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)

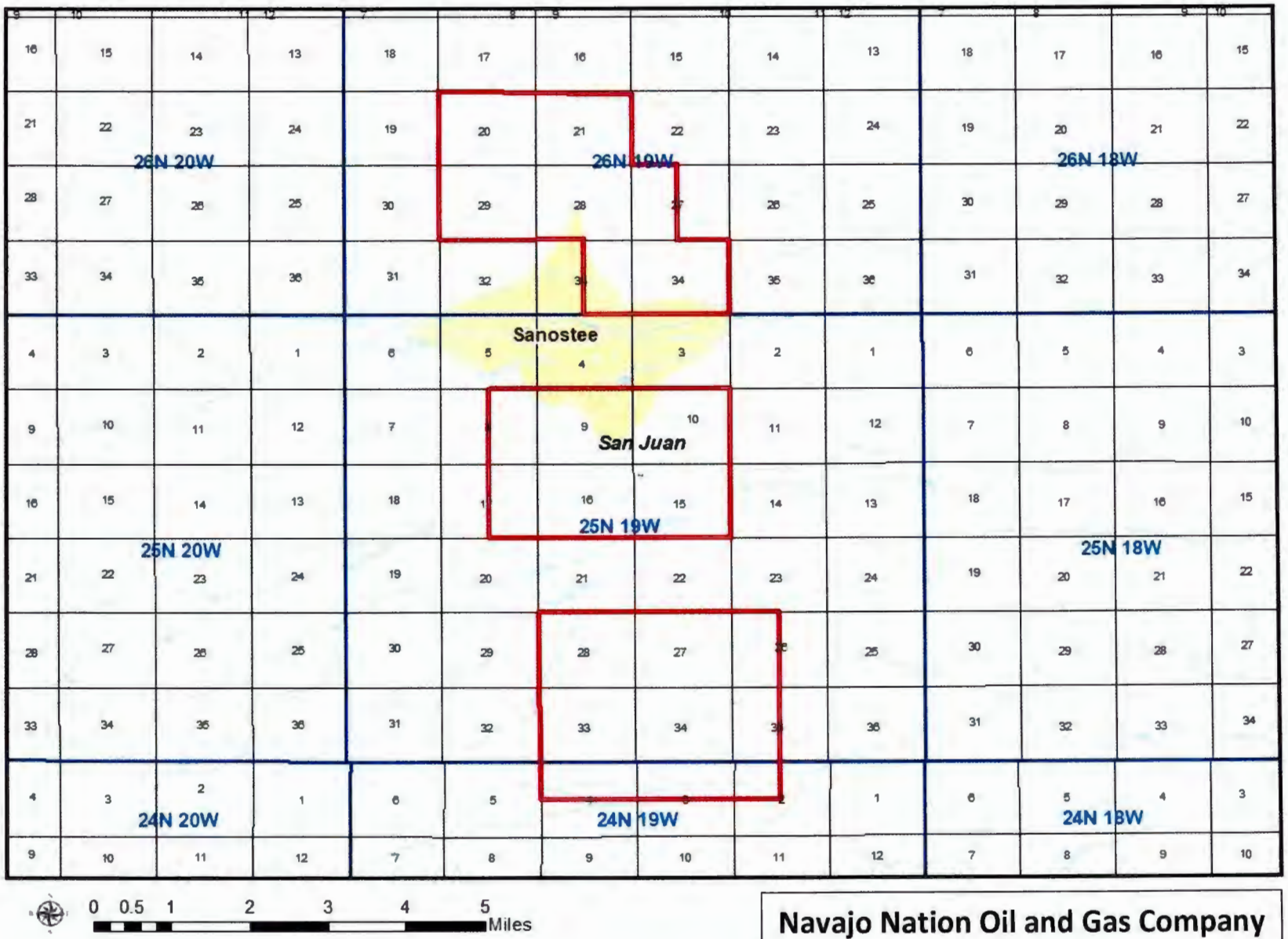
By: _____ 6/29/21
James R. McClure, Chief Executive Officer Date

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: _____



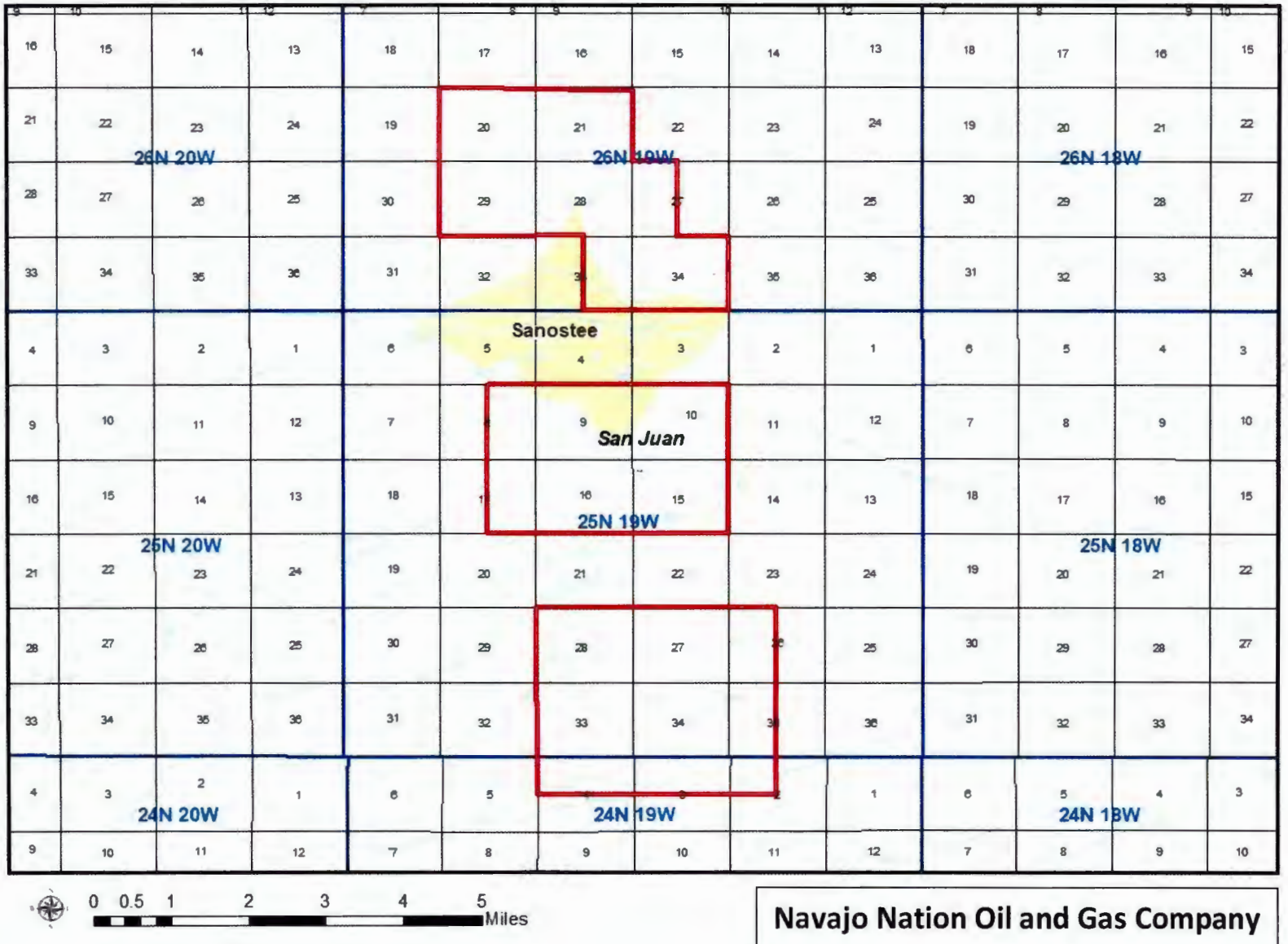
Navajo Nation Oil and Gas Company

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.

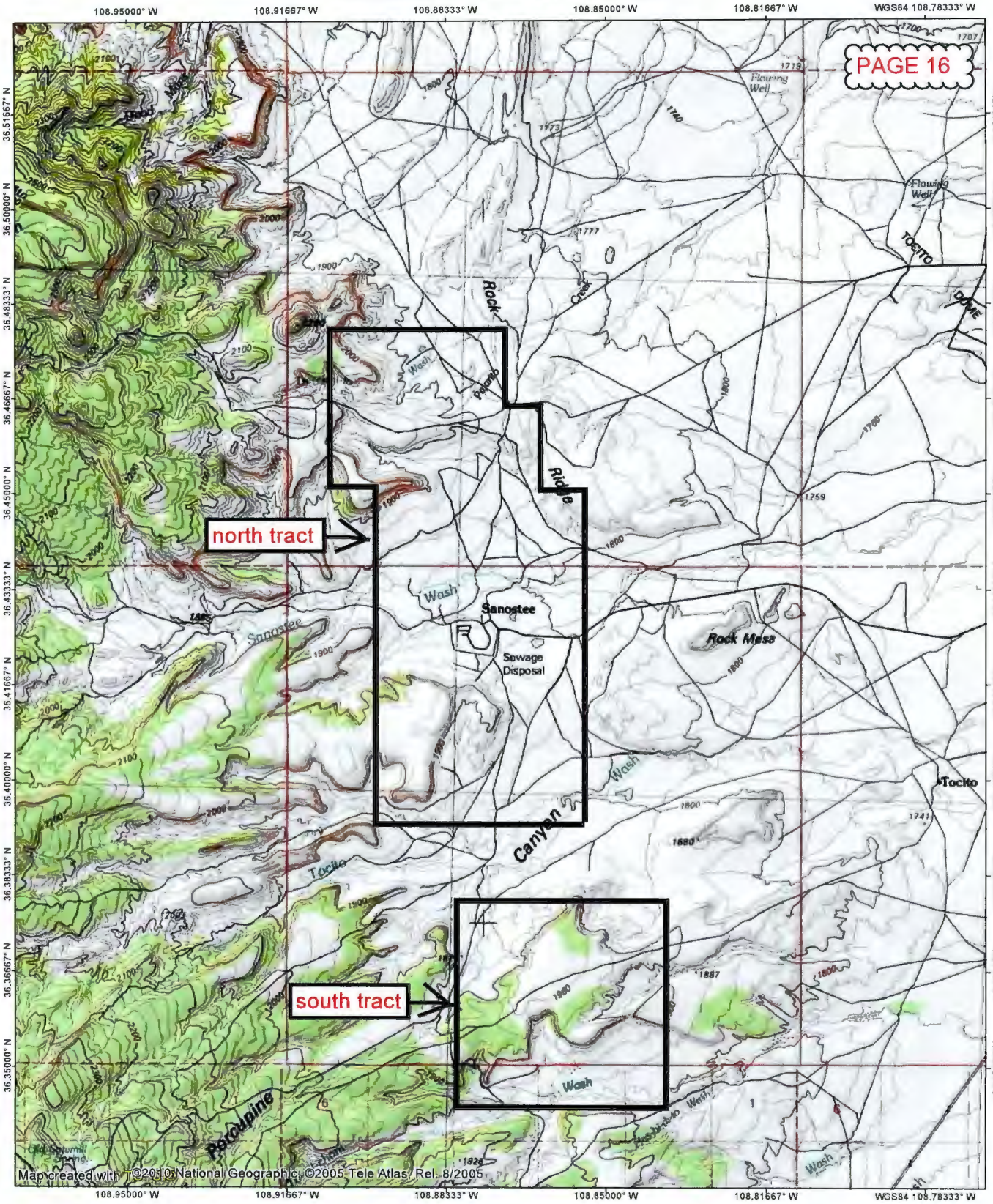
1.3 VICINITY MAPS

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

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°
06/12/21

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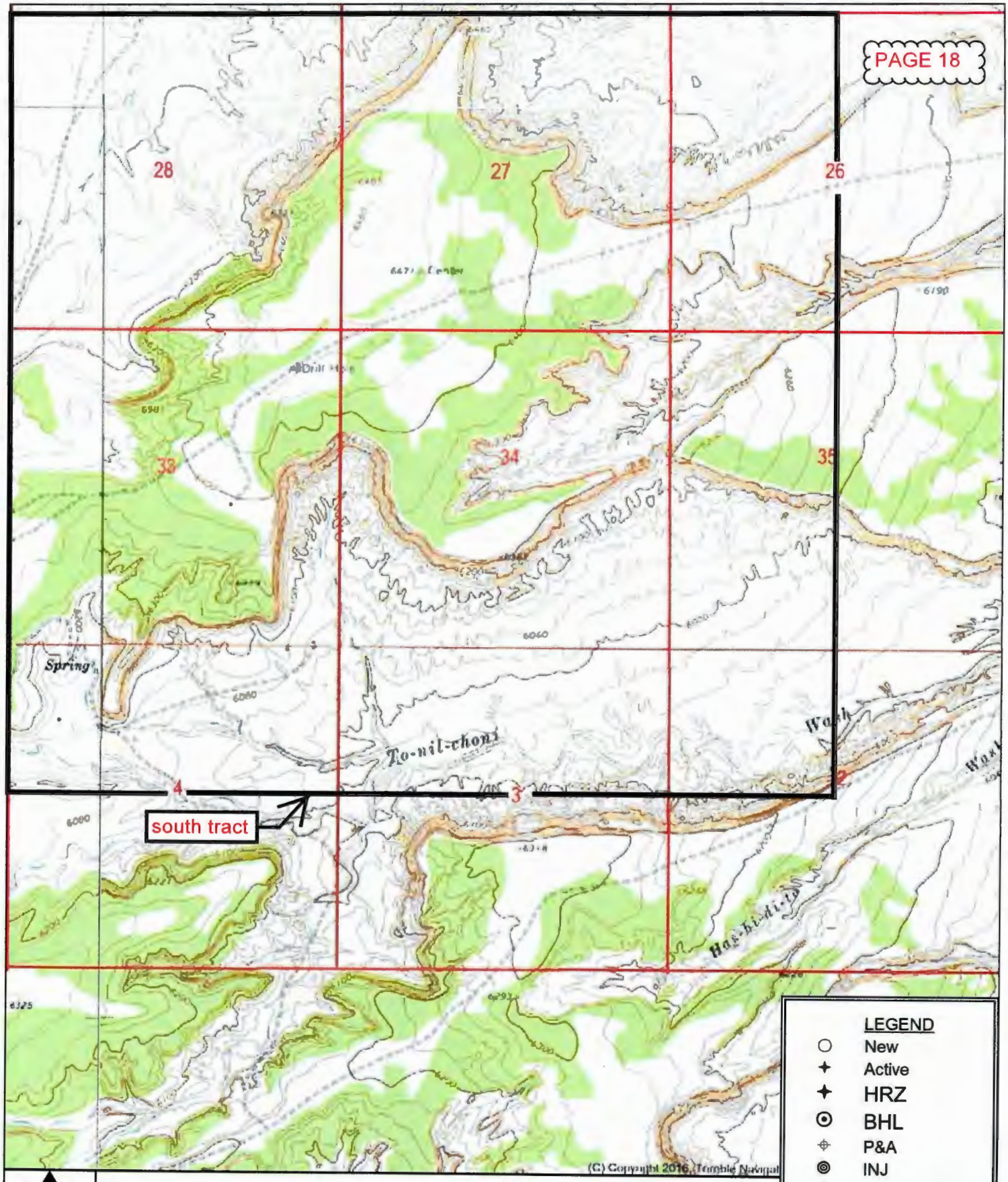
Quad: SANOSTEE EAST
Scale: 1 inch = 2,583 ft.


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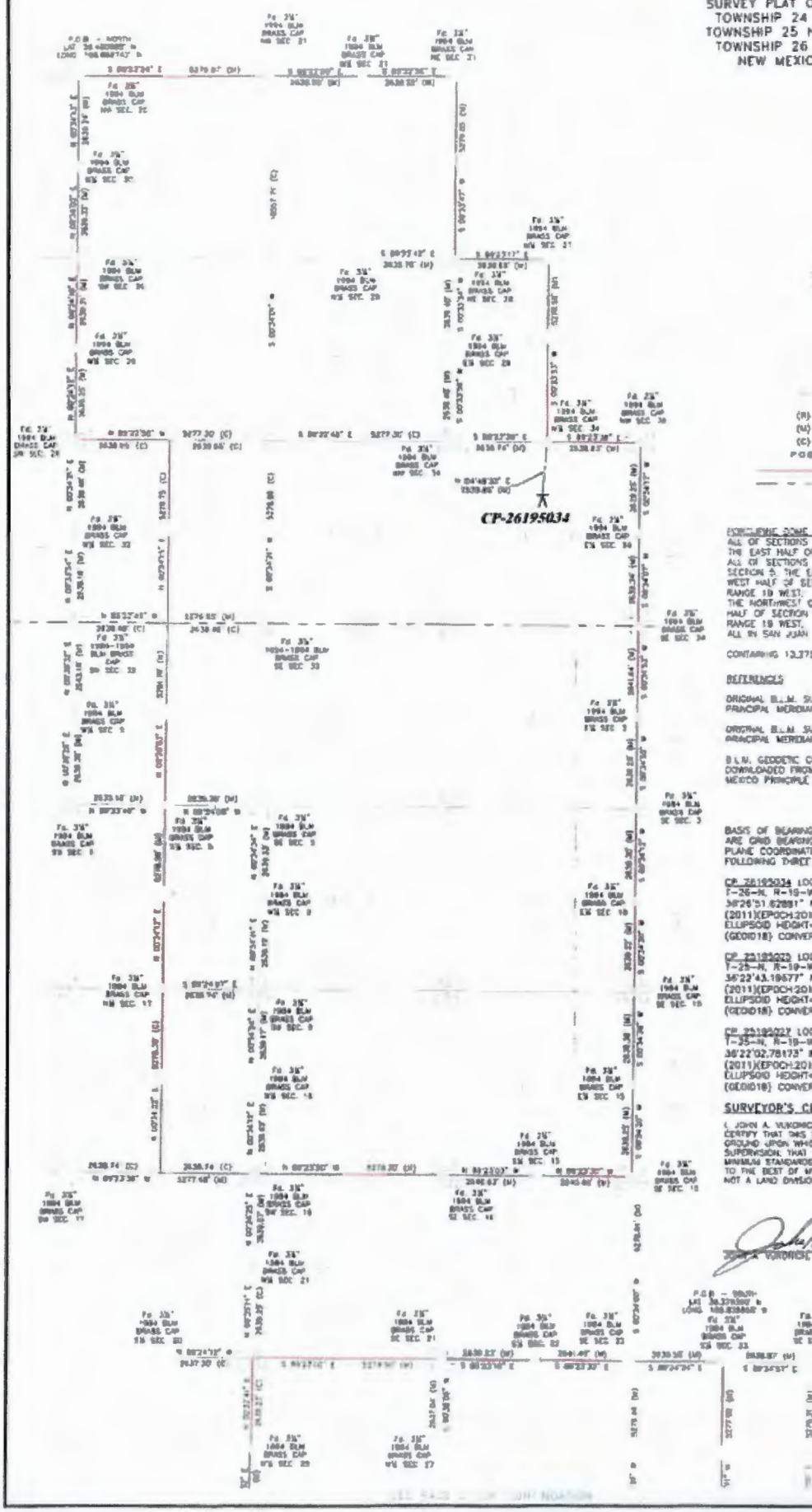
Quad: TSINNASKID
Scale: 1 inch = 2,000 ft.

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

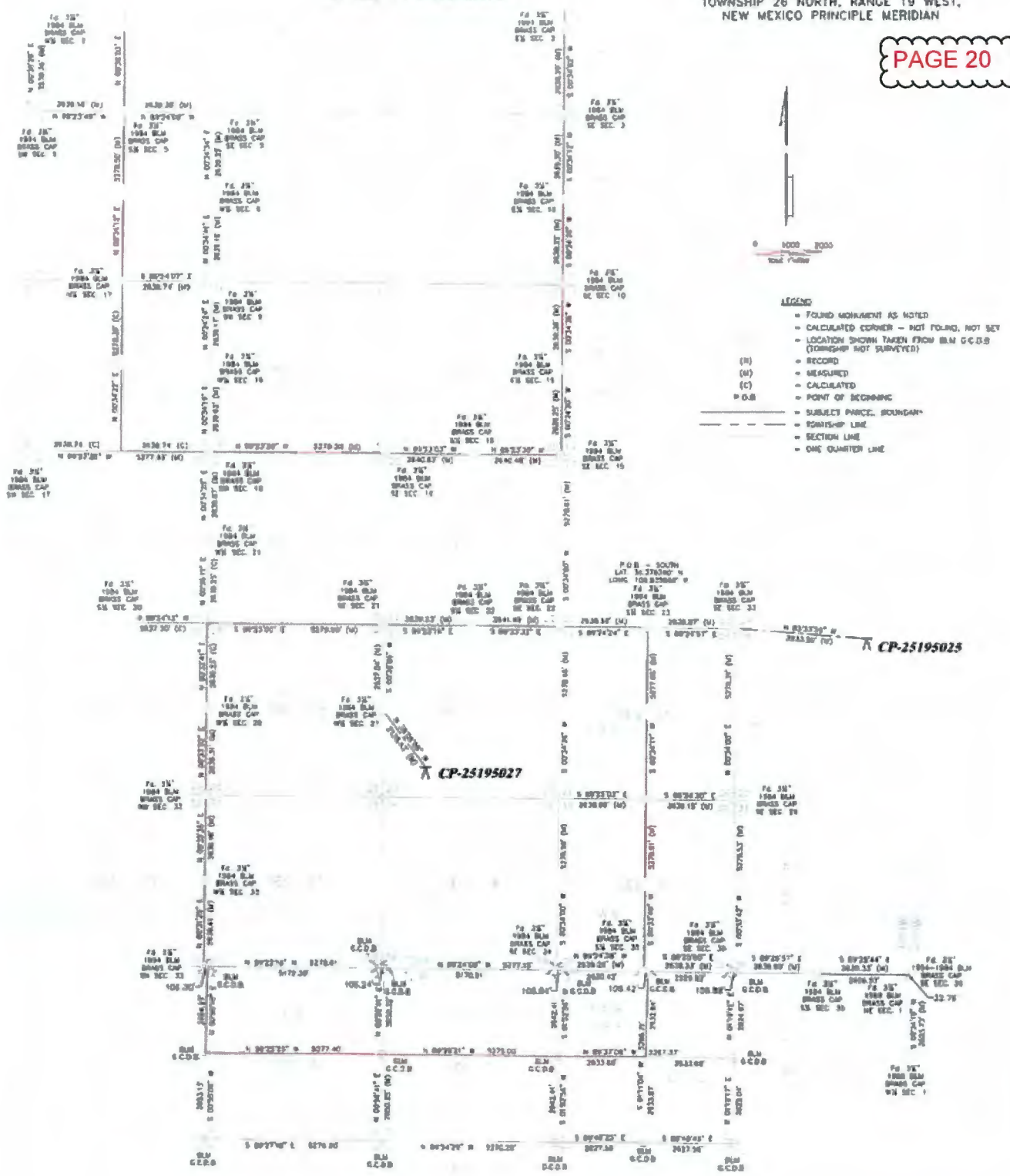
NAVAJO NATION OIL & GAS COMPANY

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.

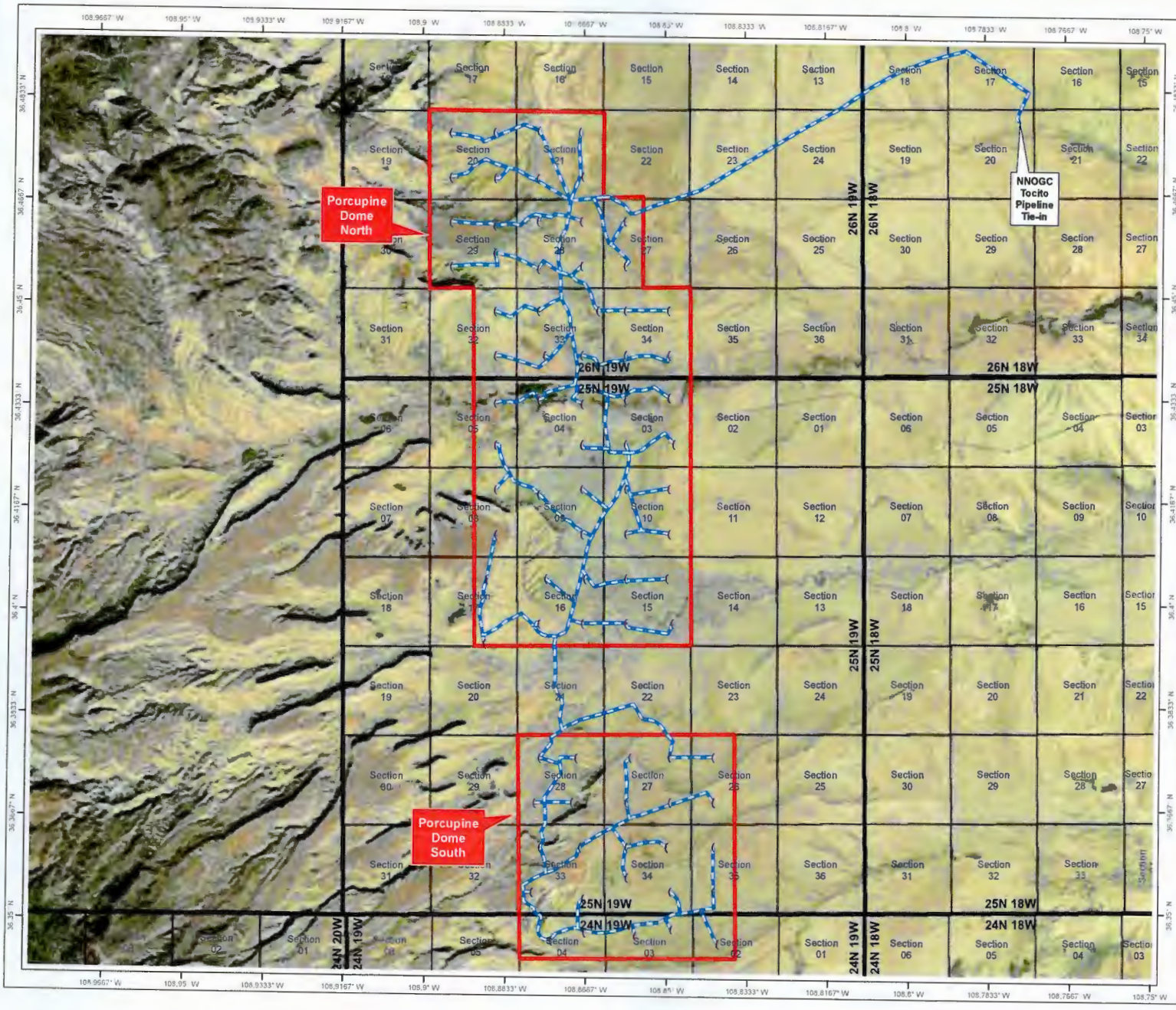
Project grading will disturb a maximum of 514.75 acres. If all 83 well pads produce and 1 compressor site is built; then 248.45 acres would be in long term use (e. g., not available for grazing) during production due to well pads (185.92 acres), compressor pad (4.59 acres), and 20' wide roads (57.94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

The following documents were used in the preparation of this EA:

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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,
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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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).

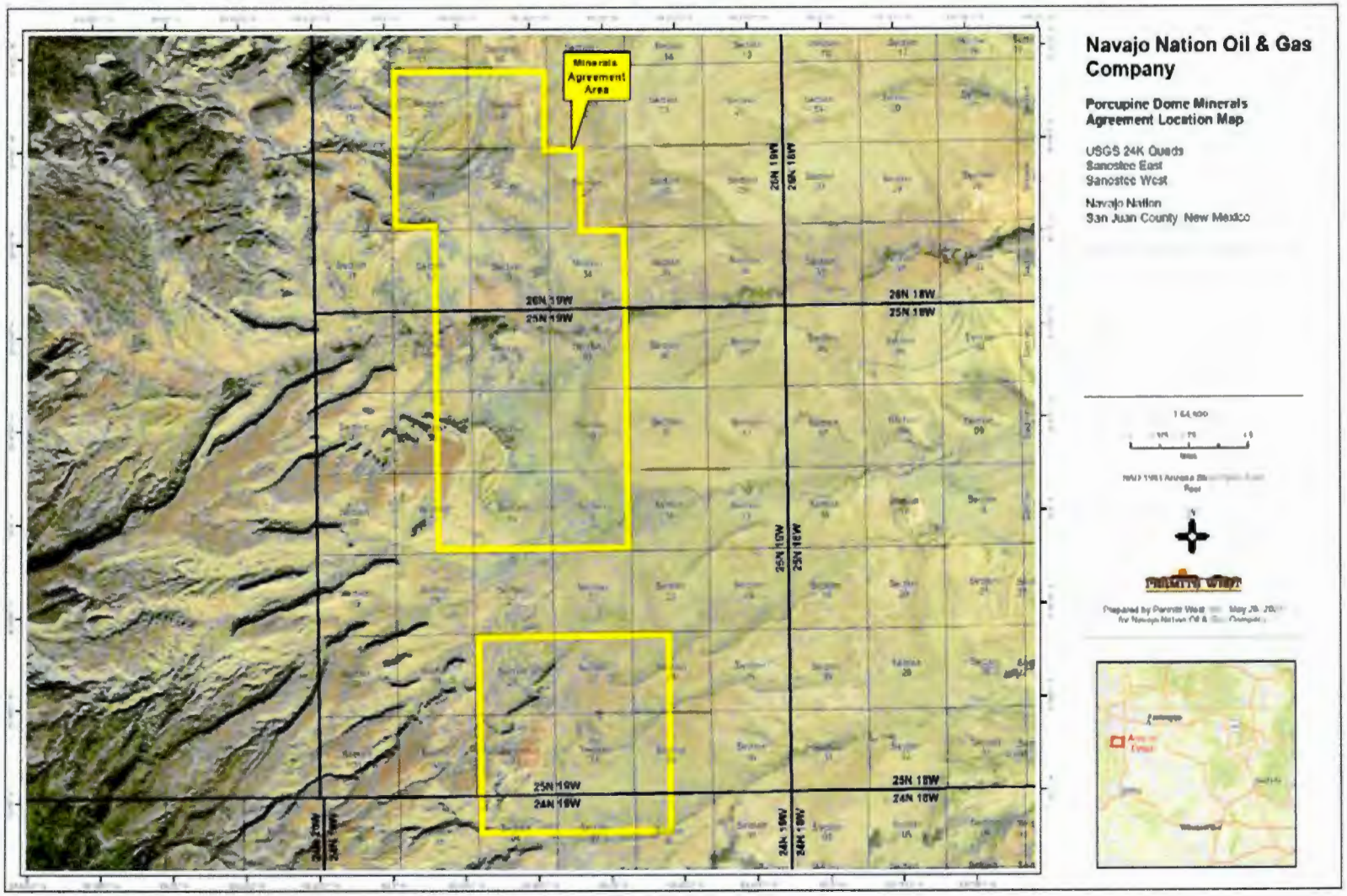

Figure 1. Porcupine Dome Minerals Agreement Lease boundary.

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).

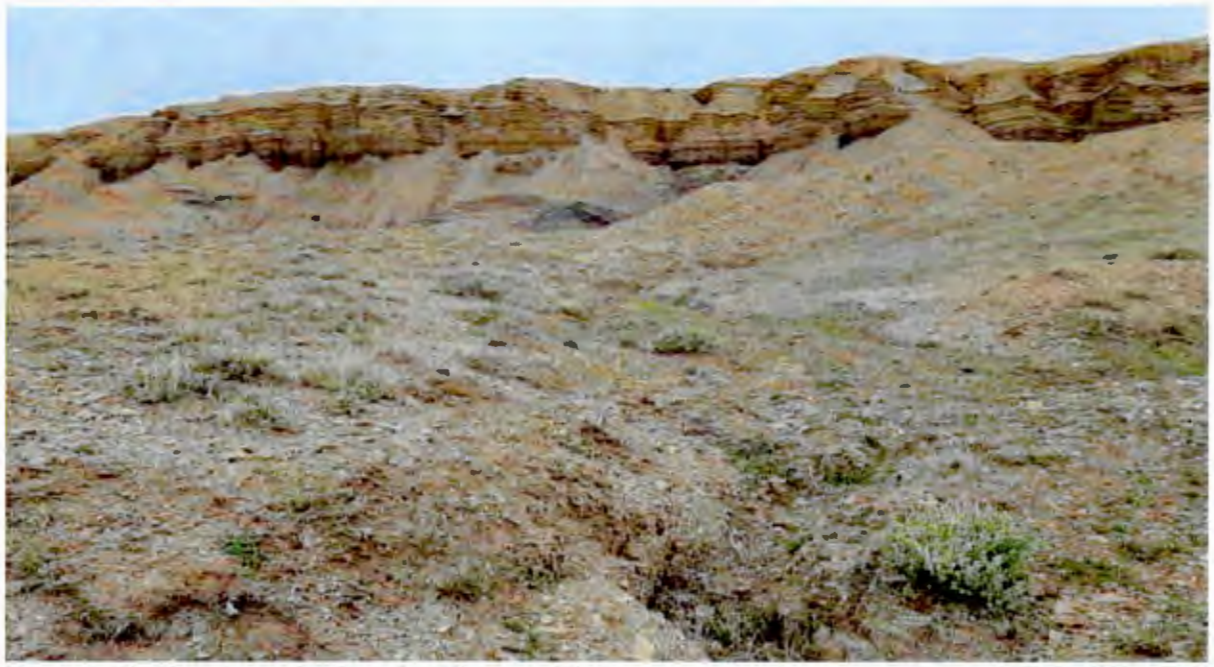


Photo 2. Bluffs and grassland south of Sanostee. Facing west towards from Lat. 36.410274°, Long. -108.870368° (NAD 83).

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

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.

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

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

NOT FOR CONSULTATION

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].

NOT FOR CONSULTATION

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

NOT FOR CONSULTATION

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

NOT FOR CONSULTATION

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.

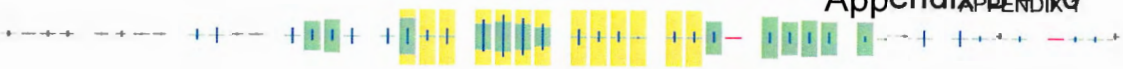
No Data (–)
A week is marked as having no data if there were no survey events for that week.

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.

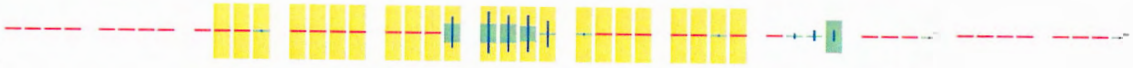
NOT FOR CONSULTATION

Appendix B – 10

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



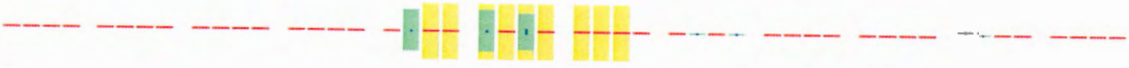
Burrowing Owl BCC - BCR (This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA)



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)



NOT FOR CONSULTATION

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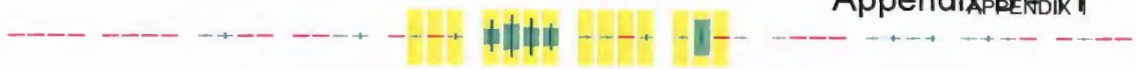
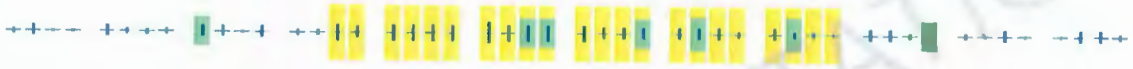
APPENDIX 1

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.)

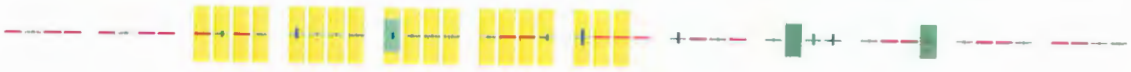
Lewis's Woodpecker BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)



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

NOT FOR CONSULTATION

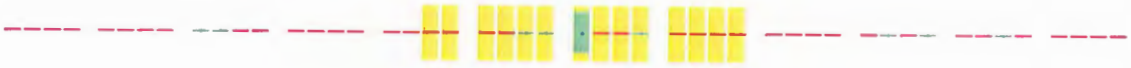
SPECIES	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Long-eared Owl BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)												



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.)

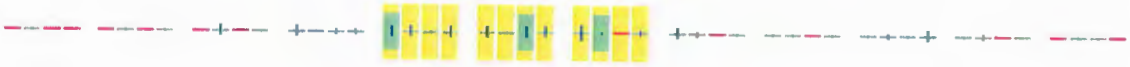
Olive-sided Flycatcher BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)



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.)



NOT FOR CONSULTATION

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.

NOT FOR CONSULTATION

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

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APPENDIX 1

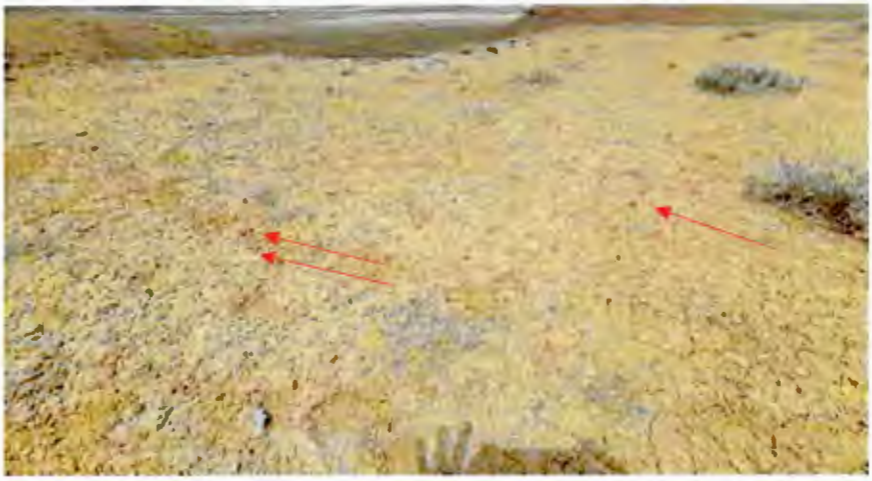
the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary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

NOT FOR CONSULTATION

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).

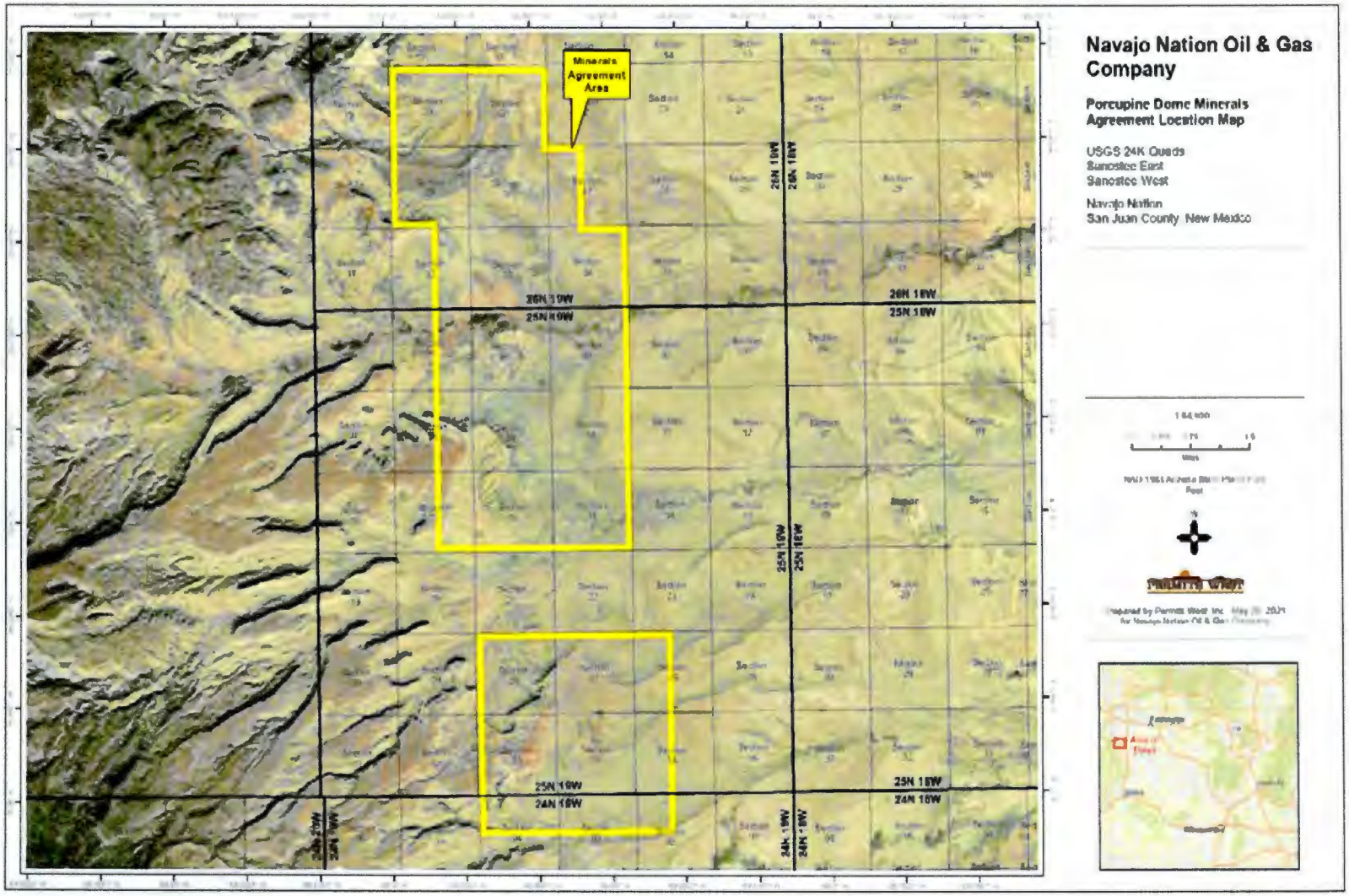

Figure 1. Porcupine Dome Minerals Agreement Lease boundary.

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].

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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

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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.

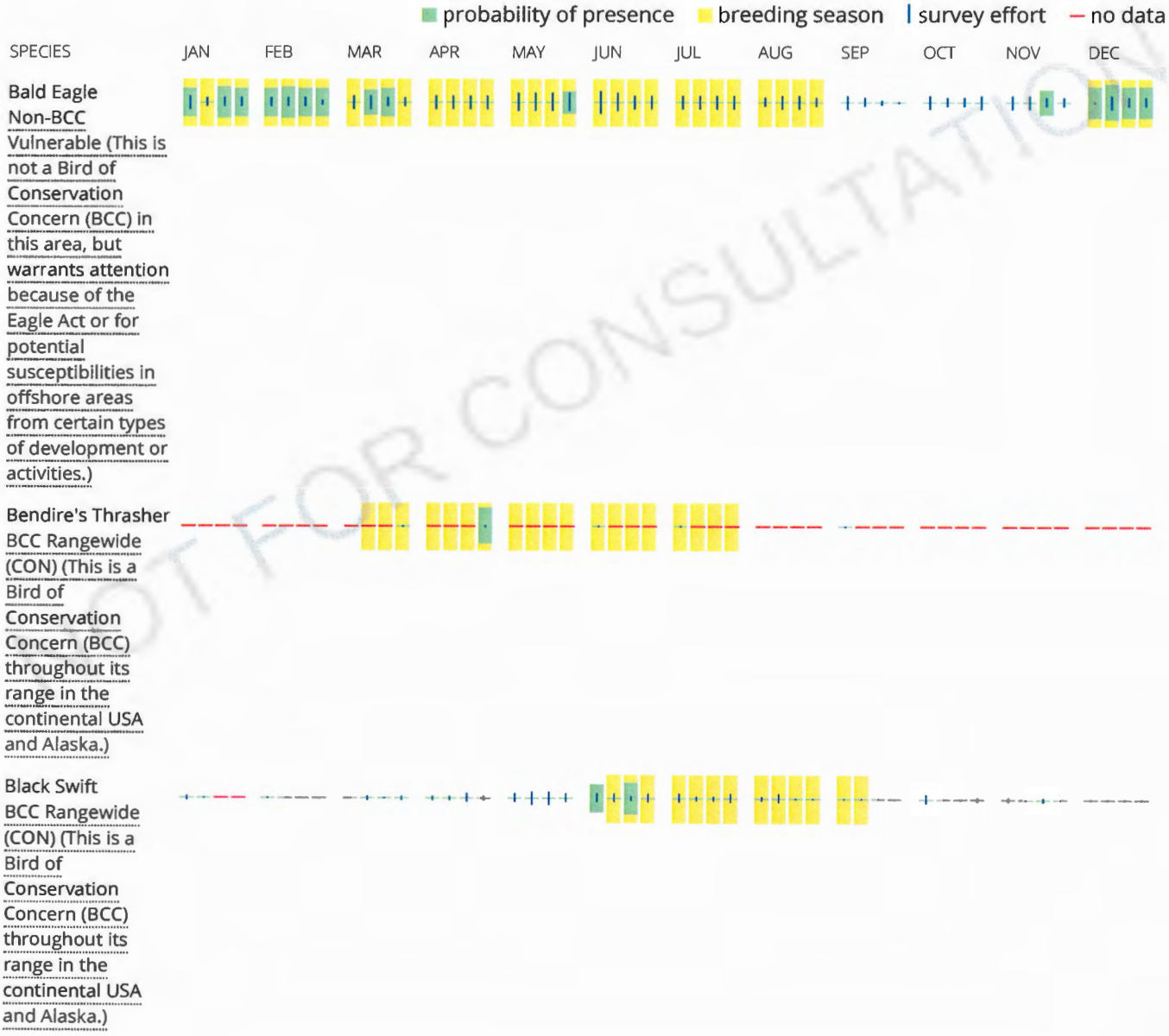
Survey Effort (|)

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.



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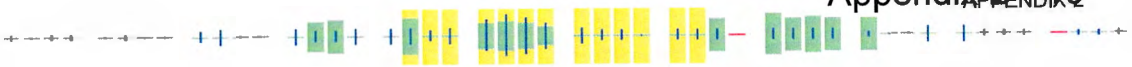
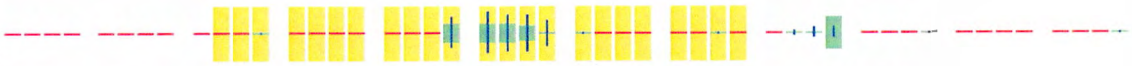
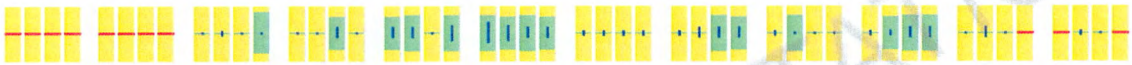
Brewer's Sparrow BCC - BCR (This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA)



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.)

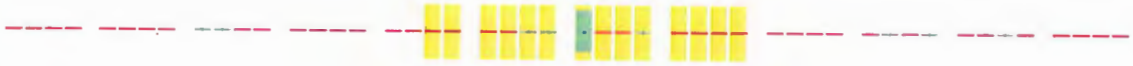
SPECIES JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC

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

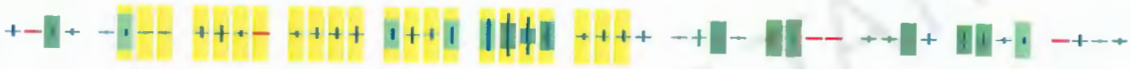
DRAFT FOR CONSULTATION

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

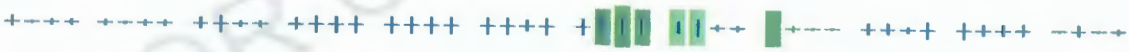
Olive-sided Flycatcher BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)



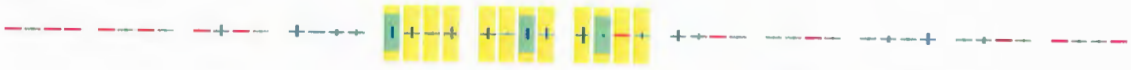
Pinyon Jay BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)



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



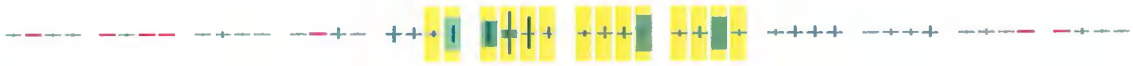
Virginia's Warbler BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)



NOT FOR CONSULTATION

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

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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

NOT FOR CONSULTATION

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

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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.

NOT FOR CONSULTATION

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
Douglas H.M. Boggess, Kobi Weaver,
and Beth McCormack
Lone Mountain Archaeological Services, Inc.

Submitted by
Douglas H.M. Boggess, Principal Investigator
Lone Mountain Archaeological Services, Inc.
2625 Pennsylvania Street NE
Albuquerque, New Mexico 87110

Prepared for
Navajo Nation Oil & Gas Company
50 Narbono Circle West
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.

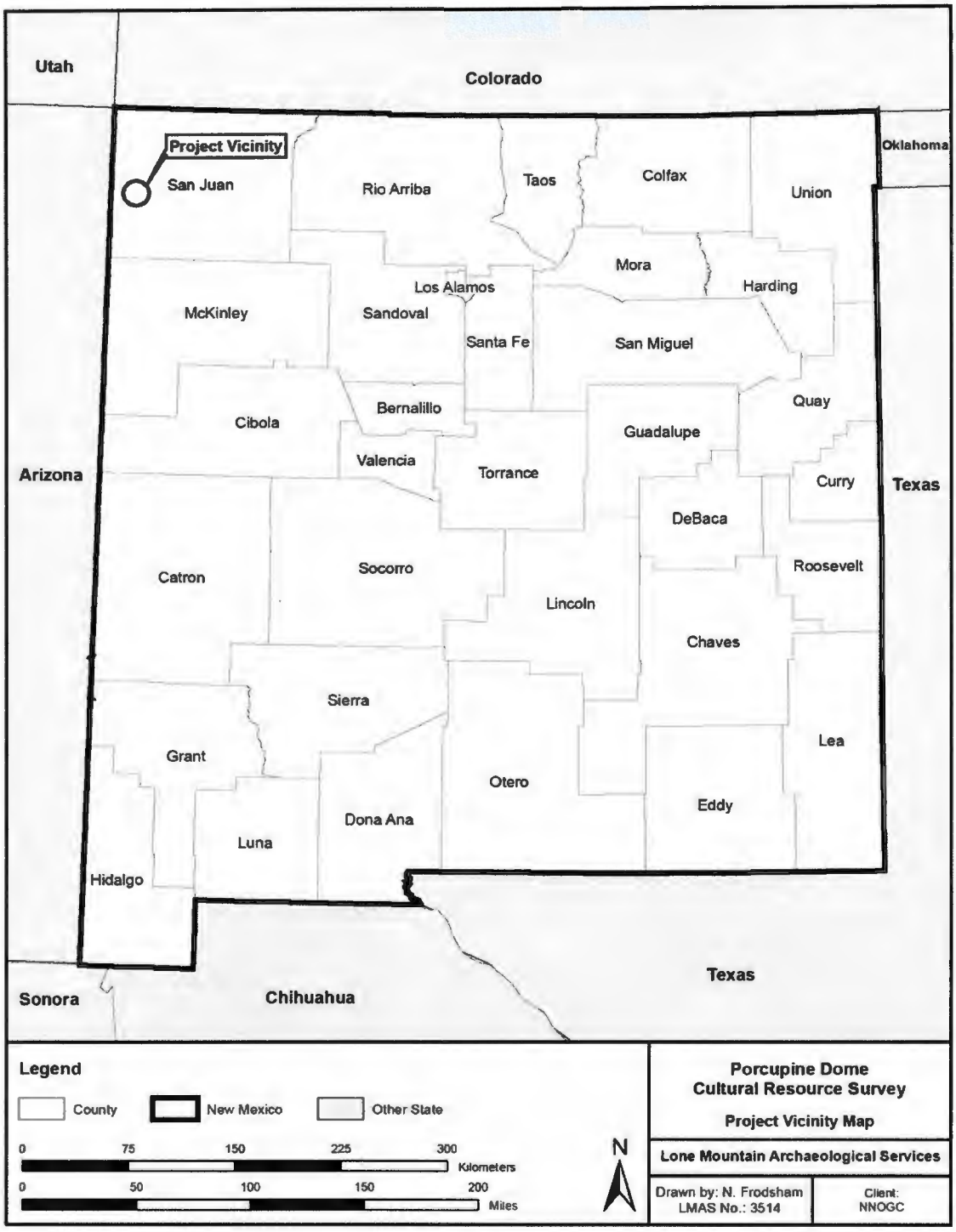

Figure 1.1: Project Vicinity.

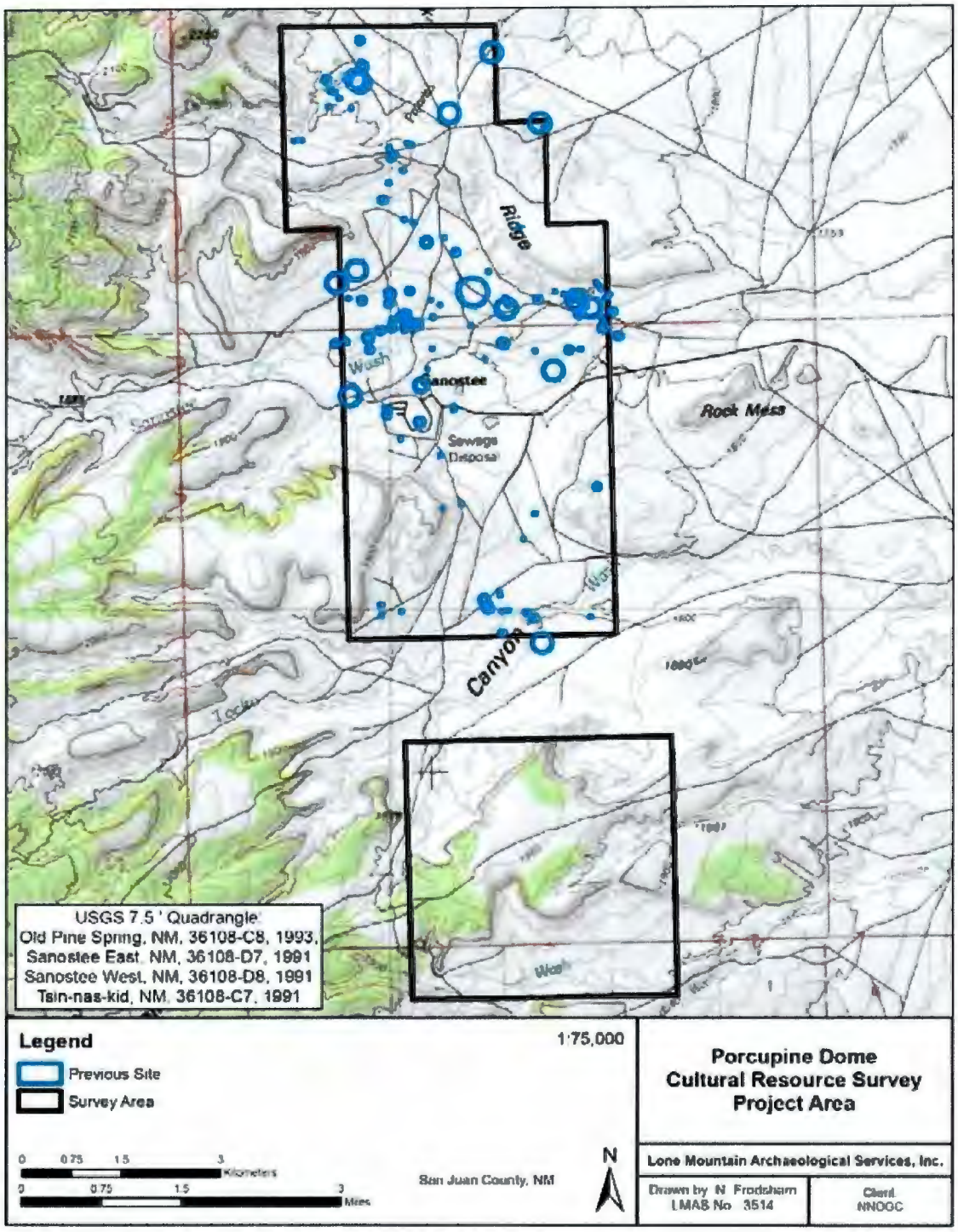

Figure 1.2: Project Area Overview.

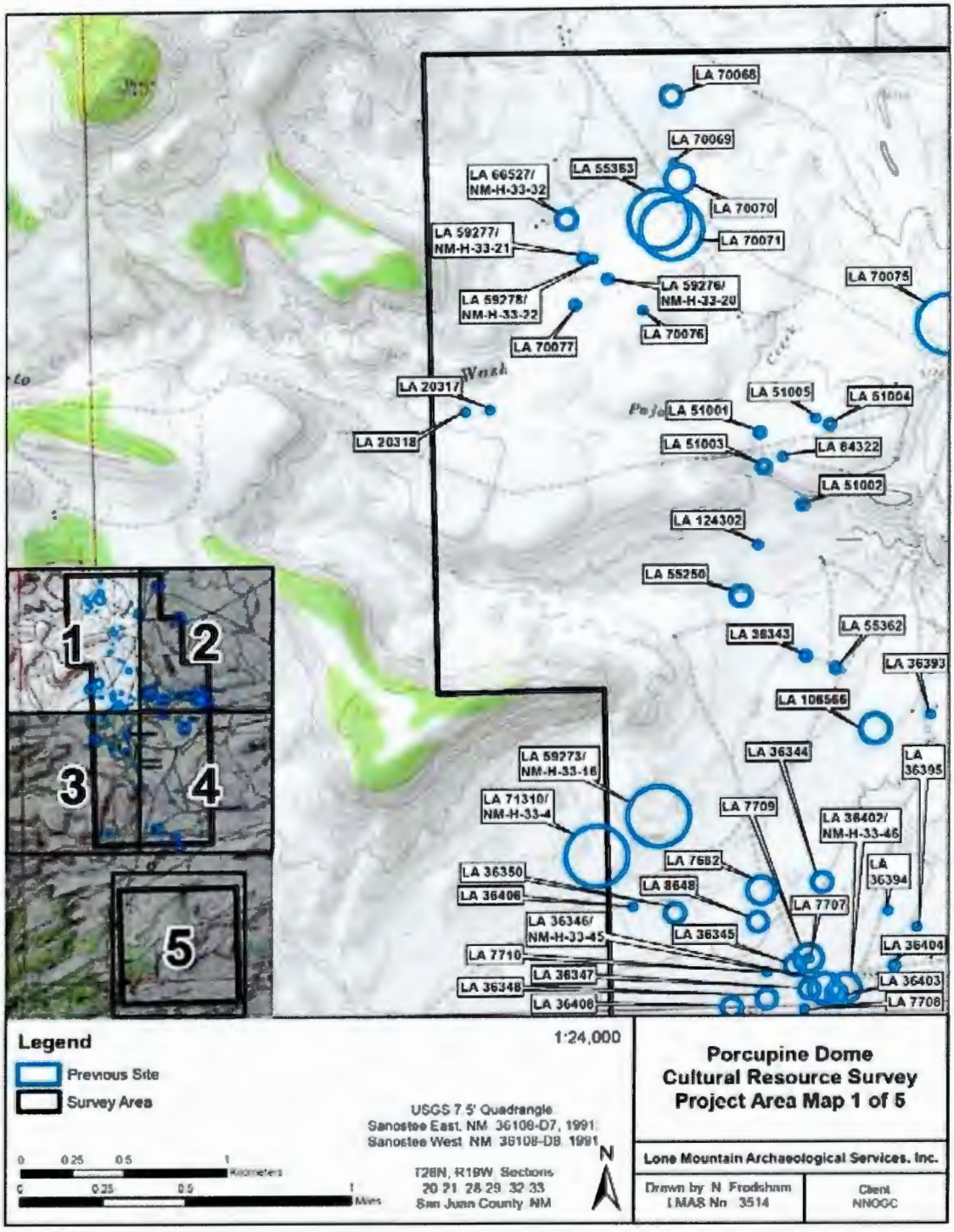

Figure 1.3: Project Area (1 of 5).

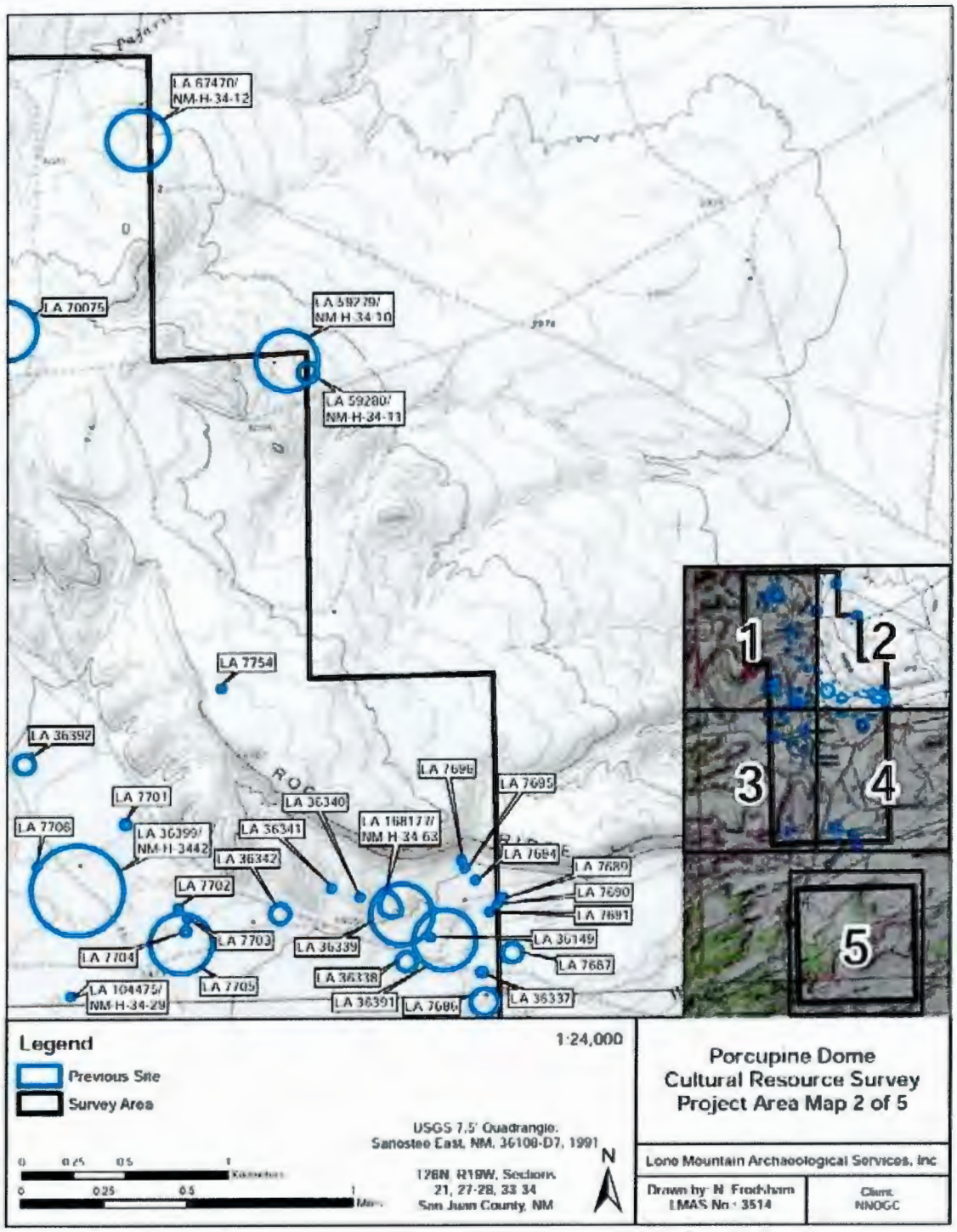

Figure 1.4: Project Area (2 of 5).

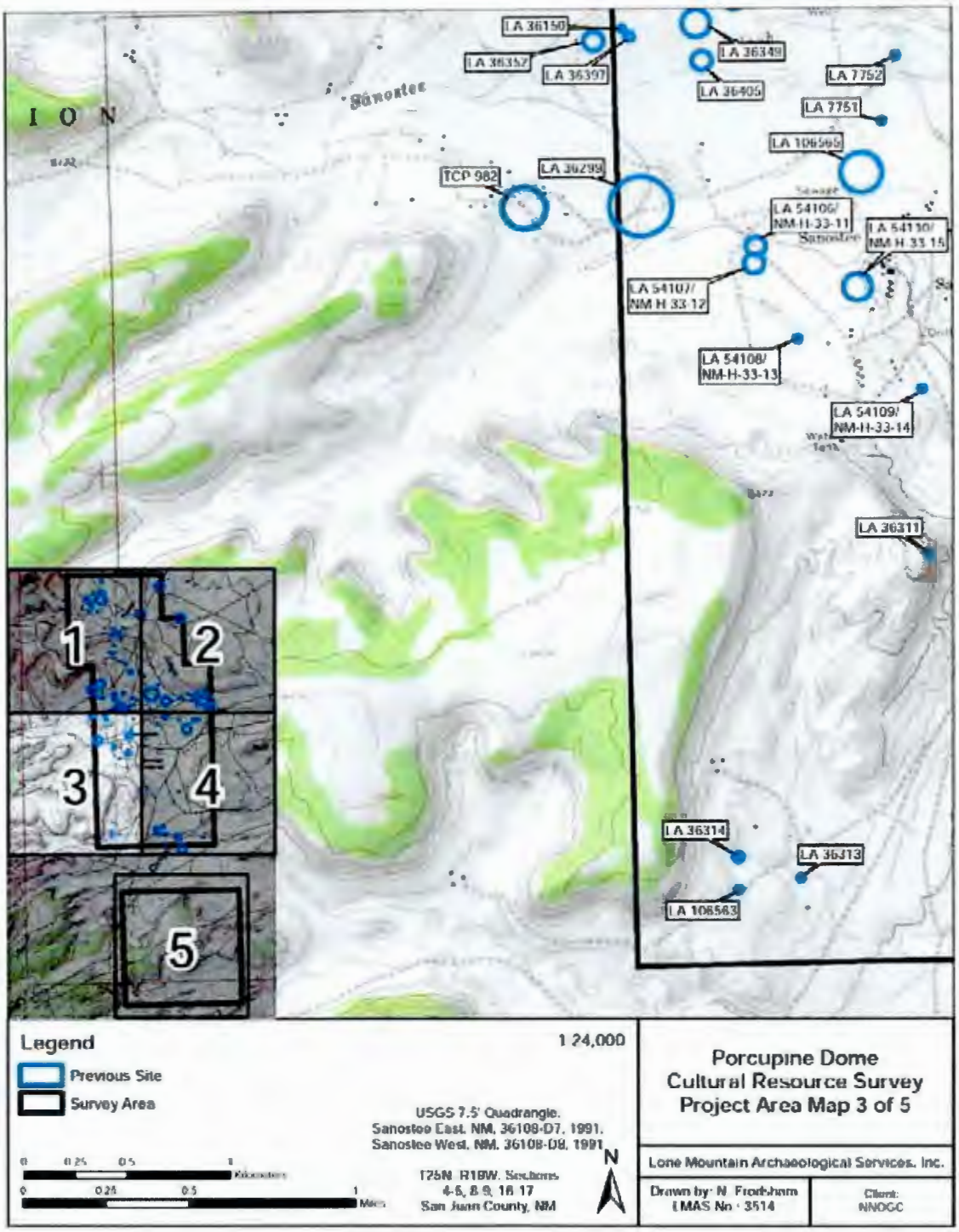

Figure 1.5: Project Area (3 of 5).

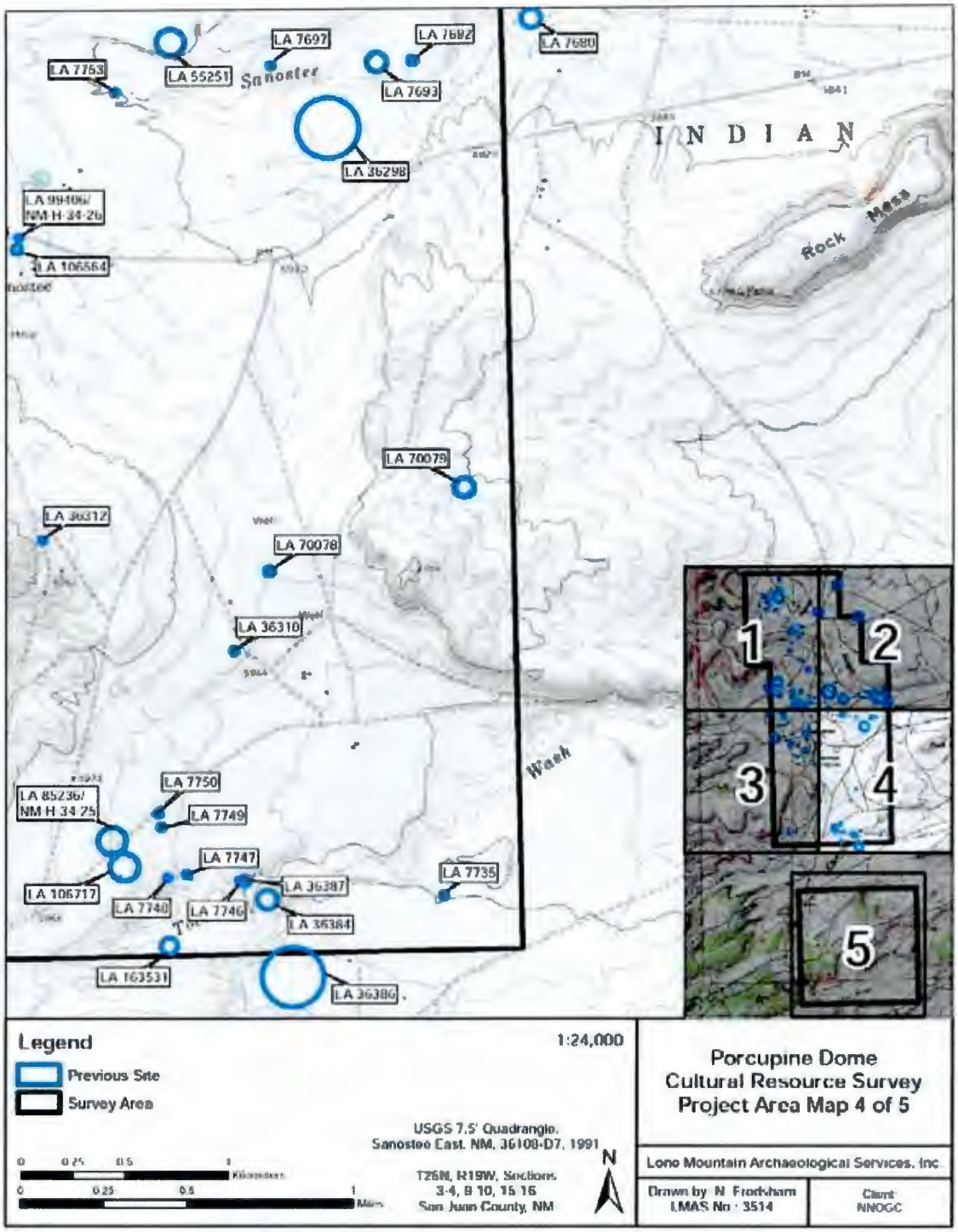

Figure 1.6: Project Area (4 of 5).

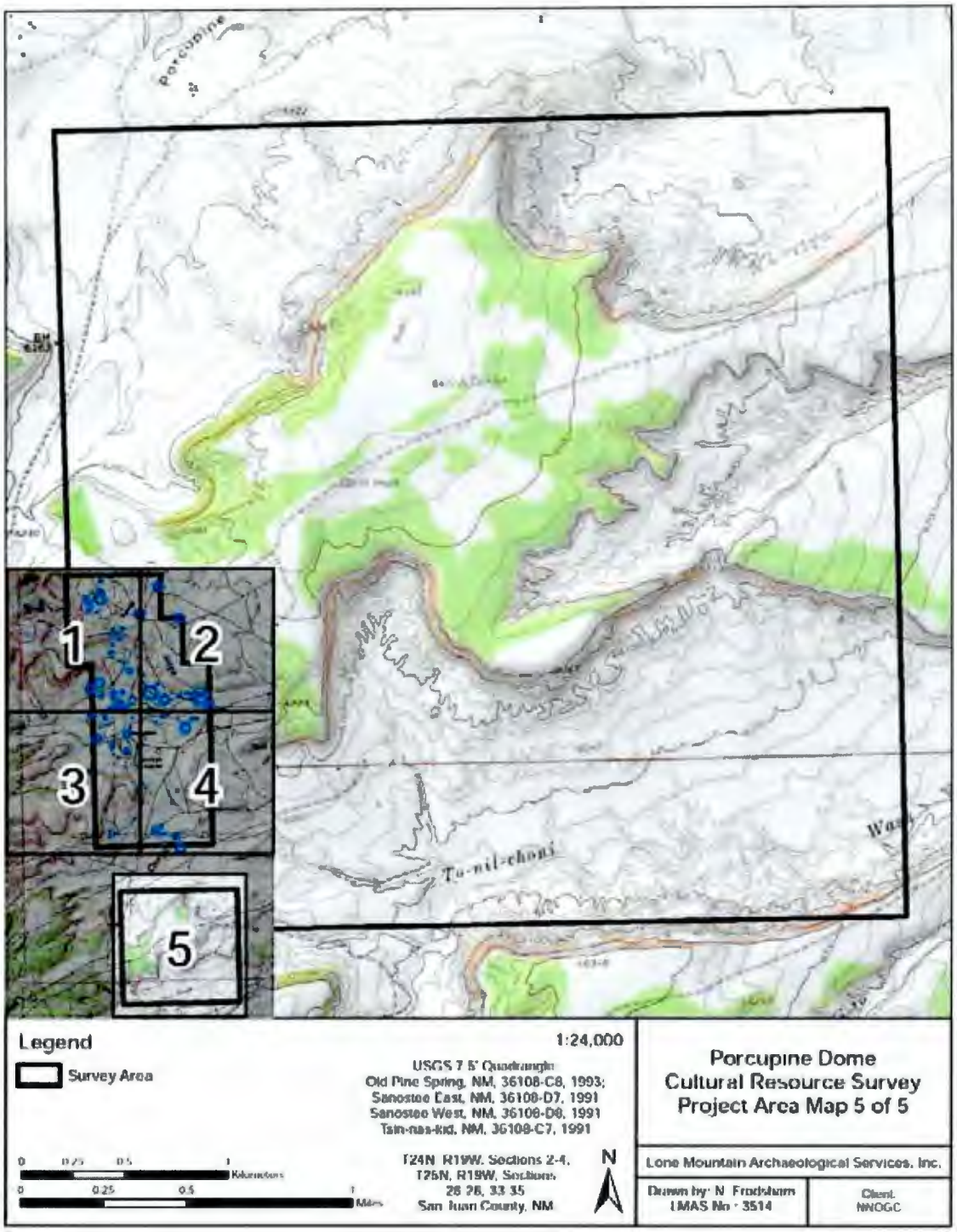

Figure 1.7: Project Area (5 of 5).

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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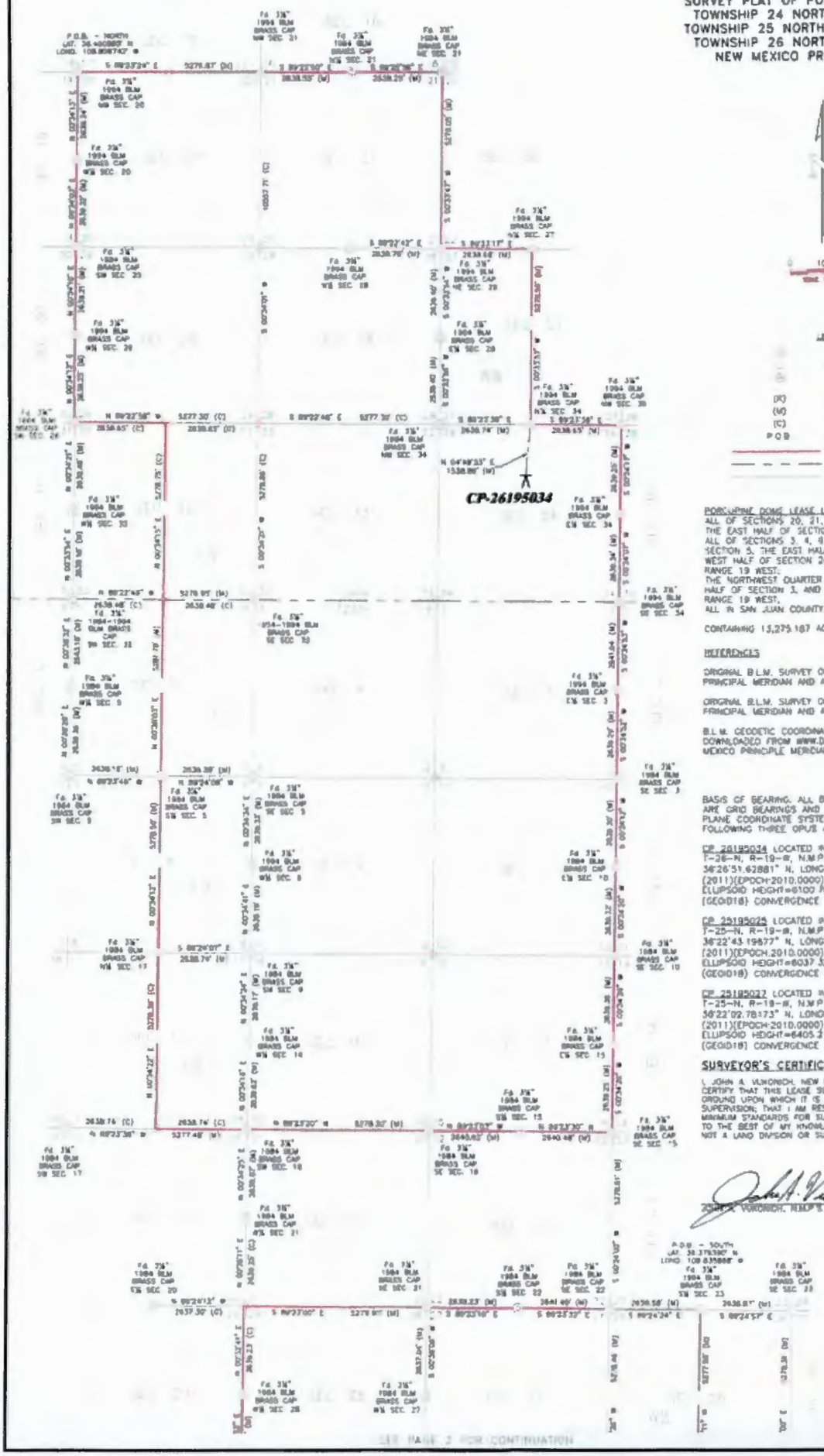
Surveyor's Plats

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

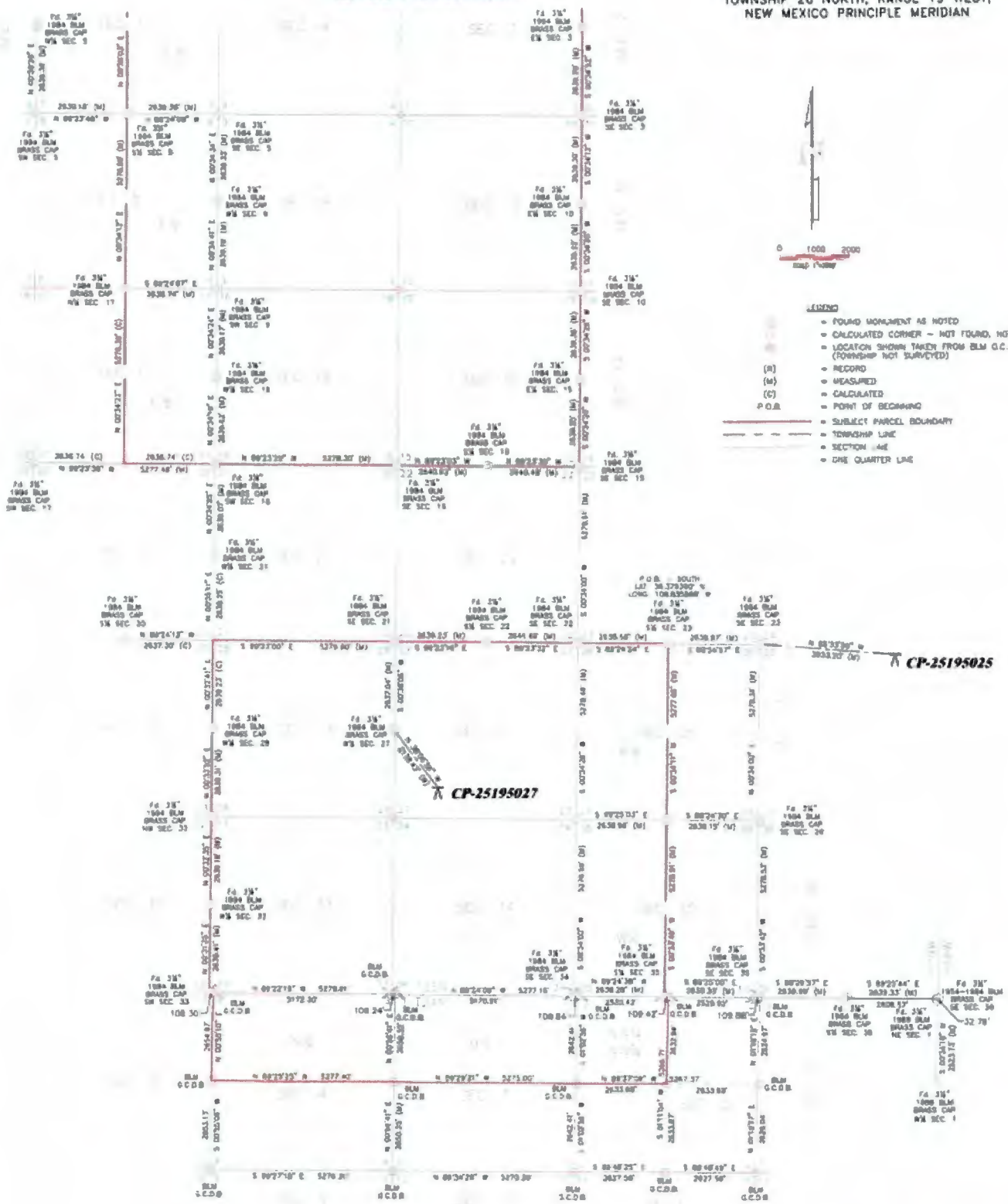
UNITED FIELD SERVICES INC.

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

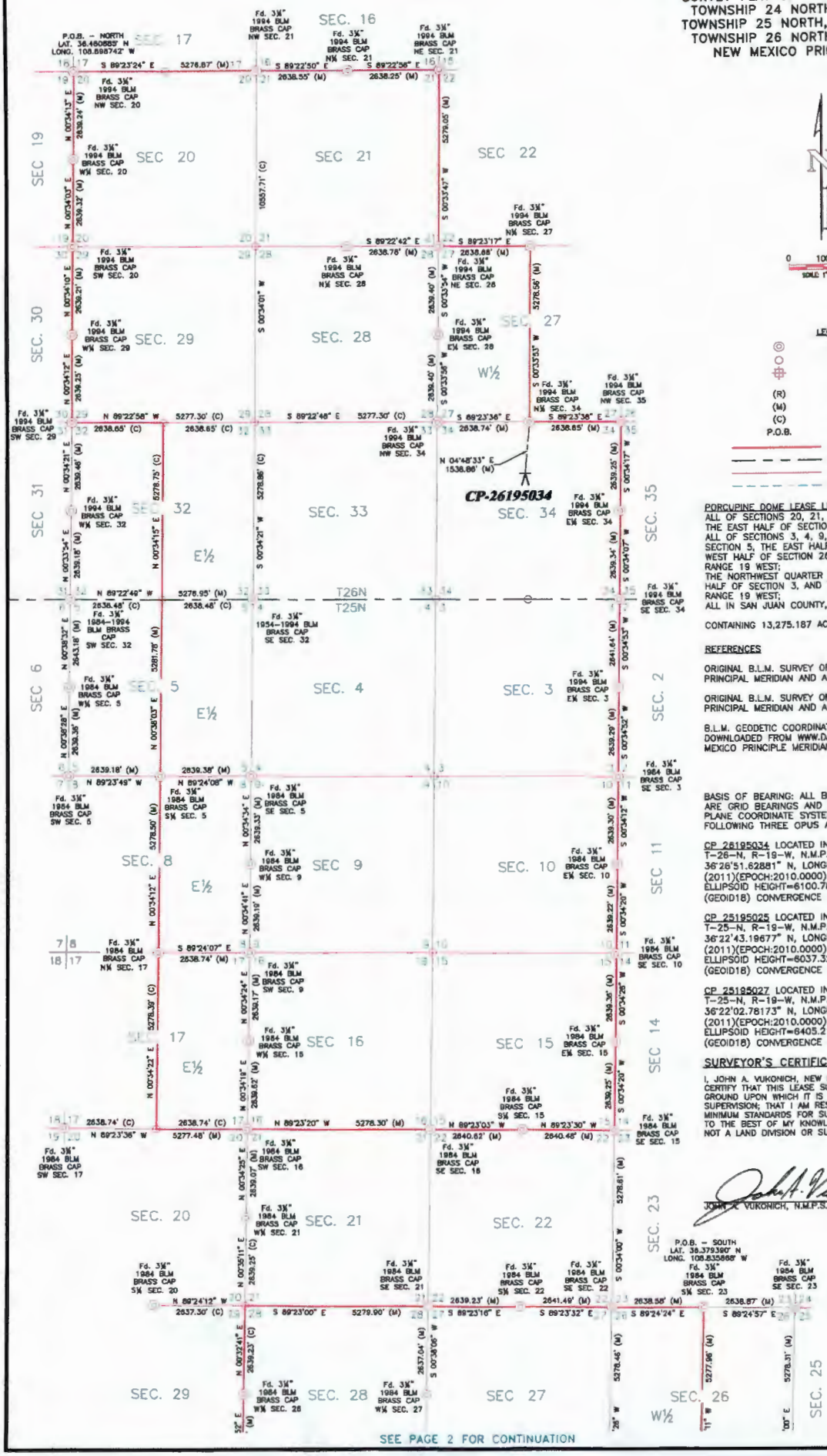
JOHN A VUKONICH
NEW MEXICO
14831
PROFESSIONAL SURVEYOR

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

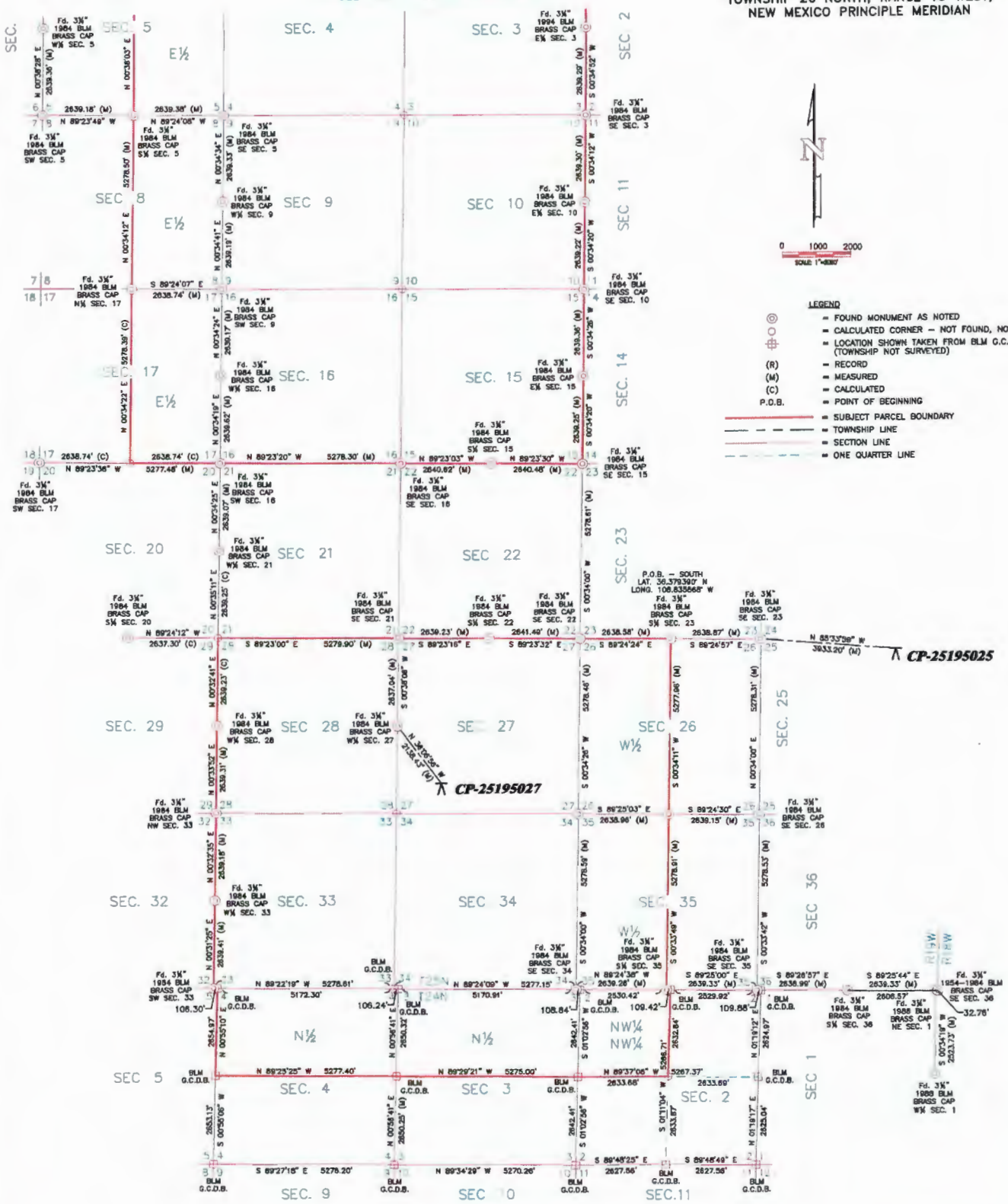
UNITED FIELD SERVICES INC.

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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- = SUBJECT PARCEL BOUNDARY
- = TOWNSHIP LINE
- = SECTION LINE
- = ONE QUARTER LINE

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)

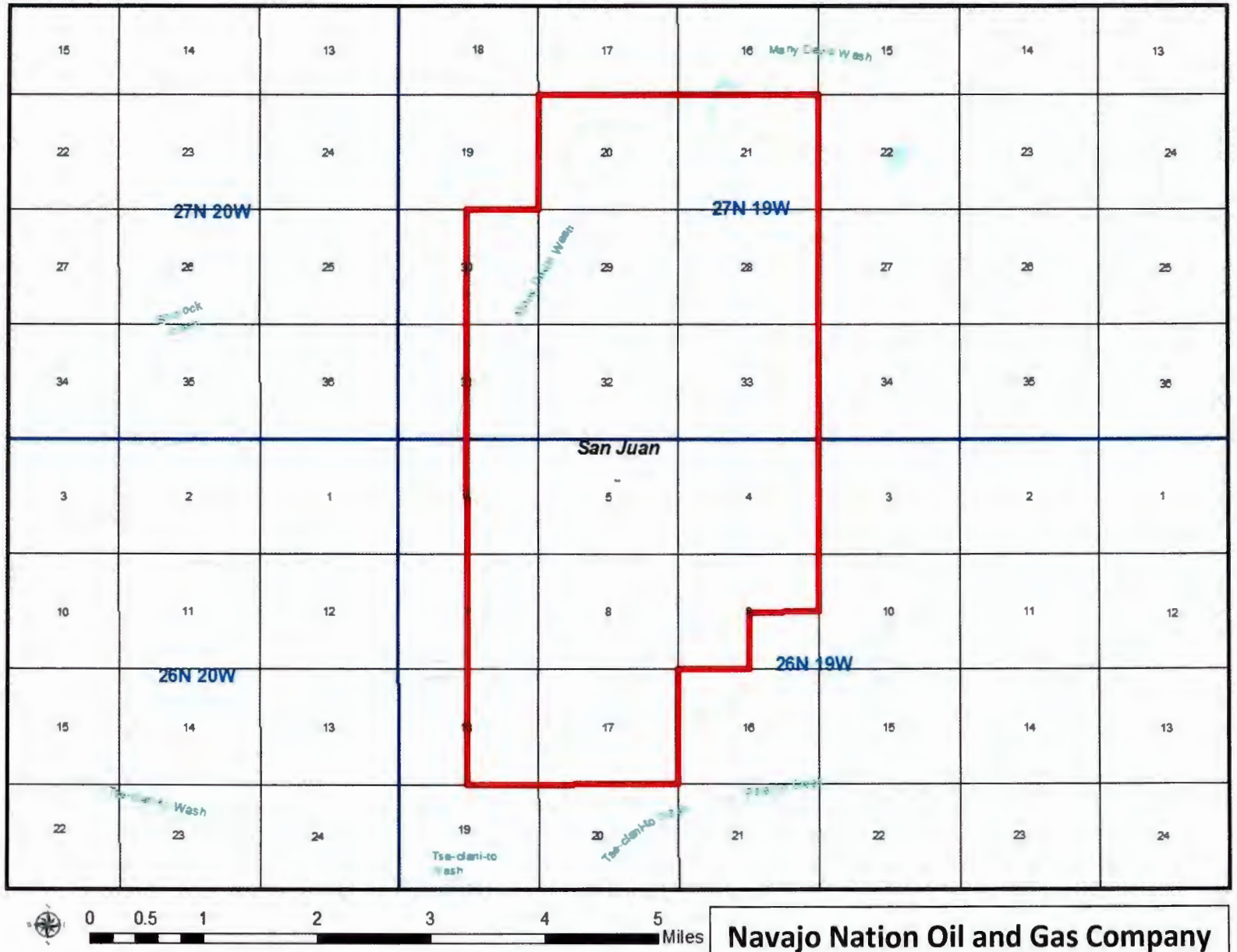
By: _____ 6/29/21
James R. McClure, Chief Executive Officer Date

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: _____



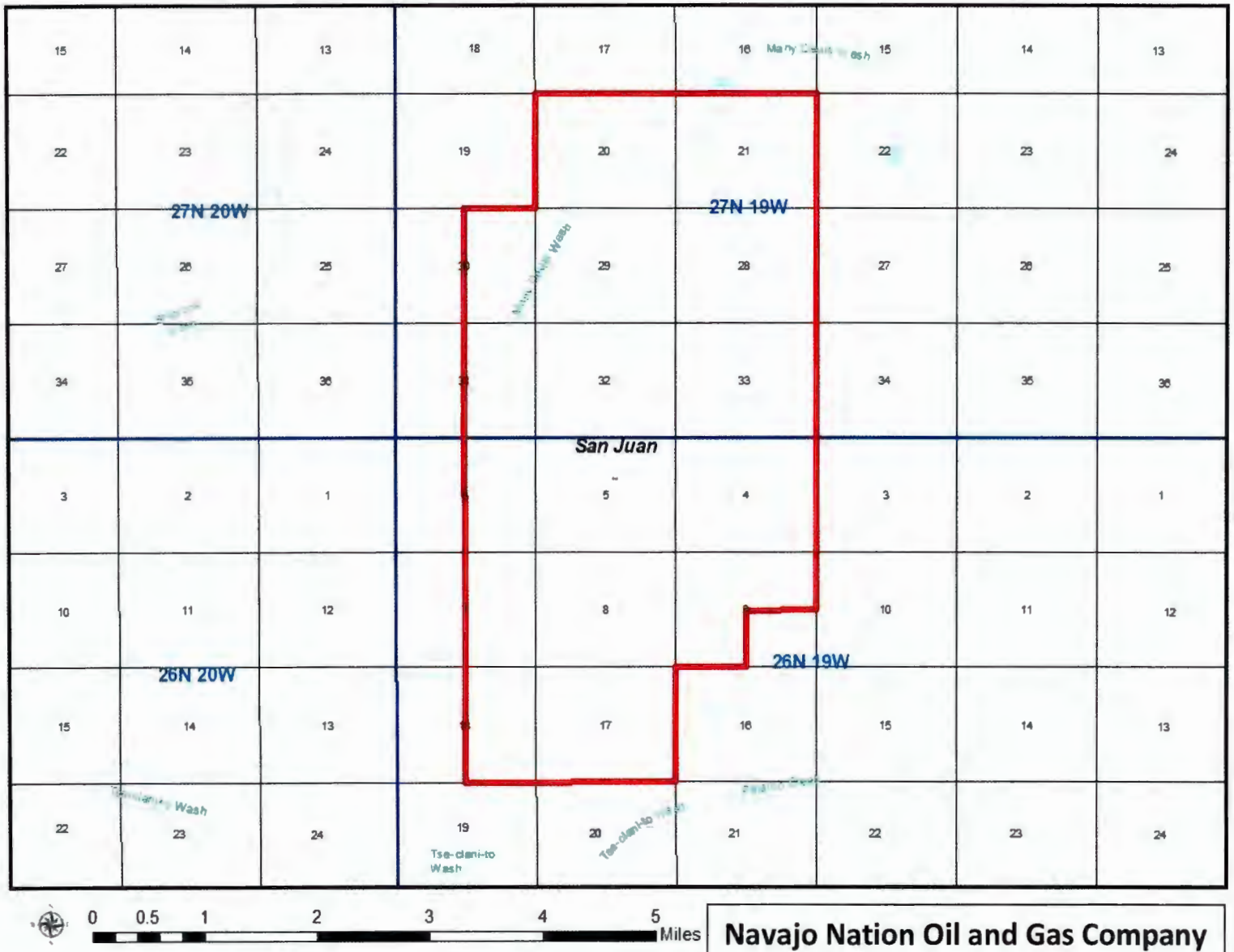
Navajo Nation Oil and Gas Company

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
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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.

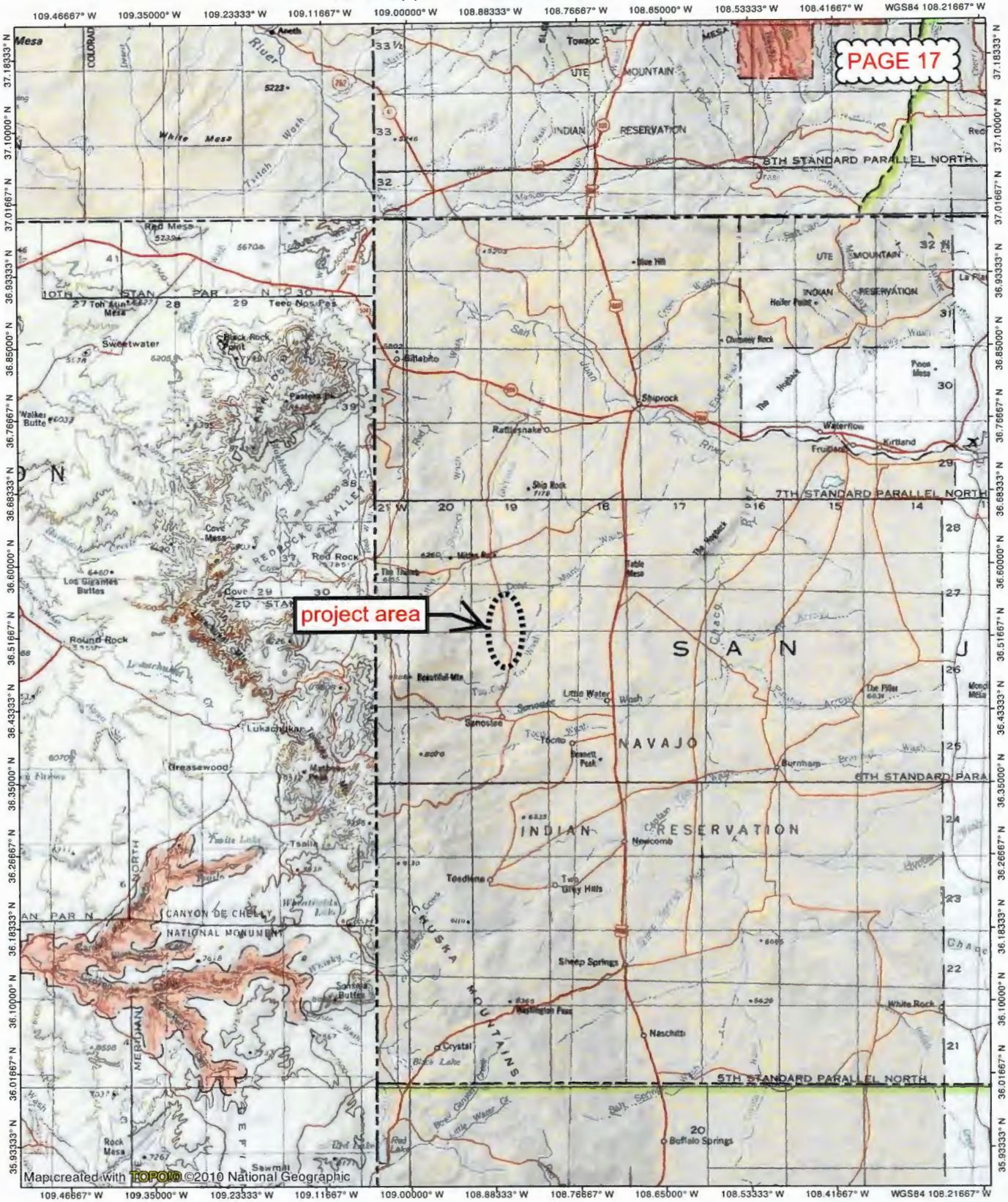
1.3 VICINITY MAPS

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"

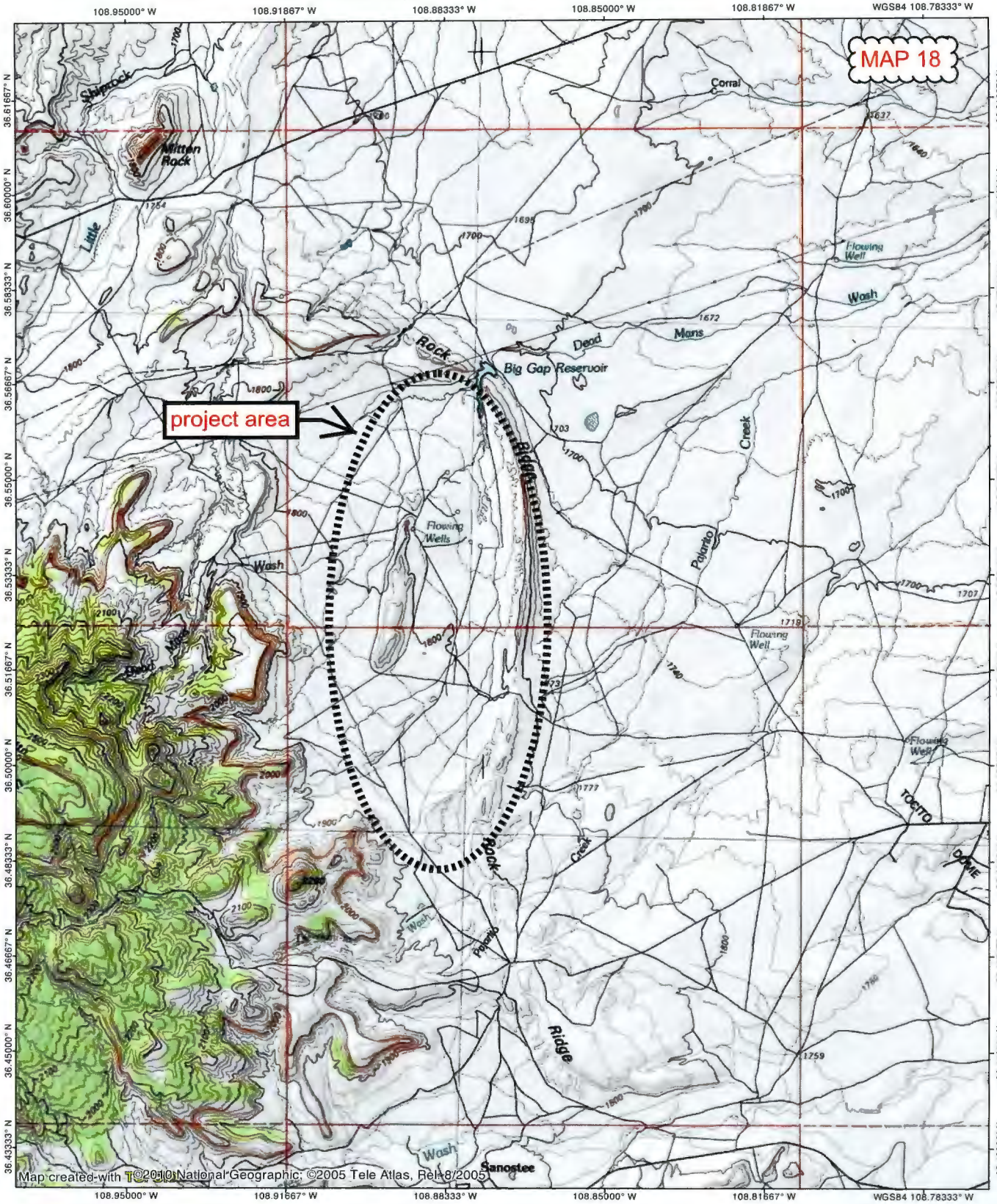


NATIONAL GEOGRAPHIC

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

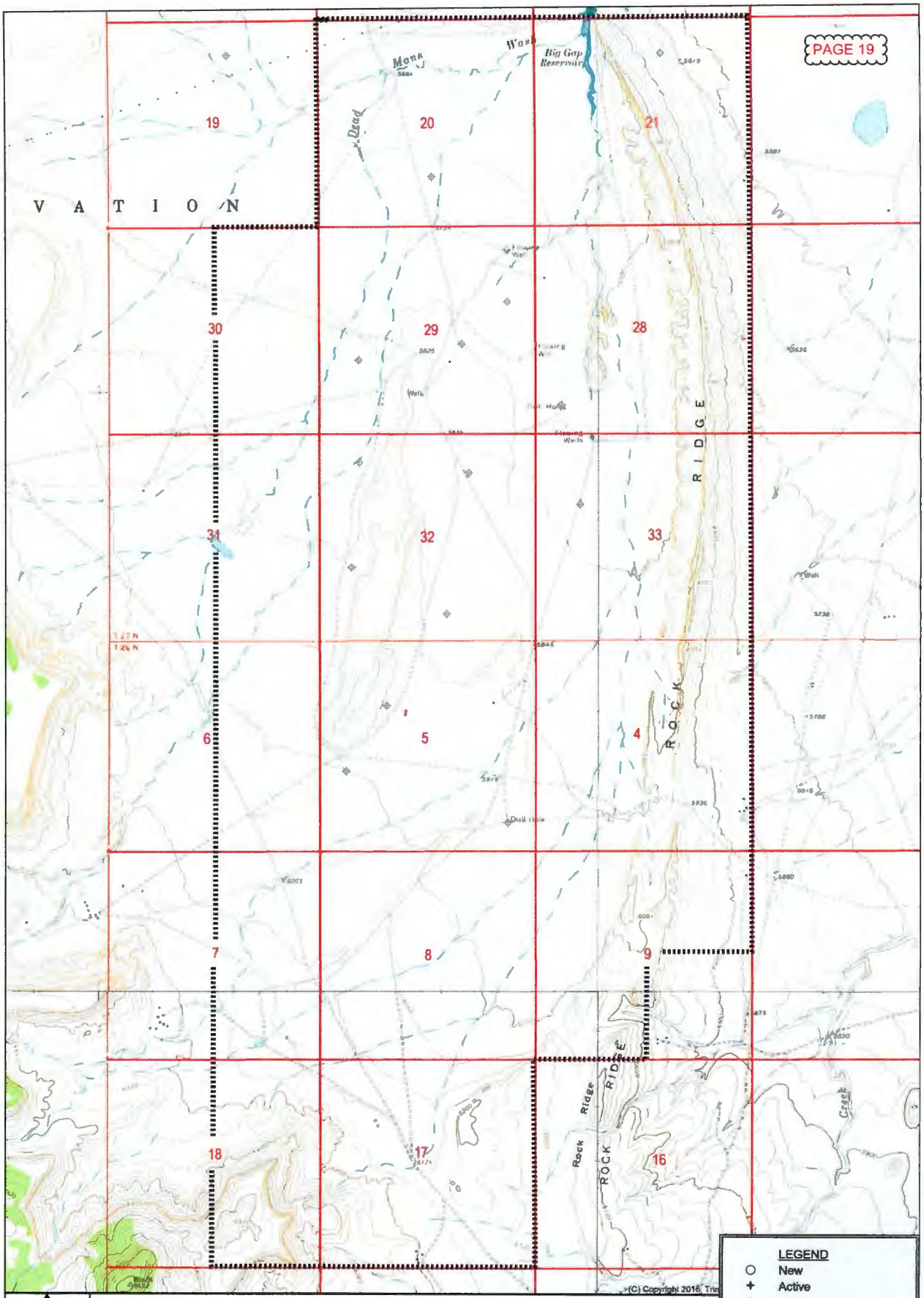
0.0 0.5 1.0 1.5 2.0 2.5 3.0 miles

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)

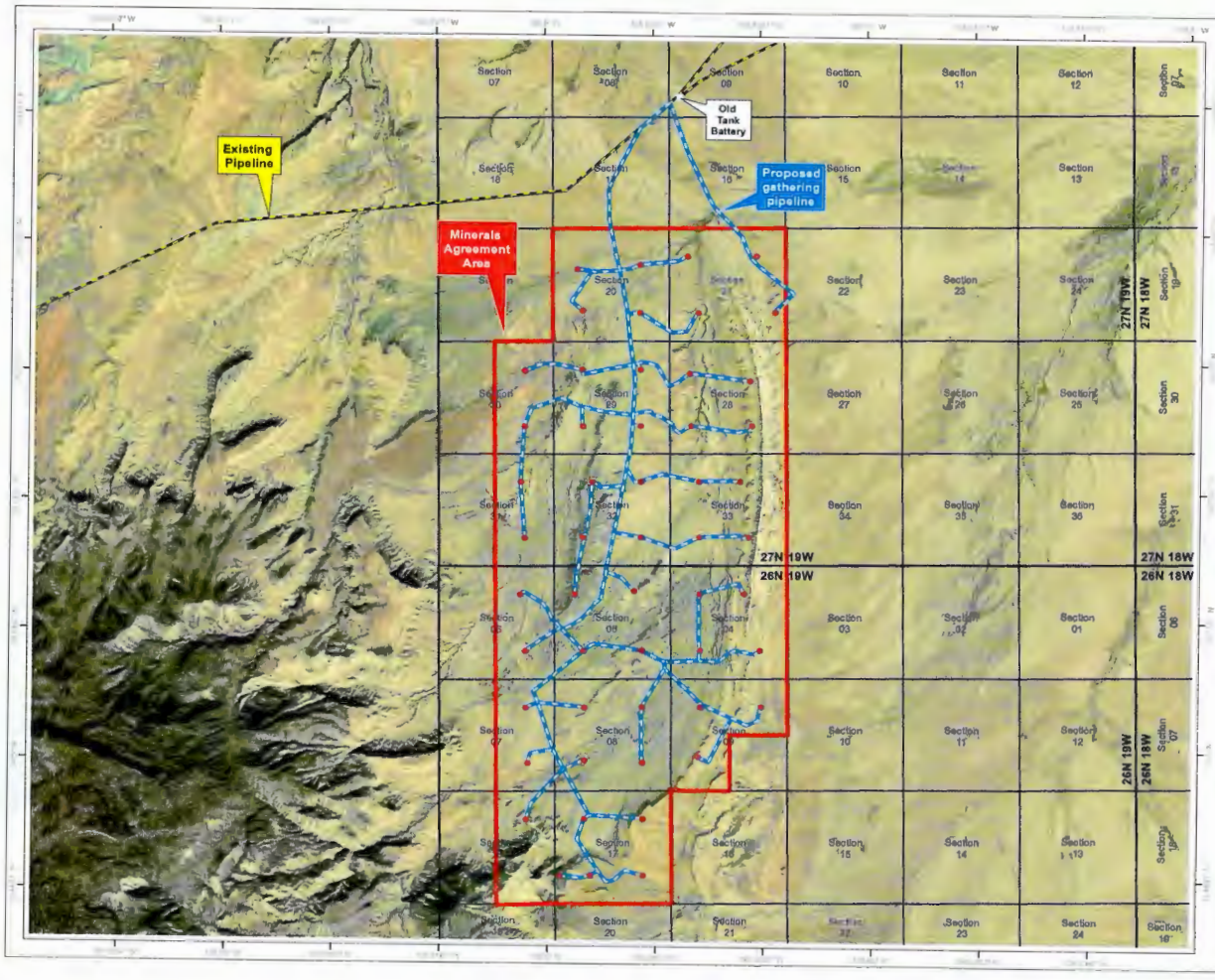
The agreement will mandate diligent development. Evaluation of impacts and mitigation will be based on a maximum development model of one well pad per quarter section (= 53 well pads). There could be multiple wells on each well pad due to different producing zones or directional drilling.

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
37 Verano Loop, Santa Fe, New Mexico 87508 505-466-8120

May 14, 2021

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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).

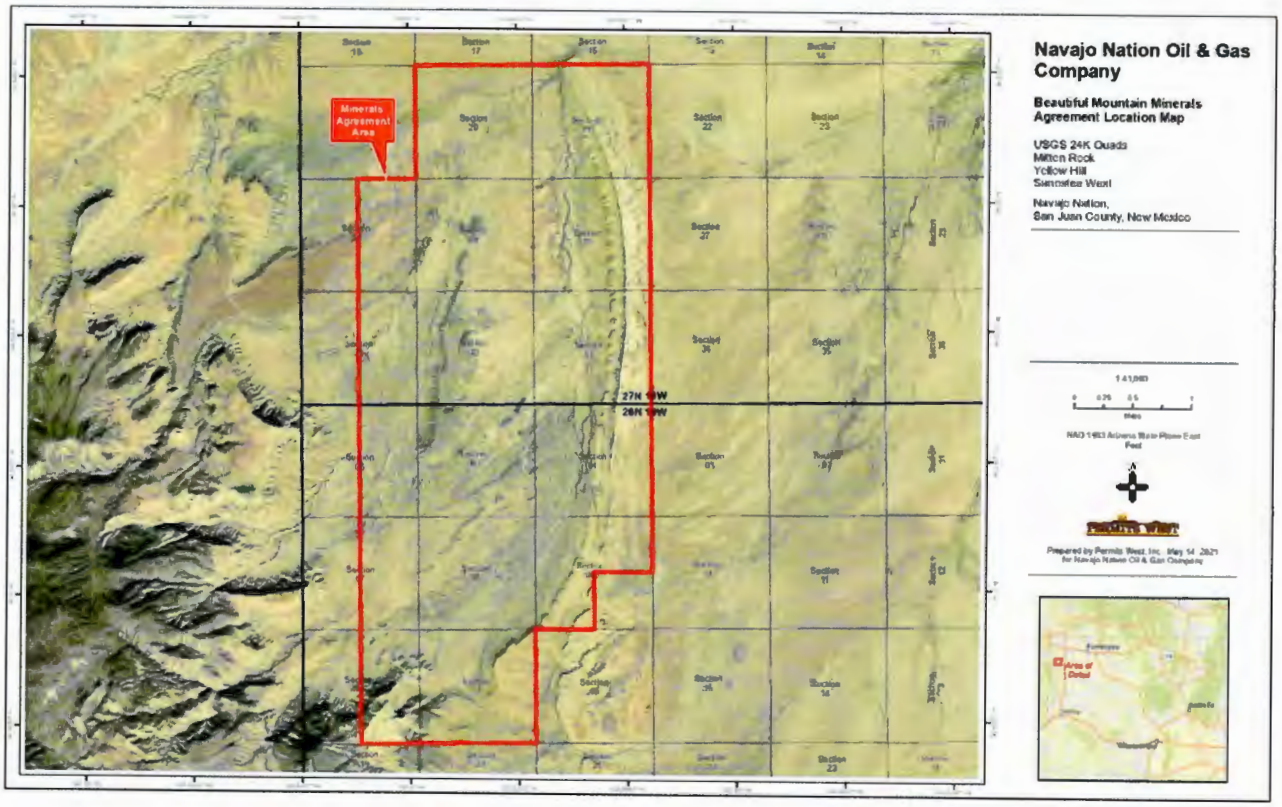

Figure 1. Beautiful Mountain Minerals Agreement Area (Lease).

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

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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

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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.

NOT FOR CONSULTATION

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

NOT FOR CONSULTATION

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**

NOT FOR CONSULTATION

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].

NOT FOR CONSULTATION

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.

NOT FOR CONSULTATION

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

NOT FOR CONSULTATION

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

NOT FOR CONSULTATION

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 (|)

NOT FOR CONSULTATION

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.

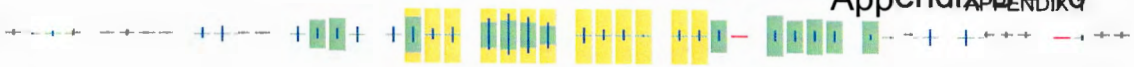
No Data (–)
A week is marked as having no data if there were no survey events for that week.

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.

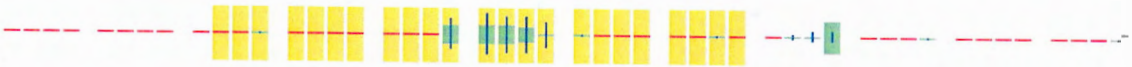
NOT FOR CONSULTATION

Appendix B - 10

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

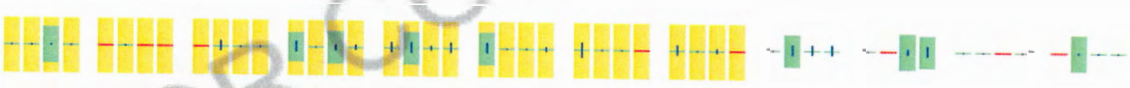


Burrowing Owl BCC - BCR (This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA)



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.)

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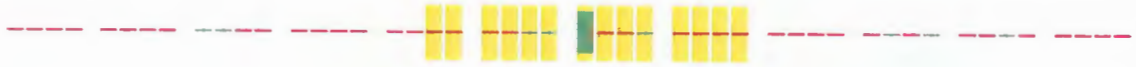
SPECIES	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Long-eared Owl BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)												

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.)

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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)

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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.

Appendix B - 14

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

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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

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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

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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.

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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
37 Verano Loop, Santa Fe, New Mexico 87508 505-466-8120

May 10, 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 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).

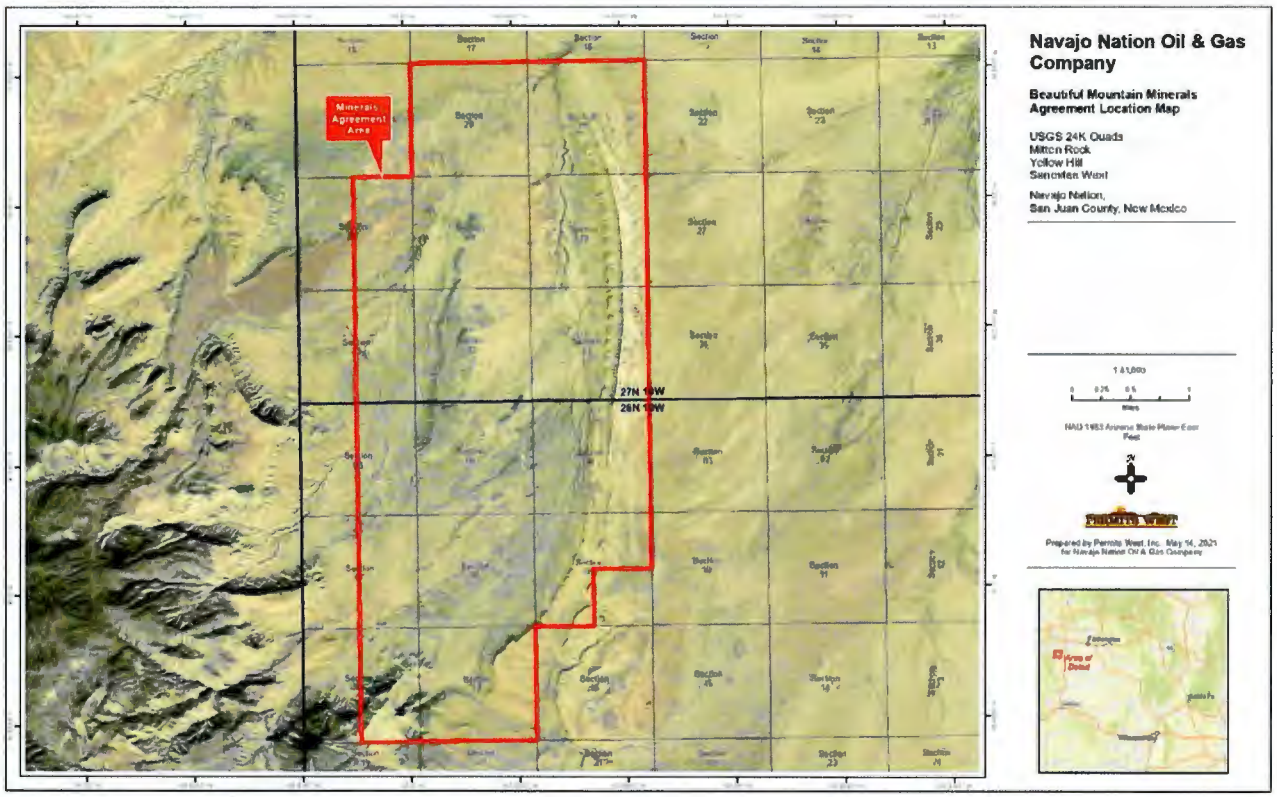

Figure 1. Beautiful Mountain Mineral Agreement Area (Lease).

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).

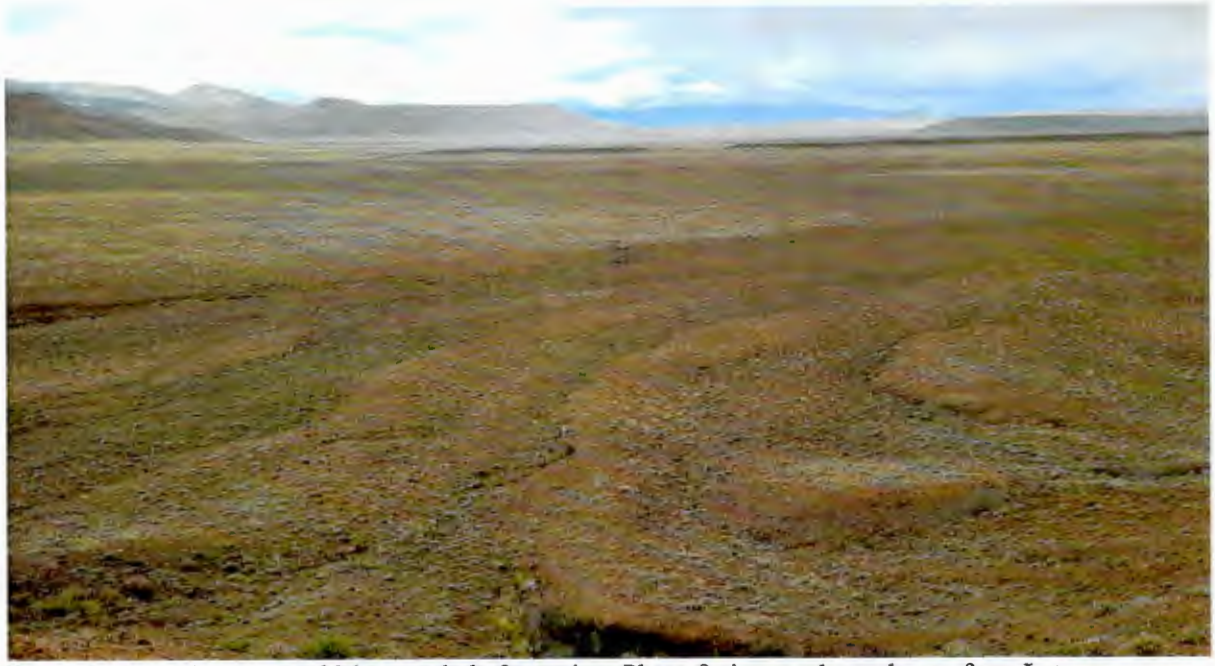

Photo 3. Sparsely vegetated Mancos shale formation. Photo facing north-northwest from Lat. 36.492314°, Long. -108.885533° (NAD 83).

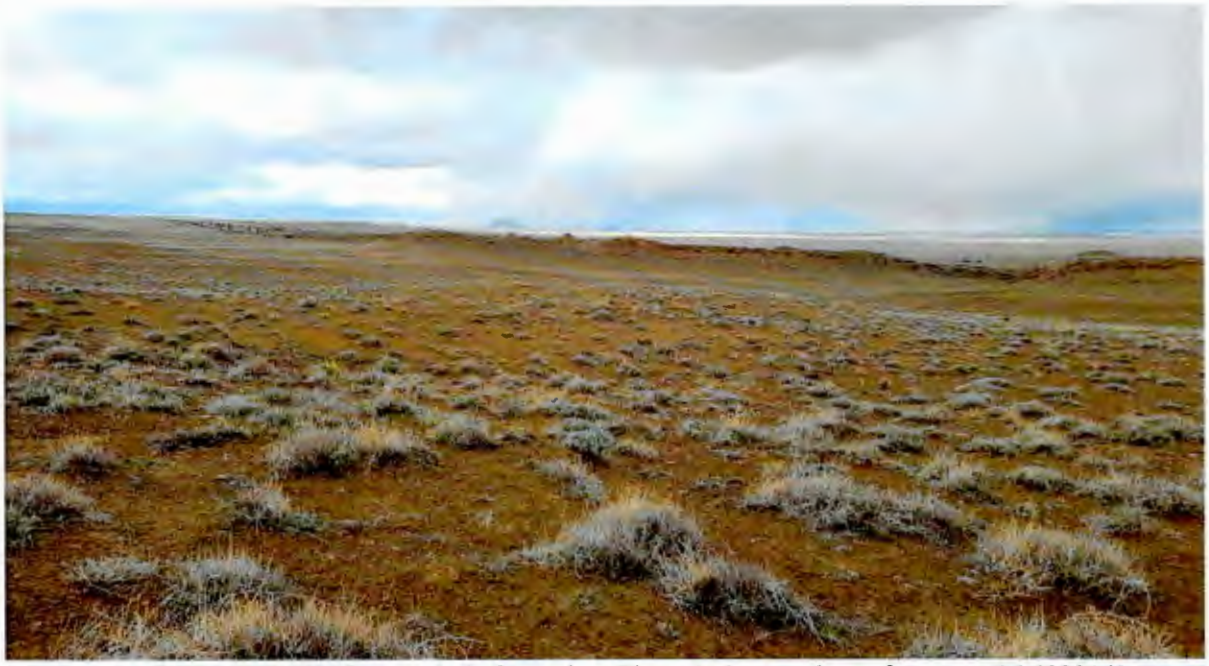

Photo 3. Sparsely vegetated Mancos shale formation. Photo facing southeast from Lat. 36.492314°, Long. -108.885533° (NAD 83).

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.

21perm103

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.

NOT FOR CONSULTATION

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

NOT FOR CONSULTATION

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

NOT FOR CONSULTATION

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

NOT FOR CONSULTATION

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.

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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

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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

NOT FOR CONSULTATION

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 (|)

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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.

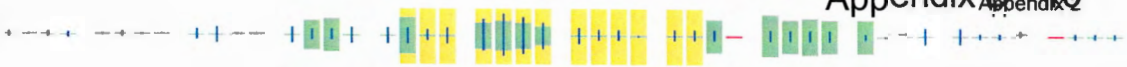
To see a bar's survey effort range, simply hover your mouse cursor over the bar.

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

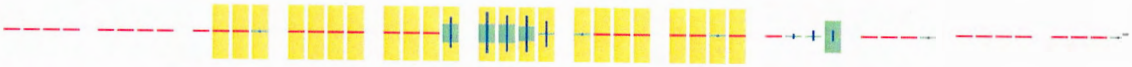
Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.

NOT FOR CONSULTATION

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

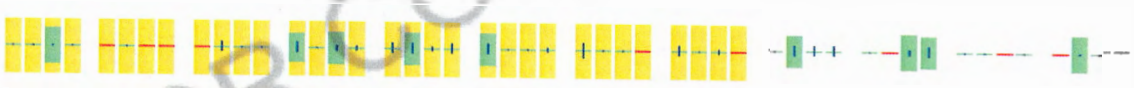


Burrowing Owl BCC - BCR (This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA)



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)

NOT FOR CONSULTATION

Appendix B - 11

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.)												

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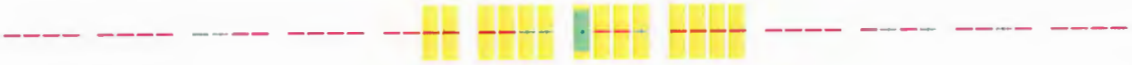
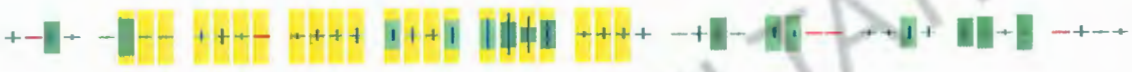
Marbled Godwit BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

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.)



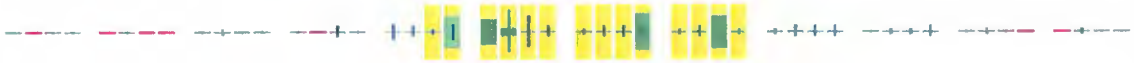
Rufous Hummingbird BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

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

DRAFT FOR CONSULTATION

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)



NOT FOR CONSULTATION

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

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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

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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

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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.

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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
Douglas H.M. Boggess, Kobi Weaver,
and Beth McCormack
Lone Mountain Archaeological Services, Inc.

Submitted by
Douglas H.M. Boggess, Principal Investigator
Lone Mountain Archaeological Services, Inc.
2625 Pennsylvania Street NE
Albuquerque, New Mexico 87110

Prepared for
Navajo Nation Oil & Gas Company
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.

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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.

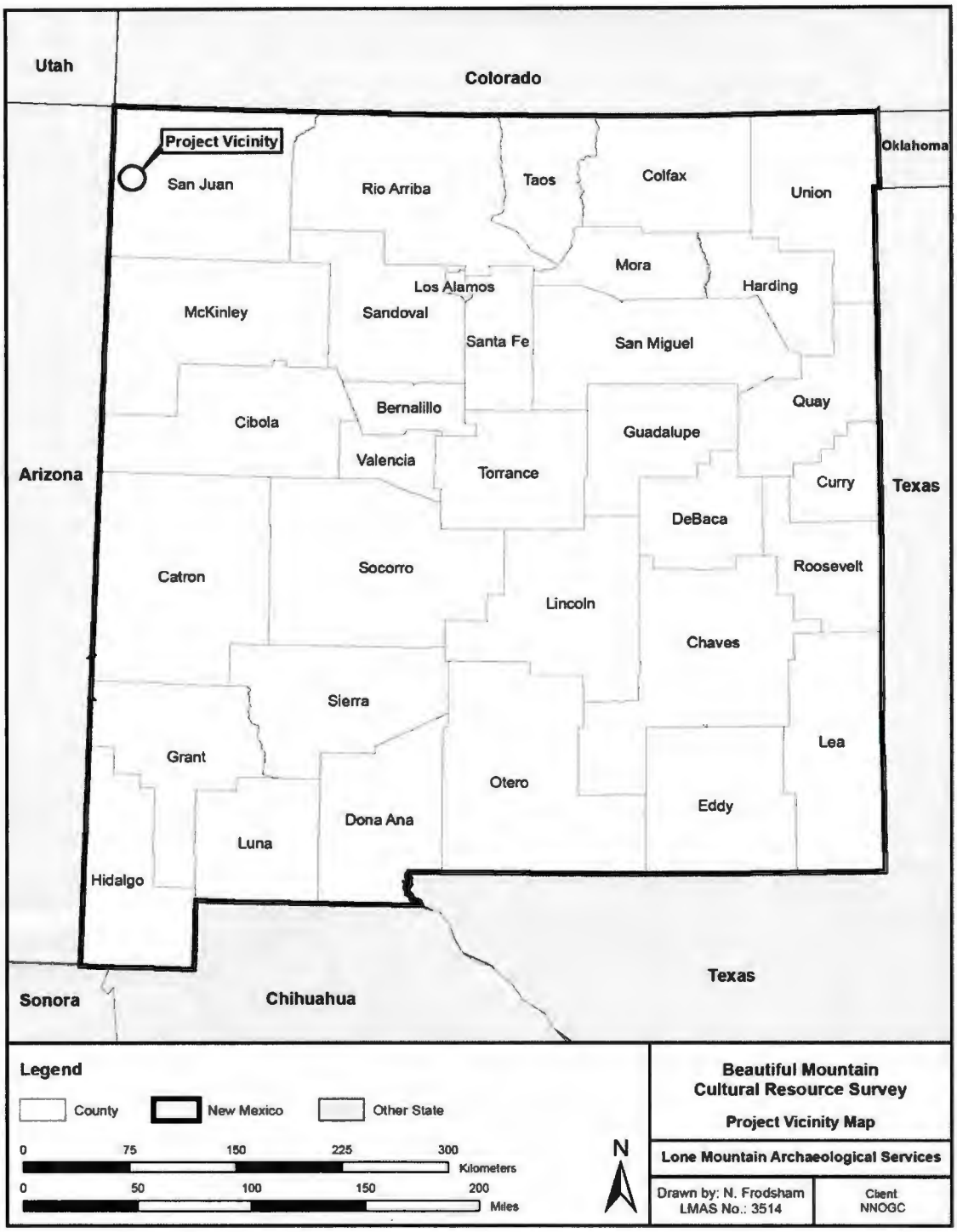

Figure 1.1: Project Vicinity.

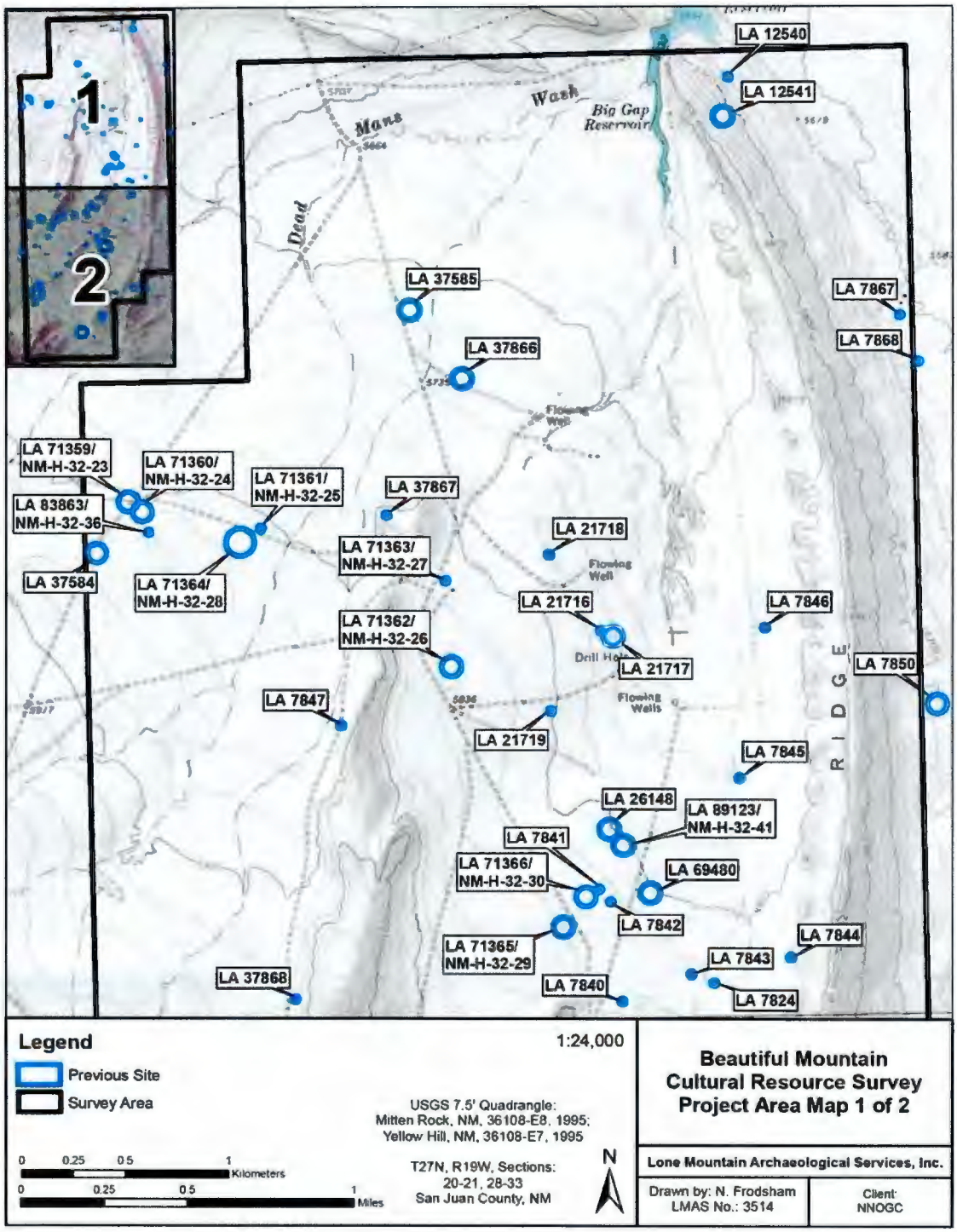

Figure 1.2: Project Area (1 of 2).

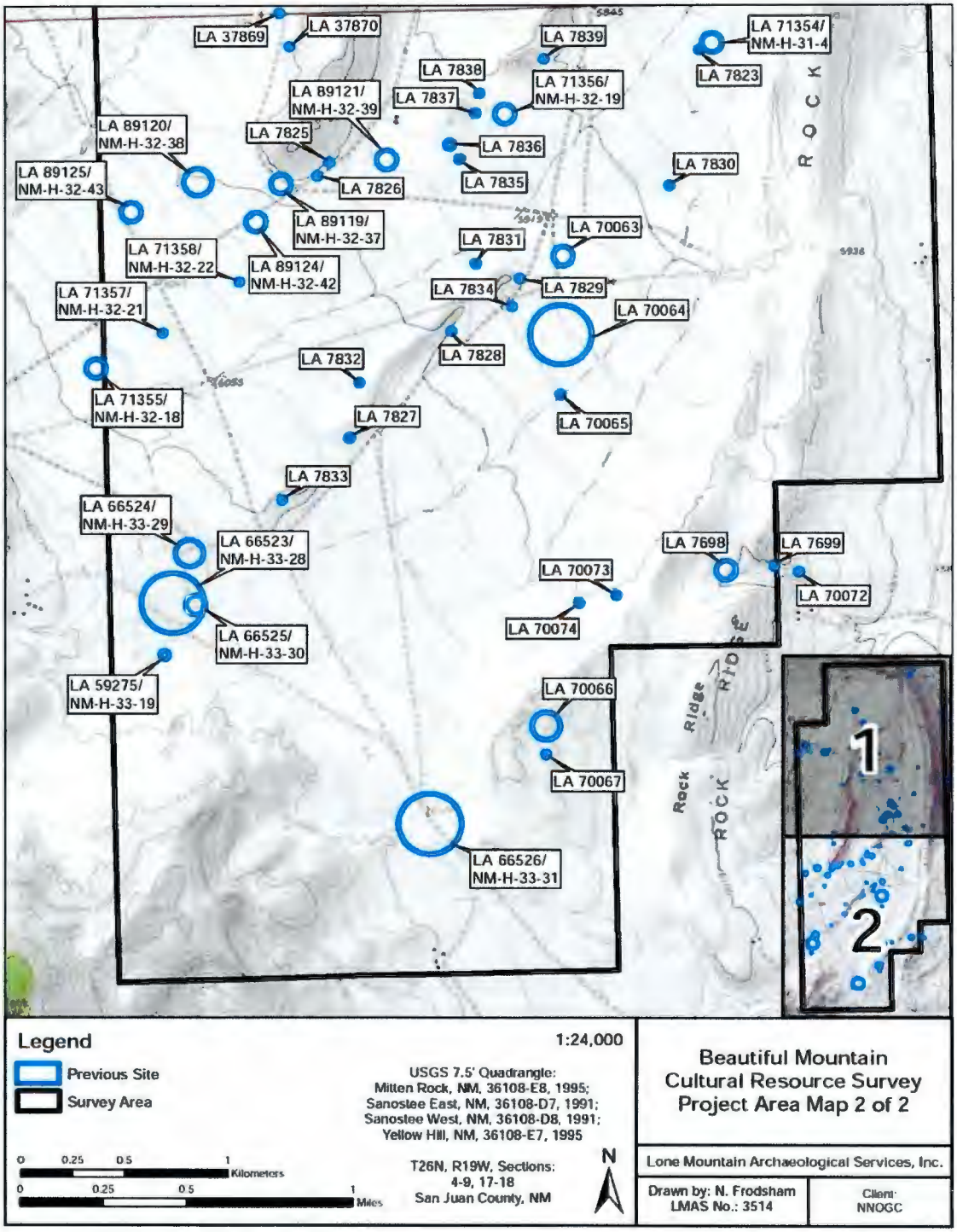

Figure 1.3: Project Area (2 of 2).

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

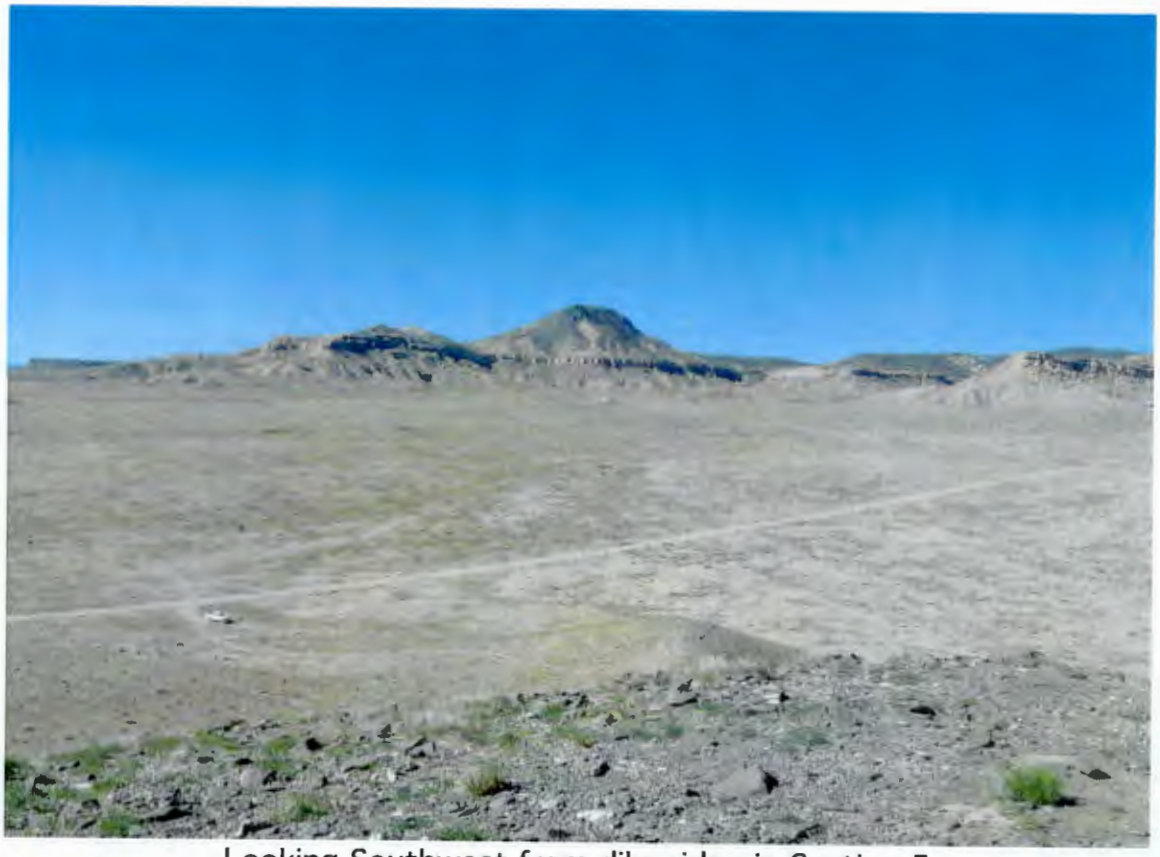
Looking Northwest at N-5012 in Section 17

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

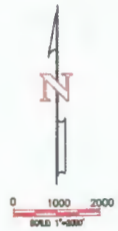


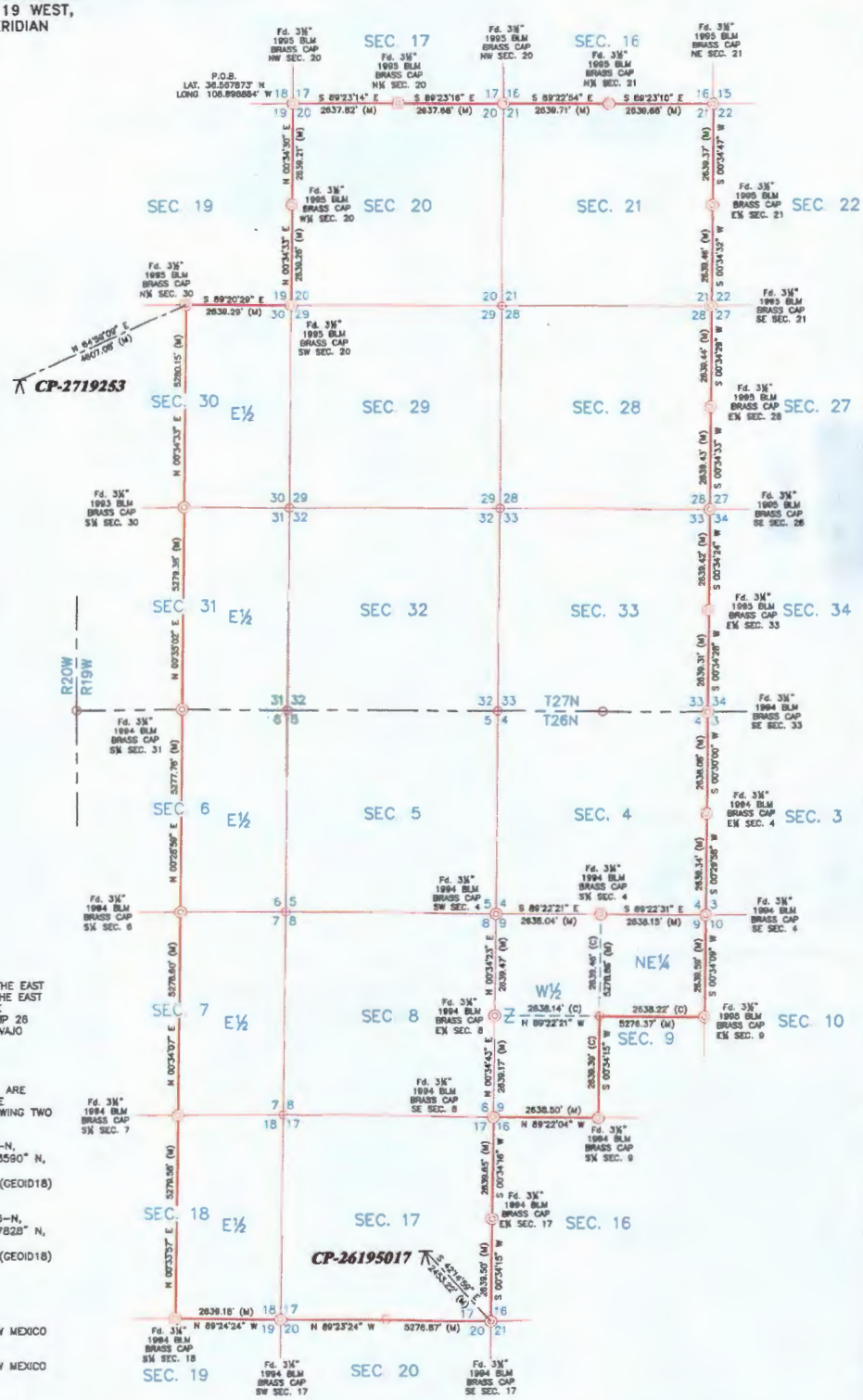
Looking Southwest from dike ridge in Section 5

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

- = 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.

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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.
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)

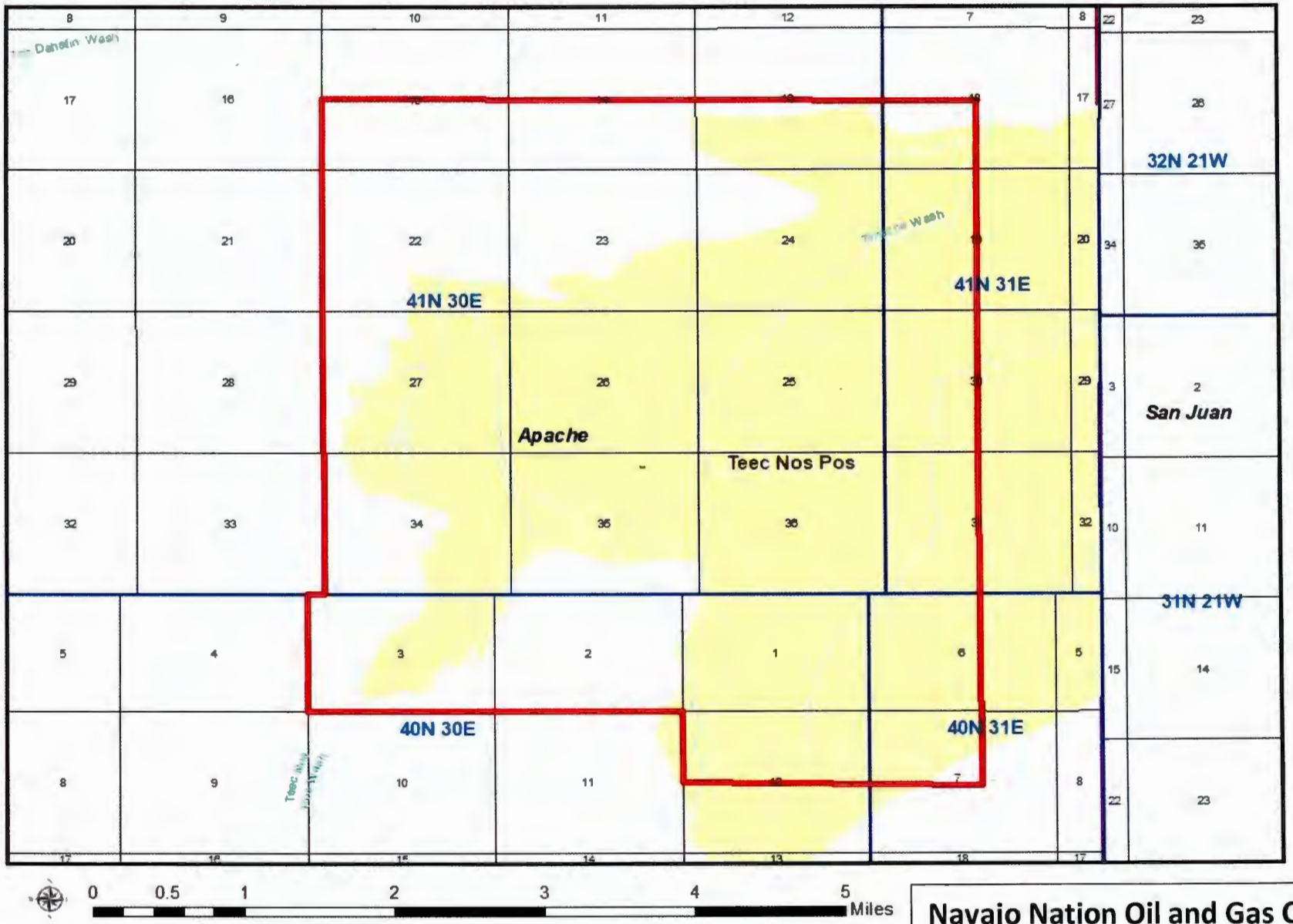
By: _____ 6/29/21
James R. McClure, Chief Executive Officer Date

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: _____



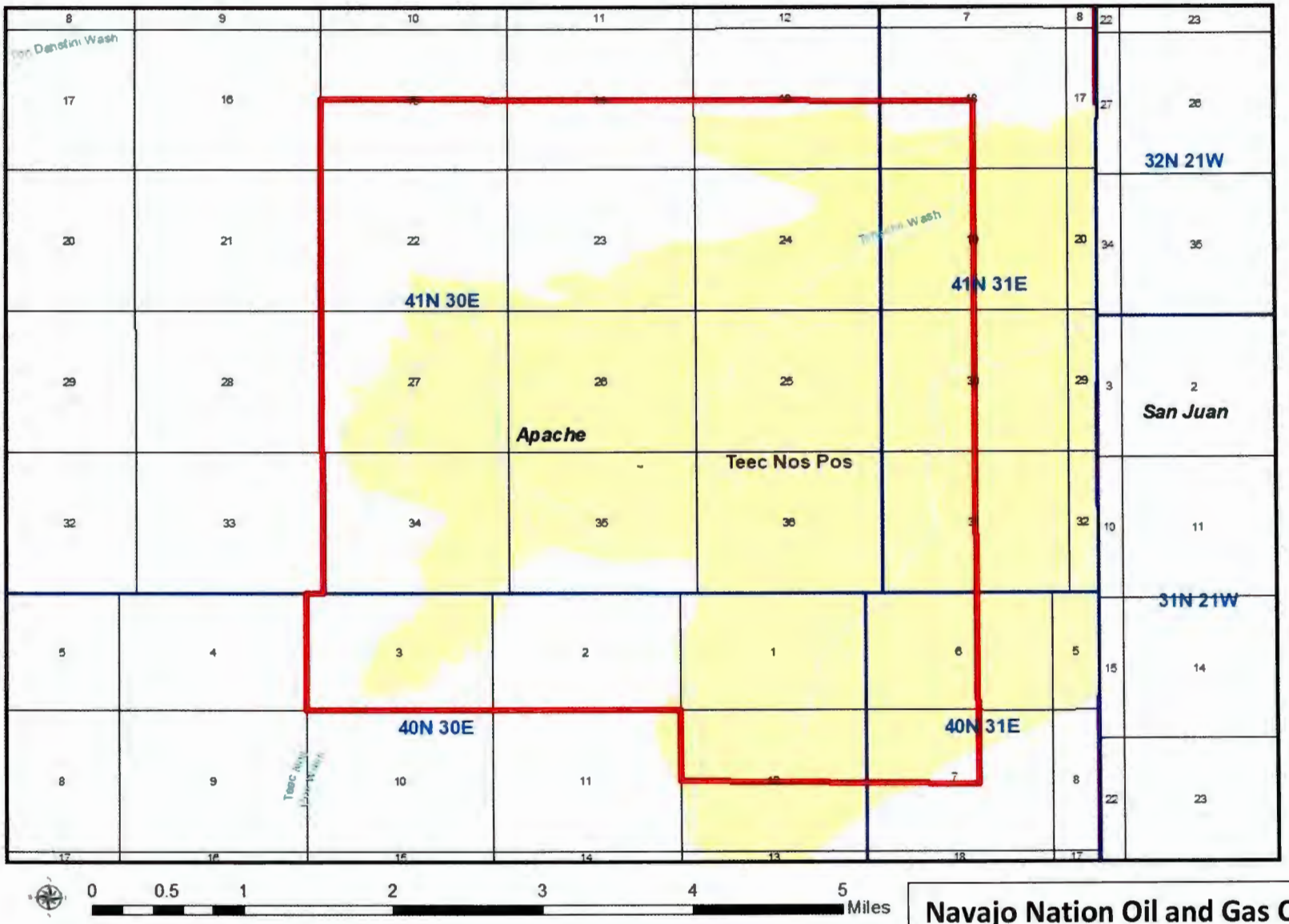
Navajo Nation Oil and Gas Company

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.

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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.

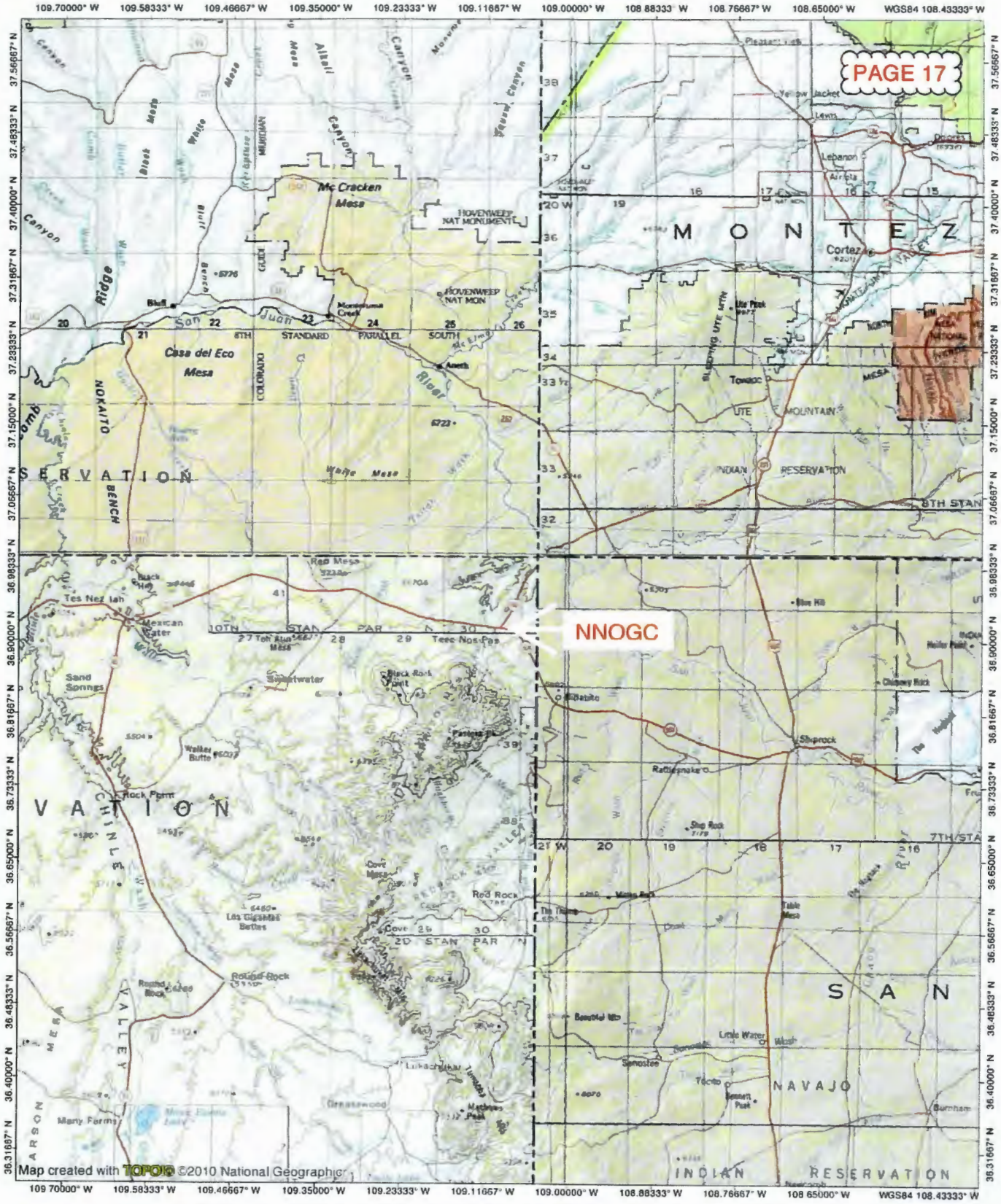
1.3 VICINITY MAPS

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"

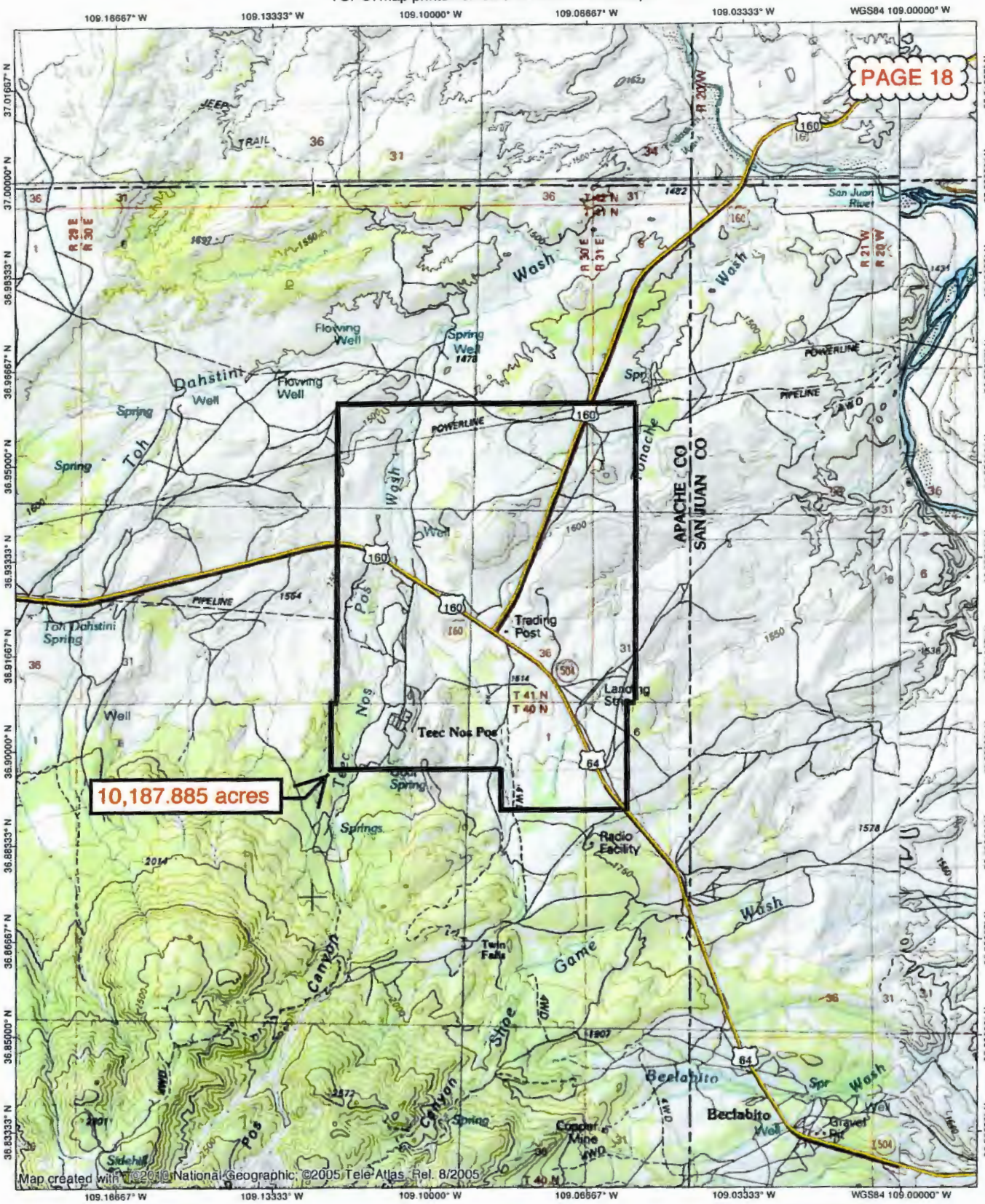


NATIONAL GEOGRAPHIC

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"



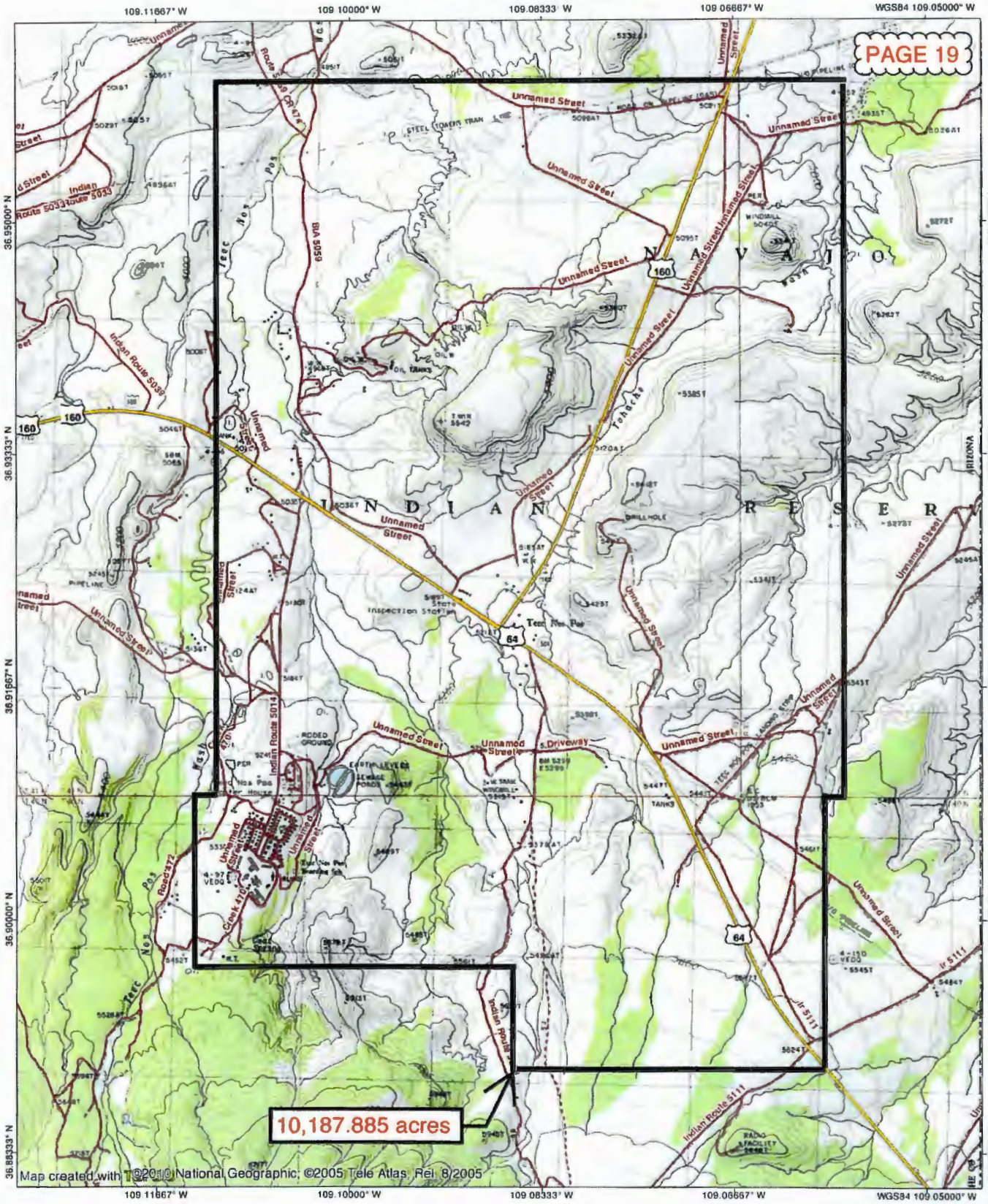
NATIONAL GEOGRAPHIC

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

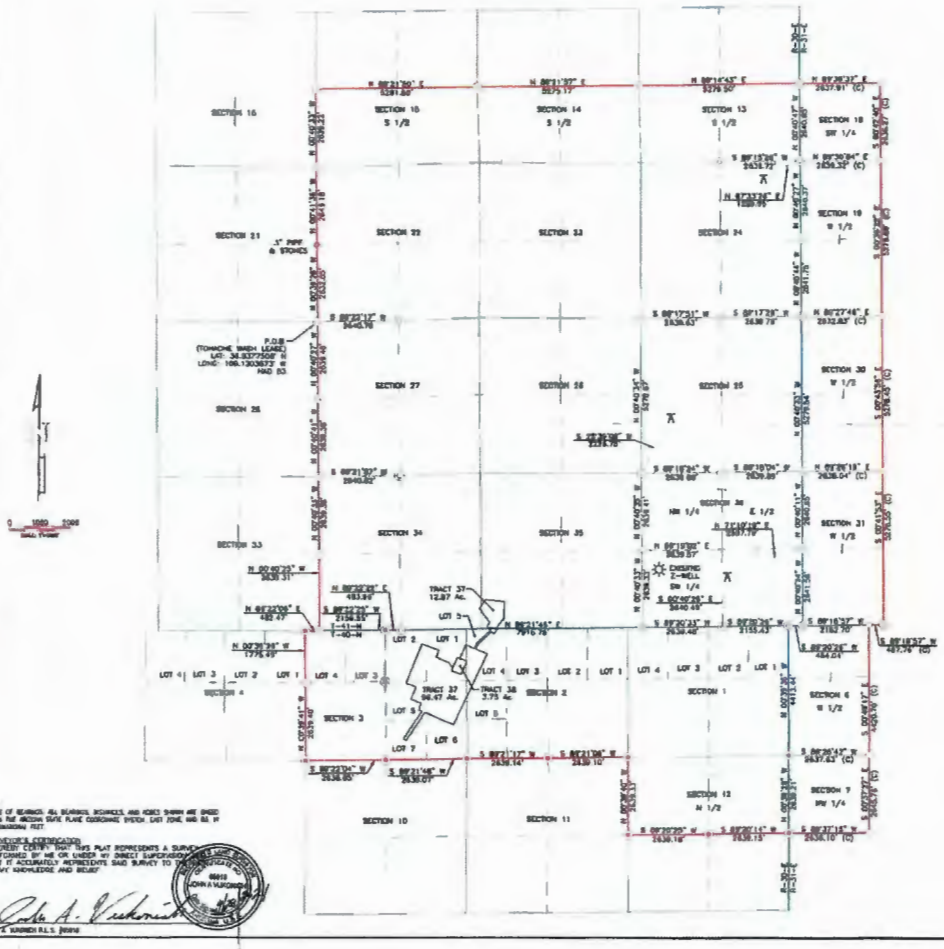
TN 9.5° MN

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)

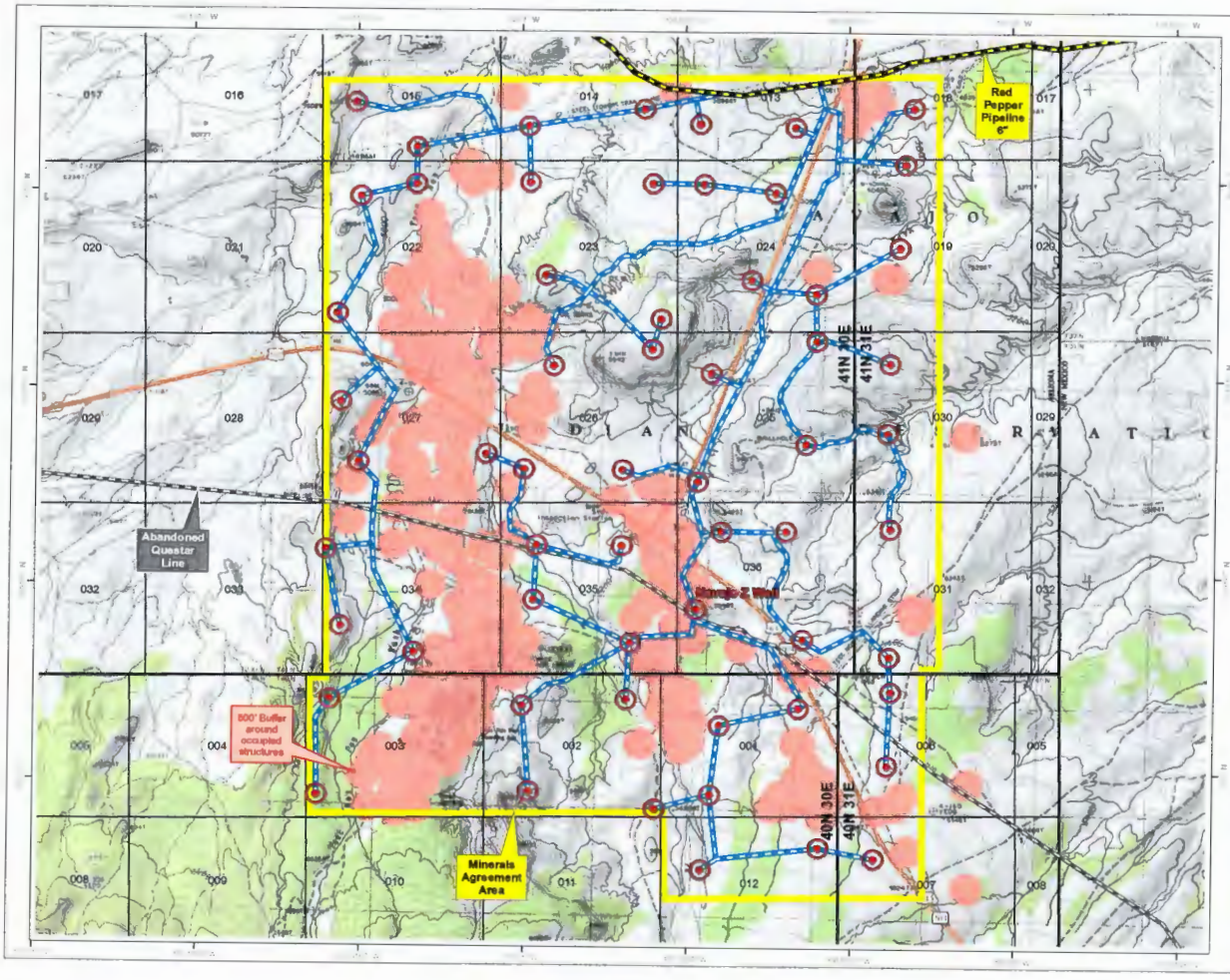
The agreement will mandate diligent development. Evaluation of impacts and mitigation will be based on a maximum development model of one well site per quarter section (= 60 well sites). There could be multiple wells on each well site due to different producing zones or directional drilling.

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

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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

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, 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

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

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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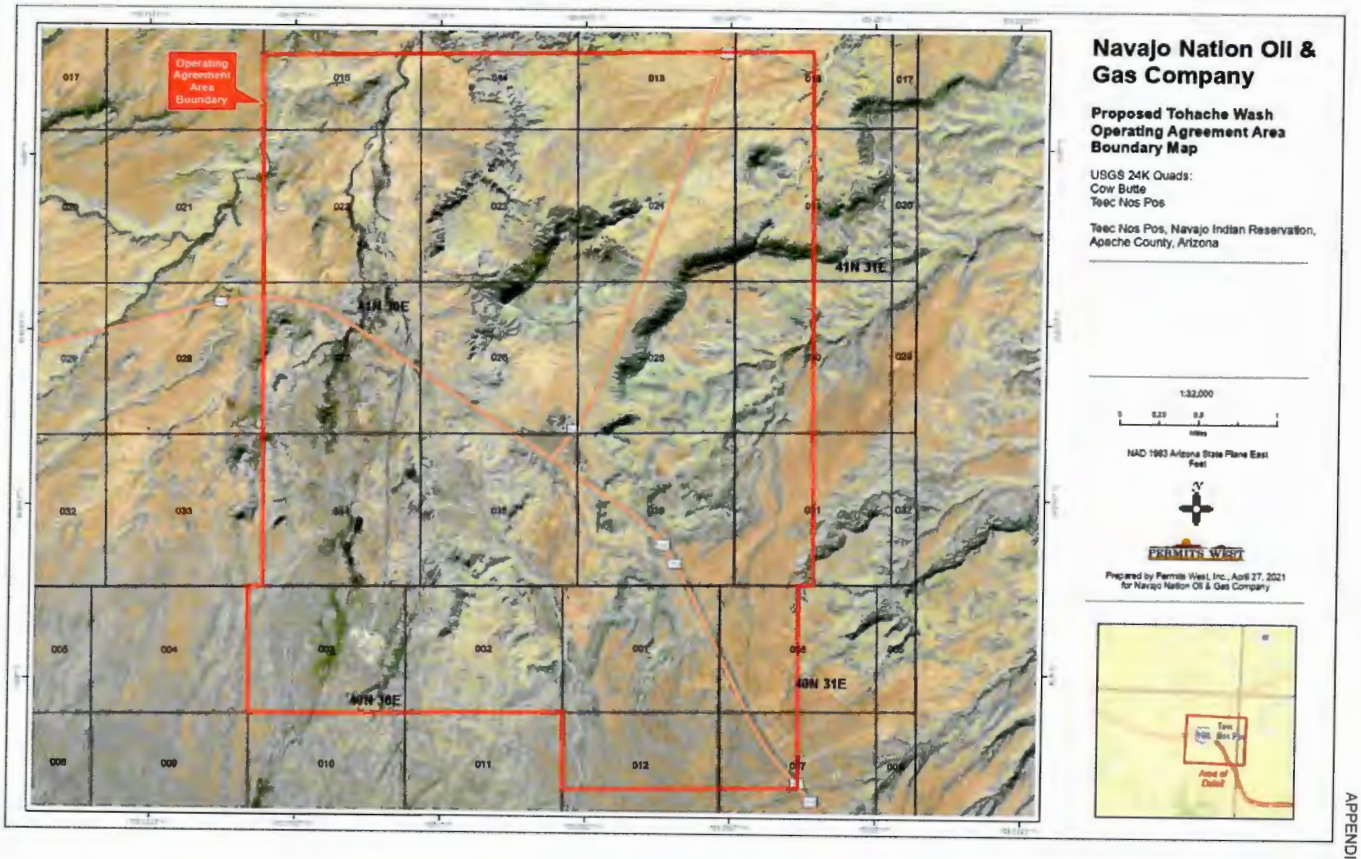
APPENDIX B - Map

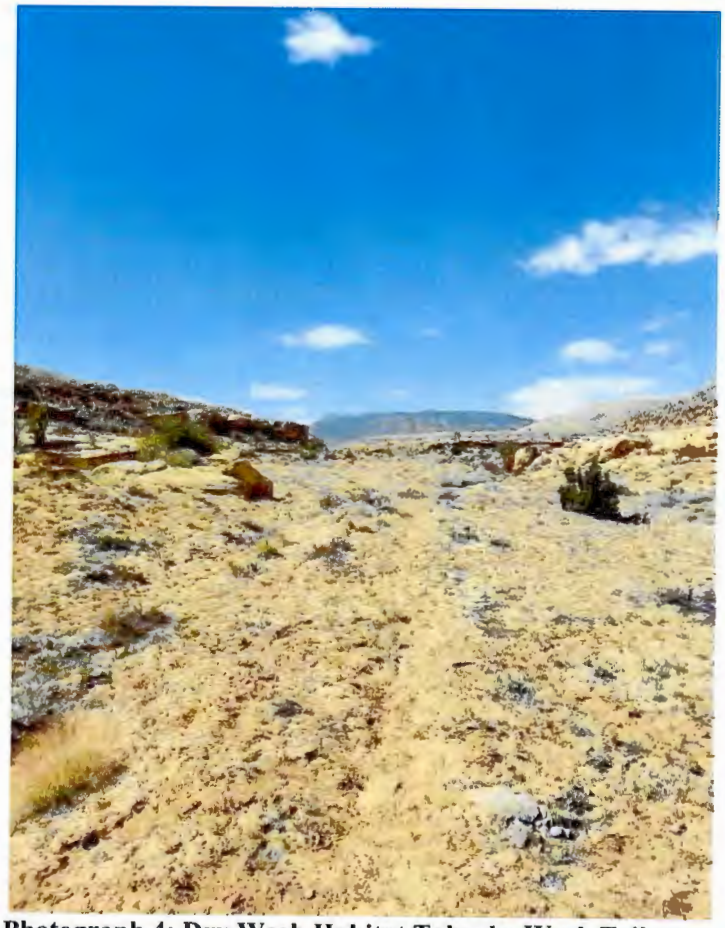

Navajo Nation Oil & Gas Company
Proposed Tohache Wash Operating Agreement Area Boundary Map
USGS 24K Quads:
Cow Butte
Teec Nos Pos
Teec Nos Pos, Navajo Indian Reservation, Apache County, Arizona
1:32,000
NAD 1983 Arizona State Plane East Feet
PERMITS WEST
Prepared by Permits West, Inc., April 27, 2021 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

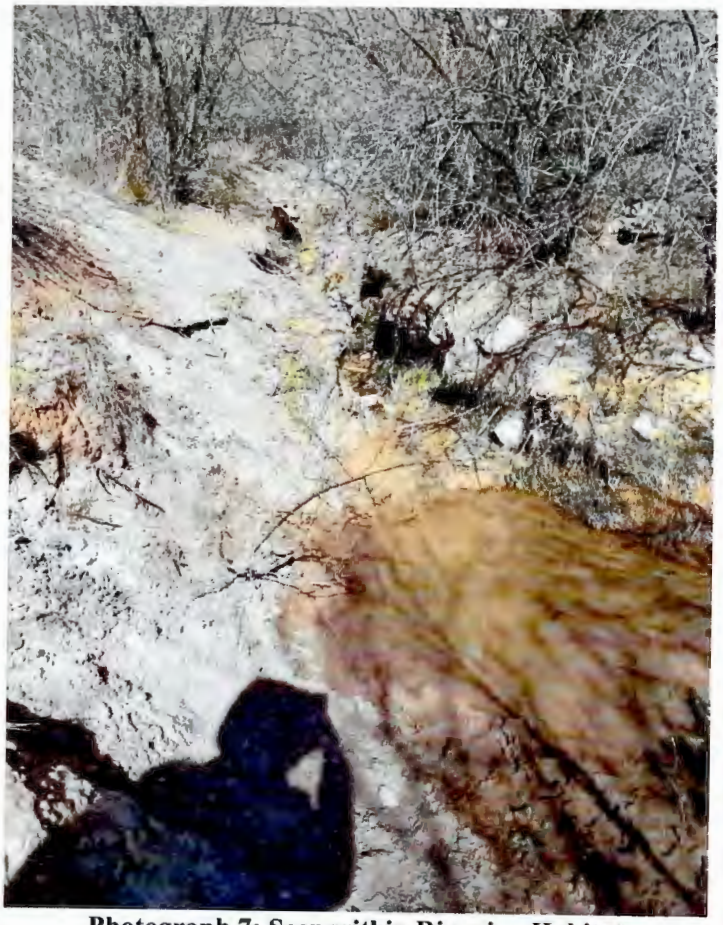
Photograph 3: Rangeland Habitat



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
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 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
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
928.545.2898
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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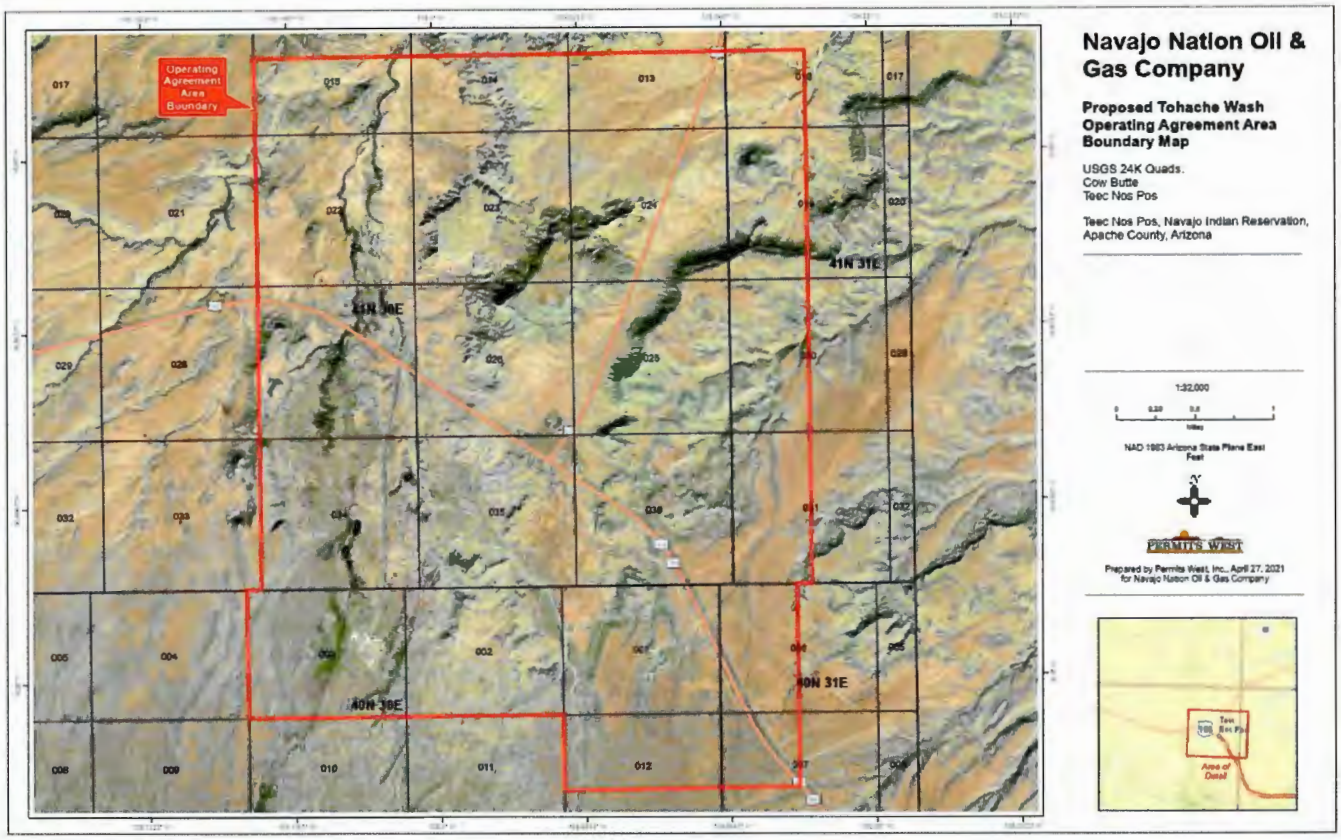
APPENDIX B - Map

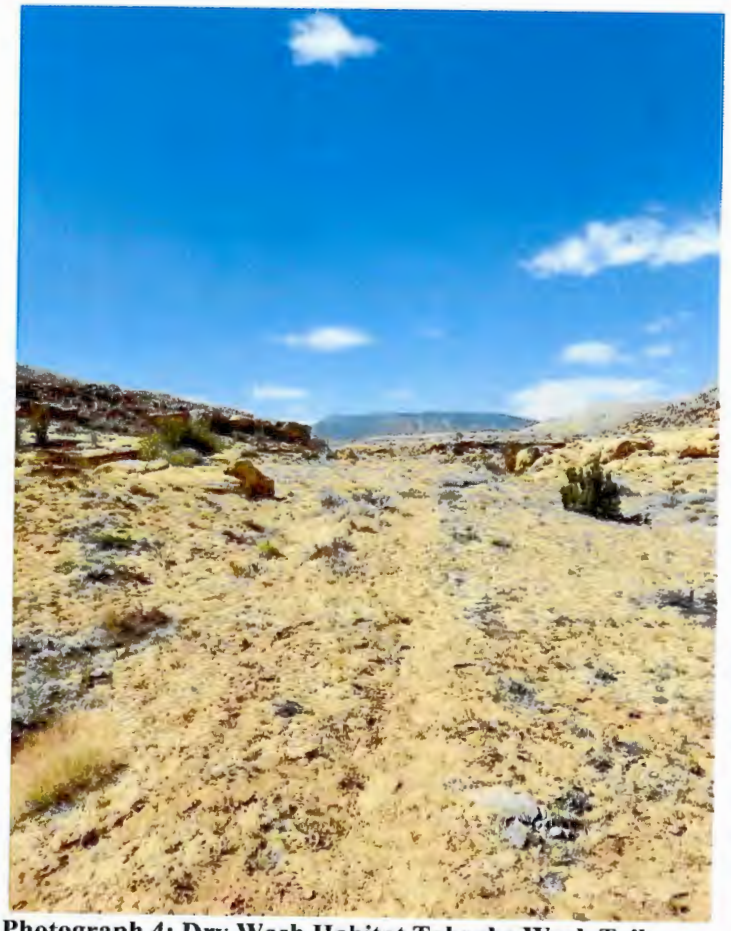

Navajo Nation Oil & Gas Company
Proposed Tohache Wash Operating Agreement Area Boundary Map
USGS 24K Quads.
Cow Butte
Teec Nos Pos
Teec Nos Pos, Navajo Indian Reservation, Apache County, Arizona
1:32,000
NAD 1983 Arizona State Plane East Feet
PERMITS WEST
Prepared by Permits West, Inc., April 27, 2021 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

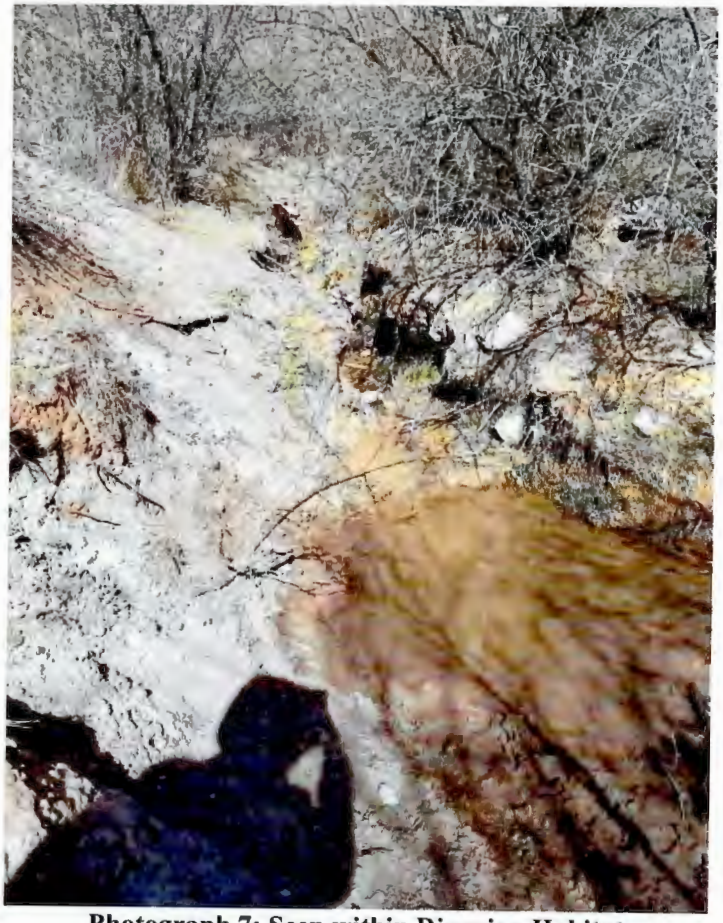
Photograph 3: Rangeland Habitat



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
Lone Mountain Archaeological Services, Inc.
2625 Pennsylvania Street NE
Albuquerque, New Mexico 87110

Prepared for
Navajo Nation Oil & Gas Company
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 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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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.

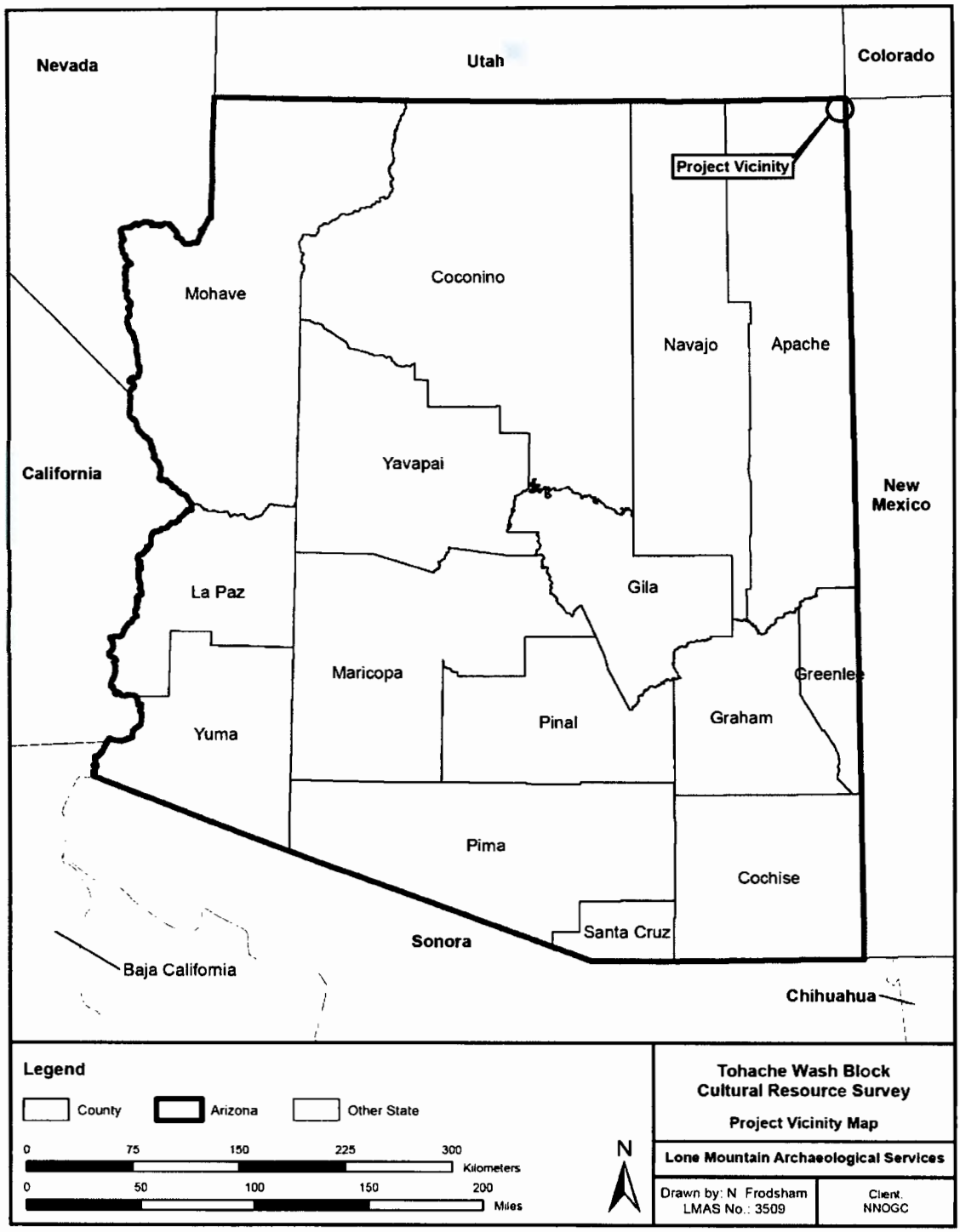

Figure 1.1: Project Vicinity.

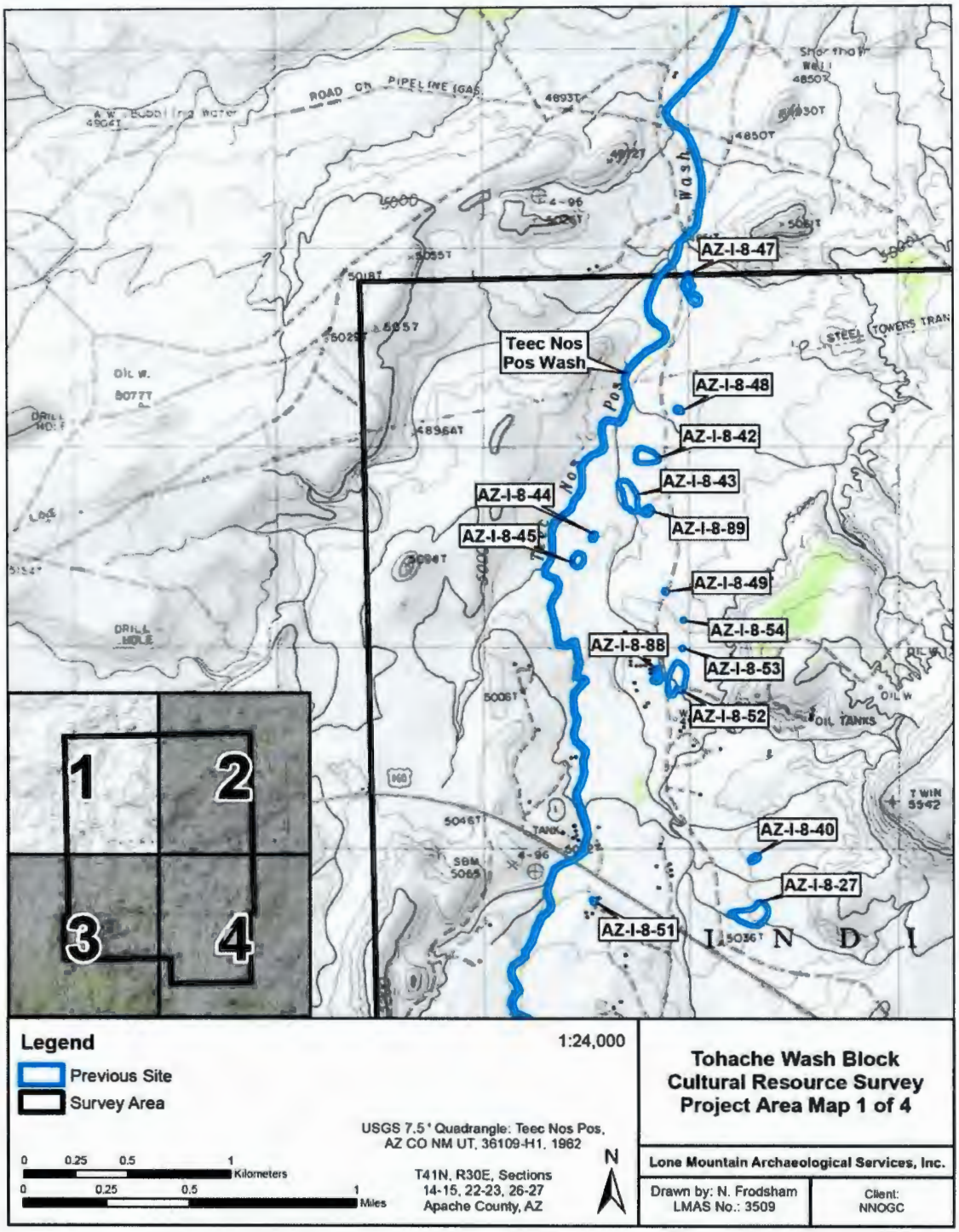

Figure 1.2: Project Area (1 of 4).

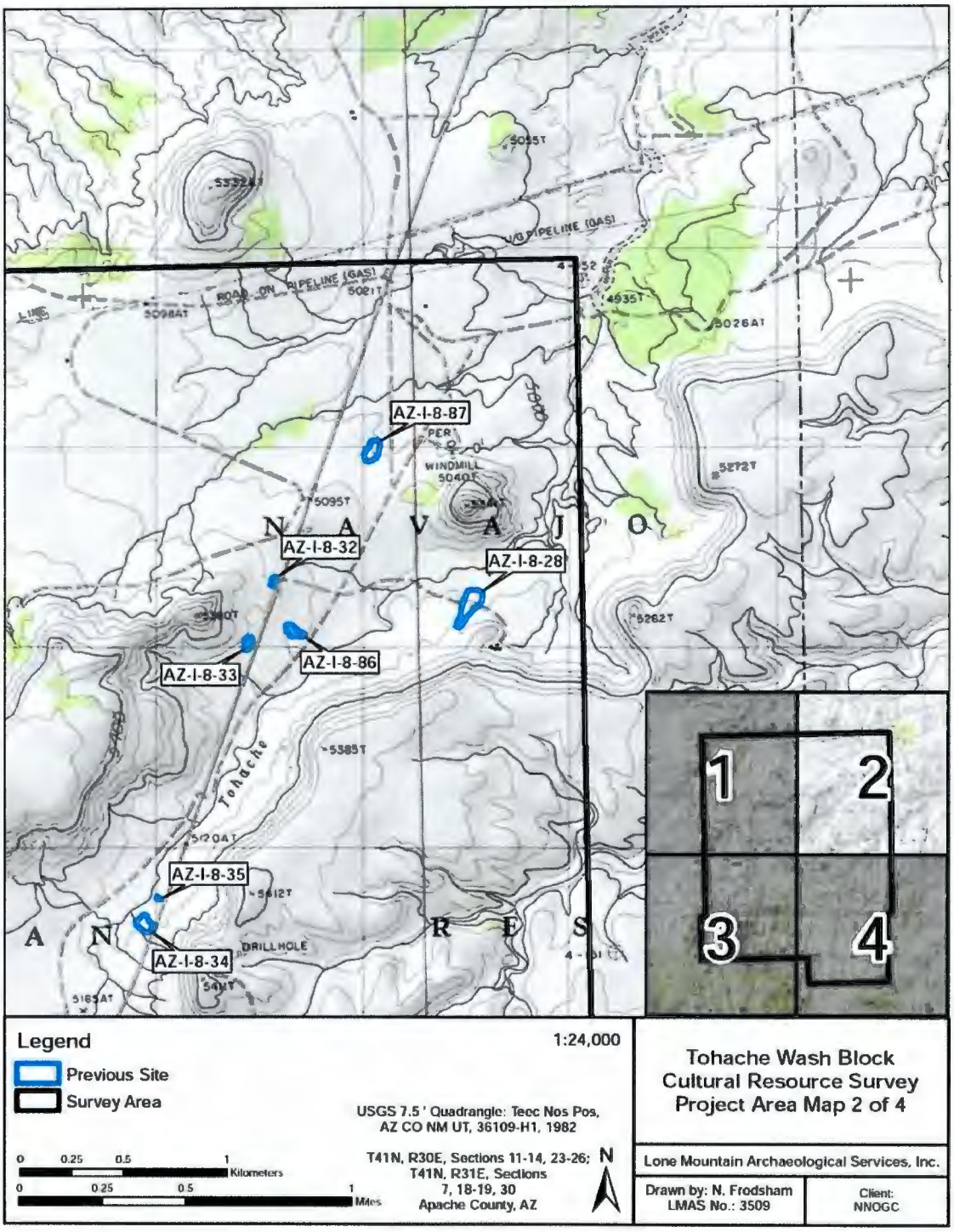

Figure 1.3: Project Area (2 of 4).

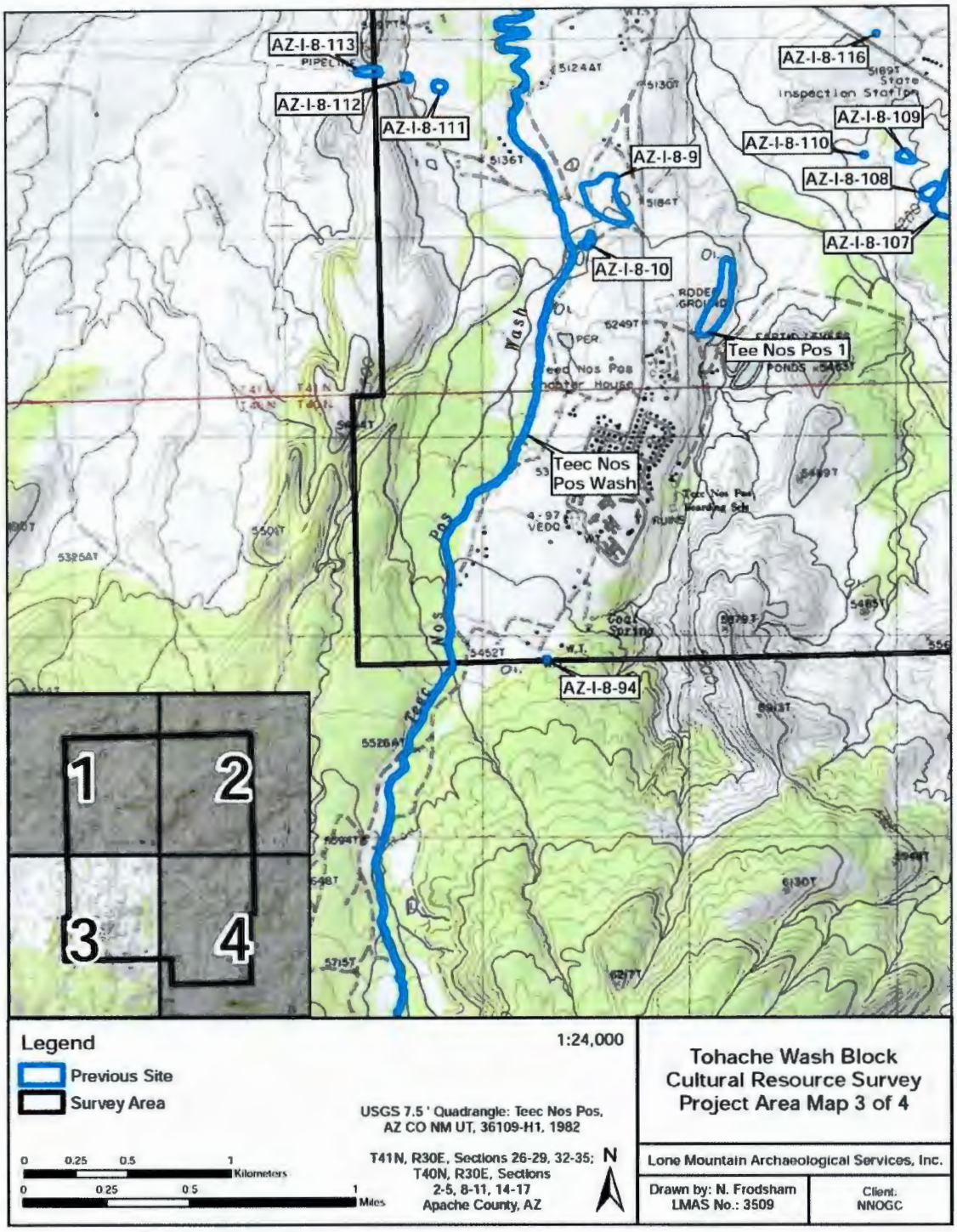

Figure 1.4: Project Area (3 of 4).

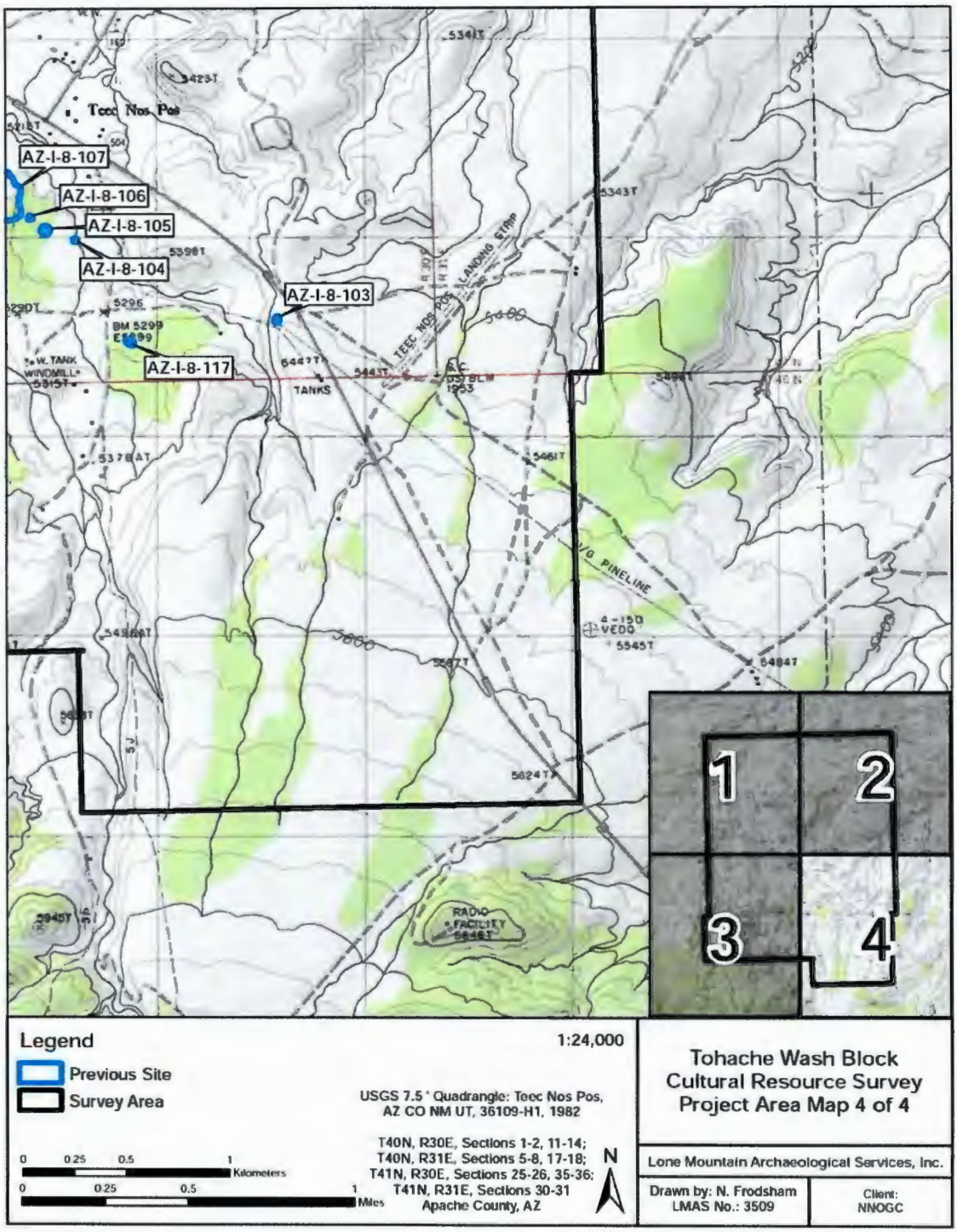

Figure 1.5: Project Area (4 of 4).

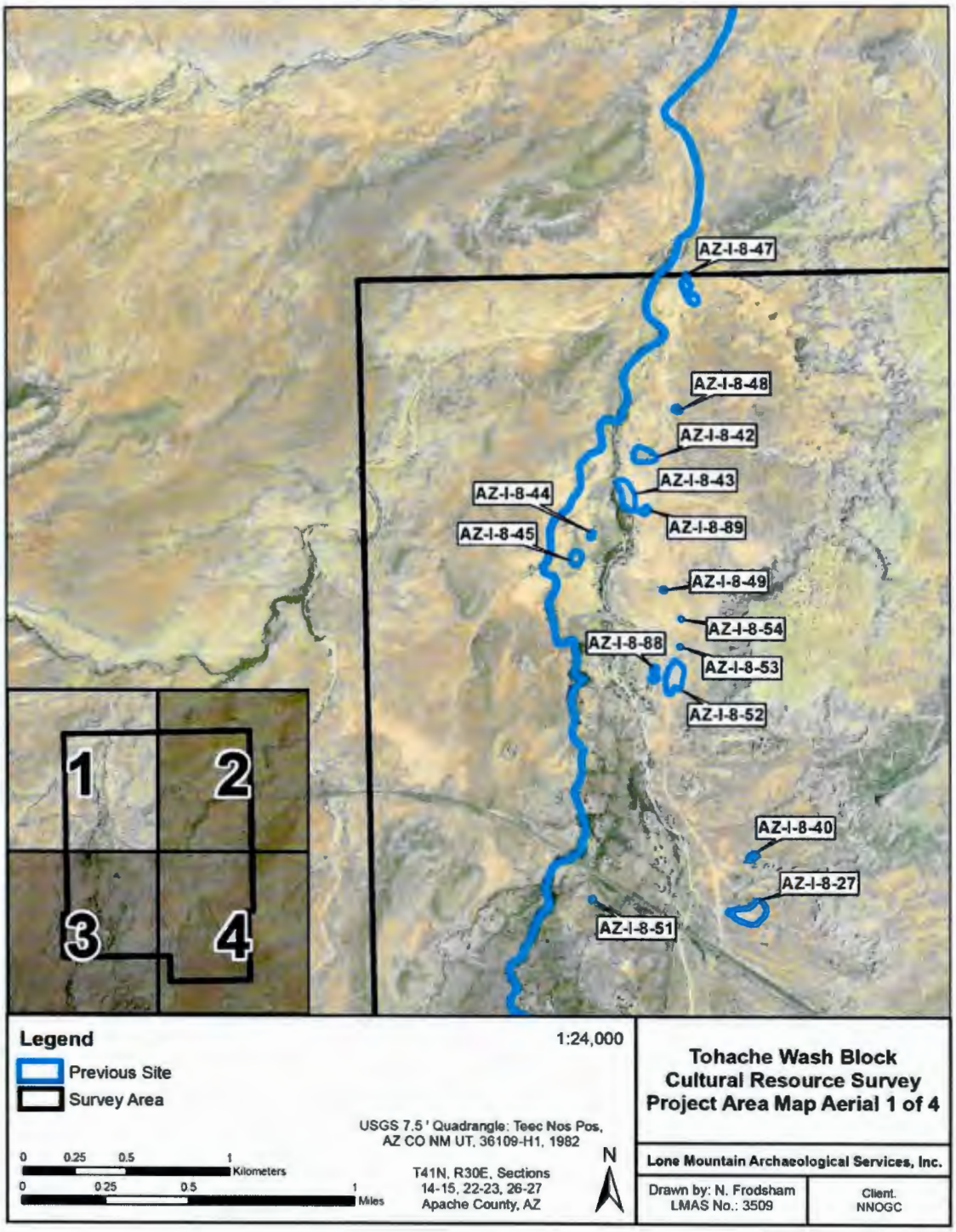

Figure 1.6: Project Area Aerial (1 of 4).

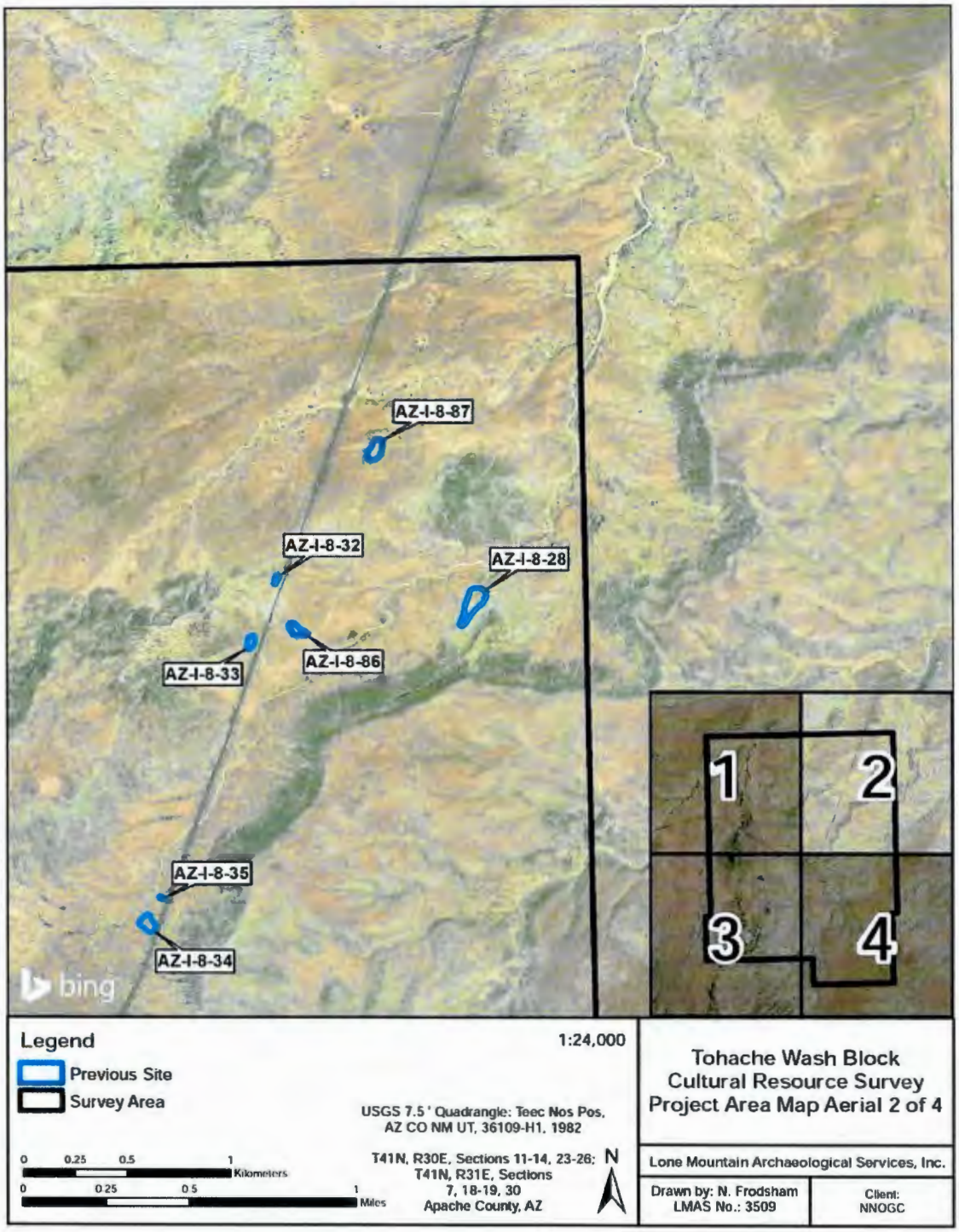

Figure 1.7: Project Area Aerial (2 of 4).

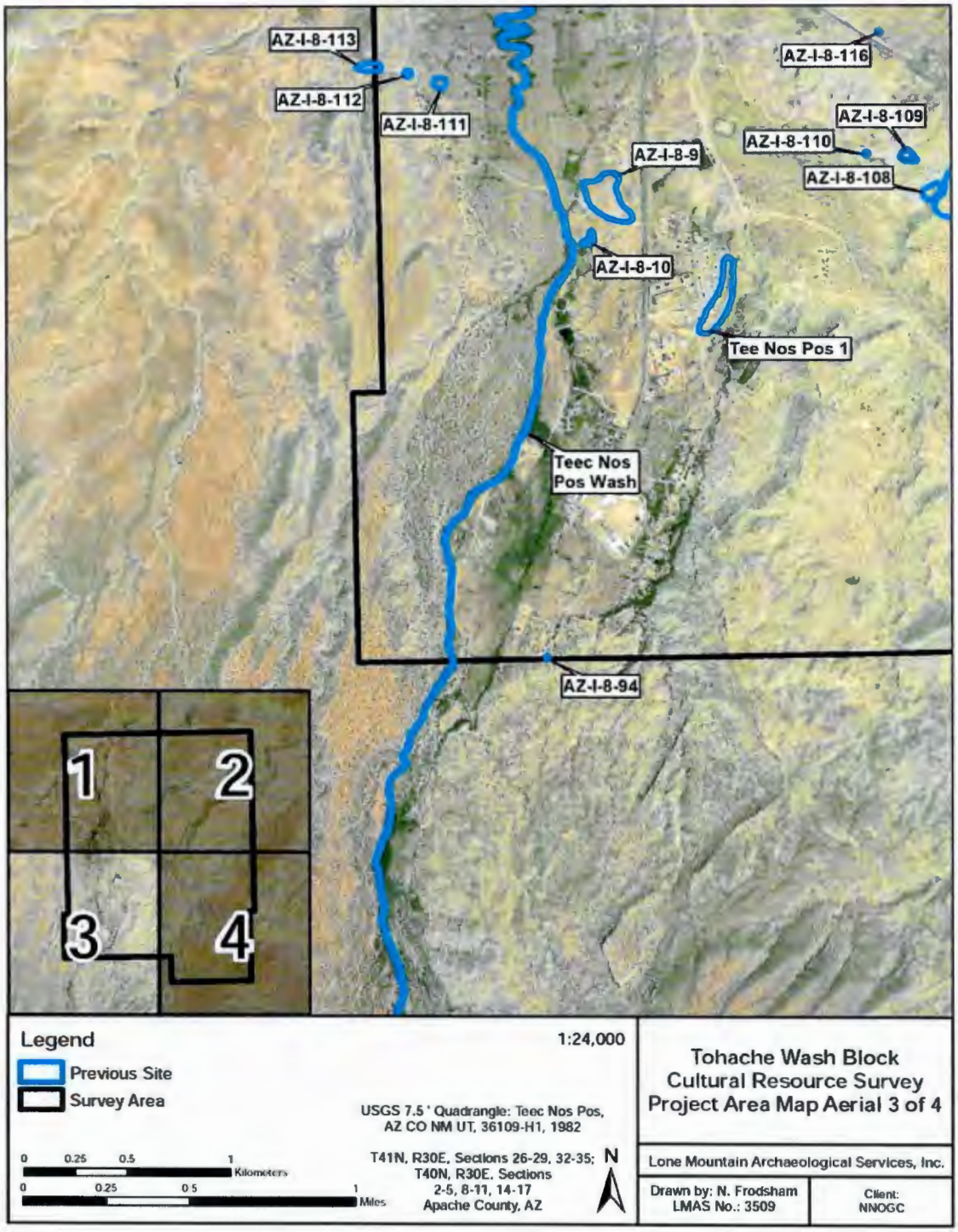

Figure 1.8: Project Area Aerial (3 of 4).

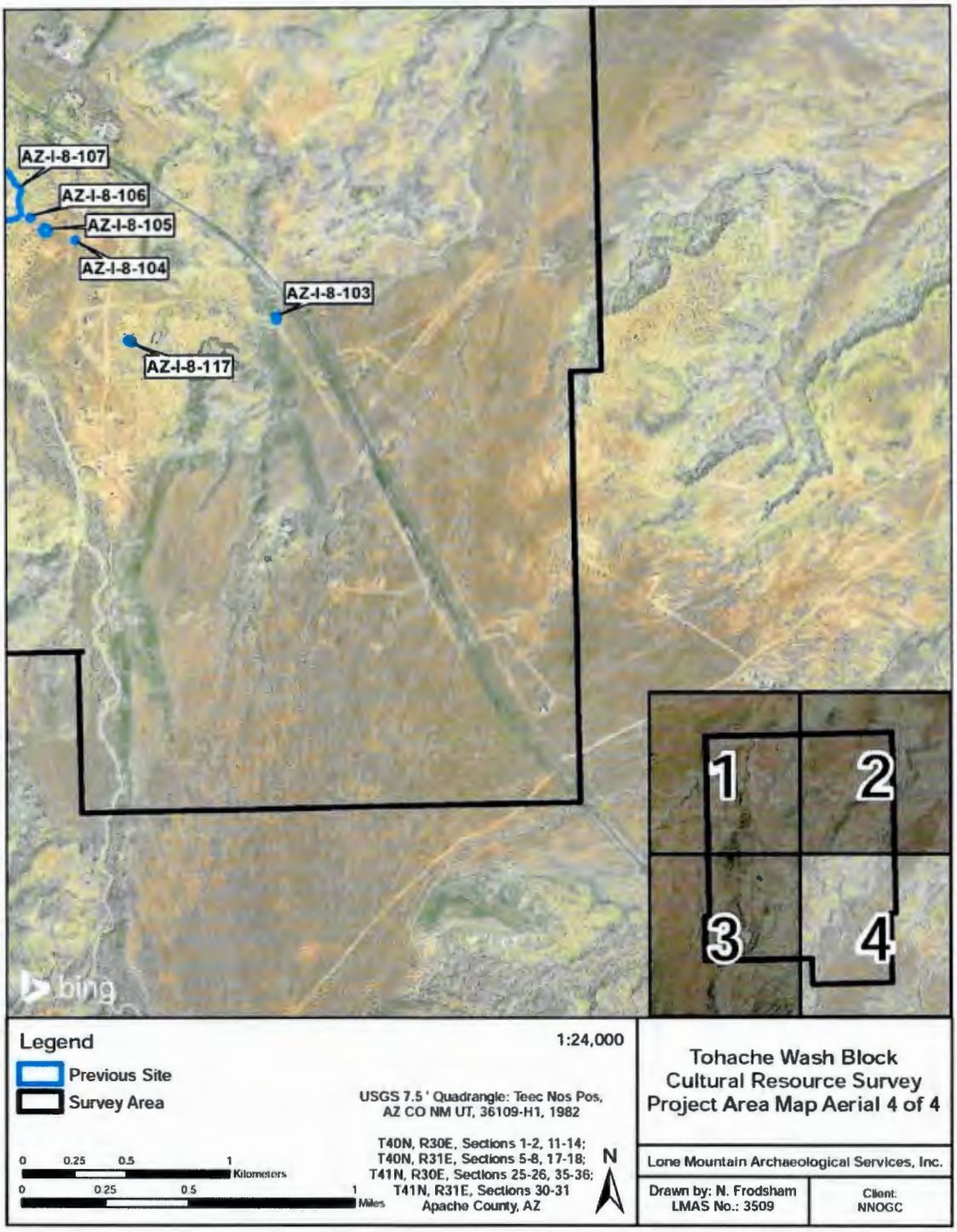

Figure 1.9: Project Area Aerial (4 of 4).

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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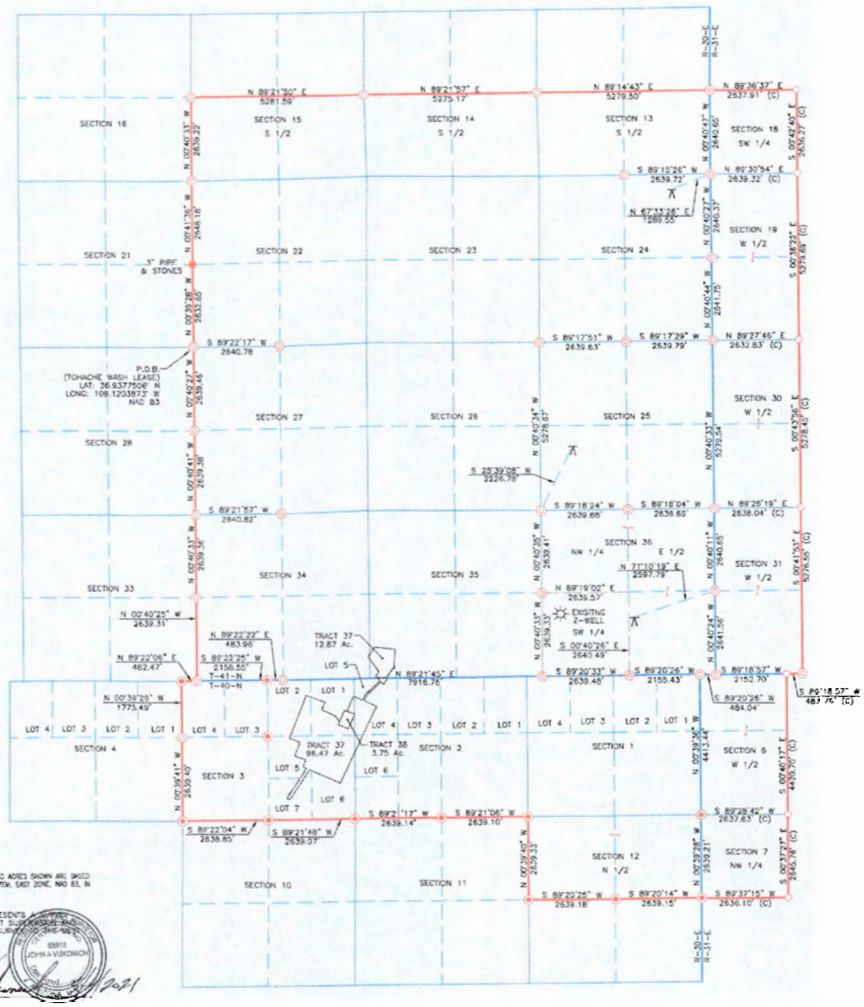
Surveyor's Plats

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

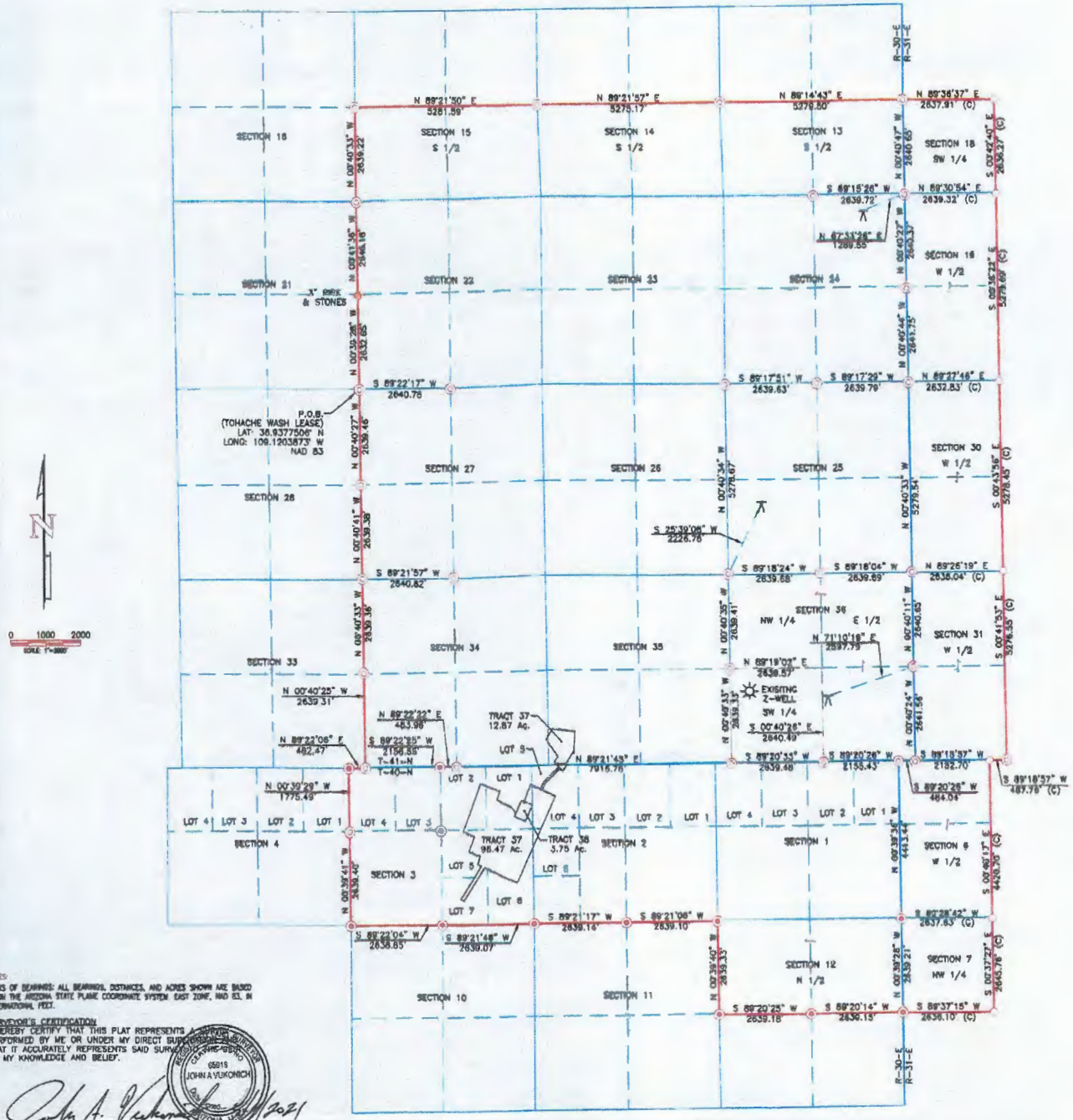
Looking southwest at Navajo Z 1 well in Section 36

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

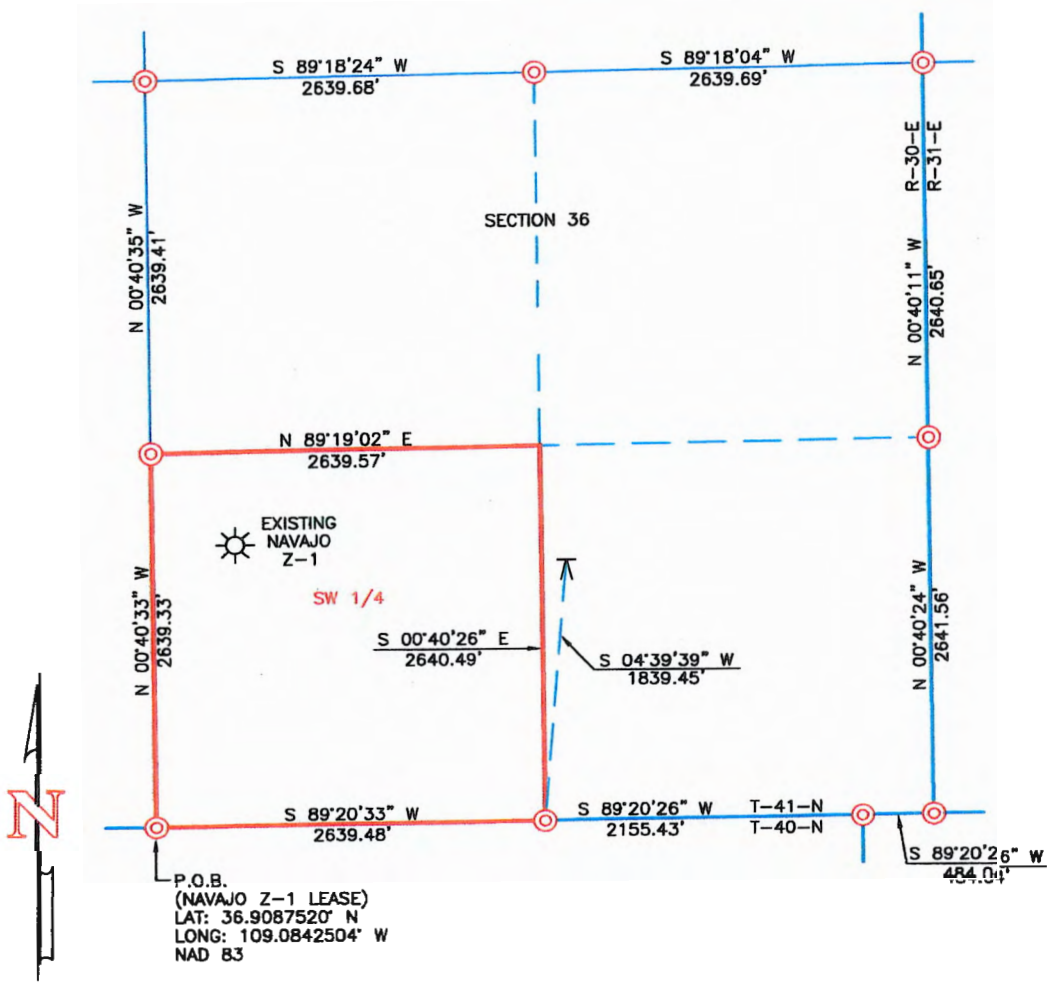
JOHN A. VUKONICH, AZ R.L.S. #65918

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.

CHAPTER OFFICERS

Alfred L. Jim, President
Kenny Victor, Vice President
Daron Yellowhorse, Secretary/Treasurer
Dale Redhouse, Grazing Officer
Davis Filfred, Council Delegate

ADMINISTRATION:

Steven Benally, Chapter Coordinator
Matilda Begay, Accountant Maintenance Specialist

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

RECEIVED
JUN 2019
Sanostee Chapter

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.

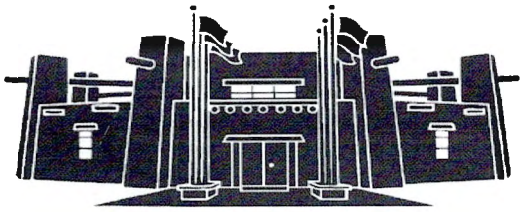
The OAs will provide guidelines and approval for NNOGC to undertake exploration for helium in three areas of the Navajo Nation, specifically: Tohache Wash, Beautiful Mountain, and Porcupine Dome. Each of the OAs includes a map of the specific area where NNOGC will drill wells to explore for and eventually 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.

Please note: This digital copy is being provided for the benefit of the Navajo Nation chapters and public use. Any political use is prohibited. All written comments received become the property of the Navajo Nation and will be forwarded to the assigned Navajo Nation Council standing committee(s) and/or the Navajo Nation Council for review. Any tampering with public records are punishable by Navajo Nation law pursuant to 17 N.N.C. *§374 et. seq*.

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