

State of Colorado
Oil and Gas Conservation Commission

1120 Lincoln Street, Suite 801, Denver, Colorado 80203 (303)894-2100 Fax:(303)894-2109



#6102

FOR OGCC USE ONLY

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9/1/2011

SITE INVESTIGATION AND REMEDIATION WORKPLAN

This form shall be submitted to the Director for approval prior to the initiation of site investigation and remediation activities. Form 27 is intended to be used whenever possible. Additional documentation will be required when large volumes of soil and groundwater have been impacted or involve large facilities with multiple source areas. See Rule 910. Attach as many pages as needed to fully describe the proposed work.

CAUSE OF CONDITION BEING INVESTIGATED AND REMEDIATED

☐ Spill or Release ☐ Plug & Abandon ☐ Central Facility Closure ☐ Site/Facility Closure ☒ Other (describe): Facility liner removal

OGCC Employee:

☐ Spill ☐ Complaint
☐ Inspection ☐ NOAV

Tracking No:

OGCC Operator Number: 10163

Name of Operator: Nonsuch Natural Gas Inc.

Address: P.O. Box 110066

City: Naples State: FL Zip: 34108

Contact Name and Telephone:

David Lee - President

No: (239) 289-9046

Fax: (239) 594-1422

API Number: 05-045-07948-00

County: Garfield (045)

Facility Name: CSOC 697-14 1

Facility Number: 279253

Well Name: CSOC 697-14

Well Number: 1

Location: (QtrQtr, Sec, Twp, Rng, Meridian): SE SW 14 T6S R9TW 6 Latitude: Longitude:

TECHNICAL CONDITIONS

Type of Waste Causing Impact (crude oil, condensate, produced water, etc): Liner

Site Conditions: Is location within a sensitive area (according to Rule 901e)? ☒ Y ☐ N If yes, attach evaluation.

Adjacent land use (cultivated, irrigated, dry land farming, industrial, residential, etc.): Ranch land

Soil type, if not previously identified on Form 2A or Federal Surface Use Plan:

Potential receptors (water wells within 1/4 mi, surface waters, etc.): springs

COGCC determined within sensitive area, due to impacts to springs

Description of Impact (if previously provided, refer to that form or document):

Impacted Media (check):

Extent of Impact:

How Determined:



Soils

(See previous reports)

Soil Analytical Results



Vegetation



Groundwater



Surface Water

REMEDIATION WORKPLAN

Describe initial action taken (if previously provided, refer to that form or document):

The facility was closed with the synthetic liner in place without surface owner approval. The facility will be excavated using a trackhoe and the synthetic liner will be removed for disposal at an appropriate disposal facility.

Describe how source is to be removed:

The E&P wastes fabric liner, drill cuttings and dried muds will be excavated from the facility in September 2011, as weather permits. These wastes will be stockpiled onsite, pending analytical results. Two composite waste samples will be collected and analyzed for TPH and other analyses described in the work plan. At least four confirmation soil samples will be collected from beneath the liner in native soils and submitted for TPH and other analysis described in the work plan.

Describe how remediation of existing impacts is to be accomplished, including removal and disposal at an injection well or licensed facility, land treatment on site, removal of impacted groundwater, insitu bioremediation, burning of oily vegetation, etc.:

See attached Work Plan for details.



Tracking Number: _____
Name of Operator: _____
OGCC Operator No: _____
Received Date: _____
Well Name & No: _____
Facility Name & No: _____

Page 2

REMEDIATION WORKPLAN (Cont.)

OGCC Employee: _____

If groundwater has been impacted, describe proposed monitoring plan (# of wells or sample points, sampling schedule, analytical methods, etc.):

Groundwater is not expected to be encountered in the excavation of the former reserve pit based on groundwater levels reported from area groundwater monitoring wells and previous site work. If groundwater is encountered, a grab groundwater sample will be collected using a disposable bailer and it will be submitted for laboratory analysis for TPH.

Describe reclamation plan. Discuss existing and new grade recontouring; method and testing of compaction alleviation; and reseeding program, including location of new seed, seed mix and noxious weed prevention. Attach diagram or drawing. Use additional sheet for description if required.

The pit will be backfilled to grade and the soils will be returned to their original relative position. No more than de minimis amounts of the E&P wastes will be incorporated into the surface materials. The pit will be monitored for subsidence and additional soils will be added if subsidence occurs. The pit location will be maintained to prevent noxious weeds, and will be seeded with a native grass seed mix if applicable.

Attach samples and analytical results taken to verify remediation of impacts. Show locations of samples on an onsite schematic or drawing.

Is further site investigation required? ☐ Y ☒ N If yes, describe:

Final disposition of E&P waste (landtreated and disposed onsite, name of licensed disposal facility, recycling, reuse, etc.):

Before deposition of the pit materials, laboratory results will be reviewed and if the laboratory results indicate the materials exceed table 910-1 standards, the deposition or treatment of the materials will be evaluated. If the results indicate the soil meets the table 910-1 standard for TPH, the soil will be used to backfill the old pit excavation.

IMPLEMENTATION SCHEDULE

Date Site Investigation Began: _____ Date Site Investigation Completed: _____ Date Remediation Plan Submitted: _____
Remediation Start Date: September 2011 Anticipated Completion Date: October 2011 Actual Completion Date: _____

I hereby certify that the statements made in this form are, to the best of my knowledge, true, correct, and complete.

Print Name: David Lee

Signed: [Signature]

Title: President

Date: 8-30-2011

OGCC Approved: _____ Title: _____ Date: _____

NONSUCH NATURAL GAS, INC.

CSOC 697-14 #1

FACILITY #279253 EXCAVATION WORK PLAN

August 29, 2011

Prepared by:

Conestoga-Rovers & Associates

14998 West 6th Avenue Frontage Road #800

Golden, Colorado 80401

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1.0 INTRODUCTION

Conestoga-Rovers Associates (CRA) has been contracted by Nonsuch Natural Gas, Inc. to provide environmental services and site oversight for site reclamation associated with Facility #279253, which was located on the CSOC 697-14#1 pad. This Work Plan outlines the technical approach and procedures that will be used to remove the liner material and any impacted soil from the Facility #279253. The removal of the Facility #279253 materials will be conducted in two phases or using two separate excavations. The two phases are necessary due to safety concerns related to the space limitations on the pad. If the excavation was performed all at once, equipment access and management of the excavated materials would pose safety concerns due to limited site access (only one entrance to the site) and the narrow shape of the pad does not allow for ample room for the safe management of the excavated soil. The first phase will include excavation of the Facility #279253 materials from approximately 1/2 of the Facility #279253 (southwest area) or the area that is not covered by the present skim pit. The remaining 1/2 of the Facility #279253 (northeast area) will be excavated following completion of the backfilling of the southwestern 1/2 excavation. Removal of the existing skim pit fluids, liner and associated fencing and netting will be required prior to excavating the northeast area 1/2 of the Facility.

1.1 Site Location

The site is located two hours north of Rifle on the Roan Plateau in Garfield County, Colorado.

The pad is located in Sec. 14, T6S R97W within the Circle Dot Gulch 1:24,000 quadrangle (Figure 1). The Nonsuch CSOC 697-14 well pad is situated in bedrock within the Unita Formation.

1.2 Site Setting

The following sections discuss the lithology and the hydrogeologic characteristics of the area. Groundwater is not encountered at the site. Fractures are found in siltstone is found beneath the site.

1.2.1 Geology

The site is located on the eastern edge of the Piceance Basin, an elongate geologic structural depression, oriented northwest to southeast. The Piceance basin is surrounded by uplifts and other structural geologic features that include the Grand Hogback, the Axial Basin Arch, and Yampa Plateau to the northeast and north, the Douglas Creek Arch and Uncompahgre Uplift to the west and southwest, and the Gunnison Uplift and White River Uplift to the south and southeast. The Roan Cliffs delimit the southern extent of this province and the Roan Plateau rises to an elevation of almost 9,000 feet above sea level.

The Roan Plateau is capped by the Tertiary age Uinta Formation, and the cliffs expose hundreds of feet of the Tertiary age Green River Formation and some of the underlying Tertiary age Wasatch Formation. The Green River Formation is valued as a potential resource for its kerogen bearing marlstone, commonly known as “oil shale.” Much of the groundwater resource knowledge has been gained from interest in oil shale development.

1.2.2 Hydrogeology

The Uinta Formation and the upper part of the Green River Formation comprise the Upper Piceance Basin Aquifer. Sandstone and fractured siltstone of the Uinta Formation and the fractured

marlstone and solution cavities in the upper Green River Formation are able to store and transmit groundwater to area wells. The Lower Piceance Basin aquifer includes fractured marlstone and leached section of the lower part of the Parachute Creek Member of the Green River Formation. The Upper Piceance Basin aquifer and Lower Piceance Basin aquifer are separated by the Mahogany confining unit which is located in the upper one-third of the Parachute Creek Member and is the most consistently rich and aerially extensive interval of oil shale in the Piceance Basin. The Mahogany confining unit thickness averages 160 feet.

The lower part of the Green River Formation and underlying Wasatch Formation form a basal confining unit. The upper and lower aquifer units are bound on the north by the White River and to the south by the Colorado River, while the basal confining unit is present throughout most of the structural Piceance Basin. This basal confining unit is exposed at the land surface in the vicinity of the town of Rifle, Colorado.

The Colorado River, Government Creek, and the East Fork of Parachute Creek control the surface water hydrology in the area around Rifle and the area to the north and northwest. There are areas with deeply incised drainages cut into the Upper and Lower Piceance Basin aquifers and underlying confining members. Springs form where these units crop out and provide recharge to area streams.

The Nonsuch CSOC 697-14 well pad is situated in bedrock within the Uinta Formation. Based on oil shale cores and the elevation of Spring 2, the top of the Mahogany member of the Green River formation (Hail, 1982), the Prather Spring and the Nonsuch CSOC 697-14 well pad are located along a topographically high ridge which defines a surface watershed divide between tributaries to Parachute Creek towards the east and Clear Creek towards the west (Figure 2). The trend of the topographic high is coincident with the axial trace of a mapped anticline.

1.3 Site History

Nonsuch purchased the site on December 16, 2005. In August 2006, Nonsuch excavated an existing drilling fluids pit, and enlarged and lined the pit for the purpose of containing fracture fluids and produced water (COGCC Facility #279253). All fluids were removed from Facility #279253 in May/June 2008 and this facility was closed, leaving the facility liner in place.

There has been some conflicting information concerning the dimensions and location of the Facility #279253. An aerial photograph of the well site taken while the Facility #279253 was still open shows that the Facility #279253 may have measured approximately 50 feet wide by 80 feet long with its longitudinal axis aligned NE to SW beginning at a point southwest of the above ground storage tanks (ASTs) that are located on the site. Information from field personnel who constructed the current skim pit concur that the current skim pit was constructed within the northeast end of Facility #279253. Subsequently, the field investigation conducted in October 2010 confirmed the outline of the southwestern edge of Facility #279253 as shown in Figure 3. The liner and stained materials from the Facility #279253 were found in trenches located southwest of the skim pit and extending to an area near the well. Therefore, Nonsuch believes the northeast edge of the present skim pit location is conterminous to the northeast edge of the Facility #279253. The Facility #279253 dimensions are estimated to be approximately 50 feet wide by 80 feet long by 20 feet deep (Figure 3).

1.4 Previous Investigations

Since 2008, a soil gas survey, subsurface soil sampling and groundwater sampling have been conducted at the site to characterize any impacts associated with the former Facility #279253.

In 2008, a soil gas survey was conducted on the Nonsuch 697-14 Well Pad to evaluate vapor concentrations of benzene, toluene, ethylbenzene, xylenes (BTEX) and various other hydrocarbon compounds that may be related to Facility #279253 that was located at the pad. A total of seven vapor samples were collected for mobile laboratory analysis. The laboratory results for the soil vapor samples indicated various target compounds including benzene, toluene, and xylenes, as well as several tentatively identified hydrocarbon compounds. All of the soil vapor samples were collected above the liner. The results of the soil gas survey indicated that the Facility #279253 was located slightly north and east of the well. At the time of this soil gas survey, one groundwater sample was collected and the laboratory analysis showed a benzene concentration of 29 µg/l. The water found at this location is assumed to be water contained in Facility #279253 and was not encountered again in subsequent sampling attempts.

On September 27, 2010, three trenches were excavated with a trackhoe to locate the Facility #279253 in the area north and west of the present location of the skim pit (Figure 3). The laboratory analyses of the Facility #279253 materials above the liner indicated TPH soil concentrations ranging from approximately 50 mg/kg to 750 mg/kg. Below the liner the soil concentration did not exceed 50 mg/kg TPH.

The first trench, T1, was excavated on the northwest edge of the well pad and north of the present location of the skim pit. The trench was excavated to a total depth of 13 feet-below the ground surface (ft-bgs), where refusal by the excavator was encountered in the bedrock. The trench showed only fill material consisting of gravel to cobble size rock mixed with silt and clay above siltstone bedrock. There were no volatiles or staining observed in the excavation. The Facility #279253 liner was not encountered in this trench.

A second trench, T2, was excavated on the southwest side of the present skim pit location to a total depth of approximately 20 ft-bgs, where excavator refusal was encountered in the bedrock (Figure 3). The trench was excavated from the north to the south, in close proximity to the fence, and on the southwest side of the current skim pit. The materials that were encountered included fill material consisting of rock mixed with silt and clay above siltstone bedrock. The Facility #279253 was encountered in this excavation and was noticeable due to the presence of the liner fabric and gray stained soil.

The third trench, T3, was excavated southwest of the T2 trench and excavated to approximately 20 ft-bgs, where excavator refusal was encountered in the bedrock (Figure 3). The materials that were encountered included fill material consisting of rock mixed with silt and clay overlying siltstone bedrock. The Facility #279253 and associated liner were encountered in only a portion of this excavation.

2.0 EXCAVATION TECHNICAL APPROACH AND PROCEDURES

This section describes the technical approach and procedures for the excavation of the Facility #279253 materials.

2.1 Documentation

All information collected during the field activities will be documented in such a manner that it can be easily transferred and interpreted by those not familiar with the field activities being conducted for the excavation. In accordance with this goal, bound field logbooks will be maintained throughout the field activities. Each page will be legible when copied and written using an indelible-ink pen for all records. The pages in the logbook will be dated, numbered and initialed by the recorder. All field data such as sample id, sample date and time, sample location, total excavation depth, presence of free product/sheen, soil vapors, soil conditions and any other qualitative observations will be documented in the field log book. In addition to the field data, general information will also be recorded, such as equipment used, equipment calibration records, daily weather conditions, personnel on site, site safety meetings and any anomalies that may occur during field activities.

2.2 Utility Locates

Prior to the initiation of excavation activities, CRA will call Nonsuch and the Colorado One Call and arrange for buried pipelines and utilities to be located and marked in the area.

2.3 Health and Safety Plan and Job Safety Analysis

The project health and safety plan includes a discussion of the drilling and sampling activities. A copy of the health and safety plan will be kept onsite during all field activities. CRA will conduct daily health and safety “tailgate” meetings prior to the initiation of any field activities. A daily Job Safety Analysis (JSA) will be completed to evaluate potential safety risks associated with the drilling activities.

2.4 Excavation Approach and Procedures

Based on results from the soil gas survey and associated probe refusals conducted in 2008, available aerial photos, interviews with site personnel and the excavation activities conducted in 2010, the Facility #279253 had an estimated pit dimension of approximately 50 feet wide by 80 feet long by 20 feet deep and is located as shown in Figure 3. Based on these site activities, it appears that up to ½ of the Facility #279253 may be buried beneath the current skim pit.

For the removal of the Facility #279253 materials, approximately ½ of Facility #279253 (southwestern portion of Facility #279253) will be excavated beginning at a safe distance from the skim pit area and continuing in a southwest direction (Figure 3). This will allow for approximately ½ of Facility #279253 materials to be excavated safely. As the materials are removed, the liner or fabric material will be separated from the soil and collected for disposal at an appropriate. The other half of Facility #279253 (northeastern portion) materials, which is presently covered by the active skim pit, will be removed following the analysis of a the soil samples collected from the southwestern portion of Facility #279253 and the completion of the backfilling activities of this excavation. Prior to the initiation of excavation activities, the fluids will be removed and placed into a covered AST. The well fluids will be redirected to the AST.

For both excavations, the excavated materials from the buried pit will be removed and temporarily managed on site until the laboratory results are received. If the laboratory results indicate that the soil is below the Table 910-1 standards, the removed soil will be used for backfilling of the excavation. If the results indicate the soil is above the Table 910-1 standards, appropriate disposition or treatment options will be determined.

A track hoe will be used to excavate the pit materials. The excavation will continue to a depth of approximately 20 feet below ground surface or to below Facility #279253 materials and into one to two vertical feet of native material beneath the bottom of the liner. If necessary the excavation may be benched to allow for removal of Facility #279253 materials to depth. The materials from the excavation will be screened with a photo-ionizing detector (PID) to preliminarily assess soil impacts. The materials will be temporarily stockpiled on plastic sheeting.

Due to the potential safety hazards associated with entering the excavation in unconsolidated soils, samples will be collected using the excavator bucket. Due to limitations of safety in entering the excavation, no one will be allowed to enter the excavation at any time to collect soil samples. One composite sample will be obtained from the materials above the liner from each ½ of Facility #279253 excavations for a total of two composite samples of the fill materials. The narrow nature of the pad and the depth of excavation will make sidewall sampling difficult and/or dangerous. If practicable and safe, Nonsuch will attempt to take discrete sidewall samples; if site conditions or safety concerns make that impracticable, Nonsuch will use its best efforts to obtain sidewall composite samples. One discrete or composite sample will be acquired from each end of the short side of the excavation side walls of Facility #279253 and three samples (composite or discrete) will be obtained from each long end of the sidewalls. A total of eight (8) soil samples will be collected from the entire Facility #279253 excavation sidewalls. From below the liner or in native materials below Facility #279253 a total of four (4) discrete soil samples will be obtained with 2 collected from each half of the excavations. The rationale for collecting all samples will be noted in field notebooks and reported. All samples will be split with one split sample field-screened using the standard headspace method for analysis of volatile organic compounds (VOCs) using a PID. The remaining sample split will be submitted for laboratory analyses.

All soil samples will have GPS locations determined as required by Section 215 of the COGCC regulations. The depth of each sample will be measured using a tape measure, and the GPS location and depth of each sample will be noted in a field notebook. The excavation will be photographed along its entire length and depth, and a log describing the excavations will be prepared by a geologist. Digital photographs will attempt to capture observed soil and bedding contacts, staining and all sampling locations.

The results of the excavation samples will be compared to background soil sample analyses from samples collected from non-impacted native soils on September 22, 2010 (Table 1).

2.5 Analytical Program

Soil samples will be analyzed for TVPH by Method 8015M, TEPH by Method 8015M, chloride and sulfate by Method 300, bicarbonate by Method 2320B, electrical conductivity by Method 2510B, sodium, potassium, calcium, and magnesium by Method 6010B and sodium adsorption ratio (SAR) by USDA Method 60. The samples will be analyzed by Accutest Laboratories of Houston, TX.

2.6 Quality Assurance/Quality Control

Quality assurance/quality control measures will be followed according to industry-accepted standards. The PID will be calibrated daily when in use with 100 ppm Isobutylene and the calibration will be recorded in the logbook. One duplicate sample will be collected for laboratory analyses.

A trip blank will be included in each cooler shipped to the laboratory and analyzed for BTEX. A temperature trip blank will be included with each submitted cooler and used to determine temperature at the time of submission to the lab.

3.0 REPORTING

An excavation report describing the excavation and the results of the soil sampling will be submitted within 45 days of receipt of all laboratory reports. This report may include recommendations for any additional excavation and remediation options that may be required as a result of this effort.

4.0 SCHEDULE

The activities for the removal the liner and any impacted soil from Facility #279253 will be initiated in September 2011. The southwestern portion of Facility #279253 or the portion of Facility #279253 not currently overlaid by the skim pit will be excavated initially. The remaining portion of Facility #279253 will be excavated immediately following completion of backfilling of the southwestern portion of Facility #279253.

TABLE

Table 1 - Summary of Detections for the Background Soil Samples at Nonsuch Pad 14

Sample ID:		14 BG-1	14 BG-2	14 BG-3
Date Sampled:		9/22/2010	9/22/2010	9/22/2010
Matrix:		Soil	Soil	Soil
GC/MS Volatiles (SW846 8260B)				
Methylene chloride	ug/kg	ND (2.5)	ND (2.3)	2.7 J ^a
Tetrachloroethylene	ug/kg	22.1	ND (0.74)	ND (0.80)
Toluene	ug/kg	1.8 J	ND (0.91)	ND (0.98)
GC/MS Semi-volatiles (SW846 8270C)				
	ug/kg	ND	ND	ND
GC Volatiles (SW846 8015)				
TPH-GRO (C6-C10)	mg/kg	ND (0.36)	ND (0.36)	ND (0.35)
GC Semi-volatiles (SW846 8015 M)				
TPH (C10-C28)	mg/kg	12.6	14.6	8.28
Metals Analysis				
Arsenic	mg/kg	5.6	8.8	8.3
Barium	mg/kg	315	374	500
Cadmium	mg/kg	<0.33	<0.32	<0.29
Calcium	mg/l	1390	829	1760
Chromium	mg/kg	29.4	29.5	30.8
Lead	mg/kg	14.7	14.3	13.4
Magnesium	mg/l	177	126	201
Mercury	mg/kg	0.019	0.019	0.025
Selenium	mg/kg	1.2	1.2	1.2
Silver	mg/kg	<0.66	<0.64	<0.58
Sodium	mg/l	153	<25	52.8
General Chemistry				
Sodium Adsorption Ratio	ratio	1.03 ^b	0.167 ^b	0.318 ^b
Solids, Percent	%	90.1	90.8	91.9
Specific Conductivity	umhos/cm	64.6	39.6	78.8
pH	su	7.22	7.07	7.58
Footnotes:				
^a Suspected laboratory contaminant.				
^b Calculated as: (Na meq/L) / sqrt [(Ca meq/L)+(Mg meq/L)/2]				

FIGURES

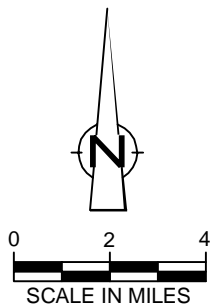
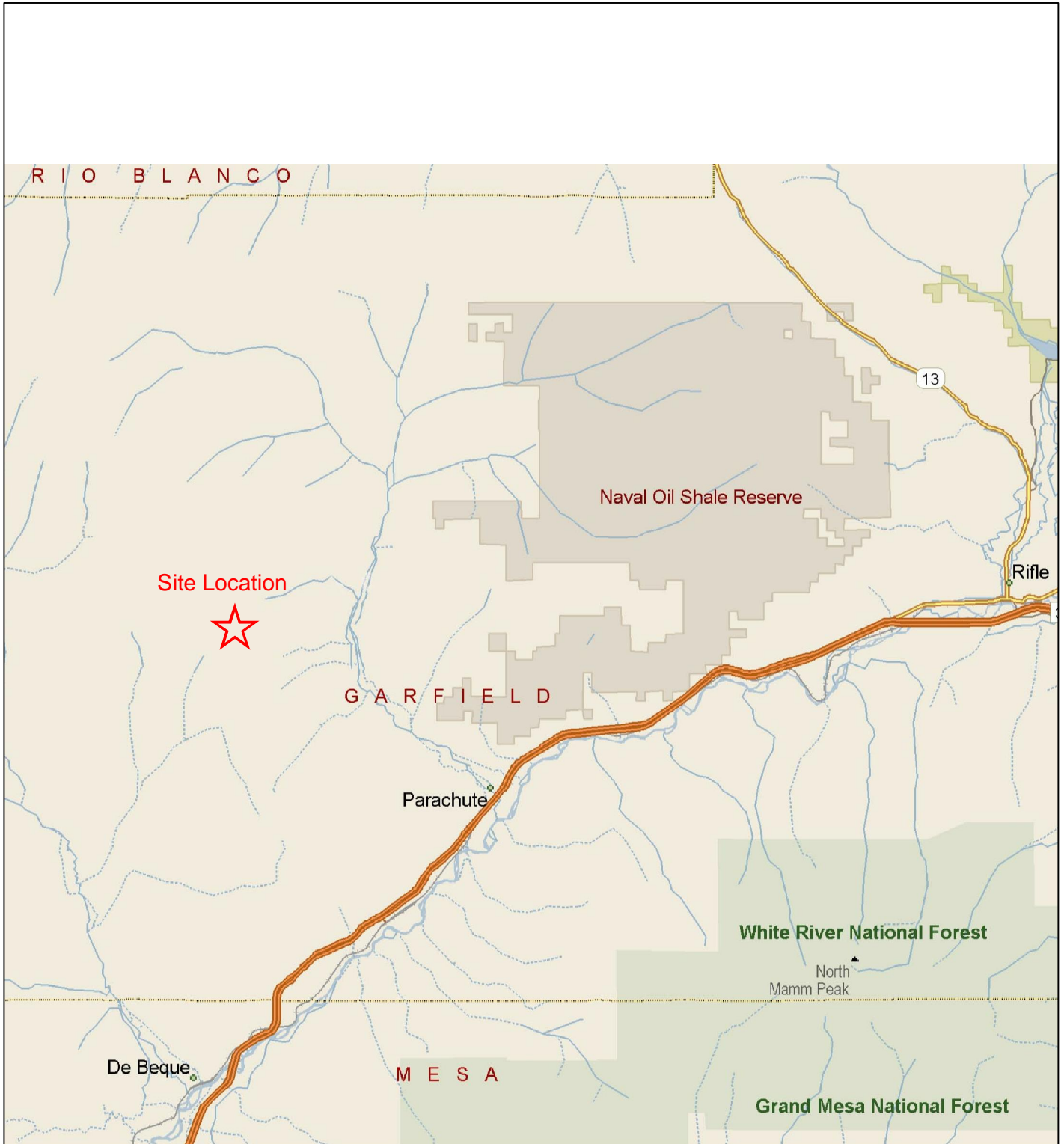
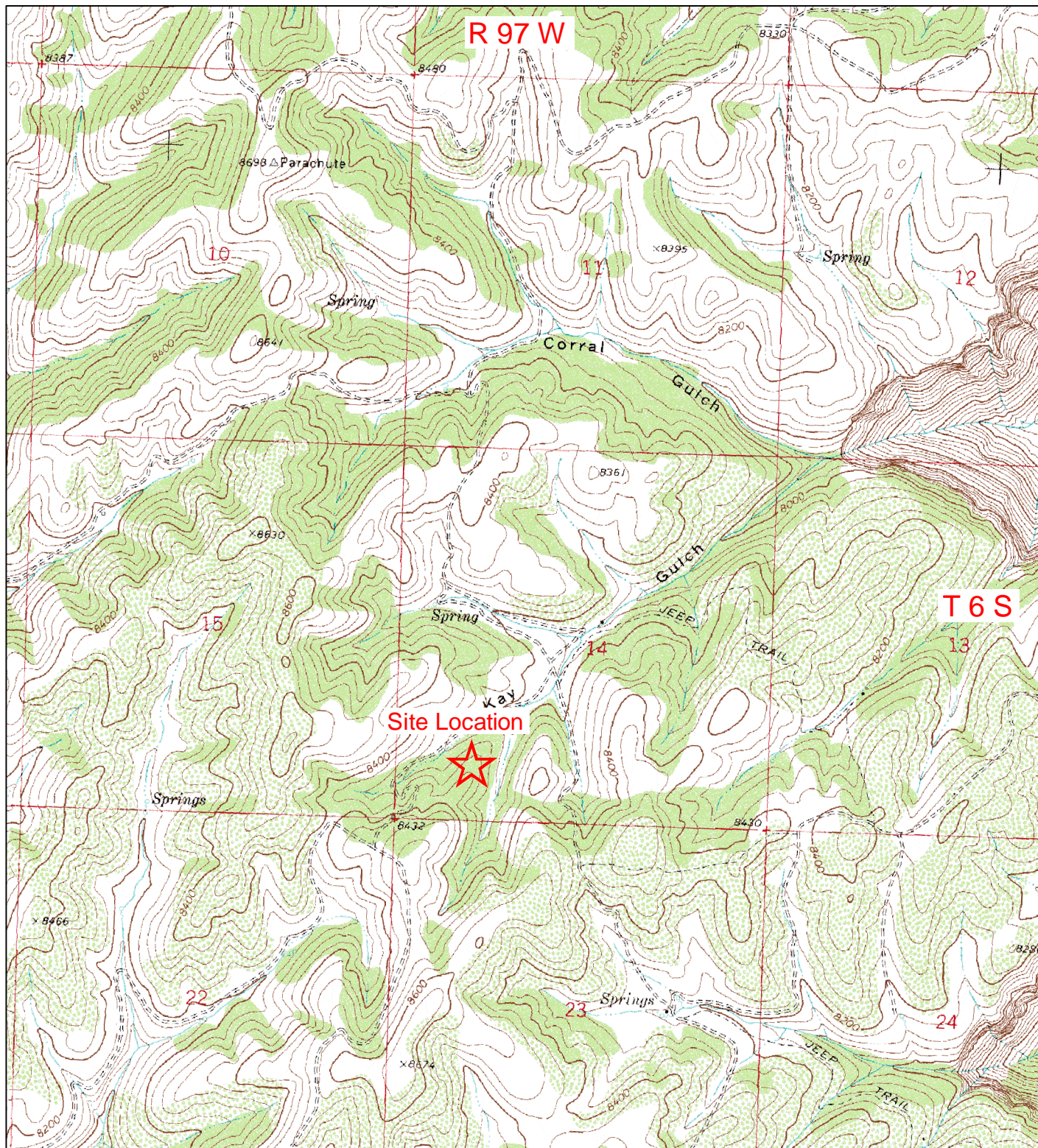


Figure 1
GENERAL LOCATION
NONSUCH
CSOC 697-14 #1 WELL PAD
GARFIELD COUNTY, COLORADO



SOURCE: USGS CIRCLE DOT GULCH 7.5 MINUTE QUADRANGLE

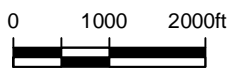
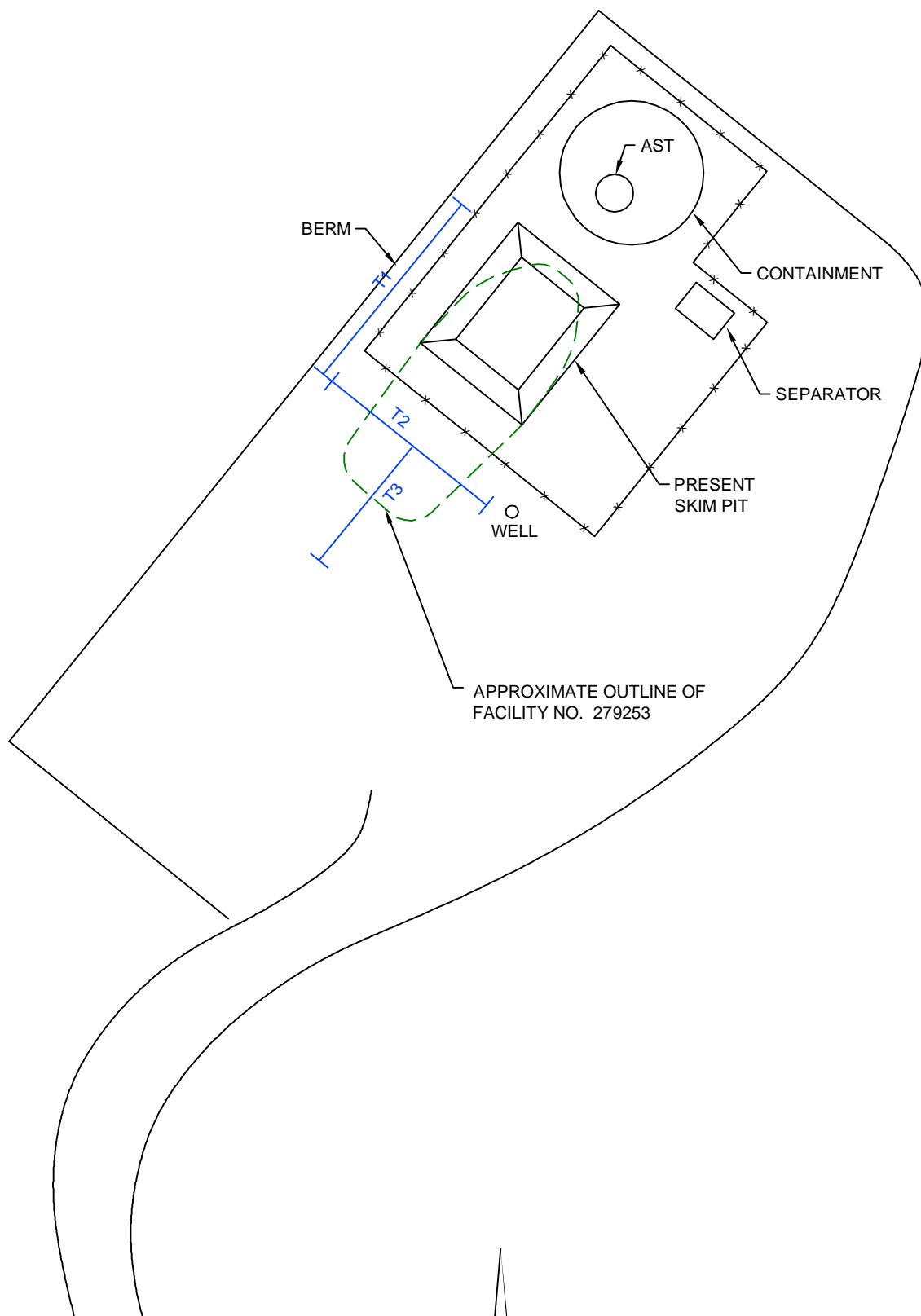


Figure 2

TOPOGRAPHIC MAP
NONSUCH

CSOC 697-14 #1 WELL PAD
GARFIELD COUNTY, COLORADO





LEGEND

— (T1) TRENCH LOCATION

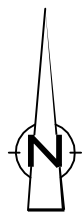


Figure 3

FACILITY NO. 279253 LOCATION
NONSUCH

CSOC 697-14 #1 WELL PAD
GARFIELD COUNTY, COLORADO