of river flow. The water used for drilling is a one-time event, not a daily withdrawal.) Water used for drilling will be bought, pumped, and trucked from NTUA. River water is not sufficiently clean for drilling.

4.3. AIR RESOURCES

Dust (particulates), noise, and emissions (carbon monoxide, ozone, nitrogen oxides, hydrogen sulfide, and sulfur dioxide) will temporarily increase due to traffic, construction, flaring, venting, or compressors. (The latter three occur only if gas is found.) All will be reduced once each well is completed. (BLM rules ban flaring or venting after 30 days or 50 million cubic feet, whichever comes first.) Engines will comply with regulatory requirements.

Hydrogen sulfide could be found in the Mississippian zones. If hydrogen sulfide (H2S) is expected or encountered, then H2S contingency plans will be created and followed in accordance with BLM's Onshore Order 6. The plans describe safety procedures and equipment.

Traffic at each well pad will drop from two-dozen vehicles per day during drilling to 1 to 2 vehicles daily if production is established. Revegetation, gravel, and dust suppressants (e. g., magnesium chloride), will control dust.

Piping gas instead of trucking, flaring, or venting will benefit air quality. Water misters will control dust from air drilling. Engines and compressors will be equipped and operated to meet emission standards. Gas leaks will be avoided by padding pipe in rocky areas, pressure testing, installing shut off valves, and posting warning signs.

Laying pipe parallel to a road minimizes blading which creates dust. No trash will be burned. Well site equipment will be painted a flat earth tone color to reduce visibility.

Weather can impact the project by increasing costs if operations are shut down or if roads must be graveled.

The Navajo Nation Air Quality Control Program is responsible for regulating air quality in the project area. Air quality is determined by atmospheric pollutants and chemistry, dispersion meteorology and terrain, and also includes applications of noise, smoke management, and visibility.

BLM's shared jurisdiction over production operations has resulted in the development of "Best Management Practices" (BMPs) designed to reduce impacts to air quality. Typical measures may include: flare hydrocarbon and gases at high temperatures in order to reduce emissions of incomplete combustion; water dirt roads during periods of high use in order to reduce fugitive dust emissions; require vapor recovery systems to be maintained and functional in areas where petroleum liquids are stored; revegetate areas of the pad not required for production facilities to reduce the amount of dust from the pad; and compressor engines 300 horsepower or less must have NOx emissions limited to 2 grams per horsepower hour.

EPA data show that improved practices and technology and changing economics have reduced emissions from oil and gas exploration and development (Inventory of US Greenhouse Gas Emissions and Sinks: 1990-2006). One of the factors in this improvement is the adoption by industry of best management practices proposed by the EPA's Natural Gas Energy Star program.

4.4. BIOTIC RESOURCES

There will be no widespread ecosystem change. Brushy areas will become weedy and grassy. Grass will benefit grazing permittees. Livestock prefer grass to sagebrush. Ecosystem mitigation will consist of the aforementioned physical and biotic mitigation measures.

Wildlife will be briefly displaced by increased activity during seismic operations, construction, and drilling. Wildlife will also incur forage loss due to vegetation removal. Vegetation (cover) loss makes prey more vulnerable to predators. Forage loss will be minimized by seeding disturbed areas. Seeding with species (e. g., sunflower) favored by wildlife can benefit wildlife as more diverse plants are introduced. These species can be used to further other goals (e. g., rapid ground cover) too. Reserve pits will be netted while drying to keep out birds.

There will be no effect on listed T & E wildlife species. The project will not impact the continued existence of any listed T & E species; nor reduce its habitat, reproductive ability, numbers, or distribution. Wildlife impacts can be mitigated by conducting T & E inspections, seasonal or spatial avoidance of T & E species if found, avoiding loop roads which disrupt wildlife movement and cover; minimizing tree loss which provide perches, cover, nest sites, and insects for food; spreading bladed brush back onto reclaimed areas to provide cover; seeding to speed re-vegetation; seeding with some native species to replicate the native environment; seeding with some nonnative species (e. g., yellow sweet clover) and including at least a forb, grass, and shrub in each seed mix to quickly stabilize soil and speed diverse plant succession; seeding with species favored by wildlife; using existing roads to minimize new disturbance; fencing and netting reserve pits; banning workers from bringing guns and dogs to the job; screening open tanks; and minimizing the length of time and distance for open trench so as to not unduly interfere with wildlife movement.

Pump jacks, tanks, fences, P & A markers, and power poles will provide perches for birds in an area with few trees.

The Migratory Bird Treaty, Endangered Species Act, and Eagle Protection Act provide penalties which act as an incentive for protection.

The project would directly and temporarily impact vegetation by grading vegetation. A maximum of 309.37 acres of vegetation would be bladed, which is 3.6% of the Acreage. Reserve pits and utility line corridors would be seeded within a year of being bladed. Wells and their roads will be reclaimed once the wells are plugged.

The project could indirectly impact adjacent vegetation. Sediment can bury plants. Erosion exposes plant roots. Noxious weeds can crowd out native flora. Seeding, contouring, scarifying, and water bars will prevent indirect impacts from becoming significant long-term impacts.

If noxious weeds invade, then they will be controlled. The Navajo Nation EPA Pesticide Enforcement and Development Program will be contacted for lists of approved herbicides and applicators.

The project will not impact the continued existence of any listed T & E flora species; nor reduce its habitat, reproductive ability, numbers, or distribution.

Vegetation impacts will be mitigated by the same measures which mitigate soil impacts. Seed mixes should include both native and nonnative grass, shrub, and forb seeds to increase the diversity and speed of re-vegetation. Actual seed species, quantities, and method and time of sowing will be specified by the Navajo Nation, BIA, or BLM. Reclamation will start once a reserve pit is dry. All disturbed areas will

be contoured to a natural shape to blend with the surrounding topography. Compacted areas will be plowed or ripped 12" deep and harrowed 6" deep before seeding.

No seeding will be done when soil is muddy or frozen. The seed mix bag tag will be kept. Disturbed areas will be harrowed and broadcast seeded with the Navajo Department of Agriculture recommended desert grassland mix of 1.5 pounds per acre alkali sacaton, 1.5 pounds per acre curly grass, 2 pounds per acre Indian ricegrass, 1.5 pounds per acre sand dropseed, 3 pounds per acre western wheatgrass, 2 pounds per acre four wing saltbush, 1.5 pound per acre shadscale, and 1/2 pound per acre bandera penstemon. Seeded areas will be drug with a chain or bed spring to cover the seed.

Once a well is plugged, the road will be blocked and reclaimed as previously described. If a well produces, then the reserve pit and any other area not needed for maintenance or production will be reclaimed the same way.

One listed T & E species is known to now be in the project area. It is the Mesa Verde cactus and is listed as Threatened. Botanical surveys will be conducted before any ground disturbing actions and the plant will be avoided if found. If new facts arise in the future and other T & E species may be affected by site specific projects, then impacts will be mitigated by space or time avoidance, habitat manipulation, surveys, directional drilling, or otherwise as deemed appropriate through consultation.

The Navajo Natural Heritage Program will be consulted prior to any ground disturbing project. They have the most complete and current information on T & E species, T & E habitat, and other species of concern on the Navajo Nation.

There may be a short term insignificant impact as livestock move away from activity. Reclamation will revegetate pipeline and power line corridors within one year even if a well is productive. This is ≈36% of the bladed area. When the wells are plugged, then all bladed areas will be reclaimed and re-vegetated.

Impacts to the livestock industry will be mitigated by reclamation. Cattle guards and/or gates will be installed if functional fences are crossed with roads. Reserve pits will be fenced. Grazing permittees will be paid compensation in excess of the fair market forage value. Workers' dogs and guns will be prohibited from the project area to avoid harassment of stock.

4.5. CULTURAL RESOURCES

Traditional cultural properties and archaeology sites will not be significantly impacted. A BIA approved archaeologist will inspect proposed surface disturbing projects prior to disturbance. Surveys will include the area of proposed disturbance plus a minimum 50' buffer zone. The archaeologist will interview residents to verify that nonphysical sacred sites are also avoided. The archaeology report will be approved by HPD before disturbance occurs. All significant sites will be avoided by at least 100', have their research potential exhausted, or will otherwise be mitigated.

Significant sites (cultural, religious, sacred, historic, or archaeology) which are found will be avoided by detouring projects around them. If the site is in close proximity, then monitoring or fencing may be implemented. If avoidance is impossible, then Section 106 consultation will be followed and mitigation by data recovery (collection and/or excavation) will be done. Should sites be found during construction (e. g., buried site without surface evidence), work will stop in that area and BIA will be notified. Mitigation will be assured by warning project personnel that disturbing sites or collecting artifacts is illegal.

4.6. SOCIOECONOMICS

The maximum development model could create ≈26,355 person-days of labor:

2 people to build a well pad x 5 days/pad x 53 pads = 530 person-days
15 people/day to drill a shallow well x 7 days/well x 53 wells = 5,565 person-days
15 people/day to drill a deep well x 14 days/well x 53 wells = 11,130 person-days
5 people/day to complete a well x 10 days x 106 wells = 5,300 person-days
5 people/day to install pipeline for each pad x 5 days/pad x 53 pads = 1,325 person days
5 people/day to install compressor x 20 days/compressor x 1 compressors = 100 person-days
4 people/day to remove compressor x 5 days/compressor x 1 compressors = 20 person-days
4 people/day to plug well x 5 daays/well x 106 wells = 2,120 person-days
+ 1 person/day to reclaim pad & road x 5 days/pad x 53 pads = 265 person-days
Total = 26,355 person-days

The 26,355 person-days would be the equivalent of ≈105 full time jobs for one year. If all 106 wells are successful, and each pumper spends ≈15 minutes per day per well, then 3-4 full time pumper job could be created. An increased tax base may allow for more services or lower taxes.

Approval of the Beautiful Mountain Project will allow NNOGC to explore and produce, which will:

a) Maintain employment for people working in allied service sectors.

b) Pay royalties which are foregone if fields are not found and developed. Ten wells reported production on the Acreage. If their first day results are typical, then NNOGC would produce the following volumes and generate the following gross revenue on its first day of producing each of ten new wells. Rates are May 24, 2021 prices (NYMEX & Henry Hub).

49 barrels of oil per well x 10 wells x $62.05/bbl = $30,404.50
+ 717 Mcf gas per well x 10 wells x $2.89/Mcf = $20,721.30
Total 1st day revenue from 10 wells = $51,125.80

If a 12.5% royalty were paid, then the Navajo Nation would receive $6,390.72 from that first day of production. (One-eighth (12.5%) royalty is typical BLM rate. Actual Tribal rate is confidential.) These figures are not guaranteed since volumes change, success and geology vary, and prices fluctuate.

c) Increase the incentive for companies to invest more. According to a University of New Mexico School of Business study, each dollar spent on drilling or related activities generates ≈$2.50 in the local economy. Each well will cost ≥$1,000,000 to drill, complete, and connect - which can generate ≥$2,500,000 more in benefits per well.

d) Jobs directly created by development indirectly create more jobs as workers buy food, clothes, housing, etc. There is a 1.44 multiplier for jobs in a rural area. If the maximum development model happens, then ≈26,355 person-days of direct labor can create ≈37,951 person-days of labor.

e) Decreasing America's dependence on foreign oil and its negative impact on America's balance of payments and security. America imports more than 50% of its oil.

f) Paying grazing permittees compensation for surface damages (e. g., $3,000 per well site) which exceeds the fair market value of damages provides discretionary income.

Local income means families no longer have to leave home for economic reasons. One author said the, "... influx of federal money through health, education,

housing, employment ... has probably had a greater impact on reservation life than energy resource development."

There are serendipitous benefits. Families can take advantage of flat land to build homes on P & A well sites.

The project can negatively impact socioeconomics by temporarily increasing the number of people in the area during seismic, construction, and drilling. That may increase the demand and price for goods and services in an area of low wages. However, there is excess capacity in the labor pool. Feelings can suffer if people are not familiar with or sensitive to Navajo culture. This should not be a problem. Most workers will come from the Four Corners which has a large Navajo population. Others may envy permittees who receive money.

Government survey section corners will be marked and avoided. Project personnel will be forbidden to bring firearms, drugs, dogs, or alcohol to the project area. Residents will be treated with courtesy and respect. NNOGC will pay for its road construction and maintenance (which benefits other road users), environmental assessments, archaeology and biology surveys, and a $500 per well application fee. By paying these project costs, NNOGC minimizes the impact on government budgets and increases government data bases.

All well bores will be at least 500' from the closest house unless the occupants consent in writing to a closer location. Wells drilled that close will have all production engines equipped with electric engines or dual dissipative (aka, hospital quiet) mufflers. Mufflers will be pointed away from occupied homes. Insulated buildings may be used on compressors if needed.

Paying surface damages to the permittees will exceed the cost of the loss of livestock forage and feed.

Impacts to the energy industry will be mitigated by following state spacing rules so no other lease is drained. Pipeline operators will be contacted before crossing their lines with roads or pipelines to prevent damage. New Mexico One Call (811) will be notified >2 business days before construction to verify there are no unmarked buried utility lines present. Roads will have at least one lane kept open or a detour provided when pipeline construction crosses.

Light smooth bare ground will contrast with the darker rough brush covered surroundings. The linear shape of pipelines, power lines, and roads will appear unnatural. Vertical tanks stand out in an area of few trees. Impacts will be reduced by reclamation, paralleling other linear features where practical, and painting equipment flat earth tone colors.

4.7. ENVIRONMENTAL MODULE

A trash cage will be used for garbage at each compressor or drilling well. Cage will be hauled to a state approved county transfer station or landfill. Chemical toilets will be used for human waste. Toilet contents will be hauled to a state approved dump station. Well treating chemical containers will have secondary above ground containment (e. g., fiberglass or galvanized steel tank). Obsolete pipe and tubing will be recycled as fence posts and braces or trucked to a salvage yard. Waste handling is described below.

Solid Waste Management Plan

Typical Field Waste
Meter charts, welding rods, wrapping tape, broken wood four by four supports
Laths, stakes, flagging, nylon rope
Lunch trash, cardboard
Collection Method: Trash cage at well pad
Disposal Point: All waste hauled to county landfill for disposal

Miscellaneous Waste
Humans waste in chemical toilets
Disposed of at state approved dump stations

Other Waste Considered, but not Generated in Field
Vehicle Fluids and Parts
Maintenance done in garage on private land or at service station off reservation

4.8. CUMULATIVE IMPACTS

Impacts will not be individually or cumulatively significant. Regional infrastructure (interstate pipelines, power line grid, paved roads, county roads, disposal ponds, landfill, dump stations, service firms, hospitals, schools, lodging, restaurants and grocery stores) is already in place. Any future ground disturbing project will require a project specific EA.

BLM evaluated cumulative impacts from oil and gas leases in northwest New Mexico in 2003 and in southeast Utah in 2008. While BLM did not examine Indian minerals, BLM's scale of analysis provides a point of reference. BLM's documents approved 29,739 acres of disturbance from oil and gas activity. The Beautiful

Mountain project will result in a maximum of 309.37 acres of land use, or ≈1.04% of BLM's figure.

This environmental assessment provides a more site-specific description of a proposed action, alternatives, impacts, and mitigation measures which fit within the scale of BLM's environmental impact statements.

5.0. PREPARER

This EA was prepared by Brian Wood. His experience includes:

1. He has written EAs for 1,500+ miles of power lines, pipelines, roads, and seismic lines, and 440,000+ acres of tribal and allotted oil and gas leases. He designed and permitted the first plastic lined commercial brine disposal pond in Utah, worked on 26 reservations or pueblos in seven states, and permitted wells and rights-of-way from Texas to North Dakota and Arkansas to Nevada. He has been published in the Oil & Gas Journal and Western Oil World.
2. Three years as a Natural Resource Specialist for BLM in Monticello, Utah. He served as a team leader on EAs for wilderness wells, construction on a National Historic Trail, and geophysical exploration. He assisted on other EAs, including the Dept. of Energy's Nuclear Waste Repository. His experience includes supervising 150 oil and gas wells; processing 200+ APDs and 50+ rights-of-way; and inspecting construction, drilling, and reclamation. The latter included assessing environmental impacts, avoiding impacts, and formulating mitigation plans where impacts could not be avoided.
3. Two years as a Range Technician for the Medicine Bow National Forest in Laramie, Wyoming. Experience included supervising work crews planting trees, building trails, repairing campgrounds, fighting forest fires, spraying noxious weeds, fence building, reclaiming 120 miles of roads, and installing watershed improvements for trout streams. He also designed a computer system for measuring winter recreation use.
4. Two and one-half years as a Staff Assistant in the Environmental Health Division of the West Virginia Health Department in Charleston, WV. He conducted a statewide survey of solid waste gathering and disposal systems, inspected fly ash and sanitary landfills, assisted in an EPA hazardous waste inventory, and designed and taught safety and landfill operation courses.

His education includes:

1. Master of Science degree in Recreation and Park Administration from the University of Wyoming, including 12 semester hours in geology.
2. Met half the requirements for a Master of Science degree in Environmental Studies from the West Virginia College of Graduate Studies.
3. Bachelor of Arts degree from the University of Virginia, with a major in Sociology and minors in Environmental Science and Government.

6.0. To Whom EA Will be Sent

- Bureau of Indian Affairs Navajo Regional Office Division of Environmental, Cultural and Safety Management

7.0. CONSULTATION AND COORDINATION

The following were consulted with in the preparation of this EA:

Racheal Dahozy, Land Manager
Navajo Nation Oil & Gas Company, St. Michaels AZ
Dexter Prall, GIS Supervisor
Natural Heritage Program, Window Rock, AZ

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Botanical
Species of Concern
Habitat Assessment Report

Beautiful Mountain Minerals Agreement Lease Area
Navajo Nation Oil & Gas Company
Sanostee and Red Valley Chapters

Prepared for:
Navajo Natural Heritage Program – Navajo Nation Department of Fish and Wildlife

Prepared by:
Celia Cook,
Permits West, Inc

PERMITS WEST
PROVIDING PERMITS for LAND USERS
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May 14, 2021

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Appendices:

Appendix A- Navajo Nation Natural Heritage Program Letter of Correspondence (21perm103).
Appendix B – USFWS IPaC Species List.

1.0 Introduction

The Navajo Nation Oil & Gas Company (NNOGC) is proposing to develop oil and gas resources in their Beautiful Mountain Mineral Lease area (Lease). The Beautiful Mountain Lease is sparsely populated region on the Navajo Nation approximately 18 miles southwest of Shiprock, San Juan County, New Mexico and within the Red Valley and Sanostee Chapters. The lease area lies within a broad valley and is bordered by Beautiful Mountain on the west and Rock Ridge on the east. Approximately 8,473.707 acres in size, it occupies all or portions of Sections 20, 21, 28, 29, 30, 31, 32, 33 of Township 27 North, Range 19 West, and Sections 4, 5, 6, 7, 8, 9, 17, and 18 of Township 26 North, Range 19 West (**Figure 1**).

NNOGC is in the initial stages of oil, gas, and helium minerals exploration of the Lease. This report provides an overview of the ecological conditions of the Beautiful Mountain Lease area as they pertain to botanical resources and is the first step in ensuring that industry impacts to sensitive botanical resources are avoided or mitigated during any future minerals development of the lease.

2.0 Methods

Regulatory laws applicable to the Beautiful Mountain lease development include, but are not limited to:

- Navajo Endangered Species Act. 17 NNC § 507.
- U.S. Endangered Species Act (ESA) [1973 as amended]

Prior to any field surveys, a written request for information on was submitted to Navajo Nation Natural Heritage Program (NNHP) for information on Navajo Nation botanical species of concern with known or potential occurrence in the project area as well as Biological Resource Land Use Clearance Policies and Procedures (RCP) areas present in the project area. A response was received April 8, 2021 (Appendix A, 21perm103). In addition, U.S. Fish and Wildlife Information for Planning and Consultation (USFWS-IPaC) database for federally listed species in San Juan County, New Mexico was accessed online and reviewed (Appendix B). Google Earth imagery, as well as topographic maps were used to determine potential sites for on the ground surveys and the NNHP wildlife biologist and botanist were notified of pending surveys via email correspondence.

Celia Cook, Wildlife Biologist for Permits West, Inc. conducted pedestrian and driving surveys in the Beautiful Mountain Lease area April 27 and 28, 2021. The project area was surveyed for floral and faunal species, with an emphasis on inspecting the area for suitable habitat and/or the presence of Navajo Endangered Species List (NESL) or Federal listed botanical species. Several areas were surveyed on foot while other areas were surveyed by driving and stopping along roads to identify plants and evaluate habitat. Habitat and existing conditions were evaluated, and plants and animals were identified and recorded. Field equipment including Avenza Maps application for recording tracks and gps points. Photographs of representative habitat were taken (Section 11.0). Weather conditions during the surveys where not unseasonal and varied from moderate12-15 mph winds to no wind, cloudy skies with light precipitation and cool temperatures, and partly cloudy skies with warm, mild temperatures.

3.0 Project Description

Navajo Nation Oil and Gas Company proposes to develop the Beautiful Mountain Minerals Agreement area of approximately 8,473.707 acres. The proposed development is at its exploratory and preliminary stages and would include oil, gas, and/or helium extraction; specific areas of development have not been selected at this time.

4.0 Location

The proposed Beautiful Mountain lease is located within the Sanostee and Red Valley Chapters of the Navajo Nation on Tribal Trust lands approximately 18 miles southwest of Shiprock and 4 miles north of Sanostee, San Juan County, New Mexico.

The proposed Beautiful Mountain lease is within the Mitten Rock, Sanostee East, Sanostee West, and Yellow Hill, New Mexico, and Utah 7.5-minute quadrangle maps within Sections 26, 27, 34, 35, and 36, Township 41 North, Range 30 East, Sections 1, 2, and 3, Township 40 North, Range 30 East, Section 31, Township 41 North, Range 31 East, Section 6, Township 40 North, Range 31 East, Section 18, Township 41 North, Range 31 East (**Figure 1**).

5.0 General Environmental Setting

The Beautiful Mountain lease area is within the Colorado Plateau physiographic region. This area is characterized by sedimentary rock formations, including mesas, buttes, sandstone ridges, and badlands. Broad valleys and deeply incised ephemeral washes are found in lower lying areas. Beautiful Mountain, part of the Chuska Mountain Range, borders the lease to the west. It is the highest mountain of this range at 9,388 feet above sea level. Within the eastern border of the lease, the long north-south sandstone formation, Rock Ridge, is a dominant topographic feature. Between these two areas are smaller hills of shale and igneous formations, rocky outcrops and ledges within a wide valley. Vegetation is sparse due to persistent drought, historic grazing pressure, and highly erosive soils. Primary overstory vegetation includes shrubs such as shadscale (*Atriplex confertifolia*), greasewood (*Sarcobatus vermiculatus*), and four-wing saltbush (*Atriplex canescens*). There are very few trees in the lease area, most of them concentrated along ephemeral washes; these consisting of non-native, invasive saltcedar (*Tamarix* sp.) and Russian olive (*Elaeagnus angustifolia*). Sparse and scattered juniper trees (*Juniperus* spp.) are present along ridges, side-slopes and escarpments. See Section 11.0 for photos of the project area.

The climate is a semiarid climate characterized by hot summers and cold winters with little precipitation. The average annual high temperature is 69.8°F and the average annual low temperature is 36.4°F. The average annual precipitation (from 1926 to 2007) is 7 inches (WRCC, 2021).

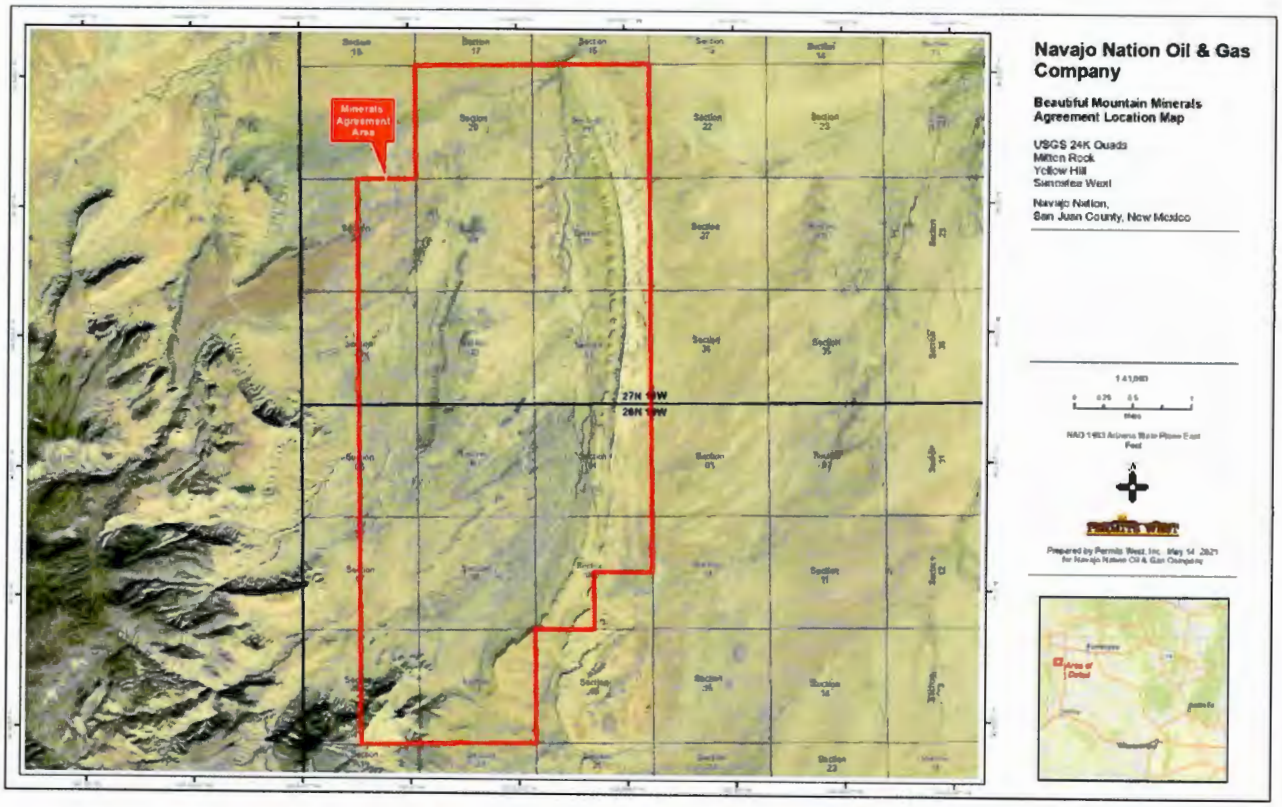

Figure 1. Beautiful Mountain Minerals Agreement Area (Lease).

5.1 Geology

The lower elevation areas of Beautiful Mountain lease are mapped as Mancos Shale, lower part. Major lithologic constituents are sedimentary, limestone, mudstone, and shale. The western portions of the lease have areas mapped as Dakota Sandstone, Gallup Sandstone, and Mancos Shale, upper part. Mancos Shale, upper part has major lithologic constituents of sandstone and mudstone (Green et al, 1997).

5.2 Soils

Major soil units within the Beautiful Mountain lease are mapped as Persayo-Nataani-Littlehat-Awet (USDA Soil Web, 2021). The Littlehat series consists of well drained, moderately permeable saline-sodic soils which are moderately deep to soft bedrock. These soils formed in alluvium and residuum derived from siltstone and shale on summits, footslopes, and backslopes of undulating plateaus. Slopes are 1-45 percent. These soils are comprised of silt loams, with a soil depth of 20 to 40 inches and rapid runoff. The Persayo series consists of shallow, well-drained soils that formed in slope alluvium or colluvium over residuum derived from soft sedimentary bedrock. These soils are on hills, basin floor remnants, fan remnants, dipslopes, scarp slopes and escarments. Slopes are 0 to 65 percent. These soils are comprised of silty clay loams have a moderately slow permeability. The Lawet series consists of very deep, poorly drained and very poorly drained soils formed in loamy alluvium on floodplains. Slopes range from 0 to 2 percent. These soils are made up of sandy clay loams and have slow runoff. The Nataani series consists of well drained, moderately permeable soils which are moderately deep to soft bedrock. Nataani soils formed in alluvium, slope alluvium, and residuum derived from siltstone and sandstone on toeslopes of undulating plateaus and structural benches. Slopes are 1 to 9 percent. These soils are comprised of fine sandy loams, loams, and gypsiferous silt loams and have slow runoff.

5.3 Surface Waters and Floodplains

The proposed project area is located within the Middle San Juan watershed (14080105) and the Chaco watershed (14080106) both draining towards the San Juan River, located approximately 18 miles northeast of the proposed lease (NRCS, 2012). According to the Federal Emergency Management FEMA Flood Map Service Center, the Beautiful Mountain Lease area does not have a printed flood map to reference. Flooding in the area is likely minimal because of the lack of perennial surface waters and low precipitation events in the region; particularly over the last 15 to 20 years where climate change has resulted in rising temperatures and less precipitation. There is one major ephemeral drain, Dead Man's Wash, that flows from the Beautiful Mountain foothills in the southwest to northeast towards the USGS mapped Big Gap Reservoir near the northeastern portions of the lease boundary; however, this reservoir is nonexistent and there is no surface water within in the project area other than at well fed livestock tanks. Areas of Dead Man's Wash and its tributaries encountered during the survey did show high water marks but all where well within the often deeply incised channels of the drainages. Livestock has further degraded bank structure and vegetation along washes, searching for grazing in a very sparse landscape. Lack of precipitation, livestock pressure, and drought have resulted in complete loss of any native riparian vegetation along drainages and contributed to the establishment of pervasive saltcedar. Saltcedar is a Navajo Nation Category B noxious weed (BIA Navajo Integrated Weed Management Plan).

5.4 Ecoregions and Vegetation Communities

The Beautiful Mountain lease area lies within the San Juan/Chaco Tablelands and Mesas level IV Ecoregion (Griffith et al, 2006). Vegetation is mapped as Desert Grassland ecotone (Dick-Peddie, 1993).

Representative grass species included alkali sacaton (*Sporobolus airoides*), galleta (*Pleuraphis jamesii*), and foxtail barley (*Hordeum jubatum*). Annual wheatgrass (*Eremopyrum triticeum*) is common in wash bottoms and flats. Some areas, particularly along escarpments, side slopes, and at the summits of hills and mesas, supported a few healthy grasslands; however, most accessible, low-lying areas lacked grasses or supported only heavily grazed grasses. Dominant shrubs throughout the lease area are represented by four-wing saltbush, shadscale, and greasewood. Wildflowers and forbs, some of which were blooming included stemless evening primrose (*Oenothera albicaulis*), scorpion weed (*Phacelia* sp.), sand verbena (*Abronia fragans*), and Astragalus (*Astragalus* spp.), among others.

Three noxious weeds were observed during the surveys: saltcedar, Russian olive, and halogeton (*Halogeton glomeratus*). All three of these species are recognized as noxious weeds by the New Mexico Department of Agriculture and the Navajo Nation (NMDA, 2020) (BIA Navajo Nation Integrated Weed Management Plan), Many areas were inundated with weedy and invasive species, including Russian tumbleweed and Kochia (*Kochia scoparia*).

There are no wetlands, wetland vegetation or native riparian vegetation present within the proposed Beautiful Mountain lease area (USFWS-NWI, 2021).

6.0 NESL and USFWS Listed Plant Species with Potential to Occur in Project Area

The majority of the proposed Beautiful Mountain lease area overlaps with NNHP RCP Area 2. Area 2 has moderately sensitive resources and moderate restrictions on development to avoid sensitive species and habitats. The eastern portion of the Beautiful Mountain lease area overlaps with RCP Area 3. Area 3 has low sensitivity resources with few restrictions on development.

Correspondence with NNDFW-NNHP indicates that there is one "Known" NESL plant species and two "Potential" plant species as present or potentially present within 1 to 3 miles of the project area based on their analysis of the Mitten Rock, Sanostee East, Sansotee West, and Yellow Hill, New Mexico 7.5-minute quadrangles. These NESL plant Species of Concern are discussed in Table 1.

The U.S. Fish and Wildlife Services Information, Planning, and Consultation website lists three species of plants that are federally listed as Threatened or Endangered in San Juan County, New Mexico (USFWS-IPaC, 2021). These federally listed plant species are discussed in Table 1. Habitat information in Table 1 is taken from NESL Species Accounts Version 4.20 (NNDFW-NNHP, 2020) and New Mexico Rare Plant Technical Council (NMRPTC, 1999, updated 14 May 2021).

Table 1. NESL and USFWS Listed Plant Species with Known or Potential Occurrence in Project Area.

Species Name	Status*	Habitat	Comments
Mesa Verde Cactus *Sclerocactus mesae-verdae*	ESA Threatened NESL Group 2	Salt-desert scrub communities, typically in the Fruitland and Mancos shale formations, but also in the Menefee Formation overlaying Mancos shale. It is most frequently found on the tops of hills or benches and along slopes.	Most of the Beautiful Mountain lease area is mapped as Manco Shale, lower part geologic formation (NMBGMR, 2003). Slopes, hills and benches in the extreme northern, west central, and southern portions of the Lease area may provide suitable habitat for this species. NNHP has mapped at least three known locations within the lease area (Talkington, 2021). One of these areas was inspected during the April 27 and 28 surveys, but no Mesa Verde cactus were observed. Other locations throughout the Beautiful Mountain lease area were searched for Mesa Verde cactus during the April 27 and 28 surveys of the project area. No Mesa Verde cactus were found.
Knowlton's cactus *Pediocactus knowltonii*	ESA Endangered	Found on rolling gravelly hills in pinyon-juniper-sagebrush communities.	There are no pinyon-juniper-sagebrush communities within the Beautiful Mountain lease area. This species would not be expected to occur due to lack of suitable habitat.
Mancos Milkvetch *Astragalus humillimus*	ESA Endangered	Cracks or eroded depressions on sandstone rimrock ledges and mesa tops in Point Lookout sandstone.	The sandstone formations within the Beautiful Mountain lease area are mapped as Dakota and Gallup Sandstone (NMBGMR, 2003); therefore, this species would not be expected to occur in the project area.
Parish's Alkali Grass *Puccinellia parishii*	NESL Group 4	This species occurs in alkaline springs, seeps, and seasonally wet areas that occur at heads of drainages or on gently slopes and requires continuously damp soils during its late winter to spring growing period.	Potentially wet areas in the far northwest corner of the Beautiful Mountain lease may support this species; however, this area was completely dry during the April 27 and 28, 2021 surveys and appeared to have been dry for some time. Unless seasonal moisture improves conditions for this area, this species would not be expected to occur in the Beautiful Mountain lease area. Not other seasonally wet areas, springs, or seeps were observed in the lease area during the April 27 and 28, 2021 surveys.
Yellow Lady's Slipper *Cypripedium parviflorum* var. *pubescens*	NESL Group 4	Mesic deciduous and coniferous forest, openings, thickets, prairies, meadows, and fens.	This species would not be expected to occur in the project area due to lack of mesic deciduous and coniferous forests and associated habitats.

*NESL: Navajo Endangered Species List

Group 1: Species or subspecies that no longer occur on Navajo Land.

Group 2: "Endangered" species or subspecies that are in danger of being eliminated from all or a significant portion of their ranges on the Navajo Nation.

Group 3: Species or subspecies that are considered likely to become endangered throughout all or a significant portion of their ranges on the Navajo Nation within the foreseeable future

Group 4: Species or subspecies for which NDFW does not currently have sufficient information for inclusion in Group 2 or 3, but which are being considered

USFWS ESA: U.S. Fish and Wildlife Service Endangered Species Act

Endangered: A species which is in danger of extinction throughout all or a significant portion of its range.

Threatened: A species which is likely to become an Endangered species within the foreseeable future.

7.0 Survey Results

The April 27 and 28, 2021 surveys of the Beautiful Mountain lease occurred during the initial growing and flowering season for many species of grasses, forbs, wildflowers, and shrubs (Section 11.0). Flowering species aided in identification. Despite grazing pressure and persistent drought in the region, many species of plants were recorded. No listed NESL or USFWS listed plant species were observed in the Lease area during the surveys. Plant species observed are presented in Table 2.

Table 2. *Plants observed during the Beautiful Mountain April 27 and 28, 2021 survey*

Species Name	Common Name
Trees, shrubs, and subshrubs	
Juniperus monosperma.	Oneseed juniper
Tamarix sp.	Saltcedar
Elaeagnus angustifolia	Russian olive
Sarcobatus vermiculatus	Greasewood
Ericameria nauseosus sp.	Rubber rabbitbrush
Atriplex canescens	Fourwing saltbush
Shadscale	Atriplex confertifolia
Artemisia bigelovii	Bigelow's sagebrush
Yucca angustissima	Narrowleaf yucca
Yucca baccata	Banana yucca
Ephedra torreyana	Torrey's ephedra
Atriplex corrugata	Mat saltbush
Brickellia sp.	Bricklebrush
Lycium pallidum	Pale wolfberry
Gutierrezia sarothrae	Broom snakeweed
Coleogyne ramosissima	Blackbrush
Forbs and Wildflowers	
Townsendia annua	Annual easter daisy
Stanleya pinnata	Prince's plume
Lesquerella sp.	Bladderpod
Descurainia pinnata	Western tansymustard
Cymopterus glomeratus var. *fendleri*	Plain's spring parsley
Cymopterus sp.	Spring parsley
Sphaeralcea coccinea	Scarlet globemallow
Phacelia sp.	Scorpion weed
Oenothera albicaulis	Stemless evening primrose
Halogeton glomeratus	Halogeton (Navajo Nation Category B noxious weed)
Salsola tragus	Russian thistle

Kochia scoparia	Kochia
Helianthus anuus	Annual sunflower
Eriogonum annuum	Annual buckwheat
Senecio flaccidus	Threadleaf ragwort
Thermopsis sp.	Golden banner
Astragalus missouriensis or amphioxys	Astragalus
Malcomia africana	African mustard
Mentzelia albicaulis	Blazing star
Lappula redowskii	Lappula
Calochortus nuttallii	Sego lilly
Abronia fragrans	Sand verbena
Androstephium breviflorum	Small flowered-androstephium
Camissonia scapoidea	Leafless suncups
Cryptantha sp. (*crassisepala*)	Hiddenflower
Grasses	
Bouteloua gracilis	Blue grama
Oryzopsis hymenoides	Indian ricegrass
Muhlenbergia porteri	Bush muhly
Aristida sp.	Threeawn
Sporobolus airoides	Alkali sacaton
Sporobolus cryptandrus	Sand dropseed
Pleuraphis jamesii	Galleta
Hordeum jubatum	Foxtail barley
Eremopyrum triticeum	Annual wheatgrass

8.0 Recommendations

As the development of the Beautiful Mountain lease progresses, NNDFW-NNHP may request further surveys to ensure that impacts to sensitive and listed plant resources and sensitive habitats are avoided or mitigated. Permits West, Inc. agrees with the need for further surveys should areas proposed for development include suitable habitat for any NESL listed plant species and/or sensitive habitats. NNHP would need to be consulted for final decisions on impacts to botanical resources prior to breaking ground on development within the lease.

9.0 Certification

Results contained in this report represent my best professional judgement and are based on field investigations, research and review of pertinent information sources, information provided by the project proponent, and information provided by the the Navajo Natural Heritage Program.

Celia Cook
Wildlife Biologist
Permits West, Inc.

May 13, 2021

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11.0 Photos from April 27 and 28, 2021 Field Surveys of the Beautiful Mountain Lease area.

Photo 1. Grassland habitat. Photo taken facing northeast from Lat. 36.474222°, Long. -108.883826° (Nad 83).

Photo 2. Grassland habitat (better) within the Beautiful Mountain lease area. Facing west towards "the Bell" (outside of lease area) from Lat. 36.477533°°, Long. -108.887645°° (Nad 83).

Photo 3. Sparsely vegetated Mancos shale formation. Photo facing north-northwest from Lat. 36.492314°, Long. -108.885533° (NAD 83).

Photo 3. Sparsely vegetated Mancos shale formation. Photo facing southeast from Lat. 36.492314°, Long. -108.885533° (NAD 83).

Photo 5. Sparsely vegetated valley bottom at north end of lease. Photo facing southwest from Lat. 36.567935°, Long. -108.893892° (NAD 83).

Photo 6. Heavily grazed valley bottom at north end of lease. Photo facing east towards Rock Ridge formation from Lat. 36.558916°, Long. -108.885933° (NAD 83).

Photo 7. Small hill with volcanic cobble. Photo taken from Lat. 36.559143°, Long. -108.886947° (NAD 83).

Photo 8. Heavily grazed valley bottom and deeply incised tributary of Dead Man's wash. Photo facing south-southeast towards Rock Ridge formation from Lat. 36.558480°, Long. -108.876772° (NAD 83).

Photo 9. Drainage area at near mouth of Big Gap. Photo facing north from Lat. 36.565366°, Long. -108.875994° (NAD 83).

Photo 10. Facing east from base of Rock Ridge. Photo taken from Lat. 36.560348°, Long. -108.872558° (NAD 83).

Appendix A: NNHP Correspondence 21perm103 (9 pages) follows:

NNHP
Navajo Natural Heritage Program

PO BOX 1480
Window Rock, AZ 86515

P 928.871.6472
F 928.871.7603

www.nndfw.org

21perm103

08-April-2021

Cari Eggleston
Permit's West, Inc
37 Verano Loop
Santa Fe, NM 87508
cari@permitswest.com

SUBJECT: Navajo Nation Oil and Gas Company - Beautiful Mountain Project

Cari Eggleston,

NNHP has performed an analysis of your project in comparison to known biological resources of the Navajo Nation and has included the findings in this letter. The letter is composed of seven parts. The sections as they appear in the letter are:

1. **Known Species** – a list of all species within relative proximity to the project
2. **Potential Species** – a list of potential species based on project proximity to respective suitable habitat
3. **Quadrangles** – an exhaustive list of quads containing the project
4. **Project Summary** – a categorized list of biological resources within relative proximity to the project grouped by individual project site(s) or quads
5. **Conditional Criteria Notes** – additional details concerning various species, habitat, etc.
6. **Personnel Contacts** – a list of employee contacts
7. **Resources** – identifies sources for further information

Known Species lists "species of concern" known to occur within proximity to the project area. Planning for avoidance of these species is expected. If no species are displayed then based upon the records of the Navajo Nation Department of Fish and Wildlife (NNDFW) there are no "species of concern" within proximity to the project. Refer to the Navajo Endangered Species List (NESL) Species Accounts for recommended avoidance measures, biology, and distribution of NESL species on the Navajo Nation (https://www.nndfw.org/nnhp/sp_account.htm).

Potential Species lists species that are potentially within proximity to the project area and need to be evaluated for presence/absence. If no species are found within the Known or Potential Species lists, the project is not expected to affect any federally listed species, nor significantly impact any tribally listed species or other species of concern. Potential for species has been determined primarily on habitat characteristics and species range information. A thorough habitat analysis, and if necessary, species specific surveys, are required to determine the potential for each species.

Species of concern include protected, candidate, and other rare or otherwise sensitive species, including certain native species and species of economic or cultural significance. For legally protected species, the following tribal and federal statuses are indicated: NESL, federal Endangered Species Act (ESA), Migratory Bird Treaty Act (MBTA), and Eagle Protection Act (EPA). No legal protection is afforded species with only

ESA candidate, NESL group 4 status, and species listed on the Sensitive Species List. Please be aware of these species during surveys and inform the NNDFW of observations. Reported observations of these species and documenting them in project planning and management is important for conservation and may contribute to ensuring they will not be up listed in the future.

In any and all correspondence with NNDFW or NNHP concerning this project please cite the Data Request Code associated with this document. It can be found in this report on the top right corner of the every page. Additionally please cite this code in any biological evaluation documents returned to our office.

1. Known Species *(NESL=Navajo Endangered Species List, FE=Federally Endangered, FT=Federally Threatened, FC=Federal Candidate)*

Species

SCMEVE = Sclerocactus mesae-verdae / Mesa Verde Cactus NESL G2 FT
VUMA = Vulpes macrotis / Kit Fox NESL G4

2. Potential Species

Species

AQCH = Aquila chrysaetos / Golden Eagle NESL G3
ATCU = Athene cunicularia / Burrowing Owl NESL G4
BURE = Buteo regalis / Ferruginous Hawk NESL G3
CHMO = Charadrius montanus / Mountain Plover NESL G4
CYPAPU = Cypripedium parviflorum var. pubescens / Yellow Lady's Slipper NESL G4
EMTREX = Empidonax traillii extimus / Southwestern Willow Flycatcher NESL G2 FE
FAPE = Falco peregrinus / Peregrine Falcon NESL G4
LIPI = Lithobates pipiens / Northern Leopard Frog NESL G2
PUPA = Puccinellia parishii / Parish's Alkali Grass NESL G4
SCMEVE = Sclerocactus mesae-verdae / Mesa Verde Cactus NESL G2 FT
STOCLU = Strix occidentalis lucida / Mexican Spotted Owl NESL G3 FT
VUMA = Vulpes macrotis / Kit Fox NESL G4

3. Quadrangles (7.5 Minute)

Quadrangles

Mitten Rock (36108-E8) / NM
Sanostee East (36108-D7) / NM
Sanostee West (36108-D8) / NM
Yellow Hill (36108-E7) / NM

4. Project Summary *(EO1 Mile/EO 3 Miles=elements occuring within 1 & 3 miles., MSO=mexican spotted owl PACs, POTS=potential species, RCP=Biological Areas)*

SITE	EO1MI	EO3MI	QUAD	MSO	POTS	RCP

21perm103

SITE	EO1MI	EO3MI	QUAD	MSO	POTS	RCP
Beautiful Mountain Project Area	SCMEVE	SCMEVE	Mitten Rock (36108-E8) / NM	None	AQCH, ATCU, BURE, CHMO, EMTREX, FAPE, LIPI, PUPA, SCMEVE, STOCLU	Area 2, Area 3
Beautiful Mountain Project Area	SCMEVE	SCMEVE	Sanostee East (36108-D7) / NM	None	AQCH, ATCU, BURE, CHMO, EMTREX, PUPA, SCMEVE, VUMA	Area 2, Area 3
Beautiful Mountain Project Area	SCMEVE	SCMEVE	Sanostee West (36108-D8) / NM	None	AQCH, ATCU, BURE, CHMO, CYPAPU, EMTREX, FAPE, LIPI, PUPA, SCMEVE, STOCLU	Area 2, Area 3
Beautiful Mountain Project Area	SCMEVE	SCMEVE, VUMA	Yellow Hill (36108-E7) / NM	None	AQCH, ATCU, BURE, CHMO, FAPE, LIPI, PUPA, SCMEVE, VUMA	Area 2, Area 3

5. Conditional Criteria Notes *(Recent revisions made please read thoroughly. For certain species, and/or circumstances, please read and comply)*

A. Biological Resource Land Use Clearance Policies and Procedures (RCP) - The purpose of the RCP is to assist the Navajo Nation government and chapters ensure compliance with federal and Navajo laws which protect, wildlife resources, including plants, and their habitat resulting in an expedited land use clearance process. After years of research and study, the NNDFW has identified and mapped wildlife habitat and sensitive areas that cover the entire Navajo Nation.

The following is a brief summary of six (6) wildlife areas:

1. **Highly Sensitive Area** – recommended no development with few exceptions.
2. **Moderately Sensitive Area** – moderate restrictions on development to avoid sensitive species/habitats.
3. **Less Sensitive Area** – fewest restrictions on development.
4. Community Development Area – areas in and around towns with few or no restrictions on development.
5. **Biological Preserve** – no development unless compatible with the purpose of this area.
6. **Recreation Area** – no development unless compatible with the purpose of this area.

None - outside the boundaries of the Navajo Nation

This is not intended to be a full description of the RCP please refer to the our website for additional information at https://www.nndfw.org/clup.htm.

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B. Raptors – If raptors are known to occur within 1 mile of project location: Contact the NNHP zoologist at 871-7070 regarding your evaluation of potential impacts and mitigation.
Golden and Bald Eagles- If Golden or Bald Eagle are known to occur within 1 mile of the project, decision makers need to ensure that they are not in violation of the *Golden and Bald Eagle Nest Protection Regulations* found at https://www.nndfw.org/nnhp/docs_reps/gben.pdf.
Ferruginous Hawks – Refer to *Navajo Nation Department of Fish and Wildlife's Ferruginous Hawk Management Guidelines for Nest Protection* (https://www.nndfw.org/nnhp/docs_reps.htm) for relevant information on avoiding impacts to Ferruginous Hawks within 1 mile of project location.
Mexican Spotted Owl - Please refer to the *Navajo Nation Mexican Spotted Owl Management Plan* (https://www.nndfw.org/nnhp/docs_reps.htm) for relevant information on proper project planning near/within spotted owl protected activity centers and habitat.

C. Surveys – Biological surveys need to be conducted during the appropriate season to ensure they are complete and accurate please refer to NN Species Accounts https://www.nndfw.org/nnhp/sp_account.htm. Surveyors on the Navajo Nation must be permitted by the Director, NNDFW. Contact Jeff Cole at (928) 871-6450 for permitting procedures. Questions pertaining to surveys should be directed to the NNDFW the NNHP Zoologist for animals, and the NNHP Botanist for plants. Questions regarding biological evaluation should be directed to Jeff Cole at 871-6450.

D. Oil/Gas Lease Sales – Any settling or evaporation pits that could hold contaminants should be lined and covered. Covering pits, with a net or other material, will deter waterfowl and other migratory bird use. Lining pits will protect ground water quality.

E. Power line Projects – These projects need to ensure that they do not violate the regulations set forth in the *Navajo Nation Raptor Electrocution Prevention Regulations* found at https://www.nndfw.org/nnhp/docs_reps/repr.pdf.

F. Guy Wires – Does the project design include guy wires for structural support? If so, and if bird species may occur in relatively high concentrations in the project area, then guy wires should be equipped with highly visual markers to reduce the potential mortality due to bird-guy wire collisions. Examples of visual markers include aviation balls and bird flight diverters. Birds can be expected to occur in relatively high concentrations along migration routes (e.g., rivers, ridges or other distinctive linear topographic features) or where important habitat for breeding, feeding, roosting, etc. occurs. The U.S. Fish and Wildlife Service recommends marking guy wires with at least one marker per 100 meters of wire.

G. San Juan River – On 21 March 1994 (Federal Register, Vol. 59, No. 54), the U.S. Fish and Wildlife Service designated portions of the San Juan River (SJR) as critical habitat for Ptychocheilus lucius (Colorado pikeminnow) and Xyrauchen texanus (Razorback sucker). Colorado pikeminnow critical habitat includes the SJR and its 100-year floodplain from the State Route 371 Bridge in T29N, R13W, sec. 17 (New Mexico Meridian) to Neskahai Canyon in the San Juan arm of Lake Powell in T41S, R11E, sec. 26 (Salt Lake Meridian) up to the full pool elevation. Razorback sucker critical habitat includes the SJR and its 100-year floodplain from the Hogback Diversion in T29N, R16W, sec. 9 (New Mexico Meridian) to the full pool elevation at the mouth of Neskahai Canyon on the San Juan arm of Lake Powell in T41S, R11E, sec. 26 (Salt Lake Meridian). All actions carried out, funded or authorized by a federal agency which may alter the constituent elements of critical habitat must undergo section 7 consultation under the Endangered Species Act of 1973, as amended. Constituent elements are those physical and biological attributes essential to a species conservation and include, but are not limited to, water, physical habitat, and biological environment as required for each particular life stage of a species.

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H. Little Colorado River - On 21 March 1994 (Federal Register, Vol. 59, No. 54) the U.S. Fish and Wildlife Service designated Critical Habitat along portions of the Colorado and Little Colorado Rivers (LCR) for Gila cypha (humpback chub). Within or adjacent to the Navajo Nation this critical habitat includes the LCR and its 100-year floodplain from river mile 8 in T32N R6E, sec. 12 (Salt and Gila River Meridian) to its confluence with the Colorado River in T32N R5E sec. 1 (S&GRM) and the Colorado River and 100-year floodplain from Nautuloid Canyon (River Mile 34) T36N R5E sec. 35 (S&GRM) to its confluence with the LCR. All actions carried out, funded or authorized by a federal agency which may alter the constituent elements of Critical Habitat must undergo section 7 consultation under the Endangered Species Act of 1973, as amended. Constituent elements are those physical and biological attributes essential to a species conservation and include, but are not limited to, water, physical habitat, and biological environment as required for each particular life stage of a species.

I. Wetlands – In Arizona and New Mexico, potential impacts to wetlands should also be evaluated. The U.S. Fish & Wildlife Service's National Wetlands Inventory (NWI) maps should be examined to determine whether areas classified as wetlands are located close enough to the project site(s) to be impacted. In cases where the maps are inconclusive (e.g., due to their small scale), field surveys must be completed. For field surveys, wetlands identification and delineation methodology contained in the "Corps of Engineers Wetlands Delineation Manual" (Technical Report Y-87-1) should be used. When wetlands are present, potential impacts must be addressed in an environmental assessment and the Army Corps of Engineers, Phoenix office, must be contacted. NWI maps are available for examination at the Navajo Natural Heritage Program (NNHP) office, or may be purchased through the U.S. Geological Survey (order forms are available through the NNHP). The NNHP has complete coverage of the Navajo Nation, excluding Utah, at 1:100,000 scale; and coverage at 1:24,000 scale in the southwestern portion of the Navajo Nation. In Utah, the U.S. Fish & Wildlife Service's National Wetlands Inventory maps are not yet available for the Utah portion of the Navajo Nation, therefore, field surveys should be completed to determine whether wetlands are located close enough to the project site(s) to be impacted. For field surveys, wetlands identification and delineation methodology contained in the "Corps of Engineers Wetlands Delineation Manual" (Technical Report Y-87-1) should be used. When wetlands are present, potential impacts must be addressed in an environmental assessment and the Army Corps of Engineers, Phoenix office, must be contacted. For more information contact the Navajo Environmental Protection Agency's Water Quality Program.

J. Life Length of Data Request – The information in this report was identified by the NNHP and NNDFW's biologists and computerized database, and is based on data available at the time of this response. If project planning takes more than two (02) years from the date of this response, verification of the information provided herein is necessary. It should not be regarded as the final statement on the occurrence of any species, nor should it substitute for on-site surveys. Also, because the NNDFW information is continually updated, any given information response is only wholly appropriate for its respective request.

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K. Ground Water Pumping - Projects involving the ground water pumping for mining operations, agricultural projects or commercial wells (including municipal wells) will have to provide an analysis on the effects to surface water and address potential impacts on all aquatic and/or wetlands species listed below. NESL Species potentially impacted by ground water pumping: Carex specuicola (Navajo Sedge), Cirsium rydbergii (Rydberg's Thistle), Primula specuicola (Cave Primrose), Platanthera zothecina (Alcove Bog Orchid), Puccinellia parishii (Parish Alkali Grass), Zigadenus vaginatus (Alcove Death Camas), Perityle specuicola (Alcove Rock Daisy), Symphyotrichum welshii (Welsh's American-aster), Coccyzus americanus (Yellow-billed Cuckoo), Empidonax traillii extimus (Southwestern Willow Flycatcher), Rana pipiens (Northern Leopard Frog), Gila cypha (Humpback Chub), Gila robusta (Roundtail Chub), Ptychocheilus lucius (Colorado Pikeminnow), Xyrauchen texanus (Razorback Sucker), Cinclus mexicanus (American Dipper), Speyeria nokomis (Western Seep Fritillary), Aechmophorus clarkia (Clark's Grebe), Ceryle alcyon (Belted Kingfisher), Dendroica petechia (Yellow Warbler), Porzana carolina (Sora), Catostomus discobolus (Bluehead Sucker), Cottus bairdi (Mottled Sculpin), Oxyloma kanabense (Kanab Ambersnail)

6. Personnel Contacts

Wildlife Manager
Leanna Begay
928.871.6450
lbegay@nndfw.org

Zoologist
Brent Powers
928.871.7070
bpowers@nndfw.org

Botanist
Nora Talkington
ntalkington@nndfw.org

Biological Reviewer (Interim)
Taylor Greene
928.871.6450
tgreene@nndfw.org

GIS Supervisor
Dexter D Prall
928.645.2898
prall@nndfw.org

7. Resources

Navajo Endangered Species List:
https://www.nndfw.org/nnhp/endangered.htm

Species Accounts:
https://www.nndfw.org/nnhp/sp_account.htm

Biological Investigation Permit Application
https://www.nndfw.org/nnhp/study_permit.htm

Navajo Nation Sensitive Species List
https://www.nndfw.org/nnhp/trackinglist.htm

Various Species Management and/or Document and Reports
https://www.nndfw.org/nnhp/docs_reps.htm

Consultant List
https://www.nndfw.org/bi_consult_list_2014.pdf

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Dexter D Prall, GIS Supervisor - Natural Heritage Program
Navajo Nation Department of Fish and Wildlife

IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

Location

San Juan County, New Mexico

Local office

New Mexico Ecological Services Field Office

(505) 346-2525
(505) 346-2542

2105 Osuna Road Ne
Albuquerque, NM 87113-1001

http://www.fws.gov/southwest/es/NewMexico/
http://www.fws.gov/southwest/es/ES_Lists_Main2.html

Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species[1] and their critical habitats are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries[2]).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact NOAA Fisheries for species under their jurisdiction.

1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information. IPaC only shows species that are regulated by USFWS (see FAQ).
2. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following species are potentially affected by activities in this location:

Mammals

NAME	STATUS

Canada Lynx Lynx canadensis — Threatened

There is **final** critical habitat for this species. The location of the critical habitat is not available.
https://ecos.fws.gov/ecp/species/3652

New Mexico Meadow Jumping Mouse Zapus hudsonius luteus — Endangered

Wherever found

This species only needs to be considered if the following condition applies:

- If project affects dense herbaceous riparian vegetation along waterways (stream, seep, canal/ditch).

There is **final** critical habitat for this species. The location of the critical habitat is not available.
https://ecos.fws.gov/ecp/species/7965

Birds

NAME	STATUS
Southwestern Willow Flycatcher Empidonax traillii extimus Wherever found There is **final** critical habitat for this species. The location of the critical habitat is not available. https://ecos.fws.gov/ecp/species/6749	**Endangered**
Yellow-billed Cuckoo Coccyzus americanus There is **final** critical habitat for this species. The location of the critical habitat is not available. https://ecos.fws.gov/ecp/species/3911	**Threatened**

Fishes

NAME	STATUS
Colorado Pikeminnow (=squawfish) Ptychocheilus lucius There is **final** critical habitat for this species. Your location overlaps the critical habitat. https://ecos.fws.gov/ecp/species/3531	**Endangered**
Razorback Sucker Xyrauchen texanus Wherever found There is **final** critical habitat for this species. Your location overlaps the critical habitat. https://ecos.fws.gov/ecp/species/530	**Endangered**

Zuni Bluehead Sucker Catostomus discobolus yarrowi Wherever found There is **final** critical habitat for this species. The location of the critical habitat is not available. https://ecos.fws.gov/ecp/species/3536	Endangered

Flowering Plants

NAME	STATUS
Knowlton's Cactus Pediocactus knowltonii Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/1590	Endangered
Mancos Milk-vetch Astragalus humillimus Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/7483	Endangered
Mesa Verde Cactus Sclerocactus mesae-verdae Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/6005	Threatened

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

This location overlaps the critical habitat for the following species:

NAME	TYPE
Colorado Pikeminnow (=squawfish) Ptychocheilus lucius https://ecos.fws.gov/ecp/species/3531#crithab	Final
Razorback Sucker Xyrauchen texanus https://ecos.fws.gov/ecp/species/530#crithab	Final

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.

Additional information can be found using the following links:

- Birds of Conservation Concern http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php
- Measures for avoiding and minimizing impacts to birds http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php
- Nationwide conservation measures for birds http://www.fws.gov/migratorybirds/pdf/management/nationwidestandardconservationmeasures.pdf

The birds listed below are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ below. This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the E-bird data mapping tool (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found below.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON (IF A BREEDING SEASON IS INDICATED FOR A BIRD ON YOUR LIST, THE BIRD MAY BREED IN YOUR PROJECT AREA SOMETIME WITHIN THE TIMEFRAME SPECIFIED, WHICH IS A VERY LIBERAL ESTIMATE OF THE DATES INSIDE WHICH THE BIRD BREEDS ACROSS ITS ENTIRE RANGE. "BREEDS ELSEWHERE" INDICATES THAT THE BIRD DOES NOT LIKELY BREED IN YOUR PROJECT AREA.)

Bald Eagle Haliaeetus leucocephalus — Breeds Dec 1 to Aug 31

This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.
https://ecos.fws.gov/ecp/species/1626

Bendire's Thrasher Toxostoma bendirei — Breeds Mar 15 to Jul 31

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9435

Black Swift Cypseloides niger — Breeds Jun 15 to Sep 10

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/8878

Brewer's Sparrow Spizella breweri — Breeds May 15 to Aug 10

This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA
https://ecos.fws.gov/ecp/species/9291

Burrowing Owl Athene cunicularia — Breeds Mar 15 to Aug 31

This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA
https://ecos.fws.gov/ecp/species/9737

Clark's Grebe Aechmophorus clarkii — Breeds Jan 1 to Dec 31

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Golden Eagle Aquila chrysaetos — Breeds Jan 1 to Aug 31

This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA
https://ecos.fws.gov/ecp/species/1680

Grace's Warbler Dendroica graciae — Breeds May 20 to Jul 20

This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA

Gray Vireo Vireo vicinior — Breeds May 10 to Aug 20

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/8680

Lesser Yellowlegs Tringa flavipes — Breeds elsewhere
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9679

Lewis's Woodpecker Melanerpes lewis — Breeds Apr 20 to Sep 30
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9408

Long-billed Curlew Numenius americanus — Breeds Apr 1 to Jul 31
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/5511

Long-eared Owl asio otus — Breeds Mar 1 to Jul 15
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/3631

Marbled Godwit Limosa fedoa — Breeds elsewhere
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9481

Olive-sided Flycatcher Contopus cooperi — Breeds May 20 to Aug 31
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/3914

Pinyon Jay Gymnorhinus cyanocephalus — Breeds Feb 15 to Jul 15
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9420

Rufous Hummingbird selasphorus rufus — Breeds elsewhere
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/8002

Virginia's Warbler Vermivora virginiae — Breeds May 1 to Jul 31
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9441

Willet Tringa semipalmata — Breeds elsewhere

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Willow Flycatcher Empidonax traillii — Breeds May 20 to Aug 31

This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA
https://ecos.fws.gov/ecp/species/3482

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

Breeding Season (■)
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)

Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

To see a bar's survey effort range, simply hover your mouse cursor over the bar.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.

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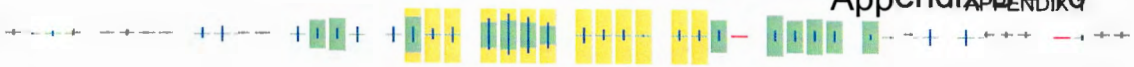
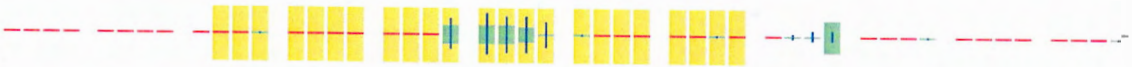
Brewer's Sparrow BCC - BCR (This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA)

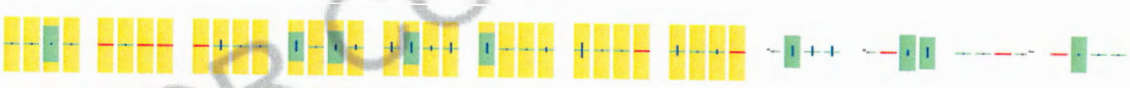


Burrowing Owl BCC - BCR (This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA)



Clark's Grebe BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Golden Eagle BCC - BCR (This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA)



Grace's Warbler BCC - BCR (This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA)

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Gray Vireo BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Lesser Yellowlegs BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

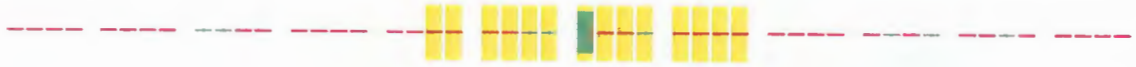
Lewis's Woodpecker BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Long-billed Curlew BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

SPECIES	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Long-eared Owl BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)												

Marbled Godwit BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Olive-sided Flycatcher BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)



Pinyon Jay BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Rufous Hummingbird BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Virginia's Warbler BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Willet BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Willow Flycatcher BCC - BCR (This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA)

Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the migratory birds potentially occurring in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the AKN Phenology Tool.

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets .

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering, migrating or present year-round in my project area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may refer to the following resources: The Cornell Lab of Ornithology All About Birds Bird Guide, or (if you are unsuccessful in locating the bird of interest there), the Cornell Lab of Ornithology Neotropical Birds guide. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting

point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

Facilities

National Wildlife Refuge lands

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS AT THIS LOCATION.

Fish hatcheries

THERE ARE NO FISH HATCHERIES AT THIS LOCATION.

Wetlands in the National Wetlands Inventory

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

This location overlaps the following wetlands:

The area of this project is too large for IPaC to load all NWI wetlands in the area. The list below may be incomplete. Please contact the local U.S. Fish and Wildlife Service office or visit the NWI map for a full list.

FRESHWATER EMERGENT WETLAND

PEM1A

PEM1/SS1A
PEM1/SS2A
PEM1/SS1C
PEM1/SS2Jh
PEM1/SS1Ah
PEM1/SS1Ch

FRESHWATER POND

PAB4Hh
PAB4Fh
PAB4Fx

LAKE

L1UBHh
L
L2UBF
L2UBFx
L2UBFh
L2USAh
L2EM2F
L2USCh

A full description for each wetland code can be found at the National Wetlands Inventory website

Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish

the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

Wildlife
Species of Concern
Habitat Assessment Report

Beautiful Mountain Lease Area
Navajo Nation Oil & Gas Company
Sanostee and Red Valley Chapters

Prepared for:
Navajo Natural Heritage Program – Navajo Nation Department of Fish and Wildlife

Prepared by:
Celia Cook,
Permits West, Inc

PERMITS WEST
PROVIDING PERMITS for LAND USERS
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May 10, 2021

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Appendix A- Navajo Nation Natural Heritage Program Letter of Correspondence (21perm103).
Appendix B – USFWS IPaC Species List.

1.0 Introduction

The Navajo Nation Oil & Gas Company (NNOGC) is proposing to develop oil and gas resources in their Beautiful Mountain Lease. The Beautiful Mountain lease is sparsely populated region on the Navajo Nation approximately 18 miles southwest of Shiprock, San Juan County, New Mexico and within the Red Valley and Sanostee Chapters. The lease area lies within a broad valley and is bordered by Beautiful Mountain on the west and Rock Ridge on the east. Approximately 8,473.707 acres in size, it occupies all or portions of Sections 20, 21, 28, 29, 30, 31, 32, 33 of Township 27 North, Range 19 West, and Sections 4, 5, 6, 7, 8, 9, 17, and 18 of Township 26 North, Range 19 West (**Figure 1**).

NNOGC is in the initial stages of oil, gas, and helium minerals exploration of the Beautiful Mountain lease. This report provides an overview of the ecological conditions of the Beautiful Mountain lease area as they pertain to wildlife resources and is the first step in ensuring that industry impacts to sensitive wildlife resources are avoided or mitigated during any future minerals development of the lease.

2.0 Methods

Regulatory laws applicable to the Beautiful Mountain lease development include, but are not limited to:

- Navajo Endangered Species Act. 17 NNC § 507.
- U.S. Endangered Species Act (ESA) [1973 as amended]
- Navajo Nation Golden and Bald Eagle Nest Protection Regulations (NNC, 2008)
- Migratory Bird Treaty Act (MBTA)
- Bald and Golden Eagle Protection Act (BGEPA) [USFWS, 2004]

Prior to any field surveys, a written request for information on was submitted to Navajo Nation Natural Heritage Program (NNHP) for information on Navajo Nation wildlife species of concern with known or potential occurrence in the project area as well as Biological Resource Land Use Clearance Policies and Procedures (RCP) wildlife areas present in the project area. A response was received April 8, 2021 (Appendix A, 21perm103). In addition, U.S. Fish and Wildlife Information for Planning and Consultation (USFWS-IPaC) database for federally listed species in San Juan County, New Mexico was accessed online and reviewed (Appendix B). Google Earth imagery, as well as topographic maps were used to determine potential sites for on the ground surveys and the NNHP wildlife biologist and botanist were notified of pending surveys via email correspondence.

Celia Cook, Wildlife Biologist for Permits West, Inc. conducted pedestrian and driving surveys in the Beautiful Mountain lease area April 27 and 28, 2021. The project area was surveyed for flora and fauna species, with an emphasis on inspecting the area for suitable habitat and/or the presence of Navajo Endangered Species List (NESL) or Federal listed wildlife species. Several areas were surveyed on foot while other areas were surveyed by driving and stopping along roads to scan for wildlife. Habitat and existing conditions were evaluated, and plants and animals were identified and recorded. Field equipment including Avenza Maps application for recording tracks and gps points. Cliffs and other topographic features were scanned with 12 x 50 binoculars to search for raptor or migratory bird activity. Wildlife

species were recorded from direct observation, tracks, scat, and other sign (Section 7.0). Photographs of representative habitat were taken (Section 11.0). Weather conditions during the surveys where not unseasonal and varied from moderate12-15 mph winds to no wind, cloudy skies with light precipitation and cool temperatures, and partly cloudy skies with warm, mild temperatures.

3.0 Project Description

Navajo Nation Oil and Gas Company proposes to develop the Beautiful Mountain Minerals Agreement area of approximately 8,473.707 acres. The proposed development is at its exploratory and preliminary stages and would include oil, gas, and/or helium extraction; specific areas of development have not been selected at this time.

4.0 Location

The proposed Beautiful Mountain lease is located within the Sanostee and Red Valley Chapters of the Navajo Nation on Tribal Trust lands approximately 18 miles southwest of Shiprock and 4 miles north of Sanostee, San Juan County, New Mexico.

The proposed Beautiful Mountain lease is within the Mitten Rock, Sanostee East, Sanostee West, and Yellow Hill, New Mexico, and Utah 7.5-minute quadrangle maps within Sections 26, 27, 34, 35, and 36, Township 41 North, Range 30 East, Sections 1, 2, and 3, Township 40 North, Range 30 East, Section 31, Township 41 North, Range 31 East, Section 6, Township 40 North, Range 31 East, Section 18, Township 41 North, Range 31 East (**Figure 1**).

5.0 General Environmental Setting

The Beautiful Mountain lease area is within the Colorado Plateau physiographic region. This area is characterized by sedimentary rock formations, including mesas, buttes, sandstone ridges, and badlands. Broad valleys and deeply incised ephemeral washes are found in lower lying areas. Beautiful Mountain, part of the Chuska Mountain Range, borders the lease to the west. It is the highest mountain of this range at 9,388 feet above sea level. Within the eastern border of the lease, the long north-south sandstone formation, Rock Ridge, is a dominant topographic feature. Between these two areas are smaller hills of shale and igneous formations, rocky outcrops and ledges within a wide valley. Vegetation is sparse due to persistent drought, historic grazing pressure, and highly erosive soils. Primary overstory vegetation includes shrubs such as shadscale (*Atriplex confertifolia*), greasewood (*Sarcobatus vermiculatus*), and four-wing saltbush (*Atriplex canescens*). There are very few trees in the lease area, most of them concentrated along ephemeral washes; these consisting of non-native, invasive saltcedar (*Tamarix* sp.) and Russian olive (*Elaeagnus angustifolia*). Sparse and scattered juniper trees (*Juniperus* spp.) are present along ridges, side-slopes and escarpments.

The climate is a semiarid climate characterized by hot summers and cold winters with little precipitation. The average annual high temperature is 69.8°F and the average annual low temperature is 36.4°F. The average annual precipitation (from 1926 to 2007) is 7 inches (WRCC, 2021).

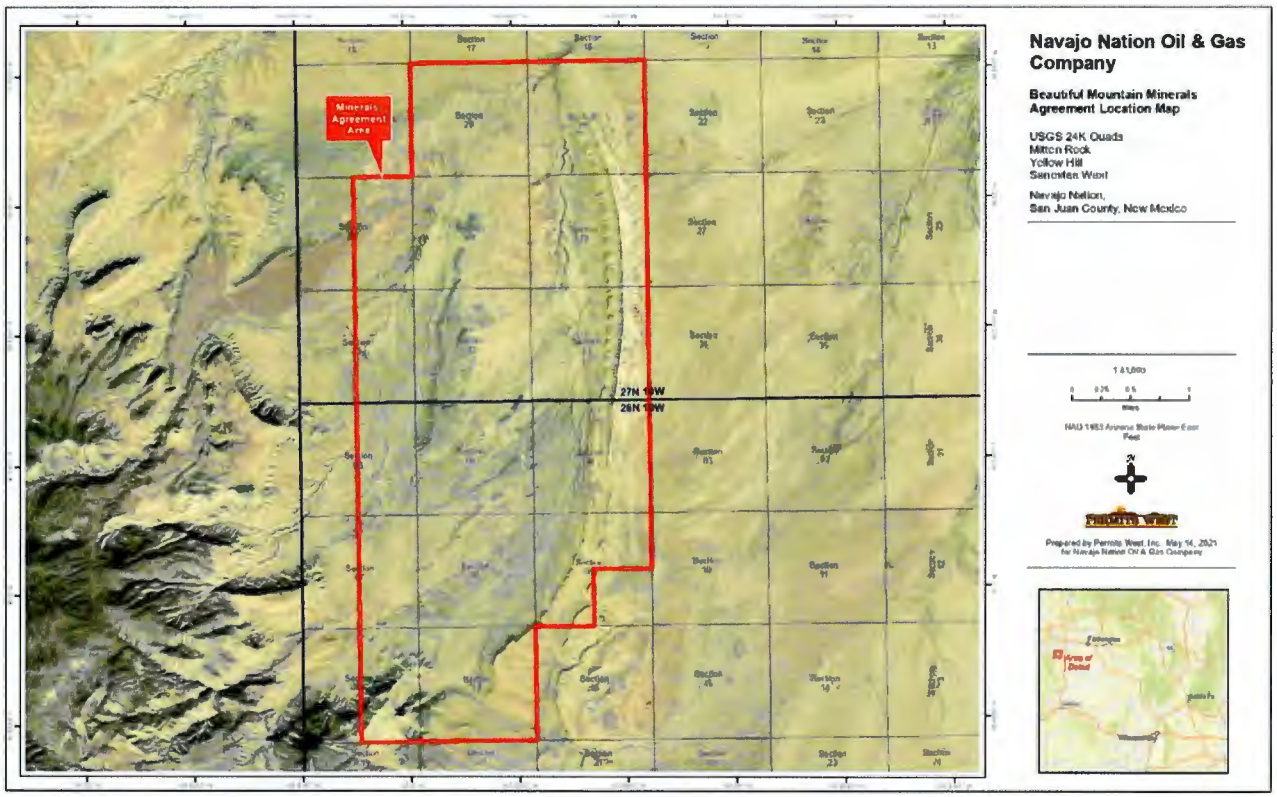

Figure 1. Beautiful Mountain Mineral Agreement Area (Lease).

5.1 Geology

The lower elevation areas of Beautiful Mountain lease are mapped as Mancos Shale, lower part. Major lithologic constituents are sedimentary, limestone, mudstone, and shale. The western portions of the lease have areas mapped as Dakota Sandstone, Gallup Sandstone, and Mancos Shale, upper part. Mancos Shale, upper part has major lithologic constituents of sandstone and mudstone (Green et al, 1997).

5.2 Soils

Major soil units within the Beautiful Mountain lease are mapped as Persayo-Nataani-Littlehat-Awet (USDA Soil Web, 2021). The Littlehat series consists of well drained, moderately permeable saline-sodic soils which are moderately deep to soft bedrock. These soils formed in alluvium and residuum derived from siltstone and shale on summits, footslopes, and backslopes of undulating plateaus. Slopes are 1-45 percent. These soils are comprised of silt loams, with a soil depth of 20 to 40 inches and rapid runoff. The Persayo series consists of shallow, well-drained soils that formed in slope alluvium or colluvium over residuum derived from soft sedimentary bedrock. These soils are on hills, basin floor remnants, fan remnants, dipslopes, scarp slopes and escarments. Slopes are 0 to 65 percent. These soils are comprised of silty clay loams have a moderately slow permeability. The Lawet series consists of very deep, poorly drained and very poorly drained soils formed in loamy alluvium on floodplains. Slopes range from 0 to 2 percent. These soils are made up of sandy clay loams and have slow runoff. The Nataani series consists of well drained, moderately permeable soils which are moderately deep to soft bedrock. Nataani soils formed in alluvium, slope alluvium, and residuum derived from siltstone and sandstone on toeslopes of undulating plateaus and structural benches. Slopes are 1 to 9 percent. These soils are comprised of fine sandy loams, loams, and gypsiferous silt loams and have slow runoff.

5.3 Surface Waters and Floodplains

The proposed project area is located within the Middle San Juan watershed (14080105) and the Chaco watershed (14080106) both draining towards the San Juan River, located approximately 18 miles northeast of the proposed lease (NRCS, 2012). According to the Federal Emergency Management FEMA Flood Map Service Center, the Beautiful Mountain Lease area does not have a printed flood map to reference. Flooding in the area is likely minimal because of the lack of perennial surface waters and low precipitation events in the region; particularly over the last 15 to 20 years where climate change has resulted in rising temperatures and less precipitation. There is one major ephemeral drain, Dead Man's Wash, that flows from the Beautiful Mountain foothills in the southwest to northeast towards the USGS mapped Big Gap Reservoir near the northeastern portions of the lease boundary; however, this reservoir is nonexistent and there is no surface water within in the project area other than at well fed livestock tanks. Areas of Dead Man's Wash and its tributaries encountered during the survey did show high water marks but all where well within the often deeply incised channels of the drainages. Livestock has further degraded bank structure and vegetation along washes, searching for grazing in a very sparse landscape. Lack of precipitation, livestock pressure, and drought have resulted in complete loss of any native riparian vegetation along drainages and contributed to the establishment of pervasive saltcedar. Saltcedar is a Navajo Nation Category B noxious weed (BIA Navajo Integrated Weed Management Plan).

5.4 Ecoregions and Vegetation Communities

The Beautiful Mountain lease area lies within the San Juan/Chaco Tablelands and mesas level IV Ecoregion (Griffith et al, 2006). Vegetation is mapped as Desert Grassland ecotone (Dick-Peddie, 1993).

Representative grass species included alkali sacaton (*Sporobolus airoides*), galleta (*Pleuraphis jamesii*), and foxtail barley (*Hordeum jubatum*). Annual wheatgrass (*Eremopyrum triticeum*) is common in wash bottoms and flats. Some areas, particularly along escarpments, side slopes, and at the summits of hills and mesas, supported a few healthy grasslands; however, most accessible, low-lying areas lacked grasses or supported only heavily grazed grasses. Dominant shrubs throughout the lease area are represented by four-wing saltbush, shadscale, and greasewood. Wildflowers and forbs, some of which were blooming included stemless evening primrose (*Oenothera albicaulis*), scorpion weed (*Phacelia* sp.), sand verbena (*Abronia fragans*), and Astragalus (*Astragalus* spp.), among others.

Three noxious weeds were observed during the surveys: saltcedar, Russian olive, and halogeton (*Halogeton glomeratus*). All three of these species are recognized as noxious weeds by the New Mexico Department of Agriculture and the Navajo Nation (NMDA, 2020) (BIA Navajo Nation Integrated Weed Management Plan), Many areas were inundated with weedy and invasive species, including Russian tumbleweed and Kochia (*Kochia scoparia*).

There are no wetlands, wetland vegetation or native riparian vegetation present within the proposed Beautiful Mountain lease area (USFWS-NWI, 2021).

6.0 NESL and USFWS Listed Species with Potential to Occur in Project Area

The majority of the proposed Beautiful Mountain lease area overlaps with NNHP RCP Area 2. Area 2 has moderately sensitive resources and moderate restrictions on development to avoid sensitive species and habitats. The eastern portion of the Beautiful Mountain lease area overlaps with RCP Area 3. Area 3 has low sensitivity wildlife resources with few restrictions on development.

Correspondence with NNDFW-NNHP indicates that there is one "Known" wildlife species and eight "Potential" wildlife species as present or potentially present within 1 to 3 miles of the project area based on their analysis of the Mitten Rock, Sanostee East, Sansotee West, and Yellow Hill, New Mexico 7.5-minute quadrangles. These NESL wildlife Species of Concern are discussed in Table 1.

The U.S. Fish and Wildlife Services Information, Planning, and Consultation website, lists seven species of wildlife that are federally listed as Threatened or Endangered in San Juan County, New Mexico (USFWS-IPaC, 2021). These federally listed species are discussed in Table 1. Habitat information in Table 1 is taken from NESL Species Accounts Version 4.20 (NNDFW-NNHP, 2020) and U.S. Fish and Wildlife Service Environmental Conservation Online system (USFWS-ECOS, 2021).

Table 1. NESL and USFWS Listed Wildlife Species with Known or Potential Occurrence in Project Area.

Species Name	Status*	Habitat	Comments
Birds			
Burrowing owl *Athene cunicularia*	NESL Group 4	Nests in ground burrows (often deserted prairie-dog burrows) typically in dry, open grasslands or desert scrub. Grasslands with sparse junipers may also be used on the Navajo Nation; presence of suitable nest burrow is critical requisite.	No burrowing owls or burrowing owl habitat burrows were observed during the April 27 and 28, 2021 surveys of the project area. No prairie dog colonies were observed during walking and driving of areas surveyed.
Ferruginous hawk *Buteo regalis*	NESL Group 3	Nests in badlands, flat or rolling desert grasslands, and desert shrub. Most nests on Navajo Nation are on pinnacles, small buttes, or short cliffs.	Potential nesting habitat does occur within the project area. However, drought and disease have resulted in decreases in available prey base. Scant evidence of rodents and only one cottontail (*Sylvilagus* sp.) were observed during the April 27 and 28, 2021 surveys. No ferruginous hawks or ferruginous hawk nests were observed during the surveys.
Golden eagle *Aquila chrysaetos*	NESL Group 3	Nests on steep cliffs typically adjacent to foraging habitat. Foraging habitat includes desert grasslands, sagebrush scrub, or desert scrub; shrubs, if present, are sparse.	Cliffs suitable for nesting are not present in the lease area; however, a resident indicated that there were golden eagles along the lower ridges below Beautiful Mountain, approximately 1.0 mile west of the lease boundary. No golden eagles or eagle nests were observed during the April 27 and 28, 2021 survey. Lack of available prey base may be influencing golden eagle presence in the area.
Mexican spotted owl *Strix occidentalis lucida*	NESL Group 3 ESA Threatened	This species is found within three distinct habitat types: 1) mid-aged to mature mixed-conifer stands dominated by Douglas-fir, typically on mountain slopes, with moderate to dense canopies and multiple canopy layers; and 2) steep-walled, narrow canyons often with riparian vegetation and cool microclimates and 3) moderately sloped drainages with Douglas fir, in piñon-juniper woodland. Not known to nest in ponderosa pine-oak forests on the Navajo Nation, but will use a variety of habitats, including piñon-juniper woodland and clearings when foraging.	The Mexican spotted owl would not be expected to occur in the Beautiful Mountain lease area due to lack of suitable habitat.

Species Name	Status*	Habitat	Comments
Mountain plover *Charadrius montanus*	NESL Group 4	Typically nests in flat to slightly rolling expanses of grassland, semi-desert, or badland, in an area with short, sparse vegetation; with large bare areas; and that is typically disturbed. Grasslands between the Chuska Mountains and Black Mesa, and southwest of Black Mesa to the Little Colorado River are potential habitat.	No mountain plover or evidence of mountain plover were observed during the April 27 and 28 surveys of the Beautiful Mountain lease area. Habitat for this species occurs in the project area, particularly in the northern portions. Additional surveys are recommended for this species if development is to occur in suitable habitat during the breeding season for this species.
Peregrine falcon *Falco peregrinus*	NESL Group 4	Nests on steep cliffs > 100 feet high (typically ≥ 150 feet) in a scrape on sheltered ledges or potholes. Foraging habitat quality is an important factor; often, but not always, extensive wetland and/or forest habitat is within the falcon's hunting range of 7 miles.	Cliffs high enough for nesting do not occur within the Beautiful Mountain lease area; however, an adult peregrine falcon was observed April 27, 2021 at Table Mesa approximately 8 miles northwest of the lease boundary. This species may forage in the lease area.
Southwestern willow flycatcher *Empidonax traillii extimus*	NESL Group 2 ESA Endangered	Dense, multi-tiered riparian vegetation near surface water.	The southwestern willow flycatcher would not be expected to occur in the project area due to lack of suitable riparian habitat and surface water.
Yellow-billed cuckoo *Coccyzus americanus*	ESA Threatened	Wooded habitat with dense cover and water nearby, including woodlands with low scrubby vegetation and dense thickets along streams rivers and marshes (CLA, 2021).	The yellow-billed cuckoo would not be expected to occur in the project area due to lack of suitable woodland riparian habitat and surface water.
Mammals			
Canada lynx *Lynx canadensis*	ESA Threatened	High elevation and subalpine forests with heavy snowfall.	This species would not be expected to occur in the project area due to lack of high elevation forests.
New Mexico meadow jumping mouse *Zapus hudsonius luteus*	ESA Endangered	Wet meadows, riparian corridors, and wetland areas with dense herbaceous vegetation.	This species would not be expected to occur in the project area due to lack of water features supporting wetland or riparian vegetation.
Kit fox *Vulpes macrotis*	NESL Group 4	Occupies desert scrub and desert grasslands with soft, alluvial or silty-clay soils and often with sparse saltbush, shadscale, greasewood, or sagebrush and grasses.	No kit foxes or evidence of kit foxes were observed during the April 27 and 28 surveys of the Beautiful Mountain lease area. Habitat for this species occurs in the project area. Additional surveys are recommended for this species if development is to occur in suitable habitat.
Fish			

Species Name	Status*	Habitat	Comments
Colorado pikeminnow *Ptchocheilus lucius*	ESA Endangered	Adults use backwaters and flooded riparian areas during spring runoff and migrate to spawn in riffle-run areas with cobble/gravel substrates. Post-spawning adults primarily use run habitats, with eddies and slackwater also being important.	This species would not be expected to occur in the project area due to lack of rivers and streams.
Razorback sucker *Xyrauchen texanus*	ESA Endangered	Inhabits backwaters over sand/silt substrate, deep eddies, and impoundments, shallow to deep runs over sandbars and seasonally flooded shorelines and bottomlands.	This species would not be expected to occur in the project area due to lack of rivers, lakes and streams.
Zuni bluehead sucker *Catostomus discobolus yarrowi*	ESA Endangered	Adults inhabit permanent water in cool to warm water mid-elevation streams, typically using pools and eddies adjacent to rapids and boulders.	This species would not be expected to occur in the project area due to lack of rivers and streams.
Amphibians			
Northern leopard frog *Lithobetes pipens*	NESL Group 2	Found in wetlands usually with permanent water and aquatic vegetation (especially cattails), ranging from irrigation ditches and small streams to rivers, and small ponds and marshes to lakes or reservoirs.	This species could potentially occur in stock ponds/cattle tanks within the project area. Surveys for this species should occur if lease development has the potential to impact any stock ponds/cattle tanks.

*NESL: Navajo Endangered Species List

Group 1: Species or subspecies that no longer occur on Navajo Land.

Group 2: "Endangered" species or subspecies that are in danger of being eliminated from all or a significant portion of their ranges on the Navajo Nation.

Group 3: Species or subspecies that are considered likely to become endangered throughout all or a significant portion of their ranges on the Navajo Nation within the foreseeable future

Group 4: Species or subspecies for which NDFW does not currently have sufficient information for inclusion in Group 2 or 3, but which are being considered

USFWS ESA: U.S. Fish and Wildlife Service Endangered Species Act

Endangered: A species which is in danger of extinction throughout all or a significant portion of its range.

Threatened: A species which is likely to become an Endangered species within the foreseeable future.

7.0 Survey Results

Wildlife potentially occurring in the proposed project area includes a variety of mammals, birds, and reptiles common to the Navajo Nation; however, persistent drought and climate change are likely impacting wildlife across the southwest in various ways, reducing population numbers, impacting reproductive success, and influencing distribution across ranges. These impacts are possibly implicated in the astonishing numbers of deceased birds observed during the fall of 2020 and spring 2021 migration events, rabbit hemorraghic disease, plague and tularemia, declines in insect populations, and other factors. The Beautiful Mountain lease area is remote and sparsely populated and the spring is usually a good time

to witness many species of wildlife; however, few species of wildlife were observed during the April 27 and 28, 2021 surveys. Species observed are presented in Table 2.

7.1 Migratory Birds and Raptors

Only 6 species of migratory birds and two raptors were observed during two days of survey of Beautiful Mountain (Table 2). Birds were observed in grasslands and shrubland areas, along cliffs and bluffs, and in ephemeral washes. No active raptor nests were observed; however, several active common raven (*Corvus corax*) nests were observed. Future development of the Beautiful Mountain lease should consider impacts to nesting migratory birds.

7.2 Species of Concern

No NESL species were observed during the surveys of the Beautiful Mountain lease area. One NESL Group 4 species, peregrine falcon, was observed within 8 miles of the survey area. Habitat for two NESL Group 4 species, the mountain plover and the kit fox was observed in the project area. Future development of the lease should consider impacts to these species.

Table 2. Wildlife recorded during the Beautiful Mountain April 27 and 28, 2021 survey

Species Name	Common Name
Birds	
Buteo jamaicensis	Red-tailed hawk (just outside lease area)
Falco sparverius	American kestrel
Corvus corax	Common raven (several active nests along cliff areas
Eremophila alpestris	Horned lark
Haemorhous mexicanus	House finch
Salpinctes obsoletus	Rock wren
Haemorhous cassinii	Cassin's finch (migrant)
Pooecetes gramineus	Vesper sparrow
Spizella breweri	Brewer's sparrow
Petrochelidon fulva	Cliff swallow (last season nests only)
Mammals	
Bos taurus	Cattle
Equus caballus	Horse
Ovis sp.	Sheep
Neotoma sp.	Woodrat (along rocky/cliff areas only)
Ammospermophilus sp.	Spotted ground squirrel or White-tailed antelope squirrel (burrows)
Reptiles	
Uta stansburiana	Side-blotch lizard
Sceloporus undulatus sp.	Fence lizard

8.0 Recommendations

As the development of the Beautiful Mountain lease progresses, NNDFW-NNHP may request further surveys to ensure that impacts to wildlife resources, including NESL listed species, migratory birds, or sensitive habitats are avoided or mitigated. Permits West, Inc. agrees with the need for further surveys should areas proposed for development include suitable habitat for any NESL listed species, migratory birds or raptors, and/or sensitive habitats. Some areas of the Beautiful Mountain lease may be developed without the need for further surveys based on initial results from the April 27 and 28, 2021 surveys and

proposed time of year for development. In any case, NNHP would need to be consulted for final decisions on impacts to wildlife resources prior to breaking ground on development within the lease.

9.0 Certification

Results contained in this report represent my best professional judgement and are based on field investigations, research and review of pertinent information sources, information provided by the project proponent, and information provided by the the Navajo Natural Heritage Program.

Celia Cook
Wildlife Biologist
Permits West, Inc.

May 13, 2021

10.0 References

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Photos from April 27 and 28, 2021 Field Surveys of the Beautiful Mountain Lease area.

Photo 1. Grassland habitat. Photo taken facing northeast from Lat. 36.474222°, Long. -108.883826° (Nad 83).

Photo 2. Grassland habitat (better) within the Beautiful Mountain lease area. Facing west towards "the Bell" (outside of lease area) from Lat. 36.477533°°, Long. -108.887645°° (Nad 83).

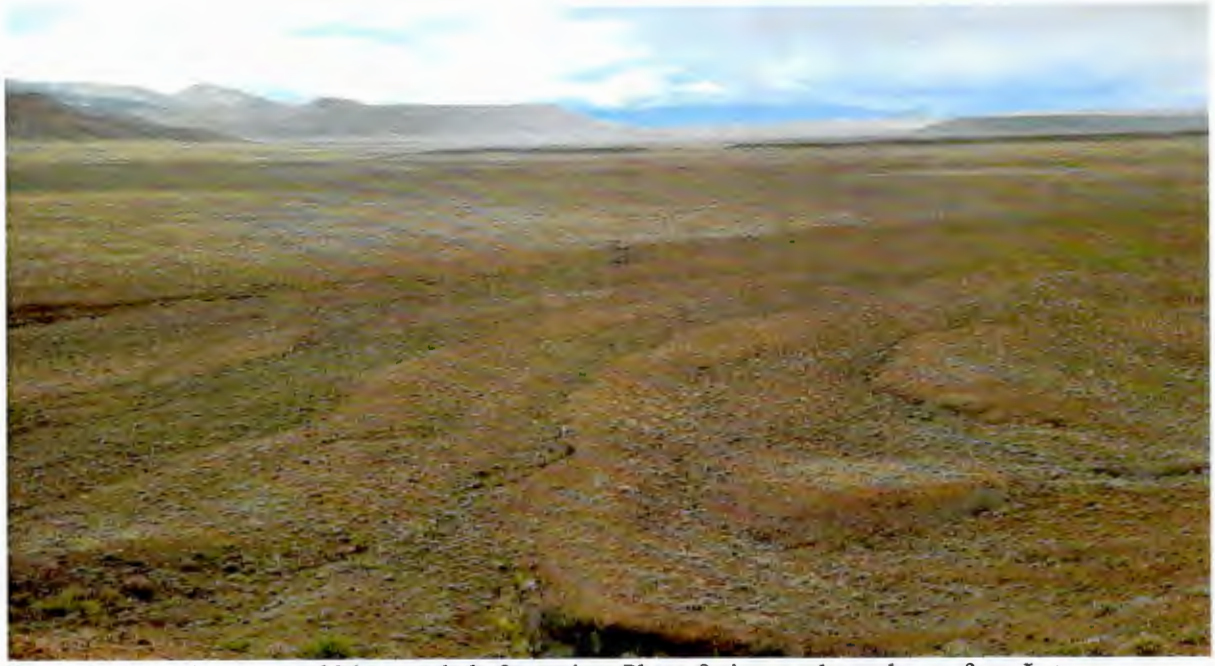

Photo 3. Sparsely vegetated Mancos shale formation. Photo facing north-northwest from Lat. 36.492314°, Long. -108.885533° (NAD 83).

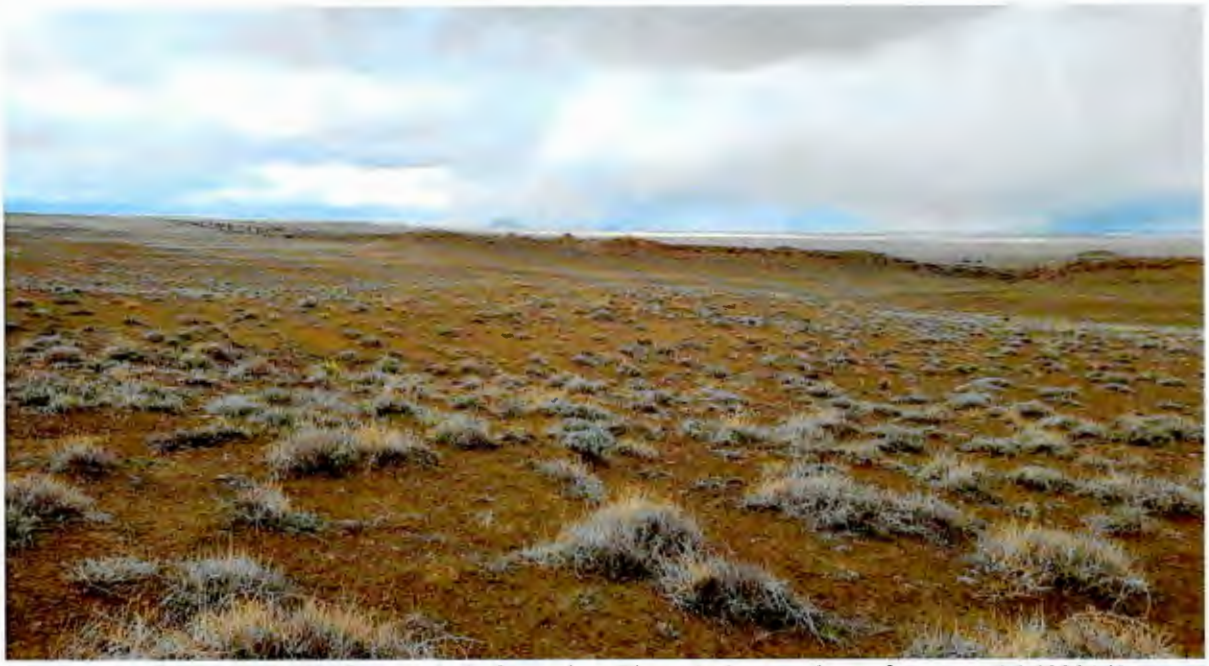

Photo 3. Sparsely vegetated Mancos shale formation. Photo facing southeast from Lat. 36.492314°, Long. -108.885533° (NAD 83).

Photo 5. Sparsely vegetated valley bottom at north end of lease. Photo facing southwest from Lat. 36.567935°, Long. -108.893892° (NAD 83).

Photo 6. Heavily grazed valley bottom at north end of lease. Photo facing east towards Rock Ridge formation from Lat. 36.558916°, Long. -108.885933° (NAD 83).

Photo 7. Small hill with volcanic cobble. Photo taken from Lat. 36.559143°, Long. -108.886947° (NAD 83).

Photo 8. Heavily grazed valley bottom and deeply incised tributary of Dead Man's wash. Photo facing south-southeast towards Rock Ridge formation from Lat. 36.558480°, Long. -108.876772° (NAD 83).

Photo 9. Drainage area at near mouth of Big Gap. Photo facing north from Lat. 36.565366°, Long. -108.875994° (NAD 83).

Photo 10. Facing east from base of Rock Ridge. Photo taken from Lat. 36.560348°, Long. -108.872558° (NAD 83).

Appendix A: NNHP Correspondence 21perm103 (9 pages) follows:

NNHP
Navajo Natural Heritage Program

PO BOX 1480
Window Rock, AZ 86515

P 928.871.6472
F 928.871.7603

www.nndfw.org

21perm103

08-April-2021

Cari Eggleston
Permit's West, Inc
37 Verano Loop
Santa Fe, NM 87508
cari@permitswest.com

SUBJECT: Navajo Nation Oil and Gas Company - Beautiful Mountain Project

Cari Eggleston,

NNHP has performed an analysis of your project in comparison to known biological resources of the Navajo Nation and has included the findings in this letter. The letter is composed of seven parts. The sections as they appear in the letter are:

1. **Known Species** – a list of all species within relative proximity to the project
2. **Potential Species** – a list of potential species based on project proximity to respective suitable habitat
3. **Quadrangles** – an exhaustive list of quads containing the project
4. **Project Summary** – a categorized list of biological resources within relative proximity to the project grouped by individual project site(s) or quads
5. **Conditional Criteria Notes** – additional details concerning various species, habitat, etc.
6. **Personnel Contacts** – a list of employee contacts
7. **Resources** – identifies sources for further information

Known Species lists "species of concern" known to occur within proximity to the project area. Planning for avoidance of these species is expected. If no species are displayed then based upon the records of the Navajo Nation Department of Fish and Wildlife (NNDFW) there are no "species of concern" within proximity to the project. Refer to the Navajo Endangered Species List (NESL) Species Accounts for recommended avoidance measures, biology, and distribution of NESL species on the Navajo Nation (https://www.nndfw.org/nnhp/sp_account.htm).

Potential Species lists species that are potentially within proximity to the project area and need to be evaluated for presence/absence. If no species are found within the Known or Potential Species lists, the project is not expected to affect any federally listed species, nor significantly impact any tribally listed species or other species of concern. Potential for species has been determined primarily on habitat characteristics and species range information. A thorough habitat analysis, and if necessary, species specific surveys, are required to determine the potential for each species.

Species of concern include protected, candidate, and other rare or otherwise sensitive species, including certain native species and species of economic or cultural significance. For legally protected species, the following tribal and federal statuses are indicated: NESL, federal Endangered Species Act (ESA), Migratory Bird Treaty Act (MBTA), and Eagle Protection Act (EPA). No legal protection is afforded species with only

ESA candidate, NESL group 4 status, and species listed on the Sensitive Species List. Please be aware of these species during surveys and inform the NNDFW of observations. Reported observations of these species and documenting them in project planning and management is important for conservation and may contribute to ensuring they will not be up listed in the future.

In any and all correspondence with NNDFW or NNHP concerning this project please cite the Data Request Code associated with this document. It can be found in this report on the top right corner of the every page. Additionally please cite this code in any biological evaluation documents returned to our office.

1. Known Species *(NESL=Navajo Endangered Species List, FE=Federally Endangered, FT=Federally Threatened, FC=Federal Candidate)*

Species

SCMEVE = Sclerocactus mesae-verdae / Mesa Verde Cactus NESL G2 FT
VUMA = Vulpes macrotis / Kit Fox NESL G4

2. Potential Species

Species

AQCH = Aquila chrysaetos / Golden Eagle NESL G3
ATCU = Athene cunicularia / Burrowing Owl NESL G4
BURE = Buteo regalis / Ferruginous Hawk NESL G3
CHMO = Charadrius montanus / Mountain Plover NESL G4
CYPAPU = Cypripedium parviflorum var. pubescens / Yellow Lady's Slipper NESL G4
EMTREX = Empidonax traillii extimus / Southwestern Willow Flycatcher NESL G2 FE
FAPE = Falco peregrinus / Peregrine Falcon NESL G4
LIPI = Lithobates pipiens / Northern Leopard Frog NESL G2
PUPA = Puccinellia parishii / Parish's Alkali Grass NESL G4
SCMEVE = Sclerocactus mesae-verdae / Mesa Verde Cactus NESL G2 FT
STOCLU = Strix occidentalis lucida / Mexican Spotted Owl NESL G3 FT
VUMA = Vulpes macrotis / Kit Fox NESL G4

3. Quadrangles (7.5 Minute)

Quadrangles

Mitten Rock (36108-E8) / NM
Sanostee East (36108-D7) / NM
Sanostee West (36108-D8) / NM
Yellow Hill (36108-E7) / NM

4. Project Summary *(EO1 Mile/EO 3 Miles=elements occuring within 1 & 3 miles., MSO=mexican spotted owl PACs, POTS=potential species, RCP=Biological Areas)*

SITE	EO1MI	EO3MI	QUAD	MSO	POTS	RCP

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SITE	EO1MI	EO3MI	QUAD	MSO	POTS	RCP
Beautiful Mountain Project Area	SCMEVE	SCMEVE	Mitten Rock (36108-E8) / NM	None	AQCH, ATCU, BURE, CHMO, EMTREX, FAPE, LIPI, PUPA, SCMEVE, STOCLU	Area 2, Area 3
Beautiful Mountain Project Area	SCMEVE	SCMEVE	Sanostee East (36108-D7) / NM	None	AQCH, ATCU, BURE, CHMO, EMTREX, PUPA, SCMEVE, VUMA	Area 2, Area 3
Beautiful Mountain Project Area	SCMEVE	SCMEVE	Sanostee West (36108-D8) / NM	None	AQCH, ATCU, BURE, CHMO, CYPAPU, EMTREX, FAPE, LIPI, PUPA, SCMEVE, STOCLU	Area 2, Area 3
Beautiful Mountain Project Area	SCMEVE	SCMEVE, VUMA	Yellow Hill (36108-E7) / NM	None	AQCH, ATCU, BURE, CHMO, FAPE, LIPI, PUPA, SCMEVE, VUMA	Area 2, Area 3

5. Conditional Criteria Notes *(Recent revisions made please read thoroughly. For certain species, and/or circumstances, please read and comply)*

A. Biological Resource Land Use Clearance Policies and Procedures (RCP) - The purpose of the RCP is to assist the Navajo Nation government and chapters ensure compliance with federal and Navajo laws which protect, wildlife resources, including plants, and their habitat resulting in an expedited land use clearance process. After years of research and study, the NNDFW has identified and mapped wildlife habitat and sensitive areas that cover the entire Navajo Nation.

The following is a brief summary of six (6) wildlife areas:

1. **Highly Sensitive Area** – recommended no development with few exceptions.
2. **Moderately Sensitive Area** – moderate restrictions on development to avoid sensitive species/habitats.
3. **Less Sensitive Area** – fewest restrictions on development.
4. Community Development Area – areas in and around towns with few or no restrictions on development.
5. **Biological Preserve** – no development unless compatible with the purpose of this area.
6. **Recreation Area** – no development unless compatible with the purpose of this area.

None - outside the boundaries of the Navajo Nation

This is not intended to be a full description of the RCP please refer to the our website for additional information at https://www.nndfw.org/clup.htm.

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B. Raptors – If raptors are known to occur within 1 mile of project location: Contact the NNHP zoologist at 871-7070 regarding your evaluation of potential impacts and mitigation.
Golden and Bald Eagles- If Golden or Bald Eagle are known to occur within 1 mile of the project, decision makers need to ensure that they are not in violation of the *Golden and Bald Eagle Nest Protection Regulations* found at https://www.nndfw.org/nnhp/docs_reps/gben.pdf.
Ferruginous Hawks – Refer to *Navajo Nation Department of Fish and Wildlife's Ferruginous Hawk Management Guidelines for Nest Protection* (https://www.nndfw.org/nnhp/docs_reps.htm) for relevant information on avoiding impacts to Ferruginous Hawks within 1 mile of project location.
Mexican Spotted Owl - Please refer to the *Navajo Nation Mexican Spotted Owl Management Plan* (https://www.nndfw.org/nnhp/docs_reps.htm) for relevant information on proper project planning near/within spotted owl protected activity centers and habitat.

C. Surveys – Biological surveys need to be conducted during the appropriate season to ensure they are complete and accurate please refer to NN Species Accounts https://www.nndfw.org/nnhp/sp_account.htm. Surveyors on the Navajo Nation must be permitted by the Director, NNDFW. Contact Jeff Cole at (928) 871-6450 for permitting procedures. Questions pertaining to surveys should be directed to the NNDFW the NNHP Zoologist for animals, and the NNHP Botanist for plants. Questions regarding biological evaluation should be directed to Jeff Cole at 871-6450.

D. Oil/Gas Lease Sales – Any settling or evaporation pits that could hold contaminants should be lined and covered. Covering pits, with a net or other material, will deter waterfowl and other migratory bird use. Lining pits will protect ground water quality.

E. Power line Projects – These projects need to ensure that they do not violate the regulations set forth in the *Navajo Nation Raptor Electrocution Prevention Regulations* found at https://www.nndfw.org/nnhp/docs_reps/repr.pdf.

F. Guy Wires – Does the project design include guy wires for structural support? If so, and if bird species may occur in relatively high concentrations in the project area, then guy wires should be equipped with highly visual markers to reduce the potential mortality due to bird-guy wire collisions. Examples of visual markers include aviation balls and bird flight diverters. Birds can be expected to occur in relatively high concentrations along migration routes (e.g., rivers, ridges or other distinctive linear topographic features) or where important habitat for breeding, feeding, roosting, etc. occurs. The U.S. Fish and Wildlife Service recommends marking guy wires with at least one marker per 100 meters of wire.

G. San Juan River – On 21 March 1994 (Federal Register, Vol. 59, No. 54), the U.S. Fish and Wildlife Service designated portions of the San Juan River (SJR) as critical habitat for Ptychocheilus lucius (Colorado pikeminnow) and Xyrauchen texanus (Razorback sucker). Colorado pikeminnow critical habitat includes the SJR and its 100-year floodplain from the State Route 371 Bridge in T29N, R13W, sec. 17 (New Mexico Meridian) to Neskahai Canyon in the San Juan arm of Lake Powell in T41S, R11E, sec. 26 (Salt Lake Meridian) up to the full pool elevation. Razorback sucker critical habitat includes the SJR and its 100-year floodplain from the Hogback Diversion in T29N, R16W, sec. 9 (New Mexico Meridian) to the full pool elevation at the mouth of Neskahai Canyon on the San Juan arm of Lake Powell in T41S, R11E, sec. 26 (Salt Lake Meridian). All actions carried out, funded or authorized by a federal agency which may alter the constituent elements of critical habitat must undergo section 7 consultation under the Endangered Species Act of 1973, as amended. Constituent elements are those physical and biological attributes essential to a species conservation and include, but are not limited to, water, physical habitat, and biological environment as required for each particular life stage of a species.

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H. Little Colorado River - On 21 March 1994 (Federal Register, Vol. 59, No. 54) the U.S. Fish and Wildlife Service designated Critical Habitat along portions of the Colorado and Little Colorado Rivers (LCR) for Gila cypha (humpback chub). Within or adjacent to the Navajo Nation this critical habitat includes the LCR and its 100-year floodplain from river mile 8 in T32N R6E, sec. 12 (Salt and Gila River Meridian) to its confluence with the Colorado River in T32N R5E sec. 1 (S&GRM) and the Colorado River and 100-year floodplain from Nautuloid Canyon (River Mile 34) T36N R5E sec. 35 (S&GRM) to its confluence with the LCR. All actions carried out, funded or authorized by a federal agency which may alter the constituent elements of Critical Habitat must undergo section 7 consultation under the Endangered Species Act of 1973, as amended. Constituent elements are those physical and biological attributes essential to a species conservation and include, but are not limited to, water, physical habitat, and biological environment as required for each particular life stage of a species.

I. Wetlands – In Arizona and New Mexico, potential impacts to wetlands should also be evaluated. The U.S. Fish & Wildlife Service's National Wetlands Inventory (NWI) maps should be examined to determine whether areas classified as wetlands are located close enough to the project site(s) to be impacted. In cases where the maps are inconclusive (e.g., due to their small scale), field surveys must be completed. For field surveys, wetlands identification and delineation methodology contained in the "Corps of Engineers Wetlands Delineation Manual" (Technical Report Y-87-1) should be used. When wetlands are present, potential impacts must be addressed in an environmental assessment and the Army Corps of Engineers, Phoenix office, must be contacted. NWI maps are available for examination at the Navajo Natural Heritage Program (NNHP) office, or may be purchased through the U.S. Geological Survey (order forms are available through the NNHP). The NNHP has complete coverage of the Navajo Nation, excluding Utah, at 1:100,000 scale; and coverage at 1:24,000 scale in the southwestern portion of the Navajo Nation. In Utah, the U.S. Fish & Wildlife Service's National Wetlands Inventory maps are not yet available for the Utah portion of the Navajo Nation, therefore, field surveys should be completed to determine whether wetlands are located close enough to the project site(s) to be impacted. For field surveys, wetlands identification and delineation methodology contained in the "Corps of Engineers Wetlands Delineation Manual" (Technical Report Y-87-1) should be used. When wetlands are present, potential impacts must be addressed in an environmental assessment and the Army Corps of Engineers, Phoenix office, must be contacted. For more information contact the Navajo Environmental Protection Agency's Water Quality Program.

J. Life Length of Data Request – The information in this report was identified by the NNHP and NNDFW's biologists and computerized database, and is based on data available at the time of this response. If project planning takes more than two (02) years from the date of this response, verification of the information provided herein is necessary. It should not be regarded as the final statement on the occurrence of any species, nor should it substitute for on-site surveys. Also, because the NNDFW information is continually updated, any given information response is only wholly appropriate for its respective request.

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K. Ground Water Pumping - Projects involving the ground water pumping for mining operations, agricultural projects or commercial wells (including municipal wells) will have to provide an analysis on the effects to surface water and address potential impacts on all aquatic and/or wetlands species listed below. NESL Species potentially impacted by ground water pumping: Carex specuicola (Navajo Sedge), Cirsium rydbergii (Rydberg's Thistle), Primula specuicola (Cave Primrose), Platanthera zothecina (Alcove Bog Orchid), Puccinellia parishii (Parish Alkali Grass), Zigadenus vaginatus (Alcove Death Camas), Perityle specuicola (Alcove Rock Daisy), Symphyotrichum welshii (Welsh's American-aster), Coccyzus americanus (Yellow-billed Cuckoo), Empidonax traillii extimus (Southwestern Willow Flycatcher), Rana pipiens (Northern Leopard Frog), Gila cypha (Humpback Chub), Gila robusta (Roundtail Chub), Ptychocheilus lucius (Colorado Pikeminnow), Xyrauchen texanus (Razorback Sucker), Cinclus mexicanus (American Dipper), Speyeria nokomis (Western Seep Fritillary), Aechmophorus clarkia (Clark's Grebe), Ceryle alcyon (Belted Kingfisher), Dendroica petechia (Yellow Warbler), Porzana carolina (Sora), Catostomus discobolus (Bluehead Sucker), Cottus bairdi (Mottled Sculpin), Oxyloma kanabense (Kanab Ambersnail)

6. Personnel Contacts

Wildlife Manager
Leanna Begay
928.871.6450
lbegay@nndfw.org

Zoologist
Brent Powers
928.871.7070
bpowers@nndfw.org

Botanist
Nora Talkington
ntalkington@nndfw.org

Biological Reviewer (Interim)
Taylor Greene
928.871.6450
tgreene@nndfw.org

GIS Supervisor
Dexter D Prall
928.645.2898
prall@nndfw.org

7. Resources

Navajo Endangered Species List:
https://www.nndfw.org/nnhp/endangered.htm

Species Accounts:
https://www.nndfw.org/nnhp/sp_account.htm

Biological Investigation Permit Application
https://www.nndfw.org/nnhp/study_permit.htm

Navajo Nation Sensitive Species List
https://www.nndfw.org/nnhp/trackinglist.htm

Various Species Management and/or Document and Reports
https://www.nndfw.org/nnhp/docs_reps.htm

Consultant List
https://www.nndfw.org/bi_consult_list_2014.pdf

Dexter D Prall, GIS Supervisor - Natural Heritage Program
Navajo Nation Department of Fish and Wildlife

IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

Location

San Juan County, New Mexico

Local office

New Mexico Ecological Services Field Office

(505) 346-2525
(505) 346-2542

2105 Osuna Road Ne
Albuquerque, NM 87113-1001

http://www.fws.gov/southwest/es/NewMexico/
http://www.fws.gov/southwest/es/ES_Lists_Main2.html

Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species[1] and their critical habitats are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries[2]).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact NOAA Fisheries for species under their jurisdiction.

1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information. IPaC only shows species that are regulated by USFWS (see FAQ).
2. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following species are potentially affected by activities in this location:

Mammals

NAME	STATUS

Canada Lynx Lynx canadensis — Threatened

There is **final** critical habitat for this species. The location of the critical habitat is not available.
https://ecos.fws.gov/ecp/species/3652

New Mexico Meadow Jumping Mouse Zapus hudsonius luteus — Endangered

Wherever found

This species only needs to be considered if the following condition applies:

- If project affects dense herbaceous riparian vegetation along waterways (stream, seep, canal/ditch).

There is **final** critical habitat for this species. The location of the critical habitat is not available.
https://ecos.fws.gov/ecp/species/7965

Birds

NAME	STATUS
Southwestern Willow Flycatcher Empidonax traillii extimus Wherever found There is **final** critical habitat for this species. The location of the critical habitat is not available. https://ecos.fws.gov/ecp/species/6749	Endangered
Yellow-billed Cuckoo Coccyzus americanus There is **final** critical habitat for this species. The location of the critical habitat is not available. https://ecos.fws.gov/ecp/species/3911	Threatened

Fishes

NAME	STATUS
Colorado Pikeminnow (=squawfish) Ptychocheilus lucius There is **final** critical habitat for this species. Your location overlaps the critical habitat. https://ecos.fws.gov/ecp/species/3531	Endangered
Razorback Sucker Xyrauchen texanus Wherever found There is **final** critical habitat for this species. Your location overlaps the critical habitat. https://ecos.fws.gov/ecp/species/530	Endangered

Zuni Bluehead Sucker Catostomus discobolus yarrowi — Endangered
Wherever found
There is **final** critical habitat for this species. The location of the critical habitat is not available.
https://ecos.fws.gov/ecp/species/3536

Flowering Plants

NAME	STATUS
Knowlton's Cactus Pediocactus knowltonii Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/1590	Endangered
Mancos Milk-vetch Astragalus humillimus Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/7483	Endangered
Mesa Verde Cactus Sclerocactus mesae-verdae Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/6005	Threatened

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

This location overlaps the critical habitat for the following species:

NAME	TYPE
Colorado Pikeminnow (=squawfish) Ptychocheilus lucius https://ecos.fws.gov/ecp/species/3531#crithab	Final
Razorback Sucker Xyrauchen texanus https://ecos.fws.gov/ecp/species/530#crithab	Final

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.

Additional information can be found using the following links:

- Birds of Conservation Concern http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php
- Measures for avoiding and minimizing impacts to birds http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php
- Nationwide conservation measures for birds http://www.fws.gov/migratorybirds/pdf/management/nationwidestandardconservationmeasures.pdf

The birds listed below are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ below. This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the E-bird data mapping tool (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found below.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON (IF A BREEDING SEASON IS INDICATED FOR A BIRD ON YOUR LIST, THE BIRD MAY BREED IN YOUR PROJECT AREA SOMETIME WITHIN THE TIMEFRAME SPECIFIED, WHICH IS A VERY LIBERAL ESTIMATE OF THE DATES INSIDE WHICH THE BIRD BREEDS ACROSS ITS ENTIRE RANGE. "BREEDS ELSEWHERE" INDICATES THAT THE BIRD DOES NOT LIKELY BREED IN YOUR PROJECT AREA.)

Bald Eagle Haliaeetus leucocephalus — Breeds Dec 1 to Aug 31

This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.
https://ecos.fws.gov/ecp/species/1626

Bendire's Thrasher Toxostoma bendirei — Breeds Mar 15 to Jul 31

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9435

Black Swift Cypseloides niger — Breeds Jun 15 to Sep 10

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/8878

Brewer's Sparrow Spizella breweri — Breeds May 15 to Aug 10

This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA
https://ecos.fws.gov/ecp/species/9291

Burrowing Owl Athene cunicularia — Breeds Mar 15 to Aug 31

This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA
https://ecos.fws.gov/ecp/species/9737

Clark's Grebe Aechmophorus clarkii — Breeds Jan 1 to Dec 31

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Golden Eagle Aquila chrysaetos — Breeds Jan 1 to Aug 31

This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA
https://ecos.fws.gov/ecp/species/1680

Grace's Warbler Dendroica graciae — Breeds May 20 to Jul 20

This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA

Gray Vireo Vireo vicinior — Breeds May 10 to Aug 20

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/8680

Lesser Yellowlegs Tringa flavipes — Breeds elsewhere
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9679

Lewis's Woodpecker Melanerpes lewis — Breeds Apr 20 to Sep 30
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9408

Long-billed Curlew Numenius americanus — Breeds Apr 1 to Jul 31
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/5511

Long-eared Owl asio otus — Breeds Mar 1 to Jul 15
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/3631

Marbled Godwit Limosa fedoa — Breeds elsewhere
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9481

Olive-sided Flycatcher Contopus cooperi — Breeds May 20 to Aug 31
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/3914

Pinyon Jay Gymnorhinus cyanocephalus — Breeds Feb 15 to Jul 15
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9420

Rufous Hummingbird selasphorus rufus — Breeds elsewhere
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/8002

Virginia's Warbler Vermivora virginiae — Breeds May 1 to Jul 31
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9441

Willet Tringa semipalmata — Breeds elsewhere
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Willow Flycatcher Empidonax traillii — Breeds May 20 to Aug 31
This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA
https://ecos.fws.gov/ecp/species/3482

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

Breeding Season (■)
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)

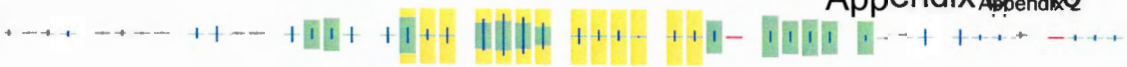
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

To see a bar's survey effort range, simply hover your mouse cursor over the bar.

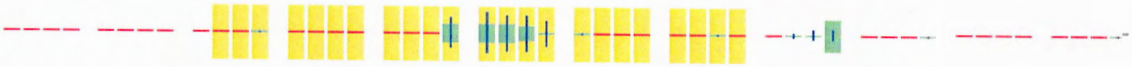
No Data (–)
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.

Brewer's Sparrow BCC - BCR (This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA)

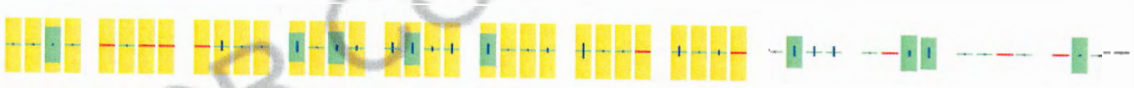


Burrowing Owl BCC - BCR (This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA)



Clark's Grebe BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Golden Eagle BCC - BCR (This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA)



Grace's Warbler BCC - BCR (This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA)

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Appendix 2

Gray Vireo BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Lesser Yellowlegs BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

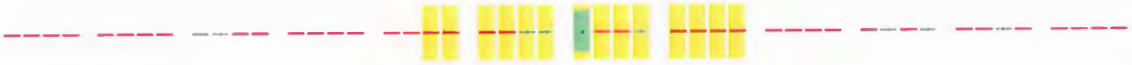
Lewis's Woodpecker BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Long-billed Curlew BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

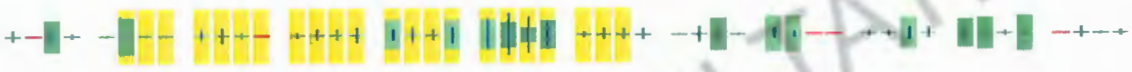
SPECIES	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Long-eared Owl BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)												

Marbled Godwit BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Olive-sided Flycatcher BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)



Pinyon Jay BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

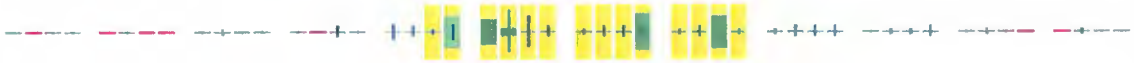


Rufous Hummingbird BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Virginia's Warbler BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Willet BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Willow Flycatcher BCC - BCR (This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA)



Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the migratory birds potentially occurring in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the AKN Phenology Tool.

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets .

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering, migrating or present year-round in my project area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may refer to the following resources: The Cornell Lab of Ornithology All About Birds Bird Guide, or (if you are unsuccessful in locating the bird of interest there), the Cornell Lab of Ornithology Neotropical Birds guide. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting

point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

Facilities

National Wildlife Refuge lands

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS AT THIS LOCATION.

Fish hatcheries

THERE ARE NO FISH HATCHERIES AT THIS LOCATION.

Wetlands in the National Wetlands Inventory

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

This location overlaps the following wetlands:

The area of this project is too large for IPaC to load all NWI wetlands in the area. The list below may be incomplete. Please contact the local U.S. Fish and Wildlife Service office or visit the NWI map for a full list.

FRESHWATER EMERGENT WETLAND

PEM1A

PEM1/SS1A
PEM1/SS2A
PEM1/SS1C
PEM1/SS2Jh
PEM1/SS1Ah
PEM1/SS1Ch

FRESHWATER POND

PAB4Hh
PAB4Fh
PAB4Fx

LAKE

L1UBHh
L
L2UBF
L2UBFx
L2UBFh
L2USAh
L2EM2F
L2USCh

A full description for each wetland code can be found at the National Wetlands Inventory website

Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish

the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

A REVIEW OF NNHPD AND NMCRIS SITE RECORDS FOR NAVAJO NATION OIL & GAS COMPANY'S BEAUTIFUL MOUNTAIN LEASE AREA, SANOSTEE AND RED VALLEY CHAPTERS, SAN JUAN COUNTY, NEW MEXICO

Prepared by
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and Beth McCormack
Lone Mountain Archaeological Services, Inc.

Submitted by
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Prepared for
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50 Narbono Circle West
St. Michaels, Arizona 86511

LONE MOUNTAIN ARCHAEOLOGICAL SERVICES, INC.

Lone Mountain Report No. 3509
May 6, 2021

Navajo Nation Oil & Gas Company proposes to design and place oil and gas production facilities in the Beautiful Mountain Lease Area on Navajo Nation lands, Sanostee and Red Valley Chapters, San Juan County, New Mexico. Planning locations and designs for any proposed facilities will depend on environmental and cultural conditions within the Beautiful Mountain Lease Area, including the location of previously-identified archaeological sites and Traditional Cultural Properties.

In anticipation of this undertaking, Lone Mountain Archaeologist, Douglas Boggess, performed a records search of the 8,473.707-acre Beautiful Mountain Lease Area on April 7, 2021 at the offices of the Navajo Nation Heritage and Historic Preservation Department in Window Rock, Arizona and between May 5 and 8, 2021 with NMCRIS records maintained by the State of New Mexico.

Lands in the lease area are administered by the Navajo Nation Heritage and Historic Preservation Department, which will serve as lead agency for any development within the lease area. The lease area is within San Juan County on the Mitten Rock, NM; Sanostee East, NM; Sanostee West, NM; and Yellow Hill, NM 7.5' USGS quadrangles. The lease area falls within Township 26 North, Range 19 West, Sections 4 to 9, 17, and 18 and Township 20 North, Range 19 West, Sections 20, 21, and 28 to 30.

Lone Mountain identified no previously-reported Traditional Cultural Properties and 78 archaeological sites within the lease area. Development should be designed to avoid all NRHP-eligible sites by at least 100 ft.

ABSTRACT ii

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Lone Mountain Archaeologist, Douglas Boggess, performed a records search of the 8,473.707-acre Beautiful Mountain Lease Area.

DESCRIPTION OF UNDERTAKING

Navajo Nation Oil & Gas Company proposes to design and place oil and gas production facilities in the Beautiful Mountain Lease Area on Navajo Nation lands, Sanostee and Red Valley Chapters, San Juan County, New Mexico. Planning locations and designs for any proposed facilities will depend on environmental and cultural conditions within the Beautiful Mountain Lease Area, including the location of previously-identified archaeological sites and Traditional Cultural Properties.

PROJECT LOCATION

The 8,473.707-acre lease area falls within Township 26 North, Range 19 West, Sections 4 through 9, 17, and 18 and Township 27 North, Range 19 West, Sections 20, 21, and 28 through 30 (Figures 1.1 through 1.3).

ENVIRONMENTAL SETTING

The Beautiful Mountain Lease Area is an approximately 8,474-acre block that is located in the northern Chuska Valley in the San Juan Basin at the northeast base of Beautiful Mountain, a peak of the Chuska Mountains. Rock Ridge passes through the east side of the lease area, and there are several washes, reservoirs, and other water sources in and around the lease area, including Deadman's Wash, Big Gap Reservoir, and Flowing Wells. The lease area overlies Dakota Sandstone, a Cretaceous-period formation. Elevations are between 5,580 ft and 6,930 ft amsl.

Brown (1994) characterizes the area as Plains and Great Basin Grassland to the east and Great Basin Conifer Woodland to the west. Local vegetation includes juniper, sand sage, snakeweed, and various forbs and grasses.

CULTURAL BACKGROUND

The presence, nature, and spatial organization of prehistoric, protohistoric, and historic resources in the project area have been studied sporadically since the mid 1980s. As described below, much of the previous work within the Beautiful Mountain area has consisted of literature reviews and linear surveys for powerlines and pipelines. Archaeological sites, including prehistoric and possibly protohistoric sites, have been found in moderate density in this area. Resources can be expected to represent much of antiquity, spanning a 6,000- to 7,000-year period of use. In the following paragraphs, a brief outline of these resource types is presented to provide a background for the study of the prehistoric, protohistoric, and historic resources found in the lease area.

PALEOINDIAN PERIOD (CA. 10,500 B.C.+ TO 5,500 B.C.)

Despite some controversial evidence indicating a human presence in the New World earlier than 10,500 B.C., Anderson and Faught (2000) argue that current evidence is insufficient to describe any cultural trends prior to the appearance of the Clovis complex at around 10,500 B.C., notwithstanding Hayden's (1976) arguments for the Malpais pre-San Dieguito/San Dieguito material (Heilen 2004). The earliest documented human use of the region was during the Paleoindian Period (ca. 10,500 B.C. to 5.500 B.C.). This period is generally divided into three temporally-distinct complexes based on changes in material culture and adaptation: the Clovis, Folsom, and Plano phases.

Paleoindian settlement and subsistence strategies are best described as primarily focused on the hunting of Pleistocene megafauna, most notably mammoth and bison. Given the nature of these animals and their wide distribution across the landscape, it has been assumed that Paleoindians were highly mobile hunters. This is supported by tools manufactured of raw materials procured from sources that are at great distances from sites.

The Clovis complex (ca. 10,500 B.C. to 9000 B.C.) is defined by the presence of Clovis points and a hunting economy focused on the exploitation of megafauna, particularly the mammoth. Clovis points are large, bifacially flaked lanceolate projectile points that are distinctively fluted. These points have a concave base and the scar of a flute or channel flake that has been removed from each side of the point base extending upward and parallel to the blade margins. Other artifacts found in the Clovis assemblage include transverse end scrapers, side scrapers, bifacial knives, perforators, gravers, and hammerstones (Stuart and Gauthier 1988). These tools tend to be quite distinct in the fineness of their manufacture and the quality of materials used.

The Folsom complex (ca. 9000 B.C. to 8200 B.C.) is defined by the presence of Folsom points and an economy that was largely based on the exploitation of Bison antiquus. Folsom points were also fluted, but a change in technology and craftsmanship from the Clovis period makes these points distinctive. Folsom points are characterized by highly skilled lateral flaking and a broader, longer channel flake scar than on Clovis points. Midland-style points are also associated with the Folsom phase and are similar to Folsom points, but without the fluting. Other tools associated with the Folsom assemblage include end scrapers, perforators, knives, drills, choppers, and awls.

The Plano complex is generally used to describe the Late Paleoindian Period, dating from 8200 B.C. to 5500 B.C. This phase includes a number of complexes characterized by large unfluted lanceolate points. These include Plainview, Frederick, Agate Basin, Hell Gap, Firstview, Alberta, and Cody. Very few Paleoindian remains have been found thus far in the Chuska Valley, with the exception of the Peach Springs site in the southern Chuska Valley.

ARCHAIC PERIOD (5500 B.C. TO 1500 B.C.)

Archaic-period sites date between 5500 and 1500 B.C. The Archaic Period may be subdivided into the Early, Middle, and Late Archaic phases. The beginning of the Archaic Period, the Early Archaic, corresponds to climatic changes that brought warmer, drier conditions. These environmental changes required different subsistence strategies than those practiced during the preceding Paleoindian Period. Subsistence procurement shifted from a strategy focused on hunting to the exploitation of a broad spectrum of faunal and floral resources. Archaic populations responded to the discontinuous spatial and seasonal availability of resources through a serial foraging settlement system employing a high degree of residential mobility. During the terminal Archaic, maize (corn) is introduced and horticulture becomes the dominant subsistence mode in the Glen Canyon area (Geib 1996).

Artifact assemblages from the Archaic Period exhibit a greater diversity than that of the preceding Paleoindian Period. Projectile points decreased in size, indicating that smaller animal species were being hunted. The introduction of groundstone tools indicates an increased emphasis on vegetable foods in the diet. Studies of Archaic-period cultural remains in the region indicate that projectile points include a variety of stemmed, corner-notched, and side-notched forms (e.g., Geib 1996; Irwin 1999). Open-twined and plain-weave sandals and close-coiled basketry are typical of this period (Geib 1996).

Archaic sites dating to the Early, Middle, and Late Archaic have been documented in the region, though not within the lease area. These occur primarily in higher-altitude settings where game and wild plant resources are abundant. Maize was introduced to this region during the Late Archaic. This resource may have been used differentially by various dispersed Archaic groups. Some groups may have depended almost entirely on wild plant resources, while others may have adopted maize as a supplement to their diet. These differences resulted in divergences in the settlement and subsistence systems employed by Archaic groups in the San Juan Basin and Northern Colorado Plateau. Vierra and Doleman (1994) have suggested that San Juan Basin Archaic groups may have practiced a mixed collector-forager strategy wherein they aggregated into winter base camps and dispersed into small groups utilizing a foraging strategy during spring, summer, and fall.

Groups wintered in higher altitude settings, subsisting on stored foods, piñon nuts, and game resources. During the spring and summer, San Juan Basin groups migrated to lower-altitude settings where grasses and other resources were bountiful.

BASKETMAKER II PERIOD (1500 B.C. TO A.D. 500; A.D. 1 TO 400)

Although the Pecos Classification indicates the Basketmaker II Period dates to between 1500 B.C. and A.D. 500, most Basketmaker II sites in the Four Corners Region date between A.D. 1 and A.D. 400 (Fuller 1989; Gregg and Smiley 1995; Matson et al. 1988; Morris and Burgh 1954). The Basketmaker II period marks a transition toward a greater reliance on maize agriculture, increased sedentism, and the initiation of the Anasazi way of life.

Some researchers (Kidder and Guernsey 1919, 1922; Matson 1991) assert that the Basketmaker II Period marks the intrusion of farmers known as the White Dog variant of the Basketmaker II culture. Excavations at cave sites in southeastern Utah (Blackburn and Williamson 1997; Geib 1996; Geib and Davidson 1994) indicate that White Dog Basketmaker material culture is distinct from the preceding Archaic Period and includes weft-twined cord bags, weft-face plain-weave sandals, White Dog projectile points, S-shaped sticks, and close-coiled basketry. Projectile points are large and similar to the dart points of the Archaic Period, but typically have wider, shallower notches than Archaic point types.

BASKETMAKER III PERIOD (A.D. 575 TO 750)

The Basketmaker III (A.D. 575 to 750) Period is distinguished from the preceding period by the introduction of ceramics and the bow and arrow. This corresponds with a decrease in the size of projectile points. Beans were added to the subsistence regime. An increased reliance on maize agriculture and decreased use of faunal and wild plant resources is reflected in settlement patterns and in the nature of artifact assemblages.

A distinctive Chuska Valley ceramic series with trachyte temper begins to appear at this time with Bennet Gray and Theodore Black-on-white being the earliest types identified in this series. Small stemmed and corner-notched arrow points are typical of this period. Lithic technology became increasingly focused on core reduction and the production of simple flake tools. Groundstone tools increased in frequency and trough metates were introduced, reflecting the importance of maize in the Basketmaker III diet.

Shallow pit structures with antechambers, banquettes, central clay-lined hearths, wing walls, four-post roof supports, and storage pits typify the Basketmaker III Period. Storage facilities became more common, again reflecting the importance of domesticated crops. Evidence has been found of village life and community formation during the Basketmaker III period, although such aggregations may have been seasonal prior to the Pueblo I period.

PUEBLO I PERIOD (A.D. 750 TO 900)

The Pueblo I Period in northwestern New Mexico dates between A.D. 750 and A.D. 900. It is during this period that a distinctive architectural layout and the formation of large village settlements were introduced. Habitation sites were generally composed of square subterranean, pit structures backed by one or two rows of contiguous rectangular surface rooms constructed of jacal and slab-lined walls. Graywares (Bennet Gray, Sheep Springs Gray, and Tocito Gray) Neck-banded graywares (Gray Hills Banded); redwares (Sanostee Red-on-orange); and whitewares (Pena, Crozier, Tunicha, and Drolet Black-on-whites) characterize Pueblo I-period ceramic assemblages.

Regionally, Pueblo I settlements range from isolated pit structures to large villages comprised of multiple pit structures and arcs of surface rooms. Most sites identified thus far in the Beautiful Mountain area are Pueblo I at the oldest.

PUEBLO II PERIOD (A.D. 900 TO 1100)

The Pueblo II Period dates between A.D. 900 and A.D. 1100. Pueblo II subsistence became increasingly dependent on maize agriculture. A marked increase in the frequency and diversity of groundstone tools and a concurrent decrease in flaked-stone tools associated with hunting reflect this trend. Ceramic types in the Chuska Valley became more diverse and include corrugated and indented corrugated graywares (e.g. Newcomb Cor-

rugated, Captain Tom Corrugated, and Hunter Corrugated), and whitewares occurring both as organic and mineral painted variants (Newcomb and Naschitti, Toadlena and Taylor, and Burnham, Chuska, and Brimhall Black-on-whites).

Regionally, the Pueblo II Period marks the transition to stone masonry architectural units and the development of new forms of community organization. Habitation sites from this period typically consist of unit pueblos (Prudden 1903) comprised of surface masonry rooms, an earthen pit structure or kiva, and a trash midden. During the early Pueblo II Period, surface rooms had stone masonry lower walls with jacal construction. Later in the period, full-height masonry walls became common. Kivas were generally round, with a surrounding bench, six masonry pilasters, a hearth, ventilator shaft, and sipapu (Cordell 1997). Recent research in the region suggests that subterranean or semi-subterranean mealing rooms are frequently associated with kiva facilities (Mobley-Tanaka 1993).

While much of the population occupied small, dispersed habitations, the Chacoan form of community organization emerged in the Chuska Valley, indicating higher levels of community integration and interaction relative to the preceding period. Great houses, road segments, and great kivas formed the central elements to the community of households and farmsteads. The introduction of the Chacoan form of organization along drainages in the Anasazi region marked an era of agricultural intensification, increased economic specialization and community interaction, and social differentiation.

Late Pueblo II- to Early Pueblo III-period sites are common along drainages throughout the region and include habitations, field houses, and artifact scatters. These great house sites appear to have served as central places for the Pueblo II and Pueblo III community and are found across the region.

PUEBLO III PERIOD (A.D. 1100 TO 1350)

The Pueblo III Period dates between A.D. 1100 and A.D. 1350. The early Pueblo III Period witnessed a reorganization of the community in the post-Chacoan era, leading to the development of communities focused on nucleated pueblos within defensible locations dwell while small family group sites began to appear in the southern Chuska Valley. This form of organization continued until Pueblo sites were abandoned in the early 1300s.

During the Pueblo III Period, there was a notable increase in site size. Sites are found in a variety of areas, including canyon rims, rockshelters, talus slopes, and canyon bottoms (Cordell 1997). Multi-story habitations with kivas, wholly or partially enclosed by rooms or walls, became more frequent and Mesa Verde keyhole-shaped kivas tended to replace the circular forms found during the preceding period. New site types and features were also introduced, including tri-wall structures, towers, plazas, shrines, reservoirs, stone check dams, and field houses (Cordell 1997). These developments signal a change in social organization, increased ceremonialism, and an intensification of the agricultural subsistence base.

Pueblo III ceramic assemblages in the Chuska Valley include Hunter Corrugated, Nava Black-on-white, and Crumbled House Black-on-white.

PROTOHISTORIC PERIOD (A.D. 1350 TO 1700)

While the Rio Grande and the Little Colorado drainages continued to be utilized into the early Protohistoric (Pueblo IV) Period by Puebloan groups, the San Juan Region was abandoned by Pueblo people following the Pueblo III Period, between A.D. 1350 and A.D. 1500.

Archaeological remains that are identifiably Navajo have dates between A.D. 1350 and A.D. 1700. The Navajo likely adopted or otherwise absorbed any remaining Anasazi. Little is known regarding these occupations in the Northern San Juan Region, partly because these groups employed a hunter- gatherer economy similar to Archaic groups. A fortification wall made of unshaped sandstone slabs found on McCracken Mesa in southeastern Utah has been dated to A.D. 1380 and identified as a Navajo structure (personal communication, Ron Maldonado to Douglas Boggess, August 8, 2005). High residential mobility, the use of temporary structures, and the paucity of sherds and other datable materials frequently confound our ability to recognize Protohis-

toric Navajo sites in the region, although Navajo oral history confirms that the Navajo have always been here. Datable material culture items associated with the Protohistoric Period include Dinétah Grayware, Gobernador Polychrome, micaceous-tempered grayware, and Desert Side-notched projectile points.

HISTORIC PERIOD

As early as the 1600s, Spanish soldiers were dispatched into the area that would become the Four Corners to destroy Navajo crops and homes. These forays came at least as far north as the San Juan River. By the time Frays Dominguez and Escalante traveled through the area along what would later become the Old Spanish Trail in 1776, they identified the San Juan River as the boundary between Navajo territory to the south and Ute territory to the north (McPherson 1995:77).

Remote locations, such as Elk Ridge and the rugged tributary canyons of the San Juan River, were sanctuary areas sought out by the Navajo, Paiute, and Ute people when military pressures increased in other parts of their homelands. One example is provided by K'aayelii, a Navajo who in 1860 established a small settlement at Kigalia Springs on the south end of Elk Ridge. In such an isolated location, K'aayelii's band was undisturbed by Kit Carson and his soldiers (McPherson 1992:39). Conflicts between Indians and Anglos eventually led to the reservation system. On May 28, 1868, the Navajo signed a treaty (McPherson 1995:67). Numerous historical reports state that Navajo people continued to use their lands outside the reservation boundaries.

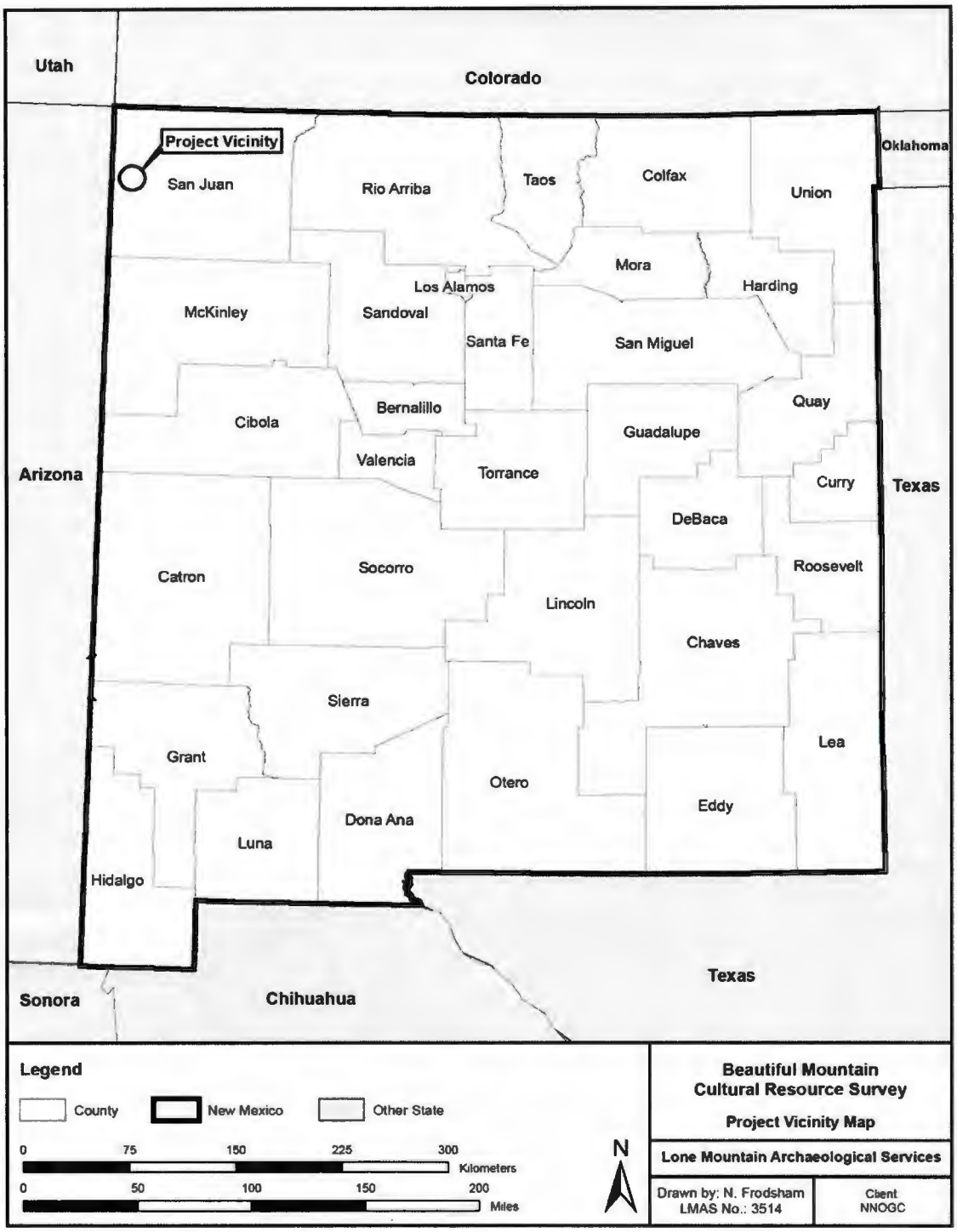

Figure 1.1: Project Vicinity.

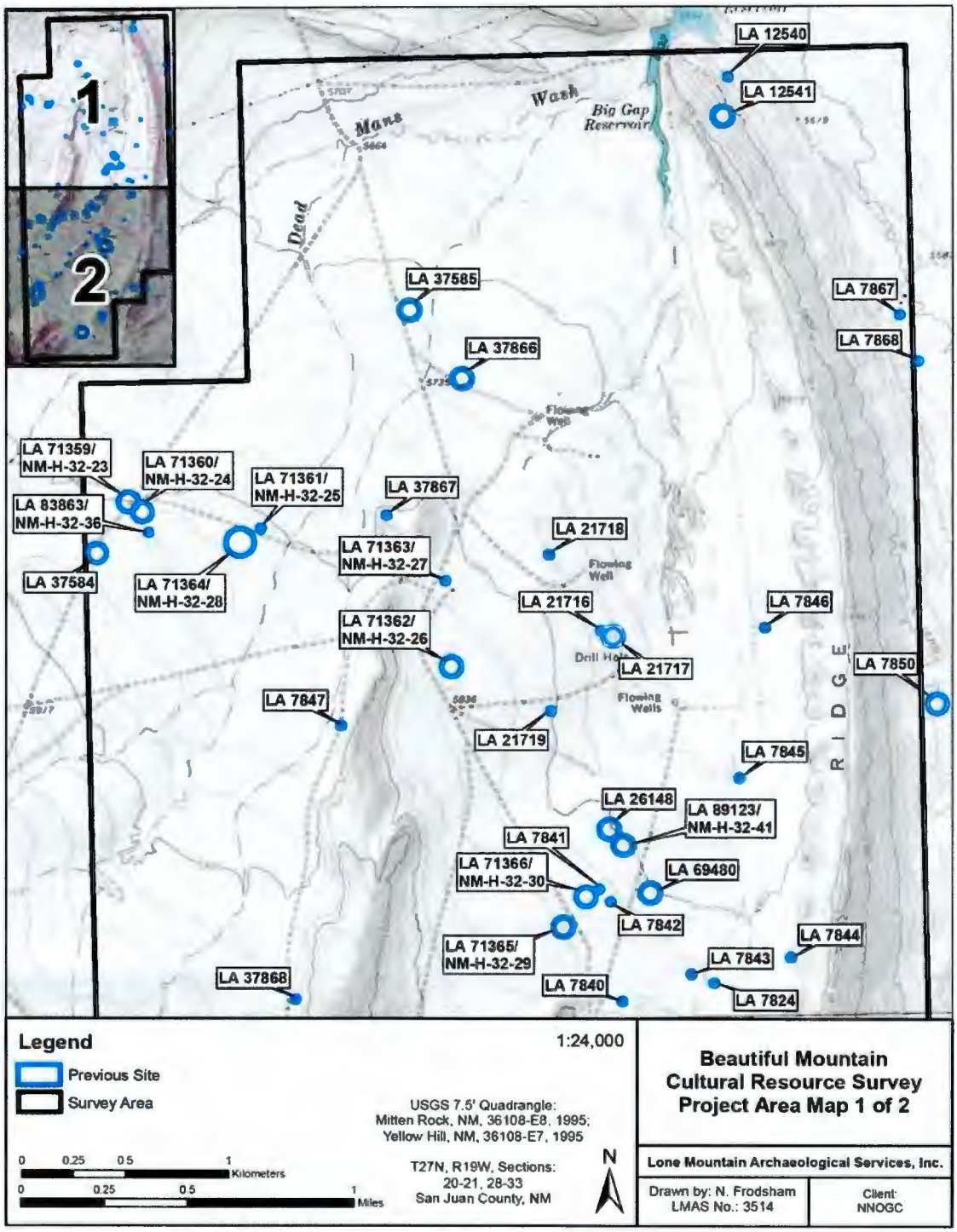

Figure 1.2: Project Area (1 of 2).

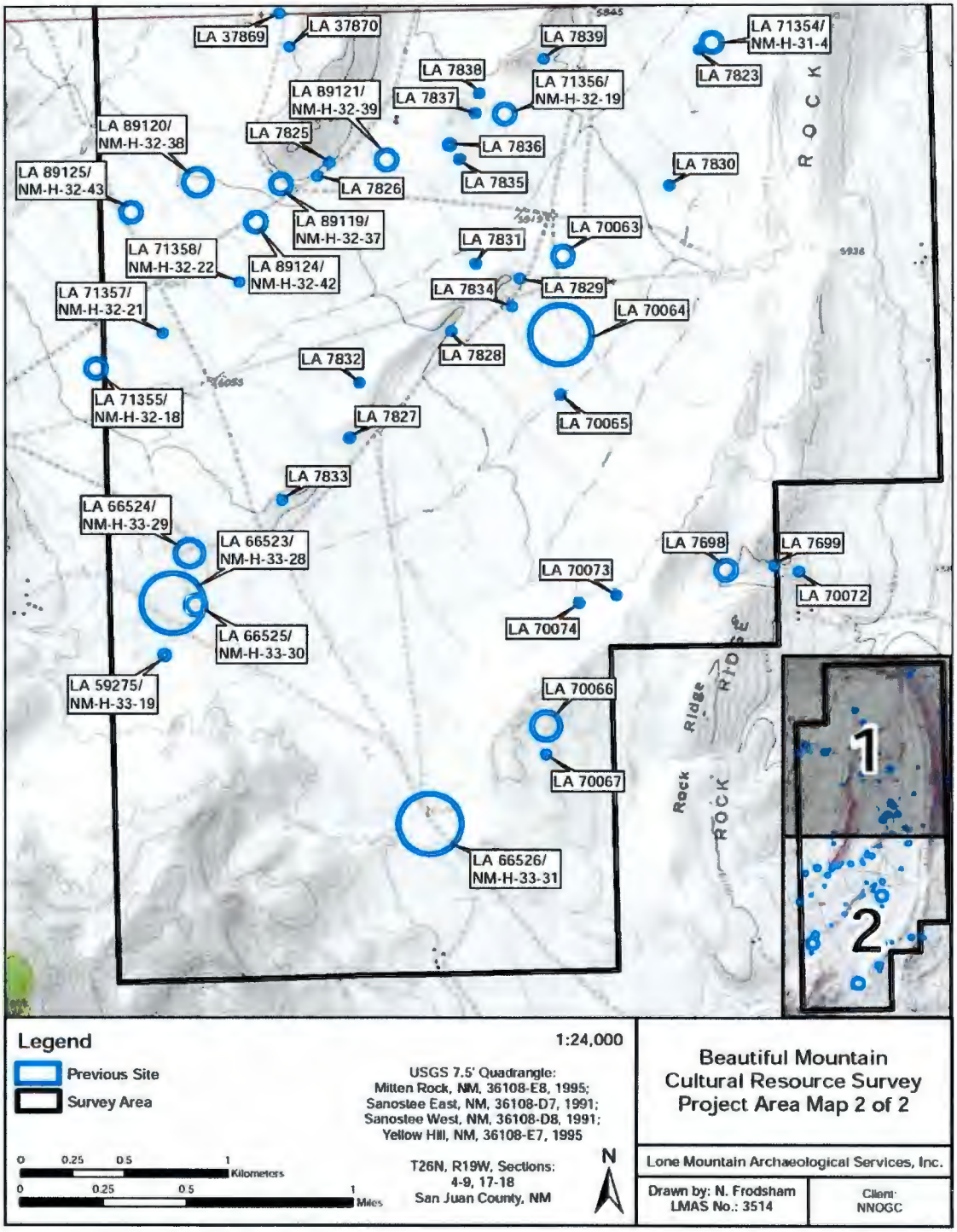

Figure 1.3: Project Area (2 of 2).

Lone Mountain Archaeologist, Douglas Boggess, performed a records search of the 8,473.707-acre Beautiful Mountain Lease Area.

RESEARCH METHODS

On April 7, 2021, a site files review was conducted of the Navajo Nation Historic Preservation Division (NNHPD) site records in Window Rock to identify previously-recorded cultural resources and previously-conducted surveys within the lease area. This work took place during the Covid 19 pandemic. The hours available for files searches were limited and only a few people could be in the NNHPD offices at any time. For this reason, only those reports postdating 2005 were sought, as records predating that year can be found in the NMCRIS system. An electronic files search of the NMCRIS system was conducted on May 6, 2021.

At the time of this files-search, NNHPD records consisted of scanned images of USGS maps with handwritten notations identifying sites and surveys. For the most part, these are legible. NMCRIS records predating recent years did not digitize specific site shapes. Sites appear in those records as circles reflecting the largest measurement. A 20-m by 50-m site may, therefore, appear as a 50-m diameter circle.

LOCATED RESOURCES

Lone Mountain identified no Traditional Cultural Properties in the confidential Sacred Places Database at the NNHPD offices in Window Rock and 78 archaeological sites in NMCRIS records within the Beautiful Mountain Lease Area. The sites are summarized in the table below.

The review of NNHPD's Cultural Resources Compliance Section files revealed that several cultural resource surveys are plotted on NNHPD maps as having taken place within the lease area. The earliest archaeological work known in the lease area was performed in 1967 and identified 30 of the sites reported to be in the lease area. Given the age of the site records, the reported site locations may not be entirely accurate according to current standards. Most compliance related surveys appear to be pipelines and waterlines.

Table 2.1: Summary of Previously-recorded Sites.

NN No	LA No	NMCRIS	NNHPD Rpt No	Component	Description	Eligibility	ARPA
	7698	21545, 31033		Anasazi Pueblo I (A.D. 700 to 900), Pueblo III (A.D. 1100 to 1300), Unspecific Anasazi (A.D. 1 to 1600)	Depression and room block with with lithic and ceramic artifact scatterlithic and ceramic artifact scatter	N/A	Yes
	7699	21545, 31033		Unspecific Anasazi (A.D.1 to 1600), Unspecific Navajo (A.D. 1500 to 1993)	Petroglyph	N/A	Yes
	7823	21545, 31033		Anasazi Pueblo II to Pueblo III (A.D. 900 to 1300)	Kiva and roomblock with lithic and ceramic artifact scatter	N/A	Yes
	7824	21545, 31033		Anasazi Pueblo II (A.D. 900 to 1100)	Room with lithic and ceramic artifact scatter	N/A	Yes
	7825	21545, 31033		Anasazi Pueblo I to Pueblo III (A.D. 700 to 1300.)	Kiva and roomblock with lithic and ceramic artifact scatter	N/A	Yes

Table 2.1: Summary of Previously-recorded Sites. (Continued)

NN No	LA No	NMCRIS	NNHPD Rpt No	Component	Description	Eligibility	ARPA
	7826	21545, 31033		Anasazi Pueblo II (A.D 900 to 1100)	Roomblock and midden with lithic and ceramic artifact scatter	N/A	Yes
	7827	21545, 31033		Anasazi Pueblo II to Pueblo III (A.D. 900 to 1300)	Two kivas and roomblock with lithic and ceramic artifact scatter	N/A	Yes
	7828	21545, 31033		Anasazi Pueblo II to Pueblo III (A.D. 900 to 1300)	Kiva and roomblock with lithic and ceramic artifact scatter	N/A	Yes
	7829	21545, 31033		Anasazi Pueblo II to Pueblo III (A.D. 900 to 1300)	Kiva, room, and roomblock with lithic and ceramic artifact scatter	N/A	Yes
	7830	21545, 31033		Anasazi Pueblo II to Pueblo III (A.D. 900 to 1300)	Kiva and roomblock with lithic and ceramic artifact scatter	N/A	Yes
	7831	21545, 31033		Anasazi Pueblo II to Pueblo III (A.D. 900 to 1300)	Kiva and roomblock with lithic and ceramic artifact scatter	N/A	Yes
	7832	21545, 31033		Anasazi Pueblo II to Pueblo III (A.D. 900 to 1300), Unspecific Navajo (A.D. 1500 to 1993)	Midden, mound and roomblock with lithic and ceramic artifact scatter	N/A	Yes
	7833	21545, 31033		Anasazi Pueblo II to Pueblo III (A.D. 900 to 1300), Unspecific Navajo (A.D. 1500 to 1993)	Kiva, midden, and roomblock with lithic and ceramic artifact scatter	N/A	Yes
	7834	21545, 31033		Anasazi Pueblo II (A.D. 900 to 1100)	Midden and isolated room with lithic and ceramic artifact scatter	N/A	Yes
	7835	21545, 31033		Anasazi Pueblo II to Pueblo III (A.D. 900 to 1300)	Kiva and roomblock with lithic and ceramic artifact scatter	N/A	Yes
	7836	21545, 31033		Anasazi Pueblo II to Pueblo III (A.D. 900 to 1300)	Kiva, one room, and roomblock with lithic and ceramic artifact scatter	N/A	Yes
	7837	21545, 31033		Anasazi Pueblo II to Pueblo III (A.D. 900 to 1300)	Kiva, Midden and roomblock with lithic and ceramic artifact scatter	N/A	Yes

Table 2.1: Summary of Previously-recorded Sites. (Continued)

NN No	LA No	NMCRIS	NNHPD Rpt No	Component	Description	Eligibility	ARPA
	7838	21545, 31033		Anasazi Pueblo II to Pueblo III (A.D. 900 to 1300)	Kiva and roomblock with lithic and ceramic artifact scatter	N/A	Yes
	7839	21545, 31033		Anasazi Pueblo II to Pueblo III (A.D. 900 to 1300)	Roomblack with lithic and ceramic artifact scatter	N/A	Yes
	7840	21545, 31033		Anasazi Pueblo II to Pueblo III (A.D. 900 to 1300)	Kiva, midden, and roomblock with lithic and ceramic artifact scatter	N/A	Yes
	7841	21545, 31033		Anasazi Pueblo II to Pueblo III (A.D. 900 to 1300)	Kiva, midden, and roomblock with middena lithic and ceramic artifact scatter	N/A	Yes
	7842	21545, 31033		Anasazi Pueblo II to Pueblo III (A.D. 900 to 1300)	Kiva and roomblock with ceramic scatter	N/A	Yes
	7843	21545, 31033		Anasazi Pueblo II to Pueblo III (A.D. 900 to 1300)	Kiva, midden, and roomblock with lithic and ceramic artifact scatter	N/A	Yes
	7844	21545, 31033		Anasazi Pueblo II to Pueblo III (A.D. 900 to 1300)	Kiva, midden, and roomblock with lithic and ceramic artifact scatter	N/A	Yes
	7845	21545, 31033		Anasazi Pueblo II to Pueblo III (A.D. 900 to 1300)	Kiva and roomblock with lithic and ceramic artifact scatter	N/A	Yes
	7846	21545, 31033		Anasazi Pueblo III (A.D. 1100 to 1300)	Kiva, hearth, and roomblock with lithic and ceramic artifact scatter	N/A	Yes
	7847	21545, 31033		Anasazi Pueblo II to Pueblo III (A.D. 900 to 1300)	Kiva and roomblock with lithic and ceramic artifact scatter	N/A	Yes
	7850	21545, 31033		Unspecific Anasazi (A.D. 1 to 1600), Navajo Early Reservation (A.D. 1868 to 1880)	Corral and five hogans with prehistoric ceramics and historic trash	N/A	Yes
	7867	21545, 31033		Anasazi Pueblo III (A.D. 1100 to 1300)	Kiva and roomblock with lithic and ceramic artifact scatter	N/A	Yes

Table 2.1: Summary of Previously-recorded Sites. (Continued)

NN No	LA No	NMCRIS	NNHPD Rpt No	Component	Description	Eligibility	ARPA
	7868	21545, 31033		Anasazi Basketmaker III (A.D. 500 to 700), Unspecific Navajo (A.D. 1500 to 1993), and Unspecific Historic (A.D. 1539 to 1993)	Hogan, pithouse, road/ trail, and roomblock with lithic and ceramic artifact scatter	N/A	Yes
	12540	852		Unspecific Navajo (A.D. 1500 to 1993)	Corral, two hogans, and masonry room block	N/A	Unkno wn
	12541	852		Unspecific Navajo (A.D. 1500 to 1993)	Three hogans	N/A	Unkno wn
	21716	9242		Unknown (9500 B.C. to A.D. 1993)	Depression and pithouse	N/A	Unkno wn
	21717	9242		Unspecific Navajo (A.D. 1500 to 1993)	Corral and masonry room block	N/A	Unkno wn
	21718	9242		Unspecific Navajo (A.D. 1500 to 1993)	Hearth and milled lumber structure	N/A	Unkno wn
	21719	9242		Unspecific Navajo (A.D. 1500 to 1993)	Corral and hogan	N/A	Unkno wn
	26148	9231		Anasazi Pueblo II to Pueblo III (A.D. 900 to 1300) , Unspecific Historic (A.D. 1539 to 1993)	Prehistoric and hsitoric artifact scatter	N/A	Yes
	37584	10921		Recent Navajo (A.D. 1945 to 1994)	Two corrals	N/A	Unkno wn
	37585	10921		Anasazi Pueblo II (A.D. 900 to 1100)	Cistern and possible hearth	N/A	Yes
	37866	10923		Anasazi Pueblo III (A.D. 1100 to 1300)	Rubble mound with possible 4 to 6 rooms	N/A	Yes
	37867	N/A		Anasazi Pueblo II (A.D. 900 to 1100)	Two hearths	Eligible	Yes
	37868	N/A		Anasazi Pueblo II to Pueblo III (A.D. 900 to 1300)	Hearth	N/A	Yes
	37869	N/A		Anasazi Pueblo III (A.D. 1100 to 1300)	Roomblock with Chuska Valley ceramics	N/A	Yes
	37870	N/A		Unspecified Anasazi (A.D. 1 to 1600)	Two rock alignments with lithic and ceramic artifact scatter	N/A	Yes
NM-H-33-19	59275	17462	NNAD-86-357	Unspecified Anasazi (A.D. 1 o 1600)	Stone circle with lithic scatter	N/A	Yes
NM-H-33-28	66523	20446	NNAD-87-084	Anasazi Pueblo II to Pueblo III (A.D. 900 to 1300)	Midden, six mounds and roomblock	N/A	Yes
NM-H-33-29	66524	20446	NNAD-87-084	Anasazi Pueblo II to Pueblo III (A.D. 900 to 1300)	Midden, three mounds and roomblock	N/A	Yes

Table 2.1: Summary of Previously-recorded Sites. (Continued)

NN No	LA No	NMCRIS	NNHPD Rpt No	Component	Description	Eligibility	ARPA
NM-H-33-30	66525	20446	NNAD-87-084	Unspecified Anasazi (A.D. 1 to 1600)	Not entered	N/A	Yes
NM-H-33-31	66526	20446	NNAD-87-084	Middle Reservation to WWI (A.D. 1889 to 1920)	Hogan, three horno ovens, and a house foundation	N/A	Unk
	69480	23655		Anasazi Pueblo II to Pueblo III (A.D. 900 to 1300)	Ceramic scatter	N/A	Yes
	70063	24211	NNAD-88-282	Anasazi Pueblo II (A.D. 900 to 1100)	lithic and ceramic artifact scatter	N/A	Yes
	70064	24211	NNAD-88-282	Anasazi Pueblo II (A.D. 900 to 1100)	lithic and ceramic artifact scatter	N/A	Yes
	70065	24211	NNAD-88-282	Anasazi Basketmaker III (A.D. 500 to 700)	Hearth with lithic and ceramic artifact scatter	N/A	Yes
	70066	24211	NNAD-88-282	Unspecific Navajo (A.D. 1500 to 1993)	Rock cairn	N/A	Unk
	70067	24211	NNAD-88-282	Unspecific Navajo (A.D. 1500 to 1993)	Hogan	N/A	Unk
	70072	24211	NNAD-88-282	Unspecific Navajo (A.D. 1500 to 1993)	Rock alignment	N/A	Unk
	70073	24211	NNAD-88-282	Anasazi Basketmaker III (A.D. 500 to 700)	Rock alignment	N/A	Yes
	70074	24211	NNAD-88-282	Anasazi Pueblo II to Pueblo III (A.D. 900 to 1300)	Ceramic scatter	N/A	Yes
NM-H-31-4	71354	24662	NNAD-87-330	Anasazi Pueblo I to Pueblo III (A.D. 700 to 1300)	Hearth and a ceramic scatter	N/A	Yes
NM-H-32-18	71355	24662	NNAD-87-330	Anasazi Pueblo I to Pueblo III (A.D. 700 to 1300)	Hearth and lithic and ceramic artifact scatter	N/A	Yes
NM-H-32-19	71356	24662	NNAD-87-330	Anasazi Pueblo II to Pueblo III (A.D. 900 to 1300)	Midden and lithic and ceramic artifact scatter	N/A	Yes
NM-H-32-21	71357	24662	NNAD-87-330	Anasazi Pueblo I to Pueblo II (A.D. 700 to 1100)	lithic and ceramic artifact scatter	N/A	Yes
NM-H-32-22	71358	24662	NNAD-87-330	Anasazi Pueblo II to Pueblo III (A.D. 900 to 1300)	Hearth, rock alignment and a lithic and ceramic artifact scatter	N/A	Yes
NM-H-32-23	71359	24662	NNAD-87-330	Anasazi Pueblo II (A.D. 900 to 1200) Recent Navajo (A.D. 1945 to 1993)	Mound with lithic and ceramic artifact scatter	N/A	Yes
NM-H-32-24	71360	24662	NNAD-87-330	Anasazi Pueblo II (A.D. 900 to 1200)	Hogan with lithic and ceramic artifact scatter, historic trash	N/A	Yes

Table 2.1: Summary of Previously-recorded Sites. (Continued)

NN No	LA No	NMCRIS	NNHPD Rpt No	Component	Description	Eligibility	ARPA
NM-H-32-25	71361	24662	NNAD-87-330	Anasazi Pueblo I (A.D. 700 to 900)	Two stone circles with lithic and ceramic artifact scatter	Not Entered	Yes
NM-H-32-26	71362	24662	NNAD-87-330	Anasazi Pueblo I to Pueblo II (A.D. 700 to 1100)	lithic and ceramic artifact scatter	N/A	Yes
NM-H-32-27	71363	24662	NNAD-87-330	Unspecific Navajo (A.D. 1500 to 1993)	House foundation and historic trash	N/A	Unk
NM-H-32-28	71364	24662	NNAD-87-330	Anasazi Pueblo I to Pueblo II (A.D. 700 to 1100)	lithic and ceramic artifact scatter	N/A	Yes
NM-H-32-29	71365	24662	NNAD-87-330	Anasazi Pueblo II to Pueblo III (A.D. 900 to 1300)	Hearth and a lithic and ceramic artifact scatter	N/A	Yes
NM-H-32-30	71366	24662	NNAD-87-330	Anasazi Pueblo I to Pueblo II (A.D. 700 to 1100)	lithic and ceramic artifact scatter	N/A	Yes
NM-H-32-36	83863	38086	NNAD-91-100	Anasazi Pueblo III (A.D. 1100 to 1300)	lithic and ceramic artifact scatter	N/A	Yes
NM-H-32-37	89119	37965	NNAD-92-320	Anasazi Pueblo I to Pueblo II (A.D. 700 to 1100)	Hearth with lithic and ceramic artifact scatter	Unevaluated	Yes
NM-H-32-38	89120	37965, 106314	NNAD-92-320, NNHPD-01-229	Anasazi Pueblo I to Pueblo II (A.D. 700 to 1100)	Lithic and ceramic artifact scatter	Eligible, D	Yes
NM-H-32-39	89121	37965, 106314	NNAD-92-320, NNHPD-01-229	Anasazi Pueblo II to Pueblo III (A.D. 900 to 1300)	Mound and a lithic and ceramic artifact scatter	Eligible, D	Yes
NM-H-32-41	89123	37965	NNAD-92-320	Anasazi Pueblo II to Pueblo III (A.D. 900 to 1300)	Hearth with lithic and ceramic artifact scatter	Unevaluated	Yes
NM-H-32-42	89124	37965	NNAD-92-320	Anasazi Pueblo I to Pueblo II (A.D. 700 to 1100)	lithic and ceramic artifact scatter	Unevaluated	Yes
NM-H-32-43	89125	37965	NNAD-92-320	Anasazi Pueblo I to Pueblo II (A.D. 700 to 1100)	Hearth withlithic and ceramic artifact scatter	Eligible, D	Yes

Unk: Unknown

Table 2.2. Summary of Previous Reports.

NNHPD Rpt	NMCRIS	Performing Agency	Acres Surveyed	Reference
NNHPD 85-505	13026	Navajo Nation Cultural Resources Management Program	293.88	Martin, R. 1986. 41 Scattered Homesites, service & water lines for his
NNHPD-00-136	95465	Navajo Nation Capitol Impr ovement Projects	1.18	Copeland, Denise R.E 2000 A Cultural Resource Inventory of the NTUA Extension for Grace Tallbrother, Part of the Sanostee Scattered Powerline Project, Sanostee Chapter, San Juan County, New Mexico
	21545/ 31033	MNM-LA	0	Harris, Arthur H. James Schoenwetter and A.H. Warren 1967 An Archaeological Survey of the Chuska Valley and the Chaco Plateau New Mexico Parts I and II
	852	UNM-OCA	2.96	Allan,W C 1975 Northwest Pipeline Corporation Barbara Kay No.2 Second Relocation
	9242	San Juan College	2.84	Henderson, R W 1980 2 Wells Barbra K #1, Navajo As #1 & Access Road For Petroleum Energy
	9231	San Juan College	2.07	Henderson, R W 1980 #1 NAVAJO 33 Well Location For Petroleum Energy, Inc.
	10921	P. Whitten	23.3	Whitten, P. 1982 3.84 Miles Of Pipe Line R/w In Chuska Valley For Petroleum Energy
	10923	P. Whitten	48.56	Whitten, P. 1982 3 Well Pads 2.63 Miles Pipe Line R/w & 2.3 Miles Of Road For Petroleum Energy
NNAD-86-357	17462	NNAD	146.9	Werito, L. 1986 12 Miles Water Line, 21 Homesites & Facilities In Sanostee For His
NNAD-87-084	20446	NNAD	Not entered	Werito, L. 1987 Power Lines Near Red Valley For Navajo Tribal Utility Authority
	23655	San Juan College	14.3	Matthews, M H 1988 2 Helium Well Locations (Serh 33-2, 5-3) For Stiff Eberley Refined Helium
NNAD-88-282	24211	NNAD	276.7	Langenfeld, K. 1988 10 Seismic Lines For Chuska Energy
NNAD-87-330	24662	NNAD	347.95	Cleveland, E. 1988 26 Miles Of Water Main/service Lines & Septic Near Sanostee, NM
NNAD-91-100	38086	NNAD	9.64	Pino, Genevieve 1991 An Archaeological Survey of the Proposed Begay Power Line for Navajo Tribal Authority near Red Valley, San Juan County, New Mexico
NNAD-92-320	37965	NNAD	43.57	Reed, P F 1992 3.38 Miles of Power Line Near Mitten Rock, Nm For Navajo Tribal Utility Authority
NNHPD-01-229	106314	NNDOT-DCD	245.5	Not entered.

Most sites are Pueblo I to Pueblo III Anasazi or historic Navajo. Most sites have no determination of NRHP eligibility listed. Twelve sites have an undetermined ARPA significance and may or may not be 100 years old and the remaining sites have ARPA significance. It is recommended that sites be reevaluated and locations confirmed prior to oil and gas development and this development be designed to avoid known NRHP-eligible sites by at least 100 feet. Many parts of the lease area have not been surveyed; any new development should be surveyed and subject to ethnographic study according to NNHPD standards.

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Surveyor's Plats

NAVAJO NATION OIL & GAS COMPANY

SURVEY PLAT OF BEAUTIFUL MOUNTAIN LEASE TOWNSHIP 27 NORTH, RANGE 19 WEST & TOWNSHIP 26 NORTH, RANGE 19 WEST, NEW MEXICO PRINCIPLE MERIDIAN

LEGEND

- = FOUND MONUMENT AS NOTED
- = SET 5/8" REBAR W/ 2" ALUM. CAP MARKED – UNITED FIELD SERVICES NMPS #14831 2020
- = CALCULATED CORNER – NOT FOUND, NOT SET
- (R) = RECORD
- (M) = MEASURED
- (C) = CALCULATED
- P.O.B. = POINT OF BEGINNING
- = SUBJECT PARCEL BOUNDARY
- = TOWNSHIP LINE
- = SECTION LINE
- = ONE QUARTER LINE

BEAUTIFUL MOUNTAIN LEASE LEGAL DESCRIPTION

ALL OF SECTIONS 20, 21, 28, 29, 32, 33, THE EAST HALF OF SECTION 30, THE EAST HALF OF SECTION 31, TOWNSHIP 27 NORTH; ALL OF SECTIONS 4, 5, 8, 17, THE EAST HALF OF SECTION 6, THE EAST HALF OF SECTION 7, THE WEST HALF AND THE NORTHEAST QUARTER OF SECTION 9, THE EAST HALF OF SECTION 18, TOWNSHIP 26 NORTH, ALL IN RANGE 19 WEST. SAN JUAN COUNTY, NEW MEXICO, ALL ON NAVAJO TRIBAL TRUST LAND.

CONTAINING 8,473.707 ACRES MORE OR LESS.

BASIS OF BEARING: ALL BEARINGS, DISTANCES, AND ACRES SHOWN HEREON ARE GRID BEARINGS AND DISTANCES FOR THE NAD83, NEW MEXICO STATE PLANE COORDINATE SYSTEM–WEST ZONE–U.S. SURVEY FEET BASED ON THE FOLLOWING TWO OPUS ADJUSTED BASE POINTS:

CP 2719253 LOCATED IN THE NORTHEAST QUARTER OF SECTION 25, T–27–N, R–20–W, N.M.P.M., SAN JUAN COUNTY, NEW MEXICO. LATITUDE: 36°32'52.43590" N, LONGITUDE: 108°55'19.15460" W, NAD_83 (2011)(EPOCH:2010.0000). ELLIPSOID HEIGHT=6084.627 SFT., ELEVATION = 6152.084 SFT., NAVD 88, (GEOID18) CONVERGENCE ANGLE –0°38'54.0200".

CP 26195017 LOCATED IN THE SOUTHEAST QUARTER OF SECTION 17, T–26–N, R–20–W, N.M.P.M., SAN JUAN COUNTY, NEW MEXICO. LATITUDE: 36°28'08.97828" N, LONGITUDE: 108°53'11.29862" W, NAD_83 (2011)(EPOCH:2010.0000). ELLIPSOID HEIGHT=6124.578 SFT., ELEVATION = 6191.497 SFT., NAVD 88, (GEOID18) CONVERGENCE ANGLE –0°37'34.5600".

REFERENCES

(R–1) ORIGINAL B.L.M. SURVEY OF TOWNSHIP 27 NORTH, RANGE 19 WEST, NEW MEXICO PRINCIPAL MERIDIAN AND ASSOCIATED FIELD NOTES DATED APRIL 14, 1997.

(R–2) ORIGINAL B.L.M. SURVEY OF TOWNSHIP 26 NORTH, RANGE 19 WEST, NEW MEXICO PRINCIPAL MERIDIAN AND ASSOCIATED FIELD NOTES DATED APRIL 14, 1997.

SURVEYOR'S CERTIFICATION

I, JOHN A. VUKONICH, NEW MEXICO PROFESSIONAL SURVEYOR NO. 14831, DO HEREBY CERTIFY THAT THIS LEASE SURVEY SHOWN HEREON AND THE ACTUAL SURVEY ON THE GROUND UPON WHICH IT IS BASED WERE PERFORMED BY ME OR UNDER MY DIRECT SUPERVISION; THAT I AM RESPONSIBLE FOR THIS SURVEY; THAT THIS SURVEY MEETS THE MINIMUM STANDARDS FOR SURVEYING IN NEW MEXICO; AND THAT IT IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF. I FURTHER CERTIFY THAT THIS SURVEY IS NOT A LAND DIVISION OR SUBDIVISION AS DEFINED IN THE NEW MEXICO SUBDIVISION ACT.

JOHN A VUKONICH NEW MEXICO 14831 PROFESSIONAL SURVEYOR

5/5/2021

JOHN A. VUKONICH, N.M.P.S. NO. 14831 DATE

NAVAJO NATION OIL & GAS COMPANY

UNITED FIELD SERVICES INC.

SURVEYED: 4/3/21	REV DATE: 5/4/21	APP BY: J.A.V.
DRAWN BY: D.E.H.	DATE DRAWN: 4/26/21	FILE NAME: 11348 BEAUMTN

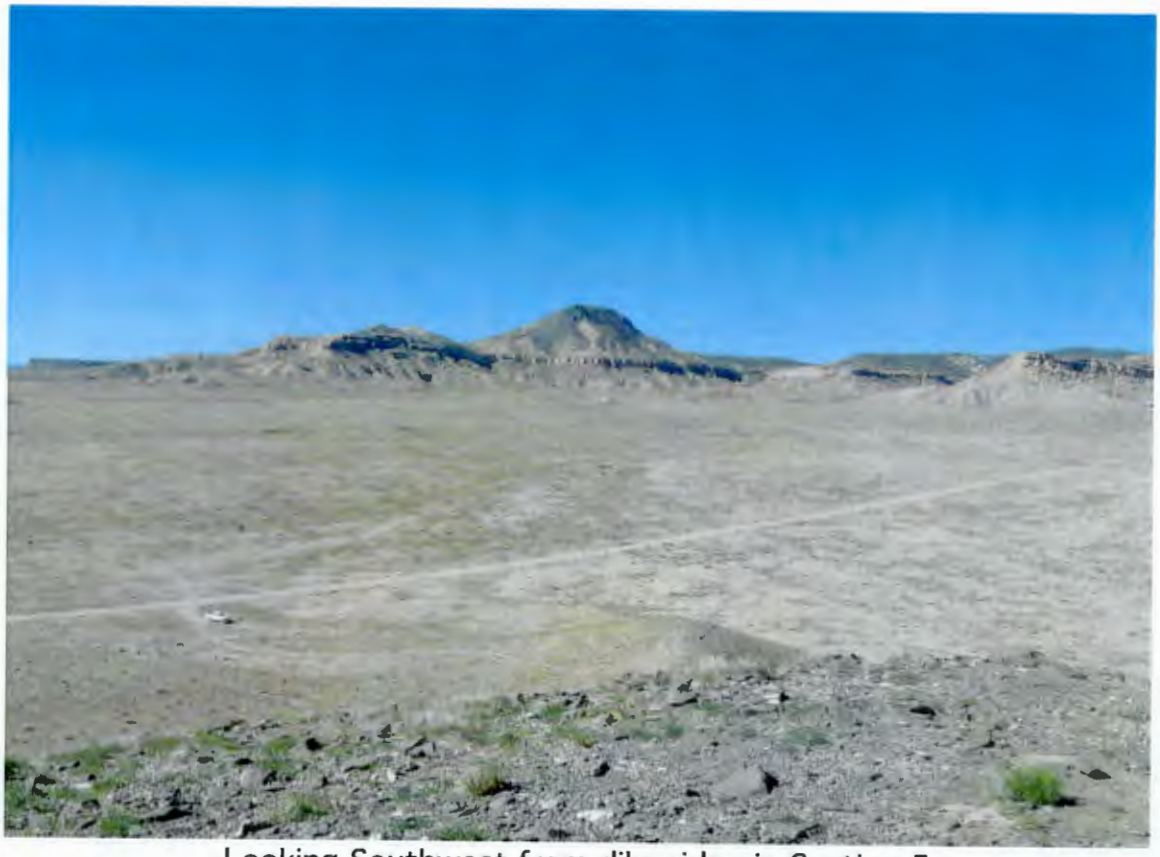
Looking Northwest at N-5012 in Section 17

Looking Southwest through Big Gap in Section 21

Dry water well in Section 29

Dry water well in Section 29

Looking North toward Shiprock along dike ridge in Section 5

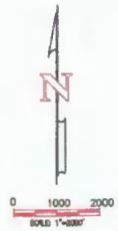


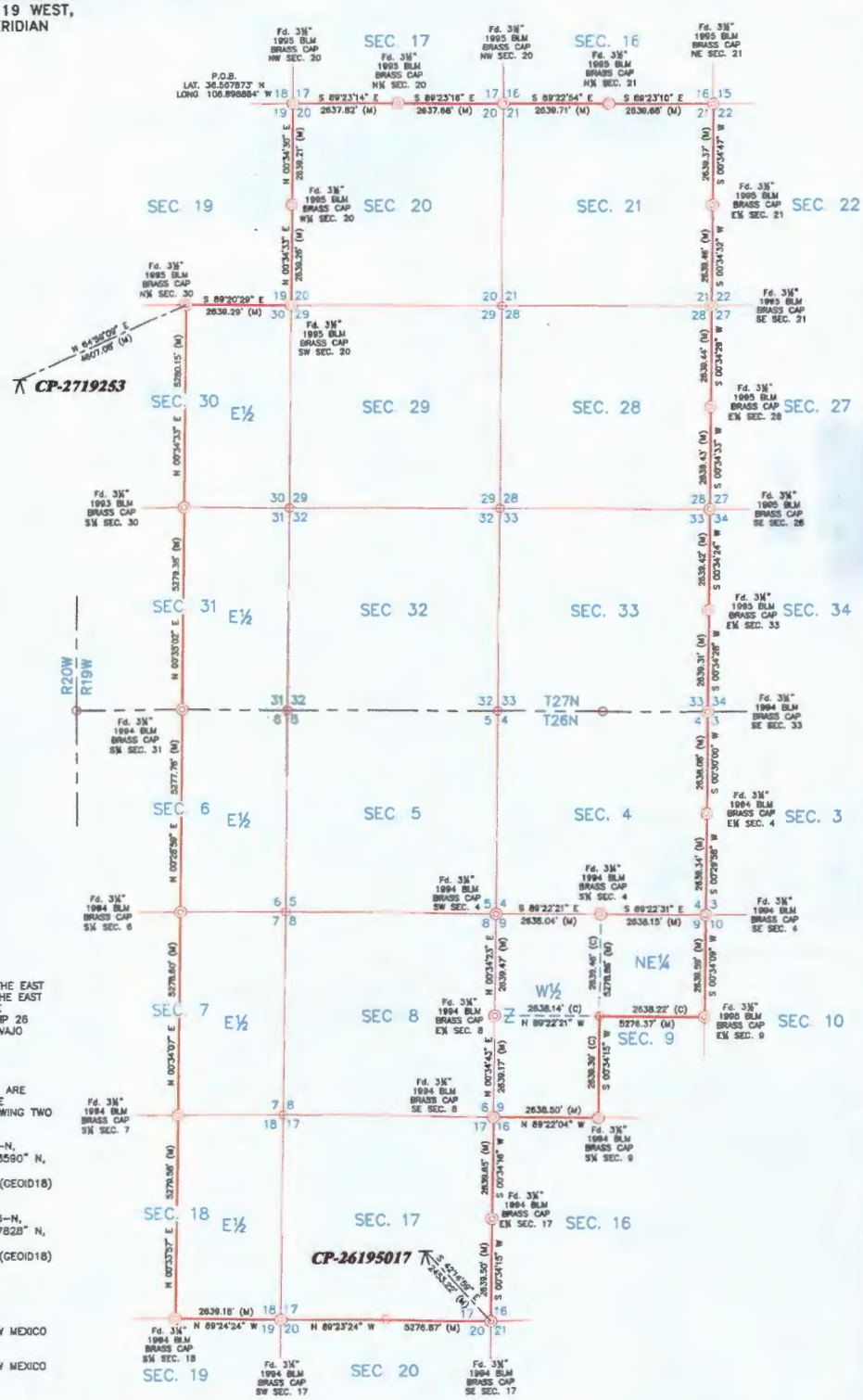
Looking Southwest from dike ridge in Section 5

EXHIBIT B-2

NAVAJO NATION OIL & GAS COMPANY

SURVEY PLAT OF
BEAUTIFUL MOUNTAIN LEASE
TOWNSHIP 27 NORTH, RANGE 19 WEST &
TOWNSHIP 26 NORTH, RANGE 19 WEST,
NEW MEXICO PRINCIPLE MERIDIAN





LEGEND

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- = SET 5/8" REBAR W/ 2" ALUM. CAP MARKED – UNITED FIELD SERVICES NMPS #14831 2020
- = CALCULATED CORNER – NOT FOUND, NOT SET
- (R) = RECORD
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CP 26195017 LOCATED IN THE SOUTHEAST QUARTER OF SECTION 17, T–26–N, R–20–W, N.M.P.M., SAN JUAN COUNTY, NEW MEXICO. LATITUDE: 36°29'08.97828" N, LONGITUDE: 108°53'11.29862" W, NAD_83 (2011)(EPOCH:2010.0000). ELLIPSOID HEIGHT=6124.578 SFT., ELEVATION = 6191.497 SFT., NAVD 88, (GEOID18) CONVERGENCE ANGLE –0°37'34.5600".

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(R–2) ORIGINAL B.L.M. SURVEY OF TOWNSHIP 26 NORTH, RANGE 19 WEST, NEW MEXICO PRINCIPAL MERIDIAN AND ASSOCIATED FIELD NOTES DATED APRIL 14, 1997.

SURVEYOR'S CERTIFICATION

I, JOHN A. VUKONICH, NEW MEXICO PROFESSIONAL SURVEYOR NO. 14831, DO HEREBY CERTIFY THAT THIS LEASE SURVEY SHOWN HEREON AND THE ACTUAL SURVEY ON THE GROUND UPON WHICH IT IS BASED WERE PERFORMED BY ME OR UNDER MY DIRECT SUPERVISION; THAT I AM RESPONSIBLE FOR THIS SURVEY; THAT THIS SURVEY MEETS THE MINIMUM STANDARDS FOR SURVEYING IN NEW MEXICO, AND THAT IT IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF. I FURTHER CERTIFY THAT THIS SURVEY IS NOT A LAND DIVISION OR SUBDIVISION AS DEFINED IN THE NEW MEXICO SUBDIVISION ACT.

JOHN A VUKONICH NEW MEXICO 14831 PROFESSIONAL SURVEYOR

5/5/2021

JOHN A. VUKONICH, N.M.P.S. NO. 14831 DATE

NAVAJO NATION OIL & GAS COMPANY

UNITED FIELD SERVICES INC.
P.O. BOX 2561
FARMINGTON, NEW MEXICO, 87499
(505) 564-3100

SURVEYED: 4/3/21	REV DATE: 5/4/21	APP BY: J.A.V.
DRAWN BY: D.E.H.	DATE DRAWN: 4/26/21	FILE NAME: 11549 BEAUMTN

Navajo Nation Oil & Gas Company
APRIL 30, 2021

Legal description – Beautiful Mountain Lease

A minerals lease being all of Sections 20, 21, 28, 29, 32, 33, the East Half of Section 30, the East Half of Section 31, Township 27 North; all of Sections 4, 5, 8, 17, the East Half of Section 6, the East Half of Section 7, the West Half and the Northeast Quarter of Section 9, the East Half of Section 18, Township 26 North, ALL in Range 19 West, San Juan County, New Mexico, being also more particularly described as:

Beginning at the northwest corner of said Section 20, being a found 1995, 3½ inch BLM Brass Cap, being the Point of Beginning (POB) for this description;

Thence along the north line of the Northwest Quarter thereof, South 89°23'14" East, 2637.82 feet to the North Quarter corner thereof being a found 1995, 3½ inch BLM Brass Cap;

Thence along the north line of the Northeast Quarter thereof, South 89°23'16" East, 2637.68 feet to the northwest corner of said Section 21 being a found 1995, 3½ inch BLM Brass Cap;

Thence along the north line of the Northwest Quarter thereof, South 89°22'54" East, 2639.71 feet to the North Quarter corner thereof being a found 1995, 3½ inch BLM Brass Cap;

Thence along the north line of the Northeast Quarter thereof, South 89°23'10" East, 2639.68 feet to the northeast corner thereof being a found 1995, 3½ inch BLM Brass Cap;

Thence along the east line of the Northeast Quarter thereof, South 00°34'47" West, 2639.37 feet to the East Quarter corner thereof being a found 1995, 3½ inch BLM Brass Cap;

Thence along the east line of the Southeast Quarter thereof, South 00°34'32" West, 2639.46 feet to the northeast corner of said Section 28 being a found 1995, 3½ inch BLM Brass Cap;

Thence along the east line of the Northeast Quarter thereof, South 00°34'29" West, 2639.44 feet to the East Quarter corner thereof being a found 1995, 3½ inch BLM Brass Cap;

Thence along the east line of the Southeast Quarter thereof, South 00°34'33" West, 2639.43 feet to the northeast corner of said Section 33 being a found 1995, 3¼ inch BLM Brass Cap;

Thence along the east line of the Northeast Quarter thereof, South 00°34'24" West, 2639.42 feet to the East Quarter corner thereof being a found 1995, 3¼ inch BLM Brass Cap;

Thence along the east line of the Southeast Quarter thereof, South 00°34'28" West, 2639.31 feet to the northeast corner of said Section 4 being a found 1994, 3¼ inch BLM Brass Cap;

Thence along the east line of the Northeast Quarter thereof, South 00°30'00" West, 2638.06 feet to the East Quarter corner thereof being a found 1994, 3¼ inch BLM Brass Cap;

Thence along the east line of the Southeast Quarter thereof, South 00°29'58" West, 2639.34 feet to the northeast corner of said Section 9 being a found 1994, 3¼ inch BLM Brass Cap;

Thence along the east line of the Northeast Quarter thereof, South 00°34'09" West, 2639.59 feet to the East Quarter corner thereof being a found 1994, 3¼ inch BLM Brass Cap;

Thence along the south line of the Northeast Quarter thereof, North 89°22'21" West, 2638.22 feet to the calculated Center Quarter corner thereof;

Thence along the east line of the Southwest Quarter thereof, South 00°34'15" West, 2639.39 feet to the South Quarter corner thereof being a found 1994, 3¼ inch BLM Brass Cap;

Thence along the south line of the Southwest Quarter thereof, North 89°22'04" West, 2638.50 feet to the northeast corner of said Section 17 being a found 1994, 3¼ inch BLM Brass Cap;

Thence along the east line of the Northeast Quarter thereof, South 00°34'16" West, 2639.65 feet to the East Quarter corner thereof being a found 1994, 3¼ inch BLM Brass Cap;

Thence along the east line of the Southeast Quarter thereof, South 00°34'15" West, 2639.50 feet to the southeast corner thereof being a found 1994, 3¼ inch BLM Brass Cap;

Thence along the south line thereof, North 89°23'24" West, 5276.87 feet to the southeast corner of said Section 18 being a found 1994, 3¼ inch BLM Brass Cap;

Thence along the south line of the Southeast Quarter thereof, North 89°24'24" West, 2639.18 feet to the South Quarter corner thereof being a found 1994, 3¼ inch BLM Brass Cap;

Thence along the north-south center of section line thereof, North 00°33'57" East, 5279.58 feet to the South Quarter corner of said Section 7 being a found 1994, 3¼ inch BLM Brass Cap;

Thence along the north-south center of section line thereof, North 00°34'07" East, 5278.60 feet to the South Quarter corner of said Section 6 being a found 1994, 3¼ inch BLM Brass Cap;

Thence along the north-south center of section line thereof, North 00°28'59" East, 5277.76 feet to the South Quarter corner of said Section 31 being a found 1994, 3¼ inch BLM Brass Cap;

Thence along the north-south center of section line thereof, North 00°35'02" East, 5279.38 feet to the South Quarter corner of said Section 30 being a found 1993, 3¼ inch BLM Brass Cap;

Thence along the north-south center of section line thereof, North 00°34'33" East, 5280.15 feet to the South Quarter corner of said Section 19 being a found 1995, 3½ inch BLM Brass Cap;

Thence along the south line of the Southeast Quarter thereof, South 89°20'29" East, 2639.29 feet to the southwest corner of said Section 20 being a found 1995, 3½ inch BLM Brass Cap;

Thence along the west line of the Southwest Quarter thereof, North 00°34'33" East, 2639.26 feet to the West Quarter corner thereof being a found 1995, 3½ inch BLM Brass Cap;

Thence along the west line of the Northwest Quarter thereof, North 00°34'30" East, 2639.21 feet to the POINT OF BEGINNING.

The above described parcel of land containing 8,473.707 acres of land, more or less all located on Navajo Tribal Trust land.

All bearings, distances and acres in this description are based upon the New Mexico State Plane Coordinate System of 1983, West Zone, in U.S. Feet. A plat of the same date accompanies this description.

I hereby certify that the survey represented in this description was made by me or under my direct supervision and accurately represents the survey to the best of my knowledge and belief.

5/5/2021

JOHN A. VUKONICH, N.M.P.S. NO. 14831

JOHN A VUKONICH NEW MEXICO 14831 PROFESSIONAL SURVEYOR

EXHIBIT C

NAVAJO NATION
OIL AND GAS OPERATING AGREEMENT

This Oil and Gas Operating Agreement ("OA" or the "Agreement") is made and entered into this _____ day of _____, 2021, by and between the Navajo Nation ("Nation" or "Lessor") and the Navajo Nation Oil and Gas Company ("NNOGC" or "Operator"), each a "Party" and collectively the "Parties," on the terms and conditions set forth herein.

RECITALS

WHEREAS, the Nation is a sovereign Indian Nation and the beneficial owner of certain surface land and mineral estates located on the Navajo Nation in the States of Arizona, Utah and New Mexico; and

WHEREAS, NNOGC is a wholly owned arm and instrumentality of the Nation organized under Section 17 of the Indian Reorganization Act, 25 U.S.C. § 5124 (formerly 25 U.S.C. § 477), and charged by the Nation pursuant to its corporate Charter, approved by the Navajo Nation Council, with, among other purposes, conducting oil and gas exploration and production on behalf of the Nation, for the benefit of the Navajo Nation, and to return all dividends and distributions of profit to the Navajo Nation government; and

WHEREAS, NNOGC and the Nation intend that all activities authorized hereunder will be conducted in a manner consistent with NNOGC's Charter and other applicable Navajo law, and with NNOGC's obligation to maximize the value of the Nation's oil and gas resources for the benefit of the Navajo Nation.

NOW, THEREFORE, for and in consideration of the foregoing recitals and the mutual covenants and obligations set forth herein, the Parties agree as follows:

I. DEFINITIONS.

A. "Affiliate" means any entity as defined in 30 Code of Federal Regulations (CFR) § 1206.51 or any applicable substitute future regulations.

B. "Anniversary Date" means the date one year after the Effective Date of this Agreement and each subsequent date one year after the Anniversary Date thereafter.

C. "Conducting operations" means any work undertaken or commenced in good faith for the purpose of carrying out the rights, privileges or duties of NNOGC under this OA, including the construction of necessary structures for the drilling of an oil or gas well, and by the actual

operation of drilling in the ground, and which shall include all activities common in the industry, unless otherwise prohibited by law.

D. "Crude Helium" means the grade of helium produced or extracted at any facility other than a gas plant, and which is less than 99.995 percent helium by volume.

E. "Effective Date" means the date that this Agreement is approved by the U.S. Bureau of Indian Affairs (BIA).

F. "Gas" or "gas" shall be defined pursuant to 30 C.F.R. Part 1206, Subpart E, § 1206.171.

G. "Gathering" means the movement of OA production to a central accumulation or treatment point on the OA Area; or a central accumulation or treatment point off the OA Area.

H. "Gross Proceeds" for royalty payment purposes means: for gas royalties, except for helium royalties, the definition contained at 30 C.F.R. § 1206.171, or any applicable substitute future regulation; for oil royalties, the definition contained at 30 C.F.R. § 1206.51 or any applicable substitute future regulation. For purposes of determining royalties as provided herein, except for royalties taken in-kind by the Nation, the point of valuation of hydrocarbons shall be the Bureau of Land Management facility measurement point.

I. "Hydrocarbons" or "hydrocarbons" means naturally occurring hydrocarbon oil, gas, casing head gas, coal bed methane, distillate, condensate, liquid hydrocarbons and each of their respective constituent vapors and liquids, and including without limitation, helium and carbon dioxide, and all other non-hydrocarbon gases within the OA Area. Hydrocarbons do not include coal matrix material or the in-situ synthetic gasification of coal matrix material.

J. "Oil" or "oil" means petroleum or liquid hydrocarbons originally existing in a reservoir in a liquid state.

K. "Payment in Lieu of Tax" or "PILT" means a payment made by NNOGC pursuant to this Agreement in lieu of the Possessory Interest Tax and the Oil and Gas Severance Tax, from which NNOGC is statutorily exempt.

L. "Primary Term" means the initial term of the OA which shall be for a period of up to ten (10) years, which may be automatically extended for one (1) additional year as provided in this OA, during which NNOGC has exclusive rights and privileges in the Properties for Oil and Gas exploration and development, such rights and privileges which are held by the Bonus, as defined in Section II(A), and by the Delay Rentals, as defined in Section IV(A). Acreage of the Properties moves from the Primary Term to the Secondary Term effective upon NNOGC's development of a well that is producing Oil or Gas in paying quantities. Any portion of the Properties may be relinquished to the Nation during the Primary Term as provided in this OA.

M. "Produced, producing, or production in paying quantities" or "held by production" means sufficient net income from production to: (a) operate and maintain the Properties or a portion thereof, as provided herein; (b) market the production; and (c) result in a net income to Operator greater than zero dollars ($0.00).

N. "Properties" or "OA Area" shall have the meaning set forth in Section II(A) of this Agreement.

O. "Regulations" means the Code of Federal Regulations (CFR).

P. "Secondary Term" means, for any portion of the Properties or all of the Properties held by production, the period of time after the Primary Term ends during which the Properties or any portion thereof are producing oil or gas in paying quantities, as defined and provided for herein, and during which NNOGC has exclusive rights and privileges in such Properties for oil and gas exploration, development, and production.

Q. "Secretary" means the Secretary of the Department of Interior or his/her designee.

II. PROPERTIES; BONUS; TERM.

A. The Nation, in consideration of a cash bonus of $25.00 per acre, for a total bonus of $264,000.00 (the "Bonus"), to be paid within 60 days of the Effective Date, which Bonus shall hold the Properties, as defined herein, for the first year of the Primary Term, and in consideration of the Delay Rentals and royalties to be paid, and the covenants to be observed as herein set forth, does hereby grant and lease to NNOGC the exclusive right and privilege to drill for, extract, remove, and dispose of all the oil and gas deposits, including helium gas, carbon dioxide gas, and sulphur gas, at all depths in or under the following-described tracts of land situated in the County of _Apache_, State of _Arizona_, and more particularly described as follows:

Township 41 North, Range 30 East
Section 13: S/2
Section 14: S/2
Section 15: S/2
All of Sections 22, 23, 24, 25, 26, 27, 34, 35, 36

Township 41 North, Range 31 East
Section 18: SW/4
Section 19: W/2
Section 30: W/2
Section 31: W/2

Township 40 North, Range 30 East
All of Sections 1, 2, and 3

Section 12: N/2

Township 40 North, Range 31 East
Section 6: W/2
Section 7: NW/4

containing 10,560 acres more or less (the "Properties" or the "OA Area"), together with the right to construct and maintain on the Properties such structures necessary for the development and operation of the Properties. The Properties are shown on the Map attached hereto as Attachment "A."

B. NNOGC's exclusive right and privilege under this OA during the Secondary Term shall continue for so long as oil and/or gas is produced in paying quantities from the Properties, *i.e.*, while the Properties are "held by production". For purposes of the Secondary Term, a single producing gas well shall hold 640 acres and a single producing oil well shall hold 160 acres of the Properties.

C. The Primary Term for any portion of the Properties not held by production or extended as provided herein will expire at midnight on the 364th day after the 9-year anniversary of the Effective Date (or on the 365th day after the 9 year anniversary of the Effective Date if the year is a Leap Year). If necessary, the Primary Term may be automatically extended for such time as it takes NNOGC to complete conducting operations on such acreage, not to exceed a period of twelve (12) months.

D. If, at any time during the Primary Term, NNOGC determines, in its sole discretion, that development of all or any portion of the Properties is not economically feasible, NNOGC may relinquish any such uneconomic portion of the Properties back to the Nation at no additional cost to NNOGC and which shall not affect in any manner NNOGC's right to develop and operate the Properties remaining under the OA. Delay rentals shall not be paid on relinquished acres.

E. For any Properties that are not relinquished by NNOGC to the Nation during or at the expiration of the Primary Term, this OA shall continue in effect for so long as there are oil or gas wells producing in paying quantities. During the Secondary Term, production may be interrupted periodically, *e.g.*, where there is a mechanical breakdown or on a good-faith market basis, so long as production is resumed by NNOGC within a reasonable time after well work, facility repairs, or market pricing enables wells to return to paying quantities.

III. SURFACE USE AUTHORIZATION; EASEMENTS.

A. Without limitation, the Nation hereby grants to and gives its consent for NNOGC access to the Properties for the purpose of conducting environmental, archaeological, biological and seismic studies preparatory to operations on the OA, and the right to build and maintain pipelines, transmission lines, and other lines, including without limitation oil, gas, power and water lines incidental to the operations authorized hereunder ("Lines"). As of the Effective Date,

NNOGC is hereby authorized to conduct geophysical surveys on all, or any part of the Properties, which shall be without charge for surface damages and/or permit fees in favor of the Nation. The Nation, through its Land, Minerals, General Land Development Department and other Departments, further agrees to promptly review and approve reasonable requests of NNOGC, from time to time, of all such additional permits or authorizations as are necessary or incidental to the conduct of NNOGC's authorized activities hereunder, including without limitation permits for seismic and other studies, water usage, easements, and for the use of existing or expired rights-of-way in order that the Purposes of this Agreement, express or implied, can be fully accomplished without unnecessary or unusual delays. For all authorizations provided in this entire Section III(A), NNOGC shall comply with Navajo Nation laws governing environmental resources, including water, and cultural resources, and shall obtain the appropriate Navajo Nation environmental and cultural resource clearances, and grazing clearances, prior to any disturbance of the Properties.

IV. NNOGC'S OBLIGATIONS.

A. Delay Rental Payments. Properties for the first year of the Primary Term are held by NNOGC by payment of the Bonus, as set forth in Section II(A). As consideration to the Nation for NNOGC's holding non-producing acreage of the Properties and non-relinquished acreage of the Properties after the first year of the Primary Term, (beginning on the one-year anniversary of the Effective Date, and on each one-year anniversary thereafter for the duration of the Primary Term, NNOGC shall pay an advance annual delay rental of **$10.00 per acre** (the "Delay Rental") for any acreage of the Properties not held by a producing well and not relinquished by NNOGC prior to the Delay Rental payment date. For purposes of this Section IV(A), a single producing gas well shall hold 640 acres and a single producing oil well shall hold 160 acres of the Properties. For the sake of clarity, in no event shall NNOGC pay a Delay Rental for acreage of the Properties that are held by a producing well or for acreage of the Properties that have been relinquished by NNOGC prior to the Delay Rental payment date, nor shall NNOGC pay a Delay Rental for acreage of the Properties that has passed out of the Primary Term. Annual Delay Rental payments will be due on the Anniversary Date and shall include a complete listing and location of producing oil and gas wells within the OA Area. Delay rental payments are not recoupable against any royalty payments. Any Delay Rental not paid within ten (10) days of the Anniversary Date will be deemed late in accordance with Section IV(I) of this Agreement.

B. Annual OA Rental Payments. Beginning on the one-year anniversary of the effective date of the Secondary Term, and on each one-year anniversary thereafter for the duration of the Secondary Term, NNOGC shall pay an advance annual rental of $2.00 per acre (the "Annual OA Rental Payment") for any acreage of the Properties held by a producing well. Such Annual OA Rental Payment is due on or before the Anniversary Date and is recoupable against royalty payments. Recoupment of the Annual OA Rental Payment must be made at least one sales month after the rental is paid.

C. Oil Royalty. The Nation's royalty share of oil produced within the OA Area will be determined by applying a 20 percent royalty to the value as determined under this paragraph. The sales value of oil for royalty purposes shall be determined using the higher of the Gross Proceeds received by Operator or the oil major portion index price approved by the United States, Office of Natural Resources Revenue (or "ONRR") for the field or area ("ONRR Oil Index Based Major Portion Price") to determine the monthly weighted average oil price per barrel ("$/Barrel"), pursuant to the provisions of 30 C.F. R. § 1206.51 or any applicable substitute future regulations.

D. Gas Royalty. The Nation's royalty share of natural gas produced within the OA Area, except for helium and gases produced and sold in association therewith, will be determined by applying a 20 percent royalty to the value as determined under this paragraph. The sales value of natural gas for royalty purposes shall be the higher of the Gross Proceeds received by Operator or the gas index zone price approved by the ONRR for natural gas produced and sold from the Properties. The Operator will use the index zone price for natural gas approved by ONRR for the field or area (ONRR Gas Index Zone Price) to determine the monthly weighted average gas price ($/MMBtu), pursuant to the provisions of 30 CFR § 1206.170 or any applicable substitute future regulations.

E. Royalty In-Kind. The Nation may elect to take its royalty share of oil in-kind. If the Navajo Nation elects to take its royalty share of oil in-kind, Operator will continue to follow all Federal and Navajo Nation reporting requirements. If the Nation's share of oil taken in-kind is subject to a crude oil sale agreement between the Nation and Operator, payment for the Nation's share of oil taken in-kind shall be calculated in accordance with such agreement.

F. Helium Royalty. The Nation's royalty share of helium produced within the OA Area will be determined by applying a 20 percent royalty to the value as determined under this paragraph. The value of helium for royalty purposes shall be the gross proceeds price received by Operator for the first arm's-length sale of Crude Helium. For purposes of determining royalties, there shall be no deductions from the gross proceeds price received. If gross proceeds for royalty valuation purposes have been reduced by any costs including but not limited to marketable condition costs, marketing costs, transportation or processing costs, by the purchaser, or any other person, that value will be added back to gross proceeds for purposes of determining royalties. For purposes of determining royalties as provided herein, the point of valuation shall be the Bureau of Land Management facility measuring point.

G. NGLs, Argon, and Other Gas Production. The Nation's royalty share of natural gas liquids ("NGLs)", argon, and other gases produced within the OA Area that are not covered by Paragraphs D or F above, will be determined by applying a 20 percent royalty to the value as determined under this paragraph. The sales value of NGLs, argon and other gases produced shall be determined pursuant to the provisions of 30 C.F.R. § 1206.174.

H. Navajo Scholarship. Within ten (10) days after the Parties have fully executed this Agreement and annually thereafter until the effective date of the Secondary Term, Operator shall

pay $10,000.00 annually to the Navajo Nation Scholarship Office for its general scholarship fund. Within ten (10) days after the effective date of the Secondary Term, Operator shall pay to the Navajo Nation Scholarship Office for its general scholarship fund $2,000.00 per producing well, as defined herein, such payment which shall not be less than $15,000.00 annually (the scholarship payment "floor") nor greater than $50,000.00 annually (the scholarship payment "ceiling").

I. Payment in Lieu of Navajo Nation Taxes. Operator shall pay all applicable Navajo Nation taxes. Operator and the Navajo Nation hereby agree that for the purpose and intent of this OA, Operator shall make payments in lieu of Navajo Nation taxes related to its operation and activities, at the following rate determined to be appropriate by the Navajo Nation Minerals Department: the PILT payment will be 5%, shall be determined on the same basis upon which royalties are determined, and is not included in the 20% royalty rate established for each product under Section IV, Paragraphs C, D, F and G. However, if in the future Operator is required to pay Navajo Nation taxes pursuant to a Navajo Nation Tax Code amendment approved by the Navajo Tax Commission and Navajo Nation Council, or alternative agreement, the 5% PILT shall cease, and the royalty rate in Section IV, Paragraphs C, D, F and G shall remain 20%.

J. Late Payments. Any payment, including but without limitation, bonus, royalty, rental, damages, and taxes, not received by the Nation in a timely manner shall bear interest and applicable penalty from the date payment was due to the date payment was received by the Nation at the rate then being assessed by the ONRR.

V. COMPLIANCE WITH NAVAJO NATION AND FEDERAL REQUIREMENTS.

A. Governing Law. The rights and the obligations of the Parties shall be governed by Federal and Navajo Nation laws, specifically including the Indian Mineral Development Act of 1982, 25 U.S.C. § 2101 *et seq.*, and applicable regulations pertaining thereto. Operator agrees that the performance of this OA within the Nation is subject to the supervision, monitoring and regulations of the Nation and of any Federal agency with jurisdiction over Operator's performance of this OA. Any matter not subject to exclusive Federal regulation shall be subject to Nation regulations. Operator agrees to strictly observe all Nation laws and regulations, unless specifically waived by the Navajo Nation Council. Operator shall comply with applicable Navajo and Federal laws and regulations prior to commencement of operations and, with respect to any well plugged and abandoned by it hereunder, shall restore the surface pursuant to such regulations.

B. General Requirements. The Operator shall comply with all applicable Nation and Federal rules, regulations, permits, and laws including without limitation, the following:

Navajo preference in employment and business laws;
Environmental protection rules and regulations;
The Navajo Nation Tax Code;
Cultural resources and antiquities laws and regulations; and
The Navajo Nation Water Code.

C. Permits and Licenses. The Operator shall obtain such permits and licenses as may be required by applicable Nation and/or Federal authorities for the exploration, development, production and sale of all hydrocarbons and any related activity including the production or disposal of produced water. Operator shall not be subject to any liability, loss or forfeiture of any rights under this OA for failure to perform any obligation under this OA during the time and to the extent that the failure to do so is caused by the unreasonable withholding of approval by any such governmental agency.

D. Successors. The covenants contained in this Agreement shall extend to and be binding upon the successors and assigns of the Parties to this OA. . While the lands of the Nation are in trust or restricted status, all obligations of the Operator under this Agreement are to the United States as well as to the Nation.

E. Access to Land. Operator shall not deny access to the Operator's operations under this Agreement at any time to duly authorized employees or agents of the Nation or appropriate Federal agencies.

F. Applications for a permit to drill (APD). All APDs will be approved by the Nation and appropriate Federal agencies in a timely manner prior to the commencement of drilling operations.

G. Prudent Operator Standards. Operator shall exercise diligence at all times in the exploration, drilling, completing and operating of all wells and all associated facilities constructed in accordance with this Agreement and shall carry on all operations in a workmanlike and prudent manner, having due regard for preventing waste or destruction of hydrocarbons, contamination of surface or groundwater, contamination of soils, pollution of air, injury to workmen and the public.

H. Water Resource Protection. All water used or encountered by Operator in connection with oil and gas exploration and development under this Agreement shall be in accordance with applicable Nation and Federal laws and regulations.

I. Dry Holes. Subject to applicable Nation and Federal regulations, Operator shall have the right to use for disposal, injection, or water production any well it drills that is determined to be incapable of producing hydrocarbons in paying quantities. Operator shall plug and abandon any dry hole in accordance with applicable Nation and Federal laws and regulations.

J. Dewatering. Dewatering of any geologic formation by a well or wells drilling the OA Area by Operator in conjunction with hydrocarbon testing or production shall be in accordance with applicable Nation and Federal laws and regulations.

K. Protection of Coal and Other Mineral Resources. Operator shall conduct all oil and gas exploration and development activities in a manner that minimizes the damage to coal deposits or other mineral deposits within the OA Area. Operator has no rights to coal matrix material, water

(except for water produced, removed, re-injected or disposed of as a result of hydrocarbon production), or to other mineral resources within the OA Area.

L. Surface Protection. Operator shall comply with applicable Nation and Federal laws and regulations concerning use of the surface of the OA Area, location of wells, production facilities, access and production equipment rights-of-way in the OA Area and across other lands of the Nation. Before any surface-disturbing activities commence, Operator shall obtain the necessary Nation and Federal approvals, including but not limited to payment of the project review processing fee, surface damage payments, archeological/cultural and environmental surveys and/or assessments, customary land user consent, required surety bonds and consideration to the Nation. Operator shall not be required to pay right-of-way consideration to the Nation for oil and gas production-related rights-of-way within the OA Area.

VI. GENERAL REPORTING PROCEDURES.

A. Periodic Drilling Reports. Operator shall notify the Navajo Nation Minerals Department prior to the commencement of any well drilling operation, and thereafter shall provide drilling reports showing the progress of said well. Operator shall also provide notification of testing of any well and/or geologic formation at least forty-eight (48) hours prior to such testing in order that a representative of the Nation has the opportunity to witness such testing.

B. Copies of Reports and Tests. Operator shall provide the Navajo Nation Minerals Department with copies of all log runs, drill stem tests, geological reports, and other related documentation in connection with the well within thirty (30) days of conducting such log runs and tests. In addition, Operator shall provide on a quarterly basis all data, including but not limited to maps, drill logs, core analyses, surveys, production records, and seismic data obtained by Operator for the OA Area.

C. Production and Royalty Reports. Operator shall submit all required monthly production and royalty reports to the Navajo Nation Minerals Department and Federal government in accordance with Nation and Federal regulations. All OA rental and royalty payments shall be submitted to the Navajo Nation's Royalty Lockbox Account with a corresponding Form ONRR-2014, Report of Sales and Royalty Remittance submitted to the Office of Natural Resources Revenue. Operator shall notify the Navajo Nation Minerals Department and the Bureau of Land Management in writing if any extraordinary events occur, including but not limited to, the shutting-in of any well for a period of thirty (30) days or longer.

D. Well Information. Operator will provide the Navajo Nation Minerals Department the following information if obtained by Operator for each well drilled, completed, reworked, or plugged and abandoned pursuant to the OA:

Logs
Core Analysis

Drill Stem Tests
Revised Structure and Isopach Maps, if available
Location Plat & Schematics
Drilling Summary
Directional Survey
Geological Report
Production Test Data
Bottom Hole Pressure Surveys
Gas, Oil and/or Water Analyses
Completion Reports
Work Over Reports
Plugging and Abandonment Reports
Monthly Production and Sales Reports

E. Seismic Data. Operator shall provide the Navajo Nation Minerals Department with copies of all data, conclusions, and interpretations generated by or resulting from seismic surveys upon completion of the survey within the OA Area.

F. Sole Owner of Seismic Data; Operator License. The Navajo Nation is the sole owner of all seismic data. Operator shall deliver all originals and copies of seismic data, interpretations therefrom, including all such information in digital form, to the Nation, if such data and information is obtained by Operator. The Nation hereby grants Operator a free non-revocable license to access and use all data and information pertaining to the OA Area for the duration of the OA. The Nation also hereby grants Operator a three (3) year non-revocable and exclusive license for Operator to use all data and information obtained or generated by Operator, its agents, and its consultants, including but not limited to maps, drill logs, core analyses, surveys, production records, and seismic data, during which three (3) year period such data and information shall be kept in strict confidence by the Navajo Nation Minerals Department and shall not be disclosed by the Nation to any third party; provided, however, that during such three (3) year license period, Operator shall have an exclusive right to exchange or trade such data or information with third parties under a sublicense, which sublicense shall not be longer than the three (3) year license period. Such three (3) year license period shall commence on the date that Operator delivers the data and/or information to the Nation.

VII. GENERAL PROVISIONS.

A. Indemnification and Insurance.

1. Indemnification. Operator assumes all risk of personal injury to or death of its employees. Operator agrees to indemnify and hold the Nation and the Secretary and their agents, employees, licensees, customary land users, permittees and tenants harmless from all claims, liability and causes of action alleging bodily injury or property damage asserted against the Operator, its agents, employees and subcontractors or any third-party which may arise by reason

of the operations of the Operator, its agents, employees and subcontractors, including any negligent omissions in connection with such operations.

2. Minimum Insurance Requirements. The Operator shall maintain and shall require its contractors and subcontractors to maintain all insurance required under all applicable laws and regulations. Operator shall carry the following minimum insurance naming both the Nation and the Operator as insured:

a. Comprehensive public liability insurance with limits of not less than $300,000.00 for each accident and $1,000,000.00 for death or injury of one person.
b. Comprehensive public liability property damage insurance with limits of not less than $1,000,000.00 for each accident and $5,000,000.00 aggregate per policy.
c. Automobile public liability insurance with limits of $300,000.00 for the death or injury of one person and $1,000,000.00 for each accident.
d. Workers' compensation insurance in the Operator's name in the amount established by Navajo law.

3. Certificates of Insurance. Certificates of insurance naming the Nation and the Secretary as additional insured for all said policies will be furnished the Nation within a reasonable time after receipt.

B. Dispute Resolution and Navajo Nation Jurisdiction.

1. Sovereignty of the Nation. Nothing contained herein shall be interpreted as constituting a waiver, express or implied, of the sovereign immunity of the Nation or NNOGC.

2. Royalties. Any dispute between the Parties involving royalties due under Section IV, Paragraphs C, D, F and G of the OA shall be resolved in accordance with the requirements and procedures contained in ONRR's regulations, including 30 C.F.R. Part 1241, or any applicable substitute future regulations. Any other dispute between the Parties concerning the OA shall be resolved in accordance with this Section VII, Paragraph B.

3. Negotiation. In the event of any dispute, the Parties shall use their good faith efforts to resolve the dispute, and each Party shall continue to perform in accordance with the other provisions of this OA during the pendency of the dispute. As a first step to resolving any dispute, the Parties shall attempt to negotiate a just and equitable settlement thereof. Each Party will communicate and/or meet with the other in good faith and attempt to reach a solution satisfactory to both Parties. If either Party fails or refuses to participate in such negotiations or such negotiations do not result in the Parties resolving the dispute within twenty (20) working days after one Party has requested that negotiation begin (and the period is not extended with the consent of the Parties), then either Party may cause the dispute to be referred to arbitration.

4. Arbitration. If such efforts in Section VII(B)(2) are unsuccessful in reaching a resolution of the Parties' dispute within 60 calendar days of commencement of the negotiations, then either party may invoke arbitration according to the procedures referenced in the Navajo Sovereign Immunity Act, as amended, at 1 N.N.C. §554(J) and §554(K), and as set forth in the Navajo Nation Arbitration Act, as amended, at 7 N.N.C. §§1101 *et seq.* Such arbitration shall be conducted in accordance with the Commercial Arbitration Rules of the American Arbitration Association, except to the extent such rules are modified by the following:

a. unless otherwise agreed to in writing by the Parties, all arbitration procedures shall be held in Window Rock, Arizona; and
b. the arbitration shall be conducted by a single arbitrator selected by the Navajo Nation, unless any claim, individually, or in the aggregate, exceeds $1,000,000.00, exclusive of interests, costs and fees; in such case the arbitration shall be conducted by a panel of three (3) arbitrators, each party selecting one (1) arbitrator, with the two arbitrators choosing the third; at least one arbitrator shall possess at least ten (10) years' experience in Federal Indian Law; and
c. notice of intent to invoke arbitration shall be filed in strict compliance with the notice requirements of the Navajo Sovereign Immunity Act, 1 N.N.C. § 555; and
d. whether as a result of an arbitration provided for herein or of any judicial action to enforce an arbitration award resulting from such arbitration, any award against the Nation shall be in strict conformance with the provisions of 1 N.N.C. § 554(K)(1-6); and
e. whether in the context of an arbitration provided for herein or of any judicial action to enforce an arbitration award resulting from such arbitration, the laws of the Nation shall exclusively govern the interpretation of this OA, the arbitration provisions set forth herein and the arbitration procedures conducted pursuant thereto, and the application of all the provisions herein to the Operator and its subcontractors, agents, representatives, employees, or consultants; and
f. pursuant to 1 N.N.C. §554(K) and 7 N.N.C. §1102, the appropriate Navajo Nation District Court shall have exclusive jurisdiction to compel the Nation's participation in an arbitration, and shall have exclusive jurisdiction to enforce, modify, or vacate an arbitration award resulting from such arbitration; neither Party may recover from the other any attorneys fees or costs.

5. Jurisdiction. There is expressly reserved to the Nation full territorial legislative, executive and judicial jurisdiction over the OA area under the OA and all lands burdened by the OA, including without limitation over all persons, including the public, and all activities conducted or otherwise occurring within the OA area under the OA and all lands burdened by the OA shall be and forever remain Navajo Indian Country for purposes of Nation jurisdiction.

6. Waiver of suit: The negotiation and arbitration provisions herein shall constitute the sole and exclusive procedural remedy to any dispute or controversy arising out of this Contract. Commencement of negations or arbitration shall be a complete defense to any suit, claim, action or proceeding instituted in any Federal, state, or tribal court or any administrative tribunal, with respect to any dispute or controversy arising out of this Agreement that is negotiated or arbitrated as set forth herein.

7. Post-termination; post-expiration: The dispute resolution provisions of this Agreement shall, with respect to such any dispute or controversy arising out of this Agreement, survive the termination or expiration of this Agreement.

8. Challenges limited. By entering into this Agreement, NNOGC expressly covenants and agrees that it shall not contest or challenge the territorial, administrative, legislative, executive or judicial jurisdiction of the Navajo Nation on the basis that such jurisdiction is inconsistent with the status of the Navajo Nation as an Indian tribal Nation, or that the Navajo Nation government is not a government of general jurisdiction, or that the Navajo Nation government does not possess full police power (i.e. the power to legislate and regulate for the public's general health and welfare) over all lands, persons, activities, transactions, or occurrences within its territorial boundaries, or on any other basis not generally applicable in a similar challenge to the jurisdiction of a state government.

C. Force Majeure.

1. Force Majeure Defined. For purposes of this OA, Force Majeure is defined to include strikes, insurrections, demonstrations, terrorist activities, explosions, acts of God, floods, storms, fires, epidemics and unavoidable accidents.

2. Effect of Force Majeure. Operator shall not be deemed to be in violation or breach of any obligation under this OA during the time and to the extent that it is prevented from or delayed in performing such obligation by Force Majeure.

3. Situations Exempt from this Section. Nothing in this Section shall be construed as compelling Operator to settle any labor dispute contrary to its wishes, or as preventing Operator from testing the validity of any local, tribal, or Federal order, regulation or law through available administrative, arbitral, or judicial proceedings.

D. Assignment Procedures.

1. Approval of the Nation and Secretary. Operator shall not assign, sell, exchange, lease or otherwise dispose of all or any part of its interests under this OA without the prior written approval of the Nation as provided in 18 N. N. C. § 605 and the Secretary in accordance with applicable Nation and Federal laws and regulations. Any successor or assign shall agree in the applicable assignment or other appropriate agreement to be bound by all the terms and conditions

of this OA. Among other things, the assignee shall be required to comply with all Navajo Nation tax laws. For the avoidance of doubt, Section IV(I) of the OA does not apply to any assignee of the Operator. If the OA is to be assigned, Operator also understands that the assignee shall negotiate new royalty rates with the Navajo Nation Minerals Department prior to the Nation's approval of the assignment.

2. Unconsented Assignment Void. Any assignment, sale, exchange, lease or other transfer of Operator's interest without the Nation's prior written approval shall be null and void.

3. Operator Retains a Majority Interest. Operator will always retain at least an undivided fifty-one (51) percent interest in the OA Area and this OA for so long as this OA remains in full force and effect. Any attempt by Operator to assign, sell, exchange, lease or otherwise dispose of more than an undivided cumulative forty-nine percent (49%) interest in the OA Area and this OA at any time during the Primary or Secondary Terms shall be null and void.

4. Navajo Nation Right of First Refusal. Should Operator desire to assign or sell all or part of its operating interests under this OA, it shall comply with applicable Navajo laws, including, but not limited to, 18 N.N.C. § 605 as such law may be amended from time to time.

E. Notices. All notices and communications required or permitted hereunder shall be in writing and shall be deemed to have been duly made if actually delivered to, or mailed by registered or certified mail, postage prepaid, addressed to the parties at the following addresses. Written notice may also be given by facsimile transmission and shall be effective upon receipt of the transmission. Either party may, by written communication so delivered to the other, change the name or address to which delivery thereafter shall be made.

To or upon the Nation:

Navajo Nation
Attn: Office of the President
P.O. Box 9000
Window Rock, AZ 86515
Phone: 928-871-6352
Fax: 928-871-4025

Navajo Nation Minerals Department
Attn: Department Director
P.O. Box 1910
Window Rock, AZ 86515
Phone: 928-871-6587
Fax: 928-871-7095

To or upon the Secretary:

Regional Director
Navajo Region
Bureau of Indian Affairs
United States Department of Interior
301 West Hill Street
Post Office Box 1060
Gallup, New Mexico 87305

To or upon the Operator:

Navajo Nation Oil and Gas Company
Attn: Chief Executive Officer
P.O. Box 4439
Window Rock, AZ 86515
Phone: (928) 871-4880
Fax: (928) 871-4882

Phone: 505-863-8314
Fax: 505-863-8324

F. Severability. The invalidity of any term or provision of this OA shall not affect the validity of any other provision herein, and the parties shall negotiate in good faith to enter into an agreement amending any such provision in a manner to make it valid, legal and enforceable while retaining the original intent of the parties with regard to such term or provision.

G. Bankruptcy. In the event of insolvency, bankruptcy or receivership of the Operator, or its successors, devisees, and assignees, this OA and all other agreements, easements, permits, and approvals pertinent hereto shall be voidable at the sole discretion of the Nation as to any lands not held by oil and gas production within the OA Area pursuant to Section II.

H. Navajo Nation Court Jurisdiction. Except to the extent specifically committed to arbitration by this OA, the courts of the Navajo Nation shall have jurisdiction over all disputes between the Nation and Operator relating to this OA.

I. Default and Termination.

1. Default by Operator. In the event of any material default by Operator in the performance of its obligations under this OA, the Nation shall give Operator notice specifying the default. If Operator does not, within thirty (30) days of receipt of the notice, correct the default or initiate diligent efforts to correct the default, the Nation may terminate this OA by delivering a termination notice to Operator, subject to Operator's rights as provided in paragraph (4), below, and subject to Section VII(B).

2. Reclamation. Upon expiration or termination of this OA or partial or complete relinquishment of lands within the OA Area, Operator shall surrender the OA Area or a portion of the OA Area, as applicable, in a condition that complies with applicable Nation and Federal laws. It shall be the obligation of Operator to restore those areas within the OA Area disturbed by Operator or its subcontractors, pursuant to approved reclamation plans and in compliance with all applicable laws, statutes, regulations and administrative orders.

3. Final Data. Upon expiration or termination of this OA or of the partial or total relinquishment of lands within the OA Area, the Nation shall become the owner of all data in Operator's possession or control relating to the expired, terminated, or relinquished lands. Within sixty (60) days after the expiration or termination of this OA of partial relinquishment of lands within the OA Area, Operator shall deliver to the Nation all such data that Operator has not previously furnished to the Nation. Operator may retain access to all such data for area studies and further evaluation for use in future exploration for as long as this OA remains in-force.

4. Removal of Improvements, Equipment, and Stockpiled Products. Operator shall have the right of ingress and egress for ninety (90) days after expiration or termination of this OA

or after partial or total relinquishment of lands within the OA Area, to remove its property from the affected portions of the OA Area, subject to the following restrictions:

a. Operator may not remove casing in wells and other material, equipment and structures necessary for the continued operation of wells producing or capable of producing Hydrocarbons in paying quantities as determined by the Navajo Nation Minerals Department and the Secretary. Unless refused by the Nation, all such casing in wells, material, structures and equipment shall be and become the property of the Nation when this OA expires.
b. Operator may not remove any property from the OA Area if Operator has outstanding financial obligations to the Nation related to this OA.

J. Department of Justice Approval. Pursuant to 1 N.N.C. § 554(J)(2) and (K)(2), Navajo Nation Department of Justice Approval is required for all agreements that include a limited waiver of sovereign immunity to compel or enforce arbitration under the Navajo Nation Arbitration Act, as amended, 7 N.N.C. § 1101 et seq.

Navajo Nation Department of Justice

7/20/21
Date

[SIGNATURES ON NEXT PAGE]

SIGNATURES

NAVAJO NATION (LESSOR)

By: _____ _____
Jonathan Nez, President Date

NAVAJO NATION OIL AND GAS COMPANY (OPERATOR)

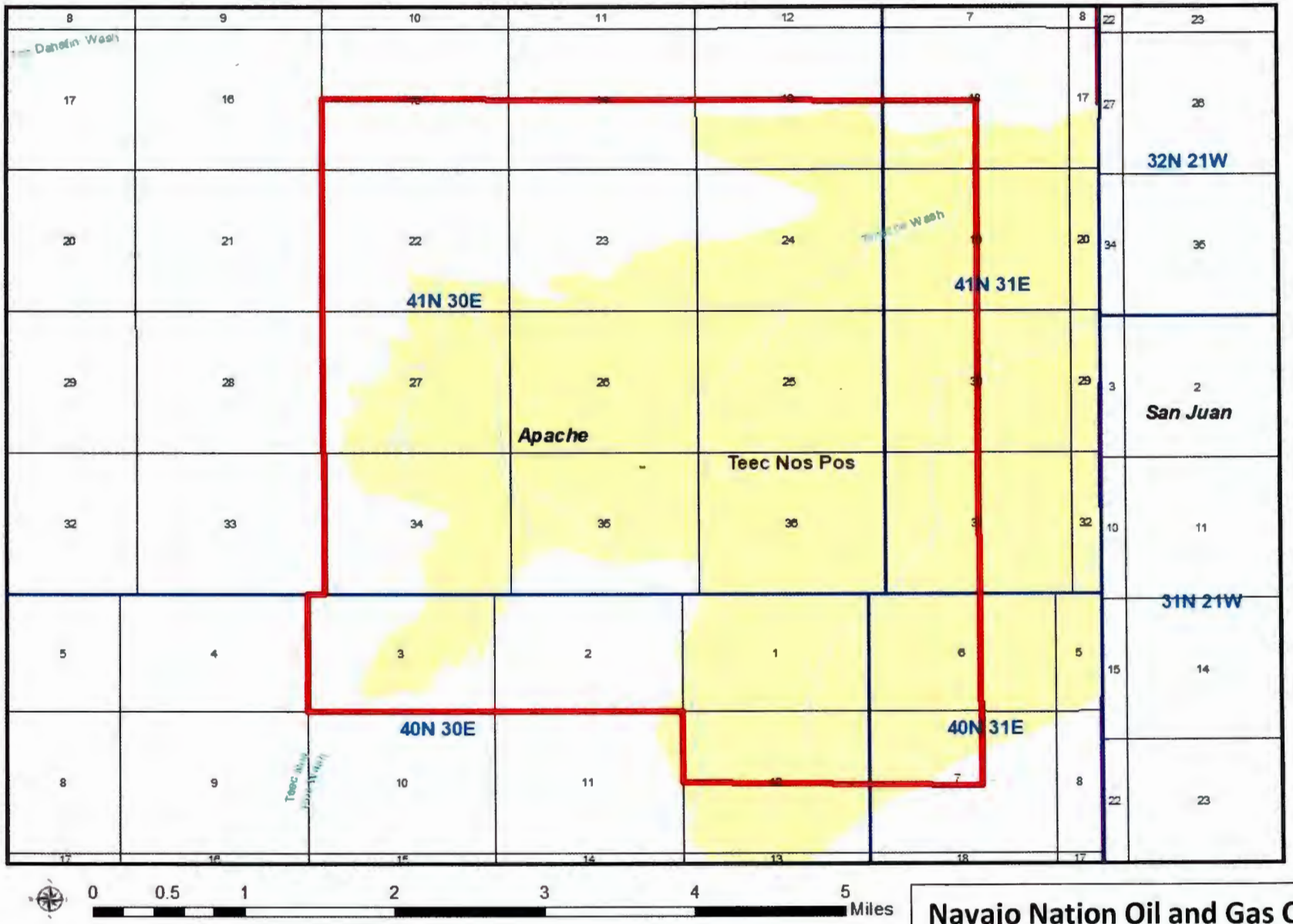
By: _____ 6/29/21
James R. McClure, Chief Executive Officer Date

CERTIFICATE OF APPROVAL

APPROVED PURSUANT TO THE INDIAN MINERAL DEVELOPMENT ACT OF 1982:

By: _____
Regional Director
Navajo Region
Bureau of Indian Affairs
U.S. Department of the Interior

Date: _____



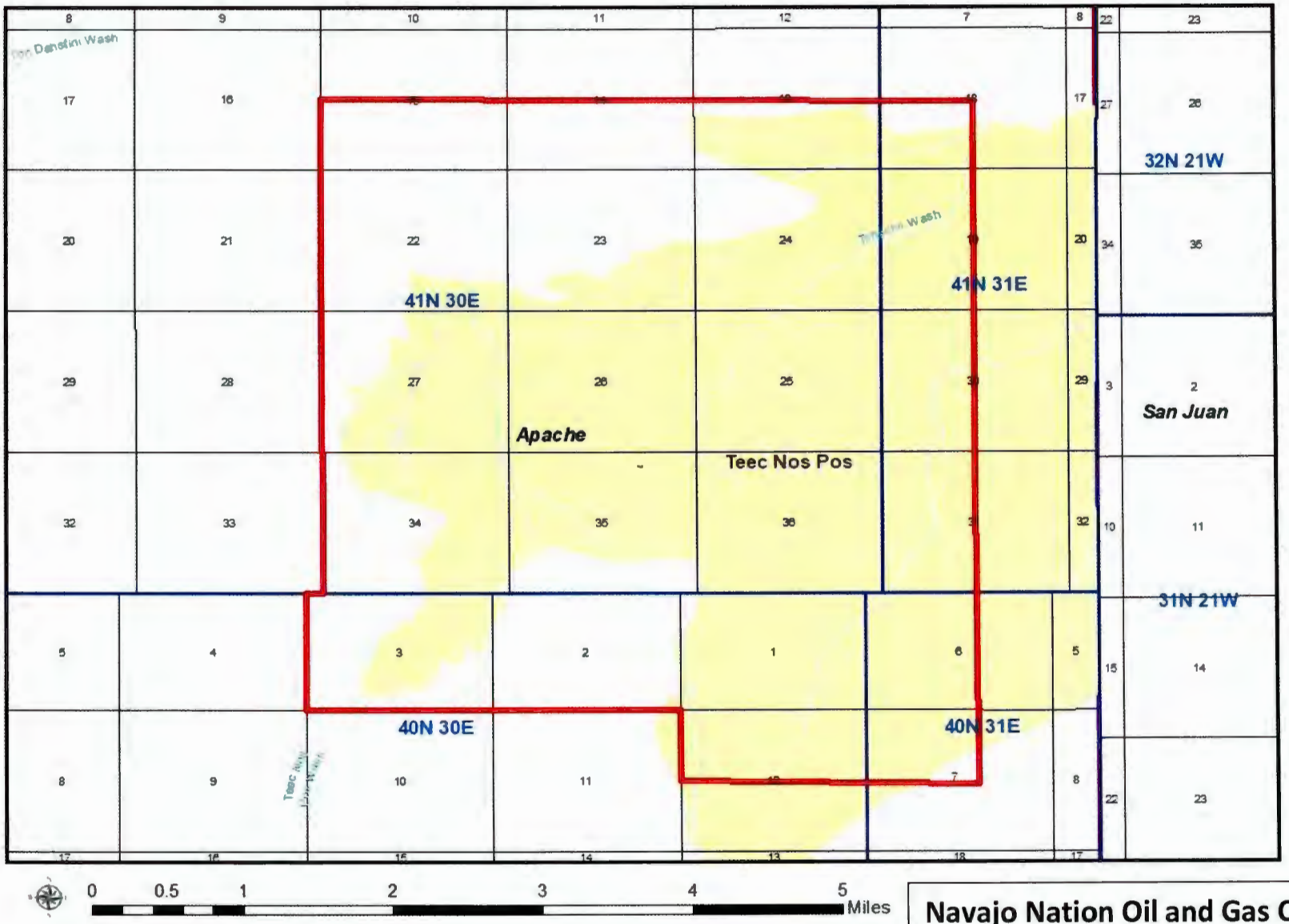
Navajo Nation Oil and Gas Company

Tohache Wash

Exhibit A - Reference Map

May 27, 2021

Attachment A



Navajo Nation Oil and Gas Company

Tohache Wash

Exhibit A - Reference Map

May 27, 2021

EXHIBIT
C-1

PROGRAMMATIC ENVIRONMENTAL ASSESSMENT OF THE TOHACHE WASH PROJECT FOR NAVAJO NATION OIL & GAS COMPPANY APACHE COUNTY, ARIZONA

SUBMITTED TO THE
DEPT. OF INTERIOR FOR NEPA REVIEW

LEAD OFFICE: BUREAU OF INDIAN AFFAIRS
AGENCY: SHIPROCK
CHAPTER: TEEC NOS POS

TOPOGRAPHIC MAP: TEEC NOS POS

Proposed By:
NAVAJO NATION OIL & GAS COMPPANY
50 NARBONO CIRCLE WEST
ST. MICHAELS AZ 86511

Prepared by
BRIAN WOOD

MAY 9, 2021

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1.0 PURPOSE OF AND NEED FOR ACTION

1.1 SUMMARY OF PROPOSED ACTION

Navajo Nation Oil & Gas Company (NNOGC) of 50 Narbono Circle West, St. Michaels, AZ 86511 has negotiated a Minerals Agreement ("Agreement") with the Navajo Nation as allowed under the Indian Mineral Development Act of 1982. Bureau of Indian Affairs (BIA) approval of the Agreement would give NNOGC the exclusive right to explore for and produce oil and gas on 10,187.885 acres ("acreage") in Apache County, Arizona. Land details are:

T. 40 N., R. 30 E.
all Sections 1 - 3
N2 Section 12

T. 40 N., R. 31 E.
W2 Section 6
NW4 Section 7

T. 41 N., R. 30 E.
S2 Section 13
S2 Section 14
S2 Section 15
all Sections 22 - 27
all Sections 34 - 36

T. 41 N., R. 31 E.
SW4 Section 18
W2 Section 19
W2 Section 30
W2 Section 31

The next step in the process is BIA approval or disapproval of the agreement, in whole or in part. This constitutes a Federal action under the National Environmental Policy Act. BIA approval, whether in whole or in part, will not be a blanket approval. Subsequent actions (e. g., geophysical projects, wells, pipelines,

etc.) will require project specific applications, archaeology and biology inspections, NEPA reviews, and Tribal and Federal approvals.

This document was developed, and future documents will be developed, in accordance with the National Environmental Policy Act (NEPA). Numerous government agencies, depending on the project, will be involved before ground disturbance can be approved. These agencies include the Navajo Nation (Environmental Protection Agency, Historic Preservation Department, Fish and Wildlife Department, Natural Heritage Program, Minerals Department, Department of Justice, General Land Development, Project Review Office, Resources Committee), Bureau of Land Management, Bureau of Indian Affairs, U. S. Army Corps of Engineers, Apache County, Arizona Oil and Gas Conservation Commission, etc.

Other national and Tribal statutes, regulations, and executive orders considered in the preparation of this Programmatic Environmental Assessment and future NEPA documents include:

- Indian Minerals Development Act of 1982 (25 USC 2101-2108)
- Resource Conservation and Recovery Act of 1976, as amended by the Hazardous and Solid Waste Amendments of 1984 (42 USC 3251)
- Environmental Justice (Executive Order 12898)
- Floodplain Management (EO 11988)
- Protection of Wetlands (EO 11990)
- Endangered Species Act (42 USC 1531)
- Migratory Bird Treaty Act of 1918
- National Historic Preservation Act (16 USC 470)
- Protection of Historic Properties (36 CFR 800)
- Navajo Nation Cultural Resources Protection Act (NNCRPA CMY-19-88)
- Navajo Nation Policy of Protection of Jischaá: Graves, Human Remains, and Funerary Items
- Navajo Nation Policy to Protect Traditional Cultural Properties
- Clean Air Act (42 USC 7401)

- Clean Water Act (33 USC 12510

The preceding list is not exclusive. However, it does list the more significant laws, regulations, and executive orders that would be considered for future actions associated with exploration and development.

The issuance of a "Finding of No Significant Impact" statement for the Programmatic Environmental Assessment from the BIA does not authorize the applicant to engage in ground disturbing activities until further site-specific NEPA analysis is completed. This would include site-specific cultural surveys and biological surveys in compliance with the National Historic Preservation Act and the Endangered Species Act, respectively. The proposed action outlined in this environmental analysis will merely encumber the land for potential oil and gas development through a lease.

BIA approval of the Agreement will give NNOGC the right and obligation to explore for and produce oil and gas. Much of the acreage has previously been leased (14-20-603-401, 14-20-603-715, 14-20-603-716, 14-20-603-4165, N00-C-14-20-2244, N00-C-14-20-4433, & NOG-8202-1116) for oil and gas. NOG-8202-1116 was a 252,625 acre Agreement approved in 1988. None of the 10,187.885 acres is currently leased for oil and gas.

Fifteen oil and gas wells have been drilled within the 10,187.885 acres. Over half found oil and/or gas. First well was drilled in 1956. The last well was plugged in 1999. All targeted the Ismay (≈5,000' deep) or deeper formations. Deepest well was 7230', which bottomed in Pre-Cambrian granite. Age of productive formations ranged from Pennsylvanian through Devonian.

The acreage overlaps three Arizona Oil and Gas Conservation Commission designated oil and gas fields – Bita Peak, Teec Nos Pos, and Tohache Wash. Bita Peak produced 12,528 barrels of oil and 2,376,948 Mcf of methane before being plugged. Teec Nos Pos produced 486,341 barrels of oil and 1,427,866 Mcf of methane before being plugged. Tohache Wash produced 764 barrels of oil, 328 Mcf of methane, and 385,774 Mcf of helium before being plugged.

Production could also be sought in shallower (≈3,000' deep) Permian age sandstones. Boundary Butte Field, ≈23 miles northwest of the acreage, has produced over 5,631,717 barrels of oil and 13,951,664 Mcf of gas since 1948.

Maximum projected development will be 1 well pad per quarter section, or 64 well pads for the 10,187.885 acres. Spacing is a function of pressure, production history, time, depth, and other factors (e. g., terrain, archaeology, land use, special flora or fauna species).

NAVAJO PETROLEUM

A well can be completed in multiple zones. For example, in southeast Utah, Desert Creek and Ismay oil zones produce through the same well bore. This is called a dual completion and results in fewer wells. However, due to reservoir characteristics (e. g., different pressures, temperatures, or fluids), it is not possible to complete all wells as dual producers.

To best assess cumulative impacts, it will be assumed 60 well pads may eventually be built. There could be multiple wells on each pad (i. e., two or more wells bores on one pad), but a maximum of 60 well pads are projected. Well pads will range in size from 1.46 to 5.00 acres depending on depth, type (horizontal or directional well will need more space than a vertical well), and the number of wells on each pad. The wells could be dual completions (i. e., 2 oil zones in 1 well bore).

Fifteen oil or gas wells have been drilled to date on the acreage. All the wells were plugged and abandoned (P & A). Therefore, the 60 well pads projected should be viewed as a maximum rather than as a minimum. The location of the well pads will be a function of geology, terrain, cultural resources, biological resources, etc. The number of wells drilled is a dynamic function of gas and oil prices, competing energy prices, price stability, demand (local, national, and international), taxes (energy, severance, property, sales, income), funding and capital, attraction of competing investments (bonds, stocks), attraction of competing lands (other Trust lands, states, or countries) for investment, fluid quality (waxy crude and high water volumes raise costs), reservoir extent, technology, regulatory practices, success rate, terrain, cultural and biological resources, etc.

EXPLORATION

Exploration starts by reviewing maps, well histories, geochemical and geophysical data, well logs, geology studies, and other research. Using this data, scientists develop maps to describe strata and structures which may be found while drilling. Plan and profile view maps show the relative position, area, and depth of underground strata. A model may be made from the data to indicate the most promising site(s) to drill.

Both the Ismay and Desert Creek are Pennsylvanian age (≈310 million years ago) carbonate rocks. Ismay and Desert Creek reservoirs are generally stratigraphic traps, not structural. Stratigraphic traps are not visible on the surface, unlike structural traps (e. g., anticline). Stratigraphic traps are due to subtle changes in rock type caused by different porosity and permeability.

Geologists believe the depositional environment for the Ismay and Desert Creek was a shallow ocean in which algal mounds formed on a submarine mud bar.

After hundreds of millions of years of erosion and deposition, oil and gas formed in parts of the now fossilized mounds. Wells drilled on the tops of the mounds may find oil and gas. Wells drilled on the flanks of the mounds may find less oil and gas, or no oil and gas. Six of the fifteen wells drilled on the acreage did not produce.

Mississippian (≈340 million years ago) and Devonian (≈390 million years ago) reservoirs are structural traps and marine deposits. The Mississippian reservoir rock is limestone. The Devonian is dolomite and shale. Only one of the three wells that drilled through the Mississippian and Devonian rocks produced from those rocks.

A well which finds small amounts of oil may not be economic to operate if large volumes of water must be pumped and disposed. For example, 4.97 barrels of water were produced for each barrel of oil in the nearby Aneth Field in 1985. The ratio had more than doubled to 12.65 in 2020. Two wells on the acreage were converted to water disposal wells in the mile deep Ismay formation.

Geophysical (aka, seismic) data may provide the information which will indicate where, if any, stratigraphic reservoir rock may be found. Terrain, geology, land uses, economics, and technology determine which seismic energy source will yield the best data under given circumstances.

Seismic lines may be run to provide a two or three-dimensional view of the subsurface. Two-D seismic lines have the source and receivers in line. Two-D seismic lines were run on the Acreage as early as 1956. Three-D seismic lines have the source and receiver lines at right angles. Seismic data can map a possible reservoir, but only drilling will reveal what is actually in a reservoir.

An application package detailing where and how seismic lines will be run must be approved before seismic data acquisition operations start. Typical requirements include conducting archaeology and Threatened & Endangered (T & E) species surveys, writing an environmental assessment (EA), obtaining the consent of the grazing permittees, and paying fees. The application package will be submitted to the Navajo Nation and BIA for review and approval.

First action on the ground is to survey (flag, stake, and measure with GPS) the source lines, receiver lines, and access routes to the lines for archaeologists and biologists to inspect. This is authorized by the Navajo Nation via a Walk-On Permit.

A survey crew can include a dozen or more people and half a dozen pick-up trucks or all-terrain vehicles (ATVs). ATVs and any other off-road vehicles will be power washed off the reservation at a commercial car wash to avoid the introduction of noxious weeds. Surveyors flag the lines, specific points on the lines, and off-line access routes. This phase is only to map source and receiver line routes and show archaeologists and biologists where to inspect. They will inspect the lines,

routes, and buffer zones on each side of the lines and routes. Actual seismic data acquisition operations will not occur until after full project approval by the Navajo Nation and BIA.

This is a dynamic process. Archaeologists and biologists follow the surveyors and move lines or routes around any significant locations. After a line or route is moved, then the survey crew flags the new line or route. Once all inspections and flagging are complete, then the survey crew generates a map and measures the length of each line or route. Archaeologists and biologists then use the surveyors' map and measurements to prepare their reports. The same information is used in the preparation of the application and EA.

An archaeology report is submitted to the Navajo Nation Historic Preservation Department and a biological assessment (BA) is submitted to the Navajo Natural Heritage Program at the completion of the flagging and inspections. An EA, including the archaeology report and BA, is prepared. Surface disturbance is not allowed until the EA is reviewed, a FONSI (Finding of No Significant Impact) issued, and the permit approved by the Navajo Nation and BIA.

Seismographs record variations in how rocks reflect energy waves. Reflections vary with energy source and rock type, depth, density, and dip. Underground explosions or vibrations generate the energy waves.

The reflected waves are received at the surface by fist size devices called geophones. Geophones convert sound waves into electric signals that, via cables, are recorded. The data is processed by computers to display graphs of geologic structures and strata below and around a seismic line.

Energy wave source will be determined by target depth, terrain, proximity to homes and utility lines, environmental concerns, and type of data sought. Vibrators and controlled underground detonations are the most common sound wave sources. Vibrators are usually cheaper, but can have poorer resolution. On the other hand, vibrators may be preferable to drilling shot holes in a developed area where underground utilities could be cut by a drill. Vibrators also offer more operational flexibility during data acquisition than shot holes.

Vibrator trucks emit energy waves by vibrating a heavy plate set on the ground. (The plate is not dropped.) They normally travel in groups of three or more. The plates are simultaneously vibrated. A truck can hydraulically exert more than 30,000 pounds of energy to send a sound pulse into the ground.

Shot holes are another source of energy waves. Five-inch diameter holes are drilled to bedrock and loaded with dynamite. Holes are drilled 110' to 330' apart by a truck mounted drill. The truck minimizes impacts by being self-leveling. A pad is

not bladed. Fewer drill trucks can be used than vibrator trucks for a similar project. NNOGC ran a 3-D seismic project at Desert Creek in 2019. Three percent of the source point were shot holes.

One shot hole is electrically detonated at a time. The detonation, if audible at all, is a muffled thump at the surface. The only evidence of a shot hole is the blasting cap wire. No crater results. Blasting cap wires are cut off below grade and the hole filled with soil and rock to the surface. If water is encountered, then the hole is plugged with bentonite (clay that expands when wet). If artesian water is encountered, then the hole is plugged with cement. Dynamite is kept in a federally (Bureau of Alcohol, Tobacco, and Firearms) approved locked, guarded, and fire and bulletproof steel box posted with warning signs. The location could be on or off the Acreage. Tribal, county, and state police are notified of its location.

Once an area is ready to be shot or vibrated, geophones and cables are strung along the lines to be recorded. Cables connect seismic recorders in a truck or portable hut (aka, the doghouse) with geophones. The doghouse is in the center of as much as a four-mile long line.

Geophones are jug shaped plastic cases containing a magnet, wire coil, and spring. Wires lead from the geophone to the doghouse. The difference in movement between the coil and magnet created by a reflected signal generates an electric current. The electric current is recorded as a series of lines on the seismic display in the doghouse.

A geophone crew lays out the cables. The cable, similar to a TV cable, is a half inch in diameter and can be over two miles long. Once a record had been made of the reflected signal, then geophones and cables are moved along the line. This procedure is repeated until the survey is complete.

After all the data has been recorded, a crew collects the cables, geophones, and survey markers. A reclamation crew contours, harrows, water bars, rakes out ruts, seeds, and scatters limbs to BIA or Tribal specifications. A botanist approved by the Navajo Natural Heritage Program will make an inspection within one month of the completion of operations and an annual inspection until reclamation and weed control are satisfactory. If weed control is necessary, then NNOGC will contract with a Tribally approved herbicide applicator.

WELL CONSTRUCTION & DRILLING

Once a potential well site is determined, NNOGC will notify the Navajo Nation of its intent to survey. A registered land surveyor will locate the well site and mark it with a steel post, wood stakes, and flagging.

NNOGC will then schedule an on-site inspection. Representatives from the Navajo Nation, NNOGC, and BIA will inspect the project together. The on-site goal is to form a consensus on the suitability of the project and how to avoid or mitigate impacts. This may cause a well, road, pipeline, or power line to be moved.

The project will also be inspected for archaeology, special species, and special species habitat. A minimum 50' buffer zone beyond the construction footprint will be inspected. Raptor surveys will cover a mile radius. The archaeologist submits a report for approval by the Historic Preservation Department and BIA. Biologists submit reports or a BA for approval by the Navajo Natural Heritage Program.

Mitigation measures identified at or after the on-site inspection are included in a site-specific EA, Application for Permit to Drill (APD), or attached to the APD as conditions of approval by the Navajo Nation, BIA, or BLM. An APD has two parts, down hole program and surface use program.

A down hole program describes at what depth formations will be found; whether they hold water, oil, gas, or other minerals; how aquifers will be protected; how much pressure will be found and how it will be controlled; what type of casing and cement will be used to guarantee well bore integrity and protect aquifers; and what evaluations will be used to detect oil or gas.

A surface use program describes roads and how they will be built, upgraded, and maintained; where and what type of production equipment will be installed; water source; construction methods and material for the road, pad, and reserve pit; waste disposal; and reclamation.

Maximum use will be made of existing roads to minimize disturbance. Travel surface must be ≥12' wide to permit drill rig passage. A 20' wide construction corridor allows for crowning, ditching, and culvert installation. The road may be flat bladed for drilling, and crowned and ditched if production results. The latter is usually postponed until production results to justify the extra land use. Gates and cattle guards will be installed in functional fences.

Typically, ≈25 trucks travel to a well daily during drilling. One to two trucks visit a well daily during production. Roads will be maintained and repaired as needed. Sandy roads may require rock surfacing. Rock would be hauled from pits north of the San Juan River.

Well site construction starts by grading and stockpiling topsoil for reclamation. Construction will stop when wet soil results in ruts ≥6" deep. Site (pad and pit) size depends on well depth and type, rig size, and completion plan. A mile deep well (e. g., Desert Creek) may need a 235' x 270' well pad (1.46 acres).

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A 7,000' deep vertical well (e. g., Mississippian) may need a 260' x 330' pad (2.00 acres). Deeper wells need larger sites because the drill rig is larger and more material is used. For example, a Desert Creek well would need more than a mile of drill pipe, more than a mile of casing, and more than a mile of tubing. Completion operations (well stimulation) can use more space than a drill rig. Deep horizontal wells need as much as 5.00 acres (e. g., 466' x 466'). The extra space is due to even more drill pipe, casing, cement, tubing, equipment, and service companies.

Space is needed so a drill rig can lay down its derrick and tractor-trailers can safely turn around. Camp trailers for a drilling supervisor, tool pusher, mud logger, and other service company personnel and equipment will also be on site. Sewage is disposed of in chemical toilets and holding tanks and hauled to the Cortez waste water treatment plant. Trash is placed in a portable metal trash cage and hauled to a county transfer station in Kirtland, NM.

A reserve pit will be dug within the well site perimeter. Pit size is a function of well depth (deeper well needs a larger pit), drilling medium (air drilling uses a smaller pit), well pressure (high pressure may need larger pit), and geology (water producing zones may need a larger pit). A shallow well pit can be 10' x 65' x 140'. A deeper well may need a 12' x 100' x 175' pit. A horizontal well will need an even larger pit (e. g., 12' x 125' x 250') to handle the increased volume of mud.

The pit holds drilling mud, rock cuttings, and water found while drilling. A pit usually has half of its capacity dug below original ground level for structural integrity. The pit will be lined with commercial bentonite and/or $\geq$20 mil plastic. The pit will be fenced to keep out livestock and wildlife.

A flare or blow pit may be built near the reserve pit and $\geq$100' from the well head if gas is expected. This pit is $\approx$5' deep and $\approx$10' to $\approx$40' on a side. Gas is piped into it and ignited to prevent uncontrolled fires during drilling, completion, or testing. Air drill cuttings are also blown into it.

The drill rig moves in when the road, pad, and pit are ready. A mile deep well can take $\approx$2-1/2 weeks to drill (around the clock) and $\approx$1-1/2 weeks (daylight) to complete. A horizontal well takes longer to drill than a vertical well of the same depth. Drilling takes longer if there is a problem (e. g., drill bit twists off). Drilling goes on around the clock until total depth is reached. Otherwise, drilling mud can deteriorate and lose its effectiveness.

All wells drilled to date on the Acreage are vertical. Directional drilling may be used on the Acreage due to the terrain and development. Horizontal drilling can expose more of a reservoir. For example, the average perforated interval per well to date on the Acreage is 23'. If a reservoir had a 23' thick pay zone, then a vertical

well would expose 23'. However, a horizontal well could expose hundreds or thousands of feet of that pay zone. Horizontal wells are not as common as vertical wells because of greater cost and drilling difficulty.

A diesel-powered drill rig is ≈120' tall. While drilling a ≤20" diameter hole, a rig circulates mud down the drill pipe and back out the top of the well and into the reserve pit. Drilling mud is a fresh water based mix of clay, bentonite, barite, and other material (e. g., cedar bark to control lost circulation) blended in steel tanks at the drill rig.

Approximately one barrel of water is used for each foot of well depth. Thus, a 5,500' deep well needs ≈5,500 barrels (0.7 acre-foot). Water will be trucked from existing state approved water wells on private land north of the San Juan River.

If a Mississippian well is drilled, then a brine based mud system may be used when drilling through salt zones below the Desert Creek. Brine would be hauled from an existing lined saltwater evaporation pond northeast of Bluff, brine wells near Moab, or mixed on site.

Drilling mud has four main functions. It lubricates the drill bit, lines well walls to hinder sloughing, transports drill cuttings up and out of the hole, and counteracts formation pressures. Mud is pumped back to the surface and into the reserve pit where it drops the drill cuttings. Cuttings are rock fragments. After drilling is finished, the reserve pit is fenced on the fourth side and allowed to evaporate before it is filled and reclaimed. Complete evaporation can take a year.

In a delicate zone (e. g., shale), compressed air or nitrogen is used instead of mud to minimize formation damage. Unlike mud, gases will not cause shale or clay to swell. Swelling can plug a zone. Air drilling uses compressors and a mister. Compressors increase pressure enough to push cuttings to the surface. A mister sprays water on the cuttings to control dust as the cuttings blow into a pit.

If a reserve pit cannot be built, then steel mud tanks will be used instead. Tank contents will be hauled to a state approved disposal site near Bloomfield.

A drill rig periodically stops to set and cement casing. Casing is steel pipe which lines the well bore. Cement is pumped down the interior of the casing and back up and between the casing and well bore walls. Casing prevents rock from sloughing into the well bore. Cement holds casing in place and prevents fluids and gases in different zones from mixing. Fresh water zones are cemented off to prevent contamination.

Surface casing (8.625" - 13.375" outside diameter) is set from the surface through all shallow fresh water zones. Average surface casing setting depth of the wells drilled to date is 711'. The entire interval will be cemented to the surface.

Once total depth is reached, a decision is made to complete the well or plug and abandon (P & A) it. The decision is based on an evaluation of cuttings, cores, and logs. Logs are cylindrical devices which are lowered into the well bore and measure rock and reservoir characteristics.

If the decision is made to P & A, then the well is cemented 50' above, through, and 50' below all water or petroleum zones. A 4' tall steel pipe marks the well bore. Once the pit dries; the pad, pit, and new road are contoured, topsoil spread, harrowed, water barred, and seeded in accordance with stipulations.

On occasion, artesian pressure flows fresh water to the surface. If requested in writing in advance, such a well can be plugged to just below the bottom of the fresh water zone (i. e., seal off any potential hydrocarbon zones).

If a well is to be completed as a producer, then a string of ≈5.5" diameter casing is run. This is called the long string or production string. It is usually cemented back to the surface, or at least to above the bottom of the surface casing. At a minimum, enough cement will be run to cover all water and hydrocarbon bearing zones.

Casing and cement are perforated where they cross potentially productive zones. Such zones are identified from logs and drill cuttings. After perforating, the zone is acidized or hydraulically fractured. Such a procedure is called stimulating the well.

Acidizing uses a weak (e. g., ≈15% HCl) acid solution to partially dissolve limestone, enlarge pore space, and increase oil and gas flow. Fracturing pumps propping material (e. g., special sand or ceramic beads) under high pressure into sandstone or shale. High pressures fracture the rock. Propping agents keep fractures open and allow more flow.

Tubing is next lowered into the well. Tubing is ≈2.5" diameter steel pipe through which an oil-gas-water emulsion comes to the surface. A rubber doughnut shape device called a packer is placed around tubing to prevent gas or fluids from traveling up the inside of the casing. From outside to inside are rock, cement, casing, packer, and tubing. There can be multiple layers of casing and cement where different casing strings overlap.

If there is enough natural pressure, the gas-oil-water emulsion flows to the surface on its own. Otherwise, a pump is installed. Pumps will ultimately be needed as reservoir pressure declines over time. Pumps can be powered by propane, gas from the well, or electricity.

POWER LINES

Electric lines (distribution and transmission) already cross the acreage. The same approval process (archaeology and biology inspections, EA, etc.) used for an APD applies to power lines.

Power lines will be either be buried or strung overhead on ≈35' high wood poles. Anchors will be set at ends and angles. Construction will use four-wheel drive trucks and six workers. No access will be bladed. All travel will be on existing roads or cross country.

Six-foot deep holes will be bored with a truck mounted auger. The auger is on a ≈20' long boom. The boom extends from a truck so it need not park directly over a hole. Cross pieces and insulators will be mounted on poles in the field. Once assembled, the raptor safe structure will be set in its hole with a truck mounted crane. The hole is filled and tamped.

Next, a pull line will be strung along the route by a truck. Workers run the pull line through pulleys on the cross piece. Finally, conductor or ground wire is attached to a pull line and pulled through the pulleys from a reel truck by a winch truck. The route is cleaned and reclaimed as needed.

PIPELINES

Once on the surface, the emulsion will be piped to a separator or heater-treater that uses heat, turbulence, and gravity to break apart the emulsion into its water, oil, and gas constituent parts.

Gas next goes to a dehydrator or meter. Exact sequence and equipment depend on the gas character. After metering, gas will be compressed and piped to market. NNOGC has an existing 6" O. D. gas line crossing the north part of the Acreage. An idle NTUA 12" O. D. gas line crosses the middle of the Acreage. Both are interstate pipelines.

Oil will be piped to and stored in steel tanks on a well pad. From the pad, the oil will be trucked from the pad to a tank farm at Montezuma Creek. A crude oil pipeline leads southeast from the tank farm to Jal, NM.

Produced water is too salty (57,119 ppm TDS in the Navajo O 2 well) for surface discharge. Water will be disposed of in injection wells. An injection well is the reverse of a producing well. Water is pumped into a formation, instead of out. If water is pumped into the same formation from which it came, then it can increase oil production. The Aneth Field has had water injection for over 50 years. Or, produced water may be injected into an unproductive zone. In any event, fresh water zones are protected, casing strings are run and cemented, target zones

perforated, packers set, and tubing hung. The Navajo Nation Environmental Protection Agency Underground Injection Control Program has primacy in approving injection wells.

If NNOGC builds a pipeline or power line on the acreage, then it will be authorized by an APD or Sundry Notice. If it is built by another company or off the Acreage, then it will be authorized by a right-of-way. The same approval process (archaeology and biology inspections, EA, etc.) used for an APD applies for off acreage or non-NNOGC lines.

Pipelines will be ≤12" diameter. They will be buried ≥36" deep if freezing is a problem, or deeper if crossing a road, pipeline, or wash. Disturbed width will be ≤40'. Pipelines can be steel, fiberglass, composite, coiled tubing, or high-density polyethylene (HDPE). HDPE pipes can be installed by plowing.

Surface pipes can be laid if freezing (paraffin in oil and liquids in gas) or vandalism is not a problem. Oil and gas composition vary from well to well, even in the same field. Surface pipelines disturb less area less intensively.

Surface line construction is simple. Pipe is trucked, unloaded, and joined along its route. If the terrain is too rugged, then pipe will be strung together and joined at intervals. Joined sections are then pulled into place by a winch. Wood four by fours may be set under steel pipe in rocky areas to protect the pipe. A surface line disturbs less area than a buried line. Maximum disturbed width can be ≤25'. By contrast, buried lines need a ≥35' wide working area.

Burying pipe is more complex. Construction begins by blading a corridor to create a safe flat work surface so equipment does not roll over. Once a way has been bladed clear, a trenching machine excavates a ≈18" wide by ≈42" deep ditch. If it cannot dig effectively, a tracked backhoe can assist. If the backhoe slows, a bulldozer ripper or rock saw can loosen a trench.

When the corridor is ready, the pipe will be unloaded and joined. After joining, the pipe will be lowered into the trench. Dirt or sand may be used to pad pipe in rocky areas. A typical source of padding dirt is dry silt from a stock pond. The pipe will then be flanged up and tested. If there are no leaks, then the trench will be filled and compacted.

Pipelines may be placed (cased) inside steel pipe to cross BIA or ADOT Roads. Casing top will be ≥36" below the bottom of the borrow ditch. Casing vent pipes and warning signs will be outside the borrow ditch back slope. Or, instead of casing, thicker wall pipe may be used at the crossing. Detours around open trenches will be provided during construction.

NAVAJO PETROLEUM

Once installed, pipelines are pressure tested for leaks. Trucked in fresh water, gas from a well, or nitrogen delivered by tank truck will be pumped under pressure into the pipe. (Nitrogen, an inert gas, is ≈80% of the atmosphere.) Water will be hauled from a private well. (Water from an arroyo would be too dirty.) Water will be discharged into an NNOGC reserve pit. Gas will flow to market. Nitrogen will be vented to the atmosphere.

After pipe testing is completed, the corridor will be reclaimed. Surface lines may need nothing more than gathering wood braces. Buried pipeline corridors must be cleaned, contoured, water bars built, harrowed, seeded (mix and method determined by the Navajo Nation or BIA), and stockpiled brush and rock spread on disturbed areas to control erosion.

Pipeline warning markers with emergency phone numbers will be installed as the final step. Markers will be inter-visible on buried lines and placed on both shoulders of all road crossings. The ≈48" high markers are usually fiberglass.

Pipelines may have pig launchers and catchers, which are above ground extensions of the pipe. A pig cleans and/or analyzes the inside of a pipeline. An example of a pig is a hard rubber ball. It can be pushed through by pressure.

SECONDARY & TERTIARY RECOVERY

Production and pressure declines as a field ages. For example, the peak production year for the Aneth Field was 1958 when 10,026,375 barrels of oil were produced. Production is 2020 was 3,137,411 barrels.

Decline rates can be slowed or reversed by secondary and tertiary recovery. Secondary recovery injects gas or water into perimeter wells to push oil to a central well. Water has been injected in the Aneth Field since the 1960s. Tertiary follows secondary and injects a different medium, e. g., carbon dioxide. Carbon dioxide has been injected in the Aneth Field since the 1980s.

When a well is finally depleted, it will be P & A and reclaimed as previously described. Depletion can happen in days or take decades.

REGULATORY COMPLIANCE

This document was developed in accordance with the National Environmental Policy Act (NEPA). In addition, consultation was sought with the Navajo Nation Natural Heritage Program, Navajo Nation Historic Preservation Program, and Navajo Nation Minerals Department. Other national statutes, regulations and executive

orders considered in the preparation of this Programmatic Environmental Assessment include:

- Indian Minerals Development Act of 1982 (25 USC 2101-2108)
- Resource Conservation and Recovery Act of 1976, as amended by the Hazardous and Solid Waste Amendments of 1984 (42 USC 3251)
- Environmental Justice (Executive Order 12898)
- Floodplain Management (EO 11988)
- Protection of Wetlands (EO 11990)
- Endangered Species Act (42 USC 1531)
- Migratory Bird Treaty Act of 1918
- National Historic Preservation Act (16 USC 470)
- Protection of Historic Properties (36 CFR 800)
- Navajo Nation Cultural Resources Protection Act (NNCRPA CMY-19-88)
- Navajo Nation Policy of Protection of Jischaá: Graves, Human Remains, and Funerary Items
- Navajo Nation Policy to Protect Traditional Cultural Properties
- Clean Air Act (42 USC 7401)
- Clean Water Act (33 USC 12510

This list is not exclusive. However, it does list the more significant laws, regulations, and executive orders that would be considered for future actions associated with exploration and development.

Futhermore, the issuance of a "Finding of No Significant Impact" statement for the Programmatic Environmental Assessment from the Bureau of Indian Affairs does not authorize the applicant to engage in ground disturbing activities until further site specific NEPA analysis is completed. This would include site specific cultural surveys and biological in compliance with the National Historic Preservation Act and the Endangered Species Act, respectively. The proposed action outlined in this environmental analysis will merely encumber the land for potential oil and gas development through a lease.

1.2 PURPOSE AND NEED FOR ACTION

The purpose of the project is to explore for and develop oil and natural gas. Existing production liquidates itself if it is not replaced. This applies as much to America and the State of Arizona as it does to NNOGC.

The primary need is for NNOGC to grow its production. NNOGC produced 87,920 barrels of oil and 46,022 Mcf of gas in Utah in 2020. This was 39% less oil than NNOGC's peak Utah oil year in 2013 and 66% less gas than its peak Utah gas year of 2014. NNOGC produced 7,005 barrels of oil and 7,233 Mcf of gas in New Mexico in 2020. This is 77% less oil than NNOGC's peak New Mexico year in 1995 and 96% less gas than its peak New Mexico gas year in 1996. Three known oil and gas fields are in the Acreage. NNOGC believes its expertise and new technology will allow it to find more oil and gas.

The global need is based on increasing demand for oil and gas. More people are living longer and using more energy on a per capita basis. There is a positive correlation between energy use, life span, and living standards.

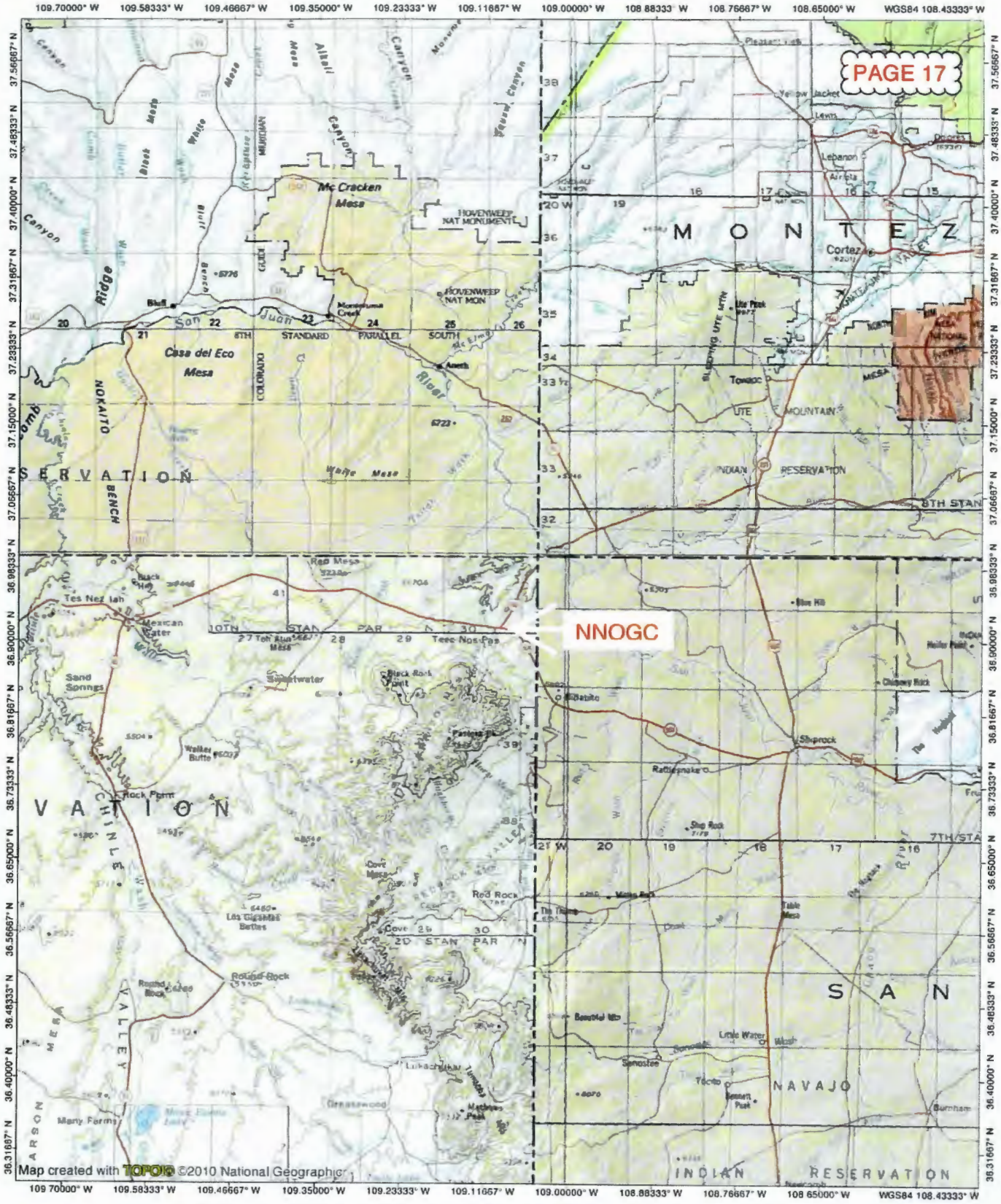
1.3 VICINITY MAPS

The project is centered on the junction of US 64 and US 160 at the village of Teec Nos Pos in northeast Apache County, Arizona. PAGE 17 is a 1:654,720 scale map showing the project in relation to state lines. PAGE 18 is a 1:100,000 scale map showing the project in relation to township lines. PAGE 19 is a 1:41,000 scale map of the USGS Teec Nos Pos; Ariz. – N. Mex. – Utah - Colo quad. PAGE 20 is a survey plat showing the distances and bearings of the Acreage perimeter.

1.4 LOCATION

Point of beginning for the Acreage perimeter is the southwest corner of 22-41n-30e, G&SRM; 36.93775, -109.12038, NAD 83.

TOPO! map printed on 05/01/21 from "Untitled.tpo"

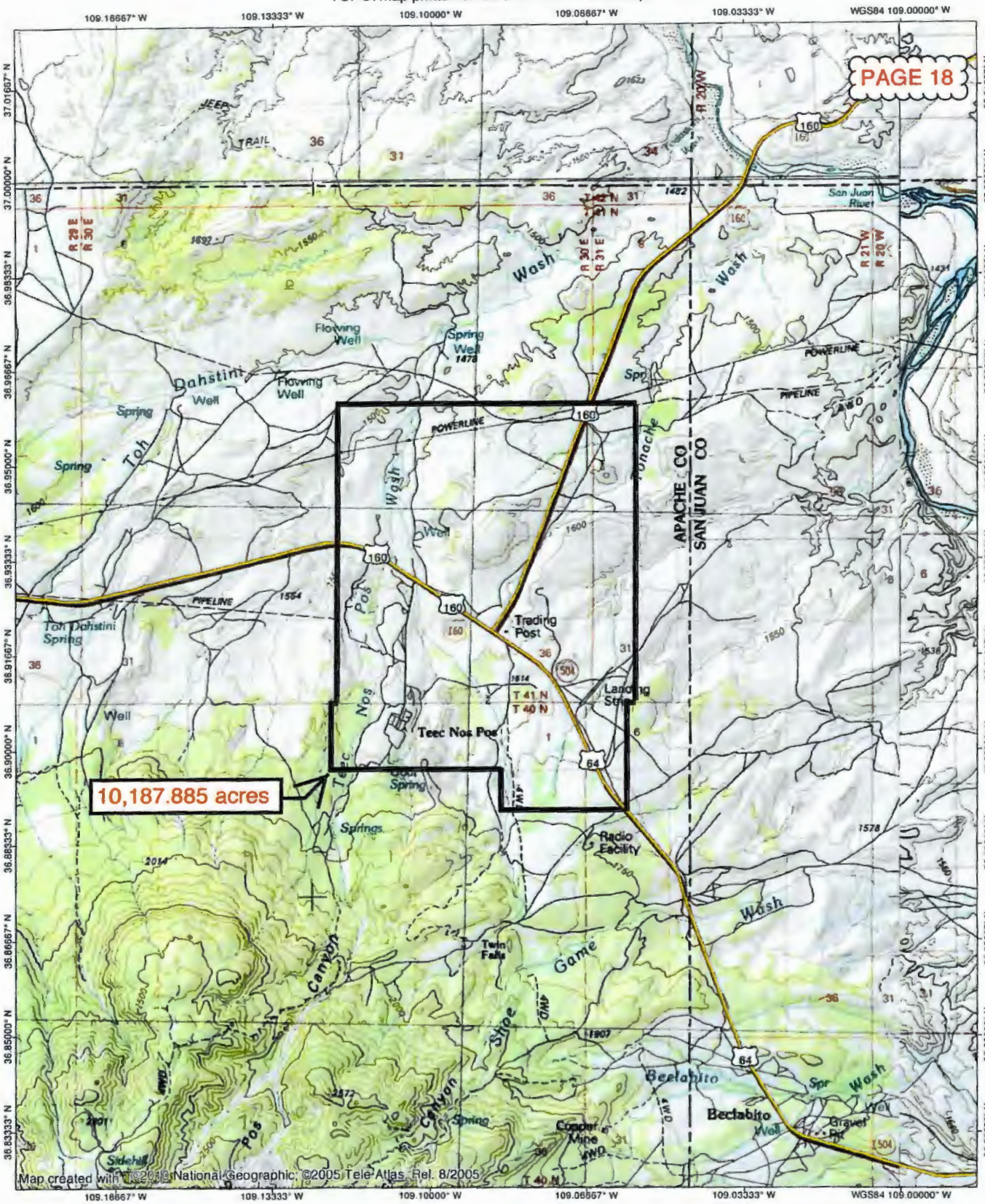


NATIONAL GEOGRAPHIC

0 5 10 15 20 miles
0 5 10 15 20 25 30 km

TN MN
9.5°
05/01/21

TOPO! map printed on 05/01/21 from "Untitled.tpo"



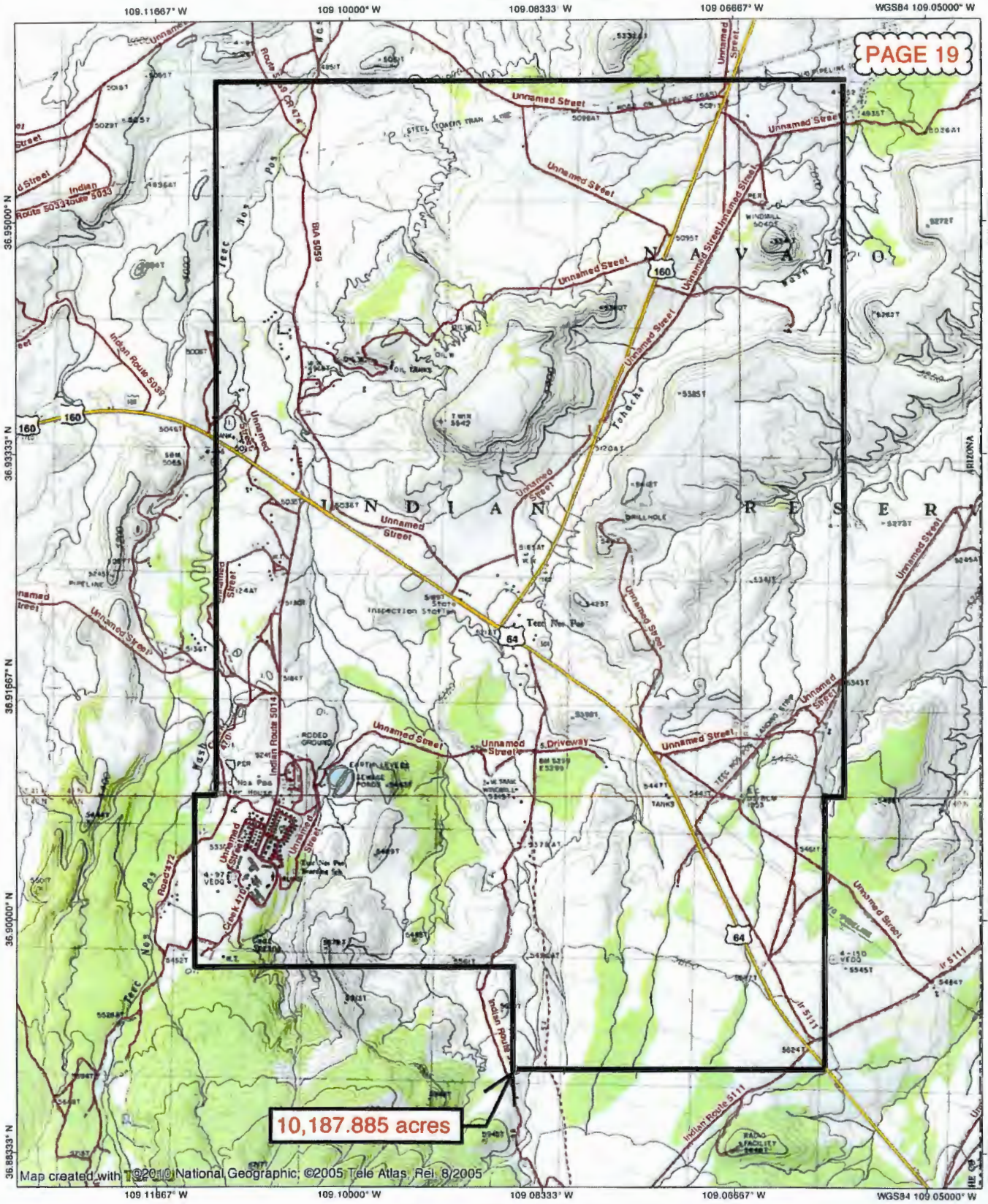
NATIONAL GEOGRAPHIC

0.0 0.5 1.0 1.5 2.0 2.5 3.0 miles

0 1 2 3 4 5 km

TN MN 9.5° 05/01/21

TOPO! map printed on 05/01/21 from "Untitled.tpo"



NATIONAL GEOGRAPHIC

0.0 0.5 1.0 miles

0.0 0.5 1.0 1.5 km

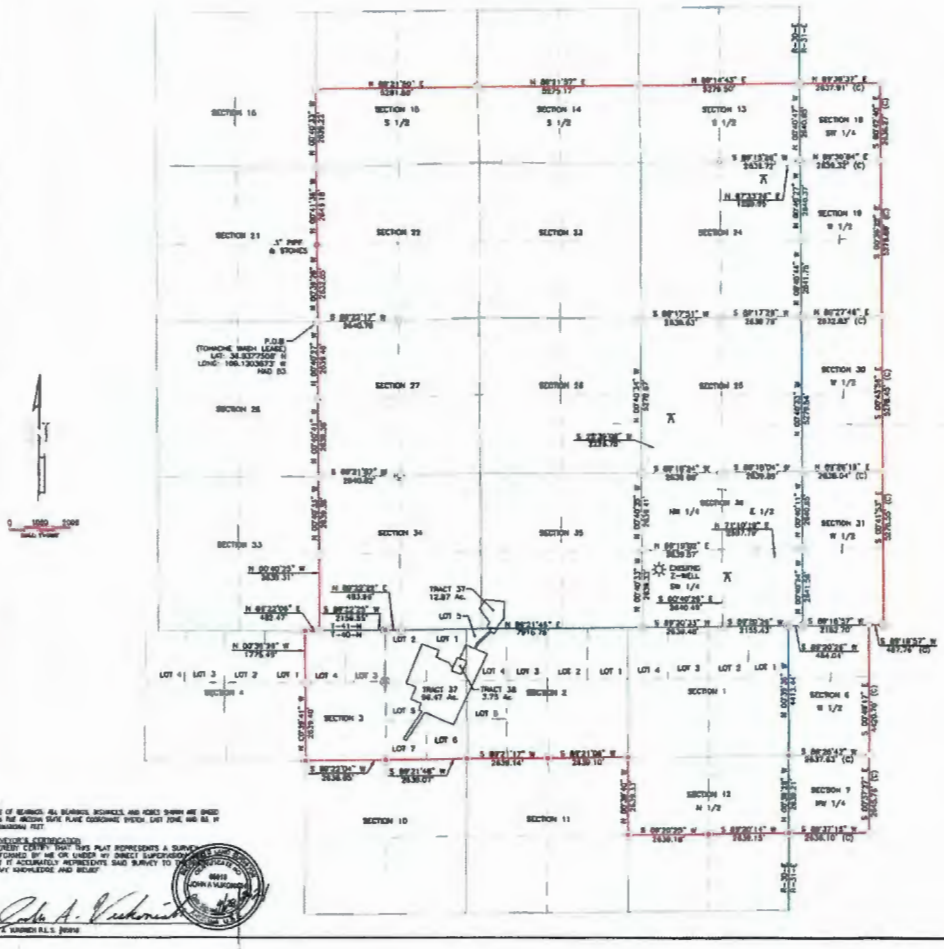
TN 9.5° MN

05/01/21

NNOGC EXPLORATION AND PRODUCTION, LLC

SURVEY PLAT OF TOHACHE WASH LEASE

TOWNSHIP 40 NORTH, RANGE 30 EAST, TOWNSHIP 40 NORTH, RANGE 31 EAST, TOWNSHIP 41 NORTH, RANGE 30 EAST AND TOWNSHIP 41 NORTH, RANGE 31 EAST,
GILA AND SALT RIVER MERIDIAN, APACHE COUNTY, ARIZONA



Tohache Wash Lease legal description –

Township 41 North, Range 30 East, Gila and Salt River Meridian, Apache County, New Mexico:
S½ of Section 13, S½ of Section 14, S½ of Section 15, Sections 22, 23, 24, 25, 26, 27, 34, 35 and Section 36

Township 41 North, Range 31 East, Gila and Salt River Meridian, Apache County, New Mexico:
SW¼ of Section 18, W½ of Section 19, W½ of Section 30, W½ of Section 31.

Township 40 North, Range 30 East, Gila and Salt River Meridian, Apache County, New Mexico:
Sections 1, 2, 3, and N½ of Section 12

Township 40 North, Range 31 East, Gila and Salt River Meridian, Apache County, New Mexico:
W½ of Section 6, NW¼ of Section 7.

Containing 10,187.885 acres more or less.

LEGEND

- = FOUND USED 3 1/4" 2006 BLM BRASS CAP
- = FOUND USED 3 1/2" 2008 BLM BRASS CAP
- = FOUND MONUMENT AS NOTED
- = CALCULATED CORNER – NOT FOUND, NOT SET
- (C) = CALCULATED
- = SUBJECT PARCEL BOUNDARY
- = SECTION LINE
- = ONE QUARTER LINE
- = ONE SIXTEENTH LINE
- = WELLHEAD
- P.O.B. = POINT OF BEGINNING
- = SET 5/8" REBAR WITH 1 1/2" ALUM. CAP

BASIS OF BEARINGS: ALL BEARINGS, DISTANCES, AND AREAS SHOWN ARE BASED UPON THE ARIZONA STATE PLANE COORDINATE SYSTEM, EAST ZONE, NAD 83, IN INTERNATIONAL FEET.

SURVEYOR'S CERTIFICATION
I HEREBY CERTIFY THAT THIS PLAT REPRESENTS A SURVEY PERFORMED BY ME OR UNDER MY DIRECT SUPERVISION THAT IT ACCURATELY REPRESENTS SAID SURVEY TO THE BEST OF MY KNOWLEDGE AND BELIEF

JOHN A. VUKONICH R.L.S. 26916

MAP 20

NNOGC EXPLORATION AND PRODUCTION, LLC

UNITED FIELD SERVICES INC.

P.O. Box 2414
Farmington, NM 87499
Office: (505) 326-4568

FIELD NO. 110001 TOHACHE WELL LEASE	REVISION:
DRAWN BY: K.S.	DATE DRAWN: 4/19/21
SURVEYED: 04/02/21	APP BY: A.L.V.

REV. DATE:
SHEET: 1 OF 1

2.0 ALTERNATIVES

No action will prevent agreement issuance and subsequent exploration and production. This will deny NNOGC and the Navajo Nation the opportunity to develop oil and gas resources and improve the economy. Opportunity costs include a loss of wages, income, taxes, bonus, rent, royalties, jobs, and other ancillary benefits.

Nine wells reported production on the Acreage. If their first day results are typical, then NNOGC would produce the following volumes and generate the following gross revenue on its first day of producing each of nine new wells. Rates are end of April prices.

608 barrels of oil x $63.58/bbl = $38,656.64
29,407 Mcf gas x $2.92/Mcf = $85,868.44
3,202 Mcf helium x $100/Mcf = $320,200
+ 1,078 bbl condensate x $56.74/bbl = $61,165.72
Total 1st day revenue from 9 wells = $505,890.80

If a 12.5% royalty were paid, then the Navajo Nation would receive $63,236.35 from that first day of production. (One-eighth (12.5%) royalty is typical BLM rate. Actual Tribal rate is confidential.):

Exploration and production will be geographically or seasonally limited on some parts of the acreage depending on land use (e. g., BIA has a 500' setback from homes), archaeology, steep slopes, drainages (Teec Nos Pos Wash & Tohache Wash), and biology (raptor nests). The appropriate limits can be determined during the on-site inspection process. Government review will provide opportunities for site specific mitigation after agreement approval.

Oil and gas exploration and production have occurred on and around the Acreage since 1956 and proven to be compatible.

The proposed action is to approve an agreement that will allow oil and gas exploration and production, following subsequent project specific NEPA analysis, on 10,187.885 acres.

NAVAJO PETROLEUM

3.0 AFFECTED ENVIRONMENT

3.1. LAND RESOURCES

3.1.1. Topography

There is ≈1,050' of relief. High point on the Acreage is ≈5,900' and the low point is ≈4,850'. Aspect is to the north. Slopes range from flat to very steep. Two main valleys are Teec Nos Pos Wash and Tohache Wash. Badland mesas are prominent to the north. The Abajo (Blue) Mountains are visible to the northwest on a clear day. Sleeping Ute Mountain is visible to the northeast. The Carrizo Mountains dominate the view to the south.

3.1.2. Soils

There are over a dozen soil types in the Acreage. They are derived from igneous rock in the Carrizo Mountains and the lower softer sedimentary Morrison Formation. Erosion is active and runoff is rapid. Principle soil types follow.

Recapture-Shorthair-Aneth complex comprises ≈20% of the Acreage and is found on 1% – 8% slopes. Top horizon is a loamy fine sand. It is well drained and slightly to strongly saline.

Millett-Blanding-Strych association covers ≈17% of the Acreage and is found on 1% to 50% slopes. Top horizon is gravelly fine sandy loam. It is well drained and very slightly saline to slightly saline.

Blackston-Grazane association covers 10% of the Acreage and is found on 3% - 50% slopes. Top horizon is fine sandy loam. It is well drained and is slightly saline to moderately saline.

While the Gotho fine sandy loam only covers 4% of the Acreage, it is important because it farmed. It is mainly found on flat to 2% slopes adjacent to Teec Nos Pos Wash. Top horizon is fine sandy loam. It is well drained and slightly saline to moderately saline. Farms irrigate with water from Teec Nos Pos Wash when it flows. Otherwise, it is dry land farming.

3.1.3. Geology

The project is in the south of the Paradox Basin of the Colorado Plateau Physiographic Province. There is no evidence of large scale mass wasting from landslides or mudflows. Acreage surface is the Jurassic Morrison Formation. The Jurassic was the age, 135 to 190 million years ago, of dinosaurs. It is a several

hundred-foot thick layer of gray soft sand and mud stones known for rainbow colored badlands.

Fifteen wells have been drilled on the Acreage. The earliest well was drilled in 1956. The last well was drilled in 1983. Depths ranged from 5,155' to 7,230'. The average depth was 5,811'. All were tests of the Pennsylvanian, Mississippian, or Devonian ages. Three of the wells bottomed in Pre-Cambrian granite, basement rock. Nine of the wells produced oil or gas. All 15 wells were plugged, though the Navajo Z 1 was re-entered by NNOGC in 2015 and successfully tested for helium. It is currently shut-in. Three fields (Bita Peak, Teec Nos Pos, and Tohache Wash) were designated. Cumulative production was 499,633 barrels of oil, 3,805,142 Mcf of gas, and 385,774 Mcf of helium.

There is no other mineral development present on the Acreage. Closest solid mineral development is a gravel pit 7-miles northeast in Colorado.

3.2. WATER RESOURCES

Given the arid climate (8" annual total precipitation), most water is sourced from ground water.

3.2.1. Surface Water

All of the Acreage is in the Teec Nos Pos Wash and Tohache Wash watersheds, both of which drain into the San Juan River, 6 miles northeast. Teec Nos Pos Wash first flows into Dahstini Wash, which in turn flows into the San Juan River. Tohache Wash flows directly into the San Juan River.

Teec Nos Pos Wash flows in the spring as snow pack from the 9,000' high Carrizo Mountains melts. Tohache Wash flows only after thunderstorms. The U. S. Fish and Wildlife Service National Wetlands Inventory shows wetlands along Teec Nos Pos Wash, but none along Tohache Wash.

The Acreage is in an area that has not been delineated on the Federal Emergency Management Agency Flood Insurance Rate Map for the 100-year flood plain. Impacts on flood plains typically occur when the topography within a flood plain is substantially modified either by placement or removal of materials within the flood plain. Because approval of the agreement does not authorize construction, the agreement will not substantially modify topography in the permit activity area. Therefore, no impacts on flood plains are anticipated by approval of the agreement.

3.2.2. Ground Water

The Glen Canyon group of sandstones is the main aquifer in the area. It is 770' to 1620' deep as measured in the Bita Peak 1 well. It is more plentiful and of better quality than more alkaline surface waters and alluvial aquifers. The sandstones can have artesian flows due to their recharge area in the higher Carrizo Mountains. There are also windmills and hand pumps in the Acreage. NTUA has a water tank in the southeast corner of the Acreage and distribution lines throughout the Acreage.

3.3. AIR RESOURCES

3.3.1. Quality

The acreage is in the Four Corners Interstate Air Quality Control Region. Air quality is classified into one of four categories (I, IA II, or III) for each type of emission. These categories are:

I = Significant violation of Federal standard from several sources exist for part of the region. Special emission controls needed.
IA = Significant violation of Federal standard from a single source (coal fired power plant) exist for part of the region.
II = Better air quality.
III = Best air quality.

Apache County is in the Class II category for the prevention of significant deterioration of air quality. Air quality parameters range from Class IA for sulfur oxides and particulates to Class III for nitrogen dioxide, carbon monoxide, and photochemical oxidants. These categories indicate air quality is good to very good, with some deterioration allowed.

Closest Class I area is Mesa Verde National Park, ≈35 miles northeast. No deterioration is allowed in a Class I area. Overall air quality is good. Nitrogen dioxide, carbon monoxide, and photochemical oxidants are rated best. Violations of particulate and sulfur oxide levels occur east of the Arizona state line due to coal fired power plants in New Mexico.

Major local pollution sources are wind blowing across bare soil and dirt roads.

3.3.2. Visibility

Visibility is usually limited only by the horizon. Landmarks on the horizon are the Abajo Mountains 65 miles to the northwest, Sleeping Ute Mountain 25 miles to

the northeast, and most prominently, the Carrizo Mountains less than 5 miles to the south. Visibility is most likely to be impaired during spring dust storms.

3.3.3. Climate

The following data were recorded from 1962 - 2016 at Teec Nos Pos.

MONTH	PRECIPITATION	SNOWFALL
January	0.65"	2.0"
February	0.51"	1.1"
March	0.70"	0.4"
April	0.51"	0.1"
May	0.49"	---
June	0.26"	---
July	0.97"	---
August	1.16"	---
September	0.80"	---
October	0.91"	---
November	0.55"	0.5"
December	0.58"	1.3"
ANNUAL	8.09"	5.4"

January is the coldest month with an average low of 20° F. Lowest recorded temperate is -18° F. July is the hottest month with an average high of 93° F. Highest recorded temperature is 105° F. Average daily high temperature is 68° F. Average daily low temperature is 42° F.

Prevailing winds, usually <20 mph, are out of the southwest. Spring is the windy season. Evaporation exceeds precipitation by 7:1. Flash floods are most likely to happen after thunderstorms in July through October.

3.4. BIOTIC RESOURCES

3.4.1. Ecosystem

The project is in the Plains and Great Basin Grassland biotic community.

3.4.2. Wildlife

The Navajo Natural Heritage Program believes (see Appendix) thirteen important species may be in the project area (21perm102). The Eagle Protection Act (EPA), Endangered Species Act (ESA), Migratory Bird Treaty Act (MBTA), and the Navajo Endangered Species List (NESL) provide protection. Species marked

"Yes" for the EPA, ESA, or MBTA are protected by Federal law. FESA candidate species have been formally proposed for protection. NESL group 2 and 3 species are protected by Tribal law. NESL group 4 or unnumbered species have no legal protection under the Federal Endangered Species Act or Tribal laws, but information is being gathered to decide whether they merit protection.

Species	EPA	ESA	MBTA	NESL
burrowing owl	-	-	Yes	4
Colorado pike minnow	-	-	-	2
ferruginous hawk	-	-	Yes	3
golden eagle	Yes	-	Yes	3
Mexican spotted owl	-	Threatened	Yes	3
mottled sculpin	-	-	-	4
mountain plover	-	-	Yes	4
northern leopard frog	-	-	-	2
northern saw-whet owl	-	-	Yes	4
peregrine falcon	-	-	Yes	4
razorback sucker	-	Endangered	-	2
roundtail chub	-	-	-	2
southwestern willow flycatcher	-	Endangered	Yes	2

The project area was inspected by biologist Cindy Lawrence on April 13 - 15, 2021. None of the above cited nineteen animals were seen. No riparian or aquatic animals were seen. No Threatened and Endangered species were seen. She saw, heard, or found sign of three reptile species, five mammal species, and sixteen bird species. Her report is the Appendix. A variety of habitats are present: mesa tops, talus slopes, sand dunes, desert shrub land, scattered pinyon-juniper, seep, sewage lagoons, manmade raptor perches (power line structures), and abandoned buildings. As is typical of arid regions, there were few wild ungulates, herbivores, or carnivores. Over grazing and free roaming dogs and cats impact wildlife.

3.4.3. Vegetation

The Navajo Natural Heritage Program believes (see Appendix) three important species are or may be in the project area. Protection is provided by the Endangered Species Act (ESA) and Navajo Endangered Species List (NESL). Species marked "Yes" for the ESA are protected by Federal law. FESA candidate species have been formally proposed for protection. NESL group 2 and 3 species are protected by Tribal law. NESL group 4 or unnumbered species have no legal protection under the

Federal Endangered Species Act or Tribal laws, but information is being gathered to decide whether they merit protection.

Species	ESA	NESL
Cronquist milkvetch	---	3
Parish's alkali grass	---	4
Welsh's milkweed	Threatened	3

Cindy Lawrence inspected the project area on April 13 - 15, 2021. Habitat for Cronquist's milkvetch was found. The plant itself was not found. It flowers from late April through June.

Four major plant habitat types are within the project area: mesa, rangeland, dry wash, and riparian. Cindy found 32 species (4 tree + 10 shrub + 21 forb + 4 grasses + 3 cactus). Extensive flora changes have occurred from over a century of intensive year-round grazing, down cutting arroyos which drain soil moisture, and weeds. Four of the forty-six species listed on the Navajo Nation Integrated Weed Management Plan were found in the project area.

3.4.4. Agriculture

Local families farm terraces along Teec Nos Pos Wash. Livestock (sheep, goats, horses, cattle) graze year-round. Range improvements include corrals, windmills, stock ponds, and fences. Stocking rates can range from 10 acres per sheep on good range in good years to >275 acres per sheep on poor range in poor years.

3.5. CULTURAL RESOURCES

3.5.1. Traditional

Navajo Mountain (100 miles west), Sleeping Ute Mountain (25 miles northeast), and Shiprock (>20 miles southeast), sacred sites, are visible from areas of the Acreage.

3.5.2 Archaeological

Lone Mountain Archaeological Services reviewed (LMAS Report 3509) Navajo Nation Historic Preservation Department records for the Acreage. Thirty-nine archaeology sites and one traditional cultural property have been found to date. Much of the Acreage remains to be inspected. Site types include habitations, camps,

hearths, and lithic and ceramic scatters. Cultural affiliations include Navajo, Anasazi, Basketmaker, Archaic, and Aboriginal. Sites ages could be as much as 5,500 years B. C. Densest concentration of sites found to date are along Teec Nos Pos Wash. Residential development is concentrated along the Wash. Residential infrastructure (houses and power, water, and sewer lines) drove the need for archaeology inspections.

3.6. SOCIOECONOMICS

3.6.1. Employment & Income

The January 2021 county unemployment rate was 11.6%, compared to a statewide rate of 6.9%. Leading employment sectors in the county are: #1 education, health care, and social assistance; #2 construction; and #3 transport, warehousing, and utilities. The average county monthly wage ($967) paid in the third quarter of 2020 was 11% lower than the average state monthly wage ($1,090). County poverty rate is 37% vs statewide rate of 14%.

3.6.2. Demographics & Trends

County population is growing (0.12% per year) at less than 1/10 the rate of the state (1.39% per year) over the last decade. Estimated county population in 2019 was 71,887. Fifty-eight % of the county population speaks Navajo at home, 38% speak English, and 3% speak Spanish. Fifty-six building permits were issued in the county in 2019 compared to the 46,580 in the state. Median age in the county is 34.7 years compared to the state rate of 38.3 years.

3.6.3. Life Styles, Cultural Values, Attitudes, & Expectations

Apache County is a rural county. Population density is 6.4 people per square mile (89% below the state average of 57.56). Average education index for the county is 12.0 vs. state average of 13.41.

Median value of a house in the county ($81,900) is half that of the state ($162,900). Median age of a house in the county (1985) is older than that of the state (1989). Rate of vacant housing in the county (42%) is higher than that of the state (17%).

Residents are familiar with oil and gas development. Oil has been produced in the Four Corners for a century. Drives to closest shopping centers (Blanding, Cortez, Farmington) all pass through oil or gas fields. They have seen the full range of

exploration and production. People bridge contemporary and traditional lifestyles by working in towns or the oil field and tending livestock in the evenings and weekends. They work and hope for a better future for their children.

3.6.4. Community Infrastructure

The project is in the Teec Nos Pos (T'iis nazbas)) Chapter and BIA's Shiprock Agency. The chapter house is on the Acreage and is a community center for meetings, senior citizen meals, and recreation. Teec Nos Pos has a school, trading post, gas station, and post office. Closest full-service towns are Shiprock (30 miles east) and Cortez (45 miles northeast.).

Three paved roads and numerous dirt roads cross the Acreage. The Arizona Dept. of Transportation has a maintenance yard and weigh station at the junction of US 64 and US 160. There is school bus service, package delivery service, water lines, phone lines, cell phone service, power lines, and sewage systems on the Acreage.

3.7. ENVIRONMENTAL JUSTICE

Executive Order 12898 requires Federal agencies to identify and evaluate actions which may disproportionately and negatively impact low income or minority populations. The Navajo Nation is such a population. Unemployment and the proportion of the population living below the poverty line exceed 40%. Environmental justice is an issue because the Navajo Nation wants an opportunity for prosperity. The Navajo Nation has freely chosen to enter in an agreement with the expectation that wells will be drilled and produce. Revenue from minerals has declined with closure of coal mines and decreased oil and gas production.

Two groups of homes are concentrated on the Acreage. One group is along Teec Nos Pos Wash. The other group is south of the junction of US 64 and US 160. There are other homes scattered about the Acreage.

3.7.1. Trust Resources

Besides oil and gas, the only other trust resource present is range land. The range is grazed year-round.

3.8. ENVIRONMENTAL MODULE

NNOGC will comply with all environmental statutes including, but not limited to, the Clean Water Act, Resources Conservation and Recovery Act, Comprehensive

Environmental Response Compensation and Liability Act, and Toxic Substances Control Act. No underground tanks are planned.

3.9. RESOURCE & LAND USE PATTERNS

There is no fishing. Deer hunting and pine nut gathering in the Carrizo Mountains occurs. Farming takes place along Teec Nos Pos Wash. Grazing is the oldest use. It dates to ≈1600 when the Navajo (Dine) acquired livestock in trade with Spanish settlers along the Rio Grande. Cattle, goats, sheep, horses, burros, and mules were then driven northwest.

Residential development is the dominant and most visible land use on the Acreage. There is no county zoning.

3.10. OTHER VALUES

The project will not impact any wilderness, wilderness study, or primitive area. Sound and noise sensitive areas are houses. Along with NNOGC employees and contractors, the residents of those houses are of the most health and safety concern.

There are no units of the Wild & Scenic River System, State Parks, Tribal Parks, or National Park Service on the Acreage. Closest such land is the Four Corners Monument, a Tribal Park ≈6 miles northeast.

4.0. ENVIRONMENTAL CONSEQUENCES (IMPACTS & MITIGATION)

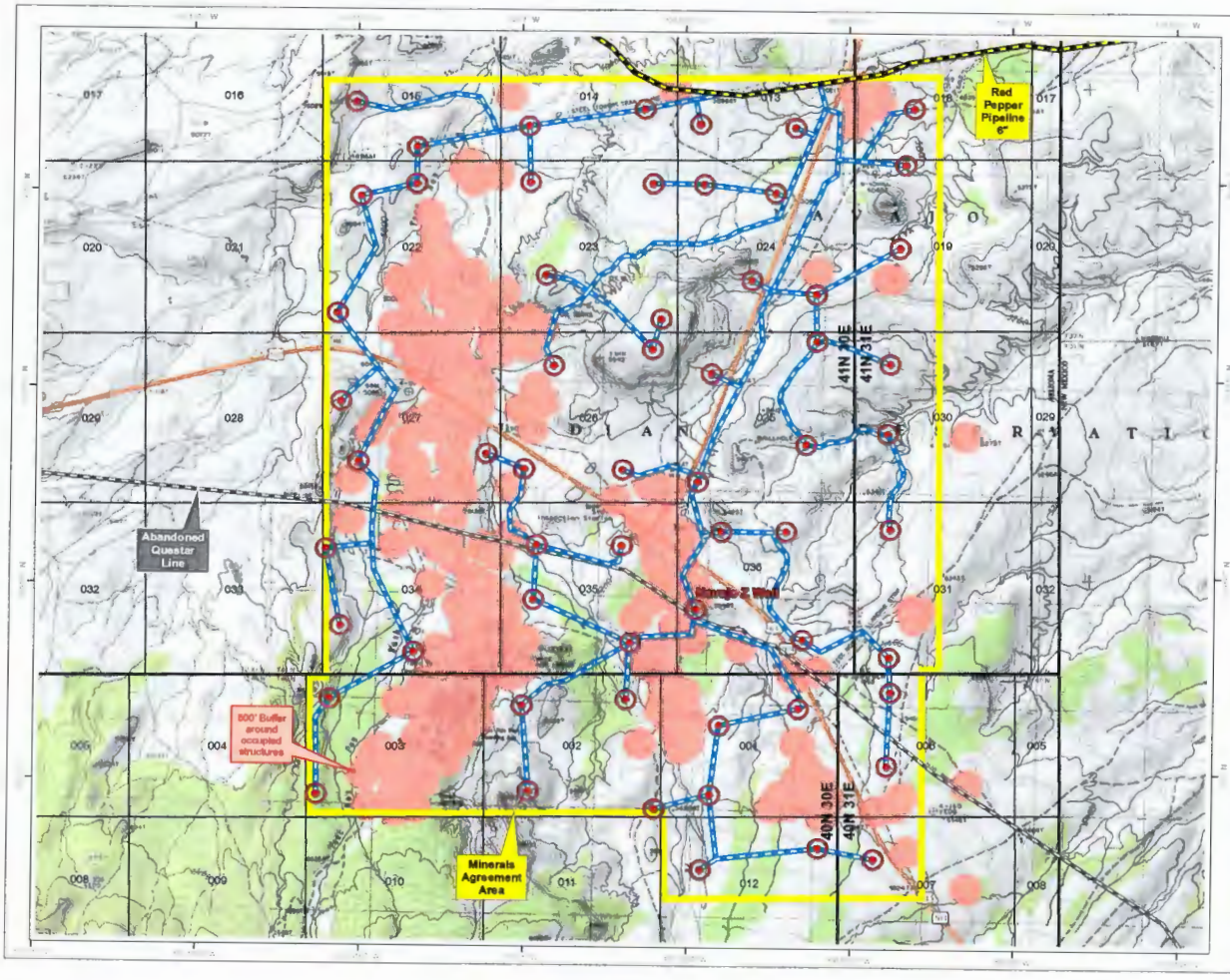
The agreement will mandate diligent development. Evaluation of impacts and mitigation will be based on a maximum development model of one well site per quarter section (= 60 well sites). There could be multiple wells on each well site due to different producing zones or directional drilling.

If each well site is located in the center of each quarter section (see map on the next page), then a total of 17.22 miles of new road would be built to serve those well sites. Maximum disturbed width for road construction will be 20'. Together, this could result in:

45 Ismay-Desert Creek well pads x 1.46 acres each = 65.70 acres
15 deeper, multiple, or horizontal well pads x 5.00 acres each = 75.00 acres
+ 31.73 miles of new road pipe power line corridors x 50' wide = 192.30 acres
333.00 acres

Thus, maximum development could use 333.00 acres or 3.3% of the acreage. It is unlikely that maximum development would occur. Seven of the wells drilled on the Acreage to date were dry holes. Furthermore, NNOGC will reclaim the pipe and power line portions (30') of the corridors. That is 115.38 acres, or 34.6% of the overall 333.00 acres.

Mitigation measures in this EA should be viewed as a minimum. As archaeologists, biologists, residents, and government agencies (e. g., BIA, BLM, Navajo Nation) review site-specific projects, more mitigation (e. g., directional drilling) may be required. Their stipulations will supplement any in this EA. Site and project specific mitigation measures will be developed at on-site inspections with the Navajo Nation and BIA. The sum of the mitigation becomes the cumulative mitigation measures. Based on the history of the Desert Creek Field, duration could be 65 or more years.



Navajo Nation Oil & Gas Company

Proposed Tohache Wash Minerals Agreement Proposed Well Pad and Gathering System Map

Teec Nos Pos, Navajo Indian Reservation, Apache County, Arizona

- Proposed Well Pad
- Existing Red Pepper 6" Line
- Proposed Tohache Wash Gathering Line
- Existing (Abandoned) Questar Line
- 500' Buffer Around Occupied Structure

1:33,000

0 0.25 0.5 1 Miles

NAD 1983 Arizona State Plane East Feet

N

PERMITS WEST

Prepared by Permits West, Inc., April 30, 2021 for Navajo Nation Oil & Gas Company

4.1. LAND RESOURCES

There is potential for cuts and fills of as much as 30'. Reclamation will return the land to natural contours. Manmade slopes will be reduced to no steeper than 3 to 1. Topographic impacts will be mitigated, where practical, by avoiding grading when running seismic lines, using existing roads, terracing reserve pits, building pipelines and power lines along roads, laying pipelines on the surface on steep or rocky slopes; avoiding running pipelines, power lines, and roads along ridge lines; back filling, and contouring to a natural shape.

Project grading will disturb a maximum of 333 acres. If all 60 well pads produce, and 1.25 acre is needed for production at each smaller pad and 2.5 acres is needed for production at each larger pad; then 170.67 acres would be in long term use (e. g., not available for grazing) during production due to pads (93.75 acres) and 20' wide roads (76.92 acres).

The 170.67 acres would be 51% of the land bladed by NNOGC or 1.6% of the agreement Acreage. The 51% (remainder of each well pad + all roads) will be reclaimed as each well is plugged, unless residents want a pad or road left for a home site or access.

Soil can be damaged by erosion. Erosion results from a lack of plant cover, soil compaction, grading which mixes soil layers, fertility loss as minerals are leached, and water concentrating in vehicle ruts. Any or all can increase water runoff rates. Soil impacts will be minimal, temporary, and short term if the recommended mitigation is followed.

Impacts to soil will be mitigated by not blading seismic lines, building overhead power lines instead of buried lines, postponing construction when wet weather leads to ruts >6" deep; building diversion ditches above well sites, having pipeline corridors double as roads during construction; laying surface pipelines where practical; using existing roads where feasible to minimize new disturbance; installing road drainage control (crown and ditch, borrow ditch turnouts, culverts, water bars, surfacing) as needed if production results; storing topsoil separate from subsoil to maintain soil fertility; seeding and mulching topsoil piles; compacting filled trenches; building water bars to stop gullies; digging water bars in cut and skewing them to drain; thoroughly spreading stockpiled soil; spreading removed brush to deflect rain, reduce evaporation, interfere with off road travel, and minimize erosion; and scarifying and reseeding to accelerate re-vegetation which provides soil cover.

Seed mix should include grass, shrub, and forb seeds for a more natural appearing plant cover and to increase re-vegetation success. Four wing saltbush

and wild sunflower are especially recommended. They grow fast, provide seed for birds, and their height shelters bare soil.

Geology will be impacted by the production of oil and gas - which is the project goal. Wells will comply with state spacing and drilling rules to prevent drainage. Casing and cement will prevent water or hydrocarbons from commingling or damaging other mineral zones. Pressure loss will be prevented by using and testing blowout preventers and drilling with weighted mud or compressed air or gas. (Premature pressure loss can decrease the amount of oil or gas ultimately recovered.) Geophysical logs will be run to record hydrocarbon bearing strata. If cores are cut or drill stem tests run, their data will be recorded too. Seismic data will be provided to the Navajo Nation. Well records will be provided to the Navajo Nation, BLM, BIA, and the Arizona Oil and Gas Conservation Commission. No slope will be undercut or overburdened. All holes and excavations will be filled. Wells will be plugged once they are abandoned.

4.2. WATER RESOURCES

Construction could impact surface water. There could be a temporary increase in sediment from grading vegetation, compacting soil, fertility loss, and runoff concentrating in vehicle ruts. Seeding, building wells adjacent to existing roads to minimize new disturbance, contouring, scarifying, seeding; spreading removed brush and rocks to act as a mulch; and installing water bars will prevent a short-term impact from becoming a significant long-term impact.

Surface water impacts will be mitigated by controlling erosion. Those measures which mitigate soil impacts will also control erosion. Tanks will be surrounded by impermeable dirt berms of sufficient size to hold all of the tanks' volume + 10%.

The Federal Emergency Management Agency has not mapped the Acreage. Impacts on flood plains typically occur when the topography within a flood plain is substantially modified, either by placement or removal of materials within the flood plain. NNOGC will not impede the flow of floodwaters (no structures will be built above grade in the flood plain) nor impair the flood holding capacity (by not substantially modifying the topography in the flood plain). Therefore, no impacts on flood plains are anticipated.

Groundwater will be protected since all aquifers will be behind casing and cement. Produced water will be hauled or piped to an approved disposal well or to an existing state approved lined ($\geq$20 mil) evaporation pond near Bluff, Utah.

Injection wells will not adversely impact aquifers. The Navajo Nation, BIA, BLM, and the state will approve injection only if the disposal zone is too mineralized or too deep for use. Anticipated disposal zones are the Pennsylvanian or Mississippian. These zones are too saline or hydrocarbon bearing for human or animal use. The agencies will review the volume of water, injection pressure, and well bore integrity.

Reserve pits will be built at least half in cut for structural integrity and lined with ≥20 mil plastic and/or commercial bentonite to prevent leaks. Chemical toilets and camper trailers with holding tanks will be used for human waste. No mercury or PCBs will be used.

Approximately 0.7 acre-foot of water would be used to drill a 5,500' deep well. (As a point of comparison only, the San Juan River at Bluff was flowing at a rate of 570 cubic feet (0.013 acre-feet) per second on May 2, 2021. Thus, all the water needed to drill a 5,500' well would be the equivalent to 54 seconds of river flow. The water used for drilling is a one-time event, not a daily withdrawal.) Water used for drilling will be pumped and trucked from existing state approved water wells off the Navajo Nation. River water is not sufficiently clean for drilling.

4.3. AIR RESOURCES

Dust (particulates), noise, and emissions (carbon monoxide, ozone, nitrogen oxides, hydrogen sulfide, and sulfur dioxide) will temporarily increase due to traffic, construction, flaring, venting, or compressors. (The latter three occur only if gas is found.) All will be reduced once each well is completed. (BLM rules ban flaring or venting after 30 days or 50 million cubic feet, whichever comes first.) Engines will comply with regulatory requirements.

Hydrogen sulfide could be found in the Mississippian zones. If hydrogen sulfide (H2S) is expected or encountered, then H2S contingency plans will be created and followed in accordance with BLM's Onshore Order 6. The plans describe safety procedures and equipment.

Traffic at each well pad will drop from two-dozen vehicles per day during drilling to 1 to 2 vehicles daily if production is established. Revegetation, gravel, and dust suppressants (e. g., magnesium chloride), can control dust.

Piping gas instead of trucking, flaring, or venting will benefit air quality. Water misters will control dust from air drilling. Engines and compressors will be equipped and operated to meet emission standards. Gas leaks will be avoided by padding pipe in rocky areas, pressure testing, installing shut off valves, and posting warning signs.

Laying pipe parallel to a road minimizes blading which creates dust. No trash will be burned. Well site equipment will be painted a flat earth tone color to reduce visibility.

Weather can impact the project by increasing costs if operations are shut down or if roads must be graveled.

The Navajo Nation Air Quality Control Program is responsible for regulating air quality in the project area. Air quality is determined by atmospheric pollutants and chemistry, dispersion meteorology and terrain, and also includes applications of noise, smoke management, and visibility.

BLM's shared jurisdiction over field production operations has resulted in the development of "Best Management Practices" (BMPs) designed to reduce impacts to air quality. Typical measures may include: flare hydrocarbon and gases at high temperatures in order to reduce emissions of incomplete combustion; water dirt roads during periods of high use in order to reduce fugitive dust emissions; require vapor recovery systems to be maintained and functional in areas where petroleum liquids are stored; revegetate areas of the pad not required for production facilities to reduce the amount of dust from the pad; and compressor engines 300 horsepower or less must have NOx emissions limited to 2 grams per horsepower hour.

EPA data show that improved practices and technology and changing economics have reduced emissions from oil and gas exploration and development (Inventory of US Greenhouse Gas Emissions and Sinks: 1990-2006). One of the factors in this improvement is the adoption by industry of best management practices proposed by the EPA's Natural Gas Energy Star program.

4.4. BIOTIC RESOURCES

There will be no widespread ecosystem change. Brushy areas will become weedy and grassy. Grass will benefit grazing permittees. Livestock prefer grass to sagebrush. Ecosystem mitigation will consist of the aforementioned physical and biotic mitigation measures.

Wildlife will be briefly displaced by increased activity during seismic operations, construction, and drilling. Wildlife will also incur forage loss due to vegetation removal. Vegetation (cover) loss makes prey more vulnerable to predators. Forage loss will be minimized by seeding disturbed areas. Seeding with species (e. g., sunflower) favored by wildlife can benefit wildlife as more diverse plants are introduced. These species can be used to further other goals (e. g., rapid ground cover) too. Reserve pits will be netted while drying to keep out birds.

There will be no effect on listed T & E wildlife species. The project will not impact the continued existence of any listed T & E species; nor reduce its habitat, reproductive ability, numbers, or distribution. Wildlife impacts can be mitigated by conducting T & E inspections, seasonal or spatial avoidance of T & E species if found, avoiding loop roads which disrupt wildlife movement and cover; minimizing tree loss which provide perches, cover, nest sites, and insects for food; spreading bladed brush back onto reclaimed areas to provide cover; seeding to speed re-vegetation; seeding with some native species to replicate the native environment; seeding with some nonnative species (e. g., yellow sweet clover) and including at least a forb, grass, and shrub in each seed mix to quickly stabilize soil and speed diverse plant succession; seeding with species favored by wildlife; using existing roads to minimize new disturbance; fencing and netting reserve pits; banning workers from bringing guns and dogs to the job; screening open tanks; and minimizing the length of time and distance for open trench so as to not unduly interfere with wildlife movement.

Pump jacks, tanks, P & A markers, and power poles will provide perches for birds in an area with few trees.

The Migratory Bird Treaty, Endangered Species Act, and Eagle Protection Act provide penalties which act as an incentive for protection.

The project would directly and temporarily impact vegetation by grading vegetation. A maximum of 333 acres of vegetation would be bladed, which is 3.3% of the Acreage. Reserve pits and utility line corridors would be seeded within a year of being bladed. Wells and their roads will be reclaimed once the wells are plugged.

The project could indirectly impact adjacent vegetation. Sediment can bury plants. Erosion exposes plant roots. Noxious weeds can crowd out native flora. Seeding, contouring, scarifying, and water bars will prevent indirect impacts from becoming significant long-term impacts.

If noxious weeds invade, then they will be controlled. The Navajo Nation EPA Pesticide Enforcement and Development Program will be contacted for lists of approved herbicides and applicators.

The project will not impact the continued existence of any listed T & E flora species; nor reduce its habitat, reproductive ability, numbers, or distribution.

Vegetation impacts will be mitigated by the same measures which mitigate soil impacts. Seed mixes should include both native and nonnative grass, shrub, and forb seeds to increase the diversity and speed of re-vegetation. Actual seed species, quantities, and method and time of sowing will be specified by the Navajo Nation, BIA, or BLM. Reclamation will start once a reserve pit is dry. All disturbed areas will be contoured to a natural shape to blend with the surrounding topography.

Compacted areas will be plowed or ripped 12" deep and harrowed 6" deep before seeding.

No seeding will be done when soil is muddy or frozen. The seed mix bag tag will be kept. Disturbed areas will be harrowed and broadcast seeded with the Navajo Department of Agriculture recommended desert grassland mix of 1.5 pounds per acre alkali sacaton, 1.5 pounds per acre curly grass, 2 pounds per acre Indian ricegrass, 1.5 pounds per acre sand dropseed, 3 pounds per acre western wheatgrass, 2 pounds per acre four wing saltbush, 1.5 pound per acre shadscale, and 1/2 pound per acre bandera penstemon. Seeded areas will be drug with a chain or bed spring to cover the seed.

Once a well is plugged, the road will be blocked and reclaimed as previously described. If a well produces, then the reserve pit and any other area not needed for maintenance or production will be reclaimed the same way.

No listed T & E species are known to now be in the project area. Therefore, no mitigation just for T & E species is planned. However, if new facts arise in the future and T & E species may be affected by site specific projects, then impacts will be mitigated by space or time avoidance, habitat manipulation, surveys, directional drilling, or otherwise as deemed appropriate through consultation.

The Navajo Natural Heritage Program will be consulted prior to any ground disturbing project. They have the most complete and current information on T & E species, T & E habitat, and other species of concern on the Navajo Nation.

There may be a short term insignificant impact as livestock move away from activity. Reclamation will revegetate ≈49% of the bladed area within one year even if the wells are productive. When the wells are plugged, then all bladed areas will be reclaimed and re-vegetated.

Impacts to the livestock industry will be mitigated by reclamation. Cattle guards and/or gates will be installed if functional fences are crossed with roads. Reserve pits will be fenced. Grazing permittees will be paid compensation in excess of the fair market forage value. Workers' dogs and guns will be prohibited from the project area to avoid harassment of stock.

4.5. CULTURAL RESOURCES

Traditional cultural properties and archaeology sites will not be significantly impacted. A BIA approved archaeologist will inspect proposed surface disturbing projects prior to disturbance. Surveys will include the area of proposed disturbance plus a minimum 50' buffer zone. The archaeologist will interview residents to verify

that nonphysical sacred sites are also avoided. The archaeology report will be approved by HPD before disturbance occurs. All significant sites will be avoided by at least 100', have their research potential exhausted, or will otherwise be mitigated.

Significant sites (cultural, religious, sacred, historic, or archaeology) which are found will be avoided by detouring projects around them. If the site is in close proximity, then monitoring or fencing may be implemented. If avoidance is impossible, then Section 106 consultation will be followed and mitigation by data recovery (collection and/or excavation) will be done. Should sites be found during construction (e. g., buried site without surface evidence), work will stop in that area and BIA will be notified. Mitigation will be assured by warning project personnel that disturbing sites or collecting artifacts is illegal.

4.6. SOCIOECONOMICS

The maximum development model could create ≈24,540 person-days of labor:

2 people to build a well pad x 5 days/well x 60 pads = 600 person-days
15 people/day to drill a Pennsylvanian well x 18 days/well x 45 wells = 12,150 person-days
15 people/day to drill a Mississippian well x 30 days/well x 15 wells = 6,750 person-days
5 people/day to complete a well x 10 days x 60 wells = 3,000 person-days
5 people/day to install pipeline for each well x 5 days/well x 60 wells = 1,500 person days
5 people/day to install compressor x 20 days/compressor x 2 compressors = 200 person-days
4 people/day to remove compressor x 5 days/compressor x 2 compressors = 40 person-days
+ 1 person/day to reclaim pad & road x 5 days/well x 60 wells = 300 person-days
Total = 24,540 person-days

The 24,540 person-days would be the equivalent of 98 full time jobs for one year. If all 60 wells are successful, and each pumper spends ≈15 minutes per day per well, then ≈2 full time pumper job could be created. An increased tax base may allow for more services or lower taxes.

Approval of the Tohache Wash Project will allow NNOGC to explore and produce, which will:

a) Maintain employment for people working in allied service sectors.
b) Pay royalties which are foregone if fields are not found and developed. Nine wells reported production on the Acreage. If their first day results are typical, then NNOGC would produce the following volumes and generate the

following gross revenue on its first day of producing each of nine new wells. Rates are end of April 2021 prices.

608 barrels of oil x $63.58/bbl = $38,656.64
29,407 Mcf gas x $2.92/Mcf = $85,868.44
3,202 Mcf helium x $100/Mcf = $320,200
+ 1,078 bbl condensate x $56.74/bbl = $61,165.72
Total 1st day revenue from 9 wells = $505,890.80

If a 12.5% royalty were paid, then the Navajo Nation would receive $63,236.35 from that first day of production. (One-eighth (12.5%) royalty is typical BLM rate. Actual Tribal rate is confidential.) These figures are not guaranteed since volumes change, success and geology vary, and prices fluctuate.

c) Increase the incentive for companies to invest more. According to a University of New Mexico School of Business study, each dollar spent on drilling or related activities generates ≈$2.50 in the local economy. Each well will cost ≥$1,000,000 to drill, complete, and connect - which can generate ≥$2,500,000 more in benefits per well.
d) Jobs directly created by development indirectly create more jobs as workers buy food, clothes, housing, etc. There is a 1.44 multiplier for jobs in a rural area. If the maximum development model happens, then ≈24,540 person-days of direct labor can create ≈35,337 person-days of labor.
e) Decreasing America's dependence on foreign oil and its negative impact on America's balance of payments and security. America imports more than 50% of its oil.
f) Paying grazing permittees compensation for surface damages (e. g., $3,000 per well site) which exceeds the fair market value of damages provides discretionary income.

Local income means families no longer have to leave home for economic reasons. One author said the, "... influx of federal money through health, education, housing, employment ... has probably had a greater impact on reservation life than energy resource development."

There are serendipitous benefits. Families can take advantage of flat land to build homes on P & A well sites.

NAVAJO PETROLEUM

The project can negatively impact socioeconomics by temporarily increasing the number of people in the area during seismic, construction, and drilling. That may increase the demand and price for goods and services in an area of low wages. However, there is excess capacity in the labor pool. Feelings can suffer if people are not familiar with or sensitive to Navajo culture. This should not be a problem. Most workers will come from the Four Corners which has a large Navajo population. Others may envy permittees who receive money.

Government survey section corners will be marked and avoided. Project personnel will be forbidden to bring firearms, drugs, dogs, or alcohol to the project area. Residents will be treated with courtesy and respect. NNOGC will pay for its road construction and maintenance (which benefits other road users), environmental assessments, archaeology and biology surveys, and a $500 per well application fee. By paying these project costs, NNOGC minimizes the impact on government budgets and increases government data bases.

All well bores will be at least 500' from the closest house unless the occupants consent in writing to a closer location. Wells drilled that close will have all production engines equipped with electric engines or dual dissipative (aka, hospital quiet) mufflers. Mufflers will be pointed away from occupied homes. Insulated buildings may be used on compressors if needed.

Paying surface damages to the permittees will exceed the cost of the loss of livestock forage and feed.

Impacts to the energy industry will be mitigated by following state spacing rules so no other lease is drained. Pipeline operators will be contacted before crossing their lines with roads or pipelines to prevent damage. Arizona One Call (811) will be notified >2 business days before construction to verify there are no unmarked buried utility lines present. Roads will have at least one lane kept open or a detour provided when pipeline construction crosses.

Light smooth bare ground will contrast with the darker rough brush covered surroundings. The linear shape of pipelines, power lines, and roads will appear unnatural. Vertical tanks stand out in an area of few trees. Impacts will be reduced by reclamation, paralleling other linear features where practical, and painting equipment flat earth tone colors.

4.7. ENVIRONMENTAL MODULE

A trash cage will be used for garbage at each compressor or drilling well. Cage will be hauled to a state approved county transfer station or landfill. Chemical toilets

will be used for human waste. Toilet contents will be hauled to a state approved dump station. Well treating chemical containers will have secondary above ground containment (e. g., fiberglass or galvanized steel tank). Obsolete pipe and tubing will be recycled as fence posts and braces or trucked to a salvage yard. Waste handling is described below.

Solid Waste Management Plan

Typical Field Waste
Meter charts, welding rods, wrapping tape, broken wood four by four supports
Laths, stakes, flagging, nylon rope
Lunch trash, cardboard
Collection Method: Trash cage at well pad
Disposal Point: All waste hauled to county landfill for disposal

Miscellaneous Waste
Humans waste in chemical toilets
Disposed of at state approved dump stations

Other Waste Considered, but not Generated in Field
Vehicle Fluids and Parts
Maintenance done in garage on private land or at service station off reservation

4.8. CUMULATIVE IMPACTS

Impacts will not be individually or cumulatively significant. Regional infrastructure (interstate pipelines, power line grid, paved roads, county roads, disposal ponds, landfill, dump stations, service firms, hospitals, schools, lodging, restaurants and grocery stores) is already in place. Any future ground disturbing project will require a project specific EA.

BLM evaluated cumulative impacts from oil and gas leases in northwest New Mexico in 2003 and in southeast Utah in 2008. While BLM did not examine Indian minerals, BLM's scale of analysis provides a point of reference. BLM's documents approved 29,739 acres of disturbance from oil and gas activity. The Tohache Wash project will result in a maximum of 333 acres of land use, or ≈1.1% of BLM's figure.

This environmental assessment provides a more site-specific description of a proposed action, alternatives, impacts, and mitigation measures which fit within the scale of BLM's environmental impact statements.

5.0. PREPARER

This EA was prepared by Brian Wood. His experience includes:

1. He has written EAs for 1,500+ miles of power lines, pipelines, roads, and seismic lines, and 430,000+ acres of tribal and allotted oil and gas leases. He designed and permitted the first plastic lined commercial brine disposal pond in Utah, worked on 26 reservations or pueblos in seven states, and permitted wells and rights-of-way from Texas to North Dakota and Arkansas to Nevada. He has been published in the Oil & Gas Journal and Western Oil World.
2. Three years as a Natural Resource Specialist for BLM in Monticello, Utah. He served as a team leader on EAs for wilderness wells, construction on a National Historic Trail, and geophysical exploration. He assisted on other EAs, including the Dept. of Energy's Nuclear Waste Repository. His experience includes supervising 150 oil and gas wells; processing 200+ APDs and 50+ rights-of-way; and inspecting construction, drilling, and reclamation. The latter included assessing environmental impacts, avoiding impacts, and formulating mitigation plans where impacts could not be avoided.
3. Two years as a Range Technician for the Medicine Bow National Forest in Laramie, Wyoming. Experience included supervising work crews planting trees, building trails, repairing campgrounds, fighting forest fires, spraying noxious weeds, fence building, reclaiming 120 miles of roads, and installing watershed improvements for trout streams. He also designed a computer system for measuring winter recreation use.
4. Two and one-half years as a Staff Assistant in the Environmental Health Division of the West Virginia Health Department in Charleston, WV. He conducted a statewide survey of solid waste gathering and disposal systems, inspected fly ash and sanitary landfills, assisted in an EPA hazardous waste inventory, and designed and taught safety and landfill operation courses.

His education includes:

1. Master of Science degree in Recreation and Park Administration from the University of Wyoming, including 12 semester hours in geology.
2. Met half the requirements for a Master of Science degree in Environmental Studies from the West Virginia College of Graduate Studies.
3. Bachelor of Arts degree from the University of Virginia, with a major in Sociology and minors in Environmental Science and Government.

6.0. To Whom EA Will be Sent
- Bureau of Indian Affairs Navajo Regional Office Division of Environmental, Cultural and Safety Management

7.0. CONSULTATION AND COORDINATION

The following were consulted with in the preparation of this EA:

Racheal Dahozy, Land Manager
NNOGC Exploration and Production LLC, St. Michaels AZ
Dexter Prall, GIS Supervisor
Natural Heritage Program, Window Rock, AZ

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Botanical
Species of Concern
Habitat Assessment Report

For:

Tohache Wash Operating Agreement Area

Sponsored by:
Navajo Nation Oil & Gas Company

Prepared for:
Navajo Natural Heritage Program – Navajo Nation Department of Fish and Wildlife

Prepared by:
Cindy Lawrence, Permits West, Inc

PERMITS WEST
PROVIDING PERMITS for LAND USERS
37 Verano Loop, Santa Fe, New Mexico 87508 505-466-8120

TEEC NOS POS CHAPTER
APACHE COUNTY, ARIZONA
NAVAJO NATION – TRIBAL LAND TRUST

April 2021

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INTRODUCTION

The Navajo Nation Oil & Gas Company (NNOGC) is proposing to develop the Tohache Wash Operating Agreement Area (Project Area). Data Responses from the Navajo Nation Department of Fish and Wildlife (NNDFW) were received March 29, 2021 (Appendix A). Permits West, Inc., conducted a Species of Concern survey within the Operating agreement area from April 13th through April 15th, 2021.

A Species of Concern survey is required for the proposed mineral agreement area in order to comply with the United States' Endangered Species Act of 1973, as amended; Navajo Nation code requirements for Navajo Endangered Species (17 NNC § 507); the National Environmental Policy Act (NEPA); the Migratory Bird Treaty Act (MBTA); and the Bald and Golden Eagle Protection Act (EPA). "Species of Concern" include species listed by the U.S. Fish and Wildlife Service (USFWS) and the Navajo Natural Heritage Program's (NNHP's) NNDFW. Species of Concern are protected, candidate, or other rare or otherwise sensitive species, including native species and species of economic or cultural significance.

The objectives of a Species of Concern survey are to determine whether any Species of Concern or critical associated habitats are present within a proposed project area and whether the proposed project may have a potential impact to these species or habitats. Additional objectives are to provide a physical and biological description of the proposed project area and to determine the presence of any invasive weed species.

PROJECT DESCRIPTION

The proposed project includes the potential proposed development of the Tohache Wash Operating Agreement Area (approximately 10,187.885 acres). The proposed development is at its exploratory and preliminary stages and would include oil, gas, and/or helium extraction; specific areas of development have not been selected, at this time.

LOCATION

The proposed Tohache Wash Operating Agreement Project Area is located within the Teec Nos Pos Chapter on Tribal Trust Land - Navajo Nation, Apache County, Arizona. The project area encompasses the town of Teec Nos Pos and outlying residential areas. Also included in the outlying areas is a convenience store/trading post, a gas station, post office, Arizona Agricultural Station, and one or two additional government buildings. See Appendices B and C, respectively, for a map and photographs of the proposed project area.

The proposed project area has been mapped on the Cow Butte, Arizona and Utah, and Teec Nos Pos, Arizona, Colorado, New Mexico, and Utah 7.5-minute quadrangle maps within Sections 26, 27, 34, 35, and 36, Township 41 North, Range 30 East, Sections 1, 2, and 3, Township 40 North, Range 30 East, Section 31, Township 41 North, Range 31 East, Section 6, Township 40 North, Range 31 East, Section 18, Township 41 North, Range 31 East.

METHODS AND MATERIALS

On March 29, 2021, NNHP-NNDFW provided a list of Species of Concern known to occur within 3 miles of the proposed project area or with the potential to occur within the Cow Butte and Teec Nos Pos quadrangles (Appendix A).

The Species of Concern survey was conducted from April 13th through April 15th, 2021. The survey consisted of walking and driving through the proposed project area to assess the general habitat and the potential for Species of Concern to occur. A complete list plants identified during the survey is included in the vegetation section of this report. Field survey conditions were variable with temperatures ranging from 54 to 77 degrees (F) with clear skies to 100 percent cloud cover, and wind speeds from 0 to 25 miles per hour with occasional 40 mile per hour gusts in the afternoon. Photographs were taken of the proposed project area (Appendix C).

The Species of Concern survey was intended to serve as a preliminary survey to obtain a general habitat assessment. More concentrated surveys were conducted in areas of potential listed-species habitats, although still considered to serve only as a preliminary survey.

AFFECTED ENVIRONMENT

Geology

The Navajo Nation lies entirely on the Colorado Plateau, and is made up of an array of geologic features including gentle uplifts, monoclines, broad basins, diatremes, and laccolith ranges. Geologic formations of the proposed project area include Arapian Shale, Eolian Deposits, and Morrison (Baars, 1995).

Topography & Watershed

Topography within the Tohache Operating Agreement Area consists of open rangeland with sloping mesas, and erosional washes. Major washes include Teec Nos Pos Wash, Tohache Wash, and tributaries of these washes. The southern border of the project area is flanked by the footslope of the Carrizo Mountains. Elevation ranges from approximately 4,900 feet to 5,630 feet.

There are no perennial or ephemeral water courses within the project area. Storm water runoff transported via project area washes ultimately drains into the San Juan River located approximately 3.5 miles downstream from the proposed project area. The proposed project area is located within the Colorado Watershed with the San Juan River being the closest major river.

Soils

The Natural Resources Conservation Service (NRCS) has mapped 15 soils within the proposed project area. These soils consist mainly of sandy loams.

Vegetation

Four habitat types occur within the proposed project area: Mesa, rangeland, dry washes, and one riparian area. A complete list of plants identified during the survey is included below the habitat descriptions.

1. The mesa habitat type is composed of rocky footslopes, steep-sloping sideslopes, and stabilized dunes at the mesa tops. Mesa cliffs are generally unstable and less than 30 feet in height. Dominant vegetation along the footslopes and sideslopes include forbs such as dwarf lupine (*Lupinus pusillus*), longleaf fiddle-mustard (*Streptanthella longirostris*), and shrubs such as fourwing saltbush (*Atriplex canescens*), rabbitbrush (*Ericameria nauseous*), wolfberry (*Lycium pallidum*), and ephedra (*Ephedra cutleri*). Mesa top vegetation is dominated by rabbitbrush, fourwing saltbush, ephedra, and scattered juniper trees (*Juniperus osteosperma*). The entire habitat has been severely over grazed by horses. (Photographs 1-2, Appendix C).

2. Rangeland habitat is open and relatively flat. Dominant vegetation includes galleta (*Pleuraphis jamesii*) and cheatgrass (*Bromus tectorum*), a few forbs are present and juniper is widely scattered. The entire area has been severely over grazed by horses. (Photograph 3, Appendix C).

3. Dry wash habitat consists of scattered to dense salt cedar (*Tamarix chinensis*) and scattered juniper trees. Occasionally, cottonwood trees (*Populus deltoides*) are loosely scattered along the washes at higher elevations. Other dominant vegetation includes rabbitbrush and fourwing saltbush. Lower elevation washes are dominated by rabbit brush, fourwing saltbush, singleleaf ash (*Fraxinus anomala*), and wolfberry. Grasses include galleta and cheatgrass. The entire area has been severely over grazed by horses. (Photographs 4-5, Appendix C).

4. Riparian habitat is located immediately adjacent to the town of Teec Nos Pos within a fairly deeply-incised wash. There is one small seep within this drainage. Several cottonwoods inhabit this area. Other vegetation includes salt cedar, rabbitbrush, juniper trees, fourwing saltbush, Utah serviceberry (*Amelanchier utahensis*), and singleleaf ash. (Photograph 6, Appendix C).

Species Name	Common Name
Trees	
Fraxinus anomala	Singleleaf ash
Juniperus osteosperma	Utah juniper
Populus deltoides	Cottonwood
Tamarix chinensis	Salt cedar
Shrubs and Subshrubs	
Amelanchier utahensis	Utah serviceberry
Atriplex canescens	Fourwing saltbush
Ericameria nauseosa	Rubber rabbitbrush
Gutierrezia sarothrae	Broom snakeweed
Ephedra cutleri (viridis)	Cutler's ephedra
Ephedra torreyana	Torrey's ephedra
Lycium pallidum	Pale wolfberry
Purshia stansburyana	Cliffrose
Sarcobatus vermiculatus	Greasewood
Stanleya pinnata	Prince's plume
Forbs	
Abronia fragrans	Fragrant sand-verbena
Allium macropetalum	San Juan onion
Ambrosia acanthicarpa	Bur ragweed
Astragalus mollisimos	Wooly locoweed
Calochortus sp.	Lily
Castilleja chromosa	Desert paintbrush
Cordylanthus wrightii	Wright's birdbeak
Cymopterus glomeratus	Spring parsley
Descurainia sp.	Tansy mustard
Dimorphocarpa wislizeni	Spectacle pod
Eriogonum cernuum	Nodding wild buckwheat
Eriogonum inflatum	Desert trumpet
Erodium cicutarium	Redstem filaree
Haplopappus rusbyi	Rusby's goldenbush
Halogeton glomeratus	Halogeton
Lupinus pusillus	Dwarf lupine
Phacelia crenulata	Corrugated scorpion weed
Rumex hymenosepalus	Sand dock
Salsola tragus	Russian thistle
Sphaeralcea coccinea	Scarlet globemallow
Streptanthella longirostris	Longbeak fiddle-mustard
Grasses	
Achnatherum hymenoides	Indian ricegrass
Aristida sp.	Threeawn
Bromus tectorum	Cheatgrass
Pleuraphis jamesii	Galleta
Cactus and Cactus-Like Plants	
Opuntia polyacantha	Prickly pear
Sclerocactus sp.	Fishhook cactus
Yucca sp.	Yucca

Noxious Weeds

Forty-six weed species are identified as a priority for control in the *Navajo Nation Integrated Weed Management Plan*. These species have been classified as Category A, B, or C species. Category A species are currently not present in Navajo Nation but may occur in neighboring areas, or have limited distribution. The management goal for Category A weeds is to prevent new infestations and eradicate existing infestations. Category B species are limited in range to portions of the Navajo Nation; the management goal is to contain the infestation and stop any further spread. Category C species are wide spread and well established in the Navajo Nation; the management goal is to locally contain the infestation and monitor the population.

Four noxious weed species were identified during the April survey of the proposed project area: Salt cedar (Class B), halogeton (Class B), cheatgrass (Class C), and Russian thistle (Class C).

Wetlands

There are no wetlands present within or within the vicinity of the proposed project area. There is one riparian area located immediately adjacent to the town of Teec Nos Pos. This riparian area contains one small seep consisting of a small pool (approximately 3 feet in diameter) and was flowing/seeping for approximately 100 feet (Photograph 7, Appendix C).

SPECIES OF CONCERN

The proposed project area is located on the Cow Butte and Teec Nos Pos quadrangle maps and has been classified by the NNHP as Wildlife Areas 1, 2, and 3: Area 1 has highly sensitive wildlife resources and no development, with few exceptions, is recommended within this designation. Area 2 has moderately sensitive wildlife resources with moderate restrictions on development to avoid sensitive species and habitats. Area 3 has low sensitivity wildlife resources with few restrictions on development.

The following table lists and describes botanical Species of Concern known to occur within 1 to 3 miles of the proposed project area and with the potential to occur within the Cow Butte and Teec Nos Pos quadrangle maps.

Potential Botanical Species of Concern for the Tohache Wash Operating Area

Species Name	Status[1]	Habitat[2]	Potential to Occur within the Proposed Project Area (PA)
		Plants	
Cronquist milk-vetch *(Astragalus cronquistii)*	NESL Group 3	Found in salt desert shrub and blackbrush communities on sandy or gravelly soils derived from the Cutler and Morrison Formations. Also known to occur on Mancos shale. Elevation 4,750 to 5,800 feet.	POSSIBLE: The PA is located on sandy soils derived from the Morrison Formation. Potential habitat with associated desert shrub plant communities occurs within the PA.
Parish's alkali grass *(Puccinellia parishii)*	NESL Group 4	Alkaline seeps, springs, and seasonally wet areas such as washes. Elevation 5,000-7,200 feet.	DOES NOT OCCUR: No alkaline seeps, springs, or seasonally wet areas found within the PA. The seep area within the PA is not alkaline.
Welsh's milkweed *(Asclepias welshii)*	NESL Group 3, ESA Threatened	Occupies active sand dunes derived from Navajo sandstone in sagebrush, juniper, and ponderosa pine communities. Known populations occur from 5,000 to 6,230 feet in elevation.	DOES NOT OCCUR: No active sand dunes are present within the PA. The dunes located on PA mesa tops are too stabilized with vegetation for this species to occur.

[1] Status:

NESL: Navajo Endangered Species List

Group 1: Species or subspecies that no longer occur on Navajo Land.

Group 2: "Endangered" species or subspecies that are in danger of being eliminated from all or a significant portion of their ranges on the Navajo Nation.

Group 3: Species or subspecies that are considered likely to become endangered throughout all or a significant portion of their ranges on the Navajo Nation within the foreseeable future

Group 4: Species or subspecies for which NDFW does not currently have sufficient information for inclusion in Group 2 or 3, but which are being considered

ESA: U.S. FWS Endangered Species Act

Candidate: A species which has sufficient evidence to be proposed as an Endangered or Threatened Species, but for which development of a listing is precluded by other, higher priority, listing activities.

Endangered: A species which is in danger of extinction throughout all or a significant portion of its range.

Threatened: A species which is likely to become an Endangered species within the foreseeable future.

EPA: Eagle Protection Act

MBTA: Migratory Bird Treaty Act

[2] Habitat Data: NNDFW 2008a, 2019

Species of Concern Eliminated from Detailed Evaluation

Due to lack of appropriate habitat, two Species of Concern were given a rating of "Does Not Occur" within the proposed project area or within the vicinity of the proposed project area. Refer to the above table for explanations as to why habitat is considered unsuitable.

Species of Concern Warranting Detailed Evaluation

One Species of Concern has the potential to occur within the proposed project area or within the vicinity of the proposed project area: Cronquist milkvetch. This species is discussed further below.

Cronquist milkvetch

Cronquist milkvetch is a medium-sized milkvetch that closely resembles the more common Hopi milkvetch (*Astragalus fucatus*), vegetatively. It has pink-purple flowers with a pale keel and wing that are dispersed along the flowering stalk when blooming. The pods are uniformly green, narrow, and drooping, with a pronounced furrow separating the pod into two locules. The leaves have sheathing but not truly connate stipules. Hopi milkvetch has uniformly light pink flowers that are clustered near the top of the flowering stalk when first blooming. The stalk elongates as the flowers wilt and go to fruit. The pods are highly mottled, inflated, and unilocular. The leaves have minimally connate stipules. (UNPS, 2003-2011; Roth, 2001b). On the Navajo Nation, Cronquist milkvetch flowers from late April to June and grows at elevations of 4,600 to 5,800 feet (Roth, 2001b; personal observation) On the Morrison Formation, it usually grows in open blackbrush-rabbitbrush communities (*Coleogyne ramosissima–Chrysothamnus nauseosus*) on sandy clay loam soil, often in transition areas between clay loam and sandy loam soils and frequently near rock outcrops.

No Cronquist milkvetch were recorded within the project area during the April survey. However, if future projects are proposed within this species habitat, intensive project-specific surveys would be recommended for this species. Surveys would be conducted during the recommended survey period by a qualified biologist/botanist.

RECOMMENDATIONS

If NNDFW should request additional surveys for the Species of Concern with the potential to occur with a proposed project area, these surveys would be conducted during the appropriate survey periods; no project implementation would take place until these surveys have been completed and the NNDFW has recommended clearance for the proposed project.

CERTIFICATION

Conclusions of this report are based on actual field examination and are correct to the best of my knowledge.

Cindy Lawrence, Wildlife Biologist

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APPENDIX A– Communication with NNHP-NNDFW

NNHP
Navajo Natural Heritage Program

PO BOX 1480
Window Rock, AZ 86515

P 928.871.6472
F 928.871.7603

www.nndfw.org

21perm102

29-March-2021

Cari Eggleston
Permit's West, Inc
37 Verano Loop
Santa Fe, NM 87508
cari@permitswest.com

SUBJECT: Navajo Nation Oil and Gas Company Tohache Wash Project

Cari Eggleston,

NNHP has performed an analysis of your project in comparison to known biological resources of the Navajo Nation and has included the findings in this letter. The letter is composed of seven parts. The sections as they appear in the letter are

1. **Known Species** – a list of all species within relative proximity to the project
2. **Potential Species** – a list of potential species based on project proximity to respective suitable habitat
3. **Quadrangles** – an exhaustive list of quads containing the project
4. **Project Summary** – a categorized list of biological resources within relative proximity to the project grouped by individual project site(s) or quads
5. **Conditional Criteria Notes** – additional details concerning various species, habitat, etc
6. **Personnel Contacts** – a list of employee contacts
7. **Resources** – identifies sources for further information

Known Species lists "species of concern" known to occur within proximity to the project area. Planning for avoidance of these species is expected. If no species are displayed then based upon the records of the Navajo Nation Department of Fish and Wildlife (NNDFW) there are no "species of concern" within proximity to the project. Refer to the Navajo Endangered Species List (NESL) Species Accounts for recommended avoidance measures, biology, and distribution of NESL species on the Navajo Nation (https://www.nndfw.org/nnhp/sp_account.htm).

Potential Species lists species that are potentially within proximity to the project area and need to be evaluated for presence/absence. If no species are found within the Known or Potential Species lists, the project is not expected to affect any federally listed species, nor significantly impact any tribally listed species or other species of concern. Potential for species has been determined primarily on habitat characteristics and species range information A thorough habitat analysis, and if necessary, species specific surveys, are required to determine the potential for each species.

Species of concern include protected, candidate, and other rare or otherwise sensitive species, including certain native species and species of economic or cultural significance. For legally protected species, the following tribal and federal statuses are indicated: NESL, federal Endangered Species Act (ESA), Migratory Bird Treaty Act (MBTA), and Eagle Protection Act (EPA). No legal protection is afforded species with only

ESA candidate, NESL group 4 status, and species listed on the Sensitive Species List. Please be aware of these species during surveys and inform the NNDFW of observations. Reported observations of these species and documenting them in project planning and management is important for conservation and may contribute to ensuring they will not be up listed in the future.

In any and all correspondence with NNDFW or NNHP concerning this project please cite the Data Request Code associated with this document. It can be found in this report on the top right corner of the every page. Additionally please cite this code in any biological evaluation documents returned to our office.

1. Known Species *(NESL=Navajo Endangered Species List, FE=Federally Endangered, FT=Federally Threatened, FC=Federal Candidate)*

Species

PUPA = Puccinellia parishii / Parish's Alkali Grass NESL G4

2. Potential Species

Species

AEAC = Aegolius acadicus / Northern Saw-whet Owl NESL G4
AQCH = Aquila chrysaetos / Golden Eagle NESL G3
ASCR = Astragalus cronquistii / Cronquist Milk-vetch NESL G3
ASWE = Asclepias welshii / Welsh's Milkweed NESL G3 FT
ATCU = Athene cunicularia / Burrowing Owl NESL G4
BURE = Buteo regalis / Ferruginous Hawk NESL G3
CHMO = Charadrius montanus / Mountain Plover NESL G4
COBA = Cottus bairdi / Mottled Sculpin NESL G4
EMTREX = Empidonax traillii extimus / Southwestern Willow Flycatcher NESL G2 FE
FAPE = Falco peregrinus / Peregrine Falcon NESL G4
GIRO = Gila robusta / Roundtail Chub NESL G2
LIPI = Lithobates pipiens / Northern Leopard Frog NESL G2
PTLU = Ptchocheilus lucius / Colorado Pikeminnow NESL G2
PUPA = Puccinellia parishii / Parish's Alkali Grass NESL G4
STOCLU = Strix occidentalis lucida / Mexican Spotted Owl NESL G3 FT
XYTE = Xyrauchen texanus / Razorback Sucker NESL G2 FE

3. Quadrangles (7.5 Minute)

Quadrangles

Cow Butte (36109-H2) / AZ, UT
Teec Nos Pos (36109-H1) / AZ, CO, NM, UT

4. Project Summary *(EO1 Mile/EO 3 Miles=elements occuring within 1 & 3 miles., MSO=mexican spotted owl PACs, POTS=potential species, RCP=Biological Areas)*

SITE	EO1MI	EO3MI	QUAD	MSO	POTS	RCP

21perm102

SITE	EO1MI	EO3MI	QUAD	MSO	POTS	RCP
Project Area	None	PUPA	Cow Butte (36109-H2) / AZ, UT	None	AEAC, AOCH ASCR, ASWE ATCU, BURE CHMO, EMTREX FAPE, LIPI, PUPA, STOCLU	Area 1, Area 2
Project Area	None	None	Teec Nos Pos (36109-H1) / AZ, CO, NM, UT	None	AEAC, AOCH, ASCR, ASWE ATCU, BURE, CHMO, COBA EMTREX FAPE, GIRO LIPI, PTLU, PUPA, STOCLU, XYTE	Area 1, Area 2, Area 3

5. Conditional Criteria Notes *(Recent revisions made please read thoroughly For certain species, and/or circumstances, please read and comply)*

A. Biological Resource Land Use Clearance Policies and Procedures (RCP) - The purpose of the RCP is to assist the Navajo Nation government and chapters ensure compliance with federal and Navajo laws which protect, wildlife resources, including plants, and their habitat resulting in an expedited land use clearance process. After years of research and study, the NNDFW has identified and mapped wildlife habitat and sensitive areas that cover the entire Navajo Nation.
The following is a brief summary of six (6) wildlife areas:
1. **Highly Sensitive Area** – recommended no development with few exceptions.
2. **Moderately Sensitive Area** – moderate restrictions on development to avoid sensitive species/habitats.
3. **Less Sensitive Area** – fewest restrictions on development
4. **Community Development Area** – areas in and around towns with few or no restrictions on development.
5. **Biological Preserve** – no development unless compatible with the purpose of this area.
6. **Recreation Area** – no development unless compatible with the purpose of this area.

None - outside the boundaries of the Navajo Nation
This is not intended to be a full description of the RCP please refer to the our website for additional information at https://www.nndfw.org/clup.htm

B. Raptors – If raptors are known to occur within 1 mile of project location: Contact the NNHP zoologist at 871-7070 regarding your evaluation of potential impacts and mitigation.
Golden and Bald Eagles- If Golden or Bald Eagle are known to occur within 1 mile of the project, decision makers need to ensure that they are not in violation of the *Golden and Bald Eagle Nest Protection Regulations* found at https://www.nndfw.org/nnhp/docs_reps/gben.pdf.
Ferruginous Hawks – Refer to *Navajo Nation Department of Fish and Wildlife's Ferruginous Hawk Management Guidelines for Nest Protection* (https://www.nndfw.org/nnhp/docs_reps.htm) for relevant information on avoiding impacts to Ferruginous Hawks within 1 mile of project location.
Mexican Spotted Owl - Please refer to the *Navajo Nation Mexican Spotted Owl Management Plan* (https://www.nndfw.org/nnhp/docs_reps.htm) for relevant information on proper project planning near/within spotted owl protected activity centers and habitat.

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C. Surveys – Biological surveys need to be conducted during *the appropriate season* to ensure they are complete and accurate please refer to NNI Species Accounts https://www.nndfw.org/nnhp/sp_account.htm. Surveyors on the Navajo Nation must be permitted by the Director, NNDFW. Contact Jeff Cole at (928) 871-6450 for permitting procedures Questions pertaining to surveys should be directed to the NNDFW the NNHP Zoologist for animals, and the NNHP Botanist for plants. Questions regarding biological evaluation should be directed to Jeff Cole at 871-6450.

D. Oil/Gas Lease Sales – Any settling or evaporation pits that could hold contaminants should be lined and covered Covering pits, with a net or other material, will deter waterfowl and other migratory bird use Lining pits will protect ground water quality

E. Power line Projects – These projects need to ensure that they do not violate the regulations set forth *in the Navajo Nation Raptor Electrocution Prevention Regulations* found at https://www.nndfw.org/nnhp/docs_reps/repr.pdf.

F. Guy Wires – Does the project design include guy wires for structural support? If so, and if bird species may occur in relatively high concentrations in the project area, then guy wires should be equipped with highly visual markers to reduce the potential mortality due to bird-guy wire collisions Examples of visual markers include aviation balls and bird flight diverters. Birds can be expected to occur in relatively high concentrations along migration routes (e.g., rivers, ridges or other distinctive linear topographic features) or where important habitat for breeding, feeding, roosting, etc. occurs. The U.S. Fish and Wildlife Service recommends marking guy wires with at least one marker per 100 meters of wire.

G. San Juan River – On 21 March 1994 (Federal Register, Vol. 59, No. 54), the U.S. Fish and Wildlife Service designated portions of the San Juan River (SJR) as critical habitat for Ptychocheilus lucius (Colorado pikeminnow) and Xyrauchen texanus (Razorback sucker) Colorado pikeminnow critical habitat includes the SJR and its 100-year floodplain from the State Route 371 Bridge in T29N, R13W, sec. 17 (New Mexico Meridian) to Neskahai Canyon in the San Juan arm of Lake Powell in T41S, R11E, sec. 26 (Salt Lake Meridian) up to the full pool elevation Razorback sucker critical habitat includes the SJR and its 100-year floodplain from the Hogback Diversion in T29N, R16W, sec. 9 (New Mexico Meridian) to the full pool elevation at the mouth of Neskahai Canyon on the San Juan arm of Lake Powell in T41S, R11E, sec. 26 (Salt Lake Meridian) All actions carried out, funded or authorized by a federal agency which may alter the constituent elements of critical habitat must undergo section 7 consultation under the Endangered Species Act of 1973, as amended Constituent elements are those physical and biological attributes essential to a species conservation and include, but are not limited to, water, physical habitat, and biological environment as required for each particular life stage of a species.

H. Little Colorado River - On 21 March 1994 (Federal Register, Vol. 59, No 54) the U.S Fish and Wildlife Service designated Critical Habitat along portions of the Colorado and Little Colorado Rivers (LCR) for Gila cypha (humpback chub). Within or adjacent to the Navajo Nation this critical habitat includes the LCR and its 100-year floodplain from river mile 8 in T32N R6E sec. 12 (Salt and Gila River Meridian) to its confluence with the Colorado River in T32N R5E sec. 1 (S&GRM) and the Colorado River and 100-year floodplain from Nautuloid Canyon (River Mile 34) T36N R5E sec 35 (S&GRM) to its confluence with the LCR. All actions carried out, funded or authorized by a federal agency which may alter the constituent elements of Critical Habitat must undergo section 7 consultation under the Endangered Species Act of 1973, as amended Constituent elements are those physical and biological attributes essential to a species conservation and include, but are not limited to, water, physical habitat, and biological environment as required for each particular life stage of a species

I. Wetlands – In Arizona and New Mexico, potential impacts to wetlands should also be evaluated. The U.S. Fish & Wildlife Service's National Wetlands Inventory (NWI) maps should be examined to determine whether areas classified as wetlands are located close enough to the project site(s) to be impacted. In cases where the maps are inconclusive (e.g., due to their small scale), field surveys must be completed

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For field surveys, wetlands identification and delineation methodology contained in the "Corps of Engineers Wetlands Delineation Manual" (Technical Report Y-87-1) should be used. When wetlands are present, potential impacts must be addressed in an environmental assessment and the Army Corps of Engineers, Phoenix office, must be contacted. NWI maps are available for examination at the Navajo Natural Heritage Program (NNHP) office, or may be purchased through the U.S. Geological Survey (order forms are available through the NNHP). The NNHP has complete coverage of the Navajo Nation, excluding Utah, at 1:100,000 scale; and coverage at 1:24,000 scale in the southwestern portion of the Navajo Nation. In Utah, the U.S. Fish & Wildlife Service's National Wetlands Inventory maps are not yet available for the Utah portion of the Navajo Nation, therefore, field surveys should be completed to determine whether wetlands are located close enough to the project site(s) to be impacted. For field surveys, wetlands identification and delineation methodology contained in the "Corps of Engineers Wetlands Delineation Manual" (Technical Report Y-87-1) should be used. When wetlands are present, potential impacts must be addressed in an environmental assessment and the Army Corps of Engineers, Phoenix office, must be contacted. For more information contact the Navajo Environmental Protection Agency's Water Quality Program.

J. Life Length of Data Request – The information in this report was identified by the NNHP and NNDFW's biologists and computerized database, and is based on data available at the time of this response. If project planning takes more than two (02) years from the date of this response, verification of the information provided herein is necessary. It should not be regarded as the final statement on the occurrence of any species, nor should it substitute for on-site surveys. Also, because the NNDFW information is continually updated, any given information response is only wholly appropriate for its respective request.

K. Ground Water Pumping - Projects involving the ground water pumping for mining operations, agricultural projects or commercial wells (including municipal wells) will have to provide an analysis on the effects to surface water and address potential impacts on all aquatic and/or wetlands species listed below. NESL Species potentially impacted by ground water pumping: Carex specuicola (Navajo Sedge), Cirsium rydbergii (Rydberg's Thistle), Primula specuicola (Cave Primrose), Platanthera zothecina (Alcove Bog Orchid), Puccinellia parishii (Parish Alkali Grass), Zigadenus vaginatus (Alcove Death Camas), Perityle specuicola (Alcove Rock Daisy), Symphyotrichum welshii (Welsh's American-aster), Coccyzus americanus (Yellow-billed Cuckoo), Empidonax traillii extimus (Southwestern Willow Flycatcher), Rana pipiens (Northern Leopard Frog), Gila cypha (Humpback Chub), Gila robusta (Roundtail Chub), Ptychocheilus lucius (Colorado Pikeminnow), Xyrauchen texanus (Razorback Sucker), Cinclus mexicanus (American Dipper), Speyeria nokomis (Western Seep Fritillary), Aechmophorus clarkia (Clark's Grebe), Ceryle alcyon (Belted Kingfisher), Dendroica petechia (Yellow Warbler), Porzana carolina (Sora), Catostomus discobolus (Bluehead Sucker), Cottus bairdi (Mottled Sculpin), Oxyloma kanabense (Kanab Ambersnail)

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6. Personnel Contacts

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7. Resources

Navajo Endangered Species List:
https://www.nndfw.org/nnhp/endangered.htm

Species Accounts:
https://www.nndfw.org/nnhp/sp_account.htm

Biological Investigation Permit Application
https://www.nndfw.org/nnhp/study_permit.htm

Navajo Nation Sensitive Species List
https://www.nndfw.org/nnhp/trackinglist.htm

Various Species Management and/or Document *and Reports*
https://www.nndfw.org/nnhp/docs_reps.htm

Consultant List
https://www.nndfw.org/bi_consult_list_2014.pdf

Dexter D Prall

Digitally signed by Dexter D Prall
DN: cn=Dexter D Prall, o=Navajo Natural Heritage Program, ou=Navajo Nation Department of Fish and Wildlife, email=prall@nndfw.org, c=US
Date: 2021.03.29 08:36:25 -07'00'

Dexter D Prall, GIS Supervisor - Natural Heritage Program
Navajo Nation Department of Fish and Wildlife

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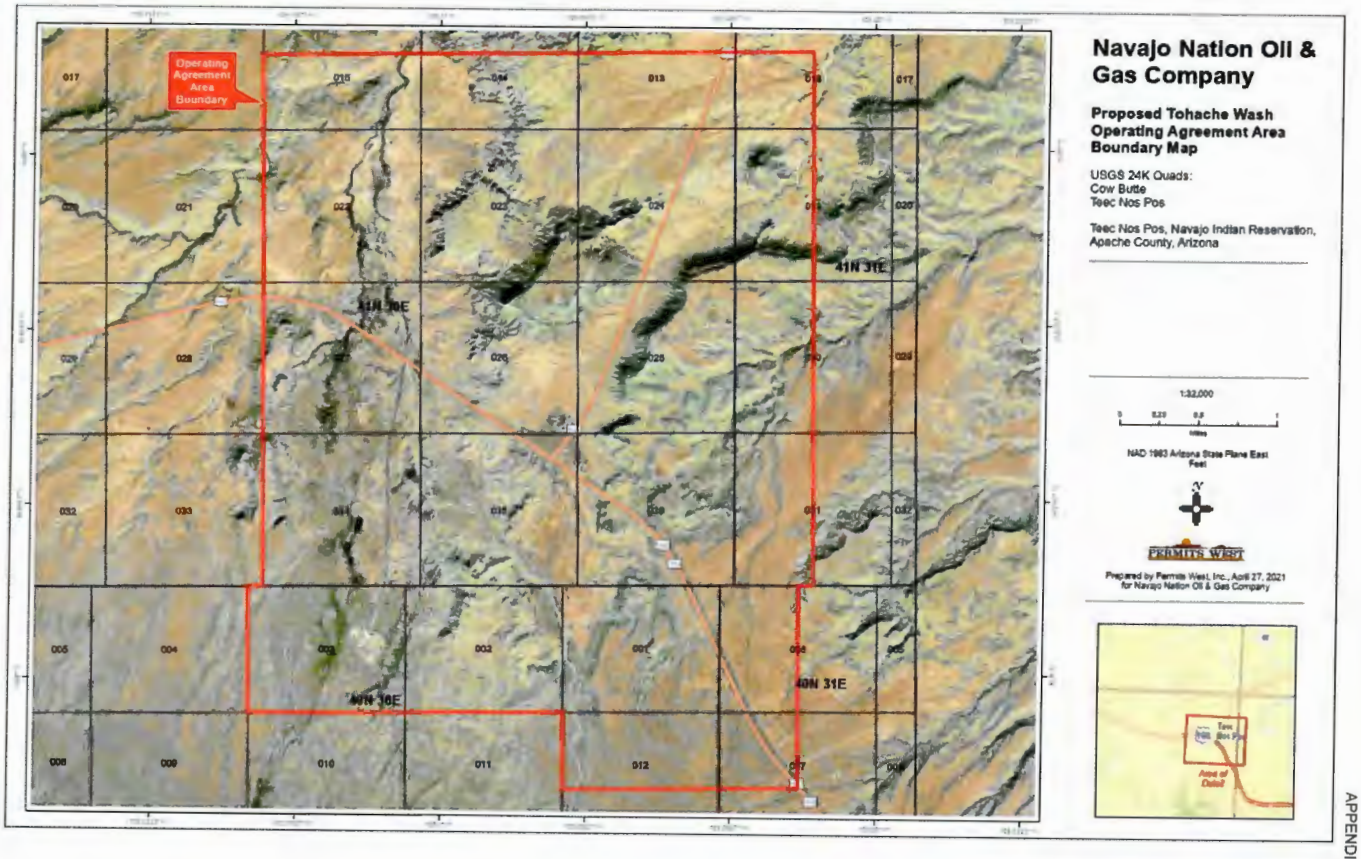
APPENDIX B - Map

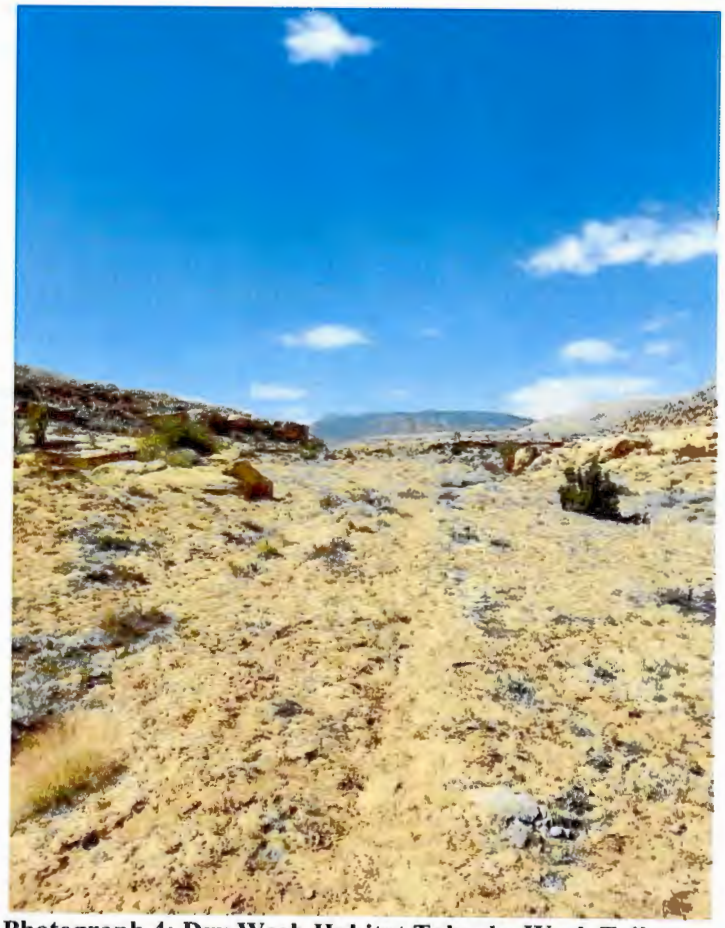

Navajo Nation Oil & Gas Company
Proposed Tohache Wash Operating Agreement Area Boundary Map
USGS 24K Quads:
Cow Butte
Teec Nos Pos
Teec Nos Pos, Navajo Indian Reservation, Apache County, Arizona
1:32,000
NAD 1983 Arizona State Plane East Feet
PERMITS WEST
Prepared by Permits West, Inc., April 27, 2021 for Navajo Nation Oil & Gas Company
Operating Agreement Area Boundary
41N 31E
41N 30E
40N 31E
40N 30E
Area of Detail

APPENDIX C - Photos

Photograph 1: Mesa Sideslope Habitat

Photograph 2: Mesa Top Habitat with Stabilized Dunes

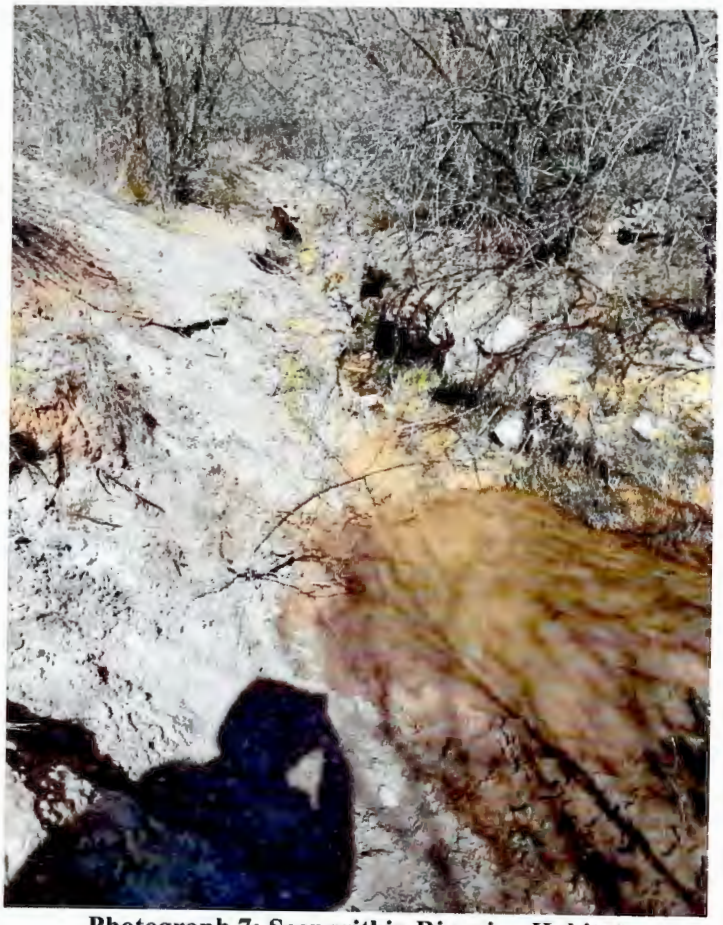
Photograph 3: Rangeland Habitat



Photograph 4: Dry Wash Habitat Tohache Wash Tributary

Photograph 5: Dry Wash Habitat Teec Nos Pos Wash Tributary

Photograph 6: Riparian Habitat



Photograph 7: Seep within Riparian Habitat

Wildlife
Species of Concern
Habitat Assessment Report

For:

Tohache Wash Operating Agreement Area

Sponsored by:
Navajo Nation Oil & Gas Company

Prepared for:
Navajo Natural Heritage Program – Navajo Nation Department of Fish and Wildlife

Prepared by:
Cindy Lawrence, Permits West, Inc

PERMITS WEST
PROVIDING PERMITS for LAND USERS
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TEEC NOS POS CHAPTER
APACHE COUNTY, ARIZONA
NAVAJO NATION – TRIBAL LAND TRUST

April 2021

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INTRODUCTION

The Navajo Nation Oil & Gas Company (NNOGC) is proposing to develop the Tohache Wash Operating Agreement Area (Project Area). Data Responses from the Navajo Nation Department of Fish and Wildlife (NNDFW) were received March 29, 2021 (Appendix A). Permits West, Inc., conducted a Species of Concern survey within the operating agreement area from April 13th through April 15th, 2021.

A Species of Concern survey is required for the proposed operating agreement area in order to comply with the United States' Endangered Species Act of 1973, as amended; Navajo Nation code requirements for Navajo Endangered Species (17 NNC § 507); the National Environmental Policy Act (NEPA); the Migratory Bird Treaty Act (MBTA); and the Bald and Golden Eagle Protection Act (EPA). "Species of Concern" include species listed by the U.S. Fish and Wildlife Service (USFWS) and the Navajo Natural Heritage Program's (NNHP's) NNDFW. Species of Concern are protected, candidate, or other rare or otherwise sensitive species, including native species and species of economic or cultural significance.

The objectives of a Species of Concern survey are to determine whether any Species of Concern or critical associated habitats are present within a proposed project area and whether the proposed project may have a potential impact to these species or habitats. Additional objectives are to provide a physical and biological description of the proposed project area.

PROJECT DESCRIPTION

The proposed project includes the potential proposed development of the Tohache Wash Operating Agreement Area (approximately 10,187.885 acres). The proposed development is at its exploratory and preliminary stages and would include oil, gas, and/or helium extraction; specific areas of development have not been selected, at this time.

LOCATION

The proposed Tohache Wash Operating Agreement Project Area is located within the Teec Nos Pos Chapter on Tribal Trust Land - Navajo Nation, Apache County, Arizona. The project area encompasses the town of Teec Nos Pos and outlying residential areas. Also included in the outlying areas is a convenience store/trading post, a gas station, post office, Arizona Agricultural Station, and one or two additional government buildings. See Appendices B and C, respectively, for a map and photographs of the proposed project area.

The proposed project area has been mapped on the Cow Butte, Arizona and Utah, and Teec Nos Pos, Arizona, Colorado, New Mexico, and Utah 7.5-minute quadrangle maps within Sections 26, 27, 34, 35, and 36, Township 41 North, Range 30 East, Sections 1, 2, and 3, Township 40 North, Range 30 East, Section 31, Township 41 North, Range 31 East, Section 6, Township 40 North, Range 31 East, Section 18, Township 41 North, Range 31 East.

METHODS AND MATERIALS

On March 29, 2021, NNHP-NNDFW provided a list of Species of Concern known to occur within 3 miles of the proposed project area or with the potential to occur within the Cow Butte and Teec Nos Pos quadrangles (Appendix A).

The Species of Concern survey was conducted from April 13th through April 15th, 2021. The survey consisted of walking and driving through the proposed project area to assess the general habitat and the potential for Species of Concern to occur. Where potential raptor nesting habitat was detected, the habitat was scanned with binoculars. In addition, all wildlife and wildlife sign observed were recorded. A complete list of wildlife identified during the survey is included in wildlife section of this report. Field survey conditions were variable with temperatures ranging from 54 to 77 degrees (F) with clear skies to 100 percent cloud cover, and wind speeds from 0 to 25 miles per hour with occasional 40 mile per hour gusts in the afternoon. Photographs were taken of the proposed project area (Appendix C).

The Species of Concern survey was intended to serve as a preliminary survey to obtain a general habitat assessment. More concentrated surveys were conducted in areas of potential listed-species habitats, although still considered to serve only as a preliminary survey.

AFFECTED ENVIRONMENT

Geology

The Navajo Nation lies entirely on the Colorado Plateau, and is made up of an array of geologic features including gentle uplifts, monoclines, broad basins, diatremes, and laccolith ranges. Geologic formations of the proposed project area include Arapian Shale, Eolian Deposits, and Morrison (Baars, 1995).

Topography & Watershed

Topography within the Tohache Operating Agreement Area consists of open rangeland with sloping mesas, and erosional washes. Major washes include Teec Nos Pos Wash, Tohache Wash, and tributaries of these washes. The southern border of the project area is flanked by the footslope of the Carrizo Mountains. Elevation ranges from approximately 4,900 feet to 5,630 feet.

There are no perennial or ephemeral water courses within the project area. Storm water runoff transported via project area washes ultimately drains into the San Juan River located approximately 3.5 miles downstream from the proposed project area. The proposed project area is located within the Colorado Watershed with the San Juan River being the closest major river.

Vegetation

Four habitat types occur within the proposed project area: Mesa, rangeland, dry washes, and one riparian area:

1. The mesa habitat type is composed of rocky footslopes, steep-sloping sideslopes, and stabilized dunes at the mesa tops. Mesa cliffs are generally unstable and less than 30 feet in height. Dominant vegetation along the footslopes and sideslopes include forbs such as dwarf lupine (*Lupinus pusillus*), longleaf fiddle-mustard (*Streptanthella longirostris*), and shrubs such as fourwing saltbush (*Atriplex canescens*), rabbitbrush (*Ericameria nauseous*), wolfberry (*Lycium pallidum*), and ephedra (*Ephedra cutleri*). Mesa top vegetation is dominated by rabbitbrush, fourwing saltbush, ephedra, and scattered juniper trees (*Juniperus osteosperma*). The entire habitat has been severely over grazed by horses. (Photographs 1-2, Appendix C).

2. Rangeland habitat is open and relatively flat. Dominant vegetation includes galleta (*Pleuraphis jamesii*) and cheatgrass (*Bromus tectorum*), a few forbs are present and juniper is widely scattered. The entire area has been severely over grazed by horses. (Photograph 3, Appendix C).

3. Dry wash habitat consists of scattered to dense salt cedar (*Tamarix chinensis*) and scattered juniper trees. Occasionally, cottonwood trees (*Populus deltoides*) are loosely scattered along the washes at higher elevations. Other dominant vegetation includes rabbitbrush and fourwing saltbush. Lower elevation washes are dominated by rabbit brush, fourwing saltbush, singleleaf ash (*Fraxinus anomala*), and wolfberry. Grasses include galleta and cheatgrass. The entire area has been severely over grazed by horses. (Photographs 4-5, Appendix C).

4. Riparian habitat is located immediately adjacent to the town of Teec Nos Pos within a fairly deeply-incised wash. There is one small seep within this drainage. Several cottonwoods inhabit this area. Other vegetation includes salt cedar, rabbitbrush, juniper trees, fourwing saltbush, Utah serviceberry (*Amelanchier utahensis*), and singleleaf ash. (Photograph 6, Appendix C).

Wetlands

There are no wetlands present within or within the vicinity of the proposed project area. There is one riparian area located immediately adjacent to the town of Teec Nos Pos. This riparian area contains one small seep consisting of a small pool (approximately 3 feet in diameter) and was flowing/seeping for approximately 100 feet (Photograph 7, Appendix C).

Wildlife

Wildlife potentially occurring in the proposed project area includes a variety of mammals, birds, and reptiles common to the Navajo Nation. However, all habitat types listed above, with the exception of the riparian area, had low species diversity. Dominant avian species included house finches (*Haemorhous mexicanus*), rock wrens (*Salpinctes obsoletus*), and western bluebirds (*Sialia mexicana*). No lagomorphs were detected. Very few rodent burrows were present and only one woodrat (*Neotoma* sp.) midden was recorded. Reptiles were readily observed at the rocky mesa footslopes. The riparian area had a higher incidence of species diversity with the majority of avian sightings recorded within this habitat type. Horses were prevalent and have severely over grazed the entire project area. One active common raven nest was recorded on the wall of a rock outcropping. White wash was observed on other cliff faces; however, no evidence of current nesting activity was observed. Wildlife detected during the survey are listed below:

Species Name	Common Name
Birds	
Baeolophus ridgwayi	Juniper titmouse
Buteo jamaicensis	Red-tailed hawk
Cathartes aura	Turkey vulture
Charadrius vociferus	Killdeer
Coccothraustes vespertinus	Evening grosbeak
Corvus corax	Common raven
Eremophila alpestris	Horned lark
Haemorhous mexicanus	House finch
Myadestes townsendi	Townsend's solitaire
Pipilo maculatus	Spotted towhee
Salpinctes obsoletus	Rock wren
Sayornis saya	Say's phoebe
Setophaga nigrescens	Black-throated gray warbler
Sialia mexicana	Western bluebird
Streptopelia decaocto	Eurasian collared dove
Thryomanes bewickii	Bewick's wren
Mammals	
Bos taurus	Cattle (3)
Equus caballus	Horse (many)
Neotoma sp.	Woodrat (1)
Otospermophilus variegatus	Rock squirrel
Perognathus sp.	Pocket mouse
Reptiles	
Crotalus viridis	Western rattlesnake
Crotaphytus collaris	Collared lizard
Sceloporus sp.	Sagebrush lizard

SPECIES OF CONCERN

The proposed project area is located on the Cow Butte and Teec Nos Pos quadrangle maps and has been classified by the NNHP as Wildlife Areas 1, 2, and 3: Area 1 has highly sensitive wildlife resources and no

development, with few exceptions, is recommended within this designation. Area 2 has moderately sensitive wildlife resources with moderate restrictions on development to avoid sensitive species and habitats. Area 3 has low sensitivity wildlife resources with few restrictions on development.

The following table lists and describes wildlife Species of Concern known to occur within 1 to 3 miles of the proposed project area and with the potential to occur within the Cow Butte and Teec Nos Pos quadrangle maps.

Potential Wildlife Species of Concern for the Tohache Wash Operating Agreement Area

Species Name	Status[1]	Habitat[2]	Potential to Occur within the Proposed Project Area (PA)
		Birds	
Burrowing owl *(Athene cunicularia)*	NESL Group 4, MBTA	Nests in ground burrows (often deserted prairie-dog burrows) typically in dry, open grasslands or desert scrub. Grasslands with sparse junipers may also be used on the Navajo Nation; presence of suitable nest burrow is critical requisite.	DOES NOT OCCUR: Suitable nest burrows are absent from the PA. Prairie dogs towns were absent from the PA at the time of the April 2021 survey.
Ferruginous hawk *(Buteo regalis)*	NESL Group 3, MBTA	Nests in badlands, flat or rolling desert grasslands, and desert shrub. Most nests on Navajo Nation are on pinnacles, small buttes, or short cliffs.	DOES NOT OCCUR: Potential nesting habitat does occur within the PA. However, there is a severe lack of an available prey base. No lagomorphs and extremely low numbers of rodents occurred within the PA at the time of the April 2021 survey.
Golden eagle *(Aquila chrysaetos)*	NESL Group 3, EPA, MBTA	Nests on steep cliffs typically adjacent to foraging habitat. Foraging habitat includes desert grasslands, sagebrush scrub, or desert scrub; shrubs, if present, are sparse.	DOES NOT OCCUR: Cliffs suitable for nesting are absent from PA. In addition, there was a severe lack of available prey base at the time of the April 2021 survey.
Mexican spotted owl *(Strix occidentalis lucida)*	NESL Group 3, ESA Threatened	This species is found within three distinct habitat types 1) mid-aged to mature mixed-conifer stands dominated by Douglas-fir, typically on mountain slopes, with moderate to dense canopies and multiple canopy layers; and 2) steep-walled, narrow canyons often with riparian vegetation and cool microclimates and 3) moderately sloped drainages with Douglas fir, in piñon-juniper woodland. Not known to nest in ponderosa pine-oak forests on the Navajo Nation, but will use a variety of habitats, including piñon-juniper woodland and clearings when foraging.	DOES NOT OCCUR: None of the three habitat types are found within the PA.
Mountain plover (*Charadrius montanus*)	NESL Group 4, MBTA	Typically nests in flat to slightly rolling expanses of grassland, semi-desert, or badland, in an area with short, sparse vegetation; with large bare areas; and that is typically disturbed. Grasslands between the Chuska Mountains and Black Mesa, and southwest of Black Mesa to the Little Colorado River are potential habitat.	DOES NOT OCCUR: The PA does not contain a grassland component such as is found in grasslands between the Chuska Mountains and Black Mesa, and southwest of Black Mesa to the Little Colorado River.

Species Name	Status[1]	Habitat[2]	Potential to Occur within the Proposed Project Area (PA)
Northern saw-whet owl *(Aegolius acadicus)*	NESL Group 4, MBTA	Nests in tree cavities in relatively open ponderosa pine, Douglas fir, or mixed conifer forests; may also nest in old growth riparian woodlands. Wintering habitat is variable, but dense vegetation is critical.	DOES NOT OCCUR: No conifer or mixed-conifer forests or old growth riparian woodlands occur within the PA.
Peregrine falcon *(Falco peregrinus)*	NESL Group 4, MBTA	Nests on steep cliffs > 100 feet high (typically ≥ 150 feet) in a scrape on sheltered ledges or potholes. Foraging habitat quality is an important factor; often, but not always, extensive wetland and/or forest habitat is within the falcon's hunting range of 7 miles.	DOES NOT OCCUR: Steep cliffs for nesting do not occur within the PA. Foraging habitat within and within the vicinity of the PA is of poor quality.
Southwestern willow flycatcher *(Empidonax traillii extimus)*	NESL Group 2, ESA Endangered, MBTA	Dense, multi-tiered riparian vegetation near surface water.	DOES NOT OCCUR: Dense, multi-tiered vegetation is found within the riparian area of the PA. However, surface water is absent from the riparian area.
Fish			
Colorado pikeminnow *(Ptchocheilus lucius)*	NESL Group 2, ESA Endangered	Adults use backwaters and flooded riparian areas during spring runoff, and migrate to spawn in riffle-run areas with cobble/gravel substrates. Post-spawning adults primarily use run habitats, with eddies and slackwater also being important.	DOES NOT OCCUR: No waterbodies occur within the PA or within the immediate vicinity of the PA.
Mottled sculpin *(Cottus bairdi)*	NESL Group 4	Prefers stream sections with coarse gravel and small-to-large rock substrates usually with riffles, regardless of depth.	DOES NOT OCCUR: No waterbodies occur within the PA or within the immediate vicinity of the PA.
Razorback sucker *(Xyrauchen texanus)*	NESL Group 2, ESA Endangered	Inhabits backwaters over sand/silt substrate, deep eddies, and impoundments, shallow to deep runs over sandbars and seasonally-flooded shorelines and bottomlands.	DOES NOT OCCUR: No waterbodies occur within the PA or within the immediate vicinity of the PA.
Roundtail chub *(Gila robusta)*	NESL Group 2	Adults inhabit permanent water in cool to warm water mid-elevation streams, typically using pools and eddies adjacent to rapids and boulders.	DOES NOT OCCUR: No waterbodies occur within the PA or within the immediate vicinity of the PA.
Amphibians			
Northern leopard frog *(Lithobetes pipens)*	NESL Group 2	Found in wetlands usually with permanent water and aquatic vegetation (especially cattails), ranging from irrigation ditches and small streams to rivers, and small ponds and marshes to lakes or reservoirs.	DOES NOT OCCUR: There is a small seep within the PA riparian area; however, this seep does not support aquatic vegetation.

[1] Status:

NESL: Navajo Endangered Species List

Group 1: Species or subspecies that no longer occur on Navajo Land.

Group 2: "Endangered" species or subspecies that are in danger of being eliminated from all or a significant portion of their ranges on the Navajo Nation.

Group 3: Species or subspecies that are considered likely to become endangered throughout all or a significant portion of their ranges on the Navajo Nation within the foreseeable future

Group 4: Species or subspecies for which NDFW does not currently have sufficient information for inclusion in Group 2 or 3, but which are being considered

ESA: U.S. FWS Endangered Species Act

Candidate: A species which has sufficient evidence to be proposed as an Endangered or Threatened Species, but for which development of a listing is precluded by other, higher priority, listing activities.

Endangered: A species which is in danger of extinction throughout all or a significant portion of its range.

Threatened: A species which is likely to become an Endangered species within the foreseeable future.

EPA: Eagle Protection Act

MBTA: Migratory Bird Treaty Act

[2] Habitat Data: NNDFW 2008a, 2019

Species of Concern Eliminated from Detailed Evaluation

Due to lack of appropriate habitat, all wildlife Species of Concern were given a rating of "Does Not Occur" within the proposed project area or within the vicinity of the proposed project area. Refer to the above table for explanations as to why habitat is considered unsuitable. No Species of Concern or associated sign was observed during the survey of the proposed project area.

RECOMMENDATIONS

If NNDFW should request additional surveys for the Species of Concern with the potential to occur with a proposed project area, these surveys would be conducted during the appropriate survey periods; no project implementation would take place until these surveys have been completed and the NNDFW has recommended clearance for the proposed project.

CERTIFICATION

Conclusions of this report are based on actual field examination and are correct to the best of my knowledge.

Cindy Lawrence, Wildlife Biologist

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APPENDIX A– Communication with NNHP-NNDFW

NNHP
Navajo Natural Heritage Program

PO BOX 1480
Window Rock, AZ 86515

P 928.871.6472
F 928.871.7603

www.nndfw.org

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29-March-2021

Cari Eggleston
Permit's West, Inc
37 Verano Loop
Santa Fe, NM 87508
cari@permitswest.com

SUBJECT: Navajo Nation Oil and Gas Company Tohache Wash Project

Cari Eggleston,

NNHP has performed an analysis of your project in comparison to known biological resources of the Navajo Nation and has included the findings in this letter. The letter is composed of seven parts. The sections as they appear in the letter are

1. **Known Species** – a list of all species within relative proximity to the project
2. **Potential Species** – a list of potential species based on project proximity to respective suitable habitat
3. **Quadrangles** – an exhaustive list of quads containing the project
4. **Project Summary** – a categorized list of biological resources within relative proximity to the project grouped by individual project site(s) or quads
5. **Conditional Criteria Notes** – additional details concerning various species, habitat, etc
6. **Personnel Contacts** – a list of employee contacts
7. **Resources** – identifies sources for further information

Known Species lists "species of concern" known to occur within proximity to the project area. Planning for avoidance of these species is expected. If no species are displayed then based upon the records of the Navajo Nation Department of Fish and Wildlife (NNDFW) there are no "species of concern" within proximity to the project. Refer to the Navajo Endangered Species List (NESL) Species Accounts for recommended avoidance measures, biology, and distribution of NESL species on the Navajo Nation (https://www.nndfw.org/nnhp/sp_account.htm).

Potential Species lists species that are potentially within proximity to the project area and need to be evaluated for presence/absence. If no species are found within the Known or Potential Species lists, the project is not expected to affect any federally listed species, nor significantly impact any tribally listed species or other species of concern. Potential for species has been determined primarily on habitat characteristics and species range information A thorough habitat analysis, and if necessary, species specific surveys, are required to determine the potential for each species.

Species of concern include protected, candidate, and other rare or otherwise sensitive species, including certain native species and species of economic or cultural significance. For legally protected species, the following tribal and federal statuses are indicated: NESL, federal Endangered Species Act (ESA), Migratory Bird Treaty Act (MBTA), and Eagle Protection Act (EPA). No legal protection is afforded species with only

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ESA candidate, NESL group 4 status, and species listed on the Sensitive Species List. Please be aware of these species during surveys and inform the NNDFW of observations. Reported observations of these species and documenting them in project planning and management is important for conservation and may contribute to ensuring they will not be up listed in the future.

In any and all correspondence with NNDFW or NNHP concerning this project please cite the Data Request Code associated with this document. It can be found in this report on the top right corner of the every page. Additionally please cite this code in any biological evaluation documents returned to our office.

1. Known Species *(NESL=Navajo Endangered Species List, FE=Federally Endangered, FT=Federally Threatened, FC=Federal Candidate)*

Species

PUPA = Puccinellia parishii / Parish's Alkali Grass NESL G4

2. Potential Species

Species

AEAC = Aegolius acadicus / Northern Saw-whet Owl NESL G4
AQCH = Aquila chrysaetos / Golden Eagle NESL G3
ASCR = Astragalus cronquistii / Cronquist Milk-vetch NESL G3
ASWE = Asclepias welshii / Welsh's Milkweed NESL G3 FT
ATCU = Athene cunicularia / Burrowing Owl NESL G4
BURE = Buteo regalis / Ferruginous Hawk NESL G3
CHMO = Charadrius montanus / Mountain Plover NESL G4
COBA = Cottus bairdi / Mottled Sculpin NESL G4
EMTREX = Empidonax traillii extimus / Southwestern Willow Flycatcher NESL G2 FE
FAPE = Falco peregrinus / Peregrine Falcon NESL G4
GIRO = Gila robusta / Roundtail Chub NESL G2
LIPI = Lithobates pipiens / Northern Leopard Frog NESL G2
PTLU = Ptchocheilus lucius / Colorado Pikeminnow NESL G2
PUPA = Puccinellia parishii / Parish's Alkali Grass NESL G4
STOCLU = Strix occidentalis lucida / Mexican Spotted Owl NESL G3 FT
XYTE = Xyrauchen texanus / Razorback Sucker NESL G2 FE

3. Quadrangles (7.5 Minute)

Quadrangles

Cow Butte (36109-H2) / AZ, UT
Teec Nos Pos (36109-H1) / AZ, CO, NM, UT

4. Project Summary *(EO1 Mile/EO 3 Miles=elements occuring within 1 & 3 miles., MSO=mexican spotted owl PACs, POTS=potential species, RCP=Biological Areas)*

SITE	EO1MI	EO3MI	QUAD	MSO	POTS	RCP

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SITE	EO1MI	EO3MI	QUAD	MSO	POTS	RCP
Project Area	None	PUPA	Cow Butte (36109-H2) / AZ, UT	None	AEAC, AQCH ASCR, ASWE ATCU, BURE CHMO, EMTREX FAPE, LIPI, PUPA, STOCLU	Area 1, Area 2
Project Area	None	None	Teec Nos Pos (36109-H1) / AZ, CO, NM, UT	None	AEAC, AQCH ASCR, ASWE ATCU, BURE, CHMO, COBA, EMTREX FAPE, GIRO, LIPI, PTLU, PUPA, STOCLU, XYTE	Area 1, Area 2, Area 3

5. Conditional Criteria Notes *(Recent revisions made please read thoroughly For certain species, and/or circumstances, please read and comply)*

A. Biological Resource Land Use Clearance Policies and Procedures (RCP) - The purpose of the RCP is to assist the Navajo Nation government and chapters ensure compliance with federal and Navajo laws which protect, wildlife resources, including plants, and their habitat resulting in an expedited land use clearance process. After years of research and study, the NNDFW has identified and mapped wildlife habitat and sensitive areas that cover the entire Navajo Nation.
The following is a brief summary of six (6) wildlife areas
1. **Highly Sensitive Area** – recommended no development with few exceptions
2. **Moderately Sensitive Area** – moderate restrictions on development to avoid sensitive species/habitats.
3. **Less Sensitive Area** – fewest restrictions on development
4. **Community Development Area** – areas in and around towns with few or no restrictions on development.
5. **Biological Preserve** – no development unless compatible with the purpose of this area.
6. **Recreation Area** – no development unless compatible with the purpose of this area
None - outside the boundaries of the Navajo Nation
This is not intended to be a full description of the RCP please refer to the our website for additional information at https://www.nndfw.org/clup.htm

B. Raptors – If raptors are known to occur within 1 mile of project location: Contact the NNHP zoologist at 871-7070 regarding your evaluation of potential impacts and mitigation.
Golden and Bald Eagles- If Golden or Bald Eagle are known to occur within 1 mile of the project, decision makers need to ensure that they are not in violation of the *Golden and Bald Eagle Nest Protection Regulations* found at https://www.nndfw.org/nnhp/docs_reps/gben.pdf.
Ferruginous Hawks – Refer to *Navajo Nation Department of Fish and Wildlife's Ferruginous Hawk Management Guidelines for Nest Protection* (https://www.nndfw.org/nnhp/docs_reps.htm) for relevant information on avoiding impacts to Ferruginous Hawks within 1 mile of project location.
Mexican Spotted Owl - Please refer to the *Navajo Nation Mexican Spotted Owl Management Plan* (https://www.nndfw.org/nnhp/docs_reps.htm) for relevant information on proper project planning near/within spotted owl protected activity centers and habitat.

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C. Surveys – Biological surveys need to be conducted during *the appropriate season to ensure they are* complete and accurate please refer to NNHP Species Accounts https://www.nndfw.org/nnhp/sp_account.htm. Surveyors on the Navajo Nation must be permitted by the Director, NNDFW. Contact Jeff Cole at (928) 871-6450 for permitting procedures Questions pertaining to surveys should be directed to the NNDFW the NNHP Zoologist for animals, and the NNHP Botanist for plants. Questions regarding biological evaluation should be directed to Jeff Cole at 871-6450.

D. Oil/Gas Lease Sales – Any settling or evaporation pits that could hold contaminants should be lined and covered Covering pits, with a net or other material, will deter waterfowl and other migratory bird use Lining pits will protect ground water quality

E. Power line Projects – These projects need to ensure that they do not violate the regulations set forth *in the Navajo Nation Raptor Electrocution Prevention Regulations* found at https://www.nndfw.org/nnhp/docs_reps/repr.pdf.

F. Guy Wires – Does the project design include guy wires for structural support? If so, and if bird species may occur in relatively high concentrations in the project area, then guy wires should be equipped with highly visual markers to reduce the potential mortality due to bird-guy wire collisions Examples of visual markers include aviation balls and bird flight diverters. Birds can be expected to occur in relatively high concentrations along migration routes (e.g., rivers, ridges or other distinctive linear topographic features) or where important habitat for breeding, feeding, roosting, etc. occurs. The U.S. Fish and Wildlife Service recommends marking guy wires with at least one marker per 100 meters of wire.

G. San Juan River – On 21 March 1994 (Federal Register, Vol. 59, No 54), the U.S. Fish and Wildlife Service designated portions of the San Juan River (SJR) as critical habitat for Ptychocheilus lucius (Colorado pikeminnow) and Xyrauchen texanus (Razorback sucker) Colorado pikeminnow critical habitat includes the SJR and its 100-year floodplain from the State Route 371 Bridge in T29N, R13W, sec. 17 (New Mexico Meridian) to Neskahai Canyon in the San Juan arm of Lake Powell in T41S, R11E, sec. 26 (Salt Lake Meridian) up to the full pool elevation Razorback sucker critical habitat includes the SJR and its 100-year floodplain from the Hogback Diversion in T29N, R16W, sec 9 (New Mexico Meridian) to the full pool elevation at the mouth of Neskahai Canyon on the San Juan arm of Lake Powell in T41S, R11E, sec. 26 (Salt Lake Meridian) All actions carried out, funded or authorized by a federal agency which may alter the constituent elements of critical habitat must undergo section 7 consultation under the Endangered Species Act of 1973, as amended Constituent elements are those physical and biological attributes essential to a species conservation and include, but are not limited to, water, physical habitat, and biological environment as required for each particular life stage of a species.

H. Little Colorado River - On 21 March 1994 (Federal Register, Vol. 59, No 54) the U.S Fish and Wildlife Service designated Critical Habitat along portions of the Colorado and Little Colorado Rivers (LCR) for Gila cypha (humpback chub). Within or adjacent to the Navajo Nation this critical habitat includes the LCR and its 100-year floodplain from river mile 8 in T32N R6E, sec. 12 (Salt and Gila River Meridian) to its confluence with the Colorado River in T32N R5E sec. 1 (S&GRM) and the Colorado River and 100-year floodplain from Nautuloid Canyon (River Mile 34) T36N R5E sec 35 (S&GRM) to its confluence with the LCR. All actions carried out, funded or authorized by a federal agency which may alter the constituent elements of Critical Habitat must undergo section 7 consultation under the Endangered Species Act of 1973, as amended Constituent elements are those physical and biological attributes essential to a species conservation and include, but are not limited to, water, physical habitat, and biological environment as required for each particular life stage of a species

I. Wetlands – In Arizona and New Mexico, potential impacts to wetlands should also be evaluated. The U.S. Fish & Wildlife Service's National Wetlands Inventory (NWI) maps should be examined to determine whether areas classified as wetlands are located close enough to the project site(s) to be impacted. In cases where the maps are inconclusive (e.g., due to their small scale), field surveys must be completed

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For field surveys, wetlands identification and delineation methodology contained in the "Corps of Engineers Wetlands Delineation Manual" (Technical Report Y-87-1) should be used. When wetlands are present, potential impacts must be addressed in an environmental assessment and the Army Corps of Engineers, Phoenix office, must be contacted. NWI maps are available for examination at the Navajo Natural Heritage Program (NNHP) office, or may be purchased through the U.S. Geological Survey (order forms are available through the NNHP). The NNHP has complete coverage of the Navajo Nation, excluding Utah, at 1:100,000 scale; and coverage at 1:24,000 scale in the southwestern portion of the Navajo Nation. In Utah, the U.S. Fish & Wildlife Service's National Wetlands Inventory maps are not yet available for the Utah portion of the Navajo Nation, therefore, field surveys should be completed to determine whether wetlands are located close enough to the project site(s) to be impacted. For field surveys, wetlands identification and delineation methodology contained in the "Corps of Engineers Wetlands Delineation Manual" (Technical Report Y-87-1) should be used. When wetlands are present, potential impacts must be addressed in an environmental assessment and the Army Corps of Engineers, Phoenix office, must be contacted. For more information contact the Navajo Environmental Protection Agency's Water Quality Program.

J. Life Length of Data Request – The information in this report was identified by the NNHP and NNDFW's biologists and computerized database, and is based on data available at the time of this response. If project planning takes more than two (02) years from the date of this response, verification of the information provided herein is necessary. It should not be regarded as the final statement on the occurrence of any species, nor should it substitute for on-site surveys. Also, because the NNDFW information is continually updated, any given information response is only wholly appropriate for its respective request.

K. Ground Water Pumping - Projects involving the ground water pumping for mining operations, agricultural projects or commercial wells (including municipal wells) will have to provide an analysis on the effects to surface water and address potential impacts on all aquatic and/or wetlands species listed below. NESL Species potentially impacted by ground water pumping: Carex specuicola (Navajo Sedge), Cirsium rydbergii (Rydberg's Thistle), Primula specuicola (Cave Primrose), Platanthera zothecina (Alcove Bog Orchid), Puccinellia parishii (Parish Alkali Grass), Zigadenus vaginatus (Alcove Death Camas), Perityle specuicola (Alcove Rock Daisy), Symphyotrichum welshii (Welsh's American-aster), Coccyzus americanus (Yellow-billed Cuckoo), Empidonax traillii extimus (Southwestern Willow Flycatcher), Rana pipiens (Northern Leopard Frog), Gila cypha (Humpback Chub), Gila robusta (Roundtail Chub), Ptychocheilus lucius (Colorado Pikeminnow), Xyrauchen texanus (Razorback Sucker), Cinclus mexicanus (American Dipper), Speyeria nokomis (Western Seep Fritillary), Aechmophorus clarkia (Clark's Grebe), Ceryle alcyon (Belted Kingfisher), Dendroica petechia (Yellow Warbler), Porzana carolina (Sora), Catostomus discobolus (Bluehead Sucker), Cottus bairdi (Mottled Sculpin), Oxyloma kanabense (Kanab Ambersnail)

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6. Personnel Contacts

Wildlife Manager
Leanna Begay
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lbegay@nndfw.org

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Botanist
Nora Talkington
ntalkington@nndfw.org

Biological Reviewer (Interim)
Taylor Greene
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tgreene@nndfw.org

GIS Supervisor
Dexter D Prall
928.545.2898
prall@nndfw.org

7. Resources

Navajo Endangered Species List:
https://www.nndfw.org/nnhp/endangered.htm

Species Accounts:
https://www.nndfw.org/nnhp/sp_account.htm

Biological Investigation Permit Application
https://www.nndfw.org/nnhp/study_permit.htm

Navajo Nation Sensitive Species List
https://www.nndfw.org/nnhp/trackinglist.htm

Various Species Management and/or Document and Reports
https://www.nndfw.org/nnhp/docs_reps.htm

Consultant List
https://www.nndfw.org/bi_consult_list_2014.pdf

Dexter D Prall

Digitally signed by Dexter D Prall
DN: cn=Dexter D Prall, o=Navajo Natural Heritage Program, ou=Navajo Nation Department of Fish and Wildlife, email=prall@nndfw.org, c=US
Date: 2021.03.29 08:36:25 -07'00'

Dexter D Prall, GIS Supervisor - Natural Heritage Program
Navajo Nation Department of Fish and Wildlife

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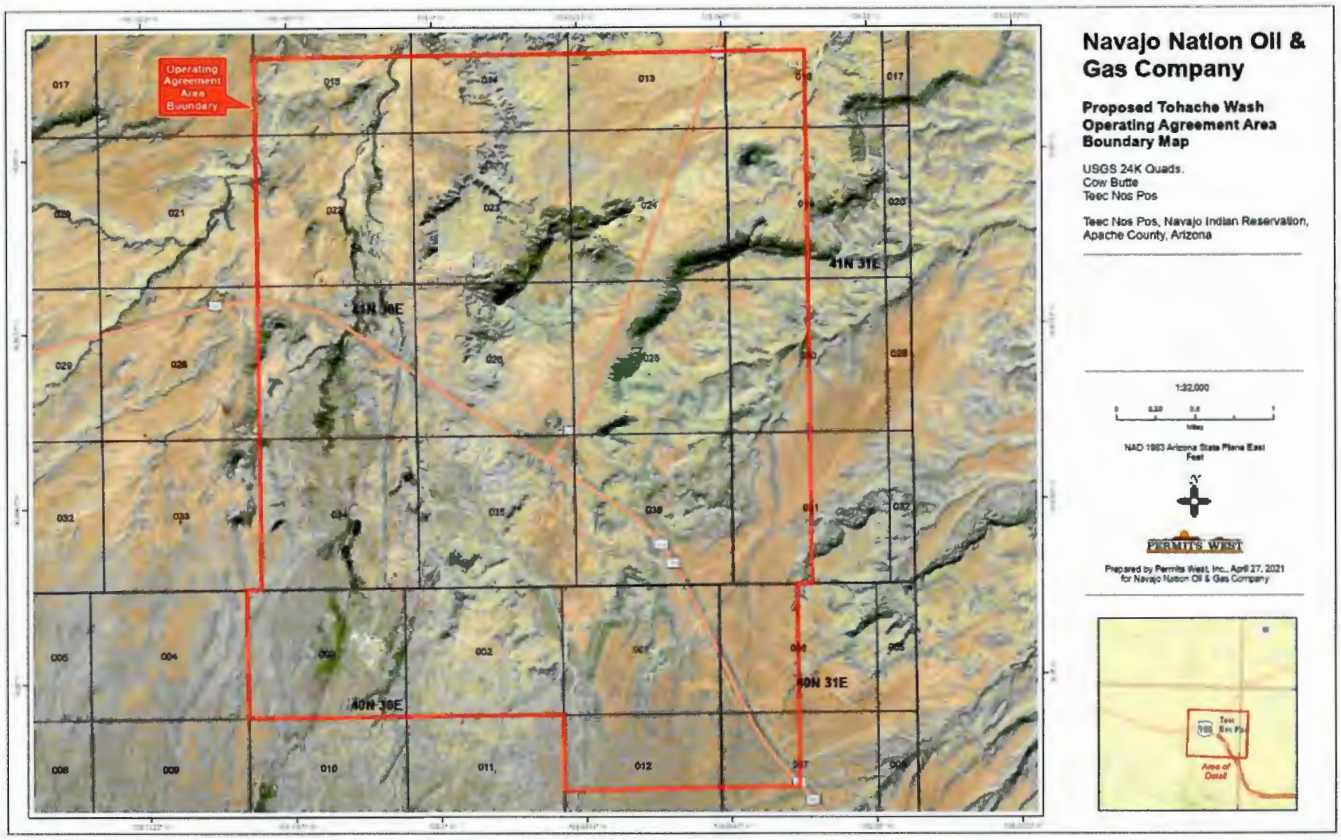
APPENDIX B - Map

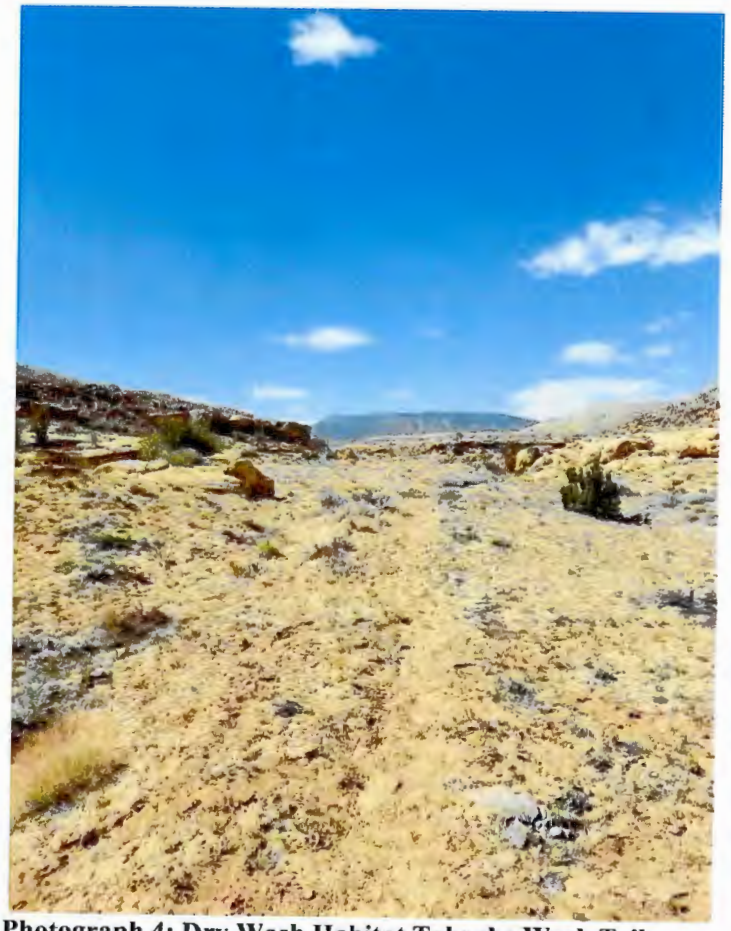

Navajo Nation Oil & Gas Company
Proposed Tohache Wash Operating Agreement Area Boundary Map
USGS 24K Quads.
Cow Butte
Teec Nos Pos
Teec Nos Pos, Navajo Indian Reservation, Apache County, Arizona
1:32,000
NAD 1983 Arizona State Plane East Feet
PERMITS WEST
Prepared by Permits West, Inc., April 27, 2021 for Navajo Nation Oil & Gas Company
Operating Agreement Area Boundary
41N 31E
41N 30E
40N 31E
40N 30E
Area of Detail

APPENDIX C - Photos

Photograph 1: Mesa Sideslope Habitat

Photograph 2: Mesa Top Habitat with Stabilized Dunes

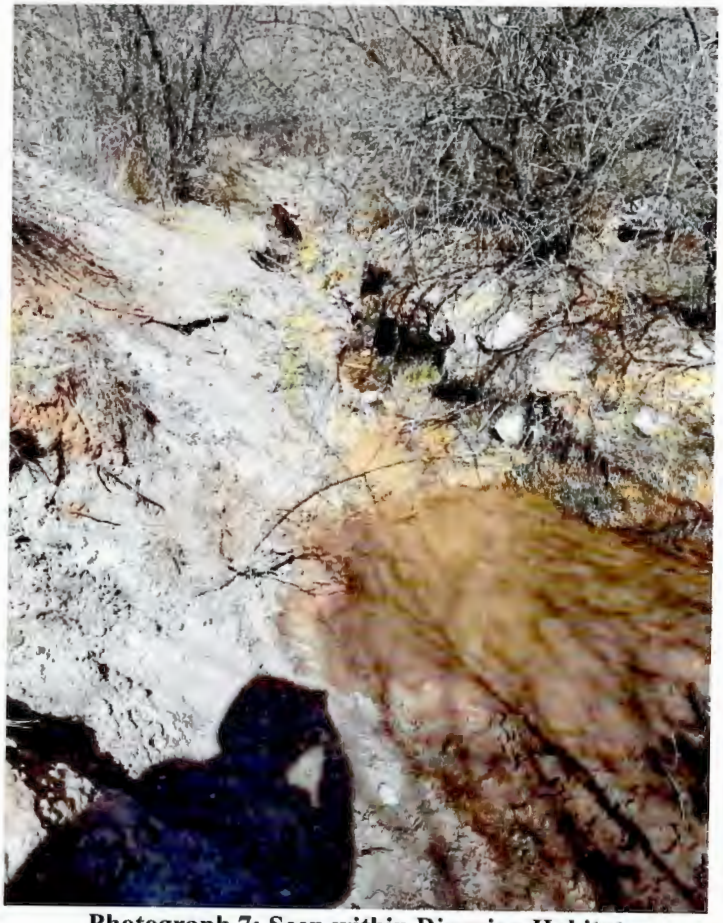
Photograph 3: Rangeland Habitat



Photograph 4: Dry Wash Habitat Tohache Wash Tributary

Photograph 5: Dry Wash Habitat Teec Nos Pos Wash Tributary

Photograph 6: Riparian Habitat



Photograph 7: Seep within Riparian Habitat

A REVIEW OF NNHPD SITE RECORDS FOR NAVAJO NATION OIL & GAS COMPANY'S TOHACHE WASH LEASE AREA, TEEC NOS POS CHAPTER, APACHE COUNTY, ARIZONA

Prepared by
Douglas H.M. Boggess
Lone Mountain Archaeological Services, Inc.

Submitted by
Douglas H.M. Boggess, Principal Investigator
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Prepared for
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LONE MOUNTAIN ARCHAEOLOGICAL SERVICES, INC.

Lone Mountain Report No. 3509
May 6, 2021

Navajo Nation Oil & Gas Company proposes to design and place oil and gas production facilities in the Tohache Wash Lease Area on Navajo Nation lands, Teec Nos Pos Chapter, Apache County, Arizona. Planning locations and designs for any proposed facilities will depend on environmental and cultural conditions within the Tohache Wash Lease Area, including the location of previously-identified archaeological sites and Traditional Cultural Properties.

In anticipation of this undertaking, Lone Mountain Archaeologist, Douglas Boggess, performed a records search of the 10,187.855-acre Tohache Wash Lease Area on April 7, 2021 at the offices of the Navajo Nation Heritage and Historic Preservation Department in Window Rock, Arizona.

Lands in the lease area are administered by the Navajo Nation Heritage and Historic Preservation Department, which will serve as lead agency for any development within the lease area. The lease area is within Apache County on the Teec Nos Pos, AZ-NM-UT 7.5' USGS quadrangle. The lease area falls within Township 41 North, Range 30 East, Gila and Salt River Meridian, Sections 13 to 15, 22 to 27, and 34 to 36; Township 41 North, Range 31 East, Gila and Salt River Meridian, Sections 18, 19, 30, and 31; Township 40 North, Range 30 East, Gila and Salt River Meridian, Sections 1 to 3 and 12; and Township 40 North, Range 31 East, Gila and Salt River Meridian, Sections 6 and 7.

Lone Mountain identified one Traditional Cultural Property and 39 archaeological sites (likely 95 percent of previously-documented sites) within the survey area. Development should be designed to avoid all NRHP-eligible sites by at least 100 ft.

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APPENDIX A: SURVEYOR'S PLAT A-1

FIGURES

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FIGURE 1.9: PROJECT AREA AERIAL (4 OF 4). 14
FIGURE A.1: SURVEYOR'S PLAT A-2

TABLES

TABLE 1: SUMMARY OF PREVIOUSLY-RECORDED SITES. 15

Lone Mountain Archaeologist, Douglas Boggess, performed a records search of the 10,187.855-acre Tohache Wash Lease Area on April 7, 2021

DESCRIPTION OF UNDERTAKING

Navajo Nation Oil & Gas Company proposes to design and place oil and gas production facilities in the Tohache Wash Lease Area on Navajo Nation lands, Teec Nos Pos Chapter, Apache County, Arizona. Planning locations and designs for any proposed facilities will depend on environmental and cultural conditions within the Tohache Wash Lease Area, including the location of previously-identified archaeological sites and Traditional Cultural Properties.

PROJECT LOCATION

The 10,187.855 lease area falls in Township 41 North, Range 30 East, Gila and Salt River Meridian, Sections 13 to 15, 22 to 27, and 34 to 36; Township 41 North, Range 31 East, Gila and Salt River Meridian, Sections 18, 19, 30, and 31; Township 40 North, Range 30 East, Gila and Salt River Meridian, Sections 1 to 3 and 12; and Township 40 North, Range 31 East, Gila and Salt River Meridian, Sections 6 and 7 (Figures 1.1 through 1.9).

ENVIRONMENTAL SETTING

The Tohache Wash Lease Area is an approximately 10,188-acre block that encompasses flood plains, canyons, the census-designated place of Teec Nos Pos, and US Highways 160 and 64. Teec Nos Pos Wash is located on the west side of the lease area and Tohache Wash is to the center and east. The lease area overlies the Morrison Formation, formed during the Late Jurassic and is comprised of commonly cliff-forming, cross-bedded sandstone lenses alternating with slope-forming siltstone, mudstone, and shale. Elevations are between 4,700 ft and 5,680 ft amsl.

Brown (1994) characterizes the area as Plains and Great Basin Grassland in the north and Great Basin Conifer Woodland in the south. Local vegetation includes juniper, sand sage, snakeweed, and various forbs and grasses.

CULTURAL BACKGROUND

The presence, nature, and spatial organization of prehistoric, protohistoric, and historic resources in the project area have been studied sporadically since the mid 1980s. As described below, much of the previous work within the Teec Nos Pos area has consisted of small block surveys for home sites. Archaeological sites, including prehistoric and possibly protohistoric sites, have been found in the area in a low to moderate density. Resources can be expected to represent much of antiquity, spanning a 6,000- to 7,000-year period of use. In the following paragraphs, a brief outline of these resource types is presented to provide a background for the study of the prehistoric, protohistoric, and historic resources found in the lease area.

PALEOINDIAN PERIOD (CA. 10,500 B.C.+ TO 6,000 B.C.)

Despite some controversial evidence indicating a human presence in the New World earlier than 10,500 B.C., Anderson and Faught (2000) argue that current evidence is insufficient to describe any cultural trends prior to the appearance of the Clovis complex at around 10,500 B.C., notwithstanding Hayden's (1976) arguments for the Malpais pre-San Dieguito/San Dieguito material (Heilen 2004). The earliest documented human use of the region was during the Paleoindian Period (ca. 10,500 B.C. to 5.500 B.C.). This period is generally divided into three temporally-distinct complexes based on changes in material culture and adaptation: the Clovis, Folsom, and Plano phases.

Paleoindian settlement and subsistence strategies are best described as primarily focused on the hunting of Pleistocene megafauna, most notably mammoth and bison. Given the nature of these animals and their wide distribution across the landscape, it has been assumed that Paleoindians were highly mobile hunters. This is supported by tools manufactured of raw materials procured from sources that are at great distances from sites.

The Clovis complex (ca. 10,500 B.C. to 9000 B.C.) is defined by the presence of Clovis points and a hunting economy focused on the exploitation of megafauna, particularly the mammoth. Clovis points are large, bifacially flaked lanceolate projectile points that are distinctively fluted. These points have a concave base and the scar of a flute or channel flake that has been removed from each side of the point base extending upward and parallel to the blade margins. Other artifacts found in the Clovis assemblage include transverse end scrapers, side scrapers, bifacial knives, perforators, gravers, and hammerstones (Stuart and Gauthier 1988). These tools tend to be quite distinct in the fineness of their manufacture and the quality of materials used.

The Folsom complex (ca. 9000 B.C. to 8200 B.C.) is defined by the presence of Folsom points and an economy that was largely based on the exploitation of Bison antiquus. Folsom points were also fluted, but a change in technology and craftsmanship from the Clovis period makes these points distinctive. Folsom points are characterized by highly skilled lateral flaking and a broader, longer channel flake scar than on Clovis points. Midland-style points are also associated with the Folsom phase and are similar to Folsom points, but without the fluting. Other tools associated with the Folsom assemblage include end scrapers, perforators, knives, drills, choppers, and awls.

The Plano complex is generally used to describe the Late Paleoindian Period, dating from 8200 B.C. to 5500 B.C. This phase includes a number of complexes characterized by large unfluted lanceolate points. These include Plainview, Frederick, Agate Basin, Hell Gap, Firstview, Alberta, and Cody.

Recent archaeological studies in the Four Corners have identified Paleoindian points in isolated contexts or as individual points found at sites, such as the Clovis point bases recovered from the Lime Ridge site (Davis 1989; Davis and Brown 1986; Firor 1998; Irwin 1999). The site is located on a ridge top at the head of a canyon that drains eastward toward the confluence of Comb Wash and the San Juan River. Two Paleoindian points have been found in the vicinity of Natural Bridges National Monument (Hurst 1996 in Till and Davis 1997; Irwin 1999). One is a Hell Gap point found near the south edge of the Monument in association with bison antiquus bones, while the second, an unfinished and broken fluted biface similar to a Clovis point, was found to the north of White Canyon. Finally, a broken Folsom point has been documented on Milk Ranch Point on the southeast edge of Elk Ridge.

ARCHAIC PERIOD (5500 B.C. TO 1500 B.C.)

Archaic-period sites date between 5500 and 1500 B.C. The Archaic Period may be subdivided into the Early, Middle, and Late Archaic phases. The beginning of the Archaic Period, the Early Archaic, corresponds to climatic changes that brought warmer, drier conditions. These environmental changes required different subsistence strategies than those practiced during the preceding Paleoindian Period. Subsistence procurement shifted from a strategy focused on hunting to the exploitation of a broad spectrum of faunal and floral resources. Archaic populations responded to the discontinuous spatial and seasonal availability of resources through a serial foraging settlement system employing a high degree of residential mobility. During the terminal Archaic, maize (corn) is introduced and horticulture becomes the dominant subsistence mode in the Glen Canyon area (Geib 1996).

Artifact assemblages from the Archaic Period exhibit a greater diversity than that of the preceding Paleoindian Period. Projectile points decreased in size, indicating that smaller animal species were being hunted. The introduction of groundstone tools indicates an increased emphasis on vegetable foods in the diet. Studies of Archaic-period cultural remains in the region indicate that projectile points include a variety of stemmed, corner-notched, and side-notched forms (e.g., Geib 1996; Irwin 1999). Open-twined and plain-weave sandals and close-coiled basketry are typical of this period (Geib 1996).

Archaic sites dating to the Early, Middle, and Late Archaic have been documented in the Cottonwood Wash region (Fetterman and Honeycut 1998; McVickar 1999; Till and Davis 1997; Tipps 1988, 1995). These occur primarily in higher-altitude settings where game and wild plant resources are abundant. Maize was introduced to this region during the Late Archaic. This resource may have been used differentially by various dispersed Archaic groups. Some groups may have depended almost entirely on wild plant resources, while others may have adopted maize as a supplement to their diet. These differences resulted in divergences in the settlement and subsistence systems employed by Archaic groups in the San Juan Basin and Northern Colorado Plateau.

Vierra and Doleman (1994) have suggested that San Juan Basin Archaic groups may have practiced a mixed collector-forager strategy wherein they aggregated into winter base camps and dispersed into small groups utilizing a foraging strategy during spring, summer, and fall.

Groups wintered in higher altitude settings, subsisting on stored foods, piñon nuts, and game resources. During the spring and summer, San Juan Basin groups migrated to lower-altitude settings where grasses and other resources were bountiful. In contrast, the Natural Bridges Survey found that Archaic sites are located on mesa tops and at the heads of the tributary canyons to White Canyon near the base of Elk Ridge (Irwin 1999). Data from the Natural Bridges Survey suggest that the Archaic economy was based on a forager strategy focused on wild plant and animal resources (Irwin 1999).

BASKETMAKER II PERIOD (1500 B.C. TO A.D. 500; A.D. 1 TO 400)

Although the Pecos Classification indicates the Basketmaker II Period dates to between 1500 B.C. and A.D. 500, most Basketmaker II sites in the Four Corners Region date between A.D. 1 and A.D. 400 (Fuller 1989; Gregg and Smiley 1995; Matson et al. 1988; Morris and Burgh 1954). The Basketmaker II period marks a transition toward a greater reliance on maize agriculture, increased sedentism, and the initiation of the Anasazi way of life. In southeastern Utah, the Basketmaker II occupation is centered on Cedar Mesa, where habitations, campsites, and limited-activity sites have been identified. Habitations are generally found in upland settings that are near lands that are favorable for agriculture, whereas wild upland resources were extracted through a series of seasonal camps and locations. On Cedar Mesa (Matson et al. 1988) and at Natural Bridges (McVickar 1999), these resources are primarily found along canyon rims, mesa tops, and, most commonly, the upper reaches of canyons.

Some researchers (Kidder and Guernsey 1919, 1922; Matson 1991) assert that the Basketmaker II Period marks the intrusion of farmers known as the White Dog variant of the Basketmaker II culture. Excavations at cave sites in southeastern Utah (Blackburn and Williamson 1997; Geib 1996; Geib and Davidson 1994) indicate that White Dog Basketmaker material culture is distinct from the preceding Archaic Period and includes weft-twined cord bags, weft-face plain-weave sandals, White Dog projectile points, S-shaped sticks, and close-coiled basketry. Projectile points are large and similar to the dart points of the Archaic Period, but typically have wider, shallower notches than Archaic point types.

BASKETMAKER III PERIOD (A.D. 575 TO 750)

The Basketmaker III (A.D. 575 to 750) Period is distinguished from the preceding period by the introduction of ceramics and the bow and arrow. This corresponds with a decrease in the size of projectile points. Beans were added to the subsistence regime. An increased reliance on maize agriculture and decreased use of faunal and wild plant resources is reflected in settlement patterns and in the nature of artifact assemblages.

Plain Chapin Gray is the dominant ceramic type found at Basketmaker III sites, along with smaller numbers of Chapin Black-on-white, Abajo Red-on-orange, and Abajo Polychrome sherds. Small stemmed and corner-notched arrow points belonging to the Rosegate series are typical of this period. Lithic technology became increasingly focused on core reduction and the production of simple flake tools. Groundstone tools increased in frequency and trough metates were introduced, reflecting the importance of maize in the Basketmaker III diet.

Shallow pit structures with antechambers, banquettes, central clay-lined hearths, wing walls, four-post roof supports, and storage pits typify the Basketmaker III Period. Storage facilities became more common, again reflecting the importance of domesticated crops. Evidence has been found of village life and community formation during the Basketmaker III period, although such aggregations may have been seasonal prior to the Pueblo I period.

PUEBLO I PERIOD (A.D. 750 TO 900)

The Pueblo I Period in the Four Corners Region dates between A.D. 750 and A.D. 900. It is during this period that a distinctive architectural layout and the formation of large village settlements were introduced. Habitation sites were generally composed of square subterranean, pit structures backed by one or two rows of con-

tiguous rectangular surface rooms constructed of jacal and slab-lined walls. Neck-banded graywares (Moccasin Gray); early San Juan redwares (Abajo Red-on-orange, Bluff Black-on-red, and Deadmans Black-on-red); and early Mesa Verde whitewares (Chapin, Piedra, and White Mesa Black-on-white) characterize Pueblo I-period ceramic assemblages.

Regionally, Pueblo I settlements range from isolated pit structures to large villages comprised of multiple pit structures and arcs of surface rooms. Large Pueblo I villages are found on Alkali Ridge in southeastern Utah (Brew 1946) and in the Dolores River Valley in southwestern Colorado (Breternitz et al. 1986).

PUEBLO II PERIOD (A.D. 900 TO 1100)

The Pueblo II Period dates between A.D. 900 and A.D. 1100. Pueblo II subsistence became increasingly dependent on maize agriculture. A marked increase in the frequency and diversity of groundstone tools and a concurrent decrease in flaked-stone tools associated with hunting reflect this trend. Ceramic types in the Mesa Verde region became more diverse and include indented corrugated graywares, Cortez Black-on-white, and Mancos Black-on-white, along with a variety of trade wares such as Tusayan Black-on-red, Sosi Black-on-white, Dogoshzi Black-on-white, and other types.

Regionally, the Pueblo II Period marks the transition to stone masonry architectural units and the development of new forms of community organization. Habitation sites from this period typically consist of unit pueblos (Prudden 1903) comprised of surface masonry rooms, an earthen pit structure or kiva, and a trash midden. During the early Pueblo II Period, surface rooms had stone masonry lower walls with jacal construction. Later in the period, full-height masonry walls became common. Kivas were generally round, with a surrounding bench, six masonry pilasters, a hearth, ventilator shaft, and sipapu (Cordell 1997). Recent research in the region suggests that subterranean or semi-subterranean mealing rooms are frequently associated with kiva facilities (Mobley-Tanaka 1993).

While much of the population occupied small, dispersed habitations, the Chacoan form of community organization emerged in the Four Corners and elsewhere in the region, indicating higher levels of community integration and interaction relative to the preceding period. Great houses, road segments, and great kivas formed the central elements to the community of households and farmsteads. In a region typically dominated by Kayenta and Mesa Verde traditions, the nature and role of the Chacoan tradition is of considerable anthropological interest. The introduction of the Chacoan form of organization along drainages in the Four Corners and elsewhere in the Anasazi region marked an era of agricultural intensification, increased economic specialization and community interaction, and social differentiation.

Late Pueblo II- to Early Pueblo III-period sites are common along drainages throughout the region and include habitations, field houses, and artifact scatters. These great house sites appear to have served as central places for the Pueblo II and Pueblo III community and are found across the region.

PUEBLO III PERIOD (A.D. 1100 TO 1350)

The Pueblo III Period dates between A.D. 1100 and A.D. 1350. The early Pueblo III Period witnessed a reorganization of the community in the post-Chacoan era, leading to the development of communities focused on nucleated pueblos with plazas and cliff dwellings. This form of organization continued until the region was abandoned at approximately A.D. 1270.

During the Pueblo III Period, there was a notable increase in site size. Sites are found in a variety of areas, including canyon rims, rockshelters, talus slopes, and canyon bottoms (Cordell 1997). Multi-story habitations with kivas, wholly or partially enclosed by rooms or walls, became more frequent and Mesa Verde keyhole-shaped kivas tended to replace the circular forms found during the preceding period. New site types and features were also introduced, including tri-wall structures, towers, plazas, shrines, reservoirs, stone check dams, and field houses (Cordell 1997). These developments signal a change in social organization, increased ceremonialism, and an intensification of the agricultural subsistence base.

Pueblo III ceramic assemblages include Mesa Verde Corrugated, McElmo Black-on-white, Mesa Verde Black-on-white, Tusayan Polychrome, and Citadel Polychrome. Vessel forms diversified to include a variety of shapes in addition to bowls and jars, such as canteens, mugs, dippers, and ollas.

PROTOHISTORIC PERIOD (A.D. 1350 TO 1700)

While the Rio Grande and the Little Colorado drainages continued to be utilized into the early Protohistoric (Pueblo IV) Period by Puebloan groups, the San Juan Region was abandoned following the Pueblo III Period, between A.D. 1350 and A.D. 1500.

Archaeological remains that are identifiably Navajo have dates between A.D. 1350 and A.D. 1700. The Navajo likely adopted or otherwise absorbed any remaining Anasazi. Little is known regarding these occupations in the Northern San Juan Region, partly because these groups employed a hunter- gatherer economy similar to Archaic groups. A fortification wall made of unshaped sandstone slabs found on McCracken Mesa in south-eastern Utah has been dated to A.D. 1380 and identified as a Navajo structure (personal communication, Ron Maldonado to Douglas Boggess, August 8, 2005). High residential mobility, the use of temporary structures, and the paucity of sherds and other datable materials frequently confound our ability to recognize Protohistoric Navajo sites in the region, although Navajo oral history confirms that the Navajo have always been here. Datable material culture items associated with the Protohistoric Period include Dinétah Grayware, Gobernador Polychrome, micaceous-tempered grayware, and Desert Side-notched projectile points.

HISTORIC PERIOD

As early as the 1600s, Spanish soldiers were dispatched into the area that would become the Four Corners to destroy Navajo crops and homes. These forays came at least as far north as the San Juan River. By the time Frays Dominguez and Escalante traveled through the area along what would later become the Old Spanish Trail in 1776, they identified the San Juan River as the boundary between Navajo territory to the south and Ute territory to the north (McPherson 1995:77). Spanish names were applied to a number of topographic features, including "Orejas del Oso" for the Bears Ears, and "Rio Navajo" for the San Juan River. The Old Spanish Trail did not approach the Cottonwood or Elk Ridge areas (McPherson 1995:78), but another, the Bears Ears Trail, was perhaps used by Spanish explorers. It climbed to Elk Ridge by the Bears Ears, followed the ridge to an area above Cataract Canyon, dropped into a side canyon to cross the Colorado River, and continued toward the Henry Mountains. Many historians regard this trail as speculative, however (McPherson 1995:79).

Remote locations, such as Elk Ridge and the rugged tributary canyons of the San Juan River, were sanctuary areas sought out by the Navajo, Paiute, and Ute people when military pressures increased in other parts of their homelands. One example is provided by K'aayelii, a Navajo who in 1860 established a small settlement at Kigalia Springs on the south end of Elk Ridge. In such an isolated location, K'aayelii's band was undisturbed by Kit Carson and his soldiers (McPherson 1992:39). Conflicts between Indians and Anglos eventually led to the reservation system. On May 28, 1868, the Navajo signed a treaty (McPherson 1995:67). Numerous historical reports state that Navajo people continued to use their lands outside the reservation boundaries.

Teec Nos Pos was the site of a trading post by 1905. The post and surrounding settlement were originally to the south of the present location and was known as Tisnasbas. In the 1930s, two dams were constructed along T'iisnázbas Creek to irrigate 400 acres of farmland. In 1960, the name of the place became Teec Nos Pas, and in 1983, Teec Nos Pos.

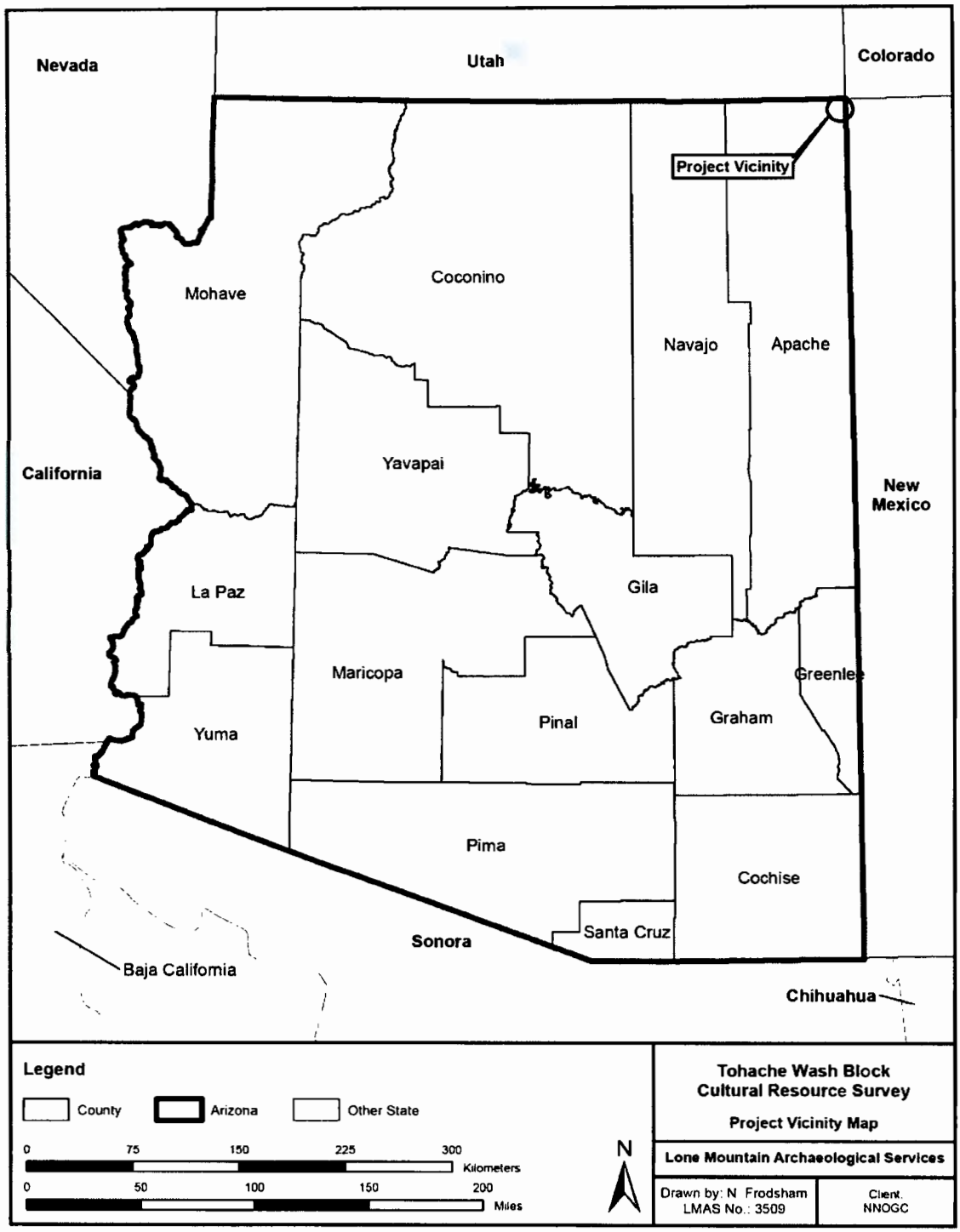

Figure 1.1: Project Vicinity.

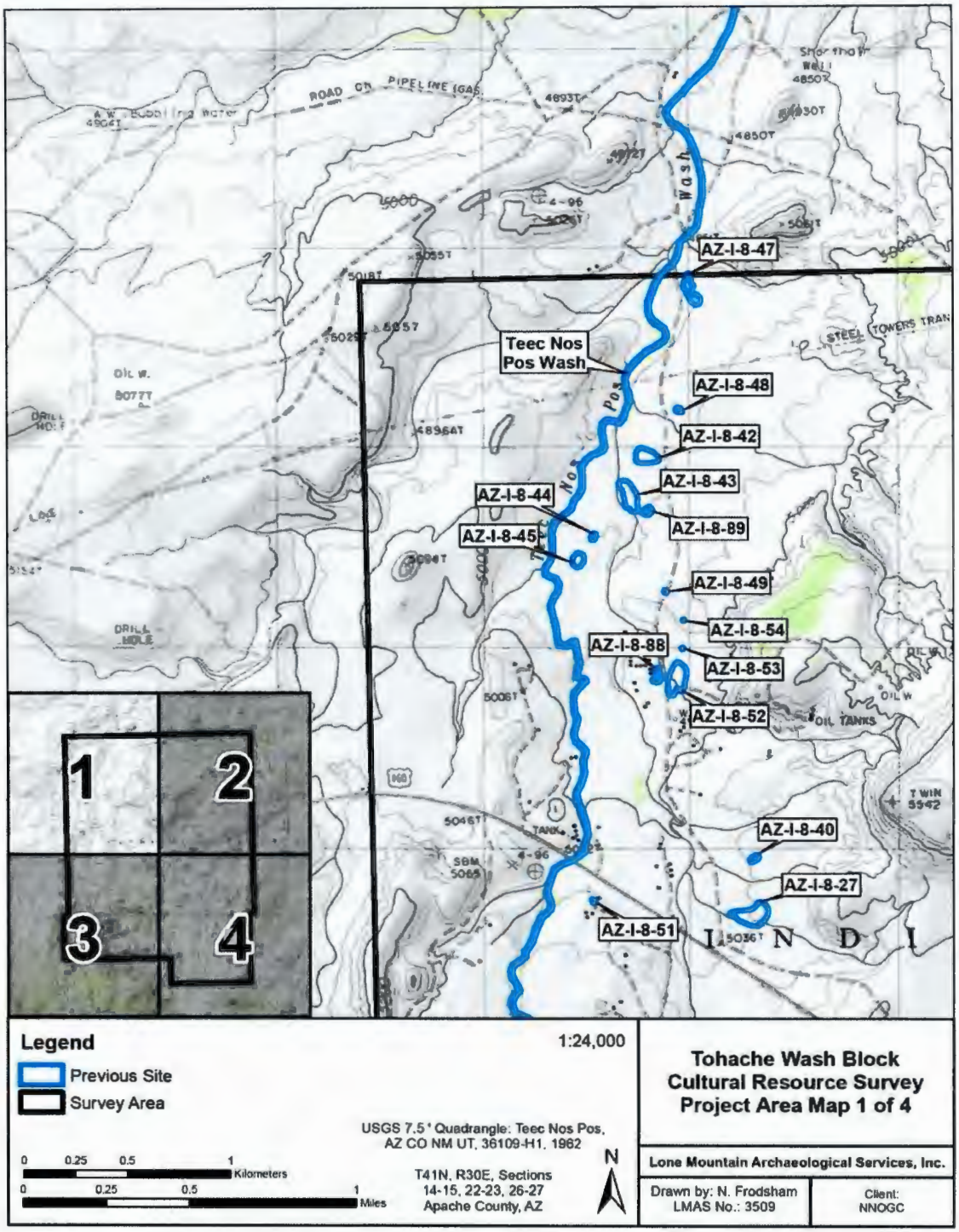

Figure 1.2: Project Area (1 of 4).

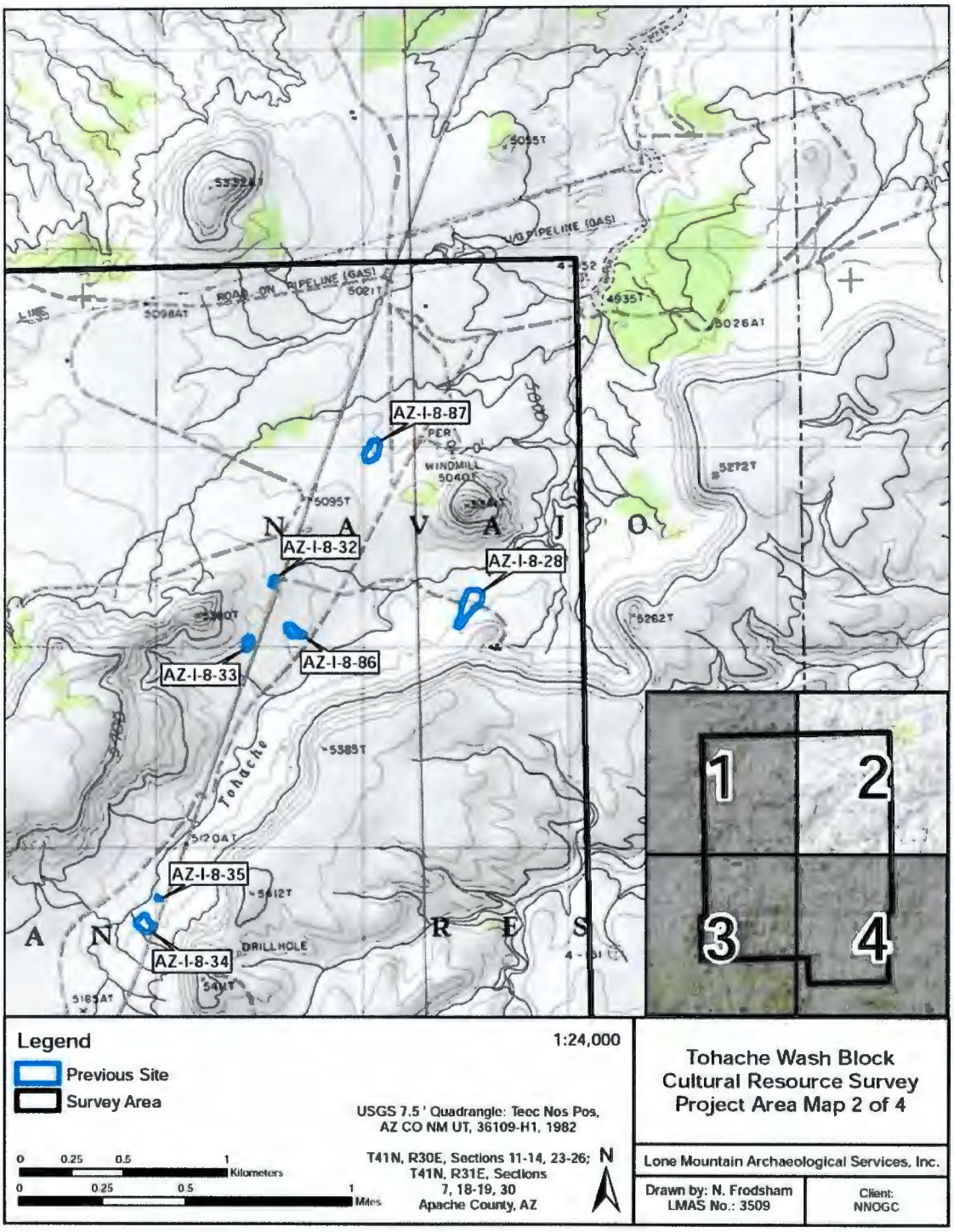

Figure 1.3: Project Area (2 of 4).

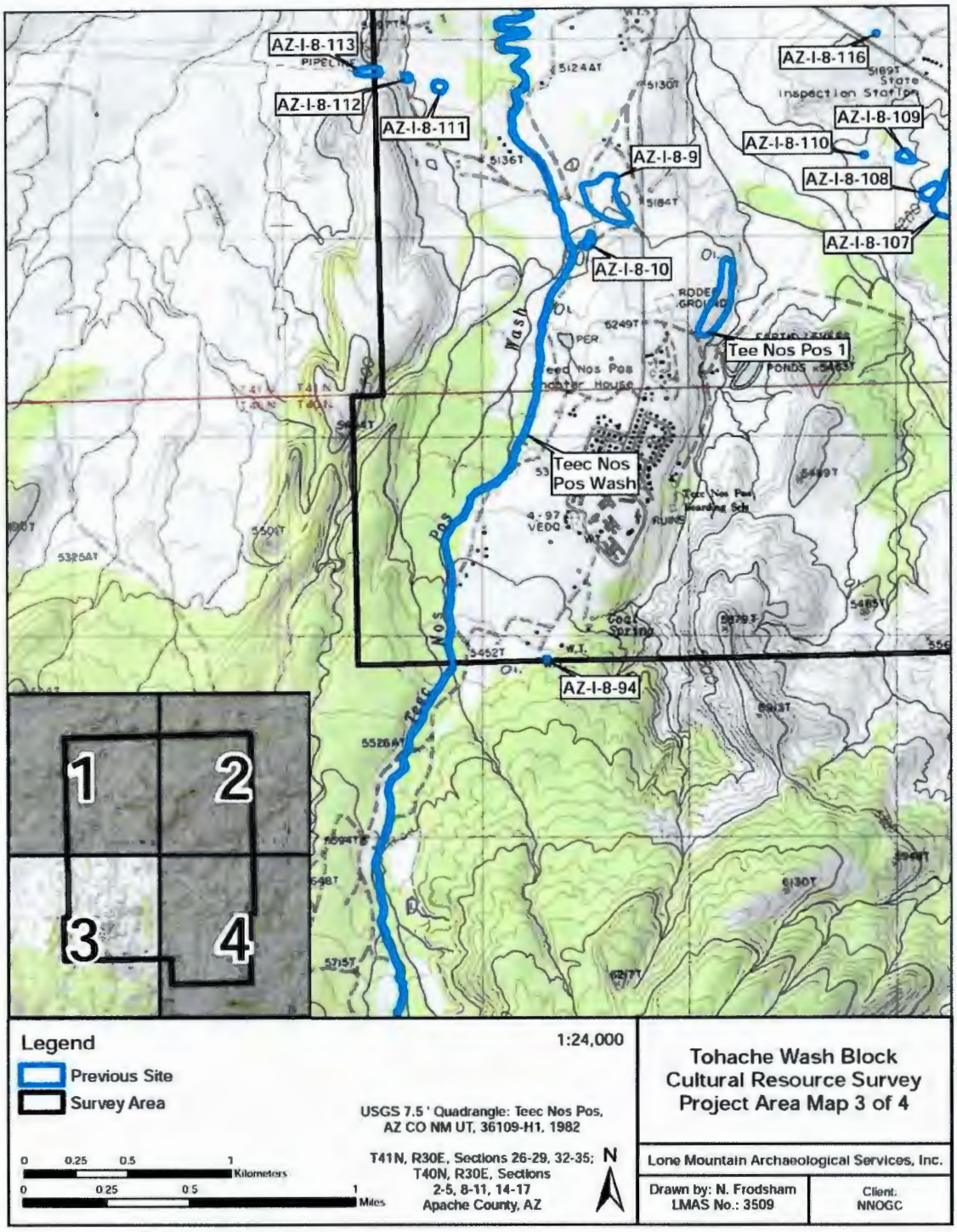

Figure 1.4: Project Area (3 of 4).

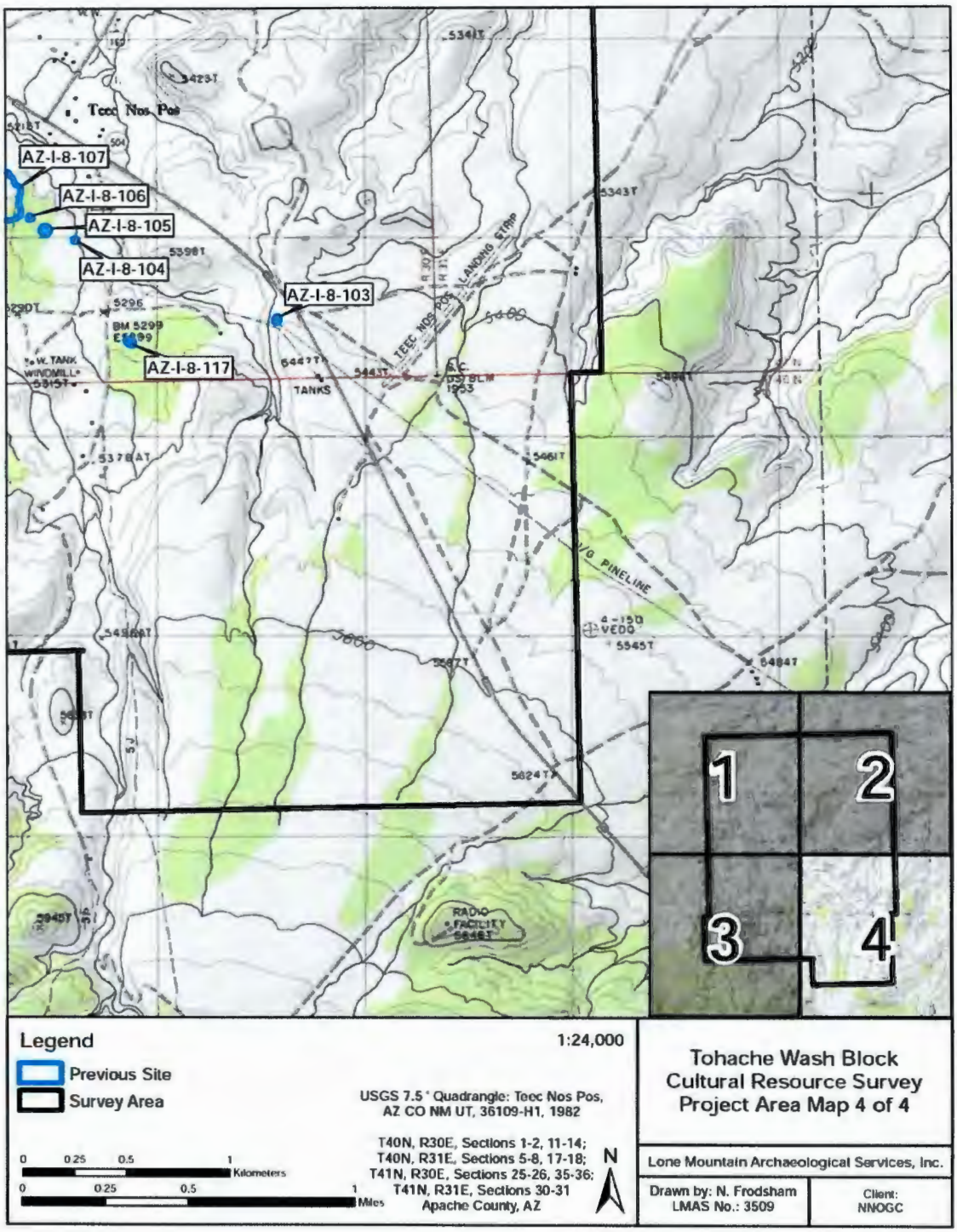

Figure 1.5: Project Area (4 of 4).

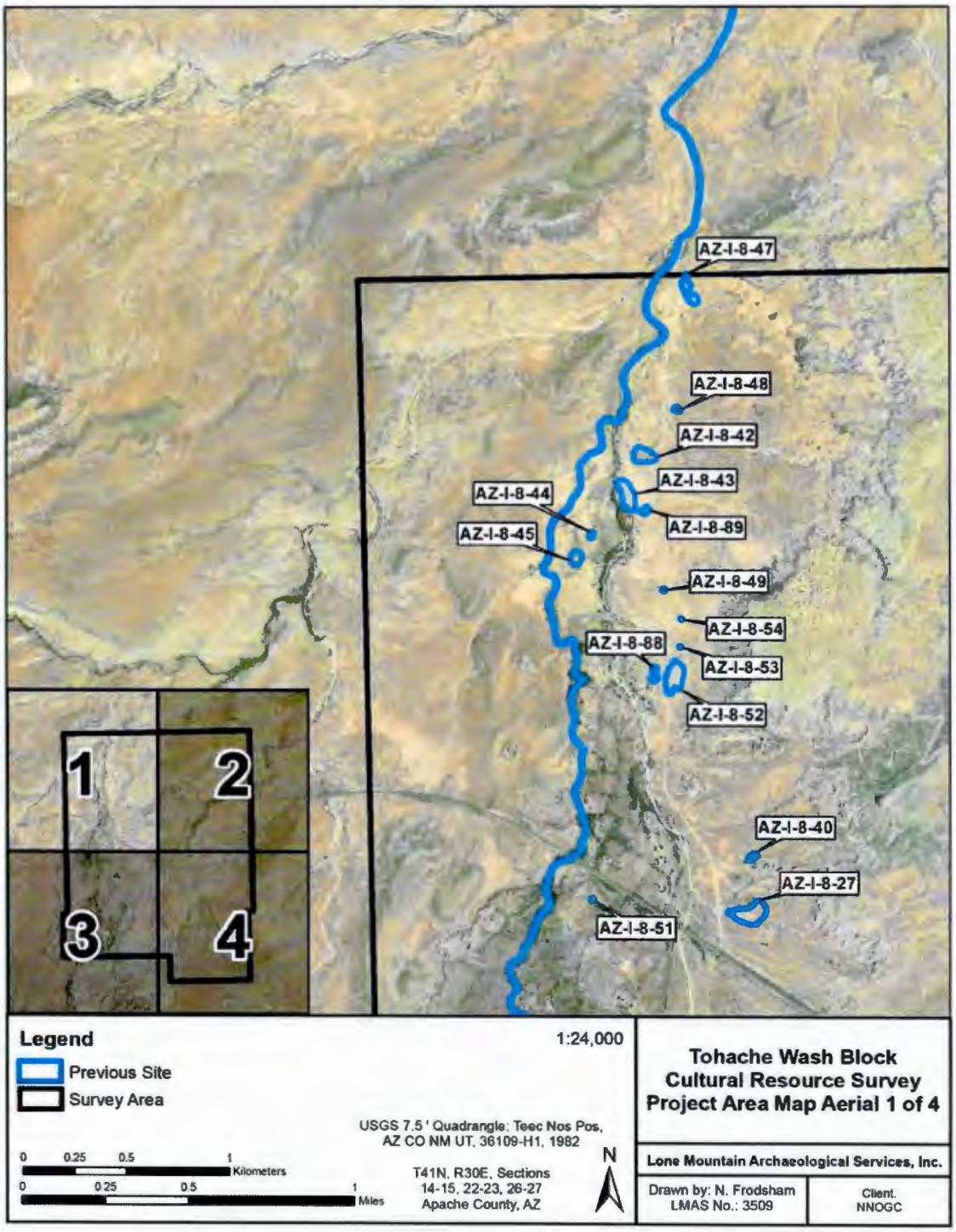

Figure 1.6: Project Area Aerial (1 of 4).

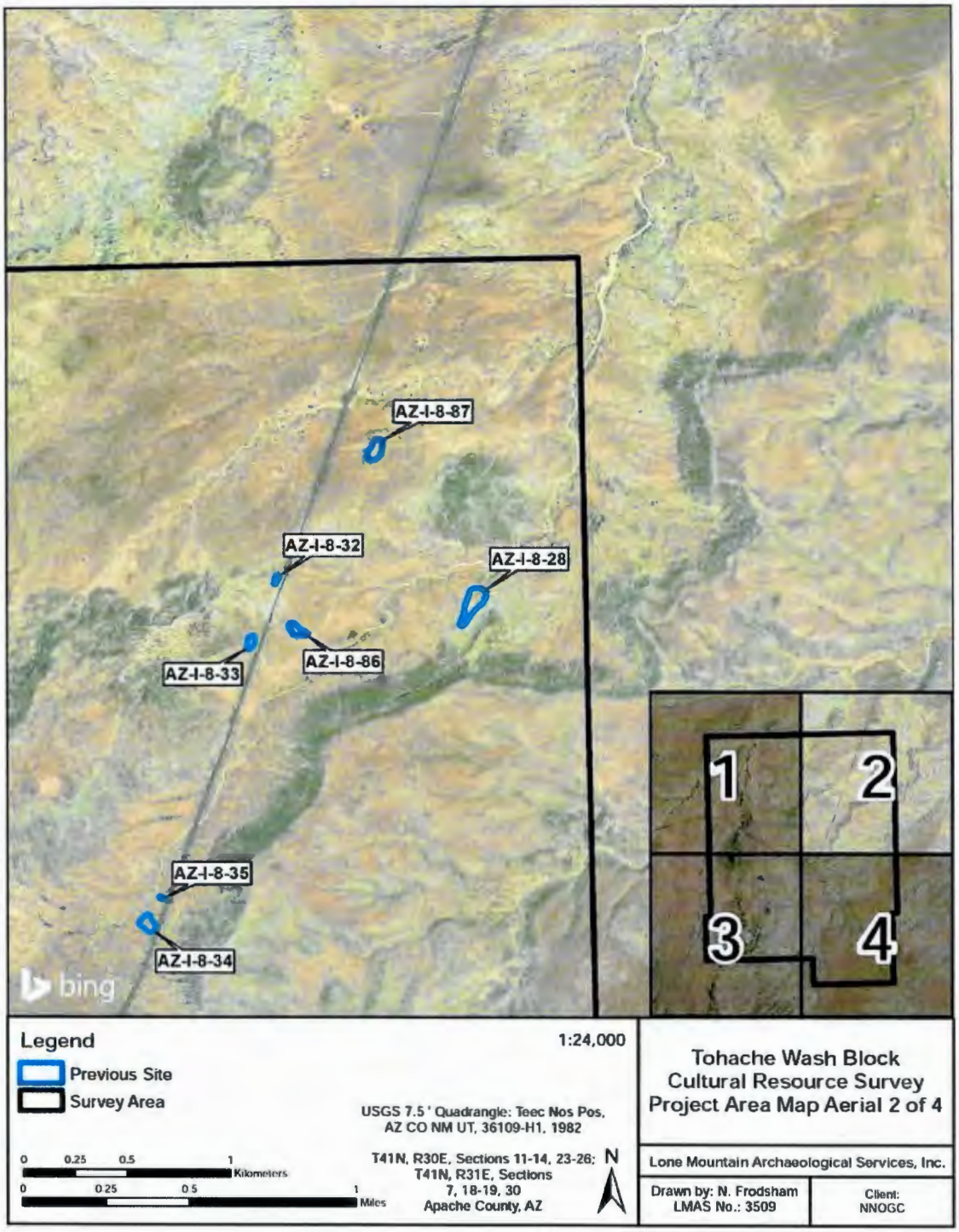

Figure 1.7: Project Area Aerial (2 of 4).

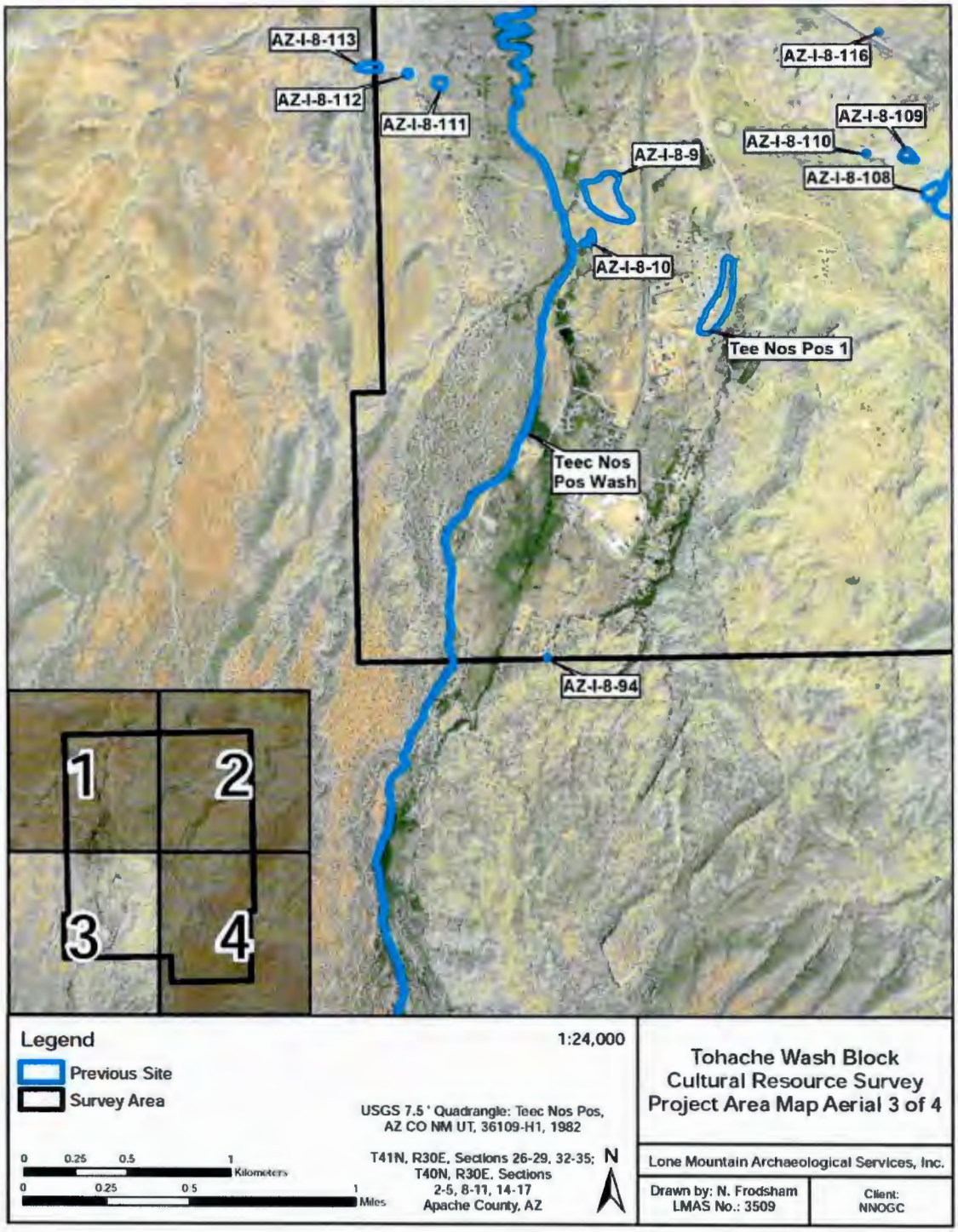

Figure 1.8: Project Area Aerial (3 of 4).

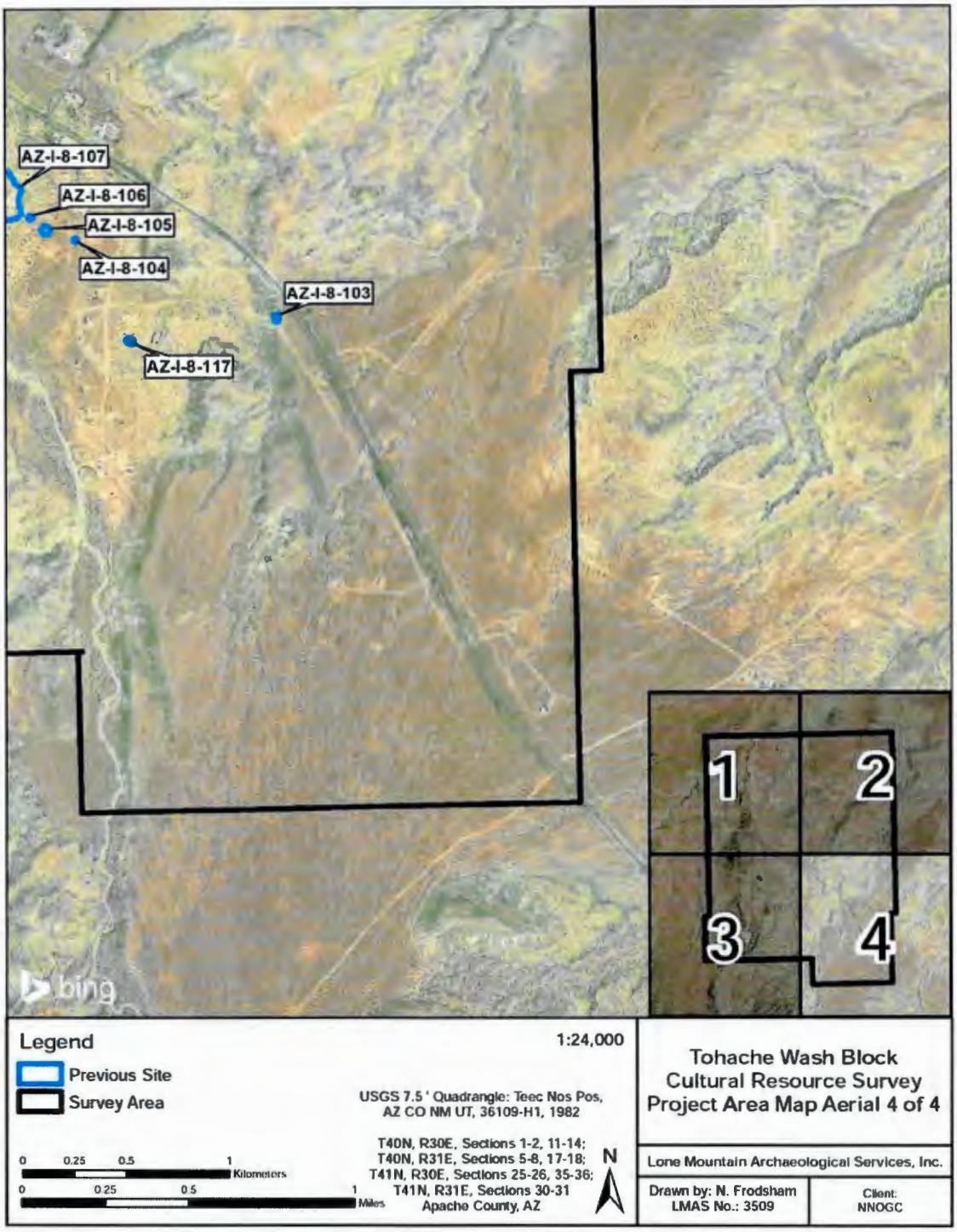

Figure 1.9: Project Area Aerial (4 of 4).

Lone Mountain Archaeologist, Douglas Boggess, performed a records search of the 10,187.855-acre Tohache Wash Lease Area on April 7, 2021

RESEARCH METHODS

On April 7, 2021, a site files review was conducted of the Navajo Nation Historic Preservation Division (NNHPD) site records in Window Rock to identify previously-recorded cultural resources and previously-conducted surveys within the lease area. This work took place during the Covid19 pandemic. The hours available for files searches were limited and only a few people could be in the NNHPD offices at any time. For this reason, only reports that resulted in the discovery of sites were examined.

At the time of this files-search, NNHPD records consisted of scanned images of USGS maps with handwritten notations identifying sites and surveys. For the most part, these are legible, but there were a few smudged numbers and sites that fell within several overlapping home site survey areas that could not be identified or found within the time allotted. It is estimated that Lone Mountain obtained records for no less than 95 percent of the sites in the lease area. The missed sites fall near the southwestern edge of the lease area and, since any oil and gas development must avoid homesites by 500 ft, these sites will be avoided by any proposed construction.

LOCATED RESOURCES

Lone Mountain identified one Traditional Cultural Property and 39 archaeological sites (likely 95 percent of previously-documented sites) within the Tohache Wash Lease Area. The sites are summarized in the table below.

The review of NNHPD's Cultural Resources Compliance Section files revealed that several cultural resource surveys are plotted on NNHPD maps as having taken place within the lease area. The earliest archaeological work known in the project area was performed in the mid 1980s, with most projects associated with waterlines and homesites. Many of the previously-recorded sites within the project area were first documented in a cultural resources report prepared for Questar's Southern Trails pipeline (Robinson et al. 2003). Homesite surveys are typically small block surveys, while waterlines and other pipelines are linear surveys. There do not appear to have been any large block surveys within the lease area.

A review of the confidential Sacred Places Database at the NNHPD offices in Window Rock revealed a single identified Traditional Cultural Property, Teec Nos Pos Wash.

Table 1: Summary of Previously-recorded Sites.

NN Site No.	Site Type	Cultural Affiliation (as provided)	Report Reference	NRHP Eligibility	ARPA
Tee Nos Pos 1	Modern Trash Dump	Modern Navajo (1970s)	Wigglesworth, Karen. 1989. *Archaeological Survey of the Three Housing Project Areas on Navajo Nation Lands, Apache and Coconino Counties, Arizona.* BIA NAO UA 89. CSWTA-097-008. Navajo Nation Archaeology Department, Window Rock, AZ.	Unk	No
AZ-I-8-9	Anasazi Habitation Site	Archaic (3000 to 1800 B.C.) and Anasazi (A.D. 900 to 1300)	Klesert, Anthony. 1985. *An Archaeological Survey of a Proposed Water Well and a Proposed Water Line Right-of-way at Teec Nos Pos, Arizona.* NTM-85-44. NMCRMP 85-42. Navajo Nation Archaeology Department, Window Rock, AZ.	Unk	Yes

Table 1: Summary of Previously-recorded Sites. (Continued)

NN Site No.	Site Type	Cultural Affiliation (as provided)	Report Reference	NRHP Eligibility	ARPA
AZ-I-8-10	Multiple Dwelling Permanent Camp	Unknown Aboriginal, Historic Navajo (1932 to 1945)	Klesert, Anthony. 1985. *An Archaeological Survey of a Proposed Water Well and a Proposed Water Line Right-of-way at Teec Nos Pos, Arizona.* NTM-85-44. NMCRMP 85-42. Navajo Nation Archaeology Department, Window Rock, AZ.	Unk	Yes
AZ-I-8-27	Campsite	Anasazi Pueblo II (A.D. 1075 to 1100)	Klesert, Anthony. 1993. *An Archaeological Survey of Shiprock District Scattered Homesites and Water Service Lines for Indian Health Service.* HPD-93-5470. NNAD 93-009. Navajo Nation Archaeology Department, Window Rock, AZ.	Unk	Yes
AZ-I-8-28	Multiple Dwelling Permanent Camp	Unknown Aboriginal, Navajo (A.D. 1954 to Present)	Werito, Clifford and Loretta Werito. 1986. *An Archaeological Survey of the Proposed Johnny Babbitt Homesite (CF #02130) in Teec Nos Pos, Arizona.* NNCRMP 033-1. BIA NAO NTM-86-169. Navajo Nation Archaeology Department, Window Rock, AZ.	Rec. eligible	Yes
AZ-I-8-32	Lithic Production Site with Features	Basketmaker II/100 B.C. - A.D. 400	Klesert, Anthony. 1989. *An Archaeological Survey of a Proposed Telephone Cable from Teec Nos Pos, Arizona to Four Corners National Monument.* NNAD 88-364. BIA-NAO NTM-88-502. Navajo Nation Archaeology Department, Window Rock, AZ.	Rec. eligible	Yes
AZ-I-8-33	Lithic Production Site	Unknown Aboriginal, Undated Prehistoric	Klesert, Anthony. 1989. *An Archaeological Survey of a Proposed Telephone Cable from Teec Nos Pos, Arizona to Four Corners National Monument.* NNAD 88-364. BIA-NAO NTM-88-502. Navajo Nation Archaeology Department, Window Rock, AZ.	Rec. eligible	Yes
AZ-I-8-34	Lithic Production Site	Unknown Aboriginal, Undated Prehistoric	Klesert, Anthony. 1989. *An Archaeological Survey of a Proposed Telephone Cable from Teec Nos Pos, Arizona to Four Corners National Monument.* NNAD 88-364. BIA-NAO NTM-88-502. Navajo Nation Archaeology Department, Window Rock, AZ.	Rec. eligible	Yes
AZ-I-8-35	Lithic Production Site	Unknown Aboriginal, Undated Prehistoric	Klesert, Anthony. 1989. *An Archaeological Survey of a Proposed Telephone Cable from Teec Nos Pos, Arizona to Four Corners National Monument.* NNAD 88-364. BIA-NAO NTM-88-502. Navajo Nation Archaeology Department, Window Rock, AZ.	Rec. eligible	Yes
AZ-I-8-40	Campsite	Unknown Aboriginal	Klesert, Anthony. 1993. *An Archaeological Survey of Shiprock District Scattered Homesites and Water Service Lines for Indian Health Service.* HPD-93-5470. NNAD 93-009. Navajo Nation Archaeology Department, Window Rock, AZ.	Unk	Yes

Table 1: Summary of Previously-recorded Sites. (Continued)

NN Site No.	Site Type	Cultural Affiliation (as provided)	Report Reference	NRHP Eligibility	ARPA
AZ-I-8-42	Campsite	Middle Archaic	Klesert, Anthony. 1998. *An Archaeological Survey of the Four Corners Extension for HIS in Teec Nos Pos Chapter, Apache County, Arizona.* HPD-98-336. NNAD 97-184. Navajo Nation Archaeology Department, Window Rock, AZ.	Eligible	Yes
AZ-I-8-43	Prehistoric and Historic site	Navajo	Dryer, Jamers. 2000. *An Archaeological Survey of the Proposed Walker Power Line Project for the Navajo Tribal Utility Authority in Teec Nos Pos, Apache County, Arizona.* HDP-97-624. NNAD-97-169. Navajo Nation Archaeology Department, Window Rock, AZ.	Eligible	Yes
AZ-I-8-44	Ceramic and Lithic Artifact Scatter	Anasazi	Dryer, Jamers. 2000. *An Archaeological Survey of the Proposed Walker Power Line Project for the Navajo Tribal Utility Authority in Teec Nos Pos, Apache County, Arizona.* HDP-97-624. NNAD-97-169. Navajo Nation Archaeology Department, Window Rock, AZ.	Eligible	Yes
AZ-I-8-45	Ceramic and lithic artifact scatter	Anasazi	Dryer, Jamers. 2000. *An Archaeological Survey of the Proposed Walker Power Line Project for the Navajo Tribal Utility Authority in Teec Nos Pos, Apache County, Arizona.* HDP-97-624. NNAD-97-169. Navajo Nation Archaeology Department, Window Rock, AZ.	Eligible	Yes
AZ-I-8-47	Campsite	Archaic (5500 B.C. to A.D. 100)	Klesert, Anthony. 1998. *An Archaeological Survey of the Four Corners Extension for HIS in Teec Nos Pos Chapter, Apache County, Arizona.* HPD-98-336. NNAD 97-184. Navajo Nation Archaeology Department, Window Rock, AZ.	Rec. eligible	Yes
AZ-I-8-48	Campsite	Archaic (5500 B.C. to A.D. 100)	Klesert, Anthony. 1998. *An Archaeological Survey of the Four Corners Extension for HIS in Teec Nos Pos Chapter, Apache County, Arizona.* HPD-98-336. NNAD 97-184. Navajo Nation Archaeology Department, Window Rock, AZ.	Rec. eligible	Yes
AZ-I-8-49	Lithic Scatter with Thermal Feature	Unknown Aboriginal	Klesert, Anthony. 1998. *An Archaeological Survey of the Four Corners Extension for HIS in Teec Nos Pos Chapter, Apache County, Arizona.* HPD-98-336. NNAD 97-184. Navajo Nation Archaeology Department, Window Rock, AZ.	Rec. eligible	Yes
AZ-I-8-51	1920's House	Navajo 1920s Habitation	Klesert, Anthony. 1998. *An Archaeological Survey of the Four Corners Extension for HIS in Teec Nos Pos Chapter, Apache County, Arizona.* HPD-98-336. NNAD 97-184. Navajo Nation Archaeology Department, Window Rock, AZ.	Rec. eligible	No

Table 1: Summary of Previously-recorded Sites. (Continued)

NN Site No.	Site Type	Cultural Affiliation (as provided)	Report Reference	NRHP Eligibility	ARPA
AZ-I-8-52	Lithic Artifact Scatter	Anasazi (100 B.C. to A.D. 1300)	Klesert, Anthony. 1998. *An Archaeological Survey of the Four Corners Extension for HIS in Teec Nos Pos Chapter, Apache County, Arizona.* HPD-98-336. NNAD 97-184. Navajo Nation Archaeology Department, Window Rock, AZ.	Rec. eligible	Yes
AZ-I-8-53	Campsite	Undated Navajo Habitation	Klesert, Anthony. 1998. *An Archaeological Survey of the Four Corners Extension for HIS in Teec Nos Pos Chapter, Apache County, Arizona.* HPD-98-336. NNAD 97-184. Navajo Nation Archaeology Department, Window Rock, AZ.	Rec. eligible	Unk
AZ-I-8-54	Possible childrenâ€™s play area	Undated Navajo	Klesert, Anthony. 1998. *An Archaeological Survey of the Four Corners Extension for HIS in Teec Nos Pos Chapter, Apache County, Arizona.* HPD-98-336. NNAD 97-184. Navajo Nation Archaeology Department, Window Rock, AZ.	Rec. eligible	Unk
AZ-I-8-86	Lithic Artifact Scatter with One Feature	Unknown Aboriginal	Klesert, Anthony. 2000. *A Cultural Resources Inventory of a Segment of the Teec Nos Pos Four Corners Water Line Extension for the Indian Health Service Teec Noc Pos, Apache County, Arizona.* HPD-00-379. NNAD 99-282. Navajo Nation Archaeology Department, Window Rock, AZ.	Rec. eligible	Yes
AZ-I-8-87	Lithic Scatter	Unknown Aboriginal	Klesert, Anthony. 2000. *A Cultural Resources Inventory of a Segment of the Teec Nos Pos Four Corners Water Line Extension for the Indian Health Service Teec Noc Pos, Apache County, Arizona.* HPD-00-379. NNAD 99-282. Navajo Nation Archaeology Department, Window Rock, AZ.	Rec. eligible	Yes
AZ-I-8-88	Campsite	Unknown Aboriginal	Dryer, Jamers. 2000. *An Archaeological Survey of the Proposed Walker Power Line Project for the Navajo Tribal Utility Authority in Teec Nos Pos, Apache County, Arizona - Addendum 1- A Cultural Resources Inventory of a Reroute of the Proposed Walker Powerline.* HDP-97-624. NNAD-97-169. Navajo Nation Archaeology Department, Window Rock, AZ.	Eligible	Yes
AZ-I-8-89	Lithic and Ceramic Artifact Scatter	Anasazi Pueblo II (A.D. 900 to 100)	Dryer, Jamers. 2000. *An Archaeological Survey of the Proposed Walker Power Line Project for the Navajo Tribal Utility Authority in Teec Nos Pos, Apache County, Arizona - Addendum 1- A Cultural Resources Inventory of a Reroute of the Proposed Walker Powerline.* HDP-97-624. NNAD-97-169. Navajo Nation Archaeology Department, Window Rock, AZ.	Eligible	Yes

Table 1: Summary of Previously-recorded Sites. (Continued)

NN Site No.	Site Type	Cultural Affiliation (as provided)	Report Reference	NRHP Eligibility	ARPA
AZ-I-8-94	Stone Hogan Ring	Navajo 1950s Habitation	Martin, Rena. 2002. *The Navajo Nation Electrification Demonstration Program, A Cultural Resources Inventory of 41 Homesite Electrical Tap-Lines in Navajo Tribal Utility Authority.* HPD-02-675. DCRM 2002:05. Navajo Nation Archaeology Department, Window Rock, AZ.	Eligible	No
AZ-I-8-103	Campsite	Unknown Aboriginal	Robinson, Dana L., Lyn Wharton, Vern Hensler, William T. Brown, and Gregory A. Park. 2003. *The Cultural Resources Inventory of Questar Corporation's Existing Southern Trails Pipeline Line 92 Right-of-Way and an Associated Proposed Loop Line in Shiprock Agency, San Juan County, New Mexico, Apache County, Arizona, and San Juan County, Utah.* HPD-02-1232. DCA Report 1-DCA-195. Division of Conservation Archaeology, Bloomfield, NM.	Rec. ineligible	Yes
AZ-I-8-104	Campsite	Unknown Aboriginal	Robinson, Dana L., Lyn Wharton, Vern Hensler, William T. Brown, and Gregory A. Park. 2003. *The Cultural Resources Inventory of Questar Corporation's Existing Southern Trails Pipeline Line 92 Right-of-Way and an Associated Proposed Loop Line in Shiprock Agency, San Juan County, New Mexico, Apache County, Arizona, and San Juan County, Utah.* HPD-02-1232. DCA Report 1-DCA-195. Division of Conservation Archaeology, Bloomfield, NM.	Rec. ineligible	Yes
AZ-I-8-105	Campsite	Unknown Aboriginal	Robinson, Dana L., Lyn Wharton, Vern Hensler, William T. Brown, and Gregory A. Park. 2003. *The Cultural Resources Inventory of Questar Corporation's Existing Southern Trails Pipeline Line 92 Right-of-Way and an Associated Proposed Loop Line in Shiprock Agency, San Juan County, New Mexico, Apache County, Arizona, and San Juan County, Utah.* HPD-02-1232. DCA Report 1-DCA-195. Division of Conservation Archaeology, Bloomfield, NM.	Rec. eligible	Yes
AZ-I-8-106	Temporary Campsite	Archaic (5500 B.C. to A.D. 200), Anasazi Pueblo II to Pueblo III (A.D. 900 to 1300)	Robinson, Dana L., Lyn Wharton, Vern Hensler, William T. Brown, and Gregory A. Park. 2003. *The Cultural Resources Inventory of Questar Corporation's Existing Southern Trails Pipeline Line 92 Right-of-Way and an Associated Proposed Loop Line in Shiprock Agency, San Juan County, New Mexico, Apache County, Arizona, and San Juan County, Utah.* HPD-02-1232. DCA Report 1-DCA-195. Division of Conservation Archaeology, Bloomfield, NM.	Rec. eligible	Yes

Table 1: Summary of Previously-recorded Sites. (Continued)

NN Site No.	Site Type	Cultural Affiliation (as provided)	Report Reference	NRHP Eligibility	ARPA
AZ-I-8-107	Long Term Campsite	Late Archaic to Anasazi Basketmaker II (1800 B.C. to A.D. 500)	Robinson, Dana L., Lyn Wharton, Vern Hensler, William T. Brown, and Gregory A. Park. 2003. *The Cultural Resources Inventory of Questar Corporation's Existing Southern Trails Pipeline Line 92 Right-of-Way and an Associated Proposed Loop Line in Shiprock Agency, San Juan County, New Mexico, Apache County, Arizona, and San Juan County, Utah.* HPD-02-1232. DCA Report 1-DCA-195. Division of Conservation Archaeology, Bloomfield, NM.	Rec. eligible	Yes
AZ-I-8-108	Historic Homestead	Navajo 1900's Habitation	Robinson, Dana L., Lyn Wharton, Vern Hensler, William T. Brown, and Gregory A. Park. 2003. *The Cultural Resources Inventory of Questar Corporation's Existing Southern Trails Pipeline Line 92 Right-of-Way and an Associated Proposed Loop Line in Shiprock Agency, San Juan County, New Mexico, Apache County, Arizona, and San Juan County, Utah.* HPD-02-1232. DCA Report 1-DCA-195. Division of Conservation Archaeology, Bloomfield, NM.	Rec. eligible	No
AZ-I-8-109	Lithic Artifact Scatter	Early Archaic (5500 to 3000 B.C.)	Robinson, Dana L., Lyn Wharton, Vern Hensler, William T. Brown, and Gregory A. Park. 2003. *The Cultural Resources Inventory of Questar Corporation's Existing Southern Trails Pipeline Line 92 Right-of-Way and an Associated Proposed Loop Line in Shiprock Agency, San Juan County, New Mexico, Apache County, Arizona, and San Juan County, Utah.* HPD-02-1232. DCA Report 1-DCA-195. Division of Conservation Archaeology, Bloomfield, NM.	Rec. eligible	Yes
AZ-I-8-110	Campsite	Archaic (5500 B.C, to A.D. 200)	Robinson, Dana L., Lyn Wharton, Vern Hensler, William T. Brown, and Gregory A. Park. 2003. *The Cultural Resources Inventory of Questar Corporation's Existing Southern Trails Pipeline Line 92 Right-of-Way and an Associated Proposed Loop Line in Shiprock Agency, San Juan County, New Mexico, Apache County, Arizona, and San Juan County, Utah.* HPD-02-1232. DCA Report 1-DCA-195. Division of Conservation Archaeology, Bloomfield, NM.	Rec. eligible	Yes
AZ-I-8-111	Campsite	Anasazi Pueblo II (A.D. 900 - 1100)	Robinson, Dana L., Lyn Wharton, Vern Hensler, William T. Brown, and Gregory A. Park. 2003. *The Cultural Resources Inventory of Questar Corporation's Existing Southern Trails Pipeline Line 92 Right-of-Way and an Associated Proposed Loop Line in Shiprock Agency, San Juan County, New Mexico, Apache County, Arizona, and San Juan County, Utah.* HPD-02-1232. DCA Report 1-DCA-195. Division of Conservation Archaeology, Bloomfield, NM.	Rec. eligible	Yes

Table 1: Summary of Previously-recorded Sites. (Continued)

NN Site No.	Site Type	Cultural Affiliation (as provided)	Report Reference	NRHP Eligibility	ARPA
AZ-I-8-112	Lithic and Ceramic Artifact Scatter	Anasazi Pueblo II (A.D. 900 - 1100)	Robinson, Dana L., Lyn Wharton, Vern Hensler, William T. Brown, and Gregory A. Park. 2003. *The Cultural Resources Inventory of Questar Corporation's Existing Southern Trails Pipeline Line 92 Right-of-Way and an Associated Proposed Loop Line in Shiprock Agency, San Juan County, New Mexico, Apache County, Arizona, and San Juan County, Utah.* HPD-02-1232. DCA Report 1-DCA-195. Division of Conservation Archaeology, Bloomfield, NM.	Rec. ineligible	Yes
AZ-I-8-113	Artifact Scatter	Anasazi Pueblo II (A.D. 900 - 1100)	Robinson, Dana L., Lyn Wharton, Vern Hensler, William T. Brown, and Gregory A. Park. 2003. *The Cultural Resources Inventory of Questar Corporation's Existing Southern Trails Pipeline Line 92 Right-of-Way and an Associated Proposed Loop Line in Shiprock Agency, San Juan County, New Mexico, Apache County, Arizona, and San Juan County, Utah.* HPD-02-1232. DCA Report 1-DCA-195. Division of Conservation Archaeology, Bloomfield, NM.	Rec. ineligible	Yes
AZ-I-8-116	Lithic Artifact Scatter	Unknown Aboriginal	Martin, Rena and Loretta Chavez. 2004. *A Cultural Resources Inventory of the Proposed Dwayne Billsie Homesite, Teec Nos Pos, Apache County, Arizona.* HPD-04-071. Dinetahoo CRM and Ed Services, Farmington, NM.	Rec. ineligible	Yes
AZ-I-8-117	Lithic Artifact Scatter with Groundstone	Unknown Aboriginal	Wero, Shane V. 2004. *A Cultural Resources inventory of the Proposed Malcolm Ute 1.0 Acre Homesite in Teec Nos Pos, Apache County, Arizona.* HPD-04-825. Dinetahoo CRM and Ed Services, Farmington, NM.	May be eligible	Yes

Most sites that are not undated lithic artifact scatters are Archaic, Pueblo II Anasazi, or historic Navajo. Twenty-eight sites are listed as (or have been recommended) eligible for nomination to the NRHP), one site was described as "may be eligible," five have been recommended not eligible, and five have no specified eligibility. Four sites have no ARPA significance, as they are less than 100 years old; two sites may or may not be 100 years old; and the remainder have ARPA significance. It is recommended that any oil and gas development be designed to avoid known NRHP-eligible sites by at least 100 feet. Many parts of the lease area have not been surveyed and any new development should be surveyed and subject to ethnographic study according to NNHPD standards.

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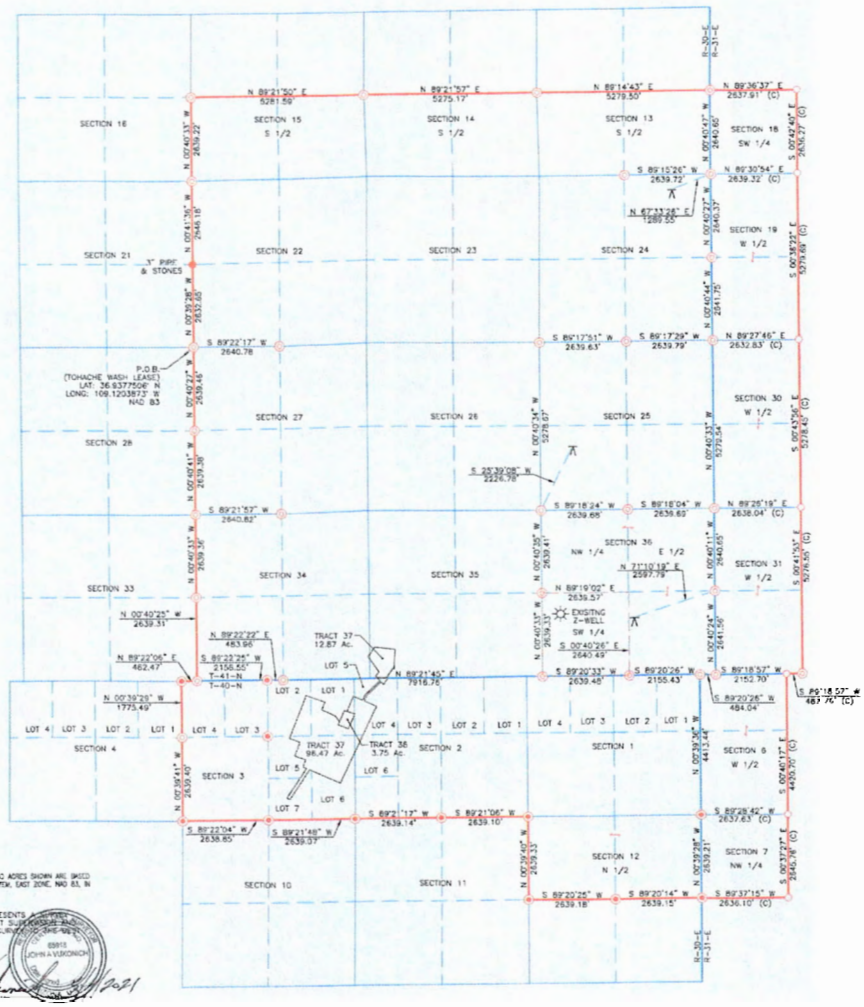
Surveyor's Plats

NAVAJO NATION OIL & GAS COMPANY

SURVEY PLAT OF TOHACHE WASH LEASE

TOWNSHIP 40 NORTH, RANGE 30 EAST, TOWNSHIP 40 NORTH, RANGE 31 EAST, TOWNSHIP 41 NORTH, RANGE 30 EAST AND TOWNSHIP 41 NORTH, RANGE 31 EAST,
GILA AND SALT RIVER MERIDIAN, APACHE COUNTY, ARIZONA



Tohache Wash Lease legal description -

Township 41 North, Range 30 East, Gila and Salt River Meridian, Apache County, Arizona.
S½ of Section 13, S½ of Section 14, S½ of Section 15, Sections 22, 23, 24, 25, 26, 27, 34, 35 and Section 36

Township 41 North, Range 31 East Gila and Salt River Meridian, Apache County, Arizona
SW¼ of Section 18, W½ of Section 19, W½ of Section 30, W½ of Section 31

Township 41 North, Range 30 East, Gila and Salt River Meridian, Apache County, Arizona.
Sections 1, 2, 3, and N½ of Section 12

Township 40 North, Range 31 East Gila and Salt River Meridian Apache County, Arizona
W½ of Section 6, NW¼ of Section 7

Containing 1,187.85± acres more or less

LEGEND (TYPICAL)

- FOUND USE 3 1/4" 2006 BLM BRASS CAP
- FOUND USE 3 1/2" 2006 BLM BRASS CAP
- FOUND MONUMENT AS NOTED
- CALCULATED CORNER - NOT FOUND, NOT SET
- (C) = CALCULATED
- SUBJECT PARCEL BOUNDARY
- SECTION LINE
- ONE QUARTER LINE
- ONE SIXTEENTH LINE
- WELLHEAD
- POB = POINT OF BEGINNING
- SET 5/8" REBAR with 1 1/2" ALUM CAP

NOTE:
BASIS OF BEARING: ALL BEARINGS, DISTANCES, AND AREAS SHOWN ARE BASED ON THE ARIZONA STATE PLANE COORDINATE SYSTEM, EAST ZONE, NAD 83, IN INTERNATIONAL FEET.

SURVEYOR'S CERTIFICATION:
I HEREBY CERTIFY THAT THIS PLAT REPRESENTS A SURVEY PERFORMED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT IT ACCURATELY REPRESENTS SAID SURVEY TO THE BEST OF MY KNOWLEDGE AND BELIEF.

JOHN A VERONICA 15917 ARIZONA U.S.A.

JOHN A VERONICA P.L.S. 15917

NAVAJO NATION OIL & GAS COMPANY

UNITED

P.O. BOX 3651
FARMINGTON, NM 87499
OFFICE: (505) 334-0408

DWG NO.: 11531-TOHACHE WELL LEASE		REVISION: 1
DRAWN BY: - E	DATE DRAWN: 4/14/21	REV. DATE: 5/23/21
SURVEYED: 04/09/21	APP BY: J.A.V.	SHEET: 1 OF 1

Looking south at Teec Nos Pos Wash & N-5059 in Section 15

Looking South at windmill in Section 19

Looking southwest along US 160 in Section 13

Looking northeast toward dry sewage lagoons in Section 34

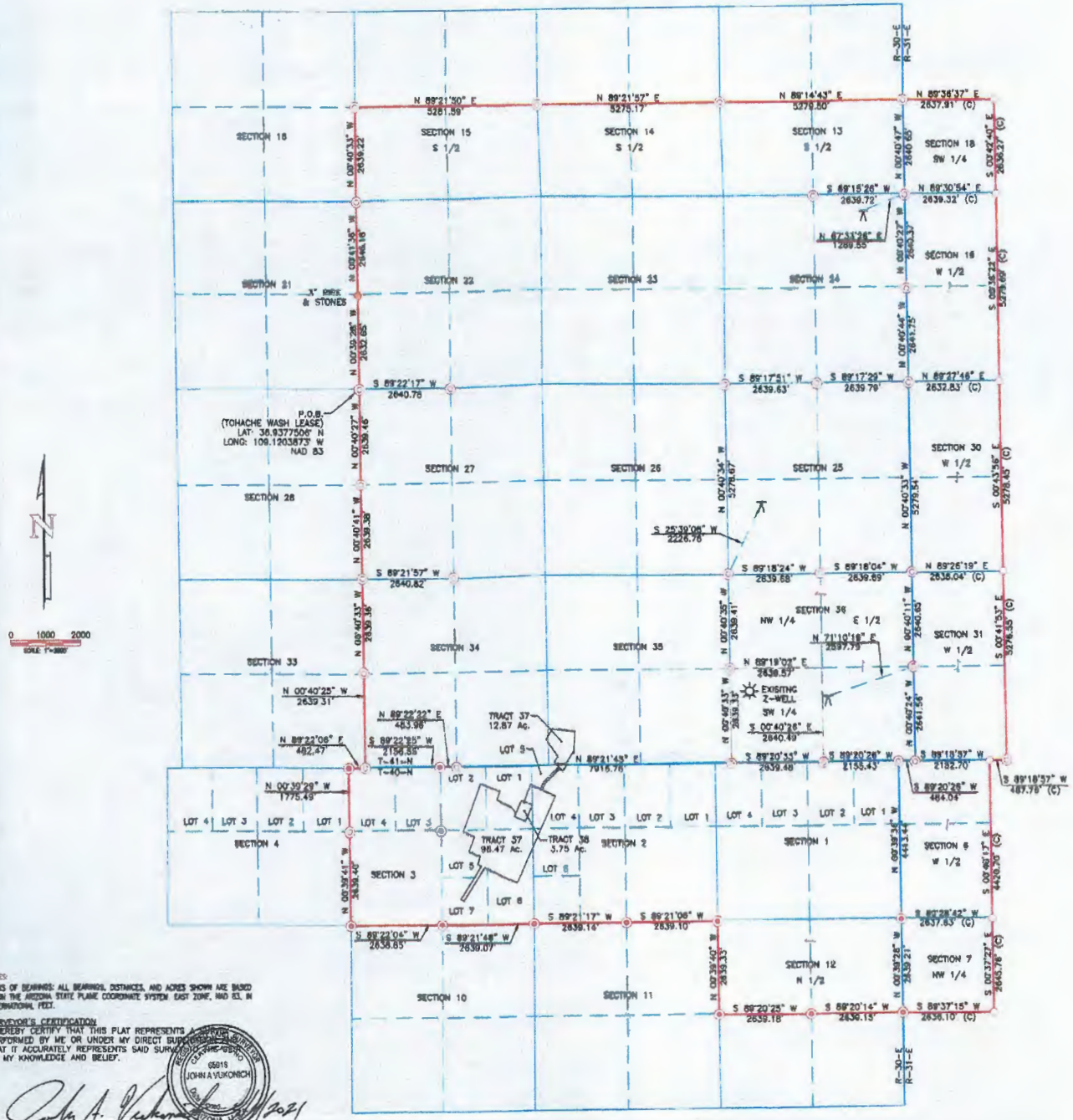
Looking southwest at Navajo Z 1 well in Section 36

Looking north toward NTUA water tank in Section 7

NAVAJO NATION OIL & GAS COMPANY

SURVEY PLAT OF TOHACHE WASH LEASE

TOWNSHIP 40 NORTH, RANGE 30 EAST, TOWNSHIP 40 NORTH, RANGE 31 EAST, TOWNSHIP 41 NORTH, RANGE 30 EAST AND TOWNSHIP 41 NORTH, RANGE 31 EAST,
GILA AND SALT RIVER MERIDIAN, APACHE COUNTY, ARIZONA



Tohache Wash Lease legal description –

Township 41 North, Range 30 East, Gila and Salt River Meridian, Apache County, Arizona:
S½ of Section 13, S½ of Section 14, S½ of Section 15, Sections 22, 23, 24, 25, 26, 27, 34, 35 and Section 36.

Township 41 North, Range 31 East, Gila and Salt River Meridian, Apache County, Arizona:
SW¼ of Section 18, W½ of Section 19, W½ of Section 30, W½ of Section 31.

Township 40 North, Range 30 East, Gila and Salt River Meridian, Apache County, Arizona:
Sections 1, 2, 3, and N½ of Section 12

Township 40 North, Range 31 East, Gila and Salt River Meridian, Apache County, Arizona:
W½ of Section 6, NW¼ of Section 7.

Containing 10,187.885 acres more or less

LEGEND (TYPICAL)

- = FOUND USGI 3 1/4" 2008 BLM BRASS CAP
- = FOUND USGI 3 1/2" 2008 BLM BRASS CAP
- = FOUND MONUMENT AS NOTED
- = CALCULATED CORNER – NOT FOUND, NOT SET
- (C) = CALCULATED
- = SUBJECT PARCEL BOUNDARY
- = SECTION LINE
- = ONE QUARTER LINE
- = ONE SIXTEENTH LINE
- = WELLHEAD
- P.O.B = POINT OF BEGINNING
- = SET 5/8" REBAR WITH 1 1/2" ALUM. CAP

NOTES:
BASIS OF BEARINGS: ALL BEARINGS, DISTANCES, AND ACRES SHOWN ARE BASED UPON THE ARIZONA STATE PLANE COORDINATE SYSTEM EAST ZONE, NAD 83, IN INTERNATIONAL FEET.

SURVEYOR'S CERTIFICATION
I HEREBY CERTIFY THAT THIS PLAT REPRESENTS A SURVEY PERFORMED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT IT ACCURATELY REPRESENTS SAID SURVEY TO THE BEST OF MY KNOWLEDGE AND BELIEF.

REGISTERED LAND SURVEYOR 05915 JOHN A YUKONICH ARIZONA U.S.A.

JOHN A. YUKONICH R.L.S. #05915

tabbies

EXHIBIT C-2

NAVAJO NATION OIL & GAS COMPANY

UNITED FIELD SERVICES INC.
P.O. BOX 5861
FARMINGTON, NM 87499
OFFICE: (505) 334-0408

DWG. NO. : 11881-TOHACHE WELL LEASE	REVISION: 1
DRAWN BY: K.S. / DATE DRAWN: 4/19/21	REV. DATE: 5/03/21
SURVEYED: 04/05/21 / APP BY: J.A.Y.	SHEET: 1 OF 1

NAVAJO NATION OIL & GAS COMPANY

May 3, 2021

TOHACHE WASH LEASE

Description for a minerals lease, situated in Township 40 North, Range 30 East, Township 40 North, Range 31 East, Township 41 North, Range 30 East and Township 41 North, Range 31 East, Gila and Salt River Meridian, Apache County, Arizona, being more particularly described as follows:

Beginning at a found 2006 B.L.M. brass cap for the Southwest corner of Section 22, Township 41 North, Range 30 East, Gila and Salt River Meridian, Apache County, Arizona, being the Point of Beginning (P.O.B.) for this description;

Thence North 00°39'28" West, a distance of 2632.65 feet, along the West line of the SW 1/4 of Section 22;

Thence North 00°41'36" West, a distance of 2646.18 feet, along the West line of the NW 1/4 of Section 22;

Thence North 00°40'33" West, a distance of 2639.22 feet, along the West line of the SW 1/4 of Section 15;

Thence North 89°21'50" East, a distance of 5281.59 feet, along the North line of the South 1/2 of Section 15;

Thence North 89°21'57" East, a distance of 5275.17 feet, along the North line of the South 1/2 of Section 14;

Thence North 89°14'43" East, a distance of 5279.50 feet, along the North line of the South 1/2 of Section 13;

Thence North 89°36'37" East, a distance of 2637.91 feet, along the North line of the SW 1/4 of Section 18; Township 41 North, Range 31 East;

Thence South 00°42'40" East, a distance of 2636.27 feet, along the East line of SW 1/4 of Section 18;

Thence South 00°36'22" East, a distance of 5279.69 feet, along the East line of the West 1/2 of Section 19;

Thence South 00°43'56" East, a distance of 5278.45 feet, along the East line of the West 1/2 of Section 30;

Thence South 00°41'53" East, a distance of 5276.55 feet, along the East line of the West 1/2 of Section 31;

Thence South 89°18'57" West, a distance of 487.76 feet, along the South line of the SW 1/4 of Section 31;

Thence South 00°40'17" East, a distance of 4420.70 feet, along the East line of the West 1/2 of Section 6; Township 40 North, Range 31 East;

Thence South 00°37'27" East, a distance of 2645.76 feet, along the East line of the NW 1/4 of Section 7;

Thence South 89°37'15" West, a distance of 2636.10 feet, along the South line of the NW 1/4 of Section 7;

Thence South 89°20'14" West, a distance of 2639.15 feet, along the South line of the NE 1/4 of Section 12; Township 40 North, Range 30 East;

Thence South 89°20'25" West, a distance of 2639.18 feet, along the South line of the NW 1/4 of Section 12;

Thence North 00°39'40" West, a distance of 2639.33 feet, along the West line of the NW 1/4 of Section 12;

Thence South 89°21'06" West, a distance of 2639.10 feet, along the South line of the SE 1/4 of Section 2;

Thence South 89°21'17" West, a distance of 2639.14 feet, along the South line of the SW 1/4 of Section 2;

Thence South 89°21'48" West, a distance of 2639.07 feet, along the South line of the SE 1/4 of Section 3;

Thence South 89°22'04" West, a distance of 2638.85 feet, along the South line of the SW 1/4 of Section 3;

Thence North 00°39'41" West, a distance of 2639.40 feet, along the West line of the SW 1/4 of Section 3;

Thence North 00°39'29" West, a distance of 1775.49 feet, along the West line of Lot 4 of Section 3;

Thence North 89°22'06" East, a distance of 482.47 feet, along the North line of Lot 4 of Section 3; Township 40 North, Range 30 East;

Thence North 00°40'25" West, a distance of 2639.31 feet, along the West line of the SW 1/4 of Section 34;

Thence North 00°40'33" West, a distance of 2639.36 feet, along the West line of the NW 1/4 of Section 34;

Thence North 00°40'41" West, a distance of 2639.38 feet, along the West line of the SW 1/4 of Section 27;

Thence North 00°40'27" West, a distance of 2639.46 feet, along the West line of the NW 1/4 of said Section 27; Township 41 North, Range 30 East, back to the Point of Beginning and is the end of this description.

The above described parcel of land contains in 10,187.885 acres, more or less.

ALL BEARINGS, DISTANCES, AND ACRES IN THIS DESCRIPTION ARE BASED UPON THE ARIZONA STATE PLANE COORDINATE SYSTEM OF 1983, EAST ZONE, IN INTERNATIONAL FEET.
A PLAT OF SAME DATE ACCOMPANIES THIS DESCRIPTION.

I HEREBY CERTIFY THAT THE SURVEY REPRESENTED IN THIS DESCRIPTION WAS MADE BY ME OR UNDER MY DIRECT SUPERVISION AND ACCURATELY REPRESENTS SAID SURVEY TO THE BEST OF MY KNOWLEDGE AND BELIEF.

REGISTERED LAND SURVEYOR
CERTIFICATE NO.
65918
JOHN A VUKONICH
ARIZONA U.S.A.

5/4/2021

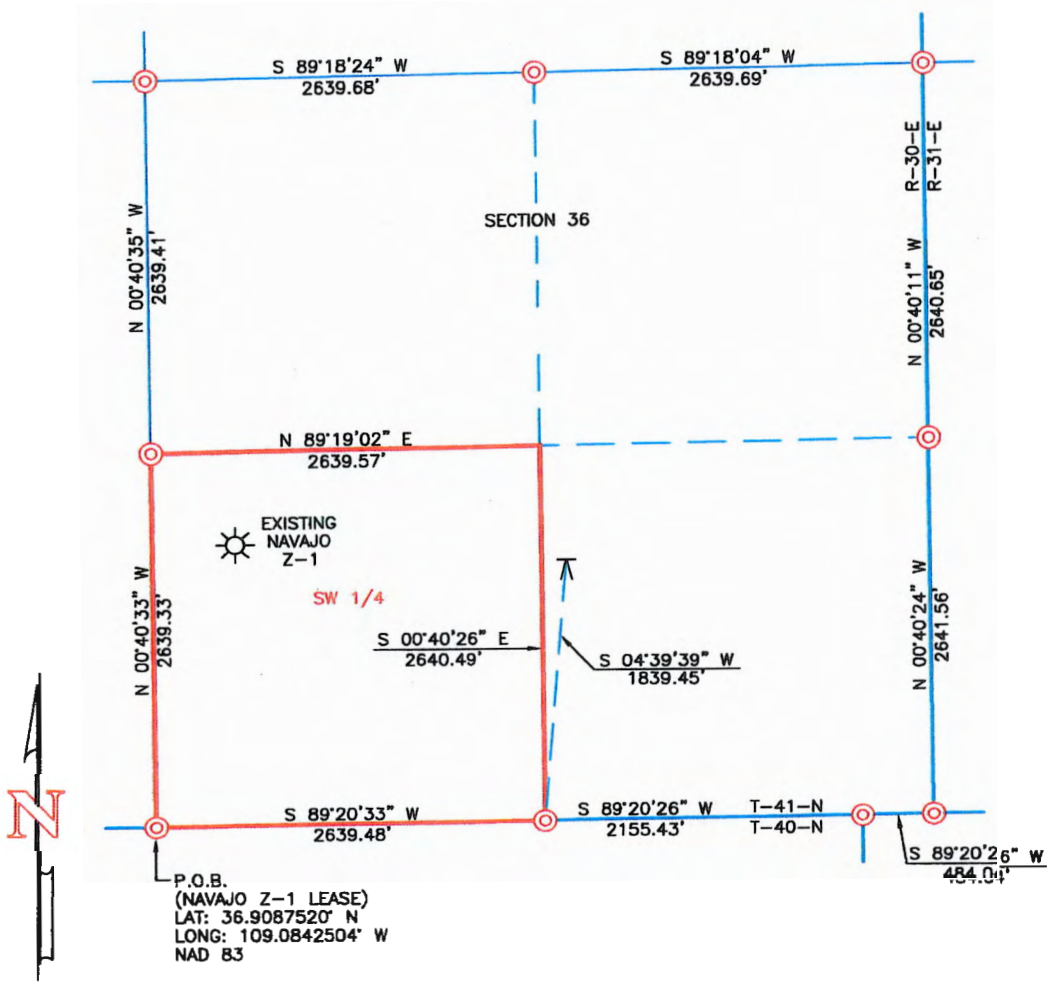
JOHN A. VUKONICH, AZ R.L.S. #65918

DWG NO.: 11551-TOHACHE WASH LEASE REV 1

NAVAJO NATION OIL & GAS COMPANY

SURVEY PLAT OF NAVAJO Z-1 LEASE

SOUTHWEST QUARTER OF SECTION 36, TOWNSHIP 41 NORTH, RANGE 30 EAST,
GILA AND SALT RIVER MERIDIAN, APACHE COUNTY, ARIZONA



0 500 1000
SCALE: 1"=1000'

Navajo Z-1 Lease legal description –

Township 41 North, Range 30 East, Gila and Salt River Meridian, Apache County, New Mexico:
SW¼ of Section 36

Containing 159.966 acres more or less.

LEGEND (TYPICAL)

- = FOUND USDI 3 1/4" 2006 BLM BRASS CAP
- = FOUND USDI 3 1/2" 2008 BLM BRASS CAP
- = FOUND MONUMENT AS NOTED
- = CALCULATED CORNER – NOT FOUND, NOT SET
- (C) = CALCULATED
- = SUBJECT PARCEL BOUNDARY
- = SECTION LINE
- = ONE QUARTER LINE
- = ONE SIXTEENTH LINE
- = WELLHEAD
- P.O.B. = POINT OF BEGINNING
- = SET 5/8" REBAR WITH 1 1/2" ALUM. CAP

NOTES:

BASIS OF BEARINGS: ALL BEARINGS, DISTANCES & COORDINATES SHOWN ARE BASED UPON THE ARIZONA STATE PLANE COORDINATE SYSTEM, EAST ZONE, NAD 83, IN INTERNATIONAL FEET.

SURVEYOR'S CERTIFICATION

I HEREBY CERTIFY THAT THIS PLAT REPRESENTS A SURVEY PERFORMED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT IT ACCURATELY REPRESENTS SAID SURVEY TO THE BEST OF MY KNOWLEDGE AND BELIEF.

REGISTERED LAND SURVEYOR CERTIFICATE NO. 65918 JOHN A VUKONICH Date Signed 5/6/2021 ARIZONA U.S.A.

JOHN A. VUKONICH R.L.S. #65918

NAVAJO NATION OIL & GAS COMPANY

UNITED FIELD SERVICES INC.
P.O. BOX 3651
FARMINGTON, NM 87499
OFFICE: (505) 334-0408

DWG. NO. : 11851-Z-1		REVISION: 1
DRAWN BY: K.S.	DATE DRAWN: 4/19/21	REV. DATE: 5/03/21
SURVEYED: 04/05/21	APP BY: J.A.V.	SHEET: 1 OF 1

NAVAJO NATION OIL & GAS COMPANY

May 3, 2021

NAVAJO Z-1 LEASE

Description for a minerals lease, situated in the Southwest Quarter of Section 36, Township 41 North, Range 30 East, Gila and Salt River Meridian, Apache County, Arizona, being more particularly described as follows:

Beginning at the Southwest corner of said Section 36. Said point also being the Point of Beginning (P.O.B.) for this description;

Thence North 00°40'33" West, a distance of 2639.33 feet; along the West line of the SW 1/4 of Section 36; Township 41 North, Range 30 East;

Thence North 89°19'02" East, a distance of 2639.57 feet, along the North line of the SW 1/4 of Section 36;

Thence South 00°40'26" East, a distance of 2640.49 feet, along the East line of the SW 1/4 of Section 36;

Thence South 89°20'33" West, a distance of 2639.48 feet, along the South line of the SW 1/4 of Section 36; Township 41 North, Range 30 East; back to the Point of Beginning and is the end of this description.

The above described parcel of land contains in 159.966 acres, more or less.

ALL BEARINGS AND DISTANCES IN THIS DESCRIPTION ARE BASED UPON THE ARIZONA STATE PLANE COORDINATE SYSTEM OF 1983, EAST ZONE, IN INTERNATIONAL FEET.
A PLAT OF SAME DATE ACCOMPANIES THIS DESCRIPTION.

I HEREBY CERTIFY THAT THE SURVEY REPRESENTED IN THIS DESCRIPTION WAS MADE BY ME OR UNDER MY DIRECT SUPERVISION AND ACCURATELY REPRESENTS THE SURVEY TO THE BEST OF MY KNOWLEDGE AND BELIEF

REGISTERED LAND SURVEYOR
CERTIFICATE NO.
65918
JOHN A VUKONICH
Date Signed 5/3/2021
ARIZONA U.S.A.

JOHN A. VUKONICH, AZ R.L.S. #65918

DWG NO.: 11551-Z-1 REV 1

EXHIBIT D

TEEC NOS POS CHAPTER

P. O. Box 106, Teec Nos Pos, Arizona, Navajo Nation 86514
Highway 160 BIA School Road #5114 Chapter Government Building
Telephone #928-656-3662 Fax#928-656-3661

RESOLUTION FOR TEECNOSPOS CHAPTER TNPCH 07-09-17 R61

SUPPORT AND ENDORSING THE GRANT OF A SURFACE LEASE AND EASEMENT TO THE NAVAJO NATION OIL AND GAS COMPANY FOR HELIUM PROCESSING AND MARKETING.

WHEREAS:

1. Pursuant to the "Local Government Act", 26 N.N.C chapter 1, sub-chapter 1, Section 3 (a) the Teec Nos Pos Chapter is continued as a certified local chapter of the Navajo Nation Government by the Navajo Nation Resolution Number CAP 34-98 with the responsibility and authority to promote, protect, and preserve the culture and tradition including enjoying a safe environment for its community people and property; and

2. The Navajo Nation Oil and Gas Company ("NNOGC") is a wholly owned entity of the Navajo Nation government charged with developing the Nation's oil and gas resources for the benefit of the Navajo people, including the citizens of Teec Nos Pos Chapter; and

3. On behalf of the Navajo Nation, and with funding by NNOGC and from a grant received by the Navajo Nation Minerals Department from the Department of the Interior, NNOGC re-entered the Texaco No. 1 Navajo Z well (the "Z-well",) a helium well located in Teec Nos Pos Chapter; and

4. Based on that re-entry and studies conducted on the Z-well, NNOGC has determined that the Z-well and associated properties have enormous potential for helium production, and are world-class properties in terms of the percentage of helium production; and

5. In order for the Navajo Nation and NNOGC to develop the Z-well and associated properties, NNOGC needs to have a surface lease for placement of a processing facility and a pipeline easement from the properties to the processing facility; and

6. A processing facility was formerly place near the Z-well and NNOGC plans to place a new facility on the same footprint as the former facility. Additionally, there was formerly a pipeline in the place that has already disturbed the land. Accordingly, placement of the facility and any pipeline will not cause any additional environment impacts; and

7. NNOGC, in partnership with the Teec Nos Pos Chapter, is interested in promoting economic development in Teec Nos Pos Chapter, providing scholarships for students in Teec Nos Pos Chapter, and providing funding for services and programs for the elderly in Teec Nos Pos Chapter; and

8. NNOGC will have resources to assist the Teec Nos Pos Chapter if helium production is successful in the Chapter.

NOW THEREFORE BE IT RESOLVED:

1. The Teec Nos Pos Chapter hereby respectfully submits its support and endorsement of NNOGC's helium E&P efforts in the Teec Nos Pos Chapter, production, processing and marketing of helium from the Texaco No. 1 Navajo Z well, including the placement of a helium processing facility and pipeline, and the grant of such leases and easements by the Navajo Nation as are necessary for helium E&P by NNOGC in the Teec Nos Pos Chapter.

CERTIFICATION

Teec Nos Pos Chapter hereby certify that the foregoing resolution was considered by the Teec Nos Pos Chapter (Navajo Nation) at a duly called meeting at which a quorum was present and was motioned by: Barbara Whitehorse, seconded by: John Wilson and that same was passed by a vote of **21** in favor, **00** opposed and **1** abstained, this **9th** day of **July, 2017**.

Alfred L. Jim, President

Kenny Victor, Vice President

Daron Yellowhorse, Secretary/Treasurer

Davis Filfred, Council Delegate

EXHIBIT
E

TEEC NOS POS CHAPTER GOVERNMENT

P. O. Box 106, Teec Nos Pos, Arizona, Navajo Nation 86514
Highway 160 BIA School Road #5114 Chapter Government Building
Telephone #928-656-3662 Fax#928-656-3661

RESOULTION FOR TEECNOSPOS CHAPTER TNPCH 06-13-2019 R-76

REAFFIRMED-SUPPORT AND ENDORSING THE GRANT OF A SURFACE LEASE AND EASEMENT TO THE NAVAJO NATION OIL AND GAS COMPANY FOR HELIUM PROCESSING AND MARKETING.

WHEREAS:

1. Pursuant to the "Local Government Act", 26 N.N.C chapter 1, sub-chapter 1, Section 3 (a) the Teec Nos Pos Chapter is continued as a certified local chapter of the Navajo Nation Government by the Navajo Nation Resolution Number CAP 34-98 with the responsibility and authority to promote, protect, and preserve the culture and tradition including enjoying a safe environment for its community people and property; and
2. The Navajo Nation Oil and Gas Company ("NNOGC") is a wholly owned entity of the Navajo Nation government charged with developing the Nation's oil and gas resources for the benefit of the Navajo people, including the citizens of Teec Nos Pos Chapter; and
3. On behalf of the Navajo Nation, and with funding by NNOGC and from a grant received by the Navajo Nation Minerals Department from the Department of the Interior, NNOGC re-entered the Texaco No. 1 Navajo Z well (the "Z-well",) a helium well located in Teec Nos Pos Chapter; and
4. Based on that re-entry and studies conducted on the Z-well, NNOGC has determined that the Z-well and associated properties have enormous potential for helium production, and are world-class properties in terms of the percentage of helium production; and
5. In order for the Navajo Nation and NNOGC to develop the Z-well and associated properties, NNOGC needs to have a surface lease for placement of a processing facility and a pipeline easement from the properties to the processing facility; and
6. A processing facility was formerly place near the Z-well and NNOGC plans to place a new facility on the same footprint as the former facility. Additionally, there was formerly a pipeline in the place that has already disturbed the land. Accordingly, placement of the facility and any pipeline will not cause any additional environment impacts; and
7. NNOGC, in partnership with the Teec Nos Pos Chapter, is interested in promoting economic development in Teec Nos Pos Chapter, providing scholarships for students in Teec Nos Pos Chapter, and providing funding for services and programs for the elderly in Teec Nos Pos Chapter; and
8. NNOGC will have resources to assist the Teec Nos Pos Chapter if helium production is successful in the Chapter.
9. Teec Nos Pos Chapter did pass a supporting resolution **R-07-09-2017 R-61 therefore, Resolution will be reaffirmed for support.**

TEEC NOS POS CHAPTER GOVERNMENT

P. O. Box 106, Teec Nos Pos, Arizona, Navajo Nation 86514
Highway 160 BIA School Road #5114 Chapter Government Building
Telephone #928-656-3662 Fax#928-656-3661

RESOULTION FOR TEECNOSPOS CHAPTER TNPCH 06-13-2019 R-76

NOW THEREFORE BE IT RESOLED:
The Teec Nos Pos Chapter hereby respectfully submits its support and Reaffirmed of NNOGC's helium E&P efforts in the Teec Nos Pos Chapter, production, processing and marketing of helium from the Texaco No. 1 Navajo Z well, including the placement of a helium processing facility and pipeline, and the grant of such leases and easements by the Navajo Nation as are necessary for helium E&P by NNOGC in the Teec Nos Pos Chapter.

CERTIFICAITION

Teec Nos Pos Chapter hereby certify that the foregoing resolution was considered by the Teec Nos Pos Chapter (Navajo Nation) at a duly called meeting at which a quorum was present and was **Motioned by: Arlene Ayze** and **Seconded by: Juanita Woodis** and that same was passed by a vote of **26** in favor, **00** opposed and **08** abstained, this **13th** day of **June, 2019**.

Alfred L. Jim, President

Kenny Victor, Vice President

Daron Yellowhorse, Secretary/Treasurer

Charlaine Tso, Council Delegate

TSÉ AŁNÁOZTI'Í CHAPTER GOVERNMENT
P.O. Box 219 Sanostee, New Mexico 87461
Phone (505) 723-2702 – Fax (505) 723-2705 – sanostee@navajochapters.org

EXHIBIT
F

RESOLUTION OF TSÉ' AŁNAOZTI'Í CHAPTER
RESOLUTION NO. TAT-19-06-66

SUPPORTING AND ENDORSING HELIUM EXPLORATION AND PRODUCTION (E &P) EFFORTS IN THE TSE ALNAOZTI'I CHAPTER BY THE NAVAJO NATION OIL AND GAS COMPANY AND REAFFIRMING THE CHAPTER'S DISAPPROVAL OF ANY NON-NAVAJO ENTITIES CONDUCTING SUCH E &P ACTIVITES IN TSE ALNAOZTI'I CHAPTER

WHEREAS;

1. Pursuant to 26 NNC, Section 1 (B), the Navajo Nation Council delegated the authority to Tsé Ałnaozti'í Chapter to review and process all local matters affecting the community and its constituents, assuring that quality services are provided and Section 101 (A) (B), Tsé Ałnaozti'í Chapter shall operate under Five Management System (FMS) consist with applicable Navajo Nation Laws; and
2. Pursuant to 26 NNC, Section 103 (A), Tsé Ałnaozti'í Chapter membership are authorized to oversee the authority delegated to the chapter and Section 1004 (A), Tsé Ałnaozti'í Chapter shall enact by resolutions plans of operations for all executive functions and administrative policies of the chapter; and
3. The Tse Alnaozti'i Chapter has grave concerns about the well-being of it's constituents and the Chapter environment due to current helium extraction being done in the Tse Alnaozti'i Chapter area, which is not being done in a transparent manner consistent with Navajo Fundamental Law, custom and tradition, including the requirements of k'e; and
4. By Resolution No. TAT-18-07-25, the Tse Alnaozti'i Chapter therefore rescinded any support for a non-Navajo entity conducting helium E & P activities in the Chapter, and by Resolution No. TAT-18-07-26 has requested that the Navajo Nation Minerals Department be fully transparent and provide all documentation related to current helium extraction in the Tse Alnaozti'i Chapter; and
5. Navajo Nation Oil and Gas Company("NNOGC") is a wholly owned economic arm and instrumentality of the Navajo Nation charged by the Navajo Nation Council with the responsibility of exploring and developing the Nation's oil and gas resources, including helium resources, for the benefit of the Navajo people, including the constituents of Tse Alnaozti'i Chapter: and
6. NNOGC's mission statement is to "Maximize resources for the benefit of the Navajo Nation with respect for Mother Earth" and NNOGC is committed to carrying out it's oil and gas activities in an environmentally responsible manner in accordance with Navajo Nation law, including the requirements of k'e; and
7. NNOGC has identified that there are significant opportunities for helium exploration and development (E & P) in the Tse Alnaozti'i Chapter boundaries and wishes to transparently pursue such E & P activities such E & P activities in an environmentally responsible manner, with the full support of the Tse Alnaozti'i Chapter; and
8. NNOGC in partnership and with the support of the Tse Alnaozti'i Chapter is also interested in promoting other types of economic development in Tse Alnaozti'i Chapter, providing a share of profits to the chapter, which the chapter at its discretion, can expend for services to Chapter members; and
9. NNOGC will have resources to assist the Tse Alnaozti'i Chapter with such beneficial programs and development if NNOGC is successful in pursuing helium production in the Tse Alnaozti'i Chapter; and
10. The Tse Alnaozti'i Chapter now wished to give its full support and endorsement to NNOGC for NNOGC to have the exclusive right to conduct helium E & P activities in the Tse Alnaozti'i Chapter, in the best interest of the Chapter and its constituents, the Navajo Nation and the Dine.

Chapter Officials
Frank Smith, President
Gerald Henderson, Vice- President
Jourdan Washburn, Secretary/ Treasurer

Council Delegate
Amber K. Crotty

Chapter Admin
Clarina Clark, CSC
Shelia Mitchell, AMS

TSÉ AŁNÁOZTI'Í CHAPTER GOVERNMENT
P.O. Box 219 Sanostee, New Mexico 87461
Phone (505) 723-2702 – Fax (505) 723-2705 – sanostee@navajochapters.org

NOW, THEREFORE BE IT RESOLVED THAT;

1. The Tse Alnaozti'i Chapter hereby provides its full support and endorsement for NNOGC to have the exclusive right to conduct helium E & P activities within the Tse Alnaozti'i Chapter boundaries
2. The Tse Alnaozti'i Chapter hereby requests that the Navajo Nation expeditiously provide all requisite approvals to NNOGC for any and all permits, operating agreements, leases, easements and any other authorizations that are necessary for NNOGC to conduct helium E & P activities in Tse Alnaozti'i Chapter without further action by the Tse Alnaozti'i Chapter
3. The Tse Alnaozti'i Chapter hereby reaffirms its disapproval and withdraws its consent for any Non-Navajo entity to conduct helium E & P activities in Tse Alnaozti'i Chapter
4. The Tse Alnaozti'i Chapter hereby reaffirms and restates its request to the Navajo Nation Minerals Department that the Department be fully transparent about helium E & P activities in the Tse Alnaozti'i Chapter and immediately provide all documentation of any such activities.

CERTIFICATION

We, hereby certify that the foregoing resolution was presented and thoroughly discussed by the constituents, at a duly called Chapter Meeting at Tsé Ałnaozti'í (Sanostee), New Mexico, at which a quorum was present and that same was passed by a vote of 23 in favor, 1 opposed and 7 abstained, on this 17th day of June 2019.

Motioned by: Darlene Begay

Seconded by: Irvin Tyler

Frank Smith, President

Gerald Henderson, Vice President

Jourdan Washburn, Secretary/ Treasurer

EXHIBIT G

Document No. 016149 Date Issued: 03/29/2021

EXECUTIVE OFFICIAL REVIEW

Title of Document: NNOGC - 3 Operating Agreements Contact Name: CHEROMIAH, ROWENA L

Program/Division: DIVISION OF NATURAL RESOURCES

Email: rcheromiah@navajo-nsn.gov Phone Number: (928) 871-6057

			Sufficient	Insufficient
☐ **Business Site Lease**				
1. Division:	_____	Date: _____	☐	☐
2. Office of the Controller:	_____	Date: _____	☐	☐
(only if Procurement Clearance is not issued within 30 days of the initiation of the E.O. review)				
3. Office of the Attorney General:	_____	Date: _____	☐	☐
☐ **Business and Industrial Development Financing, Veteran Loans, (i.e. Loan, Loan Guarantee and Investment) or Delegation of Approving and/or Management Authority of Leasing transactions**				
1. Division:	_____	Date: _____	☐	☐
2. Office of the Attorney General:	_____	Date: _____	☐	☐
☐ **Fund Management Plan, Expenditure Plans, Carry Over Requests, Budget Modifications**				
1. Office of Management and Budget:	_____	Date: _____	☐	☐
2. Office of the Controller:	_____	Date: _____	☐	☐
3. Office of the Attorney General:	_____	Date: _____	☐	☐
☐ **Navajo Housing Authority Request for Release of Funds**				
1. NNEPA:	_____	Date: _____	☐	☐
2. Office of the Attorney General:	_____	Date: _____	☐	☐
☐ **Lease Purchase Agreements**				
1. Office of the Controller: (recommendation only)	_____	Date: _____	☐	☐
2. Office of the Attorney General:	_____	Date: _____	☐	☐
☐ **Grant Applications**				
1. Office of Management and Budget:	_____	Date: _____	☐	☐
2. Office of the Controller:	_____	Date: _____	☐	☐
3. Office of the Attorney General:	_____	Date: _____	☐	☐
☐ **Five Management Plan of the Local Governance Act, Delegation of an Approving Authority from a Standing Committee, Local Ordinances (Local Government Units), or Plans of Operation/Division Policies Requiring Committee Approval**				
1. Division:	_____	Date: _____	☐	☐
2. Office of the Attorney General:	_____	Date: _____	☐	☐
☐ **Relinquishment of Navajo Membership**				
1. Land Department:	_____	Date: _____	☐	☐
2. Elections:	_____	Date: _____	☐	☐
3. Office of the Attorney General:	_____	Date: _____	☐	☐

Pursuant to 2 N.N.C. § 164 and Executive Order Number 07-2013

			Sufficient	Insufficient
☐ **Land Withdrawal or Relinquishment for Commercial Purposes**				
1. Division	_____	Date: _____	☐	☐
2. Office of the Attorney General	_____	Date. _____	☐	☐
☐ **Land Withdrawals for Non-Commercial Purposes, General Land Leases and Resource Leases**				
1 NLD	_____	Date: _____	☐	☐
2. F&W	_____	Date: _____	☐	☐
3. HPD	_____	Date: _____	☐	☐
4 Minerals	_____	Date _____	☐	☐
5 NNEPA	_____	Date: _____	☐	☐
6 DNR	_____	Date: _____	☐	☐
7. DOJ	_____	Date _____	☐	☐
☐ **Rights of Way**				
1 NLD	_____	Date _____	☐	☐
2. F&W	_____	Date _____	☐	☐
3. HPD	_____	Date _____	☐	☐
4 Minerals	_____	Date _____	☐	☐
5. NNEPA	_____	Date _____	☐	☐
6 Office of the Attorney General	_____	Date _____	☐	☐
7. OPVP	_____	Date _____	☐	☐
☐ **Oil and Gas Prospecting Permits, Drilling and Exploration Permits, Mining Permit, Mining Lease**				
1. Minerals	_____	Date: _____	☐	☐
2. OPVP	_____	Date: _____	☐	☐
3. NLD	_____	Date: _____	☐	☐
☐ **Assignment of Mineral Lease**				
1. Minerals	_____	Date. _____	☐	☐
2 DNR	_____	Date _____	☐	☐
3. DOJ	_____	Date _____	☐	☐
☐ **ROW (where there has been no delegation of authority to the Navajo Land Department to grant the Nation's consent to a ROW)**				
1. NLD	_____	Date. _____	☐	☐
2. F&W	_____	Date _____	☐	☐
3. HPD	_____	Date: _____	☐	☐
4 Minerals	_____	Date: _____	☐	☐
5. NNEPA	_____	Date _____	☐	☐
6. DNR	_____	Date _____	☐	☐
7 DOJ	_____	Date: _____	☐	☐
8 OPVP	_____	Date: _____	☐	☐
☑ **OTHER: 3 OPERATING AGREEMTS. - TOHACHEE WASH, BEAUTIFUL MTN., AND PORCUPINE DOME (President's Signature)**				
1. DNR	[illegible]	Date 6 30 2021	☒	☐
2. DOJ	[illegible]	Date 7/20/21	☒	☐
3 OPVP	[illegible]	Date 7/29/21	☑	☐
4	_____	Date _____	☐	☐
5.	_____	Date _____	☐	☐
6	_____	Date _____	☐	☐

NAVAJO NATION DEPARTMENT OF JUSTICE
OFFICE OF THE ATTORNEY GENERAL

DOREEN N. MCPAUL
Attorney General

KIMBERLY A. DUTCHER
Deputy Attorney General

MEMORANDUM

TO: Executive Reviewers

FROM: April Quinn, Principal Attorney
Natural Resources Unit, Department of Justice

DATE: July 20, 2021

SUBJECT: Document No. 016149 – NNOGC Three Operating Agreements (Tohachee Wash, Beautiful Mountain and Porcupine Dome)

The Department of Justice (DOJ) deems the above-referenced operating agreements legally sufficient and notes that our office assisted in the drafting of these agreements. As far as DOJ's executive review is concerned, our office only reviewed the operating agreements included in the above-referenced document. DOJ did not review the supporting documents (*i.e.* the Environmental Assessments and supporting appendices) and is not weighing in as to their sufficiency at this time. The review of these documents will be done by the applicable Navajo Nation departments when NNOGC submits any Application for a Permit to Drill in accordance with the "Navajo Nation Procedures for the Review and Approval of Applications for Permit to Drill Oil and Gas Wells and Sundry Notices to Construct Associated Ancillary Facilities on Navajo Nation Lands".

P.O. Box 2010 • Window Rock, Navajo Nation (AZ) 86515 • 928-871-6345 • Fax No. 928-871-6177

NAVAJO NATION DEPARTMENT OF JUSTICE

☐ RESUBMITTAL

DOCUMENT REVIEW REQUEST FORM

RECEIVED JUL - 1 2021 DEPARTMENT OF JUSTICE ADMINISTRATION

DOJ
7/1/21 @ 934a
DATE / TIME
☐ 7 Day Deadline
DOC # 016149
SAS #
UNIT: NRM

*** FOR NNDOJ USE ONLY - DO NOT CHANGE OR REVISE FORM. VARIATIONS OF THIS FORM WILL NOT BE ACCEPTED. ***

DATE OF REQUEST:	6/30/2021	DIVISION:	Natural Resources
CONTACT NAME:	Rowena Cheromiah	DEPARTMENT:	Minerals
PHONE NUMBER:	871-6057	E-MAIL:	rcheromiah@navajo-nsn.gov

TITLE OF DOCUMENT: *3 Operating Agreements (Tohachee Wash, Beautiful Mtn., Porcupine Dome)* 1 2 3

DATE/TIME IN UNIT: 7.1.21 10am

REVIEWING ATTORNEY/ADVOCATE: Emailed April Quinn 7/13/21

DATE TIME OUT OF UNIT: 7.20.21

Legally sufficient. Please see enclosed DOJ memo.

REVIEWED BY: (*Print*)	Date / Time	SURNAMED BY: (*Print*)	Date / Time
Quinn	7/20/21 12:04pm	V.Blackhat	7/20/21 12:26pm

Rowena 7.20.21 2pm

PICKED UP BY: (*Print*) DATE / TIME:

NNDOJ/DRRF-July 2013

COMPLETED

THE NAVAJO NATION

JONATHAN NEZ PRESIDENT
MYRON LIZER VICE PRESIDENT

June 29, 2021

MEMORANDUM

TO : 164 Reviewers

FROM : Rowena Cheromiah

Rowena Cheromiah, Acting Director
Minerals Department

SUBJECT : **OPERATING AGREEMENT (OAs) BETWEEN THE NAVAJO NATION (NATION) AND NAVAJO NATION OIL AND GAS COMPANY (NNOGC)**

The attached three OAs are submitted for Section 164 Review and approval of the Office of the President and Vice President.

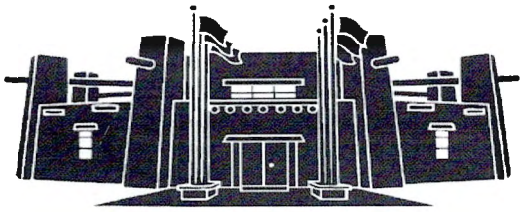
The OAs will provide guidelines and approval for NNOGC to undertake exploration for helium in three areas of the Navajo Nation, specifically: Tohache Wash, Beautiful Mountain, and Porcupine Dome. Each of the OAs includes a map of the specific area where NNOGC will drill wells to explore for and eventually produce helium.

Your consideration and approval of the OAs is appreciated. If you have any questions, please contact Mr. Steven L. Prince, Principal Petroleum Engineer at Ext. 7285.

SLP:RC/kjg
ATTACHMENTS

*Minerals Department * P.O. Box 1910 * Window Rock, Arizona 86515 * Phone (928) 871-6588 * Fax (928) 871-7095*

Office of Legislative Counsel
Telephone: (928) 871-7166
Fax # (928) 871-7576



Honorable Seth Damon
Speaker
24th Navajo Nation Council

MEMORANDUM

TO: Honorable Speaker Damon
24th Navajo Nation Council Delegate

FROM: Mariana Kahn
Mariana Kahn, Attorney
Office of Legislative Counsel

DATE: October 18, 2021

SUBJECT: PROPOSED NAVAJO NATION COUNCIL RESOLUTION; AN ACTION RELATING TO RESOURCES AND DEVELOPMENT COMMITTEE, NAABIK'ÍYÁTI' COMMITTEE, AND THE NAVAJO NATION COUNCIL; APPROVING OIL AND GAS OPERATING AGREEMENTS BETWEEN THE NAVAJO NATION AND NAVAJO NATION OIL AND GAS COMPANY FOR TOHACHEE WASH, BEAUTIFUL MOUNTAIN, AND PORCUPINE DOME

I have prepared the above-referenced proposed resolution and associated legislative summary sheet pursuant to your request for legislative drafting. Based on existing law and review of documents submitted, the resolution as drafted is legally sufficient. As with any action of government however, it can be subject to review by the courts in the event of proper challenge.

The Office of Legislative Counsel confirms the appropriate standing committee(s) based on the standing committees' powers outlined in 2 N.N.C. §§301, 401, 501, 601 and 701. Nevertheless, "the Speaker of the Navajo Nation Council shall introduce [the proposed resolution] into the legislative process by assigning it to the respective oversight committee(s) of the Navajo Nation Council having authority over the matters for proper consideration." 2 N.N.C. §164(A)(5).

Please ensure that his particular resolution request is precisely what you want. You are encouraged to review the proposed resolution to ensure that it is drafted to your satisfaction. If the proposed resolution is unacceptable to you, please contact me at the Office of Legislative Counsel and advise me of the changes you would like made to the proposed resolution.

THE NAVAJO NATION
LEGISLATIVE BRANCH
INTERNET PUBLIC REVIEW PUBLICATION

LEGISLATION NO: _0232-21__ **SPONSOR: Seth Damon**

TITLE: An Action Relating to Resources and Development Committee; Naabik'íyáti' Committee, and the Navajo Nation Council; Approving Oil and Gas Operating Agreements Between the Navajo Nation and Navajo Nation Oil and Gas Company for Tohachee Wash, Beautiful Mountain, and Porcupine Dome

***Date posted*: November 4, 2021 at 10:39 PM**

Digital comments may be e-mailed to comments@navajo-nsn.gov

Written comments may be mailed to:

Executive Director
Office of Legislative Services
P.O. Box 3390
Window Rock, AZ 86515
(928) 871-7586

Comments may be made in the form of chapter resolutions, letters, position papers, etc. Please include your name, position title, address for written comments; a valid e-mail address is required. Anonymous comments will not be included in the Legislation packet.

THE NAVAJO NATION
LEGISLATIVE BRANCH
INTERNET PUBLIC REVIEW SUMMARY

LEGISLATION NO.: 0232-21

SPONSOR: Honorable Seth Damon

TITLE: An Action Relating to Resources and Development Committee; Naabik'íyáti' Committee, and the Navajo Nation Council; Approving Oil and Gas Operating Agreements Between the Navajo Nation and Navajo Nation Oil and Gas Company for Tohachee Wash, Beautiful Mountain, and Porcupine Dome

Posted: November 04, 2021 at 10:39 PM

5 DAY Comment Period Ended: November 9, 2021

Digital Comments received:

Comments Supporting	***None***
Comments Opposing	***None***
Comments/Recommendations	***None***

Legislative Tracking Secretary
Office of Legislative Services

11/10/21 8:47AM
Date/Time

RESOURCES AND DEVELOPMENT COMMITTEE
24TH NAVAJO NATION COUNCIL

THIRD YEAR 2021

COMMITTEE REPORT

Mr. Speaker,

The **RESOURCES AND DEVELOPMENT COMMITTEE** to whom has been assigned:

LEGISLATION #0232-21: AN ACTION RELATING TO RESOURCES AND DEVELOPMENT COMMITTEE; NAABIK'ÍYÁTI' COMMITTEE, AND THE NAVAJO NATION COUNCIL; APPROVING OIL AND GAS OPERATING AGREEMENTS BETWEEN THE NAVAJO NATION AND NAVAJO NATION OIL AND GAS COMPANY FOR TOHACHEE WASH, BEAUTIFUL MOUNTAIN, AND PORCUPINE DOME. *Sponsor: Honorable Seth Damon*

Has had it under consideration and reports as DO PASS with no amendment.

And thereafter the legislation was referred to Naabik'íyáti' Committee.

Respectfully submitted,

Rickie Nez, *Chairperson*
Resources and Development Committee of
the 24th Navajo Nation Council

Date: November 10, 2021 – Regular Meeting (Teleconference)
Location: Resources and Development Committee members called in via teleconference from their location within the boundary of the Navajo Nation.

Main Motion:

M: Kee Allen Begay, Jr. **S:** Thomas Walker, Jr. **V:** 5-0-1 (CNV)
In Favor: Thomas Walker, Jr.; Kee Allen Begay, Jr.; Herman M. Daniels; Mark A. Freeland; Wilson C. Stewart, Jr.
Opposition: None
Excuse: None
Not Voting: Rickie Nez, *Chairperson*

(NOTE: VOTE TALLY attached hereto)

RESOURCES AND DEVELOPMENT COMMITTEE
24TH NAVAJO NATION COUNCIL

THIRD YEAR 2021

ROLL CALL
VOTE TALLY SHEET

LEGISLATION #0232-21: AN ACTION RELATING TO RESOURCES AND DEVELOPMENT COMMITTEE; NAABIK'ÍYÁTI' COMMITTEE, AND THE NAVAJO NATION COUNCIL; APPROVING OIL AND GAS OPERATING AGREEMENTS BETWEEN THE NAVAJO NATION AND NAVAJO NATION OIL AND GAS COMPANY FOR TOHACHEE WASH, BEAUTIFUL MOUNTAIN, AND PORCUPINE DOME. *Sponsor: Honorable Seth Damon*

Date:	November 10, 2021 – Regular Meeting (Teleconference)
Location:	Resources and Development Committee members called in via teleconference from their location within the boundary of the Navajo Nation.

Main Motion:

M: Kee Allen Begay, Jr. **S:** Thomas Walker, Jr. **V:** 5-0-1 (CNV)
In Favor: Thomas Walker, Jr.; Kee Allen Begay, Jr.; Herman M. Daniels; Mark A. Freeland; Wilson C. Stewart, Jr.
Opposition: None
Excuse: None
Not Voting: Rickie Nez, *Chairperson*

Honorable Rickie Nez, *Chairperson*
Resources and Development Committee

Rodney L. Tahe

Rodney L. Tahe, *Legislative Advisor*
Office of Legislative Services

24th NAVAJO NATION COUNCIL
NAABIK'ÍYÁTI' COMMITTEE REPORT
Fourth Year 2022

The **NAABIK'ÍYÁTI' COMMITTEE** to whom has been assigned:

NAVAJO LEGISLATIVE BILL #0232-21

An Action Relating to Resources and Development Committee; Naabik'íyáti' Committee, and the Navajo Nation Council; Approving Oil and Gas Operating Agreements Between the Navajo Nation and Navajo Nation Oil and Gas Company for Tohachee Wash, Beautiful Mountain, and Porcupine Dome

Sponsored by: Honorable Seth Damon

Has had it under consideration and reports the same that the legislation **WAS PASSED AND REFERRED TO THE NAVAJO NATION COUNCIL**.

Respectfully Submitted,

Honorable Eugenia Charles-Newton, Chairperson Pro Tem
NAABIK'ÍYÁTI' COMMITTEE

13 January 2022

MAIN MOTION
Motioned by: Honorable Eugene Tso
Seconded by: Honorable Edmund Yazzie
Vote: 18 In Favor, 04 Opposed (Chairperson Pro Tem Charles-Newton Not Voting)

----------*FAILED MOTIONS*----------

TABLING MOTION
Motion to Table Legislation 0232-21 Until a Community Work Session is completed in the Communities impacted (Sanostee & Teec Nos Pos) by this legislation
Motion by: Honorable Amber Kanazbah Crotty
Second by: Honorable Daniel E. Tso
Vote: 05 In Favor, 18 Opposed (Chairperson Pro Tem Charles-Newton Not Voting)

NAVAJO NATION

1161

1/13/2022

Naa'bik'iyati' Committee Regular Meeting

02:47:40 PM

Amd# to Amd#	Motion to Table Legislation	FAILED
MOT Crotty SEC Tso, D	0232-21 until community work sessions are held in the communities effected	

Yeas : 5 **Nays : 18** **Excused : 0** **Not Voting : 1**

Yea : 5

Brown	Slater, C	Tso, D	Tso, E
Crotty			

Nay : 18

Begay, E	Freeland, M	Smith	Walker, T
Begay, K	Halona, P	Stewart, W	Wauneka, E
Begay, P	Henio, J	Tso, C	Yazzie
Damon	James, V	Tso, O	Yellowhair
Daniels	Nez, R		

Excused : 0

Not Voting : 1

Charles-Newton

Presiding Speaker: Charles-Newton

NAVAJO NATION

1162 | 1/13/2022

Naa'bik'iyati' Committee Regular Meeting | 04:26:05 PM

Amd# to Amd#	Legislation 0232-21:	PASSED
MOT Tso, E	Approving Oil & Gas Operating	
SEC Yazzie	Agreements Between the Navajo	
	Nation & Navajo Nation Oil...	

Yeas : 18 **Nays : 4** **Excused : 0** **Not Voting : 1**

Yea : 18

Begay, E	Freeland, M	Smith	Walker, T
Begay, K	Halona, P	Stewart, W	Wauneka, E
Brown	Henio, J	Tso, C	Yazzie
Damon	James, V	Tso, O	Yellowhair
Daniels	Nez, R		

Nay : 4

Tso, D	Tso, E	Crotty	Slater, C

Excused : 0

Not Voting : 1

Begay, P

Presiding Speaker: Charles-Newton

THE NAVAJO NATION
LEGISLATIVE BRANCH
INTERNET PUBLIC REVIEW SUMMARY

LEGISLATION NO.: 0232-21

SPONSOR: Honorable Seth Damon

TITLE: An Action Relating to Resources and Development Committee; Naabik'íyáti' Committee, and the Navajo Nation Council; Approving Oil and Gas Operating Agreements Between the Navajo Nation and Navajo Nation Oil and Gas Company for Tohachee Wash, Beautiful Mountain, and Porcupine Dome

Posted: November 04, 2021 at 10:39 PM

5 DAY Comment Period Ended: November 9, 2021

Digital Comments received:

Comments Supporting	***None***
Comments Opposing	**1.) Beverly Maxwell** **2.) Elouise Brown** **3.) Robyn Jackson** **4.) Pierette Baldwin** **5.) Christine Benally** **6.) Percy Deal** **7.) Kendra Pinto**
Comments/Recommendations	***None***

VSRedhorse
Legislative Tracking Secretary
Office of Legislative Services

January 27, 2022; 1:00 PM
Date/Time

LEGISLATION 0232-21

beverly maxwell <beverlymaxwell@hotmail.com>

Wed 1/26/2022 9:20 PM

To: 24thnnc <24thnnc@navajo-nsn.gov>; comments <comments@navajo-nsn.gov>; Seth Damon <sdamon@navajo-nsn.gov>;

Ya'aht'eeh,

We, the Dine people say, "Dooda! (NO!) helium extraction to all Navajo Nation Council delegates, Navajo Nation President Nez and Navajo Nation Vice-President Lizer."

Please respect our voice and sincere consideration for future generations given our Nihima Naasdzaan, Yadilhil & the Natural World are telling us of inbalance happening globally each day.

Dooda!/NO! to Helium Extraction.

A'he'hee',

Toaheedlinii nisli, Tlaashchii bashichiin, Kinlichinii dashi nali, Tlizidaalchii-Tacheene dashi chei
Beverly Maxwell, mother-grandmother-daughter-granddaughter-veteran
Tooh, Dine' Bikeyah-Yootooh

Sent from Mail for Windows

Dooda (NO) Helium Extraction please!

El Brown <thebrownmachine@hotmail.com>

Thu 1/27/2022 5:23 AM

To: Seth Damon <sdamon@navajo-nsn.gov>; comments <comments@navajo-nsn.gov>; 24thNNC@navajo-navajo.gov <24thNNC@navajo-navajo.gov>; Jonathan Nez <jonathannez@navajo-nsn.gov>; myronlizer@gmail.com <myronlizer@gmail.com>;

Ya'ateeh Speaker Damon,
Ya'ateeh 25th NN Council,
Ya'ateeh NN President Nez, doo'
Ya'ateeh NN Vice President Lizer,

T'aashoodi, No Helium Extraction!

Simply because we don't want Mother Earth disturbed. We love her and do not agree with navajo oil and gas or any other entities to drill into her!

Our precious Mother Earth is more important than money!

Please find other ways to generate revenue for our people on the Navajo Nation.

Please vote red on legislation 0232-21!

Please listen to us voters!
Please hear our cry for Mother Earth!
REMINDING you;
We, the people, the voters put you in your seat as a naat'aani and you are supposed to advocate for us (the people), for a better Nation!

T'ashoodi, Dooda (NO) Helium Extraction on Navajo Nation, especially in TseAlnaozti'i areas of Beautiful Mountain, Porcupine area, T'osido, and throughout Navajo Nation and Turtle Island!

Elouise Brown,
27Jan2022
Mother Earth Protector,
TseAlnaozti'i Chapter Voter,
Former Grazing Officer,
SWCD Board President,
TVO Secretary,
NNVO Commander,
NNVAC Vice Chairperson,

Sent from my Verizon, Samsung Galaxy smartphone

Vote NO on LEGISLATION 0232-21

Robyn <chooshgai.bitsi@gmail.com>

Thu 1/27/2022 7:39 AM

To: comments <comments@navajo-nsn.gov>; Seth Damon <sdamon@navajo-nsn.gov>; Amber K. Crotty <acrotty@navajo-nsn.gov>; Rickie Nez <rickienez@navajo-nsn.gov>; Kee Allen Begay Jr. <keeallenbegayjr@navajo-nsn.gov>; Wilson Stewart, Jr. <wilsonstewartjr@navajo-nsn.gov>; thomaswalkerjr@navajo-nsns.gov <thomaswalkerjr@navajo-nsns.gov>; Mark Freeland <m.freeland@navajo-nsn.gov>; Herman Daniels, Jr. <hdaniels@navajo-nsn.gov>; Pernell Halona <pernellhalona@navajo-nsn.gov>; Eugenia Charles-Newton <echarles-newton@navajo-nsn.gov>; Carl Slater <carlslater@navajo-nsn.gov>; Raymond Smith Jr. <rsmithjr@navajo-nsn.gov>; Edison J. Wauneka <ejwauneka@navajo-nsn.gov>; Vince R. James <vincejames@navajo-nsn.gov>; Elmer P. Begay <elmerbegay@navajo-nsn.gov>; Charlaine Tso <charlainetso@navajo-nsn.gov>; Otto Tso <otso@navajo-nsn.gov>; Eugene Tso <etso@navajo-nsn.gov>; Daniel Tso <danieltso@navajo-nsn.gov>; Jimmy Yellowhair <jyellowhair@navajo-nsn.gov>; Paul Begay <paulbegay@navajo-nsn.gov>; Nathaniel Brown <nbrown@navajo-nsn.gov>; Jamie Henio <jhenio@navajo-nsn.gov>; Edmund E. Yazzie <edmundyazzie@navajo-nsn.gov>;

2 attachments (544 KB)

Health and environment flier-final(2).pdf; Public info handout on helium navajo dbk(3).pdf;

Yá'át'ééh Navajo Nation Council Delegate,

I am requesting that you **VOTE NO** on LEGISLATION 0232-21.

I ask that you rescind all previous resolutions that support helium, oil and gas extraction, development, drilling, production and processing in the Tohachee Wash, Beautiful Mountain, and Porcupine Dome areas.

I ask that you vote down this legislation and rescind any approved agreements, leases, and contracts for the following reasons:

- The impacts of helium drilling will cause long-term harm to our land and water. Helium is extracted the same way oil and gas is extracted. More often these days, it is hydraulic fracturing (fracking). When they drill, everything comes to the surface: methane, oil, brine, including the release of many toxic and deadly gases like hydrocarbons, volatile organic compounds, and (H2S) hydrogen sulfide. Don't allow this rush for a quick buck to destroy our communities and sacred places. As water and climate effects intensify across Diné Bikéyah, the consequences of helium fracking are too heavy of a price to pay for our future and generations to come.
- Ch'ooshgai and Beautiful Mountain are sacred mountains and are of prominent Nihookáá' Diyin Diné'é historical significance.
- We the residents, voters, constituents, citizens, and allies OPPOSE helium extraction. We were not adequately consulted and did not consent.
- Porcupine dome has a tsenaamaji'i (a sacred site) and there are many other sites in the area.
- The Nihookáá' Diyin Diné'é oppose the extraction of helium, oil, and gas in the Beautiful Mountain, Porcupine Dome, Littlewater, and surrounding Nihookáá' Diyin Diné'é Bikéyah indigenous habitat including our homelands, farms, grazing, cultural, religious, ceremonial areas, grounds, sites, and trails that are protected under Nihookáá' Diyin Diné'é values and fundamental laws as well as the American Indian Religious Freedom Act which is a federal law protecting American Indian religions, lands, and traditions.
- Navajo Oil and Gas is only talking to the chapter officials, not residents. Community and residents left out. Why weren't the residents included in the Albuquerque and all meetings? The residents oppose. Engaging with the chapter doesn't mean community and residents Engagement. Many signed the petition opposing helium and the Dine Medicine Men Association resolution opposing it.
- Navajo government is violating our rights, fundamentally, under the United Nations Declaration on the Rights of Indigenous Peoples, and American Indian Religious Freedom Act.

Ahéhee',
Robyn Jackson
Wheatfields

What's in the air?

Hydrogen Sulfide

Wells in the Dineh Bi Keyah field release dangerous levels of hydrogen sulfide (H2S), a naturally occurring gas found within natural gas. At low concentrations H2S smells like rotten eggs, but at high concentrations humans cannot smell it. H2S is considered a broadspectrum poison, because it can poison many systems in the human body. Exposure to high concentrations of H2S can be deadly. It can also cause eye, nose and throat problems, cause fluid to build up in the lungs, poison the nervous system, and cause respiratory and digestive problems, among other negative health effects.

Volatile Organic Compounds

Volatile Organic Compounds (VOCs) are a category of gases emitted during oil and gas production, including helium production. The VOCs most typically associated with this activity include benzene, toluene, ethylbenzene, and xylene. Each of these chemicals can cause neurological harms, and benzene is also a known carcinogen. Breathing in these substances can irritate the nose, eyes, and throat, and cause nausea. When VOCs mix with sunlight and nitrogen oxide, a chemical released when fossil fuels are burned (for instance, from a car engine or a coal plant), they cause regional smog or ground-level ozone, which can cause or exacerbate respiratory problems like asthma.

DINÉ C.A.R.E.

• Citizens Against Ruining our Environment •

www.dine-care.org
Facebook: @careforedine

To learn more or get involved, contact Diné CARE

Environmental and Health Impacts of Fracking

Understanding the risks of oil, gas, and helium extraction in Red Valley, Navajo Nation

What is fracking?

"Fracking" is a suite of practices used to extract oil and natural gas from the Earth. During fracking, operators inject large volumes of water, chemicals, and typically sand into the earth to break open rock layers and access oil or gas.

Helium is a component of natural gas. Natural gas found Red Valley is particularly rich in helium. Natural gas extracted from wells in Red Valley is sent to a helium processing plant on CR 41 South, where the helium is separated from the gas stream and refined. From there, it is sold to private buyers.

There is no such thing as safe fracking.

A growing body of research shows that fracking is harmful to the environment, the global climate, human health, and social and economic wellbeing. These impacts are intertwined. Even with regulation, fracking cannot be done safely.

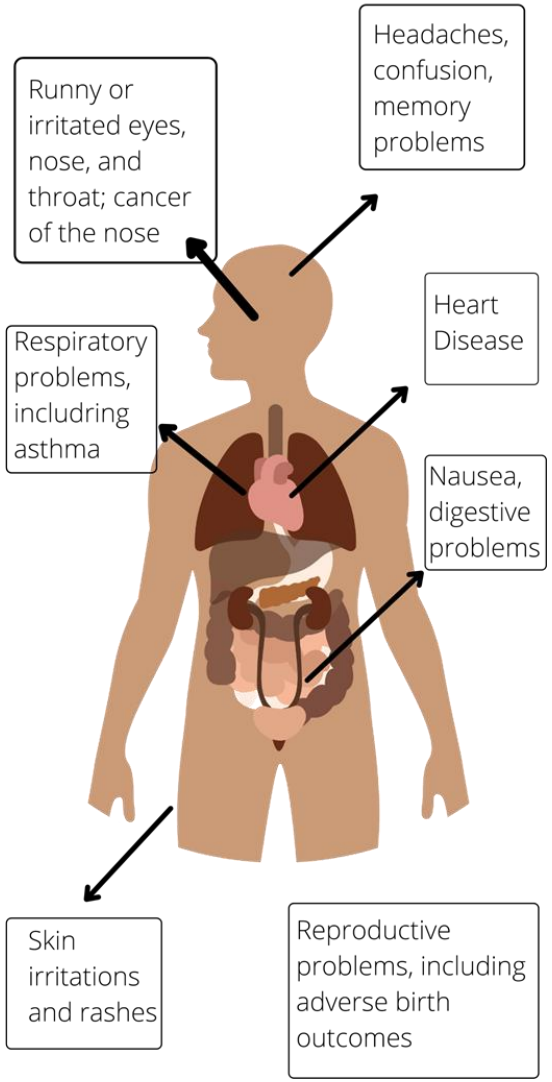
Airborne chemicals and gases emitted during fracking negatively impact local air quality and the climate.

Radioactive materials that often occur naturally in underground shale become components of fracking wastewater and solid waste. These radioactive substances threaten groundwater, surface water, and local communities near disposal sites.

Fracking threatens ground-water and can pollute drinking water sources.

Evidence from several U.S. states and other countries shows that fracking causes earthquakes, which can pose risks to communities, animals, infrastructures, and cultural resources.

Chemicals released into the environment during fracking can cause multiple health problems.



HELIUM IN THE DINEH BI KEYAH (DBK) FIELD

The DBK field was first developed in the late 1960s to extract oil. The field was largely depleted of oil by the early 2000s. At that point, companies turned to extract helium. First, they drill for natural gas. Then, at a helium processing plant, the helium is separated from the gas stream and prepared for market.

There are currently eight active helium wells in the DBK field and several old oil wells that produce oil in small quantities.

To learn more or get involved, get in touch with Diné CARE on facebook or via our email at dinecare88@gmail.com

DINÉ C.A.R.E.

Citizens Against Ruining our Environment

HELIUM OPERATIONS ON THE NAVAJO NATION

Public information handout by Diné CARE

INCREASING DEVELOPMENT

There is increasing interest from corporations in extracting helium from Navajo Nation lands - for instance, in areas such as Red Valley, the Hogback, Tocito Dome, and throughout the Holbrook Basin, including Nahata' Dzil. But impacted communities are not always informed of the potential impacts of this development. In Red Valley, residents' concerns about existing development have been ignored for years.

In the **Dineh Bi Keyah** field near Red Valley, helium and legacy oil operations have brought:

THREATS TO AIR QUALITY

Air sampling by Diné CARE reveals dangerous levels of air toxins and pollutants.

THREATS TO HEALTH

These toxins pose health risks to residents who are exposed.

THREATS TO LAND AND WATER

Diné CARE has documented several oil spills that pose a threat to the land and water. The operator, Capitol Operating Group, does not appear to maintain well sites or roads frequently.

Navajo Nation agencies have been unresponsive to multiple complaints and requests for information.

Spilled oil in the Dineh Bi Keyah Field

Community members deserve answers to their questions, and assurance that their environment is safe.

VOTE NO on LEGISLATION 0232-21

Robyn <chooshgai.bitsi@gmail.com>

Thu 1/27/2022 8:12 AM

To: comments <comments@navajo-nsn.gov>; Seth Damon <sdamon@navajo-nsn.gov>; Amber K. Crotty <acrotty@navajo-nsn.gov>; Rickie Nez <rickienez@navajo-nsn.gov>; Kee Allen Begay Jr. <keeallenbegayjr@navajo-nsn.gov>; Wilson Stewart, Jr. <wilsonstewartjr@navajo-nsn.gov>; Mark Freeland <m.freeland@navajo-nsn.gov>; Herman Daniels, Jr. <hdaniels@navajo-nsn.gov>; Pernell Halona <pernellhalona@navajo-nsn.gov>; Eugenia Charles-Newton <echarles-newton@navajo-nsn.gov>; Carl Slater <carlslater@navajo-nsn.gov>; Raymond Smith Jr. <rsmithjr@navajo-nsn.gov>; Edison J. Wauneka <ejwauneka@navajo-nsn.gov>; Vince R. James <vincejames@navajo-nsn.gov>; Elmer P. Begay <elmerbegay@navajo-nsn.gov>; Charlaine Tso <charlainetso@navajo-nsn.gov>; Otto Tso <otso@navajo-nsn.gov>; Eugene Tso <etso@navajo-nsn.gov>; Daniel Tso <danieltso@navajo-nsn.gov>; Jimmy Yellowhair <jyellowhair@navajo-nsn.gov>; Paul Begay <paulbegay@navajo-nsn.gov>; Nathaniel Brown <nbrown@navajo-nsn.gov>; Jamie Henio <jhenio@navajo-nsn.gov>; Edmund E. Yazzie <edmundyazzie@navajo-nsn.gov>; thomaswalker@navajo-nsn.gov <thomaswalker@navajo-nsn.gov>;

2 attachments (9 MB)

Oil, Gas, Helium in DBK with Appendices_opt.pdf; Dine CARE Sampling Summary .pdf;

Yá'át'ééh,

Attached are two reports:

1) The Oil, Gas and Helium Operation in the Dineh Bi Keyah Field: Community Concerns and Findings
- This report is on the history of helium extraction on Navajo Nation and oil and gas activity, with a particular focus on the Dineh Bi Keyah Field (DBK) in Red Valley.

2) The second report includes findings and a lab analysis by the national organization Earthworks and Dine CARE that is based on air samples taken of the oil wells in Red Valley. These findings were alarming and expose a health hazard/emergency at that oil/helium field.

Based on the hazards of oil, gas, and helium drilling, production and processing, I request that you VOTE NO on legislation 0232-21. The development of helium across the Navajo Nation has not been properly assessed. There are existing problems with this type of development that is putting the Navajo public at risk health and safety wise.

Robyn Jackson
Wheatfields

OIL, GAS, AND HELIUM OPERATIONS IN THE DINEH BI KEYAH FIELD

COMMUNITY CONCERNS AND FINDINGS

A REPORT BY DINÉ CARE

2021

Prepared by Sonia Grant, Ph.D. for Diné CARE. September 2021.

The author would like to thank Diné CARE, and especially Robyn Jackson, for their assistance; Nathalie Eddy, Nadia Steinzor, Melissa Ostroff, and Kendra Pinto at Earthworks; and staff within Navajo Nation, federal, and state agencies who took the time to answer questions and provide information. Any errors and omissions in the report are the author's and not Diné CARE's.

Contact Diné CARE for questions regarding distribution and ongoing work in Red Valley.

Cite as: Grant, Sonia. 2021. "Oil, Gas, and Helium Operations in the DBK Field: Community Concerns and Findings". Diné CARE. Navajo Nation.

ACRONYMS AND ABBREVIATIONS

AQCP	Navajo Nation Air Quality Control Program
AZOGCC	Arizona Oil and Gas Conservation Commission
BLM	U.S. Bureau of Land Management
DBK	Dineh Bi Keyah
Diné CARE	Diné Citizens Against Ruining Our Environment
ESL	Effects Screening Levels
H_2S	Hydrogen sulfide
JOA	Joint Operating Agreement
MCF / MSCF	One Thousand Cubic Feet / One Thousand Standard Cubic Feet
Minerals	Navajo Nation Minerals Department
NNDNR	Navajo Nation Division of Natural Resources
NNEPA	Navajo Nation Environmental Protection Agency
OGI	Optical Gas Imaging
OSHA	U.S. Occupational Safety and Health Administration
ppm	Parts Per Million
SEC	Securities and Exchange Commission
TNSR	Tribal New Source Review
U.S. EPA	United States Environmental Protection Agency
WELC	Western Environmental Law Center
WRAP	Western Regional Air Partnership

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Appendix IV – Resolutions from Red Valley and Tsaile/Wheatfields Chapters

Appendix V – March 2019 Letter from Navajo Nation Minerals Department to Diné Care

Appendix VI – Copy of Purchase and Sale Agreement Between Nacogdoches Oil and Gas, Inc. and Nordic USA 4 LLC

Appendix VII – Copy of DBK Lease Assignments

Appendix VIII – Memo to Delegate Crotty from Minerals

Appendix IX – WELC Requests for Information and Responses

1. INTRODUCTION

The purpose of this report is to inform Navajo Nation citizens, the general public, the Navajo Nation Council, the Office of the President and Vice President, the Navajo Nation Division of Natural Resources and departments therein, the Navajo Nation Environmental Protection Agency and departments therein, federal agencies, and other relevant offices and personnel within Navajo Nation government of concerns that Diné CARE has about oil, gas, and helium extraction happening in the Dineh Bi Keyah (DBK) field located in Apache County, Arizona.

Diné CARE, Citizens Against Ruining our Environment, is an all-Navajo environmental organization, based within the Navajo homeland. We strive to educate and advocate for our traditional teachings as we protect and provide a voice for all life in the Four Sacred Mountains. We promote alternative uses of natural resources that are consistent with the Diné philosophy of Beauty Way. Our main goal is to empower local and traditional people to organize, speak out and determine their own destinies. Diné CARE - an indigenous environmental organization to protect and preserve the Diné way of life.

In the Fall of 2017, Diné CARE staff began hearing concerns from community members in Red Valley about increased truck traffic, chemical odors, and industrial activity in the Chuska Mountains and surrounding valley. Some residents no longer felt comfortable bringing their sheep up to camps in the mountains due to the odors and health symptoms they would experience with prolonged exposure, like headaches. Diné CARE began researching what was happening in the area. We visited sites in the DBK oil field, took air samples from sites that emitted strong odors, and conducted optical gas imaging (OGI) in partnership with the organization Earthworks. When OGI and independent lab analyses revealed concerning levels of air pollutants, we notified Navajo Nation EPA (NNEPA), the United States Environmental Protection Agency Region 9 (U.S. EPA), and the Navajo Nation Minerals Department (Minerals).

This report summarizes Diné CARE's findings from over four years of research and community discussions in Red Valley.

2. BACKGROUND: THE DINEH BI KEYAH FIELD

A) FIELD GEOLOGY AND EARLY EXPLORATION

Oil was discovered near Red Valley (Apache County, Arizona) in 1967 by Kerr-McGee Oil Industries (Kerr-McGee). Both Kerr-McGee and Humble Oil & Refining Company had begun acquiring leases in this area from the Navajo Tribal Council in 1964, but their first test wells were dry.

Kerr-McGee drilled its first successful well in January of 1967. The well hit promising quantities of oil, which prompted Kerr-McGee to expand its operations in the area, eventually defining an oil field. Located on the Toadlena Anticline of the Colorado Plateau, the ~3,000-acre field was given the name Dineh Bi Keyah (DBK), "The People's Field", upon the suggestion of Raymond Nakai, then Chairman of the Navajo Tribal Council.

Called "Navajo #1", Kerr-McGee's first well began producing 648 barrels of oil per day and later produced more than 1,800 barrels of oil and 135,000 cubic feet of gas per day.[i]

Kerr-McGee had first attempted to extract petroleum from Navajo #1 in 1965. At the time, the company had drilled into granite nearly 4,000 feet deep, and again into sandstone at 590-880 feet. When these attempts were unsuccessful, the company temporarily abandoned the well.

In early 1967, Kerr-McGee decided to reenter Navajo #1 at a different depth. This decision was based on a review of well logs and the hunch of a geologist on the Kerr-McGee team. The well interval at 2,860-2,885 feet was perforated and came up dry. Engineers decided to acidize the well. It still came up dry. Finally, Kerr-McGee authorized a frack job. The well was fracked with 10,000 gallons of oil and 10,000 gallons of sand, which opened the rock containing oil.[ii]

Test it. Acidize it. Frac it.

John A. Masters, who worked for Kerr-McGee in the 1960s, reminisced on his "discovery" of the DBK field as follows. His recollections show how, from the early days, the DBK field has been a site of experimentation.

"In 1967, I found Dineh-bi-keyah, Field of the People, on the Navajo Reservation, right in the uranium area I had worked so intensively. I did this by myself, with an idea that came to me alone on a Saturday afternoon in the Kerr-McGee office in Oklahoma City. I had left Arizona 14 years before and hadn't thought much about the area since then. But that Saturday afternoon, my subconscious mind finally put together a geologic picture it had probably been wrestling with for the whole 14 years. Suddenly, in a single flash, I saw all the data in my memory rearranged into a convincing regional structural picture. It formed a huge buried anticline 35 miles long under most of the uranium area I had worked so long ago. It was probably the largest undrilled anticline left in the United States. It was virtually invisible to anyone who had not walked and jeeped over nearly every mile of that structure. Indeed, it had stayed invisible to me for 14 years.

On that Monday, I went to Mr. McGee. He asked me about 20 serious, probing questions and then said, "OK." He was the clearest-thinking, most decisive man I've ever known. We drilled it and found no conventional reservoir rock, but it did have an igneous sill at 2,800 feet — with good oil shows. Everyone wanted to plug it. McGee had sat a lot of wells as a young geologist for Phillips. This time, he didn't pay much attention to the rock type, the correlations, or the structural position. He was fixated on the oil show. He said, **"Test it."** No oil. He said, **"Acidize it."** No oil. Then he said, **"Frac it."** The well came in for 648 BOPD of 45° API gravity oil. We drilled 31 wells which produced an average of more than 500,000 barrels each from 2800 feet. Total production was nearly 20 million barrels.

That was my igneous intrusive field, mine and Mr. McGee's — a ***screwball, one of a kind***. The rule learned from that was that you don't have to be entirely right — just right enough, and ahead of everyone else. And work for someone like Dean McGee".[1]

The discovery of oil at this depth, in an igneous rock, came as a surprise to geologists at the time. Most hydrocarbons are found in sedimentary rock formations, like sandstone, limestone, and shale. These formations tend to be porous, meaning that they contain small empty spaces where oil and gas can be trapped. Igneous rocks, on the other hand, tend to be non-porous, with some exceptions.

In the case of the DBK field, oil is produced from a syenite sill that intruded into limestones and shales formed during the Pennsylvanian era, some 300 million years ago.[iii] The sill itself dates to the Tertiary era, some 66-2.6 million years ago, and is unusually porous.[iv] Kerr-McGee geologists suspect that the intrusion of the sill raised the temperature of the shale, which was the source rock, and caused hydrocarbons to migrate into the syenite sill where it was found.[v]

Sedimentary rocks form from the accumulation of the Earth's matter, when particles settle out of water, precipitation, or air. Hydrocarbons are typically extracted from sedimentary rocks, including limestone, sandstone, and shale. These rocks tend to be porous, to a greater or lesser degree. Oil and natural gas get trapped in the pores of the rock.

Igneous rocks form when magma solidifies. Examples include granite, basalt, obsidian. Igneous rocks tend to be crystalline and non-porous. While igneous rocks are now known to sometimes contain hydrocarbon resources, the occurrence of a viable oil or gas source is rarer in igneous rocks than in sedimentary rocks.

In July of 1967, Kerr-McGee completed a 33-mile pipeline to transport oil from its producing wells in the DBK field to Shiprock, where it connected to the Four Corners pipeline. Whereas oil had previously been trucked to Shiprock, the construction of the pipeline expanded Kerr-McGee's ability to bring DBK oil to market.[vi] The Navajo Times reported in August 1967 that Kerr-McGee was sending the oil it produced to several refineries in Los Angeles, California.[vii]

The surprising discovery of oil near Red Valley caused some to refer to the DBK field as a "geological freak".[viii] The Navajo Times, for example, described the field's syenite sill as follows:

"This freak, which experts say "should not exist", offers the promise that Arizona will soon be numbered among the major oil-producing states, and it offers new hope for economic security to the Navajo Nation".[ix]

Navajo Tribal officials expressed enthusiasm for Kerr-Mcgee's discovery and ongoing development. Chairman Nakai was quoted in the Navajo Times in September 1967:

"This new field will cause reevaluation of all the existing data regarding oil. I am glad to report that this new discovery revives the interest in our Navajo reservation which has become very dormant. I am told this Is the first meaningful discovery of oil in Arizona"[x]

Not only did leasing and drilling in the DBK field generate significant revenue for the Navajo Tribe: the excitement around the DBK oil discovery also made the oil and gas leasing market more competitive throughout the Four Corners region. In June 1967, for example, months after Kerr-McGee's spudding of Navajo #1, oil and gas companies offered bonus bids of $1.2 million for leases on the Navajo Nation in the Four Corners region.[xi]

B) DBK IN CONTEXT

The DBK field became the largest producing oil field in Arizona and produced nearly 20 million barrels of oil, a significant quantity for a field its size.[xii] But despite early fanfare, the DBK field did not launch Arizona into the ranks of top oil-producing states.

By late 1981, 18 million barrels of oil had been extracted in Arizona, 89% of which came from the DBK field. More than 88% of all oil extracted in Arizona by 2001 (22.5 million barrels) came from the DBK field. In fact, all oil extracted in Arizona comes from Diné lands.[xiii]

Oil production in Arizona peaked around 1970, after which it began a sharp decline from which it has not recovered.[xiv] The DBK field was largely depleted by 2000, but still produces oil and gas in small quantities from twenty wells. Today, the primary extractive interest in the DBK field is helium.

Kerr-McGee's Secondary Recovery Program

In the late 1970s, Kerr-McGee sought – and seems to have obtained – permission from the AZOGCC for a "secondary recovery program" in the DBK field. The secondary recovery program was a proposal to inject salt water into the underground Hermosa formation to facilitate oil extraction.[1] This hydraulic fracturing technique was used on wells Navajo #21, #23, and #24.[1]

C) CULTURAL RESOURCES SURVEYS AT DBK

EARLY PRODUCTION

In the old well files maintained by the Arizona Oil and Gas Conservation Commission, the only record of a cultural resources survey in the DBK area is of a survey conducted for Kerr-McGee in 1980. The survey was requested by Victor Eaton of Atchison Construction. Eaton worked as a heavy equipment operator for several construction companies in the Four Corners.xv From the records, it can be deduced that Atchison Construction was hired by Kerr-McGee to build or improve access roads and to construct new well pads.

The survey was completed by the Division of Conservation Archaeology (DCA) at the San Juan County Museum Association (New Mexico) for six well sites and associated access roads, including wells Navajo 25, Navajo 26, Navajo 27, Navajo 88-3, Navajo 88-6, and Navajo 138-3. DCA archeologist Margaret Powers conducted the survey and was accompanied by Kames O'Leary of Kerr-McGee, Victor Eaton of Atchison Construction, and Dave Bahe and Ron Milford of the Bureau of Indian Affairs forestry office in Fort Defiance, Arizona.

The survey was conducted in December 1980, with a follow-up in January 1981 due to extensive snow cover during the initial survey.

Methods: The archaeologist surveyed the well pads as well as a 50-foot "buffer zone" around each pad. Note that today, the standard buffer zone around a well pad is 100 feet, which is often still insufficient for understanding the impact of a well pad on cultural resources.xvi The archeologist surveyed the proposed access roads and a buffer zone of 35 feet on each side of the proposed roads and conducted a record search at the San Juan County Archeological Research Center to determine if cultural sites had been previously noted. The archeologist recorded "cultural remains" observed during the survey.

Findings: The archeologist noted that the proposed activities would take place in the northeastern flanks of the Chuska Mountains in the headwaters of Standing Red Rock Creek. The setting is a mixed forest consisting of Ponderosa Pine, Aspen, and Douglas Fir, with an understory dominated by snowberry. Logging activities were evident throughout the area. The archeologist noted signs of deer, squirrel, rabbit, and porcupine during the survey.

In terms of "cultural remains", the archeologist found mostly then-contemporary items like soda pop cans or coffee lids. On the proposed site for Navajo #26, the archeologist found "a modern Navajo construction" described as a "small sweathouse-like structure", estimated to be 5-20 years old in 1981. This structure was marked and recommended for avoidance. If the site could not be avoided, the DCA recommended that an "ethnographer and informant visit the site to obtain better functional assessment" prior to construction of the well pad and presumed demolition of the structure.

All pads, wells, and access roads were recommended for archeological clearance.

21ST CENTURY HELIUM PRODUCTION

Because most files for 21st century operations in the DBK field are not available (see Sections 6 and 7) it is unclear whether further cultural resources surveys were conducted by the Navajo Historic Preservation Department, the Bureau of Indian Affairs, the operator, or other entities when the DBK field was reworked for helium extraction.

The DBK field sits in the Chuska Mountains, an area of great importance to local communities and to Diné people. In 2018, the Red Valley Chapter passed a resolution expressing concerns regarding operations in the DBK field. The resolution described the importance of the area as follows:

> "The Chuska, Fort Defiance and Carrizo mountains are known to the Dine' as the holy male deity Ch'ooshgai, and as such deserves respect, protection, diligent care, and restoration, in accordance with section B of Dine' Bi Beenahaz'aannii (1 N.N.C. § 201-201§ 5. Nahasdz'áanii – Dine' Natural Law 1. N.N. C. § 205): "The six sacred mountains, Sisnajini, Tsoodzil, Dook'o'oosliid, Dibe' Nitsaa, Dzil Na'oodilii, Dxil Ch'ool'l'l', and all the attendant mountains must be respected, honored and protected for they, as leaders, are the foundations of the Navajo Nation".[xvii]

3. OIL, GAS, AND HELIUM OPERATORS IN THE DBK FIELD

A) THE KERR-MCGEE YEARS: 1967 - 1994

Between 1967-1973, the top operators in the DBK field were Kerr-McGee and Humble. Kerr-McGee operated most of the field until 1994, when Mountain States Petroleum took over operations, followed by Nacogdoches and then Capitol Operating Group.

Kerr-McGee Oil Industries, Inc. acquired its leases in the DBK area in 1964 and 1965. While the DBK field itself is relatively small, by 1967 Kerr-McGee had acquired 47,000 acres in leases in the Four Corners area.[xviii] The company drilled a total of 31 wells in the DBK field. Kerr-McGee Oil Industries changed its name to Kerr-McGee Corporation in 1965, after acquiring its DBK leases.[xix] The company has a reputation on the Navajo Nation that extends far beyond the DBK field for its role in the destructive practice of uranium mining.

Humble Oil & Refining Company, Inc. acquired its leases in the DBK area in 1964 and 1965. Shortly thereafter, Humble would merge with Standard Oil and become Exxon Corporation in 1973. Humble drilled a total of 8 wells in the DBK field and along with Kerr-McGee, was one of the major investors and operators in the field. Prior to its assumption into Exxon Corporation, Humble sold its leases and assets in the DBK field, including title and operating rights, to Kerr-McGee in 1972. This transfer was approved and formalized in 1973.

Mesa Petroleum completed one well, "Navajo 1B", in 1970. It was "very dry". The company plugged and abandoned it shortly thereafter.

Anadarko Petroleum completed one well, "Navajo-135", in 1967. It did not strike oil, however the company noted high concentrations of helium in the gas (+6%). Anadarko plugged and abandoned the well shortly thereafter.

Pan American completed one well, "Navajo AE", in 1968. It came up dry and was plugged and abandoned shortly after.

Continental, RMC, Z&D, and Beta Exploration
A handful of other companies drilled wells in the early years of DBK exploration in search of oil. For example, four different companies attempted and failed to extract petroleum from the now abandoned well "Navajo 2XE". The first attempt was made by Continental Energy Corporation in 1969. The well came up dry and was plugged and abandoned shortly thereafter. Two years later, in 1971, Republic Mineral Corporation obtained permission to reenter Navajo 2XE. The well again came up dry, and RMC abandoned it. In 1973, Zoller & Danneberg obtained permission to reenter the well, but they too were unsuccessful, and soon plugged and abandoned it. Finally, in 1975, Beta Exploration reentered the well and was unable to strike oil. The well was plugged and abandoned.

B) POST KERR-MCGEE: 1994-2021

Mountain States Petroleum Corporation acquired title and operating rights to all of Kerr-McGee's leases in 1994. Mountain States was a New Mexico corporation with its primary places of business in Farmington and Roswell.[xx] No records can be obtained as to its status in 2021. It seems that Mountain States was acquired by Apollo Resources International in late 2008.[xxi] Apollo Resources

International was a Utah corporation based in Dallas, Texas that was attempting to go private in 2007 around the time of the financial crash. In 2011, the U.S. Securities and Exchange Commission (SEC) revoked Apollo's registration with the SEC for failure to comply with the Exchange Act. Specifically, Apollo had failed to file required periodic reports with the SEC since 2006. It appears that Apollo is now defunct.[xxii]

Neptune Leasing Inc. is a Texas-based company that owned and operated a helium processing plant from an unknown period until 2006, at which point it sold it to Mountain States (lease records for Neptune are not available). As part of the sale, Neptune negotiated a payment plan with Mountain States. However, one year after the purchase of the plant, Mountain States sold the plant to Nacogdoches Oil and Gas Inc. Neptune sued Mountain States and Nacogdoches in Shiprock District Court, which said it did not have jurisdiction in the case. Neptune appealed to the Navajo Nation Supreme Court. In an important decision, Chief Justice Herb Yazzie ruled that the Court did indeed have jurisdiction in the case and remanded the matter to the Shiprock District Court. Despite multiple requests, Diné CARE was not able to obtain records of the case once it was remanded to the District Court. See *Neptune Leasing, Inc*. v. *Mountain States* (No. SC-CV-24-10) and section 6d of this report.

Nacogdoches Oil and Gas Inc. acquired title and operating rights to all of Mountain States' assets in the DBK field in 2008, just before Apollo acquired Mountain States. Nacogdoches is a small Texas-based company. In 2014, the company operated 103 oil and gas wells in the Southwest, 51 of which were located on the Navajo Reservation. The company reported that while only half of its infrastructure was located on the Reservation, 91% of its total production and revenue came from its Navajo operations.[xxiii]

NASCO is a company in the business of locating, acquiring, and operating helium fields in the United States. As of 2021, its estimated net worth is $121.5 million.[xxiv] NASCO began investing in the DBK field in 2015, and its share in the field has grown from approximately 20-80% between 2015-2021.[xxv] NASCO is based in Hamburg, Germany, and is especially active in the United States. By some estimates, NASCO is the largest helium producer in the United States. Notably, NASCO is a joint partner in other helium ventures on and near Diné lands in the Hogback area (San Juan County, New Mexico) and Boundary Butte area (San Juan County, Utah).[xxvi] February 2020, NASCO completed an $83 million securitization transaction to refinance its debt associated with the DBK Helium Project, effectively raising $83 million in investor-grade financing against its assets.[xxvii] The Deputy Chairman of NASCO, the person responsible for the company's operations in the United States, is David Burns.

Capitol Operating Group, LLC assumed control over operations in the DBK field in 2016, as per the terms of a Joint Operating Agreement between Capitol, Nacogdoches, and Nordic 2. Capitol is owned by NASCO and its president is David Burns. Capitol has contracted its affiliated, DB(K) Helium LLC to operate an ACMS helium processing plant that was brought online in 2019. Capitol also operates the Boundary Butte Project in San Juan County, Utah, which it took over from Nacogdoches. Capitol is based in Lafayette, Louisiana.

DB(K) Helium, LLC is retained by Capitol Operating Group to operate the AMCS helium processing plant in the DBK field, as per the terms of a 2019 Master Services Agreement. DB(K) and Capitol are affiliate entities with identical ownership structures – effectively the same company with a different name.[xxviii]

Nordic Oil USA 4 LLC (Nordic 4) and **Nordic Oil USA 2 LLLP (Nordic 2)** together own the leasing and operating rights in the DBK field. They began acquiring these interests in 2016. Nordic 4 and Nordic 2 are both owned by NASCO.

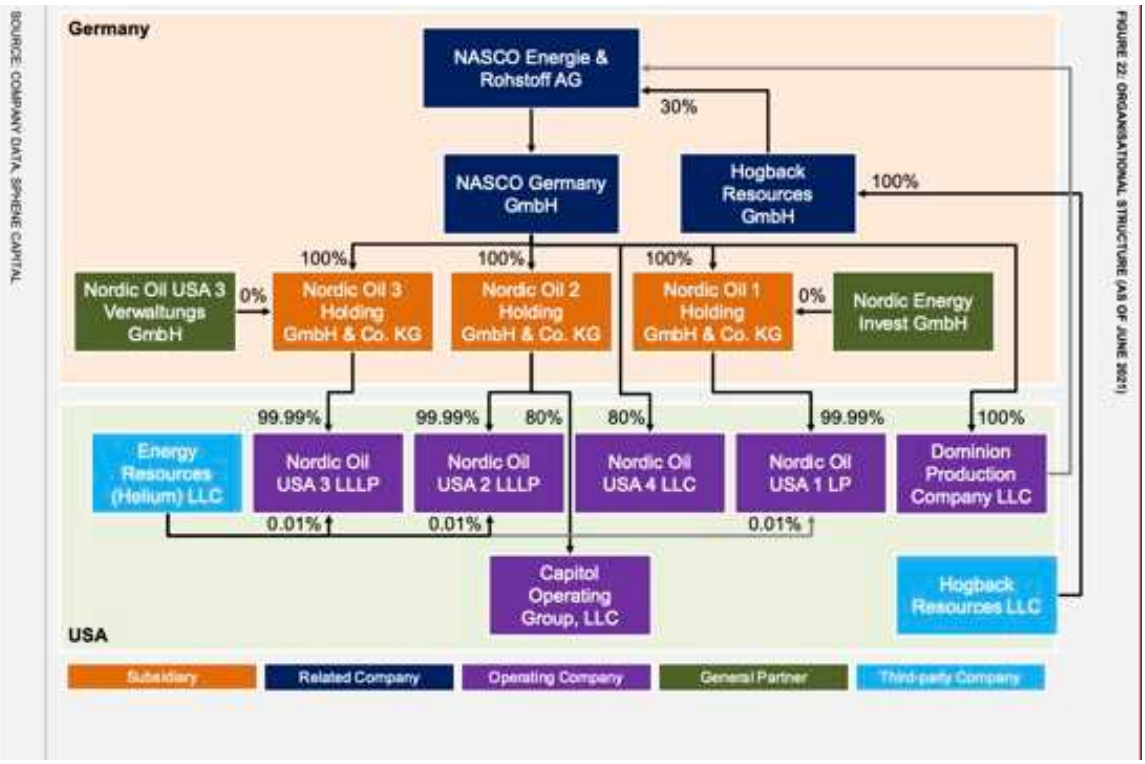

Figure 1 – NASCO's organizational structure as of 2021. Image from Hasler, Sphene Capital, 2021.

4. HELIUM IN THE DBK FIELD

A) HELIUM POTENTIAL AND HISTORY

Geologists and oil companies recognized the helium potential of the DBK field early in the field's development. Helium is generally considered to be worth extracting if it is present in natural gas in quantities of 0.3% or greater. Most oil and gas fields only contain minuscule traces of helium, at approximately 0.05%.[xxix] By contrast, initial tests of the gas produced from several wells in the DBK field revealed exceptionally high concentrations of helium, averaging 4.2% in the igneous sill (a layer of rock that forms between two preexisting rock layers) that produces oil, to 4.8%-5.6% in a sandstone formation 500 feet beneath the sill.[xxx] In 2019, the estimated average helium concentration in producing wells in the DBK field was 4.9%, a very high concentration.[xxxi]

There was not a viable commercial market for helium in the late 1960s when Kerr-McGee, Humble, and other companies took note of the high concentrations of the gas in the DBK field. Kerr-McGee completed two wells in the helium-bearing sandstone in 1967 (Navajo C2 and B2), but temporarily shut them in.[xxxii] Today, Capitol Operating Group extracts helium from these wells.

Helium production from the DBK field did not begin until 2003, under Mountain States Petroleum, a company that acquired title and operating rights to all of Kerr-McGee's leases in 1994. When it entered the helium market, Mountain States shipped natural gas through a pipeline to Newpoint Gas Services' helium processing plant near Shiprock.[xxxiii]

Nacogdoches Oil and Gas Inc and then Capitol Operating Group took over Mountain States' helium operations in the DBK field between 2008-2016 (see Section 4b-c and Appendix I). Today, Capitol operates a total of eight helium wells in the DBK field. These eight wells were deepened in 2017 to extract a total of 400,000 MCF (one thousand cubic feet) of helium per day. Capitol Operating Group contracted a local company, Drake Drilling Services, to help rework the wells.[xxxiv][xxxv]

B) NASCO HELIUM PROCESSING FACILITIES DBK HELIUM PROJECT

Oil, gas, and helium extraction in the DBK field today fall under one name: "NASCO Helium Processing Facilities DBK Helium Project" - or the "DBK Helium Project" for short. The DBK Helium Project has a complex corporate structure, with many small and larger corporate actors operating in tandem through a Joint Operating Agreement, a Master Services Agreement, and several leasing agreements. The land comprising the DBK Helium Project is calculated at 8,690 acres.

Controlling Shareholder: NASCO is the controlling shareholder in the DBK Helium Project. Specifically, NASCO controls 80% of Capitol Operating Group, LLC, the company operating the DBK field, and holds 60% of the leases.[xxxvi]

Working Interest: Nordic 4 and Nordic 2 own own 25% and 75% of the *working interest* in the DBK Helium Project, respectively. Working interest is a form of investment that includes all the costs of production.

Operating rights: Capitol Operating Group, LLC, has operating rights in the DBK field. Capitol is owned by NASCO and controlled by NASCO and Nordic 2.

C) JOINT OPERATING AGREEMENT

On September 30, 2016, Nordic 2 executed a Joint Operating Agreement (JOA) with Capitol Operating Group LLC and Nacogdoches Oil and Gas Inc. The JOA authorized Capitol Operating Group to have total operating control over the DBK field, including operation of the wells and future drilling and exploration. In 2019, Nordic 4 purchased Nacogdoches' 25% stake in the DBK field. Nordic 2 and Nordic 4 now owned all title and operating rights.

David Burns

Burns is the CEO of the entire DBK Helium David Project and a central figure in all the companies involved in the project. Burns' companies are based in Arizona, Louisiana, Utah, and Germany.[1] He is the Deputy Chairman of NASCO, the controlling shareholder of the entire DBK Helium Project. Burns is also the Manager of Nordic 4 and the CEO of Nordic 2, the two companies that own full working interest in the DBK Helium Project. He is the Manager and Director of Capitol Operating Group, the company who operates the field, and CEO of DB(K) Helium, member of Capitol and operator of the field's AMCS Plant. Burns is also the founder of Dominion Production Company, LLC.[1]

In 2019, Nordic 2 and Nordic 4 brought a new AMCS helium processing plant online. AMCS Corporation specializes in providing equipment to the oil and gas. An AMCS plant is a facility made from AMCS equipment and processes. Capitol contracted DB(K) Helium LLC to operate the plant. DB(K) Helium LLC leases some of the equipment from Shiprock Helium LP, who also installed the plant. Under direction of NASCO, Nordic 2 and Nordic 4 began planning the plant in 2016.[xxxvii]

Nordic 2 leases 18 helium trailers from Specialty Trailor Leasing, Inc and P-Leasing, Inc. Power for the AMCS Plant is provided by the Navajo Tribal Utility Authority.

D) HELIUM PROCESSING

There are two helium processing plants in the DBK field, where helium is removed from the natural gas stream, purified, compressed, and prepared for shipment and sale:

AMCS Helium Extraction Plant: Operated by DB(K) Helium, LLC, a subsidiary of Capitol Operating Group. In January 2019, Nordic 2 and Nordic 4 brought this plant online. As of May 2019, DB(K) is responsible for operating the plant as per the terms of a Master Services Agreement between Capitol and DB(K), whereby DB(K) is retained by Capitol to operate the plant, remove helium from the natural gas stream, and purify the helium to 98.85% purity.[xxxviii] The plant uses cryogenic technology designed by AMCS corporation and allows the DBK Helium Project to more than double its production from the field. DB(K) leases the AMCS Plant equipment from Shiprock Helium, LP, an affiliate of Nacogdoches Oil and Gas Inc. based in Texas.[xxxix] There were several malfunctions with the plant when DB(K) brought it online in 2019, which required DB(K) to invest an additional $1 million in repairs.[xl]

Before the natural gas extracted from helium wells in the DBK field is fed into the AMCS plant, it passes through particulate matter removal equipment to get rid of large impurities. Then, it enters the Plant where the first step is to pass through a Pressure Swing Absorption system that removes carbon dioxide from the gas. Then, the gas is cooled using nitrogen. Next, the nitrogen

is removed. Finally, the remaining gas passes through a Temperature Swing Absorption system to remove hydrocarbons. What is left is purified helium, which is compressed into helium trailers. These helium trailers are delivered to Praxair, who purchases the helium.

IACX Energy Plant: Owned and operated separately from the entities that run the DBK Helium Project under the JOA. It is not used when the AMCS Plant is in operation, but additional capacity from the plant can be procured as backup by DB(K) when needed. Like AMCS, IACX is a corporation that provides oil, gas, and helium processing equipment to the private sector. According to IACX's website, it has installed two Helium Recovery Units at the DBK field.[xli] Very little information is publicly available about this plant. It is adjacent to the newer AMCS Plant.

E) PURCHASE AGREEMENTS

Nordic 2 entered into an agreement with Praxair Inc. in 2016. Praxair merged with and became a subsidiary of British multinational chemical company Linde in 2020. Nordic's agreement with Praxair/Linde will remain in effect until 2031, after which it can be renewed for one-year terms.

The agreement lays out minimum and maximum monthly purchase agreements of helium from the DBK field. Full details of the purchase agreement are not publicly available. There are inconsistencies in mentions of the purchase agreement between a 2019 technical due diligence report filled with the SEC by Nordic 2 and a 2021valuation report prepared for NASCO.[xlii] According to the 2021 valuation report, NASCO has an obligation to supply a minimum monthly production volume of 5 million cubic feet of helium to Linde.

The Navajo Nation collects a royalty of 16.67% on the value of minerals produced from the DBK field (see Appendix VII, Lease Assignments).

F) JURISDICTION

DBK Helium Project operations occur on Navajo Nation Tribal Trust land. Both the surface and subsurface land (mineral estate) are in trust. As detailed in Appendix I, VI, and VII, the five leases that comprise the DBK Helium Project were granted by the Chairman of the Navajo Nation Council in the mid 1960s and are currently administered by the Navajo Nation Minerals Department (Minerals).

As per numerous conversations with tribal, state, and federal officials Diné CARE has determined that the following agencies have jurisdiction over operations in the DBK field:

Navajo Nation Division of Natural Resources

Departments within NNDNR (Water, Resource Enforcement, Land, Parks, Historic Preservation, Forestry, Fish & Wildlife, Abandoned Mine Lands, Agriculture, and Minerals) are responsible for reviewing permits.

- Minerals is responsible for making sure that tribal and federal laws are followed when it comes to mineral development on the Navajo Nation. Minerals has an Oil and Gas Inspection Program through which staff inspect every well operating on the Navajo Nation at least once annually.
- Minerals has the authority to issue a "Notice of Incident of Non-Compliance" but has yet to do so for any facility in the DBK field.[xliii] In a conversation with Minerals Manager Rowena Cheromiah on August 9th, 2021, Cheromiah informed the author that Minerals does not have enforcement authority in the event of a violation.

- If an operator fails to come into compliance after a notice is issued, Minerals will seek federal support for enforcement from an agency within the Department of the Interior – in this case from the Bureau of Land Management Farmington Field Office.
- Minerals administers the leases, updates to lease terms, and royalty payments.

Navajo Nation Environmental Protection Agency

NNEPA is charged with protecting human health, welfare, and the environment of the Navajo Nation. NNEPA's Air Toxics Department hosts the Air Quality Control Program (AQCP), which operates with funding from U.S. EPA Region 9.

- NNEPA AQCP has a responsibility to conduct environmental education and outreach in English and Navajo. Staff from the program have previously held an information session at Red Valley Chapter regarding activities in the DBK field and could do so again.
- NNEPA AQCP oversees the Navajo Nation's implementation of the Clean Air Act.
- NNEPA is in the process of finalizing new regulations for "minor sources" of air pollution. A source is considered a "minor source" if it emits above a certain threshold of pollutants (see Figure 2) but below the threshold for what the Clean Air Act defines as a major source. Once this rule is approved by the U.S. EPA Administrator, it will give NNEPA the authority to require that existing minor sources obtain a registration permit. New sources will be required to apply for a preconstruction and operating permit.[xliv]
- Until NNEPA's minor source rule is in place, the AQCP likely does not have jurisdiction to require permits or registrations from operators in the DBK field, but it is well within the scope of the agency's mission to assist communities by providing education and to respond to concerns regarding poor air quality.

Minor Tribal New Source Review Rule Thresholds (came into effect in 2011as part of U.S. EPA's Federal Implementation Plan for Indian Country, 40 CFR 49)[xlv]

Regulated NSR Pollutant	For Nonattainment Areas (tpy)	For Attainment Areas (tpy)
Carbon monoxide (CO)	5	10
Oxides of nitrogen (NO_x)	5	10
Sulfur dioxide (SO2)	5	10
Volatile organic compounds (VOC)	2	5
PM	5	10
PM-10	1	5
PM-2.5	0.6	3
Lead	0.1	0.1
Fluorides	NA	1
Sulfuric acid mist	NA	2
Hydrogen sulfide (H_2S)	NA	2
Total reduced sulfur (including H_2S)	NA	2
Reduced sulfur compounds (including H_2S)	NA	2
Municipal waste combustor emissions	NA	2
Municipal solid waste landfills emissions	NA	10

Figure 2 - Minor Tribal New Source Review Rule Thresholds, U.S. EPA.[xlvi]

U.S. EPA Region 9

- Until NNEPA finalizes its minor source rule, U.S. EPA Region 9 will continue to administer the Clean Air Act's Tribal New Source Review rule. However, as per emissions estimates that U.S. EPA received from DBK operators, facilities in the DBK field emit well under the TNSR threshold.[xlvii] Because they do not currently count as "minor sources", they are not required to register with U.S. EPA. These sources of pollution effectively fall through the cracks.
- U.S. EPA Region 9 may have jurisdiction to require DBK operators to submit a "Spill Prevention, Countermeasure, and Control Plan" for its facilities, should it be determined that these facilities can reasonably be expected to discharge oil into navigable waters of the United States. Following multiple discharge incidents observed by Diné CARE (see Section 4b), U.S. EPA Region 9 is currently assessing whether it has jurisdiction in this matter.

Arizona Oil and Gas Conservation Commission (AZOGCC)

- AZOGCC does not have permitting authority over wells in the DBK field.
- AZOGCC does however maintain a map of current and historic wells in Arizona, including wells in the DBK field, which can be accessed on the AZOGCC website. The map links to historic well files that were previously maintained and digitized by the Arizona Geological Survey. The Arizona Geological Survey was housed under AZOGCC prior to 2016. Well files for DBK facilities available through this tool have not been updated since 2016. Updated files should be housed with the Navajo Nation Minerals Department.
- Production data for wells operating in Arizona can be requested from AZOGCC.

This summary may not be comprehensive of all entities that have regulatory or enforcement authority regarding oil, gas, and helium operations in the DBK field, and may not comprehensively list the existing or potential powers of each agency. Because jurisdiction over extraction in the DBK field is split across multiple tribal and federal agencies, and because the documentary record regarding extraction also appears to be scattered across these agencies and/or missing in some cases, it has been extremely challenging for Diné CARE and local community members to ascertain exactly who is responsible for ensuring that extraction in this area meets all health, safety, and environmental standards. See Sections 6 and 7 for further discussion.

5. COMMUNITY CONCERNS

The Red Valley community has had concerns about operations in the DBK field for decades. Community mobilization has flashed up in two moments – 1978 and 2017-present – when technological innovations brought increased traffic and impacts to the area.

A) SECONDARY RECOVERY PROGRAM: 1978

While early development in the DBK field brought significant revenue to the Navajo Nation, residents saw little benefit. In 1978, residents of Red Valley Chapter began to speak out about the negative impacts of oil and gas operations. This coincided with Kerr-McGee's secondary recovery program, which brought increased truck traffic and drilling operations into the Red Valley community.[xlviii]

Six Red Valley families whose water, livestock, and grazing areas were directly affected by the drilling began meeting in one another's homes to discuss their concerns. Soon, these families brought their concerns to the Red Valley Chapter. An estimated 25 families were directly affected by the drilling activities, while others were affected simply by virtue of living within the Red Valley community.

On May 9th, 1978, Red Valley Chapter approved a list of demands to be presented to Kerr-McGee, who was at the time the most active operator in the DBK field. The demands included:

- Kerr-McGee must notify Chapter residents of a "dry hole" from which oil cannot be produced, but which could produce domestic water for local use. Kerr-McGee should work with residents to complete this well with pumping equipment.
- Kerr-McGee must work with residents and relevant agencies to provide running water, electricity, and natural gas to residents who live within a reasonable distance from the DBK field.
- Kerr-McGee must quickly settle any valid claims presented to the leases, which will be screened by a committee of three local residents.
- Kerr-McGee must exercise every precaution to avoid causing environmental contamination.
- Kerr-McGee must assist in improving existing roads to oil wells and residences in the oil field area and must fence in all producing wells.
- Kerr-McGee must restore a spring that was damaged by a bulldozer (located near Frank Bluehouse's residence).
- Prior to beginning any new drilling operations, Kerr-McGee must obtain the consent of families who have grazing rights in the lease area.
- Kerr-McGee must agree to allow damage claims from oil and gas development to be screened by a 3-person committee appointed by Red Valley Chapter.
- In consultation with the families who have grazing rights in the area, Kerr-McGee must install cattle guards and culverts wherever needed. Kerr-McGee will incur the costs of installation.
- Kerr-McGee shall give employment preference to qualified applicants from families who have grazing permits within the lease area, without consideration of sex.

In August 1978, the *Navajo Times* covered the controversial development in the DBK field. At that time, Kerr-McGee had yet to respond to the demands of the Red Valley Chapter.[xlix] It is unclear

from the record whether the company ever did. Residents interviewed by the *Navajo Times* shared the following comments regarding extraction in the DBK field:

"*There used to be good livestock grazing up there, but that has changed. Mary Nakai had a good healthy herd of sheep before, but now the sheep don't look very good. I think it's due to the oil drilling and all the pollution.*"
– James Taylor, community grazing board representative

"*The smell of oil gives us all headaches and always makes me feel sick in the stomach. Our animals get sick from the water pollution and the chemicals the companies leave around. And we never get any money in compensation for the damage they cause. I just wish they wouldn't drill anymore*"
– Alice Lee, resident with grazing rights in lease area

"*I don't know how the people up there can stand it. The smell is so bad, especially in the summer, that it makes you sick*."
– Ella Taylor, Red Valley Chapter Secretary

B) HELIUM: 2017

Red Valley residents became concerned about increased activity in the DBK field around 2017, shortly after a Joint Operating Agreement was signed between Nordic 2, Nacogdoches, and Capitol Operating Group, giving Capitol Operating Group full control of operations in the DBK field as part of the DBK Helium Project. The field would have begun to see increased activity not long after the signing of the Joint Operating Agreement.

In March 2018, Red Valley Chapter passed a resolution (24 in favor, 0 against, 2 abstained), in which it requested that several federal and Navajo Nation agencies "formally investigate oil and gas operations at the Dineh Bi Keyah Oil Field in Red Valley, AZ and to remediate health and safety concerns and complaints brought forth by residents and community members of the Red Valley Chapter". The resolution, along with a supportive resolution from Tsaile/Wheatfields, is attached in Appendix IV. In summary, Red Valley Chapter expressed the following concerns:

- Residents are observing an "apparent rapid apparent increase in helium production and are hearing reports that Navajo Nation is entering into new contracts for helium extraction in the area, about which residents and chapter officials have been given no information".
- Residents of the Red Valley Chapter "that have homesite and grazing permits near the DBK Oil Field and within the Navajo Nation Forestlands, and Chuska Mountain Range, have complaints about the strong, foul smelling fumes and emissions from the DBK oil field, including loud noises, and bright lights on during the night".
- "Residents and community members have complaints about the heavy traffic that oil and gas operators of the DBK field have brought to community roads in the mountains and in the valley. Mountain dirt roads are showing signs of erosion, and oil/gas truck traffic restricts community use and access". The resolution goes on to note that some roads have been blocked off by construction materials, restricting community access to homesites and traditional herbs and medicines. Lastly, the resolution indicates that oil and gas contractors have begun using the BIA-

maintained school bus road instead of their own access roads, which puts the community at risk.

- "In 2005, there was a large oil spill that came from an oil well in the DBK field. Residents do not feel the cleanup and remediation was properly addressed."
- Powerlines have been "knocked down and electrocuted livestock and wildlife".
- Not enough has been done by the Navajo Nation, its departments, and BIA to monitor the safety of operations in the DBK field. Residents note concerns about air quality.
- "Residents that have homesites and grazing permits near the oil field, have noticed the increase of headaches at their summer sheep composites in the mountains."[1]

As is evident from these concerns articulated by the Red Valley Community in 1978 and again in 2018, there are longstanding issues with DBK operations that have gone unaddressed by operators and regulators.

6. DINÉ CARE FINDINGS

Diné CARE hosted a table at the 2017 Navajo Nation Fair in Window Rock. It was then that staff were first approached by community members from Red Valley who were concerned about the potential impacts from increased oil and gas extraction happening in the Chuska Mountains. Residents noticed increased truck traffic, strong foul odors, and traces of oil residue in surface water. Diné CARE began conducting research and field visits in the area in the Fall of 2017 to gather information for the community.

In January 2018, we were accompanied for the first time by certified thermographers from Earthworks. Earthworks is a national non-profit organization dedicated to protecting communities and the environment from the adverse impacts of mineral and energy development while promoting sustainable solutions. Since 2018, Diné CARE has collaborated with Earthworks to take Optical Gas Imaging (OGI) videos on five separate occasions. On two occasions, our team took air samples that were analyzed by an independent laboratory (ALS Environmental). Diné CARE staff have visited the DBK field on numerous other occasions since 2017.

Diné CARE also researched the history of the DBK field and has tried to obtain information from relevant Navajo Nation, state, and federal agencies. In 2021, we hired a research consultant to help compile information about the history and management of the DBK field. As detailed below, our organization has encountered significant barriers in obtaining information about the regulation of the DBK field.

A) AIR QUALITY CONCERNS

AIR SAMPLING: METHODS

Diné CARE and Earthworks conducted air sampling in October 2019 and May 2021 at oil and gas well sites in the DBK field. We chose the air sampling locations based on strong odors we smelled and on OGI work that revealed heavy emissions (pollution) coming from specific well sites. We then deployed Summa canisters to capture air samples near the emission source. The 2019 samples were "grab" samples that lasted several seconds at each of three selected well sites (Navajo 14, 19, and 25). In 2021, we repeated the grab sampling at the same three sites, plus three other ones. A longer-term air sample (lasting several hours) was also taken near a summer residence and sheep camp.

A certified laboratory (ALS Environmental) provided the canisters and analyzed the results using the TO-3 test for methane and TO-15 test for volatile organic compounds (VOCs) developed by U.S. EPA, as well as ASTM International standard test D 5504-12 for sulfur compounds in oil and gas.

The pollution sources at all the well sites where grab samples were taken appeared to be ground-level surface casing vents, which are designed to release gas as it flows from underground to the surface. At the time of our visits, Diné CARE and Earthworks staff detected strong odors and reported health effects such as headaches and eye irritation. We detailed those symptoms in complaints submitted to NNEPA.

RESULTS: POTENTIAL HEALTH EMERGENCY

The air sampling results were dramatic and sobering, with clear risks to health for anyone exposed to pollution at or near the sites. The concentrations of all the VOCs and sulfur compounds detected far exceeded the Effects Screening Levels (ESL), or levels likely to trigger health symptoms.[li]

The actual health impacts on nearby residents, workers, and anyone who visits these sites would depend on factors such as proximity and wind direction. However, the ESLs were exceeded by tens, hundreds, thousands, and even tens of thousands of times, making this an extreme situation by any measure.

All the chemicals detected have scientifically established health effects, many of which are related to inhalation, i.e., exposure through air. There was remarkable consistency in the compounds detected across nearly all the sites where sampling occurred, as well as in the concentration levels, indicating that similar products were being used and produced at all sites that resulted in the same mix of pollutants.

The data table in Appendix II details sampling results for the three sites where repeat air sampling occurred in 2019 and 2021. Most notably:

- Hydrogen sulfide (H_2S) levels were in line with what the U.S. Occupational Safety and Health Administration (OSHA) considers dangerous for acute (short-term) exposure, such as what workers, inspectors, or anyone visiting the site could experience.[lii] At the Navajo 19 site, the concentration of H_2S (170 parts per million [ppm] in 2019 and 180 ppm in 2021) was high enough to cause a loss of sense of smell and was close to the level (200 ppm) that would cause eye and respiratory irritation; with prolonged exposure, this concentration of H_2S could cause fluid buildup in the lungs.
- At the Navajo 14 and 25 sites in 2019, the H_2S concentrations (440 and 410 ppm respectively) were just under the level (500 ppm) for acute exposure that OSHA has determined can cause "staggering, collapse in 5 minutes. Serious damage to the eyes in 30 minutes. Death after 30-60 minutes." Even though the H_2S concentrations were somewhat lower for these and other sites at the time of sampling in 2021, they remained many times higher than the levels that OSHA considers hazardous to health.
- Some of the other sulfur compounds detected, including thiophene and mercaptans, are scientifically established to be associated with nausea, vomiting, headache, and eye, nose, throat, and skin irritation.[liii]
- The sampling at all three sites detected benzene, a known carcinogen, and ethylbenzene, a possible carcinogen. Several other VOCs were detected that are scientifically established to be associated with eye, nose, and throat irritation, dizziness, irregular heartbeat, and changes to the kidney and liver.
- Some of the pollution releases documented by Diné CARE and Earthworks were many times higher than what the U.S. EPA considers to be a "leak" that requires repair (any release of 500pm by volume – ppmV – or more). For example, the leak at the Navajo 25 site had a methane concentration more than 100 times that level in 2019 (51,000 ppmV), while the leaks at the Navajo 19 and 14 sites were more than 300 times as high (161,000 ppmV) in 2019 and 200-300 times as high (150,000 and 120,000 ppm respectively) in 2021. These leaks could have significant impact on air quality and the climate. [liv]

It is important to note that of the three wells that Diné CARE and Earthworks have sampled, only one has been in production. According to production reports available from the AZOGCC, Navajo 19 was shut in during the calendar year 2015-2016, and Navajo 25 was shut in during the

calendar year 2014-2015. For its part, Navajo 14, while active, produces very small and declining quantities of oil. According to production data provided by the AZOGCC, in 2017, Navajo 14 produced 648 barrels; in 2018 it produced 410 barrels; in 2019 in produced 503 barrels; and in 2020 it only produced 96 barrels.

The emissions coming from wells 14, 19, and 25 pose a grave threat to public health. It is particularly troubling that these emissions are coming from sites that have been shut in or, in the case of Navajo 14, produce very little. More can and should be done to ensure that these wells do not pose a threat to public health and the environment. If Capitol does not intend to produce from 19 and 25, these wells should be plugged and abandoned, with the land properly remediated and reclaimed.

B) APPARENT DISRESPECT FOR THE LAND: SPILLS, GARBAGE, AND ROAD EROSION

During Diné CARE's many visits to the DBK field, we were disappointed to observe that many of the well sites appear to be poorly maintained. Some roads to well sites are in such bad shape that they are inaccessible in a standard 4X4 vehicle. We observed well sites that did not have appropriate signage, and sites where garbage and industrial debris were strewn about (see figure 7).

More worrisome, we observed sites where an oil spill had taken place and had not been remediated.

For example, at a pipe adjacent to the well "Navajo 24", Diné CARE observed large amounts of spilled oil coming from a crudely maintained pipe. We first observed this spillage in 2018 and reported it to NNEPA (see figures 5 and 6). We observed more spillage and further deterioration of the piping in 2021 (see figures 3 and 4).

Figures 3 and 4 – Spilled oil and poorly maintained piping observed in May 2021 at Navajo 24.

Red Valley residents also made Diné CARE aware of a large oil spill that occurred in 2005, which residents feel was not properly remediated.[lv]

The conditions on the ground in the DBK field indicate to Diné CARE that there is irregular maintenance of sites. We infer from these conditions that even if there is an annual inspection of sites by staff with Minerals' Oil and Gas Inspection Program, the issuance of violations and collaboration with federal agencies on enforcement may be lacking.

Figures 5 and 6 - Spilled oil and poorly maintained piping observed in 2018 at Navajo 24.

Figure 7 – Well site where road is completely eroded. Garbage and debris on site covering spilled oil.

C) LACK OF RESPONSE AND TRANSPARENCY FROM RESPONSIBLE AGENCIES

Since 2018, Diné CARE and Earthworks have filed 29 complaints with NNEPA based on troubling OGI and air sampling results from the DBK field. Diné CARE filed complaints in March and June of 2018, in November 2019, and in August 2021.

In 2018, Red Valley Chapter and Tsaile/Wheatfields Chapter requested that agencies within the Navajo Nation and the Department of the Interior formally investigate residents' complaints about operations in the DBK field and develop plans to address health and safety concerns, including air quality and noxious odors, liquid waste discharges, heavy traffic and hazards, loud noises, and bright lights. To our knowledge, no such investigations have occurred, and no plans have been put into place to address the concerns of the community.

Diné CARE has made numerous attempts to obtain information about extraction in the DBK field from NNEPA and Minerals on behalf of the community, to little avail. It has become clear to Diné CARE that greater transparency, accountability, and enforcement capacity is needed to ensure that operations in the DBK field are being conducted safely and with clear communication to impacted communities.

NNEPA RESPONSE

In May 2018, NNEPA issued a report in response to community complaints of strong noxious odors, received by Minerals, and air quality complaints filed with NNEPA in March of 2018 by Diné CARE and Earthworks. The report did not lead to any corrective action because NNEPA found that it did not have jurisdiction over sources of pollution in the DBK field, while Minerals seemed to dismiss the complaints entirely.

NNEPA's report stated that staff from Minerals had visited the helium processing facility at the DBK field with a hand-held H_2S monitor in February 2018 but claimed not to detect any H_2S. While Minerals visited the helium processing facility, there is no mention that staff visited any of the well sites for which complaints were made.

NNEPA stated in its report that it did not have the monitoring capacity to detect H_2S. In conversations with NNEPA in subsequent years, Diné CARE staff have learned that NNEPA's Air Quality Control Program (AQCP) has since acquired a stationary H_2S monitor but does not, as of 2021, have the capacity to deploy it in Red Valley.

Minerals requested that NNEPA's AQCP conduct H_2S monitoring in the DBK field in February 2018, in response to community complaints as well as a January 2018 *Navajo Times* story that featured findings from Diné CARE and Earthworks' fieldwork. Because NNEPA did not have a monitor, it requested data from the BLM Farmington Field Office. Minerals had informed NNEPA that a former operator in the DBK field reported emissions to BLM. BLM Geologist Joe Hewitt provided the most recent data available to NNEPA, which was from 1996. This data was deemed outdated, and more recent data was not available. In August 2021, the author contacted BLM Farmington Field Office and learned that Joe Hewitt had retired. The author spoke with a colleague of Hewitt's, Chris Wenman, who did not know of any available data. Wenman also asked Hewitt about the matter and Hewitt did not have any updated information to provide.

NNEPA requested information from U.S. EPA Region 9 about emissions estimates for facilities in the DBK field. U.S. EPA provided the registration forms that Nacogdoches, a previous operator, had submitted for its 31 wells and the processing plant. Later, Capitol Operating Group provided its emissions estimates to U.S. EPA Region 9, and NNEPA reviewed these. According to Capitol's emissions estimates, the wells and the helium processing plant emitted quantities of pollutants that were below the threshold of a "minor source" under the Clean Air Act. This meant that the sources did not need to be registered with U.S. EPA, unless they are modified in the future such that they will emit at or above the threshold of a minor source. When NNEPA implements its anticipated minor source rule, there may be mechanisms for it to require a registration of some facilities at the DBK field if they are found to emit within the minor source threshold.

Notably, no on-the-ground monitoring was conducted by NNEPA, Minerals, or BLM to determine whether Capitol's emissions estimates were accurate.

In November 2019, Diné CARE filed a third set of complaints with NNEPA based on fieldwork conducted in October 2019. Diné CARE received no response from NNEPA regarding these complaints.

In August 2021, Diné CARE again filed complaints with NNEPA and this time copied Minerals and U.S. EPA Region 9. In this set of complaints, Diné CARE included the results of air sampling that showed alarming levels of H_2S. At the time of writing (September 2021), Diné CARE has yet to receive a response from NNEPA.

Requests Pursuant to the Navajo Nation Privacy and Access to Information Act
In 2019, Diné CARE sought legal assistance in soliciting documentation about the DBK field from NNEPA. Attorney Julia Guarino of Western Environmental Law Center sent letters in May 2019 on behalf of Diné CARE to NNEPA requesting records pursuant to the Navajo Nation Privacy and Access to Information Act (see Appendix IX). From NNEPA, Guarino requested:

- "Water Permits for operation in the DBK field;
- Inspection Reports of the DBK wells and the helium processing site in Red Valley;
- Emissions reports from wells in the DBK field and helium processing site in Red Valley;
- Copies of BLM and Capitol Operating Groups reports on quarterly air monitoring data and H2S monitoring data, which Navajo EPA's Air Quality Follow-up Report recommended that Navajo Minerals Department request and provide copies to Navajo EPA."

On August 15, 2019, Guarino and Diné CARE received a response from NNEPA. Regarding water permits, NNEPA stated that it did not have these in its possession and suggested that Diné CARE contact the Department of Water Resources. As explained below, Diné CARE did contact Water Resources, and the agency responded saying it did not have water permits in its possession. Regarding documents pertaining to air quality and emissions, NNEPA stated that it did not have these in its possession and recommended that Diné CARE contact Minerals.

The response from NNEPA also stated:

> "In your letter, you also asked two questions: (1) Are the wells in the DBK field considered minor source air emissions? and (2) Is the helium processing site considered minor source, as well? The answer to both of these questions is yes".

This response directly contradicts NNEPA's 2018 report, in which it states that facilities in the DBK field do not meet the emissions threshold to count as minor sources. It is unclear why this

determination changed. Was new, more accurate emissions data made available to NNEPA? Where is this data? NNEPA insists that it does not have it, and, as explained below, Minerals has yet to respond to requests for information.

NAVAJO NATION MINERALS DEPARTMENT RESPONSE:

Diné CARE and the Red Valley community have had difficulty obtaining documentation about DBK operations from Minerals.

Minerals' Memo to Delegate Crotty

In September 2017, the Honorable Council Delegate Amber Crotty requested information from Minerals regarding increased oil and gas activity in the DBK field. Delegate Crotty issued this request in response to concerns from Red Valley Chapter.

On March 6, 2018, Steven L. Prince, Principal Petroleum Engineer at Minerals, provided a memo in response to Delegate Crotty's request (see Appendix VIII). The overall tone and content of the memo, while cordial, did not seem to take seriously the concerns of the community, nor did it indicate a willingness on the part of Minerals to assist the community in seeking answers to its outstanding questions.

Regarding the community's concern that there may be increased oil and gas activity in the DBK field, the memo notes that oil and gas production is in fact declining in the area. While he mentions in passing that helium extraction has recently increased, he fails to note that helium is extracted from natural gas. The impacts that community members were noticing – like a rise in truck traffic and noxious odors – may well have been due to operators reworking oil wells to extract helium-bearing gas.

Residents were concerned about the non-consent of grazing permittees. The memo indicated that the leases in the DBK field were issued in the 1960s, and so new activity did not require the consent of grazing permittees. While this may be the case, it is also true that the Red Valley community raised concerns in 1978 regarding lack of consultation with grazing permittees, among several other complaints.[lvi] It is unclear whether there was ever meaningful consultation with the Red Valley community regarding the DBK leases. Prince offered to provide Delegate Crotty with a copy of the leases.

The memo dismissed residents' concerns of increased traffic by placing the blame on residents themselves. The memo stated than an access road to oil sites had been built in the 1960s by a former DBK operator, presumably Kerr-McGee, and that over time many residents had chosen to relocate along the road and to use it as if it were intended for local traffic.

Residents' concerns about smells and impacts to land and water were also dismissed, rather than investigated. The memo stated that residents were not smelling H_2S or other sulfur or volatile organic compounds, but rather a "scavenger gas" intended to absorb H_2S and transform it into a "benign product". Without citing emissions estimates or measurements, the memo stated that "there is no danger from the H_2S in this area". Regarding impacts to land and water, the memo indicated that any incidents are always addressed by Minerals before they become a problem, and that Prince was not aware of "any impacts to the land/water which have not been addressed and rectified".

The last set of community concerns addressed in the memo had to do with lack of communications with the operator(s) at the DBK field and lack of clarity regarding the ownership of the operations. Regarding communications, Prince wrote that he had recently heard from Red Valley Chapter Vice-President that the operator had donated uniforms to the school sports

teams, so there must be communications between Red Valley officials and the operator. Regarding ownership, Prince enclosed the name of the leaseholder (Nordic) and operator (Capitol) and shared the email and business address for Nordic's president, David Burns. This information is helpful, but as detailed in Section 3 and Section 4B, does not provide a full sense of the ownership structure of the field, nor does it address the sense of confusion among residents.

Memo to Diné CARE

In December of 2018, Robyn Jackson, Climate & Energy Outreach Coordinator with Diné CARE, wrote a letter to Steven Prince at Minerals requesting documentation regarding extraction in the DBK field. Specifically, Jackson sought tribal permits held by operators and lessees, water permits, inspection reports for well sites and the helium processing facility, emissions reports, and quarterly air monitoring data (including H_2S data). Prince responded in March 2019 (see Appendix V).

Except for Water Permits, for which Price recommended that Jackson contact Jason John, Acting Director of the Navajo Nation Department of Water Resources, Prince responded to each request by stating that Minerals did not have any such permits in its possession, nor did it know "of any Navajo Nation entity that maintains such documentation".

In her letter, Jackson had also asked whether the wells in the DBK field are considered minor sources, and whether the helium processing facility is also considered a minor source. To these questions, Prince responded: "It is Minerals' understanding that both the wells in the DBK field and the helium processing site are considered minor sources, but we strongly recommend you seek an official answer to these questions from the U.S. Environmental Protection Agency".

Requests Pursuant to the Navajo Nation Privacy and Access to Information Act

In 2019, Diné CARE sought legal assistance in soliciting documentation about the DBK field from Minerals. Attorney Julia Guarino of Western Environmental Law Center sent letters in May 2019 on behalf of Diné CARE to Minerals requesting records pursuant to the Navajo Nation Privacy and Access to Information Act (see Appendix IX). From Minerals, Guarino requested:

- "Water Permits for operation in the DBK field;
- Inspection Reports of the DBK wells and the helium processing site in Red Valley;
- Emissions reports from wells in the DBK field and helium processing site in Red Valley;
- Copies of BLM and Capitol Operating Groups reports on quarterly air monitoring data and H2S monitoring data, which Navajo EPA's Air Quality Follow-up Report recommended that Navajo Minerals Department request and provide copies to Navajo EPA."
- All original lease or permitting documents as well as any lease modifications, related approvals of infrastructure or right of ways, or other related permits or approvals in the DBK field."

From Jason Johns (Acting Director of the Navajo Nation Department of Water Resources), Guarino additionally requested Water Permits. On August 15, 2019, Water Resources responded to this requested stating: "The Navajo Department of Water Resources does not have any water use permits issued to operators of the Dineh-Bi-Keyah Field".

As of August 2021, neither Diné CARE nor Western Environmental Law Center have received responses from Minerals to these requests.

D) IMPLICATIONS FOR SELF-DETERMINATION

The lack of transparency and documentation regarding operations in the DBK field has potential implications for the self-determination of the Red Valley community and the Navajo Nation more broadly. The confusion around the regulation of the DBK Helium Project, which appears to be present among regulators themselves, makes it difficult for community members to find clear answers to their concerns and to hold operators responsible when pollution or environmental degradation occurs. Furthermore, the lacking documentary record puts the Navajo Nation and local communities in a potentially compromised position if any serious incidents were to occur in the DBK field.

A Navajo Nation Supreme Court Case, in which the Honorable Chief Justice Herb Yazzie presided, provides a cautionary tale. *Neptune Leasing, Inc*. v. *Mountain States* (No. SC-CV-24-10) is a case involving two former operators of a helium processing plant in the DBK field. Details of the case are provided in Appendix VI. In his opinion, Chief Justice Yazzie made several statements that are pertinent beyond the specificities of the case, and that are instructive for understanding the implications of the current situation in the DBK field.

Chief Justice Yazzie found that the absence of a documentary record regarding land dealings would "surely threaten or have some direct effect on the political integrity, the economic security, or the health or welfare of the tribe […]. Navajo land belongs to the people, and management of Navajo land carries a solemn responsibility".

Chief Justice Yazzie goes on to say: "As we say in Diné, *t'óó hoł dah hazkę́ę́ eḩgoóh há k'íhodoodoo̜o̜ł* (one cannot resolve disputes when in a confused state)". While Chief Justice Yazzie is referring here to the transfer of Navajo trust lands without lease records, this lesson could also apply to the confusion that results from among regulators and community members alike about jurisdiction in the DBK field. As in the *Neptune Leasing, Inc*. v. *Mountain States,* the absence of documentation regarding DBK operations obfuscates jurisdictional matters and poses an obstacle to local and national Navajo self-determination.

7. RECOMMENDATIONS

Based on Diné CARE's years of fieldwork, research, and conversations with the Red Valley community, we respectfully make the following recommendations to the Navajo Nation Council, responsible agencies within the Navajo Nation, and to federal agencies. Diné CARE believes these recommendations will support a clearer understanding of the roles, responsibilities, and powers of agencies within the Navajo Nation and the U.S. Government to regulate operations in the DBK field. A clearer understanding of jurisdiction and more open communication with impacted communities will, we hope, lead to a safer and healthier environment in Red Valley.

COMMUNITY ENGAGEMENT

1. ***Community Information Sessions:*** The Red Valley community has expressed that it would like further information about what is going on in the DBK field. Diné CARE recommends that NNEPA and Minerals work with Red Valley Chapter officials to set dates for an information session and/or presentation during a Chapter meeting. As per the needs of the community, multiple information sessions may be required. David Burns plays a central leadership role in all the companies involved in the DBK Helium Project. Inviting him to a local information session could be beneficial.

2. ***Provide Clear Directions for Community Concerns:*** As part of the information that Navajo Nation agencies provide to the Red Valley community, Diné CARE recommends that agencies collaborate and, if appropriate, consult the Navajo Nation Natural Resources Unit for the Department of Justice for any needed clarifications, to provide community members with a clear fact sheet that includes the following information: which agencies or departments residents should contact for specific concerns regarding DBK operations; which laws and regulations apply in what instances; how residents should initiate contact; and contact information for relevant personnel. This information could also be beneficial to Diné communities in other parts of the Navajo Nation who are impacted by resource extraction.

3. ***Community Reinvestment Fund***: For too long, the Red Valley community has borne the impacts of oil and gas extraction in the DBK field without seeing tangible benefits. Diné CARE recommends that the appropriate Committees and Departments within the Navajo Nation collaborate with the Red Valley Chapter to discuss an equitable reinvestment plan. For example, in 2020, the Resources and Development Committee, the Naa'bik'iyati' Committee, and the Navajo Nation Council passed legislation approving the Rattlesnake and Tocito Dome North Oil and Gas Exploration and Development Operating Agreements between the Navajo Nation and Tacitus, LLC, for certain trust lands on the Navajo Nation (San Juan County, New Mexico) (0038-20). The primary commodity sought in this project is helium. Under the terms of the operating agreement, the Navajo Nation will set aside three-quarters of one percent (0.75%) of its royalty payments, generated from the gross proceeds of Tacitus' helium sales, into a "Community Reinvestment Fund" that will be established by the Office of the Controller. A fund management plan is to be governed by the Navajo Nation Resources Development Committee and approved by the Budget and Finances Committee.

4. ***Local Consultation***: Diné CARE understands that helium extraction is being considered or is already underway in many parts of the Navajo Nation. We urge that a meaningful process of local consultation, wherein the local community receives all pertinent information regarding helium extraction and its potential impacts, occur prior to any exploration or development. Exploration and development should only occur with explicit support of the community.

ENVIRONMENTAL REVIEW AND MONITORING

1. ***Real-time Air Monitoring:*** The air sampling done by Diné CARE and Earthworks shows that there could be an urgent threat to public health due to H_2S and other emissions from facilities in the DBK field. Diné CARE recommends that the Navajo Nation Council ensures that NNEPA and Minerals have sufficient staffing capacity, equipment, and expertise to conduct on-the-ground air monitoring in the DBK field on a regular basis. As part of this effort, the Navajo Nation should ensure that NNEPA has the capacity to apply for federal U.S. EPA grants. The results of this monitoring should be readily available to the public. The record shows that in the past, BLM Farmington Field Office has had some role in reviewing and/or archiving air monitoring data from the DBK field. While BLM does not typically do air monitoring, Diné CARE recommends that NNEPA also collaborate with BLM to determine whether BLM can lend capacity to monitoring, inspection, enforcement, and/or analytic efforts.

2. ***Clarify Whether DBK Sites Count as Minor Sources:*** According to a 2018 NNEPA report, both Nacogdoches and Capitol have provided emissions estimates to U.S. EPA, and NNEPA's ACQP have reviewed these estimates. As per these estimates in 2018, the sources did not meet the threshold for a "minor source" and therefore did not require registration. Yet, in a March 2019 letter to Diné CARE from Minerals, petroleum engineer Steven Prince indicated that it was Minerals' understanding that wells and the helium processing facilities in the DBK field *were* minor sources. Moreover, in an August 2019 letter to Diné CARE's attorney Julia Guarino, NNEPA reversed its 2018 opinion and indicated that these facilities were indeed minor sources. Considering NNEPA's upcoming minor source regulation, Diné CARE recommends that NNEPA collaborate with U.S. EPA Region 9 to determine whether, in fact, facilities in the DBK field meet the threshold requirements for minor sources, and whether they need to be registered as such. Given the dangerous emissions levels that Diné CARE and Earthworks found in our air sampling, Diné CARE further recommends that U.S. EPA Region 9 and NNEPA verify operators' self-reporting with a thorough monitoring campaign to assess actual emissions levels of criteria and hazardous air pollutants.

3. ***Methane Regulations:*** Diné CARE recommends that NNEPA consider implementing strong methane regulations for the oil and gas sector.

4. ***Consider the Full Lifecycle of Helium Operations:*** When assessing other proposals for helium extraction on Navajo Nation lands, Diné CARE recommends that the Navajo Nation consider the full lifecycle of helium extraction: including natural gas exploration and extraction, transportation to a helium processing plant, the plant operations themselves, transportation of the helium to market, and eventual remediation and reclamation of abandoned wells. The cumulative social, environmental, and cultural impacts of each phase should be fully analyzed and disclosed to potentially impacted communities.[lvii]

5. ***Make a Jurisdictional Determination Regarding Water Resources in the DBK Field:*** Diné CARE recommends that U.S. EPA Region 9 collaborate with relevant Navajo Nation agencies and to determine whether facilities in the DBK field can be reasonably expected to discharge oil into navigable waters of the United States and as such may require Spill, Countermeasure, and Control plans. This effort may require collaboration with the Red Valley community to identify and locate water resources. Additionally, Diné CARE recommends that these agencies collaborate to provide clarity to the Red Valley community regarding which laws (federal and/or tribal) are in place to protect surface water and groundwater in the DBK field, and which agency oversees saltwater injection.

6. ***Well Abandonment:*** Except for the eight wells producing gas-bearing helium, most wells in the DBK field have been shut-in for years and either produce no oil or do not produce in paying quantities (see Appendix I). With the crisis of orphaned and abandoned wells growing across the country, it has become clear that operators cannot afford to properly plug their infrastructure let alone reclaim the land.[lviii] This poses a major public and environmental burden to the Navajo Nation and the Red Valley community. The Navajo Nation is at risk of losing the ability to hold operators accountable for reclamation costs should further changes in ownership of the DBK field occur. In April 2021, New Mexico State Land Commissioner had to take Dominion Production Company, LLC, another company owned by David Burns, to State Court to compel Dominion to plug and abandon wells on expired leases.[lix] Diné CARE recommends that Minerals review Navajo Nation and federal regulation to determine whether any of these wells are at the point where they should be plugged and abandoned (see for instance 43 CFR § 3162.3-4 and Arizona Administrative Code R12-7-125). If some wells do need to be plugged and abandoned, NNDNR should work with the operator to ensure proper reclamation and remediation of the land.

IMPROVE ACCESS TO INFORMATION:

1. ***Improve and Update Agency Websites:*** In trying to understand DBK operations, Diné CARE found it difficult to access information on the websites of public Navajo Nation agencies like NNEPA and Minerals. In many instances, information and agency contacts were outdated or simply unavailable. For example, it is difficult or impossible to access web versions of current rules and regulations, contact information for current personnel, information about facilities operating on the Navajo Nation, or relevant data about these facilities. Diné CARE recommends that divisions like DNR and NNEPA ensure that they can provide public and timely access to this information.

2. ***Make Monitoring Data Available:*** Emissions data, whether self-reported or collected by NNEPA or another entity, should be made available to the public.

3. ***Improve Response Time:*** Diné CARE has received no response to several complaints and requests for information. In other instances, it has taken several months to receive a response. Diné CARE recommends that the Navajo Nation work to increase capacity within its agencies to ensure a faster response time to community concerns and requests for information.

4. ***Locate Documents Pertaining to DBK Field:*** In a 2019 letter in response to an informal request for information from Diné CARE, Minerals noted that it did not have in its possession any tribal permits held by operators and lessees, water permits, inspection

reports for well sites and the helium processing facility, emissions reports, and quarterly air monitoring data for the DBK field, nor did it know of any agency within the Navajo Nation that had possession of such documents. Shortly thereafter, Minerals failed to respond to a formal request for documentation sent in 2019 pursuant to the Navajo Nation Privacy and Access to Information Act. NNEPA and Water Resources both responded by stating that they had no documents. The absence of a documentary record makes it impossible for communities to understand how extraction in the DBK field is regulated, or to hold operators and regulators accountable for their responsibilities under Navajo Nation and federal law. Diné CARE thus recommends that Minerals and other relevant departments within NNDNR collaborate with NNEPA and with federal agencies if necessary to locate – and make readily available to the public – all permits and inspection data regarding operations in the DBK field. It may be necessary to consult with the Navajo Nation Department of Justice to obtain further clarity on this matter.

CAPACITY

1. ***Funding and Capacity*:** Diné CARE recommends that the Navajo Nation Council ensure that NNEPA programs and departments within NNDNR (such as Minerals) have adequate funding and staffing capacity to carry out duties in an efficient and timely manner; that staff have access to the equipment they need (such as vehicles and monitoring equipment), training, and professional development opportunities to ensure the health and safety of Diné communities.

2. ***Consider Joining WRAP*:** Diné CARE recommends that the Navajo Nation consider joining the Western Regional Air Partnership (WRAP), "a voluntary partnership of states, tribes, federal land managers, local air agencies and the U.S. EPA whose purpose is to understand current and evolving regional air concerns in the West".[lx] Several Tribes in the Southwest are already part of this partnership. Joining may help build capacity at NNEPA AQCP for addressing local and regional air quality issues.

APPENDICES

APPENDIX I – OVERVIEW OF DBK LEASES

A) OVERVIEW OF LEASE STRUCTURE:

There are 5 active leases in the DBK field. Broadly, they have undergone similar changes in ownership since the 1970s. Figure 8 provides an overview.

This information is gleaned from: a review of DBK leases, a review of the purchase agreement between Nordic 2 and Nacogdoches, a review of well files maintained by AZOGCC, and a review of production reports for the DBK field from 2017-2020.

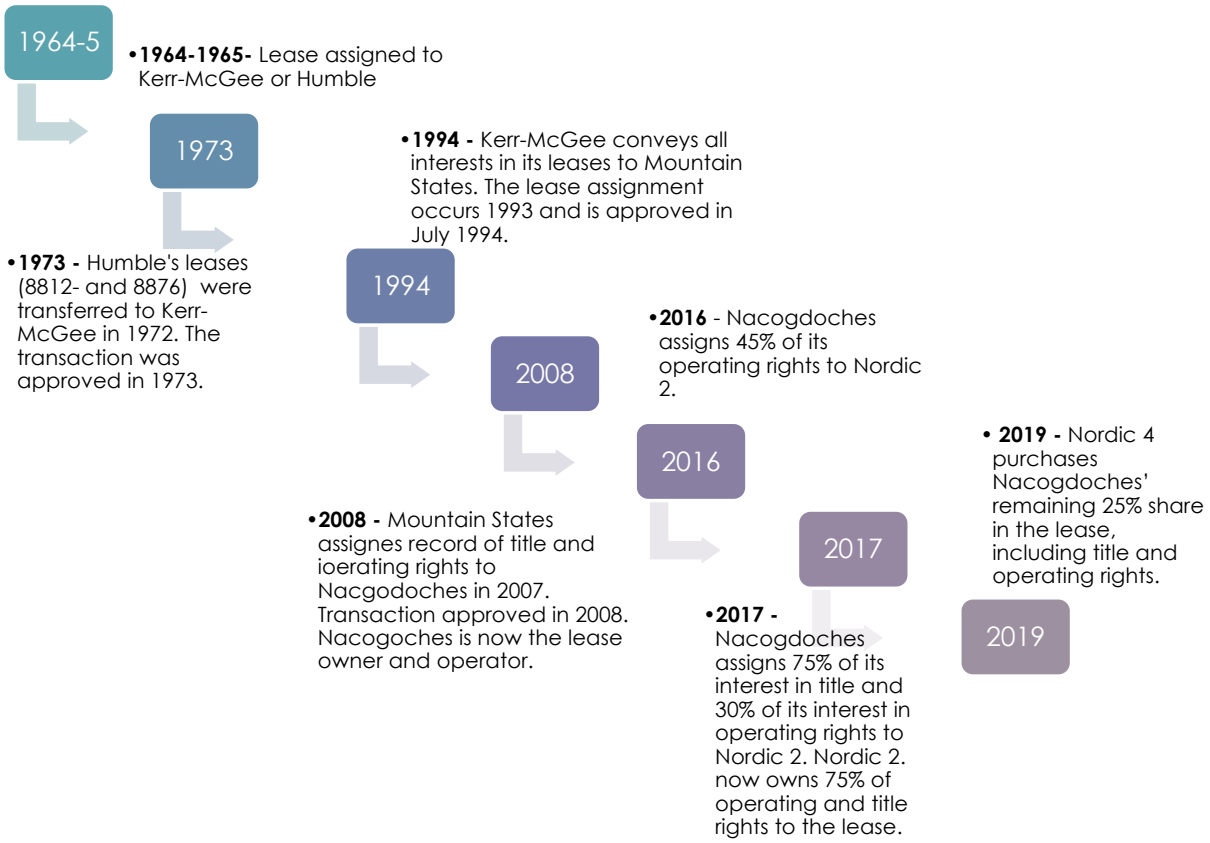

Figure 8 - Overview of DBK lease history

Nordic Oil USA 2 LLLP (Nordic 2) and Nordic Oil USA 4 LLC (Nordic 4) currently hold 75% and 25%, respectively, of operating and title rights to these leases.

Leases are administered by the Navajo Nation Minerals Department within the Division of Natural Resources.

Leases were initially issued to Kerr-McGee Oil Industries or Humble Oil & Refining Company in the mid-1960s, with a royalty rate of 16.67%. This rate has remained unchanged.

Kerr-McGee acquired Humble's leases in 1973.

In 1994, Mountain States Petroleum acquired all the leases from Kerr-McGee.

In 2008, Nacogdoches Oil and Gas Inc acquired all the leases from Mountain States Petroleum. In 2012, Nacogdoches began the process of assigning 45% of its *operating* rights on the leases to Nordic 2. This transfer was approved and finalized in 2016. The next year, in 2017, Nordic 2 acquired an additional 30% of Nacogdoches' interest in operating rights, and 75% of Nacogdoches' interest in title in the lease. This means that by 2017, Nordic 2 owned 75% in title and operating rights to the leases.

In 2019, Nacogdoches sold its remaining 25% share in the lease, including title and operating rights, to Nordic USA 4 LLP (see Appendix VI).

By this point, Nordic 2 and Nordic 4, both owned by NASCO, controlled the DBK Helium Project.

B) DBK WELLS BY LEASE

LEASE 14-20-0603-8823

Lease 8823 was initially granted to Kerr-McGee Oil Industries Inc. in 1964. The lease terms included title and operating rights, with a royalty rate of 16.67%. Kerr-McGee began developing oil and gas wells on this lease in 1967, eventually developing a total of 28 wells, 19 of which are still active to extract oil or helium, and one which is used as a saltwater injection well.

The land in question includes Township 36 North, Range 30 East. All of Sections 27, 28, 33 and 34, in Apache County, Arizona, Navajo Nation.

Active and shut-in wells under 8823

Well	API	Type	Status
Navajo 1	02-001-20001	Oil	P
Navajo 3X	02-001-20011	Oil	S
Navajo 4	02-001-20009	Helium	S
Navajo 6	02-001-20014	Oil	S
Navajo 7	02-001-20013	Saltwater Injection	I
Navajo 9	02-001-20020	Oil	P
Navajo 11	02-001-20106	Oil	P
Navajo 14	02-001-20040	Oil	P
Navajo 15	02-001-20041	Helium	S**

Navajo 16	02-001-20043	Oil	S
Navajo 17	02-001-20190	Oil	P
Navajo 19	02-001-20240	Oil	S
Navajo 20	02-001-20245	Oil	S
Navajo 21	02-001-20242	Oil	S
Navajo 22	02-001-20241	Oil	S
Navajo 24	02-001-20244	Helium	S**
Navajo 25	02-001-20249	Oil	S
Navajo 26	02-001-20250	Oil	S
Navajo 27	02-001-20251	Oil	P
Misc. equipment			

*Status Code
F = Flowing
P = Pumping
G = Gas Lift
S = Shut In
T = Temporarily Abandoned
I = Injection

**Production reports indicate that these wells are shut-in but also indicate that they produce significant quantities of gas. This gas is presumably transported to the AMCS plant for treatment and separation into helium. It is possible that the shut-in status indicates that the well is shut-in for oil production.

Plugged and abandoned wells under lease 8823 (damage on the ground still present):

- Navajo 5 - API: 02-001-20016
- Navajo 13 - API: 02-001-20044
- Navajo 10 - API: 02-001-20042
- Navajo 3 - API: 02-001-20005
- Navajo 18 - API: 02-001-20239
- Navajo 8 - API: 02-001-20015
- Navajo 23 - API: 02-001-20243
- Navajo 2 API: 02-001-20004

LEASE 14-20-0603-8822

Lease 8822 was originally granted by the Navajo Nation to Kerr-McGee in 1964, including title and operating rights, at a royalty rate of 16.67%. Kerr-McGee developed 2 wells on this lease.

The land comprises Township 36, Range 30 East, Sections 27, 28, 33 & 34, encompassing 2,560 acres in Apache County, Arizona, Navajo Nation.

Active and shut-in wells under 8822

Well	API	Type	Status
Navajo C-1	02-001-20092	Oil	P
Navajo C-2	02-001-20046	Helium	S**

*Status Code
F = Flowing
P = Pumping
G = Gas Lift
S = Shut In
T = Temporarily Abandoned
I = Injection

**Production reports indicate that this well is shut-in, but it is also a well that was recently converted to extract helium. It is unclear from the record whether it will be brought into production soon.

LEASE 14-20-0603-8889

Lease 8889 was originally granted to Kerr-McGee in 1965, including title and operating rights, at a royalty rate of 16.67%. Kerr-McGee developed 3 wells on this lease, one of which is abandoned.

The land in question is Township 35 North, Range 30 East. All of Section 5, comprising 640 Acres in Apache County, Arizona, Navajo Nation.

Active and shut-in wells under 8889

Well	API	Type	Status
Navajo B1-X	02-001-20068	Oil	S
Navajo B2	02-001-20010	Helium	S**

*Status Code
F = Flowing
P = Pumping
G = Gas Lift
S = Shut In
T = Temporarily Abandoned
I = Injection

**Production reports indicate that this well is shut-in but also indicate that it produces significant quantities of gas. This gas is presumably transported to the AMCS plant for treatment and separation into helium. It is possible that the shut-in status indicates that the well is shut-in for oil production.

Plugged and abandoned wells under lease 8889:

- Navajo 1-B – API: 02-001-00006

LEASE 14-20-0603-8812

Lease 8812 was originally granted to Humble Oil & Refining Company in October 1964. The royalty rate was and is 16.67%. Humble developed 5 wells on this lease, one of which is currently abandoned.

The land in question includes Township 36 North, Range 29 East, Apache County, Arizona, Navajo Nation, covering all of sections 25, 26, 35, and 36, totaling 2,560 acres.

Active and shut-in wells under 8812

Well	API	Type	Status
Navajo 88-1	02-001-20045	Oil	S
Navajo 88-2	02-001-20055	Helium	S**
Navajo 88-3	02-001-20066	Helium	S**
Navajo 88-6	02-001-200252	Oil	S

*Status Code
F = Flowing
P = Pumping
G = Gas Lift
S = Shut In
T = Temporarily Abandoned I = Injection

**Production reports indicate that these wells are shut-in but also indicates that these wells produce significant quantities of gas. This gas is presumably transported to the AMCS plant for treatment and separation into helium. It is possible that the shut-in status indicates that the well is shut-in for oil production.

Plugged and abandoned well under lease 8812:

- Navajo 88-4 – API: 02-001-20069

LEASE 14-20-0603-8876

Lease 8876 was issued by the Navajo Tribal Council to Humble Oil & Refining Company in 1965, including all title and operating interests, at a royalty rate of 16.67%. Humble developed 3 wells on this lease, one of which is currently abandoned.

Land in question encompasses Township 35 North, Range 30 East. All of Section 6, totaling 615.01 acres. Apache County, Arizona, Navajo Nation.

Active and shut-in wells under 8876

	Well	**API**	**Type**	**Status**
1	Navajo 138-1	02-001-20012	Helium	S**
2	Navajo 138-3	02-001-200253	Oil	S

Status Code
F = Flowing
P = Pumping
G = Gas Lift
S = Shut In
T = Temporarily Abandoned
I = Injection

**Production reports indicate that these wells are shut-in but also indicates that these wells produce significant quantities of gas. This gas is presumably transported to the AMCS plant for treatment and separation into helium. It is possible that the shut-in status indicates that the well is shut-in for oil production.

Plugged and abandoned wells under lease 8876:

- Navajo 138-2 – API: 02-001-20024

Plugged and abandoned wells under inactive leases in DBK field:

Well	Operator	API	Lease
Navajo 1B	Mesa Petroleum	02-001-20124	8888
Navajo 1-151	Humble	02-001-20076	8882
Navajo 1-135	Anadarko Production	02-001-20019	8897
Navajo 1-AE	Pan American	02-001-20079	1563
Navajo 1-F	Kerr-McGee	02-001-200-51	8824
Navajo 1-146	Humble	02-001-20074	8880
Navajo 2XE	Continental Energy Corporation	02-001-20016-0000	2981
2XE Reentry 1	Republic Mineral Corporation	02-001-20016-0001	2981
2XE Reentry 2	Zoller & Danneberg	02-001-20016-0002	2981
2XE Reentry 3	Beta Exploration	02-001-20016-0003	2981

APPENDIX II – AIR SAMPLING DATA

This table provides an overview of air sampling results from fieldwork that Diné CARE conducted in collaboration with Earthworks in late October of 2019 (analysis returned in November) and May of 2021. Three wells in the DBK field were sampled each time – "Navajo 19" (API 02-001-20240), "Navajo 25" (API 02-001-20249), and "Navajo 14" (02-001-20242). These three wells are all under the same lease - 14-20-0603-8823.

According to records provided by AZOGCC, only Navajo 14 is in operation, Navajo 19 has been shut in since 2015-2016, while Navajo 25 has been shut in since 2014-2015. Navajo 14 produces very small quantities of oil, and its production is in decline. Meanwhile, the toxic emissions coming from these sites are significant and threatening.

Compound (selected)	Health effects *	Long-term ESL (annual averaging; TCEQ 2020) **	#19 - Nov. 2019	#19 - May 2021	#25 - Nov. 2019	#25 - May 2021	#14 - Nov. 2019	#14 - May 2021
sulfur compounds detected (of 20 analyzed)			16	16	15	10	15	14
Hydrogen sulfide	Lack of oxygen/asphyxiation; respiratory arrest; skin/eye/nose/respiratory irritation	n/a	170,000 ppbV	180,000 ppbV	410,000 ppbV	17,000 ppbv	440,000 ppbV	330,000 ppbv
Methyl mercaptan	Eye/skin/respiratory irritation; headache, nausea, dizziness	0.5 ppbV	190 ppbV	150 ppbv	130 ppbV	15 ppbv	240 ppbV	130 ppbv
Ethyl mercaptan	Respiratory arrest, dizziness, nausea; similar effects as H2S	0.5 ppbV	36,000 ppbV	27,000 ppbv	15,000 ppbV	600 ppbv	53,000 ppbV	32,000 ppbv
Isopropyl mercaptan	Hazardous on contact.	1.8 ug/m3	37,000 ug/m3	26,000 ug/m3	19,000 ug/m3	780 ug/m3	72,000 ug/m3	10,000 ppbv
tert-Butyl Mercaptan	Eye/skin/respiratory irritation; headache, nausea, dizziness.	0.49 ppbV	630 ppbV	450 ppbv	120 ppbV	ND	510 ppbV	420 ppbv
n-Propyl mercaptan	Eye/skin/nose irritant.	0.5 ppbV	34,000 ppbV	23,000 ppbv	5,100 ppbV	110 ppbv	18,000 ppbV	14,000 ppbv
Ethyl Methyl Sulfide	Eye & skin damage (inhalation)	14 ug/m3	3,000 ug/m3	ND	800 ug/m3	41 ug/m3	2,700 ug/m3	ND
Thiophene	Nausea, vomiting, headache,	57 ug/m3	38,000 ug/m3	23,000 ug/m3	6,700 ug/m3	170 ug/m3	26,000 ug/m3	16,000 ug/m3

	eye/nose/throat/skin irritation							
Isobutyl mercaptan	Eye/skin/respiratory irritant; headache, nausea, dizziness	1.8 ug/m3	7,000 ug/m3	5,300 ug/m3	2,400 ug/m3	150 ug/m3	7,400 ug/m3	1,400 ug/m3
Diethyl sulfide	Skin/eye/nose/throat/ irritation	14 ug/m3	270,000 ug/m3	220,000 ug/m3	52,000 ug/m3	2,400 ug/m3	220,000 ug/m3	170,000 ug/m3
n-Butyl mercaptan	Eye/skin/respiratory irritant; headache, nausea, dizziness	0.49 ppbV	8,200 ppbV	2,900 ppbv	720 ppbV	ND	2,700 ppbV	1,300 ppbv
3-methylthiophene	Skin/eye/oral irritant	57 ug/m3	2,800 ug/m3	1,600 ug/m3	800 ug/m3	ND	3,900 ug/m3	1,900 ug/m3
Tetrahydrothiophene	Headache, nausea, dizziness, palpitations	50 ppbV	500 ppbV	240 ppbv	ND	ND	ND	ND
2,5-Dimethylthiophene	Eye irritation	10 ug/m3	9,400 ug/m3	2,500 ug/m3	1,300 ug/m3	ND	5,200 ug/m3	1,500 ug/m3
2-Ethylthiophene	Contact & inhalation toxicity	57 ug/m3	4,600 ug/m3	2,300 ug/m3	550 ug/m3	ND	3,700 ug/m3	1,400 ug/m3
Diethyl Disulfide	Nose/throat/skin/eye/respiratory irritant	14 ug/m3	1,700 ug/m3	1,500 ug/m3	580 ug/m3	41 ug/m3	1,700 ug/m3	500 ug/m3
VOCs detected (of 50 analyzed)			9	9	11	10	10	9
1,3 Butadiene	Skin, eye/nose/throat irritation; respiratory distress	4.5 ppbV	ND	ND	3,300 ppbV	ND	ND	ND
n-Hexane	Dizziness, headaches, neuropathy	57 ppbV	1,600,000 ppbV	2,700,000 ppbv	380,000 ppbV	57,000 ppbv	2,600,000 ppbV	1,700,000 ppbv
Benzene	Dizziness, headaches, rapid heartbeat; carcinogen	1.4 ppbV	270,000 ppbV	360,000 ppbv	44,000 ppbV	6,400 ppbv	330,000 ppbV	190,000 ppbv
Cyclohexane	Eye/nose/throat irritation, dizziness, headache	100 ppbV	900,000 ppbV	1,300,000 ppbv	150,000 ppbV	20,000 ppbv	1,100,000 ppbV	680,000 ppbv
n-Heptane	Eye/nose/throat irritation, dizziness, headache, nausea	660 ppbV	770,000 ppbV	1,100,000 ppbv	100,000 ppbV	15,000 ppbv	980,000 ppbV	640,000 ppbv
Toluene	Eye/nose irritation, dizziness,	320 ppbV	300,000 ppbV	390,000 ppbv	37,000 ppbV	7,300 ppbv	490,000 ppbV	280,000 ppbv

	kidney/liver damage							
n-Octane	Eye/nose/throat irritation, lightheadedness, headache	110 ppbV	230,000 ppbV	240,000 ppbv	24,000 ppbV	3,900 ppbv	370,000 ppbV	180,000 ppbv
Ethylbenzene	Eye/nose irritation, dizziness, kidney/liver damage; possible carcinogen	130 ppbV	33,000 ppbV	43,000 ppbv	3,800 ppbV	860 ppbv	64,000 ppbV	29,000 ppbv
m,p-Xylenes	Eye/nose/respiratory irritation, dizziness, irregular heartbeat, kidney/liver changes	41 ppbV	71,000 ppbV	100,000 ppbv	8,400 ppbV	1,900 ppbv	150,000 ppbV	66,000 ppbv
o-Xylene	Eye/nose/respiratory irritation, dizziness, irregular heartbeat, kidney/liver changes	41 ppbV	20,000 ppbV	50,000 ppbv	2,600 ppbV	610 ppbv	46,000 ppbV	25,000 ppbv
n-Nonane	Nose/throat irritant, coughing, headache, dizziness	86 ppbV	ND	ND	6,400 ppbV	1,100 ppbv	170,000 ppbV	ND

Data compiled by Earthworks. Air samples analyzed by ASL Environmental.

*** Sources:** Agency for Toxic Substances and Disease Registry, Toxic Substances Portal: https://www.atsdr.cdc.gov/substances/index.asp; the National Institutes of Health Library of Medicine, https://www.nlm.nih.gov/; hazardous substances fact sheets from the NJ Department of Health, https://nj.gov/health/workplacehealthandsafety/right-to-know/hazardous-substances/index.shtml; and other governmental and industry information resources.

**** Data results** for air sampling are reported in both parts per billion by volume (ppbV) and micrograms per cubic meter (ug/m3). The Effects Screening Levels (ESL) from the TX Commission on Environmental Quality's 2020 list (https://www.tceq.texas.gov/toxicology/esl) includes both measurements depending on the chemical.

APPENDIX III - NEPTUNE LEASING, INC. V. MOUNTAIN STATES PETROLEUM CORPORATION AND NACOGDOCHES OIL AND GAS INC.

Neptune Leasing, Inc. v. *Mountain States* is a Navajo Nation Supreme Court Case (No. SC-CV-24-10) decided in May 2013. The Supreme Court made important jurisdictional decisions regarding the case but remanded the specific matter at hand back to the Shiprock District Court. During the COVID-19 pandemic, Diné CARE was unable to obtain information from the court system to ascertain how or if the case was ultimately resolved. The decision at the Navajo Nation Supreme Court level was significant because it clarified important questions around Tribal jurisdiction with regards to non-Navajo companies operating on trust lands.

The Parties:
Neptune Leasing Inc
Texas-based company. Operator of a helium plant on Navajo trust land in the DBK field from an unknown period until 2006.

Mountain States Petroleum
New Mexico-based company. Acquired DBK assets from Kerr-McGee in 1994 and bought helium plant from Neptune in 2006. Sold assets, including helium plant, to Nacogdoches in 2007-2008.

Nacogdoches Oil and Gas Inc
Texas-based company. Acquired DBK assets, including helium plant, from Mountain States in 2007-2008. Began selling assets to Nordic Oil USA 2 and Nordic Oil USA 4 in 2016.

Case background: In November 2006, Neptune sold a helium processing plant in the DBK field to Mountain States. As part of the sale, Mountain States worked out a multi-year payment plan or security agreement with Neptune. But then, in August 2007, Mountain States sold the plant, along with its other assets, to Nacogdoches. Neptune claimed that Mountain States' sale of the plant constituted a breach of its security agreement, as well as a breach of Diné Fundamental Law.

Neptune first brought its case against Mountain States and the plant's new owner, Nacogdoches, to the Shiprock District Court in 2010.

Mountain States and Nacogdoches argued that the Navajo Nation did not have jurisdiction over them or over the subject matter. Nacogdoches later withdrew this claim, but Mountain States argued that the case should be heard in Texas based on a clause in its agreement with Neptune.

The Shiprock District Court ultimately found that it had jurisdiction over the subject property (the helium plant) but that its jurisdiction to adjudicate the breach of contract was ambiguous. It thus decided to yield jurisdiction on the contractual matter to an unnamed Texas court. With regards to personal jurisdiction, the Shiprock District Court found that it had jurisdiction over Neptune, which consented to as much, and over Nacogdoches, who had clear business dealings on the Navajo Nation, but found that it did not have jurisdiction over Mountain States because the company no longer had business dealings on the Navajo Nation.

The Helium Plant: The helium plant in question is on Navajo trust land, in the DBK field. The last known business lease written for the site, at the time of the Supreme Court decision, was in 1974 for a party unrelated (and unnamed) to the case. There is no lease record for Neptune, Mountain States, or Nacogdoches' use of the site. Neptune could not produce a record of its

ownership of the helium plant. The sale of the plant to Mountain States was done without knowledge of the Navajo Nation, while Nacogdoches stated that the Navajo Nation was aware of its purchase of the plant from Mountain States and that the Nation was aware of its operations of the plant as well as other oil, gas, and helium recovery activities on and near the Navajo Nation. Because the Shiprock District Court found that it did not have personal jurisdiction over Mountain States, it dismissed the case.

Neptune appealed the case to the Navajo Nation Supreme Court.

THE NAVAJO NATION SUPREME COURT DECISION:

The Supreme Court considered the following issues and analyzed them both as they pertained to Navajo Nation Common Law and U.S. Common Law:

1. "Whether the district court properly dismissed the action below for lack of personal jurisdiction over Mountain States".
2. "Whether the district court properly "yielded" subject matter jurisdiction to an unnamed Texas court conducting unspecified proceedings involving some or all of the parties".

QUESTION 1

Navajo Common Law:
The authority of the Navajo Nation to regulate non-members is recognized in the Treaty of 1868 and codified in the Navajo Nation Long-Arm Statute at 7 N.N.C. § 253(a). One of the grounds for jurisdiction established in the long-arm statute is when a non-member consents to jurisdiction through "commercial dealings" with the Nation, as was the case with Neptune, Mountain States, and Nacogdoches, insofar as they operate(d) on the Navajo Nation. However, the Shiprock District Court had determined that what was relevant for establishing jurisdiction was that Mountain States no longer operated on the Navajo Nation at the time that the suit was brought. The Supreme Court found that the District Court had erred in this decision. According to the Supreme Court, it is not relevant whether the non-member entity (Mountain States) is currently conducting business on the Navajo Nation so long as they once did. The Supreme Court thus reversed this decision.

Federal Common Law:
To determine whether the Navajo Nation has personal jurisdiction over Mountain States under federal common law, the Navajo Nation Supreme Court applied a two-pronged jurisdictional test (the *Montana test*) established in a U.S. Supreme Court Case, *Montana* v. *United States*, 450 U.S. 544 (1981) for personal jurisdiction over non-members.

The Montana Test: In *Montana*, the U.S. Supreme Court held that while Tribes generally do not have jurisdiction over non-members on non-member fee land, Tribes do retain civil jurisdiction over non-members on the reservation in two instances:

1. When non-members enter into "consensual relationships with the tribe or its members, through commercial dealing, contracts, leases, or other arrangements" OR
2. When non-member "conduct threatens or has some direct effect on the political integrity, the economic security, or the health or welfare of the tribe." *Montana, supra* at 566.

The Navajo Nation Supreme Court noted that the District Court failed to perform the *Montana* test in analyzing the *Neptune* v. *Mountain States* case. The Supreme Court found that if the District Court had done such an analysis, it would have found that the Navajo Nation had personal jurisdiction over Mountain States because Mountain States did indeed enter into consensual relationships with the Tribe by virtue of its commercial dealings. The Supreme Court rejected the notion espoused by the District Court that the Nation's jurisdiction over Mountain States had ended when Mountain States' commercial relationship with the Nation ended.

In the security agreement (purchase plan) between Neptune and Mountain States, both companies had agreed that conflicts between the two would be addressed in a Texas Court. Mountain States argued that due to this clause in the agreement, the Navajo Nation did not have jurisdiction over its dispute with Neptune. The Navajo Nation Supreme Court rejected this argument:

"If we apply *Montana,* the private party transfers of Navajo land in this case [between Neptune and Mountain States], without written leases, surely threaten or have some direct effect on the political integrity, the economic security, or the health or welfare of the tribe under *Montana's* second prong. Navajo land belongs to the people, and management of Navajo land carries a solemn responsibility" (p. 8).

Citing the poorly documented practices around the helium plant at the DBK field, the Supreme Court wrote:

"The practice of swift re-sale without involving the Nation clearly interferes with the Nation's ability to manage our land. While being able to point to a lease's terms would be crucial to a jurisdictional challenger under *Montana* in seeking to limit the Nation's reversionary interest in this case, the lack of a lease, and lack of involvement of the Nation across generations of valuable transfers, does not remove private entities from regulation or adjudication under Navajo law" (p. 12).

The Supreme Court thus found that under the two-prong *Montana* test, which is applicable under federal common law, the Navajo Nation did indeed have personal jurisdiction over Mountain States.

QUESTION 2:

The Navajo Nation Supreme Court found that the Shiprock District Court erred in "yielding" subject matter jurisdiction to a Texas court because it did not determine what proceedings, if any, were ongoing in Texas on the matter. In other words, the Shiprock District Court did not confirm whether there was an ongoing case in Texas, in which Court, and involving what parties. In passing off the case, the Court did not do its due diligence to make sure justice would be served in Texas.

Outcome: The Navajo Nation Supreme Court remanded the case to the Shiprock District Court. Records of the case are not available.

APPENDIX IV – RESOLUTIONS FROM RED VALLEY AND TSAILE/WHEATFIELDS CHAPTERS

Red Valley Chapter Government • The Navajo Nation
P.O. Box 304 • Red Valley, Arizona 86544
Hwy 491 Route N13 Buffalo Drive, Bldg. #R006-001

RVC-33-18

Resolution of the Red Valley Chapter

REQUESTING THE DEPARTMENT OF INTERIOR, BUREAU OF INDIAN AFFAIRS NAVAJO REGION, BUREAU OF LAND MANAGEMENT, NAVAJO NATURAL RESOURCE DIVISION, MINERALS DEPARTMENT, OIL AND GAS PERMIT OFFICE, NAVAJO NATION OFFICE OF THE PRESIDENT AND VICE PRESIDENT, NAVAJO NATION RESOURCE & DEVELOPMENT COMMITTEE, NAVAJO HEALTH, EDUCATION & HUMAN SERVICES COMMITTEE TO FORMALLY INVESTIGATE OIL AND GAS OPERATIONS AT THE DINE'BIKEYAH OIL FIELD IN RED VALLEY, AZ AND TO REMEDIATE HEALTH AND SAFETY CONCERNS AND COMPLAINTS BROUGH FORTH BY RESIDENTS AND COMMUNITY MEMBERS OF THE RED VALLEY CHAPTER.

WHEREAS:

1. The RED VALLEY CHAPTER , pursuant to the Navajo Nation Council Resolution #CAP-34-98 dated October 01, 1998, is a recognized certified local unit of government with the responsibility to review matters pertaining to its government, administration, membership and to decide whether issue(s) is/are in their best interest or not and act accordingly, AND

2. The RED VALLEY CHAPTER, is a certified entity of the Navajo Nation Council Government, vested with the authority to review all issues affecting the respective community; AND

3. The Indian Self-Determination Act (P.L. 93-638) of the U.S. Congress and Local Governance Initiatives entitles and support us, Navajo Indians, in initiating plans making decisions, recommendation, request, etc.., according to our actual needs and desires; AND

4. Residents of the RED VALLEY CHAPTER maintain their right as Dine', the aboriginal People of Dine' Bikeyah, to be duly informed and consulted with, and included in any contracts concerning leasing of their lands for minerals, oil, gas, and/or helium, or natural resource management plans involving the IBA, BLM, Navajo Nation, and Minerals Department. Residents are observing an apparent rapid increase in helium production, and are hearing reports that the Navajo Nation is entering into new contracts for helium extraction in the area, about which residents and chapter officials have been given no information; AND

5. The United Nations Declaration on the Rights of Indigenous Peoples recognizes "free, prior, and informed consent (FPIC), AS A SPECIFIC RIGHT THAT PERTAINS TO Indigenous People. FPIC, recognizes that Indigenous People may withhold consent to a project that may affect them or their territories. Once they have given their consents, they can withdraw it at any stage. Furthermore, AFPIC enables them to negotiate the conditions under which the project will be designed, implemented, monitored and evaluated. This is also embedded within the universal right to self-determination; AND

6. The RED VALKEY CHAPTER maintains section G of Diyin Bitsaadee Beenahaz'aanii—Dine' Traditional Law (1 N.N.C. § 203): "Our elders and our medicine people, the teachers of traditional laws, values and principles must always be respected and honored if the people and the government are to persevere and thrive; the teachings of the elders and medicine people, their participation in government and their contributions of the traditional values and principles of Dine' life way will ensure growth of the Navajo Nation; AND

7. The Chuska, Fort Defiance and Carrizo mountains are known to the Dine' as the holy male deity Ch'ooshgai, and as such deserves respect, protection, diligent care, and restoration, in accordance with section B of Dine' Bi Beenahaz'aanii (1 N.N.C. § 201-201§ 5. Nahasdz'áanii—Dine' Natural Law (1 N.N.C. § 205): "The six sacred mountains, Sisnajini, Tsoodzil, Dook'o'oosliid, Dibe' Nitsaa, Dzil Na'oodilii, Dxil Ch'ool'i'I, and all the attendant mountains must be respected, honored and protected for they, as leaders, are the foundations of the Navajo Nation"; AND

8. Residents of the RED VALLEY CHAPTER that have homesite and grazing permits near the DBK Oil Field and within the Navajo Nation Forestlands, and Chuska Mountain Range have complaints about the strong, foul smelling fumes and emissions from the DBK oil field, including loud noises, and bright lights on during the night; AND

9. Residents and community members have complaints about the heavy traffic that oil and gas operators of the DBK field have brought to community roads in the mountains and in the valley. Mountain dirt roads are showing signs of erosion, and oil/gas truck traffic restricts community use and access. Residents and homesite lease holders have also notices new roads built by oil/gas workers and community roads are blocked off by beams, restricting community access to homesites and traditional herbs and medicine. Additionally, there is a BIA-maintained road used by school buses that oil/gas truck drivers are using regularly, driving far above the speed limit, and causing some community members and a school bus at one time to be pushed off the road. Community members have stated that DBK oil and gas field drivers are not using their designated road, are not maintaining their road, and are heavily using the BIA school bus road, and as such are putting the community at risk with increased traffic and dangerous driving: AND

10. In 2005, there was a large oil spill that came from an oil well in the DBK field. Residents do not feel the cleanup and remediation was properly addressed. Residents have also noticed a number of power lines in the oil field are knocked down and have electrocuted livestock and wildlife; AND

11. Residents and community members do not feel that enough has been done by Navajo Nation and its departments, BIA, or the oil and gas operators of the DBK field to monitor and ensure proper safety standards are carried out in their operations. A January 11th article in Navajo Times exposed toxic and dangerous ground gas leakage and emissions coming from gas well API: 02-001-20020, State Permit # AZOGCC:0396 and Nacogdoches Oil and Gas Helium Fractionators Plant. Outside technicians brought in to survey the DBK site stated that practices at the DBK field are not up to proper safety standards. Bad practices at the DBK field pose a very dangerous risk to the community. Residents request that all responsible agencies act to ensure the safety of the Red Valley Community and environment. Additionally, residents ask that OSHA become involved and access the DBK site, to initiate and ensure that proper practices are addressed; AND

12. Residents that have homesites and grazing permits near the oil field, have noticed the increase of headaches at their summer sheep composites in the mountains. Numerous studies and articles have stated the dangers of oil, gas and fracking operations to human and environmental health. Organizations that have long worked on oil and gas issues, have noted that communities hat live near oil and gas fields often report symptoms of respiratory problems, such as asthma, coughing, eye, nose, and throat irritation, headaches, nausea, dizziness, trouble sleeping, and fatigue (Eathworks, 2017, Oil and Gas Health Effects; AND

13. Residents' concerns about the harmful health effect of fumes coming from poorly operated oil and gas wells are supported by research such as a 2014 study published in Environmental Health 13:82, entitled "Air Concentrations of Volatile Compounds Near Oil and Gas Production: A Community-based Exploratory Study," which found that "Levels of eight volatile chemicals exceeded federal guidelines under several operations circumstances. Benzene, formaldehyde, and hydrogen sulfide were the most common compounds to exceed acute and other health-based risk levels"; AND

14. Oil and Gas and fracking operations require millions of gallons of water, sand, and dangerous chemicals. Deep shale wells can use anywhere from 2 to 10 million gallons of water to fracture a single well. A four million fracturing operations uses from 80-330 tons of various chemicals. Red Valley residents are concerned about negative effects to their community and environment resulting from the large amount of chemicals and water use at the DBK Oil Field. Many fracturing fluid chemicals are known to be toxic to humans and wildlife, and several are known to cause cancer. Some chemicals, like benzene even in small quantities can contaminate millions of gallons of water. (Earthworks 2017, Hydraulic Fracturing-What it is); AND

15. Residents have expressed concern that companies operating in the DBK oil field may be illegally and unsafely disposing of potentially hazardous, toxic, and even radioactive liquid wastes onto oil field sites, along roadways, and into the watershed; AND

16. PART 167.3 of Navajo Grazing Regulations states that the Navajo Nation is committed to "The preservation of the forage, the land, and the water resources on the Navajo Reservation, and the building up of those resources where they have deteriorated." Red Valley grazing permit holdrs and local livestock owners are therefore notifying the Navajo Nation of their concern about potential damage from fumes and waste fluid pollution on livestock, as well as on wildlife in the vicinity of the DBK oil field; AND

17. The Navajo Nation Natural Resource Division is currently developing an Integrated Resource Management Plan (IRMP) for the Navajo Forestlands, which includes Red Valley and other chapters in the Chuska Mountains and Defiance Plateau regions, and which proposes to increase oil and gas exploration, logging, and gravel mining in the area, without comprehensive community consultations; AND

18. This chapter supports our residents and other Navajo community members who have signed a petition seeking redress and reparation for the damages that are being and have been caused by DBK oil field company operations, which is a right guaranteed by Section 4 of the Navajo Nation Bill of Rights, as well as the Indian Civil Rights Act, under freedom of religion, speech, press, and the right of assembly and petition.

NOW THEREFORE BE IT RESOLVED THAT:

1. The RED VALLEY CHAPTER hereby approves a resolution requesting the requesting the Department Of Interior, Bureau of Indian Affairs Navajo Region, Bureau of Land Management, Navajo Natural Resource Division, Minerals Department, Oil and Gas Permit Office, Navajo Nation Office of the President and Vice President, Navajo Nation Resource & Development Committee, Navajo Health, Education & Human Services Committee to formally investigate oil and gas operations at the Dine'Bikeyah oil field in Red Valley, AZ and to remediate health and safety concerns and complaints brought forth by residents and community members of the RED VALLEY CHAPTER; AND

2. The RED VALLEY CHAPTER and community must be duly informed, and consulted with immediately on all contracts, leasing, current and future oil and gas operations, as well as natural resource management plans, involving the Red Valley community and Chuska mountain region; AN

3. Complaints brought forth by the RED VALLEY CHAPTER and residents must be addressed immediately, including complaints concerning strong odors and fumes, loud noise, bright lights, road and traffic hazards; AND

4. A formal investigation and detailed survey of the DBK oil and gas field must be carried out by each of the agencies listed in the title of this resolution; AND

5. A plan must be developed by all responsible agencies to repair and remediate all environment damages and toxic dumps, including those from historical wells that are no longer in operation; AND

6. Navajo Nation should commence negotiations regarding compensation to RED VALLEY CHAPTER and community for damages inflicted on their livelihoods, homesite, grazing permit rights and Dine' cultural practices; AND

7. It would be in the best interest of RED VALLEY CHAPTER, residents and local Chuska forest communities, as well as the Navajo Nation, to ensure that complaints brought forth by Red Valley resident are properly investigated, and that remediation is carried out in a responsible and timely manner to safeguard the health, safety, and well being of its communities.

CERTIFICATION

WE, hereby certify the foregoing resolution was duly considered at called meeting at RED VALLEY CHAPTER, Navajo Nation, ARIZONA, at which quorum was present and that same was passed by a vote of 24 in favor, 0 opposed, and 2 abstained on this 11th day of March, 2018.

MOTION BY: Willie Johnson

SECONDED BY: Sally Benally

03/19/2018

J.C. Begay, President

Gary Chavez, Vice-President

Stella Tsosie, Secretary/Treasurer

Amber Crotty, Council Delegate

Tsaile/Wheatfields Chapter
Post Office Box C18
Tsaile, Arizona 86556
Phone: (928) 724-2220 Fax: (928) 724-2223

Tséehilí **TóDzis'á** **Tsézhine**

Zane P. James, President
Charles R. Chee, Grazing Committee
Devon Begay, Vice President
Kuhyorne E. Nata'ani, Secretary/Treasurer
Nelson Begaye, Council Delegate

TWFY18-094

RESOLUTION OF THE
TSAILE/WHEATFIELDS CHAPTER #038

Supporting the Red Valley Chapter request to: 1.) The Department of Interior, Bureau of Indian Affairs Navajo Region; 2.) Bureau of Land Management; 3.) Navajo Nation Natural Resource Division: Minerals Department, Oil and Gas Permit Office; 4.) Navajo Nation Environmental Protection Agency; and 5.) Navajo Nation Office of President and Vice President, 6) Navajo Nation Resource & Development Committee, and 7) Navajo Nation Health, Education & Human Services Committee to formally investigate oil and gas operations at the Diné Bikeyah Oil Field in Red Valley, AZ, and to remediate health and safety concerns and complaints brought forth by residents and community members of the Red Valley Chapter.

WHEREAS:

1. Pursuant to Navajo Nation Council Resolution No. CJ-20-55, dated December 2, 1955, the Tsaile/Wheatfields Chapter is vested with authority and charged with the responsibility to promote, protect and preserve the interest and general welfare, including the health and safety of its community people; and
2. The Indian Self-Determination Act (P.L. 93-638) of U.S. Congress entitles and support us, Navajo Indians, in initiating plans and making decisions, recommendations, request, etc., according to our needs and desires; and
3. Residents of the Tsaile/Wheatfields Chapter maintain their right as Dịné, the aboriginal People of Diné Bikeyah, to be duly informed and consulted with, and included in any contracts concerning leasing of their lands for minerals, oil, gas, and/or helium, or natural resource management plans involving the BIA, BLM, Navajo Nation, and Minerals Department. Residents are observing an apparent rapid increase in helium production, and are hearing reports that the Navajo Nation is entering into new contracts for helium extraction in the area, about which residents and chapter officials have been given no information; and
4. The United Nations Declaration on the Rights of Indigenous Peoples recognizes "free, prior, and informed consent (FPIC), as a specific right that pertains to Indigenous People. FPIC recognizes that Indigenous People may withhold consent to a project that may affect them or their territories. Once they have given their consent, they can withdraw it at any stage. Furthermore, FPIC enables them to negotiate the conditions under which the project will be designed, implemented, monitored and evaluated. This is also embedded within the universal right to self-determination; and
5. The Tsaile/Wheatfields Chapter maintains section G of Diyin Bitsąądęę Beenahaz'áanii--Diné Traditional Law (1 N.N.C. § 203): "Our elders and our medicine people, the teachers of traditional laws, values and principles must always be respected and honored if the people and the government are to persevere and thrive; the teachings of the elders and medicine people, their participation in government and their contributions of the traditional values and principles of Diné life way will ensure growth of the Navajo Nation ..."; and
6. The Chuska, Fort Defiance and Carrizo mountains are known to the Diné as the holy male deity Ch'ooshgai, and as such deserves respect, protection, diligent care, and restoration, in

accordance with section B of Diné Bi Beenahaz'áanii (1 N.N.C. §§ 201-206)§ 5. **Nahasdzáán dóó Yádiłhił Bitsąądęę Beenahaz'áanii--Diné Natural Law (1 N.N.C. § 205): "The six sacred mountains, Sisnajini, Tsoodził, Dook'o'ooslííd, Dibé Nitsaa, Dził Na'oodiłii, Dził Ch'ool'í'í, and all the attendant mountains must be respected, honored and protected for they, as leaders, are the foundation of the Navajo Nation"; and**

7. Residents of the Red Valley Chapter that have homesites and grazing permits near the DBK Oil Field and within the Navajo Nation Forestlands, and Chuska Mountain Range have complaints about the strong, foul smelling fumes and emissions from the DBK oil field, including loud noises, and bright lights on during the night; and
8. Residents and community members have complaints about the heavy traffic that oil and gas operators of the DBK field have brought to community roads in the mountains and in the valley. Mountain dirt roads are showing signs of erosion, and oil/gas truck traffic restricts community use and access. Residents and homesite lease holders have noticed new roads built by oil/gas workers and community roads are blocked off by berms, restricting community access to homesites and prevents the gathering of traditional herbs and medicine. Additionally, there is a BIA-maintained road used by school buses that oil/ gas truck drivers are using regularly, driving far above the speed limit, and causing some community members, and a school bus at one time to be pushed off the road. Community members have stated that DBK oil and gas field drivers are not using their designated road, are not maintaining their road, and are heavily using the BIA school bus road, and as such are putting the community at risk with increased traffic and dangerous driving; and
9. In 2005, there was a large oil spill that came from an oil well in the DBK field. Residents do not feel the cleanup and remediation was properly addressed. Residents have also noticed a number of power lines in the oil field are knocked down and have electrocuted livestock and wildlife; and
10. Residents and community members do not feel that enough has been done by Navajo Nation and its departments, BIA, or the oil and gas operators of the DBK field to monitor and ensure proper safety standards are carried out in their operations. A January 11th article in the Navajo Times exposed toxic and dangerous ground gas leakage and emissions coming from gas well API: 02-001-20020, State Permit # AZ0GCC:0396 and the Nacogdoches Oil and Gas Helium Fractionator Plant. Outside technicians brought in to survey the DBK site stated that practices at the DBK field are not up to proper safety standards. Bad practices at the DBK field pose a very dangerous risk to the community. Residents request that all responsible agencies act to ensure the safety of the Red Valley community and environment. Additionally, residents ask that OSHA become involved and access the DBK site, to initiate and ensure that proper practices are addressed; and
11. Residents that have homesites and grazing permits near the oil field, have noticed the increase of headaches at their summer homesites in the mountains. Numerous studies and articles have stated the dangers of oil, gas, and fracking operations to human and environmental health. Organizations that have long worked on oil and gas issues, have noted that communities that live near oil and gas fields often report symptoms of respiratory problems, such as asthma, coughing, eye, nose, and throat irritation, headaches, nausea, dizziness, trouble sleeping, and fatigue (Earthworks, 2017, Oil and Gas Health Effects); and
12. Residents' concern about the harmful health effects of fumes coming from poorly operated oil and gas wells are supported by research such as a 2014 study published in *Environmental Health* 13:82, entitled "Air Concentrations of Volatile Compounds Near Oil and Gas Production: A Community-based Exploratory Study," which found that "Levels of eight volatile chemicals exceeded federal guidelines under several operational circumstances. Benzene, formaldehyde, and hydrogen sulfide were the most common compounds to exceed acute and other health-based risk levels"; and
13. Oil and gas and fracking operations require millions of gallons of water, sand, and dangerous chemicals. Deep shale wells can use anywhere from 2 to 10 million gallons of water to fracture a single well. A four million gallon fracturing operation uses from 80-330 tons of various

chemicals. Red Valley residents are concerned about negative effects to their community and environment resulting from the large amount of chemicals and water used at the DBK oil field. Many fracturing fluid chemicals are known to be toxic to humans and wildlife, and several are known to cause cancer. Some chemicals, like benzene even in small quantities can contaminate millions of gallons of water. (Earthworks 2017, Hydraulic Fracturing- What it is); and

14. Residents have expressed concern that companies operating in the DBK oil field may be illegally and unsafely disposing of potentially hazardous, toxic, and even radioactive liquid wastes onto oil field sites, along roadways, and into the watershed; and
15. Part 167.3 of Navajo Grazing Regulations states that the Navajo Nation is committed to "The preservation of the forage, the land, and the water resources on the Navajo Reservation, and the building up of those resources where they have deteriorated." Red Valley grazing permit holders and local livestock owners are therefore notifying the Navajo Nation of their concern about potential damage from fumes and waste fluid pollution on livestock, as well as on wildlife in the vicinity of the DBK oil field; and
16. The Navajo Nation Natural Resource Division is currently developing an Integrated Resource Management Plan (IRMP) for the Navajo Forestlands, which includes Red Valley and other chapters in the Chuska Mountains and Defiance Plateau regions, and which proposes to increase oil and gas exploration, logging, and gravel mining in the area, without comprehensive community consultation; and
17. This chapter supports residents of the Chuska Mountains and Defiance Plateau, and other Navajo community members who have signed a petition seeking redress and reparation for the damages that are being and have been caused by DBK oil field company operations, which is a right guaranteed by Section 4 of the Navajo Nation Bill of Rights, as well as the Indian Civil Rights Act, under freedom of religion, speech, press, and the right of assembly and petition.

NOW THEREFORE IT BE RESOLVED THAT:

1. The Tsaile/Wheatfields Chapter hereby approves and supports the Red Valley Chapter to: 1.) the Department of Interior, Bureau of Indian Affairs Navajo Region; 2.) Bureau of Land Management; 3.) Navajo Nation Natural Resource Division: Minerals Department, Oil and Gas Permit Office; 4.) Navajo Nation Environmental Protection Agency; and 5.) Navajo Nation Office of President and Vice President, to formally investigate oil and gas operations at the Diné Bikeyah Oil Field in Red Valley, AZ, and to remediate health and safety concerns and complaints brought forth by residents and community members of the Red Valley Chapter.

2. The Red Valley Chapter and communities in the Chuska and Defiance mountain range must be duly informed, and consulted with immediately on all contracts, leasing, current and future oil and gas operations, as well as natural resource management plans, involving the Red Valley community and Chuska mountain region; and

3. Complaints brought forth by the Red Valley Chapter and residents must be addressed immediately, including complaints concerning strong odors and fumes, loud noise, bright lights, road and traffic hazards; and

4. A formal investigation and detailed survey of the DBK oil and gas field must be carried out by each of the agencies listed in the title of this resolution; and

5. A plan must be developed by all responsible agencies to repair and remediate all environmental damage and toxic dumps, including those from historical wells that are no longer in operation; and

6. Navajo Nation should commence negotiations regarding compensation to Red Valley Chapter and community for damages inflicted on their livelihoods, homesites, grazing permit rights, and Diné cultural practices; and

7. No new leases or contracts should be entered into, until concerns and complaints brought forth by the Red Valley Chapter and community are remedied; and

8. It would be in the best interest of Tsaile/Wheatfields Chapter, residents, and local Chuska forest communities, as well as the Navajo Nation, to ensure that complaints brought forth by Red Valley residents are properly investigated, and that remediation is carried out in a responsible and timely manner to safeguard the health, safety, and well-being of its communities.

CERTIFICATION

I, hereby certify the foregoing resolution was duly considered by the Tsaile/Wheatfields Chapter at a duly called meeting at Wheatfields, Arizona at which a quorum was present and the same was passed by a vote of 26 in favor, 0 opposed, and 5 abstained on this **19th** day of **March, 2018.**

Motion by: Adella Begay Second by: Willis Becenti

Zane James
Tsaile/Wheatfields Chapter President

APPENDIX V – MARCH 2019 LETTER FROM NAVAJO NATION MINERALS DEPARTMENT TO DINÉ CARE

THE NAVAJO NATION

JONATHAN NEZ | PRESIDENT MYRON LIZER | VICE PRESIDENT

March 6, 2019

Robyn Jackson, Climate & Energy Outreach Coordinator
Diné C.A.R.E.
HC 63 Box 272
Dilkon, Arizona 86047

RE: Request for Documents

Dear Ms. Jackson:

This letter is in response to your request for documents submitted to me on December 7, 2108. The following is the Navajo Nation Minerals Department (or "Minerals")' response to each of your requests contained in your December 7th letter:

- Tribal Permits held by operators and lesees [sic] in the DBK field
    - **Minerals Response:** Minerals does not have any tribal permits in its possession related to the DBK field. Your December 7th letter states that you have already spoken with the Navajo Nation Environmental Protection Agency (Navajo EPA) who referred you to Minerals. Therefore, Minerals does not know of any Navajo Nation entity that maintains such documentation.
- Water Permits for operation in the DBK field
    - **Minerals Response:** Minerals does not have any water permits in its possession related to the DBK field. The Navajo Nation Department of Water Resources may maintain water permits associated with the DBK field. Our office recommends that you contact Mr. Jason John, Acting Director, Navajo Nation Department of Water Resources, PO Box 678, Fort Defiance, AZ 86504.
- Inspection Reports of the DBK wells and the helium processing site in Red Valley
    - **Minerals Response:** Minerals does not have any of these environmental inspection reports in its possession, nor does Minerals know of any Navajo Nation entity that maintains such documentation.
- Emissions reports from wells in the DBK field and helium processing site in Red Valley
    - **Minerals Response:** Minerals does not have any emissions reports in our possession. As your December 7th letter indicates, you have already spoken with Navajo EPA who referred you to Minerals. Therefore, Minerals does not know of

any Navajo Nation entity which maintains such documentation.

- Copies of BLM and Capitol Operating Groups reports on quarterly air monitoring data and H2S monitoring data.
    - **Minerals Response:** Minerals does not have copies of these documents in its possession. Minerals does not know of any Navajo Nation entity that maintains these documents.

In your letter, you also asked two additional questions: 1.) Are the wells in the DBK field considered minor source air emissions? and 2.) Is the helium processing site considered minor source, as well? It is Minerals' understanding that both the wells in the DBK field and the helium processing site are considered minor sources, but we strongly recommend you seek an official answer to these questions from the U.S. Environmental Protection Agency.

Sincerely,

Steven L. Prince

Steven L. Prince, Principal Petroleum Engineer
Minerals Department

xc: April Quinn, Attorney, DOJ
Akhtar Zaman, Director, Minerals Department

APPENDIX VI – COPY OF PURCHASE AND SALE AGREEMENT BETWEEN NACOGDOCHES OIL AND GAS, INC. AND NORDIC USA 4 LLC

Nacogdoches Oil & Gas, Inc.

March 29, 2019

Red Valley Chapter
PO BOX 304
Red Valley, AZ 86544

via certified mail return receipt requested

Re: Nacogdoches Oil and Gas, Inc.'s Application for Approval of Assignment of Five Tribal Oil and Gas Mining Leases to Nordic Oil USA 4 LLC

Apache County, Arizona Lease Nos.: 14-20-0603-8812; 14-20-0603-8822; 14-20-0603-8823; 14-20-0603-8876; 14-20-0603-8889

Ladies and Gentlemen:

Pursuant to N.N.C. T. 18 § 605, Nacogdoches Oil and Gas, Inc. ("NOG") has submitted the enclosed applications to the Navajo Nation for approval of assignment of all of NOG's right, tile and interest in and to the above-referenced Oil and Gas Mining Leases to Nordic Oil USA 4 LLC ("Nordic").

Such applications were executed pursuant to the enclosed Purchase and Sale Agreement, executed by NOG as Seller and Nordic as Buyer, dated March 29, 2019, with exhibits and schedules, which constitute the full and complete economic terms between the parties for this transaction.

Capitol Operating Group, LLC is currently the operator of these five leases. Following the transfer of assignments to Nordic, Capitol Operating Group, LLC shall remain operator.

Should you have any questions, please do not hesitate to contact me at (936) 560-4747 or brent.ivy@nogtx.com.

Sincerely,

Brent Ivy
Vice President

Enclosures.

816 North Street, Nacogdoches, Texas 75961 • Phone: 936.560.4747/Fax: 936-560-5088

7338622v1

EXECUTION

PURCHASE AND SALE AGREEMENT

BY AND BETWEEN

NACOGDOCHES OIL AND GAS, INC.

AS SELLER,

AND

NORDIC OIL USA 4 LLC

AS BUYER,

DATED AS OF MARCH 29, 2019

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PURCHASE AND SALE AGREEMENT

This PURCHASE AND SALE AGREEMENT (this "***Agreement***") is entered into this 29th day of March, 2019 (the "***Execution Date***"), by and between **NACOGDOCHES OIL AND GAS, INC.**, a Texas corporation ("***Seller***"), and **NORDIC OIL USA 4 LLC**, a Delaware limited liability company ("***Buyer***"). Buyer and Seller are each referred to herein, individually, as a "***Party***" and, collectively, as the "***Parties***".

RECITALS

WHEREAS, Seller desires to sell, and Buyer desires to purchase, all of the Properties (as hereinafter defined); and

WHEREAS, the purchase and sale of the Properties will be consummated on the terms and conditions set forth in this Agreement;

NOW, THEREFORE, for and in consideration of the mutual promises, representations, warranties, covenants, conditions and agreements contained herein, and for other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the Parties hereby agree as follows:

1. **Definitions and References**. Capitalized terms used in this Agreement and not defined elsewhere in this Agreement shall have the meanings set forth in this Section 1.1.

1.1. Definitions. The following terms have the meanings given in this Section 1.1 or in the Section referred to below:

"***Accounting Referee***" means a nationally recognized accounting firm mutually agreed upon by Seller and Buyer, *provided* that such Accounting Referee has not performed any material work for any of the Parties or any of their respective Affiliates within the preceding five (5) year period.

"***Affiliate***" means, with respect to any Person, any other Person that directly or indirectly (through one or more intermediaries or otherwise) Controls, is Controlled by, or is under common Control with the first Person.

"***Agreement***" has the meaning specified in the introductory paragraph.

"***Allocated Value***" means, with respect to a Property, the portion of the Purchase Price allocated to such Property as shown on Exhibit A.

"***Assignment***" means the Assignment, Bill of Sale and Conveyance in substantially the same form attached hereto as Exhibit B, from Seller to Buyer assigning the Properties effective as of the Effective Time.

"***Assumed Obligations***" means the following: (a) Liabilities solely to the extent attributable to the ownership, use or operation of the Properties during the period from and after the Effective Time, including the payment of real estate, use,

occupation, ad valorem, severance, production and personal property Taxes attributable to the Properties for calendar year 2019 and thereafter (subject to apportionment of such Taxes as provided for in this Agreement); and (b) Liabilities, whether accruing or attributable to periods before or after the Effective Time, arising out of or relating to: (i) Gas Imbalances, and (ii) Suspended Funds, but only to the extent such Suspended Funds were paid by Seller to Buyer as provided in this Agreement; *provided, however*, Buyer does not assume and Assumed Obligations does not include any of the foregoing (or any other Liabilities) to the extent constituting Retained Liabilities or to the extent resulting from any matters that are the subject of any other indemnity obligation of Seller hereunder.

"***Basket***" has the meaning specified in Section 10.6.1.

"***Business Day***" means any day other than Saturday or Sunday or a day on which banking institutions in Houston, Texas are authorized by Law to close.

"***Buyer***" has the meaning specified in the introductory paragraph.

"***Buyer Indemnified Parties***" has the meaning specified in Section 10.2.

"***Capitol Operating***" means Capitol Operating Group, LLC, a Texas limited liability company.

"***Casualty***" means volcanic eruptions, acts of God, terrorist acts, fire, explosion, gathering line failure, earthquake, wind storm, flood, drought, or other casualty, or any condemnation, exercise of eminent domain, confiscation or seizure.

"***Claim Notice***" has the meaning specified in Section 10.5.2.

"***Closing***" means the closing and consummation of the transactions contemplated by this Agreement.

"***Closing Date***" means the Execution Date.

"***Closing Payment***" means the Purchase Price as adjusted at Closing, as determined in accordance with Section 2.7 and set forth in the Closing Statement.

"***Closing Statement***" has the meaning specified in Section 2.7.

"***Code***" means the Internal Revenue Code of 1986, as amended.

"***Contracts***" has the meaning specified in the definition of Properties.

"***Control***" means the possession, directly or indirectly, of the power, directly or indirectly, to direct or cause the direction of the management or policies of the controlled Person, whether through the ownership of equity interests in or voting rights attributable to the equity interests in such Person, by contract or agency, by

the general partner of a Person that is a partnership, or otherwise; and "***Controls***" and "***Controlled***" have meanings correlative thereto.

"***Customary Post-Closing Consents***" has the meaning specified in the definition of Permitted Encumbrances.

"***Debt Financing Party***" means any lender, arranger, commitment party or agent acting in such capacity with respect to any Financing, and their respective Affiliates, equityholders, members, partners, officers, directors, employees, agents, advisors and representatives involved in the Financing and the successors and assigns of any of the foregoing.

"***Debt Instrument***" means any contract or instrument evidencing any indebtedness for borrowed money, deferred payment of purchase price, or carry obligation, or any guaranty, endorsement, assumption or other contingent obligation in respect of indebtedness of others, including any note, indenture, mortgage, security interest, loan, credit agreement, financing lease or similar instrument.

"***Defensible Title***" means title to each Real Property Interest and each Well that as of both the Effective Time and immediately prior to the Closing:

(a) with respect to a Real Property Interest or Well, (i) entitles Seller (and immediately following the Closing, will entitle Buyer) to receive throughout the productive life of such Real Property Interest and Well not less than the NRI for such Real Property Interest and Well shown on Exhibit A, except for decreases required to allow other working interest owners to make up past underproduction or pipelines to make up past under deliveries, or (ii) obligates Seller (and immediately following the Closing, will obligate Buyer) to bear throughout the productive life of such Real Property Interest or Well not greater than the Working Interest for such Real Property Interest or Well shown on Exhibit A, except for (A) any increases that result in at least a proportionate increase in Seller's NRI for such Real Property Interest or Well, and (B) increases resulting from contribution requirements with respect to defaulting co-owners under applicable operating agreements;

(b) with respect to a Real Property Interest, such Real Property Interest is in full force and effect and entitles Seller (and immediately following the Closing, will entitle Buyer) to not less than the number of Net Acres shown on Exhibit A for such Real Property Interest; and

(c) subject to Permitted Encumbrances, is free and clear of all Liens.

"***Disallowed Expenses***" means Operating Expenses and other expenses that are incurred, or otherwise contracted or consented to, by or on behalf of Seller at any time during the period from the Effective Time until Closing (or that are otherwise attributable to the ownership or operation of the Properties from and after the Effective Time) and that (a) were not incurred in the Ordinary Course of

Business, (b) were not incurred in compliance with the terms of this Agreement or any applicable Contracts, or (c) constitute capital expenditures related to any Wells listed on Exhibit A (unless set forth on Schedule 3.10).

"***Dollar***" means the United States of America dollar.

"***Easements***" has the meaning specified in the definition of Properties.

"***Effective Time***" means 12:00:01 a.m. Central Time, March 1, 2019.

"***Environmental Law***" means any Law relating to the environment, health and safety, Hazardous Materials, industrial hygiene, Hydrocarbon well construction, the environmental conditions on, under, or about any of the Properties, including soil, groundwater, and indoor and ambient air conditions or the reporting or remediation of environmental contamination and includes, without limitation, the Comprehensive Environmental Response, Compensation and Liability Act of 1980, as amended, including the Superfund Amendments and Reauthorization Act of 1986, 42 U.S.C. § 9601 *et seq.*; the Resource Conservation and Recovery Act, including the Hazardous and Solid Waste Amendments Act of 1984, 42 U.S.C. § 6901 *et seq.*; the Federal Water Pollution Control Act, 33 U.S.C. § 1251 *et seq.*; the Clean Air Act, 42 U.S.C. § 7401 *et seq.*; the Hazardous Materials Transportation Act, 49 U.S.C. § 1471 *et seq.*; the Toxic Substances Control Act, 15 U.S.C. §§ 2601 *et seq.*; the Oil Pollution Act of 1990, 33 U.S.C. § 2701 *et seq.*; the Emergency Planning and Community Right to Know Act of 1986, 42 U.S.C. § 11001 *et seq.*; the Safe Drinking Water Act, 42 U.S.C. §§ 300f *et seq.*; the Rivers and Harbors Act of 1899, 33 U.S.C. § 401 *et seq.*; Fungicide and Rodenticide Act 7 U.S.C. Section 136, *et seq.*; and the Occupational Safety and Health Act, 29 U.S.C. § 651 *et seq.*; as any of the foregoing may be amended and any other Law the purpose of which is to conserve or protect human health, the environment, wildlife or natural resources.

"***Equipment***" has the meaning specified in the definition of Properties.

"***Excluded Assets***" means the following:

(a) Seller's minute books, financial and income or franchise tax records, Tax Returns to the extent relating to Seller's income or franchise taxes, and legal records (other than title records);

(b) any existing or future refund of costs, Taxes or expenses borne by any of Seller, its Affiliates or its or their respective predecessors in title, to the extent attributable to the period prior to the Effective Time;

(c) all claims and causes of action of Seller or its Affiliates arising under or with respect to any of the Contracts that are attributable to periods of time prior to the Effective Time (including claims for adjustments or refunds);

(d) all rights and interests of Seller or its Affiliates (i) under any policy or agreement of insurance or indemnity to the extent and only to the extent such rights and interests relate to the ownership of the Properties prior to the Effective Time and not to any Assumed Obligations, and (ii) under any bond;

(e) Seller's rights with respect to Hydrocarbons produced from the Properties with respect to all periods prior to the Effective Time and all proceeds from the disposition thereof, other than inventory for which an adjustment is made under Section 2.5(a); and any and all proceeds from production and from the settlements of contract disputes with purchasers of Hydrocarbons or byproducts from the Lands, including settlement of take-or-pay disputes, insofar as said proceeds are attributable to periods of time prior to the Effective Time;

(f) all accounts receivable and audit rights arising under any of the Contracts or otherwise with respect to the Properties solely with respect to any period prior to the Effective Time or to any of the Excluded Assets, and except for any Gas Imbalances;

(g) all claims of Seller or any of its Affiliates for refunds of or loss carry forwards with respect to (1) production, ad valorem or any other Taxes attributable to any period prior to the Effective Time, (2) income or franchise Taxes, or (3) any Taxes attributable to the Excluded Assets;

(h) all documents and instruments of Seller or any of its Affiliates that may be protected by an attorney-client privilege, except to the extent relating to any Assumed Obligations;

(i) all information that cannot be disclosed to Buyer as a result of confidentiality arrangements under agreements with Third Parties (other than title opinions and other title records relating to the Properties) for which Seller is unable to secure permission (after using its commercially reasonable efforts, at no material out-of-pocket cost to Seller) to provide or convey to Buyer;

(j) all Hedge Contracts and all rights and Liabilities thereunder, and all Debt Instruments of Seller and its Affiliates and all Liabilities thereunder;

(k) all of Seller's proprietary computer software, patents, trade secrets, copyrights, names, trademarks, logos and other intellectual property;

(l) documents prepared or received by Seller or its Affiliates with respect to (i) lists of prospective purchasers for the Properties, (ii) correspondence between or among Seller, its representatives and any prospective purchaser other than Buyer, and (iii) correspondence between Seller or any of its representatives with respect to any of the prospective purchasers or the transactions contemplated by this Agreement;

(m) all employee files of Seller; and

(n) all e-mails and other electronic files on Seller's servers and networks to the extent not primarily related to the ownership, operation or development of the Properties.

"***Execution Date***" has the meaning specified in the introductory paragraph.

"***Final Statement***" has the meaning specified in Section 2.8.

"***Financing***" means any debt financing now or hereinafter obtained by the Buyer in connection with the transactions contemplated by this Agreement as such debt financing may be amended, restated, modified, supplemented, refinanced or replaced.

"***Fundamental Representation***" means with respect to a Party the representations and warranties of such Party that are contained in Sections 3.1, 3.2, 3.3, 3.5, 3.19, 3.20, 4.1, 4.2, 4.3, 4.6, and 4.7, as applicable.

"***GAAP***" means generally accepted accounting principles, consistently applied, as recognized by the U.S. Financial Accounting Standards Board (or any generally recognized successor). The requisite that such principles be consistently applied means that the accounting principles in a current period are comparable in all material respects to those applied in preceding periods.

"***Gas Imbalances***" means any over-production of Hydrocarbons or under-production of Hydrocarbons, or over-deliveries or under-deliveries with respect to Hydrocarbons produced from or allocated to the Properties.

"***Geological and Geophysical Information***" means all proprietary and (to the extent transferable without payment of a fee or other penalty to any Third Party, unless Buyer has separately agreed in writing to pay such fee or other penalty) non-proprietary geophysical, seismic and related technical data, including data, core and fluid samples and other engineering, geological and/or geophysical studies (including seismic data, studies, analyses, interpretations and information), and other similar information and records, in each case relating to the Properties.

"***Governmental Authority***" means any foreign, national, state, local, municipal, tribal or other government or division thereof; any governmental, regulatory or administrative agency, commission, body or other authority exercising or entitled to exercise any administrative, executive, judicial, legislative, police, regulatory or taxing authority or power; and any court or governmental tribunal or arbitrator.

"***Hazardous Materials***" means, without limitation, any waste, substance, product, or other material (whether solid, liquid, gas or mixed), which is identified, listed, published, or defined as a hazardous substance, hazardous waste, hazardous material, toxic substance, radioactive material or solid waste, including Hydrocarbons, oil, or petroleum waste, or any other waste, pollutant or contaminant that is regulated, restricted or subject to reporting and recordkeeping under any Environmental Law.

"***Hedge Contract***" means any contract or agreement to which Seller or any of its Affiliates is a party with respect to any swap, forward, future or derivative transaction or option or similar agreement, whether exchange traded, "over-the-counter" or otherwise, involving, or settled by reference to, one or more rates, currencies, commodities, equity or debt instruments or securities, or economic, financial or pricing indices or measures of economic, financial or pricing risk or value or any similar transaction or any combination of these transactions.

"***Hydrocarbons***" means crude oil, natural gas, casinghead gas, condensate, natural gas liquids, and other liquid or gaseous hydrocarbons and any combination or constituents thereof or extracted therefrom, including, without, limitation, helium.

"***Indemnified Party***" has the meaning specified in Section 10.5.1

"***Indemnifying Party***" has the meaning specified in Section 10.5.1.

"***Individual Claim***" has the meaning specified in Section 10.6.1.

"***Knowledge***" of a fact or matter means the actual knowledge with respect to such fact or matter of any of the following listed individuals: (a) with respect to Buyer, the individuals listed in Schedule 1.1(a), and (b) with respect to Seller, the individuals listed in Schedule 1.1(b).

"***Lands***" means the lands covered by the Real Property Interests and all lands pooled or unitized therewith.

"***Laws***" means any and all applicable laws, statutes, ordinances, permits, decrees, writs, injunctions, orders, codes, judgments, principles of common law, rules or regulations (including Environmental Laws) which are promulgated, issued or enacted by a Governmental Authority having jurisdiction.

"***Liabilities***" means any and all claims, demands causes of action, payments, charges, judgments, assessments, liabilities, losses, damages, diminution in value, debts, duties, obligations, violations, penalties, fines, costs, and/or expenses, including attorney fees, legal or other expenses incurred in connection therewith.

"***Lien***" means any lien, mortgage, security interest, pledge, charge, encumbrance or other arrangements substantially equivalent thereto or other defect in title.

"***Net Acres***" means, as calculated separately with respect to each Real Property Interest, (a) the number of gross acres of land covered by such Real Property Interest, multiplied by (b) the lessor's undivided interest in the Hydrocarbons in the lands covered by such Real Property Interest, multiplied by (c) Seller's undivided interest in such Real Property Interest; *provided, however*, if items (b) and (c) vary as to different areas of such lands covered by such Real Property Interest, a separate calculation shall be performed with respect to each such area.

"***Net Revenue Interest***" or "***NRI***" means, with respect to a Real Property Interest or Well, the decimal interest in and to all Hydrocarbons produced and saved or sold from or allocated to such Property after giving effect to all royalties, overriding royalties, production payments, carried interests, net profits interests, reversionary interests and other burdens upon, measured by or payable out of production therefrom.

"***Operating Expenses***" means all operating expenses (excluding all costs and expenses of bonds, letters of credit or other surety instruments, but including costs of insurance and ad valorem, property, severance, production and similar Taxes based upon or measured by or attributable to the ownership or operation of the Properties or the production of Hydrocarbons therefrom, but excluding any other Taxes) and capital expenditures incurred in the ownership, operation, use or maintenance of the Properties, and overhead costs, if any, charged by Third Party operators to the Properties under operating agreements, but excluding Liabilities attributable to (a) personal injury, death, property damage, torts, breach of contract or violation of any Law, (b) obligations relating to abandoning or plugging of wells, dismantling or decommissioning facilities, closing pits and restoring the surface around such wells, facilities and pits, (c) Liabilities associated with violations of applicable Environmental Laws, existing as of the Effective Time or occurring at any time prior to Closing, in, on or under or emanating from or related to any Property that requires, if known, or will require, once discovered, reporting to a Governmental Authority, investigation, monitoring, reporting, removal, cleanup, remediation, restoration or correction under Environmental Laws, (d) Gas Imbalances, (e) obligations to pay royalty owners, working interest owners or other interest holders revenues or proceeds attributable to sales of Hydrocarbons, including those held in suspense, (f) title and environmental curative costs, or (g) claims for indemnification or reimbursement from any Third Party with respect to costs of the types described in the preceding clauses (a) through (f), whether such claims are made pursuant to contract or otherwise.

"***Ordinary Course of Business***" means the ordinary course of Seller's business in material compliance with applicable Laws and the terms and conditions of the Real Property Interests, Contracts, Permits, and Easements, consistent with past custom and practice (including with respect to quantity and frequency).

"***Parties***" has the meaning specified in the introductory paragraph.

"***Party***" has the meaning specified in the introductory paragraph.

"***Permits***" has the meaning specified in Section 3.6.

"***Permitted Encumbrances***" means the following to the extent and only to the extent that the same do not, individually or in the aggregate, reduce Seller's NRI or Net Acres, or increase its Working Interest (without at least a proportionate corresponding increase in its NRI), in any Property from that shown on Exhibit A:

(a) the terms and conditions of the Leases and Contracts,

(b) royalties, overriding royalties, and similar burdens on production;

(c) Liens for Taxes for which payment is not yet due or delinquent;

(d) Liens of mechanics, materialmen, warehousemen, landlords, vendors, and carriers and any similar Liens arising by operation of Law which arise in the Ordinary Course of Business for sums not yet due or delinquent;

(e) the terms and conditions of all operating agreements, unit agreements, unitization and pooling designations and declarations, gathering and transportation agreements, processing agreements, Hydrocarbon purchase contracts and other Contracts constituting Properties, in each case, to the extent they do not materially impair the ownership, development, operation, production or use of the Properties for the purposes of Hydrocarbon development as currently being developed;

(f) easements, surface leases, surface use agreements, and other surface rights and plat restrictions, in each case, to the extent they do not materially impair the ownership, development, operation, production or use of the Properties for the purposes of Hydrocarbon development as currently being developed; and all zoning laws, restrictive covenants and conditions, regulatory authority of Governmental Authorities, and building and other land use laws and similar encumbrances;

(g) all rights to consent by, required notices to, filings with or other actions by Governmental Authorities in connection with the sale, disposition, transfer or conveyance of federal, state, tribal, or other governmental oil and gas leases or interests therein or related thereto, or the transfer of operations of any of the Wells, where the same are customarily obtained subsequent to the assignment, disposition or transfer of such oil and gas leases or interests therein, or such operations ("***Customary Post-Closing Consents***");

(h) to the extent such rights have not been triggered on or prior to the Closing Date, conventional rights of reassignment obligating the lessee to reassign or offer to reassign its interests in any lease prior to a release or abandonment of such lease;

(i) preferential rights to purchase and required consents to assignment and similar agreements;

(j) any Lien affecting any of the Properties that is discharged by Seller or its Affiliates at or prior to Closing; and

(k) rights vested in or reserved to any Governmental Authority to regulate the Properties in any manner, to terminate any right, power, franchise,

license or permit afforded by such Governmental Authority, or to purchase, condemn or expropriate any of the Properties.

"***Permits***" means all licenses, approvals, authorizations, certifications, clearances, consents, franchises, permits, registrations, waivers, variances or other authorization required under applicable Law to be obtained from or issued, granted, given, or otherwise made available by or under the authority of any Governmental Authority necessary and sufficient to permit operation of the Properties.

"***Person***" means an individual, corporation, partnership, limited liability company, joint venture, association, joint stock company, trust, unincorporated organization or other entity or Governmental Authority.

"***PPR***" has the meaning specified in Section 2.2.

"***Proceedings***" means any and all proceedings, suits, claims and causes of action by or before any Governmental Authority or arbitrator.

"***Properties***" means all of Seller's right, title and interest in and to the following (but excluding the Excluded Assets):

(a) the oil, gas and mineral leases described on Exhibit A, whether producing or non-producing, together with all leasehold interests in and to the leasehold estates created thereby, and all royalties, working interests, net revenue interests, overriding royalties, production payments, carried interests, net profits interests, reversionary interests, and other Hydrocarbon interests of any kind or character created thereby, derived therefrom or attributable thereto, as well as any and all operating rights thereunder (collectively, the "***Real Property Interests***");

(b) all oil, condensate, gas, helium, water, carbon dioxide, disposal, injection, observation and other wells located on the Lands, including the oil and gas wells shown on Exhibit A (collectively, the "***Wells***"), and all tangible personal property, supplies, inventory, equipment, fixtures and improvements, including all injection wells, salt water disposal and handling facilities, frac ponds, frac pits, pads, well heads, casing, tubing, pumps, motors, gauges, valves, heaters, treaters, water lines, vessels, tanks, boilers, separators, treating equipment, compressors, pipelines, gathering systems, other equipment, automation systems including meters and related telemetry on wells, power lines, telephone and communication lines and other appurtenances owned or held primarily for use in connection with operation, production, treating, storing, transportation or marketing of Hydrocarbons from the Wells (collectively, the "***Equipment***");

(c) all presently existing unitization, pooling and/or communitization agreements, declarations or designations, and statutorily, judicially or administratively created drilling, spacing and/or production units, whether recorded or unrecorded, insofar as the same are attributable or allocated to the Lands; and the properties covered or units created thereby;

(d) all Hydrocarbons in, on, under or produced from or attributable to the Lands from and after the Effective Time and the proceeds thereof, and all inventory purchased pursuant to Section 2.5(a) and the proceeds thereof; and

(e) all surface fee interests, easements, surface leases, surface use agreements, surface rights, servitudes, water rights, licenses and rights of way appurtenant to or otherwise used or held for use in connection with the Properties or the operation, production, treating, storing, transportation or marketing of Hydrocarbons therefrom or allocated thereto ("***Easements***"); and, to the extent the same are transferrable, all Permits used primarily in connection with the ownership or operation of the Properties;

(f) all presently existing and valid Hydrocarbon sales agreements, operating agreements, gathering agreements, transportation agreements, farmout and farmin agreements, purchase agreements, exploration agreements, area of mutual interest agreements, processing agreements, and other contracts, agreements and instruments, in each case, to the extent Seller is a party or is otherwise bound and the above agreements cover, are attributable to or relate to the Properties and are set forth on Schedule 3.8 (collectively, the "***Contracts***");

(g) all rights, benefits and obligations arising from or in connection with any Gas Imbalances as of the Effective Time;

(h) all audit rights, rights to receive refunds or payments of any nature, and all amounts of money, relating thereto, in each case, to the extent arising from, or relating to, the ownership, operation, or sale or other disposition of the Properties from and after the Effective Time and any claim of indemnity, contribution or reimbursement relating to the Assumed Obligations;

(i) all claims, rights, demands, causes of action, suits, actions, judgments, damages, awards, recoveries, settlements, indemnities, rights to insurance proceeds, duties, obligations and liabilities in favor of or owed to Seller and relating to any Assumed Obligations or arising from acts, omissions or events, or damage to or destruction of Properties occurring from and after the Effective Time; and

(j) all of Seller's files, records and data (including electronic data) that (1) primarily relate to the ownership, operation or development of the Properties described above, and (2) are in Seller's or its Affiliates' possession, including but not limited to lease files, land files, division order files, abstracts, title files, maps, well files, well logs, well tests, mud logs, directional surveys, core reports, daily drilling records, machinery and equipment files, engineering and/or production files, Geological and Geophysical Information, regulatory files, environmental and health and safety files, Contracts and related files, and production, accounting and Tax records ("***Records***").

"***Purchase Price***" has the meaning specified in Section 2.

"***Real Property Interests***" has the meaning specified in the definition of Properties.

"***Records***" has the meaning specified in the definition of Properties.

"***Required Consent***" means a consent by a Third Party that, if not obtained prior to the assignment of a Property, either (a) voids or nullifies the Assignment with respect to such Property (or would give the holder thereof the right to void or nullify such assignment), (b) terminates Seller's interest in the Property subject to such consent (or would give the holder thereof the right to terminate such interest), or (c) would give rise to a payment obligation pursuant to the terms of the underlying Real Property Interest or Contract; *provided, however*, "Required Consent" does not include any Customary Post-Closing Consent.

"***Retained Liabilities***" has the meaning specified in Section 10.1.

"***Seller***" has the meaning specified in the introductory paragraph.

"***Seller Indemnified Parties***" has the meaning specified in Section 10.3.

"***Special Damages***" has the meaning specified in Section 13.17.

"***Suspended Funds***" means funds which Seller is holding as of the Closing Date which are owing to Third Party owners of royalty, overriding royalty, working or other interests in respect of past production of oil, gas or other Hydrocarbons attributable to the Properties.

"***Taxes***" means taxes of any kind, levies, or other like assessments, customs, duties, imposts, charges or fees of any Governmental Authority, including gross receipts, ad valorem, value added, excise, real or personal property, asset, sales, use, royalty, license, payroll, transaction, capital, net worth and franchise taxes, withholding, employment, social security, workers compensation, utility, severance, production, unemployment compensation, occupation, premium, windfall profits, transfer and gains taxes or other governmental taxes imposed or payable to the United States or any other Governmental Authority, and in each instance such term shall include any interest, penalties or additions to tax attributable to any such Tax, including penalties for the failure to file any tax return or report.

"***Tax Return***" has the meaning specified in Section 3.5.

"***Third Party***" means any Person other than a Party or an Affiliate of a Party.

"***Third Party Claim***" has the meaning specified in Section 10.5.2.

"***Transaction Documents***" means this Agreement and each other document and instruments executed or delivered pursuant hereto or in connection herewith.

"***Wells***" has the meaning specified in the definition of Properties.

"***Working Interest***" or "***WI***" means the decimal interest in the full and entire leasehold estate in any Property and all rights and obligations of every kind and character pertinent thereto or arising therefrom, without regard to any lessor royalties, overriding royalties and/or other burdens against production, insofar as said interest in said leasehold estate is burdened with the obligation to bear and pay the cost of exploration, development and operation.

"***WTNB***" means West Texas National Bank, a national banking association, whose principal business address is 6 Desta Drive, Suite 2400, Midland, Texas 79705.

1.2. References; Construction. All references in this Agreement to Exhibits, Schedules, Sections, paragraphs, subsections and other subdivisions refer to the corresponding Exhibits, Schedules, Sections, paragraphs, subsections and other subdivisions of or to this Agreement unless expressly provided otherwise. Titles appearing at the beginning of any Sections, subsections or other subdivisions of this Agreement are for convenience only, do not constitute any part of this Agreement, and shall be disregarded in construing the language hereof. The words "this Agreement," "herein," "hereby," "hereunder" and "hereof" and words of similar import, refer to this Agreement as a whole and not to any particular subdivision unless expressly so limited. The words "this Section" and "this subsection," and words of similar import, refer only to the Section or subsection hereof in which such words occur. A defined term has its defined meaning throughout this Agreement regardless of whether it appears before or after the place where it is defined. The word "including" (in its various forms) means including without limitation. Examples are not to be construed to limit, expressly or by implication, the matter they illustrate. Each accounting term not defined herein, and each accounting term partly defined herein to the extent not defined, will have the meaning given to it under GAAP. All references to prices, values or monetary amounts refer to Dollars. Pronouns in masculine, feminine or neuter genders shall be construed to state and include any other gender, and words, terms and titles (including terms defined herein) in the singular form shall be construed to include the plural and vice versa, unless the context otherwise requires. Exhibits and Schedules referred to herein are attached to and by this reference incorporated herein for all purposes.

2. **Purchase and Sale; Purchase Price**. At the Closing, and upon the terms and subject to the conditions of this Agreement, Seller agrees to sell and convey to Buyer all of the Properties, and Buyer agrees to purchase, accept and pay for the Properties. In consideration for the sale of all of the Properties, Buyer will pay to Seller the purchase price of FIFTEEN MILLION TWO HUNDRED THOUSAND AND 00/100 DOLLARS ($15,200,000.00) (the "***Purchase Price***"). The Purchase Price will be adjusted (without duplication) as set forth below in this Section 2.

2.1. Title. At Closing, Seller shall deliver the Assignment which shall contain a special warranty of title with respect to the Properties (including Defensible Title to the Real Property Interests and Wells), subject to Permitted Encumbrances.

2.2. Preferential Purchase Rights. At Closing, Seller shall provide any required notifications of a preferential purchase right, right of first refusal or other agreement which gives a Third Party a right to purchase the Properties ("***PPR***"), requesting waivers thereof, in connection with the transactions contemplated hereby. Seller will thereafter use commercially reasonable efforts to ensure that all such waivers are promptly granted. Buyer shall purchase the Properties subject to the unexpired PPR, and if such PPR is subsequently exercised, Buyer shall deliver the affected Properties to the holder of such PPR pursuant to an assignment in substantially the same form as the Assignment and under the terms of this Agreement, and shall be entitled to retain the proceeds paid for such Properties to Buyer by the party exercising the PPR.

2.3. Gas Imbalances. The Purchase Price will be adjusted upward or downward, as applicable, by (a) the net mcf amount of Seller's aggregate wellhead Gas Imbalances as of the Effective Time multiplied by Buyer's contract price per mcf (upward for underage and downward for overage); and (b) the mmbtu amount of any pipeline Gas Imbalances or unsatisfied throughput obligations attributable to Seller or the Properties as of the Effective Time multiplied by the actual settlement price per mmbtu (upward for over deliveries and downward for under deliveries).

2.4. Reserved.

2.5. Certain Upward Adjustments. The Purchase Price shall be increased by the following (without duplication): (a) the value of all liquid Hydrocarbons in pipelines or in tanks (but excluding tank bottoms and basic sediment and water impurities in crude oil) above pipeline connections at the Effective Time that is credited to the Properties in accordance with gauging and other customary industry procedures, in each case such value to be based upon the contract price in effect as of the Effective Time (or if no such contract is in effect, the current market price in the area at the Effective Time), less severance taxes and gravity adjustments deducted by the purchaser of such oil or other liquid Hydrocarbons; (b) the amount of all Operating Expenses attributable to the ownership, operation or maintenance of the Properties during the period from and after the Effective Time and that were actually paid by Seller, but excluding any Disallowed Expenses; and (c) any other amount agreed upon by the Parties, or otherwise required to be reflected pursuant to the other provisions of this Agreement.

2.6. Certain Downward Adjustments. The Purchase Price shall be decreased by the following (without duplication): (a) the amount of any proceeds received by Seller from the sale of Hydrocarbons produced from and after the Effective Time from the Properties (net of marketing fees, royalties and other burdens, and production, severance, sales, use and similar Taxes measured by or payable out of

production if not deducted pursuant to Section 2.5 above); (b) the amount equal to all unpaid ad valorem, property, production, severance and similar Taxes (excluding income, capital gains, franchise or similar Taxes) based upon or measured by the ownership of the Properties or the production of Hydrocarbons therefrom or the receipt of proceeds attributable thereto, which accrue to or are chargeable against the Properties in accordance with GAAP prior to the Effective Time, which amount shall, to the extent not actually assessed or known, be computed based upon such Taxes for the immediately preceding calendar year, or, if such Taxes are assessed on other than a calendar year basis, for the Tax period last ended; (c) the amount of all Operating Expenses attributable to the ownership, operation or maintenance of the Properties during the period prior to the Effective Time and that are paid or payable by Buyer, and the amount of any Disallowed Expenses that are paid or payable by Buyer; (d) amount of all Suspended Funds; and (e) any other amount agreed upon by the Parties, or otherwise required to be reflected pursuant to the other provisions of this Agreement.

2.7. Closing Date Estimates. The statement (the "***Closing Statement***") setting forth the mutually agreed estimate of each adjustment to the Purchase Price required under this Agreement and showing the calculation of such adjustments, shall be delivered by the Parties pursuant to Section 8.1 and 8.2. Any final adjustments, if necessary, will be made pursuant to Section 2.8 of this Agreement.

2.8. Final Accounting. On or before the later of one hundred twenty (120) days after the Closing Date, Buyer will prepare, in accordance with the provisions of this Agreement, and deliver to Seller, a post-closing statement setting forth a detailed calculation of all final adjustments to the Purchase Price which takes into account all such adjustments provided in this Agreement (the "***Final Statement***"). If Seller disputes any items in or the accuracy and completeness of the Final Statement, then as soon as reasonably practicable, but in no event later than fifteen (15) Business Days after its receipt of the Final Statement, Seller will deliver to Buyer a written exception report containing any changes Seller proposes to be made to the Final Statement and the reasons therefor ("***Dispute Notice***"). If Seller fails to deliver the Dispute Notice to Buyer within that period, then the Final Statement as delivered by Buyer will be deemed to be true and correct, binding upon and not subject to dispute by any Party. If Seller delivers a timely Dispute Notice, then as soon as reasonably practicable, but in no event later than thirty (30) days after Buyer receives Seller's Dispute Notice, the Parties will meet and undertake to agree on the final post-Closing adjustments to the Purchase Price. If Seller and Buyer fail to agree on the final post-Closing adjustments within sixty (60) days after Buyer's receipt of the Dispute Notice, then the Parties will submit the dispute for resolution exclusively through the binding resolution process set forth in this Section 2.8 by submission to the Accounting Referee. The cost of the Accounting Referee shall be paid fifty percent (50%) by each Party. Each Party shall each present to the Accounting Referee, with a simultaneous copy to the other Party, a single written statement of its position on the dispute in question, together with a copy of this Agreement, the Closing Statement, the proposed Final Statement, and the Dispute Notice and any

supporting material that such Party desires to furnish, not later than ten (10) Business Days after appointment of the Accounting Referee. In making its determination, the Accounting Referee shall be bound by the terms of this Agreement and, without any additional or supplemental submittals by either Party (except as may be specifically requested by the Accounting Referee), may consider such other accounting and financial standards matters as in its opinion are necessary or appropriate to make a proper determination. The Parties shall direct the Accounting Referee to resolve the disputes within thirty (30) days after receipt of the written statements submitted for review and to render a decision in writing based upon such written statements. **The Accounting Referee shall act as an expert for the limited purpose of determining the specific Final Statement dispute presented to it, shall be limited to the procedures set forth in this Section 2.8, shall not have the powers of an arbitrator, shall not consider any other disputes or matters, and may not award damages, interest, costs, attorney's fees, expenses or penalties to any Party.** Upon agreement of the Parties to the adjustments to the Final Statement, or upon resolution of such adjustments by the Accounting Referee, as the case may be, the amounts in the Final Statement (as adjusted pursuant to such agreement or resolution by the Accounting Referee) will be deemed final, conclusive and binding on all of the Parties, without right of appeal, and the aggregate amount due to either Party pursuant to such Final Statement will be paid within five (5) Business Days after the final determination is made that such payments are due and payable, by wire transfer of immediately available funds pursuant to wire transfer instructions designated in advance by the receiving Party to the paying Party in writing) for the account of the receiving Party.

3. **Seller's Representations and Warranties**. Seller hereby represents and warrants to Buyer as follows:

3.1. Organization and Good Standing. Seller is duly formed, validly existing and in good standing under the Laws of the State of its formation, and Seller is duly qualified and/or licensed, as may be required, and in good standing in all jurisdictions in which it carries on business or owns assets and such qualification is required by Law. Seller has all requisite power and authority to own and operate the Properties as now being operated by Seller and to carry on its business as now conducted.

3.2. Authority. Seller has adequate power, authority and legal right to enter into and perform this Agreement and each Transaction Document and to consummate the transactions contemplated herein and therein, and Seller has taken all necessary action to authorize the execution, delivery and performance of this Agreement and each other Transaction Document. This Agreement is (and each other Transaction Document will be) legal, valid and binding with respect to Seller and enforceable against Seller in accordance with its terms, except as the enforceability thereof may be limited by bankruptcy, insolvency, reorganization, moratorium or similar laws affecting creditors' rights generally or by principles of equity.

3.3. No Breach. Except as disclosed in Schedule 3.3, the execution, delivery, performance and consummation of this Agreement do not and will not: (a) violate, conflict with or constitute a default or an event that, with notice or lapse of time or both, would be a default, breach, or violation under any term or provision of any governing document of Seller; (b) violate, breach or constitute a default under, or result (with notice or lapse of time or both) in the breach, violation, acceleration or termination of any agreement, contract, instrument, license, lease, promissory note, indenture, mortgage, deed of trust, or other arrangement to which Seller is a party or by which Seller or any of the Properties is bound; (c) violate, conflict with or constitute a breach of any Law applicable to Seller or the Properties; or (d) except for Permitted Encumbrances, result in the creation, imposition or continuation of Liens on or affecting the Properties.

3.4. Litigation. Except as disclosed in Schedule 3.4, (a) there are no Proceedings pending or, to Seller's Knowledge, threatened in writing against Seller involving the Properties, (b) there are no actions, suits, or proceedings pending, or, to Seller's Knowledge, threatened in writing, before any Governmental Authority or arbitrator against Seller or its Affiliates, which are reasonably likely to impair or delay materially Seller's ability to perform its obligations under this Agreement; (c) there is no investigation, proceeding, charge or audit pending, or to Seller's Knowledge threatened, before or by any Governmental Authority with respect to any of the Properties; and (d) there has been no settlement or other similar agreement or order of any Governmental Authority with respect to the ownership or operation of the Properties that is or could reasonably be expected to be material.

3.5. Taxes. Except as disclosed in Schedule 3.5, (a) each Tax return, declaration, report, claim for refund or information return or statement relating to Taxes, including any schedule or attachment thereto, and including any amendment thereof (a "***Tax Return***") required to be filed with a Governmental Authority with respect to the Properties has been timely filed; (b) all such Tax Returns are complete and accurate in all material respects and disclose all Taxes required to be paid in respect of the Properties; (c) all Taxes shown due on such Tax Returns with respect to the Properties have been timely paid; (d) there is not currently in effect any extension or waiver of any statute of limitations of any jurisdiction regarding the assessment or collection of any Tax of Seller relating to its acquisition, ownership or operation of the Properties; (e) there are no liens, charges, obligations or other encumbrances (other than Permitted Encumbrances) on any of the Properties that arose in connection with its failure or alleged failure to pay any Tax; (f) neither Seller nor any of its Affiliates is presently contesting a Tax liability with respect to ownership of the Properties before any Governmental Authority; and (g) none of the Properties is subject to any tax partnership agreement or provisions requiring a partnership income tax return to be filed under Subchapter K of Chapter 1 of Subtitle A of the Code or any similar state statute.

3.6. Reserved.

3.7. Compliance with Laws. During the period that Seller or its Affiliates have operated any of the Properties, those Properties have been operated in compliance, in all material respects, with the provisions and requirements of all applicable Laws (excluding Environmental Laws, which are solely addressed in Section 3.9, and Tax matters, which are solely addressed in Section 3.5), except for prior instances of non-compliance that have been fully and finally resolved to the satisfaction of all Governmental Authorities with jurisdiction over such matters.

3.8. Contracts. Except for the Real Property Interests, Seller has listed in Schedule 3.8 all of the following contracts, agreements and instruments to the extent covering, attributable to or relating to the Properties:

3.8.1 all farm-in, farm-out, exploration, development, participation, joint venture, non-competition, area of mutual interest, purchase and/or acquisition agreements, operating agreements and similar agreements, in each case, where any of the terms of which remain executory and which cover, are attributable to or relate to the Properties;

3.8.2 all Hydrocarbon purchase and/or sale contracts, gathering contracts, processing contracts, transportation contracts, marketing contracts, drilling contracts, disposal contracts, injection contracts, and all other similar contracts, in each case, cover, are attributable to or relate to the Properties and that are not terminable without penalty upon 90 days or less notice;

3.8.3 all contracts that cover, are attributable to or relate to the Properties and that, individually, can reasonably be expected to result in aggregate payments by or revenues to Seller (or Buyer, after Closing) of more than $50,000 during the current or any subsequent fiscal year (based solely on the terms thereof without regard to expected increase in volumes or revenues);

3.8.4 all contracts that constitutes a lease under which Seller is the lessor or the lessee of real or personal property that (a) cannot be terminated by Seller (without penalty) upon thirty (30) days or less notice, and (b) involves an annual base rental of more than $25,000;

3.8.5 all production payments or net profits interests burdening any of the Properties;

3.8.6 all contracts where the primary purpose thereof is to indemnify another Person and which will be binding on Buyer or on any of the Properties after Closing;

3.8.7 any contracts with any Affiliate of Seller that will not be terminated on or prior to Closing and which will be binding on Buyer or on any of the Properties after Closing;

3.8.8 all contracts that are a seismic or other geophysical acquisition or sharing agreement or license and which cover, are attributable to or relate to the Properties; and

3.8.9 all contracts that contain any mandatory drilling requirements with respect to any of the Properties.

Prior to the Closing Date, Seller has made available to Buyer true and correct copies of all of the Contracts. Except as separately described on Schedule 3.8, (a) all of the Contracts are in full force and effect and are legal, valid and binding obligations of Seller, and, to the Knowledge of Seller, are the legal, valid and binding obligation of each of other party thereto, except as the enforceability thereof may be limited by bankruptcy, insolvency or similar laws affecting creditors' rights generally or by principles of equity, (b) neither Seller nor, to Seller's Knowledge, any other Person is in material default under any of the Contracts, and (c) no event has occurred that with notice or lapse of time or both would constitute any material default under any such Contract by Seller or, to Seller's Knowledge, by any other party thereto. No written notice of default or breach has been received or delivered by Seller under any Contract, the resolution of which is currently outstanding. No currently effective written notices have been received by Seller of the exercise of any premature termination, price redetermination, market-out, shut-in or curtailment of or under any of the Contracts.

3.9. Environmental and Safety Matters. Notwithstanding any provision to the contrary in this Agreement, the representations and warranties contained in this Section 3.9, are the sole and exclusive representations and warranties of Seller pertaining or related to matters arising under or with respect to applicable Environmental Laws. Except as set forth in Schedule 3.9, (a) except for any noncompliance that has been remediated in accordance with applicable Environmental Law, to Seller's Knowledge, during the period from October 1, 2016 to the Closing Date, such Properties have been operated in compliance, in all material respects, with the regulatory requirements of all applicable Environmental Laws; (b) to Seller's Knowledge, there is no contamination of groundwater, surface water or soil on the Properties resulting from Hydrocarbon activities on the Properties by Seller or any of its Affiliates, or any Third Party, for which Seller would be liable, and to Seller's Knowledge, no Hazardous Substance has been handled, managed, stored, transported, processed, treated, disposed of (onsite or offsite) by Seller or any of its Affiliates or any Third Party in connection with the Properties or the ownership or operation of the Properties by Seller, in each case, which would reasonably be expected to result in a material violation of any material Permit or applicable Environmental Laws; (c) Seller has received no written notice of any alleged or actual material violation or non-compliance with any Environmental Law or of material non-compliance with the terms or conditions of any environmental Permits, arising from, based upon, associated with or related to the Properties or the ownership or operation of any thereof by Seller or any Affiliate; and (d) Seller has provided Buyer true and accurate copies of all written

environmental reports, studies and notices prepared by a Third Party on behalf of, or delivered by a Governmental Authority to, Seller or any of its Affiliates with respect to any of the Properties.

3.10. Current Commitments. Except as set forth on Schedule 3.10, as of the Effective Time, Seller is not legally or contractually obligated for any future commitments requiring an expenditure by Seller in excess of Fifty Thousand Dollars ($50,000) (net to Seller's interest) relating to any of the Properties.

3.11. Suspended Funds. Schedule 3.11 sets forth, as of the Effective Time, all Suspended Funds with respect to the Properties.

3.12. Gas Imbalances. Schedule 3.12 sets forth, as of the Effective Time, all Gas Imbalances with respect to the Properties.

3.13. Advance Payments. Except as set forth on Schedule 3.13, Seller is not obligated by virtue of any take or pay payment, advance payment or other similar payment (other than customary gas balancing arrangements and for the rights of any lessor to take free gas under the terms of the relevant Real Property Interest for its use on the lands covered thereby) to deliver Hydrocarbons, or proceeds from the sale thereof, attributable to the Properties at some future time without receiving payment therefor at or after the time of delivery.

3.14. Payout Balances. Schedule 3.14 contains a list, which is complete and accurate, of the status of the Payout Balance, as of the Effective Time, for each of the Wells. "***Payout Balance***" means the status, as of the date of the calculations, of the recovery by Seller or a third party of a cost amount specified in the contract relating to a well out of the revenue from such well where the NRI of Seller therein will be reduced or Seller's WI therein will be increased when such amount has been recovered.

3.15. PPRs, Rights and Required Consents. Except as set forth in Schedule 3.15, no Property is subject to (a) any preferential right of purchase, right of first refusal or other agreement which gives a Third Party the right to purchase any interest in a Property or any tag along rights, drag along rights, co-sale rights or similar rights, or (b) any Required Consent.

3.16. Leases. Neither Seller nor, to Seller's Knowledge, any other Person is in material default under any of the Real Property Interests and no event has occurred that, with notice or lapse of time or both, would constitute a material default by Seller or, to Seller's Knowledge, by any other Person under any Real Property Interest. No party to any Real Property Interest or any successor to the interest of such party has filed or, to Seller's Knowledge, threatened in writing to file any action to terminate, cancel, rescind or procure judicial reformation of any Real Property Interest. Seller has timely paid, in all material respects, all rentals, delay rentals, shut-in royalties, royalties, overriding royalties, and other burdens due by Seller with respect to the Properties.

3.17. Wells and Equipment. Except as set forth on Schedule 3.17, Seller has not received any written notice that the Wells, platforms, pits, or other facilitates or equipment located on the Properties are obligated by any Laws to be plugged, dismantled, closed or abandoned or are currently subject to exceptions to a requirement to plug and/or abandon issued by a Governmental Authority.

3.18. Operations. Seller has not declined to participate in any operation or activity proposed with respect to the Properties that could result in its interest in the Properties becoming subject to a penalty or forfeiture as a result of such election not to participate in such operation or activity, except to the extent reflected in the NRI and WI for such Properties set forth in Exhibit A. Seller has paid or caused to be paid when due all operating and capital expenses with respect to the Properties.

3.19. Broker's or Finder's Fees. Neither Seller nor any of its Affiliates has incurred any liability, contingent or otherwise, for brokers', finders' or similar fees in respect of the transactions contemplated by this Agreement for which Buyer or its Affiliates will have any responsibility whatsoever.

3.20. Bankruptcy. There are no bankruptcy, reorganization or arrangement proceedings pending, being contemplated by or, to Seller's Knowledge, threatened against Seller or any Affiliate of Seller.

3.21. Absence of Certain Changes. To the Knowledge of Seller, since the Effective Time, there has not been any Casualty with respect to the Properties.

4. **Buyer's Representations and Warranties**. Buyer hereby represents and warrants to Seller as follows:

4.1. Organization and Good Standing. Buyer is duly formed, validly existing and in good standing under the Laws of the State of its formation and Buyer is duly qualified and/or licensed, as may be required, and in good standing, in all jurisdictions in which it carries on business or owns assets and such qualification is required by Law. Buyer has the power and authority to acquire and own the Properties and to conduct business in the State of Arizona.

4.2. Authority. Buyer has adequate power, authority and legal right to enter into and perform this Agreement and each Transaction Document and to consummate the transactions contemplated herein and therein, and Buyer has taken all necessary action to authorize the execution, delivery and performance of this Agreement and each other Transaction Document. This Agreement is (and each other Transaction Document will be) legal, valid and binding with respect to Buyer and enforceable against Buyer in accordance with its terms, except as the enforceability thereof may be limited by bankruptcy, insolvency, reorganization, moratorium or similar laws affecting creditors' rights generally or by principles of equity.

Taxes attributable to the Properties with respect to periods prior to the Effective Time;

(c) reserved;

(d) accounting for, failure to pay or the incorrect payment to any royalty owner, overriding royalty owner, working interest owner or other interest holder under the Properties insofar as the same are attributable to periods and Hydrocarbons produced prior to the Effective Time;

(e) gross negligence or willful misconduct of Seller or its Affiliates as operator of any of the Properties before the Closing;

(f) bodily injury, illness or death arising out of, incident to or in connection with operations on the Properties prior to the Closing;

(g) claims, demands, violations, actions, suits or other Proceedings to the extent existing as of the Closing and related to any of the Properties or the ownership, operation or maintenance thereof, including the matters set forth on Schedule 3.4;

(h) obligations or liabilities of Seller to any of its Affiliates to the extent accruing during the period prior to the Closing Date, other than for goods or services furnished in the Ordinary Course of Business on an arms-length basis;

(i) plugging, abandoning, closing or decommissioning wells, facilities, equipment, personal property, pits and/or fixtures located on or comprising part of the Properties that, as of Closing, were required by applicable Law to be plugged, abandoned, closed or decommissioned;

(j) disposal or transportation prior to the Closing Date of any Hazardous Materials from the Properties; and

(k) the Excluded Assets.

10.2. Seller's Indemnification. Upon the Closing, Seller will agree (and, upon the delivery of the Assignment to Buyer, Seller shall be deemed to have agreed) to pay, defend, indemnify, reimburse and hold harmless Buyer and its Affiliates and Buyer's and its Affiliates' partners, members, managers, directors, officers, agents and employees (the "***Buyer Indemnified Parties***") for, from and against any and all Liabilities (including interest, reasonable legal fees, and expenses of litigation and attorneys' fees in enforcing this indemnity) incurred, suffered, paid by or resulting to any of the Buyer Indemnified Parties and which result from, arise out of or in connection with, are based upon, or exist by reason of: (a) the breach of any representation or warranty of Seller set forth in Section 3 of this Agreement (other than a breach of any Fundamental Representation); (b) the breach of any Fundamental Representation of Seller; (c) any failure by Seller to perform any of

its covenants or obligations in this Agreement; or (d) any of the Retained Liabilities.

10.3. Buyer's Indemnification. Upon the Closing, Buyer will agree (and, upon the delivery of the Assignment by Seller, Buyer shall be deemed to have agreed) to pay, defend, indemnify, reimburse and hold harmless Seller and its Affiliates and Seller's and its Affiliates' partners, members, managers, directors, officers, agents and employees (the "***Seller Indemnified Parties***") for, from and against any and all Liabilities (including interest, reasonable legal fees, and expenses of litigation and attorneys' fees in enforcing this indemnity) incurred, suffered, paid by or resulting to any of the Seller Indemnified Parties and which result from, arise out of or in connection with, are based upon, or exist by reason of: (a) the breach of any representation or warranty of Buyer set forth in Section 4 of this Agreement (other than a breach of any Fundamental Representation); (b) the breach of any Fundamental Representation of Buyer; (c) any failure by Buyer to perform any of its covenants or obligations in this Agreement; or (d) any of the Assumed Obligations.

10.4. EXCLUSIVE REMEDY; EXPRESS NEGLIGENCE.

NOTWITHSTANDING ANYTHING TO THE CONTRARY CONTAINED IN THIS AGREEMENT, THE INDEMNIFICATION SET FORTH IN SECTION 10.2 AND SECTION 10.3 SHALL CONSTITUTE THE SOLE AND EXCLUSIVE POST-CLOSING REMEDIES OF THE PARTIES AGAINST EACH OTHER WITH RESPECT TO BREACHES OF THE REPRESENTATIONS, WARRANTIES, COVENANTS AND AGREEMENTS OF THE PARTIES CONTAINED IN SECTION 3, SECTION 4, AND SECTION 5 (OTHER THAN SECTIONS 5.3, 5.4, 5.5, AND 5.9) OF THIS AGREEMENT. WITHOUT LIMITING THE FOREGOING, EXCEPT FOR (A) THE REMEDIES CONTAINED IN SECTION 10.2 AND SECTION 10.3, (B) ANY OTHER REMEDIES AVAILABLE AT LAW OR IN EQUITY FOR A PARTY'S BREACH OF THIS AGREEMENT (OTHER THAN WITH RESPECT TO SECTION 3, SECTION 4, AND SECTION 5 (EXCLUDING SECTIONS 5.3, 5.4, 5.5, AND 5.9), AND (C) THE REMEDIES AVAILABLE AT LAW OR IN EQUITY IN CONNECTION WITH ANY TRANSACTION DOCUMENT DELIVERED BY THE PARTIES IN CONNECTION WITH THE CONSUMMATION OF THE TRANSACTIONS CONTEMPLATED HEREBY (INCLUDING THE SPECIAL WARRANTY OF TITLE CONTAINED IN THE ASSIGNMENT AND INCLUDING ANY REMEDIES EXPRESSLY PROVIDED IN SUCH DOCUMENTS DELIVERED PURSUANT TO THIS AGREEMENT), FROM AND AFTER CLOSING, EACH PARTY RELEASES, REMISES AND FOREVER DISCHARGES THE OTHER PARTY AND THE OTHER PARTY'S AFFILIATES AND THE OTHER PARTY'S AND ITS AFFILIATES' PARTNERS, MEMBERS, MANAGERS, DIRECTORS, OFFICERS, AGENTS, EMPLOYEES, ADVISORS AND REPRESENTATIVES FROM ANY AND ALL CLAIMS, CAUSES OF

ACTIONS, PAYMENTS, CHARGES, JUDGMENTS, ASSESSMENTS, LIABILITIES, LOSSES, DAMAGES, PENALTIES, FINES OR COSTS AND EXPENSES (INCLUDING ANY ATTORNEYS' FEES, LEGAL OR OTHER EXPENSES INCURRED IN CONNECTION THEREWITH AND INCLUDING LIABILITIES, COSTS, LOSSES AND DAMAGES FOR PERSONAL INJURY OR DEATH OR PROPERTY DAMAGE), IN LAW OR IN EQUITY, KNOWN OR UNKNOWN, WHICH IT (OR ITS RESPECTIVE INDEMNIFIED PARTIES HEREUNDER) MIGHT NOW OR SUBSEQUENTLY MAY HAVE, BASED ON, RELATING TO OR ARISING OUT OF THIS AGREEMENT, THE OWNERSHIP, USE OR OPERATION OF THE PROPERTIES PRIOR TO THE CLOSING, OR THE CONDITION, QUALITY, STATUS OR NATURE OF THE PROPERTIES PRIOR TO THE CLOSING, INCLUDING RIGHTS TO CONTRIBUTION UNDER ANY ENVIRONMENTAL LAW, BREACHES OF STATUTORY OR IMPLIED WARRANTIES, NUISANCE OR OTHER TORT ACTIONS, RIGHTS TO PUNITIVE DAMAGES, COMMON LAW RIGHTS OF CONTRIBUTION, AND RIGHTS UNDER INSURANCE MAINTAINED BY SELLER OR ANY OF ITS AFFILIATES.

WITHOUT LIMITING OR ENLARGING THE SCOPE OF THE INDEMNIFICATION, DEFENSE AND ASSUMPTION PROVISIONS SET FORTH IN THIS AGREEMENT, TO THE FULLEST EXTENT PERMITTED BY LAW, AN INDEMNIFIED PARTY SHALL BE ENTITLED TO INDEMNIFICATION HEREUNDER IN ACCORDANCE WITH THE TERMS OF SECTIONS 10.2 OR 10.3, REGARDLESS OF WHETHER THE ACT, OCCURRENCE OR CIRCUMSTANCE GIVING RISE TO ANY SUCH INDEMNIFICATION OBLIGATION IS THE RESULT OF THE SOLE, ACTIVE, PASSIVE, CONCURRENT OR COMPARATIVE NEGLIGENCE, STRICT LIABILITY, BREACH OF DUTY (STATUTORY OR OTHERWISE), OR OTHER FAULT OR VIOLATION OF ANY LAW OF OR BY ANY SUCH INDEMNIFIED PARTY, *PROVIDED THAT* NO SUCH INDEMNIFICATION SHALL BE APPLICABLE TO THE EXTENT OF ANY GROSS NEGLIGENCE OR WILLFUL MISCONDUCT, BAD FAITH OR FRAUD OF THE INDEMNIFIED PARTY, EACH OF BUYER AND SELLER ACKNOWLEDGES AND AGREES THAT THIS STATEMENT COMPLIES WITH THE EXPRESS NEGLIGENCE RULE AND IS CONSPICUOUS.

10.5. Indemnification Procedure. Claims for indemnification under Section 10.2 and Section 10.3 shall be asserted and resolved as follows:

10.5.1 For purposes of this Section 10.5, the term "***Indemnifying Party***" when used in connection with particular Liabilities shall mean the Party or Parties having an obligation to indemnify the other Party and/or other Persons with respect to such Liabilities pursuant to Section 10.2 or 10.3, and the term "***Indemnified Party***" when used in connection with particular

Liabilities shall mean the Party and/or other Persons having the right to be indemnified with respect to such Liabilities by the Indemnifying Party pursuant to Section 10.2 or 10.3.

10.5.2 To make a claim for indemnification under Section 10.2 or 10.3, an Indemnified Party shall notify the Indemnifying Party of its claim under this Section 10.5, including the specific details of and specific basis under this Agreement for its claim (the "***Claim Notice***") and may thereafter exercise any remedies available to such Indemnified Party under this Agreement; *provided, however*, the failure of any Indemnified Party to give a Claim Notice as provided herein will not relieve the indemnifying Party of any obligations hereunder, to the extent the indemnifying Party is not materially prejudiced thereby. In the event that the claim for indemnification is based upon a claim by a Third Party against the Indemnified Party (a "***Third Party Claim***"), the Indemnified Party shall provide its Claim Notice promptly after the Indemnified Party has actual knowledge of the Third Party Claim and shall enclose a copy of all papers (if any) served with respect to the Third Party Claim; *provided, however*, the failure of any Indemnified Party to give notice of a Third Party Claim as provided in this Section 10.5 shall not relieve the Indemnifying Party of its obligations under Section 10.2 or 10.3 (as applicable) except to the extent such failure materially prejudices the Indemnifying Party's ability to defend against the Third Party Claim.

10.5.3 In the case of a claim for indemnification based upon a Third Party Claim, the Indemnifying Party shall have thirty (30) days from its receipt of the Claim Notice to notify the Indemnified Party whether it admits or denies its obligation to defend and indemnify the Indemnified Party against such Third Party Claim at the sole cost and expense of the Indemnifying Party. The Indemnified Party is authorized, prior to and during such thirty (30) day period, to file any motion, answer or other pleading that it shall deem necessary or appropriate to protect its interests or those of the Indemnifying Party and that is not prejudicial to the Indemnifying Party.

10.5.4 If the Indemnifying Party admits its potential obligation to defend and indemnify the Indemnified Party against a Third Party Claim, then it shall have the right and obligation to diligently defend, at its sole cost and expense, the Indemnified Party against such Third Party Claim. The Indemnifying Party shall have full control of such defense and proceedings, including any compromise or settlement thereof, unless the compromise or settlement includes the payment of any amount by (because of the Basket or otherwise), the performance of any obligation by or the limitation of any right or benefit of, the Indemnified Party, in which event such settlement or compromise shall not be effective without the consent of the Indemnified Party, which shall not be unreasonably withheld or delayed. If requested by the Indemnifying Party, the Indemnified Party agrees to cooperate (at the sole cost and expense of the

Indemnifying Party) in contesting any Third Party Claim which the Indemnifying Party elects to contest. The Indemnified Party may participate in, but not control, at its own expense, any defense or settlement of any Third Party Claim controlled by the Indemnifying Party pursuant to this Section 10.5. An Indemnifying Party shall not, without the written consent of the Indemnified Party, (a) settle any Third Party Claim or consent to the entry of any judgment with respect thereto which does not include an unconditional written release of the Indemnified Party from all liability in respect of such Third Party Claim or (B) settle any Third Party Claim or consent to the entry of any judgment with respect thereto in any manner that may materially and adversely affect the Indemnified Party (other than as a result of money damages fully covered by the indemnity).

10.5.5 If the Indemnifying Party does not admit its potential obligation, or admits its potential obligation to defend and indemnify the Indemnified Party against a Third Party Claim, but fails to diligently prosecute, indemnify against or settle the Third Party Claim, then the Indemnified Party shall have the right to defend against the Third Party Claim at the sole cost and expense of the Indemnifying Party, with counsel of the Indemnified Party's choosing, subject to the right of the Indemnifying Party to admit its potential liability and assume the defense of the Third Party Claim at any time prior to settlement or final determination thereof. If the Indemnifying Party has not yet admitted its potential obligation to defend and indemnify the Indemnified Party against a Third Party Claim, the Indemnified Party shall send written notice to the Indemnifying Party of any proposed settlement and the Indemnifying Party shall have the option for ten (10) days following receipt of such notice to (a) admit in writing its potential liability to indemnify the Indemnified Party from and against the liability and consent to such settlement, (b) if potential liability is so admitted, reject, in its reasonable judgment, the proposed settlement, or (c) deny liability. Any failure by the Indemnifying Party to respond to such notice shall be deemed to be an election under subsection (c) above.

10.5.6 In the case of a claim for indemnification not based upon a Third Party Claim, the Indemnifying Party shall have thirty (30) days from its receipt of the Claim Notice to (a) cure the Liabilities complained of, (b) admit its liability for such Liability or (c) dispute the claim for such Liabilities. If the Indemnifying Party does not notify the Indemnified Party within such thirty (30) day period that it has cured the Liabilities or that it disputes the claim for such Liabilities, then the Indemnifying Party shall be deemed to be disputing the claim for such Liabilities hereunder.

10.6. Certain Limitations on Indemnity Obligations.

10.6.1 No claim of the Buyer Indemnified Parties pursuant to Section 10.2(a) shall be made hereunder unless the amount of such claim exceeds an

amount equal to Twenty-Five Thousand Dollars ($25,000) (each an "***Individual Claim***"). In addition, no claim of the Buyer Indemnified Parties pursuant to Section 10.2(a) shall be made hereunder until the total of all Individual Claims pursuant to such Section exceeds two percent (2%) of the unadjusted Purchase Price (the "***Basket***"). If the total amount of all of the Buyer Indemnified Parties' Individual Claims exceeds the Basket, then the Seller's obligations under Section 10.2(a) shall be limited to the amount by which the aggregate amount of such Individual Claims exceeds the Basket.

10.6.2 In no event will Seller's aggregate liability under Section 10.2(a) exceed fifteen percent (15%) of the unadjusted Purchase Price.

10.6.3 The amount of any indemnification provided under Section 10.2 or 10.3 shall be net of any amounts actually recovered by the indemnified party under insurance policies (net of any collection costs, and excluding the proceeds of any insurance policy issued or underwritten by the indemnified Person or its Affiliates); *provided, however*, that no Person shall be required to seek recovery under any policy of insurance as a condition to indemnification hereunder.

10.6.4 All of the representations and warranties set forth in this Agreement that are qualified as to "material," "materiality," "material respects," "material adverse effect," "material adverse effect" or words of similar import or effect shall be deemed to have been made without any such qualification for all purposes of this Section 10.6.4, including for purposes of determining the existence of a breach of a representation or warranty (and whether the indemnified Person is entitled hereunder to indemnification) as well as for purposes of determining whether a claim exceeds the Individual Claim threshold or Basket.

11. **Reserved**.

12. **Reserved**.

13. **Miscellaneous**. It is further agreed as follows:

13.1. Time. Time is of the essence of this Agreement.

13.2. Notices. All notices and communications required or permitted under this Agreement shall be in writing addressed as indicated below, and any communication or delivery hereunder shall be deemed to have been duly delivered upon the earliest of: (a) actual receipt by the Party to be notified; (b) if sent by U.S. certified mail, postage prepaid, return receipt requested, then the date shown as received on the return notice; (c) if by email, upon receipt, *provided* that if such email is received after 5:00 pm local time of such recipient, such email will be deemed to have been received on the following Business Day; or (d) if by Federal Express overnight delivery (or other reputable overnight delivery service),

the date shown on the notice of delivery. Addresses for all such notices and communication shall be as follows:

To Seller:	Nacogdoches Oil and Gas, Inc. 816 North Street Nacogdoches, Texas 75961 Attention: Michael L. Finley Facsimile: (936) 560-5088 Email: mike.finley@nogtx.com
To Buyer:	Nordic Oil USA 4 LLC 113 Jean Baptiste Dr. Lafayette, Louisiana 70503 Attention: David Burns Email: burnsdavid@verizon.net
With a copy to:	Porter Hedges LLP 1000 Main, 36th Floor Houston, Texas 77002 Attention: McCaleb (Mac) Marshall Facsimile: (713) 226-6312 Email: mmarshall@porterhedges.com

Either Party may, upon written notice to the other Party, change the address(es) and person(s) to whom such communications are to be directed. If the date specified in this Agreement for giving any notice or taking any action is not a Business Day (or if the period during which any notice is required to be given or any action taken expires on a date which is not a Business Day), then the date for giving such notice or taking such action (and the expiration date of such period during which notice is required to be given or action taken) shall be the next day which is a Business Day.

13.3. Survival. The Fundamental Representations and the special warranty of title in the Assignment will survive the Closing without time limit. All of the remaining representations and warranties of the Parties contained in Section 3 and Section 4 of this Agreement will survive the Closing Date for a period of twelve (12) months and shall thereafter be of no further force or effect. The remainder of this Agreement shall survive the Closing without time limit, except as may otherwise be expressly provided herein. Representations, warranties, covenants and agreements shall be of no further force and effect after the date of their expiration; *provided, however*, there shall be no termination of any bona fide claim that is asserted pursuant to this Agreement prior to its expiration date with respect to such a representation, warranty, covenant or agreement.

The indemnities in Sections 10.2(a), 10.2(b), 10.3(a), and 10.3(b) shall terminate as of the termination date of the respective representation, warranty, covenant or agreement that is subject to indemnification.

The indemnities in Sections 10.2(c), 10.3(c) and 10.3(d) shall survive the Closing without time limit. The indemnity in Section 10.2(d) with respect to Retained Liabilities shall be subject to the following survival periods: (i) the indemnity for the Retained Liabilities set forth in Section 10.1(b), Section 10.1(g), Section 10.1(h), and Section 10.1(k) shall survive the Closing without time limit; and (ii) the indemnity for the Retained Liabilities set forth in Section 10.1(a), Section 10.1(c), Section 10.1(d), Section 10.1(e), Section 10.1(f), Section 10.1(i), and Section 10.1(j) shall survive the Closing for a period of three (3) years.

13.4. Cooperation. At all times following the consummation of this Agreement, the Parties agree to execute and deliver, or cause to be executed and delivered, such documents and do, or cause to be done, such other acts and things as might reasonably be requested by any Party to this Agreement to assure that the benefits of this Agreement are realized by the Parties, including, without limitation, the execution and delivery any documents or applications necessary to transfer title to the vehicles, rolling stock and equipment described on Exhibit A.

13.5. No Third Party Beneficiaries. Except for the indemnification rights of the Seller Indemnified Parties and the Buyer Indemnified Parties under Section 10, nothing in this Agreement, express or implied, is intended to confer upon anyone, other than the Parties hereto and their respective successors and assigns, any rights or remedies under or by reason of this Agreement or to constitute any Person a third party beneficiary of this Agreement.

13.6. Cumulative Remedies. Subject to the other provisions hereof, no failure on the part of any Party to this Agreement to exercise and no delay in exercising any right hereunder will operate as a waiver thereof, nor will any single or partial exercise by any Party hereto of any right hereunder preclude any other or further right of exercise thereof or the exercise of any other right.

13.7. **CHOICE OF LAW; VENUE. THIS AGREEMENT WILL BE INTERPRETED, CONSTRUED AND ENFORCED IN ACCORDANCE WITH THE LAWS OF THE STATE OF TEXAS (EXCEPT AS TO TITLE MATTERS, WHICH SHALL BE INTERPRETED AND CONSTRUED IN ACCORDANCE WITH THE LAWS OF THE STATE WHERE THE APPLICABLE PROPERTY IS LOCATED), WITHOUT GIVING EFFECT TO ANY RULES OR PRINCIPLES OF CONFLICTS OF LAW THAT MIGHT OTHERWISE REFER TO THE LAWS OF ANOTHER JURISDICTION. EACH OF SELLER AND BUYER CONSENT TO THE EXERCISE OF JURISDICTION IN PERSONAM BY THE COURTS OF THE STATE OF TEXAS FOR ANY ACTION ARISING OUT OF THIS AGREEMENT, THE OTHER TRANSACTION DOCUMENTS OR THE TRANSACTIONS CONTEMPLATED HEREBY. ALL PROCEEDINGS**

WITH RESPECT TO, ARISING DIRECTLY OR INDIRECTLY IN CONNECTION WITH, OUT OF, RELATED TO OR FROM THIS AGREEMENT OR THE OTHER TRANSACTION DOCUMENTS SHALL BE EXCLUSIVELY LITIGATED IN COURTS HAVING SITES IN HOUSTON, HARRIS COUNTY, TEXAS, AND EACH PARTY WAIVES ANY OBJECTION IT MAY HAVE TO VENUE OR JURISDICTION THEREIN.

13.8. Entire Agreement. This Agreement, the Assignment and the other Transaction Documents constitute the entire agreement between the Parties with respect to the subject matter hereof and there are no agreements, understandings, warranties or representations except as set forth herein or therein.

13.9. Assignment. Except for any assignment to (i) an Affiliate of Buyer or (ii) any Debt Financing Party or any purchaser at any foreclosure sale in connection with a Financing or any assignee, designee or transferee under any instrument of assignment or transfer in lieu of foreclosure in connection with a Financing, no Party may assign its rights nor delegate its duties under this Agreement without the express written consent of the other Party to this Agreement. The terms and provisions of this Agreement shall be binding upon and inure to the benefit of Seller and Buyer and their respective successors and permitted assigns.

13.10. Like-Kind Exchanges. Each Party consents to the other Party's assignment of its rights and obligations under this Agreement to Petroleum Strategies, Inc. as Qualified Intermediary (as that term is defined in Section 1.1031(k)-1(g)(4)(v) of the Treasury Regulations), or to its Qualified Exchange Accommodation Titleholder (as that term is defined in Internal Revenue Service Revenue Procedure 2000-37), in connection with effectuation of a like-kind exchange. However, Seller and Buyer acknowledge and agree that any assignment of this Agreement to a Qualified Intermediary or to a Qualified Exchange Accommodation Titleholder does not release either Party from any of their respective liabilities and obligations to each other under the Agreement. Each Party agrees to reasonably cooperate with the other to attempt to structure the transaction as a like-kind exchange. Notwithstanding anything in this Section 13.10 to the contrary, (i) nothing in this Section 13.10 shall require any Party to pay additional costs or incur any additional liabilities, (ii) any assignee under this Section 13.10 shall be jointly and severally liable with the assigning Party for the liabilities and obligations of the assigning Party hereunder, and any such assignee shall acknowledge same in the applicable assignment, with the other Party to be made a direct third-party beneficiary of such acknowledgement, and (iii) neither Party is making any representation or warranty to the other Party or to any other Person as to whether any transaction or transactions qualify as a like-kind exchange or as to any other Tax matters.

13.11. Amendment. Neither this Agreement nor any of the provisions hereof can be changed, waived, discharged or terminated, except by an instrument in writing

signed by the Party against whom enforcement of the change, waiver, discharge or termination is sought.

13.12. Severability. If any clause or provision of this Agreement is illegal, invalid or unenforceable under any present or future Law or public policy, the remainder of this Agreement shall remain in full force and effect so long as the economic or legal substance of the transactions contemplated hereby is not affected in any materially adverse manner to any Party. It is the intention of the Parties that if any such provision is held to be illegal, invalid or unenforceable, the Parties will negotiate in good faith to modify the Agreement to add in lieu thereof a provision as similar in terms to such provisions as is possible to make such provision legal, valid and enforceable.

13.13. Attorney Fees. If a Party institutes an action or proceeding against the other Party relating to the provisions of this Agreement, then the Party to such action or proceeding which does not prevail (as determined by a court of competent jurisdiction in a final, non-appealable decision) shall reimburse the prevailing Party therein (regardless of whether the prevailing Party is plaintiff or defendant in such action or proceeding) for the reasonable legal fees and expenses incurred by the prevailing Party in connection with such action or proceeding, including any appeal therefrom. The applicable Governmental Authority shall be empowered to designate the prevailing party for purposes of this Section 14.12.

13.14. Waiver. Waiver of performance of any obligation or term contained in this Agreement by a Party, or waiver by a Party of the other's default hereunder, will not operate as a waiver of performance of any other obligation or term of this Agreement or a future waiver of the same obligation or a waiver of any future default.

13.15. Counterparts; Facsimiles; Electronic Transmission. This Agreement may be executed in multiple counterparts, each of which will be an original instrument, but all of which will constitute one agreement. The execution and delivery of this Agreement by any Party may be evidenced by facsimile or other electronic transmission (including scanned documents delivered by email), which shall be binding upon all Parties.

13.16. **JOINT ACKNOWLEDGMENT. THIS WRITTEN AGREEMENT REPRESENTS THE FINAL AGREEMENT BETWEEN THE PARTIES AND MAY NOT BE CONTRADICTED BY EVIDENCE OF PRIOR, CONTEMPORANEOUS OR SUBSEQUENT ORAL AGREEMENTS OF THE PARTIES. THERE ARE NO UNWRITTEN ORAL AGREEMENTS BETWEEN THE PARTIES REGARDING THE SUBJECT MATTER CONTEMPLATED BY THIS AGREEMENT.**

13.17. **WAIVER OF JURY TRIAL, SPECIAL DAMAGES, ETC. EACH OF BUYER AND SELLER HEREBY KNOWINGLY, VOLUNTARILY, INTENTIONALLY AND IRREVOCABLY (A) WAIVES, TO THE**

MAXIMUM EXTENT NOT PROHIBITED BY LAW, ANY RIGHT IT MAY HAVE TO A TRIAL BY A JURY IN RESPECT OF ANY LITIGATION BASED HEREON, OR DIRECTLY OR INDIRECTLY AT ANY TIME ARISING OUT OF, UNDER OR IN CONNECTION WITH THIS AGREEMENT OR ANY TRANSACTION CONTEMPLATED HEREBY OR ASSOCIATED HEREWITH, (B) WAIVES, TO THE MAXIMUM EXTENT NOT PROHIBITED BY LAW, ANY RIGHT IT MAY HAVE TO CLAIM OR RECOVER IN ANY SUCH LITIGATION OR ARBITRATION ANY SPECIAL DAMAGES, AND (C) ACKNOWLEDGES THAT IT HAS BEEN INDUCED TO ENTER INTO THIS AGREEMENT AND THE TRANSACTIONS CONTEMPLATED HEREBY BY, AMONG OTHER THINGS, THE MUTUAL WAIVERS AND CERTIFICATIONS CONTAINED IN THIS SECTION 13.17, IN EACH CASE IT BEING THE EXPRESS INTENT, UNDERSTANDING, AND AGREEMENT OF THE PARTIES THAT SUCH WAIVERS ARE TO BE GIVEN THE FULLEST EFFECT, NOTWITHSTANDING THE NEGLIGENCE (WHETHER SOLE, JOINT OR CONCURRENT), STRICT LIABILITY OR OTHER LEGAL FAULT OF ANY PARTY. AS USED IN THIS SECTION 13.17, "*SPECIAL DAMAGES*" MEANS ALL SPECIAL, EXEMPLARY, PUNITIVE, REMOTE AND SPECULATIVE DAMAGES (REGARDLESS OF HOW NAMED), BUT DOES NOT INCLUDE ANY PAYMENTS OR FUNDS WHICH ANY PARTY HAS EXPRESSLY PROMISED TO PAY OR DELIVER TO THE OTHER PARTY OR ANY CLAIMS OF ANY THIRD PARTY FOR WHICH ONE PARTY HAS AGREED TO INDEMNIFY THE OTHER PARTY UNDER THIS AGREEMENT.

13.18. Mutuality. The Parties acknowledge and declare that this Agreement is the result of extensive negotiations between them. Accordingly, if there is any ambiguity in this Agreement, there shall be no presumption that this instrument was prepared solely by either Party.

13.19. Schedules. The inclusion of any information (including dollar amounts) in any section of the disclosure Schedules hereto shall not be deemed to be an admission or acknowledgment by Seller that such information is required to be listed on such Schedule. The matters reflected in the Schedules are not necessarily limited to matters required by this Agreement to be reflected in the Schedules. Any such additional matters are set forth for informational purposes only and do not necessarily include other matters of a similar nature. The Schedules are qualified in their entirety by reference to the specific provisions of this Agreement, and are not intended to constitute, and shall not be construed as constituting representations or warranties of either Party, except as and to the extent provided in this Agreement. Headings have been inserted on the sections of the Schedules for convenience or reference only, shall not constitute a part of the Schedules or this Agreement, and shall to no extent have the effect of amending or changing the express description of the Sections as set forth in this Agreement. The information contained in this Agreement, the Exhibits and the Schedules hereto is disclosed solely for purposes of this Agreement, and no information contained

herein or therein shall be deemed to be an admission by any Party hereto to any Third Party of any matter whatsoever (including materiality, any violation of a legal requirement or breach of contract).

**[REMAINDER OF PAGE INTENTIONALLY LEFT BLANK
SIGNATURE PAGES FOLLOW]**

IN WITNESS WHEREOF, I have set forth my name below, solely in my capacity as President of the Seller, as of the date first written above.

SELLER:

NACOGDOCHES OIL AND GAS, INC.

By: _____
Brent Ivy, Vice President

IN WITNESS WHEREOF, Buyer has executed this Agreement as of the Execution Date.

BUYER:

NORDIC OIL USA 4 LLC, a Delaware limited liability company

By:_____

David Burns, President

Exhibit A

PROPERTIES AND ALLOCATED VALUES

Real Property Interests

DINEH-BI-KEYAH— ARIZONA (APACHE COUNTY, ARIZONA)

Lease#: 14-20-0603-8822 Allocated Value: $4,155,121.19

Oil and Gas Mining Lease - Tribal Indian Lands, dated the 9th day of October, 1964, between the Chairman, Navajo Tribal Council of Apache County, State of Arizona, for and on behalf of the Navajo Tribe of Indians, as lessor, and Kerr-McGee Oil Industries, Inc., as lessee, recorded with the Department of the Interior, Bureau of Indian Affairs, on October 29, 1964, covering all of Sections 27, 28, 33 and 34 in Township 36 North, Range 30 East, G&SRM, Apache County, Arizona.

WI: 25%

NRI: 20.833333333%

Gross Acreage: 2,560 acres

Net Acreage: 640 acres

Lease#: 14-20-0603-8812 Allocated Value: $4,203,814.03

Oil and Gas Mining Lease - Tribal Indian Lands, dated the 12th day of October, 1964, between the Chairman, Navajo Tribal Council of Apache County, State of Arizona, for and on behalf of the Navajo Tribe of Indians, as lessor, and Humble Oil & Refining Company, as lessee, recorded with the Department of the Interior, Bureau of Indian Affairs, on October 26, 1964, covering all of Sections 25, 26, 35, and 36 in Township 36 North, Range 29 East, G&SRM, Apache County, Arizona.

WI: 25%

NRI: 20.833333333%

Gross Acreage: 2,590 acres

Net Acreage: 647.50 acres

Lease#: 14-20-0603-8823 Allocated Value: $4,111,297.65

Oil and Gas Mining Lease - Tribal Indian Lands, dated the 9th day of October, 1964, between the Chairman, Navajo Tribal Council of Apache County, State of Arizona, for and on behalf of the Navajo Tribe of Indians, as lessor, and Kerr-McGee Oil Industries, Inc., as lessee, recorded

with the Department of the Interior, Bureau of Indian Affairs, on October 29, 1964, covering all of Sections 29, 30, 31, and 32 in Township 36 North, Range 30 East, G&SRM, Apache County, Arizona.

WI: 25%

NRI: 20.833333333%

Gross Acreage: 2,533 acres

Net Acreage: 633.25 acres

Lease#: 14-20-0603-8876 **Allocated Value: $1,019,303.17**

Oil and Gas Mining Lease - Tribal Indian Lands, dated the 15th day of January, 1965, between the Chairman, Navajo Tribal Council of Apache County, State of Arizona, for and on behalf of the Navajo Tribe of Indians, as lessor, and Humble Oil & Refining Company, as lessee, recorded with the Department of the Interior, Bureau of Indian Affairs, on February 18, 1965, covering all of Section 6 in Township 35 North, Range 30 East, G&SRM, Apache County, Arizona.

WI: 25%

NRI: 20.833333333%

Gross Acreage: 628 acres

Net Acreage: 157 acres

Lease#: 14-20-0603-8889 **Allocated Value: $1,038,780.30**

Oil and Gas Mining Lease - Tribal Indian Lands, dated the 15th day of January, 1965, between the Chairman, Navajo Tribal Council of Apache County, State of Arizona, for and on behalf of the Navajo Tribe of Indians, as lessor, and Kerr-McGee Oil Industries, Inc., as lessee, recorded with the Department of the Interior, Bureau of Indian Affairs, on February 18, 1965, covering all of Section 5 in Township 35 North, Range 30 East, G&SRM, Apache County, Arizona.

WI: 25%

NRI: 20.833333333%

Gross Acreage: 640 acres

Net Acreage: 160 acres

Wells and Well Equipment

DINEH-BI-KEYAH— ARIZONA (APACHE COUNTY, ARIZONA)

Allocated Value: $671,683.66

Lease#: 14-20-0603-8823

Navajo 1— Oil; API #02-001-20001 WI: 25%; NRI: 20.833333333%

American 160-20-74 pump jack, rods, tubing, D-JAX pump off controller (POC), chemical and methanol tanks, Bluetick automation equipment, down hole pump.

Navajo 3X— Oil; API #02-001-20011 WI: 25%; NRI: 20.833333333%

Cabot 160 pump jack, rods, tubing, D-JAX pump off controller (POC), (1) 400 bbl. tank, chemical and methanol tanks, Bluetick automation equipment, down hole pump.

Navajo 4— Helium; API #02-001-20009 WI: 25%; NRI: 20.833333333%

Variable choke, meter run, ABB Total Flow meter, vertical separator, (1) 210 bbl. tank, Bluetick automation equipment, tubing, packer.

Navajo 6— Oil; API #02-001-20014 WI: 25%; NRI: 20.833333333%

Lufkin 114-64 pump jack, rods, tubing, D-JAX pump off controller (POC), chemical and methanol tanks, Bluetick automation equipment, down hole pump.

Navajo 7— Salt Water Injection Well (SWD); API #02-001-20013 WI: 25%; NRI: 20.833333333%

Free Water Knockout (FWKO), (2) 400 bbl. tanks, well head, ABB meter, chemical and methanol tank, Bluetick automation equipment, tubing, packer.

Navajo 9— Oil; API #02-001-20020 WI: 25%; NRI: 20.833333333%

American 160-200-74 pump jack, rods, tubing, D-JAX pump off controller (POC), variable frequency drive (VFD), chemical and methanol tanks, Bluetick automation equipment, down hole pump.

Navajo 11— Oil; API #02-001-20106 WI: 25%; NRI: 20.833333333%

Cont. Busco 160-200-74 pump jack, rods, tubing, D-JAX pump off controller (POC), variable frequency drive (VFD), chemical and methanol tanks, Bluetick automation equipment, down hole pump.

Navajo 14— Oil; API #02-001-20040 WI: 25%; NRI: 20.833333333%

Alten A12CFC pump jack, rods, tubing, D-JAX pump off controller (POC), chemical and methanol tanks, Bluetick automation equipment, down hole pump.

Navajo 15— Helium; API #02-001-20041 WI: 25%; NRI: 20.833333333%

Variable choke, meter run, ABB Total Flow meter, horizontal separator, (1) 210 bbl. tank, Bluetick automation equipment, chemical injection tank and equipment, tubing, packer.

Navajo 16— Oil; API #02-001-20043 WI: 25%; NRI: 20.833333333%

Lufkin 114-64 pump jack, rods, tubing, D-JAX pump off controller (POC), chemical and methanol tanks, (1) 210 bbl. tank, Bluetick automation equipment, down hole pump.

Navajo 17— Oil; API #02-001-20190 WI: 25%; NRI: 20.833333333%

Permian C-640-365-168 pump jack, rods, tubing, D-JAX pump off controller (POC), variable frequency drive (VFD), chemical and methanol tanks, (1) 210 bbl. tank, vent tank, Bluetick automation equipment, down hole pump.

Navajo 19— Oil; API #02-001-20240 WI: 25%; NRI: 20.833333333%

American D160-200-74 pump jack, rods, tubing, D-JAX pump off controller (POC), chemical and methanol tanks, Bluetick automation equipment, down hole pump.

Navajo 20— Oil; API #02-001-20245 WI: 25%; NRI: 20.833333333%

American D160-200-74 pump jack, rods, tubing, D-JAX pump off controller (POC), chemical and methanol tanks, Bluetick automation equipment, down hole pump.

Navajo 21— Oil; API #02-001-20242 WI: 25%; NRI: 20.833333333%

American D160-200-74 pump jack, rods, tubing, D-JAX pump off controller (POC), chemical and methanol tanks, (1) 210 bbl. tank, Bluetick automation equipment, down hole pump.

Navajo 22— Oil; API #02-001-20241 WI: 25%; NRI: 20.833333333%

American D160-200-74 pump jack, rods, tubing, D-JAX pump off controller (POC), chemical and methanol tanks, (1) 210 bbl. tank, Bluetick automation equipment, down hole pump.

Navajo 24— Helium; API #02-001-20244 WI: 25%; NRI: 20.833333333%

Variable choke, meter run, ABB Total Flow meter, horizontal separator, (1) 210 bbl. tank, Bluetick automation equipment, chemical injection tank and equipment, tubing, packer.

Navajo 25— Oil; API #02-001-20249 WI: 25%; NRI: 20.833333333%

American 160-200-74 pump jack, rods, tubing, D-JAX pump off controller (POC), chemical and methanol tanks, (1) 210 bbl. tank, Bluetick automation equipment, down hole pump.

Navajo 26— Oil; API #02-001-20250 WI: 25%; NRI: 20.833333333%

American 160-200-74 pump jack, rods, tubing, D-JAX pump off controller (POC), variable frequency drive (VFD), chemical and methanol tanks, (1) 210 bbl. tank, Bluetick automation equipment, down hole pump.

Navajo 27— Oil; API #02-001-20251 WI: 25%; NRI: 20.833333333%

American 160-200-74 pump jack, rods, tubing, D-JAX pump off controller (POC), chemical and methanol tanks, (1) 210 bbl. tank, Bluetick automation equipment, down hole pump.

Miscellaneous Lease Fixtures:

(4) 400 bbl. oil tanks, (2) 500 bbl. oil tanks, (3) 400 bbl. water tanks, water injection pump, (2) metal buildings, computer, surveillance system, printer, (3) desks, (2) file cabinets, (2) desks chairs, miscellaneous hand tools, ~3,000 gallon fuel tank, (1) 600 bbl. gun barrel tank.

Lease#: 14-20-0603-8822

Navajo C-1— Oil; API #02-001-20092 WI: 25%; NRI: 20.833333333%

Cabot 114 pump jack, rods, tubing, D-JAX pump off controller (POC), chemical and methanol tanks, down hole pump.

Navajo C-2— Helium; API #02-001-20046 WI: 25%; NRI: 20.833333333%

Variable choke, meter run, ABB Total Flow meter, horizontal separator, (1) 210 bbl. tank, Bluetick automation equipment, chemical injection tank and equipment, tubing, packer.

Lease#: 14-20-0603-8876

Navajo 138-1— Helium; API #02-001-20012 WI: 25%; NRI: 20.833333333%

Variable choke, meter run, ABB Total Flow meter, horizontal separator, (1) 210 bbl. tank, Bluetick automation equipment, chemical injection tank and equipment, tubing, packer..

Navajo 138-3— Oil; API #02-001-20253 WI: 25%; NRI: 20.833333333%

American 160-200-74 pump jack, rods, tubing, D-JAX pump off controller (POC), chemical and methanol tanks, (1) 210 bbl. tank, Bluetick automation equipment, down hole pump.

Lease #: 14-20-0603-8812

Navajo 88-1— Oil; API #02-001-20045 WI: 25%; NRI: 20.833333333%

Cabot 160 pump jack, rods, tubing, D-JAX pump off controller (POC), chemical and methanol tanks, (1) 210 bbl. tank, Bluetick automation equipment, down hole pump.

Navajo 88-2— Helium; API #02-001-20055 WI: 25%; NRI: 20.833333333%

Variable choke, meter run, ABB Total Flow meter, horizontal separator, (2) 400 bbl. tanks, Bluetick automation equipment, tubing, packer, Cabot 160 pumpjack (not in use).

Navajo 88-3— Helium; API #02-001-20066 WI: 25%; NRI: 20.833333333%

Variable choke, meter run, ABB Total Flow meter, horizontal separator, (1) 210 bbl. tank, Bluetick automation equipment, chemical injection tank and equipment, tubing, packer

Navajo 88-6— Oil; API #02-001-20252 WI: 25%; NRI: 20.833333333%

American 228 pump jack, rods, tubing, D-JAX pump off controller (POC), chemical and methanol tanks, (1) 210 bbl. tank, Bluetick automation equipment, down hole pump.

Lease#: 14-20-0603-8889

Navajo B1-X— Oil; API #02-001-20068 WI: 25%; NRI: 20.833333333%

American 160-200-74 pump jack, rods, tubing, D-JAX pump off controller (POC), chemical and methanol tanks, (1) 210 bbl. tank, Bluetick automation equipment, tubing, packer, down hole pump.

Navajo B2— Helium; API #02-001-20010 WI: 25%; NRI: 20.833333333%

Variable choke, meter run, ABB Total Flow meter, horizontal separator, (1) 210 bbl. tank, Bluetick automation equipment, chemical injection tank and equipment, tubing, packer.

Exhibit B

FORM OF ASSIGNMENT, BILL OF SALE AND CONVEYANCE

[ATTACHED]

After Recording, Return to:
Nordic Oil USA 4 LLC
113 Jean Baptiste Dr.
Lafayette, Louisiana 70503
Attention: David Burns

NOTICE OF CONFIDENTIALITY RIGHTS: IF YOU ARE A NATURAL PERSON, YOU MAY REMOVE OR STRIKE ANY OR ALL OF THE FOLLOWING INFORMATION FROM ANY INSTRUMENT THAT TRANSFER AN INTEREST IN REAL PROPERTY BEFORE IT IS FILED FOR RECORD IN THE PUBLIC RECORDS: YOUR SOCIAL SECURITY NUMBER OR YOUR DRIVER'S LICENSE NUMBER.

ASSIGNMENT, BILL OF SALE AND CONVEYANCE

STATE OF ARIZONA	§	
	§	KNOW ALL MEN BY THESE PRESENTS, THAT:
COUNTY OF APACHE	§	

This ASSIGNMENT, BILL OF SALE AND CONVEYANCE (this "*Assignment*") is from **NACOGDOCHES OIL AND GAS, INC.**, a Texas corporation ("*Assignor*"), whose address is 816 North Street, Nacogdoches, Texas 75961, to **NORDIC OIL USA 4 LLC**, a Delaware limited liability company ("*Assignee*"), whose address is 113 Jean Baptiste Dr., Lafayette, Louisiana 70503, and is effective as of 12:00:01 a.m. Central Time, March 1, 2019 (the "*Effective Time*").

RECITALS

WHEREAS, Assignor desires to assign to Assignee, and Assignee desires to receive from Assignor, the Properties described below in accordance with this Assignment and the Purchase and Sale Agreement (defined below).

NOW, THEREFORE, for and in consideration of the mutual promises contained herein and in the Purchase and Sale Agreement, the benefits to be derived by each party hereunder and under the Purchase and Sale Agreement, and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, Assignor and Assignee agree as follows:

ARTICLE I
DEFINED TERMS

1.1 ***Definitions.*** Capitalized terms used herein and not otherwise defined herein shall have the meanings given such terms in the Purchase and Sale Agreement, dated as of March 29, 2019, as amended, by and between Assignor and Assignee (the "***Purchase and Sale Agreement***").

ARTICLE II
ASSIGNMENT OF ASSETS

2.1 ***Assignment.*** For and in consideration of Ten Dollars ($10.00) and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, Assignor does hereby **GRANT, BARGAIN, SELL, CONVEY, ASSIGN, TRANSFER, SET OVER, AND DELIVER** unto Assignee, all of Assignor's right, title and interest in and to the assets and properties described below, less and except for the Excluded Assets (the "***Properties***"):

(a) the oil, gas and mineral leases described on Exhibit A, whether producing or non-producing, together with all leasehold interests in and to the leasehold estates created thereby, and all royalties, working interests, net revenue interests, overriding royalties, production payments, carried interests, net profits interests, reversionary interests, and other Hydrocarbon interests of any kind or character created thereby, derived therefrom or attributable thereto, as well as any and all operating rights thereunder (collectively, the "***Real Property Interests***"), and the lands covered by the Real Property Interests and all lands pooled or unitized therewith (the "***Lands***");

(b) all oil, condensate, gas, helium, water, carbon dioxide, disposal, injection, observation and other wells located on the Lands, including the oil and gas wells shown on Exhibit A (collectively, the "***Wells***"), and all tangible personal property, supplies, inventory, equipment, fixtures and improvements, including all injection wells, salt water disposal and handling facilities, frac ponds, frac pits, pads, well heads, casing, tubing, pumps, motors, gauges, valves, heaters, treaters, water lines, vessels, tanks, boilers, separators, treating equipment, compressors, pipelines, gathering systems, other equipment, automation systems including meters and related telemetry on wells, power lines, telephone and communication lines and other appurtenances owned or held primarily for use in connection with operation, production, treating, storing, transportation or marketing of Hydrocarbons from the Wells (collectively, the "***Equipment***");

(c) all presently existing unitization, pooling and/or communitization agreements, declarations or designations, and statutorily, judicially or administratively created drilling, spacing and/or production units, whether recorded or unrecorded, insofar as the same are attributable or allocated to the Lands; and the properties covered or units created thereby;

(d) all Hydrocarbons in, on, under or produced from or attributable to the Lands from and after the Effective Time and the proceeds thereof, and all inventory purchased pursuant to Section 2.5(a) of the Purchase and Sale Agreement and the proceeds thereof; and

(e) all surface fee interests, easements, surface leases, surface use agreements, surface rights, servitudes, water rights, licenses and rights of way appurtenant to or otherwise used or held for use in connection with the Properties or the operation, production, treating, storing, transportation or marketing of Hydrocarbons therefrom or allocated thereto ("***Easements***"); and, to the extent the same are transferrable, all Permits used primarily in connection with the ownership or operation of the Properties;

(f) all presently existing and valid Hydrocarbon sales agreements, operating agreements, gathering agreements, transportation agreements, farmout and farmin agreements, purchase agreements, exploration agreements, area of mutual interest agreements, processing agreements, and other contracts, agreements and instruments, in each case, to the extent Assignor is a party or is otherwise bound and the above agreements cover, are attributable to or relate to the Properties and are set forth on **Exhibit B** (collectively, the "***Contracts***");

(g) all rights, benefits and obligations arising from or in connection with any Gas Imbalances as of the Effective Time;

(h) all audit rights, rights to receive refunds or payments of any nature, and all amounts of money, relating thereto, in each case, to the extent arising from, or relating to, the ownership, operation, or sale or other disposition of the Properties from and after the Effective Time and any claim of indemnity, contribution or reimbursement relating to the Assumed Obligations;

(i) all claims, rights, demands, causes of action, suits, actions, judgments, damages, awards, recoveries, settlements, indemnities, rights to insurance proceeds, duties, obligations and liabilities in favor of or owed to Assignor and relating to any Assumed Obligations or arising from acts, omissions or events, or damage to or destruction of Properties occurring from and after the Effective Time; and

(j) all of Assignor's files, records and data (including electronic data) that (1) primarily relate to the ownership, operation or development of the Properties described above, and (2) are in Assignor's or its Affiliates' possession, including but not limited to lease files, land files, division order files, abstracts, title files, maps, well files, well logs, well tests, mud logs, directional surveys, core reports, daily drilling records, machinery and equipment files, engineering and/or production files, Geological and Geophysical Information, regulatory files, environmental and health and safety files, Contracts and related files, and production, accounting and Tax records ("***Records***").

TO HAVE AND TO HOLD the Properties unto Assignee, its successors and assigns, forever, subject, however, to all the terms and conditions of this Assignment, including, without limitation, Article III.

2.2 ***Excluded Assets.*** Assignor specifically excepts from this Assignment and reserves unto itself the following (the "***Excluded Assets***"):

(a) Assignor's minute books, financial and income or franchise tax records, Tax Returns to the extent relating to Assignor's income or franchise taxes, and legal records (other than title records);

(b) any existing or future refund of costs, Taxes or expenses borne by any of Assignor, its Affiliates or its or their respective predecessors in title, to the extent attributable to the period prior to the Effective Time;

(c) all claims and causes of action of Assignor or its Affiliates arising under or with respect to any of the Contracts that are attributable to periods of time prior to the Effective Time (including claims for adjustments or refunds);

(d) all rights and interests of Assignor or its Affiliates (i) under any policy or agreement of insurance or indemnity to the extent and only to the extent such rights and interests relate to the ownership of the Properties prior to the Effective Time and not to any Assumed Obligations, and (ii) under any bond;

(e) Assignor's rights with respect to Hydrocarbons produced from the Properties with respect to all periods prior to the Effective Time and all proceeds from the disposition thereof, other than inventory for which an adjustment is made under Section 2.5(a) of the Purchase and Sale Agreement; and any and all proceeds from production and from the settlements of contract disputes with purchasers of Hydrocarbons or byproducts from the Lands, including settlement of take-or-pay disputes, insofar as said proceeds are attributable to periods of time prior to the Effective Time;

(f) all accounts receivable and audit rights arising under any of the Contracts or otherwise with respect to the Properties solely with respect to any period prior to the Effective Time or to any of the Excluded Assets, and except for any Gas Imbalances;

(g) all claims of Assignor or any of its Affiliates for refunds of or loss carry forwards with respect to (1) production, ad valorem or any other Taxes attributable to any period prior to the Effective Time, (2) income or franchise Taxes, or (3) any Taxes attributable to the Excluded Assets;

(h) all documents and instruments of Assignor or any of its Affiliates that may be protected by an attorney-client privilege, except to the extent relating to any Assumed Obligations;

(i) all information that cannot be disclosed to Assignee as a result of confidentiality arrangements under agreements with Third Parties (other than title opinions and other title records relating to the Properties) for which Assignor is unable to secure permission (after using its commercially reasonable efforts, at no material out-of-pocket cost to Assignor) to provide or convey to Assignee;

(j) all Hedge Contracts and all rights and Liabilities thereunder, and all Debt Instruments of Assignor and its Affiliates and all Liabilities thereunder;

(k) all of Assignor's proprietary computer software, patents, trade secrets, copyrights, names, trademarks, logos and other intellectual property;

(l) documents prepared or received by Assignor or its Affiliates with respect to (i) lists of prospective purchasers for the Properties, (ii) correspondence between or among Assignor, its representatives and any prospective purchaser other than Assignee, and (iii) correspondence between Assignor or any of its representatives with respect to any of the prospective purchasers or the transactions contemplated by the Purchase and Sale Agreement;

(m) all employee files of Assignor; and

(n) all e-mails and other electronic files on Assignor's servers and networks to the extent not primarily related to the ownership, operation or development of the Properties.

ARTICLE III
SPECIAL WARRANTY; DISCLAIMERS

3.1 ***Special Warranty.*** Assignor does hereby bind itself and its successors and assigns to warrant and forever defend all and singular title to the Properties (with, in respect of the Real Property Interests and Wells, title to not less than the NRIs for such Real Property Interests and Wells set forth in **Exhibit A** to the Purchase and Sale Agreement, in respect of the Real Property Interests and Wells, title to not more than the Working Interests for such Real Property Interests and Wells set forth in **Exhibit A** to the Purchase and Sale Agreement, in each case, subject to the exceptions set forth in subparts (a) of the definition of "Defensible Title" under the Purchase and Sale Agreement, and in respect of the Real Property Interests, title to not less than the number of Net Acres for such Real Property Interests set forth in **Exhibit A** to the Purchase and Sale Agreement) unto Assignee and Assignee's successors and assigns, against every Person whomsoever lawfully claiming or to claim the same or any part thereof, by, through, or under Assignor, but not otherwise and subject to Permitted Encumbrances.

3.2 ***Subrogation.*** Assignor hereby assigns to Assignee all rights, claims and causes of action under title warranties given or made by Assignor's predecessors in interest with respect to the Properties, and Assignee is specifically subrogated to all rights which Assignor may have against such predecessors in interest with respect to the Properties, to the extent Assignor may legally transfer such rights and grant such subrogation.

3.3 ***Disclaimers of Warranties and Representations.***

EXCEPT FOR THE REPRESENTATIONS AND WARRANTIES OF ASSIGNOR SET FORTH IN THE PURCHASE AND SALE AGREEMENT AND THE SPECIAL WARRANTY OF TITLE SET FORTH IN SECTION 3.1 ABOVE, ASSIGNEE ACKNOWLEDGES THAT ASSIGNOR HAS NOT MADE, AND ASSIGNOR HEREBY EXPRESSLY DISCLAIMS AND NEGATES, AND ASSIGNEE HEREBY EXPRESSLY WAIVES, ANY REPRESENTATION OR WARRANTY, EXPRESS, IMPLIED, AT COMMON LAW, BY STATUTE OR OTHERWISE. EXCEPT FOR THE REPRESENTATIONS AND WARRANTIES OF ASSIGNOR SET FORTH IN THE

PURCHASE AND SALE AGREEMENT AND THE SPECIAL WARRANTY OF TITLE SET FORTH IN SECTION 3.1 ABOVE, AND WITHOUT LIMITING THE GENERALITY OF THE FOREGOING, ASSIGNOR EXPRESSLY DISCLAIMS AND NEGATES, AND ASSIGNEE HEREBY WAIVES, AS TO PERSONAL PROPERTY, EQUIPMENT, INVENTORY, MACHINERY AND FIXTURES CONSTITUTING A PART OF THE PROPERTIES (A) ANY IMPLIED OR EXPRESS WARRANTY OF MERCHANTABILITY, (B) ANY IMPLIED OR EXPRESS WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE, (C) ANY IMPLIED OR EXPRESS WARRANTY OF CONFORMITY TO MODELS OR SAMPLES OF MATERIALS, (D) ANY RIGHTS OF PURCHASERS UNDER APPROPRIATE STATUTES TO CLAIM DIMINUTION OF CONSIDERATION OR RETURN OF THE PURCHASE PRICE FOR BREACH OF AN IMPLIED OR EXPRESS REPRESENTATION OR WARRANTY, (E) ANY IMPLIED OR EXPRESS WARRANTY OF FREEDOM FROM DEFECTS, WHETHER KNOWN OR UNKNOWN, (F) ANY AND ALL IMPLIED WARRANTIES EXISTING UNDER APPLICABLE LAW, AND (G) ANY IMPLIED OR EXPRESS WARRANTY REGARDING ENVIRONMENTAL LAWS, THE RELEASE OF HAZARDOUS MATERIALS INTO THE ENVIRONMENT, OR PROTECTION OF THE ENVIRONMENT OR HEALTH, IT BEING THE EXPRESS INTENTION OF ASSIGNEE AND ASSIGNOR THAT, EXCEPT FOR THE REPRESENTATIONS AND WARRANTIES OF ASSIGNOR IN THE PURCHASE AND SALE AGREEMENT AND THE SPECIAL WARRANTY OF TITLE SET FORTH IN SECTION 3.1 ABOVE OR AS OTHERWISE PROVIDED IN THE PURCHASE AND SALE AGREEMENT AND THIS ASSIGNMENT, THE PERSONAL PROPERTY, EQUIPMENT, INVENTORY, MACHINERY AND FIXTURES IN WHICH ASSIGNOR HAS ANY INTEREST ARE BEING ACCEPTED BY ASSIGNEE, "AS IS, WHERE IS, WITH ALL FAULTS" AND IN THEIR PRESENT CONDITION AND STATE OF REPAIR.

ASSIGNOR AND ASSIGNEE AGREE THAT, TO THE EXTENT REQUIRED BY APPLICABLE LAW TO BE EFFECTIVE, THE DISCLAIMERS OF CERTAIN WARRANTIES CONTAINED IN THIS SECTION 3.3 ARE "CONSPICUOUS" DISCLAIMERS FOR THE PURPOSES OF ANY APPLICABLE LAW, RULE OR ORDER.

ARTICLE IV
ASSUMED OBLIGATIONS AND RETAINED LIABILITIES

Subject to the terms and conditions of the Purchase and Sale Agreement, effective as of the date of this Assignment, Assignee hereby assumes and agrees to fulfill, perform, pay and discharge (or cause to be fulfilled, performed, paid or discharged) all of the Assumed Obligations, and Assignor shall retain and agrees to fulfill, perform, pay and discharge (or cause to be fulfilled, performed, paid or discharged) all of the Retained Liabilities.

ARTICLE V
MISCELLANEOUS

5.1 ***Separate Assignments.*** Where separate assignments of the Properties have been or will be executed for filing in other recording jurisdictions or counties or for filing with, and

approval by, applicable Governmental Authorities, any such separate assignments (a) shall evidence this Assignment and assignment of the Properties herein made and shall not constitute any additional assignment of any of the Properties covered hereby or thereby, (b) are not intended to modify, and shall not modify, any of the terms, covenants and conditions or limitations on warranties set forth in this Assignment or the Purchase and Sale Agreement and are not intended to create, and shall not create, any representations, warranties or additional covenants of or by Assignor or Assignee, and (c) shall be deemed to contain all of the terms and provisions of this Assignment, as fully and to all intents and purposes as though the same were set forth at length in such separate assignments.

5.2 ***Assignment Subject to Purchase and Sale Agreement.*** This Assignment is expressly subject to the terms and conditions of the Purchase and Sale Agreement, including with respect to the interests assigned hereby. If there is a conflict between the terms of this Assignment and the Purchased and Sale Agreement, the terms of the Purchase and Sale Agreement shall control. This Assignment is intended by Assignor and Assignee to be an assignment and conveyance of the Properties, not a quitclaim.

5.3 ***Governing Law.*** EXCEPT TO THE EXTENT THE LAWS OF ANOTHER JURISDICTION WILL, UNDER CONFLICT OF LAWS PRINCIPLES, GOVERN TRANSFERS OF THE PROPERTIES LOCATED IN SUCH OTHER JURISDICTION, THIS ASSIGNMENT AND THE LEGAL RELATIONS AMONG ASSIGNOR AND ASSIGNEE SHALL BE GOVERNED AND CONSTRUED IN ACCORDANCE WITH THE LAWS OF THE STATE OF TEXAS.

5.4 ***Cooperation.*** In addition to this Assignment, Assignor shall execute, acknowledge, and deliver to Assignee, in a timely manner and without further consideration, any documents or instruments that Assignee may reasonably require, including further assignments or conveyances required by any Governmental Authorities, deeds, and consents to further evidence the assignment and conveyance of the Properties by Assignor to Assignee.

5.5 ***Successors and Assigns.*** This Assignment shall bind and inure to the benefit of the parties hereto and their respective successors and assigns.

5.6 ***Counterparts.*** This Assignment may be executed in any number of counterparts, and each such counterpart hereof shall be deemed to be an original instrument, but all of such counterparts shall constitute for all purposes one agreement.

[*Signature pages follow*]

IN WITNESS WHEREOF, this Assignment has been executed by Assignor as of the date of acknowledgment below, but is effective for all purposes as of the Effective Time.

ASSIGNOR:

NACOGDOCHES OIL AND GAS, INC.,
a Texas corporation

By: _____
Brent Ivy, Vice President

ACKNOWLEDGMENT

STATE OF TEXAS §
§
COUNTY OF NACOGDOCHES §

This instrument was acknowledged before me on this ____ day of March, 2019, by Brent Ivy, as Vice President of **NACOGDOCHES OIL AND GAS, INC.**, a Texas corporation, as the act and deed and on behalf of such corporation.

_____
Notary Public

My Commission Expires: _____
Commission Number: _____

IN WITNESS WHEREOF, this Assignment has been executed by Assignee as of the date of acknowledgment below, but is effective for all purposes as of the Effective Time.

ASSIGNEE:

NORDIC OIL USA 4 LLC,
a Delaware limited liability company

By: _____
David Burns, President

ACKNOWLEDGMENT

STATE OF LOUISIANA §
§
PARISH OF LAFAYETTE §

This instrument was acknowledged before me on this ____ day of March, 2019, by David Burns, as President of **NORDIC OIL USA 4 LLC**, a Delaware limited liability company, as the act and deed and on behalf of such limited liability company.

_____
Notary Public

My Commission Expires: _____
Commission Number: _____

EXHIBIT A

PROPERTIES

Real Property Interests

DINEH-BI-KEYAH— ARIZONA (APACHE COUNTY, ARIZONA)

Lease#: 14-20-0603-8822

Oil and Gas Mining Lease - Tribal Indian Lands, dated the 9th day of October, 1964, between the Chairman, Navajo Tribal Council of Apache County, State of Arizona, for and on behalf of the Navajo Tribe of Indians, as lessor, and Kerr-McGee Oil Industries, Inc., as lessee, recorded with the Department of the Interior, Bureau of Indian Affairs, on October 29, 1964, covering all of Sections 27, 28, 33 and 34 in Township 36 North, Range 30 East, G&SRM, Apache County, Arizona.

Gross Acreage: 2,560 acres

Lease#: 14-20-0603-8812

Oil and Gas Mining Lease - Tribal Indian Lands, dated the 12th day of October, 1964, between the Chairman, Navajo Tribal Council of Apache County, State of Arizona, for and on behalf of the Navajo Tribe of Indians, as lessor, and Humble Oil & Refining Company, as lessee, recorded with the Department of the Interior, Bureau of Indian Affairs, on October 26, 1964, covering all of Sections 25, 26, 35, and 36 in Township 36 North, Range 29 East, G&SRM, Apache County, Arizona.

Gross Acreage: 2,590 acres

Lease#: 14-20-0603-8823

Oil and Gas Mining Lease - Tribal Indian Lands, dated the 9th day of October, 1964, between the Chairman, Navajo Tribal Council of Apache County, State of Arizona, for and on behalf of the Navajo Tribe of Indians, as lessor, and Kerr-McGee Oil Industries, Inc., as lessee, recorded with the Department of the Interior, Bureau of Indian Affairs, on October 29, 1964, covering all of Sections 29, 30, 31, and 32 in Township 36 North, Range 30 East, G&SRM, Apache County, Arizona.

Gross Acreage: 2,533 acres

Lease#: 14-20-0603-8876

Oil and Gas Mining Lease - Tribal Indian Lands, dated the 15th day of January, 1965, between the Chairman, Navajo Tribal Council of Apache County, State of Arizona, for and on behalf of the Navajo Tribe of Indians, as lessor, and Humble Oil & Refining Company, as lessee, recorded

with the Department of the Interior, Bureau of Indian Affairs, on February 18, 1965, covering all of Section 6 in Township 35 North, Range 30 East, G&SRM, Apache County, Arizona.

Gross Acreage: 628 acres

Lease#: 14-20-0603-8889

Oil and Gas Mining Lease - Tribal Indian Lands, dated the 15th day of January, 1965, between the Chairman, Navajo Tribal Council of Apache County, State of Arizona, for and on behalf of the Navajo Tribe of Indians, as lessor, and Kerr-McGee Oil Industries, Inc., as lessee, recorded with the Department of the Interior, Bureau of Indian Affairs, on February 18, 1965, covering all of Section 5 in Township 35 North, Range 30 East, G&SRM, Apache County, Arizona.

Gross Acreage: 640 acres

Wells and Well Equipment

DINEH-BI-KEYAH— ARIZONA (APACHE COUNTY, ARIZONA)

Lease#: 14-20-0603-8823

Navajo 1— Oil; API #02-001-20001

American 160-20-74 pump jack, rods, tubing, D-JAX pump off controller (POC), chemical and methanol tanks, Bluetick automation equipment, down hole pump.

Navajo 3X— Oil; API #02-001-20011

Cabot 160 pump jack, rods, tubing, D-JAX pump off controller (POC), (1) 400 bbl. tank, chemical and methanol tanks, Bluetick automation equipment, down hole pump.

Navajo 4— Helium; API #02-001-20009

Variable choke, meter run, ABB Total Flow meter, vertical separator, (1) 210 bbl. tank, Bluetick automation equipment, tubing, packer.

Navajo 6— Oil; API #02-001-20014

Lufkin 114-64 pump jack, rods, tubing, D-JAX pump off controller (POC), chemical and methanol tanks, Bluetick automation equipment, down hole pump.

Navajo 7— Salt Water Injection Well (SWD); API #02-001-20013

Free Water Knockout (FWKO), (2) 400 bbl. tanks, well head, ABB meter, chemical and methanol tank, Bluetick automation equipment, tubing, packer.

Navajo 9— Oil; API #02-001-20020

American 160-200-74 pump jack, rods, tubing, D-JAX pump off controller (POC), variable frequency drive (VFD), chemical and methanol tanks, Bluetick automation equipment, down hole pump.

Navajo 11— **Oil; API #02-001-20106**

Cont. Busco 160-200-74 pump jack, rods, tubing, D-JAX pump off controller (POC), variable frequency drive (VFD), chemical and methanol tanks, Bluetick automation equipment, down hole pump.

Navajo 14— **Oil; API #02-001-20040**

Alten A12CFC pump jack, rods, tubing, D-JAX pump off controller (POC), chemical and methanol tanks, Bluetick automation equipment, down hole pump.

Navajo 15— **Helium; API #02-001-20041**

Variable choke, meter run, ABB Total Flow meter, horizontal separator, (1) 210 bbl. tank, Bluetick automation equipment, chemical injection tank and equipment, tubing, packer.

Navajo 16— **Oil; API #02-001-20043**

Lufkin 114-64 pump jack, rods, tubing, D-JAX pump off controller (POC), chemical and methanol tanks, (1) 210 bbl. tank, Bluetick automation equipment, down hole pump.

Navajo 17— **Oil; API #02-001-20190**

Permian C-640-365-168 pump jack, rods, tubing, D-JAX pump off controller (POC), variable frequency drive (VFD), chemical and methanol tanks, (1) 210 bbl. tank, vent tank, Bluetick automation equipment, down hole pump.

Navajo 19— **Oil; API #02-001-20240**

American D160-200-74 pump jack, rods, tubing, D-JAX pump off controller (POC), chemical and methanol tanks, Bluetick automation equipment, down hole pump.

Navajo 20— **Oil; API #02-001-20245**

American D160-200-74 pump jack, rods, tubing, D-JAX pump off controller (POC), chemical and methanol tanks, Bluetick automation equipment, down hole pump.

Navajo 21— **Oil; API #02-001-20242**

American D160-200-74 pump jack, rods, tubing, D-JAX pump off controller (POC), chemical and methanol tanks, (1) 210 bbl. tank, Bluetick automation equipment, down hole pump.

Navajo 22— Oil; API #02-001-20241

American D160-200-74 pump jack, rods, tubing, D-JAX pump off controller (POC), chemical and methanol tanks, (1) 210 bbl. tank, Bluetick automation equipment, down hole pump.

Navajo 24— Helium; API #02-001-20244

Variable choke, meter run, ABB Total Flow meter, horizontal separator, (1) 210 bbl. tank, Bluetick automation equipment, chemical injection tank and equipment, tubing, packer.

Navajo 25— Oil; API #02-001-20249

American 160-200-74 pump jack, rods, tubing, D-JAX pump off controller (POC), chemical and methanol tanks, (1) 210 bbl. tank, Bluetick automation equipment, down hole pump.

Navajo 26— Oil; API #02-001-20250

American 160-200-74 pump jack, rods, tubing, D-JAX pump off controller (POC), variable frequency drive (VFD), chemical and methanol tanks, (1) 210 bbl. tank, Bluetick automation equipment, down hole pump.

Navajo 27— Oil; API #02-001-20251

American 160-200-74 pump jack, rods, tubing, D-JAX pump off controller (POC), chemical and methanol tanks, (1) 210 bbl. tank, Bluetick automation equipment, down hole pump.

Miscellaneous Lease Fixtures:

(4) 400 bbl. oil tanks, (2) 500 bbl. oil tanks, (3) 400 bbl. water tanks, water injection pump, (2) metal buildings, computer, surveillance system, printer, (3) desks, (2) file cabinets, (2) desks chairs, miscellaneous hand tools, ~3,000 gallon fuel tank, (1) 600 bbl. gun barrel tank.

Lease#: 14-20-0603-8822

Navajo C-1— Oil; API #02-001-20092

Cabot 114 pump jack, rods, tubing, D-JAX pump off controller (POC), chemical and methanol tanks, down hole pump.

Navajo C-2— Helium; API #02-001-20046

Variable choke, meter run, ABB Total Flow meter, horizontal separator, (1) 210 bbl. tank, Bluetick automation equipment, chemical injection tank and equipment, tubing, packer.

Lease#: 14-20-0603-8876

Navajo 138-1— Helium; API #02-001-20012

Variable choke, meter run, ABB Total Flow meter, horizontal separator, (1) 210 bbl. tank, Bluetick automation equipment, chemical injection tank and equipment, tubing, packer..

Navajo 138-3— Oil; API #02-001-20253

American 160-200-74 pump jack, rods, tubing, D-JAX pump off controller (POC), chemical and methanol tanks, (1) 210 bbl. tank, Bluetick automation equipment, down hole pump.

Lease #: 14-20-0603-8812

Navajo 88-1— Oil; API #02-001-20045

Cabot 160 pump jack, rods, tubing, D-JAX pump off controller (POC), chemical and methanol tanks, (1) 210 bbl. tank, Bluetick automation equipment, down hole pump.

Navajo 88-2— Helium; API #02-001-20055

Variable choke, meter run, ABB Total Flow meter, horizontal separator, (2) 400 bbl. tanks, Bluetick automation equipment, tubing, packer, Cabot 160 pumpjack (not in use).

Navajo 88-3— Helium; API #02-001-20066

Variable choke, meter run, ABB Total Flow meter, horizontal separator, (1) 210 bbl. tank, Bluetick automation equipment, chemical injection tank and equipment, tubing, packer

Navajo 88-6— Oil; API #02-001-20252

American 228 pump jack, rods, tubing, D-JAX pump off controller (POC), chemical and methanol tanks, (1) 210 bbl. tank, Bluetick automation equipment, down hole pump.

Lease#: 14-20-0603-8889

Navajo B1-X— Oil; API #02-001-20068

American 160-200-74 pump jack, rods, tubing, D-JAX pump off controller (POC), chemical and methanol tanks, (1) 210 bbl. tank, Bluetick automation equipment, tubing, packer, down hole pump.

Navajo B2— Helium; API #02-001-20010

Variable choke, meter run, ABB Total Flow meter, horizontal separator, (1) 210 bbl. tank, Bluetick automation equipment, chemical injection tank and equipment, tubing, packer.

EXHIBIT B

CONTRACTS

That certain Joint Operating Agreement dated September, 30 2016 (Dineh-Bi-Keyah (DBK) Field – Apache County, Arizona), among CAPITOL OPERATING GROUP, LLC, as Operator, and NORDIC OIL USA 2, LLLP, and NACOGDOCHES OIL AND GAS, INC., as Non-Operators.

SCHEDULES

TO

PURCHASE AND SALE AGREEMENT

BY AND BETWEEN

NACOGDOCHES OIL AND GAS, INC., AS SELLER,

AND

NORDIC OIL USA 4 LLC, AS BUYER

DATED MARCH 29, 2019

SCHEDULES

Schedule 1.1(a)	Buyer Knowledge Persons
Schedule 1.1(b)	Seller Knowledge Persons
Schedule 3.3	No Breaches
Schedule 3.4	Litigation
Schedule 3.5	Taxes
Schedule 3.8	Contracts
Schedule 3.9	Environmental and Safety Matters
Schedule 3.10	Current Commitments
Schedule 3.11	Suspended Funds
Schedule 3.12	Gas Imbalances
Schedule 3.13	Advance Payments
Schedule 3.14	Payout Balances
Schedule 3.15	PPRs, Rights and Required Consents
Schedule 3.17	Wells and Equipment
Schedule 5.8	Governmental Bonds

Schedule 1.1(a)

BUYERS KNOWLEDGE PERSONS

David Burns

Schedule 1.1(b)

SELLER'S KNOWLEDGE PERSONS

Mike Finley

Brent Ivy

Schedule 3.3

NO BREACHES

None.

Schedule 3.4

LITIGATION

None.

Schedule 3.5

TAXES

None.

Schedule 3.8

CONTRACTS

That certain Joint Operating Agreement dated September, 30 2016 (Dineh-Bi-Keyah (DBK) Field – Apache County, Arizona), among CAPITOL OPERATING GROUP, LLC, as Operator, and NORDIC OIL USA 2, LLLP, and NACOGDOCHES OIL AND GAS, INC., as Non-Operators.

Schedule 3.9

ENVIRONMENTAL AND SAFETY MATTERS

None.

Schedule 3.10

CURRENT COMMITMENTS

None.

Schedule 3.11

SUSPENDED FUNDS

None.

Schedule 3.12

GAS IMBALANCES

None.

Schedule 3.13

ADVANCE PAYMENTS

None.

Schedule 3.14

PAYOUT BALANCES

None.

Schedule 3.15

PPRS, RIGHTS AND REQUIRED CONSENTS

PPRs

Navajo Nation:

The Navajo Nation has a right of first refusal under 18 N.N.C. § 605 for any transfer of a mine or mineral interest pertaining to Navajo lands.

Required Consents

None.

Schedule 3.17

WELLS AND EQUIPMENT

None.

Schedule 5.8

GOVERNMENTAL BONDS

The following letter of credit has been extended to Capital Operating Group, LLC, as principal, in connection with the Properties, requiring cash-collateralization by Buyer:

1. Letter of Credit No. 8021092 issued on May 17, 2012 by the West Texas National Bank with Seller, as principal, for the benefit of the Bureau of Indian Affairs, Navajo Region Office, as beneficiary, in the original face amount of $713,500.00, as amended on March 16, 2016 to add Nordic Oil USA 2, LLLP as an additional principal and to increase the face amount to Nine Hundred Seventy Thousand One Hundred and No/100 Dollars ($970,100.00), and as further amended on December 1, 2016 to name Capital Operating Group, LLC as principal.

APPENDIX VII – COPY OF DBK LEASE ASSIGNMENTS

Form NTC T.18 § 605
Rev. 6/12

THE NAVAJO NATION
MINERALS DEPARTMENT
DIVISION OF NATURAL RESOURCES

ASSIGNMENT OF OIL AND GAS LEASE

ASSIGNMENT FOR: [X] TITLE [X] OPERATING RIGHTS [ ] FARM-OUT

Lease No. 14-20-0603-8822

1. Original Lessee: Kerr-McGee Oil Industries, Inc.
2. Approval Date of Original Lease: October 29, 1964
3. Royalty Rate: 16 2/3%
4. Current Land Description: Township 36 North, Range 30 East
   All of Sections 27, 28, 33, & 34 containing 2560 Acres in Apache County, Arizona
5. Description of Land Being Assigned: Same as above.
6. Assignor: Nacogdoches Oil and Gas, Inc.
7. Assignee: Nordic Oil USA 4 LLC
8. Portion of Rights/Title Under Transfer: All of Assignor's right, title and interest
9. Reserved Overriding Royalties: None.
10. Previous Assignments and Portion of Rights/Title Transferred:

(1) Assignment of Mining Lease dated December 2, 1993 from Kerr-McGee Corporation, formerly Kerr-McGee Oil Industries, Inc., conveying all of their interest to Mountain States Petroleum. Approved on July 18, 1994. No overriding royalty interest reserved.

(2) Assignment of Record Title and Operating Rights dated August 31, 2007, from Mountain States Petroleum Corporation to Nacogdoches Oil and Gas, Inc., insofar as said lease covers Township 36 North, Range 30 East. All of Sections 27, 28, 33 & 34 containing 2560 Acres in Apache County, Arizona. Approved November 17, 2008. No overriding royalty interest reserved.

(3) Assignment of Operating Rights dated April 5, 2012, from Nacogdoches Oil and Gas, Inc. to Nordic Oil USA 2, LLLP, conveying forty-five percent (45%) of their interest, insofar as said lease covers Township 36 North, Range 30 East. All of Sections 27, 28, 33 & 34 containing 2560 Acres in Apache County, Arizona. Approved on April 1, 2016. No overriding royalty interest reserved.

(4) Assignment of Record Title and Operating Rights dated September 29, 2016, from Nacogdoches Oil and Gas, Inc. to Nordic Oil USA 2, LLLP, conveying a seventy-five percent (75%) of 8/8ths interest in title (being 75% of Nacogdoches Oil and Gas, Inc.'s then current interest) and thirty percent (30%) of 8/8ths interest in operating rights (being 54.54% of Nacogdoches Oil and Gas, Inc.'s then current interest), insofar as said lease covers Township 36 North, Range 30 East. All of Sections 27, 28, 33 & 34 containing 2560 Acres in Apache County, Arizona. Approved on October 2, 2017. No overriding royalty interest reserved.

The assignee shall furnish to the lessor, the Navajo Nation, c/o the Minerals Department, P.O. Box 1910, Window Rock, AZ 86515, copies of all reports filed with the U.S. Office of Natural Resources Revenue and the Bureau of Land Management pursuant to federal laws and regulations. The assignee shall furnish also all oil and gas run tickets, copies of drillstem tests, pressure tests, core analysis, seismic data and any other information required by the Minerals Department for this lease.

March 29, 2019
DATE

ASSIGNEE'S SIGNATURE

STATE OF LOUISIANA PARISH OF LAFAYETTE

Before me, a notary public, in and for said county and state on this 29th day of March, 2019, personally appeared Mr. David Burns, to me known to be the identical person who subscribed the name of the maker thereof to the foregoing instrument as its President and acknowledged to me that he executed the same as his free and voluntary act and deed of such limited liability company, for the use and purposes therein set forth.

My Commission Expires at death

NOTARY Rene Guidry
LSBA # 26910

March 29, 2019
DATE

ASSIGNOR'S SIGNATURE

STATE OF TEXAS COUNTY OF NACOGDOCHES

Before me, a notary public, in and for said county and state on this 29th day of March, 2019, personally appeared Mr. Brent Ivy, to me known to be the identical person who subscribed the name of the maker thereof to the foregoing instrument as its Vice President and acknowledged to me that he executed the same as his free and voluntary act and deed of such corporation, for the use and purposes therein set forth.

My Commission Expires _____

NOTARY

President's Office – Approval

This assignment has been reviewed by the appropriate Departments of the Navajo Nation and is hereby approved.

DATE

PRESIDENT, THE NAVAJO NATION

The assignee shall furnish to the lessor, the Navajo Nation, c/o the Minerals Department, P.O. Box 1910, Window Rock, AZ 86515, copies of all reports filed with the U.S. Office of Natural Resources Revenue and the Bureau of Land Management pursuant to federal laws and regulations. The assignee shall furnish also all oil and gas run tickets, copies of drillstem tests, pressure tests, core analysis, seismic data and any other information required by the Minerals Department for this lease.

March 29, 2019
DATE

ASSIGNEE'S SIGNATURE

STATE OF LOUISIANA

PARISH OF LAFAYETTE

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My Commission Expires _____

NOTARY

March 29, 2019
DATE

ASSIGNOR'S SIGNATURE

STATE OF TEXAS

COUNTY ~~OF NACOG~~DOCHES

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MARY D. ROBERTS
My Notary ID #7143129
Expires September 12, 2021

My Commission Expires SEPTEMBER 12, 2021

Mary D. Roberts
NOTARY

President's Office – Approval

This assignment has been reviewed by the appropriate Departments of the Navajo Nation and is hereby approved.

DATE

PRESIDENT, THE NAVAJO NATION

Form NTC T.18 § 605
Rev. 6/12

THE NAVAJO NATION
MINERALS DEPARTMENT
DIVISION OF NATURAL RESOURCES

ASSIGNMENT OF OIL AND GAS LEASE

ASSIGNMENT FOR: [X] TITLE [X] OPERATING RIGHTS [ ] FARM-OUT

Lease No. 14-20-0603-8812

1. Original Lessee: Humble Oil & Refining Company
2. Approval Date of Original Lease: October 26, 1964
3. Royalty Rate: 16 2/3%
4. Current Land Description: Township 36 North, Range 29 East
   All of Sections 25, 26, 35 & 36 containing 2560 Acres in Apache County, Arizona
5. Description of Land Being Assigned: Same as above.
6. Assignor: Nacogdoches Oil and Gas, Inc.
7. Assignee: Nordic Oil USA 4 LLC
8. Portion of Rights/Title Under Transfer: All of Assignor's right, title and interest
9. Reserved Overriding Royalties: None.
10. Previous Assignments and Portion of Rights/Title Transferred:

(1) Assignment of Mining Lease dated December 22, 1972 from Humble Oil & Refining Company, conveying all of their interest to Kerr-McGee Corporation. Approved on February 15, 1973. No overriding royalty interest reserved.

(2) Assignment of Mining Lease dated December 1, 1993 from Kerr-McGee Corporation, conveying all of their interest to Mountain States Petroleum. Approved on July 18, 1994. No overriding royalty interest reserved.

(3) Assignment of Record Title and Operating Rights dated August 31, 2007, from Mountain States Petroleum Corporation to Nacogdoches Oil and Gas, Inc., insofar as said lease covers Township 36 North, Range 29 East. All of Sections 25, 26, 35 & 36 containing 2560 Acres in Apache County, Arizona. Approved on November 17, 2008. No overriding royalty interest reserved.

(4) Assignment of Operating Rights dated April 5, 2012, from Nacogdoches Oil and Gas, Inc. to Nordic Oil USA 2, LLLP, conveying forty-five percent (45%) of their interest, insofar as said lease covers Township 36 North, Range 29 East. All of Sections 25, 26, 35 & 36 containing 2560 Acres in Apache County, Arizona. Approved on April 1, 2016. No overriding royalty interest reserved.

(5) Assignment of Record Title and Operating Rights dated September 29, 2016, from Nacogdoches Oil and Gas, Inc. to Nordic Oil USA 2, LLLP, conveying a seventy-five percent (75%) of 8/8ths interest in title (being 75% of Nacogdoches Oil and Gas, Inc.'s then current interest) and thirty percent (30%) of 8/8ths interest in operating rights (being 54.54% of Nacogdoches Oil and Gas, Inc.'s then current interest), insofar as said lease covers Township 36 North, Range 29 East. All of Sections 25, 26, 35 & 36 containing 2560 Acres in Apache County, Arizona. Approved on October 2, 2017. No overriding royalty interest reserved.

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The assignee shall furnish to the lessor, the Navajo Nation, c/o the Minerals Department, P.O. Box 1910, Window Rock, AZ 86515, copies of all reports filed with the U.S. Office of Natural Resources Revenue and the Bureau of Land Management pursuant to federal laws and regulations. The assignee shall furnish also all oil and gas run tickets, copies of drillstem tests, pressure tests, core analysis, seismic data and any other information required by the Minerals Department for this lease.

March 29, 2019
DATE

ASSIGNEE'S SIGNATURE

STATE OF LOUISIANA

PARISH OF LAFAYETTE

Before me, a notary public, in and for said county and state on this 29th day of March, 2019, personally appeared Mr. David Burns, to me known to be the identical person who subscribed the name of the maker thereof to the foregoing instrument as its President and acknowledged to me that he executed the same as his free and voluntary act and deed of such limited liability company, for the use and purposes therein set forth.

My Commission Expires at death

NOTARY Rene Guidry
LSBA # 26910

March 29, 2019
DATE

ASSIGNOR'S SIGNATURE

STATE OF TEXAS

COUNTY OF NACOGDOCHES

Before me, a notary public, in and for said county and state on this 29th day of March, 2019, personally appeared Mr. Brent Ivy, to me known to be the identical person who subscribed the name of the maker thereof to the foregoing instrument as its Vice President and acknowledged to me that he executed the same as his free and voluntary act and deed of such corporation, for the use and purposes therein set forth.

My Commission Expires _____

NOTARY

President's Office – Approval

This assignment has been reviewed by the appropriate Departments of the Navajo Nation and is hereby approved.

DATE

PRESIDENT, THE NAVAJO NATION

The assignee shall furnish to the lessor, the Navajo Nation, c/o the Minerals Department, P.O. Box 1910, Window Rock, AZ 86515, copies of all reports filed with the U.S. Office of Natural Resources Revenue and the Bureau of Land Management pursuant to federal laws and regulations. The assignee shall furnish also all oil and gas run tickets, copies of drillstem tests, pressure tests, core analysis, seismic data and any other information required by the Minerals Department for this lease.

March 29, 2019
DATE

ASSIGNEE'S SIGNATURE

STATE OF LOUISIANA

PARISH OF LAFAYETTE

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My Commission Expires _____

NOTARY

March 29, 2019
DATE

ASSIGNOR'S SIGNATURE

STATE OF TEXAS

COUNTY OF NACOGDOCHES

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MARY D. ROBERTS
Notary ID # 143129
Expires September 12, 2021

My Commission Expires SEPTEMBER 12, 2021

Mary D. Roberts
NOTARY

President's Office – Approval

This assignment has been reviewed by the appropriate Departments of the Navajo Nation and is hereby approved.

DATE

PRESIDENT, THE NAVAJO NATION

Form NTC T.18 § 605
Rev. 6/12

THE NAVAJO NATION
MINERALS DEPARTMENT
DIVISION OF NATURAL RESOURCES

ASSIGNMENT OF OIL AND GAS LEASE

ASSIGNMENT FOR: [X] TITLE [X] OPERATING RIGHTS [ ] FARM-OUT

Lease No. 14-20-0603-8823

1. Original Lessee: Kerr-McGee Oil Industries, Inc.
2. Approval Date of Original Lease: October 29, 1964
3. Royalty Rate: 16 2/3%
4. Current Land Description: Township 36 North, Range 30 East
   All of Sections 29, 30, 31 and 32, containing 2533 Acres in Apache County, Arizona
5. Description of Land Being Assigned: Same as above.
6. Assignor: Nacogdoches Oil and Gas, Inc.
7. Assignee: Nordic Oil USA 4 LLC
8. Portion of Rights/Title Under Transfer: All of Assignor's right, title and interest
9. Reserved Overriding Royalties: None.
10. Previous Assignments and Portion of Rights/Title Transferred:

(1) Assignment of Mining Lease dated December 2, 1993 from Kerr-McGee Corporation, formerly Kerr-McGee Oil Industries, Inc., conveying all of their interest to Mountain States Petroleum. Approved on July 18, 1994. No overriding royalty interest reserved.

(2) Assignment of Record Title and Operating Rights dated August 31, 2007, from Mountain States Petroleum Corporation to Nacogdoches Oil and Gas, Inc., insofar as said lease covers Township 36 North, Range 30 East. All of Sections 29, 30, 31 and 32, containing 2533 Acres in Apache County, Arizona. Approved November 17, 2008. No overriding royalty interest reserved.

(3) Assignment of Operating Rights dated April 5, 2012, from Nacogdoches Oil and Gas, Inc. to Nordic Oil USA 2, LLLP, conveying forty-five percent (45%) of their interest, insofar as said lease covers Township 36 North, Range 30 East. All of Sections 29, 30, 31 and 32, containing 2533 Acres in Apache County, Arizona. Approved on April 1, 2016. No overriding royalty interest reserved.

(4) Assignment of Record Title and Operating Rights dated September 29, 2016, from Nacogdoches Oil and Gas, Inc. to Nordic Oil USA 2, LLLP, conveying a seventy-five percent (75%) of 8/8ths interest in title (being 75% of Nacogdoches Oil and Gas, Inc.'s then current interest) and thirty percent (30%) of 8/8ths interest in operating rights (being 54.54% of Nacogdoches Oil and Gas, Inc.'s then current interest), insofar as said lease covers Township 36 North, Range 30 East. All of Sections 29, 30, 31 and 32, containing 2533 Acres in Apache County, Arizona. Approved on October 2, 2017. No overriding royalty interest reserved.

The assignee shall furnish to the lessor, the Navajo Nation, c/o the Minerals Department, P.O. Box 1910, Window Rock, AZ 86515, copies of all reports filed with the U.S. Office of Natural Resources Revenue and the Bureau of Land Management pursuant to federal laws and regulations. The assignee shall furnish also all oil and gas run tickets, copies of drillstem tests, pressure tests, core analysis, seismic data and any other information required by the Minerals Department for this lease.

March 29, 2019
DATE

ASSIGNEE'S SIGNATURE

STATE OF LOUISIANA

PARISH OF LAFAYETTE

Before me, a notary public, in and for said county and state on this 29th day of March, 2019, personally appeared Mr. David Burns, to me known to be the identical person who subscribed the name of the maker thereof to the foregoing instrument as its President and acknowledged to me that he executed the same as his free and voluntary act and deed of such limited liability company, for the use and purposes therein set forth.

My Commission Expires at death

NOTARY Rene Guidry
LSBA # 26910

March 29, 2019
DATE

ASSIGNOR'S SIGNATURE

STATE OF TEXAS

COUNTY OF NACOGDOCHES

Before me, a notary public, in and for said county and state on this 29th day of March, 2019, personally appeared Mr. Brent Ivy, to me known to be the identical person who subscribed the name of the maker thereof to the foregoing instrument as its Vice President and acknowledged to me that he executed the same as his free and voluntary act and deed of such corporation, for the use and purposes therein set forth.

My Commission Expires _____

NOTARY

President's Office – Approval

This assignment has been reviewed by the appropriate Departments of the Navajo Nation and is hereby approved.

DATE

PRESIDENT, THE NAVAJO NATION

The assignee shall furnish to the lessor, the Navajo Nation, c/o the Minerals Department, P.O. Box 1910, Window Rock, AZ 86515, copies of all reports filed with the U.S. Office of Natural Resources Revenue and the Bureau of Land Management pursuant to federal laws and regulations. The assignee shall furnish also all oil and gas run tickets, copies of drillstem tests, pressure tests, core analysis, seismic data and any other information required by the Minerals Department for this lease.

March 29, 2019
DATE

ASSIGNEE'S SIGNATURE

STATE OF LOUISIANA

PARISH OF LAFAYETTE

Before me, a notary public, in and for said county and state on this 29th day of March, 2019, personally appeared Mr. David Burns, to me known to be the identical person who subscribed the name of the maker thereof to the foregoing instrument as its President and acknowledged to me that he executed the same as his free and voluntary act and deed of such limited liability company, for the use and purposes therein set forth.

My Commission Expires _____

NOTARY

March 29, 2019
DATE

ASSIGNOR'S SIGNATURE

STATE OF TEXAS

COUNTY OF NACOGDOCHES

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My Commission Expires SEPTEMBER 12, 2021 Mary D. Roberts
NOTARY

MARY D. ROBERTS
My Not. 7143129
Expires Sep. 12, 2021

President's Office – Approval

This assignment has been reviewed by the appropriate Departments of the Navajo Nation and is hereby approved.

DATE

PRESIDENT, THE NAVAJO NATION

Form NTC T.18 § 605
Rev. 6/12

THE NAVAJO NATION
MINERALS DEPARTMENT
DIVISION OF NATURAL RESOURCES

ASSIGNMENT OF OIL AND GAS LEASE

ASSIGNMENT FOR: [X] TITLE [X] OPERATING RIGHTS [ ] FARM-OUT

Lease No. 14-20-0603-8876

1. Original Lessee: Humble Oil & Refining Company
2. Approval Date of Original Lease: February 18, 1965
3. Royalty Rate: 16 2/3%
4. Current Land Description: Township 35 North, Range 30 East
   All of Section 6, containing 615.01 Acres in Apache County, Arizona
5. Description of Land Being Assigned: Same as above.
6. Assignor: Nacogdoches Oil and Gas, Inc.
7. Assignee: Nordic Oil USA 4 LLC
8. Portion of Rights/Title Under Transfer: All of Assignor's right, title and interest
9. Reserved Overriding Royalties: None.
10. Previous Assignments and Portion of Rights/Title Transferred:

(1) Assignment of Mining Lease dated December 22, 1972 from Humble Oil & Refining Company, conveying all of their interest to Kerr-McGee Corporation. Approved on February 15, 1973. No overriding royalty interest reserved.

(2) Assignment of Mining Lease dated December 2, 1993 from Kerr-McGee Corporation, conveying all of their interest to Mountain States Petroleum. Approved on July 19, 1994. No overriding royalty interest reserved.

(3) Assignment of Record Title and Operating Rights dated August 31, 2007, from Mountain States Petroleum Corporation to Nacogdoches Oil and Gas, Inc., insofar as said lease covers Township 35 North, Range 30 East. All of Section 6, containing 615.01 Acres in Apache County, Arizona. Approved November 17, 2008. No overriding royalty interest reserved.

(4) Assignment of Operating Rights dated April 5, 2012, from Nacogdoches Oil and Gas, Inc. to Nordic Oil USA 2, LLLP, conveying forty-five percent (45%) of their interest, insofar as said lease covers Township 35 North, Range 30 East. All of Section 6, containing 615.01 Acres in Apache County, Arizona. Approved on April 1, 2016. No overriding royalty interest reserved.

(5) Assignment of Record Title and Operating Rights dated September 29, 2016, from Nacogdoches Oil and Gas, Inc. to Nordic Oil USA 2, LLLP, conveying a seventy-five percent (75%) of 8/8ths interest in title (being 75% of Nacogdoches Oil and Gas, Inc.'s then current interest) and thirty percent (30%) of 8/8ths interest in operating rights (being 54.54% of

Nacogdoches Oil and Gas, Inc.'s then current interest), insofar as said lease covers Township 35 North, Range 30 East. All of Section 6, containing 615.01 Acres in Apache County, Arizona. Approved on October 2, 2017. No overriding royalty interest reserved.

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The assignee shall furnish to the lessor, the Navajo Nation, c/o the Minerals Department, P.O. Box 1910, Window Rock, AZ 86515, copies of all reports filed with the U.S. Office of Natural Resources Revenue and the Bureau of Land Management pursuant to federal laws and regulations. The assignee shall furnish also all oil and gas run tickets, copies of drillstem tests, pressure tests, core analysis, seismic data and any other information required by the Minerals Department for this lease.

March 29, 2019
DATE

ASSIGNEE'S SIGNATURE

STATE OF LOUISIANA

PARISH OF LAFAYETTE

Before me, a notary public, in and for said county and state on this 29th day of March, 2019, personally appeared Mr. David Burns, to me known to be the identical person who subscribed the name of the maker thereof to the foregoing instrument as its President and acknowledged to me that he executed the same as his free and voluntary act and deed of such limited liability company, for the use and purposes therein set forth.

My Commission Expires at death

NOTARY Rene Guidry
LSBA # 26910

March 29, 2019
DATE

ASSIGNOR'S SIGNATURE

STATE OF TEXAS

COUNTY OF NACOGDOCHES

Before me, a notary public, in and for said county and state on this 29th day of March, 2019, personally appeared Mr. Brent Ivy, to me known to be the identical person who subscribed the name of the maker thereof to the foregoing instrument as its Vice President and acknowledged to me that he executed the same as his free and voluntary act and deed of such corporation, for the use and purposes therein set forth.

My Commission Expires _____

NOTARY

President's Office – Approval

This assignment has been reviewed by the appropriate Departments of the Navajo Nation and is hereby approved.

DATE

PRESIDENT, THE NAVAJO NATION

The assignee shall furnish to the lessor, the Navajo Nation, c/o the Minerals Department, P.O. Box 1910, Window Rock, AZ 86515, copies of all reports filed with the U.S. Office of Natural Resources Revenue and the Bureau of Land Management pursuant to federal laws and regulations. The assignee shall furnish also all oil and gas run tickets, copies of drillstem tests, pressure tests, core analysis, seismic data and any other information required by the Minerals Department for this lease.

March 29, 2019
DATE

ASSIGNEE'S SIGNATURE

STATE OF LOUISIANA PARISH OF LAFAYETTE

Before me, a notary public, in and for said county and state on this 29th day of March, 2019, personally appeared Mr. David Burns, to me known to be the identical person who subscribed the name of the maker thereof to the foregoing instrument as its President and acknowledged to me that he executed the same as his free and voluntary act and deed of such limited liability company, for the use and purposes therein set forth.

My Commission Expires _____

NOTARY

March 29, 2019
DATE

ASSIGNOR'S SIGNATURE

STATE OF TEXAS COUNTY OF NACOGDOCHES

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MARY D. ROBERTS
My Notary ID # 114129
Expires September 12, 2021

My Commission Expires SEPTEMBER 12, 2021 Mary D. Roberts

NOTARY

President's Office – Approval

This assignment has been reviewed by the appropriate Departments of the Navajo Nation and is hereby approved.

DATE

PRESIDENT, THE NAVAJO NATION

Form NTC T.18 § 605
Rev. 6/12

THE NAVAJO NATION
MINERALS DEPARTMENT
DIVISION OF NATURAL RESOURCES

ASSIGNMENT OF OIL AND GAS LEASE

ASSIGNMENT FOR: [X] TITLE [X] OPERATING RIGHTS [ ] FARM-OUT

Lease No. 14-20-0603-8889

1. Original Lessee: Kerr-McGee Oil Industries, Inc.
2. Approval Date of Original Lease: February 18, 1965
3. Royalty Rate: 16 2/3%
4. Current Land Description: Township 35 North, Range 30 East
   All of Section 5, containing 640 Acres in Apache County, Arizona
5. Description of Land Being Assigned: Same as above.
6. Assignor: Nacogdoches Oil and Gas, Inc.
7. Assignee: Nordic Oil USA 4 LLC
8. Portion of Rights/Title Under Transfer: All of Assignor's right, title and interest
9. Reserved Overriding Royalties: None.
10. Previous Assignments and Portion of Rights/Title Transferred:

(1) Assignment of Mining Lease dated December 2, 1993 from Kerr-McGee Corporation, formerly Kerr-McGee Oil Industries, Inc., conveying all of their interest to Mountain States Petroleum. Approved on July 19, 1994. No overriding royalty interest reserved.

(2) Assignment of Record Title and Operating Rights dated August 31, 2007, from Mountain States Petroleum Corporation to Nacogdoches Oil and Gas, Inc., insofar as said lease covers Township 35 North, Range 30 East. All of Section 5, containing 640 Acres in Apache County, Arizona. Approved November 17, 2008. No overriding royalty interest reserved.

(3) Assignment of Operating Rights dated April 5, 2012, from Nacogdoches Oil and Gas, Inc. to Nordic Oil USA 2, LLLP, conveying forty-five percent (45%) of their interest, insofar as said lease covers Township 35 North, Range 30 East. All of Section 5, containing 640 Acres in Apache County, Arizona. Approved on April 1, 2016. No overriding royalty interest reserved.

(4) Assignment of Record Title and Operating Rights dated September 29, 2016, from Nacogdoches Oil and Gas, Inc. to Nordic Oil USA 2, LLLP, conveying a seventy-five percent (75%) of 8/8ths interest in title (being 75% of Nacogdoches Oil and Gas, Inc.'s then current interest) and thirty percent (30%) of 8/8ths interest in operating rights (being 54.54% of Nacogdoches Oil and Gas, Inc.'s then current interest), insofar as said lease covers Township 35 North, Range 30 East. All of Section 5, containing 640 Acres in Apache County, Arizona. Approved on October 2, 2017. No overriding royalty interest reserved.

The assignee shall furnish to the lessor, the Navajo Nation, c/o the Minerals Department, P.O. Box 1910, Window Rock, AZ 86515, copies of all reports filed with the U.S. Office of Natural Resources Revenue and the Bureau of Land Management pursuant to federal laws and regulations. The assignee shall furnish also all oil and gas run tickets, copies of drillstem tests, pressure tests, core analysis, seismic data and any other information required by the Minerals Department for this lease.

March 29, 2019
DATE

ASSIGNEE'S SIGNATURE

STATE OF LOUISIANA

PARISH OF LAFAYETTE

Before me, a notary public, in and for said county and state on this 29th day of March, 2019, personally appeared Mr. David Burns, to me known to be the identical person who subscribed the name of the maker thereof to the foregoing instrument as its President and acknowledged to me that he executed the same as his free and voluntary act and deed of such limited liability company, for the use and purposes therein set forth.

My Commission Expires at death

NOTARY Rene Guidry
LSBA # 26910

March 29, 2019
DATE

ASSIGNOR'S SIGNATURE

STATE OF TEXAS

COUNTY OF NACOGDOCHES

Before me, a notary public, in and for said county and state on this 29th day of March, 2019, personally appeared Mr. Brent Ivy, to me known to be the identical person who subscribed the name of the maker thereof to the foregoing instrument as its Vice President and acknowledged to me that he executed the same as his free and voluntary act and deed of such corporation, for the use and purposes therein set forth.

My Commission Expires _____

NOTARY

President's Office – Approval

This assignment has been reviewed by the appropriate Departments of the Navajo Nation and is hereby approved.

DATE

PRESIDENT, THE NAVAJO NATION

The assignee shall furnish to the lessor, the Navajo Nation, c/o the Minerals Department, P.O. Box 1910, Window Rock, AZ 86515, copies of all reports filed with the U.S. Office of Natural Resources Revenue and the Bureau of Land Management pursuant to federal laws and regulations. The assignee shall furnish also all oil and gas run tickets, copies of drillstem tests, pressure tests, core analysis, seismic data and any other information required by the Minerals Department for this lease.

March 29, 2019
DATE

ASSIGNEE'S SIGNATURE

STATE OF LOUISIANA

PARISH OF LAFAYETTE

Before me, a notary public, in and for said county and state on this 29th day of March, 2019, personally appeared Mr. David Burns, to me known to be the identical person who subscribed the name of the maker thereof to the foregoing instrument as its President and acknowledged to me that he executed the same as his free and voluntary act and deed of such limited liability company, for the use and purposes therein set forth.

My Commission Expires _____

NOTARY

March 29, 2019
DATE

ASSIGNOR'S SIGNATURE

STATE OF TEXAS

COUNTY OF NACOGDOCHES

Before me, a notary public, in and for said county and state on this 29th day of March, 2019, personally appeared Mr. Brent Ivy, to me known to be the identical person who subscribed the name of the maker thereof to the foregoing instrument as its Vice President and acknowledged to me that he executed the same as his free and voluntary act and deed of such corporation, for the use and purposes therein set forth.

MARY D. ROBERTS
My Notary ID # 7143129
Expires September 12, 2021

My Commission Expires SEPTEMBER 12, 2021

Mary D. Roberts
NOTARY

President's Office – Approval

This assignment has been reviewed by the appropriate Departments of the Navajo Nation and is hereby approved.

DATE

PRESIDENT, THE NAVAJO NATION

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS

Lease No:
14-20-0603-8822

ASSIGNMENT OF OIL AND GAS LEASE
OPERATING RIGHTS

WHEREAS, for and in consideration of Ten Dollars ($10.00) and other valuable consideration, the receipt of which is hereby acknowledged, the said Nacogdoches Oil and Gas, Inc., a Texas corporation, the owner of the above-described lease (hereafter called "Assignor"), hereby bargains, sells, transfers, assigns, and conveys to Nordic Oil USA 4 LLC, a Delaware limited liability company (hereafter called "Assignee"), right title, and interest in and to said operating rights, subject to the approval of the Secretary of the Interior, the following described interest to wit:

> All of Assignor's operating rights interest in an Oil and Gas Mining Lease - Tribal Indian Lands, dated the 9th day of October, 1964, between the Chairman, Navajo Tribal Council of Apache County, State of Arizona, for and on behalf of the Navajo Tribe of Indians, as lessor, and Kerr-McGee Oil Industries, Inc., as lessee, recorded with the Department of the Interior, Bureau of Indian Affairs, on October 29, 1964, covering all of Sections 27, 28, 33 and 34 in Township 36 North, Range 30 East, G&SRM, Apache County, Arizona.

That Assignor's interest in the lands is a Twenty-Five percent (25%) of 8/8ths operating rights interest, the interest being transferred is a Twenty-Five percent (25%) of 8/8ths operating rights interest and the interest being retained is a Zero percent (0%) of 8/8ths operating rights interest. The Assignor reserves an overriding royalty in the amount of Zero percent (0%). Said operating rights assignment to be effective from the date of approval hereby by the Secretary of the Interior.

And for the same consideration the Assignor covenants with the Assignee, its heirs, successors or assigns: that the Assignor is the lawful owner of and has good title to the interest above assigned in and to said lease, free and clear from all liens, encumbrances or adverse claims; that said lease is a valid and subsisting lease on the lands above described, and all rentals and royalties due thereunder have been paid and all conditions necessary to keep the same in full force have been duly performed.

Attach all appropriate documentation relevant to this document.

IN WITNESS WHEREOF, the said Assignor has hereunto set its hand and seal, this 29th day of March, 2019.

Nacogdoches Oil and Gas, Inc.,
a Texas corporation

By: _____
Brent Ivy, its Vice President

ACKNOWLEDGEMENT OF CORPORATION

STATE OF TEXAS)
) SS:
COUNTY OF NACOGDOCHES)

Before me, a notary public in and for said county and state on this 29 day of March 20 19 personally appeared Brent Ivy, on behalf of NACOGDOCHES OIL AND GAS, INC. to me known to be the identical person who subscribed the name of the foregoing instrument as its Vice President and acknowledged to me that he executed the same as his free and voluntary act and deed, as the free and voluntary act and deed of such corporation, for the uses and purposes therein set forth

MARY D. ROBERTS
My Notary ID # 7143129
Expires September 12, 2021

My commission expires SEPTEMBER 12 20 21

Mary D. Roberts
Notary Public

ACKNOWLEDGEMENT OF INDIVIDUAL

STATE OF _____)
) SS:
COUNTY OF _____)

Before me, a notary public, in and for said county and state on this _____ day of _____, 20_____ personally appeared _____ to me known to be the identical person _____ who executed the within and foregoing instrument, and acknowledged to me that _____ executed the same as _____ free and voluntary act and deed, for the uses and purposes therein set forth.

Notary Public _____

My commission expires _____ 20____

ACCEPTANCE BY ASSIGNEE

NORDIC OIL USA 4 LLC the assignee in the above and foregoing assignment made subject to the approval of the Secretary of the Interior, hereby accepts such assignment, assumes full liability under the lease from its effective date and agrees to fulfill all the obligations, conditions, terms, restrictions and stipulations in and described indenture of lease, and the rules and regulations of the Secretary of the Interior applicable thereto, and to furnish proper bond guaranteeing a faithful compliance with said lease and this agreement. In addition assignee is in compliance to with all regulations and authorizing acts

IN WITNESS WHEREOF, the said assignee has hereto set its hand and seal this 29th day of March 20 19

NORDIC OIL USA 4 LLC
By:
David Burns, President

CONSENT OF SURETY

We _____, surety for _____ on the bond accompanying the lease above described, hereby consents to the assignment and transfer of said lease as above made and agrees that said bond shall remain in force and effect covering obligations of assignee

Dated at _____ this _____ day of _____ 19____

ACKNOWLEDGEMENT OF CORPORATION

STATE OF TEXAS)

) ss:

COUNTY OF NACOGDOCHES)

Before me, a notary public in and for said county and state on this 29 day of March 20 19 personally appeared Brent Ivy, on behalf of NACOGDOCHES OIL AND GAS, INC. to me known to be the identical person who subscribed the name of the foregoing instrument as Vice President and acknowledged to me that he executed the same as his free and voluntary act and deed, as the free and voluntary act and deed of said corporation, for the uses and purposes therein set forth.

Notary Public

My commission expires _____ 20 ___

ACKNOWLEDGEMENT OF INDIVIDUAL

STATE OF _____)

) ss:

COUNTY OF _____)

Before me, a notary public in and for said county and state on this _____ day of _____ 20 ___ personally appeared _____ to me known to be the identical person _____ who executed the within and foregoing instrument, and acknowledged to me that _____ executed the same as _____ free and voluntary act and deed, for the uses and purposes therein set forth.

Notary Public

My commission expires _____ 20 ___

ACCEPTANCE BY ASSIGNEE

NORDIC OIL USA 4 LLC hereby accepts the assignment, assumes full liability under the lease from its effective date and agrees to fulfill all the obligations, conditions, terms, restrictions and stipulations in said described indenture of lease, and the rules and regulations of the Secretary of the Interior applicable thereto, and to furnish proper bond to guarantee a faithful compliance with said lease and this agreement. In addition assignee is in compliance to with all regulations and statutes, as

IN WITNESS WHEREOF, the said assignee has hereto set its hand and seal this 29th day of March 20 19

NORDIC OIL USA 4 LLC

By:

David Burns, President

CONSENT OF SURETY

We _____ agree to _____ which accompanying the lease above described, hereby consents to the assignment and transfer of said lease as above made and agrees that said bond shall remain in force and effect covering all actions of assignee

Dated at _____ this _____ day of _____ 19 ___

LEASE NO. _____

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS

APPROVED: Pursuant to Secretarial
Redelegation Order 209 DM 8,
230 DM 1 and 3 IAM 4

_____
Date Approved

_____
Regional Director, Navajo

This assignment is approved **ONLY** as to the operating rights in & to said lease subject to the provisions of 25 CFR 211, and the conditions that approval will not serve to modify any of the terms of the lease. This action does not constitute approval of any other agreement mentioned in the assignment.

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS

Lease No:
14-20-0603-8812

ASSIGNMENT OF OIL AND GAS LEASE
OPERATING RIGHTS

WHEREAS, for and in consideration of Ten Dollars ($10.00) and other valuable consideration, the receipt of which is hereby acknowledged, the said Nacogdoches Oil and Gas, Inc., a Texas corporation, the owner of the above-described lease (hereafter called "Assignor"), hereby bargains, sells, transfers, assigns, and conveys to Nordic Oil USA 4 LLC, a Delaware limited liability company (hereafter called "Assignee"), right title, and interest in and to said operating rights, subject to the approval of the Secretary of the Interior, the following described interest to wit:

> All of Assignor's operating rights interest in an Oil and Gas Mining Lease - Tribal Indian Lands, dated the 12th day of October, 1964, between the Chairman, Navajo Tribal Council of Apache County, State of Arizona, for and on behalf of the Navajo Tribe of Indians, as lessor, and Humble Oil & Refining Company, as lessee, recorded with the Department of the Interior, Bureau of Indian Affairs, on October 26, 1964, covering all of Sections 25, 26, 35, and 36 in Township 36 North, Range 29 East, G&SRM, Apache County, Arizona.

That Assignor's interest in the lands is a Twenty-Five percent (25%) of 8/8ths operating rights interest, the interest being transferred is a Twenty-Five percent (25%) of 8/8ths operating rights interest and the interest being retained is a Zero percent (0%) of 8/8ths operating rights interest. The Assignor reserves an overriding royalty in the amount of Zero percent (0%). Said operating rights assignment to be effective from the date of approval hereby by the Secretary of the Interior.

And for the same consideration the Assignor covenants with the Assignee, its heirs, successors or assigns: that the Assignor is the lawful owner of and has good title to the interest above assigned in and to said lease, free and clear from all liens, encumbrances or adverse claims; that said lease is a valid and subsisting lease on the lands above described, and all rentals and royalties due thereunder have been paid and all conditions necessary to keep the same in full force have been duly performed.

Attach all appropriate documentation relevant to this document.

IN WITNESS WHEREOF, the said Assignor has hereunto set its hand and seal, this 29th day of March, 2019.

Nacogdoches Oil and Gas, Inc.,
a Texas corporation

By: _____
Brent Ivy, its Vice President

ACKNOWLEDGEMENT OF CORPORATION

STATE OF TEXAS)
) ss:
COUNTY OF NACOGDOCHES)

Before me, a notary public, in and for said county and state on this 29 day of March 20 19 personally appeared Brent Ivy, on behalf of NACOGDOCHES OIL AND GAS, INC. to me known to be the identical person who subscribed the name of the foregoing instrument as its Vice President and acknowledged to me that he executed the same as his free and voluntary act and deed, as the free and voluntary act and deed of such corporation, for the uses and purposes therein set forth

MARY D. ROBERTS
My Notary ID # 7143129
Expires September 12, 2021

My commission expires September 12, 2021

Mary D. Roberts
Notary Public

ACKNOWLEDGEMENT OF INDIVIDUAL

STATE OF _____)
) ss:
COUNTY OF _____)

Before me, a notary public, in and for said county and state on this _____ day of _____, 20_____ personally appeared _____ to me known to be the identical person _____ who executed the within and foregoing instrument, and acknowledged to me that _____ executed the same as _____ free and voluntary act and deed, for the uses and purposes therein set forth.

Notary Public _____

My commission expires _____, 20____

ACCEPTANCE BY ASSIGNEE

NORDIC OIL USA 4 LLC, the assignee in the above and foregoing assignment, inside subject to the approval of the Secretary of the Interior, hereby accepts such assignment, assumes full liability under the lease from its effective date and agrees to fulfil, all the obligations, conditions, terms, restrictions and stipulations in said described indenture of lease, and the rules and regulations of the Secretary of the Interior applicable thereto, and to furnish proper bond guaranteeing a faithful compliance with said lease and this agreement. In addition assignee is in compliance to with all regulations and authorizing acts

IN WITNESS WHEREOF, the said assignee has hereto set its hand and seal this 29th day of March 20 19

NORDIC OIL USA 4 LLC
By: _____
David Burns, President

CONSENT OF SURETY

The _____, surety for _____ on the bond accompanying the lease above described, hereby consents to the assignment and transfer of said lease as above made and agrees that said bond shall remain in force and effect covering obligations of assignee

Dated at _____ this _____ day of _____, 19____

ACKNOWLEDGEMENT OF CORPORATION

STATE OF TEXAS)

) SS:

COUNTY OF NACOGDOCHES)

Before me, a notary public in and for said county and state on this 29 day of March 20 19 personally appeared Brent Ivy, on behalf of NACOGDOCHES OIL AND GAS, INC. to me known by the identical person who subscribed the name of the foregoing instrument as its Vice President and acknowledged to me that he executed the same as his free and voluntary act and deed, as the free and voluntary act and deed of said corporation, for the uses and purposes therein set forth.

Notary Public

My commission expires _____ 20__

ACKNOWLEDGEMENT OF INDIVIDUAL

STATE OF _____)

) SS:

COUNTY OF _____)

Before me, a notary public in and for said county and state on this _____ day of _____ 20__ personally appeared _____ to me known to be the identical person _____ who executed the within and foregoing instrument, and acknowledged to me that _____ executed the same as _____ free and voluntary act and deed for the uses and purposes therein set forth.

Notary Public

My commission expires _____ 20__

ACCEPTANCE BY ASSIGNEE

NORDIC OIL USA 4 LLC the assignee in the above and foregoing assignment made subject to the approval of the Secretary of the Interior, hereby accepts such assignment, assumes full liability under the lease from its effective date and agrees to fulfill all the obligations, conditions, terms, restrictions and stipulations in and described instrument of lease, and the rules and regulations of the Secretary of the Interior applicable thereto, and to furnish proper bond guaranteeing a faithful compliance with and lease and this agreement. In addition assignee is in compliance to with all regulations and authority, acts

IN WITNESS WHEREOF, the said assignee has hereto set its hand and seal this 29th day of March 20 19

NORDIC OIL USA 4 LLC
By:
David Burns, President

CONSENT OF SURETY

The _____ surety to _____ on the bond accompanying the lease above described. Surety consents to the assignment and transfer of said lease as above made and agrees that said bond shall remain in force and effect covering all obligations of assignee

Dated at _____ this _____ day of _____ 19__

LEASE NO. _____

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS

APPROVED: Pursuant to Secretarial
Redelegation Order 209 DM 8,
230 DM 1 and 3 IAM 4

_____
Date Approved

_____
Regional Director, Navajo

This assignment is approved **ONLY** as to the operating rights in & to said lease subject to the provisions of 25 CFR 211, and the conditions that approval will not serve to modify any of the terms of the lease. This action does not constitute approval of any other agreement mentioned in the assignment.

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS

Lease No:
14-20-0603-8823

ASSIGNMENT OF OIL AND GAS LEASE
OPERATING RIGHTS

WHEREAS, for and in consideration of Ten Dollars ($10.00) and other valuable consideration, the receipt of which is hereby acknowledged, the said Nacogdoches Oil and Gas, Inc., a Texas corporation, the owner of the above-described lease (hereafter called "Assignor"), hereby bargains, sells, transfers, assigns, and conveys to Nordic Oil USA 4 LLC, a Delaware limited liability company (hereafter called "Assignee"), right title, and interest in and to said operating rights, subject to the approval of the Secretary of the Interior, the following described interest to wit:

> All of Assignor's operating rights interest in an Oil and Gas Mining Lease - Tribal Indian Lands, dated the 9th day of October, 1964, between the Chairman, Navajo Tribal Council of Apache County, State of Arizona, for and on behalf of the Navajo Tribe of Indians, as lessor, and Kerr-McGee Oil Industries, Inc., as lessee, recorded with the Department of the Interior, Bureau of Indian Affairs, on October 29, 1964, covering all of Sections 29, 30, 31, and 32 in Township 36 North, Range 30 East, G&SRM, Apache County, Arizona.

That Assignor's interest in the lands is a Twenty-Five percent (25%) of 8/8ths operating rights interest, the interest being transferred is a Twenty-Five percent (25%) of 8/8ths operating rights interest and the interest being retained is a Zero percent (0%) of 8/8ths operating rights interest. The Assignor reserves an overriding royalty in the amount of Zero percent (0%). Said operating rights assignment to be effective from the date of approval hereby by the Secretary of the Interior.

And for the same consideration the Assignor covenants with the Assignee, its heirs, successors or assigns: that the Assignor is the lawful owner of and has good title to the interest above assigned in and to said lease, free and clear from all liens, encumbrances or adverse claims; that said lease is a valid and subsisting lease on the lands above described, and all rentals and royalties due thereunder have been paid and all conditions necessary to keep the same in full force have been duly performed.

Attach all appropriate documentation relevant to this document.

IN WITNESS WHEREOF, the said Assignor has hereunto set its hand and seal, this 29th day of March, 2019.

Nacogdoches Oil and Gas, Inc.,
a Texas corporation

By: _____
Brent Ivy, its Vice President

ACKNOWLEDGEMENT OF CORPORATION

STATE OF TEXAS)
) ss:
COUNTY OF NACOGDOCHES)

Before me, a notary public in and for said county and state on this 29 day of March, 20 19 personally appeared Brent Ivy, on behalf of NACOGDOCHES OIL AND GAS, INC. to me known to be the identical person who subscribed the name of the foregoing instrument as its Vice President and acknowledged to me that he executed the same as his free and voluntary act and deed, as the free and voluntary act and deed of such corporation, for the uses and purposes therein set forth

MARY D. ROBERTS
My Notary ID # 7143129
Expires September 12, 2021

Mary D. Roberts
Notary Public

ACKNOWLEDGEMENT OF INDIVIDUAL

STATE OF _____)
) ss:
COUNTY OF _____)

Before me, a notary public, in and for said county and state on this _____ day of _____, 20_____ personally appeared _____ to me known to be the identical person _____ who executed the within and foregoing instrument, and acknowledged to me that _____ executed the same as _____ free and voluntary act and deed, for the uses and purposes therein set forth.

Notary Public _____

My commission expires _____ 20____

ACCEPTANCE BY ASSIGNEE

NORDIC OIL USA 4 LLC, the assignee in the above and foregoing assignment, made subject to the approval of the Secretary of the Interior, hereby accepts such assignment, assumes full liability under the lease from its effective date and agrees to fulfill all the obligations, conditions, terms, restrictions and stipulations in said described indenture of lease, and the rules and regulations of the Secretary of the Interior applicable thereto, and to furnish proper bond guaranteeing a faithful compliance with said lease and this agreement. In addition assignee is in compliance to with all regulations and authorizing acts

IN WITNESS WHEREOF, the said assignee has hereto set its hand and seal this 29th day of March, 20 19

NORDIC OIL USA 4 LLC
By: _____
David Burns, President

CONSENT OF SURETY

The _____ surety for _____ on the bond accompanying the lease above described hereby consents to the assignment and transfer of said lease as above made and agrees that said bond shall remain in force and effect covering obligations of assignee

Dated at _____ this _____ day of _____ 19____

ACKNOWLEDGEMENT OF CORPORATION

STATE OF TEXAS)

) ss:

COUNTY OF NACOGDOCHES)

Before me, a notary public in and for said county and state on this 29 day of March 19 personally appeared Brent Ivy, on behalf of NACOGDOCHES OIL AND GAS, INC. to me known to be the identical person who subscribed the name of the foregoing instrument as Vice President and acknowledged to me that he executed the same as his free and voluntary act and deed, as the free and voluntary act and deed of said corporation, for the uses and purposes therein set forth.

Notary Public

My commission expires _____ 19__

ACKNOWLEDGEMENT OF INDIVIDUAL

STATE OF _____)

) ss:

COUNTY OF _____)

Before me, a notary public, in and for said county and state on the _____ day of _____ 19__ personally appeared _____ to me known to be the identical person _____ who executed the within and foregoing instrument, and acknowledged to me that _____ executed the same as _____ free and voluntary act and deed for the uses and purposes therein set forth.

Notary Public

My commission expires _____ 19__

ACCEPTANCE BY ASSIGNEE

NORDIC OIL USA 4 LLC the assignee in the above and foregoing assignment, made subject to the approval of the Secretary of the Interior, hereby accepts such assignment, assumes full liability under the lease from its effective date and agrees to fulfill all the obligations, conditions, terms, restrictions and stipulations in and described in said lease, and the rules and regulations of the Secretary of the Interior applicable thereto, and to furnish proper bond guaranteeing a faithful compliance with said lease and this agreement. In addition, assignee is in compliance to with all regulations and authorizes, acts

IN WITNESS WHEREOF, the said assignee has hereto set its hand and seal this 29th day of March 19

NORDIC OIL USA 4 LLC

By: _____

David Burns, President

CONSENT OF SURETY

The _____ surety to _____ on the bond accompanying the lease above described, hereby consents to the assignment and transfer of said lease as above made and agrees that said bond shall remain in force and effect covering obligations of assignee.

Dated at _____ this _____ day of _____ 19__

LEASE NO. _____

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS

APPROVED: Pursuant to Secretarial
Redelegation Order 209 DM 8,
230 DM 1 and 3 IAM 4

_____
Date Approved

_____
Regional Director, Navajo

This assignment is approved **ONLY** as to the operating rights in & to said lease subject to the provisions of 25 CFR 211, and the conditions that approval will not serve to modify any of the terms of the lease. This action does not constitute approval of any other agreement mentioned in the assignment.

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS

Lease No:
14-20-0603-8876

ASSIGNMENT OF OIL AND GAS LEASE
OPERATING RIGHTS

WHEREAS, for and in consideration of Ten Dollars ($10.00) and other valuable consideration, the receipt of which is hereby acknowledged, the said Nacogdoches Oil and Gas, Inc., a Texas corporation, the owner of the above-described lease (hereafter called "Assignor"), hereby bargains, sells, transfers, assigns, and conveys to Nordic Oil USA 4 LLC, a Delaware limited liability company (hereafter called "Assignee"), right title, and interest in and to said operating rights, subject to the approval of the Secretary of the Interior, the following described interest to wit:

> All of Assignor's operating rights interest in an Oil and Gas Mining Lease - Tribal Indian Lands, dated the 15th day of January, 1965, between the Chairman, Navajo Tribal Council of Apache County, State of Arizona, for and on behalf of the Navajo Tribe of Indians, as lessor, and Humble Oil & Refining Company, as lessee, recorded with the Department of the Interior, Bureau of Indian Affairs, on February 18, 1965, covering all of Section 6 in Township 35 North, Range 30 East, G&SRM, Apache County, Arizona.

That Assignor's interest in the lands is a Twenty-Five percent (25%) of 8/8ths operating rights interest, the interest being transferred is a Twenty-Five percent (25%) of 8/8ths operating rights interest and the interest being retained is a Zero percent (0%) of 8/8ths operating rights interest. The Assignor reserves an overriding royalty in the amount of Zero percent (0%). Said operating rights assignment to be effective from the date of approval hereby by the Secretary of the Interior.

And for the same consideration the Assignor covenants with the Assignee, its heirs, successors or assigns: that the Assignor is the lawful owner of and has good title to the interest above assigned in and to said lease, free and clear from all liens, encumbrances or adverse claims; that said lease is a valid and subsisting lease on the lands above described, and all rentals and royalties due thereunder have been paid and all conditions necessary to keep the same in full force have been duly performed.

Attach all appropriate documentation relevant to this document.

IN WITNESS WHEREOF, the said Assignor has hereunto set its hand and seal, this 29th day of March, 2019.

Nacogdoches Oil and Gas, Inc.,
a Texas corporation

By: _____
Brent Ivy, its Vice President

ACKNOWLEDGEMENT OF CORPORATION

STATE OF TEXAS)
) SS:
COUNTY OF NACOGDOCHES)

Before me, a notary public in and for said county and state on this 29 day of March, 20 19 personally appeared Brent Ivy, on behalf of NACOGDOCHES OIL AND GAS, INC. to me known to be the identical person who subscribed the name of the foregoing instrument as its Vice President and acknowledged to me that he executed the same as his free and voluntary act and deed, as the free and voluntary act and deed of such corporation, for the uses and purposes therein set forth

MARY D. ROBERTS
My Notary ID # 7143129
Expires September 12, 2021

My commission expires SEPTEMBER 12

Mary D. Roberts
Notary Public

ACKNOWLEDGEMENT OF INDIVIDUAL

STATE OF _____)
) SS:
COUNTY OF _____)

Before me, a notary public, in and for said county and state on this _____ day of _____, 20_____ personally appeared _____ to me known to be the identical person _____ who executed the within and foregoing instrument, and acknowledged to me that _____ executed the same as _____ free and voluntary act and deed, for the uses and purposes therein set forth.

Notary Public _____

My commission expires _____, 20____

ACCEPTANCE BY ASSIGNEE

NORDIC OIL USA 4 LLC, the assignee in the above and foregoing assignment, made subject to the approval of the Secretary of the Interior, hereby accepts such assignment, assumes full liability under the lease from its effective date and agrees to fulfill all the obligations, conditions, terms, restrictions and stipulations in said described indenture of lease, and the rules and regulations of the Secretary of the Interior applicable thereto, and to furnish proper bond guaranteeing a faithful compliance with said lease and this agreement. In addition assignee is in compliance to with all regulations and authorizing acts

IN WITNESS WHEREOF, the said assignee has hereto set its hand and seal this 29th day of March, 20 19

NORDIC OIL USA 4 LLC
By: _____
David Burns, President

CONSENT OF SURETY

We _____, surety for _____ on the bond accompanying the lease above described, hereby consents to the assignment and transfer of said lease as above made and agrees that said bond shall remain in force and effect covering obligations of assignee

Dated at _____ this _____ day of _____, 19____

ACKNOWLEDGEMENT OF CORPORATION

STATE OF TEXAS)

) SS:

COUNTY OF NACOGDOCHES)

Before me, a notary public in and for said county and state on the 29 day of March 19 personally appeared Brent Ivy, on behalf of NACOGDOCHES OIL AND GAS, INC. to me known to be the identical person who subscribed the name of the foregoing instrument as a Vice President and acknowledged to me that he executed the same as his free and voluntary act and deed, as the free and voluntary act and deed of such corporation, for the uses and purposes therein set forth.

Notary Public

My commission expires _____ 19__

ACKNOWLEDGEMENT OF INDIVIDUAL

STATE OF _____)

) SS:

COUNTY OF _____)

Before me, a notary public in and for said county and state on the ____ day of _____ 19__ personally appeared _____ to me known to be the identical person _____ who executed the within and foregoing instrument, and acknowledged to me that _____ executed the same as _____ free and voluntary act and deed, for the uses and purposes therein set forth.

Notary Public

My commission expires _____ 19__

ACCEPTANCE BY ASSIGNEE

NORDIC OIL USA 4 LLC _____ the assignee in the above and foregoing assignment, made subject to the approval of the Secretary of the Interior, hereby accepts such assignment, assumes full liability on and for the leases from its effective date and agrees to fulfill all the obligations, conditions, terms, restrictions and stipulations in said described indenture of lease, and the rules and regulations of the Secretary of the Interior applicable thereto, and to furnish proper bond guaranteeing a faithful compliance with said lease and this agreement. In addition assignee is in compliance to with all regulations and mineral leasing acts.

IN WITNESS WHEREOF, the said assignee has hereto set its hand and seal this 29th day of March 19

NORDIC OIL USA 4 LLC

By:

David Burns, President

CONSENT OF SURETY

We _____ surety of _____ on the bond accompanying the lease above described, hereby consent to the assignment and transfer of said lease as above made and agree that said bond shall remain in force and effect covering all portions of assignee.

Dated at _____ this ____ day of _____ 19__

LEASE NO. _____

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS

APPROVED: Pursuant to Secretarial
Redelegation Order 209 DM 8,
230 DM 1 and 3 IAM 4

_____
Date Approved

_____
Regional Director, Navajo

This assignment is approved **ONLY** as to the operating rights in & to said lease subject to the provisions of 25 CFR 211, and the conditions that approval will not serve to modify any of the terms of the lease. This action does not constitute approval of any other agreement mentioned in the assignment.

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS

Lease No:
14-20-0603-8889

ASSIGNMENT OF OIL AND GAS LEASE OPERATING RIGHTS

WHEREAS, for and in consideration of Ten Dollars ($10.00) and other valuable consideration, the receipt of which is hereby acknowledged, the said Nacogdoches Oil and Gas, Inc., a Texas corporation, the owner of the above-described lease (hereafter called "Assignor"), hereby bargains, sells, transfers, assigns, and conveys to Nordic Oil USA 4 LLC, a Delaware limited liability company (hereafter called "Assignee"), right title, and interest in and to said operating rights, subject to the approval of the Secretary of the Interior, the following described interest to wit:

> All of Assignor's operating rights interest in an Oil and Gas Mining Lease - Tribal Indian Lands, dated the 15th day of January, 1965, between the Chairman, Navajo Tribal Council of Apache County, State of Arizona, for and on behalf of the Navajo Tribe of Indians, as lessor, and Kerr-McGee Oil Industries, Inc., as lessee, recorded with the Department of the Interior, Bureau of Indian Affairs, on February 18, 1965, covering all of Section 5 in Township 35 North, Range 30 East, G&SRM, Apache County, Arizona.

That Assignor's interest in the lands is a Twenty-Five percent (25%) of 8/8ths operating rights interest, the interest being transferred is a Twenty-Five percent (25%) of 8/8ths operating rights interest and the interest being retained is a Zero percent (0%) of 8/8ths operating rights interest. The Assignor reserves an overriding royalty in the amount of Zero percent (0%). Said operating rights assignment to be effective from the date of approval hereby by the Secretary of the Interior.

And for the same consideration the Assignor covenants with the Assignee, its heirs, successors or assigns: that the Assignor is the lawful owner of and has good title to the interest above assigned in and to said lease, free and clear from all liens, encumbrances or adverse claims; that said lease is a valid and subsisting lease on the lands above described, and all rentals and royalties due thereunder have been paid and all conditions necessary to keep the same in full force have been duly performed.

Attach all appropriate documentation relevant to this document.

IN WITNESS WHEREOF, the said Assignor has hereunto set its hand and seal, this 29th day of March, 2019.

Nacogdoches Oil and Gas, Inc.,
a Texas corporation

By: _____
Brent Ivy, its Vice-President

ACKNOWLEDGEMENT OF CORPORATION

STATE OF TEXAS)
) ss:
COUNTY OF NACOGDOCHES)

Before me, a notary public, in and for said county and state on this 29 day of March, 20 19 personally appeared Brent Ivy, on behalf of NACOGDOCHES OIL AND GAS, INC. to me known to be the identical person who subscribed the name of the foregoing instrument as Vice President and acknowledged to me that he executed the same as his free and voluntary act and deed, as the free and voluntary act and deed of such corporation, for the uses and purposes therein set forth.

MARY D. ROBERTS
My Notary ID # 7143129
Expires September 12, 2021

Mary D. Roberts
Notary Public

My commission expires SEPTEMBER 12 2021

ACKNOWLEDGEMENT OF INDIVIDUAL

STATE OF _____)
) ss:
COUNTY OF _____)

Before me, a notary public, in and for said county and state on this _____ day of _____, 20_____ personally appeared _____ to me known to be the identical person _____ who executed the within and foregoing instrument, and acknowledged to me that _____ executed the same as _____ free and voluntary act and deed, for the uses and purposes therein set forth.

Notary Public _____

My commission expires _____ 20___

ACCEPTANCE BY ASSIGNEE

NORDIC OIL USA 4 LLC, the assignee in the above and foregoing assignment, made subject to the approval of the Secretary of the Interior, hereby accepts such assignment, assumes full liability under the lease from its effective date and agrees to fulfill all the obligations, conditions, terms, restrictions and stipulations in said described indenture of lease, and the rules and regulations of the Secretary of the Interior applicable thereto, and to furnish proper bond guaranteeing a faithful compliance with said lease and this agreement. In addition assignee is in compliance to with all regulations and authorizing acts

IN WITNESS WHEREOF, the said assignee has hereto set its hand and seal this 29th day of March, 20 19

NORDIC OIL USA 4 LLC
By: _____
David Burns, President

CONSENT OF SURETY

The _____ surety for _____ on the bond accompanying the lease above described, hereby consents to the assignment and transfer of said lease as above made and agrees that said bond shall remain in force and effect covering obligations of assignee

Dated at _____ this _____ day of _____ 19____

ACKNOWLEDGEMENT OF CORPORATION

STATE OF TEXAS)

) ss:

COUNTY OF NACOGDOCHES)

Before me, a notary public in and for said county and state on this 29 day of March 20 19 personally appeared Brent Ivy, on behalf of NACOGDOCHES OIL AND GAS, INC. to me known to be the identical person who subscribed the name of the foregoing instrument as its Vice President and acknowledged to me that he executed the same as his free and voluntary act and deed, as the free and voluntary act and deed of such corporation, for the uses and purposes therein set forth.

Notary Public

My commission expires _____ 20__

ACKNOWLEDGEMENT OF INDIVIDUAL

STATE OF _____)

) ss:

COUNTY OF _____)

Before me, a notary public in and for said county and state on this _____ day of _____ 20__, personally appeared _____ to me known to be the identical person _____ who executed the within and foregoing instrument, and acknowledged to me that _____ executed the same as _____ free and voluntary act and deed, for the uses and purposes therein set forth.

Notary Public

My commission expires _____ 20__

ACCEPTANCE BY ASSIGNEE

NORDIC OIL USA 4 LLC the assignee in the above and foregoing assignment, made subject to the approval of the Secretary of the Interior, hereby accepts such assignment, assumes full liability under the lease from its effective date and agrees to fulfill all the obligations, conditions, terms, restrictions and stipulations in said described indenture of lease, and the rules and regulations of the Secretary of the Interior applicable thereto, and to furnish proper bond in assuring a faithful compliance with said lease and this agreement. In addition assignee is in compliance to with all regulations and authorizing acts

IN WITNESS WHEREOF, the said assignee has hereto set its hand and seal this 29th day of March 20 19

NORDIC OIL USA 4 LLC

By:

David Burns, President

CONSENT OF SURETY

The _____ surety for _____ on the bond accompanying the lease above described. Surety consents to the assignment and transfer of said lease as above made and agrees that said bond shall remain in force and effect covering obligations of assignee

Dated at _____ this _____ day of _____ 19__

LEASE NO. _____

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS

APPROVED: Pursuant to Secretarial
Redelegation Order 209 DM 8,
230 DM 1 and 3 IAM 4

_____
Date Approved

_____
Regional Director, Navajo

This assignment is approved **ONLY** as to the operating rights in & to said lease subject to the provisions of 25 CFR 211, and the conditions that approval will not serve to modify any of the terms of the lease. This action does not constitute approval of any other agreement mentioned in the assignment.

5-5429
(August 1961)

Lease No. 14-20-0603-8822
Contract No. _____

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS

ASSIGNMENT OF MINING LEASE

Whereas, the Secretary of the Interior or his authorized representative has heretofore approved an Oil and Gas mining lease, dated the 9th day of October, 1964, entered into by and between Chairman, Navajo Tribal Council of Apache County, State of Arizona, for and on behalf of the Navajo Tribe of Indians, lessor, and Kerr-McGee Oil Industries, Inc., lessee, covering the following-described lands in the Navajo Nation (Insert name of Reservation, Pueblo Nation, etc, as needed) in the State of Arizona, covering all of Sections 27, 28, 33 and 34 in Township 36 North, Range 30 East, G&SRM, Apache County, Arizona

NOW, THEREFORE, for and in consideration of Ten dollars ($10.00), the receipt of which is hereby acknowledged, the said Nacogdoches Oil and Gas, Inc., a Texas corporation the owner of the above-described lease, hereby bargains, sells, transfers, assigns, and conveys all of its right, title, and interest in and to said lease, subject to the approval of the Secretary of the Interior or his authorized representative to ~~of~~ Nordic Oil USA 4 LLC, a Delaware limited liability company. Said assignment to be effective from the date of approval hereby by the Secretary of the Interior or his authorized representative.

IN WITNESS WHEREOF, the said assignor has hereunto set its hand and seal, this 29th day of March, 2019.

Nacogdoches Oil and Gas, Inc.
By: _____
Brent Ivy, its Vice President

(Over)

ACKNOWLEDGMENT OF CORPORATION

STATE OF TEXAS)
) ss:
COUNTY OF NACOGDOCHES)

Before me, a notary public, in and for said county and State on this 29th day of March, 20 19 personally appeared Brent Ivy, on behalf of NACOGDOCHES OIL AND GAS, INC. to me known to be the identical person who subscribed the name of the maker thereof to the foregoing instrument as its Vice President and acknowledged to me that he executed the same as his free and voluntary act and deed, and as the free and voluntary act and deed of such corporation, for the uses and purposes therein set forth.

My commission expires 12 2021

MARY D. ROBERTS
My Notary ID # 7143129
Expires September 12, 2021

Mary D. Roberts
Notary Public

ACKNOWLEDGMENT OF INDIVIDUAL

STATE OF _____)
) ss:
COUNTY OF _____)

Before me, a notary public, in and for said county and State on this _____ day of _____, 20___ personally appeared _____

_____ to me known to be the identical person ___ who executed the within and foregoing instrument, and acknowledged to me that _____ executed the same as _____ free and voluntary act and deed, for the uses and purposes therein set forth.

My commission expires _____, 20___

_____
Notary Public

ACCEPTANCE BY ASSIGNEE

The assignee in the above and foregoing assignment, made subject to the approval of the Secretary of the Interior, hereby accepts such assignment, assumes full liability under the lease from its effective date and agrees to fulfill all the obligations, conditions, terms, restrictions and stipulations in said described indenture of lease, and the rules and regulations of the Secretary of the Interior applicable thereto, and to furnish proper bond guaranteeing a faithful compliance with said lease and this agreement. In addition assignee is in compliance with all regulations and authorizing acts.

IN WITNESS WHEREOF, the said assignee has hereto set its hand and seal this 29th day of March, 20 19.

NORDIC OIL USA 4 LLC
By:
David Burns, President

CONSENT OF SURETY

The _____, of _____, surety for _____ on the bond accompanying the lease above described, hereby consents to the assignment and transfer of said lease as above made and agrees that said bond shall remain in force and effect covering obligations of assignee.

Dated at _____ this _____ day of _____, 20___.

_____

_____

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS

_____
Date

_____
REGIONAL DIRECTOR, NAVAJO

APPROVED: Pursuant to the Secretarial Redelegation Order 209 DM 8, 230 DM 1 and 3 IAM 4.

ACKNOWLEDGMENT OF CORPORATION

STATE OF TEXAS)
) ss:
COUNTY OF NACOGDOCHES)

Before me, a notary public, in and for said county and State on this 29th day of March, 20 19 personally appeared Brent Ivy, on behalf of NACOGDOCHES OIL AND GAS, INC. to me known to be the identical person who subscribed the name of the maker thereof to the foregoing instrument as its Vice President and acknowledged to me that he executed the same as his free and voluntary act and deed, and as the free and voluntary act and deed of such corporation, for the uses and purposes therein set forth.

My commission expires _____, 20___ _____
Notary Public

ACKNOWLEDGMENT OF INDIVIDUAL

STATE OF _____)
) ss:
COUNTY OF _____)

Before me, a notary public, in and for said county and State on this _____ day of _____, 20___ personally appeared _____

_____ to me known to be the identical person ___ who executed the within and foregoing instrument, and acknowledged to me that _____ executed the same as _____ free and voluntary act and deed, for the uses and purposes therein set forth.

My commission expires _____, 20___ _____
Notary Public

ACCEPTANCE BY ASSIGNEE

The assignee in the above and foregoing assignment, made subject to the approval of the Secretary of the Interior, hereby accepts such assignment, assumes full liability under the lease from its effective date and agrees to fulfill all the obligations, conditions, terms, restrictions and stipulations in said described indenture of lease, and the rules and regulations of the Secretary of the Interior applicable thereto, and to furnish proper bond guaranteeing a faithful compliance with said lease and this agreement. In addition assignee is in compliance with all regulations and authorizing acts.

IN WITNESS WHEREOF, the said assignee has hereto set its hand and seal this 29th day of March, 20 19.

NORDIC OIL USA 4 LLC
By:
David Burns, President

CONSENT OF SURETY

The _____, of _____, surety for _____ on the bond accompanying the lease above described, hereby consents to the assignment and transfer of said lease as above made and agrees that said bond shall remain in force and effect covering obligations of assignee.

Dated at _____ this _____ day of _____, 20___.

_____
_____

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS

APPROVED: Pursuant to the Secretarial Redelegation Order 209 DM 8, 230 DM 1 and 3 IAM 4.

_____
Date

_____
REGIONAL DIRECTOR, NAVAJO

S-5429
(August 1961)

Lease No. 14-20-0603-8812
Contract No. _____

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS

ASSIGNMENT OF MINING LEASE

Whereas, the Secretary of the Interior or his authorized representative has heretofore approved an Oil and Gas mining lease, dated the 12th day of October, 1964, entered into by and between Chairman, Navajo Tribal Council of Apache County, State of Arizona, for and on behalf of the Navajo Tribe of Indians, lessor, and Humble Oil & Refining Company, lessee, covering the following-described lands in the Navajo Nation (Insert name of Reservation, Pueblo Nation, etc, as needed) in the State of Arizona, covering all of Sections 25, 26, 35, and 36 in Township 36 North, Range 29 East, G&SRM, Apache County, Arizona

NOW, THEREFORE, for and in consideration of Ten dollars ($10.00), the receipt of which is hereby acknowledged, the said Nacogdoches Oil and Gas, Inc., a Texas corporation the owner of the above-described lease, hereby bargains, sells, transfers, assigns, and conveys all of its right, title, and interest in and to said lease, subject to the approval of the Secretary of the Interior or his authorized representative to ~~of~~ Nordic Oil USA 4 LLC, a Delaware limited liability company. Said assignment to be effective from the date of approval hereby by the Secretary of the Interior or his authorized representative.

IN WITNESS WHEREOF, the said assignor has hereunto set its hand and seal, this 29th day of March, 2019.

Nacogdoches Oil and Gas, Inc.
By:
Brent Ivy, its Vice President

(Over)

ACKNOWLEDGMENT OF CORPORATION

STATE OF TEXAS)
) ss:
COUNTY OF NACOGDOCHES)

Before me, a notary public, in and for said county and State on this 29th day of March, 20 19 personally appeared Brent Ivy, on behalf of NACOGDOCHES OIL AND GAS, INC. to me known to be the identical person who subscribed the name of the maker thereof to the foregoing instrument as its Vice President and acknowledged to me that he executed the same as his free and voluntary act and deed, and as the free and voluntary act and deed of such corporation, for the uses and purposes therein set forth.

MARY D. ROBERTS
My Notary ID # 7143129
Expires September 12, 2021

My commission expires September 12, 2021

Mary D Roberts
Notary Public

ACKNOWLEDGMENT OF INDIVIDUAL

STATE OF _____)
) ss:
COUNTY OF _____)

Before me, a notary public, in and for said county and State on this _____ day of _____, 20____ personally appeared _____

_____ to me known to be the identical person ___ who executed the within and foregoing instrument, and acknowledged to me that _____ executed the same as _____ free and voluntary act and deed, for the uses and purposes therein set forth.

My commission expires _____, 20___

_____
Notary Public

ACCEPTANCE BY ASSIGNEE

The assignee in the above and foregoing assignment, made subject to the approval of the Secretary of the Interior, hereby accepts such assignment, assumes full liability under the lease from its effective date and agrees to fulfill all the obligations, conditions, terms, restrictions and stipulations in said described indenture of lease, and the rules and regulations of the Secretary of the Interior applicable thereto, and to furnish proper bond guaranteeing a faithful compliance with said lease and this agreement. In addition assignee is in compliance with all regulations and authorizing acts.

IN WITNESS WHEREOF, the said assignee has hereto set its hand and seal this 29th day of March, 20 19.

Nordic Oil USA 4 LLC
By:
David Burns, President

CONSENT OF SURETY

The _____, of _____, surety for _____ on the bond accompanying the lease above described, hereby consents to the assignment and transfer of said lease as above made and agrees that said bond shall remain in force and effect covering obligations of assignee.

Dated at _____ this _____ day of _____, 20___.

_____

_____

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS

APPROVED: Pursuant to the Secretarial Redelegation Order 209 DM 8, 230 DM 1 and 3 IAM 4.

_____
Date

_____
REGIONAL DIRECTOR, NAVAJO

ACKNOWLEDGMENT OF CORPORATION

STATE OF TEXAS)
) ss:
COUNTY OF NACOGDOCHES)

Before me, a notary public, in and for said county and State on this 29th day of March, 20 19 personally appeared Brent Ivy, on behalf of NACOGDOCHES OIL AND GAS, INC. to me known to be the identical person who subscribed the name of the maker thereof to the foregoing instrument as its Vice President and acknowledged to me that he executed the same as his free and voluntary act and deed, and as the free and voluntary act and deed of such corporation, for the uses and purposes therein set forth.

My commission expires _____, 20___ _____
Notary Public

ACKNOWLEDGMENT OF INDIVIDUAL

STATE OF _____)
) ss:
COUNTY OF _____)

Before me, a notary public, in and for said county and State on this _____ day of _____, 20___ personally appeared _____

_____ to me known to be the identical person ___ who executed the within and foregoing instrument, and acknowledged to me that _____ executed the same as _____ free and voluntary act and deed, for the uses and purposes therein set forth.

My commission expires _____, 20___ _____
Notary Public

ACCEPTANCE BY ASSIGNEE

The assignee in the above and foregoing assignment, made subject to the approval of the Secretary of the Interior, hereby accepts such assignment, assumes full liability under the lease from its effective date and agrees to fulfill all the obligations, conditions, terms, restrictions and stipulations in said described indenture of lease, and the rules and regulations of the Secretary of the Interior applicable thereto, and to furnish proper bond guaranteeing a faithful compliance with said lease and this agreement. In addition assignee is in compliance with all regulations and authorizing acts.

IN WITNESS WHEREOF, the said assignee has hereto set its hand and seal this 29th day of March, 20 19.

NORDIC OIL USA 4 LLC
By:
David Burns, President

CONSENT OF SURETY

The _____, of _____, surety for _____ on the bond accompanying the lease above described, hereby consents to the assignment and transfer of said lease as above made and agrees that said bond shall remain in force and effect covering obligations of assignee.

Dated at _____ this _____ day of _____, 20___.

_____
_____

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS

_____
Date

_____
REGIONAL DIRECTOR, NAVAJO

APPROVED: Pursuant to the Secretarial Redelegation Order
209 DM 8, 230 DM 1 and 3 IAM 4.

5-5429
(August 1961)

Lease No. 14-20-0603-8823
Contract No. _____

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS

ASSIGNMENT OF MINING LEASE

Whereas, the Secretary of the Interior or his authorized representative has heretofore approved an Oil and Gas mining lease, dated the 9th day of October, 1964, entered into by and between Chairman, Navajo Tribal Council of Apache County, State of Arizona, for and on behalf of the Navajo Tribe of Indians, lessor, and Kerr-McGee Oil Industries, Inc., lessee, covering the following-described lands in the Navajo Nation (Insert name of Reservation, Pueblo Nation, etc, as needed) in the State of Arizona, covering all of Sections 29, 30, 31, and 32 in Township 36 North, Range 30 East, G&SRM, Apache County, Arizona

NOW, THEREFORE, for and in consideration of Ten dollars ($10.00), the receipt of which is hereby acknowledged, the said Nacogdoches Oil and Gas, Inc., a Texas corporation the owner of the above-described lease, hereby bargains, sells, transfers, assigns, and conveys all of its right, title, and interest in and to said lease, subject to the approval of the Secretary of the Interior or his authorized representative to ~~of~~ Nordic Oil USA 4 LLC, a Delaware limited liability company. Said assignment to be effective from the date of approval hereby by the Secretary of the Interior or his authorized representative.

IN WITNESS WHEREOF, the said assignor has hereunto set its hand and seal, this 29th day of March, 2019.

Nacogdoches Oil and Gas, Inc.
By: _____
Brent Ivy, its Vice President

(Over)

ACKNOWLEDGMENT OF CORPORATION

STATE OF TEXAS)
) ss:
COUNTY OF NACOGDOCHES)

Before me, a notary public, in and for said county and State on this 29th day of March, 20 19 personally appeared Brent Ivy, on behalf of NACOGDOCHES OIL AND GAS, INC. to me known to be the identical person who subscribed the name of the maker thereof to the foregoing instrument as its Vice President and acknowledged to me that he executed the same as his free and voluntary act and deed, and as the free and voluntary act and deed of such corporation, for the uses and purposes therein set forth.

MARY D. ROBERTS
My Notary ID # 7143129
Expires September 12, 2021

My commission expires [illegible]

Mary D. Roberts
Notary Public

ACKNOWLEDGMENT OF INDIVIDUAL

STATE OF _____)
) ss:
COUNTY OF _____)

Before me, a notary public, in and for said county and State on this _____ day of _____, 20____ personally appeared _____

_____ to me known to be the identical person ___ who executed the within and foregoing instrument, and acknowledged to me that _____ executed the same as _____ free and voluntary act and deed, for the uses and purposes therein set forth.

My commission expires _____, 20___

_____
Notary Public

ACCEPTANCE BY ASSIGNEE

The assignee in the above and foregoing assignment, made subject to the approval of the Secretary of the Interior, hereby accepts such assignment, assumes full liability under the lease from its effective date and agrees to fulfill all the obligations, conditions, terms, restrictions and stipulations in said described indenture of lease, and the rules and regulations of the Secretary of the Interior applicable thereto, and to furnish proper bond guaranteeing a faithful compliance with said lease and this agreement. In addition assignee is in compliance with all regulations and authorizing acts.

IN WITNESS WHEREOF, the said assignee has hereto set its hand and seal this 29th day of March, 20 19.

NORDIC OIL USA 4 LLC
By: _____
David Burns, President

CONSENT OF SURETY

The _____, of _____, surety for _____ on the bond accompanying the lease above described, hereby consents to the assignment and transfer of said lease as above made and agrees that said bond shall remain in force and effect covering obligations of assignee.

Dated at _____ this _____ day of _____, 20___.

_____

_____

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS

_____
Date

APPROVED: Pursuant to the Secretarial Redelegation Order 209 DM 8, 230 DM 1 and 3 IAM 4.

_____
REGIONAL DIRECTOR, NAVAJO

ACKNOWLEDGMENT OF CORPORATION

STATE OF TEXAS)
) ss:
COUNTY OF NACOGDOCHES)

Before me, a notary public, in and for said county and State on this 29th day of March, 20 19 personally appeared Brent Ivy, on behalf of NACOGDOCHES OIL AND GAS, INC. to me known to be the identical person who subscribed the name of the maker thereof to the foregoing instrument as its Vice President and acknowledged to me that he executed the same as his free and voluntary act and deed, and as the free and voluntary act and deed of such corporation, for the uses and purposes therein set forth.

My commission expires _____, 20___ _____
Notary Public

ACKNOWLEDGMENT OF INDIVIDUAL

STATE OF _____)
) ss:
COUNTY OF _____)

Before me, a notary public, in and for said county and State on this _____ day of _____, 20___ personally appeared _____

_____ to me known to be the identical person ___ who executed the within and foregoing instrument, and acknowledged to me that _____ executed the same as _____ free and voluntary act and deed, for the uses and purposes therein set forth.

My commission expires _____, 20___ _____
Notary Public

ACCEPTANCE BY ASSIGNEE

The assignee in the above and foregoing assignment, made subject to the approval of the Secretary of the Interior, hereby accepts such assignment, assumes full liability under the lease from its effective date and agrees to fulfill all the obligations, conditions, terms, restrictions and stipulations in said described indenture of lease, and the rules and regulations of the Secretary of the Interior applicable thereto, and to furnish proper bond guaranteeing a faithful compliance with said lease and this agreement. In addition assignee is in compliance with all regulations and authorizing acts.

IN WITNESS WHEREOF, the said assignee has hereto set its hand and seal this 29th day of March, 20 19.

NORDIC OIL USA 4 LLC
By:
David Burns, President

CONSENT OF SURETY

The _____, of _____, surety for _____ on the bond accompanying the lease above described, hereby consents to the assignment and transfer of said lease as above made and agrees that said bond shall remain in force and effect covering obligations of assignee.

Dated at _____ this _____ day of _____, 20___.

_____
_____

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS

_____
Date

_____
REGIONAL DIRECTOR, NAVAJO

APPROVED: Pursuant to the Secretarial Redelegation Order 209 DM 8, 230 DM 1 and 3 IAM 4.

5-5429
(August 1961)

Lease No. 14-20-0603-8876
Contract No. _____

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS

ASSIGNMENT OF MINING LEASE

Whereas, the Secretary of the Interior or his authorized representative has heretofore approved an Oil and Gas mining lease, dated the 15th day of January, 1965, entered into by and between Chairman, Navajo Tribal Council of Apache County, State of Arizona, for and on behalf of the Navajo Tribe of Indians, lessor, and Humble Oil & Refining Company, lessee, covering the following-described lands in the Navajo Nation (Insert name of Reservation, Pueblo Nation, etc, as needed) in the State of Arizona, covering all of Section 6 in Township 35 North, Range 30 East, G&SRM, Apache County, Arizona

NOW, THEREFORE, for and in consideration of Ten dollars ($10.00), the receipt of which is hereby acknowledged, the said Nacogdoches Oil and Gas, Inc., a Texas corporation the owner of the above-described lease, hereby bargains, sells, transfers, assigns, and conveys all of its right, title, and interest in and to said lease, subject to the approval of the Secretary of the Interior or his authorized representative to ~~of~~ Nordic Oil USA 4 LLC, a Delaware limited liability company. Said assignment to be effective from the date of approval hereby by the Secretary of the Interior or his authorized representative.

IN WITNESS WHEREOF, the said assignor has hereunto set its hand and seal, this 29th day of March, 2019.

Nacogdoches Oil and Gas, Inc.
By: _____
Brent Ivy, its Vice President

(Over)

ACKNOWLEDGMENT OF CORPORATION

STATE OF TEXAS)
) ss:
COUNTY OF NACOGDOCHES)

Before me, a notary public, in and for said county and State on this 29th day of March, 20 19 personally appeared Brent Ivy, on behalf of NACOGDOCHES OIL AND GAS, INC. to me known to be the identical person who subscribed the name of the maker thereof to the foregoing instrument as its Vice President and acknowledged to me that he executed the same as his free and voluntary act and deed, and as the free and voluntary act and deed of such corporation, for the uses and purposes therein set forth.

MARY D. ROBERTS
My Notary ID # 7143129
Expires September 12, 2021

My commission expires SEPTEMBER 12, 2021

Mary D. Roberts
Notary Public

ACKNOWLEDGMENT OF INDIVIDUAL

STATE OF _____)
) ss:
COUNTY OF _____)

Before me, a notary public, in and for said county and State on this _____ day of _____, 20____ personally appeared _____

_____ to me known to be the identical person ___ who executed the within and foregoing instrument, and acknowledged to me that _____ executed the same as _____ free and voluntary act and deed, for the uses and purposes therein set forth.

My commission expires _____, 20___

_____
Notary Public

ACCEPTANCE BY ASSIGNEE

The assignee in the above and foregoing assignment, made subject to the approval of the Secretary of the Interior, hereby accepts such assignment, assumes full liability under the lease from its effective date and agrees to fulfill all the obligations, conditions, terms, restrictions and stipulations in said described indenture of lease, and the rules and regulations of the Secretary of the Interior applicable thereto, and to furnish proper bond guaranteeing a faithful compliance with said lease and this agreement. In addition assignee is in compliance with all regulations and authorizing acts.

IN WITNESS WHEREOF, the said assignee has hereto set its hand and seal this 29th day of March, 20 19.

NORDIC OIL USA 4 LLC
By: _____
David Burns, President

CONSENT OF SURETY

The _____, of _____, surety for _____ on the bond accompanying the lease above described, hereby consents to the assignment and transfer of said lease as above made and agrees that said bond shall remain in force and effect covering obligations of assignee.

Dated at _____ this _____ day of _____, 20___.

_____

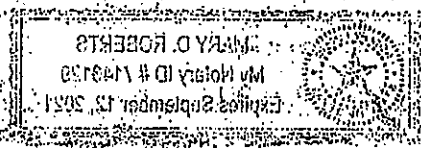
_____

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS

APPROVED: Pursuant to the Secretarial Redelegation Order 209 DM 8, 230 DM 1 and 3 IAM 4.

_____
Date

_____
REGIONAL DIRECTOR, NAVAJO


JULIA D. ROBERTS
My Notary ID # 174279
Expires September 12, 2021

ACKNOWLEDGMENT OF CORPORATION

STATE OF TEXAS)
) ss:
COUNTY OF NACOGDOCHES)

Before me, a notary public, in and for said county and State on this 29th day of March, 20 19 personally appeared Brent Ivy, on behalf of NACOGDOCHES OIL AND GAS, INC. to me known to be the identical person who subscribed the name of the maker thereof to the foregoing instrument as its Vice President and acknowledged to me that he executed the same as his free and voluntary act and deed, and as the free and voluntary act and deed of such corporation, for the uses and purposes therein set forth.

My commission expires _____, 20___

_____
Notary Public

ACKNOWLEDGMENT OF INDIVIDUAL

STATE OF _____)
) ss:
COUNTY OF _____)

Before me, a notary public, in and for said county and State on this _____ day of _____, 20___ personally appeared _____

_____ to me known to be the identical person ___ who executed the within and foregoing instrument, and acknowledged to me that _____ executed the same as _____ free and voluntary act and deed, for the uses and purposes therein set forth.

My commission expires _____, 20___

_____
Notary Public

ACCEPTANCE BY ASSIGNEE

The assignee in the above and foregoing assignment, made subject to the approval of the Secretary of the Interior, hereby accepts such assignment, assumes full liability under the lease from its effective date and agrees to fulfill all the obligations, conditions, terms, restrictions and stipulations in said described indenture of lease, and the rules and regulations of the Secretary of the Interior applicable thereto, and to furnish proper bond guaranteeing a faithful compliance with said lease and this agreement. In addition assignee is in compliance with all regulations and authorizing acts.

IN WITNESS WHEREOF, the said assignee has hereto set its hand and seal this 29th day of March, 20 19.

NORDIC OIL USA 4 LLC
By: _____
David Burns, President

CONSENT OF SURETY

The _____, of _____, surety for _____ on the bond accompanying the lease above described, hereby consents to the assignment and transfer of said lease as above made and agrees that said bond shall remain in force and effect covering obligations of assignee.

Dated at _____ this _____ day of _____, 20___.

_____

_____

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS

APPROVED: Pursuant to the Secretarial Redelegation Order 209 DM 8, 230 DM 1 and 3 IAM 4.

_____
Date

_____
REGIONAL DIRECTOR, NAVAJO

5-5429
(August 1961)

Lease No. 14-20-0603-8889
Contract No. _____

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS

ASSIGNMENT OF MINING LEASE

Whereas, the Secretary of the Interior or his authorized representative has heretofore approved an Oil and Gas mining lease, dated the 15th day of January, 1965, entered into by and between Chairman, Navajo Tribal Council of Apache County, State of Arizona, for and on behalf of the Navajo Tribe of Indians, lessor, and Kerr-McGee Oil Industries, Inc., lessee, covering the following-described lands in the Navajo Nation (Insert name of Reservation, Pueblo Nation, etc, as needed) in the State of Arizona, covering all of Section 5 in Township 35 North, Range 30 East, G&SRM, Apache County, Arizona

NOW, THEREFORE, for and in consideration of Ten dollars ($ 10.00), the receipt of which is hereby acknowledged, the said Nacogdoches Oil and Gas, Inc., a Texas corporation the owner of the above-described lease, hereby bargains, sells, transfers, assigns, and conveys all of its right, title, and interest in and to said lease, subject to the approval of the Secretary of the Interior or his authorized representative to ~~_____ of~~ Nordic Oil USA 4 LLC, a Delaware limited liability company. Said assignment to be effective from the date of approval hereby by the Secretary of the Interior or his authorized representative.

IN WITNESS WHEREOF, the said assignor has hereunto set its hand and seal, this 29th day of March, 2019.

Nacogdoches Oil and Gas, Inc.
By: _____
Brent Ivy, Its Vice President

(Over)

ACKNOWLEDGMENT OF CORPORATION

STATE OF TEXAS)
) ss:
COUNTY OF NACOGDOCHES)

Before me, a notary public, in and for said county and State on this 29th day of March, 20 19 personally appeared Brent Ivy, on behalf of NACOGDOCHES OIL AND GAS, INC. to me known to be the identical person who subscribed the name of the maker thereof to the foregoing instrument as its Vice President and acknowledged to me that he executed the same as his free and voluntary act and deed, and as the free and voluntary act and deed of such corporation, for the uses and purposes therein set forth.

MARY D. ROBERTS
My Notary ID # 7143129
Expires September 12, 2021

My commission expires September 12, 2021

Mary D. Roberts
Notary Public

ACKNOWLEDGMENT OF INDIVIDUAL

STATE OF _____)
) ss:
COUNTY OF _____)

Before me, a notary public, in and for said county and State on this _____ day of _____, 20___ personally appeared _____

_____ to me known to be the identical person ___ who executed the within and foregoing instrument, and acknowledged to me that _____ executed the same as _____ free and voluntary act and deed, for the uses and purposes therein set forth.

My commission expires _____, 20___

_____
Notary Public

ACCEPTANCE BY ASSIGNEE

The assignee in the above and foregoing assignment, made subject to the approval of the Secretary of the Interior, hereby accepts such assignment, assumes full liability under the lease from its effective date and agrees to fulfill all the obligations, conditions, terms, restrictions and stipulations in said described indenture of lease, and the rules and regulations of the Secretary of the Interior applicable thereto, and to furnish proper bond guaranteeing a faithful compliance with said lease and this agreement. In addition assignee is in compliance with all regulations and authorizing acts.

IN WITNESS WHEREOF, the said assignee has hereto set its hand and seal this 29th day of March, 20 19.

NORDIC OIL USA 4 LLC
By:
David Burns, President

CONSENT OF SURETY

The _____, of _____, surety for _____ on the bond accompanying the lease above described, hereby consents to the assignment and transfer of said lease as above made and agrees that said bond shall remain in force and effect covering obligations of assignee.

Dated at _____ this _____ day of _____, 20___.

_____

_____

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS

APPROVED: Pursuant to the Secretarial Redelegation Order
209 DM 8, 230 DM 1 and 3 IAM 4.

_____
Date

_____
REGIONAL DIRECTOR, NAVAJO

ACKNOWLEDGMENT OF CORPORATION

STATE OF TEXAS)
) ss:
COUNTY OF NACOGDOCHES)

Before me, a notary public, in and for said county and State on this 29th day of March, 20 19 personally appeared Brent Ivy, on behalf of NACOGDOCHES OIL AND GAS, INC. to me known to be the identical person who subscribed the name of the maker thereof to the foregoing instrument as its Vice President and acknowledged to me that he executed the same as his free and voluntary act and deed, and as the free and voluntary act and deed of such corporation, for the uses and purposes therein set forth.

My commission expires _____, 20___ _____
Notary Public

ACKNOWLEDGMENT OF INDIVIDUAL

STATE OF _____)
) ss:
COUNTY OF_____)

Before me, a notary public, in and for said county and State on this _____ day of _____, 20___ personally appeared _____

_____ to me known to be the identical person ___ who executed the within and foregoing instrument, and acknowledged to me that _____ executed the same as _____ free and voluntary act and deed, for the uses and purposes therein set forth.

My commission expires _____, 20___ _____
Notary Public

ACCEPTANCE BY ASSIGNEE

The assignee in the above and foregoing assignment, made subject to the approval of the Secretary of the Interior, hereby accepts such assignment, assumes full liability under the lease from its effective date and agrees to fulfill all the obligations, conditions, terms, restrictions and stipulations in said described indenture of lease, and the rules and regulations of the Secretary of the Interior applicable thereto, and to furnish proper bond guaranteeing a faithful compliance with said lease and this agreement. In addition assignee is in compliance with all regulations and authorizing acts.

IN WITNESS WHEREOF, the said assignee has hereto set its hand and seal this 29th day of March, 20 19.

NORDIC OIL USA 4 LLC
By:
David Burns, President

CONSENT OF SURETY

The _____, of _____, surety for _____ on the bond accompanying the lease above described, hereby consents to the assignment and transfer of said lease as above made and agrees that said bond shall remain in force and effect covering obligations of assignee.

Dated at _____ this_____ day of _____, 20___.

_____
_____

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS

_____
Date

_____
REGIONAL DIRECTOR, NAVAJO

APPROVED: Pursuant to the Secretarial Redelegation Order 209 DM 8, 230 DM 1 and 3 IAM 4.

APPENDIX VIII – MEMO TO DELEGATE CROTTY FROM MINERALS

THE NAVAJO NATION

RUSSELL BEGAYE
JONATHAN NEZ

INTER-OFFICE MEMORANDUM

TO : Honorable Amber Crotty, Delegate
Navajo Nation Council

FROM : Steven L. Prince
Steven L. Prince, Principal Petroleum Engineer
Minerals Department

DATE : March 6, 2018

SUBJECT: RED VALLEY CHAPTER OIL AND GAS CONCERNS

This memorandum is in response to your request to provide a written report to address the concerns raised in your letter dated 9/11/2017 and received by me on 2/22/2018. You requested a meeting to address questions and concerns raised at a meeting at the Red Valley Chapter house "regarding the increase of possible Oil and Gas extraction" and shared those questions and concerns in the letter. There has been no increase of oil and gas extraction at the Dineh Bi Keyah (DBK) field near Red Valley Chapter, where oil and gas extraction had been declining in the past several years until extraction of helium began a few years ago, however, oil and gas extraction is still well below extraction levels at the peak of the field's productivity. I will try to address each of the points raised in the letter in the following narrative.

Non-consent of Grazing Permittee

The five leases that comprise the DBK field were approved in 1964/5. In a continuation sheet attached to each of the leases, the following is stated: "Navajo grazing rights to the surface of any lands so leased shall be protected, and Navajo rights respecting the use of water shall be unimpaired." Besides that clause, there is no indication in our lease files to indicate that consent of the grazing permittee was given or required back then. Therefore, in order to determine if consent was given or not, someone would have to research the records of grazing permittees from that period of time and I presume that those records would be found at the Navajo Land Department (NLD) or with the General Land Development Department (GLDD). I have copied Mike Halona, Director of NLD, and Elerina Yazzie, Director of GLDD, to provide information on the status of the grazing consents. The current grazing permit holder expressed a desire to have a copy of the lease and I believe that copies of those leases may be publically available from the U.S. Department of Interior's Bureau of Indian Affairs (BIA) with tribal consent. We have copies of the leases in our files and with Navajo Nation Department of Justice consent and approval, we would be happy to provide copies of the leases to you.

Minerals Department • Post Office Box 1910 • Window Rock, Arizona 86515 • Phone: (928) 871-6588 • Fax: (928) 871-7095

Traffic

At the outset of the development of the DBK field in the mid-1960s, the operator was required to build a new road to be used exclusively by the vehicles belonging to the operation, so they would not tear up the local roads used by the local residents and also to prevent traffic on that road from adversely impacting the local residents. Over time, local residents have begun to use the oil field access road instead of the existing local roads because they have consistently been better maintained than the existing local roads. Many residents have chosen over time to locate their residences along the oil field access road primarily for this reason as well and they now use that road as if it were a road intended for local access and traffic.

Smell

Some of the wells in the DBK field have small percentages of naturally occurring hydrogen sulfide (H_2S) gas mixed into the natural gas and oil which is produced from the wells. The operator of the leases uses a technology which employs another chemical called a "scavenger" to remove the H_2S from the natural gas and oil stream before it reaches the surface as it is brought to the surface. In simplest terms, the scavenger is sent to the bottom of the well where it absorbs all of the H_2S, transforming it into a benign byproduct of the oil and gas production. The scavenger has a unique odor which is distinctly different from the "rotten egg" smell emanating from H_2S. The scent of the scavenger remains in close proximity to the well where it is being used. Although there are signs in both Navajo and English at all of the wells where H_2S is potentially present at the surface, warning that toxic gases may be present, as long as the scent of the scavenger and not that of H_2S is detected at the well site, there is no danger from the H_2S in that area.

Impact to Land/Water

I am not aware of any impacts to the land/water which have not been addressed and rectified. The Navajo Nation Minerals Department's Oil and Gas Inspection and Enforcement (I&E) team which is trained, certified, and overseen by the BLM inspects the wells, facilities, pipelines, and surrounding land/water on a regular basis and issue citations and potential fines to the operator if any of the operations are out of compliance with Federal and Tribal laws. Several years ago, one of our inspectors found oil leaking onto the ground at DBK and alerted the operator to repair the leak and clean up the spill before any of the leaking oil reached the nearby creek bed. Our inspectors consistently find small problems before they become major problems and make sure that any damage is promptly rectified.

Lack of Communication with the Operator

In a recent meeting at my office with Mr. Gary Chavez, Vice President, Red Valley Chapter and Mr. Lee Zhonnie, I was told that recently the operator of the DBK field generously provided uniforms for the local school's entire boys' and girls' sports teams. In order for the operator to provide that generous donation, there must be someone in the community communicating with the operator.

Ownership or Operation of the Site and **Community Unawareness of Owner/Operator of the Site**

The "major issue" regarding the ownership or operation of the site was not explained in the letter. Assuming that the "major issue" is the community's lack of knowledge of who is the operator, below I share contact information for the operator in addition to explaining about the recent changes in the ownership of the leases. The ownership of the leases and operational facilities recently passed from Nacogdoches Oil and Gas, Inc. to Nordic Oil USA 2, LLLP (Nordic) and the name of the designated operator is Capitol Operating Group, LLC. Nordic's President is David Burns and the business address for the company is: 5000 Ambassador Caffrey Parkway, Province Building 15B, Lafayette, Louisiana 70508. Mr. Burns' email address is: burnsdavid@verizon.net. Mr. Burns should be able to provide contact information for the designated operator if that is needed.

cc: Bidtah Becker, Executive Director, Division of Natural Resources
Akhtar Zaman, Director, Minerals Department
Mike Halona, Director, Land Department
Elerina Yazzie, Director, General Land Development Department

APPENDIX IX – WESTERN ENVIRONMENTAL LAW CENTER REQUESTS FOR INFORMATION

Headquarters
120 Shelton McMurphey Blvd.
Suite 340
Eugene, Oregon 97401
(541) 485-2471
info@westernlaw.org

Offices
Portland, Oregon
Seattle, Washington
Taos, New Mexico
Santa Fe, New Mexico
Helena, Montana

Defending the West westernlaw.org

Western Environmental Law Center

May 17, 2019

Mr. Oliver Whaley, Executive Director
Navajo Nation Environmental Protection Agency
P.O. Box 339
Window Rock, AZ 86515

Sent via USPS certified mail

Re: **Request for records of oil and helium leases in Red Valley, Arizona pursuant to the Navajo Nation Privacy and Access to Information Act**

Dear Mr. Whaley:

This letter is a request for information pursuant to the Navajo Nation Privacy and Access to Information Act, 2 N.N.C. §81 et seq., for all documents pertaining to helium and/or oil and gas leases in the Dineh-Bi-Keyah ("DBK") Field adjacent to the Red Valley, Arizona community. This request is submitted by the Western Environmental Law Center, a public interest environmental law firm, on behalf of Diné Citizens Against Ruining our Environment, a Navajo community-based organization.

We request copies of the following documents:

- Water Permits for operation in the DBK field;
- Inspection Reports of the DBK wells and the helium processing site in Red Valley;
- Emissions reports from wells in the DBK field and helium processing site in Red Valley; and
- Copies of BLM and Capitol Operating Groups reports on quarterly air monitoring data and H2S monitoring data, which Navajo EPA's Air Quality Follow-up Report recommended that Navajo Minerals Department request and provide copies of to Navajo EPA.

Please send the documents, in hard copy or digital format, to the mailing or email address in the signature line, below.

We additionally request your response to the following questions:

1. Are the wells in the DBK field considered minor source air emissions?
2. Is the helium processing site considered minor source, as well?

If you believe any records amongst those requested is protected from disclosure, please provide a description of each record so protected, in addition to the reasons why it is protected under the Privacy and Access to Information Act. If you believe another entity, such as the Bureau of Indian Affairs, possesses any documents you do not possess, we request that you inform us of that belief or any other information you have that might help us locate those documents.

Thank you very much for taking the time to respond to this request. If I can provide any further clarification please contact me at the phone number or email address below.

Sincerely,

Julia Guarino, Attorney
Western Environmental Law Center
208 Paseo del Pueblo Sur, #602
Taos, NM 87571
guarino@westernlaw.org
575-224-6205

Headquarters
120 Shelton McMurphey Blvd.
Suite 340
Eugene, Oregon 97401
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info@westernlaw.org

Offices
Portland, Oregon
Seattle, Washington
Taos, New Mexico
Santa Fe, New Mexico
Helena, Montana

Defending the West westernlaw.org

Western Environmental Law Center

May 17, 2019

Mr. Ahktar Zaman, Director
Navajo Nation Minerals Department
P.O. Box 9000
Window Rock, AZ 86515

Sent via USPS certified mail

Re: **Request for records of oil and helium leases in Red Valley, Arizona pursuant to the Navajo Nation Privacy and Access to Information Act**

Dear Mr. Zaman:

This letter is a request for information pursuant to the Navajo Nation Privacy and Access to Information Act, 2 N.N.C. §81 et seq., for all leases and related documents pertaining to helium and/or oil and gas leases in the Dineh-Bi-Keyah ("DBK") Field adjacent to the Red Valley, Arizona community. This request is submitted by the Western Environmental Law Center, a public interest environmental law firm, on behalf of Diné Citizens Against Ruining our Environment, a Navajo community-based organization.

We request copies of the following documents:

- All original lease or permitting documents as well as any lease modifications, related approvals of infrastructure or right of ways, or other related permits or approvals in the DBK field;
- Water Permits for operation in the DBK field;
- Inspection Reports of the DBK wells and the helium processing site in Red Valley;
- Emissions reports from wells in the DBK field and helium processing site in Red Valley; and
- Copies of BLM and Capitol Operating Groups reports on quarterly air monitoring data and H2S monitoring data, which Navajo EPA's Air Quality Follow-up Report recommended that Navajo Minerals Department request and provide copies of to Navajo EPA.

Please send the documents, in hard copy or digital format, to the mailing or email address in the signature line, below.

If you believe any records amongst those requested is protected from disclosure, please provide a description of each record so protected, in addition to the reasons why it is protected under the Privacy and Access to Information Act. If you believe another entity, such as the Bureau of Indian Affairs, possesses any documents you do not possess, we request that you inform us of that belief or any other information you have that might help us locate those documents.

Thank you very much for taking the time to respond to this request. If I can provide any further clarification please contact me at the phone number or email address below.

Sincerely,

Julia Guarino, Attorney
Western Environmental Law Center
208 Paseo del Pueblo Sur, #602
Taos, NM 87571
guarino@westernlaw.org
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Portland, Oregon
Seattle, Washington
Taos, New Mexico
Santa Fe, New Mexico
Helena, Montana

Defending the West
westernlaw.org

Western Environmental Law Center

May 17, 2019

Mr. Jason John, Acting Director
Navajo Nation Minerals Department
P.O. Box 678
Fort Defiance, AZ 86504

Sent via USPS certified mail

Re: **Request for records of oil and helium leases in Red Valley, Arizona pursuant to the Navajo Nation Privacy and Access to Information Act**

Dear Mr. John:

This letter is a request for information pursuant to the Navajo Nation Privacy and Access to Information Act, 2 N.N.C. §81 et seq., for all documents pertaining to water permits related to helium and/or oil and gas leases in the Dineh-Bi-Keyah ("DBK") Field adjacent to the Red Valley, Arizona community. This request is submitted by the Western Environmental Law Center, a public interest environmental law firm, on behalf of Diné Citizens Against Ruining our Environment, a Navajo community-based organization.

We request copies of the following documents:

- Water Permits for operation in the DBK field.

Please send the documents, in hard copy or digital format, to the mailing or email address in the signature line, below.

If you believe any records amongst those requested is protected from disclosure, please provide a description of each record so protected, in addition to the reasons why it is protected under the Privacy and Access to Information Act. If you believe another entity, such as the Bureau of Indian Affairs, possesses any documents you do not possess, we request that you inform us of that belief or any other information you have that might help us locate those documents.

Thank you very much for taking the time to respond to this request. If I can provide any further clarification please contact me at the phone number or email address below.

Sincerely,

Julia Guarino, Attorney
Western Environmental Law Center
208 Paseo del Pueblo Sur, #602
Taos, NM 87571
guarino@westernlaw.org
575-224-6205

THE NAVAJO NATION

JONATHAN NEZ | PRESIDENT MYRON LIZER | VICE PRESIDENT

August 15, 2019

Julia Guarino, Attorney
Western Environmental Law Center
208 Paseo del Pueblo Sur, #602
Taos, NM 87571
VIA EMAIL: guarino@westernlaw.org

RE: Response to request for records of oil and helium leases in Red Valley, Arizona pursuant to the Navajo Nation Privacy and Access to Information Act

Ms. Guarino,

We received your request dated May 17, 2019 for information pursuant to the Navajo Nation Privacy and Access to Information Act, 2 N.N.C. §81 et seq., for all documents pertaining to water permits related to helium and/or oil and gas leases in the Dineh-Bi-Keyah ("DBK") Field adjacent to the Red Valley, Arizona community. This request was submitted by the Western Environmental Law Center on behalf of Diné Citizens Against Ruining our Environment, a Navajo community-based organization.

You requested copies of the following documents: Water Permits for operation in the DBK field.

The Navajo Department of Water Resources does not have any water use permits issued to operators of the Dineh-Bi-Keyah Field.

Sincerely,

Jason John, Director
Navajo Department of Water Resources

Copy:
Veronica Blackhat, Navajo Department of Justice
Najam Tariq, Navajo Department of Water Resources

August 15, 2019

Julia Guarino
Western Environmental Law Center
208 Paseo del Pueblo Sur, #602
Taos, New Mexico 87571

RE: Request for records of oil and helium leases in Red Valley, Arizona pursuant to the Navajo Nation Privacy and Access to Information Act

Dear Ms. Guarino:

This letter is in response to the above-referenced request for records submitted to the Navajo Nation Environmental Protection Act (Navajo EPA) on May 17, 2019. Enclosed please find a May 8, 2018 "Air Quality Compliant Follow-Up Report" and its attachments prepared by Navajo EPA's Air Quality Control/Operating Permit Program. These attachments include a spreadsheet of air emissions data received from the United States Environmental Protection Agency in June 2018.

Navajo EPA also offers the following responses:

- Water Permits for operation in the DBK field
    - Response: Navajo EPA does not have any water permits in its possession related to the DBK field. The Navajo Nation Department of Water Resources may maintain water permits associated with the DBK field. Our office recommends that you contact Jason John, Director, Navajo Nation Department of Water Resources, PO Box 678, Fort Defiance, AZ 86504.
- Copies of BLM and Capitol Operating Groups reports on quarterly air monitoring data and H2S monitoring data, which Navajo EPA's Air Quality Follow-Up Report recommended that Navajo Minerals Department request and provide copies of to Navajo EPA
    - Response: Navajo EPA does not have copies of these documents in its possession. The Navajo Nation Minerals Department may have copies of these documents. Our office recommends that you contact Akhtar Zaman, Director, Navajo Nation Minerals Department, PO Box 1910, Window Rock, AZ 86515.

In your letter, you also asked two questions: (1) Are the wells in the DBK field considered minor source air emissions? and (2) Is the helium processing site considered minor

source, as well? The answer to both of these questions is yes.

Sincerely,

Oliver B. Whaley
NNEPA Executive Director

[i] Steven Rauzi, "Review of Helium Production and Potential in Arizona" (Arizona Geological Survey, 2003); Jere McKenny and John Masters, "Dineh-Bi-Keyah Field, Apache County, Arizona," *American Association of Petroleum Geologists Bulletin* 52, no. 10 (1968): 2045–57. See also well files for relevant wells.
[ii] John Samuel Ezell, *Innovations in Energy: The Story of Kerr-McGee* (Norman, OK: University of Oklahoma Press, 1979); McKenny and Masters, "Dineh-Bi-Keyah Field" (1968);
[iii] Syenite is a type of igneous rock that resembles granite, and in the Chuska Mountains it is grayish green. A sill a tabular sheet intrusion that forms between layers of rock.
[iv] T.C. Danie, "Dineh-Bi-Keyah," in Four Corners Geological Society - Oil and Gas Fields of the Four Corners Area, Volumes I-II, 1978.
[v]McKenny and Masters, "Dineh-Bi-Keyah Field" (1968)
[vi]Jere McKenny and John Masters, "Dineh-Bi-Keyah Field, Apache County, Arizona," *American Association of Petroleum Geologists Bulletin* 52, no. 10 (1968): 2045–57; Navajo Times, "33-Mile Pipeline Flows Out: Kerr-McGee Doubles Oil Out-Put," *Navajo Times*, July 27, 1967, https://newspaperarchive.com/window-rock-navajo-times-jul-27-1967-p-5/.
[vii] Navajo Times, "Dineh Bi Keyah Chalks up 10th Oil Well," *Navajo Times*, August 31, 1967, https://newspaperarchive.com/window-rock-navajo-times-aug-31-1967-p-17/.
[viii] Ezell, Innovations in Energy, (1979).
[ix] Navajo Times, "New Oil Field on Navajo Reservation Holds Promise of Boosting Econom," *Navajo Times*, September 21, 1967. P. 14. https://newspaperarchive.com/window-rock-navajo-times-sep-21-1967-p-14/.
[x] ibid
[xi] Navajo Times, "Get Top Oil Bids," *Navajo Times*, June 15, 1967, https://newspaperarchive.com/window-rock-navajo-times-jun-15-1967-p-31/.
[xii] Steven Rauzi, "Arizona Has Oil and Gas Potential!" (Arizona Geological Survey, 2001).
[xiii] Rauzi, "Arizona Has Oil and Gas Potential!" (2001); United States Energy Information Administration, "Arizona Field Production of Crude Oil," Petroleum & Other Liquids, 2021, https://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=PET&s=MCRFPAZ1&f=M.
[xiv] EIA, "Arizona Field Production of Crude Oil," 2021.
[xv] "Victor Eaton" (Farmington Daily Times, February 17, 2010), https://www.legacy.com/us/obituaries/daily-times/name/victor-eaton-obituary?n=victor-eaton&pid=139786397.
[xvi] See All Pueblo Council of Governors's Amicus Brief in Diné Citizens et al. v *Bernhardt et al.* in the United States Court of Appeals for the10th Circuit 18-2089 (2019)
[xvii] As quoted in Red Valley Chapter Resolution RVC-33-18. March 11th, 2018.
[xviii] Navajo Times, "New Oil Field on Navajo Reservation Holds Promise of Boosting Econom," *Navajo Times*, September 21, 1967, https://newspaperarchive.com/window-rock-navajo-times-sep-21-1967-p-14/. See well files for Navajo 1 (API 02-001-20001)
[xix] Ezell, Innovations in Energy, (1979)
[xx] See Neptune Leasing, Inc. v. Mountain States (No. SC-CV-24-10).
[xxi] "Apollo Resources International Acquires Mountain States Petroleum," *Hart Energy*, November 20, 2008, sec. Acquisitions and Divestitures, Apollo Resources International Acquires Mountain States Petroleum.
[xxii] In the matter of American Resource Technologies Inc., et al.: Order Making Findings and Revoking Registrations By Default As To Five Respondents, No. File No. 3-24378 (Securities and Exchange Commission June 16, 2011).
[xxiii] Taylor Matthews and Nacogdoches Oil and Gas. Inc., "To Armand Southall, Regulatory Specialist, Office of Natural Resources Revenue, Re. Indian Oil Valuation Amendments, 79 Fed. Reg. 35102 (June 19, 2014)," August 18, 2014.
[xxiv] Peter Thilo Hasler, "NASCO: Significant Increase in Value after Helium Acquisitions," Pre-IPO Valuation Report (Sphene Capital GmbH, June 15, 2021).
[xxv] Ibid.
[xxvi] Ibid.
[xxvii] Hasler, "NASCO", (2021); Anish Kapadia, "Helium: A Super Cool Commodity," Equity Research (London: Hannam&Partners, 2020).
[xxviii] Arup, "Nasco Helium Processing Facilities", 2019.
[xxix] Diveena Danabalan, "On the Hunt for Helium," *Physics World*, 2017, https://physicsworld.com/a/on-the-hunt-for-helium/.
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Air sampling at Apache County, Arizona oil well sites, 2019 and 2021. Summary prepared by Nadia Steinzor, Senior Policy Analyst, Earthworks. August 2021

Project overview

In October 2019 and May 2021, Diné C.A.R.E. and Earthworks conducted optical gas imaging (OGI) and air sampling at oil well sites operated by Capitol Operating Group in Apache County, Arizona. We used OGI cameras to identify pollution releases at the sites and then deployed Summa canisters to capture air samples near the source of emissions.

The 2019 samples were "grab" ones that lasted several seconds at each of three selected well sites. In 2021, we repeated the grab sampling at the same three sites, plus three other ones; in addition, a longer-term air sample (lasting several hours) was taken near a residence.

A certified laboratory provided the canisters and analyzed the results using the TO-3 test for methane and TO-15 test for volatile organic compounds (VOCs) developed by the US Environmental Protection Agency (US EPA), as well as ASTM International standard test D 5504-12 for sulfur compounds in oil and gas.

The pollution sources at all the well sites where grab samples were taken appeared to be ground-level surface casing vents, which are designed to release gas as it flows from underground to the surface. At the time of our visits, Diné C.A.R.E. and Earthworks staff detected strong odors and reported health effects such as headaches and eye irritation, and detailed those in complaints submitted to the Navajo Nation Environmental Protection Agency (NN EPA).

Results: a potential health emergency

The air sampling results were dramatic and sobering, with clear risks to health for anyone exposed to pollution at or near the sites. The concentrations of all the VOCs and sulfur compounds detected far exceeded the Effects Screening Levels (ESL), or levels likely to trigger health symptoms.[1]

The actual health impacts on nearby residents, workers, and anyone who visits these sites would depend on such factors as proximity and wind direction. However, the ESLs were exceeded by tens, hundreds, thousands, and even tens of thousands of times--making this an extreme situation by any measure.

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All of the chemicals detected have scientifically established health effects, many of which are related to inhalation, i.e., exposure through air. There was remarkable consistency in the compounds detected across nearly all of the sites where sampling occurred, as well as in the concentration levels--indicating that similar products were being used and produced at all sites that resulted in the same mix of pollutants.

The data table below details sampling results for the three sites where repeat air sampling occurred (i.e., in both 2019 and 2021). Most notably:

- Hydrogen sulfide levels were in line with what the US Occupational Safety and Health Administration (OSHA) considers dangerous for acute (short-term) exposure, such as what workers, inspectors, or anyone visiting the site could experience.[2] At the Navajo 19 site, the concentration of H2S (170 parts per million (ppm) in 2019 and 180 ppm in 2021) was high enough to cause loss of sense of smell and close to the level (200 ppm) that would cause eye and respiratory irritation; with prolonged exposure, this concentration of H2S could cause fluid buildup in the lungs.
- At the Navajo 14 and 25 sites in 2019, the H2S concentrations (440 and 410 ppm respectively) were just under the level (500 ppm) for acute exposure that OSHA has determined can cause "staggering, collapse in 5 minutes. Serious damage to the eyes in 30 minutes. Death after 30-60 minutes." Even though the H2S concentrations were somewhat lower for these and other sites at the time of sampling in 2021, they remained many times higher than the levels that OSHA considers hazardous to health.
- Some of the other sulfur compounds detected, including thiophene and mercaptans, are scientifically established to be associated with nausea, vomiting, headache, and eye, nose, throat, and skin irritation.[3]
- The sampling at all three sites detected benzene, a known carcinogen, and ethylbenzene, a possible carcinogen. Several other VOCs were detected that are scientifically established to be associated with eye, nose, and throat irritation, dizziness, irregular heartbeat, and changes to the kidney and liver.

For several years, Earthworks has conducted air sampling at dozens of sites in oil and gas producing areas in California, Pennsylvania, and Texas. The concentrations of chemicals detected at the Apache County sites exceeded by orders of magnitude the results of any of our previous sampling--including those from much larger facilities, such as processing plants and compressor stations.

Earthworks' sampling at the compression and processing facilities in other states occurred further away from the pollution sources than was the case with the Apache County sites, which would logically result in the detection of lower concentrations. Yet even considering the influence of close proximity between the pollution source (casing vents) and the sampling

device (the Summa canister), the concentrations at the Apache County well sites can be considered extreme, including when compared to results from much larger facilities with multiple sources of pollution that could all result in sampling detections.

Responsible agencies are unresponsive

Earthworks' OGI and air sampling investigations reveal severe operational problems at all three Apache County sites and the apparent failure of Capitol Operating Group to maintain and fix its equipment for prolonged periods of time.

Starting in 2018, Earthworks and Diné C.A.R.E have conducted several rounds of fieldwork in Red Valley and filed 22 complaints. Seven additional complaints are being filed in 2021. All of these complaints have been filed with Navajo Nation EPA (several of which were also filed with US EPA). Earthworks observed the same surface casing vents leaking in 2018, 2019, and 2021. In November 2018, NN EPA released a draft report in response to complaints filed earlier that year, but to date there has been no response to the complaints filed on these three well sites (as well as others nearby) from late 2018 to the present.

Since 2018, both Diné C.A.R.E and Earthworks have contacted multiple levels of state, federal, and Navajo Nation agencies and departments for information and documentation of operations, permits, inspections, and emission reports from the wells at the Dineh Bikeyah (DBK) Oil Field and connected Nacogdoches Helium Processing Facility. Diné C.A.R.E. and Earthworks continue to request outstanding documents from these sites.

The pollution has broad consequences

Allowing the pollution documented to go unabated poses a threat to local air quality and the health and safety of nearby residents and any workers or inspectors who visit the sites.

The importance of stopping pollution problems before they get worse is the reason why the US EPA adopted VOC control rules for the oil and gas sector in 2012 and expanded those rules to specifically cover methane, a potent greenhouse gas, in 2016. Some states have also adopted their own pollution control rules specifically for the oil and gas sector. Both federal and state rules require operators to conduct leak detection and repair (LDAR), a process designed to catch and abate pollution leaks in a timely manner.

The US EPA methane rules considers releases of 500 ppm by volume (ppmV) to be a "leak" that requires repair. Some of the pollution releases documented by Diné C.A.R.E. and Earthworks were many times higher. For example, the leak at the Navajo 25 site had a methane concentration more than 100 times that level in 2019 (51,000 ppmV), while the leaks at the Navajo 19 and 14 sites were more than 300 times as high (161,000 ppmV) in 2019 and 200-300 times as high (150,000 and 120,000 ppm respectively) in 2021.

Because of the severe impacts of methane leaks this size, California's 2017 methane control rule requires that leaks with measured total hydrocarbon concentrations greater than or equal to 50,000 ppmV have to be repaired or the leaking equipment removed from service within two calendar days of the initial detection of the leak. For its part, New Mexico is poised to adopt rules to limit methane and VOC pollution at oil and gas sites that would require any leaks detected with OGI to be repaired within 7 days, and leaks detected with other methods within 15 days.[4]

The leaks we documented could have a considerable impact on air quality and climate, particularly because they have occurred at least periodically, and perhaps consistently, for months on end. Using Quantitative Optical Gas Imaging (QOGI) at a similar Capitol Operating Group site in Apache County (the Navajo 9 well), Earthworks measured the volume of pollution being released from a similar open well pipe using methane as a proxy gas.

The results indicate a potentially significant problem: an average of 18 pounds per hour, which if left unabated, would add up to 80 tons per year. That's the same as the fossil fuel combustion of 340 average Americans, or more than 1,300 passenger cars driven for a year, or more than 700 US homes' worth of energy for a year.

While the actual volume of pollution might be different since many other compounds besides methane are clearly being released, it is nonetheless evident that a single pipe leaking at a single site has the potential to release high levels of pollution. The impact is exacerbated when pollution is left unaddressed by operators and regulators for an extended period of time--as is the case with these Capitol Operating Group sites.

Compound (selected)	**Health effects ***	**Long-term ESL (annual averaging; TCEQ 2020) ****	**Navajo 19; Nov. 2019**	**Navajo 19; May 2021**	**Navajo 25; Nov. 2019**	**Navajo 25; May 2021**	**Navajo 14; Nov. 2019**	**Navajo 14; May 2021**
# sulfur compounds detected (of 20 analyzed)			*16*	*16*	*15*	*10*	*15*	*14*
Hydrogen sulfide	Lack of oxygen/asphyxiation; respiratory arrest; skin/eye/nose/respiratory irritation	n/a	170,000 ppbV	180,000 ppbV	410,000 ppbV	17,000 ppbv	440,000 ppbV	330,000 ppbv
Methyl mercaptan	Eye/skin/respiratory irritation; headache, nausea, dizziness	0.5 ppbV	190 ppbV	150 ppbv	130 ppbV	15 ppbv	240 ppbV	130 ppbv
Ethyl mercaptan	Respiratory arrest, dizziness, nausea; similar effects as H2S	0.5 ppbV	36,000 ppbV	27,000 ppbv	15,000 ppbV	600 ppbv	53,000 ppbV	32,000 ppbv
Isopropyl mercaptan	Hazardous on contact.	1.8 ug/m3	37,000 ug/m3	26,000 ug/m3	19,000 ug/m3	780 ug/m3	72,000 ug/m3	10,000 ppbv
tert-Butyl Mercaptan	Eye/skin/respiratory irritation; headache, nausea, dizziness.	0.49 ppbV	630 ppbV	450 ppbv	120 ppbV	ND	510 ppbV	420 ppbv
n-Propyl mercaptan	Eye/skin/nose irritant.	0.5 ppbV	34,000 ppbV	23,000 ppbv	5,100 ppbV	110 ppbv	18,000 ppbV	14,000 ppbv
Ethyl Methyl	Eye & skin damage	14 ug/m3	3,000	ND	800	41 ug/m3	2,700	ND

Sulfide	(inhalation)		ug/m3		ug/m3		ug/m3	
Thiophene	Nausea, vomiting, headache, eye/nose/throat/skin irritation	57 ug/m3	38,000 ug/m3	23,000 ug/m3	6,700 ug/m3	170 ug/m3	26,000 ug/m3	16,000 ug/m3
Isobutyl mercaptan	Eye/skin/respiratory irritant; headache, nausea, dizziness	1.8 ug/m3	7,000 ug/m3	5,300 ug/m3	2,400 ug/m3	150 ug/m3	7,400 ug/m3	1,400 ug/m3
Diethyl sulfide	Skin/eye/nose/throat/skin irritation	14 ug/m3	270,000 ug/m3	220,000 ug/m3	52,000 ug/m3	2,400 ug/m3	220,000 ug/m3	170,000 ug/m3
n-Butyl mercaptan	Eye/skin/respiratory irritant; headache, nausea, dizziness	0.49 ppbV	8,200 ppbV	2,900 ppbv	720 ppbV	ND	2,700 ppbV	1,300 ppbv
3-methylthiophene	Skin/eye/oral irritant	57 ug/m3	2,800 ug/m3	1,600 ug/m3	800 ug/m3	ND	3,900 ug/m3	1,900 ug/m3
Tetrahydrothiophene	Headache, nausea, dizziness, palpitations	50 ppbV	500 ppbV	240 ppbv	ND	ND	ND	ND
2,5-Dimethylthiophene	Eye irritation	10 ug/m3	9,400 ug/m3	2,500 ug/m3	1,300 ug/m3	ND	5,200 ug/m3	1,500 ug/m3
2-Ethylthiophene	Contact & inhalation toxicity	57 ug/m3	4,600 ug/m3	2,300 ug/m3	550 ug/m3	ND	3,700 ug/m3	1,400 ug/m3
Diethyl Disulfide	Nose/throat/skin/eye/respiratory irritant	14 ug/m3	1,700 ug/m3	1,500 ug/m3	580 ug/m3	41 ug/m3	1,700 ug/m3	500 ug/m3
# of VOCs detected (of 50 analyzed)			*9*	*9*	*11*	*10*	*10*	*9*

1,3 Butadiene	Skin, eye/nose/throat irritation; respiratory distress	4.5 ppbV	ND	ND	3,300 ppbV	ND	ND	ND
n-Hexane	Dizziness, headaches, neuropathy	57 ppbV	1,600,000 ppbV	2,700,000 ppbv	380,000 ppbV	57,000 ppbv	2,600,000 ppbV	1,700,000 ppbv
Benzene	Dizziness, headaches, rapid heartbeat; carcinogen	1.4 ppbV	270,000 ppbV	360,000 ppbv	44,000 ppbV	6,400 ppbv	330,000 ppbV	190,000 ppbv
Cyclohexane	Eye/nose/throat irritation, dizziness, headache	100 ppbV	900,000 ppbV	1,300,000 ppbv	150,000 ppbV	20,000 ppbv	1,100,000 ppbV	680,000 ppbv
n-Heptane	Eye/nose/throat irritation, dizziness, headache, nausea	660 ppbV	770,000 ppbV	1,100,000 ppbv	100,000 ppbV	15,000 ppbv	980,000 ppbV	640,000 ppbv
Toluene	Eye/nose irritation, dizziness, kidney/liver damage	320 ppbV	300,000 ppbV	390,000 ppbv	37,000 ppbV	7,300 ppbv	490,000 ppbV	280,000 ppbv
n-Octane	Eye/nose/throat irritation, lightheadedness, headache	110 ppbV	230,000 ppbV	240,000 ppbv	24,000 ppbV	3,900 ppbv	370,000 ppbV	180,000 ppbv
Ethylbenzene	Eye/nose irritation, dizziness, kidney/liver damage; possible carcinogen	130 ppbV	33,000 ppbV	43,000 ppbv	3,800 ppbV	860 ppbv	64,000 ppbV	29,000 ppbv
m,p-Xylenes	Eye/nose/respiratory irritation, dizziness, irregular heartbeat,	41 ppbV	71,000 ppbV	100,000 ppbv	8,400 ppbV	1,900 ppbv	150,000 ppbV	66,000 ppbv

	kidney/liver changes							
o-Xylene	Eye/nose/respiratory irritation, dizziness, irregular heartbeat, kidney/liver changes	41 ppbV	20,000 ppbV	50,000 ppbv	2,600 ppbV	610 ppbv	46,000 ppbV	25,000 ppbv
n-Nonane	Nose/throat irritant, coughing, headache, dizziness	86 ppbV	ND	ND	6,400 ppbV	1,100 ppbv	170,000 ppbV	ND
	* **Sources:** the Agency for Toxic Substances and Disease Registry, Toxic Substances Portal: https://www.atsdr.cdc.gov/substances/index.asp; the National Institutes of Health Library of Medicine, https://www.nlm.nih.gov/; hazardous substances fact sheets from the NJ Department of Health, https://nj.gov/health/workplacehealthandsafety/right-to-know/hazardous-substances/index.sh	** Data results for air sampling are reported in both parts per billion by volume (ppbV) and micrograms per cubic meter (ug/m3). The Effects Screening Levels (ESL) from the TX Commission on Environmental Quality's 2020 list (https://www.tceq.texas.go						

	tml; and other governmental and industry information resources.	v/toxicology/esl) includes both measurements depending on the chemical.						

[1] This analysis is based on the Texas Council on Environmental Quality's (TCEQ) 2020 list of Effects Screening Levels (https://www.tceq.texas.gov/toxicology/esl). According to the TCEQ, ESLs "are used to evaluate the potential for effects to occur as a result of exposure to concentrations of constituents in the air. ESLs are based on data concerning health effects, the potential for odors to be a nuisance, and effects on vegetation." Note that these values are represented in concentrations, in contrast to the volumes used in determining allowable pollution levels in permits.
[2] US Department of Labor, Occupational Safety and Health Administration. Hydrogen Sulfide, Health Hazards, https://www.osha.gov/hydrogen-sulfide/hazards
[3] See hazardous substances fact sheets from the NJ Department of Health, https://nj.gov/health/workplacehealthandsafety/right-to-know/hazardous-substances/index.shtml; the Agency for Toxic Substances and Disease Registry, Toxic Substances Portal: https://www.atsdr.cdc.gov/substances/index.asp; and the National Institutes of Health Library of Medicine, https://www.nlm.nih.gov/.
[4] New Mexico Environment Department, Ozone Precursor Pollutant rule for the oil and gas sector, §20.2.50.116(E), Repair Times, https://www.env.nm.gov/air-quality/wp-content/uploads/sites/2/2021/03/Proposed-Part-20.2.50-May-6-2021-Version.pdf

Legislation 0232-21

Pierette Baldwin <pierettebaldwin@gmail.com>

Thu 1/27/2022 10:28 AM

To: comments <comments@navajo-nsn.gov>;

Honorable Delegates

Please vote NO on legislation 0232-21.

Our lands and people already suffer health problems from the extraction of uranium and coal mines and from oil and gas drilling. We already have over 500 toxic abandoned uranium mines. Many know that pristine water was used to slurry coal off the Navajo Nation and the fumes from coal burning cause air pollution and health problems, Helium extraction is not clean, nor "green" environmentally safe. These outside companies dangled the money in front of the Council and made their money from resource extraction while leaving their toxic mess and health problems for our people.
Please protect our lands, our animals, our people from helium extraction. We will never have enough money. Please don't sacrifice our water, our lands, the plants and animals,and our people so outside companies can make a few dollars.

Pierete Baldwin, voter
St. Michaels Chapter
Navajo Nation

RE: **LEGISLATION 0232-21**

Yá'át'ééh Navajo Nation Council Delegate,

I am requesting that you **VOTE NO** on LEGISLATION 0232-21.

I ask that you rescind all previous resolutions that support helium, oil and gas extraction, development, drilling, production and processing in the Tohachee Wash, Beautiful Mountain, and Porcupine Dome areas.

I ask that you vote down this legislation and rescind any approved agreements, leases, and contracts for the following reasons:

- Ch'ooshgai and Beautiful Mountain are sacred mountains and are of prominent Nihookáá' Diyin Diné'é historical significance.
- We the residents, voters, constituents, citizens, and allies OPPOSE helium extraction. We were not adequately consulted and did not consent.
- Porcupine dome has a tsenaaji'i (a sacred site) and there are many other sites in the area.
- The Nihookáá' Diyin Diné'é oppose the extraction of helium, oil, and gas in the Beautiful Mountain, Porcupine Dome, Littlewater, and surrounding Nihookáá' Diyin Diné'é Bikéyah indigenous habitat including our homelands, farms, grazing, cultural, religious, ceremonial areas, grounds, sites, and trails that are protected under Nihookáá' Diyin Diné'é values and fundamental laws as well as the American Indian Religious Freedom Act which is a federal law protecting American Indian religions, lands, and traditions.
- Navajo Oil and Gas is only talking to the chapter officials, not residents. Community and residents left out. Why weren't the residents included in the Albuquerque and all meetings? The residents oppose. Engaging with the chapter doesn't mean community and residents Engagement. Many signed the petition opposing helium and the Dine Medicine Men Association resolution opposing it.
- Navajo government is violating our rights, fundamentally, under the United Nations Declaration on the Rights of Indigenous Peoples, and American Indian Religious Freedom Act.

christine benally
littlewater SJC, NM,

The Most Honorable Members of the Navajo Nation Council January 27, 2022

Regard Legislation 0232-21 (Helium Extraction)

Legislation 0232-21 is very concerning, particularly in this age and time on the Navajo Nation. Our elderly say "be'eso e'iya' nahodilileeh ate", on the other hand Mother Earth is all we have. There is no other land waiting elsewhere, none.

We must make the health of Mother Earth, water, air and our people a priority over extractive industries. Navajo Nation and the Bureau of Indian Affairs had its priority the other way around since early 1900's. This has to change and today is a good time to start.

The Navajo Nation's Fundamental law charged us to care for our land and everything thereon or there will be consequents. We must never compromise the future of our children and our children who have yet to come. They too deserve the healthiest and safe land to enjoy.

For more than half a century, we allowed the priority the other way around over the health of Mother Earth, as results we are now living in a world of pandemics (coronavirus) with no end in sight. It has taken nearly 1,600 of our people and caused tens of thousands of severe illness. Are we paying the consequents we been warned? With those leases the extractive industries are using more water than we are, more than 20,000 of our homes do not have water which only invites more danger from COVID-19 and the like.

With the above and many other reasons, I urging you to stand for Mother Earth and the people and vote NO on legislation 0232-21.

May the Great Spirits be your guild and be with you.

Respectfully,

Percy Deal, Big Mountain

P.O. Box

Kykotsmovi, Ariz. 86039

Email: deal.percy@gmail.com

Legislation 0232-21

Kendra Pinto <kendrapinto@gmail.com>

Thu 1/27/2022 12:53 PM

To: comments <comments@navajo-nsn.gov>;

RE: **LEGISLATION 0232-21**

Yá'át'ééh Navajo Nation Council Delegate,

I am requesting that you **VOTE NO** on **LEGISLATION 0232-21**.

I ask that you **rescind** all previous resolutions that support helium, oil and gas extraction, development, drilling, production and processing in the **Tohachee Wash, Beautiful Mountain, and Porcupine Dome** areas.

I ask that you **vote down** this legislation and **rescind** any approved agreements, leases, and contracts for the following **reasons:**

- **Ch'ooshgai and Beautiful Mountain** are sacred mountains and are of prominent **Nihookáá' Diyin Diné'é** historical significance.
- We the residents, voters, constituents, citizens, and allies **OPPOSE helium extraction**. We were not adequately consulted and did not consent.
- **Porcupine dome** has a **tsenaamaji'i (a sacred site)** and there are many other sites in the area.
- The **Nihookáá' Diyin Diné'é** oppose the extraction of helium, oil, and gas in the **Beautiful Mountain, Porcupine Dome, Littlewater, and surrounding Nihookáá' Diyin Diné'é Bikéyah** indigenous habitat including our homelands, farms, grazing, cultural, religious, ceremonial areas, grounds, sites, and trails that are protected under **Nihookáá'**

Diyin Diné'é values and fundamental laws as well as the **American Indian Religious Freedom Act** which is **a federal law** protecting American Indian religions, lands, and traditions.

- **Navajo Oil and Gas is only talking to** the chapter officials, not residents. Community and residents left out. Why weren't the residents included in the Albuquerque and all meetings? **The residents oppose**. Engaging with the chapter doesn't mean community and residents Engagement. Many signed the petition **opposing helium and the Dine Medicine Men Association resolution opposing it.**
- ***Navajo government*** *is violating our rights, fundamentally, under the United Nations Declaration on the Rights of Indigenous Peoples, and American Indian Religious Freedom Act.*
- *The fracking process* ***creates physical and mental obstacles that negatively impact Dine communities*** *(such as anxiety, stress, asthma attacks, throat and nose irritation, nosebleeds, eye irritation, and increased gaseous odors) through emissions from extraction in the form of volatile organic compounds (VOCs).*
- *The fracking process has* ***intended and unintended negative impacts on local, Dine communities*** *through fear of explosions/leaks/spills, increased violence and drug use within communities, increased truck traffic, increased noise pollution, and the potential to fracture families.*
- *If and when a* ***spill or accident*** *results from fracking, the* ***emergency response may be limited and/or delayed*** *due to the locality.*
- *The revenue from extracting helium* ***creates a concern on whether the funds invested/produced will be used within communities*** *bearing the full impacts.*
- *The Navajo Nation and* ***use of its land should not contribute to climate change nor should it increase air pollutants*** *to vulnerable communities who have limited access to public resources such as a hospital or clinic.*

- ***Historically, the use of the Navajo Nation lands and its people has had lasting health problems*** *that were not at the time deemed credible nor urgent. Full communication of the lasting mental and physical health of workers and impacted frontline community members has not been made a priority due to the imbalance of revenue and political powers from both federal and tribal governments.*

Ahéhee',
Kendra Pinto
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