

State of Colorado
Energy & Carbon Management Commission

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403921902

Receive Date:

12/06/2024

Report taken by:

Kari Brown

Site Investigation and Remediation Workplan (Supplemental Form)

This form shall be submitted to the Director for approval prior to the initiation of site investigation and remediation activities. However, this shall not preclude the Operator from taking immediate action to protect public health or safety, the environment, wildlife, or livestock.

This Form 27 describes site conditions as currently understood by the Operator; approval of this Form 27 by ECOM is based on the site conditions accurately described herein; any changes in site conditions identified during or subsequent to the performance of the approved workplan may necessitate additional investigation or remediation which shall be described on a supplemental Form 27. This Form 27 is intended to provide basic information regarding the proposed site investigation and remediation actions, but the workplan may be more fully described in attached documentation.

Closure request is not available for an Initial Site Investigation and Remediation Workplan.

OPERATOR INFORMATION

Name of Operator: CUB CREEK ENERGY LLC	Operator No: 10542	Phone Numbers
Address: 200 PLAZA DRIVE SUITE 100		Phone: (303) 881-1530
City: HIGHLANDS RANCH	State: CO	Zip: 80129
Contact Person: Christian Combs	Email: christian.combs@1876resources.com	Mobile: (303) 881-1530

PROJECT, PURPOSE & SITE INFORMATION

PROJECT INFORMATION

Remediation Project #: 34474 Initial Form 27 Document #: 403710935

PURPOSE INFORMATION

- ☐ Rule 913.c.(1): Pit or Cuttings Trench closure.
- ☐ Rule 913.c.(2): Buried or partially buried vessel closure, which will be by removal.
- ☒ Rule 913.c.(3): Remediation of Spill and Releases pursuant to Rule 912.
- ☐ Rule 913.c.(4): Land treatment of Oily Waste pursuant to Rule 905.e.
- ☐ Rule 913.c.(5): Closure of Centralized E&P Waste Management Facilities pursuant to Rule 907.h.
- ☐ Rule 913.c.(6): Remediation of impacted Groundwater pursuant to Rule 915.e.(3).D, and the contaminant concentrations in Table 915-1.
- ☐ Rule 913.c.(7): Investigation and remediation of natural gas in soil or Groundwater.
- ☐ Rule 913.c.(8): When requested by the Director due to any potential risk to soil, Groundwater, or surface water.
- ☐ Rule 913.c.(9): Decommissioning of Oil and Gas Facilities.
- ☐ Rule 913.g: Changes of Operator.
- ☐ Rule 915.b: Request to leave elevated inorganics in situ.
- ☐ Other: _____

SITE INFORMATION

Yes Multiple Facilities

Facility Type: WELL	Facility ID: _____	API #: 123-47908	County Name: WELD
Facility Name: KNIGHT 9	Latitude: 40.197670	Longitude: -105.041970	
** correct Lat/Long if needed: Latitude: _____		Longitude: _____	
QtrQtr: SWNE	Sec: 30	Twp: 3N	Range: 68W
Meridian: 6	Sensitive Area? Yes		

Facility Type: SPILL OR RELEASE	Facility ID: 484447	API #: _____	County Name: WELD
Facility Name: Knight #9	Latitude: 40.197670	Longitude: -105.041970	
** correct Lat/Long if needed: Latitude: _____		Longitude: _____	
QtrQtr: SWNE	Sec: 30	Twp: 3N	Range: 68W
Meridian: 6	Sensitive Area? Yes		

SITE CONDITIONS

General soil type - USCS Classifications SP

Most Sensitive Adjacent Land Use Occupied building

Is domestic water well within 1/4 mile? No

Is surface water within 1/4 mile? No

Is groundwater less than 20 feet below ground surface? Yes

Other Potential Receptors within 1/4 mile

Five water well permits were identified within a 1/2-mile radius of the release; however, 3/5 well permits were listed as expired and the other two were listed as application denied. The closest constructed water well (Permit #12985) is a stock well located approximately 2,735 feet northeast of the release. The nearest surface water body and wetland were identified to be Calkins Lake located approximately 2,115 feet south of the release. High priority habitat identified by Colorado Parks and Wildlife is located approximately 1,700 feet south of the release. The nearest occupied building is located approximately 600 feet west of the release. Site Location map attached as Figure 1.

SITE INVESTIGATION PLAN

TYPE OF WASTE:

- ☒ E&P Waste ☐ Other E&P Waste ☐ Non-E&P Waste
- ☐ Produced Water ☐ Workover Fluids
- ☐ Oil ☐ Tank Bottoms
- ☒ Condensate ☐ Pigging Waste
- ☐ Drilling Fluids ☐ Rig Wash
- ☐ Drill Cuttings ☐ Spent Filters
- ☐ Pit Bottoms
- ☐ Other (as described by EPA)

DESCRIPTION OF IMPACT

Impacted?	Impacted Media	Extent of Impact	How Determined
Yes	SOILS	<900 sq ft	Field screening/analytical

INITIAL ACTION SUMMARY

Description of initial action or emergency response measures take to abate, investigate, and/or remediate impacts associated with E&P Waste.

At approximately 9:00pm (4/15/23), lease operator on location identified a spill on the Knight #9 well (photo attached to Form 27 #403710935). Within 5 minutes the Knight #9 well was shut in. Clean up to begin shortly. ***Correction, leak is associated with the Knight #12 wellhead line (remediation will continue to be reported under Knight #9 for consistency).

PROPOSED SAMPLING PLAN

Proposed Soil Sampling

- ☒ Will soil samples be collected as part of this investigation? (Number, type (grab/composite), analyses, and locations of samples):

Operator will install one source area and two cross-gradient GW monitoring wells to monitor dissolved-phase contaminants and ensure GW impacts are fully delineated (Figure 2). The source area monitoring well will be installed following excavation backfill. Soil will be logged and screened with a PID during MW installation; if staining, odor, or elevated PIDs are encountered, a soil sample will be collected from unsaturated soils and analyzed for Table 915-1 (organics, soil suitability, & metals). A soil sample will not be collected from the source area monitoring well as the vadose zone in this area will be composed of clean backfill material.

Proposed Groundwater Sampling

- ☒ Will groundwater samples be collected as part of this investigation? (Number, analyses, and locations of samples):

Operator will install one source area and two cross-gradient GW monitoring wells to monitor dissolved-phase contaminants and ensure GW impacts are fully delineated. A top-of-casing survey will be completed and cross-gradient GW monitoring wells will be installed perpendicular to GW flow. GW samples will be collected from all monitoring wells and submitted for full ECMC Table 915-1 & pH on a quarterly basis until four consecutive quarters indicate compliance with ECMC Table 915-1 standards/site-specific clean up levels.

Proposed Surface Water Sampling

- ☐ Will surface water samples be collected as part of this investigation? (Number, analyses, and locations of samples):

9/13/24, surface water sample SW01 was collected from the surface pond located approximately 700 feet upgradient of the release to evaluate dissolved and total barium. Laboratory analytical results indicated barium was elevated in the surface pond with dissolved barium at 35.6 ug/L and total barium at 32.1 ug/L. Following the collection of GW samples from MW-01, MW-02, MW-03, & MW-04, a second surface water sample (SW01) was collected from the surface pond on 11/15/24, and was submitted for laboratory analysis of TDS, chloride, & sulfate to investigate elevated concentrations observed in on-site monitoring wells. TDS, chloride, & sulfate results for SW01 will be reported on a Form 27 supplemental.

Additional Investigative Actions

- ☐ Additional alternative investigative actions described in attached Site Investigation Plan (summary):

SITE INVESTIGATION REPORT

SAMPLE SUMMARY

Soil

NA / ND

Highest concentration of TPH (mg/kg)

Number of soil samples collected 9

Number of soil samples exceeding 915-1 4

Was the areal and vertical extent of soil contamination delineated? Yes

Approximate areal extent (square feet) 900

-- 776.7

-- Highest concentration of SAR 19

BTEX > 915-1 No

Vertical Extent > 915-1 (in feet) 6

Groundwater

Number of groundwater samples collected 5

Was extent of groundwater contaminated delineated? No

Depth to groundwater (below ground surface, in feet) 6

Number of groundwater monitoring wells installed 4

Number of groundwater samples exceeding 915-1 2

-- Highest concentration of Benzene (µg/l) 356

ND Highest concentration of Toluene (µg/l)

-- Highest concentration of Ethylbenzene (µg/l) 207

ND Highest concentration of Xylene (µg/l)

NA Highest concentration of Methane (mg/l)

Surface Water

2 Number of surface water samples collected

0 Number of surface water samples exceeding 915-1

If surface water is impacted, other agency notification may be required.

OTHER INVESTIGATION INFORMATION

☐ Were impacts to adjacent property or offsite impacts identified?

☒ Were background samples collected as part of this site investigation?

Nine background samples were collected from three soil sample locations (BG01, BG02, & BG03 [Figure 4]) and analyzed for soil suitability, arsenic, barium, & selenium and two background soil samples (BG1876#1@0.5 & BG1876#2@0.5 [Figure 4]) were collected and analyzed for soil suitability and metals per ECMC Table 915-1. Site-specific clean up levels were established for boron, SAR, EC, pH, arsenic, barium, lead, & selenium (Analytical Tables). Future soil sample results will be compared to site-specific clean up levels established for boron, SAR, EC, pH, arsenic, barium, lead, & selenium.

Monitoring wells MW-01 and MW-04 installed upgradient (Figure 2) of the release were used to establish site-specific clean up levels for TDS, chloride, and sulfate (Analytical Tables).

☐ Was investigation derived waste (IDW) generated as part of this investigation?

Volume of solid waste (cubic yards)

Volume of liquid waste (barrels)

☒ Is further site investigation required?

Operator will excavate contaminated soil in the vicinity of SS-1, SS-2, SS-3, SS-4, and SS-6 (Figure 3) from the surface to GW (~6 feet bgs) for off-site disposal at an approved landfill and backfill with clean soil. Once field observation and PID readings indicate soil on the sidewalls of the excavation are no longer impacted, confirmation sidewall samples will be collected from the excavation to be submitted for full ECMC Table 915-1 analytes (organics, soil suitability, & metals).

Operator will install one source area and two cross-gradient GW monitoring wells to monitor dissolved-phase contaminants and ensure GW impacts are fully delineated (Figure 2). The source area monitoring well will be installed following excavation backfill. A top-of-casing survey will be completed and cross-gradient GW monitoring wells will be installed perpendicular to GW flow. GW samples will be collected from all monitoring wells and submitted for full ECMC Table 915-1 & pH on a quarterly basis until four consecutive quarters indicate compliance with ECMC Table 915-1 standards/site-specific clean up levels.

REMEDIAL ACTION PLAN

Does this Supplemental Form 27A include changes to a previously approved Remedial Action Plan? Yes

SOURCE REMOVAL SUMMARY

Describe how source is to be removed.

Initial source removal included an 8'x12' excavation, depth of 2' bgs. Excavation backfilled with clean fill, contaminated soil transported to Pawnee Waste, for disposal (F27#403710935). SS-1 @2 & SS-4 @1.5 (6/29/23) exceeded Table 915-1 standard for TPH.

4/3/24, field screening activities indicated TPH impacted soil remained in-place in the vicinity of SS-1, SS-2, SS-3, SS-4, & SS-6 (Figure 3) from the surface to GW (6' bgs). Laboratory analytical results indicated soil in the vicinity of SS-5 compliant w/ Table 915-1 Protective of GW levels (Analytical Tables), indicating that SS-5 is downgradient (south) point-of-compliance (POC). On 9/9/24, soil samples SS-7 @6 (north), SS-8 @6 (east), & SS-9 @6 (west) collected at GW interface from 6-foot deep pothole (Figure 2). SS-7 compliant w/ Table 915-1 Protective of GW levels, indicating that SS-7 is upgradient POC. SS-8 @6 (8.50) & SS-9 @6 (8.55) exceed Table 915-1 standard/site-specific clean up for pH. All organic, soil suitability, and metal constituents have been horizontally delineated with the exception of pH (SS-8 @6 & SS-9 @6).

pH elevated in background soil samples BG01 @2 (8.30), BG03 @2 (8.42), & BG03 @4 (8.42). Anomalous pH level (8.46) identified 40 feet south of the Knight Pad Tank Battery (Rem Proj #34478) release in S01 @10 despite pH not being identified as a contaminant of concern in release characterization samples. SS-8 @6 (8.50) & SS-9 @6 (8.55) are located 15' & 30', respectively, outside identified soil impacts. Field screening indicated all soil samples mentioned in this paragraph exhibited 0.0 ppm. Operator does not consider pH a contaminant of concern associated with the release. Elevated pH to be addressed during facility decommissioning.

Operator will excavate contaminated soil for off-site disposal & backfill with clean soil. Confirmation sidewall samples will be collected from the excavation to be submitted for full ECMC Table 915-1 analytes (organics, soil suitability, & metals).

REMEDIATION SUMMARY

Describe how remediation of existing impacts to soil and groundwater is to be accomplished (i.e. summarize remedial action plan). Provide a brief narrative description including: technical justification, schedule for implementation, estimated time to attain NFA status, plus plans and specifications for the selected remedial action technology.

Operator will excavate contaminated soil for off-site disposal at an approved landfill and backfill with clean soil. Once field observation and PID readings indicate soil on the sidewalls of the excavation are no longer impacted, confirmation sidewall samples will be collected from the excavation to be submitted for full ECMC Table 915-1 analytes (organics, soil suitability, & metals).

Operator will install one source area and two cross-gradient GW monitoring wells to monitor dissolved-phase contaminants and ensure GW impacts are fully delineated (Figure 2). The source area monitoring well will be installed following excavation backfill. A top-of-casing survey will be completed and cross-gradient GW monitoring wells will be installed perpendicular to GW flow. Soil will be logged and screened with a PID during MW installation; if staining, odor, or elevated PIDs are encountered, a soil sample will be collected from unsaturated soils and analyzed for Table 915-1 (organics, soil suitability, & metals). A soil sample will not be collected from the source area monitoring well as the vadose zone in this area will be composed of clean backfill material. GW samples will be collected from all monitoring wells on a quarterly basis until four consecutive quarters indicate compliance with ECMC Table 915-1 standards/site-specific clean up levels.

Soil Remediation Summary

☐ In Situ

☒ Ex Situ

_____ Bioremediation (or enhanced bioremediation)

Yes _____ Excavate and offsite disposal

_____ Chemical oxidation

If Yes: Estimated Volume (Cubic Yards) _____ 8

_____ Air sparge / Soil vapor extraction

Name of Licensed Disposal Facility or ECMC Facility ID # _____

_____ Natural Attenuation

_____ Excavate and onsite remediation

_____ Other _____

_____ Land Treatment

_____ Bioremediation (or enhanced bioremediation)

_____ Chemical oxidation

_____ Other _____

Groundwater Remediation Summary

No _____ Bioremediation (or enhanced bioremediation)

No _____ Chemical oxidation

No _____ Air sparge / Soil vapor extraction

Yes _____ Natural Attenuation

No _____ Other _____

GROUNDWATER MONITORING

If groundwater has been impacted, describe proposed monitoring plan, including # of wells or sample points, monitoring schedule, analytical methods, points of compliance. Attach a groundwater monitoring location diagram.

Operator will install one source area and two cross-gradient GW monitoring wells to monitor dissolved-phase contaminants and ensure GW impacts are fully delineated (Figure 2). The source area monitoring well will be installed following excavation backfill. A top-of-casing survey will be completed and cross-gradient GW monitoring wells will be installed perpendicular to GW flow. Soil will be logged and screened with a PID during MW installation; if staining, odor, or elevated PIDs are encountered, a soil sample will be collected from unsaturated soils and analyzed for Table 915-1 (organics, soil suitability, & metals). A soil sample will not be collected from the source area monitoring well as the vadose zone in this area will be composed of clean backfill material. GW samples will be collected from all monitoring wells and submitted for full ECMC Table 915-1 & pH on a quarterly basis until four consecutive quarters indicate compliance with ECMC Table 915-1 standards/site-specific clean up levels.

REMEDIATION PROGRESS UPDATE

PERIODIC REPORTING

Approved Reporting Schedule:

☒ Quarterly☐ Semi-Annually☐ Annually☐ Other

☐ Request Alternative Reporting Schedule:

☐ Semi-Annually☐ Annually☐ Other

Rule 913.e:

After initial approval of a Form 27, the Operator will provide quarterly update reports in a Supplemental Form 27 to document progress of site investigation and remediation, unless an alternative reporting schedule has been requested by the Operator and approved by the Director. The Director may request a more frequent reporting schedule based on site-specific conditions.

Report Type:

☐ Groundwater Monitoring☐ Land Treatment Progress Report☐ O&M Report☒ Other Soil assessment results, propose soil assessment work.

Adequacy of Operator's General Liability Insurance and Financial Assurance

Describe the adequacy of the Operator's general liability insurance and Financial Assurance to fully address the anticipated costs of Remediation, including the estimated remaining cost for this project (below).

If this information has been provided on a Form 27 within the last 12 months, provide the Document Number of that form.

Cub Creek (1876 Resources) has sufficient insurance and bonding to fully address the anticipated costs of Remediation, including the remaining estimated costs for this project. Cub Creek (1876 Resources) has general liability insurance and financial assurance in-compliance with ECMC rules. The cost for remediation is a preliminary estimate only, costs may change upwards or downward based on site-specific information. Cub Creek (1876 Resources) makes no representation or guarantees as to the accuracy of the preliminary estimate.

Operator anticipates the remaining cost for this project to be: \$ 30000

WASTE DISPOSAL INFORMATION

Was E&P waste generated as part of this remediation? Yes

Describe beneficial use, if any, of E&P Waste derived from this remediation project:

NA

Volume of E&P Waste (solid) in cubic yards 8

E&P waste (solid) description TPH impacted soil

ECMC Disposal Facility ID #, if applicable:

Non-ECMC Disposal Facility: Pawnee Waste, LLC

Volume of E&P Waste (liquid) in barrels 19

E&P waste (liquid) description TPH impacted soil

ECMC Disposal Facility ID #, if applicable:

Non-ECMC Disposal Facility: Pawnee Waste, LLC

REMEDIATION COMPLETION REPORT

REMEDIATION COMPLETION SUMMARY

Is this a Final Closure Request for this Remediation Project? No

If YES:

☐ Compliant with Rule 913.h.(1).

☐ Compliant with Rule 913.h.(2).

☐ Compliant with Rule 913.h.(3).

Do all soils meet Table 915-1 standards?

Does the previous reply indicate consideration of background concentrations?

Does Groundwater meet Table 915-1 standards? _____

Is additional groundwater monitoring to be conducted? _____

Operator shall comply with the ECMC 1000-Series Reclamation Requirements for all impacted and disturbed areas.

RECLAMATION PLAN

RECLAMATION PLANNING

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.

Release occurred entirely within well production pad extent. Once impacted soil removed, excavation to be backfilled with clean fill and returned to pad grade. Seeding not required.

Is the described reclamation complete? No _____

Does the reclamation described herein constitute interim or final reclamation of the Oil and Gas Location?

☐ Interim

☐ Final

Did the Surface Owner provide the seed mix? No _____

If YES, does the seed mix comply with local soil conservation district recommendations? _____

Did the local soil conservation district provide the seed mix? No _____

SITE RECLAMATION DATES

Proposed date of commencement of Reclamation. 01/31/2025

Proposed date of completion of Reclamation. 02/28/2025

IMPLEMENTATION SCHEDULE

Per Rule 913.d.(2): Any change from the approved implementation schedule will be requested at least 14 days in advance, and the Operator may not make the change without the Director's approval.

PRIOR DATES

Date of Surface Owner notification/consultation, if required. 04/16/2023

Actual Spill or Release date, or date of discovery. 04/15/2023

SITE INVESTIGATION DATES

Date of Initial Actions described in Site Investigation Plan (start date). 04/15/2023

Proposed site investigation commencement. 10/31/2023

Proposed completion of site investigation. 01/31/2025

REMEDIAL ACTION DATES

Proposed start date of Remediation. 01/31/2025

Proposed date of completion of Remediation. 03/31/2026

Per Rule 913.d.(2): Any change from the approved implementation schedule will be requested at least 14 days in advance, and the Operator may not make the change without the Director's approval.

☒ Change from approved implementation schedule per Rule 913.d.(2).

Basis for change in implementation schedule:

Operator requesting implementation schedule update to allow time for remediation.

OPERATOR COMMENT

pH elevated in background soil samples BG01@2 (8.30), BG03@2 (8.42), & BG03@4 (8.42). SS-8@6 (8.50) & SS-9@6 (8.55) are located 15' & 30', respectively, outside identified soil impacts. Anomalous pH level (8.46) identified 40 feet south of the Knight Pad Tank Battery (Rem Proj #34478) release in S01@10 despite pH not being identified as a contaminant of concern in release characterization samples. Field screening indicated all soil samples mentioned above exhibited 0.0 ppm. Operator does not consider pH a contaminant of concern associated with the release. Operator requesting that elevated pH be addressed during facility decommissioning as the pH levels do not appear to be a contaminant of concern associated with the release and the pH levels do not present a threat to the environment, groundwater, human health, or property.

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

Signed: Michael A. Wicker, P.G.

Title: Senior Geologist

Submit Date: 12/06/2024

Email: mwicker@cdhconsult.com

Based on the information provided herein, this Application for Site Investigation and Remediation Workplan complies with ECMC Rules and applicable orders and is hereby approved.

ECMC Approved: Kari Brown

Date: 02/03/2025

Remediation Project Number: 34474

COA Type**Description**

	Operator will display excavation extent on future map submittals.
	Analytical data from background samples BG1987#1@0.5' and BG1987#2@0.5' do not appear to be representative of background conditions near the spill/release. These samples shall be omitted from future background determination calculations. Note: Background samples should be taken from similar depths and soil horizons or lithologic materials for comparison to confirmation soil samples.
	Operator will provide notice to the ECMC Area EPS via email at least 48 hours prior to sample collection or monitoring well installation.
	If the Operator proposes to leave material with elevated levels of EC and SAR in situ, the Operator shall define the vertical and lateral extent of impacts and provide a detailed Reclamation plan that includes, but is not limited to, soil analysis from adjacent undisturbed lands, revegetation techniques, site stabilization, and details of seeded species. Operator will submit the Reclamation plan pursuant to Rule 915.b. on a Form 27 Supplemental Report for Director review.
	Operator will install monitoring wells (within the spill/release area, cross-gradient, down-gradient, and up-gradient) to properly characterize groundwater pursuant to Rule 915 and determine hydraulic gradient, as required by Rule 915.e.(3)A.ii. All monitoring wells shall be constructed as permanent monitoring wells in accordance with the State Engineer's Water Well Construction and Permitting Rules
5 COAs	

ATTACHMENT LIST

Upon approval, the approved Form 27 and all listed attachments will be indexed to the Remediation Project file. Only the approved Form 27 will also be indexed to the related Facilities.

Att Doc Num**Name**

403921902	FORM 27-SUPPLEMENTAL-SUBMITTED
404009580	ANALYTICAL RESULTS
404009581	ANALYTICAL RESULTS
404009584	ANALYTICAL RESULTS
404009586	ANALYTICAL RESULTS
404011213	MAP
404011214	SITE MAP
404011215	SOIL SAMPLE LOCATION MAP
404011216	SOIL SAMPLE LOCATION MAP

Total Attach: 9 Files

General Comments

User Group

Comment

Comment Date

		Stamp Upon Approval
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Total: 0 comment(s)