November 12, 2024

Roberta Hudson
Department of Agriculture and Natural Resources
Minerals and Mining Program
Joe Foss Building
523 East Capitol Avenue
Pierre, SD 57501-3182

RE: Clean Nuclear Energy Corp. Uranium October Jinx Exploration Permit

Dear Mrs. Hudson,

Clean Nuclear Energy Corp. is submitting a Uranium Exploration Permit Application for the October Jinx Project located within the US Forest Service lands in Section 25, Township 7 South, Range 2 East, and Section 30, Township 7 South, Range 3 East of the Black Hills Meridian. The program consists of uranium exploration drilling from existing roads and overland travel.

Included in this application are the following:

Certificate of Applicant
Uranium Exploration Permit Application Form
A plan of reclamation pursuant to Section 9
A topographic map pursuant to Section 10
A fee of $500 pursuant to Section 18 in check form
Written consultation with landowner (Black Hills National Forest)
Written consultation with the NRCS
Mineral Lease and MOU Between Clean Nuclear Energy and Cowboy Exploration
USFS Plan of Operations
Field survey reports for vegetation, wildlife, and cultural resources

As can be seen by the maps attached to the application, the proposed project is not within the boundaries of Craven Canyon. The project will not encroach upon, damage or destroy any historic property within Craven Canyon. The consulting archeologist working on this project has coordinated with the USFS Hell Canyon Ranger District archaeologist, conducted a Level 1 records search, received a field permit from the USFS, conducted a Level 3 cultural resource survey in August 2024, and prepared an abbreviated Case Report. Clean Nuclear Energy Corp. acknowledges that consultation with SHPO is required before the final permit can be issued. However, this consultation has no bearing on the completeness of its permit application.

Clean Nuclear Energy Corp. submitted a Plan of Operations for this project to the USFS in June 2024 and revised plan in October 2024. The USFS is completing their review and intends to evaluate this project as a Categorical Exclusion. As part of the NEPA process, the USFS will be reviewing and providing guidelines on the reclamation plan as presented in this EXNI application and the Plan of Operations.

Clean Nuclear Energy Corp. desires to work hand in hand with DANR, USFS, and all other state agencies, on this project. If there are any questions or concerns, please contact me as Clean Nuclear Energy Corp. is committed to exceptional environmental stewardship by meeting or exceeding all statutes and regulations.

Regards,

Mike Blady
Clean Nuclear Energy Corp.
503-905 Pender St. W
Vancouver, British Columbia, Canada
+1 604-720-3474
mikeblady@gmail.com

Attachments

Department of Agriculture and Natural Resources
Minerals and Mining Program
523 East Capitol Avenue
Pierre, South Dakota 57501-3182
605 773-4201; Fax: 605 773-5286

URANIUM EXPLORATION PERMIT

Pursuant to SDCL 45-6D

Operator's name: Clean Nuclear Energy Corp.

Mailing address: 503-905 Pender St. W
Vancouver, Britsh Columbia, Canada V6C 1L6

Telephone: 604-720-3474

Local address: N/A

Telephone:

Resident agent (if out-of-state corporation): CT Corporation System

Resident agent address: 319 S Coteau St
Pierre, SD 57501

Resident agent telephone: 605-988-6654

Legal description of the area to be explored by Section, Township, and Range:

Section 25, Township 7S, Range 2E
Section 30, Township 7S, Range 3E
Black Hills Meridian

County: Fall River

Provide a brief description of the type of uranium exploration to be conducted. Include a complete description of methods and a list of other minerals to be explored:

Clean Nuclear Energy Corp. will explore for roll-front uranium deposits in the project area. Drilling will be completed from existing roads and trails to the extent practicable, though overland travel would be required. It is anticipated that drilling will be completed using a truck mounted mud rotary rig (typical small water well rig). Support vehicles will include a 2,000 gallon water truck, drill pipe – supply truck, and two personnel transportation trucks all requiring one or two trips daily. The project would include up to 17 drill platforms, with vertical exploration holes to a maximum depth of 183 m (600 ft). The entire drill program will require approximately three weeks of active drilling. Drilling will occur on a 18.3 m by 18.3 m (60 ft by 60 ft) drill pad with 335 m2 (0.08 acres) or less of disturbance per site. A recirculation mud pit measuring approximately 3.05 m x 1.52 m x 1.83 m (10 ft x 5 ft x 6 ft) will be excavated on each site. See the attached topographic and aerial photo map.

Date exploration will commence: January 1, 2025

What legal authority does the operator have to conduct exploration on the above-described land? Include a copy if available.

_____ Deed _____ Lease _____ US Forest Service Permit _X_ Pending US Forest Service Permit _____ Other

INSTRUCTIONS:

Please reference SDCL 45-6D. This permit must be accompanied by:

1. A plan of reclamation pursuant to Section 9.
2. A topographic map pursuant to Section 10.
3. A fee of $500 payable to the Department of Agriculture and Natural Resources pursuant to Section 18.
4. A surety in an amount to be determined by the department pursuant to Section 19.
5. Any written landowner consultations giving alternative preferences for the reclamation of the affected land pursuant to Section 16.

Before a hearing on this uranium permit can be conducted by the SD Board of Minerals and Environment, the operator must submit the following:

1. A copy of the affidavit of publication of notice pursuant to Section 12.
2. Proof of filing a copy of the permit with the Register of Deeds pursuant to Section 11.

Applicant affirms that the surface owner has been notified of the proposed uranium exploration and that said surface owner is aware of his rights to compensation for damages to property pursuant to SDCL 34A. Applicant hereby affirms that the uranium exploration will be conducted pursuant and subject to the provisions of SDCL 45-6D, and all regulations promulgated thereunder, that he will grant access to the SD Board of Minerals and Environment or its agents to the area under notice from the date of the notice and thereafter to assure compliance with the provisions of SDCL 45-6D.

I declare and affirm under the penalties of perjury that this claim (petition, application, information) has been examined by me, and to the best of my knowledge and belief, is in all things true and correct.

M. Bly. Date: Nov. 5 / 2024

Signature

Title: Director

Province
~~STATE~~ OF BC

City
~~COUNTY~~ OF Kelowna

On this 5th day of November, 20 24, before me personally appeared Mike Blady, who acknowledged himself to be the Director (Title) for Clean Nuclear Energy Corp. (Operator) and that he is authorized to execute the Uranium Exploration Permit for the purposes contained therein.

Notary Public My Commission Expires: Does not expire

SEAL

RYLE J. RAMSEY
LAWYER
Pushor Mitchell LLP
301 - 1665 Ellis Street
Kelowna, BC V1Y 2B3
Phone: 250-869-1259

FOR DEPARTMENT USE ONLY

DATE APPROVED: BOND AMOUNT: PERMIT NUMBER:

Chairman, SD Board of Minerals & Environment

Renewals: 1st Date: 2nd Date: 3rd Date:

RECEIVED
NOV 21 2024
MINERALS & MINING PROGRAM

STATE OF SOUTH DAKOTA

BEFORE THE SECRETARY OF

THE DEPARTMENT OF AGRICULTURE AND NATURAL RESOURCES

IN THE MATTER OF THE APPLICATION OF
Clean Nuclear Energy Corp.

CERTIFICATION OF APPLICANT

STATE OF South Dakota

COUNTY OF Fall River

I, Mike Blady, the applicant in the above matter after being duly sworn upon oath hereby certify the following information in regard to this application:

I have read and understand South Dakota Codified Law Section 1-41-20 which provides:

"The secretary may reject an application for any permit filed pursuant to Titles 34A or 45, including any application by any concentrated swine feeding operation for authorization to operate under a general permit, upon making a specific finding that:

(1) The applicant is unsuited or unqualified to perform the obligations of a permit holder based upon a finding that the applicant, any officer, director, partner, or resident general manager of the facility for which application has been made:

(a) Has intentionally misrepresented a material fact in applying for a permit;

(b) Has been convicted of a felony or other crime involving moral turpitude;

(c) Has habitually and intentionally violated environmental laws of any state or the United States which have caused significant and material environmental damage;

(d) Has had any permit revoked under the environmental laws of any state or the United States; or

(e) Has otherwise demonstrated through clear and convincing evidence of previous actions that the applicant lacks the necessary good character and competency to reliably carry out the obligations imposed by law upon the permit holder; or

(2) The application substantially duplicates an application by the same applicant denied within the past five years which denial has not been reversed by a court of competent jurisdiction. Nothing in this subdivision may be construed to prohibit an applicant from submitting a new application for a permit previously denied, if the new application represents a good faith attempt by the applicant to correct the deficiencies that served as the basis for the denial in the original application.

All applications filed pursuant to Titles 34A and 45 shall include a certification, sworn to under oath and signed by the applicant, that he is not disqualified by reason of this section from obtaining a permit. In the absence of evidence to the contrary, that certification shall constitute a prima facie showing of the suitability and qualification of the applicant. If at any point in the application review, recommendation or hearing process, the secretary finds the applicant has intentionally made any material misrepresentation of fact in regard to this certification,

consideration of the application may be suspended and the application may be rejected as provided for under this section.

Applications rejected pursuant to this section constitute final agency action upon that application and may be appealed to circuit court as provided for under chapter 1-26."

I certify pursuant to 1-41-20, that as an applicant, officer, director, partner, or resident general manager of the activity or facility for which the application has been made that I; a) have not intentionally misrepresented a material fact in applying for a permit; b) have not been convicted of a felony or other crime of moral turpitude; c) have not habitually and intentionally violated environmental laws of any state or the United States which have caused significant and material environmental damage; (d) have not had any permit revoked under the environmental laws of any state or the United States; or e) have not otherwise demonstrated through clear and convincing evidence of previous actions that I lack the necessary good character and competency to reliably carry out the obligations imposed by law upon me. I also certify that this application does not substantially duplicate an application by the same applicant denied within the past five years which denial has not been reversed by a court of competent jurisdiction. Further;

"I declare and affirm under the penalties of perjury that this claim (petition, application, information) has been examined by me, and to the best of my knowledge and belief, is in all things true and correct."

Dated this 5th day of November, 2024.

Applicant (print) Mike Blady

M. Bl.

Applicant (signature)

Subscribed and sworn before me this 5th day of November, 2024.

Notary Public (signature)

KYLE CRAMER expires: Does not expire

LAWYER
Pushor Mitchell LLP
301 - 1665 Ellis Street
Kelowna, BC V1Y 2B3
Phone: 250-869-1259

(SEAL)

PLEASE ATTACH ANY ADDITIONAL INFORMATION NECESSARY TO DISCLOSE ALL FACTS AND DOCUMENTS PERTAINING TO SDCL 1-41-20 (1) (a) THROUGH (e). ALL VIOLATIONS MUST BE DISCLOSED, BUT WILL NOT AUTOMATICALLY RESULT IN THE REJECTION OF AN APPLICATION

Department of Agriculture and Natural Resources
Minerals and Mining Program
523 East Capitol Avenue
Pierre, South Dakota 57501-3182
605 773-4201; Fax: 605 773-5286

URANIUM EXPLORATION RECLAMATION PLAN

Pursuant to SDCL 45-6D-9

RECEIVED
NOV 21 2024
MINERALS & MINING PROGRAM

Operator's name: Clean Nuclear Energy Corp.

In preparing this reclamation plan, please address each item in detail, following SDCL 45-6D-9. Also, refer to the reclamation standards outlined in SDCL 45-6D-33 through 45-6D-39, and the state's hole plugging regulations as detailed in ARSD 74:11.

1. Describe the type of reclamation the operator proposes to achieve in the reclamation of the affected land.

After drilling is completed at the drill sites, the pad will be recontoured (if needed), seeded, and mulched during final reclamation. Final reclamation of the drill sites and staging area will include the following elements:

- Drill holes will be sealed and reclaimed in accordance with ARSD 74:11:08 and SDCL 45-6D-33 through 45-6D-34.
- Drill sites will be recontoured to eliminate excessive rutting regardless of the pre-project condition.
- Drill fluids will be contained in recirculation pits to allow solids to settle and fluids to infiltrate /evaporate. Pits will be backfilled with excavation materials and any excess materials spread evenly on the pad.
- Overly compacted areas at the drill sites that are not located on an active roadbed will be roughed either manually or mechanically to enhance seeding viability and minimize erosion.
- Clean Nuclear will initiate revegetation as soon as possible (i.e., not to exceed 6 months) after termination of ground disturbing activities.

2. Provide a proposed timetable for seeding and replanting indicating when and how the reclamation plan will be implemented. Such timetable shall be developed after consulting with the County District Conservationist as to the nature of the soils and native vegetation in the area of the proposed operation. These recommendations shall be followed, if any are provided, and copies of all correspondence shall be provided to the Department.

Seeding will take place after recontouring, and re-grading of disturbed areas is completed during early spring (prior to May 15). Seedings would be done on a clean, smooth, weed free seedbed using a grass drill.

Clean Nuclear Energy will control all noxious weeds on areas impacted by exploration drilling throughout operations and through 1 year post-reclamation. Weeds would be clipped before they compete against the seeding for moisture and light.

All reclamation processes, seed mixes, seasonal constraints and timing and guidance will be based on South Dakota Natural Resources Conservation Service (NRCS) Conservation Practice Standard (CPS) Critical Area Planting Code 342 as suggested by the local NRCS requirements and recommendations. Reseeding of the reclaimed sites would be conducted if the initial reclamation is not successful. The seed mix for reseeding drill pad sites consists of local native species and was developed based on recommendations by the local NRCS office for immediately adjacent drilling. The reclamation seed mixture is listed in Table 1 below and attached on a NRCS Seeding Plan Tool Form.

Table 1. Reclamation Seed Mix Table: Recommended by NRCS

Species	Percent in Mixture
Sideoats grama	10%
Western wheatgrass (Pascopyrum smithii)	50%
Blue grama	5%
Green needlegrass	15%
Slender wheatgrass (Elymus trachycaulus)	10%
Purple prairie clover	2%
Little bluestem	8%
Application Rate: 14 Pounds Live Seed/Acre	

3. Describe how the reclamation plan will rehabilitate the affected land.

The goal of the reclamation plan is to rehabilitate and restore the affected lands to grazing habitat. Planting grass would control erosion and protect the soil. Grassland communities are expected to develop as reclamation matures, which would support grazing and provide support to the wildlife in the area. It is anticipated that an aggressive noxious weed control program will benefit each drill platform as well.

4. Describe the anticipated temporary and permanent plugging and capping procedures to be used. Please refer to SDCL 45-6D-33 through 45-6D-35 and the state's hole plugging regulations as detailed in ARSD 74:11.

Clean Nuclear commits to following all of the South Dakota laws and statues concerning drill hole plugging and abandonment and would install a full cement grout where needed, such as in any instance where aquifer cross contamination is possible. All of the exploration drill holes will be plugged in accordance with Administrative Rules of South Dakota (ARSD) 74:11:08 and South Dakota Codified Law (SDCL) 45-6D-33 through 45-6D-34. The drill holes are planned to penetrate the Inyan Kara Group rocks, which are water-bearing units or aquifers in some locations of the Black Hills. If an aquifer is penetrated, the completed exploration drill holes will be plugged from bottom to top using bentonite grout, which complies with the requirements of ARSD 74:11:08:05 and ARSD 74:11:08:05:01 (i.e., requirements for plugging exploration drill holes that penetrate single unconfined aquifers and confined or multiple aquifers). If a confined aquifer is penetrated, the weight of the bentonite grout column would be either sufficient to overcome formation pressure or the hole will be plugged using cement grout. The collar elevations of the planned holes are higher than the static water level to be encountered in the exploration holes; therefore, no natural artesian discharge from drill holes is anticipated.

Records regarding aquifers encountered during drilling and the plugging methods used will be recorded and retained for each exploration hole and those records would be provided to the South Dakota Department of Agriculture and Natural Resources (DANR) at the end of exploration. All exploration drill holes are planned to be plugged immediately upon completion while the drill rig is still on the site. If a drill hole temporarily needs to remain open, a temporary surface plug will be emplaced. If a hole needs to remain open for more than 30 days, Clean Nuclear Energy Corp. will apply for an alternate plugging schedule to temporarily keep the hole open.

5. Provide the estimated cost of implementing and completing the proposed reclamation. Also, provide the estimated cost of plugging and sealing each test hole.

Clean Nuclear Energy will reclaim, recontour, reseed disturbance to any drill sites as described above as well as budget for monitoring and weed control. Estimated reclamation costs are $2,400/platform for reclamation and monitoring. Costs of plugging and sealing each test hole are estimated to be ~ $25/m. Clean Nuclear Energy will post a surety bond with the State of South Dakota (SDCL 45-6D-19).

I declare and affirm under the penalties of perjury that this claim (petition, application, information) has been examined by me, and to the best of my knowledge and belief, is in all things true and correct.

M. Bell

Signature

Date: Nov. 5 /2024

Title: Director

From: Faulkner, Mitch - FPAC-NRCS, SD
To: Crystal Hocking
Cc: Humbracht, Bradley - FPAC-NRCS, SD
Subject: RE: [External Email]Basin Uranium - Consultation with Local Conservation District for Reclamation Plan
Date: Tuesday, January 23, 2024 8:36:56 AM
Attachments: Basin Uranium Soils Map.pdf
Basin Uranium Seeding Plan.pdf

Hello Crystal,
Find attached the seeding plan I made for the Basin Uranium Fall River Co project. It is calculated for the 50 ac (49.5 according to web soil survey) area of likely impact. I also included a list of named varieties of pant materials SD NRCS recommends. See also the origin guides for common seed listed within the seeding plan, and a critical area seeding guideline document with recommendations from NRCS. Finally I attached the Web Soil Survey soils/ecological sites map and information I used to design the seeding.
If you have any questions or need adjustments made please let me know.

Thanks

Mitch Faulkner
Area Rangeland Management Specialist
USDA-NRCS
Belle Fourche, SD
Cell: (605) 519-1446

From: Crystal Hocking <crystal.hocking@respec.com>
Sent: Monday, January 15, 2024 11:38 AM
To: Faulkner, Mitch - FPAC-NRCS, SD <mitch.faulkner@usda.gov>
Subject: [External Email]Basin Uranium - Consultation with Local Conservation District for Reclamation Plan

Mitch,

Basin Uranium is preparing for submittal of an Exploration Notices of Internet ("EXNI") Application with the South Dakota Department of Agriculture and Natural Resources ("DANR"). Basin would request consultation on a recommended seed mixture to be utilized under the reclamation plan that

will be submit as part of the EXNI application, per SDCL 45-6C-8(2).

The proposed project is located in Section 36, Township 7 S, Range 2 E in Fall River County and as shown on the attached site map. I've also included the soil report created from the NRCS website.

Thank you for your time as it pertains to this matter and your assistance. Should you need any further information, please contact me.

Cheers,
Crystal

Crystal M. Hocking, PE, PG
Project Geologist

RESPEC
3824 Jet Drive
Rapid City, SD 57703
605.394.6451 office
respec.com

U.S. DEPARTMENT OF AGRICULTURE
RVATION SERVICE

RECEIVED
NOV 21 2024
MINERALS & MINING PROGRAM

SD-CPA-4 3/16
PLANNED

Instructions

SEEDING PLAN

Producer	Basin Uranium	Conservation District:	Fall River	MLRA	60A
Program	CTA	Practice No.	342	Practice Name:	Critical Area Seeding
CI or Referral No.	NA	Contract #	NA		

Resource Concern (CPPE Impact)

Purpose:

342- Stabilize areas with existing or expected high rates of soil erosion by wind or water

PLANNED

Tract		Seedbed Preparation	
Field	NA	Clean, smooth, weed free seedbed will be prepared	
Acres	50.00		
Group or Site	Critical Area Group		
Site	Web Soil Survey	Loamy or Silty Texture	Have the past 3 years of Herbicide Carryover been considered?
Date to be Planted	TechNote4	Early Spring Prior to 5/15	No
Alternative planting dates			Protection Provided
Alternative planting dates			Clip weeds before they compete for moisture and light
Seeding Equipment	Special Grass Drill		
Companion Crop			

PLANNED

Species * **	max % or Rating	1/ Select Improved Variety (recommended) or select common seed (see note below)	Percent in Mixture 100	Pure Live Seeds (PLS) per square foot 32.93	Pure Live Seed (PLS) lbs/ac Needed	Acres to Seed	Pure Live Seed (PLS) lbs Required
Sideoats grama			10.0	3.75	0.79	50.00	39.65
Western wheatgrass			50.0	15.00	10.98	50.00	548.89
Blue grama			5.0	2.25	0.13	50.00	6.53
Green needlegrass			15.0	5.63	1.36	50.00	68.06
Slender wheatgrass			10.0	2.55	0.23	50.00	11.49
Purple prairie clover			2.0	0.75	0.11	50.00	5.63
Little bluestem			8.0	3.00	0.46	50.00	22.85

To meet SD NRCS Standards Please Note:

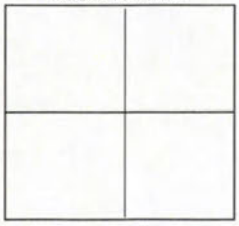
1/ Improved varieties recommended above have no restrictions on their origin.
1/ Origin of Common grass seed must be ND, SD, NE, MT, WY, MN, or IA. Exception: Smooth Bromegrass any locale.
1/ Common Native forbs and legumes will originate or be grown in (USA): ND, SD, NE, MT, IA, WY, ID, WA, OR, MN, WI, and (CAN): AB, BC, MB, ON, SK.

- Seed test must be completed according to SD Seed laws (see link below) and no more than 9 months prior to the date planted.
- All legumes must be pre-inoculated . Producer will provide all seed tags to NRCS Legume inoculants
- Tetrazolium (TZ) tests may be used as a substitute for germination tests ONLY for Green Needlegrass
- For Alfalfa Salinity tolerence use F or G from the web site link ---> Alfalfa Variety Ratings

* Pubescent wheatgrass and Intermediate wheatgrass are the same species and can be substituted for one another at any time.
** Thickspike wheatgrass may be substituted for western wheatgrass if the later is not available but only west of the Missouri River. To calculate the amount needed multiply the western wheatgrass seeding rate by .72

SD Seed Laws: Codified_Laws Statute 38-12A
Seed testing: SD state seed-lab

LOCATION MAP



N

Tract: See Map

S. 36

T. 7S

R. 2E

Planning Assistance By: Mitch Faulkner (Name) 1/22/2024 (Date)

Plan Meets SD Standards (if no explain) Yes ☑ No ☐

The seeding plan was developed from recommendations based on the NRCS Soil Survey and South Dakota Field Office Technical Guide.

Critical Area Group: **Loamy or Silty Texture**

This seeding is planned in Major Land Resource Area (MLRA): **60A**

Varieties/Cultivars that are approved for South Dakota include:

Common Name

Sideoats grama

Butte	Central Iowa Germplasm	Common	Killdeer
Northern Iowa Germplasm	Pierre	Southern Iowa Germplasm	Trailway

Western wheatgrass

Arriba	Barton	Common	Flintlock
Recovery	Rodan	Rosana	Walsh

Blue grama

Bad River	Birdseye	Common

Green needlegrass

AC Mallard Ecovar	Common	Lodorm

Slender wheatgrass

AC Pintail Ecovar (Bearded)	AC Sung Ecovar (Bearded)	Adanac	AEC Hillcrest
Common	Elbee	FirstStrike	Primar
Pryor	Revenue		

Purple prairie clover

Bismarck	Common	Kaneb

Little bluestem

Badlands Ecotype	Blaze	Camper	Central Iowa Germplasm
Common	Itasca	Northern Iowa Germplasm	Southern Iowa Germplasm

Guidance for Critical Area Planting (342)

The following is an excerpt from RANGE TECHNICAL NOTE NO. 4 PERENNIAL VEGETATION ESTABLISHMENT GUIDE.
SD/Range_Tech_Note_4.pdf

14. GUIDANCE FOR CRITICAL AREA PLANTING (342)

Seeding of a critical area may take place at any time of the year as long as a reasonable expectation of a successful seeding establishment is expected.

Site Preparation:

Follow guidance for seedbed preparation (Section 2 above) and the additional following criteria.

If necessary, divert offsite water away from the critical area. This may require a permanent conservation practice, or in other instances, a temporary measure that will be effective during the period of establishment.
Where practical, grade to permit the use of conventional equipment for seedbed preparation, seeding, mulch application, and anchoring. Cabling of equipment to prevent rollover may be necessary on some slopes such as newly constructed dams.
On construction sites where the exposed and underlying soil material will not support adequate vegetation, minimum topsoil dressing of six inches will be applied as part of construction.

After construction is complete, the seedbed will be worked to a depth of three to five inches to break up compacted areas and permit rapid root development. Drag or pack to break up large clods and firm the seedbed.

Where slopes are steeper than 1.5:1, use some means other than vegetation to stabilize slopes.

Species Selection:

Allowable species will be selected from Table 7 for the appropriate MLRA.

Between 50 to 75% of the mixture will be made up of sod forming species. Grass mixtures may include all native species, all introduced species, or a mixture of native and introduced species. Mixing smooth bromegrass, Kentucky bluegrass, and/or crested wheatgrass with native species is not recommended.

When smooth brome is to be seeded in a mixture, do not include more than 10% of other native or introduced species for early establishment.

Single species may be used on saline or wet areas (Table 7).

Do not select aggressive species such as smooth bromegrass when the adjacent area is dominated by native species.

When quick growth and/or protection of a critical area is needed, a quick establishing grass can be added in addition to the selected permanent seeding mixture. Use either slender wheatgrass or annual ryegrass. Slender wheatgrass can be used statewide and annual rye grass can be used in MLRAs 102A, 102B, 102C, 53B, 53C, 55B, 55C, 63B, 66, and 62. Add a maximum of three PLS lbs./ac of slender wheatgrass or a maximum of two PLS lbs./ac of annual ryegrass to the selected full seeding.

Conventional Seeding:

Seeding activities will follow recommendations found elsewhere in this technical note unless otherwise stated in this section.
Seeding rates will be 1.5 times those recommended in Table 2 when using a drill (recommended rate multiplied by 1.5).

When possible, drilling will be accomplished perpendicular to the slope. On grassed waterways, drilling will follow a serpentine pattern.

Broadcasting:

Many critical area plantings are too steep or too small to efficiently and safely utilize a drill. In these cases, seed may be broadcast and incorporated by harrowing, packing, or raking by hand. When broadcast seeding, increase the seeding rates found in Table 2 by two times (recommended rate multiplied by two).

Hydroseeding:

On sites that are too steep for regular equipment to operate, the use of a hydro seeder is an acceptable alternative. Seed, fertilizer, and mulch materials will be applied in one operation. Limit the application of 150 lbs. of solids per 100 gallons of water. If a legume seed is included in the mixture, any lime or fertilizer should be applied separately. A second trip may also be needed to apply an asphalt emulsion to long fiber mulches.

When using hydroseeding technique, increase seeding rates found in Table 2 by a factor of two (recommended rate multiplied by two).

Sodding:

Sod may be used on areas requiring immediate cover to prevent erosion. The sod should be in strips or blocks of native grass mixture, switchgrass, prairie cordgrass, reed canary grass, or other suitable grasses. Bluegrass sod is to be used only when the areas is irrigated and is desired for aesthetic purposes. Sod materials are to be taken from solid, thick growing stands.

Sod will be cut in strips of uniform width and to a uniform thickness of at least three inches for tall grass and ½ to 1½ inches for short grasses. Lay sod within 24 hours after it was cut.

Sod strips should be carefully placed in rows across (at right angles) to the direction of slope. The sod strips will be placed together tightly so that no open joints are left between the strips or between the end of strips. Joints between the end strips will be staggered. Any spaces between the joints will be filled with topsoil and all edges covered with topsoil at least two inches deep. The edge of the sod at the top of slopes will be turned under and a layer of soil compacted over the edge so as to conduct surface water over and onto the top of the sod. The sod will be well tramped to help it remain in place.

Fertilizing:

Do not fertilize predominantly warm-season grass seeding unless the soil material is very infertile.

Thoroughly mix all fertilizer into the upper three to five inches of the soil during final seedbed preparation.

Apply fertilizer based on the recommendations from a soil test or apply 30 to 40 lbs. of actual Nitrogen (N) and 40 to 60 lbs. of Phosphorus pentoxide (P_2O_5) per ac. Ten to 15 tons of manure per ac may be used in lieu of the commercial fertilizer and will also increase organic matter.

On medium textured soils, the addition of 5 to 10 lbs. of zinc per ac may speed up growth.

Mulching:

All mulching will be done in accordance with the SD CPS for Mulching (484). Mulching of critical area plantings is required for any of the following conditions:

Where seeding cannot be accomplished during the approved seeding periods and a cover crop is not used;

On grassed waterways, where a cover crop or companion crop is not used, and seeding is placed on a bare seedbed, and the design velocity is more than 2.5 ft per second;

Where a grassed waterway is established at the time of terrace construction, and the channel slope is 2% or greater;

On slopes 3:1 or steeper that are 10 ft or more in vertical height or longer than 20 ft; on cut south and west facing slopes; On all saline and alkaline areas.

Drill grass in the prepared seedbed, immediately prior to mulching or at the next suitable seeding period after mulching.

Management of Critical Areas During and After Establishment:

Weeds will be controlled as described elsewhere in this technical note. All use will be excluded until vegetation is well established.

Mow grassed waterways for hay annually after establishment. Other critical areas may be mowed as needed for stand maintenance.

Fertilize as necessary to maintain stand.

Inspect critical areas each spring and following heavy rain. Reshape and reseed eroded areas promptly. Reinforce grass seeding where stands are thin.

Manage any grazing use to ensure long-term survival of the stand.

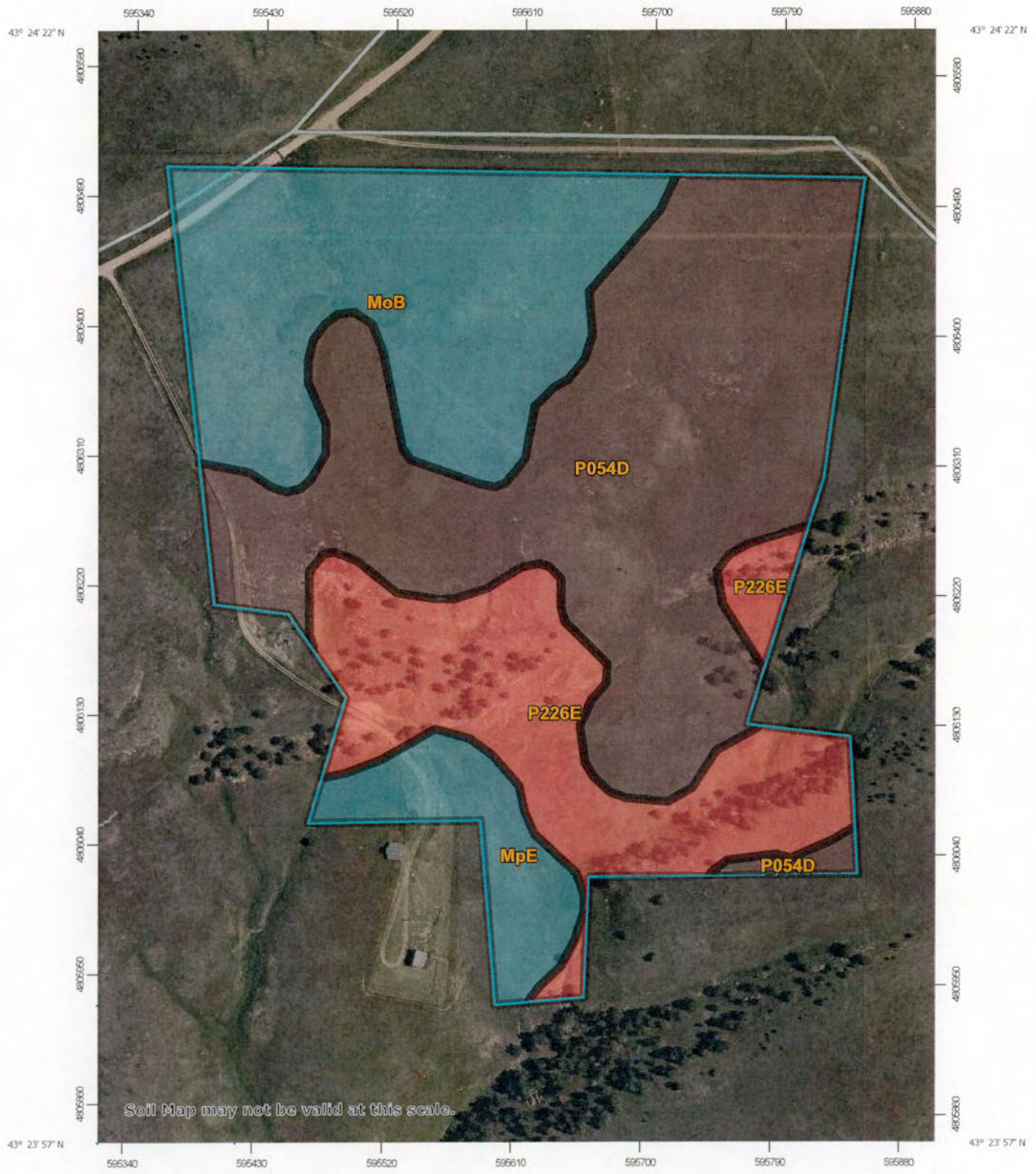
Lift tillage implements and shut off sprayers when crossing critical areas. Do not till parallel to grassed waterways.

Avoid vehicular travel on critical areas.

Providing Food, Cover, and Shelter for Wildlife:

Wildlife habitat should be considered when developing critical area planting plans and species selection. For plant species to improve wildlife habitat, refer to the SD CPS Upland Wildlife Habitat Management (645).

All Ecological Sites -- —Fall River County, South Dakota
(Basin Uranium Reclamation Plan)



Map Scale: 1:3,760 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 50 100 200 300

Feet
0 150 300 600 900

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 13N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Background

Aerial Photography

Soils

Soil Rating Polygons

R060AY012SD

R061XN024SD

R061XY029SD

Not rated or not available

Soil Rating Lines

R060AY012SD

R061XN024SD

R061XY029SD

Not rated or not available

Soil Rating Points

R060AY012SD

R061XN024SD

R061XY029SD

Not rated or not available

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Fall River County, South Dakota
Survey Area Data: Version 27, Sep 12, 2023

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

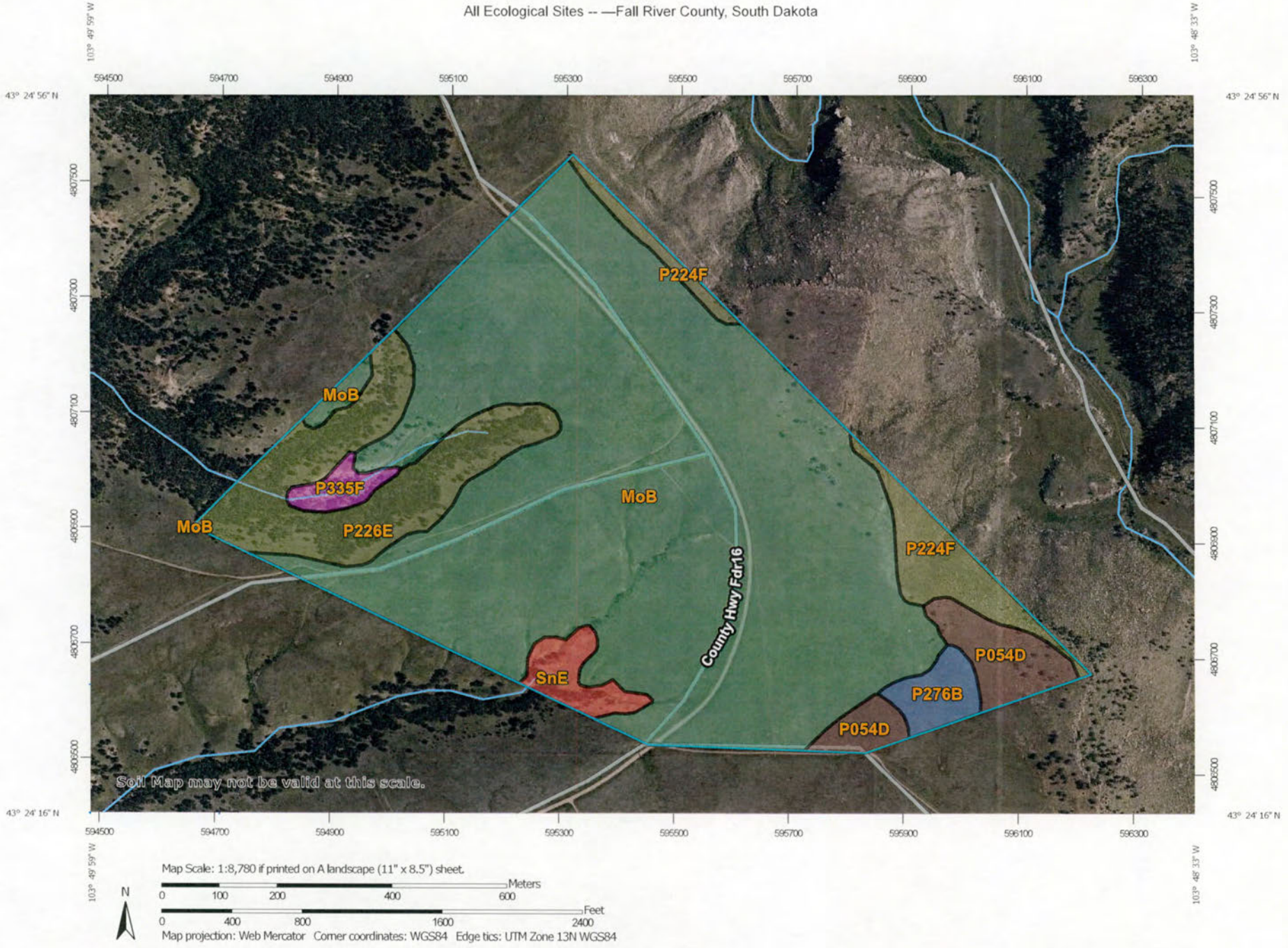
Date(s) aerial images were photographed: Jun 8, 2022—Jun 21, 2022

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

All Ecological Sites —

Map unit symbol	Map unit name	Component name (percent)	Ecological site	Acres in AOI	Percent of AOI
MoB	Minnequa silt loam, 2 to 6 percent slopes	Minnequa (90%)	R060AY012SD — Thin Upland	13.4	27.0%
		Midway (5%)	R060AY017SD — Shallow Clay		
		Pierre (5%)	R060AY011SD — Clayey 13-16" P.Z.		
MpE	Minnequa-Midway silty clay loams, 6 to 25 percent slopes	Minnequa (50%)	R060AY012SD — Thin Upland	3.3	6.6%
		Midway (40%)	R060AY017SD — Shallow Clay		
		Penrose (5%)	R060AY024SD — Shallow Loamy		
		Pierre (3%)	R060AY011SD — Clayey 13-16" P.Z.		
		Shingle (2%)	R060AY024SD — Shallow Loamy		
P054D	Butche-Boneek, dry complex, 3 to 15 percent slopes	Butche, FSL surf. (55%)	R061XN024SD — Shallow Loamy-North (18-22" PZ)	22.3	45.0%
		Boneek, dry, bedrock substratum (30%)	R061XS010SD — Loamy-South (16-18" PZ)		
		Mathias (8%)	R061XY029SD — Stony Hills		
		Rock outcrop, sandstone (7%)	R061XY999SD — Non-site		
P226E	Mathias, very stony-Samsil-Rock outcrop complex, 15 to 30 percent slopes	Mathias (50%)	R061XY029SD — Stony Hills	10.6	21.3%
		Samsil (20%)	R060AY017SD — Shallow Clay		
		Butche (15%)	R061XS024SD — Shallow Loamy-South (16-18" PZ)		
		Rock outcrop, sandstone (15%)	R061XY999SD — Non-site		
Totals for Area of Interest				**49.5**	**100.0%**

All Ecological Sites -- —Fall River County, South Dakota



Map Scale: 1:8,780 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 100 200 400 600

Feet: 0 400 800 1600 2400

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 13N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils

Soil Rating Polygons
- R060AY012SD
- R060AY024SD
- R061XN024SD
- R061XS010SD
- R061XY029SD
- R061XY999SD
- Not rated or not available

Soil Rating Lines
- R060AY012SD
- R060AY024SD
- R061XN024SD
- R061XS010SD
- R061XY029SD
- R061XY999SD
- Not rated or not available

Soil Rating Points
- R060AY012SD
- R060AY024SD
- R061XN024SD
- R061XS010SD
- R061XY029SD
- R061XY999SD
- Not rated or not available

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Fall River County, South Dakota
Survey Area Data: Version 27, Sep 12, 2023

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jun 8, 2022—Jun 21, 2022

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

All Ecological Sites —

Map unit symbol	Map unit name	Component name (percent)	Ecological site	Acres in AOI	Percent of AOI
MoB	Minnequa silt loam, 2 to 6 percent slopes	Minnequa (90%)	R060AY012SD — Thin Upland	149.8	74.3%
		Midway (5%)	R060AY017SD — Shallow Clay		
		Pierre (5%)	R060AY011SD — Clayey 13-16" P.Z.		
P054D	Butche-Boneek, dry complex, 3 to 15 percent slopes	Butche, FSL surf. (55%)	R061XN024SD — Shallow Loamy-North (18-22" PZ)	8.8	4.4%
		Boneek, dry, bedrock substratum (30%)	R061XS010SD — Loamy-South (16-18" PZ)		
		Mathias (8%)	R061XY029SD — Stony Hills		
		Rock outcrop, sandstone (7%)	R061XY999SD — Non-site		
P224F	Mathias-Rockoa-Rock outcrop complex, 25 to 60 percent slopes, stony	Mathias (40%)	R061XY029SD — Stony Hills	9.8	4.9%
		Rockoa (35%)	F061XY052SD — Mod. Steep to Steep Low Mountain Slopes		
		Rock outcrop, sandstone (15%)	R061XY999SD — Non-site		
		Butche (5%)	R061XS024SD — Shallow Loamy-South (16-18" PZ)		
		Samsil (5%)	R060AY017SD — Shallow Clay		
P226E	Mathias, very stony-Samsil-Rock outcrop complex, 15 to 30 percent slopes	Mathias (50%)	R061XY029SD — Stony Hills	22.7	11.3%
		Samsil (20%)	R060AY017SD — Shallow Clay		
		Butche (15%)	R061XS024SD — Shallow Loamy-South (16-18" PZ)		
		Rock outcrop, sandstone (15%)	R061XY999SD — Non-site		
P276B	Norka silt loam, 2 to 6 percent slopes	Norka (90%)	R061XS010SD — Loamy-South (16-18" PZ)	3.9	1.9%

Map unit symbol	Map unit name	Component name (percent)	Ecological site	Acres in AOI	Percent of AOI
		Colby, cool (10%)	R061XS012SD — Thin Upland-South (16-18" PZ)		
P335F	Pits, mine	Pits, mine (100%)	R061XY999SD — Non-site	2.4	1.2%
SnE	Shingle-Penrose-Rock outcrop complex, 15 to 40 percent slopes	Shingle (45%)	R060AY024SD — Shallow Loamy	4.2	2.1%
		Penrose (25%)	R060AY024SD — Shallow Loamy		
		Rock outcrop (20%)	R060AY999SD — Non-site		
		Midway (5%)	R060AY017SD — Shallow Clay		
		Minnequa (5%)	R060AY012SD — Thin Upland		
Totals for Area of Interest				**201.6**	**100.0%**

From: Manning, Jonathan - FS, SD
To: Crystal Hocking; Swanson, Anita - FS, SD
Cc: Mike Blady; John Glasscock
Subject: RE: [External Email]Clean Nuclear - Oct Jinx Project - Reclamation Consultation w/ Landowner
Date: Monday, November 11, 2024 7:54:12 AM
Attachments: image007.png
image008.png
image009.png
image010.png
image011.png
image012.png
image013.png
image014.png
image015.png
image016.png

Crystal,

Forest Service has received the attached reclamation plan and will consult with SD DANR regarding reclamation. This ensures that a proponent is not double bonded for the same proposed activity.

Thank you!

Jonathan Manning, EIT
Geological Engineer
Forest Service
Black Hills National Forest
p: 605-673-9314
jonathan.manning2@usda.gov
1019 N 5th St
Custer, SD 57730
www.fs.usda.gov
Caring for the land and serving people

From: Crystal Hocking <crystal.hocking@respec.com>
Sent: Saturday, November 9, 2024 1:42 PM
To: Manning, Jonathan - FS, SD <Jonathan.Manning2@usda.gov>; Swanson, Anita - FS, SD <Anita.Swanson@usda.gov>
Cc: Mike Blady <mikeblady@gmail.com>; John Glasscock <cowboyexpjwg@msn.com>
Subject: [External Email]Clean Nuclear - Oct Jinx Project - Reclamation Consultation w/ Landowner

Mr. Manning,

Clean Nuclear Energy is planning to submit a Uranium Exploration Permit application (EXNI) for exploration drilling associated with the October Jinx Project Plan of Operations. In addition to the reclamation information provided in the POO, attached is a copy of the reclamation plan presented in the state permit application.

Pursuant to SDCL 45-6D-16 (Consultation with Surface Owner), Clean Nuclear must include written landowner consultations regarding reclamation preferences. We understand that the NEPA process for this project is just beginning, and that through the NEPA process the USFS will review and finalize approved reclamation activities.

At this time, **we request a response to this email confirming that 1) the USFS has received the attached reclamation plan and 2) is being consulted with regarding their reclamation preferences**, which will be finalized through the NEPA process.

This will allow the state permitting review process to run concurrently with the USFS NEPA process. If you have any questions, please let me know.

Regards,
Crystal

RESPEC

Crystal Hocking
Project Geological Engineer

crystal.hocking@respec.com
605-394-6451
605.431.7416

3824 Jet Dr.
Rapid City, SD 57703

55 Years

USDA, Forest Service **PLAN OF OPERATIONS FOR MINING ACTIVITIES** FS-2800-5 (Rev. 3/08)

ON NATIONAL FOREST SYSTEM LANDS OMB 0596-0022

USE OF THIS FORM IS OPTIONAL! **1st TIME USERS SHOULD DIRECT QUESTIONS REGARDING THIS FORM OR REGULATIONS (36 CFR 228A) TO THE FOREST SERVICE DISTRICT OFFICE NEAREST YOUR AREA OF INTEREST.**

Submitted by:	M. Bl (Signature)	Director & Officer Clean Nuclear Energy Corp (Title)	10/24/2024 (Date mm/dd/yy)
Submitted by:	DocuSigned by: John Glasscock 1EB3805A76C5455... (Signature)	Principal Cowboy Exploration Inc. (Title)	10/24/2024 (Date mm/dd/yy)
Plan Received by:	(Signature)	(Title)	(Date mm/dd/yy)

I. GENERAL INFORMATION

A. Name of Mine/Project: October Jinx Project

B. Type of Operation: Lode Mineral Exploration

C. Is this a new operation? Yes

If continuing a previous operation, this plan (☐ replaces/☐ modifies/☐ supplements) a previous plan of operations. *(check one)* _____

D. Proposed start-up date of operation: February 1, 2025

E. Expected total duration of this operation: 2 months, including 3 weeks of active drilling, plus 3 to 4 weeks of aquifer testing, and reclamation

F. If seasonal, expected date of annual reclamation/stabilization close out: N/A

G. Expected date for completion of all required reclamation: 2 weeks after the end of drilling

PRINCIPALS

A. Name, address, and phone number of operator:

Clean Nuclear Energy Corp (herein referred to as Clean Nuclear or Operator)
Attn: Mr. Mike Blady
503-905 Pender St. W
Vancouver, British Columbia, Canada V6C 1L6
(604) 720-3474

B. Name, address, and phone number of authorized field representative (if other than the operator):

Mr. John Glasscock
Project Manager
Clean Nuclear Energy Corp.
PO Box 2498
Laramie, WY 82073
(307) 760-9512

The field representative is authorized to act on behalf of the Operator.

C. Name, address, and phone number of owners of the claims (if different than the operator):

Cowboy Uranium, LLC
PO Box 2498
Laramie, WY 82073
(307) 760-9512

Cowboy Exploration and Development (Cowboy) has optioned the Project claims to Clean Nuclear Energy Corp. Clean Nuclear Energy Corp is acting as the operator for the proposed drilling program and is earning an 90% interest in the claims through cash, share and work commitments. Cowboy is acting as a consultant for the drill program.

The option agreement between Clean Nuclear Energy and Cowboy Uranium is attached in Appendix 1. All of the project claims within the area are listed in Appendix 2.

D. Name, address, and phone number of other lessees, assigns, agents, etc., and briefly describe their involvement with the operation, if applicable:

Not Applicable

III. PROPERTY OR AREA

The October Jinx Project comprises unpatented lode claims located in the Hell Canyon Ranger District of the Black Hills National Forest (BHNF) in Fall River County, South Dakota. The project area is located in Section 25, Township 7 South, Range 2 East, and Section 30,

Township 7 South, Range 3 East of the Black Hills Meridian. The unpatented claims are listed in Appendix 2.

The Project is in close proximity to but outside the Craven Canyon Mineral Withdrawal, which occurs in portions of Section 25, T7S, R2E and Section 30, T7S, R3E as shown in Figure 1.

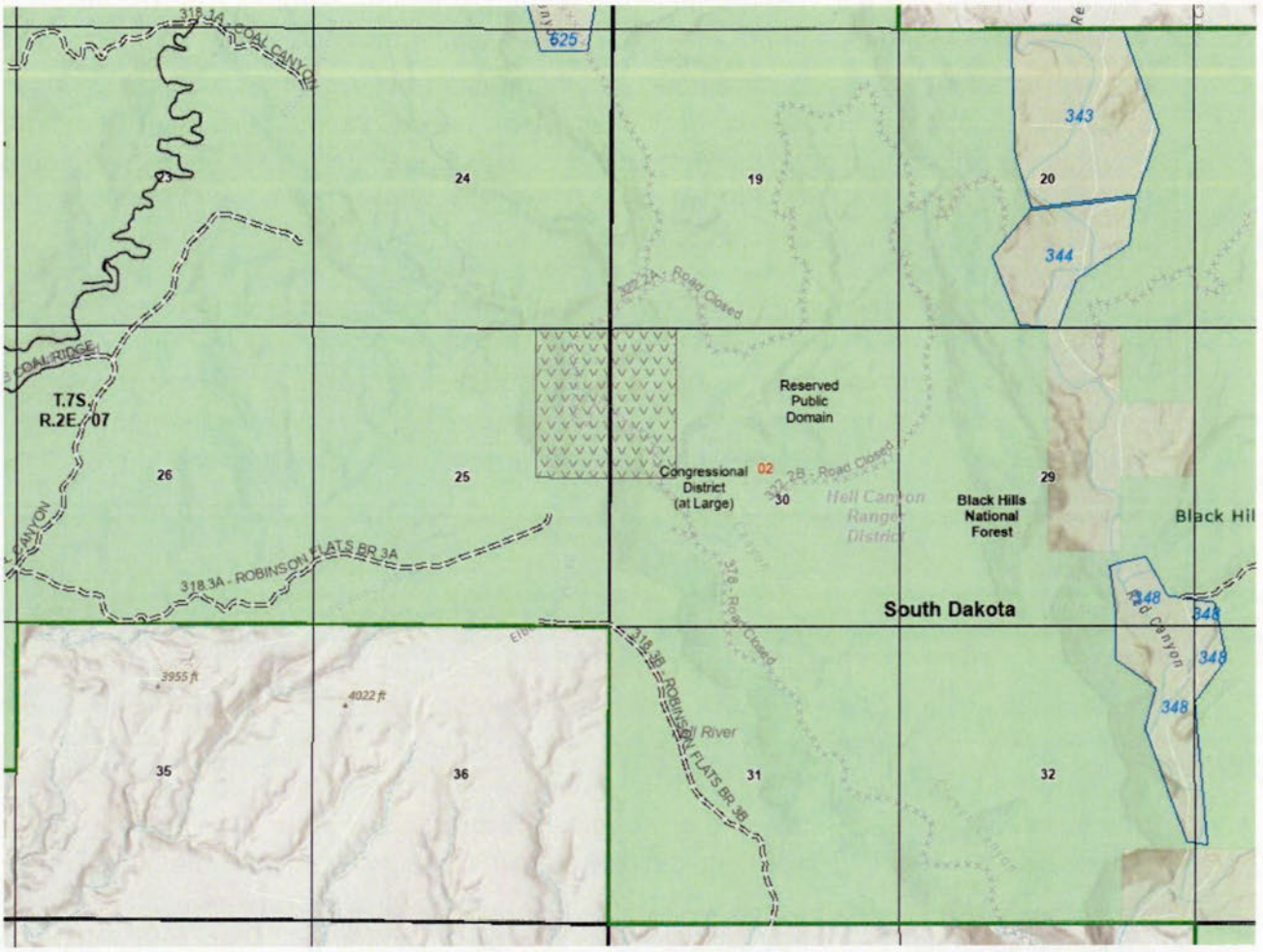


Figure 1. Craven Canyon Mineral Withdrawal Area (provided by J. Manning, BHNF, 2024)

IV. DESCRIPTION OF THE OPERATION

A. **Access.** ***Show on a map (USGS quadrangle map or a National Forest map, for example) the claim boundaries, if applicable, and all access needs such as roads and trails, on and off the claim. Specify which Forest Service roads will be used, where maintenance or reconstruction is proposed, and where new construction is necessary. For new construction, include construction***

specifications such as widths, grades, etc., location and size of culverts, describe maintenance plans, and the type and size of vehicles and equipment that will use the access routes.

Figure 2 shows the October Jinx Project area and existing principal access roads to the mineral exploration prospect areas where work is proposed. Principal highways and primary Forest Service roads are also depicted.

Elbow Canyon Road provides local access to the project area, and the site will be accessed from the south (Figure 2). The existing access road is adequate for entry to the work area and does not require construction, vegetation removal, or road widening. Clean Nuclear will retain all snags that are not considered a hazard to property or life. Access to individual drill sites will involve using existing two-tracks and trails as well as short distances of overland travel to the drill pad. In sum, the Project includes approximately 1.3 miles of overland travel access; assuming an 8-ft wide travel corridor, approximately 1.26 acres of Project disturbance is associated with overland travel on U.S. Forest Service (USFS) land.

No routine road maintenance is proposed during operation under the Plan. The USFS provides guidance on road usage to protect the roads, and Clean Nuclear will follow the USFS rules and instructions. If using roads by the Operator results in degradation of road conditions on USFS lands, then the Operator commits to performing maintenance, with prior notification and consultation with the USFS, as required to restore the road to preoperational condition.

No new construction of roads, bridges, or culverts will be required for operations under this Plan. Vehicles used in the operation of the Project are listed in Section IV (D) below.

Any unexpected road or trail damage would be repaired as soon as possible. The USFS would be consulted to approve the proposed maintenance and inspect the repair. Contractor equipment would not exceed local road weight restrictions without prior approval by applicable authorities. All existing USFS-authorized improvements including but not limited to fences, roads, trails, gates, and utility lines, are considered protected improvements and should be protected during project implementation. Should any improvement be damaged, the Hell Canyon Ranger District will be contacted, and it must be returned to its original condition as soon as possible. All access routes for equipment and water haulage that are not defined in the Plan of Operations (POO) shall be provided to the USFS for review and approval.

B. **Map, Sketch or Drawing.** ***Show location and layout of the area of operation. Identify any streams, creeks or springs if known. Show the size and kind of all surface disturbances such as trenches, pits, settling*** **ponds**, ***stream channels and runoff diversions, waste dumps, drill pads,***

timber disposal or clearance, etc. Include sizes, capacities, acreage, amounts, locations, materials involved, etc.

Figure 2 shows access to the proposed monitoring well drill sites. Figures 3 and 4 show detailed topography and imagery of the project site. All of the drill sites are listed in Table 1.

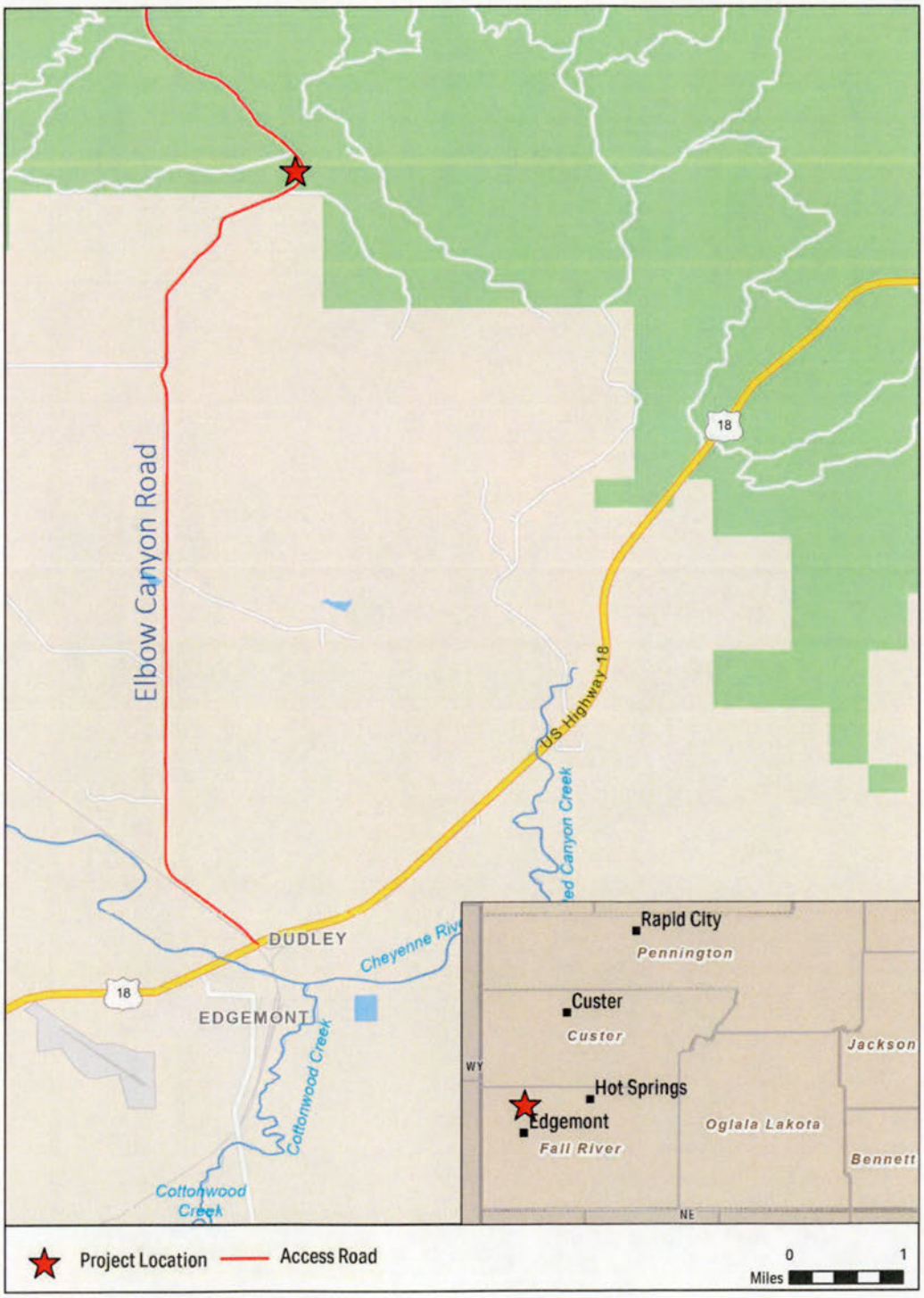
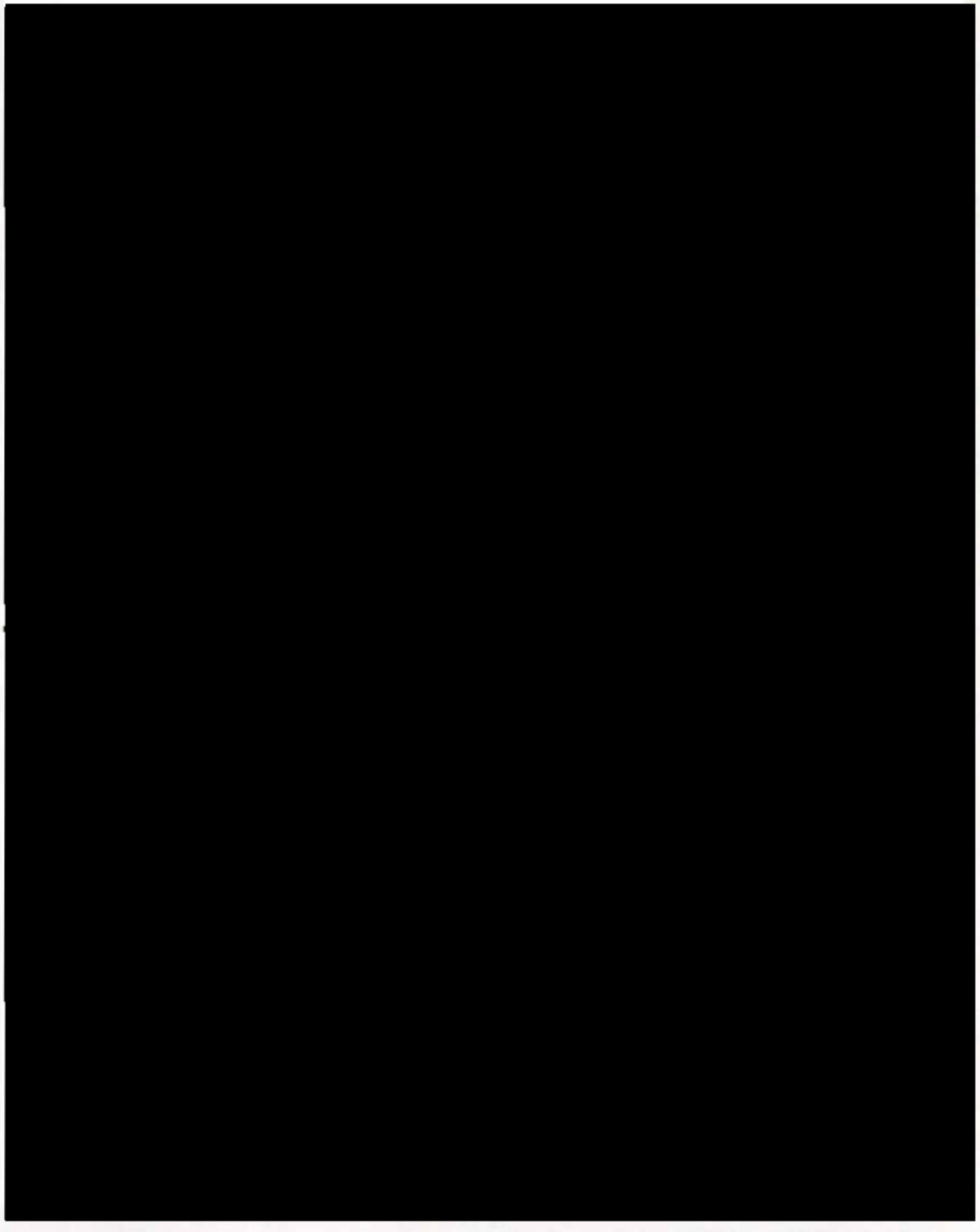


Figure 2. Project Location and Access

CONFIDENTIAL

RECEIVED
NOV 21 2024
MINERALS & MINING PROGRAM

Drill sites are positioned near Elbow Canyon Road, on relatively flat topography, and in areas that were previously impacted by wildfire and historic uranium exploration in the 1970s and 1980s. After drilling is completed at the drill sites, the pad will be recontoured (if needed), seeded, and mulched during final reclamation, as described in Section V(I).



- – - Proposed Access Routes
o Proposed Drill Sites

0 500 1,000 1,500 2,000 Feet

Figure 3. Topographic Map of Proposed Exploration Drill Sites

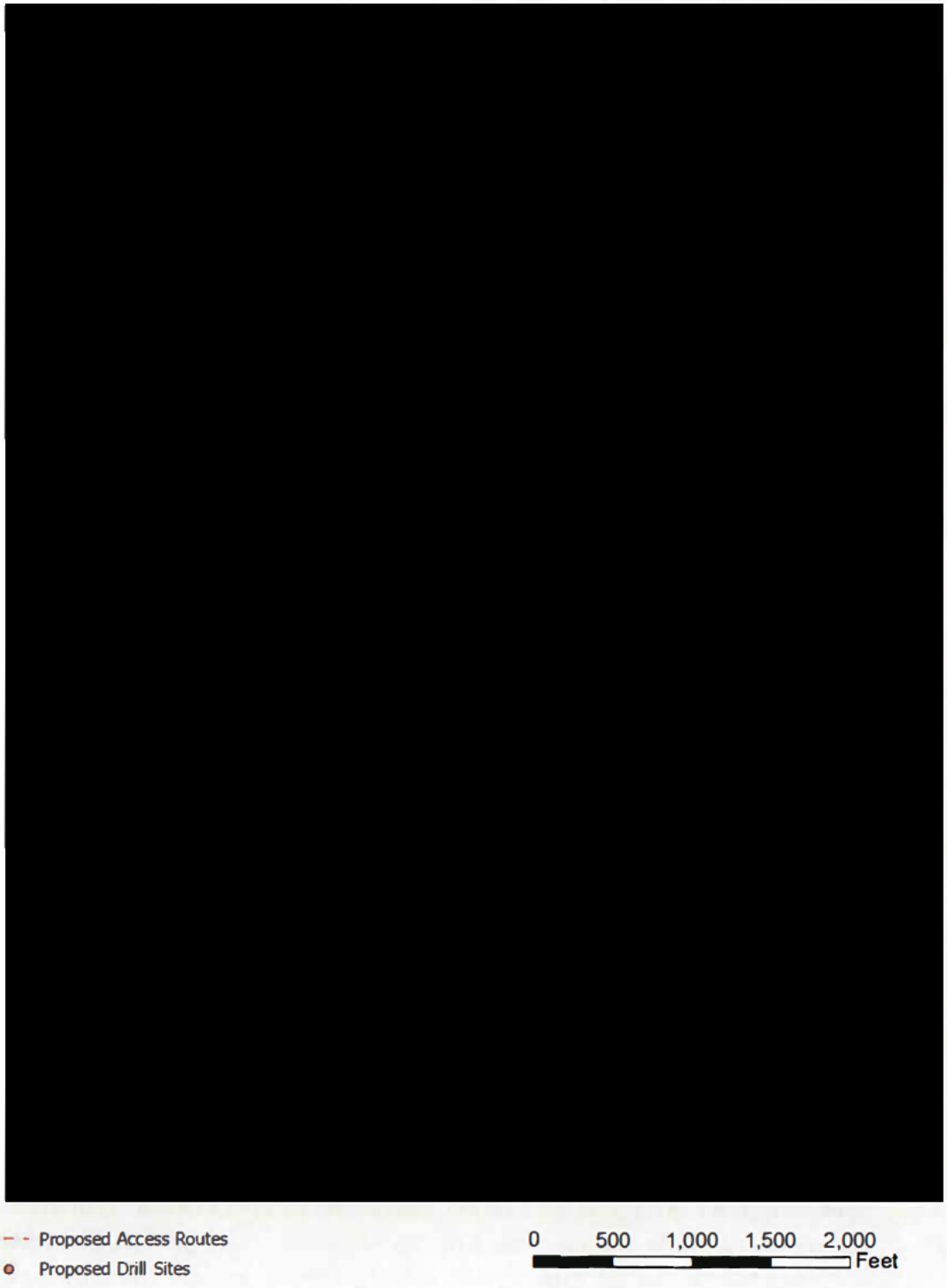


Figure 4. Aerial Photograph of Proposed Exploration Drill Sites

Table 1 Proposed Drill Sites

C. **Project Description:** ***Describe all aspects of the operation including mining, milling, and exploration methods, materials, equipment, workforce, construction and operation schedule, power requirements, how clearing will be accomplished, topsoil stockpile, waste rock placement, tailings disposal, proposed number of drillholes and depth, depth of proposed suction dredging, and how gravels will be replaced, etc. Calculate production rates of ore. Include justification and calculations for settling pond capacities, and the size of runoff diversion channels.***

Introduction and Geology

The primary purpose of this Plan is to provide documentation and support for a request for authorization of a program of reverse circulation or mud rotary drilling 17 exploration holes test for exploration of subsurface uranium mineralization and to conduct an aquifer characterization study on the October Jinx Project. Seventeen potential drill sites are shown in Figures 3 through 4. Some of the proposed 17 sites may not be used depending on the results of drilling previous holes. One truck, track or skid-mounted drill rig, is planned to be used.

Drill sites will be approximately 60 foot (ft) by 60 ft per drill pad, times 17 drill pads, or 1.4 acres total disturbance. Materials used for the Project would be stored on state lands in Section 36 along Elbow Canyon Road at a 12 ft by 80 ft (0.02 acre) laydown or staging area; the laydown area would not be located on USFS land. Clean Nuclear plans to keep all equipment on site during active drilling, but would use the laydown area for overflow. No fuel or chemicals would be stored at the laydown area. All materials would be removed after completing drilling at a particular drill site.

An estimate of the average required depth of drillholes is 500 ft, based on surface geology and knowledge of local stratigraphy. However, depending on the geology encountered in each hole, the Operator will have equipment to drill to a maximum depth of 700 ft. Each drill site would have a single vertical hole drilled.

The general geology of the area is provided in Figure 5. At the site, the surface geology consists of Cretaceous age Inyan Kara Group, including the upper Fall River Formation, Fuson Shale Member, and Lakota Formation. At depth, the other typical Mesozoic and Paleozoic formations that occur throughout the Black Hills are likely to occur at the Project. The Fall River Formation is between 65 and 125 ft thick, and the Lakota Formation is 200 to 500 ft thick.

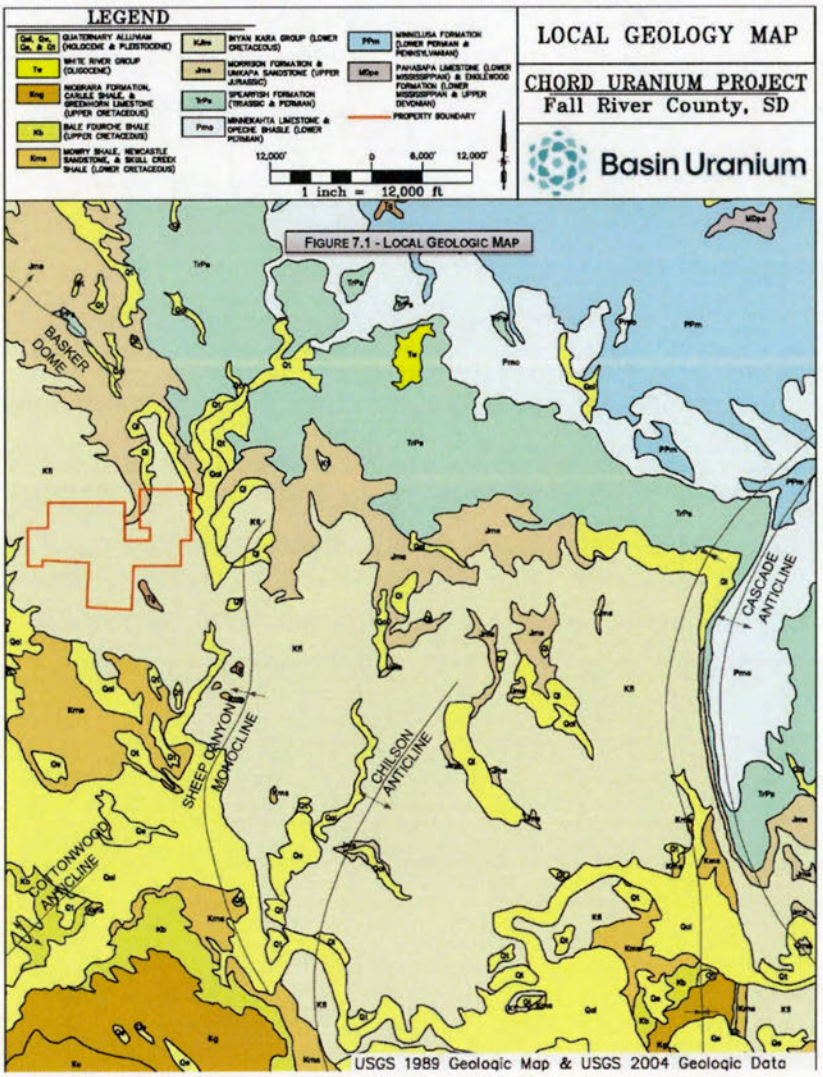


Figure 5. Project Area Geology

Drillholes to test for aquifer characteristics and indications of mineralization are planned to penetrate only the Inyan Kara Group, specifically targeting the Chilson Member of the Lakota Formation.

The Inyan Kara Group is known to be an aquifer throughout the Black Hills. However, water quality varies greatly within and outside of a roll-front uranium deposit. At the project location, uranium mineralization is likely to influence water quality, and the aquifer is unlikely to be a suitable source of drinking water at the Project. Water quality results from the Project area are described in the Report on Water Sampling and Limited Aquifer Testing Chord Project Fall River County, South Dakota by Cohan [1984][1] (included in Appendix 5). Based on data from the site [Cohen 1984], "all ground waters from the Lakota Formation… in the

[1] Cohan, W.T., 1984. Report on Water Sampling and Limited Aquifer Testing Chord Project Fall River County, South Dakota.

vicinity of the orebody contains at least slightly anomalous concentrations of natural uranium or radium 226." Specifically, Lakota Formation monitor wells B4 and B5 within the Chord Project area and a stock well in Craven Canyon had uranium concentrations that exceed current EPA standards of 30 ug/L (72, 64, and 141 ug/L respectively). Monitor well B4 and the Standin Ranch well exceeded drinking water standards for radium of 5 pCi/L (21.8 and 12.9 pCi/L respectively).

Final drillhole closure requirements will prevent cross-aquifer contamination.

The vertical distance of the water table below the surface is not sufficiently defined, though the majority of drilling will occur above the water table. Data from two existing monitoring wells on site indicate the lower portion of the Chilson Member lies within a saturated aquifer [Cohan, 1984[2]].

No petroleum is present in the rocks and is not expected to be encountered on the property.

Access

No construction of new access roads or clearing of trees and other vegetation will be required. Drill sites have been sited to take advantage of gentle topography. The drill sites will require little or no surface modification to accommodate access for the drill rig, water truck, as well as the sump installation for the settling and burial of particulates from drill water. Final closure and reclamation of the site are described in Section V(I). The choice of sites with gentle topography was also preferred to reduce reclamation complexity.

If topsoil can be selectively reclaimed within the drill sites, then the topsoil will be segregated and stockpiled for final closure as described in Section V(I). After completing the drill program and aquifer testing, this Plan proposes to recontour the drill sites and mulch and reseed these areas to improve the affected locations, as described in the following paragraphs and in Section V(I).

The proposed drill sites have been chosen based specifically on geologic potential and minimal operational impacts. The drill site locations along the existing access road will have minimal impact on forest resources and users. Visual impacts will be minimized by selecting drill sites that are not visible from paved roads or permanent structures, as discussed in Section V(D).

Drilling will occur during one or two shifts per day, 5 to 7 days per week. The entire drill program is anticipated to be completed within 1 month, followed by the aquifer testing and reclamation. If drilling is conducted after dark, two portable generator-powered light plants will be used to supply adequate lighting for the work site, as described in Section V5(D). Drilling operations would not occur on the following holidays (as well as weekend days immediately following or proceeding said holiday) because of the potential for increased

---

[2] **Cohan, W.T. 1984.** *Report on Water Sampling and Limited Aquifer Testing Chord Project.*

traffic and recreational usage: Memorial Day, Fourth of July, and Labor Day. During these pauses in drilling, equipment may remain at the drill sites and staging area.

Drilling Water Supply

Water required for drilling will be sourced from municipal water supplies in Edgemont or Hot Springs or other readily permitted sources off USFS land. Water from distant sources, such as municipal wells, will be delivered by water truck to the drill stie.

Drill water will be stored within the water truck tank at the drill sites and a sump where drill solids will be separated by gravitational settling before reuse. Sumps will be approximately 8 by 15 feet and 4-6 ft deep for each proposed drill pad. Upon a drill site closure, the drill solids will be buried in a sump, then mulched, and seeded, as described in Section V(C and H) below. Contractors will perform drilling and water haulage.

Aquifer Testing Program

This Plan includes installing four new cased groundwater monitoring wells (converted from new exploration holes) and conducting aquifer testing. The primary objective of the aquifer testing program is to determine the aquifer parameters (e.g., transmissivity, storativity, and heterogeneity). Two aquifer pumping tests are planned: a step rate test to determine the maximum pumping rate and a constant rate test. Each test will determine the aquifer parameters according to a theoretical analytical analysis (e.g., Theis).

The following list summarizes the aquifer testing tasks and approximate duration:

- **Well Completion** – Wells will be cased, screened, and completed within 1-2 days after borehole completion.
- **Water Quality Analysis**– A single water quality sample will be collected from the pumped well after the well is completed and purged. A water quality sample would verify the water could be safely disposed of via surface application or help determine other appropriate disposal methods. The laboratory analysis is expected to take approximately 1-3 weeks. Results will be submitted to the USFS and the SD DANR.
- **Water Level Monitoring** – The pumped well and monitoring wells will be fitted with transducers at least 1 week prior to the start of the step rate test. Transducers may be installed at the time wells are completed or may be installed collectively once the pump test is scheduled. This baseline data will measure natural diurnal and barometric pressure related water level fluctuations.
- **Step Rate Test** – A single step rate test is expected to be completed within 1 day. Recovery from the step rate test may be approximately 1-3 days depending on how the aquifer responds and recovers.
- **Constant Rate Test** – A single constant rate aquifer pump test will entail approximately 3 days of pumping followed by 3-7 days of passive recovery measurements. Sufficient time must pass to allow the pumped well to return to

baseline conditions after the step rate test and prior to commencing the constant rate test.

- **Well Plugging and Abandonment** – Any wells not requested to remain open by the USFS will be plugged and abandoned within 12 months following the completion of the aquifer test.

The entire duration of the aquifer testing program would be approximately 3 to 4 weeks, the majority of this time being passive monitoring before and after the pumping portion of the test.

The aquifer test will pump from one monitoring well and include observation at three monitoring wells, all to be completed within the Inyan Kara Aquifer. Tentatively, the four boreholes that could be converted to wells include 25001, 25002, 25004, and 25017, with borehole centrally located amongst the four and likely to serve as the pumping well (see Figure 2). The select exploration boreholes will be converted from open exploration holes to monitoring wells immediately after drilling and before the rig leaves the drill pad by casing the entire well depth with selected screen intervals that will be chosen upon completion and logging of the exploration borehole. The wells will be screened from approximately 400 to 450 ft below the ground surface, though final screened intervals will be chosen based on results of geophysical logging data from the earliest wells drilled. The casing will then be installed and cemented. Pressure testing of the casing will precede the placement of the well screen. Wells will be capped with a pad lock and labelled.

The pump will be placed near the bottom of the pumped well to maximize the available head. The pumping rates will be controlled by varying the discharge at the surface as well as varying the pump speed. A preliminary review of historical data in the area suggests that a rate of 30 to 50 gallons per minute (gpm) can be sustained.

A temporary groundwater use/discharge permit will need to be obtained from the SD DANR before the aquifer test.

Discharge from the pumping well will be measured using instantaneous flow meters. Discharge would be measured and adjusted as needed. Water discharging from the pumped well would be collected in a sump or discharge pit. The discharge pit will be larger than that used for drilling the well, but will be no larger than 50 ft x 50 ft and 4 to 6 ft deep, and will fit within the 60 ft by 60 ft drill pad footprint. The estimated cumulative volume of water that may need to be discharged during the 3-day constant rate test at 30 gpm is approximately 130,000 gallons.

One or more water quality samples would be collected from the pumped well during the aquifer test, and water quality analysis would include a standard suite of anions, cations, and radionuclides.

Three drillholes will be used as monitoring wells. All monitoring wells will be completed within the Inyan Kara Aquifer, similarly to the pumped well. Before starting the aquifer test, the static water level will be measured in the pumped well and each observation monitoring well. Water-level measurements will be taken for approximately 1 week before the aquifer test using transducers. These data will be compared to barometric readings for baseline assessment.

In general, for the constant rate test, the well will be pumped until the cone of depression has sufficiently developed. After the pump is shut off, recovery measurements will immediately commence and continue for approximately the same duration as the pumping test or until approximately 90 to 95 percent of the initial head is recovered. The aquifer might not recover as quickly as it drew down.

Pressure transducers with dataloggers will be used to measure water levels. Each transducer will be set to record at 30-second intervals throughout the pumping and recovery periods. The transducer in the pumping well will either be placed inside a 1-inch polyvinyl chloride (pvc) pipe to avoid tangling the transducer with cables and a drop pipe leading to the pump or tied off to the pump drop pipe, in which case the pump will need to be pulled out to remove the transducer from the pumping well. The pressure transducers will be vented and self-correcting for changes in atmospheric pressure.

The drawdown versus time data for the pumping and recovery phases of the test will be analyzed using appropriate methods with commercial test analysis software.

Clean Nuclear proposes that the four new monitoring wells remain in place, finished with appropriate surface casing and locking caps, for use in potential future water quality and water level monitoring by Clean Nuclear and the USFS. However, if requested, Clean Nuclear will properly plug and abandon the wells after completing the aquifer testing program.

Clean Nuclear can provide the USFS all data related to the aquifer testing, including water quality data, water levels, and interpreted aquifer properties.

Personnel

Personnel required at a drill site during each shift will include the following employees or contactors:

- Driller
- One to three drill helpers
- Geologist
- Water truck driver (part time, as required)
- Consultant to conduct geologic, engineering, or surveying studies on drillholes (as required)

- Drilling and Operator supervisor (occasional)

Plugging and Abandonment

Clean Nuclear commits to following all of the South Dakota laws and statutes concerning drillhole plugging and abandonment and would install a full cement grout where needed, such as in any instance where aquifer cross-contamination is possible. All of the exploration drillholes not converted to permanent monitoring wells will be plugged in accordance with the Administrative Rules of South Dakota (ARSD) 74:11:08 and South Dakota Codified Law (SDCL) 45-6D-33 through 45-6D-34. The drillholes are planned to penetrate the Inyan Kara Group rocks, which are water-bearing units or aquifers in some locations of the Black Hills. If an aquifer is penetrated, the completed exploration drillholes will be plugged from bottom to top using bentonite grout, which complies with the requirements of ARSD 74:11:08:05 and ARSD 74:11:08:05:01 (i.e., requirements for plugging exploration drillholes that penetrate single unconfined aquifers and confined or multiple aquifers). If a confined aquifer is penetrated, the weight of the bentonite grout column will either be sufficient to overcome formation pressure or the hole will be plugged using cement grout. The collar elevations of the planned holes are higher than the static water level to be encountered in the exploration holes; therefore, no natural artesian discharge from drillholes is anticipated.

Records regarding aquifers encountered during drilling and the plugging methods used will be recorded and retained for each exploration hole, and those records will be provided to the South Dakota Department of Agriculture and Natural Resources (DANR) at the end of exploration. All exploration drillholes not converted to USFS monitoring wells are planned to be plugged immediately upon completion while the drill rig is still on the site. If a drillhole temporarily needs to remain open, a temporary surface plug will be emplaced. If a hole needs to remain open for more than 30 days, Clean Nuclear will apply for an alternate plugging schedule to keep the hole open temporarily.

Monitoring wells will remain open until drilling and aquifer testing on adjacent state lands is completed, or approximately 1-year. Clean Nuclear is willing to leave all, some, or none of the proposed wells open for use by the USFS. Clean Nuclear and the USFS will need to come to an agreement on which wells, if any, will remain open prior to the end of the drill program so that undesired wells can be properly plugged and abandoned per state requirements. Only the wells requested by the USFS to be retained as monitoring wells will be permanently retained; all other wells and/or boreholes will be properly plugged and abandoned.

Based on site geology, no voids or karst are expected to be encountered.

No mining or processing of ore or storage of tailings is proposed under this plan.

D. Equipment and Vehicles.

The Project may require the following equipment during active operation:

Motorized:

- Reverse circulation or mud rotary drilling rig with auxiliary compressor
- Two or more pickup trucks
- One water truck (2,000 to 6,000 gallon capacity)
- One small dozer for repositioning the skid-mounted rig (if needed)
- One skid steer

Stationary:

- Portable toilet
- Drill steel
- Drill rod rack storage
- Water line and pumps
- Mud pump and tank for mixing drill mud, grout, and cement for drillhole reclamation
- Waste receptacles clearly labeled for trash and recyclables

Drilling Consumables:

- Diesel fuel used by the drilling rigs will be transported to the drill site in a fuel tank mounted on a pickup truck and transferred to the fuel tank on the drill rig on site. Pickup trucks may use either diesel fuel or gasoline, which will be stored in mounted tanks.
- Gasoline will be used to power water pumps and a generator at the drill site. Gasoline may be stored in portable containers.
- Drill mud bentonite clay will be used as a high-density additive to drill fluid, which increases the viscosity and density of the fluid for increased efficiency of the drilling process and improved recirculation of drill water. No oil or petroleum-based products will be used.
- Grout will be used as a high-viscosity or cemented material to prevent drill water from penetrating the adjacent rock, fix the casing into the hole, or reclaim drillholes upon completion.
- Fuel stored at the drill rig will be placed on a flat platform with a raised berm around the perimeter and then lined with a geomembrane to mitigate a spill or leakage event. The containment area will be sufficiently sized to accommodate a 110 percent spill.

Spill absorbers will also be on site in case of petroleum spills, and equipment will be cleaned before arriving and departing the site, removing all soil, plant parts, seeds, vegetative matter, or other debris that could contain seeds to prevent the spread of noxious weeds into or out of the Project area.

Aquifer Test Equipment:

- PVC well casing

- Water line
- Variable speed pump
- Flow meter
- Pressure transducers with dataloggers and cable
- Generator
- Drop pipe
- Winch
- Water truck

E. Structures

No fixed structures are proposed under this plan.

V. ENVIRONMENTAL PROTECTION MEASURES (SEE 36 CFR 228.8)

A. Air Quality. *Describe measures proposed to minimize impacts on air quality such as obtaining a burning permit for slash disposal or dust abatement on roads.*

The estimated average daily vehicle trips to and from the drill site are three per shift. Vehicles will be required to observe a speed limit of 25 miles per hour (mph) to minimize fugitive dust from vehicle travel on the project's primary and secondary USFS roads. Minimizing the number of trips to the project area will also lower dust generation. No open burning is proposed in this Plan.

All equipment, including vehicles, drill rig, generators, and pumps, will be operated according to the manufacturer's operating specifications. No equipment modifications will be made to alter the emissions of equipment used on site.

The USFS may require dust abatement measures such as reduced speeds or water spraying if conditions warrant.

B. Water Quality. *State how applicable state and federal water quality standards will be met. Describe measures or management practices to be used to minimize water quality impacts and meet applicable standards.*

There are no domestic wells completed within the roll front uranium deposit targeted by this Project. Domestic wells are located further away from the uranium resource and have different water quality characteristics. Based on the SD DANR water well completion database (see Figure 6), the nearest domestic well is 0.5 miles southeast from the project and is located in Sec 36, T 7S, R 2E; this well is noted a completed in the Fall River

Formation at a total depth of 324 ft. However, there is no residence at this location, and if the well does exist is likely a stock water well. Based on the state database, the second closest domestic well is 1.5 miles west (Section 35, T 7S, R 2E) and is completed to a depth of 396 ft in the Fall River Formation. Similarly, there is no residence at this location and the well is either mislocated in the database or is a stock water well. The nearest residence (located approximately 1.3 miles southwest of the Project) likely has a private domestic well, though the well was not registered with the state. Other residences located further from the Project also are likely to have private domestic wells, though they are similarly undocumented [SD DANR 2024][3].

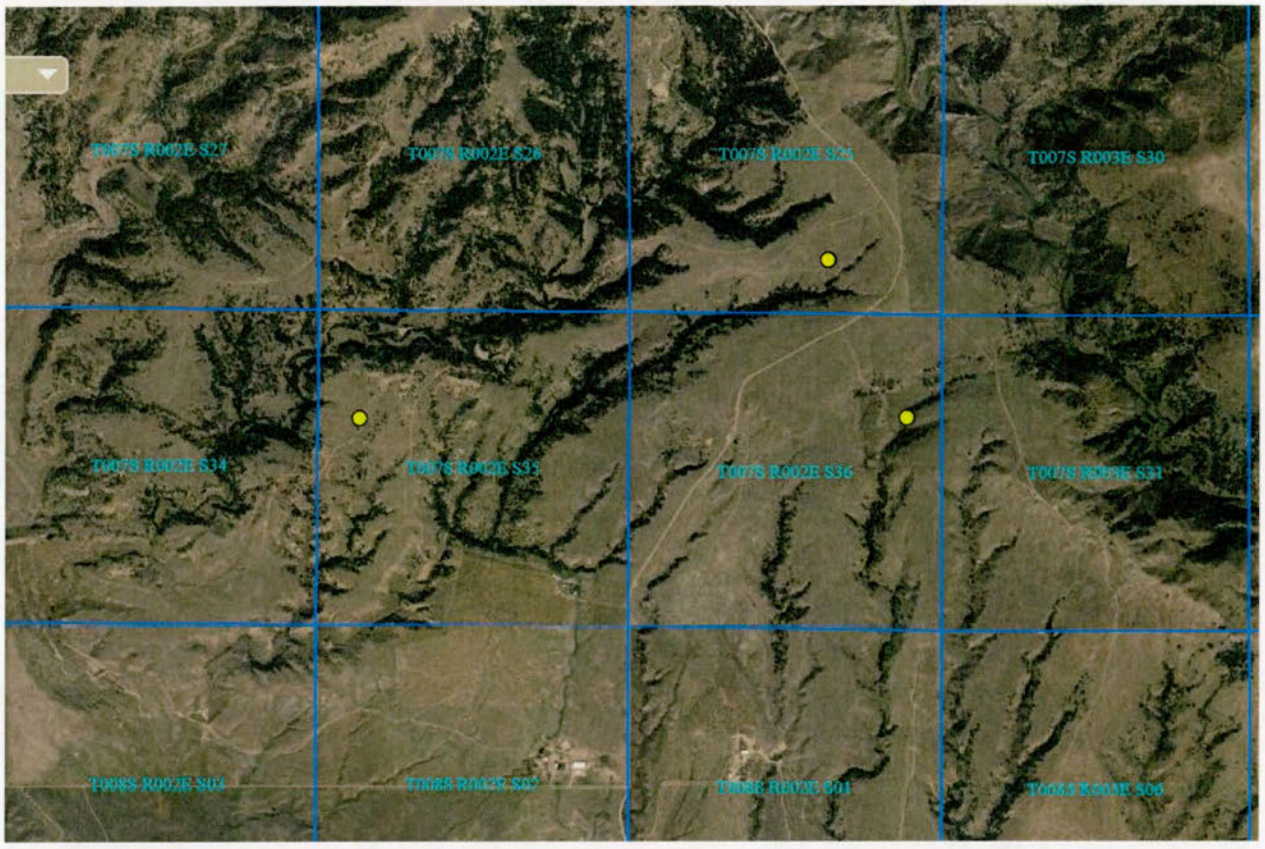


Figure 6. Water Wells in the Project Vicinity [SD DANR, 2024]

1. State whether water is to be used in the operation, and describe the quantity, source, methods and design of diversions, storage, use, disposal, and treatment facilities. Include assumptions for sizing water conveyance or storage facilities.

Water will be used in drilling as a drill lubricant and coolant as well as to evacuate drill cuttings from the drill face. The amount of water to be used will be determined by the

[3] SD DANR, 2024. Water Well Completion Reports, accessed 10/12/24, available at https://apps.sd.gov/nr68welllogs/.

permeability of the geologic formations encountered in a drillhole. Water will be recirculated to the extent possible during drilling.

Water will be transported to the site from private or public sources depending on availability, from a local water well or public source off USFS lands. A water truck will transport water to the site. Water usage is estimated to range from 5,000 to 10,000 gallons per day; however, if circulation of drill water is lost, up to 1,000 gallons per hour may be required until circulation can be reestablished.

Water will be recirculated during drilling whenever possible and placed in a sump so that drill cuttings can be segregated by gravity from the liquid and the fluid can be reused.

During operations, a drill fluid mixture containing water, bentonite, and possibly non-hazardous polymers will be pumped into the drillhole.

Upon completion of each drillhole, the hole will be plugged in accordance with state standards as prescribed in Section V(I) to prevent cross-aquifer contamination.

This Project will require a temporary groundwater discharge permit from the SD DANR before the aquifer test. During the aquifer test, water will be pumped from a single well. Small quantities of water may also be used during setup and testing of the pump equipment. The tentative pumping rate is 30 gpm for 3 days. However, the test could be extended up to 3 days or until a measurable drawdown is observed at the other monitoring wells. Water from the aquifer test will be diverted to a sump and allowed to evaporate or infiltrate. No water will be discharged to surface water sources or drainages. The aquifer test plan is detailed in Section IV(C).

Surface water will be controlled to prevent erosion, as described in Section V(B)(2); the project Stormwater Pollution Prevention Plan (SWPPP) will be finalized before operations. No active or intermittent streams exist near any of the drill sites in which uncontrolled surface water can enter; however, in areas of gentle to moderate slopes near the drillholes, surface water will be contained, as described in Section V(B)(2).

Secondary containment shall accommodate 110 percent capacity to ensure any potential leak is contained and that there is adequate freeboard to accommodate a small precipitation event.

---

2. Describe methods to control erosion and surface water runoff from all disturbed areas, including waste and tailings dumps.

The proposed monitoring well drill sites are located on relatively flat ground with permeable soils; therefore, erosion and surface water runoff are not anticipated. However, if erosion is observed at a site, erosion control logs will be placed up- or downgradient from the drill site

to prevent onflow and runoff of surface water. As necessary, water diversion structures may alternatively be used to divert surface water away from the work site.

In the emergency event that excess drilling water or precipitation fills the sumps, an additional sump downhill from the primary sump(s) would be constructed as approved by the District Ranger; this would allow for infiltration or evaporation in the sump versus land application or overland flow.

Should it become evident that an erosion control component is not performing in the manner necessary to minimize erosion and runoff, drilling operations will be stopped, and corrective measures will be initiated to mitigate the situation.

---

3. Describe proposed surface water and groundwater quality monitoring, if required, to demonstrate compliance with federal or state water quality standards.

No perennial streams or other water bodies are present at or near any of the drill sites; therefore, no surface water sampling is planned.

At this time, the site groundwater quality is based on data from 40 years ago and a single sample collected from a monitoring well (B5) in Section 25 in July 2023. Based on data from well B5 (included in Appendix 5), water is safe to discharge. However, because site groundwater data is limited and dated, a water quality sample will be collected from the pumped well prior to conducting the aquifer testing and any discharge. This water quality sample will also likely be required by the SD DANR as part of the state temporary groundwater use/discharge permit. Additionally, as part of the aquifer test, one or more water quality samples will be obtained from the pumping well during the aquifer test. The water will be analyzed for a suite of parameters, including cations, anions, and radionuclides. The results of the water quality analysis will be reported to the USFS and SD DANR. No additional groundwater monitoring is planned.

---

4. Describe the measures to be used to minimize potential water quality impacts during seasonal closures or for a temporary cessation of operations.

This Project does not include seasonal closures or temporary cessation of operations. There is no surface water present near the work areas. However, temporary mitigation measures such as erosion control logs or diversion structures may be in place during drilling operations and aquifer testing as needed to minimize erosion. The final closure and reclamation of the drill sites are described in Section V(I).

5. If land application is proposed for wastewater disposal, the location and operation of the land application system must be described. Also describe how

vegetation, soil, and surface and groundwater quality will be protected if land application is used.

No land application of wastewater is part of this Plan; however, recirculated water from the drillholes will be settled in a sump, as described in Section V(B)(1). The recirculated water will be reused in drilling after solids are separated by settling. A backhoe or small excavator will be maintained on site to ensure the excavation of the sump can be completed in a timely manner.

During the aquifer tests, water will be contained within a sump.

C. Solid Wastes. ***Describe the quantity and the physical and chemical characteristics of solid waste produced by the operation. Describe how the wastes will be disposed of including location and design of facilities or treated so as to minimize adverse impacts.***

All of the solid wastes generated on site will be transported, as needed, to approved solid waste facilities for disposal except for the drill cuttings recovered by gravity separation in sumps. These cuttings consist of crushed/pulverized rock from the drillhole with a consistency of mud or sand. After separated from the drill water by settling, these solids will reside in a sump at the site and will be buried, mulched, and seeded during final reclamation. Note, the formations expected be encountered during the drill program, from the surface through the Inyan Kara, are not potentially acid generating. All of the drill cuttings will fit into the sump and be buried for disposal. No cuttings will remain on the surface.

Human waste will be managed using portable toilets under contract with a commercial provider. The contractor will undertake the disposal of this waste at a licensed and permitted facility.

D. Scenic Values. ***Describe protection of scenic values such as screening, slash disposal, or timely reclamation.***

Proposed drill sites are located to avoid visibility from paved roads, permanent structures, dwellings, or developed campgrounds.

If drilling occurs during nighttime hours, then portable light plants will be required for work to proceed safely. To minimize stray light and light pollution, a maximum of two directional light plants will be used on a drill site. Directional lighting will generally minimize unnecessary glare by focusing the light downward on the worksite and away from populated areas to reduce stray light. Shielding of the sides and upward will reduce scattered light skyward and laterally.

The project area will be kept clear of trash and debris to reduce the negative visual impacts associated with the drill sites. At the end of the Project, all material not necessary for claim monumentation will be removed. The used area will be maintained to present a clean and orderly appearance. Reclamation will be completed in a timely manner.

E. **Fish and Wildlife.** ***Describe measures to maintain and protect fisheries and wildlife, and their habitat (includes threatened, endangered, and sensitive species) affected by the operations.***

No fisheries exist in the project vicinity, and no project activities are planned to occur within permanent waterbodies or watercourses. Erosion controls and mitigation of potential runoff into streams are addressed in Sections V(B)(2) and V(B)(4).

Wildlife species with the potential to occur in the project vicinity include small- and medium-sized mammals (e.g., squirrels, coyotes, and deer); large ungulates (e.g., elk); bats; migratory birds; raptors, and some insects. Information related to federally listed threatened, endangered, proposed, and candidate species with the potential to occur in the project vicinity was obtained through the U.S. Fish and Wildlife Service (USFWS) IPaC database [2023]. There are no critical habitats within or adjacent to the project area. Four USFWS-listed endangered species have the potential to occur in the southern Black Hills, including the Northern Long-eared Bat, Tricolored Bat, Red Knot, and Monarch Butterfly.

Any threatened or endangered (T&E) species, R2 sensitive species, or species of state concern located during project implementation would be appropriately managed through coordination with the USFS biologist.

No tree removal activities are planned, and no known bat hibernacula occur within 0.25 mile of a proposed drill site; however, if any bat roots or hibernacula are identified within the Project area, drilling activities would only occur between May 31 and October 1 or at the direction of the USFS. Any newly discovered cave or underground mine locations would be provided to the USFS for further revaluation as potential bat habitat.

No known raptor nests occur within the Project area. If any permitted activity results in the discovery of a raptor nest or defensive behavior by a raptor that suggests a nest may be nearby, Clean Nuclear will vacate the area immediately and notify the USFS biologist as soon as possible. A timing restriction will be placed if an active raptor nest is located.

Open sumps at drill locations would have a barrier around them sufficient to prevent cattle and big game from walking into the sump.

F. **Cultural Resources.** ***Describe measures for protecting known historical and archeological values, or new sites in the project area.***

During the National Environmental Policy Act (NEPA) process, the USFS and State Historic Preservation Office (SHPO) will be consulted to identify an area of potential effect (APE) and determine what studies in the APE have been historically conducted and what archeological sites may have been identified by past work, if any. A Level 1 archeological records search will be completed by a third-party contractor and submitted to the SHPO and USFS.

Known sites will be located in the field, and project activities will follow the State and USFS recommendations regarding protection of historical and cultural resources. Clean Nuclear will avoid all archaeological sites that have been previously recorded during surveys of the Project vicinity.

If, during the course of project implementation, any historic or archaeological materials are discovered or disturbed, or if unanticipated effects on historic properties are found during project activities, work in the vicinity of the discovery or disturbance will cease. The District Ranger and heritage staff will be contacted immediately so that the agency can take steps to avoid, minimize, or mitigate any adverse effects. The South Dakota State Historic Preservation Office (SD SHPO) and Tribal Historic Preservation Offices (THPOs) that have requested to be a consulting party for the BKNF will be notified within 48 hours of the discovery or disturbance and provided an opportunity to comment, according to 36 CFR §800.13.

The proposed exploration project is not located within the boundary of Craven Canyon and will not encroach upon, damage, or destroy any historic property within Craven Canyon. However, based on the proximity of exploration drilling and SHPO's existing concerns, an abbreviated case report will be required.

G. Hazardous Substances.

1. Identify the type and volume of all hazardous materials and toxic substances which will be used or generated in the operations including cyanide, solvents, petroleum products, mill, process and laboratory reagents.

Diesel, gasoline, and standard petroleum lubricants will be used in this operation. A limited amount of fuel will be contained in the fuel tanks of the equipment used on site. In addition, no more than a total of 5 gallons of petroleum product will be stored in gearboxes of equipment on site. The total estimated volume of fuel contained in the tanks and gearboxes of the equipment on site is outlined below and will be approximately 350 gallons:

- Excavator or backhoe – 40 gallons
- Forklift – 30 gallons
- Water truck – 90 gallons
- Water pump – 5 gallons
- Generator – 5 gallons

- Hydraulic fluid - 50 gallons
- Pickup truck – 30 gallons
- Drill truck – 90 gallons
- Motor oil (1 can) – 5 gallons
- Supplemental Fuel Cans (2) – 3 gallons each, 6 gallons total

2. For each material or substance, describe the methods, volume, and frequency of transport (include type of containers and vehicles), procedures for use of materials or substances, methods, volume, and containers for disposal of materials and substances, security (fencing), identification (signing/labeling), or other special operations requirements necessary to conduct the proposed operations.

No fuel or lubricants will be stored on site. All fuel will be brought to the site in proper petroleum storage containers, via pickup truck. Fuel will most likely be brought to the site daily. The storage and transportation containers will be properly labeled, and the contents will be identified. Fueling will not occur in or immediately adjacent to water sources. Empty fuel containers will be disposed of properly.

3. Describe the measures to be taken for release of a reportable quantity of a hazardous material or the release of a toxic substance. This includes plans for spill prevention, containment, notification, and cleanup.

Fuel stored at the drill rig will be placed on a flat platform with a raised berm around the perimeter then lined with a geomembrane to mitigate a spill or leakage event. The containment area will be sufficiently sized to accommodate a 110 percent spill. Absorbent wipes for cleanup will be used for spill confinement. Small fluid leaks and spills from construction equipment would be promptly cleaned up, and any contaminated soil would be removed and disposed of offsite. Reportable spills would be reported to the USFS and SD DANR. Clean Nuclear will prepare a Health and Safety Plan, including spill control measures, that will be submitted to the USFS before operations commence.

H. Reclamation. ***Describe the annual and final reclamation standards based on the anticipated schedule for construction, operations, and project closure. Include such items as the removal of structures and facilities including bridges and culverts, a revegetation plan, permanent containment of mine tailings, waste, or sludges which pose a threat of a release into the environment, closing ponds and eliminating standing water, a final surface shaping plan, and post operations monitoring and maintenance plans.***

The proposed drill sites are located on lands that have been previously disturbed by wildfire and other activities. Final reclamation of the drill sites will include the following elements:

- Drillholes not converted to permanent monitoring wells will be sealed and reclaimed in accordance with ARSD 74:11:08 and SDCL 45-6D-33 through 45-6D-34.
- Drill sites will be recontoured to eliminate excessive rutting regardless of the pre-project condition.
- Drill fluids will be contained in a sump on the Drill Site to allow solids to settle. The solids will ultimately be disposed of in a buried sump before final reclamation.
- Clean Nuclear will initiate revegetation as soon as possible (i.e., not to exceed 6 months) after terminating ground-disturbing activities.
- Overly compacted areas at the drill sites that are not located on an active roadbed will be roughed either manually or mechanically to enhance seeding viability and minimize erosion.
- Areas to be enhanced by reseeding will initially be mulched with locally derived, stockpiled organic-rich amendments or with commercially available certified weed-free mulch. Seeding will be applied in accordance with USFS guidance. The proposed seed mix is provided in Table 2 and is compatible with existing habitat and Natural Resources Conservation Service (NRCS) recommendations. On areas needing immediate establishment of vegetation, non-native, non-aggressive annuals (e.g., wheat, oats, and rye) or sterile species may be used while native perennials are becoming established or when native species are not available (e.g., during drought years or years when wildfires burn large acreages in the United States).

Table 2. Reclamation Seed Mix Table: Recommended by NRCS

Species	Percent of Seed Mix
Sideoats grama	10
Western wheatgrass (*Pascopyrum smithii*)	50
Blue grama	5
Green needlegrass	15
Slender wheatgrass (*Elymus trachycaulus*)	10
Purple prairie clover	2
Little bluestem	8

Application Rate: 14 Pounds Live Seed/Acre

The seed would be tested for noxious weeds, and evidence would be provided to the USFS before the seed is used on National Forest Service (NFS) lands. If mulches are used, they are to be noxious weed free with certification provided to the USFS before use. Weed-free alfalfa seed may be used only when native legume seed is not available and only when there is extensive disturbance associated with road construction or mine reclamation where topsoil is no longer available (Forest Plan Standard 1110).

Clean Nuclear will monitor and assess the progress of reclamation activities, including revegetation and erosion control, for a minimum of 3 years. Depending on the success of

the reclamation efforts, additional seeding, weed treatment, or installation of erosion control structures may be required by the Proponent.

Noxious weeds will be managed by Clean Nuclear in adherence with the USFS's current Noxious Weed Control Plan (NWCP). Clean Nuclear will prepare a plan that will include site inspections for noxious weeds and control measures as defined in the NWCP. This Plan will include spraying for weeds 1 year after final reclamation. All drill rigs, excavators, and equipment entering USFS lands would be washed before entry to reduce the potential for spread of noxious weeds onto USFS lands. Revegetation seed would be tested for noxious weeds. All straw wattles used on site to reduce soil erosion would be composed of certified weed-free straw and wrapped in biodegradable material (not plastic or photodegradable material). All natural fibers would be left on site.

I. Fire Prevention. ***Describe all procedures that will be followed throughout operations to prevent ignition and spread of fire including tools and prevention measures. Also describe (if any) the burning plan for slash that is not used in reclamation.***

Clean Nuclear will develop an emergency response plan for the Project as part of the site Health and Safety Plan (HASP). This plan will address a number of emergency situations (e.g., fire, injury). Protocols will be included in this plan to direct the on-site contractors' actions if they start a fire or if a fire starts on USFS land within the vicinity of the drill sites.

All vehicles, drill rigs, and other on-site equipment would be inspected as part of daily safety checks and would be equipped with a fire extinguisher, which would also be inspected routinely. Fire tools (e.g., shovels, buckets) shall also be maintained in each vehicle or staged appropriately on site.

Vehicles shall not sit idle for more than 5 minutes and shall not be over vegetation while doing so to reduce fire risk.

Burning: Excess slash and stockpiled brush will not be burned under this Plan.

J. Recreation. ***Describe any and all potential effects on recreation resources.***

Few recreation impacts would occur, primarily through minor project-related traffic, noise, and visual impacts. Impacts are expected to be minimal as there are no campgrounds, picnic areas, or non-motorized hiking trails within or adjacent to the October Jinx Project area.

Drilling equipment would use existing motorized trails during project drilling and reclamation. Traffic-related effects on recreation are anticipated to be minimal. Under the Proposed Action, traffic on local roads and trails would increase by approximately three vehicles per shift. Increased traffic congestion on Elbow Canyon Road and National Forest Service Road

318.3A associated with the Project would be minimal and have minimal impact on user access. The Project would have a minimal increase in road dust.

Increased traffic, drilling-related noise, and visual effects of large equipment may temporarily disrupt outdoor-based recreation activities in the Project vicinity, causing recreational users to either be inconvenienced, delay their activities, or temporarily find other locations for these activities. Though Project drilling is expected to take 2 months, drilling operations at an individual platform or specific drill site are temporary and are expected to take approximately one or two days of drilling per hole if there are no technical or weather delays.

Drilling operations would be prohibited on the following holidays (as well as weekend days immediately following or proceeding said holiday) because of the potential for higher traffic and recreational usage: Memorial Day, Fourth of July, and Labor Day. During these pauses in drilling, equipment may remain at the drill sites.

Hunting opportunities during the spring and fall turkey and fall deer and elk seasons may be impacted by noise and game displacement associated with the Project. Birding and photography may be reduced as drilling noise temporarily displaces wildlife.

Signs around the operating site will warn the public of any potential dangers within the Project area (i.e., open holes, hazardous material, and heavy equipment use).

K. Public Access, Safety, and Traffic Control. ***Describe how the proposed operations will not compromise public safety and access to open roads as assigned by the current District Travel Management Plan. Be sure to include traffic control measures if needed for equipment mobilization or haul routes.***

Public Access: The right of the public to lawfully use the land encompassed by the boundaries of the mining claims will not be restricted or denied by Clean Nuclear. The rights of the public do not include any activity that interferes with any mineral exploration-related activities without the claimant's consent. Clean Nuclear, in the exercise of this operating Plan, will require that its employees, subleases, contractors, subcontractors, or renters and their employees comply with all conditions of this Plan.

Safety: All operations will be conducted in a safe manner and in compliance with Occupational Safety and Health Administration (OSHA) and applicable local, state and federal requirements and guidelines. Clean Nuclear understands that failure to abide by these regulations will be grounds for termination of approval for the operating Plan by the Forest Service if the failure to comply presents a significant risk to the health, welfare, or safety of the public, agency staff, or operator's staff.

A site security plan has been developed (see Appendix 4) and will be implemented by Clean Nuclear to maintain site safety and limit the risk of public interference.

Traffic Control: Before initiating the mobilization of equipment into the project area, Clean Nuclear will notify the Hell Canyon District Ranger or other Forest Service representative. Clean Nuclear's sign plan is included in Appendix 3. Signage would be placed on any roads or trails adjacent to drill locations when drilling operations are underway. Safety signage regarding heavy equipment use on the road would be posted throughout the work area to ensure the public is aware of temporary site work.

L. Interim Shutdown Procedures. ***Describe the procedures that will be enacted if and/or when a shutdown period is required.***

No temporary or seasonal interim shutdown periods are anticipated.

M. Inspections.

The Forest Service and Clean Nuclear will agree on a schedule of inspections designed to ensure that the provisions of the operating Plan are followed. If there is uncertainty as to whether there should be an inspection before advancing in operations, the Operator will contact the Forest Service for clearance. It is understood that inspections will normally occur at the USFS's discretion and may include:

- After drill mobilization and before operation
- During operations to ensure all requirements, including fire tools and equipment, are met
- After removal of equipment
- After reseeding

Clean Nuclear and the USFS will monitor and assess the progress of reclamation activities, including revegetation and erosion control, for a minimum of 1 year. Depending on the success of the reclamation efforts, additional seeding, weed treatment, or installing erosion control structures may be required.

VI. FOREST SERVICE EVALUATION OF PLAN OF OPERATIONS

A. Required changes/modifications/special mitigation for plan of operations:

B. Bond. Reclamation of all disturbances connected with this plan of operations is covered by Reclamation Performance Bond No. ___, dated (mm/dd/yy) ___, signed by Todd Christensen (Principal) and ___ (Surety), for the penal sum of ___. This Reclamation Performance Bond is a guarantee of faithful performance with the terms and conditions listed below, and with the reclamation requirements agreed upon in the plan of

operations. This Reclamation Performance Bond also extends to and includes any unauthorized activities conducted in connection with this operation.

The bond amount for this Reclamation Performance Bond was based on a bond calculation worksheet. The bond amount may be adjusted during the term of this proposed plan of operations in response to changes in the operations or to changes in the economy. Both the Reclamation Performance Bond and the bond calculation worksheet are attached to and made part of this plan of operations. Acceptable bond securities (subject to change) include:

1. *Negotiable Treasury bills and notes which are unconditionally guaranteed as to both principle and interest in an amount equal at their par value to the penal sum of the bond; or*
2. *Certified or cashier's check, bank draft, Post Office money order, cash, assigned certificate of deposit, assigned savings account, blanket bond, or an irrevocable letter of credit equal to the penal sum of the bond.*

VII. TERMS AND CONDITIONS

A. If a bond is required, it must be furnished before approval of the plan of operations.

B. Information provided with this plan marked confidential will be treated in accordance with the agency's laws, rules, and regulations.

C. Approval of this plan does not constitute certification of ownership to any person named herein and/or recognition of the validity of any mining claim named herein.

D. Approval of this plan does not relieve me of my responsibility to comply with other applicable state or federal laws, rules, or regulations.

E. If previously undiscovered cultural resources (historic or prehistoric objects, artifacts, or sites) are exposed as a result of operations, those operations will not proceed until notification is received from the Authorized Officer that provisions for mitigating unforeseen impacts as required by 36 CFR 228.4(e) and 36 CFR 800 have been complied with.

F. This plan of operations has been approved for a period of 5 years and 7 months or until *12/15/2029*. A new or revised plan must be submitted in accordance with 36 CFR part 228, subpart A, if operations are to be continued after that time period.

VIII. OPERATING PLAN ACCEPTANCE

I/We have reviewed and agreed to comply with all conditions in this plan of operations including the required changes, modifications, special mitigation, and reclamation requirements.

I/We understand that the bond will not be released until the Authorized Officer in charge gives written approval.

Signature of Operator or Authorized Representative

Date
(mm/dd/yy)

IX. OPERATING PLAN APPROVAL

(Name)

(Title)

Signature of (Authorized Officer)

(Date)
(mm/dd/yy)

Burden and Non-Discrimination Statement

According to the Paperwork Reduction Act of 1995, an agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information collection is 0596-0022. The time required to complete this information collection is estimated to average 12 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or part of an individual's income is derived from any public assistance.

(Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at 202-720-2600 (voice and TDD).

To file a complaint of discrimination, write USDA, Director, Office of Civil Rights, 1400 Independence Avenue, SW, Washington, DC 20250-9410 or call toll free (866) 632-9992 (voice). TDD users can contact USDA through local relay or the Federal relay at (800) 877-8339 (TDD) or (866) 377-8642 (relay voice). USDA is an equal opportunity provider and employer.

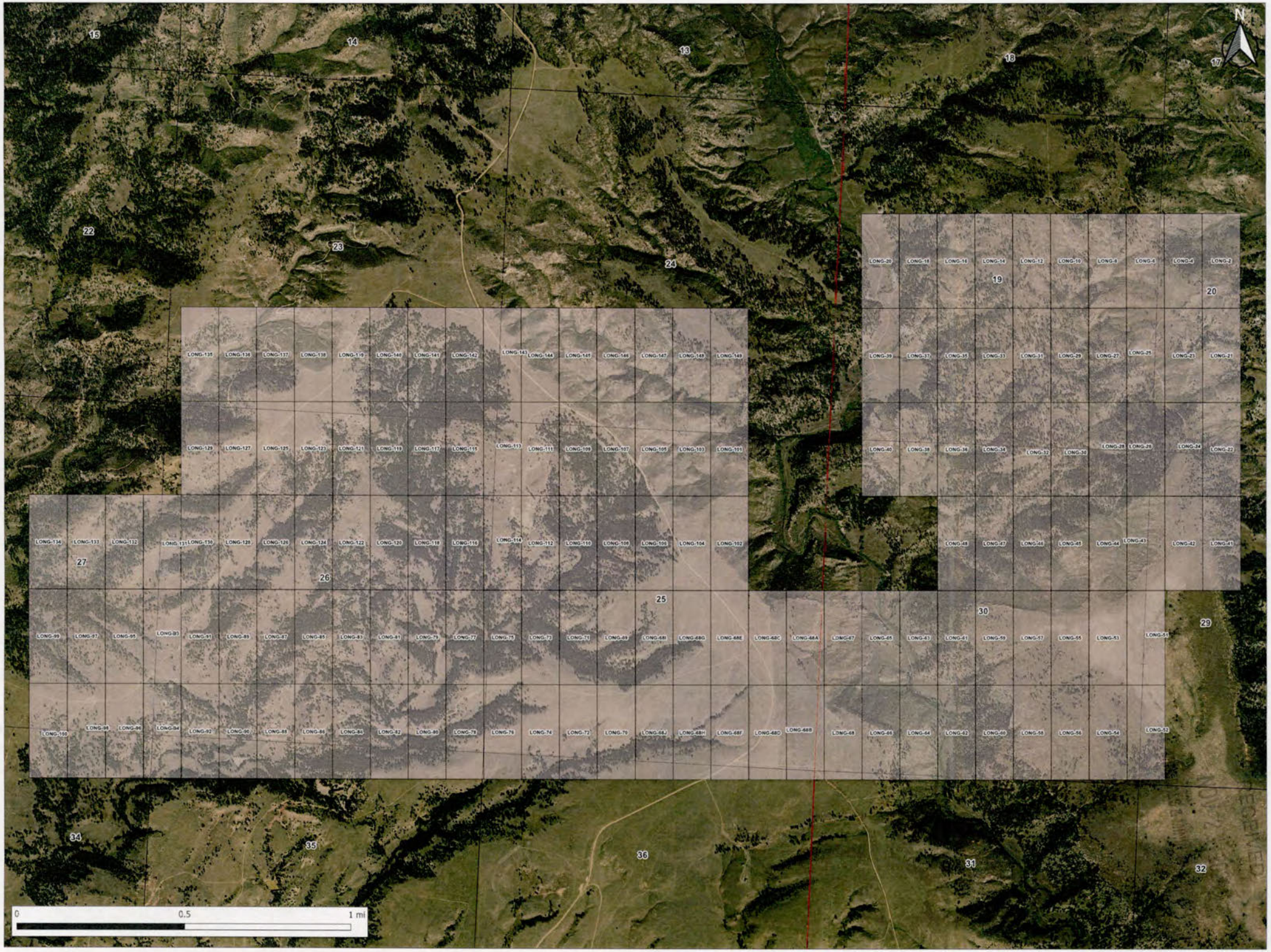
Appendix 2
Mineral Claims

October Jinx Project Mineral Claims (Page 1 of 2)

Serial Number	Claim	Disposition	Township and Range	Section(s)
MT105284232	**LONG-68 A**	ACTIVE	7S2E	25
			7S3E	30
MT105284233	**LONG-68 B**	ACTIVE	7S2E	25, 36
			7S3E	30, 31
MT105284234	**LONG-68 C**	ACTIVE	7S2E	25
MT105284235	**LONG-68 D**	ACTIVE	7S2E	25, 36
MT105284236	**LONG-68 E**	ACTIVE	7S2E	25
MT105284237	**LONG-68 F**	ACTIVE	7S2E	25, 36
MT105284238	**LONG-68 G**	ACTIVE	7S2E	25
MT105284239	**LONG-68 H**	ACTIVE	7S2E	25, 36
MT105284240	**LONG-68 I**	ACTIVE	7S2E	25
MT105284241	**LONG-68 J**	ACTIVE	7S2E	25, 36
MT105284242	LONG-69	ACTIVE	7S2E	25
MT105284243	**LONG-70**	ACTIVE	7S2E	25, 36
MT105284244	LONG-71	ACTIVE	7S2E	25
MT105284245	**LONG-72**	ACTIVE	7S2E	25, 36
MT105284246	LONG-73	ACTIVE	7S2E	25
MT105284247	LONG-74	ACTIVE	7S2E	25, 36
MT105284248	LONG-75	ACTIVE	7S2E	25, 26
MT105284249	LONG-76	ACTIVE	7S2E	25, 26, 36, 35
MT105284274	LONG-101	ACTIVE	7S2E	24, 25
MT105284275	LONG-102	ACTIVE	7S2E	25
MT105284276	LONG-103	ACTIVE	7S2E	24, 25
MT105284277	LONG-104	ACTIVE	7S2E	25
MT105284278	LONG-105	ACTIVE	7S2E	24, 25
MT105284279	LONG-106	ACTIVE	7S2E	25
MT105284280	LONG-107	ACTIVE	7S2E	24, 25
MT105284281	LONG-108	ACTIVE	7S2E	25
MT105284282	LONG-109	ACTIVE	7S2E	24, 25
MT105284283	LONG-110	ACTIVE	7S2E	25
MT105284284	LONG-111	ACTIVE	7S2E	24, 25
MT105284285	LONG-112	ACTIVE	7S2E	25
MT105284286	LONG-113	ACTIVE	7S2E	23, 24, 25, 26

October Jinx Project Mineral Claims (Page 2 of 2)

Serial Number	Claim	Disposition	Township and Range	Section(s)
MT105284287	LONG-114	ACTIVE	7S2E	25, 26
MT105284197	LONG-32	ACTIVE	7S3E	19, 30
MT105284199	LONG-34	ACTIVE	7S3E	19, 30
MT105284203	LONG-38	ACTIVE	7S3E	19, 30
MT105284205	LONG-40	ACTIVE	7S3E	19, 30
MT105284208	LONG-43	ACTIVE	7S3E	29, 30
MT105284209	LONG-44	ACTIVE	7S3E	030
MT105284210	LONG-45	ACTIVE	7S3E	030
MT105284211	LONG-46	ACTIVE	7S3E	030
MT105284212	LONG-47	ACTIVE	7S3E	030
MT105284213	LONG-48	ACTIVE	7S3E	030
MT105284214	LONG-51	ACTIVE	7S3E	29, 30
MT105284215	LONG-52	ACTIVE	7S3E	29, 30
MT105284216	LONG-53	ACTIVE	7S3E	030
MT105284217	LONG-54	ACTIVE	7S3E	030
MT105284218	LONG-55	ACTIVE	7S3E	030
MT105284219	LONG-56	ACTIVE	7S3E	030
MT105284220	LONG-57	ACTIVE	7S3E	030
MT105284221	LONG-58	ACTIVE	7S3E	030
MT105284222	LONG-59	ACTIVE	7S3E	030
MT105284223	LONG-60	ACTIVE	7S3E	30, 31
MT105284224	LONG-61	ACTIVE	7S3E	030
MT105284225	LONG-62	ACTIVE	7S3E	30, 31
MT105284226	LONG-63	ACTIVE	7S3E	030
MT105284227	LONG-64	ACTIVE	7S3E	30, 31
MT105284228	LONG-65	ACTIVE	7S3E	030
MT105284229	LONG-66	ACTIVE	7S3E	30, 31
MT105284230	LONG-67	ACTIVE	7S3E	030
MT105284231	**LONG-68**	ACTIVE	7S3E	30, 31


N
0
0.5
1 mi

Appendix 3
Signage Plan

Clean Nuclear Energy Corp's Traffic Control / Sign Plan

06/2024

DRILLING AND EXPLORATION OPERATIONS SIGNING PLAN

This traffic control sign plan is based on USFS logging and maintenance operations sign plan, modified as appropriate for drilling and exploration activities within the Black Hills National Forest.

All signs will be manufactured & installed as specified in the latest version of the Federal Highway Administration (FHWA) "**Manual on Uniform Traffic Control Devices**" (MUTCD) 2009 MUTCD with Revisions 1 and 2, May 2012 - Knowledge - FHWA MUTCD (dot.gov) and the FS publication "**Standards for Forest Service Signs & Posters**"(EM 7100-15) stelprd3810021.pdf (usda.gov) . Specific information regarding temporary traffic contol can be found in Chapter 4 of the EM 7100-15 or Part 6 of the MUTCD.

SIGN STANDARDS

SHAPE & COLOR: Generally, signs for drilling and exploration operations are considered temporary traffic control and are either diamond-shaped or rectangular. All signs will have a black legend and border on an orange retroreflective background unless shown otherwise. Hand-painted, homemade signs are not acceptable. Fluorescent paint is not reflectorized.

SUBSTRATE: Sign substrate material may be High Density Overlay (HDO) Plywood, Aluminum, Fiberglass

Reinforced Plastic, Corrugated Plastic or Roll-up Fabrics.

LEGEND: All lettering shall be minimum Series "C" alphabet, conforming to Standard Alphabets for Highway Signs. Letter size is also a function of speed - use letter size and word messages as specified in MUTCD and EM-7100-15.

SIGN PLACEMENT

Signs are to be installed in locations as agreed to in this document. All signs are to be removed, covered, or folded when operations are not in progress or the sign message is not applicable. Signs should generally be located on the right-hand side of the roadway. When special emphasis is needed, signs may be placed on both the left and right sides of the road. Sign message shall be clearly visible to road users, mounted on posts or portable sign stands.

SIGN LOCATION

Signs must be located 100-500 feet prior to the temporary traffic control activity based on speed, (both ends if a through road) to warn traffic and allow for adequate perception and

reaction time of the driver as listed in Figure 1: Table 4A.1 (EM7100-15). These numbers are intended for guidance purposes only and should be applied with engineering judgement.

Table 4A.1—Recommended spacing of advance warning signs

Speed limit or prevailing approach speed (mph)	Distance from the TTC activity area to the first sign and between subsequent signs in a series (feet)
25 or less	100
30 to 45	350
45 to 50	500

Refer to the MUTCD, chapter 6C for State and county highways and speeds greater than 50 mph.

Figure 1: Table 4A.1 Recommended Spacing of Advance Warning Signs

SIGN SUPPORTS

POSTS: Signs are to be mounted on separate posts as shown in Figure 2. Supplemental signs such as Speed Advisory plates are to be mounted on the same post as the primary sign. ***Do not mount signs on trees or other signs.*** Posts may be wood, metal, carsonite or similar material and must meet breakaway standards if within the clear zone. Wood posts that are 4 inches by 4 inches or have a cross-sectional area of 24 square inches or smaller are considered to meet breakaway standards when installed in normal soil conditions.

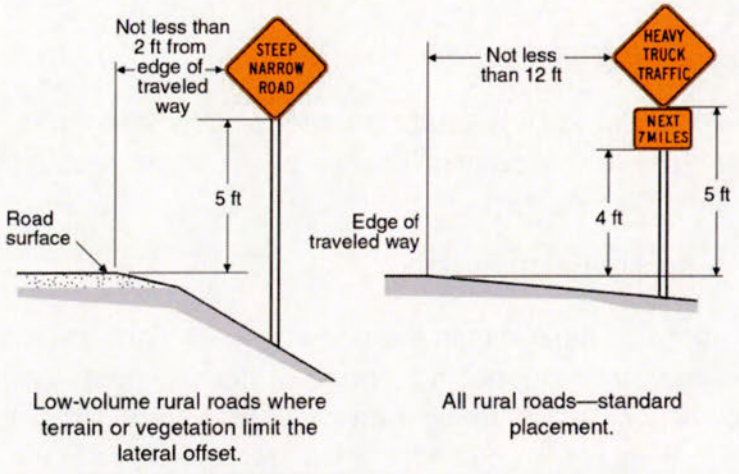


Figure 2. Sign Supports and Location

TEMPORARY/PORTABLE SUPPORTS: Portable supports may be used for short-term, short-duration, and mobile conditions, such as at drill platforms. All portable supports must

meet MUTCD standards, including breakaway. These must be a minimum of 1 foot above the traveled way. Example temporary/portable signs and supports and shown in Figure 3.

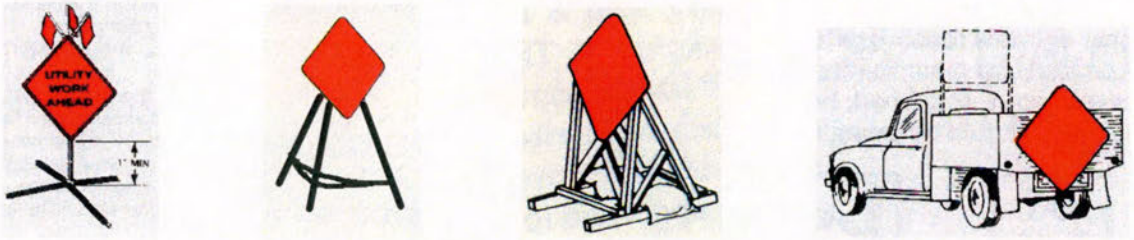


Figure 3: Examples of Temporary/Portable Supports

SIGN SIZES

Sign sizes are dependent on speed of the road and road type as shown in Figure 4 (Table 4-1 EM7100-15). Larger signs may be used whenever necessary for greater legibility or emphasis.

Table 4-1—Temporary Traffic Control sign sizes by road type

Message or Symbol	Sign code or series	Conventional road sign sizes (inches)	Low-volume roads	
			Typical sign sizes (inches) = or >35 mph	Minimum sign sizes (inches) <35 mph
REGULATORY				
TRAFFIC CONTROL POINT	EM-3	30 x 24	30 x 24	30 x 24
WARNING				
LOGGING OPERATIONS	FW11-10a	36 x 36	36 x 36	30 x 30
LOG TRUCKS	FW11-10b	36 x 36	36 x 36	30 x 30
LOG TRUCKS ENTERING ROAD	FW11-10c	36 x 36	36 x 36	30 x 30
HEAVY TRUCK TRAFFIC	FW11-10d	36 x 36	36 x 36	30 x 30

Figure 4: Table 4-1 Temporary Traffic Control Sign Sizes

TYPICAL SIGNS

The signs below in Figure 5 are not a complete listing of signs that may be needed or used. The decision to use a particular traffic control device at a specific location should be made by either an engineering study or application of engineering judgement. Sign numbers are from MUTCD. An 'F' before the sign number indicates a Forest Service sign and the last number indicates sign size, generally in the horizontal direction. The sign sizes in the signs below are for low- volume roads with a speed of less than 35 mph. Larger signs may be used whenever necessary for greater legibility or emphasis.

Additional signs will be placed at and near the drill platform during active operations, including site prepration, drilling, and reclamation (Figure 6).

Figure 5: Typical Road Signs

FW11-10d-30

W20-1-30

W21-3-30

W7-3a-24*

W13-1P-18**

W16-2P-24*

W21-1-30

W21-9-30

W20-3-30

R11-2R

Figure 6: Typical Drilling Area Signs

WARNING SIGN PLACEMENT

Project: October Jinx
Plan of Operations #: _____

Unless otherwise agreed warning signs will be placed at the following locations.

A) *Where drilling and support equipment are using main motorized roads and trails open to the public, signs will be placed warning motorists of increased truck traffic. Signs will be placed at*
   a. *Elbow Canyon Road at the USFS Boundary*
   b. *Elbow Canyon Road at the north end of the October Jinx Project Area*

B) *Signs will be placed at the beginning of system roads and trails where active drilling operations are within 100 feet of roads or trails open to the public, per the current MVUM. If it is a through road or trail, both ends of the road or trail will be signed to the extent where active drilling operations are taking place. If signs required under paragraph A already cover these roads or trails, no additional signs will be needed.*

C) *Caution or Danger – Heavy Equipment Use Ahead or Drilling signs will be placed near active drill platforms and the staging area.*

D) *Any non-gate road closures (e.g., berms, boulders) that are removed as part of Project implementation would be replaced as soon as possible after project operations behind those closures are complete. Reflective signs and orange/white barriers across roads will be used to indicate the road is closed to motorized vehicles and is accessible by permit only.*

Modifications to the signage plan will be discussed with the USFS as work begins. Specific changes may be required based on the unique site and time of year.

Agreement: Clean Nuclear Energy Corp. shall furnish, install and maintain all temporary traffic controls as defined in this document.

_____	_____
FSR / ER Representative	**Clean Nuclear Energy Corp.**
_____	_____
Date	**Date**

Appendix 4
Site Security Plan

Drill Site Security Plan for Mineral Exploration Drilling

Objective: The primary objective of this Drill Site Security Plan is to ensure the safety and security of personnel, equipment, and assets involved in mineral exploration drilling operations.

1. Site Access Control:

- Access to the drill site will be restricted to authorized personnel only.
- All entry points will be clearly marked, and access will be controlled through designated entry gates or checkpoints.
- Visitors and contractors must be pre-approved and escorted while on-site.
- Any road gates that are normally locked should remain locked unless vehicles or equipment are actively passing through them. If a gate is locked upon entry, Clean Nuclear would be required to lock the gate behind them during operations to reduce public access and ensure public safety

2. Personal Identification:

- All personnel accessing the drill site must wear visible identification at all times.
- Identification may include the individual's name, role, and company affiliation.

3. Perimeter Security:

- The drill site perimeter may be secured with flagging to limit unauthorized entry.
- Clean Nuclear personnel will monitor the perimeter regularly to detect any breaches or suspicious activity.
- Surveillance cameras may be installed at strategic locations to enhance perimeter security if necessary.
- Particular attention will be given to drill sumps to prevent animals and birds as well as personnel from falling into one. Open sumps at drill locations would have a barrier around them (e.g., hurricane fencing or something similar) sufficient to prevent cattle and big game from walking into the sump. Open sumps should be covered to the maximum extent possible with material to discourage birds or bats from entering the sumps. This material should be something other than nylon or mesh netting to prevent birds and bats from becoming entangled in the covering

4. Equipment Security:

- All drilling equipment, vehicles, and machinery will be securely parked and immobilized when not in use.
- Locks and immobilization devices will be utilized to prevent unauthorized use or theft of equipment.
- Equipment serial numbers and identification tags will be recorded and monitored to facilitate tracking and recovery in case of theft.

5. **Materials Control:**
    - Drilling materials, fuels, and chemicals will be stored in designated areas with appropriate signage and containment measures.
    - Inventory logs will be maintained to track the movement and usage of materials, with regular audits conducted to ensure compliance.
6. **Emergency Response Preparedness:**
    - Emergency response protocols will be established and communicated to all personnel.
    - Emergency contact information, including local emergency services and medical facilities, will be posted prominently at the drill site.
    - Regular drills and training exercises will be conducted to ensure all personnel are familiar with emergency procedures.
7. **Communication Systems:**
    - Reliable communication systems, including two-way radios and satellite phones, will be provided to all personnel.
    - Emergency communication channels will be established to facilitate rapid response in case of emergencies.
8. **Environmental Protection Measures:**
    - Measures will be implemented to minimize the environmental impact of drilling operations, including spill prevention and waste management protocols.
    - Environmental monitoring will be conducted regularly to ensure compliance with regulations and minimize ecological disturbances.
9. **Reporting and Documentation:**
    - All security incidents, breaches, or suspicious activities will be reported immediately to designated personnel (Clean Nuclear's Project Manager or delegated representative) and documented for further investigation.
    - Incident reports will include details of the event, actions taken, and recommendations for preventive measures.
10. **Continuous Improvement:**
    - The effectiveness of the Drill Site Security Plan will be reviewed annually or as site conditions change and evaluated to identify areas for improvement.
    - Feedback from personnel, security audits, and incident investigations will be utilized to refine security protocols and enhance overall security posture.

Conclusion: The implementation of this Drill Site Security Plan will ensure the safety, security, and integrity of mineral exploration drilling operations. By establishing robust security measures and fostering a culture of vigilance among personnel, we aim to mitigate risks and safeguard our assets, personnel, and the surrounding environment.

Appendix 5
Water Quality Results from B5

And

Report on Water Sampling and Limited Aquifer Testing
Chord Project
Fall River County, South Dakota
by W.T. Cohan, 1984

MIDCONTINENT
TESTING LABORATORIES, INC.

2381 South Plaza Drive P.O. Box 3388 Rapid City, SD 57709
(605) 348-0111 -- www.thechemistrylab.com

Sample Site: MW5-072823
Sampled: 07/28/23 at 08:00 AM by John Glasscock
Sample Matrix: Water

Lab ID#: 20230731104
Received: 07/28/23 at 11:25 AM by Eric Fuehrer
Account: w1814 - Cowboy Exploration, LLC

JOHN GLASSCOCK
COWBOY EXPLORATION, LLC
33 FOX CREEK RD
PO BOX 2498
LARAMIE, WY 82073

Parameter	Result	Units	DF	MDL	PQL	Method	Analyst	Date
Physical Properties								
Electrical Conductivity	1370	µmhos/cm	1	0.168	5.00	SM 2510B	JAM	07/31/23
pH	7.65	S.U.	1			SM 4500-H+ B	JAM	07/31/23
Total Dissolved Solids	852	mg/L	100ml	12.8	50.0	SM 2540 C	MEM	07/31/23
Total Suspended Solids	50.0	mg/L	100ml	2.83	10.0	SM 2540 D	MEM	07/31/23
Non-Metallics								
Alkalinity (CaCO3)	361	mg/L	1	0.425	10.0	SM 2320 B	JAM	07/31/23
Bicarbonate	441	mg/L	1	0.519	10.0	SM 2320 B	JAM	07/31/23
Carbonate	0.00	mg/L	1	0.213	5.00	SM 2320 B	JAM	07/31/23
Chloride (Cl-)	10.6	mg/L	1	0.230	0.500	SM 4500-Cl E	BLL	08/01/23
Fluoride	0.256	mg/L	1	0.003	0.010	SM 4500 F-C	TMN	07/31/23
Nitrogen, Ammonia (NH3)	< 0.050	mg/L	1	0.004	0.050	Timberline-001	AED	08/01/23
Nitrogen, Nitrate (NO3)	0.107	mg/L	1	0.007	0.050	SM 4500-NO3 F	BLL	08/01/23
Sulfate (SO4)	382	mg/L	10	9.15	100	SM 4500-SO4 E	BLL	08/01/23
Metals - Dissolved								
Calcium (Ca)	69.0	mg/L	3	0.285	3.00	SM 3111 B	GRT	07/31/23
Magnesium (Mg)	32.2	mg/L	1	0.090	0.500	SM 3111 B	GRT	07/31/23
Potassium (K)	12.9	mg/L	3	0.289	1.50	SM 3111 B	GRT	08/01/23
Sodium (Na)	211	mg/L	12	0.681	6.00	SM 3111 B	GRT	07/31/23
Metals - Total								
Aluminum (Al)	0.861	mg/L	10			EPA 200.8	TNA	08/02/23
Arsenic (As)	< 0.005	mg/L	10	0.000496	0.005	EPA 200.8	TNA	08/02/23
Barium (Ba)	0.044	mg/L	10	0.000138	0.005	EPA 200.8	TNA	08/02/23
Boron (B)	0.100	mg/L	10			EPA 200.8	TNA	08/02/23
Cadmium (Cd)	< 0.001	mg/L	10	0.00035	0.001	EPA 200.8	TNA	08/02/23
Chromium (Cr)	0.004	mg/L	10	0.000053	0.001	EPA 200.8 DRC	TNA	08/02/23
Copper (Cu)	0.011	mg/L	10	0.000168	0.005	EPA 200.8	TNA	08/02/23
Iron (Fe)	1.47	mg/L	10	0.002	0.050	EPA 200.8	TNA	08/02/23

Report of Analysis for: **Cowboy Exploration, LLC** Sample Site: **MW5-072823**

Parameter	Result	Units	DF	MDL	PQL	Method	Analyst/Date
Metals - Total							
Lead (Pb)	0.007	mg/L	10	0.000094	0.001	EPA 200.8	TNA 08/02/23
Manganese (Mn)	0.327	mg/L	10	0.000142	0.010	EPA 200.8	TNA 08/02/23
Mercury (Hg)	< 0.0002	mg/L	1	0.000033	0.0002	EPA 245.1	GRT 08/02/23
Molybdenum (Mo)	0.013	mg/L	10	0.000057	0.001	EPA 200.8	TNA 08/02/23
Nickel (Ni)	0.006	mg/L	10	0.00023	0.005	EPA 200.8	TNA 08/02/23
Selenium (Se)	< 0.005	mg/L	10	0.00079	0.005	EPA 200.8	TNA 08/02/23
Silicon (Si)	6.81	mg/L	1			SM 3111 D	GRT 08/11/23
Silver (Ag)	< 0.001	mg/L	10	0.00004	0.001	EPA 200.8	TNA 08/02/23
Uranium (U)	0.015	mg/L	10			EPA 200.8	TNA 08/02/23
Vanadium (V)	< 0.005	mg/L	10	0.000063	0.005	EPA 200.8	TNA 08/02/23
Zinc (Zn)	0.148	mg/L	10	0.005	0.050	EPA 200.8	TNA 08/02/23
Anion - Cation Balance							
Anions	15.5	meq/L	1			Calculation	EJF 08/03/23
Anion - Cation Balance	0.320	%	1			Calculation	EJF 08/03/23
Cations	15.6	meq/L	1			Calculation	EJF 08/03/23
Radiological							
Gross Alpha	13.9	pCi/L	1			EPA 900.0	SYS 09/02/23
Gross Beta	9.94	pCi/L	1			EPA 900.0	SYS 09/02/23
Radium-226	0.290	pCi/L	1			EPA 903.1	SYS 09/01/23
Radium-228	0.877	pCi/L	1			EPA 904.0	SYS 08/29/23
Precision Data							
Gross Alpha precision	± 4.26	pCi/L	1			SC - Gross Alpha precision	SYS 09/02/23
Gross Beta precision	± 2.04	pCi/L	1			SC - Gross Beta precision	SYS 09/02/23
Radium-226 precision	0.533	pCi/L	1			SC-Radium 226 precision	SYS 09/01/23
Radium-228 precision	0.513	pCi/L	1			SC-Radium 228 precision	SYS 08/29/23
MDA Data							
Gross Alpha MDA	4.52	pCi/L	1			SC - Gross Alpha MDA	SYS 09/02/23
Gross Beta MDA	1.03	pCi/L	1			SC - Gross Beta MDA	SYS 09/02/23
Radium-226 MDA	0.951	pCi/L	1			SC - Radium 226 MDA	SYS 09/01/23
Radium-228 MDA	0.962	pCi/L	1			SC - Radium 228 MDA	SYS 08/29/23

Report Approved By:

Report Approved On: 9/11/2023 2:21:26 PM

MIDCONTINENT
TESTING LABORATORIES, INC.

2381 South Plaza Drive P.O. Box 3388 Rapid City, SD 57709
(605) 348-0111 -- www.thechemistrylab.com

Lab Numbers: 20230731104 - 20230731104

QC Sample Report

Parameter	Lab#	QC Value	Smp Value	Spike	DF	Result	Limits	Method	
Spike									
TDS	0731206	1680	669	1000	100ml	100.6 %	(90.84) - (107.4)	SM 2540 C	
TSS	0731202	48.0	< 10.0	50.0	100ml	96.0 %	(86.60) - (112.6)	SM 2540 D	
Chloride	0801310	8.17	2.85	5.00	1	106.4 %	(90.36) - (114.4)	SM 4500-Cl E	
Fluoride	0801825	1.14	0.720	0.400	1	105.8 %	(85.40) - (121.9)	SM 4500 F-C	
Fluoride	0801976	0.969	0.586	0.400	1	95.8 %	(85.40) - (121.9)	SM 4500 F-C	
Fluoride	0801976	0.969	0.586	0.400	1	95.8 %	(85.40) - (121.9)	SM 4500 F-C	
Fluoride	0801825	1.14	0.720	0.400	1	105.8 %	(85.40) - (121.9)	SM 4500 F-C	
N, Ammonia	0801309	2.01	< 0.050	2.00	1	100.4 %	(94.98) - (110.8)	Timberline-001	
N, Ammonia	0801207	1.81	-0.030	2.00	1	91.9 %	(94.98) - (110.8)	Timberline-001	X
- Result is within QC guidelines of 90 - 110%									
N, Ammonia	0801305	2.04	< 0.050	2.00	1	102.2 %	(94.98) - (110.8)	Timberline-001	
N, Nitrate	0731107	0.405	0.009	0.400	1	99.0 %	(83.17) - (112.3)	SM 4500-NO3 F	
N, Nitrate	0731207	12.6	8.76	0.400	10	95.4 %	(83.17) - (112.3)	SM 4500-NO3 F	
N, Nitrate	0801207	3.45	2.70	0.400	2	93.1 %	(83.17) - (112.3)	SM 4500-NO3 F	
N, Nitrate	0801105	9.82	7.83	0.400	5	99.90%	(83.17) - (112.3)	SM 4500-NO3 F	
N, Nitrate	0731813	0.691	0.290	0.400	1	100.3 %	(83.17) - (112.3)	SM 4500-NO3 F	
Sulfate	0801104	774	614	19.2	10	95.9 %	(86.30) - (118.8)	SM 4500-SO4 E	
Sulfate	0731205	247	157	19.2	5	99.92%	(86.30) - (118.8)	SM 4500-SO4 E	
Calcium - D	0728104	228	124	10.0	10	104.0 %	(86.39) - (110.4)	SM 3111 B	
Calcium - D	0728106	165	67.3	10.0	10	97.3 %	(86.39) - (110.4)	SM 3111 B	
Magnesium - D	0728106	25.8	15.8	10.0	1	100.5 %	(84.08) - (107.6)	SM 3111 B	
Magnesium - D	0728104	359	260	10.0	10	98.9 %	(84.08) - (107.6)	SM 3111 B	
Potassium - D	0801103	44.3	12.3	3.00	10	106.6 %	(96.71) - (112.6)	SM 3111 B	
Sodium - D	0728105	93.0	39.4	5.00	10	107.2 %	(89.67) - (117.2)	SM 3111 B	
Sodium - D	0728106	14.7	9.78	5.00	1	97.8 %	(89.67) - (117.2)	SM 3111 B	
Aluminum - T	0731104	1.09	0.861	0.025	10	91.1 %	(61.95) - (129.5)	EPA 200.8	
Arsenic - T	0731104	0.244	< 0.005	0.025	10	97.7 %	(83.20) - (106.9)	EPA 200.8	
Arsenic - T	0726913	513	27.3	0.025	20000	97.1 %	(83.20) - (106.9)	EPA 200.8	
Barium - T	0731104	0.289	0.044	0.025	10	98.0 %	(80.61) - (107.6)	EPA 200.8	
Barium - T	0726913	695	243	0.025	20000	90.4 %	(80.61) - (107.6)	EPA 200.8	
Boron - T	0726913	378	18.9	0.025	20000	71.9 %	(81.42) - (122.3)	EPA 200.8	X
- Result is within QC guidelines of 70 - 130%									
Boron - T	0731104	0.328	0.100	0.025	10	91.3 %	(81.42) - (122.3)	EPA 200.8	
Cadmium - T	0731104	0.237	< 0.001	0.025	10	95.0 %	(83.98) - (105.1)	EPA 200.8	
Cadmium - T	0726913	469	1.49	0.025	20000	93.5 %	(83.98) - (105.1)	EPA 200.8	
Chromium - T	0731104	0.241	0.004	0.025	10	94.9 %	(81.91) - (112.8)	EPA 200.8 DRC	
Chromium - T	0726913	490	24.1	0.025	20000	93.1 %	(81.91) - (112.8)	EPA 200.8 DRC	
Copper - T	0731104	0.249	0.011	0.025	10	95.3 %	(83.46) - (101.0)	EPA 200.8	

Lab Numbers: **20230731104 - 20230731104**

Parameter	Lab#	QC Value	Smp Value	Spike	DF	Result	Limits	Method	
Spike									
Copper - T	0726913	694	225	0.025	20000	93.9 %	(83.46) - (101.0)	EPA 200.8	
Iron - T	0731104	2.69	1.47	0.125	10	98.2 %	(75.20) - (116.8)	EPA 200.8	
Lead - T	0726913	483	29.6	0.025	20000	90.6 %	(85.47) - (109.3)	EPA 200.8	
Lead - T	0731104	0.255	0.007	0.025	10	99.3 %	(85.47) - (109.3)	EPA 200.8	
Manganese - T	0726913	1380	943	0.025	20000	87.9 %	(78.79) - (122.3)	EPA 200.8	
Manganese - T	0731104	0.571	0.327	0.025	10	97.5 %	(78.79) - (122.3)	EPA 200.8	
Mercury - T	0731202	0.0020	< 0.0002	0.002	1	101.0 %	(86.71) - (117.5)	EPA 245.1	
Mercury - T	0731301	0.0028	0.0008	0.002	1	101.0 %	(86.71) - (117.5)	EPA 245.1	
Mercury - T	0731306	0.0022	< 0.0002	0.002	1	109.5 %	(86.71) - (117.5)	EPA 245.1	
Mercury - T	0801105	0.0020	< 0.0002	0.002	1	97.5 %	(86.71) - (117.5)	EPA 245.1	
Molybdenum - T	0731104	0.246	0.013	0.025	10	93.1 %	(86.73) - (115.5)	EPA 200.8	
Molybdenum - T	0726913	469	3.39	0.025	20000	93.2 %	(86.73) - (115.5)	EPA 200.8	
Nickel - T	0726913	516	48.9	0.025	20000	93.4 %	(80.90) - (112.0)	EPA 200.8	
Nickel - T	0731104	0.242	0.006	0.025	10	94.2 %	(80.90) - (112.0)	EPA 200.8	
Selenium - T	0726913	2450	13.5	0.125	20000	97.4 %	(84.50) - (103.9)	EPA 200.8	
Selenium - T	0731104	1.21	< 0.005	0.125	10	96.4 %	(84.50) - (103.9)	EPA 200.8	
Silicon - T	0731104	17.2	6.81	10.0	1	103.7 %	(83.37) - (116.9)	SM 3111 D	
Silver - T	0731104	0.229	< 0.001	0.025	10	91.5 %	(78.42) - (106.2)	EPA 200.8	
Silver - T	0726913	463	0.992	0.025	20000	92.3 %	(78.42) - (106.2)	EPA 200.8	
Uranium - T	0731104	0.277	0.015	0.025	10	104.8 %	(76.94) - (125.4)	EPA 200.8	
Uranium - T	0726913	469	1.29	0.025	20000	93.6 %	(76.94) - (125.4)	EPA 200.8	
Vanadium - T	0731104	0.252	< 0.005	0.025	10	100.8 %	(88.72) - (118.7)	EPA 200.8	
Vanadium - T	0726913	504	24.8	0.025	20000	95.9 %	(88.72) - (118.7)	EPA 200.8	
Zinc - T	0731104	0.389	0.148	0.025	10	96.3 %	(73.75) - (123.6)	EPA 200.8	
Zinc - T	0726913	855	396	0.025	20000	91.8 %	(73.75) - (123.6)	EPA 200.8	
Matrix Spike Duplicate									
Chloride	0801310	8.15	8.17		1	-0.245%	(-5.470) - (5.819)	SM 4500-Cl E	
Fluoride	0801976	0.972	0.969		1	0.309%	(-3.401) - (4.040)	SM 4500 F-C	
Fluoride	0801825	1.15	1.14		1	0.436%	(-3.401) - (4.040)	SM 4500 F-C	
Fluoride	0801976	0.972	0.969		1	0.309%	(-3.401) - (4.040)	SM 4500 F-C	
Fluoride	0801825	1.15	1.14		1	0.436%	(-3.401) - (4.040)	SM 4500 F-C	
N, Ammonia	0801305	2.23	2.04		1	8.77%	(-4.621) - (6.104)	Timberline-001	X
- Recovery was within 10% of expected value									
N, Ammonia	0801309	2.07	2.01		1	2.93%	(-4.621) - (6.104)	Timberline-001	
N, Ammonia	0801207	1.66	1.81		1	-8.66%	(-4.621) - (6.104)	Timberline-001	X
- Recovery was within 10% of expected value									
N, Nitrate	0801105	9.89	9.82		5	0.629%	(-3.451) - (3.363)	SM 4500-NO3 F	
N, Nitrate	0731107	0.401	0.405		1	-0.993%	(-3.451) - (3.363)	SM 4500-NO3 F	
N, Nitrate	0731207	12.5	12.6		10	-0.758%	(-3.451) - (3.363)	SM 4500-NO3 F	
N, Nitrate	0731813	0.696	0.691		1	0.721%	(-3.451) - (3.363)	SM 4500-NO3 F	
N, Nitrate	0801207	3.42	3.45		2	-0.874%	(-3.451) - (3.363)	SM 4500-NO3 F	
Sulfate	0731205	253	247		5	2.44%	(-4.014) - (4.651)	SM 4500-SO4 E	
Sulfate	0801104	759	774		10	-1.85%	(-4.014) - (4.651)	SM 4500-SO4 E	
Calcium - D	0728106	161	165		10	-2.02%	(-8.158) - (7.143)	SM 3111 B	
Calcium - D	0728104	215	228		10	-5.93%	(-8.158) - (7.143)	SM 3111 B	

Lab Numbers: **20230731104 - 20230731104**

Parameter	Lab#	QC Value	Smp Value	Spike	DF	Result	Limits	Method	
Matrix Spike Duplicate									
Magnesium - D	0728104	348	359		10	-2.97%	(-3.169) - (3.281)	SM 3111 B	
Magnesium - D	0728106	25.6	25.8		1	-0.817%	(-3.169) - (3.281)	SM 3111 B	
Potassium - D	0801103	44.1	44.3		10	-0.407%	(-2.910) - (2.190)	SM 3111 B	
Sodium - D	0728105	95.9	93.0		10	3.06%	(-4.158) - (4.884)	SM 3111 B	
Sodium - D	0728106	14.2	14.7		1	-3.33%	(-4.158) - (4.884)	SM 3111 B	
Aluminum - T	0731104	1.07	1.09	0.025	10	-1.36%	(-9.854) - (12.85)	EPA 200.8	
Arsenic - T	0726913	509	513		20000	-0.826%	(-12.61) - (14.51)	EPA 200.8	
Arsenic - T	0731104	0.239	0.244	0.025	10	-2.36%	(-12.61) - (14.51)	EPA 200.8	
Barium - T	0731104	0.277	0.289	0.025	10	-4.33%	(-10.50) - (10.65)	EPA 200.8	
Barium - T	0726913	693	695		20000	-0.215%	(-10.50) - (10.65)	EPA 200.8	
Boron - T	0726913	392	378		20000	3.45%	(-13.40) - (13.49)	EPA 200.8	
Cadmium - T	0731104	0.230	0.237	0.025	10	-3.38%	(-11.54) - (12.27)	EPA 200.8	
Cadmium - T	0726913	464	469		20000	-1.19%	(-11.54) - (12.27)	EPA 200.8	
Chromium - T	0726913	442	490		20000	-10.2 %	(-13.00) - (12.22)	EPA 200.8 DRC	
Chromium - T	0731104	0.235	0.241	0.025	10	-2.48%	(-13.00) - (12.22)	EPA 200.8 DRC	
Copper - T	0726913	687	694		20000	-1.15%	(-9.842) - (9.279)	EPA 200.8	
Copper - T	0731104	0.241	0.249	0.025	10	-3.25%	(-9.842) - (9.279)	EPA 200.8	
Iron - T	0731104	2.60	2.69	0.125	10	-3.39%	(-10.59) - (10.54)	EPA 200.8	
Lead - T	0726913	478	483		20000	-0.952%	(-13.00) - (11.03)	EPA 200.8	
Lead - T	0731104	0.251	0.255	0.025	10	-1.83%	(-13.00) - (11.03)	EPA 200.8	
Manganese - T	0731104	0.552	0.571	0.025	10	-3.34%	(-8.811) - (8.875)	EPA 200.8	
Manganese - T	0726913	1380	1380		20000	-0.144%	(-8.811) - (8.875)	EPA 200.8	
Mercury - T	0731306	0.0022	0.0022		1	0.456%	(-9.538) - (9.761)	EPA 245.1	
Mercury - T	0801105	0.0019	0.0020		1	-4.19%	(-9.538) - (9.761)	EPA 245.1	
Mercury - T	0731202	0.0020	0.0020		1	-3.02%	(-9.538) - (9.761)	EPA 245.1	
Mercury - T	0731301	0.0028	0.0028		1	0.360%	(-9.538) - (9.761)	EPA 245.1	
Molybdenum - T	0726913	467	469		20000	-0.540%	(-6.092) - (8.175)	EPA 200.8	
Molybdenum - T	0731104	0.243	0.246	0.025	10	-1.17%	(-6.092) - (8.175)	EPA 200.8	
Nickel - T	0731104	0.234	0.242	0.025	10	-3.25%	(-9.121) - (10.09)	EPA 200.8	
Nickel - T	0726913	512	516		20000	-0.799%	(-9.121) - (10.09)	EPA 200.8	
Selenium - T	0731104	1.18	1.21	0.125	10	-2.24%	(-11.12) - (11.35)	EPA 200.8	
Selenium - T	0726913	2410	2450		20000	-1.40%	(-11.12) - (11.35)	EPA 200.8	
Silicon - T	0731104	18.0	17.2		1	4.55%	(-7.976) - (9.559)	SM 3111 D	
Silver - T	0731104	0.225	0.229	0.025	10	-1.48%	(-12.37) - (11.74)	EPA 200.8	
Silver - T	0726913	463	463		20000	0.134%	(-12.37) - (11.74)	EPA 200.8	
Uranium - T	0731104	0.269	0.277	0.025	10	-2.80%	(-11.35) - (7.659)	EPA 200.8	
Uranium - T	0726913	464	469		20000	-1.12%	(-11.35) - (7.659)	EPA 200.8	
Vanadium - T	0726913	501	504		20000	-0.622%	(-11.32) - (11.21)	EPA 200.8	
Vanadium - T	0731104	0.246	0.252	0.025	10	-2.50%	(-11.32) - (11.21)	EPA 200.8	
Zinc - T	0731104	0.375	0.389	0.025	10	-3.48%	(-8.748) - (10.80)	EPA 200.8	
Zinc - T	0726913	850	855		20000	-0.646%	(-8.748) - (10.80)	EPA 200.8	
Duplicate									
Conductivity	0731104	1390	1370		1	0.942%	(-1.027) - (0.6961)	SM 2510B	X
- Recovery was within 10% of expected value									
Conductivity	0731108	256	255		1	0.391%	(-1.027) - (0.6961)	SM 2510B	

Lab Numbers: **20230731104 - 20230731104**

Parameter	Lab#	QC Value	Smp Value	Spike	DF	Result	Limits	Method	
Duplicate									
Conductivity	0731206	1040	1040		1	-0.192%	(-1.027) - (0.6961)	SM 2510B	
Conductivity	0731105	1040	1030		1	0.776%	(-1.027) - (0.6961)	SM 2510B	X
- Recovery was within 10% of expected value									
pH	0731104	7.61	7.65		1	-0.524%	(-1.291) - (1.443)	SM 4500-H+ B	
TDS	0731104	881	852		100ml	3.35%	(-3.662) - (7.929)	SM 2540 C	
TSS	0731104	52.0	50.0		100ml	3.92%	(-19.61) - (29.67)	SM 2540 D	
Alkalinity	0731104	352	361		1	-2.52%	(-2.918) - (2.977)	SM 2320 B	
Bicarbonate	0731104	429	441		1	-2.76%	(-3.772) - (2.963)	SM 2320 B	
Carbonate	0731104	0.00	0.00		1	0.00%	(-14.13) - (11.29)	SM 2320 B	
Chloride	0801310	2.85	2.82		1	1.06%	(-7.169) - (7.616)	SM 4500-Cl E	
Sulfate	0801104	614	617		10	-0.533%	(-5.072) - (4.043)	SM 4500-SO4 E	
Sulfate	0731205	157	156		5	0.697%	(-5.072) - (4.043)	SM 4500-SO4 E	
Initial Calibration Verification									
Conductivity		309	313		1	-1.28%	(-4.329) - (4.557)	SM 2510B	
pH		7.00	7.00		1	0.00%	(-0.8726) - (0.4726)	SM 4500-H+ B	
Chloride		26.1	25.0		1	4.28%	(-11.61) - (13.10)	SM 4500-Cl E	
Fluoride		0.382	0.400		1	-4.50%	(-13.31) - (6.058)	SM 4500 F-C	
Fluoride		0.382	0.400		1	-4.50%	(-13.31) - (6.058)	SM 4500 F-C	
N, Ammonia		2.47	2.50		1	-1.07%	(-7.965) - (9.998)	Timberline-001	
N, Nitrate		1.00	1.00		1	0.00%	(-4.578) - (5.808)	SM 4500-NO3 F	
Sulfate		51.5	50.0		1	2.98%	(-0.7880) - (8.208)	SM 4500-SO4 E	
Aluminum - D		0.050	0.050		1	-0.900%	(-8.865) - (7.659)	EPA 200.8	
Arsenic - D		0.051	0.050		1	0.900%	(-7.521) - (7.119)	EPA 200.8	
Barium - D		0.050	0.050		1	0.120%	(-8.917) - (7.185)	EPA 200.8	
Boron - D		0.052	0.050		1	3.70%	(-2.574) - (11.07)	EPA 200.8	
Cadmium - D		0.049	0.050		1	-1.50%	(-7.455) - (7.593)	EPA 200.8	
Chromium - D		0.051	0.050		1	1.86%	(-12.51) - (12.03)	EPA 200.8 DRC	
Copper - D		0.050	0.050		1	-0.040%	(-7.798) - (7.798)	EPA 200.8	
Iron - D		0.249	0.250		1	-0.316%	(-15.28) - (13.78)	EPA 200.8	
Lead - D		0.050	0.050		1	0.540%	(-7.314) - (7.742)	EPA 200.8	
Manganese - D		0.051	0.050		1	1.34%	(-7.046) - (7.870)	EPA 200.8	
Molybdenum - D		0.049	0.050		1	-1.82%	(-6.671) - (11.97)	EPA 200.8	
Nickel - D		0.050	0.050		1	-0.860%	(-7.229) - (7.769)	EPA 200.8	
Selenium - D		0.252	0.250		1	0.668%	(-8.694) - (5.704)	EPA 200.8	
Silver - D		0.050	0.050		1	0.680%	(-6.540) - (8.090)	EPA 200.8	
Uranium - D		0.051	0.050		1	2.08%	(-7.946) - (11.62)	EPA 200.8	
Vanadium - D		0.050	0.050		1	-0.200%	(-5.458) - (8.634)	EPA 200.8	
Zinc - D		0.050	0.050		1	0.440%	(-6.815) - (9.233)	EPA 200.8	
Mercury - T		0.0031	0.0030		1	1.67%	(-14.08) - (11.22)	EPA 245.1	
Continuing Calibration Verification									
Conductivity		1420	1410		1	0.212%	(-3.297) - (3.359)	SM 2510B	
pH		9.99	10.0		1	-0.100%	(-0.9583) - (1.497)	SM 4500-H+ B	
pH		6.97	7.00		1	-0.429%	(-0.9583) - (1.497)	SM 4500-H+ B	
pH		4.06	4.00		1	1.50%	(-0.9583) - (1.497)	SM 4500-H+ B	X
- Recovery was within 10% of expected value									

Lab Numbers: **20230731104 - 20230731104**

Parameter	Lab#	QC Value	Smp Value	Spike	DF	Result	Limits	Method
Continuing Calibration Verification								
TDS		936	1000		100ml	-6.40%	(-9.454) - (-0.7861)	SM 2540 C
TSS		48.0	50.0		100ml	-4.00%	(-11.91) - (7.514)	SM 2540 D
Alkalinity		306	318		1	-3.85%	(-5.630) - (3.293)	SM 2320 B
Alkalinity		104	106		1	-2.23%	(-5.630) - (3.293)	SM 2320 B
Chloride		26.0	25.0		1	3.92%	(-12.07) - (8.076)	SM 4500-Cl E
Chloride		26.0	25.0		1	3.84%	(-12.07) - (8.076)	SM 4500-Cl E
Fluoride		0.991	1.00		1	-0.900%	(-9.528) - (5.248)	SM 4500 F-C
Fluoride		0.965	1.00		1	-3.50%	(-9.528) - (5.248)	SM 4500 F-C
Fluoride		0.477	0.500		1	-4.60%	(-9.528) - (5.248)	SM 4500 F-C
Fluoride		0.477	0.500		1	-4.60%	(-9.528) - (5.248)	SM 4500 F-C
Fluoride		0.991	1.00		1	-0.900%	(-9.528) - (5.248)	SM 4500 F-C
Fluoride		0.965	1.00		1	-3.50%	(-9.528) - (5.248)	SM 4500 F-C
N, Ammonia		0.993	1.00		1	-0.690%	(-11.13) - (10.77)	Timberline-001
N, Ammonia		0.494	0.500		1	-1.26%	(-11.13) - (10.77)	Timberline-001
N, Ammonia		2.46	2.50		1	-1.60%	(-11.13) - (10.77)	Timberline-001
N, Ammonia		2.44	2.50		1	-2.34%	(-11.13) - (10.77)	Timberline-001
N, Ammonia		2.46	2.50		1	-1.52%	(-11.13) - (10.77)	Timberline-001
N, Nitrate		1.04	1.00		1	4.00%	(-3.306) - (6.236)	SM 4500-NO3 F
N, Nitrate		1.04	1.00		1	3.90%	(-3.306) - (6.236)	SM 4500-NO3 F
N, Nitrate		1.04	1.00		1	4.40%	(-3.306) - (6.236)	SM 4500-NO3 F
N, Nitrate		1.03	1.00		1	2.90%	(-3.306) - (6.236)	SM 4500-NO3 F
N, Nitrate		1.03	1.00		1	3.20%	(-3.306) - (6.236)	SM 4500-NO3 F
Sulfate		52.7	50.0		1	5.40%	(1.225) - (9.437)	SM 4500-SO4 E
Sulfate		52.2	50.0		1	4.44%	(1.225) - (9.437)	SM 4500-SO4 E
Aluminum - D		0.048	0.050		1	-3.68%	(-16.32) - (8.894)	EPA 200.8
Aluminum - D		0.047	0.050		1	-6.90%	(-16.32) - (8.894)	EPA 200.8
Aluminum - D		0.048	0.050		1	-4.68%	(-16.32) - (8.894)	EPA 200.8
Arsenic - D		0.049	0.050		1	-2.28%	(-11.03) - (9.165)	EPA 200.8
Arsenic - D		0.048	0.050		1	-4.88%	(-11.03) - (9.165)	EPA 200.8
Arsenic - D		0.047	0.050		1	-5.74%	(-11.03) - (9.165)	EPA 200.8
Arsenic - D		0.048	0.050		1	-4.42%	(-11.03) - (9.165)	EPA 200.8
Arsenic - D		0.048	0.050		1	-4.46%	(-11.03) - (9.165)	EPA 200.8
Barium - D		0.048	0.050		1	-3.36%	(-13.65) - (0.8379)	EPA 200.8
Barium - D		0.047	0.050		1	-5.14%	(-13.65) - (0.8379)	EPA 200.8
Barium - D		0.047	0.050		1	-5.56%	(-13.65) - (0.8379)	EPA 200.8
Barium - D		0.047	0.050		1	-6.52%	(-13.65) - (0.8379)	EPA 200.8
Barium - D		0.046	0.050		1	-7.14%	(-13.65) - (0.8379)	EPA 200.8
Boron - D		0.049	0.050		1	-2.66%	(-16.50) - (12.83)	EPA 200.8
Boron - D		0.046	0.050		1	-8.30%	(-16.50) - (12.83)	EPA 200.8
Boron - D		0.051	0.050		1	2.80%	(-16.50) - (12.83)	EPA 200.8
Cadmium - D		0.047	0.050		1	-5.34%	(-11.28) - (3.109)	EPA 200.8
Cadmium - D		0.047	0.050		1	-5.42%	(-11.28) - (3.109)	EPA 200.8
Cadmium - D		0.047	0.050		1	-6.06%	(-11.28) - (3.109)	EPA 200.8
Cadmium - D		0.048	0.050		1	-5.08%	(-11.28) - (3.109)	EPA 200.8
Cadmium - D		0.048	0.050		1	-4.22%	(-11.28) - (3.109)	EPA 200.8
Calcium - D		23.7	25.0		1	-5.40%	(-14.65) - (3.372)	SM 3111 B

Lab Numbers: **20230731104 - 20230731104**

Parameter	Lab#	QC Value	Smp Value	Spike	DF	Result	Limits	Method
Continuing Calibration Verification								
Calcium - D		22.8	25.0		1	-8.72%	(-14.65) - (3.372)	SM 3111 B
Calcium - D		23.7	25.0		1	-5.32%	(-14.65) - (3.372)	SM 3111 B
Calcium - D		23.4	25.0		1	-6.36%	(-14.65) - (3.372)	SM 3111 B
Calcium - D		23.7	25.0		1	-5.36%	(-14.65) - (3.372)	SM 3111 B
Calcium - D		23.5	25.0		1	-6.12%	(-14.65) - (3.372)	SM 3111 B
Chromium - D		0.049	0.050		1	-2.86%	(-14.98) - (5.863)	EPA 200.8 DRC
Chromium - D		0.050	0.050		1	0.340%	(-14.98) - (5.863)	EPA 200.8 DRC
Chromium - D		0.050	0.050		1	0.480%	(-14.98) - (5.863)	EPA 200.8 DRC
Chromium - D		0.049	0.050		1	-2.52%	(-14.98) - (5.863)	EPA 200.8 DRC
Chromium - D		0.049	0.050		1	-1.14%	(-14.98) - (5.863)	EPA 200.8 DRC
Copper - D		0.048	0.050		1	-4.38%	(-11.72) - (9.898)	EPA 200.8
Copper - D		0.048	0.050		1	-4.62%	(-11.72) - (9.898)	EPA 200.8
Copper - D		0.047	0.050		1	-5.64%	(-11.72) - (9.898)	EPA 200.8
Copper - D		0.049	0.050		1	-2.66%	(-11.72) - (9.898)	EPA 200.8
Copper - D		0.048	0.050		1	-3.80%	(-11.72) - (9.898)	EPA 200.8
Iron - D		0.247	0.250		1	-1.24%	(-16.78) - (9.751)	EPA 200.8
Iron - D		0.243	0.250		1	-2.95%	(-16.78) - (9.751)	EPA 200.8
Iron - D		0.253	0.250		1	1.21%	(-16.78) - (9.751)	EPA 200.8
Iron - D		0.250	0.250		1	0.132%	(-16.78) - (9.751)	EPA 200.8
Iron - D		0.247	0.250		1	-1.32%	(-16.78) - (9.751)	EPA 200.8
Lead - D		0.048	0.050		1	-4.08%	(-9.931) - (9.069)	EPA 200.8
Lead - D		0.047	0.050		1	-5.72%	(-9.931) - (9.069)	EPA 200.8
Lead - D		0.048	0.050		1	-3.82%	(-9.931) - (9.069)	EPA 200.8
Lead - D		0.048	0.050		1	-4.42%	(-9.931) - (9.069)	EPA 200.8
Lead - D		0.049	0.050		1	-2.54%	(-9.931) - (9.069)	EPA 200.8
Magnesium - D		25.0	25.0		1	-0.120%	(-3.353) - (5.893)	SM 3111 B
Magnesium - D		24.8	25.0		1	-0.800%	(-3.353) - (5.893)	SM 3111 B
Magnesium - D		25.0	25.0		1	0.00%	(-3.353) - (5.893)	SM 3111 B
Magnesium - D		24.7	25.0		1	-1.20%	(-3.353) - (5.893)	SM 3111 B
Magnesium - D		24.6	25.0		1	-1.44%	(-3.353) - (5.893)	SM 3111 B
Magnesium - D		24.8	25.0		1	-1.00%	(-3.353) - (5.893)	SM 3111 B
Magnesium - D		25.2	25.0		1	0.640%	(-3.353) - (5.893)	SM 3111 B
Manganese - D		0.049	0.050		1	-2.46%	(-9.939) - (14.60)	EPA 200.8
Manganese - D		0.048	0.050		1	-4.22%	(-9.939) - (14.60)	EPA 200.8
Manganese - D		0.049	0.050		1	-1.58%	(-9.939) - (14.60)	EPA 200.8
Manganese - D		0.048	0.050		1	-3.16%	(-9.939) - (14.60)	EPA 200.8
Manganese - D		0.049	0.050		1	-2.64%	(-9.939) - (14.60)	EPA 200.8
Molybdenum - D		0.049	0.050		1	-2.72%	(-10.80) - (4.781)	EPA 200.8
Molybdenum - D		0.048	0.050		1	-3.60%	(-10.80) - (4.781)	EPA 200.8
Molybdenum - D		0.047	0.050		1	-6.38%	(-10.80) - (4.781)	EPA 200.8
Molybdenum - D		0.048	0.050		1	-3.84%	(-10.80) - (4.781)	EPA 200.8
Molybdenum - D		0.049	0.050		1	-2.68%	(-10.80) - (4.781)	EPA 200.8
Nickel - D		0.048	0.050		1	-4.64%	(-14.53) - (3.753)	EPA 200.8
Nickel - D		0.048	0.050		1	-3.30%	(-14.53) - (3.753)	EPA 200.8
Nickel - D		0.048	0.050		1	-4.58%	(-14.53) - (3.753)	EPA 200.8
Nickel - D		0.047	0.050		1	-6.44%	(-14.53) - (3.753)	EPA 200.8

Lab Numbers: **20230731104 - 20230731104**

Parameter	Lab#	QC Value	Smp Value	Spike	DF	Result	Limits	Method
Continuing Calibration Verification								
Nickel - D		0.048	0.050		1	-4.74%	(-14.53) - (3.753)	EPA 200.8
Potassium - D		4.74	5.00		1	-5.20%	(-8.270) - (-1.630)	SM 3111 B
Potassium - D		4.72	5.00		1	-5.60%	(-8.270) - (-1.630)	SM 3111 B
Potassium - D		4.74	5.00		1	-5.20%	(-8.270) - (-1.630)	SM 3111 B
Selenium - D		0.238	0.250		1	-4.98%	(-14.24) - (3.454)	EPA 200.8
Selenium - D		0.236	0.250		1	-5.42%	(-14.24) - (3.454)	EPA 200.8
Selenium - D		0.238	0.250		1	-4.95%	(-14.24) - (3.454)	EPA 200.8
Selenium - D		0.237	0.250		1	-5.08%	(-14.24) - (3.454)	EPA 200.8
Selenium - D		0.241	0.250		1	-3.78%	(-14.24) - (3.454)	EPA 200.8
Silicon - D		25.1	25.0		1	0.240%	(-14.51) - (7.630)	SM 3111 D
Silicon - D		24.8	25.0		1	-0.680%	(-14.51) - (7.630)	SM 3111 D
Silicon - D		24.5	25.0		1	-1.92%	(-14.51) - (7.630)	SM 3111 D
Silver - D		0.048	0.050		1	-4.28%	(-15.55) - (7.606)	EPA 200.8
Silver - D		0.049	0.050		1	-2.74%	(-15.55) - (7.606)	EPA 200.8
Silver - D		0.048	0.050		1	-3.66%	(-15.55) - (7.606)	EPA 200.8
Silver - D		0.048	0.050		1	-3.56%	(-15.55) - (7.606)	EPA 200.8
Silver - D		0.049	0.050		1	-2.80%	(-15.55) - (7.606)	EPA 200.8
Sodium - D		14.6	15.0		1	-2.60%	(-4.412) - (1.259)	SM 3111 B
Sodium - D		14.9	15.0		1	-0.800%	(-4.412) - (1.259)	SM 3111 B
Sodium - D		15.0	15.0		1	0.133%	(-4.412) - (1.259)	SM 3111 B
Sodium - D		14.8	15.0		1	-1.27%	(-4.412) - (1.259)	SM 3111 B
Sodium - D		15.1	15.0		1	0.733%	(-4.412) - (1.259)	SM 3111 B
Sodium - D		14.9	15.0		1	-0.467%	(-4.412) - (1.259)	SM 3111 B
Uranium - D		0.049	0.050		1	-2.74%	(-15.11) - (14.67)	EPA 200.8
Uranium - D		0.050	0.050		1	-0.080%	(-15.11) - (14.67)	EPA 200.8
Uranium - D		0.048	0.050		1	-3.62%	(-15.11) - (14.67)	EPA 200.8
Uranium - D		0.047	0.050		1	-5.60%	(-15.11) - (14.67)	EPA 200.8
Uranium - D		0.049	0.050		1	-2.34%	(-15.11) - (14.67)	EPA 200.8
Vanadium - D		0.048	0.050		1	-5.00%	(-7.884) - (5.762)	EPA 200.8
Vanadium - D		0.049	0.050		1	-2.64%	(-7.884) - (5.762)	EPA 200.8
Vanadium - D		0.049	0.050		1	-2.38%	(-7.884) - (5.762)	EPA 200.8
Vanadium - D		0.048	0.050		1	-3.38%	(-7.884) - (5.762)	EPA 200.8
Vanadium - D		0.049	0.050		1	-2.38%	(-7.884) - (5.762)	EPA 200.8
Zinc - D		0.047	0.050		1	-5.52%	(-14.05) - (5.167)	EPA 200.8
Zinc - D		0.048	0.050		1	-3.70%	(-14.05) - (5.167)	EPA 200.8
Zinc - D		0.046	0.050		1	-7.42%	(-14.05) - (5.167)	EPA 200.8
Zinc - D		0.047	0.050		1	-6.06%	(-14.05) - (5.167)	EPA 200.8
Zinc - D		0.047	0.050		1	-5.66%	(-14.05) - (5.167)	EPA 200.8
Mercury - T		0.0010	0.0010		1	-3.00%	(-12.00) - (7.477)	EPA 245.1
Mercury - T		0.0050	0.0050		1	-0.800%	(-12.00) - (7.477)	EPA 245.1
Mercury - T		0.0020	0.0020		1	-0.500%	(-12.00) - (7.477)	EPA 245.1
Initial Calibration Blank								
Conductivity		0.900	0.00		1	0.9	(-0.2913) - (1.061)	SM 2510B
Alkalinity		2.06	0.00		1	2.06	(0.2034) - (2.891)	SM 2320 B
Chloride		0.460	0.00		1	0.46	(-0.1529) - (0.7879)	SM 4500-Cl E

Lab Numbers: **20230731104 - 20230731104**

Parameter	Lab#	QC Value	Smp Value	Spike	DF	Result	Limits	Method	
Initial Calibration Blank									
Fluoride		0.008	0.00		1	0.008	(0.0038) - (0.0109)	SM 4500 F-C	
Fluoride		0.008	0.00		1	0.008	(0.0038) - (0.0109)	SM 4500 F-C	
N, Ammonia		-0.040	0.00		1	-0.0401	(-0.0311) - (0.0224)	Timberline-001	X
- Blank value is less than half of the reporting limit									
N, Nitrate		- 0.013	0.00		1	0.013	(-0.0226) - (0.0342)	SM 4500-NO3 F	
Sulfate		1.53	0.00		1	1.53	(1.007) - (2.567)	SM 4500-SO4 E	
Mercury - T		-0.0001	0.000		1	-0.00008	(-0.0001) - (0.0001)	EPA 245.1	
Continuing Calibration Blank									
Conductivity		0.400	0.00		1	0.4	(-0.3152) - (1.115)	SM 2510B	
TDS		0.00	0.00		100ml	0	(0.000) - (0.000)	SM 2540 C	
TSS		0.00	0.00		100ml	0	(-2.442) - (1.642)	SM 2540 D	
Alkalinity		2.48	0.00		1	2.48	(0.6948) - (3.337)	SM 2320 B	
Chloride		0.410	0.00		1	0.41	(-0.1534) - (0.6134)	SM 4500-Cl E	
Chloride		0.380	0.00		1	0.38	(-0.1534) - (0.6134)	SM 4500-Cl E	
Fluoride		0.008	0.00		1	0.008	(0.0061) - (0.0106)	SM 4500 F-C	
Fluoride		0.008	0.00		1	0.008	(0.0061) - (0.0106)	SM 4500 F-C	
Fluoride		0.007	0.00		1	0.007	(0.0061) - (0.0106)	SM 4500 F-C	
Fluoride		0.007	0.00		1	0.007	(0.0061) - (0.0106)	SM 4500 F-C	
N, Ammonia		-0.041	0.00		1	-0.0412	(-0.0276) - (0.0125)	Timberline-001	X
- Blank value is less than half of the reporting limit									
N, Ammonia		-0.031	0.00		1	-0.0313	(-0.0276) - (0.0125)	Timberline-001	X
- Blank value is less than half of the reporting limit									
N, Ammonia		-0.040	0.00		1	-0.0401	(-0.0276) - (0.0125)	Timberline-001	X
- Blank value is less than half of the reporting limit									
N, Ammonia		-0.041	0.00		1	-0.0407	(-0.0276) - (0.0125)	Timberline-001	X
- Blank value is less than half of the reporting limit									
N, Nitrate		- 0.007	0.00		1	0.007	(-0.0058) - (0.0119)	SM 4500-NO3 F	
N, Nitrate		- 0.005	0.00		1	0.005	(-0.0058) - (0.0119)	SM 4500-NO3 F	
N, Nitrate		- 0.001	0.00		1	0.001	(-0.0058) - (0.0119)	SM 4500-NO3 F	
N, Nitrate		- 0.001	0.00		1	0.001	(-0.0058) - (0.0119)	SM 4500-NO3 F	
N, Nitrate		- 0.007	0.00		1	0.007	(-0.0058) - (0.0119)	SM 4500-NO3 F	
Sulfate		1.05	0.00		1	1.05	(0.7430) - (1.966)	SM 4500-SO4 E	
Sulfate		1.33	0.00		1	1.33	(0.7430) - (1.966)	SM 4500-SO4 E	
Aluminum - D		0.000	0.00		1	-0.00004	(-0.0003) - (0.0003)	EPA 200.8	
Arsenic - D		0.000	0.00		1	0.00003	(0.0000) - (0.0001)	EPA 200.8	
Barium - D		0.00	0.00		1	0	(0.0000) - (0.0000)	EPA 200.8	
Boron - D		0.000	0.00		1	0.00041	(-0.0005) - (0.0014)	EPA 200.8	
Cadmium - D		0.00	0.00		1	0	(0.0000) - (0.0001)	EPA 200.8	
Calcium - D		-0.050	0.00		1	-0.05	(-0.0816) - (0.1096)	SM 3111 B	
Calcium - D		0.020	0.00		1	0.02	(-0.0816) - (0.1096)	SM 3111 B	
Calcium - D		0.020	0.00		1	0.02	(-0.0816) - (0.1096)	SM 3111 B	
Calcium - D		0.010	0.00		1	0.01	(-0.0816) - (0.1096)	SM 3111 B	
Calcium - D		0.010	0.00		1	0.01	(-0.0816) - (0.1096)	SM 3111 B	
Calcium - D		0.030	0.00		1	0.03	(-0.0816) - (0.1096)	SM 3111 B	
Chromium - D		0.00	0.00		1	0	(0.0000) - (0.0001)	EPA 200.8 DRC	

Lab Numbers: **20230731104 - 20230731104**

Parameter	Lab#	QC Value	Smp Value	Spike	DF	Result	Limits	Method	
Continuing Calibration Blank									
Copper - D		0.00	0.00		1	0	(0.0000) - (0.0000)	EPA 200.8	
Iron - D		0.000	0.00		1	0.00005	(-0.0002) - (0.0004)	EPA 200.8	
Lead - D		0.00	0.00		1	0	(0.0000) - (0.0000)	EPA 200.8	
Magnesium - D		-0.020	0.00		1	-0.02	(-0.1176) - (0.0696)	SM 3111 B	
Magnesium - D		-0.060	0.00		1	-0.06	(-0.1176) - (0.0696)	SM 3111 B	
Magnesium - D		0.00	0.00		1	0	(-0.1176) - (0.0696)	SM 3111 B	
Magnesium - D		-0.030	0.00		1	-0.03	(-0.1176) - (0.0696)	SM 3111 B	
Magnesium - D		-0.030	0.00		1	-0.03	(-0.1176) - (0.0696)	SM 3111 B	
Magnesium - D		-0.060	0.00		1	-0.06	(-0.1176) - (0.0696)	SM 3111 B	
Manganese - D		0.00	0.00		1	0	(0.0000) - (0.0000)	EPA 200.8	
Molybdenum - D		0.000	0.00		1	0.00002	(0.0000) - (0.0001)	EPA 200.8	
Nickel - D		0.00	0.00		1	0	(0.0000) - (0.0000)	EPA 200.8	
Potassium - D		0.00	0.00		1	0	(-0.0171) - (0.0111)	SM 3111 B	
Potassium - D		0.00	0.00		1	0	(-0.0171) - (0.0111)	SM 3111 B	
Potassium - D		0.00	0.00		1	0	(-0.0171) - (0.0111)	SM 3111 B	
Selenium - D		0.000	0.00		1	0.0001	(-0.0002) - (0.0003)	EPA 200.8	
Silicon - D		-0.260	0.00		1	-0.26	(-1.148) - (2.190)	SM 3111 D	
Silicon - D		0.020	0.00		1	0.02	(-1.148) - (2.190)	SM 3111 D	
Silicon - D		-0.050	0.00		1	-0.05	(-1.148) - (2.190)	SM 3111 D	
Silver - D		0.000	0.00		1	-0.0003	(-0.0002) - (0.0002)	EPA 200.8	X
- Blank value is less than half of the reporting limit									
Sodium - D		-0.010	0.00		1	-0.01	(-0.0373) - (0.0433)	SM 3111 B	
Sodium - D		-0.010	0.00		1	-0.01	(-0.0373) - (0.0433)	SM 3111 B	
Sodium - D		0.00	0.00		1	0	(-0.0373) - (0.0433)	SM 3111 B	
Sodium - D		-0.010	0.00		1	-0.01	(-0.0373) - (0.0433)	SM 3111 B	
Sodium - D		-0.010	0.00		1	-0.01	(-0.0373) - (0.0433)	SM 3111 B	
Sodium - D		-0.010	0.00		1	-0.01	(-0.0373) - (0.0433)	SM 3111 B	
Uranium - D		0.00	0.00		1	0	(0.0000) - (0.0001)	EPA 200.8	
Vanadium - D		0.00	0.00		1	0	(0.0000) - (0.0001)	EPA 200.8	
Zinc - D		0.000	0.00		1	-0.00001	(-0.0001) - (0.0001)	EPA 200.8	

Approved By: Eric Fuehrer

Approved On: 09/11/2023 02:16 PM

MIDCONTINENT
TESTING LABORATORIES INC.

2381 S. Plaza Dr. • P.O. Box 3388 • Rapid City, SD 57709
(605) 348-0111 • www.TheChemistryLab.com

CHAIN OF CUSTODY RECORD

Company	Cowboy Exploration
Project Name / Mgr.	John W. Glasscock /
Project Number	
Sampled by	Signature: John W. Glasscock
Sampled by	Print: John W. Glasscock

PRESERVED WITH
FILTERED (Y/N)
REFRIGERATED (Y/N)
ANALYSES REQUESTED

FOR LAB USE ONLY

Seal Intact (Y/N)/Number	
Sample Condition	
Temperature of Container	on ice 1.4°C

REQUESTED TURN AROUND

STANDARD_____ RUSH_____

	SAMPLE NAME	DATE	TIME	MATRIX	NO. OF CONTAINERS	COMMENTS	LAB #
1	MWS-072823 104	7/28/23		water	4	See list	
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							

Batch 1 7-31-23

RELINQUISHED BY (Signature)	COMPANY NAME	DATE	TIME	RECEIVED BY (Signature)	COMPANY NAME	DATE	TIME
John W. Glasscock	Cowboy Exploration	7-28-23	11:25	Eric Fisher	MCT	7/28/23	1125

FORM 113D

104
B1
7-21-23

SAMPLE SITE		B4		B5		S2
DATE	SAMPLED	9/06/78	8/31/84	9/07/78	8/29/84	9/01/84
PARAMETER	UNITS	GROUNDWATER		GROUNDWATER		GROUNDWATER
FIELD						
TEMPERATURE	°C	19		18	13	15
pH		8.0	7.74	8.05	8.18	7.23
CONDUCTIVITY	µmhos/cm	1530	1905	1060	1282	1782
ALKALINITY	mg/L CO_3	314		298		
LABORATORY						
BICARBONATE	mg/L	ND	263	ND	305	293
CARBONATE	"	ND	0.000	ND	0.000	0.000
CHLORIDE	"	19	12.4	8.0	10.8	10.0
FLUORIDE	"	0.43	0.24	0.33	0.30	0.21
AMMONIA	"	<0.01	0.40	<0.01	0.15	0.35
NITRATE	"	0.11	0.025	0.07	0.160	0.042
SULFATE	"	650	700	395	425	988
ALKALINITY	mg/L $CaCO_3$	813	217	363	252	242
T.D.S.	mg/L	1190	1400	827	828	1450
ALUMINUM	"	0.1	0.1	0.013	0.000	0.000
ARSENIC	"	0.054	0.000	0.2	0.000	0.000
BARIUM	"	ND	0.000	ND	0.000	0.000
BORON	"	<0.1	0.40	0.2	0.355	0.330
CADMIUM	"	0.02	0.0001	0.02	0.000	0.0000
CALCIUM	"	210	199	87	54.5	136
CHROMIUM	"	ND	0.000	ND	0.000	0.000
COPPER	"	0.24	0.000	0.33	0.001	0.000
IRON	"	0.30	0.007	0.22	0.005	0.004
LEAD	"	0.10	0.002	0.05	0.001	0.000
MAGNESIUM	"	75	82.8	43	41.9	97.7
MANGANESE	"	0.31	0.441	0.13	0.146	0.043
MERCURY	"	<0.0005	0.00142	0.0011	0.00126	0.00054
MOLYBDENUM	"	<0.1	0.000	0.1	0.029	0.005
NICKEL	"	0.11	0.009	0.22	0.005	0.003
POTASSIUM	"	11	10.4	55	12.1	15.1
SELENIUM	"	<0.002	0.000	<0.002	0.008	0.003
SILICA	"	10.3	12.0	13.9	10.0	10.4
SILVER	"	ND	0.0000	ND	0.0000	0.0000
SODIUM	"	62	200	140	200	271
URANIUM	"	ND	0.072	ND	0.064	0.016
VANADIUM	"	<0.1	0.026	<0.1	0.002	0.009
ZINC	"	0.48	0.111	0.69	0.047	0.074
CONDUCTIVITY	µmhos/cm	ND	1725	ND	1250	1900
pH		ND	7.35	ND	7.65	7.05
TSS	mg/L	43	ND	39	ND	ND
GROSS ALPHA	pCi/L	ND	38 ± 13	ND	48 ± 13	39 ± 13
GROSS BETA	"	ND	16 ± 3	ND	15 ± 13	12 ± 3
GAMMA	"	ND	<15	ND	<15	<15
RADIUM 226	"	42 ± 14	21.8 ± 2.1	0.5 ± 2.2	<0.6	1.6 ± 0.7
RADIUM 228	"	ND	<1	ND	2 ± 1	2 ± 1
~~POLONIUM 210~~	"	0.0 ± 0.5	ND	0.0 ± 0.5	ND	ND
~~THORIUM 230~~	"	4.7 ± 1.1	ND	0.8 ± 0.6	ND	ND

MIDCONTINENT TESTING LABORATORIES

SAMPLE RECEIPT CHECKLIST

Company Name: Cowboy Exploration — Date/Time Received: 7-28-23 (Date) / 1125 (Time)

Project: _____ — Received by: Eric Fueline

Lab Number(s): 104 7-31-23 — Carrier Name: John Glasscock

UNPACKING

Yes	No		Initials
☑	☐	1. Shipping container in good condition?	
☑	☐	2. Custody seals present on shipping container? Condition: Intact ☐ Broken ☐	
☑	☐	3. Ice / Blue Ice (circle one) present in shipping container? Container(s) Temp. 1. 1.4°C 2. _____ 3. _____ 4. _____	
☐	☑	4. Bottles broken and/or leaking? (Photograph broken bottles.)	
☐	☑	5. Custody seals on sample bottles? Condition: Intact ☐ Broken ☐	

LABELING

Yes	No		Initials
☑	☐	6. Chain of custody Present?	
☑	☐	7. Chain of custody includes signatures, dates, and times when relinquished and received?	
☑	☐	8. Chain of custody agrees with bottle count?	
☑	☐	9. Chain of custody agrees with labels?	
☑	☐	10. Samples received within holding times?	
☑	☐	11. Samples in proper container?	
☑	☐	12. Sufficient sample volume for indicated tests?	

PRESERVATIVE

Yes	No		Initials	Yes	No		Initials
☑	☐	13. Metals bottle(s) pH < 2?		☐	☐	17. TOC bottle(s) pH < 2?	
☐	☑	14. Nutrient bottle(s) pH < 2?		☐	☐	18. Oil & Grease bottle(s) pH < 2?	
☐	☐	15. Cyanide bottle(s) pH > 12?		☐	☐	19. Volatiles pH < 2?	
☐	☐	16. Sulfide bottle(s) pH > 9?					

COMMENTS: Nutrient bottle preserved in Lab 7-28-23 BR

REPORT

ON

WATER SAMPLING

AND

LIMITED AQUIFER TESTING

CHORD PROJECT

FALL RIVER COUNTY, SOUTH DAKOTA

AUGUST & SEPTEMBER

1984

W. T. COHAN P.E., INC.
P. O. Box 2392
Grand Junction, CO 81502

Enclosure 13

W.T. COHAN P.E., INC.
MINING & GEOLOGICAL CONSULTANTS
P. O. BOX 2392 (303) 243-7583
GRAND JUNCTION, COLORADO 81502

INTRODUCTION & SCOPE

W. T. Cohan P.E., Inc. was retained to perform hydrology and water sampling services on the Chord property in Fall River County and geochemical sampling and geology mapping services on the Dollar claims in Pennigton County, South Dakota. The program was in conjunction with satisfying the annual assessment work requirements for the unpatented mining claims comprising the two properties.

The work at the Chord project consisted of a draw down-recharge test using an existing monitor well, an unsuccessful attempt to construct a second monitor well nearby and sampling surface and ground waters in the vicinity of the October-Jinx ore body. The water sampling program was to up date baseline studies initiated in 1978 by Union Carbide preparatory to obtaining operating permits for the project.

The work at the Dollar project consisted of geologic mapping and geochemical sampling along three traverses aggregating 11250 feet in length.

The work at the Dollar claims was transmitted to Altex under cover dated 12 September 1984. This report discusses the work conducted at the Chord project and a limited amount of additional work performed at the Dollar group. The time period involved consisted of the last week in August 1984 through early October at which time the site of the monitor well construction attempt was reclaimed.

WATER SAMPLING PROGRAM

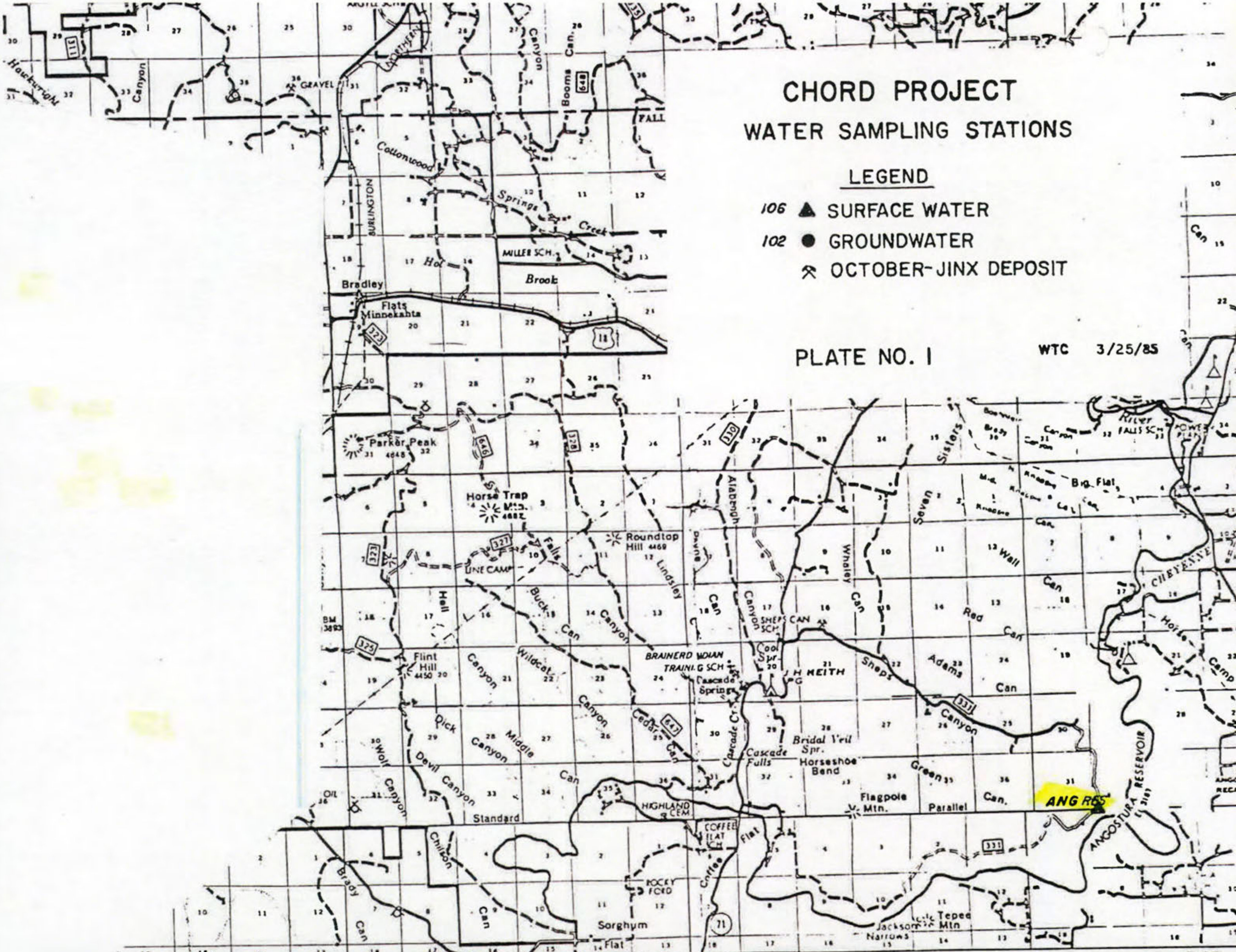
Water samples were collected at 14 sites which are indicated on Plate I. Ten of the sites were the same as those sampled on a quarterly basis

TABLE I CHORD PROJECT, FALL RIVER CO., SOUTH DAKOTA WATER SAMPLE DESCRIPTIONS

SAMPLE NO.	DATE	TYPE	FORMATION	REMARKS
B-5	8/31/84	Ground water Lakota Fm.	SW¼ SW¼ Sec. 26, T7S, R2E,B.H.M. (immediately west of October Jinx ore body)	Monitor well, D'Appolonia sample station No. 11. Water level @ -391.9 Ft.
B-4	8/29/84	Ground water Lakota fm.	SW¼ SE¼ Sec 25, T7S, R2E, B.H.M.	Monitor well, D'Appolonia sample station No. 12, water level @-266.9Ft
S-2(101)	9/01/84	Ground water Lakota Fm.	SE¼ NE¼ Sec 2, T8S, R2E, B.H.M.	Pumped domestic well Childers Ranch House, 280-300Ft deep
102	9/01/84	Ground water Lakota Fm.	NW¼ NW¼ Sec 3, T8S, R2E, B.H.M.	Pumped stock well, 200 Ft. deep, water level - 11.2 Ft.
103	9/01/84	Ground water Sundance Fm.	Hey Ranch, NE¼ SW¼ Sec 13, T7S, R2E, B.H.M.	Pumped well, D'Appolonia sample station No. 7
104	9/01/84	Ground water Sundance Fm.	Fay Ranch, SE¼ SW¼ Sec 20, T7S, R3E, B.H.M.	Pumped well, D'Appolonia sample station No. 6
105	9/02/84	Surface water	SW¼ NW¼ Sec 19. T7S, R3E B.H.M. Craven Canyon	D'Appolonia sample station No. 3
106	9/02/84	Surface water	SW¼ SW¼ Sec 17, T8S, R3E, B.H.M. Red Canyon	D'Appolonia sample station No. 4
107	9/02/84	Surface water	SE¼ NE¼ Sec 5, T8S, R3E, B.H.M. Red Canyon, 100' down stream from confluence of Red & Craven Canyons	No surface flow from Craven Canyon
108	9/02/84	Surface water	NE¼ NE¼ Sec 5, T8S, R3E, B.H.M. Red Canyon, 750' up stream from 107	D'Appolonia sample station No. 2

TABLE I CONTINUED CHORD PROJECT, FALL RIVER CO., SOUTH DAKOTA WATER SAMPLE DESCRIPTIONS

SAMPLE NO.	DATE	TYPE	FORMATION	REMARKS
CCFS-1, #2 (109)	9/18/84	Ground water Lakota fm.	NE¼ NW¼ Sec 31, T7S, R3E, B.H.M. Craven Canyon	Pumped stock well, water level @ -34.0 Ft. (9/03/84) D'Appolonia sample station No. 8
110	9/03/84	Ground water Lakota Fm.	Well: SE¼ NW¼ Sec 5, T7S, R2E B.H.M. Sample site: SE¼ SE¼ Sec 5 T7S, R2E	Pumped domestic well, Standin Ranch, sampled at Ranch House SE¼ SE¼ Sec 5
111	9/03/84	Surface water	SW¼ SW¼ Sec 22, T8S, R2E, B.H.M. Cheyenne River	Cheyenne River flowing east D'Appolonia sample station No. 5
Ang Res#1	9/19/84	Surface water	SW¼ SW¼ Sec 32, T8S, R6E, B.H.M. Angostura Reservoir	West shore. D'Appolonia sample site No. 1


CHORD PROJECT
WATER SAMPLING STATIONS
LEGEND
106 ▲ SURFACE WATER
102 ● GROUNDWATER
⚒ OCTOBER-JINX DEPOSIT
PLATE NO. I
WTC 3/25/85
Bradley
Flats
Minnekahta
Parker Peak
Horse Trap Mtn.
Roundtop Hill
Flint Hill
Cottonwood
Springs
Creek
Hot
Brook
MILLER SCH.
Cascade Springs
Cascade Falls
Bridal Veil Spr.
Horseshoe Bend
Flagpole Mtn.
ANG RES
ANGOSTURA RESERVOIR
CHEYENNE
Sorghum
Flat
Tepee Mtn
Jackson Narrows
Standard
HIGHLAND CEM
COFFEE FLAT SCH
ROCKY FORD
J H KEITH
BRAINERD INDIAN TRAINING SCH
LINE CAMP
Seven Sisters
Big Flat

in 1978 by D'Appolonia & Associates for Union Carbide Corporation. A number of the original D'Appolonia sites were eliminated as their locations were remote from the property currently leased by Altex. These sites were relevant to Union Carbide's proposed heap leach plant site located 6 miles northwest of the October Jinx ore body. The previous data from the resampled locations are included in the tables of analytical results. Four new sites were sampled in the vicinity of the October-Jinx ore body. Three of these new sample stations are wells drawing from the same horizon as the ore body (Lakota Formation) and are located down dip from and within 3 miles of the October-Jinx ore body. Eight of the 14 sample stations are wells of which four are potable water supply wells. Two of these are producing from the Lakota Formation while two are producing from the Sundance Formation. A third domestic water supply well is located near the center of Section 1, T8S, R3E two miles south and down dip from the October-Jinx ore body. The ranch house was not occupied at the time and sampling was not possible. This well should be included as a routine sampling point in the future, however. With the addition of this well as a sampling point, the current suite of sampling stations should be adequate to provide baseline water quality data for a mining operation at the October-Jinx deposit.

Two of the ground water sampling stations are monitor wells constructed by D'Appolonia & Associates as part of their monitoring program for Union Carbide in 1977-78. These wells are identified as B4 & B5. Well No. B5 is at the southwestern and down dip edge of the October-Jinx ore body. Both wells are completed in the ore bearing sandstone; the Lakota Formation. The Standin Ranch domestic well, sample station No. 110, is actually located near the center of Section 35, T7S, R2E, 1/2 mile northwest of the Standin

Ranch. This well is completed in the Lakota and is 1/2 mile south and down dip from the October-Jinx ore body. This well, the Childers well (sample No. S-2) and the previously described well near the center of Section 1, T8S, R3E will require monitoring on a regular basis during mining of the nearby October-Jinx ore body as they are completed in the ore bearing formation and are down dip from the ore body. These three wells plus a shallow stock watering well, station 109, located immediately east of the October-Jinx ore body, all show anomalous concentrations of uranium or radium 226, viz:

TABLE II: URANIUM, RADIUM CONCENTRATIONS IN WELLS PROXIMATE TO OCTOBER-JINX ORE BODY

SAMPLE STATION	URANIUM/Mg/L	RADIUM 226, pCi/L
Monitor Well B4	0.072	21.8± 2.1
Monitor Well B5	0.064	0.6
Standin Ranch Well (110)	0.006	12.9 ± 1.4
Childers Well (S-2)	0.016	1.6 ± 0.7
Stock well, Craven Canyon (109)	0.141	4.4 ± 1.2
Public Health Service Standards:		3.0
South Dakota Domestic Water Supply Standards		5.0

All samples were analyzed for parameters required by the State of South Dakota for a uranium mining permit application (see "Permitting Requirements for October-Jinx Underground Mine, Chord Project, Fall River County, South Dakota" private report to American Gold Minerals by W. T. Cohan, December 1983) as well as for parameters comprising EPA primary and secondary drinking water standards and SouthDakota domestic water supply standards. D'Appolonia analyzed for polonium 210 and thorium 230. These

TABLE III DRINKING WATER STANDARDS

PARAMETER	UNITS	EPA STANDARDS 1977 PRIMARY	EPA STANDARDS 1977 SECONDARY	U. S. PUBLIC HEALTH SERVICE STANDARDS 1962 MANDATORY	U. S. PUBLIC HEALTH SERVICE STANDARDS 1962 RECOMMENDED	SOUTH DAKOTA DOMESTIC WATER SUPPLY STANDARDS 1977
pH			6.5 to 8			6.0 - 9.0
Sulfate	Mg/L		250		250	500
Chloride	"		250		250	250
Fluoride	"			0.8 to 1.7	0.8 to 1.7	
Nitrate	"	10			10	10
Cyanide	"			0.20	0.01	
Phenols	"				0.001	
Color	APHA		15		15	
Total Dissolved Solids	Mg/L		500		500	1000
Arsenic	"	0.05		0.05	0.01	0.05
Boron	"			5.0		
Cadmium	"	0.01		0.01		0.01
Copper	"		1.0		1.0	
Iron	"		0.3		0.3	
Lead	"	0.05		0.05		0.05
Manganese	"		0.05		0.05	

TABLE III CONTINUED

DRINKING WATER STANDARDS

PARAMETER	UNITS	EPA STANDARDS 1977 PRIMARY	EPA STANDARDS 1977 SECONDARY	U. S. PUBLIC HEALTH SERVICE STANDARDS 1962 MANDATORY	U. S. PUBLIC HEALTH SERVICE STANDARDS 1962 RECOMMENDED	SOUTH DAKOTA DOMESTIC WATER SUPPLY STANDARDS 1977
Mercury	Mg/L					0.002
Selenium	"	0.01		0.01		0.01
Zinc	"		5.0		5.0	
Radium 226	pCi/L				3.0	5.0

were replaced by radium 228 and radioactivity (Gross Alpha, Gross Be and Gamma) as well as natural uranium to conform to current South Da requirements. All waters sampled exceed EPA and state drinking wate standards for total dissolved solids and sulfate concentrations. Th exception was mintor well B4. However the radium 226 concentration i this well grossly exceeded state and federal drinking water standard Table II).

The D'Appolonia sample sites now have been sampled 2 to 5 times an conclusions can be made as to the presence of any trends in water quality. These are:

(1) The ground water quality is essentially unchanged from 1978.

(2) The surface water quality is less stable than that of the ground water, due in all probability to seasonal variations in flow.

(3) All ground waters from the Lakota Formation and most surface waters in the vicinity of the ore body contain at least slightly anomalous concentrations of natural uranium or radium 226.

(4) The surface waters in Red Canyon contain seasonally high concentrations of cadmium.

(5) Additional sampling, probably 4 campaigns on a quarterly interval may be necessary to obtain a state mining permit based upon current attitudes in the South Dakota Department of Natural Resources.

PUMPING TEST

An aquifer draw down test was designed employing two monitor wells and a single pumped well located at the southwestern edge of the October-Jinx ore body. The well field would consist of a single pump well 8" diameter and 500 feet deep and two monitor wells each 75' from the pumped

wells. One monitor well, B5 already exists having been constructed in 1978. A second monitor well was to be constructed 75' north and 75' east of the proposed pumped well which would be located 75' east of B5. The objective of the pumping test was to determine the transmissivity and storage coefficients of the ore bearing formation which data would be required to obtain a mining permit from the State of South Dakota. The well field construction program would be phased over several years to coincide with annual assessment work expenditures. An approved operating plan for the entire project is on file with the U. S. Forest Service at New Castle, Wyoming. A copy of the plan and stipulations is attached hereto. This plan is valid for the project as scoped and is not time dependent. To activate the project or any part of it requires notification of the District Ranger in New Castle prior to initiating field work. It had been proposed to construct both wells to satisfy the assessment work for 1983-1984 & 1984-1985, however the permit approval was delayed such that the 1984 program was modified to conduct a limited draw down test in B5 in August and drill the second monitor well in September. This revised program would not, however, modify the overall program of a pumped well & 2 monitor wells as originally scoped. In order to avoid the necessity of obtaining an NPDES discharge permit the pumped well discharge would be disposed of by sprinkler irrigating the adjacent grass land.

The draw down test performed at B5 consisted of drawing the well's water level down by air lift pumping and subsequently by measuring the water level recovery rate. Three such tests were performed over an 18 hour period. The static level in B5 prior to pumping was at -390 feet below the surface. The contact between the Lakota Fromation and the overlying Fusson Shale is at

356 feet below the surface, indicating artesian conditions are not present. Results from this brief pumping test indicate the hydraulic conductivity (field coefficient of permeability) to be rather low in the vicinity of the ore body, probably less than 500 millidarcys. However a pumping test of longer duration with monitor wells will be necessary to provide satisfactory aquifer data for a mining permit application. The apparent low permeability may be due to poor well efficiency resulting from small diameter casing, (3") and limited length of perforations (48"). However the test served to provide an initial estimate from which the requirements for a more elaborate aquifer test can be defined. From the data obtained it is determined a pumping rate of 15-35 GPM maximum would be the proper design rate for an 8" pumped well and a 24 hour draw down test.

An attempt was made to construct the second monitor well, identified as MW-1, in September. The hole was drilled to its designed depth of 476 feet, however failure of the drilling contractor to diligently pursue the work resulted in the expansive shales above the Lakota Formation to swell closed and it was not possible to install the casing. The hole was plugged with sand and bentonite, and cement surface plug installed and the site was reclaimed. A copy of the geologic log and the abandonment schedule are attached hereto.

The forced abandonment of MW-1 was due principally to the drilling contractor's failure to stay on the job causing the hole to remain open and uncased for 5 days just below the level of the first wet zone which was also a zone of bentonitic mudstones.

GEOLOGIC LOG: PIEZOMETER WELL MW-1

COORDINATES: 410784 N 1073609 E

SYSTEM: South Dakota State Grid

COLLAR ELEVATION: 4123 FT 5 1/8

TOTAL DEPTH: 476 Ft; Diameter 5 4/8 inches

GEOGRAPHIC LOCATION: Fall River County, South Dakota

DATE STARTED: 22 September 1984

DATE COMPLETED: Abandoned 29 September 1984

DRILLER: Great Western Pump & Supply, Rapid City, S.D.

EQUIPMENT: Rotary, compressed air & water injection

LITHOLOGIC LOG

DEPTH TO TOP, FT	DESCRIPTION	FORMATION
0	Brown, fine grained sandy soil	alluvium
2	Sandstone, tan, F-Mg	Fall River
5	Sandstone, tan, F-Mg with grey claystone interbeds	" "
17	Shale, dark grey	" "
21	Sandstone, tan, V.F.G.	" "
30	" " . M.G.	" "
34	Shale & siltstone, Lt. Grey, tan	" "
40	Shale & siltstone, grey & maroon	" "
50	Sandstone, tan, orange; w/lt grey siltstone interbeds	" "
60	Sandstone w/ occasional siltstone interbeds	" "
94	Claystone & siltstone, dark grey	" "

DEPTH TO TOP, FT	DESCRIPTION	FORMATION
95	Sandstone, orange, V.F.G.	Fall River
100	Sandstone, Lt. orange & maroon, V.F.G; with thin beds of grey siltstone	" "
112	Mudstone, siltstone, very dark grey	" "
125	Sandstone w/siltstone interbeds; lt maroon to grey V.F.G.	" "
135	Sandstone, V.F.G., Lt grey to brick red	" "
140	Sandstone, V.F.G., lt yellow to white	" "
146	Mudstone/shale with occasional sandstone interbeds, dark grey to green grey, trace maroon	" "
195	Maroon sandstone F.G., silty; with minor siltstone interbeds	" "
205	Fine grained, silty sandstone with minor siltstone interbeds; white to light tan	" "
238	Shale with minor siltstone interbeds, maroon; blue green 247-248	" "
248	Sandstone, lt. grey, green, maroon w/minor siltstone interbeds, wet @ 285 ft	" "
278	Shale, green & maroon	Fuson
300(?)	Sandstone, grey	Lakota
345	Mudstone, siltstone	"
355	Sandstone	"
462	Shale	Morrison
476	E.O.H.	

ABANDONMENT SCHEDULE

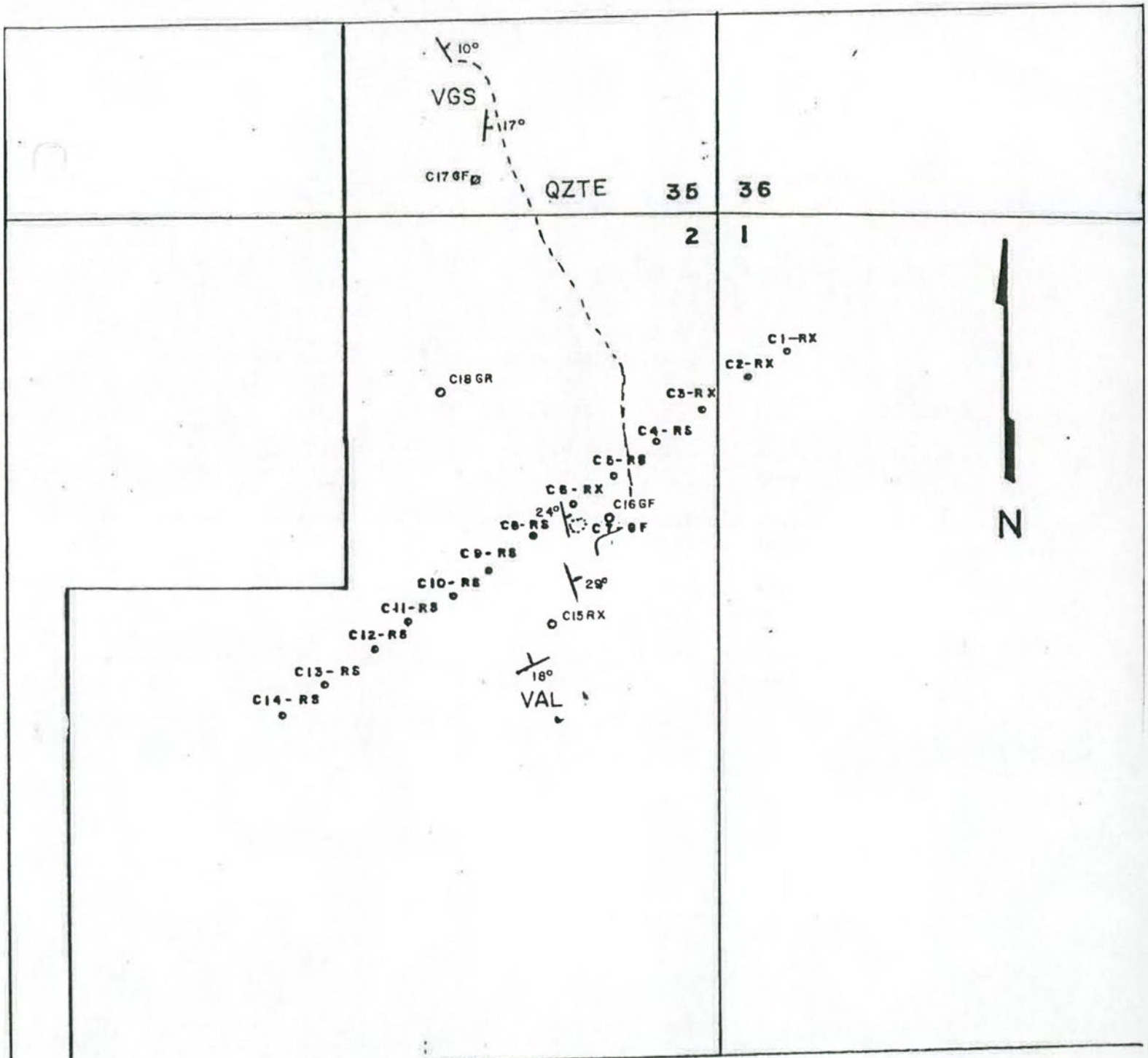
DEPTH, FT.	DESCRIPTION
0-0.5	soil
0.5 - 6	concrete
6-377	drill cuttings
377-452	bentonite pellets
452-464	washed sand, -8 mesh
464-476	bentonite pellets

DOLLAR CLAIMS

During the delay caused by the absence of the drilling contractor, an additional days mapping and sampling work was performed at the Dollar claims by S. C. Goulding.

The samples were sent to Rocky Mountain Geochemical Co. with instructions to send the results directly to Altex Minerals. This additional work was conducted in the vicinity of Geochem Traverse Line C. A revised map and list of sample descriptions is attached. This data and map supercedes that contained in our earlier report dated 12 September 1984.

W. T. COHAN P.E.



W. T. COHAN, P. E., INC.

GRAND JUNCTION, COLORADO

DOLLAR CLAIM GROUP

GEOCHEM SAMPLE LOCATION MAP

LINE C

C# = Sample Line & Number

RX = Outcrop Sample

RS = Bedrock Sample

GF = Gossan Float Sample

Compiled by:	S.C.G./ A.G.M.C.	Date:	Aug. 31, - Sept. 3, 1984
Drawn by:	S.C.G.	Date:	Sept. 6, 1984
Scale:	1" = 500'	Revision No.	1, 3/25/85

DOLLAR CLAIMS SAMPLE DESCRIPTIONS

Sample No.	Description
C 15 RX	Vgs., old discovery pit on very steep hillside, mod-st FeOxs
C 16 GF	Vgs, old discovery pit, very st lims, approx 10% gossany rock in pit
C 17 GF	Qzte/schistose: along fence line, some "gossany"; st hem, goe, v siliceous
C 18 GRY	Val: gossan, st FeOxs, on old road along fence line, 500' N63E of old red trailer

SAMPLE SITE		B4		B5		S2
DATE	SAMPLED	9/06/78	8/31/84	9/07/78	8/29/84	9/01/84
PARAMETER	UNITS	GROUNDWATER		GROUNDWATER		GROUNDWATER
FIELD						
TEMPERATURE	°C	19		18	13	15
pH		8.0	7.74	8.05	8.18	7.23
CONDUCTIVITY	µmhos/cm	1530	1905	1060	1282	1782
ALKALINITY	mg/L $CaCO_3$	314		298		
LABORATORY						
BICARBONATE	mg/L	ND	263	ND	305	293
CARBONATE	"	ND	0.000	ND	0.000	0.000
CHLORIDE	"	19	12.4	8.0	10.8	10.0
FLUORIDE	"	0.43	0.24	0.33	0.30	0.21
AMMONIA	"	<0.01	0.40	<0.01	0.15	0.35
NITRATE	"	0.11	0.025	0.07	0.160	0.042
SULFATE	"	650	700	395	425	988
ALKALINITY	mg/L $CaCO_3$	813	217	363	252	242
T.D.S.	mg/L	1190	1400	827	828	1450
ALUMINUM	"	0.1	0.1	0.013	0.000	0.000
ARSENIC	"	0.054	0.000	0.2	0.000	0.000
BARIUM	"	ND	0.000	ND	0.000	0.000
BORON	"	<0.1	0.40	0.2	0.355	0.330
CADMIUM	"	0.02	0.0001	0.02	0.000	0.0000
CALCIUM	"	210	199	87	54.5	136
CHROMIUM	"	ND	0.000	ND	0.000	0.000
COPPER	"	0.24	0.000	0.33	0.001	0.000
IRON	"	0.30	0.007	0.22	0.005	0.004
LEAD	"	0.10	0.002	0.05	0.001	0.000
MAGNESIUM	"	75	82.8	43	41.9	97.7
MANGANESE	"	0.31	0.441	0.13	0.146	0.043
MERCURY	"	<0.0005	0.00142	0.0011	0.00126	0.00054
MOLYBDENUM	"	<0.1	0.000	0.1	0.029	0.005
NICKEL	"	0.11	0.009	0.22	0.005	0.003
POTASSIUM	"	11	10.4	55	12.1	15.1
SELENIUM	"	<0.002	0.000	<0.002	0.008	0.003
SILICA	"	10.3	12.0	13.9	10.0	10.4
SILVER	"	ND	0.0000	ND	0.0000	0.0000
SODIUM	"	62	200	140	200	271
URANIUM	"	ND	0.072	ND	0.064	0.016
VANADIUM	"	<0.1	0.026	<0.1	0.002	0.009
ZINC	"	0.48	0.111	0.69	0.047	0.074
CONDUCTIVITY	µmhos/cm	ND	1725	ND	1250	1900
pH		ND	7.35	ND	7.65	7.05
TSS	mg/L	43	ND	39	ND	ND
GROSS ALPHA	pCi/L	ND	38 ± 13	ND	48 ± 13	39 ± 13
GROSS BETA	"	ND	16 ± 3	ND	15 ± 13	12 ± 3
GAMMA	"	ND	< 15	ND	< 15	< 15
RADIUM 226	"	42 ± 14	21.8 ± 2.1	0.5 ± 2.2	< 0.6	1.6 ± 0.7
RADIUM 228	"	ND	< 1	ND	2 ± 1	2 ± 1
POLONIUM 210	"	0.0 ± 0.5	ND	0.0 ± 0.5	ND	ND
THORIUM 230	"	4.7 ± 1.1	ND	0.8 ± 0.6	ND	ND

SAMPLE SITE		102	CCFS-1 (109)			
DATE	SAMPLED		12/04/77	3/02/78	5/24/78	9/18/84
PARAMETER	UNITS	GROUNDWATER	GROUND WATER			
FIELD						
TEMPERATURE	°C	13	10	10	17	19
pH		7.38	7.5	7.1	7.1	7.05
CONDUCTIVITY	µmhos/cm	2130	3100	3120	3030	4150
ALKALINITY	mg/L $CaCO_3$		300	308	304	
LABORATORY						
BICARBONATE	mg/L	305	ND	ND	ND	364
CARBONATE	"	0.000	ND	ND	ND	0.000
CHLORIDE	"	12.4	18	19	6.4	13.2
FLUORIDE	"	0.235	0.28	0.35	0,19	0.305
AMMONIA	"	0.196	<0.1	<0.1	0.26	0.34
NITRATE	"	0.025	<0.02	0.04	0.04	0.000
SULFATE	"	1062	1880	1970	2250	3550
ALKALINITY	mg/L $CaCO_3$	252	1770	1440	1500	301
T.D.S.	mg/L	1600	2960	2900	3050	3760
ALUMINUM	"	0.000	0.5	<0.1	0.2	0.000
ARSENIC	"	0.000	<0.002	<0.002	<0.002	0.000
BARIUM	"	0.000	ND	ND	ND	0,000
BORON	"	0.360	0.3	0.4	0.5	0.260
CADMIUM	"	0.0000	<0.01	<0.01	<0.01	0,0000
CALCIUM	"	201	380	310	380	665
CHROMIUM	"	0.000	ND	ND	ND	0.000
COPPER	"	0.000	<0.01	0.04	0.02	0.003
IRON	"	0.120	0.68	0.55	2.43	0.000
LEAD	"	0.001	0.10	0.06	0.16	0.000
MAGNESIUM	"	106	200	160	180	413
MANGANESE	"	0.090	0.03	0.01	0.02	0.209
MERCURY	"	0.00000	<0.0005	<0.0005	<0.0005	0,00000
MOLYBDENUM	"	0.000	<0.1	0.1	<0.1	0.000
NICKEL	"	0.002	<0.01	0.16	0.02	0.000
POTASSIUM	"	15.6	21	22	19	3.07
SELENIUM	"	0.001	<0.002	<0.002	<0.002	0.001
SILICA	"	9.4	12.5	11.5	5.6	6.2
SILVER	"	0.0000	ND	ND	ND	0.0000
SODIUM	"	229	320	350	330	417
URANIUM	"	0.008	ND	ND	ND	0.141
VANADIUM	"	0.006	<0.1	0.3	<0.1	0.000
ZINC	"	0.005	0.22	0.15	0.22	0.010
CONDUCTIVITY	µmhos/cm	2000	ND	ND	ND	3700
pH		7.4	ND	ND	ND	7.6
TSS	mg/L	ND	1	26	7	ND
GROSS ALPHA	pCi/L	14 ± 10	ND	ND	ND	39 ± 14
GROSS BETA	"	12 ± 3	ND	ND	ND	29 ± 3
GAMMA	"	<15	ND	ND	ND	NOT DETECTED
RADIUM 226	"	3 ± 0.9	1.7 ± 0.8	1.8 ± 1.4	2.3 ± 1.7	4.4 ± 1.2
RADIUM 228	"	2 ± 1	ND	ND	ND	<1
POLONIUM 210	"	ND	0.0 ± 0.6	0.5 ± 0.5	0.0 ± 0.3	ND
THORIUM 230	"	ND	11.7 ± 1.7	3.1 ± 0.9	2.6 ± 0.8	ND

SAMPLE SITE		103				
DATE	SAMPLED	12/04/77	3/01/78	5/24/78	9/07/78	9/01/84
PARAMETER	UNITS		GROUND WATER			
FIELD						
TEMPERATURE	°C	8	9	15	16.5	13
pH		7.6	7.4	7.4	7.8	7.68
CONDUCTIVITY	μmhos/cm	2460	2420	2760	2600	2660
ALKALINITY	mg/L	256	242	292	264	
LABORATORY						
BICARBONATE	mg/L	ND	ND	ND	ND	305
CARBONATE	"	ND	ND	ND	ND	0.000
CHLORIDE	"	14	15	12	18	13.2
FLUORIDE	"	0.23	0.20	0.11	0.14	0.152
AMMONIA	"	0.2	<0.1	0.18	<0.01	0.50
NITRATE	"	<0.02	<0.02	0.47	0.35	0.031
SULFATE	"	1280	1330	1800	1200	1140
ALKALINITY	"	680	636	1000	686	221
T.D.S.	"	2050	1920	2510	2030	1850
ALUMINUM	"	0.5	<0.1	0.2	<0.1	0.000
ARSENIC	"	<0.002	<0.002	<0.002	0.005	0.000
BARIUM	"	ND	ND	ND	ND	0.000
BORON	"	0.7	0.6	0.8	<0.1	0.520
CADMIUM	"	<0.01	<0.01	<0.01	0.01	0.0000
CALCIUM	"	140	110	250	150	106
CHROMIUM	"	ND	ND	ND	ND	0.000
COPPER	"	<0.01	0.02	<0.01	0.02	0.000
IRON	"	1.06	0.93	2.16	2.08	0.140
LEAD	"	<0.05	0.02	0.18	<0.01	0.003
MAGNESIUM	"	81	69	120	88	62.9
MANGANESE	"	0.02	<0.01	0.02	0.02	0.000
MERCURY	"	<0.0005	<0.0005	<0.0005	<0.0005	0.00000
MOLYBDENUM	"	<0.1	0.1	<0.1	<0.1	0.005
NICKEL	"	0.04	0.12	<0.01	0.02	0.000
POTASSIUM	"	14	13	17	15	13.9
SELENIUM	"	<0.002	<0.002	<0.002	<0.002	0.002
SILICA	"	10.5	10.0	4.9	7.7	12.6
SILVER	"	ND	ND	ND	ND	0.0000
SODIUM	"	380	440	340	390	400
URANIUM	"	ND	ND	ND	ND	0.000
VANADIUM	"	<0.1	0.4	<0.1	<0.1	0.007
ZINC	"	0.25	0.20	0.56	0.31	0.008
CONDUCTIVITY	μmhos/cm	ND	ND	ND	ND	2600
pH		ND	ND	ND	ND	7.5
TSS	mg/L	5	14	16	6	N.D.
GROSS ALPHA	pCi/L	ND	ND	ND	ND	<2
GROSS BETA	"	ND	ND	ND	ND	6±2
GAMMA	"	ND	ND	ND	ND	<15
RADIUM 226	"	0.5±1.1	0.0±0.6	0.8±0.5	0.5±0.5	<0.6
RADIUM 228	"	ND	ND	ND	ND	<1
POLONIUM 210	"	0.0±0.7	0.2±0.5	0.4±0.6	0.0±0.5	ND
THORIUM 230	"	0.3±0.4	0.3±0.4	1.0±1.6	0.2±0.4	ND

SAMPLE SITE		104				
DATE	SAMPLED	12/05/77	3/01/78	5/24/78	9/07/78	9/01/84
PARAMETER	UNITS		GROUND WATER			
FIELD						
TEMPERATURE	°C	10	7	15	17	13
pH		7.8	7.7	7.75	7.65	7.59
CONDUCTIVITY	µmhos/cm	2820	3210	3180	3350	3650
ALKALINITY	mg/L	160	108	112	116	
LABORATORY						
BICARBONATE	mg/L	ND	ND	ND	ND	144
CARBONATE	"	ND	ND	ND	ND	0.0000
CHLORIDE	"	25	40	30	34	32.4
FLUORIDE	"	0.30	0.35	0.27	0.33	0.355
AMMONIA	"	<0.1	<0.1	0.48	0.10	0.80
NITRATE	"	<0.02	0.32	<0.02	0.01	0.051
SULFATE	"	1630	1770	1850	1600	1650
ALKALINITY	"	530	508	460	539	119
T.D.S.	"	2470	2490	2570	2480	2450
ALUMINUM	"	1.8	<0.1	0.2	<0.1	0.02
ARSENIC	"	<0.002	<0.002	<0.002	0.005	0.000
BARIUM	"	ND	ND	ND	ND	0.000
BORON	"	0.4	0.3	0.5	<0.1	0.305
CADMIUM	"	<0.01	<0.01	<0.01	0.01	0.0000
CALCIUM	"	120	97	120	125	109
CHROMIUM	"	ND	ND	ND	ND	0.001
COPPER	"	<0.01	0.02	<0.01	<0.01	0.000
IRON	"	1.68	2.57	2.61	1.61	0.140
LEAD	"	<0.05	0.01	0.12	0.02	0.000
MAGNESIUM	"	56	50	52	62	62.9
MANGANESE	"	0.10	0.04	0.05	0.06	0.021
MERCURY	"	0.0026	<0.0005	0.0005	<0.0005	0.00074
MOLYBDENUM	"	<0.1	0.1	<0.1	<0.1	0.004
NICKEL	"	0.04	0.12	<0.01	0.03	0.001
POTASSIUM	"	7.5	8.5	5.6	8.7	10.4
SELENIUM	"	<0.002	<0.002	<0.002	<0.002	0.002
SILICA	"	21.5	7.5	3.3	6.6	10.2
SILVER	"	ND	ND	ND	ND	0.0001
SODIUM	"	620	650	590	590	640
URANIUM	"	ND	ND	ND	ND	0.000
VANADIUM	"	<0.1	0.3	<0.1	<0.1	0.002
ZINC	"	0.22	0.17	0.16	0.22	0.038
CONDUCTIVITY	µmhos/cm	ND	ND	ND	ND	3350
pH		ND	ND	ND	ND	7.75
TSS	mg/L	3	2	5	6	ND
GROSS ALPHA	pCi/L	ND	ND	ND	ND	<2
GROSS BETA	"	ND	ND	ND	ND	4±2
GAMMA	"	ND	ND	ND	ND	<15
RADIUM 226	"	2.2±0.9	0.5±1.3	0.8±0.5	2.4±1.8	<0.6
RADIUM 228	"	ND	ND	ND	ND	2±1
POLONIUM 210	"	0.0±0.6	0.0±0.4	0.0±0.4	0.0±0.6	ND
THORIUM 230	"	0.1±0.4	0.4±0.4	0.2±0.3	1.0±0.6	ND

SAMPLE SITE		106				
DATE	SAMPLED	12/05/77	3/02/78	5/24/78	9/06/78	9/02/64
PARAMETER	UNITS		SURFACE WATER			
FIELD						
TEMPERATURE	°C	4	<1	18	25.5	21
pH		7.8	7.7	8.0	8.0	7.88
CONDUCTIVITY	µmhos/cm	3150	ND	2040	2770	3880
ALKALINITY	mg/L $CaCO_3$	365	246	120	94	
LABORATORY						
BICARBONATE	mg/L	ND	ND	ND	ND	209
CARBONATE	"	ND	ND	ND	ND	0.000
CHLORIDE	"	16	5.6	8.6	14	11.2
FLUORIDE	"	0.23	0.35	0.31	0.26	0.25
AMMONIA	"	<0.1	<0.1	0.21	<0.01	0.32
NITRATE	"	<0.02	0.14	0.07	0.02	0.300
SULFATE	"	1920	1930	1450	1850	2150
ALKALINITY	mg/L $CaCO_3$	2060	1810	1240	1810	173
T.D.S.	mg/L	3060	2890	1900	2830	2400
ALUMINUM	"	0.8	<0.1	<0.1	<0.1	0.027
ARSENIC	"	<0.002	<0.002	<0.002	0.004	0.000
BARIUM	"	ND	ND	ND	ND	0.000
BORON	"	0.4	0.4	0.5	<0.1	0.590
CADMIUM	"	<0.01	0.05	<0.01	0.02	0.0001
CALCIUM	"	530	490	350	470	511
CHROMIUM	"	ND	ND	ND	ND	0.000
COPPER	"	<0.01	0.02	<0.01	0.01	0.001
IRON	"	1.79	0.24	0.15	0.06	0.140
LEAD	"	0.30	0.12	0.21	0.06	0.000
MAGNESIUM	"	180	150	100	130	148
MANGANESE	"	0.16	0.16	0.26	0.03	0.005
MERCURY	"	<0.0005	<0.0005	<0.0005	0.0006	0.00000
MOLYBDENUM	"	<0.1	0.1	<0.1	0.1	0.000
NICKEL	"	0.01	0.12	0.02	0.04	0.002
POTASSIUM	"	15	14	10	14	9.0
SELENIUM	"	<0.002	<0.002	0.002	<0.002	0.003
SILICA	"	19.0	12.0	1.0	<0.2	9.5
SILVER	"	ND	ND	ND	ND	0.0001
SODIUM	"	150	140	64	120	250
URANIUM	"	ND	ND	ND	ND	0.012
VANADIUM	"	<0.1	0.3	<0.1	0.1	0.001
ZINC	"	<0.01	0.13	<0.01	0.01	0.007
CONDUCTIVITY	µmhos/cm	ND	3110	ND	ND	3150
pH		ND	ND	ND	ND	7.7
T.S.S.	mg/L	7	1	7	5	1.4
GROSS ALPHA	pCi/L	ND	ND	ND	ND	13±9
GROSS BETA	"	ND	ND	ND	ND	9±2
GAMMA	"	ND	ND	ND	ND	<15
RADIUM 226	"	0.1 ± 0.5	0.0±0.5	0.1±0.3	0.7±0.5	<0.6
RADIUM 228	"	ND	ND	ND	ND	<1
POLONIUM 210	"	0.0 ± 0.7	0.0 ± 0.4	0.1 ± 0.5	0.0± 0.6	ND
THORIUM 230	"	0.0 ± 0.3	1.3 ± 0.6	0.0 ± 0.2	1.7 ± 0.7	ND

SAMPLE SITE		108				
DATE	SAMPLED	12/05/77	3/02/78	5/24/78	9/06/78	9/02/84
PARAMETER	UNITS		SURFACE	WATER		
FIELD						
TEMPERATURE	°C	6	1	14	26	16
pH		7.8	7.5	7.4	8.25	7.36
CONDUCTIVITY	µmhos/cm	2900	ND	2940	2590	2990
ALKALINITY	mg/L $CaCO_3$	302	206	212	62	
LABORATORY						
BICARBONATE	mg/L	ND	ND	ND	ND	192
CARBONATE	"	ND	ND	ND	ND	0.000
CHLORIDE	"	7.8	10	7.6	15	6.0
FLUORIDE	"	<0.05	0.35	0.20	0.20	0.27
AMMONIA	"	<0.1	<0.1	0.18	0.28	3.18
NITRATE	"	<0.02	0.36	0.26	0.13	0,169
SULFATE	"	1850	1930	2100	1650	2200
ALKALINITY	mg/L $CaCO_3$	2040	1740	1800	1620	159
T.D.S.	mg/L	2890	2810	2830	2540	2370
ALUMINUM	"	0.7	<0.1	0.3	0.1	0.000
ARSENIC	"	<0.002	<0.002	<0.002	0.005	0.01
BARIUM	"	ND	ND	ND	ND	0,000
BORON	"	0.4	0.4	0.7	0.2	0.610
CADMIUM	"	0.02	0.06	<0.01	0.02	0.0000
CALCIUM	"	620	530	570	470	598
CHROMIUM	"	ND	ND	ND	ND	0.002
COPPER	"	<0.01	0.02	0.02	0.02	0.000
IRON	"	0.32	0.37	0.76	0.17	0.035
LEAD	"	0.40	0.15	0.25	0.06	0.009
MAGNESIUM	"	120	120	110	100	160
MANGANESE	"	0.17	0.14	0.20	0.03	0.066
MERCURY	"	<0.0005	<0.0005	<0.0005	<0.0005	0.00112
MOLYBDENUM	"	<0.1	0.1	<0.1	0.1	0.000
NICKEL	"	<0.01	0.12	0.04	0.05	0.005
POTASSIUM	"	11	12	9.2	8.9	11.3
SELENIUM	"	<0.002	<0.002	<0.002	0.005	0.001
SILICA	"	15.0	12.0	6.0	7.1	14.9
SILVER	"	ND	ND	ND	ND	0.0000
SODIUM	"	100	100	91	90	271
URANIUM	"	ND	ND	ND	ND	0.002
VANADIUM	"	<0.1	0.4	<0.1	0.2	0.000
ZINC	"	0.03	0.15	<0.01	0.01	0.005
CONDUCTIVITY	µmhos/cm	ND	2900	ND	ND	3200
pH		ND	ND	ND	ND	7.4
T.S.S.	mg/L	10	8	24	17	2.1
GROSS ALPHA	pCi/L	ND	ND	ND	ND	<2
GROSS BETA	"	ND	ND	ND	ND	8 ± 2
GAMMA	"	ND	ND	ND	ND	20 ± 2
RADIUM 226	"	2.0 ± 0.8	0.0 ± 0.5	0.4 ± 0.4	0.0 ± 03	< 0.6
RADIUM 228	"	ND	ND	ND	ND	< 1
POLONIUM 210	"	0.0 ± 0.7	0.0 ± 0.3	0.0 ± 0.4	0.0 ± 0.6	ND
THORIUM 230	"	0.5 ± 0.5	0.3 ± 0.4	0.2 ± 0.3	0.2 ± 0.3	ND

SAMPLE SITE		105		107	110	
DATE	SAMPLED	5/24/78	9/02/84	9/02/84	9/03/84	
PARAMETER	UNITS	SURFACE	WATER	SURFACE WATER	GROUND WATER	
FIELD						
TEMPERATURE	°C	29	21	19	19	
pH		7.85	8.12	7.83	7.43	
CONDUCTIVITY	µmhos/cm	3320	4730	3940	1934	
ALKALINITY	mg/L $CaCO_3$	372				
LABORATORY						
BICARBONATE	mg/L	ND	358	223	275	
CARBONATE	"	ND	0.000	0.000	0.000	
CHLORIDE	"	1.0	54	10	8.4	
FLUORIDE	"	0.20	0.215	0.140	0.385	
AMMONIA	"	0.40	4.4	3.12	2.29	
NITRATE	"	0.36	0.063	0.000	0.000	
SULFATE	"	2300	2750	2150	825	
ALKALINITY	mg/L $CaCO_3$	1660	296	184	227	
T.D.S.	mg/L	3330	3480	2934	1470	
ALUMINUM	"	<0.1	0.025	0.025	0.126	
ARSENIC	"	<0.002	0.000	0.000	0.000	
BARIUM	"	ND	0.000	0.000	0.000	
BORON	"	0.9	0.610	0.385	0.230	
CADMIUM	"	<0.01	0.0008	0.0000	0.0000	
CALCIUM	"	350	268	555	176	
CHROMIUM	"	ND	0.000	0.000	0.000	
COPPER	"	<0.01	0.000	0.000	0.000	
IRON	"	0.04	0.240	0.140	0.100	
LEAD	"	0.21	0.000	0.060	0.001	
MAGNESIUM	"	210	305	83	87.5	
MANGANESE	"	0.04	0.000	0.006	0.105	
MERCURY	"	<0.0005	0.00122	0.00000	0.00084	
MOLYBDENUM	"	<0.1	0.000	0.000	0.000	
NICKEL	"	0.03	0.000	0.005	0.003	
POTASSIUM	"	19	67.5	10.9	14.7	
SELENIUM	"	<0.002	0.002	0.007	0.003	
SILICA	"	12.9	20.6	14.9	10.2	
SILVER	"	ND	0.0000	0.0001	0.0000	
SODIUM	"	340	560	271	154	
URANIUM	"	ND	0.010	0.004	0.006	
VANADIUM	"	<0.1	0.000	0.008	0.001	
ZINC	"	<0.01	0.006	0.019	0.902	
CONDUCTIVITY	µmhos/cm	ND	4700	3200	2000	
pH		ND	7.65	7.75	7.4	
T.S.S.	mg/L	3	4.8	1.8	ND	
GROSS ALPHA	pCi/L	ND	<2	<2	34±13	
GROSS BETA	"	ND	14±3	7±2	12±3	
GAMMA	"	ND	<15	<15	<15	
RADIUM 226	"	1.3±0.6	<0.6	<0.6	12.9±1.4	
RADIUM 228	"	ND	<1	<1	<1	
POLONIUM 210	"	0.0±0.5	ND	ND	ND	
THORIUM 230	"	0.8±0.4	ND	ND	ND	

SAMPLE SITE		111				
DATE	SAMPLED	12/05/77	3/01/78	5/24/78	9/06/78	9/03/84
PARAMETER	UNITS		SURFACE	WATER		
FIELD						
TEMPERATURE	°C	2	<1	16.5	32	20
pH		7.4	7.6	8.1	7.95	8.08
CONDUCTIVITY	µmhos/cm	4810	ND	1190	3600	4965
ALKALINITY	mg/L $CaCO_3$	298	228	136	222	
LABORATORY						
BICARBONATE	mg/L	ND	ND	ND	ND	214
CARBONATE	"	ND	ND	ND	ND	0.000
CHLORIDE	"	550	520	50	170	477
FLUORIDE	"	0.28	0.56	0.28	0.43	0.49
AMMONIA	"	<0.1	<0.1	0.43	<0.01	4.0
NITRATE	"	0.06	0.03	0.07	0.04	0.002
SULFATE	"	1800	1800	740	1500	2050
ALKALINITY	mg/L $CaCO_3$	1940	1670	400	911	177
T.D.S.	mg/L	3850	3600	890	2650	4110
ALUMINUM	"	2.4	<0.1	4.9	0.1	0.075
ARSENIC	"	<0.002	<0.002	<0.002	0.004	0.004
BARIUM	"	ND	ND	ND	ND	0.000
BORON	"	0.3	0.2	0.3	<0.1	0.165
CADMIUM	"	<0.01	0.02	<0.01	0.02	0.0001
CALCIUM	"	530	490	130	240	316
CHROMIUM	"	ND	ND	ND	ND	0.000
COPPER	"	0.01	0.02	<0.01	<0.01	0.004
IRON	"	0.72	0.19	13.4	0.16	0.005
LEAD	"	0.20	0.10	0.18	0.01	0.004
MAGNESIUM	"	150	120	40	90	133
MANGANESE	"	0.46	0.18	0.28	0.09	0.135
MERCURY	"	0.0036	<0.0005	<0.0005	<0.0005	0.00000
MOLYBDENUM	"	<0.1	0.1	<0.1	0.1	0.000
NICKEL	"	0.02	0.16	0.01	0.04	0.009
POTASSIUM	"	8.1	7.5	8.7	12	19.4
SELENIUM	"	<0.002	<0.002	<0.002	<0.002	0.001
SILICA	"	36.0	14.0	15.4	13.3	10.2
SILVER	"	ND	ND	ND	ND	0.0000
SODIUM	"	540	450	150	540	773
URANIUM	"	ND	ND	ND	ND	0.008
VANADIUM	"	<0.1	0.4	<0.1	0.1	0.000
ZINC	"	<0.01	0.09	0.04	<0.01	0.012
CONDUCTIVITY	µmhos/cm	ND	4430	ND	ND	5400
pH		ND	ND	ND	ND	7.9
T.S.S.	mg/L	6	6	810	18	14.8
GROSS ALPHA	pCi/L	ND	ND	ND	ND	<2
GROSS BETA	"	ND	ND	ND	ND	5±2
GAMMA	"	ND	ND	ND	ND	<15
RADIUM 226	"	4.4±2.4	0.1±0.6	0.0±1.3	0.0±1.5	<0.6
RADIUM 228	"	ND	ND	ND	ND	<1
POLONIUM 210	"	0.0±0.7	0.1±0.4	0.0±0.4	0.0±0.5	ND
THORIUM 230	"	0.5±0.5	0.2±0.3	0.5±0.4	2.3±0.8	ND

SAMPLE SITE		ANGOSTURA RESERVOIR			CANGRES #1):	
DATE	SAMPLED	12/04/77	3/01/78	5/22/78	9/06/78	9/19/84
PARAMETER	UNITS		SURFACE	WATER		
FIELD						
TEMPERATURE	°C	3	<1	20.5	26.5	24
pH		7.8	7.9	8.2	8.2	8.25
CONDUCTIVITY	µmhos/cm	2480	ND	1210	1430	2430
ALKALINITY	mg/L $CaCO_3$	110	104	108	122	
LABORATORY						
BICARBONATE	mg/L	ND	ND	ND	ND	162
CARBONATE	"	ND	ND	ND	ND	0.000
CHLORIDE	"	140	140	65	63	108
FLUORIDE	"	0.30	0.80	0.31	0.51	0.515
AMMONIA	"	<0.1	<0.1	0.22	<0.01	0.32
NITRATE	"	0.04	0.06	0.68	0.14	0.025
SULFATE	"	1330	1600	670	650	820
ALKALINITY	mg/L $CaCO_3$	1200	1290	526	474	134
T.D.S.	mg/L	2230	2610	1050	1020	1660
ALUMINUM	"	0.7	<0.1	1.0	0.2	0.000
ARSENIC	"	<0.002	<0.002	<0.002	0.004	0.000
BARIUM	"	ND	ND	ND	ND	0.000
BORON	"	0.2	0.4	0.3	0.1	0.165
CADMIUM	"	0.02	0.02	<0.01	<0.02	0.0006
CALCIUM	"	340	380	160	130	44.1
CHROMIUM	"	ND	ND	ND	ND	0.000
COPPER	"	<0.01	0.04	<0.01	0.01	0.004
IRON	"	0.01	0.10	0.86	0.31	0.005
LEAD	"	0.40	0.14	0.15	0.01	0.000
MAGNESIUM	"	86	90	42	43	70.2
MANGANESE	"	0.02	0.04	0.10	0.03	0.001
MERCURY	"	<0.0005	<0.0005	<0.0005	<0.0005	0.00057
MOLYBDENUM	"	<0.1	0.1	<0.1	0.1	0.000
NICKEL	"	<0.01	0.10	0.02	0.03	0.000
POTASSIUM	"	11	13	8.4	9.6	0.025
SELENIUM	"	<0.002	<0.002	<0.002	<0.002	0.000
SILICA	"	11.5	8.5	4.3	6.0	3.2
SILVER	"	ND	ND	ND	ND	0.0000
SODIUM	"	200	250	110	160	238
URANIUM	"	ND	ND	ND	ND	0.001
VANADIUM	"	<0.1	0.3	<0.1	0.1	0.000
ZINC	"	<0.01	0.17	0.01	0.01	0.046
CONDUCTIVITY	µmhos/cm	ND	2980	ND	ND	1900
pH		ND	ND	ND	ND	7.3
T.S.S.	mg/L	18	10	76	23	ND
GROSS ALPHA	pCi/L	ND	ND	ND	ND	<2
GROSS BETA	"	ND	ND	ND	ND	9±2
GAMMA	"	ND	ND	ND	ND	NOT DETECTED
RADIUM 226	"	0.0±0.5	0.0±0.7	0.3±0.4	0.5±0.5	<0.6
RADIUM 228	"	ND	ND	ND	ND	<1
POLONIUM 210	"	0.0±0.7	0.0±0.4	0.1±0.5	0.0±0.5	ND
THORIUM 230	"	0.4±0.4	0.2±0.3	0.3±0.3	0.0±0.4	ND

United States Department of Agriculture
Forest Service
Elk Mountain District
40 South Summit
Newcastle, WY 82701

RECEIVED SEP 15 1984

Reply to: 2820

Date: September 12, 1984

W. T. Cohan P. E., Inc.
Mining & Geological Consultants
P.O. Box 2392
Grand Junction, CO 81502

Dear Bill:

I am approving your Operating Plan for the aquifer pump test in Sec. 25, T7S, R2E contingent upon the following:

1. If air drilling is used (a) portable sumps will be used in lieu of a pit and (b) any cuttings left on the surface will be spread thinly (1") on the surface adjacent to the hole prior to seeding.

2. The cuttings will be monitored for radioactive material. If radioactive cuttings are found they will be buried to a minimum depth of 3 feet.

3. All disturbed areas will be shaped to conform to original ground contour.

4. All areas of soil disturbance will be seeded immediately following restoration work with the following mixture: 40% little bluestem, 30% Western wheatgrass, 20% side oats grama, and 10% yellow sweet clover. The seed will be applied at a rate of 20 pounds of pure live seed/acre.

5. Vehicle travel will be confined to the existing roadways as much as possible.

6. A minimum bond of $1,000.00 will be provided to cover the cost of surface reclamation.

7. All garbage, refuse, or waste shall be removed from National Forest lands.

8. Operators shall comply with all applicable Federal and State Fire Laws and regulations and shall take all reasonable measures

to prevent and suppress fires on the area of operations and shall require his employees, contractors, and subcontractors to do likewise.

9. The Forest Service shall be notified 5 days in advance of starting operations and upon completion.

For your information, I have included a copy of the Environmental Assessment and Decision Notice for the project.

Please note that the bond must be posted prior to any drilling activity.

If you have any questions please contact my assistant Ron Krager.

Sincerely,

J. PHILLIP JAMES
District Ranger

FINDING OF NO SIGNIFICANT IMPACT,
DECISION NOTICE,
and
ENVIRONMENTAL ASSESSMENT

AMERICAN GOLD MINERALS CORPORATION
ROBINSON FLATS PUMP TESTING
FALL RIVER COUNTY, SOUTH DAKOTA

BLACK HILLS NATIONAL FOREST
ELK MOUNTAIN RANGER DISTRICT

Introduction

W. T. Cohan P.E., Inc., acting as an operator for American Gold Mineral Corporation, has submitted an operating plan (attached) to conduct an aquifer pump test on their mining claims in the SE¼SE¼ Section 25, T7S, R2E (see attached vicinity map). The project would consist of drilling 2 wells and conducting a 72 hour pump test to obtain information on aquifer transmissivity.

Purpose of and Need for Action

Under the U. S. Mining Laws of 1872 a mining claimant has the right to explore for, and develop, locatable minerals on "public domain" land within the National Forest. Gathering data on groundwater is part of the exploration and development program. The Secretary of Agriculture's mineral regulations require the submission of mining operating plans and protection of surface resources. The purpose of this Environmental Assessment is to determine if the operation plan submitted by W. T. Cohan P.E., Inc. contains appropriate measures to protect the surface resources of the National Forest during mining and prospecting operations and rehabilitation of land afterward.

"The Forest Service decision will relate only to lands administered by the Forest Service and will be documented in a Decision Notice. Decisions by other jurisdictions to issue or not issue approvals related to this proposal can be made by them based on the disclosure of impacts available in this document. Listed below are cooperating agencies in the preparation of this document and to our knowledge, the approvals needed by the proponent."

This report was prepared by Ron Krager, U. S. Forest Service, with consultation from the South Dakota Department of Natural Resources. No other approvals are known to be required.

Affected Environment

The area involved is in the dry foothill region on the south and west edge of the Black Hills. The drilling area is located on a flat ridgetop in a large grass park. Vegetation is primarily Western wheatgrass and blue gramma grass. The site is primarily used by range cattle.

There are no known threatened or endangered species in the area nor are there any wetlands or flood plains.

Based on data from nearby exploration holes, the drilling will not penetrate any uranium ore bodies. The acquifer, known to be 500' depth, contains water high in cadmium (.02 ppm) but within state livestock standards. The high levels appear naturally in the area in other local wells and in surface water.

An archeological survey has been conducted without finding any archeological sites at the proposed drill site.

Proposed Action

The project will consist of (1) drilling, (2) pump testing the well, and (3) reclamation of the site.

Drilling will be done by a truck mounted drill rig. Air drilling will be used if feasible. If not, water drilling will be utilized and will require a mudpit of less than 100 ft^2 surface area. The total disturbed area for both drill holes will be less than 600 ft^2 (.01 ac.). Approximately 1/2 of the cuttings will be placed back in the holes. Both holes will be cased and cemented above the geological formation.

The larger well will be pump tested by pumping 40 gallons per minute continuously for 48-72 hours. Drawdown will be measured in the second hole. The water will be disposed of by irrigating the adjacent rangeland with an agricultural sprinkler system. The sprinkler will be moved as needed to prevent runoff or impoundment.

Reclamation will consist of spreading the remaining cuttings in a thin layer on the surface and seeding all disturbed soil. If wet drilling and a mudpit are necessary the cuttings will be buried in the pit and the site contoured before seeding.

No access or site prep bladework will be necessary.

Alternatives

In response to the above proposal 36 CFR 252.5 lists five possible actions by the District Ranger. There are three feasible alternatives:

Alternative A. Determination that an Environmental Impact Statement is needed.

It has been determined that the proposed operating plan will not have any significant effect on the quality of the human environment. Therefore an EIS is not needed.

Alternative B. Approval of the plan as submitted.

Alternative C. Approval of the plan contingent upon modification to mitigate the effects on surface resources. The is the preferred alternative.

Mitigating measures to be included in this alternative are:

1. If air drilling is used (a) portable sumps will be used in lieu of a pit and (b) any cuttings left on the surface will be spread thinly (1") on the surface adjacent to the hole prior to seeding.

2. The cuttings will be monitored for radioactive material. If radioactive cuttings are found they will be buried to a minimum depth of 3 feet.

3. All disturbed areas will be shaped to conform to original ground countour.

4. All areas of soil disturbance will be seeded immediately following restoration work with the following mixture: 40% little bluestem, 30% Western wheatgrass, 20% side oats grama, and 10% yellow sweet clover. The seed will be applied at a rate of 20 pounds of pure live seed/acre.

5. Vehicle travel will be confined to the existing roadways as much as possible.

6. A minimum bond of $1,000.00 will be provided to cover the cost of surface reclamation.

7. All garbage, refuse, or waste shall be removed from National Forest lands.

8. Operators shall comply with all applicable Federal and State Fire Laws and regulations and shall take all reasonable measures to prevent and suppress fires on the area of operations and shall require his employees, contractors, and subcontractors to do likewise.

9. The Forest Service shall be notified 5 days in advance of starting operations and upon completion.

The remaining two alternatives are to (1) not require an operating plan or (2) request additional time (up to 60 days) to review the plan. A "no action" alternative is not possible under the present mining regulations.

Environmental Consequences

Approval of the operating plan (Alternative B) would result in limited surface disturbance (max. of .01 acre). The reclamation measures are sufficient to revegetate the site. Existing vegetation on the adjacent rangeland would benefit from the sprinled water. Other impacts on wildlife, scenic values, air quality, and livestock are minimal.

Requiring additional mitigating measures (Alternative C) would result in similar environmental consequences as Alternative B. These measures, however, are designed to handle unanticipated situations (radioactive material, etc.) and further specify reclamation.

Decision

Based on the above analysis it is my decision to approve the operating plan contingent upon additional mitigating measures 1-9 above (Alternative C). This will comply with mining laws while minimizing impacts on the environment.

Implementation may take place immediately upon posting of the reclamation bond. This decision is subject to appeal pursuant to 36 CFR 211-18 (Federal Register, Volume 48, No. 63 March 31, 1983, pages 13420 to 13426). Notice of the appeal must be in writing and submitted to the District Ranger at the U.S.D.A. Forest Service, Black Hills National Forest, 640 South Summit, Newcastle, Wyoming 82701, within 45 days from the date of this decision. A statement of reasons to support the appeal and any request for oral presentation must be filed within the 45 day period for filing a notice of appeal.

District Ranger

9/12/84
Date

W.T. COHAN P.E., INC.
MINING & GEOLOGICAL CONSULTANTS
P. O. BOX 2392 (303) 243-7583
GRAND JUNCTION, COLORADO 81502

August 10, 1984

Mr. Phil James
District Ranger
Elk Mountain Ranger District
Black Hills National Forest
U. S. Department of Agriculture
Forest Service
640 South Summit
New Castle, WY 82701

Re: Proposed Operating Plan, Chord Project

Dear Mr. James:

American Gold Minerals proposes to conduct an aquifer pump test program on its mining claims in the SE¼ SE¼ Section 25, T7S, R2E, B.H.M. on the flat ridge above Craven Canyon.

The project will consist of drilling a single 8½" well, 500 feet deep and installing 6" diameter steel casing which will be perforated through and cemented above the Lakota Formation. In addition, a single monitor well 5 5/8" diameter and 500 feet deep will be drilled nearby and cased with 2" diameter casing which will be cemented above the Lakota as well. An existing monitor well will also be utilized. All operations will be conducted on the grass covered flat land near existing roads such that no new road work nor site grading activity will be conducted and surface disturbance will be limited to the actual drilling and vehicle access. This disturbance will be minimal.

The holes will be drilled by a licensed water well driller using a rotary drill rig. The holes will be flushed with compressed air unless water is required. In that event a degradable agent such as Johnson "Revert" would be employed. At the completion of drilling, the cuttings would be buried and all disturbed areas would be groomed and planted with an approved seed mixture. Top soil would be salvaged and replaced where excavation was planned for cuttings disposal or mud pits. Each pit would not exceed 100 square feet in surface area for each hole to be drilled. The pits would be 6 feet deep.

The pits would be allowed to drain prior to backfilling and covering. The total area to be distrubed for each drilling site would not exceed 300 square feet.

All holes will be fitted with steel or plastic casing which will be cemented above the producing horizon for a minimum of 50 feet by slug injection methods. In addition, the zone 2-8 feet below the surface will also be cemented and soil material back filling the first 2 feet. The annular zone between the cemented zones will be backfilled with dry cuttings as may be available. Upon completion the holes will be fitted with locked caps to prevent unauthorized entry. The casing will protrude no more than 4-6" above the ground surface and rock cairns will be constructed around the casing to obscure their view.

The pumping test shall consist of installing a submersible pump in the pumped well and pumping continuously for 48-72 hours at an anticipated rate of 40 gallons per minute or a maximum rate of 80 GPM for short periods of time. The well discharge will be disposed of through a system of agricultural sprinklers irrigating the adjacent grass land. The sprinklers will be periodically moved if necessary to prevent runoff or impoundment, i.e., proper irrigation practice will be observed and there will be no discharge to the waters of the United States.

Our proposed time table is late August-early September 1984 startup. However dependent upon budgetary constraints, the 48-72 hour pumping test might well be deferred until the fall of 1985.

The corporate offices of American Gold Minerals are located in Denver, CO as follows:

American Gold Minerals Corporation
P. O. Box 5508 T.A. (80217)
1660 Wynkoop St. (80202)
Denver, CO
(303) 534-0374

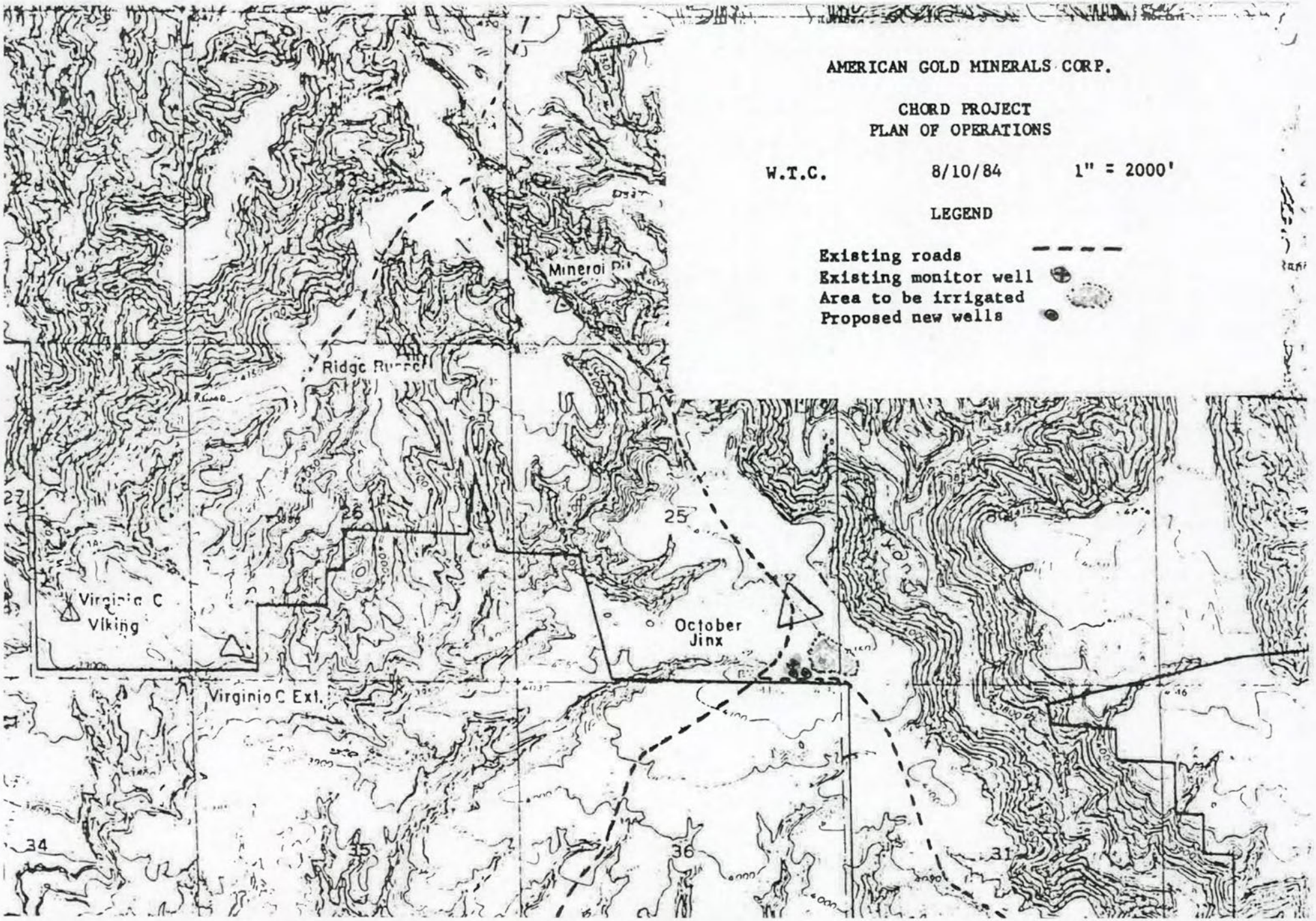
I shall be the onsite representative for American Gold Minerals. A map of the proposed site is attached hereto.

Yours truly,

W. T. Cohan P.E.

WTC/ac

cc: Mr. W. M. Shepard, AGMC
Mr. Ron Craeger U.S.F.S.


AMERICAN GOLD MINERALS CORP.
CHORD PROJECT
PLAN OF OPERATIONS
W.T.C. 8/10/84 1" = 2000'
LEGEND
Existing roads
Existing monitor well
Area to be irrigated
Proposed new wells
Mineroi Pit
Ridge Runner
Virginio C
Viking
Virginio C Ext.
October
Jinx
25
26
34
35
36
31

Clean Nuclear Energy Corp.
October Jinx Project

2024 Special Status Plant Species Inventory
Technical Report

Report Prepared for:
U.S. Forest Service, Black Hills National Forest
Hell Canyon Ranger District
Custer, South Dakota
and
Clean Nuclear Energy Corp.
503-905 Pender St. W
Vancouver, British Columbia
Canada V6C 1L6

Report Prepared by:
BKS Environmental Associates, Inc.
P.O. Box 3467
Gillette, Wyoming 82717

September 2024

TABLE OF CONTENTS

Section Page No.

INTRODUCTION 1

SURVEY AREA 1

General 1

Soils 2

Vegetation 3

METHODOLOGY 4

RESULTS 6

USFWS Threatened Plant Species 6

USFS R2 Sensitive Plant Species 6

USFS Species of Local Concern Plant Species 6

USFS Target Plant Species 7

Rare Plants of South Dakota 7

Noxious and Invasive Plant Species 7

DISCUSSION 7

REFERENCES 18

LIST OF TABLES

Table Page No.

Table 1: Summary of Status, Distribution, and Habitat of Special Status Plant Species Considered in the 2024 Field Survey for the October Jinx Project. 9

Table 2: List of Plant Species Observed During the 2024 Special Status Plant Species Survey for the October Jinx Project. 14

Table 3: Noxious and Invasive Species Observed During the 2024 Special Status Plant Species Survey for the October Jinx Project by Proposed Drill Site within the Survey Area. 17

LIST OF APPENDICIES

Appendix Page No.

Appendix A: Photographs 20

Appendix B: General Survey Information 38

Appendix C: Maps 41

INTRODUCTION

The U.S. Forest Service, Black Hills National Forest, Hell Canyon Ranger District (USFS), is preparing a Categorical Exclusion (Catex) to address potential effects of the October Jinx Project. The purpose of the 2024 inventory is to document special status plant species (SSPS) within the October Jinx Project. The October Jinx Project is located in the southern Black Hills in Fall River County, South Dakota, approximately seven miles north of Edgemont, South Dakota (Addendum C - Map 1).

Clean Nuclear Energy Corp. (herein referred to as the Company) proposes to conduct lode mineral exploration in the Hogback Ridge of the Black Hills National Forest. The Company is requesting authorization for a program of reverse circulation exploration holes to test for subsurface uranium mineralization and to conduct an aquifer characterization study on the October Jinx Project. Seventeen drill sites and associated overland travel access routes are proposed for the exploration program on USFS-administered lands (Addendum C - Map 1). The aquifer characterization study will include installation of four new cased groundwater monitoring wells (converted from new drill site exploration holes). The staging area will be located on South Dakota state land in Section 36, Township 7 South, Range 3 East of the Black Hills Meridian.

The proposed drill sites and associated overland travel access routes are located in an areas previously impacted by wildfire and uranium exploration. Existing roads provide adequate entry to the proposed work area. Modifications to the existing roadbeds or new construction of roads, bridges, or culverts are not anticipated for entry to the proposed work area. No tree or vegetation removal will be required to access the proposed drill sites. Proposed drill sites will require little or no surface modification, due to existing topography, to accommodate access for the drill rig, water truck, fresh water and recirculation tanks, and potential sump installation. No perennial or intermittent streams exist near the October Jinx Project.

The disturbance footprint of the October Jinx Project will be limited to the extent possible. Total disturbance associated with the proposed drill sites is 1.4 acres. All drill rigs, excavators, and equipment entering USFS-administered lands will be washed before entry to reduce the spread of noxious weeds. After completion of exploration drilling at the drill sites, the drill site will be recontoured, if needed, seeded to enhance pre-disturbance conditions, and amended or mulched (certified weed-free).

As part of the October Jinx Project, BKS Environmental Associates, Inc. (BKS) conducted a field survey for SSPS. The SSPS Survey Area included the seventeen proposed drill sites and associated overland travel access routes (Addendum C - Map 1). This document summarizes the methods and results of the field survey which was conducted for preparation of the USFS Catex.

SURVEY AREA

General

The October Jinx Project is located on USFS-administered land of the Black Hills National Forest Hell Canyon Ranger District, Fall River County, South Dakota. Located at the southern end of the Black Hills within the Hogback Ridge where the ponderosa pine (*Pinus ponderosa*) woodlands meet the mixed-grass prairie grasslands (Hall et al. 2002), the October Jinx Project is generally located on gently rolling plains. Two ephemeral drainages are in proximity to the October Jinx Project. Cloven Canyon is located east of the October Jinx Project, and west the landscape is dissected by ephemeral drainages associated with

Driftwood Creek. Elevations range from 4,000 to 4,200 feet above sea level.

The Survey Area including seventeen proposed drill sites and associated overland travel access routes is located within the Edgemont NE Quadrangle in (Addendum C – Map 1):

- Section 25, Township 7 South, Range 2 East of the Black Hills Meridian
- Section 30, Township 7 South, Range 3 East of the Black Hills Meridian

The entire Survey Area is approximately 44 acres. The Survey Area includes a 1.0-acre buffer for each of the seventeen proposed drill sites. For the approximately 1.3 miles of proposed overland travel access routes, a 75 feet buffer on either side of the centerline (150 feet total buffer) is also included in the Survey Area.

The Survey Area is located on lands previously impacted by wildfire and historic uranium exploration completed during the 1970s and 1980s. The existing main access road, Elbow Canyon Road, is a Fall River County maintained gravel road and is adequate for entry to the October Jinx Project. Access routes to individual proposed drill sites from the main access road will utilize existing two-tracks and trails and overland travel. Additional road construction, vegetation removal, or road widening are not required. Routine road maintenance is not anticipated during operations. Therefore, the existing main access road, two-tracks, and trails are not included in the Survey Area.

A limited number of proposed drill sites are located along the ridgetop above Cloven Canyon, and a limited number of proposed drill sites are located in proximity to an ephemeral tributary of Driftwood Creek. All proposed drill sites and associated overland travel access routes within the Survey Area are located in areas of relatively flat topography in upland topographic positions. Slopes throughout the Survey Area are generally less than 5%. As a result, no or limited surface modification is expected.

Soils

The Survey Area is located within the Hogback Ridge of the southern Black Hills National Forest. The following Natural Resource Conservation Service (NRCS 2024) soil map units (Addendum C - Map 1) are within the Survey Area:

- MoB – Minnequa silt loam, 2 to 6 percent slopes
- P054D – Butche-Boneek, dry complex, 3 to 15 percent slopes
- P224F – Mathias-Rockoa-Rock outcrop complex, 25 to 60 percent slopes, stony
- P226E – Mathias, very stony-Samsil Rock outcrop complex, 15 to 30 percent slopes
- P276B – Norka silt loam, 2 to 6 percent slopes

Soil series within these soil map units were formed in shale, sandstone, limestone, and sedimentary rocks as follows:

- Minnequa Series: moderately deep, well drained soils formed in slope alluvium and residuum weathered from chalk, marl, limestone, and limy sedimentary bedrock on hills, cuestas, plains, interfluves, pediments, and ridges.
- Butche Series: shallow, well drained to excessively drained soils formed in loamy materials weathered from sandstone on uplands.
- Boneek Series: deep and very deep, well drained soils formed in silty sediments underlain by

sandstone or siltstone on high terraces and uplands.

- Mathias Series: very deep, well drained soils formed in colluvial sediments weathered from interbedded sandstone and shale on uplands.
- Rockoa Series: very deep, well drained soils formed in colluvial material weathered from interbedded sandstone and shale on uplands.
- Samsil Series: shallow, well drained soils formed in alluvium or residuum weathered from shale on hills, ridges, and breaks of dissected shale plains.
- Norka Series: very deep, well drained soils formed in thick, calcareous, eolian or alluvial materials high in very fine sand on hills, ridges, slope breaks, and valley side slopes.

Vegetation

According to Hall et al. (2002) the varied topography, geology, and climate of the Black Hills has resulted in a corresponding variety of vegetation types. In the lower elevation Hogback Ridge, ponderosa pine forests integrate with ponderosa pine woodland. Ponderosa pine woodlands have savanna-like stands of ponderosa pine often with grass understory. Mixed-grass prairie grasslands are the most extensive within the lower elevation of the Hogback Ridge. The plant species of the mixed-grass prairie grassland are representative of the short, mixed, and tallgrass prairies.

The Survey Area is located within the mixed-grass prairie grassland. Areas associated with the ephemeral drainages of Driftwood Creek and Coven Canyon surrounding the Survey Area are within the ponderosa pine woodland. In addition to the disturbances associated with historic wildfire and uranium exploration, the area has been historically and is presently grazed by livestock. As a result, the vegetation within the Survey Area is typical of a mixed-grass prairie grassland under historic disturbance and current grazing pressures. Graminoids are the dominant life form. Forbs are present with moderate diversity. Shrubs and subshrubs are scattered and limited in abundance and diversity. Invasive annual grasses are present and locally common. Trees, primarily ponderosa pine, are limited to the ephemeral drainages of Driftwood Creek. The ponderosa pine communities are mainly composed of mature stands, not recently disturbed by commercial logging or timber harvest activities.

The Survey Area vegetation is similar to the surrounding mixed-grass prairie grassland vegetation. The dominant grasses across the Survey Area are needleandthread (*Hesperostipa comata*) and blue grama (*Bouteloua gracilis*). Prairie Junegrass (*Koeleria macrantha*), western wheatgrass (*Pascopyrum smithii*), and purple threeawn (*Aristida purpurea*) are also dominant at limited proposed drill sites. Crested wheatgrass (*Agropyron cristatum*) is common at some proposed drill sites and is likely a remnant of seeding following historic disturbance. Fringed sagewort (*Artemisia frigida*) and broom snakeweed (*Gutierrezia sarothrae*) are the most commonly observed subshrubs. White sagebrush (*Artemisia ludoviciana*) is also present but not common. Big sagebrush (*Artemisia tridentata*) is the most common full shrub. Silver sagebrush (*Artemisia cana*), yucca (*Yucca glauca*), and Woods' rose (*Rosa woodsii*) are limited in extent and rarely observed. Dominant forbs within the Survey Area are slimflower scurfpea (*Psoralidium tenuiflorum*), common yarrow (*Achillea millefolium*), purple prairie clover (*Dalea purpurea*), hairy false goldenaster (*Heterotheca villosa*), rough false pennyroyal (*Hedeoma hispida*), woolly plantain (*Plantago patagonica*), and scarlet globemallow (*Sphaeralcea coccinea*).

Overall, vegetation cover within the Survey Area ranges from 50-80% across the entire Survey Area and is predominantly grass cover. Tree canopy cover within the Survey Areas ranges from 0-3%. Only a small portion of one proposed drill site and associated overland travel access route include the ponderosa pine woodland vegetation. Two other proposed drill sites have limited individuals of ponderosa pine present.

Shrub cover within the Survey Area ranged from 3-5% of the entire Survey Area.

METHODOLOGY

SSPS considered in this report include federally Threatened plant species listed by the U.S. Fish and Wildlife Service (USFWS) under the Endangered Species Act of 1973 (16 U.S.C. 1531-1544, 87 Stat. 884); Region 2 Sensitive, Species of Local Concern, and Target plant species listed by the USFS, and rare plants of South Dakota listed by the South Dakota Natural Heritage Program (SDNHP).

The survey methodology was comprised of two main components (1) desktop analysis of existing data and (2) field surveys for SSPS within the Survey Area. A desktop analysis approach was used to inventory known SSPS populations and to determine the extent of potential SSPS habitat in the Survey Area from existing USFS information. The Black Hills National Forest, Hell Canyon Ranger District has developed a spatial database of known occurrences of SSPS. The information in this spatial database was reviewed and compared to the Survey Area to determine if any spatial overlaps existed. In addition, geospatial data acquired in 2024 from the SDNHP was compared to the Survey Area to determine if any spatial overlaps existed prior to the field surveys.

The following SSPS were included in the desktop analysis and field surveys. Additionally, USFS target plant species and rare plants of South Dakota were also considered during the field survey of the Survey Area.

USFWS Federally Listed Threatened Plant Species included:

- Leedy's roseroot (*Rhodiola integrifolia* subsp. *leedyi*)
- Hooded lady's tresses (*Spiranthes diluvialis*)

USFS Region 2 Sensitive Plant Species included:

- Foxtail sedge (*Carex alopecoidea*)
- Mountain Lady's slipper (*Cypripedium montanum*)
- Yellow Lady's slipper (*Cypripedium parviflorum*)
- Lesser round-leaf orchid (*Platanthera orbiculata*)
- Sageleaf willow (*Salix candida*)
- Autumn willow (*Salix serissima*)
- Bloodroot (*Sanguinaria canadensis*)
- Narrowleaf sphagnum (*Sphagnum angustifolium*)
- American cranberry (*Viburnum opulus* var. *americanum*)
- Selkirk's violet (*Viola selkirkii*)

USFS Species of Local Concern Plant Species included:

- Common maidenhair (*Adiantum capillus-veneris*)
- Leathery grape-fern (*Botrychium multifidum*)
- Southwestern showy sedge (*Carex bella*)
- Downy gentian (*Gentiana puberulenta*)
- Broadlipped twayblade (*Listera convallarioides*)
- Stiff clubmoss (*Lycopodium annotinum*)
- Fivestamen miterwort (*Mitella pentandra*)
- Narrowleaf sweet coltsfoot (*Petasites frigidus* var. *sagittatus*)
- Northern hollyfern (*Polystichum lonchitis*)
- Greenleaf willow (*Salix lasiandra* var. *caudata*)

- Shining willow (*Salix lucida*)

Rare Plants of South Dakota:

- Dwarf pussytoes (*Antennaria dimorpha*)
- A milkvetch (*Astragalus miser*)
- Wooly locoweed (*Astragalus mollissimus*)
- Fendler's whitethorn (*Ceanothus fendleri*)
- Parry's rabbitbush (*Chrysothamnus parryi*)
- Sugar bowls (*Clematis hirsutissima*)
- Andean prairie clover (*Dalea cylindriceps*)
- Hedgehog cactus (*Echinocereus viridiflorus*)
- Bitter fleabane (*Erigeron acris*)
- Buff fleabane (*Erigeron ochroleucus*)
- Tulip gentian (*Eustoma exaltatum*)
- Spike gila (*Ipomopsis spicata*)
- Mountain bladderpod (*Lesquerella montana*)
- Nuttall's desert-parsley (*Lomatium nuttallii*)
- Yellow evening primrose (*Oenothera flava*)
- Rydberg's twinpod (*Physaria brassicoides*)
- Bahia (*Picradeniopsis woodhousei*)
- Slimleaf scurfpea (*Psoralea linearifolia*)
- Broom groundsel (*Senecio spartioides* var. *spartioides*)
- Three-nerved goldenrod (*Solidago velutina*)
- Sleepy grass (*Stipa robusta*)
- Easter daisy (*Townsendia exscapa*)
- Largeflower Townsend-daisy (*Townsendia grandiflora*)
- Hooker's Townsend-daisy (*Townsendia hookeri*)

The Survey Area included a 1.0-acre buffer around each of the 17 proposed drill sites and a 75 feet buffer on either side of the centerline of the 1.3 miles of associated proposed overland travel access routes. The buffers were derived in ArcGIS using the proposed exploration drilling information provided by the Company. Whenever proposed drill sites and associated proposed access route buffers overlapped, the Survey Area included the furthest extent. This resulted in a total Survey Area of approximately 44 acres including approximately 17 acres for the proposed drill sites and approximately 27 additional acres for the proposed overland travel access routes. The Survey Area boundaries were located in the field with recreational grade GPS units. These same GPS units were used to mark noxious and invasive plant species locations, suitable habitat, and individuals or populations of SSPS when observed.

BKS Environmental Associates, Inc. (BKS) of Gillette, Wyoming, conducted field surveys for SSPS June 24-25 and August 1, 2024, within the Survey Area. Field surveys were conducted by pedestrian reconnaissance by walking mostly parallel transects across the proposed drill sites and associated overland travel access routes. GPS tracks were used to keep courses during the field survey to the extent possible. These GPS tracks were also utilized to ensure good coverage of the Survey Area.

The Black Hills National Forest General Plant Survey forms were used as a general guide to collect data at the proposed drill sites and along the proposed overland travel access routes within the Survey Area. Data collected at each survey site generally included community type, topographic position, slope, tree

occurrence, noxious and invasive plant species observed, general vegetation cover, and other general field notes. Regardless of habitat suitability, surveyors walked all proposed drill sites and along all proposed overland travel access routes within the Survey Area in the same manor to determine presence/absence of SSPS. The Survey Area was photographically documented.

RESULTS

Habitat descriptions and distribution information for SSPS species listed by the USFWS, USFS, and SDNHP were summarized and presented in Table 1. Occurrence/absence of SSPS within the Survey Area was summarized and presented in Table 1. A complete list of plant species observed during the field survey was compiled and presented in Table 2. A list of invasive plant species observed within the Survey Area was compiled and presented in Table 3. Photographs of the Survey Area were compiled and provided in Addendum A. General soil and vegetation survey information for the proposed drill sites was composed and presented in Addendum B. Results of the desktop review of available NRCS soil map units and 2024 field survey results were illustrated on Maps 1 and 2 in Addendum C.

USFWS Threatened Plant Species

Based on review of the USFS and SDNHP spatial data, no individuals or populations of USFWS Threatened plant species were known to occur within the Survey Area. No individuals or populations of USFWS Threatened plant species were observed during the field surveys conducted in 2024.

Hooded lady's tresses are found in association with perennial streams and wetlands (Fertig et al. 2005, USFWS 1992). Review of the USFS geospatial data indicated no mapped wetlands, springs, or perennial streams within the Survey Area. No perennial streams or wetlands were observed within the Survey Area during the field inventory. Therefore, it was determined suitable habitat for USFWS Threatened plant species, Hooded lady's tresses, was absent within the Survey Area.

Leedy's roseroot occurs in the Black Hills National Forest near Black Elk Peak on a cliffside at an elevation of approximately 7,000 feet above sea level (USFWS 2024). The Survey Area was located in the southern extent of the Black Hills National Forest at an elevation of 4,000 to 4,200 feet above sea level. No cliffside habitats were observed within the Survey Area during the field inventory. Therefore, it was determined suitable habitat for USFWS Threatened plant species, Leedy's roseroot, was absent within the Survey Area.

USFS R2 Sensitive Plant Species

Based on review of the USFS and SDNHP geospatial data, no individuals or populations of USFS R2 Sensitive plant species were known to occur within the Survey Area. No individuals or populations of USFS R2 Sensitive plant species were observed during the field surveys conducted in 2024. Suitable habitat for USFS R2 Sensitive plant species was absent within the Survey Area.

USFS Species of Local Concern Plant Species

Based on review of the USFS and SDNHP geospatial data, no individuals or populations of USFS Species of Local Concern plant species were known to occur within the Survey Area. No individuals or populations of USFS Species of Local Concern plant species were observed during the field surveys conducted in 2024. Suitable habitat for USFS Species of Local Concern plant species was absent within the Survey Area.

USFS Target Plant Species

Target plant species are monitored by the Black Hills National Forest Hell Canyon Ranger District but do qualify as one of the SSPS types previously discussed. Based on review of the USFS and SDNHP geospatial data, no individuals or populations of USFS Target plant species have been previously observed in the Survey Area. The following USFS Target plant species may have been observed during the field survey conducted in 2024.

- Buff fleabane (*Erigeron ochroleucus*)
    - This specimen was collected along a rocky area between the BUC 25014 and BUC 25004 proposed drill sites
    - Suitable habitat for this species was limited to the rocky substrate between the BUC 25014 and BUC 25004 proposed drill sites where the specimen was collected

Rare Plants of South Dakota

Rare plants of South Dakota are monitored by the South Dakota Department of Game, Fish, and Parks but do not qualify as one of the SSPS types previously discussed. Based on review of the SDNHP geospatial data, no individuals or populations of rare plants of South Dakota have been previously observed in the Survey Area. No rare plants of South Dakota or suitable habitat were observed within the Survey Area except buff fleabane discussed above under USFS Target plant species.

Noxious and Invasive Plant Species

No state of South Dakota Noxious Weeds were observed within the Survey Area. Two USFS target invasive species were observed: bulbous bluegrass (*Poa bulbosa*) and St. Johnswort (*Hypericum perforatum*). Both were isolated observations with limited individuals. Other invasive plant species were common within the Survey Area. The most common invasive plant species were *cheatgrass* (*Bromus tectorum*), bull thistle (*Cirsium vulgare*), and field brome (*Bromus arvensis)*. Bull thistle was found intermittently throughout the survey area in relatively small patches of limited individuals. Field brome and cheatgrass were abundant at some proposed drill sites generally ranging in cover from 10-25% at individual proposed drill sites, but with as great as 50-70% cover at a limited number of proposed drill sites. The proposed drill sites were in relatively close proximity of a large infestation of cheatgrass, mapped by the USFS, adjacent to the proposed northern drill sites. Less common invasive plant species were field bindweed (*Convolvulus arvensis*), American licorice (*Glycyrrhiza lepidota*) and common mullein (*Verbascum thapsus*). Occurrence of these invasive plant species was limited to individual proposed drill sites or associated overland travel access routes (Addendum C – Map 2). Occurrence of these invasive species is similar in the immediately surrounding mixed-grass prairie grassland community.

DISCUSSION

The Survey Area was located at lower elevations in the southern Black Hills within the Hogback Ridge. The vegetation within the Survey Area was typical of a mixed-grass prairie grassland impacted by historic wildfire, uranium exploration, and historic and current grazing pressures. Perennial grasses were dominant and forbs, subshrubs, and shrubs were limited. Ponderosa pine woodlands within the Survey Area were very limited in extent and only occurred within the ephemeral drainages. Invasive plant species were common in the Survey Area. Annual invasive grasses were the most prevalent invasive plant species throughout the Survey Area.

Based on review of USFS and SDNHP geospatial data, no individuals or populations of USFWS Threatened, USFS R2, USFS Species of Local Concern, USFS Target plant species, or rare plants of South Dakota were known to occur within the Survey Area. No USFWS Threatened, USFS R2, or USFS Species of Local Concern were observed within the Survey Area during the 2024 field survey. Suitable habitat for USFWS Threatened, USFS R2, and USFS Species of Local Concern was absent within the Survey Area.

One USFS Target plant species also listed as a rare plant of South Dakota, buff fleabane, was observed within the Survey Area during the 2024 field survey. Suitable habitat for buff fleabane was limited to the rocky substrate near the access route between BUC 25014 and BUC 25004 where the specimen was collected.

Table 1: Summary of Status, Distribution, and Habitat of Special Status Plant Species Considered in the 2024 Field Survey for the October Jinx Project.

Species	Status	Black Hills Distribution	Habitat Description	Species Observed in the Survey Area in 2024	Suitable Habitat in Survey Area
Leedy's roseroot (*Rhodiola integrifolia* subsp. *leedyi*)	USFWS Threatened G5T1, S1	Black Hills population is located in the vicinity of Black Elk Peak at an elevation of approximately 7,000 feet.	Moist north-facing granite cliff habitat.	Not observed	No, habitat characteristics not present.
Hooded lady's tresses (*Spiranthes diluvialis*)	USFWS Threatened	There are no known populations of Hooded lady's tresses in the Black Hills. The nearest confirmed population is located in Niobrara County, Wyoming.	Alluvial banks, point bars, floodplains, and oxbows within close proximity to perennial streams at elevations less than 7,000 feet.	Not observed	No, habitat characteristics not present.
Foxtail sedge (*Carex alopecoidea*)	R2 Sensitive	Thirty-four BH occurrences are in two general areas: Cement Ridge area along the South Dakota – Wyoming border and Bear Lodge Mountains in Wyoming (USDA Forest Service 2014).	Open areas along perennial streams, often with old beaver dams or ponds. It is usually associated with calcareous substrates (Standley 2002). Occurrences are primarily documented in the transitional areas between saturated soils and more mesic uplands, but can be associated with many different wetland, riparian, and upland communities. Habitat concentrated in the northern part of the Forest (USDA Forest Service 2014, USDA Forest Service 2016).	Not know to occur Not observed	No, habitat characteristics not present.
Mountain Lady's slipper (*Cypripedium montanum*)	R2 Sensitive	Twenty individuals were recorded from a single occurrence in the BH at the south end of Spearfish Canyon in the northern part of the Forest (USDA Forest Service 2014).	Across its range, occurs in a wide variety of habitats including mesic to dry coniferous and deciduous forests, openings, and thickets (Sheviak 2002). In the BH documented on a shaded east-facing slope dominated by a dense white spruce overstory with moist to mesic-moist soil conditions. This habitat is found with highest concentrations in the northern part of the Forest (USDA Forest Service 2014, USDA Forest Service 2016).	Not know to occur Not observed	No, habitat characteristics not present.
Yellow Lady's slipper (*Cypripedium parviflorum*)	R2 Sensitive	At least 50 occurrences in the BHNF in three Ranger Districts: Bearlodge, Northern Hills, and Mystic (USDA Forest Service 2014).	BH occurrences associated with mesic conditions on limestone rock outcrop areas, often on north-facing slopes, and mesic to saturated soils in and adjacent to riparian areas and drainages. Often associated with hardwoods, conifer-deciduous, deciduous, and conifer communities (mostly white spruce). Limestone substrates are found in a band circling the granitic central core in the central Black Hills (USDA Soil Conservation Service 1990) and the conifer-deciduous community on limestone is located in the northern part of the limestone band. Also found outside of this habitat type in the BH, so suitable habitat for the species could occur outside of this described geographic area (USDA Forest Service 2014, USDA Forest Service 2016).	Not know to occur Not observed	No, habitat characteristics not present.
Lesser round-leaf orchid (*Platanthera orbiculata*)	R2 Sensitive	More than 30 occurrences in the BHNF in three Ranger Districts: Bearlodge, Northern Hills, and Hell Canyon (USDA Forest Service 2014).	Found in dense to partially open canopy with filtered light, dense understory vegetation, and damp, humic soil with a thick litter layer. Elevated soil moisture appears to be a key component of its habitat. It occupies boreal hardwood habitats associated with paper birch, hazelnut, and white spruce forest. Suitable habitat is concentrated in the northern part of the Forest (USDA Forest Service 2014, USDA Forest Service 2016).	Not know to occur Not observed	No, habitat characteristics not present.
Sageleaf willow (*Salix candida*)	R2 Sensitive	Two sites in the BH located at McIntosh Fen and an experimental transplant near Heely Creek, both in the Mystic Ranger District (USDA Forest Service 2014).	Found in cold seep or spring-fed saturated substrates produced by unusual hydrologic conditions where sedimentary layers of the Limestone Plateau intersect impermeable schist or shale of the Crystalline Central Core. A wetland obligate commonly associated with wet meadows and fens (Argus 2010). Suitable habitat is concentrated in the northern part of the Mystic and southern part of the Northern Hills Ranger Districts (USDA Forest Service 2014, USDA Forest Service 2016).	Not know to occur Not observed	No, habitat characteristics not present.

Table 1: Summary of Status, Distribution, and Habitat of Special Status Plant Species Considered in the 2024 Field Survey for the October Jinx Project (Continued).

Species	Status	Black Hills Distribution	Habitat Description	Species Observed in the Survey Area in 2024	Suitable Habitat in Survey Area
Autumn willow (*Salix serissima*)	R2 Sensitive	Five natural sites in the BHNF in two Ranger Districts: Mystic and Northern Hills Ranger Districts. A sixth site near Heely Creek contains experimental plantings (USDA Forest Service 2014).	Found in rich calcareous fen habitats with high mineral content, along stream banks near fens, and in wet meadows with high concentrations of calcium and minerals. Suitable habitat is concentrated in the northern part of the Mystic and southern portion of the Northern Hills Ranger Districts (USDA Forest Service 2014, USDA Forest Service 2016).	Not know to occur Not observed	No, habitat characteristics not present.
Bloodroot (*Sanguinaria canadensis*)	R2 Sensitive	Over 20 occurrences in the BHNF in the northeast portion of the Forest, in the Northern Hills Ranger District (USDA Forest Service 2014).	Generally, occurs in floodplains, forested terraces, drainage bottoms, and north-facing foot slopes in open, rich hardwood plant communities. Suitable habitat is concentrated in the northern portion of the Forest (USDA Forest Service 2014, USDA Forest Service 2016).	Not know to occur Not observed	No, habitat characteristics not present.
Narrowleaf sphagnum (*Sphagnum angustifolium*)	R2 Sensitive	Only positively identified from one site, in the Rochford Cemetery Fen (RCU_001) in the Mystic Ranger District (USDA Forest Service 2014).	Occurs in a wide range of habitats, from bogs to rich (high pH) fens (McQueen & Andrus 2007). In the BH it is assumed to occur in rich fens or areas with known populations of other *Sphagnum* spp. These habitats are concentrated along the contact between the limestone and central core, as well as wetlands in the northern part of the Forest (USDA Forest Service 2014, USDA Forest Service 2016).	Not know to occur Not observed	No, habitat characteristics not present.
American cranberry (*Viburnum opulus* var. *americanum*)	R2 Sensitive	More than 60 occurrences in the BHNF in two Ranger Districts: Bearlodge and Northern Hills (USDA Forest Service 2014).	Found in wet, shaded habitats along streams, springs, and canyon bottoms. Suitable habitat is concentrated in the northern part of the Forest (USDA Forest Service 2014, USDA Forest Service 2016).	Not know to occur Not observed	No, habitat characteristics not present.
Selkirk's violet (*Viola selkirkii*)	R2 Sensitive	Occurrences are located within the Black Elk Wilderness or Norbeck Wildlife Preserve. The 19 sites are in the BHNF Hell Canyon Ranger District. Additional occurrences are known from Custer State Park and Mt. Rushmore National Memorial (USDA Forest Service 2014).	Found in cold, moist, shaded microhabitats associated with vegetated granitic rock outcrops or white spruce forest with a highly variable understory. Suitable habitat is concentrated in the high elevation granites of the east-central part of the Forest (USDA Forest Service 2014, USDA Forest Service 2016).	Not know to occur Not observed	No, habitat characteristics not present.
Common maidenhair (*Adiantum capillus-veneris*)	Species Of Local Concern	One occurrence in the BH is associated with warm springs at Cascade Creek in the southwestern Black Hills.	Shaded, calcareous, moist banks, canyon walls or porous, rocky sites, often within the spray of waterfalls, and grows on masonry, storm drains, and limestone from sea level to 8,200 feet elevation. It occurs on tufa, a calcium carbonate rock that is formed by the precipitation of hot, minerotrophic spring water in British Columbia, and on similar substrates along Cascade Creek in South Dakota (Hornbeck et al. 2003c). Plants at Cascade Creek are found in moist to saturated areas on the streambank and in depressions and old channels on the adjacent floodplain. Plants also grow on vertical rock including a rock wall and concrete culvert.	Not know to occur Not observed	No, habitat characteristics not present.
Leathery grape-fern (*Botrychium multifidum*)	Species Of Local Concern	Eight occurrences in the Black Hills National Forest, seven of which are located within the Black Elk Wilderness Area and Norbeck Wildlife Preserve on the Hell Canyon Ranger District. The other is found in the Bear Lodge Mountains on the Bearlodge Ranger District (USDA Forest Service 2016).	Along streams, in old stream channels, and in small drainage bottom clearings in white spruce or paper birch dominated riparian zones, and has been documented on sites associated with natural disturbance such as gravel bars or old stream channels. Occurs in areas with thick moss cover (USDA Forest Service 2016, USDA Forest Service 2014).	Not know to occur Not observed	No, habitat characteristics not present.

Table 1: Summary of Status, Distribution, and Habitat of Special Status Plant Species Considered in the 2024 Field Survey for the October Jinx Project (Continued).

Species	Status	Black Hills Distribution	Habitat Description	Species Observed in the Survey Area in 2024	Suitable Habitat in Survey Area
Southwestern showy sedge (*Carex bella*)	Species Of Local Concern	Five occurrences in the BHNF are located within a 3 square mile area in the Black Elk Wilderness. Several additional sites are reported from nearby Custer State Park (USDA Forest Service 2014, USDA Forest Service 2016).	BH occurrences are found in cool moist white spruce or paper birch forests among granitic outcrops or bouldery areas of low order streams (uppermost portions of high elevation BH watershed streams). Occurrences are located at some of the highest elevations in the Black Hills between 6,600 and 7,100 feet (USDA Forest Service 2014, USDA Forest Service 2016).	Not know to occur Not observed	No, habitat characteristics not present.
Downy gentian (*Gentiana puberulenta*)	Species Of Local Concern	Ten sites in the BHNF (USDA Forest Service 2014).	BH occurrences are reported on limestone substrates in dry to mesic grasslands and in transition zones between grassland and forest. Elevations range from 3,960 to 4,480 feet and are restricted to the eastern edge of the Forest (USDA Forest Service 2016).	Not know to occur Not observed	No, habitat characteristics not present.
Broadlipped twayblade (*Listera convallarioides*)	Species Of Local Concern	The four sites in the BHNF are within a 20 square mile area south of Lead, SD (USDA Forest Service 2014).	Facultative wetland species in South Dakota and eastern Wyoming and occur on rich humus in open woods and boggy meadows. It is often associated with cool soils (Magrath & Coleman 2002) and has a high tolerance for anaerobic conditions. In the BHNF grows in saturated soils adjacent to springs, and located under tree overstories dominated by white spruce. Elevations range from 5,100 to 6,100 feet (USDA Forest Service 2014, USDA Forest Service 2016).	Not know to occur Not observed	No, habitat characteristics not present.
Stiff clubmoss (*Lycopodium annotinum*)	Species Of Local Concern	The 10 occurrences in the BHNF are in three Ranger Districts: Bearlodge, Mystic, and Northern Hills.	In the BH, associated with high moisture microhabitats within remnant boreal white spruce and paper birch, beaked hazelnut communities. These are sheltered microsites that are cooler and moist than surrounding areas. Occur at elevations ranging from 4,900 to 6,300 feet (USDA Forest Service 2014, USDA Forest Service 2016).	Not know to occur Not observed	No, habitat characteristics not present.
Fivestamen miterwort (*Mitella pentandra*)	Species Of Local Concern	Eight occurrences in the BHNF are within a 10 square mile area in the vicinity of Tinton, SD.	In the BH found growing in mossy, moist to saturated soils adjacent to perennial and intermittent streams in white spruce and paper birch, hazelnut communities (USDA Forest Service 2014, USDA Forest Service 2016). Range from nearly full sun exposure to nearly full shade. Reported within elevations ranging from 5,280 to 6,280 feet.	Not know to occur Not observed	No, habitat characteristics not present.
Narrowleaf sweet coltsfoot (*Petasites frigidus* var. *sagittatus*)	Species Of Local Concern	Ten occurrences in the BHNF are from three Ranger Districts: Hell Canyon, Mystic, and Northern Hills Ranger Districts.	Facultative wetland species in the Great Plains Region. South Dakota reports of the species are from the BH and habitats display a variety of associated conditions: open to partial shade in dry to wet meadows along streams with saturated soils at elevations from 5,100 to 6,600 feet. White spruce, ponderosa pine, and quaking aspen are documented at sites with a variety of willow (*Salix*) species at most sites (USDA Forest Service 2014, USDA Forest Service 2016). Occurrences range in elevation from 5,080 to 6,600 feet.	Not know to occur Not observed	No, habitat characteristics not present.
Northern hollyfern (*Polystichum lonchitis*)	Species Of Local Concern	Over 20 sites are in the BHNF in the northern Black Hills and Bear Lodge Mountains.	In the BH, associated with rock crevices and gulches. Elevations range from 4,300 to 5,600 feet. Individuals grow in mossy, moist soils. Populations are found in shaded to partially shaded sites and occur on north-facing limestone slopes (USDA Forest Service 2016).	Not know to occur Not observed	No, habitat characteristics not present.
Greenleaf willow (*Salix lasiandra* var. *caudata*)	Species Of Local Concern	Three confirmed BHNF populations.	Associated with floodplains, wet meadows, and riparian areas (Eckenwalder 2010). In the BHNF occur along streambanks or floodplains and are located between 4,260 to 5,620 feet (USDA Forest Service 2014, USDA Forest Service 2016).	Not know to occur Not observed	No, habitat characteristics not present.

Table 1: Summary of Status, Distribution, and Habitat of Special Status Plant Species Considered in the 2024 Field Survey for the October Jinx Project (Continued).

Species	Status	Black Hills Distribution	Habitat Description	Species Observed in the Survey Area in 2024	Suitable Habitat in Survey Area
Shining willow (*Salix lucida*)	Species Of Local Concern	Distributed across eastern Canada and the northeastern United States. The species extends south to Virginia and Kansas, and reaches its western limit in Saskatchewan, North Dakota, and the Black Hills. There is one site, consisting of two individuals, known from the BH, with an additional historical report (1913) that is likely extirpated.	Associated with floodplains, wet meadows, and riparian areas (Eckenwalder 2010). Facultative wetland species in the BH. The single occurrence is located in a dense willow shrubland along the floodplain of Rapid Creek at an elevation of 5,140 (USDA Forest Service 2014, USDA Forest Service 2016).	Not know to occur Not observed	No, habitat characteristics not present.
Dwarf pussytoes (*Antennaria dimorpha*)	Rare Plant of SD G5, SU	Two collections from the Black Hills.	Found in dry, open areas in sagebrush desert to ponderosa pine forest openings, often on lithosol (Giblin 2022).	Not know to occur Not observed	No, habitat characteristics not present.
A milkvetch (*Astragalus miser*)	Rare Plant of SD G5, SH	Single collection from Black Hills in 1895.	Found in grasslands, sagebrush steppe, open forest valleys to subalpine (Montana Natural Heritage Program 2024).	Not know to occur Not observed	No, habitat characteristics not present.
Wooly locoweed (*Astragalus mollissimus*)	Rare Plant of SD G5, SH	Single 1924 collection from southwestern SD.	Found in grasslands, dry woodlands and slopes, sometimes pine forests, and usually in sandy soils (Southwest Biodiversity 2024).	Not know to occur Not observed	No, habitat characteristics not present.
Fendler's whitethorn (*Ceanothus fendleri*)	Rare Plant of SD G5, S2	Localized in southwestern Black Hills.	Apparently limited to high limestone or sandstone of the western Black Hills, in open woods, on hillsides or rocky ledges, unusually in rocky soil (Johnson, J. R and Larson, G. E. 2007).	Not know to occur Not observed	No, habitat characteristics not present.
Parry's rabbitbush (*Chrysothamnus parryi*)	Rare Plant of SD G5, SU	Reported for southwestern SD.	Typically found on stony, calcareous soil of sparsely vegetated grasslands. (Montana Natural Heritage Program 2024).	Not know to occur Not observed	No, habitat characteristics not present.
Sugar bowls (*Clematis hirsutissima*)	Rare Plant of SD G4, S2	Uncommon in grasslands of southwestern SD.	Typically found in meadows, ponderosa pine forests, montane habitats, open woods, thickets (Southwest Biodiversity 2024).	Not know to occur Not observed	No, habitat characteristics not present.
Andean prairie clover (*Dalea cylindriceps*)	Rare Plant of SD G3, G4, SH	Single collection in 1926 from southwestern SD.	Sandy or silty plains, flats, and hills (Dorn 1988).	Not know to occur Not observed	No, habitat characteristics not present.
Buff fleabane (*Erigeron ochroleucus*)	Rare Plant of SD G5 S3S4 USFS Target	Few collections from Black Hills Hogback Ridge.	Dry, stony soil of grasslands, sagebrush steppe, woodlands, fellfields, open forest at all elevations (Montana Natural Heritage Program 2024).	Not know to occur Possibly observed	Yes, habitat characteristics present.
Hedgehog cactus (*Echinocereus viridiflorus*)	Rare Plant of SD G5, S3	Native grasslands of southern Black Hills.	Typically found on sunny, gravelly to rocky slopes, hilltops, and ledges, on igneous or novaculite substrates, gravelly or silty alluvium, or rarely on limestone, associated with a variety of plant communities (Southwest Biodiversity 2024).	Not know to occur Not observed	No, habitat characteristics not present.
Spike gila (*Ipomopsis spicata*)	Rare Plant of SD G5, S4?	Uncommon in western SD.	Sandy or gravelly, often calcareous soil of eroding slopes in grasslands, steppe, woodlands, valleys to alpine (Montana Natural Heritage Program 2024).	Not know to occur Not observed	No, habitat characteristics not present.

Table 1: Summary of Status, Distribution, and Habitat of Special Status Plant Species Considered in the 2024 Field Survey for the October Jinx Project (Continued).

Species	Status	Black Hills Distribution	Habitat Description	Species Observed in the Survey Area in 2024	Suitable Habitat in Survey Area
Mountain bladderpod (*Lesquerella montana*)	Rare Plant of SD G5, S1, S2	Reported for southern Black Hills.	Found on banks, rock outcrops, from plains into benchland into stony slopes and mountains, in sagebrush, open scrub oak, ponderosa pine, pinyon-juniper woodlands, and Douglas fir on granitic, often gravelly, non-calcareous soils (NatureServe 2024).	Not know to occur Not observed	No, habitat characteristics not present.
Nuttall's desert-parsley (*Lomatium nuttallii*)	Rare Plant of SD G3, SH	Single 1926 collection from southern Black Hills.	Typically grows on open, rocky mid- and lower-slopes on sandstone, siltstone or clayey shale, in open pine woodlands from about 3,400 to 7,200 ft. (Montana Natural Heritage Program 2024).	Not know to occur Not observed	No, habitat characteristics not present.
Yellow evening primrose (*Oenothera flava*)	Rare Plant of SD G5, S1	Historically known but few recent finds in western SD.	Typically found in moist meadows, gravelly soil of roadsides; plains, valleys, montane (Montana Natural Heritage Program 2024).	Not know to occur Not observed	No, habitat characteristics not present.
Rydberg's twinpod (*Physaria brassicoides*)	Rare Plant of SD G5, S3	Regional endemic in western SD.	Occurs mostly on barren substrate with less than 10 percent vegetation cover. Typical shrubs are *Rhus aromatica*, and low forms of *Amelanchier alnifolia* and *Prunus virginiana*. Typically, the upper soil is loose and shifting and may be bound above and below by clay or shale bedrock (Montana Natural Heritage Program 2024).	Not know to occur Not observed	No, habitat characteristics not present.
Bahia (*Picradeniopsis woodhousei*)	Rare Plant of SD G4, G5, SU	Two 1967 collections from western SD.	Typically found on roadsides, on sandy, silty, or loamy soils of grasslands, plains, or prairies (FNA 2024).	Not know to occur Not observed	No, habitat characteristics not present.
Slimleaf scurfpea (*Psoralea linearifolia*)	Rare Plant of SD G4?, SU	Two historical and one 1971 report in western SD grasslands.	Calcareous prairie hillsides and bluffs, occasionally on sandy or gravelly slopes and streamsides (Flora of the Great Plains Association 1986).	Not know to occur Not observed	No, habitat characteristics not present.
Broom groundsel (*Senecio spartioides var. spartioides*)	Rare Plant of SD G5T5, S2	Uncommonly collected in southwestern SD.	Typically found on open sites, often dry and disturbed, especially along stream banks and on hillsides from 3,500-11,000 ft (Southwest Biodiversity 2024).	Not know to occur Not observed	No, habitat characteristics not present.
Three-nerved goldenrod (*Solidago velutina*)	Rare Plant of SD G5?, SU	Few scattered collections from western SD and Black Hills.	Found in a variety of habitats including roadcuts, arroyos, grassy fields and hills, canyon bottoms, and intermittent stream beds from 2,000-8,500 ft (Southwest Biodiversity 2024).	Not know to occur Not observed	No, habitat characteristics not present.
Sleepy grass (*Stipa robusta*)	Rare Plant of SD G5, S3, S4	Uncommon grass of the southern Black Hills.	Typically grows on dry plains and hills, in open woods and forest clearings, and along roadsides (Southwest Biodiversity 2024).	Not know to occur Not observed	No, habitat characteristics not present.
Easter daisy (*Townsendia exscapa*)	Rare Plant of SD S5, S4?	Uncommon in grasslands of western SD.	Typically found in dry, open, often rocky or erosive habitats in grassland or badlands topography (Johnson, J. R and Larson, G. E. 2007).	Not know to occur Not observed	No, habitat characteristics not present.
Largeflower Townsend-daisy (*Townsendia grandiflora*)	Rare Plant of SD S4?, S3, S4	Grasslands of southwestern SD.	Typically found in dry meadows and slopes on plains and foothills (Rocky Mountain Flora 2024).	Not know to occur Not observed	No, habitat characteristics not present.
Hooker's Townsend-daisy (*Townsendia hookeri*)	Rare Plant of SD G5, S3, S4	Sparse grassland and barren substrates of southwestern SD.	Occurs in grasslands, sagebrush steppe, and woodlands at lower elevations. (Montana Natural Heritage Program 2024).	Not know to occur Not observed	No, habitat characteristics not present.

Table 2: List of Plant Species Observed During the 2024 Special Status Plant Species Survey for the October Jinx Project.

Common Name	Scientific Name
Common yarrow	*Achillea millefolium*
Crested wheatgrass	*Agropyron cristatum*
Textile onion	*Allium textile*
Desert madwort	*Alyssum desertorum*
Leadplant	*Amorpha canescens*
Cutleaf anemone	*Anemone patens*
Small-leaf pussytoes	*Antennaria parvifolia*
Purple threeawn	*Aristida purpurea*
Wormwood sagewort	*Artemisia campestris*
Silver sagebrush	*Artemisia cana*
Fringed sagewort	*Artemisia frigida*
White sagebrush	*Artemisia ludoviciana*
Big sagebrush	*Artemisia tridentata*
Groundplum milkvetch	*Astragalus crassicarpus*
Laxmann's milkvetch	*Astragalus laxmannii*
Woolypod milkvetch	*Astragalus purshii*
Tufted milkvetch	*Astragalus spatulatus*
Blue grama	*Bouteloua gracilis*
Field brome	*Bromus arvensis*
Smooth brome	*Bromus inermis*
Cheatgrass	*Bromus tectorum*
Buffalograss	*Buchloe dactyloides*
Prairie sandreed	*Calamovilfa longifolia*
Bluebell bellflower	*Campanula rotundifolia*
Shortbeak sedge	*Carex brevior*
Needleleaf sedge	*Carex duriuscula*
Threadleaf sedge	*Carex filifolia*
Downy paintedcup	*Castilleja sessiliflora*
Bull thistle	*Cirsium vulgare*
Tiny trumpet	*Collomia linearis*
Field bindweed	*Convolvulus arvensis*
Pincushion	*Coryphantha* spp.
Purple prairie clover	*Dalea purpurea*
Narrowleaf purple coneflower	*Echinacea angustifolia*
Squirreltail	*Elymus elymoides*
Thickspike wheatgrass	*Elymus lanceolatus*
Hoary fleabane	*Erigeron canus*
Buff fleabane	*Erigeron ochroleucus*

Table 2: List of Plant Species Observed During the 2024 Special Status Plant Species Survey for the October Jinx Project (Continued).

Common Name	Scientific Name
Western wallflower	*Erysimum asperum*
American licorice	*Glycyrrhiza lepidota*
Curlycup gumweed	*Grindelia squarrosa*
Broom snakeweed	*Gutierrezia sarothrae*
Rough false pennyroyal	*Hedeoma hispida*
Needleandthread	*Hesperostipa comata*
Hairy false goldaster	*Heterotheca villosa*
Common St. Johnswort	*Hypericum perforatum*
Rocky Mountain juniper	*Juniperus scopulorum*
Prairie Junegrass	*Koeleria macrantha*
Prickly lettuce	*Lactuca serriola*
Clasping pepperweed	*Lepidium perfoliatum*
Foothill bladderpod	*Lesquerella ludoviciana*
Dotted blazing star	*Liatris punctata*
Granite prickly phlox	*Linanthus pungens*
Stiffstem flax	*Linum rigidum*
Narrowleaf stoneseed	*Lithospermum incisum*
Field cottonrose	*Logfia arvensis*
Rush skeletonplant	*Lygodesmia juncea*
Disc mayweed	*Matricaria discoidea*
Alfalfa	*Medicago sativa*
Sweetclover	*Melilotus officinalis*
Narrowleaf four o'clock	*Mirabilis linearis*
Scarlet beeblossom	*Oenothera suffrutescens*
Soft-hari marbleseed	*Onosmodium bejariense*
Brittle pricklypear	*Opuntia fragilis*
Plains pricklypear	*Opuntia polyacantha*
Western wheatgrass	*Pascopyrum smithii*
Silverleaf Indian breadroot	*Pediomelum argophyllum*
Large Indian breadroot	*Pediomelum esculentum*
Penstemon	*Penstemon spp.*
Spiny phlox	*Phlox hoodii*
Ponderosa pine	*Pinus ponderosa*
Woolly plantain	*Plantago patagonica*
Bulbous bluegrass	*Poa bulbosa*
Kentucky bluegrass	*Poa pratensis*
Sandberg bluegrass	*Poa secunda*

Table 2: List of Plant Species Observed During the 2024 Special Status Plant Species Survey for the October Jinx Project (Continued).

Common Name	Scientific Name
Cinquefoil	*Potentilla* spp.
Chokecherry	*Prunus virginiana*
Slimflower scurfpea	*Psoralidium tenuiflorum*
Upright prairie coneflower	*Ratibida columnifera*
Fragrant sumac	*Rhus aromatica*
Woods' rose	*Rosa woodsii*
Currant	*Ribes* spp.
Little bluestem	*Schizachyrium scoparium*
Spearleaf stonecrop	*Sedum lanceolatum*
Strict blue-eyed grass	*Sisyrinchium montanum*
Scarlet globemallow	*Sphaeralcea coccinea*
Common dandelion	*Taraxacum officinale*
Stemless four-nerve daisy	*Tetraneuris acaulis*
Prairie spiderwort	*Tradescantia occidentalis*
Yellow salsify	*Tragopogon dubius*
Common mullein	*Verbascum thapsus*
Bigbract verbena	*Verbena bracteata*
Sixweeks fescue	*Vulpia octoflora*
Yucca	*Yucca glauca*
USFS Target Invasive Plant Species and Other Invasive Species	
USFS Target Plant Species and Rare Plant of South Dakota	

Table 3: Noxious and Invasive Species Observed During the 2024 Special Status Plant Species Survey for the October Jinx Project by Proposed Drill Site within the Survey Area.

Scientific Name	Common Name	Proposed Drill Site Platform																
		BUC-25001	BUC-25002	BUC-25003	BUC-25004	BUC-25005	BUC-25006	BUC-25007	BUC-25008	BUC-25009	BUC-25010	BUC-25011	BUC-25012	BUC-25013	BUC-25014	BUC-25015	BUC-25016	BUC-25017
Bromus arvensis	Field brome	x	x		x			x			x	x	x	x				x
Bromus tectorum	Cheatgrass	x	x	x		x	x	x		x	x	x	x			x		
Cirsium vulgare	Bull thistle	x		x	x	x		x		x				x	x	x		x
Glycyrrhiza lepidota	American licorice			x														
Poa bulbosa	Bulbous bluegrass										x							
Verbascum thapsus	Common mullein			x														

REFERENCES

Argus, G.W. 2010. *Salix* In: Flora of North America. Editorial Committee, eds. 1993+. Flora of North America North of Mexico. 15+ vols. New York and Oxford. Vol. 7, pp. 23-162.

Dorn, R. D. 2001. Vascular Plants of Wyoming. Third Edition. Rocky Mountain Herbarium, Department of Botany, University of Wyoming, Laramie, WY.

Dorn, R.D. 1988. Vascular Plants of Wyoming. Rocky Mountain Herbarium, Department of Botany, University of Wyoming, Laramie, WY.

Eckenwalder, J.E. 2010. *Salix* Linnaeus subg. *Salix* In: Flora of North America. Editorial Committee, eds. 1993+. Flora of North America North of Mexico. 15+ vols. New York and Oxford. Vol. 7, p. 46-47.

Fertig, W., R. Black, and P. Wolken. 2005. Rangewide status review of Ute Ladies'-tresses (*Spiranthes diluvialis*). Prepared for the U.S. Fish and Wildlife Service and Central Utah Water Conservation District. Last revised: Unknown. Available: <http://efotg.sc.egov.usda.gov/references/public/WY/UtesRangewideStatusReview2005byFertig.pdf>. Accessed: 08/15/2024.

Flora of the Great Plains Association. 1986. Flora of the Great Plains. R.L. McGregor and T.M. Barkley, eds. University Press of Kansas. 1392 pg.

Flora of North America Editorial Committee, eds (FNA). 1993+. Flora of North America North of Mexico. 25+Vols. New York and Oxford. Available: <http://beta.floranorthamerica.org. Accessed: 09/25/2024.

Giblin, D. 2022. *Antennaria dimorpha,* cushion pussytoes, low pussytoes. Burke Herbarium Image Collection: Vascular Plants, Macrofungi, & Lichenized Fungi of Washington. Available <https://biology.burke.washington.edu/herbarium/imagecollection/taxon.php?Taxon=Antennaria dimorpha> Accessed: 08/15/2024.

Hall, J.S., H.J. Marriott, and J.K. Perot. 2002. Ecoregional Conservation in the Black Hills. The Nature Conservancy. Minneapolis, Minnesota. 176p.

Hornbeck, J.H., D. Reyher, C. Sieg, and R.W. Crook. 2003. Conservation Assessment for Southern Maidenhair Fern and Stream Orchid in the Black Hills National Forest South Dakota and Wyoming.

Johnson, J. R and Larson, G. E. 1999. Grassland Plants of South Dakota and the Northern Great Plains. B 566 (rev.) Edition. College of Agriculture and Biological Sciences, South Dakota State University, Brookings, SD.

Johnson, J. R and Larson, G. E. 2007. Plants of the Black Hills and Bear Lodge Mountains. Second Edition. College of Agriculture and Biological Sciences, South Dakota State University, Brookings, SD.

Magrath, L.K. and R.A. Coleman. 2002. *Listera convallarioides* In: Flora of North America Editorial Committee, eds. 1993+. Flora of North America North of Mexico. 16+ vols. New York and Oxford. Vol. 26, p. 590.

McQueen, C.B. and R.E. Andrus. 2007. *Sphagnaceae*. In: Flora of North America. Editorial Committee, eds. 1993+. Flora of North America North of Mexico. 15+ vols. New York and Oxford. Vol. 27, pp. 45-101.

Montana Natural Heritage Program. 2024. Montana Field Guide Available < https://fieldguide.mt.gov/displayPhyDiv.aspx?Kingdom=Plantae > Accessed: 08/15/2024.

NatureServe. 2024. NatureServe Explorer: An online encyclopedia of life. Available < https://explorer.natureserve.org/ > Accessed : 08/15/2024.

Nellessen, J.E. 2006. *Viburnum opulus* L. var. *americanum* (Mill.) Ait. (American cranberrybush): A Technical Conservation Assessment. USDA Forest Service, Rocky Mountain Region. [Online].

<https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5206906.pdf> Accessed 08/15/2024.

Rocky Mountain Flora. 2024. Wildflowers of the Southern Rocky Mountains. Available < https://rockymountainsflora.com/details/White%20Simple/Townsend%20Daisy.htm> Accessed: 08/15/2024.

Sheviak, C.J. 2002. *Cypripedium* In: Flora of North America. Editorial Committee, eds. 1993+. Flora of North America North of Mexico. 15+ vols. New York and Oxford. Vol. 26, pp. 499-507.

Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. Web Soil Survey. Available: <http://websoilsurvey.sc.egov.usda.gov/> Accessed: 08/15/2024.

South Dakota Natural Heritage Program. 2018. Rare Plants of South Dakota. South Dakota Game, Fish and Parks. Pierre, South Dakota. Available < https://gfp.sd.gov/rare-plants/.> Accessed; 08/15/2024.

Southwest Biodiversity. 2024. SEINet data portal. Available < https://swbiodiversity.org/seinet/index.php> Accessed: 08/15/2024.

Standley, L.A. 2002. *Carex* sect. *Vulpinae*. In: Flora of North America. Editorial Committee, eds. 1993+. Flora of North America North of Mexico. 15+ vols. New York and Oxford. Vol. 23, pp. 273-278.

U.S. Department of Agriculture, Forest Service. 2016. Black Hills National Forest plants database. unpublished database information updated January 2016.

U.S. Department of Agriculture, Forest Service. 2014. Black Hills National Forest Rare Plant Monitoring Report for 2013 and 2014. Black Hills National Forest, Custer South Dakota.

U.S. Department of Agriculture. Natural Resource Conservation Service. 2024. The PLANTS Database. National Plant Data Team, Greensboro, NC. <http://plants.usda.gov> Accessed: 08/15/2024.

U.S. Department of Agriculture, Soil Conservation Service. 1990. Soil Survey of Custer and Pennington Counties, Black Hills Parts, South Dakota. Prepared in cooperation with USDA Forest Service and South Dakota Agricultural Experiment Station.

U.S. Department of the Interior, Fish and Wildlife Service. 1992. Interim survey requirements for Ute Ladies'-tresses orchid (*Spiranthes diluvialis*). Last revised: Unknown. Available: < http://www.fws.gov/mountain-prairie/endspp/protocols/UteLadiesTress1992.pdf>. Accessed: 08/15/2024.

U.S. Forest Service. 2016. Forest Service Manual FSM 2600 – Wildlife, Fish, and Sensitive Plant Habitat Management. Chapter 2670 – Threatened, Endangered and Sensitive Plants and Animals. Rocky Mountain Region. Denver, CO. Amendment 2600-2016-1.

Wyoming Natural Diversity Database. 2024. Wyoming Field Guide. Available < https://fieldguide.wyndd.org/> Accessed: 08/15/2024.

Appendix A

Photographs of October Jinx Project Survey Area

Drill Site BUC 25001– North from Stake

Drill Site BUC 25001– East from Stake

Drill Site BUC 25001– South from Stake

Drill Site BUC 25001– West from Stake

Drill Site BUC 25002– North from Stake

Drill Site BUC 25002– East from Stake

Drill Site BUC 25002– South from Stake

Drill Site BUC 25002– West from Stake

Drill Site BUC 25003– North from Stake

Drill Site BUC 25003– East from Stake

Drill Site BUC 25003– South from Stake

Drill Site BUC 25003– West from Stake

Drill Site BUC 25004– North from Stake

Drill Site BUC 25004– East from Stake

Drill Site BUC 25004– South from Stake

Drill Site BUC 25004– West from Stake

Drill Site BUC 25005– North from Stake

Drill Site BUC 25005– East from Stake

Drill Site BUC 25005– South from Stake

Drill Site BUC 25005– West from Stake

Drill Site BUC 25006– North from Stake

Drill Site BUC 25006– East from Stake

Drill Site BUC 25006– South from Stake

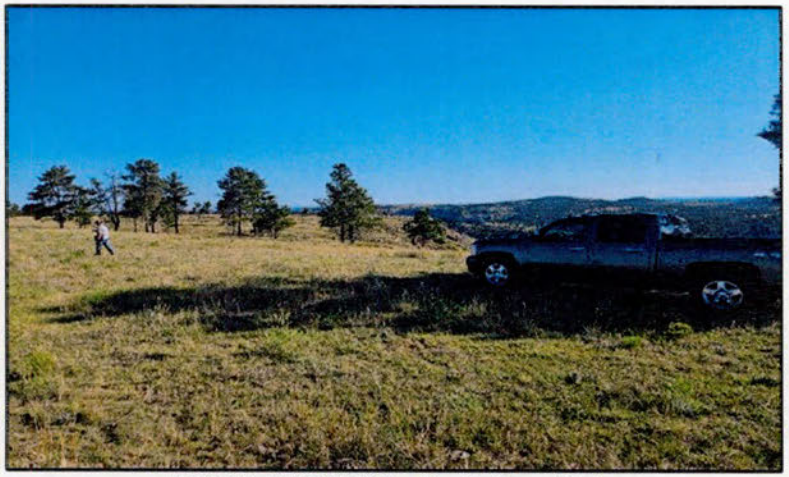
Drill Site BUC 25006– West from Stake

Drill Site BUC 25007– North from Stake

Drill Site BUC 25007– East from Stake

Drill Site BUC 25007– South from Stake

Drill Site BUC 25007– West from Stake



Drill Site BUC 25008– North from Stake

Drill Site BUC 25008– East from Stake

Drill Site BUC 25008– South from Stake

Drill Site BUC 25008– West from Stake

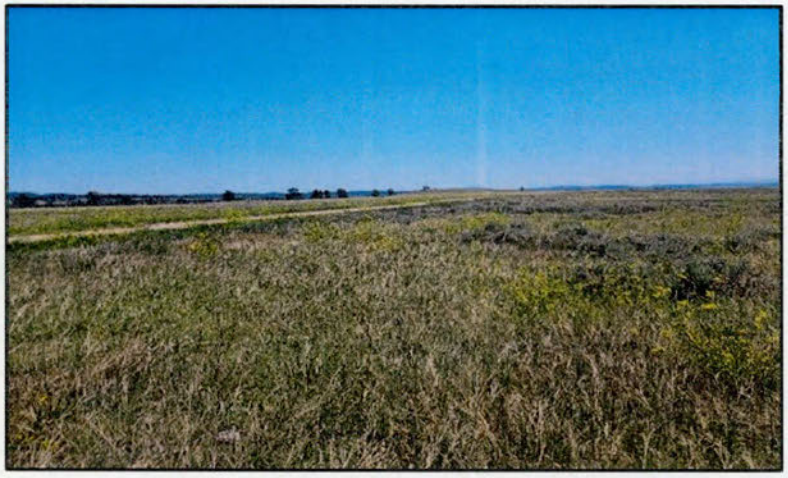
Drill Site BUC 25009– North from Stake

Drill Site BUC 25009– East from Stake

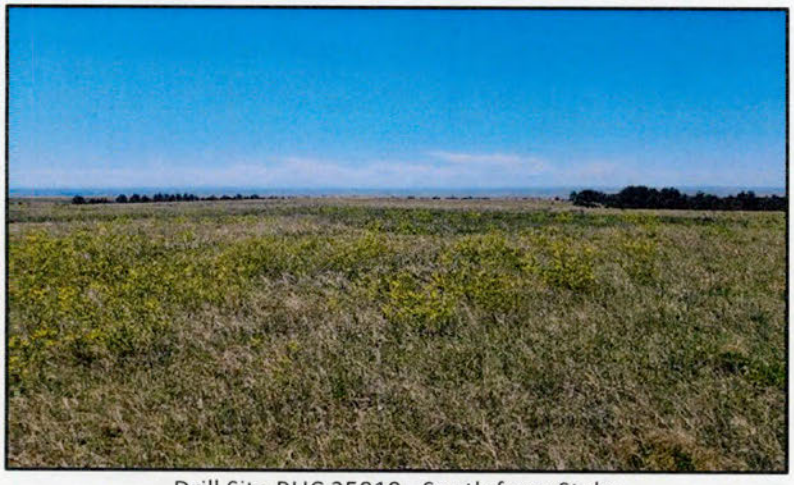
Drill Site BUC 25009– South from Stake

Drill Site BUC 25009– West from Stake

Drill Site BUC 25010– North from Stake



Drill Site BUC 25010– East from Stake



Drill Site BUC 25010– South from Stake

Drill Site BUC 25010– West from Stake

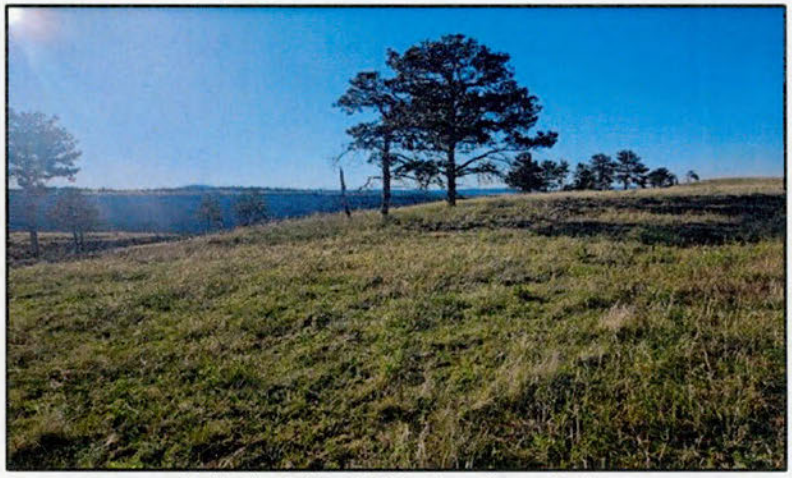
Drill Site BUC 25011– North from Stake

Drill Site BUC 25011– East from Stake

Drill Site BUC 25011– South from Stake

Drill Site BUC 25011– West from Stake

Drill Site BUC 25012– North from Stake



Drill Site BUC 25012– East from Stake

Drill Site BUC 25012– South from Stake

Drill Site BUC 25012– West from Stake

Drill Site BUC 25013– North from Stake

Drill Site BUC 25013– East from Stake

Drill Site BUC 25013– South from Stake

Drill Site BUC 25013– West from Stake

Drill Site BUC 25014– North from Stake

Drill Site BUC 25014– East from Stake

Drill Site BUC 25014– South from Stake

Drill Site BUC 25014– West from Stake

Drill Site BUC 25015– North from Stake

Drill Site BUC 25015– East from Stake

Drill Site BUC 25015– South from Stake

Drill Site BUC 25015– West from Stake

Drill Site BUC 25016– North from Stake

Drill Site BUC 25016– East from Stake

Drill Site BUC 25016– South from Stake

Drill Site BUC 25016– West from Stake

Drill Site BUC 25017– North from Stake

Drill Site BUC 25017– East from Stake

Drill Site BUC 25017– South from Stake

Drill Site BUC 25017– West from Stake

Appendix B

General Survey Information for the October Jinx Project

Drill Site	NRCS Map Unit Name	Elevation (feet)	Community Type	Topographic Position/Slope	Canopy Cover	Community Type Assemblage	General Vegetation Coverage
BUC-25001	Minnequa silt loam, 2 to 6 percent slopes	4132	Grazed, Grassland	Hilltop, 1-3% Slope	60-70%	BOUGRA/ AGRCRI	Grass/limited subshrub
BUC-25002	Minnequa silt loam, 2 to 6 percent slopes	4148	Grazed, Grassland	Hilltop, 1-2% Slope	65-75%	AGRCRI/ BOUGRA/ HESCOM	Grass/limited subshrub
BUC-25003	Minnequa silt loam, 2 to 6 percent slopes Butche-Boneek, dry complex, 3 to 15 percent slopes Mathias-Rockoa-Rock outcrop complex, 25 to 60 percent slopes, stony	4172	Grazed, Grassland	Hilltop, 3-5% Slope	65-75%	BOUGRA/ HESCOM	Grass/limited subshrub
BUC-25004	Minnequa silt loam, 2 to 6 percent slopes	4132	Grazed, Grassland	Hilltop, 1-3% Slope	65-75%	HESCOM/ BOUGRA	Grass
BUC-25005	Minnequa silt loam, 2 to 6 percent slopes	4093	Grazed, Grassland	Hilltop, 1-3% Slope	60-70%	HESCOM/ ARIPUR	Grass/limited subshrub
BUC-25006	Minnequa silt loam, 2 to 6 percent slopes	4128	Grazed, Grassland	Hilltop, 1-3% Slope	50-75%	HESCOM/ BOUGRA/ KOEMAC	Grass/limited subshrub
BUC-25007	Minnequa silt loam, 2 to 6 percent slopes	4140	Grazed, Grassland	Hilltop, 1-2% Slope	65-75%	HESCOM/ BOUGRA	Grass/limited shrub & subshrub
BUC-25008	Minnequa silt loam, 2 to 6 percent slopes	4163	Grazed, Grassland	Hilltop, 1-2% Slope	50-60%	AGRCRI/ HESCOM/ KOEMAC	Grass/limited subshrub
BUC-25009	Minnequa silt loam, 2 to 6 percent slopes Mathias, very stony-Samsil-Rock outcrop complex, 15 to 30 percent slopes	4121	Grazed, Grassland	Hilltop, 4-5% Slope	70-80%	HESCOM/ BOUGRA	Grass/limited subshrub/limited PINPON

Drill Site	NRCS Map Unit Name	Elevation (feet)	Community Type	Topographic Position/Slope	Canopy Cover	Community Type Assemblage	General Vegetation Coverage
BUC-25010	Minnequa silt loam, 2 to 6 percent slopes	4171	Grazed, Grassland	Hilltop, 1-3% Slope	65-75%	PASSMI/ BOUGRA	Grass/limited shrub & subshrub
BUC-25011	Minnequa silt loam, 2 to 6 percent slopes	4177	Grazed, Grassland	Hilltop, 1-3% Slope	65-75%	PASSMI/ BOUGRA	Grass/limited subshrub
BUC-25012	Minnequa silt loam, 2 to 6 percent slopes	4160	Grazed, Grassland	Hilltop, 3-5% Slope	65-80%	HESCOM/ BOUGRA/ KOEMAC	Grass/limited subshrub
BUC-25013	Minnequa silt loam, 2 to 6 percent slopes	4150	Grazed, Grassland	Hilltop, 1-3% Slope	65-75%	HESCOM/ BOUGRA	Grass/limited subshrub
BUC-25014	Minnequa silt loam, 2 to 6 percent slopes	4152	Grazed, Grassland	Hilltop, 1-2% Slope	65-75%	HESCOM/ BOUGRA/ KOEMAC	Grass/limited shrub & subshrub
BUC-25015	Minnequa silt loam, 2 to 6 percent slopes	4131	Grazed, Grassland	Hilltop, 3-5% Slope	60-75%	HESCOM/ BOUGRA	Grass/limited subshrub
BUC-25016	Minnequa silt loam, 2 to 6 percent slopes	4147	Grazed, Grassland	Hilltop, 1-2% Slope	60-80%	HESCOM/ BOUGRA	Grass/limited shrub & subshrub
BUC-25017	Minnequa silt loam, 2 to 6 percent slopes	4138	Grazed, Grassland	Hilltop, 1-2% Slope	60-75%	HESCOM/ BOUGRA	Grass/limited shrub & subshrub

AGRCRI = crested wheatgrass (*Agropyron cristatum*)
ARIPUR = purple threeawn (*Aristida purpurea*)
BOUGRA = blue grama (*Bouteloua gracilis*)
HESCOM = needleandthread (*Hesperostipa comata*)
KOEMAC = prairie Junegrass (*Koeleria macrantha*)
PASSMI = western wheatgrass (*Pascopyrum*)

Appendix C

Maps of the October Jinx Project

Confidential

FINAL

CLEAN NUCLEAR ENERGY CORP OCTOBER JINX WILDLIFE SURVEY REPORT

PREPARED FOR:

U.S. Forest Service, Black Hills National Forest
Hell Canyon Ranger District
Custer, South Dakota
and
RESPEC
3824 Jet Drive
Rapid City, South Dakota 57703
Contact: Crystal Hocking, Project Geologist
Crystal.Hocking@respec.com

PREPARED BY:

ICF
405 West Boxelder Road, Suite A-5
Gillette, WY 82718
Contact: Stephanie Kane
307.687-4771

October 2024

ICF

ICF. 2024. *Clean Nuclear Energy Corp October Jinx Baseline Wildlife Survey Report*. Final. October. (ICF 104928) Gillette, WY. Prepared for RESPEC, Rapid City, SD.

Contents

Contents i

Figures ii

Acronyms and Abbreviations iii

Introduction 1

Study Area Description 3

Habitat Description 4

Grassland 4

Ponderosa Pine 4

Other Minor Habitats 5

Methods 6

Raptors 6

Potential Bat Roost and Hibernaculum Habitat 7

Species of Concern 7

Incidental Wildlife Observations 7

Results 8

Raptors 8

Potential Bat Roost and Hibernaculum Habitat 10

Species of Concern 10

Incidental Wildlife Observations 10

Conclusions 12

References 13

Printed References 13

Qualifications 14

Appendix I Potential and Observed Terrestrial Species List in the October Jinx Wildlife Baseline Study Area 1

References for Potential and Observed Species Lists (Appendix I) 12

All Species 12

Mammals 12

Avian 12

Amphibians and Reptiles 13

Appendix II Vertebrate Species of Concern 1

Appendix III Representative Photographs from the Clean Nuclear Energy Corp. October Jinx Study Area 1

Figures

Figure 1. Clean Nuclear Energy Corp. October Jinx Project – Exploratory Drill Locations 2

Figure 2. Clean Nuclear Energy Corp October Jinx Project – Raptor Observations 9

Figure 3. Clean Nuclear Energy Corp October Jinx Project – Wildlife Habitat Features 11

Acronyms and Abbreviations

BHNF	Black Hills National Forest
E	East
Clean Nuclear	Clean Nuclear Energy Corp.
IPaC	Information Planning and Conservation
Project	October Jinx Project
R	Range
RESPEC	RESPEC, LLC
S	South
SDGFP	South Dakota Game, Fish and Parks
SDNHP	South Dakota Natural Heritage Program
study area	Project proposed drill sites (current as of April 2024) and a 0.5-mile perimeter
T	Township
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service

Introduction

Clean Nuclear Energy Corp. (Clean Nuclear) is proposing exploratory drilling as part of its October Jinx Project (Project) plan of operations. The Project site is approximately 9.5 miles north of Edgemont in Fall River County, South Dakota, on U.S. Forest Service (USFS)-administered lands in the Black Hills National Forest (BHNF). The proposed plan of operations includes 17 exploratory drill sites, the use of existing roads, and overland travel in Section 25, Township (T)7 South (S):Range (R) 2 East (E) and Section 30, T7S:R3E (Figure 1).

Because the Project would be located on USFS lands, the USFS is requiring surveys for nesting raptors near the proposed exploratory drill sites. RESPEC LLC (RESPEC) of Rapid City, South Dakota, on behalf of Clean Nuclear, contracted with ICF in May 2024 to conduct the surveys. The detailed survey data, as well as the results of the wildlife survey, are included with the documents compiled and submitted to RESPEC.

This report presents information regarding wildlife observations made within the study area, which included a 0.5-mile perimeter around all 17 proposed drill sites. Wildlife surveys were conducted in accordance with applicable South Dakota Game, Fish, and Parks (SDGFP), U.S. Fish and Wildlife Service (USFWS), and USFS guidelines.

ICF conducted wildlife surveys for the Project in late-June and early-July 2024. The objective of the surveys was to collect data on raptor nests, potential bat hibernacula and roosting habitats, and other wildlife habitats of interest in and near the Project. Specific surveys for threatened, endangered, or other species of concern were not required for the Project. However, information on other animal groups (i.e., avian and mammal species not previously listed, aquatic species, herptiles) was obtained through opportunistic observation in and near the Project during surveys.

Confidential

Study Area Description

Clean Nuclear is proposing exploratory drilling as part of its plan of operations. The Project site is approximately 9.5 miles north of Edgemont in Fall River County, South Dakota, on USFS-administered lands in the BHNF. The plan of operations includes 17 exploratory drill sites, the use of existing roads, and overland travel in Section 25, T7S:R2E and Section 30, T7S:R3E (Figure 1). The Project study area is defined as the proposed exploratory drill sites and surrounding 0.5-mile perimeter (hereafter referred to as the *study area*). Most lands within the study area are owned by either the USFS of State of South Dakota. A small parcel (SE NE Section 36, T7S:R2E; 40 acres) is privately owned and was not accessible during the field surveys.

The topography in the area includes moderately to steeply sloping hills and ridges. The elevation ranges from approximately 3,700 feet to 4,200 feet. Annual average precipitation, between 16 and 37 inches, increases or decreases with the elevation from west to east and from north to south. Annual snowfall ranges from about 60 inches at lower elevations to as much as 140 inches at higher elevations. The average annual temperature is 36 to 48 degrees Fahrenheit. The freeze-free period averages 125 days, with a range of 85 to 165 days (U.S. Department of Agriculture, Natural Resources Conservation Service [USDA NRCS] 2006).

The study area primarily supports dense forest vegetation and grassland. Cool- and warm-season grasses are common under open forest stands, along with forb and shrub species (USDA NRCS 2006). Forest vegetation is composed of ponderosa pine (*Pinus ponderosa*), quaking aspen (*Populus tremuloides*), paper birch (*Betula papyrifera*), white spruce (*Picea glauca*), and oak (*Quercus* sp.). Grassland areas are characterized by moderately dense cover with little bare ground. Various native short-to mid-grass species such as prairie junegrass (*Koeleria macrantha*) and western wheatgrass (*Pascopyrum smithii*) dominate this habitat type, with numerous forbs scattered throughout the area. The habitats in the Black Hills support bird species from both the west and the east coasts, allowing the region to have a high richness of avian species. The exposed rock faces and outcrops interspersed within the forest provide diverse habitats that support birds and mammals.

Craven Canyon, containing an intermittent unnamed creek, is located along the eastern edge of the study area in Section 25, T7S:R2E and Sections 30 and 31, T7S:R3E. This canyon provides some riparian vegetation such as plains cottonwood (*Populus sargentii*) and willow (*Salix* sp.). A burn scar caused by wildfire occurs on the western slope and rim of the canyon in Section 25, T7S:R2E. The burn area is dominated by grasses. Craven Canyon also contains multiple exposed rock outcrops along its rim and along the intermittent creek.

The proposed Project site is on USFS-administered lands; the study area comprises lands administered by the USFS, the State of South Dakota, and private landholders. Land uses in the study area include logging, livestock grazing, and recreation. Several USFS roads and trails pass through the study area; Elbow Canyon Road (County Road 16) passes through portions of the study area. Human activities associated with these land uses result in frequent vehicular and pedestrian traffic year-round.

Habitats that occur in the study area include grassland and coniferous forest, with ponderosa pine representing the dominant tree type. Other vegetation includes deciduous trees, woody shrubs, and forbs.

Grassland

The grassland vegetation community is the dominant vegetation community within the study area. The topography is flat to gently rolling in these areas. Common prairie grasses such as western wheatgrass, prairie junegrass, Indian ricegrass (*Oryzopsis hymenoides*), and needle and thread (*Hesperostipa comata*) are present. Common forbs present include white milkwort (*Polygala alba*), prairie coneflower (*Ratiba columnifera*), and western yarrow (*Achillea millefolium*). Shrub species found intermittently throughout the grassland community include big sagebrush (*Artemisia tridentata*) and sagewort (*Artemisia frigida*). Grassland vegetation also dominates an area of an old wildfire burn along the west slope and rim of Craven Canyon along the canyon's northern reaches in the study area. Prior to the fire, this area would have predominately contained a ponderosa pine vegetation community.

Grassland habitats tend to support a lower diversity and abundance of wildlife species. However, proximity and availability of adjacent habitats can produce grasslands that support both generalist and specialist species for a variety of activities (e.g., nesting, foraging, and refuge). Small mammals such as mice, voles, and prairie dogs [*Cynomys* sp.], as well as their predators (e.g., coyotes [*Canis latrans*], foxes [*Vulpes* sp.), and raptor species), are common in grassland habitats. Large mammals such as mule deer (*Odocoileus hemionus*) and pronghorn (*Antilocapra americana*) commonly forage in grasslands. Other bird species that utilize grasslands include several species of sparrows (Family Passerellidae), larks (Family Alaudidae), and shrikes (Family Laniidae). Multiple species of snakes and lizards can also be found in grassland habitats.

Ponderosa Pine

Ponderosa pine vegetation communities are also prevalent within the study area, and topography in these areas ranges from gently rolling to very steep and rocky. Although the overstory is dominated by ponderosa pine, white spruce, and quaking aspen area also present. The dominant shrubs in the understory include common snowberry (*Symphoricarpos albus*), kinnikinnick (*Arctostaphylos uva-ursi*), creeping juniper (*Juniperus horizontalis*), and Saskatoon serviceberry (*Amelanchier alnifolia*). Common grasses and grass-like species include Sandberg bluegrass (*Poa secunda*), prairie sandreed (*Calamovilfa longifolia*), smooth brome (*Bromus inermis*), rough-leaved ricegrass (*Oryzopsis asperifolia*), and Ross sedge (*Carex rossii*). Common forbs present include western yarrow, Virginia strawberry (*Fragaria virginiana*), and Mountain blue violet (*Viola adunca*).

All ponderosa pine habitats, particularly those with higher understory cover, support a relatively high diversity of wildlife species. These habitats generally host several levels of open canopy cover, which can provide for an array of different species while also allowing for easy wildlife movement between canopy levels and greater utilization of the overall habitat. Mammalian species such as

white-tailed deer (*Odocoileus virginianus*), squirrels (Family Sciuridae), and chipmunks (*Tamius* species) are common. Avian species such as nuthatches (Family Sittidae), chickadees (Family Paridae), warblers (Family Parulidae), and woodpeckers (Family Picidae) are also abundant in this habitat. Ponderosa pine is commonly utilized as nesting habitat by several raptor species, including American goshawk (*Accipiter atricapillus*), Cooper's hawk (*Accipiter cooperi*), broad-winged hawk (*Buteo platypterus)*, and red-tailed hawk (*Buteo jamaicensis*).

Other Minor Habitats

Other habitats that occur in the study area include riparian and disturbed areas. Riparian habitat is limited within the study area. The most prominent riparian zone occurs along the intermittent creek in Craven Canyon, which is located along the eastern boundary of the study area. At the time of the survey the intermittent creek was mostly dry, with few isolated shallow pools, and no signs of regular flow. The availability of water resources associated with riparian habitats can attract many wildlife species from neighboring areas and often concentrates an abundance of animals in this habitat. However, given the limited extent of riparian habitat, species diversity tends to be similar to that of the surrounding habitats, with little opportunity to support more specialized riparian species.

Disturbed habitats are characterized by a nearly complete absence of vegetation and, therefore, are less valuable to wildlife species. The diversity and the abundance of wildlife species are extremely low, if not absent, in these habitats. Disturbed areas in the study area are limited to the county road, 2-track roads, and one residence.

Methods

All wildlife survey protocols were based on the guidelines required for permitting and environmental analysis through state and federal agencies (primarily USFS and SDGFP). Surveys were conducted throughout the areas of proposed Project infrastructure and study area.

Prior to initiating field surveys, a comprehensive effort was made to gather information about the occurrence, abundance, and natural history of all terrestrial vertebrate species that could occur in the study area. This included the review of sensitive species lists developed for the region by the USFS, USFWS, and SDGFP, including the USFS Region 2 Species of Concern list (2023), the USFS Black Hills National Forest Species of Local Concern list (2005), the USFWS Information for Planning and Conservation (IPaC) tool, and the South Dakota Natural Heritage Program's *Rare Animal List* (2018). A potential species list for the Project was then developed based on these resources.

Wildlife data was collected for the Project on June 27 and 28, and July 3, 2024. Surveys conducted for the Project included raptors and their nests and potential bat roost and hibernaculum habitat. Data collected during raptor surveys included waypoint coordinates of bird and nest locations (with photographs), species and number of individuals seen, behavior, nest species and status of the nest, and nest substrate. Electronic call playbacks were used to aid in detection of raptors. Data collected during bat habitat surveys included photographs, waypoint coordinates of potential bat roost and hibernaculum habitat such as tree snags, caves, and rocky outcrops. Additionally, incidental wildlife species (including any federally and state-listed species) were also recorded during raptor and bat habitat surveys. Incidental wildlife data collected included species and number of individuals seen, behavior, waypoint coordinates, and habitat. Notes on habitats that could potentially host state or federally- listed species were also recorded.

All surveys were conducted by qualified biologists using standard field equipment and appropriate field guides. Most terrestrial data were collected from vantage points during pedestrian or vehicular surveys to avoid disturbing wildlife. Data were collected on iPad tablets preloaded with ArcGIS field maps of the Project sites and study area. All surveys were conducted during favorable weather conditions (no precipitation with little or no wind). All wildlife observations are provided in the tables appended to this report in Appendix I and Appendix II. Photographs of study area habitat and wildlife features of importance (e.g., rocky outcrops, dead trees) are provided in Appendix III.

Raptors

Nest searches involved walking and/or driving throughout the study area looking for raptors and their nests. New nests were located by examining typical nesting habitat (trees, cliffs, human-made structures, etc.) and watching for breeding behavior (territory defense, courtship flights, prey deliveries, etc.) during all site visits. ICF biologists used recorded raptor calls (i.e., Cooper's hawk, broad-winged hawk, American goshawk, and red-tailed hawk) broadcasted from a handheld device to elicit defensive responses, especially in heavily wooded areas where visibility was limited. During

and after playing calls, biologists watched and listened for raptors for several minutes. Areas where raptors were observed and/or raptors responded to calls were thoroughly searched on foot. To prevent nest abandonment or injury to eggs or young, raptor nest surveys followed the guidelines contained in Rosenfield et al. (2007).

Potential Bat Roost and Hibernaculum Habitat

ICF biologists conducted searches for potential bat roost and hibernaculum habitat concurrently with raptor surveys. Specific surveys for bat species were not required; however, all potential bat habitat was searched for bat presence. Potential sites included tree snags, dead trees, rocky outcrops, and cliffs. Data collected from tree snags and dead trees included substrate dimensions (e.g., height, diameter) and characteristics (e.g., crevices, cavities, sloughing bark). Similarly, biologists looked for crevices, cavities, and caves (including the estimating of depth of such features) within rocky outcrops and cliffs.

Species of Concern

No specific surveys for federal or state-listed species of concern were required. However, ICF biologists watched for and recorded any endangered, threatened, petitioned, and candidate species, or other species of special concern during raptor nest searches. Biologists also watched for any habitats that could support these species.

Incidental Wildlife Observations

Specific surveys for big game, passerine birds, upland gamebirds, waterfowl, shorebirds, large and small mammals, amphibians, reptiles, or fish were not required. Biologists recorded incidental observations of these species during raptor nest searches. All black-tailed prairie dog (*Cynomys ludovicianus*) colonies were also delineated.

Appendix I lists all species observed that could reside in the vicinity of the October Jinx study area or pass-through during migration. Species recorded in the study area are noted. Appendix II lists federal- and state-listed species that could occur in the vicinity (i.e., Fall River County, SD) of the study area. Appendix III provides representative photographs of the study area.

Raptors

Raptor species observed during the 2024 October Jinx wildlife surveys included red-tailed hawk, golden eagle (*Aquila chrysaetos*), American kestrel (*Falco sparverius*), great horned owl (*Bubo virginianus*), northern harrier (*Circus hudsonius*), and turkey vulture (*Cathartes aura*). Other raptor species (Appendix I) could also occur in the study area, particularly as seasonal migrants, but were not seen during the survey.

Figure 1 shows locations of raptor observations within the study area. Raptor sightings were recorded most often in ponderosa pine and grassland habitats. One territorial-behaving red-tailed hawk was recorded harassing a golden eagle flying over grassland habitat in NW SE Section 25, T7S:R2E on June 27, 2024. One red-tailed hawk was observed on June 28 when it was seen flying from a pine tree and displaying territorial behavior in SW NE Section 25, T7S:R2E. Another red-tailed hawk was recorded flying from a pine tree in SW NW Section 30, T7S:R3E on July 3.

One golden eagle was observed flying west over grassland and pine forest habitat in NW SE Section 25, T7S:R2E on June 27, 2024. While in flight, a red-tailed hawk and multiple American crows (*Corvus brachyrhynchos*) harassed the eagle. The eagle continued flying west and out of the study area. Biologists checked all potential golden eagle nesting substrate (e.g., large trees, cliffs) in the immediate area and did not find any nests. The golden eagle is a SDNHP species of concern (SDNHP 2018).

Additional raptor species observed in 2024 included a pair of great horned owls seen flying in pine forest habitat on June 27 in NW NW Section 36, T7N:R2E. An American kestrel was observed in pine habitats near cliffs on July 3 in NW SW Section 30, T7S:R3E. The individual displayed territorial behavior, indicating a nearby nest. One northern harrier was observed on June 28 flying over grassland in SW SW Section 25, T7S:R2E; this species is a USFS Region 2 Sensitive Species. Multiple turkey vultures were observed flying over pine forest habitat on June 28 in NE SE Section 26, T7S:R2E.

Biologists did not record any raptor nests within the study area. However, one nest in a ponderosa pine tree was discovered incidentally just outside the 0.5-mile study area (Figure 2). The occupied red-tailed hawk nest was discovered approximately 300 feet north of the study area in NW NW Section 30, T7S:R3E. The nest is over 0.5 mile from the nearest source of proposed Project disturbance and is not within line-of-sight of the Project.

Confidential

Potential Bat Roost and Hibernaculum Habitat

Potential bat roost and hibernaculum habitats are present within the study area (Figure 3). Tree snags and dead trees with exfoliating bark and/or cavities were the most common potential bat habitat features documented in the study area. Dead trees and tree snags were found primarily in ponderosa pine habitat. Several rocky outcrops containing cavities and crevices were also found. These features lined the slopes of a draw within ponderosa pine habitat in the northwest portion of the study area. Rocky outcrop habitat was also extensive in areas of Craven Canyon. The rocky outcrop habitat within the canyon was located along reaches of the rims and in the canyon bottom along an intermittent creek (Figure 3). Biologists also found small, shallow caves in some of the rock outcrops that could provide bat habitat. No mine shafts or adits from historical mining activities were recorded.

Species of Concern

Appendix I includes federally- or state-listed species observed during surveys. All species of concern that have the potential to occur in the study area are listed in Appendix II. No USFWS-listed endangered, threatened, petitioned, and candidate species were recorded during surveys. Further, no BHNF Species of Local Concern were recorded. Biologists documented two USFS Region 2 Sensitive Species during surveys, the northern harrier and the black-tailed prairie dog. One SDNHP-listed species, the golden eagle, was observed. The golden eagle and northern harrier observations were discussed in the *Raptors* section. The prairie dog colony is discussed in the *Incidental Wildlife Observations* section.

Red-headed woodpeckers (*Melanerpes erythrocephalus*) were recorded on multiple occasions. This species is a migratory Bird of Conservation Concern for Region 17 (USFWS 2021b) and is included in the USFWS IPaC Trust Resource Report for the October Jinx study area (USFWS 2024). Two individual red-headed woodpeckers were observed on June 28 in ponderosa pine habitat in NW NW Section 31, T7S:R3E and in SE NE Section 25, T7S:R3E. Another individual red-headed woodpecker was recorded on July 3 in riparian habitat in NW NW Section 30, T7S:R3E.

Incidental Wildlife Observations

Incidental wildlife observations recorded during surveys are found in Appendix I. One small, occupied black-tailed prairie dog colony was found in SE SE Section 25 and NE NE Section 36, T7S:R2E (Figure 3). Biologists delineated the colony and confirmed at least five prairie dogs occupying the colony.

Confidential

Conclusions

The October Jinx Project includes 17 proposed exploratory drill sites. Access to the drill sites will involve using existing roads and short distances of overland travel. Because each drill site is small (60 feet by 60 feet), surface disturbance and other direct habitat impacts would be limited to drill pad construction and access activities. Potential direct and indirect impacts on wildlife populations are not expected to be substantial due to the small size of surface disturbance. Further, no tree removal activities area planned for the Project, reducing potential direct effects to arboreal species.

Suitable nesting habitat (i.e., forests with close canopies, cliffs) for several raptor species is present within 0.5 mile of the Project. Despite this, no raptor nests were found within the study area. However, reproductive raptor pairs use the area as evidenced by the presence and behavior of multiple raptor species during surveys and the raptor nest discovered just outside of the study area (Figure 2). It is likely the hawk observed on July 3, 2024, was a member of the pair using the nests, given the proximity of both the observation and the nest in NW NW Section 30, T7S:R3E. The raptor nest is not within line-of-sight of any proposed drill sites and therefore any adverse effects to the nest would be minimal. Further, no suitable nesting habitat (i.e., trees or cliffs) overlaps the proposed Project infrastructure, reducing impacts to species that use these substrates. The abundance of suitable alternate nesting habitats throughout areas adjacent to and beyond the Project also minimizes the potential for both direct and indirect impacts on raptor species.

Potential habitat for roosting bats (including sensitive species) is present within 0.5 mile of the Project; however, none of the identified habitat overlaps with proposed Project infrastructure. The nearest potential bat habitat consists of rock outcrops with crevices along the rim of Craven Canyon, approximately 300 feet northeast of a proposed drillhole (Figure 3). Bat roosting habitat in the study area includes tall trees with larger diameters (i.e., greater than 5 inches) with cavities, crevices, and sloughing bark. The height and diameter of the trees makes them appropriate for use by roosting bats (Cryan et al. 2001). Other habitats include cliffs and rocky outcrops with crevices. Removal of trees is not expected during drilling activities as the drillholes do not occur in treed areas. The UFSF should be consulted prior to beginning surface disturbance activities to determine if avoidance or minimization measures will be needed for the project. Avoidance and minimization measures could include limiting activities to outside of hibernation periods, establishment of buffers around habitat, and avoidance of trees that occur near Project infrastructure.

Five state or federal-list species were recorded in 2024: two USFS Region 2 Sensitive Species, one USFWS Bird of Conservation Concern species, and one SDNHP species of concern (Appendix I and Appendix II). The limited size of the proposed disturbance diminishes direct impacts on most species of concern that do or could occur in the area. Other wildlife species of concern that occur in the area may experience direct and/or indirect impacts from increased travel and noise in the area during Project operations. Timing Project construction outside of breeding and nesting seasons would further reduce potential indirect impacts on species of interest.

Printed References

Cryan, P.N., M.A. Bogan, and G.M. Yanega. 2001. Roosting habits of four bat species in the Black Hills of South Dakota. *Acta Chiroperologica*, vol. 3, no. 1, pp. 43-52.

Rosenfield, R. N., J. W. Grier, & R. W. Fyfe. 2007. Reducing management and research disturbance. In D. M. Bird, K. L. Bildstein, D. R. Barber, & A. Zimmerman (eds.), *Raptor Research and Management Techniques* (pp. 351–364). Raptor Research Foundation. Hancock House Publishers.

South Dakota Natural Heritage Program. 2018. Rare Animals of South Dakota. South Dakota Game, Fish, and Parks. Pierre, SD. Available: https://gfp.sd.gov/rare-animals/. Accessed: August 20, 2024.

U.S. Department of Agriculture Natural Resources Conservation Service (USDA NRCS). 2006. *Land Resource Regions and Major Land Resource Areas of the United States, the Caribbean, and the Pacific Basin*. U.S. Department of Agriculture Handbook 296. https://www.nrcs.usda.gov/. Accessed August 20, 2024.

U.S. Fish and Wildlife Service (USFWS). 2021a. *South Dakota Listed Species by County List. Updated February 12, 2021.* Available: https://www.fws.gov/sites/default/files/documents/SpeciesByCounty_Feb2021.pdf. Accessed: August 20, 2024.

_____. 2021b. *Birds of Conservation Concern 2021. Falls Church, VA: United States Department of Interior, Fish and Wildlife Service, Migratory Birds.* Available: https://www.fws.gov/media/birds-conservation-concern-2021pdf. Accessed: August 20, 2024.

_____. 2024. *Information for Planning and Conservation Trust Resource Report, October Jinx Study Area*. IPaC v3.0.0. Available: https://ipac.ecosphere.fws.gov. Accessed: August 20, 2024.

U.S. Forest Service (USFS). 2005. Process for Identifying Wildlife and Plant Species of Local Concern and Results, Black Hills National Forest Phase II Plan Amendment, Appendices G, H, and I. April. Available: https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5151694.pdf. Accessed: August 20, 2024. Appendices Available: https://www.fs.usda.gov/detail/blackhills/landmanagement/?cid=stelprdb5151692. Accessed October 22, 2024.

_____. 2023. *Sensitive Species for the Rocky Mountain Region (Region 2).* Available: https://www.fs.usda.gov/detail/r2/landmanagement/?cid=stelprdb5390116. Accessed: August 20, 2024.

Qualifications

Jeff Abplanalp and Trace Buckert conducted the surveys. Jeff Abplanalp and Stephanie Kane prepared this report.

Stephanie Kane is a project manager and wildlife biologist with ICF and has worked in the Gillette office since 2013. She earned an M.S. degree in Biology from Ft. Hayes State University (2011) and a B.S. degree in Zoology from Colorado State University (2005). Stephanie has been working in Wyoming, Montana, and South Dakota with oil, gas, mining, transmission, and wind energy projects. Stephanie is responsible for managing projects, conducting habitat assessments, performing biological surveys for species of concern, and authoring technical reports. She has managed a variety of projects ranging from annual compliance surveys to baseline habitat assessments and wildlife surveys for large-scale projects. Stephanie's experience includes regional surveys for greater sage-grouse and raptors; productivity and occupation surveys for northern spotted owl (Strix occidentalis caurina); surveys and habitat assessments for wetland birds; mist-netting passerine birds and assessing associated habitats; wild bird rehabilitation; volunteer work with big game telemetry and chronic wasting disease; and vegetative surveys. In addition, she has extensive experience in environmental education, including time as a guide in Grand Teton and Yellowstone National Parks.

Jeff Abplanalp is a project manager and wildlife biologist with ICF and joined the Gillette office in 2019. He earned a B.S. degree in Wildlife and Fisheries Management and Biology from the University of Wyoming (2009). Jeff has worked closely with energy and agricultural industries throughout Wyoming and has 14 years of experience conducting terrestrial and aquatic wildlife surveys and research within the state. He has extensive experience in the surveying of greater sage-grouse, raptors, and special status species across many regions of Wyoming, such as the Powder River Basin, Wind River Basin, Red Desert, Shirley Basin, and Big Horn Basin. Jeff also has extensive experience in big game population, depredation, and disease management from his prior employment with the Wyoming Game and Fish Department.

Trace Buckert is a wildlife biologist with ICF and has worked in the Gillette office since 2021. He earned an B.S. degree in Zoology from the University of Wyoming (2018). Currently Trace supports multiple energy development projects in Arizona, Missouri, New Mexico, and Wyoming as a field biologist. Prior to joining ICF, Trace worked as a Compliance Inspector on a transmission line construction project in southern Wyoming. He has also worked as a wildland fire fighter for the National Forest Service. Trace has conducted aerial and ground-based surveys for both raptors and greater sage-grouse as well as completed avian point counts, and habitat assessments for special status species.

Appendix I
Potential and Observed Terrestrial Species List in the October Jinx Wildlife Baseline Study Area

Table I-1. Potential[1] and Observed Avian Species in the Clean Nuclear Energy Corp. October Jinx Study Area

Common Name[2]	Latin Name	Recorded in 2024
Loons and Grebes		
Common loon*	*Gavia immer*	---
Eared grebe	*Podiceps nigricollis*	---
Horned grebe*	*Podiceps auritus*	---
Pied-billed grebe*	*Podilymbus podiceps*	---
Herons and Bitterns		
American bittern	*Botaurus lentiginosus*	---
Black-crowned night heron*	*Nycticorax nycticorax*	---
Great blue heron*	*Ardea herodias*	---
Ibises		
White-faced ibis*	*Plegadis chihi*	---
Swans, Geese, and Ducks		
American wigeon	*Mareca americana*	---
Blue-winged teal	*Spatula discors*	---
Bufflehead	*Bucephala albeola*	---
Canada goose	*Branta canadensis*	---
Canvasback	*Aythya valisineria*	---
Cinnamon teal	*Spatula cyanoptera*	---
Common merganser*	*Mergus merganser*	---
Gadwall	*Mareca strepera*	---
Green-winged teal	*Anas crecca*	---
Lesser scaup	*Aythya affinis*	---
Mallard	*Anas platyrhynchos*	---
Northern pintail	*Anas acuta*	---
Northern shoveler	*Spatula clypeata*	---
Redhead	*Aythya americana*	---
Ring-necked duck	*Aythya collaris*	---
Ruddy duck	*Oxyura jamaicensis*	---
Snow goose*	*Anser caerulescens*	---
Vultures		
Turkey vulture	*Cathartes aura*	X
Diurnal Raptors		
American goshawk*	Accipiter atricapillus	---
American kestrel	*Falco sparverius*	X
Bald eagle*	*Haliaeetus leucocephalus*	---
Broad-winged hawk*	*Buteo platypterus*	---
Cooper's hawk*	*Accipiter cooperii*	---
Ferruginous hawk*	*Buteo regalis*	---
Golden eagle*	*Aquila chrysaetos*	X

Common Name[2]	Latin Name	Recorded in 2024
Merlin*	*Falco columbarius*	---
Northern harrier	*Circus cyaneus*	X
Osprey*	*Pandion haliaetus*	---
Peregrine falcon*	*Falco peregrines*	---
Prairie falcon*	*Falco mexicanus*	---
Red-tailed hawk	*Buteo jamaicensis*	X
Rough-legged hawk	*Buteo lagopus*	---
Sharp-shinned hawk*	*Accipiter striatus*	---
Swainson's hawk*	*Buteo swainsoni*	---
Gallinaceous Birds		
Ruffed grouse	*Bonasa umbellus*	---
Sharp-tailed grouse	*Tympanuchus phasianellus*	---
Wild turkey	*Meleagris gallopavo*	X
Cranes		
Sandhill crane	*Grus canadensis*	---
Whooping crane*	*Grus americana*	---
Coots, Gallinules, and Rails		
American coot	*Fulica americana*	---
Sora	*Porzana carolina*	---
Virginia rail	*Rallus limicola*	---
Shorebirds, Gulls, and Terns		
American avocet	*Recurvirostra americana*	---
Common snipe	*Gallinago*	---
Greater yellowlegs	*Tringa melanoleuca*	---
Killdeer	*Charadrius vociferus*	---
Lesser yellowlegs	*Tringa flavipes*	---
Solitary sandpiper	*Tringa solitaria*	---
Spotted sandpiper	*Actitis macularia*	---
Upland sandpiper	*Bartramia longicauda*	X
Willet	*Catoptrophorus semipalmatus*	---
Wilson's phalarope	*Phalaropus tricolor*	---
Pigeons and Doves		
Mourning dove	*Zenaida macroura*	X
Rock dove	*Columba livia*	X
Cuckoos		
Black-billed cuckoo	*Coccyzus erythropthalmus*	---
Yellow-billed cuckoo	*Coccyzus americanus*	---
Owls		
Eastern screech owl	*Otus asio*	---
Great Horned owl	*Bubo virginianus*	X
Long-eared owl*	*Asio otus*	---

Common Name[2]	Latin Name	Recorded in 2024
Northern saw-whet owl*	*Aegolius acadicus*	---
Goatsuckers		
Common nighthawk	*Chordeiles minor*	---
Common poorwill*	*Phalaenoptilus nuttallii*	---
Swifts		
White-throated swift	*Aeronautes saxatalis*	---
Hummingbirds		
Broad-tailed hummingbird	*Selasphorus platycercus*	---
Calliope hummingbird	*Selasphorus calliope*	---
Rufous hummingbird	*Selasphorus rufus*	---
Kingfishers		
Belted kingfisher	*Megaceryle alcyon*	---
Woodpeckers		
Black-backed woodpecker*	*Picoides arcticus*	---
Downy woodpecker	*Picoides pubescens*	---
Hairy woodpecker	*Picoides villosus*	---
Lewis's woodpecker*	*Melanerpes lewis*	---
Northern flicker	*Colaptes auratus*	X
Red-headed woodpecker	*Melanerpes erythrocephalus*	X
Red-naped sapsucker	*Sphyrapicus nuchalis*	---
Three-toed woodpecker*	*Picoides tridactylus*	---
Yellow-bellied sapsucker*	*Sphyripicus varius*	---
Flycatchers		
Cordilleran flycatcher	*Empidonax occidentalis*	---
Dusky flycatcher	*Empidonax oberholseri*	---
Least flycatcher	*Empidonax minimus*	---
Eastern kingbird	*Tyrannus*	X
Eastern phoebe	*Sayornis phoebe*	---
Hammond's flycatcher	*Empidonax hammondii*	---
Olive-sided flycatcher	*Contopus cooperi*	---
Say's phoebe	*Sayornis saya*	---
Western kingbird	*Tyrannus verticalis*	X
Western wood pewee	*Contopus sordidulus*	X
Larks		
Horned lark	*Eremophila alpestris*	---
Swallows		
Barn swallow	*Hirundo rustica*	---
Cliff swallow	*Hirundo pyrrhonota*	---
Tree swallow	*Tachycineta bicolor*	---
Violet-green swallow	*Tachycineta thalassina*	---

Common Name[2]	Latin Name	Recorded in 2024
Jays, Magpies, and Crows		
American crow	*Corvus brachyrhynchos*	X
Black-billed magpie	*Pica hudsonia*	X
Blue jay	*Cyanocitta cristata*	---
Clark's nutcracker*	*Nucifraga columbiana*	---
Common raven	*Corvus corax*	---
Gray jay	*Perisoreus canadensis*	---
Pinyon jay	*Gymnorhinus cyanocephalus*	---
Chickadees		
Black-capped chickadee	*Parus atricapillus*	X
Pygmy nuthatch*	*Sitta pygmaea*	---
Red-breasted nuthatch	*Sitta canadensis*	X
White-breasted nuthatch	*Sitta carolinensis*	---
Creepers		
Brown creeper*	*Certhia americana*	---
Wrens		
Canyon wren	*Catherpes mexicanus*	---
House wren	*Troglodytes aedon*	X
Rock wren	*Salpinctes obsoletus*	X
Winter wren	*Troglodytes*	---
Dippers		
American dipper*	*Cinclus mexicanus*	---
Gnatcatchers and Kinglets		
Blue-gray gnatcatcher	*Polioptila caerulea*	X
Golden-crowned kinglet	*Regulus satrapa*	---
Ruby-crowned kinglet	*Regulus calendula*	---
Thrushes		
American robin	*Turdus migratorius*	X
Eastern bluebird	*Sialia sialis*	---
Mountain bluebird	*Sialia currucoides*	X
Swainson's thrush	*Catharus ustulatus*	---
Townsend's solitaire	*Myadestes townsendi*	---
Veery*	*Catharus fuscescens*	---
Mimic Thrushes		
Brown thrasher	*Toxostoma rufum*	---
Gray catbird	*Dumetella carolinensis*	---
Northern mockingbird	*Mimus polyglottos*	---
Wagtails and Pipits		
American pipit	*Anthus rubescens*	---
Sprague's pipit	*Anthus spragueii*	---
Waxwings		

Common Name[2]	Latin Name	Recorded in 2024
Bohemian waxwing	*Bombycilla garrulus*	---
Cedar waxwing	*Bombycilla cedrorum*	---
Shrikes		
Loggerhead shrike	*Lanius ludovicianus*	---
Northern shrike	*Lanius excubitor*	---
Starlings		
European starling	*Sturnus vulgaris*	---
Vireos		
Bell's vireo	*Vireo bellii*	---
Red-eyed vireo	*Vireo olivaceus*	---
Plumbeous Vireo	*Vireo plumbeus*	---
Solitary vireo	*Vireo solitarius*	---
Warbling vireo	*Vireo gilvus*	---
Warblers		
American redstart	*Setophaga ruticilla*	---
Black-and-white warbler*	*Mniotilta varia*	---
Blackburnian warbler	*Dendroica fusca*	---
Blackpoll warbler	*Dendroica striata*	---
Common yellowthroat	*Geothlypis trichas*	X
MacGillivray's warbler	*Oporornis tolmiei*	---
Orange-crowned warbler	*Vermivora celata*	---
Ovenbird	*Seiurus aurocapillus*	---
Tennessee warbler	*Vermivora peregrina*	---
Townsend's warbler	*Dendroica townsendi*	---
Wilson's warbler	*Wilsonia pusilla*	---
Yellow warbler	*Setophaga petechia*	---
Yellow-breasted chat	*Icteria virens*	X
Yellow-rumped warbler	*Dendroica coronata*	X
Tanagers		
Western tanager	*Piranga ludoviciana*	---
Grosbeaks and Buntings		
Black-headed grosbeak	*Pheucticus melanocephalus*	---
Blue grosbeak	*Guiraca caerulea*	---
Dickcissel	*Spiza americana*	---
Indigo bunting	*Passerina cyanea*	---
Lazuli bunting	*Passerina amoena*	---
Rose-breasted grosbeak	*Pheucticus ludovicianus*	---
Towhees, Sparrows, Juncos, and Longspurs		
American tree sparrow	*Spizella arborea*	---
Baird's sparrow	*Ammodramus bairdii*	---
Chestnut-collared longspur	*Calcarius ornatus*	---

Common Name[2]	Latin Name	Recorded in 2024
Chipping sparrow	*Spizella passerina*	X
Clay-colored sparrow	*Spizella pallida*	---
Dark-eyed junco	*Junco hyemalis*	---
Field sparrow	*Spizella pusilla*	---
Grasshopper sparrow	*Ammodramus savannarum*	---
Harris' sparrow	*Zonotrichia querula*	---
Lark bunting	*Calamospiza melanocorys*	---
Lark sparrow	*Chondestes grammacus*	X
Snow bunting	*Plectrophenax nivalis*	---
Song sparrow	*Melospiza melodia*	X
Spotted towhee	*Pipilo maculatus*	X
Vesper sparrow	*Pooecetes gramineus*	X
White-crowned sparrow	*Zonotrichia leucophrys*	---
White-throated sparrow	*Zonotrichia albicollis*	---
Blackbirds, Meadowlarks, and Orioles		
Brewer's blackbird	*Euphagus cyanocephalus*	---
Brown-headed cowbird	*Molothrus ater*	X
Common grackle	*Quiscalus quiscula*	---
Bullock's oriole	*Icterus bullockii*	X
Northern oriole	*Icterus galbula*	---
Orchard oriole	*Icterus spurius*	---
Red-winged blackbird	*Agelaius phoeniceus*	X
Western meadowlark	*Sturnella neglecta*	X
Finches		
American goldfinch	*Carduelis tristis*	X
Cassin's finch*	*Carpodacus cassinii*	---
Common redpoll	*Carduelis flammea*	---
Evening grosbeak	*Coccothraustes vespertinus*	---
House finch	*Carpodacus mexicanus*	---
Pine grosbeak	*Pinicola enucleator*	---
Pine siskin	*Carduelis pinus*	---
Purple finch	*Carpodacus purpureus*	---
Red crossbill	*Loxia curvirostra*	---
Rosy finch	*Leucosticte arctoa*	---
White-winged crossbill	*Loxia leucoptera*	---
Weaver Finches		
House sparrow	*Passer domesticus*	---

[1] POTENTIAL OCCURRENCE—list derived from range and habitat information in South Dakota Game Fish and Parks (2016), Peterson (2020), Robbins et al. (2001), Stokes et al. (2013), and South Dakota Natural Heritage Program (2018).

[2] Species in **bold** indicate USFS Sensitive Species for the Rocky Mountain Region – Region 2 (2023).

Underlined species are Black Hills National Forest Species of Local Concern (2005).

Species with * are rare species tracked by the South Dakota Natural Heritage Program (2018).

Table I-2. Potential[1] and Observed Mammalian Species in the Clean Nuclear Energy Corp. October Jinx Study Area

Common Name[2]	Latin Name	Recorded in 2024
Insectivores		
Hayden's shrew	*Sorex haydeni*	---
Masked shrew	*Sorex cinereus*	---
Merriam's shrew*	*Sorex merriami*	---
Bats		
Big brown bat	*Eptesicus fuscus*	---
Fringe-tailed myotis*	*Myotis thysanodes*	---
Hoary bat	*Lasiurus cinereus*	---
Keen's myotis	*Myotis keenii*	---
Little brown bat	*Myotis lucifugus*	---
Long-eared myotis*	*Myotis evotis*	---
Long-legged myotis	*Myotis volans*	---
Northern long-eared bat*	*Myotis septentrionalis*	---
Red bat	*Lasiurus borealis*	---
Silver-haired bat	*Lasionycteris noctivagans*	---
Western small-footed myotis	*Myotis ciliolabrum*	---
Townsend's big-eared bat*	*Plecotus townsendii*	---
Unknown bat species		---
Hares and Rabbits		
Desert cottontail	*Sylvilagus audubonii*	---
Mountain cottontail	*Sylvilagus nuttallii*	---
White-tailed jackrabbit	*Lepus townsendii*	---
Cottontail species	*Sylvilagus spp.*	X
Rodents		
Black-tailed prairie dog	*Cynomys ludovicianus*	X
Bushy-tailed woodrat	*Neotoma cinerea*	---
Deer mouse	*Peromyscus maniculatus*	---
House mouse	*Mus musculus*	---
Least chipmunk	*Tamias minimus*	X
Long-tailed vole	*Microtus longicaudus*	---
Meadow jumping mouse*	*Zapus hudsonius*	---
Meadow vole	*Microtus pennsylvanicus*	---
Northern flying squirrel*	*Glaucomys sabrinus*	---
Northern pocket gopher	*Thomomys talpoides*	---
Norway rat	*Rattus norvegicus*	---
Porcupine	*Erethizon dorsatum*	---
Prairie vole	*Microtus ochrogaster*	---
Red squirrel	*Tamiasciurus hudsonicus*	X
Southern red-backed vole	*Clethrionomys gapperi*	---

Common Name[2]	Latin Name	Recorded in 2024
Thirteen-lined ground squirrel	*Spermophilus tridecemlineatus*	---
Vole species	*Microtus* spp.	---
White-footed mouse	*Peromyscus leucopus*	---
Yellow-bellied marmot	*Marmota flaviventris*	---
Carnivores		
Badger	*Taxidea taxus*	---
Black bear	*Ursus americanus*	---
Bobcat	*Lynx rufus*	---
Coyote	*Canis latrans*	---
Eastern spotted skunk*	*Spilogale putorius*	---
Ermine	*Mustela erminea*	---
Gray fox	*Urocyon cinereoargenteus*	---
Long-tailed weasel	*Mustela frenata*	---
Lynx	*Lynx canadensis*	---
Mink	*Mustela vison*	---
Mountain lion	*Felis concolor*	---
Pine marten	*Martes americana*	---
Raccoon	*Procyon lotor*	---
Red fox	*Vulpes vulpes*	---
Striped skunk	*Mephitis mephitis*	---
Weasel species	*Mustela spp.*	---
Ungulates		
Elk	*Cervus canadensis*	---
Mule deer	*Odocoileus hemionus*	X
Pronghorn	*Antilocapra americana*	---
White-tailed deer	*Odocoileus virginianus*	---

[1] POTENTIAL OCCURRENCE—list derived from range and habitat information in South Dakota Game Fish and Parks (2016), Sharps and Benzon (1984), Jones et al. (1983), Clark and Stromberg (1987), and Burt and Grossenheider (1976), and South Dakota Natural Heritage Program (2018).

[2] Species in **bold** indicate USFS Sensitive Species for the Rocky Mountain Region – Region 2 (2023).

Underlined species are Black Hills National Forest Species of Local Concern (2005).

Species with * are rare species tracked by the South Dakota Natural Heritage Program (2018).

Table I-3. Potential[1] and Observed Reptilian and Amphibian Species in the October Jinx Study Area

Common Name[2]	Latin Name	Recorded in 2024
Salamanders		
Tiger salamander	*Ambystoma tigrinum*	---
Frogs and Toads		
Boreal chorus frog	*Pseudacris triseriata*	---
Plains spadefoot toad	*Spea bombifrons*	---
Northern leopard frog	*Lithobates pipiens*	---
Lizards		
Northern sagebrush lizard	*Sceloporus graciousus*	---
Greater short-horned lizard	*Phrynosoma hernandesi*	---
Snakes		
Black hills redbelly snake*	*Storeria occipitomaculata pahasapae*	---
Bullsnake	*Pituophis melanoleucas sayi*	---
Common garter snake	*Thamnophis sirtalis*	---
Eastern yellowbelly racer	*Coluber constrictor*	---
Pale milk snake	*Lampropeltis triangulum multistriata*	---
Smooth green snake*	*Liochlorophis vernalis*	---
Western terrestrial (wandering) garter snake	*Thamnophis elegans*	---

[1] POTENTIAL OCCURRENCE—list derived from range and habitat information in South Dakota Game Fish and Parks (2016), Kiesow (2006), and South Dakota Natural Heritage Program (2018).

[2] Species in **bold** indicate USFS Sensitive Species for the Rocky Mountain Region – Region 2 (2023).

Underlined species are Black Hills National Forest Species of Local Concern (2005).

Species with * are rare species tracked by the South Dakota Natural Heritage Program (2018).

References for Potential and Observed Species Lists (Appendix I)

All Species

Sharps, J. C., and T. A. Benzon. 1984. *A Compiled List of South Dakota Wildlife.* South Dakota Department of Game, Fish, and Parks. Rapid City, SD.

South Dakota Game Fish and Parks. 2016. State and Federally Listed Threatened, Endangered and Candidate Species Documented in South Dakota by County. Updated July 19, 2016. Available: https://gfp.sd.gov/userdocs/docs/ThreatenedCountyList.pdf. Accessed August 20, 2024.

South Dakota Natural Heritage Program. 2018. Rare Animals of South Dakota. South Dakota Game, Fish, and Parks. Pierre, SD. Available: https://gfp.sd.gov/rare-animals/. Accessed: August 20, 2024.

U.S. Forest Service (USFS). 2005. Process for Identifying Wildlife and Plant Species of Local Concern and Results, Black Hills National Forest Phase II Plan Amendment. April. Available: https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5151694.pdf. Accessed: August 20, 2024. Appendices available: https://www.fs.usda.gov/detail/blackhills/landmanagement/?cid=stelprdb5151692. Accessed: October 22, 2024.

_____. 2023. *Sensitive Species for the Rocky Mountain Region (Region 2).* Available: https://www.fs.usda.gov/detail/r2/landmanagement/?cid=stelprdb5390116. Accessed: August 20, 2024.

Mammals

Burt, W. H., and R. P. Grossenheider. 1976. A field guide to the mammals. Houghton Mifflin Company, Boston. 284pp.

Clark, T. W., and M. R. Stromberg. 1987. Mammals in Wyoming. Univ. of Kansas, Museum of Natural History, Lawrence, KS. 214pp.

Jones Jr., J.K, D.M. Armstrong, RS. Hoffmann, and C. Jones. 1983. Mammals of the northern Great Plains. University of Nebraska Press, Lincoln, NE.

Avian

Peterson, R. T. 2020 Field Guide to Birds of Western North America. Houghton Mifflin Co., Boston. 480 pages.

Robbins, C. S., B. Bruun, and H. S. Zim. 2001. Birds of North America: A guide to field identification. Golden Press, New York. 360pp.

Stokes, D.W., and Stokes, L.Q. 2013. Field guide to birds: western region. Little, Brown and Co., New York.

Amphibians and Reptiles

Kiesow, AM. 2006. Field Guide to Amphibians and Reptiles of South Dakota. South Dakota Game, Fish and Parks. Pierre, SD.

Appendix II
Vertebrate Species of Concern

Table II-1. Current Federal (U.S. Fish and Wildlife Service Listing within Fall River County, SD [USFWS 2021a]), Clean Nuclear Energy Corp. October Jinx IPaC Report (USFWS 2024), and State Vertebrate Species of Concern (SDNHP 2018) that potentially occur in Fall River County, SD

Common Name (Latin Name)	Federal Status, State Status, State Rank†
Birds	
American dipper (*Cinclus mexicanus*)	L, ST, S2B
American goshawk (*Accipiter gentilis*)	R2, S3B
American three-toed woodpecker (*Picoides dorsalis*)	S2B
Baird's sparrow (*Ammodramus bairdii*)	S2B
Bald eagle (*Haliaeetus leucocephalus*)	S4B
Black-and-white warbler (*Mniotilta varia*)	L, S1B
Black-backed woodpecker (*Picoides arcticus*)	R2, S2B
Black tern (*Chlidonias niger*)	R2
Blue-gray gnatcatcher (*Polioptila caerulea*)	S2B
Broad-winged hawk (*Buteo platypterus*)	L
Brewer's sparrow (*Spizella breweri*)	R2
Burrowing owl (*Athene cunicularia*)	R2
Brown creeper (*Certhia americana*)	S2B
Cassin's finch (*Haemorhous cassinii*)	S1B
Cassin's sparrow (*Peucaea cassinii*)	R2
Chestnut-collared longspur (*Calcarius ornatus*)	R2
Clark's nutcracker (*Nucifraga columbiana*)	S2B
Common poorwill (*Phalaenoptilus nuttallii*)	S1B
Cooper's hawk (*Accipiter cooperii*)	L
Ferruginous hawk (*Buteo regalis*)	R2, S3B
Golden eagle (*Aquila chrysaetos*)*	O, S3B
Grasshopper sparrow (*Ammodramus savannarum*)	R2, O
Great blue heron (*Ardea herodias*)	S4B
Lark bunting (*Calamospiza melanocorys*)	R2, O
Lewis's woodpecker (*Melanerpes lewis*)	R2, S2B
Loggerhead shrike (*Lanius ludovicianus*)	R2
Long-billed curlew (*Numenius americanus*)	R2
Long-eared owl (*Asio otus*)	S3B
Merlin (*Falco columbarius*)	SUB
Northern harrier (*Circus cyaneus*)	R2
Northern mockingbird (*Mimus polyglottos*)	S1B
Northern saw-whet owl (*Aegolius acadicus*)	L, S2B
Olive-sided flycatcher (*Contopus cooperi*)	R2
Osprey (*Pandion haliaetus*)*	ST, S3B
Pinyon jay (*Gymnorhinus cyanocephalus*)	R2, O
Prairie falcon (*Falco mexicanus*)	O, S3, S4B
Purple martin (*Progne subis*)	R2
Pygmy nuthatch (*Sitta pygmaea*)	L, S1B
Red-headed woodpecker (*Melanerpes erythrocephalus*)*	O

Common Name (Latin Name)	Federal Status, State Status, State Rank†
Rufa red knot (*Calidris canutus rufa*)	FT
Ruffed grouse (*Bonasa umbellus*)	C
Sharped-shinned hawk (Accipiter striatus)	L, S3B
Short-eared owl (*Asio flammeus*)	R2
Thick-billed longspur (*Rhynchophanes mccownii*)	R2
Virginia's warbler (*Leiothlypis virginiae*)	R2
Whooping crane (*Grus americana*)	FE, SE, SZA
Mammals	
Black-footed ferret (*Mustela nigripes*)	FE, SE, S1
Black-tailed prairie dog (*Cynomys ludovicianus*)	R2
Fringe-tailed bat (*Myotis thysanodes pahasapensis*)	R2, S2
Hoary Bat	R2
Long-eared myotis (*Myotis evotis*)	L
Long-legged myotis (*Myotis volans*)	L
Meadow jumping mouse (*Zapus hudsonius campestris*)	L
Northern flying squirrel (*Tamias minimus var. pallidus*)	L
Northern long-eared bat (*Myotis septentrionalis*)	FT, L
Northern river otter (*Lontra canadensis*)	R2, S2
Silver-haired bat (*Lasionycteris noctivagans*)*	L, S4
Small-footed myotis (*Myotis ciliolabrum*)	L
Spotted bat (*Euderma maculatum*)	R2
Swift fox (*Vulpes velox*)	R2, ST, S3
Townsend's big-eared bat (*Corynorhinus townsendii*)*	R2, S2, S3
Amphibians and Reptiles	
Black Hills redbelly snake (*Storeria occipitomaculata pahasapae*)	S3
Northern Leopard Frog (*Rana pipiens*)	R2
Sagebrush lizard (*Sceloporus graciosus*)	S2
Smooth green snake (*Opheodrys vernalis*)	S4
Fishes	
Blacknose shiner (*Notropis heterolepis*)	SE, S1
Finescale dace (*Chrosomus neogaeus*)	SE, S1
Longnose sucker (*Catostomus catostomus*)	ST, S1
Sturgeon chub (*Macrhybopsis gelida*)	ST, S2

*Species recorded during the 2024 baseline surveys.

FC Federally listed, candidate

FE Federally listed, endangered

FT Federally listed, threatened

L U. S. Forest Service Black Hills National Forest Species of Local Concern (2005)

O Listed for the area in the U.S. Fish and Wildlife Service Information Planning and Conservation report (2024), due to species listing in the migratory Birds of Conservation Concern Report for the region (2021b).

R2 U. S. Forest Service Region 2 Sensitive Species List (2023)

SE State Endangered

ST State Threatened

† State Rank: Separate rank given for breeding (B) and nonbreeding (N) seasons (if different).

S1 Critically imperiled because of extreme rarity (five or fewer occurrences or very few remaining individuals) or because of some factor(s) making it especially vulnerable to extinction within South Dakota.

S2 Imperiled because of rarity (six to 20 occurrences or few remaining individuals) or because of some factor(s) making it very vulnerable to extinction throughout its range within South Dakota.

S3 Either very rare and local throughout its range within South Dakota or found locally (even abundantly at some of its locations in a restricted range) or vulnerable to extinction throughout its range because of other factors (in the range of 21 to 100 occurrences).

S4 Apparently secure within South Dakota, though it may be quite rare in parts of its range, especially at the periphery; cause for long-term concern.

SZ No definable occurrences for conservation purposes, usually assigned to migrants.

References for Vertebrate Species of Concern (Appendix II)

All Species

South Dakota Game Fish and Parks. 2016. State and Federally Listed Threatened, Endangered and Candidate Species Documented in South Dakota by County. Updated July 19, 2016. Available: https://gfp.sd.gov/userdocs/docs/ThreatenedCountyList.pdf. Accessed August 20, 2024.

South Dakota Natural Heritage Program. 2018. Rare Animals of South Dakota. South Dakota Game, Fish, and Parks. Pierre, SD. Available: https://gfp.sd.gov/rare-animals/. Accessed: August 20, 2024.

U.S. Fish and Wildlife Service (USFWS). 2021a. *South Dakota Listed Species by County List. Updated February 12, 2021.* Available: https://www.fws.gov/sites/default/files/documents/SpeciesByCounty_Feb2021.pdf. Accessed: August 20, 2024.

_____. 2021b. Birds of Conservation Concern 2021. Falls Church, VA: United States Department of Interior, Fish and Wildlife Service, Migratory Birds. Available: https://www.fws.gov/media/birds-conservation-concern-2021pdf. Accessed: August 20, 2024.

_____. 2024. *Information for Planning and Conservation Trust Resource Report, October Jinx Study Area.* IPaC v3.0.0. Available: https://ipac.ecosphere.fws.gov. Accessed: August 20, 2024.

U.S. Forest Service (USFS). 2005. Process for Identifying Wildlife and Plant Species of Local Concern and Results, Black Hills National Forest Phase II Plan Amendment, Appendices G, H, and I. April. Available: https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5151694.pdf. Accessed: August 20, 2024. Appendices Available: https://www.fs.usda.gov/detail/blackhills/landmanagement/?cid=stelprdb5151692. Accessed October 22, 2024.

_____. 2023. *Sensitive Species for the Rocky Mountain Region (Region 2).* Available: https://www.fs.usda.gov/detail/r2/landmanagement/?cid=stelprdb5390116. Accessed: August 20, 2024.

Appendix III
Representative Photographs from the Clean Nuclear Energy Corp. October Jinx Study Area

Photo 1

Stock tank in grassland habitat.

Photo 2

Tree snag with exfoliating bark and cavities in ponderosa pine habitat.

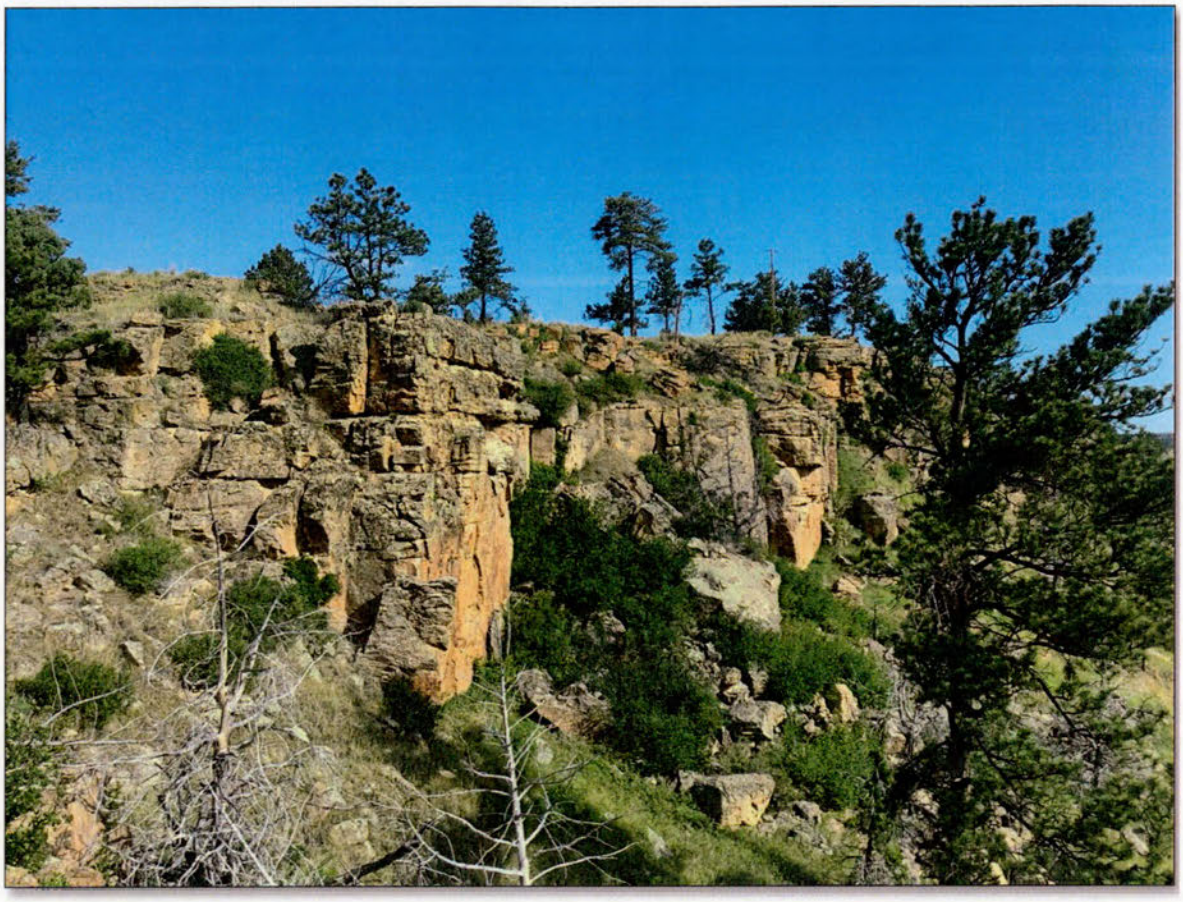


Photo 3

Rock outcrop with crevices on the west rim of Craven Canyon.

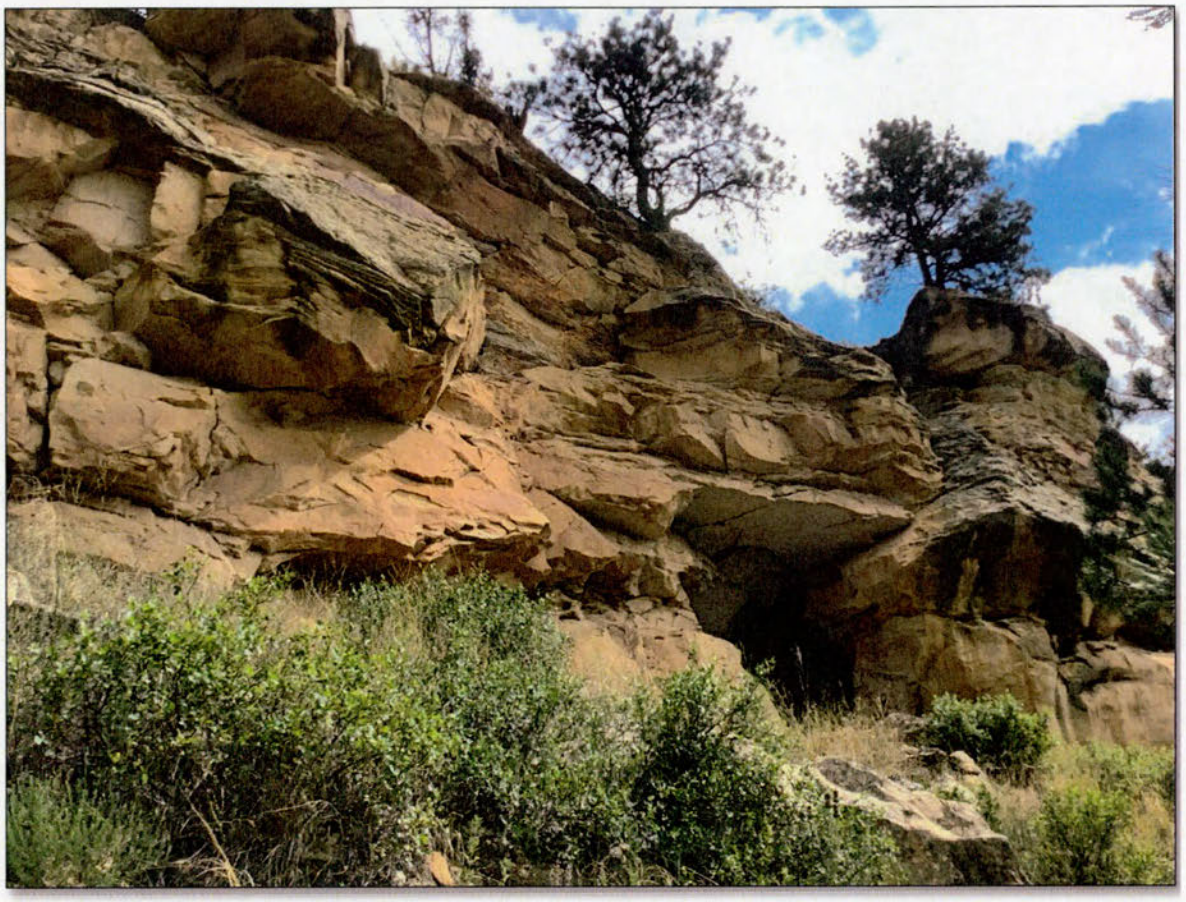


Photo 4

Rock outcrop with shallow cave in bottom of Craven Canyon.

Photo 5

Riparian-grassland habitat in bottom of Craven Canyon.

Photo 6

Tree snag with exfoliating bark and cavities in area previously burned by wildfire.