

Rule Engineering, LLCSolutions to Regulations for Industry

May 24, 2012

Mr. Alex Fisher
Colorado Oil and Gas Conservation Commission
1120 Lincoln St, Suite 801
Denver, CO 80203

Re: Revised Centralized E&P Waste Management Facility Form 28 Application
Facility ID #426582
Encana Oil and Gas (USA) Inc. NPR Solidification Facility

Dear Mr. Fisher:

Rule Engineering, LLC is submitting the Colorado Oil and Gas Conservation Commission (COGCC) Revised Form 28 Application on behalf of Encana Oil and Gas (USA), Inc. (Encana) for the proposed North Parachute Ranch (NPR) Solidification Facility (NSF). The Form 28 was revised based on your review provided in a letter dated March 12, 2012. The revisions to the Form 28 Application and response to your review comments are noted below.

Form 28 Attachment Checklist

The land use permit from Garfield County has been approved by the Board of County Commissioners during the Board Meeting on April 2, 2012, the approval recommendations from the Garfield County Planning Commission are provided and the final approved Land Use Permit will be provided to the COGCC when it is available. An Air Pollutant Emissions Notice (APEN) been submitted by Encana to the Colorado Department of Public Health and Environment (CDPHE) based on emission estimates that a permit is not required, a copy of the APEN is provided. No other permits are required.

Form 28 Questions

The Form 28 application has been revised to incorporate COGCC comments.

Form 28 Supplement

Additional details have been included regarding the proposed life and treatment details regarding the facility.

Form 28 Supplement, Rule 908.b(4)

The average annual precipitation for the site has been revised in Form 28 Question 2 to 11.61 based on the climate records from Rifle, CO.

Form 28 Supplement, Rule 908.b(5)B

The Survey Plan provided in Attachment A references section corners. A Supplement Map is included in Attachment A to show the surveyed location of the section corners in relation to the NSF.

Form 28 Supplement, Rule 908.b(5)C

The response title has been revised for accuracy and the manned guard stations are identified on Figures 1 and 4.

Form 28 Supplement, Rule 908.b(5)D

The surfacing material for the Buffer Area and Fire Access will be 3/4-inch gravel placed a minimum of 2-inches thick. A note has been added to Figure C1 on the Engineering Drawings.

Form 28 Supplement, Rule 908.b(5)E

The information from NOAA Technical Paper 40 regarding the 100-yr and 25-year 24-hour storm event is included with climate information in Attachment B. The engineering calculations for the containment is included in Attachment B. The stormwater from the upslope area near the NSF will be diverted with berms and the existing roadway where the NSF is planned has stormwater controls established to manage the 100-year storm event. The NSF Buffer Area will be raised 12 inches above the Fire Access along the south side of the NSF where stormwater will be directed by Best Management Practices (BMPs) by a stormwater berm. Based on the fact that the estimated 100-year storm event is 3 inches all stormwater will be diverted around the NSF.

Form 28 Supplement, Rule 908.b(6)

A process flow for the various waste streams has been included in Attachment D. The description of the wastes in Attachment D has been revised to include only wastes that are managed at the NSF, dissolved air flotation (DAF) wastes will not be managed at the NSF and are removed from Attachment D. The characterization frequency for the wastes has been included in the Operating Plan provided in Attachment G for each of the potential disposal facilities where the wastes will be transported for off-site disposal. Naturally occurring radioactive material (NORM) has not been analyzed in any of the waste streams. When the NSF begins operations, samples will be collected from each of the waste streams and analyzed for NORM. Results of NORM testing will be provided to COGCC within six (6) months after operation begins.

Form 28 Supplement, Rule 908.b(7)A

The site is located on top of a bench of spent oil shale mining rock from the Unocal Oil Shale operations conducted under Permit M-1978-263-UG. A copy of Notice of Completion of Reclamation dated July 18, 2002, from Unocal is provided in Attachment E. The area where the NSF is located is referred to as the East Fork Disposal Area where retorted and decarbonized shale material was placed. The disposal area was originally intended to support additional waste material but the operations were halted at the bench where the current road and the NSF will be located. The stability of the NSF area is deemed to be more than adequate to support the relatively small operations that will be conducted on the site. The waste pile was stabilized with

erosion controls and final reclamation of the area using topsoil and re-vegetation was approved in 2003 and based on current observations the disposal area is stable. No land use restrictions are in effect for the reclaimed area. A copy of the final Inspection Report from the Colorado Department of Natural Resources, Division of Minerals and Geology is also included in Attachment E which shows that no further land use restrictions or stipulations are remaining.

Form 28 Supplement, Rule 908.b(7)B.i

Figure 4 has been revised to show surface water features within 2 miles. A note is included in the data tables in Attachment E to indicate the -999.90 mg/L value is a non-detect concentration for the analyte. The produced water storage pits in Figure 4 have been removed. Encana will submit to COGCC under separate cover an update on the status of these pits. A list of the materials included in the spill kits is provided in the site specific Contingency Plan included with the Operating Plan in Attachment G. The construction details for monitoring wells within one mile of the NSF are included in Attachment E along with the list of target analytes that are part of the ongoing monitoring program. The description of the NSF features to reduce potential for surface and groundwater impacts are expanded in the Supplemental Narrative. The training provided to operators and audit processes are provided in the Operating Plan in Attachment G. The waste characterization information is provided under information for Rule 908.b(6).

Form 28 Supplement, Rule 908.b(7)B.iii

The four (4) monitoring well permits located within one mile of the NSF are shown on Figure 4. Information regarding these wells is included in Attachment E.

Form 28 Supplement, Rule 908.b(7)C

The surface material in the Buffer Area and Fire Access roads will consist of 3/4-inch gravel placed to a minimum of 2-inches thick. A note has been added to Figure C1 regarding the surface material, this material will provide tracking control for equipment and trucks and maintenance of the tracking control will be included in the Operations Plan. The hydrovac trucks that deliver waste to the NSF Mixing Bin are equipped with water and can be washed before leaving the off-loading area at the Mixing Bin if deemed necessary. A detail of the sawdust storage area had been included in Figure C3. A gate to control access to the mixing bin has been included on Figure C1 and C2. Also Figure C2 has been modified to show the placement of the mixing bin in relation to the ground surface.

Form 28 Supplement, Rule 908.b(8)

The Operating Plan will be modified to address comments from the COGCC. The anticipated duration of the facility is 10 years but this could change as conditions change regarding gas production and waste management options. It will be noted updates will be provided to the COGCC with a Form 4, Sundry Notice. The only operations at this facility will be for solidification of E&P waste. The volume of waste

managed at the facility is based on estimated volumes from the past year. A tabulation of the waste volume from each stream is provided in Attachment D. The water used for dust control is from the permitted water sources Encana uses to provide dust control for the entire North Parachute Ranch operations. Initial waste sampling has been conducted and the data is provided in Attachment D. The waste characterization required for each disposal facility is included in the Operating Plan provided in Attachment G. The Annual Report to the COGCC will include information regarding spills and upsets. The NSF is a Production/Construction facility and the most recent version of the Encana Piceance Emergency Response Plan (ERP) is included for reference in Attachment H. The ERP is updated on a regular basis and the most recent version with current contact information will be maintained at the NSF. As noted in the response to Rule 908.b(11), a site specific Contingency Plan will be added to the Operating Plan in Attachment G. Records will be made available to the COGCC. The access to this area is limited to only personnel authorized to enter Encana property by the use of a gated Guard Station manned 24-hours per day. The Guard Station is located approximately 2 miles from the NSF, no drawing of the security facilities are warranted. The NSF is not a water impoundment and will be able to operate only during daylight hours normally during the normal workweek. When weather precludes access to the NSF, no waste will be transported to or from the facility so there is no concern. There are no noise or odor issues as this facility is located on Encana property and the nearest adjacent property is over 2 miles from the NSF. The disposal facilities will be noted in the Operating Plan provided in Attachment G.

Form 28 Supplement, Rule 908.b(9)A

Information on the monitoring wells has been provided in Attachment E which includes the sampling that is conducted as part of the ongoing monitoring program for these wells. There is no need for additional baseline sampling. The monitoring of these wells (as well as surface water) will be continued quarterly by Encana.

Form 28 Supplement, Rule 908.b(9)B.i

Monitoring wells have been deleted but may be provided later at the direction of the COGCC.

Form 28 Supplement, Rule 908.b(10)

The list of analytes in the ongoing surface water monitoring program are included in Attachment E.

Form 28 Supplement, Rule 908.b(11)B

A site specific Contingency Plan has been added to the Operating Plan in Attachment G. No chemicals are stored at the NSF, only the E&P wastes that are placed in the storage bin after mixing until off-site disposal.

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Form 28 Supplement, Rule 908.g(1)A&B

A specific cost estimate for the closure of the NSF is provided in Attachment I. The anticipated duration of the facility is 10 years but this could change as conditions change regarding gas production and waste management options.

Form 28 Supplement, Rule 908.h

Documents showing compliance with local requirements are provided in Attachment J. An APEN has been submitted by Encana to the CDPHE to address air emissions, an AIRS ID 0452240-001 has been assigned to this facility.

If you have any questions please contact me at 303-431-8500 or Brett Middleton of Encana at 970-285-2739.

Sincerely,
Rule Engineering, LLC

Russell V. Knight

Russell V. Knight
Principal Hydrogeologist

cc: Brett Middleton - Encana

Attachments



State of Colorado
Oil and Gas Conservation Commission



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

CENTRALIZED E&P WASTE MANAGEMENT FACILITY PERMIT

Submit this Form and accompanying documents for each facility per Rule 908. Financial Assurance in the amount of \$50,000 is required to operate each facility.

FOR OGCC USE ONLY

Surety ID: _____

OGCC Operator Number: 100185		Contact Name and Telephone:	
Name of Operator: Encana Oil and Gas (USA), Inc.		Brett Middleton	
Address: 2717 County Road 215, Suite 100		No: 970-285-2739	
City: Parachute State: CO Zip: 81635		Fax: 970-285-2705	
Surface Owner (if different than above): Same			
Address: _____			
City: _____ State: _____ Zip: _____ Phone: _____			
Facility Name: NPR Solidification Facility		Location (QtrQtr, Sec, Twp, Rng, Mer):	
Address: Same		SE NW Sec 29, T5S, R95W 6thPM	
City: _____ State: _____ Zip: _____		Latitude: 39.58713	
Phone: _____ Fax: _____		Longitude: -108.07752	

Complete the Attachment Checklist

	Oper	OGCC
Site description (topo, geol, hydro)	✓	
Adjacent land use description	✓	
Topographic map	✓	
Site drainage map with structures	✓	
Scaled drawing and survey map	✓	
Facility design & engineering	✓	
Operating plan	✓	
Water analysis report	✓	
Financial assurance	✓	
Closure plan	✓	
Local gov't zoning compliance	✓	
Local gov't permits and notices	✓	

1. Is the site in a sensitive area? <input checked="" type="checkbox"/> Y <input type="checkbox"/> N	2. What are the average annual precipitation and evaporation rates for the site? Precipitation: 11.61 inches/year Evaporation: 60 inches/year
3. Has a description of the site's general topography, geology and hydrology been attached? <input checked="" type="checkbox"/> Y <input type="checkbox"/> N	
4. Has a description of the adjacent land use been attached? <input checked="" type="checkbox"/> Y <input type="checkbox"/> N	5. Has a 1:24,000 topographic map showing the site location been attached? <input checked="" type="checkbox"/> Y <input type="checkbox"/> N
6. Has a site plan showing drainage patterns, diversion or containment structures, roads, fencing, tanks, pits, buildings and any other pertinent construction details been attached? <input checked="" type="checkbox"/> Y <input type="checkbox"/> N	
7. If site is not owned by the operator, is written authorization of the surface owner attached? <input checked="" type="checkbox"/> Y <input type="checkbox"/> N	8. Has a scaled drawing and survey showing the entire section(s) containing the proposed facility been attached? <input checked="" type="checkbox"/> Y <input type="checkbox"/> N
9. What measures have been implemented to limit access to the facility by wildlife, domestic animals or by members of the public? Briefly explain. See Attached Supplemental Information, site with controlled access through security gate and treatment units will be netted to prevent wildlife access.	
10. Is there a planned firelane of at least 10 feet in width around the active treatment areas and within the perimeter fence? <input checked="" type="checkbox"/> Y <input type="checkbox"/> N	11. Is there an additional buffer zone of at least 10 feet within the perimeter firelane? <input checked="" type="checkbox"/> Y <input type="checkbox"/> N
12. Have surface water diversion structures been constructed to accommodate a 100-year, 24-hour event? <input checked="" type="checkbox"/> Y <input type="checkbox"/> N	13. Has a waste profile been calculated according to Rule 908.b.6? <input checked="" type="checkbox"/> Y <input type="checkbox"/> N
14. Has facility design and engineering been provided as required by Rule 908.b.7? <input checked="" type="checkbox"/> Y <input type="checkbox"/> N	15. Has an operating plan been completed as required by Rule 908.b.8? <input checked="" type="checkbox"/> Y <input type="checkbox"/> N
16. Has ground water monitoring for the site been provided? <input checked="" type="checkbox"/> Y <input type="checkbox"/> N ***Attach Water Analysis Report, Form 25, for each monitoring well installed.***	
17. Has financial assurance been provided as required by Rule 704? <input checked="" type="checkbox"/> Y <input type="checkbox"/> N	18. Has a closure plan been provided? <input checked="" type="checkbox"/> Y <input type="checkbox"/> N
19. Have local government requirements for zoning and construction been complied with? <input checked="" type="checkbox"/> Y <input type="checkbox"/> N	20. Have permits and notifications required by local governments and other agencies been provided? <input checked="" type="checkbox"/> Y <input type="checkbox"/> N

Print Name: Brett Middleton

Signed: _____

Title: Environmental Field Coordinator Date: 4-10-12

OGCC Approved: _____ Title: _____ Date: _____

CONDITIONS OF APPROVAL, IF ANY:

Facility Number:

COGCC Form 28
Centralized E&P Waste Management Facility
Supplemental Information

NPR Solidification Facility
Facility ID #426582
Encana Oil and Gas (USA), Inc.
COGCC Operator Number 100131

May 24, 2012

This supplement to the COGCC Form 28 for Encana Oil and Gas (USA), Inc. (Encana) proposed North Parachute Ranch (NPR) Solidification Facility (NSF) provided additional information as specified in the COGCC Rule 908. This Supplemental Information is presented with reference to the various Sections of Rule 908. This facility will also be permitted under a Major Impact Land Use Permit with Garfield County. A Air Pollutant Emissions Notice (APEN) has been submitted by Encana to the Colorado Department of Public Health and Environment (CDPHE) based on emission estimates that a permit is not required. No other permits are required.

Encana is seeking to obtain a permit for the proposed NSF to treat waste from various E&P operations. The purpose of the treatment at this facility is to solidify the waste created by Encana's gas production operations. The semi-solid waste is generated at Encana well pads from produced water tanks, frac tanks and production pit bottoms. The sediment along with some liquid in the tanks and pits is removed at each individual well pad using a hydrovac truck. The hydrovac trucks transport the solid/liquid mixture to the NSF. The waste mixture from the hydrovac trucks is deposited in a mixing bin that is sloped to allow separation of the solid and liquid by gravity. The liquid accumulates in the lowest part of the mixing bin where it is removed using a vac truck and the liquid is then transported to the NPR Water Treatment Facility. The NPR Water Treatment Facility is located approximately two (2) miles west of the NSF and is an Encana Centralized E&P Waste Treatment Facility (COGCC Facility ID 120803). After the liquid is removed from the mixing bin, sawdust is added to the sediment/sand waste to absorb excess moisture with the objective being to allow the waste mixture to pass the Paint-Filter Test. The Paint-Filter Test is used to characterize the waste as having no free liquids which is a requirement for transportation and disposal of the E&P waste. The solidification of the waste using sawdust is accomplished using heavy equipment to combine the materials in the mixing bin. The solidified waste is then removed from the mixing bin and placed in the storage bin. The solidified waste accumulates in the storage bin until a sufficient volume is present to transport off-site for disposal. The solidified waste is removed from the storage bin using heavy equipment and loaded on licensed trucks for transportation to a disposal facility off-site. The disposal will be at permitted E&P waste disposal sites, not the Garfield County public landfill.

The purpose of the this facility is to provide for solidification of the E&P wastes generated from various locations to be conducted in one location to provide more efficient management of the

wastes for disposal. A secondary benefit of the project is to reduce truck traffic on private, county and state roads.

Rule 908a

The proposed facility is a non-commercial, centralized E&P waste management facility for the treatment of E&P waste for Encana's operations in the Piceance Basin area of Garfield County, Colorado.

Rule 908.b.1

The facility will be operated by Encana and the operator contact information is provided on the Form 28.

Rule 908.b.2

Encana is the surface owner of this property, therefore, no surface use agreement is required.

Rule 908.b.3

The legal description of the property is provided on the Plat Map in Attachment A. A Supplemental Map is also provided showing the scaled drawing of the site in relation to the Section corners per Rule 908.b.5.B.

Rule 908.b.4

A topographic map of the site is provided in Figure 1. The site is located in the Piceance Basin of western Colorado approximately 10 miles north of the City of Parachute. The Piceance Basin geology consists of gas producing rock units of the Upper Cretaceous Williams Fork Formation, and Tertiary Wasatch and Green River Formations. The geology and hydrogeology of the site is provided in more detail below. The average annual precipitation in the area is approximately 11.61 inches (western Regional Climate Center records from Rifle, CO, Station #057031). The average annual evaporation rate in the area is approximately 60 inches (National Weather Service Evaporation Map of the United States). Climate information is provided in Attachment B of this submittal.

Rule 908.b.5.A

A site plan for the facility is provided in Figure 2. This site plan identifies the features of the facility including containment structures and roads. The drainage patterns, diversion and other construction details are provided in the engineering design package provided in Attachment C of this submittal.

Rule 908b.5.B

The scaled drawing of the proposed facility is provided in Figure 3. A Plat Map of the NSF and a Supplemental Map showing the facility in relation to the Section lines in this area are provided in Attachment A. The distance of the facility to the nearest section lines are approximately 1750 feet from the N section line and 1900 feet from the E section line of Section 29, T5S, R95W.

Rule 908.b.5.C

Security for the site is provided by a manned guard stations, one at the south entrance to the NPR property from County Road 215, the second located at the north entrance to the NPR property. The location of the guard stations are shown on Figures 1 and 4. The guard stations are manned 24-hours per day and all vehicular traffic entering this area must be authorized to do so. The mixing bin is a steel container that will be covered with bird netting when not in use to prevent access by wildlife, access will also be controlled by a gate to the mixing bin.

Rule 908.b.5.D

A fire lane that is ten (10) wide is provided outside the entire waste management and buffer area as shown on Figure C-1 in Attachment C. Also as required by the Rule, a ten (10) foot buffer area is provided between the fire lane and waste management bins as shown on Figure C-1. The surface of the buffer area and fire lane will be covered with 2-inches of 3/4-inch gravel.

Rule 908.b.5.E

The grading and drainage plans are provided in the Engineering Design Package provided in Attachment B of this submittal. The stormwater diversion structures in this area are part of the Stormwater Management Plan for the NPR and are designed to accommodate a 100-year, 24-hour event. The information from NOAA Technical Paper 40 regarding the 100-yr and 25-year 24-hour storm event is included with climate information in Attachment B. The engineering calculations for the containment is included in Attachment B. The stormwater from the upslope area near the NSF will be diverted with berms and the existing roadway where the NSF is planned has stormwater controls established to manage the 100-year storm event. The NSF Buffer Area is raised 12 inches above the Fire Access along the south side of the NSF where stormwater is directed by Best Management Practices (BMPs) by a stormwater berm. Based on the fact that the estimated 100-year 24-hour storm event is 3.5 inches all stormwater will be diverted around the NSF.

Rule 908.b.6

The waste profile of the waste streams to be solidified at this facility is provided in Attachment D. The delivery of the wastes to the NSF will vary on a daily basis depending on operations, but the anticipated average monthly volume of wastes delivered to the NSF is 400 bbls. The amount of liquid versus solid in the waste also varies but it is anticipated that approximately 75% of the waste volume is liquid that is removed to the NPR Water Treatment Facility, therefore, it is estimated approximately 300 bbls of liquid will be generated monthly. The waste to be solidified at the NSF are the Frac Tank and Produced Water Tank Bottoms, and Pit Bottoms. A process flow chart for the treatment of wastes is provided in the waste profile contained in Attachment D. These wastes are sediments or sand with excess water that is removed by adding sawdust to the waste. The percentage of water in the original wastes is approximately 20 percent and addition of the sawdust reduces the water content to

approximately 14 percent. Moisture content analysis of the wastes are provided in Attachment D.

The characterization frequency for the wastes has been included in the Operating Plan included in Attachment G for each of the potential disposal facilities where the wastes will be transported for off-site disposal. Naturally occurring radioactive material (NORM) has not been analyzed in any of the waste streams. When the NSF begins operations samples will be collected from each of the waste streams and analyzed for NORM. Results of NORM testing will be provided to COGCC within six (6) months after operation begins.

Rule 908.b.7

The engineering design of the facility is provided in Attachment C of this submittal.

Rule 908.b.7.A

Type and Thickness of Unconsolidated Soils

The area of the facility is underlain by soils of the Torriorthents-Rock outcrop complex, steep. The soils are thin, typically less 4 to 30 inches to unweathered bedrock. The soil is well drained with very low water capacity. The site is located on top of a bench of spent oil shale mining rock from the Unocal Oil Shale operations conducted under Permit M-1978-263-UG. A copy of Notice of Completion of Reclamation dated July 18, 2002, from Unocal is provided in Attachment E. The area where the NSF is located is referred to as the East Fork Disposal Area where retorted and decarbonized shale material was placed. The disposal area was originally intended to support additional waste material but the operations were halted at the bench where the current road and the NSF is located. The stability of the NSF area is deemed to be more than adequate to support the relatively small operations that will be conducted on the site. The waste pile was stabilized with erosion controls and final reclamation of the area using topsoil and revegetation was approved in 2003 and based on current observations the disposal area is stable. No land use restrictions are in effect for the reclaimed area. A copy of the final Inspection Report from the Colorado Department of Natural Resources, Division of Minerals and Geology is also included in Attachment E which indicates that no further land use restrictions or stipulations are remaining.

Type and Thickness of Consolidated Bedrock

The facility is underlain by bedrock of the Tertiary age Garden Gulch Member of the Green River Formation. The Garden Gulch Member consists fine-grained lacustrine and fluviol lacustrine rocks of dark brown and gray shale with brown sandstone and limestone. The thickness of the Garden Gulch Member in this area is approximately 700 feet (Self and Others, 2010, Stratigraphic Cross Sections of the Eocene Green River Formation in the Piceance Basin, USGS Digital Data Series DDS-69-Y, ch5)

Local and Regional Geologic Structures

The facility is located in the southern portion of the Piceance Basin and the sedimentary rocks dip gently 2 to 5 degrees north to the center of the basin. There is one small mapped fault approximately one mile east of the site and no folds shown on available geologic maps in the immediate area of the site.

Geologic Hazards

The facility is located on a bench on the south-facing slope of the East Fork Parachute Creek canyon. There are no landslides in the vicinity of the site and the hazard to landslides appears to be low. Rockfall hazards have a moderate potential in this area from the cliff faces above the steep slopes in this area. The hazard to earthquakes and other geologic hazards are low at this location.

Rule 908.b.7.B

Surface Water Features

A map of surface water features within two (2) miles of the proposed facility is provided in Figure 4. The facility is located on a bench north of the East Fork of Parachute Creek. The site is approximately 100 feet higher in elevation than the creek. The site is located approximately 2 miles upstream from the confluence with Parachute Creek. The facility is not within a flood hazard zone shown on Garfield County maps and no surface waters subject to COGCC Rule 317B are located in the vicinity. The location of surface water sampling points along the East Fork of Parachute Creek are also shown on this map. Surface water sampling point ENPR26ST is located near the NSF site and two additional sampling points ENPR14ST and ENPR15ST are located downstream within two miles of the NSF site. Encana collects samples from these points quarterly, a summary table of the laboratory results from the last four (4) quarters of sampling is provided in Attachment E. Note the data tables represent non-detect concentrations as -999.90 value.

Depth to Shallow Groundwater and Major Aquifers and Hydrologic Properties

The shallow groundwater in this area is found at 5 to 10 feet below the ground surface in the alluvial aquifer along the drainage of East Fork of Parachute Creek. The shallow groundwater aquifer does not extend to below this facility and the depth to groundwater from this facility if it was present is over 100 feet. The direction of the flow of shallow groundwater is to the west in the direction of flow of East Fork of Parachute Creek. There are no major aquifers in this area with the lower sandstone lenses in the Wasatch Formation being the only potential source of useable groundwater according the Colorado Geologic Survey Groundwater Atlas (2003).

Permitted Water Wells within a One Mile Radius

There are no permitted water wells within one mile of the site. There are four (4) well permits for monitoring wells within one mile. The monitoring wells include three (3) wells that are included in the Encana Quarterly Monitoring Program. The well logs are provided in Attachment

E. One well permit number was for an investigation at the Encana G29 Pad, water was not encountered at this location and the well was not installed. The following table lists the monitoring wells within one mile of the NSF.

Encana Well ID	Permit Number	Aquifer Total Depth	Screened Interval	Status
ENPR7MW	0044239	Creek alluvium, 26.96 ft	8.7 to 23.7 ft	Monitored Quarterly
ENPR8MW	0044240	Creek alluvium, 37.55 ft	24.2 to 34.2	Monitored Quarterly
ENPR9MW	0044241	Creek alluvium, 37.04 ft	23.6 to 33.6	Monitored Quarterly
G29	0050041	Not drilled		Notice only filed

Existing Quality of Shallow Groundwater

The existing quality of groundwater in the alluvial aquifer along East Fork of Parachute Creek is currently monitored by Encana on a regular basis by a network of monitoring wells. The water quality data is provided in Attachment E. Note the data tables represent non-detect concentrations as -999.90 value. One of the monitoring wells (ENPR8MW) is located along the East Fork of Parachute Creek approximately 0.5 miles downstream of the NSF facility; an second downgradient monitoring well (ENPR9MW) is located approximately 1.0 miles downstream. A table with the list of target analytes for the ongoing quarterly monitoring program is provided in Attachment E.

Evaluation of Potential Surface Water and Groundwater Impacts

The treatment facility is designed with a capacity to contain the waste with sufficient freeboard to contain storm water from a 25-year/24-hour storm event. Stormwater run-on will be diverted from the waste management facilities by berms and the stormwater run-off from the areas surrounding this facility are diverted to stormwater control features that are part of Best Management Practices (BMPs) that are provided in the Master Stormwater Management Plan North Parachute Ranch. A copy of Volume 1 of this document is provided in Attachment F.

Water samples are collected from both surface water in the East Fork of Parachute Creek and groundwater in the alluvial aquifer along the creek. These samples are used to assess water quality and ongoing quarterly monitoring will provide assessment of any impacts to water quality by the E&P operations in this area. . A table with the list of target analytes for the ongoing quarterly monitoring program is provided in Attachment E.

The NSF has been designed to include a number of features to significantly reduce the potential for impacts from the facility to nearby surface water and groundwater. These design features include construction materials for the waste management and storage bins, operations during waste management, and location of the facility. The facility will include steel bins for mixing and storage of the waste. The waste management and storage containers will be constructed of ½-inch steel and are impervious to leaking. The operation of the facility will include operators that will be onsite at all times during waste treatment and be able to immediately identify and control any spills or leaks. The onsite operators will be trained to respond to any spills or leaks and the

stormwater runoff containment will contain any spills that can be immediately removed. The surface of the truck access in the Buffer Area and Fire Lane will be covered with 3/4-inch gravel to prevent tracking waste off-site. The hydrovac trucks that deliver the waste to the Mixing Bin are equipped with water and will wash off prior to leaving the NSF. The gravel surface will be inspected by the operators to ensure it is maintained to prevent off-site tracking. Details of the operator training and spill response are provided in the Operating Plan included in Attachment G. The NSF is located in an area where shallow groundwater is not present and stormwater management controls are in place to prevent surface water from reaching the East Fork of Parachute Creek. The operation of the NSF site will reduce the amount of trucks required to transport waste and the operations will be conducted in a single facility that has been design to provide containment of wastes for treatment and storage prior to offsite disposal.

Rule 908.b.7.C

Engineering Data

The engineering design for the NSF is included in Attachment C of this submittal. The design includes the grading and drainage plan. The waste containment structures will consist of two storage bins built of ½-inch impervious steel.

Rule 908.b.8

Operating Plan

An Operating Plan for the NSF is provided in Attachment G. A Contingency Plan that describes emergency response actions is provided in Attachment H.

Rule 908.b.9.A

Water Wells

There are no water wells within one mile of the facility.

Rule 908.b.9.B

Site-Specific Monitoring Wells

There are existing monitoring wells located along the East Fork of Parachute Creek that are monitored on a quarterly basis. These wells were described in Rule 908.b.7.B previously. The results of the recent monitoring of these wells and the list of analytes for the ongoing monitoring are provided in Attachment E.

908.b.10

Surface Water Monitoring

There are surface water monitoring points located along the East Fork of Parachute Creek that are sampled on a quarterly basis. These monitoring points were described in Rule 908.b.7.B

previously. The results of the recent monitoring of these surface water locations and the list of analytes for the ongoing monitoring are provided in Attachment E.

908.b.11

Contingency Plan

A Contingency Plan is provided in Attachment H.

908.d

Financial Assurance

Encana will submit financial assurance to the COGCC as required by Rule 704.

908.e

Encana will submit and proposed modifications to the facility design, operations plan, permit data or permit conditions to the COGCC for prior approval under a Form 4 Sundry Notice.

908.f

Annual Permit Review

Encana will submit an annual report to the COGCC to summarize operations including the types and volumes of waste actually handled at the facility.

908.g.1

Preliminary Closure Plan

The anticipated duration of the facility operation is 10 years but this could change as conditions change regarding gas production and waste management options. The general plan for closure of the NSF will consist of removing all waste from the mixing and storage bins. The steel bins will be removed for use at other locations as necessary or sent for recycling at a metals recycling facility. Samples will be taken from native soils below the containers and analyzed for Table 910-1 constituents to verify compliance with soil cleanup requirements. These samples will be compared to baseline samples collected before operations commence to determine if naturally occurring background concentrations have been exceeded. Other remediation will be completed as necessary. The drainage controls will be removed and the area will be regraded to the present use as a road. Any final reclamation will be conducted under the requirements of the NPR reclamation plan.

The costs to close the NSF facility are estimated at \$5,486. A detailed cost breakdown is included in Attachment I.

908.g.2

Final Closure Plan

Encana will submit a detailed Site Investigation and Remediation Workplan Form 27 at least sixty (60) days prior to closure for approval by the COGCC

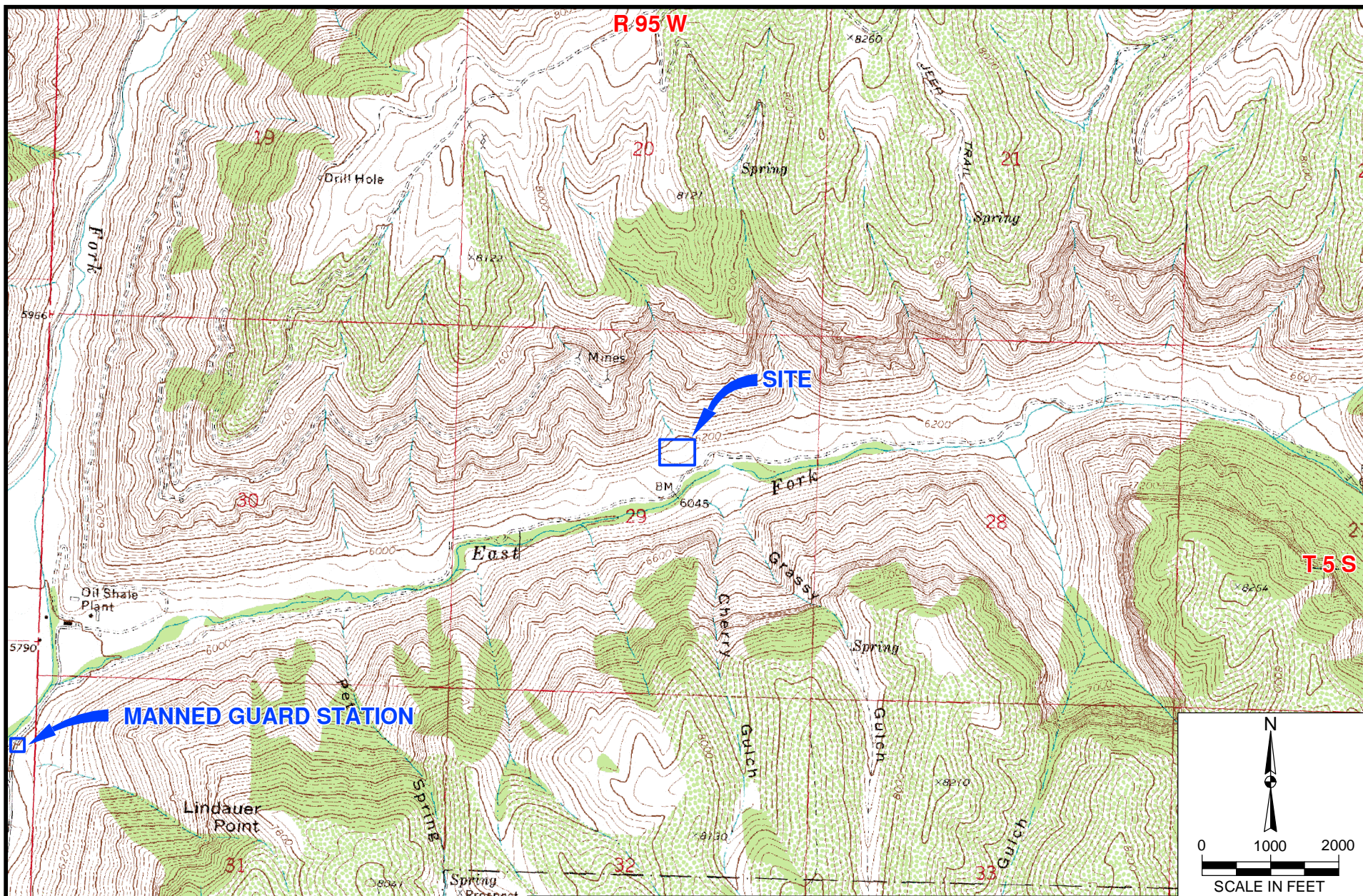
908.h

Local Permits

Encana has submitted an application for a Major Impact Review to Garfield County to allow the special use operations at this facility. Operation of the NSF will comply with permit requirements of the Garfield County Land Use Permit. The permit has been approved by the Board of County Commissioners, a copy of the approval is provided in Attachment J.

An Air Pollutant Emission Notice (APEN) had been submitted to the Colorado Department of Public Health and the Environment (CDPHE) by Encana. Based on the analysis conducted to date the facility emissions are below five (5) tons per year and a permit is not required. A copy of the APEN is provided in Attachment J. The AIRS ID for this facility assigned by the CDPHE is 0452240-001 and a copy of compliance documentation in accordance with procedures for AIRS ID assignment will be provided to the COGCC within 6 months of the start of operation.

Figures



Rule Engineering, LLC
Solutions to Regulations for Industry



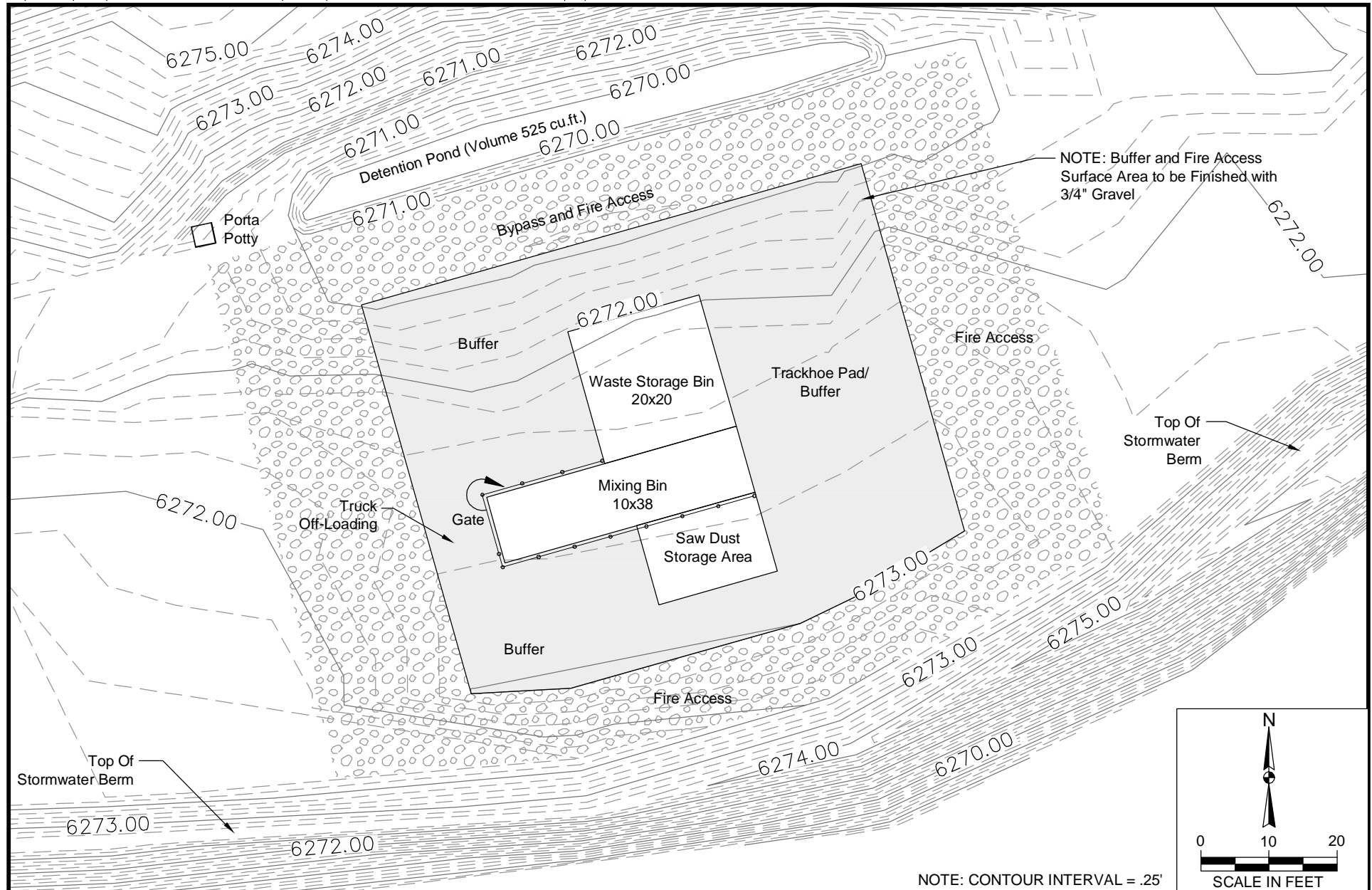
North Solidification Facility
Site Location Map

DATE: 3/22/12

FILE: NSF-Fig1-Topo.dwg

FIGURE: 1



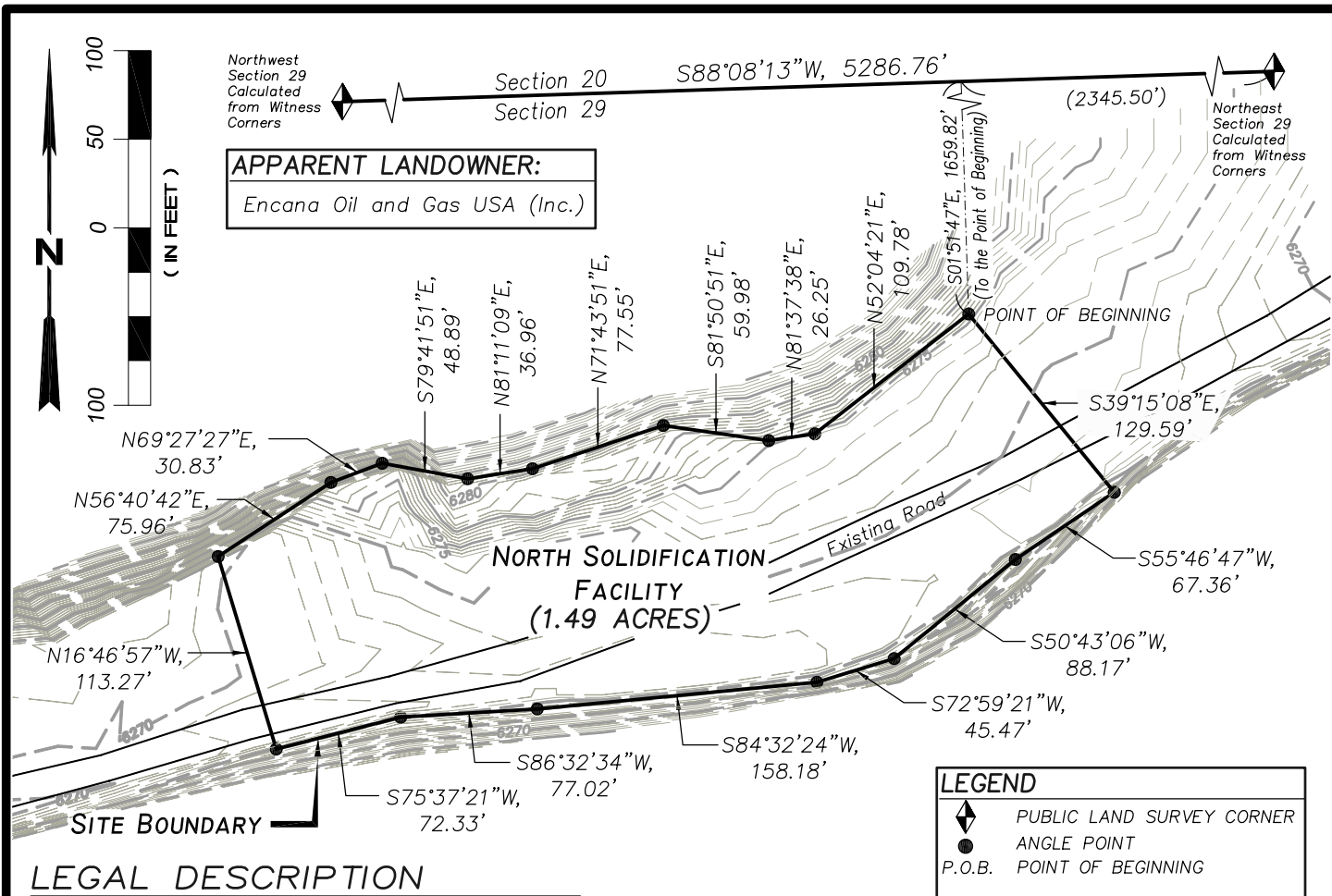


Encana Oil and Gas (USA) Inc.
North Solidification Facility
COGCC Form 28 Attachment Check List

Attachment	Description
A	Survey Plat and Legal Description
B	Climate and Stormwater Information
C	Engineering Drawings
D	Waste Profile
E	Landuse and Water Quality Information
F	Stormwater Management Plan
G	NSF Operating Plan
H	Contingency Plan
I	Closure Cost Estimate
J	Permit Documents

ATTACHMENT A

Survey Plat and Legal Description



LEGAL DESCRIPTION

A tract of land located in the SE1/4 NW1/4, and the SW1/4 NE1/4 of Section 29, T5S, R95W, 6th P.M., Garfield County, Colorado, being more particularly described as follows:

Commencing at the Northeast Corner of said Section 29 and running thence S88°08'13"W, 2345.50 feet along the North line thereof, thence S01°51'47"E, 1659.82 feet to the POINT OF BEGINNING; thence S39°15'08"E, 129.59 feet; thence S55°46'47"W, 67.36 feet; thence S50°43'06"W, 88.17 feet; thence S72°59'21"W, 45.47 feet; thence S84°32'24"W, 158.18 feet; thence S86°32'34"W, 77.02 feet; thence S75°37'21"W, 72.33 feet; thence N16°46'57"W, 113.27 feet; thence N56°40'42"E, 75.96 feet; thence N69°27'27"E, 30.83 feet; thence S79°41'51"E, 48.89 feet; thence N81°11'09"E, 36.96 feet; thence N71°43'51"E, 77.55 feet; thence S81°50'51"E, 59.98 feet; thence N81°37'38"E, 26.25 feet; thence N52°04'21"E, 109.78 feet to the POINT OF BEGINNING.


Said tract containing 1.49 Acres, more or less.

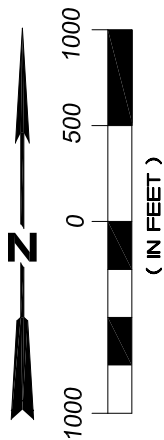
The base bearing for this survey being S88°08'13"W, 5286.76 feet between found monuments at the Northeast Corner and the Northwest Corner of Section 29, T5S, R95W, 6th P.M.

CERTIFICATE OF SURVEYOR

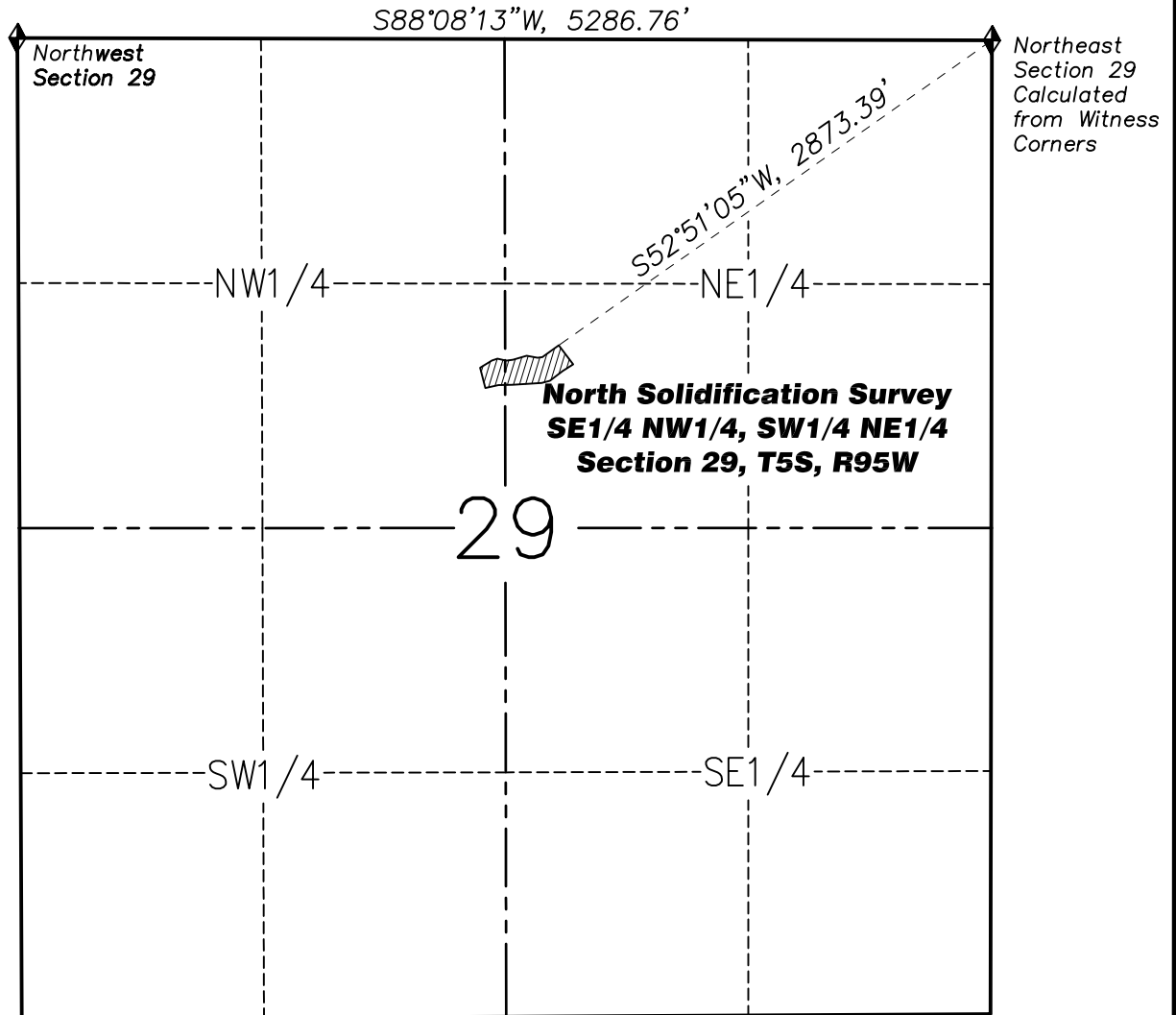
I, Ted Taggart of Fruita, Colorado hereby certify that this map was made from notes taken during an actual survey made by me or under my direction for Encana Oil & Gas (USA) Inc. and that the results of which are correctly shown hereon.




CLIENT: <i>Encana Oil & Gas (USA) Inc.</i>			DESCRIPTION: NORTH SOLIDIFICATION FACILITY LOCATED IN THE SE1/4 NW1/4 & THE SW1/4 NE1/4 OF SECTION 29, T5S, R95W, 6TH P.M. GARFIELD COUNTY, COLORADO	
SCALE: AS SHOWN	REVISION:	DRAWN BY: CJT	DATE DRAWN: 9/27/11	PROJECT NUMBER: 11-04-88
SURVEYED BY: 		WASATCH SURVEYING ASSOCIATES 906 MAIN STREET, EVANSTON, WY 82930 (307) 789-4545		EXHIBIT A
				SHEET 1 of 1



SUPPLEMENTAL MAP



The base bearing for this survey being $S88^{\circ}08'13''W$, 5286.76 feet
between the Northeast Corner and the Northwest Corner of Section 29,
T5S, R95W, 6th P.M.

CLIENT: Encana Oil & Gas (USA) Inc.			DESCRIPTION: NORTH SOLIDIFICATION FACILITY LOCATED IN THE SE1/4 NW1/4 & THE SW1/4 NE1/4 OF SECTION 29, T5S, R95W, 6TH P.M. GARFIELD COUNTY, COLORADO	
SCALE: AS SHOWN	REVISION:	DRAWN BY: SGT	DATE DRAWN: 3/28/12	PROJECT NUMBER: 11-04-88
SURVEYED BY: 		WASATCH SURVEYING ASSOCIATES 906 MAIN STREET, EVANSTON, WY 82930 (307) 789-4545		EXHIBIT A - Supplement SHEET 1 of 1

ATTACHMENT B

Climate and Stormwater Information

Back to:

**NOTE:**

To print data frame (right side), click on right frame before printing.

1981 - 2010

- [Daily Temp. & Precip.](#)
- [Daily Tabular data \(~23 KB\)](#)
- [Monthly Tabular data \(~1 KB\)](#)
- [NCDC 1981-2010 Normals \(~3 KB\)](#)

1971 - 2000

- [Daily Temp. & Precip.](#)
- [Daily Tabular data \(~23 KB\)](#)
- [Monthly Tabular data \(~1 KB\)](#)
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1961 - 1990

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- [Daily Tabular data \(~23 KB\)](#)
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- [NCDC 1961-1990 Normals \(~3 KB\)](#)

Period of Record

- [Station Metadata](#)
- [Station Metadata Graphics](#)

General Climate Summary Tables

- [Temperature](#)
- [Precipitation](#)
- [Heating Degree Days](#)
- [Cooling Degree Days](#)
- [Growing Degree Days](#)

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- [Daily Extremes and Averages](#)
- [Spring 'Freeze' Probabilities](#)
- [Fall 'Freeze' Probabilities](#)
- ['Freeze Free' Probabilities](#)
- [Monthly Temperature Listings](#)

[Average](#)[Average Maximum](#)[Average Minimum](#)**Precipitation**

- [Monthly Average](#)
- [Daily Extreme and Average](#)
- [Daily Average](#)
- [Precipitation Probability by Duration](#)
- [Precipitation Probability by Quantity](#)
- [Monthly Precipitation Listings](#)
- [Monthly Totals](#)

Snowfall

- [Daily Extreme and Average](#)
- [Daily Average](#)
- [Monthly Snowfall Listings](#)
- [Monthly Totals](#)

Snowdepth

- [Daily Extreme and Average](#)
- [Daily Average](#)

Heating Degree Days

- [Daily Average](#)

Cooling Degree Days

- [Daily Average](#)

Period of Record Data Tables

- [Daily Summary Stats \(~55 KB\)](#)
- [Monthly Tabular data \(~2 KB\)](#)

Western Regional Climate Center,
wrc@drcl.edu

RIFLE, COLORADO**Period of Record General Climate Summary - Precipitation**

Station:(057031) RIFLE														
From Year=1910 To Year=2004														
	Precipitation										Total Snowfall			
	Mean	High	Year	Low	Year	1 Day Max.	>= 0.01 in.	>= 0.10 in.	>= 0.50 in.	>= 1.00 in.	Mean	High	Year	
	in.	in.	-	in.	-	in.	# Days	# Days	# Days	# Days	in.	in.	-	
						dd/yyyy or yyyy-mm-dd								
January	0.86	2.75	1957	0.00	1919	1.30 27/1978	7	3	0	0	11.1	36.7	1988	
February	0.77	2.45	1996	0.05	1972	1.05 21/1996	7	3	0	0	7.7	35.6	1989	
March	0.95	3.04	1985	0.09	1915	0.92 20/1912	7	3	0	0	3.7	25.0	1985	
April	1.02	3.29	1999	0.08	1982	1.10 03/1934	7	3	0	0	0.8	9.0	1945	
May	1.00	3.22	1979	0.00	1936	1.41 20/1916	6	3	0	0	0.0	0.0	1912	
June	0.73	3.71	1984	0.00	1916	1.98 07/1984	4	2	0	0	0.0	0.0	1912	
July	1.02	2.63	1989	0.02	1960	1.40 29/1989	6	3	0	0	0.0	0.0	1912	
August	1.13	4.18	1957	0.10	1975	2.15 09/1930	7	4	0	0	0.0	0.0	1912	
September	1.11	3.30	1986	0.00	1956	1.76 12/1988	6	4	0	0	0.0	0.0	1911	
October	1.20	3.63	1969	0.00	1934	1.36 04/1914	6	3	1	0	0.5	5.5	1972	
November	0.89	3.59	1985	0.00	1976	1.21 26/1919	6	3	0	0	3.8	28.0	1985	
December	0.93	4.06	1951	0.02	1976	1.42 06/1966	7	3	0	0	11.1	50.9	1983	
Annual	11.61	21.76	1985	6.90	1960	2.15 19300809	77	38	4	0	38.6	104.1	1985	
Winter	2.56	5.84	1979	0.54	1931	1.42 19661206	20	9	1	0	29.8	77.0	1979	
Spring	2.96	7.19	1985	0.70	1936	1.41 19160520	21	10	1	0	4.5	25.0	1985	
Summer	2.88	8.20	1984	0.51	1962	2.15 19300809	18	9	1	0	0.0	0.0	1912	
Fall	3.20	8.28	1985	0.59	1952	1.76 19880912	18	10	1	0	4.3	28.0	1985	

Table updated on Jul 28, 2006

For monthly and annual means, thresholds, and sums:

Months with 5 or more missing days are not considered

Years with 1 or more missing months are not considered

Seasons are climatological not calendar seasons

Winter = Dec., Jan., and Feb. Spring = Mar., Apr., and May

Summer = Jun., Jul., and Aug. Fall = Sep., Oct., and Nov.

Western Regional Climate Center, wrc@drcl.edu

Back to:

[State Map](#)[Western U.S. map](#)[Home Page](#)**NOTE:**

To print data frame (right side), click on right frame before printing.

1981 - 2010

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- [Monthly Precipitation Listings](#)

[Monthly Totals](#)**Snowfall**

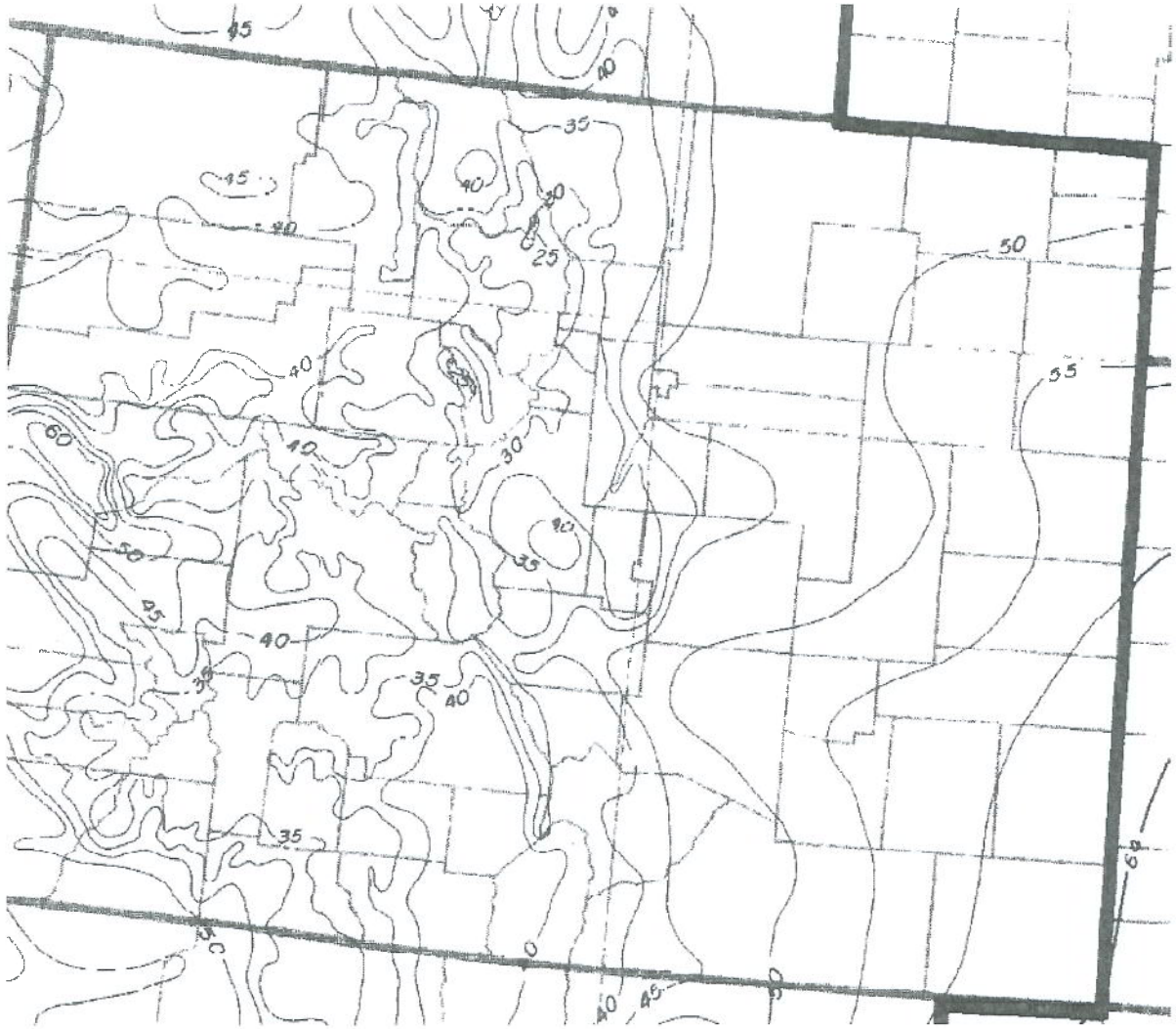
- [Daily Extreme and Average](#)
- [Daily Average](#)

RIFLE, COLORADO (057031)**Period of Record Monthly Climate Summary****Period of Record : 9/ 9/1910 to 12/31/2005**

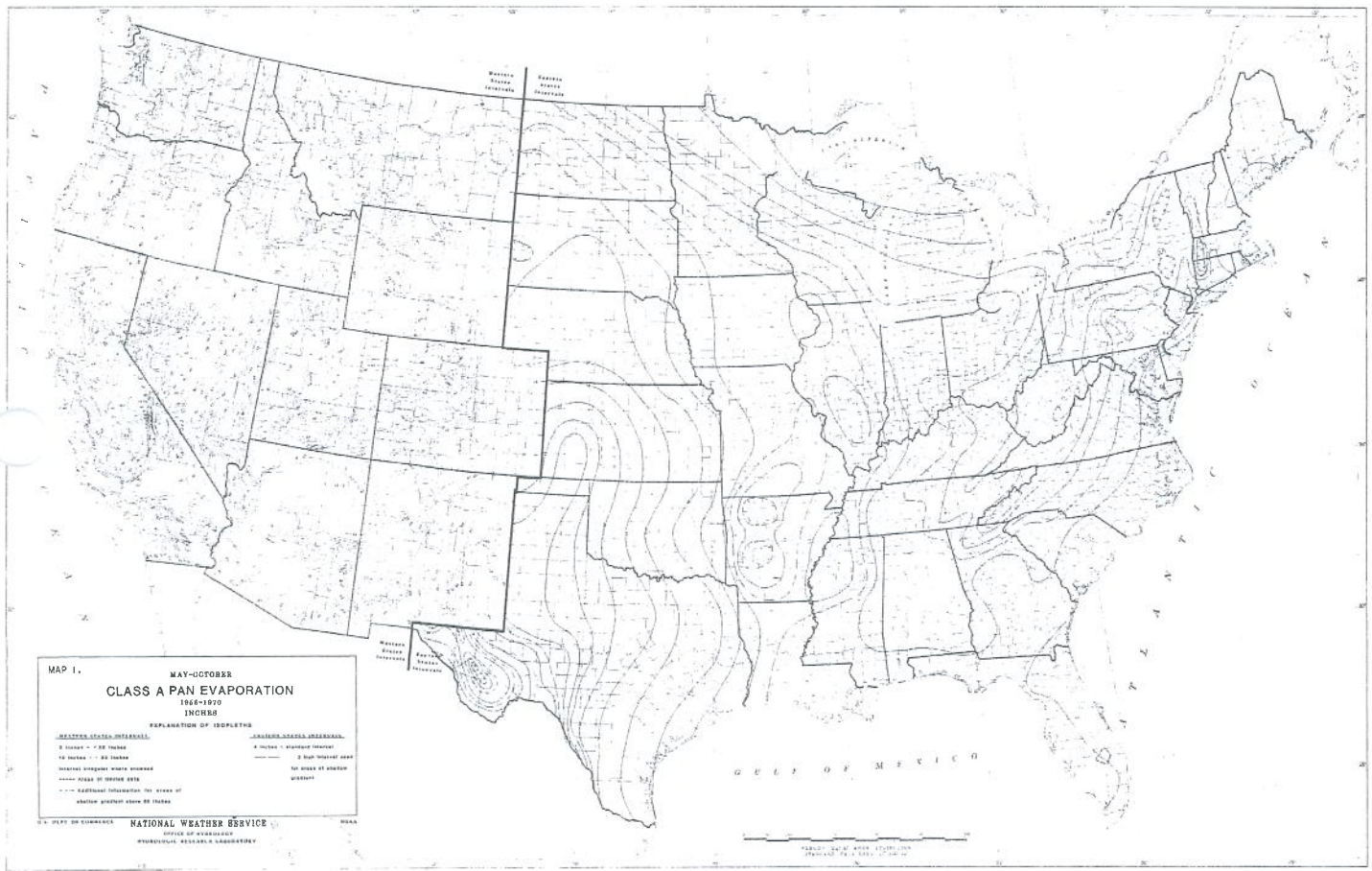
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average													
Max. Temperature (F)	36.8	43.8	53.7	64.2	74.0	84.0	90.2	87.6	79.4	67.3	51.4	39.4	64.3
Average Min. Temperature (F)	9.4	16.5	24.2	31.4	38.7	45.2	52.0	50.4	41.4	31.1	21.3	12.4	31.2
Average Total Precipitation (in.)	0.86	0.77	0.95	1.02	1.00	0.73	1.02	1.13	1.11	1.20	0.89	0.93	11.61
Average Total SnowFall (in.)	11.1	7.7	3.7	0.8	0.0	0.0	0.0	0.0	0.0	0.5	3.8	11.1	38.6
Average Snow Depth (in.)	4	3	0	0	0	0	0	0	0	0	0	2	1
Percent of possible observations for period of record.													
Max. Temp.: 92% Min. Temp.: 91.7% Precipitation: 90.7% Snowfall: 87.3%													
Snow Depth: 81.7%													
Check Station Metadata or Metadata graphics for more detail about data completeness.													

Western Regional Climate Center, wrcc@dri.edu

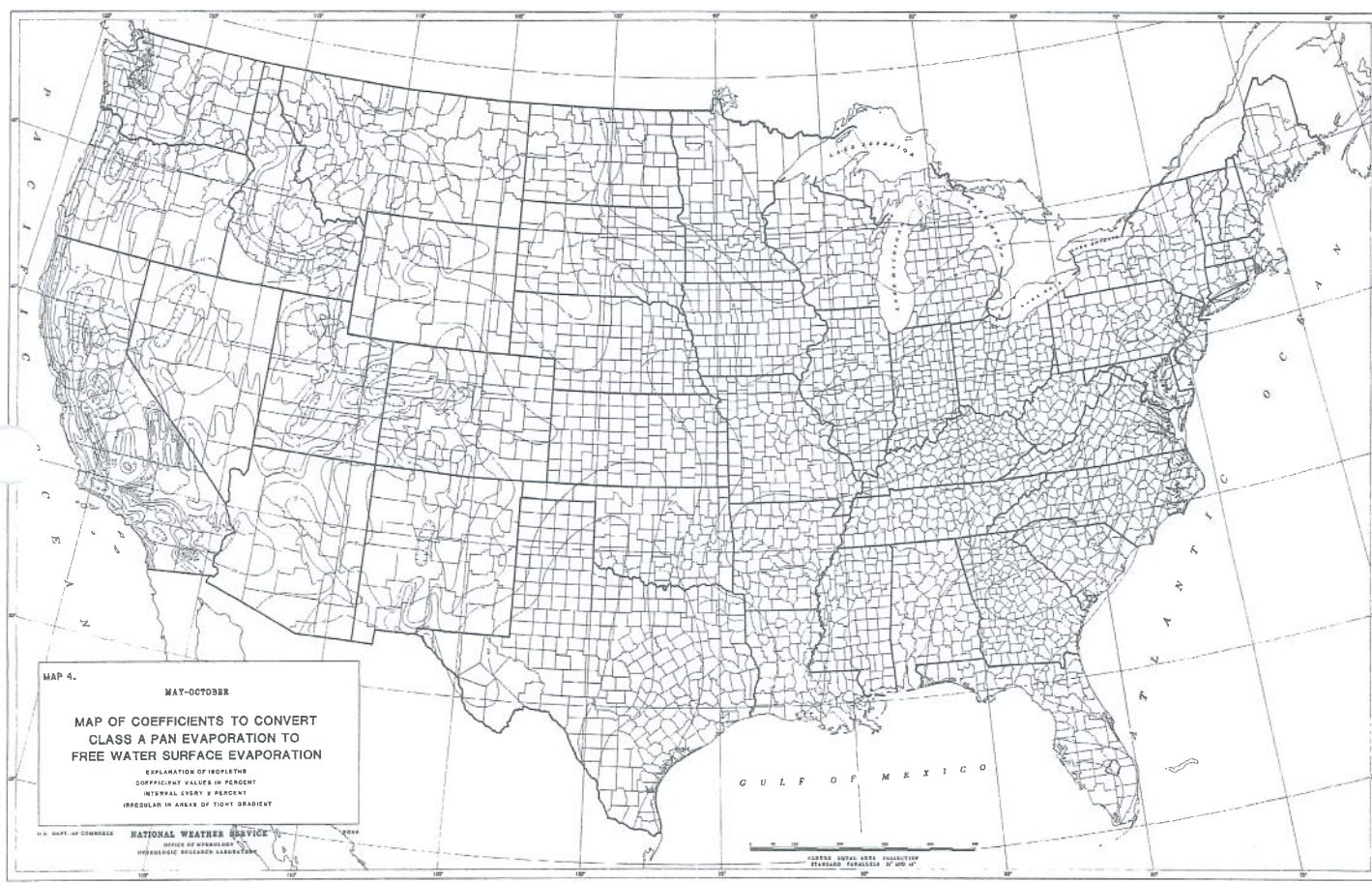
Monthly Pan Evaporation Rates



Excerpted from the *Class A Evaporation Map* prepared by the National Weather Service (NOAA Technical Report NWS 33).







COLORADO

MONTHLY AVERAGE PAN EVAPORATION (INCHES)

	PERIOD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
	OF RECORD													
AKRON 4 E	1918-2005	0.00	0.00	0.00	7.30	9.29	11.43	13.26	11.16	9.09	6.16	0.00	0.00	67.69
ALAMOSA WSO AP	1948-2005	0.00	0.00	0.00	7.06	9.01	10.08	9.16	7.81	6.40	4.39	0.00	0.00	53.91
ARBOLES	1957-1963	0.00	0.00	0.00	5.41	7.95	9.56	9.78	8.61	6.52	0.00	0.00	0.00	47.83
BONNY LAKE	1949-2005	0.00	0.00	0.00	7.26	8.69	10.86	11.78	10.61	8.12	6.12	4.57	0.00	68.01
CLIMAX	1949-2005	0.00	0.00	0.00	0.00	0.00	5.36	5.32	4.44	3.41	0.00	0.00	0.00	18.53
CONEJOS 3 NNW	1948-1960	0.00	0.00	0.00	6.30	7.14	7.67	7.41	6.87	7.19	5.74	0.00	0.00	48.32
ESTES PARK	1948-1994	0.00	0.00	0.00	5.78	5.26	7.09	7.13	6.15	5.04	4.04	0.00	0.00	40.49
FORT COLLINS	1900-2005	0.00	0.00	2.50	4.52	5.42	6.32	6.92	6.07	4.74	3.07	1.48	0.00	41.04
GRAND JUNCTION WALKER	1900-2005	0.00	0.00	4.67	8.53	12.18	15.96	16.53	14.02	10.98	7.05	2.42	0.00	92.34
GRAND JUNCTION 6 ESE	1962-2005	0.00	0.00	0.00	6.60	9.29	11.77	12.01	10.24	7.48	4.65	2.09	0.00	64.13
GRAND LAKE 6 SSW	1948-2005	0.00	0.00	0.00	4.82	7.75	7.81	6.79	5.24	5.24	3.10	0.00	0.00	35.51
GREEN MOUNTAIN DAM	1948-2005	0.00	0.00	0.00	0.00	4.96	6.56	6.93	5.90	4.65	2.90	0.00	0.00	31.90
JOHN MARTIN DAM	1941-2005	0.00	0.00	6.40	8.04	9.67	11.30	12.31	10.28	7.82	5.61	2.78	0.00	74.21
LAKE GEORGE 8 SW	1948-2005	0.00	0.00	0.00	0.00	5.15	8.26	7.39	6.02	5.72	0.00	0.00	0.00	32.54
MEREDITH	1963-2005	0.00	0.00	0.00	0.00	7.69	8.26	8.34	6.96	5.25	3.21	0.00	0.00	39.71
MONTROSE 1	1948-1982	1.68	1.49	3.34	5.69	7.49	9.47	9.04	7.39	5.54	3.45	1.61	1.26	57.45
PLATORO	1949-1991	0.00	0.00	0.00	0.00	5.86	8.10	6.57	5.24	5.52	3.33	0.00	0.00	34.62
PUEBLO WSO AP	1954-2005	0.00	0.00	0.00	8.71	9.50	11.51	12.14	10.41	8.17	6.14	0.00	0.00	66.58
PUEBLO CITY RESERVOIR	1948-1971	0.00	5.13	5.86	6.85	8.81	10.09	10.60	8.85	7.43	5.30	2.99	2.71	74.62
PUEBLO RESERVOIR	1975-2005	0.00	0.00	0.00	7.18	9.34	10.87	11.58	9.92	7.90	5.88	0.00	0.00	62.67
PUEBLO 6 SSW	1971-1985	0.00	0.00	4.82	7.47	8.57	10.65	11.30	9.40	7.13	5.53	0.00	0.00	64.87
SAN LUIS LAKES 3W	1948-1955	0.00	0.00	4.50	6.07	8.51	9.88	8.49	7.77	6.57	4.53	0.00	0.00	56.32
SPRINGFIELD 7 WSW	1956-2002	0.00	0.00	0.00	7.85	9.73	11.44	12.69	11.28	8.53	6.29	4.57	0.00	72.38
SUGARLOAF RESERVOIR	1948-2005	0.00	0.00	0.00	0.00	0.00	7.03	6.15	4.97	4.15	2.93	0.00	0.00	25.23
TRINIDAD LAKE	1989-2005	0.00	0.00	0.00	6.75	9.04	10.55	9.88	8.27	7.65	6.17	3.92	2.21	64.44
TWIN LAKES RESERVOIR	1949-2005	0.00	0.00	0.00	0.00	6.93	8.65	7.92	6.79	5.33	3.96	0.00	0.00	39.58
VALLECITO DAM	1948-2005	0.00	0.00	1.91	3.82	5.29	6.22	6.09	5.31	4.39	3.04	1.60	0.00	37.67
WAGON WHEEL GAP 3 N	1948-1972	0.00	0.00	0.00	0.00	6.69	7.90	7.15	5.81	5.30	2.61	0.00	0.00	35.46
WALSH 1 W	1951-2005	0.00	0.00	0.00	10.78	12.35	12.76	11.63	9.42	6.88	0.00	0.00	0.00	63.82
WIGGINS 7 SW	1960-1971	0.00	0.00	0.00	6.82	8.50	8.42	9.97	8.09	5.87	4.22	2.23	0.00	54.12

U.S. DEPARTMENT OF COMMERCE
LUTHER H. HODGES, Secretary

WEATHER BUREAU
F. W. REICHELDERFER, Chief

TECHNICAL PAPER NO. 40

RAINFALL FREQUENCY ATLAS OF THE UNITED STATES
for Durations from 30 Minutes to 24 Hours and
Return Periods from 1 to 100 Years

Prepared by
DAVID M. HERSHFELD
Cooperative Studies Section, Hydrologic Services Division
for
Engineering Division, Soil Conservation Service
U.S. Department of Agriculture

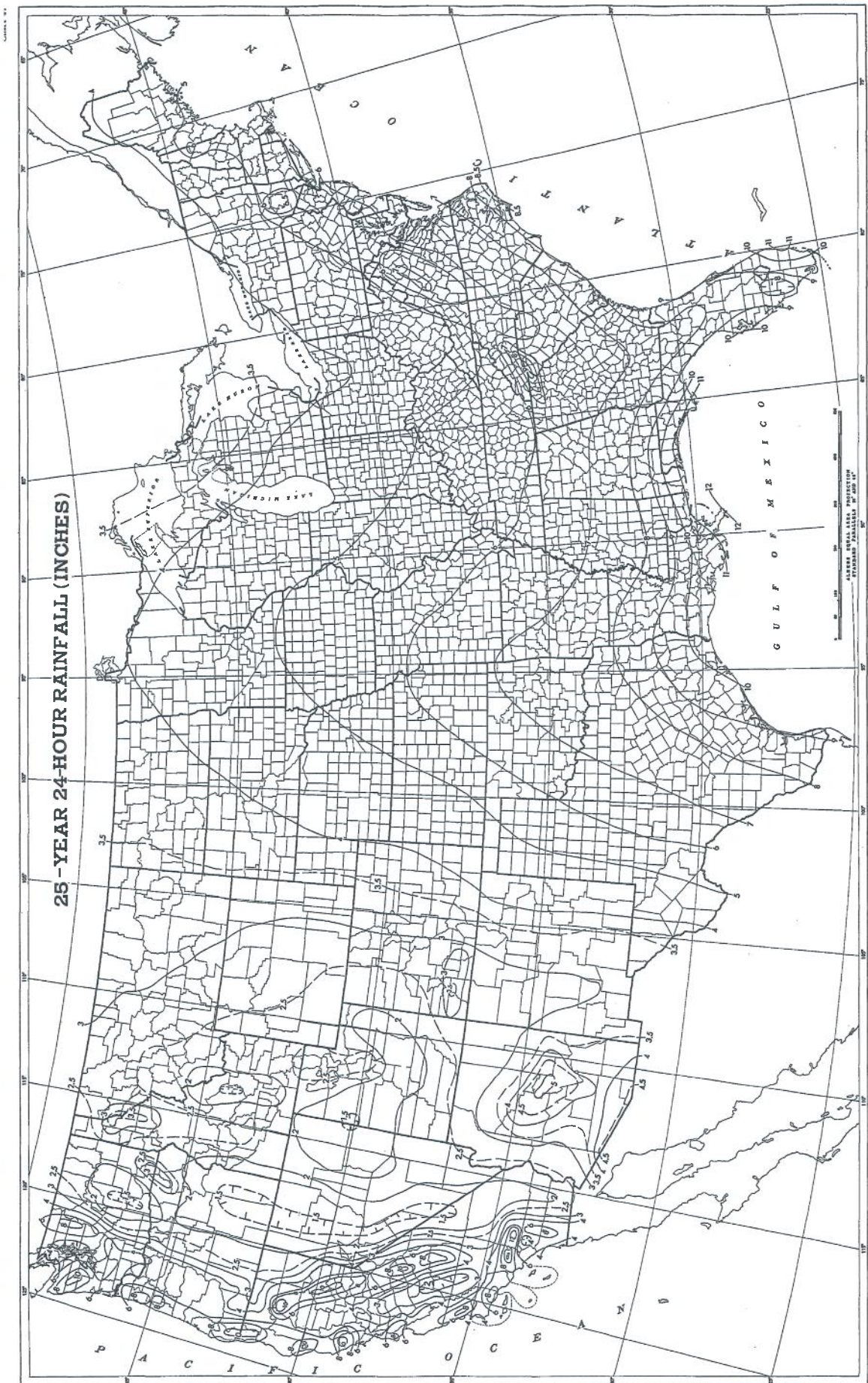


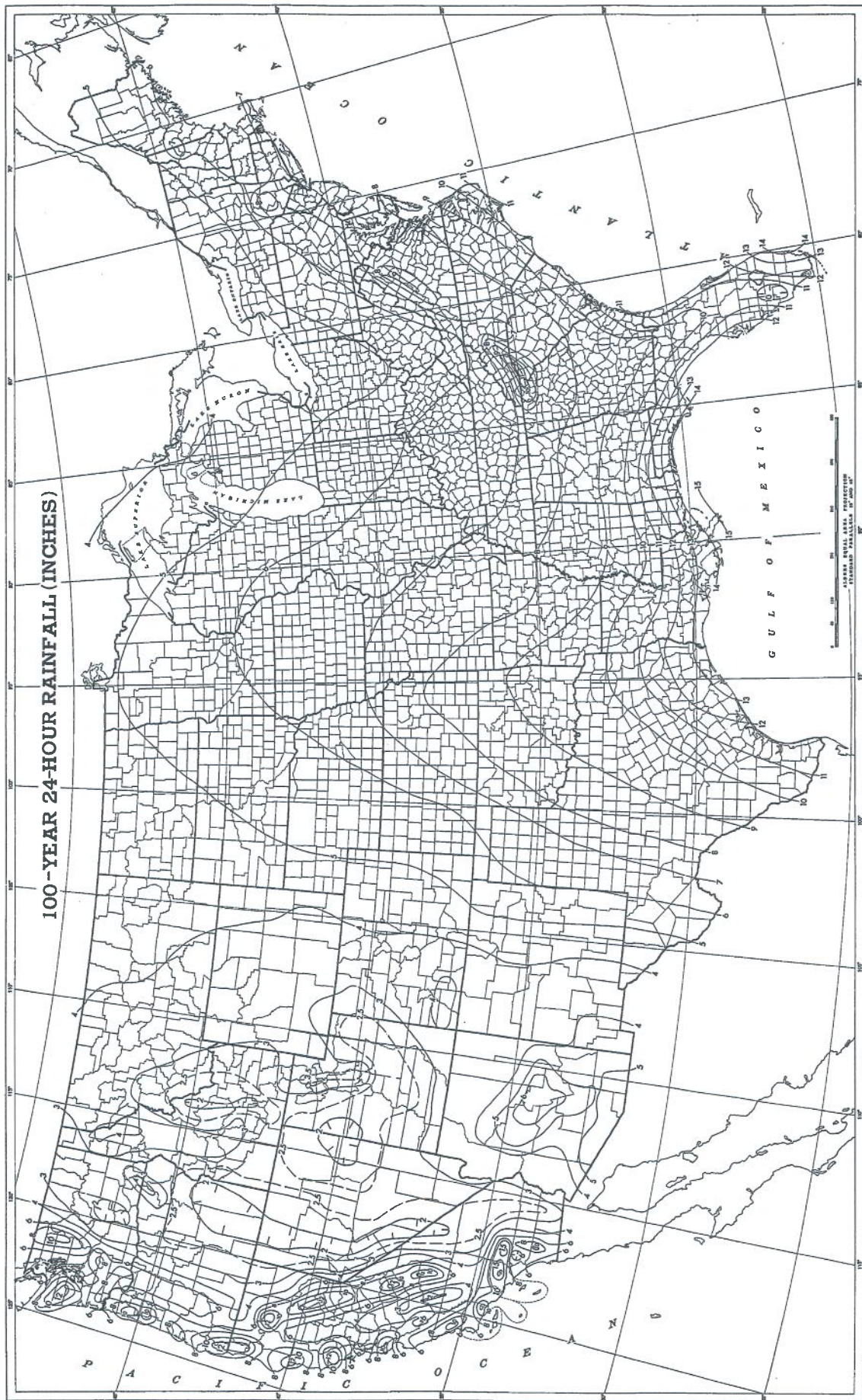
WASHINGTON, D.C.

May 1961

Repaginated and Reprinted January 1963

For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington 25, D.C. Price \$1.25





NSF run-off Containment Calculations

Buffer and Containment Area

$$75' \times 80' = 6,000 \text{ ft}^2$$

less

$$\text{Waste storage bin} = 20' \times 20' = 400 \text{ ft}^2$$

$$\text{Mixing bin} = 10' \times 38' = 380 \text{ ft}^2$$

$$\text{Total Area} = \boxed{5,220 \text{ ft}^2}$$

Rainfall 25 yr 24 hr event 2.5" (0.21') NOAA Tech

Infiltration 24 hr - gravel surface 0.15' Paper 40
Professional Engineer

$$\text{Runoff 24 hr} \quad 0.21' - 0.15' = 0.06'$$

$$25 \text{ yr 24 hr runoff Volume} \quad 6000 \text{ ft}^2 \times 0.06' = 360 \text{ ft}^3$$

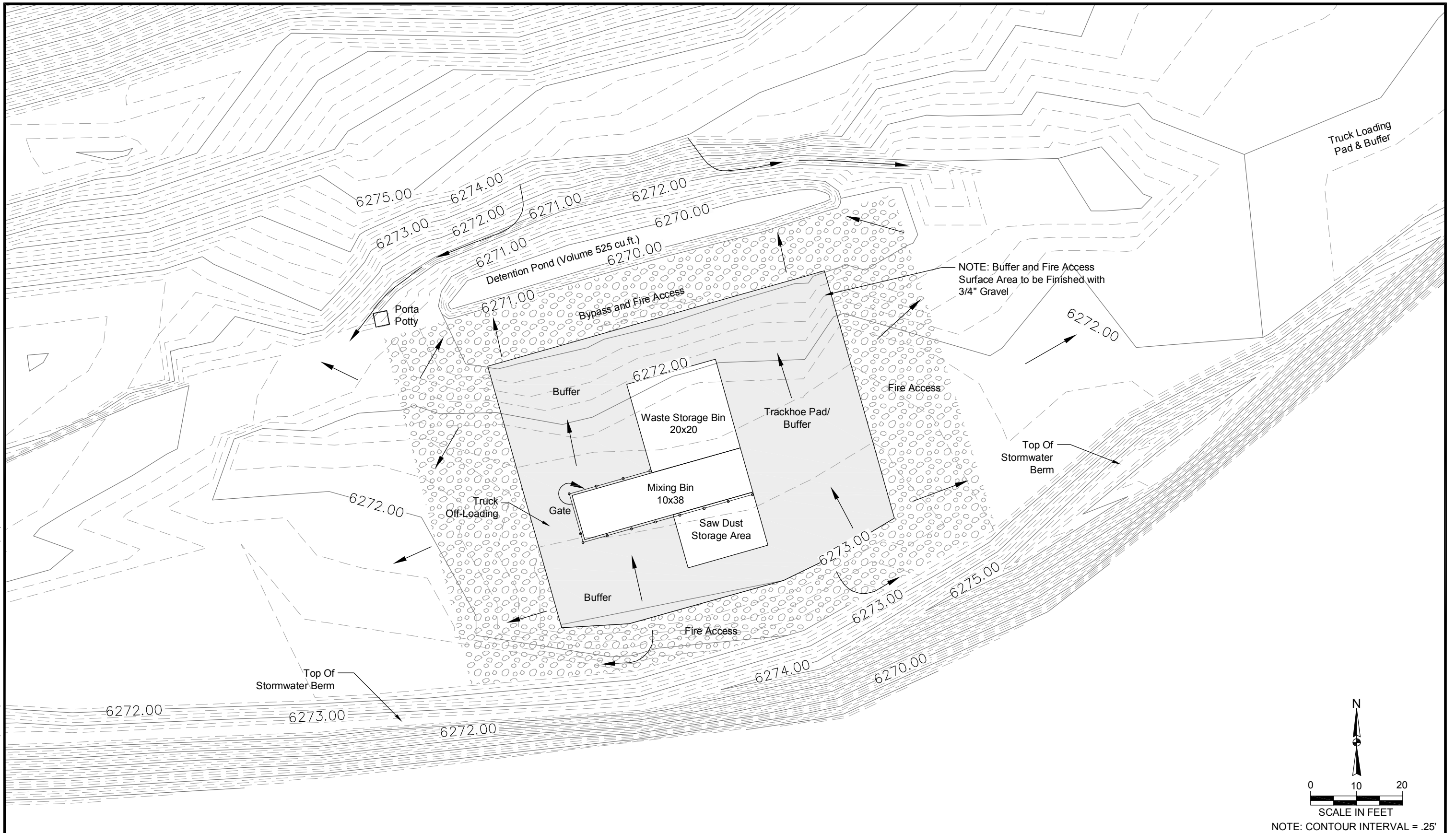
$$\text{" " " "less bins} \quad 5220 \text{ ft}^2 \times 0.06' = 313 \text{ ft}^3$$

Detention Basin volume required $\sim 350 \text{ ft}^3$

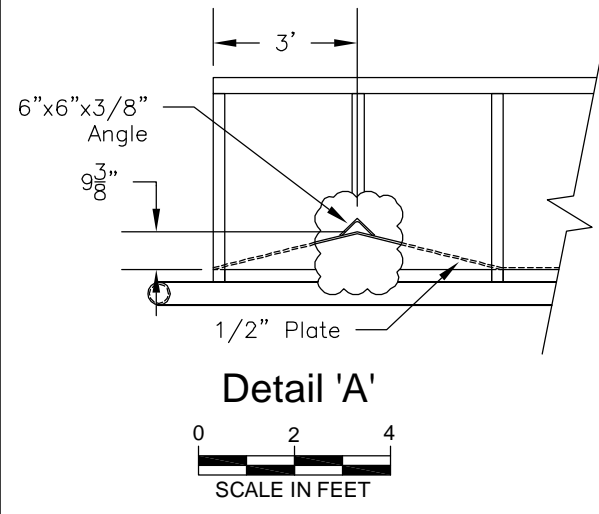
ATTACHMENT C

Engineering Drawings

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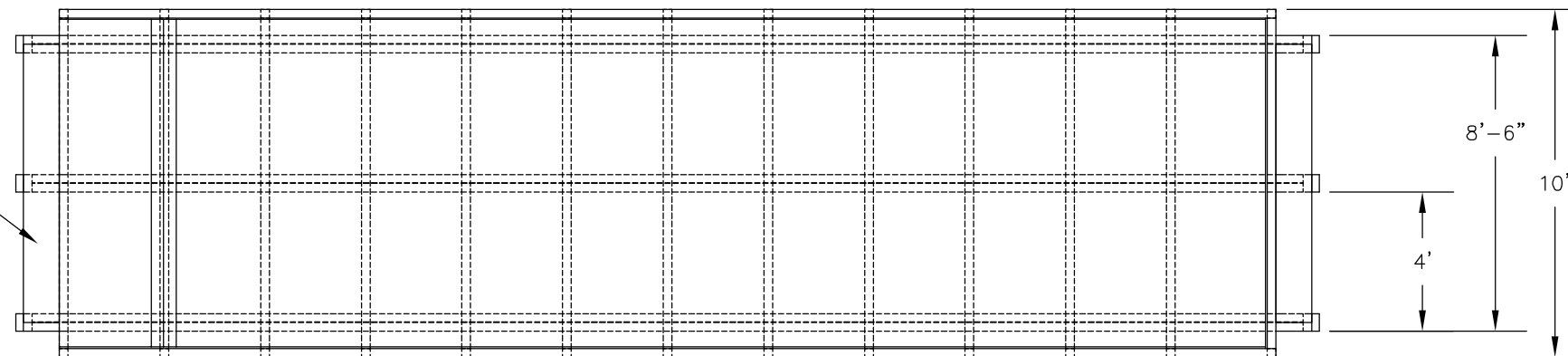


M:\CLIENTS\RULE\NORTH-SOLIDIFICATION-FACILITY\DESIGN\MIXING-BIN.DWG-LAYOUT1 03/23/2012 3:09PM

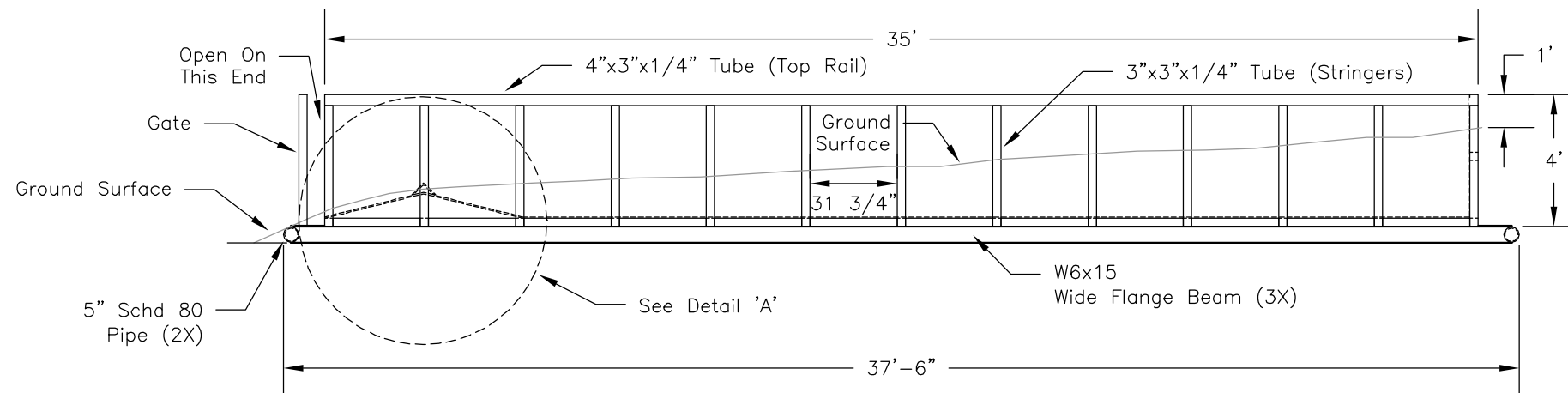


1/2" Plate Filler (2X Typ.)

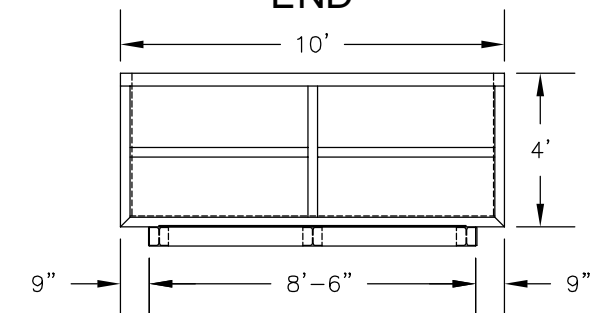
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SIDE

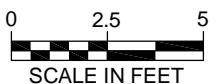


END



NOTES: Bin to be Covered With Removable Bird Netting

NOTES: Interior Sides and Floor 1/2" Plate
Interior Welds To Be Water Tight
Close All Tubing Ends



Rule Engineering, LLC
Solutions to Regulations for Industry



North Solidification Facility
Mixing Bin

NOTE: Shop Drawing From 2K Waste Containers, Inc.

DATE: 3/23/12

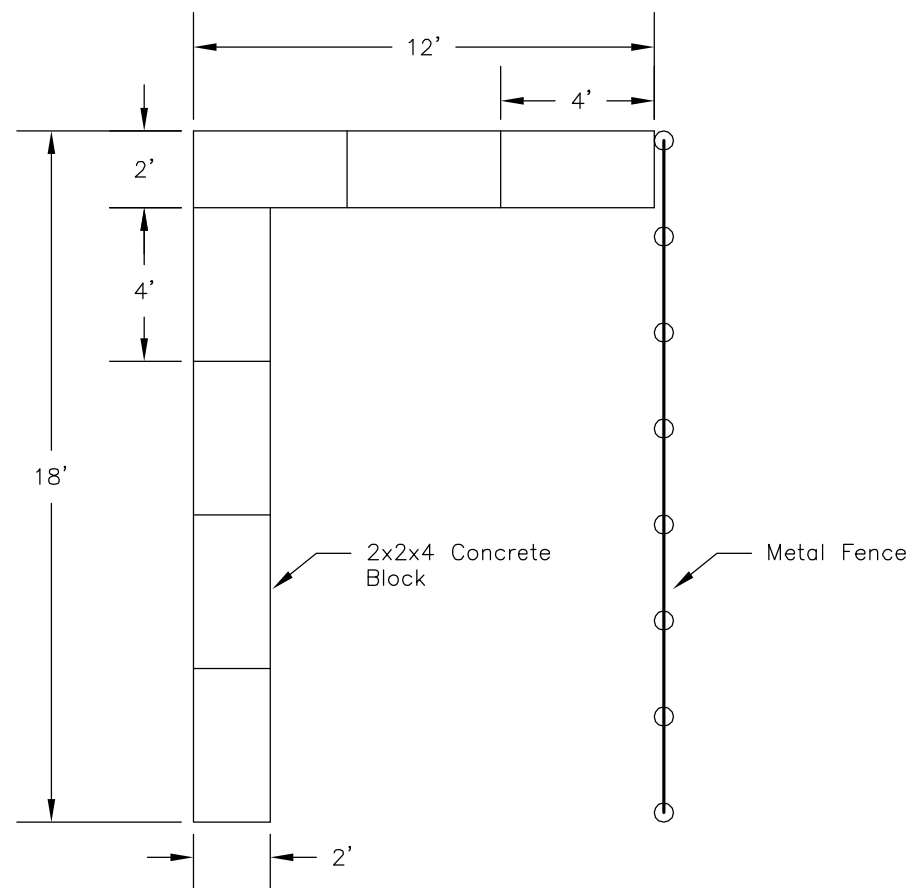
FILE: Mixing-Bin.dwg

FIGURE: C2

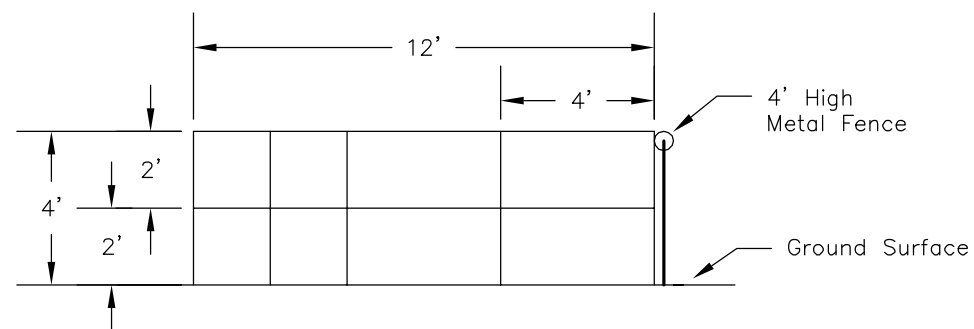
M:\CLIENTS\RULE\NORTH-SOLIDIFICATION-FACILITY\DESIGN\STORAGE-BIN.DWG-LAYOUT1 03/23/2012 3:07PM

SAWDUST STORAGE

TOP

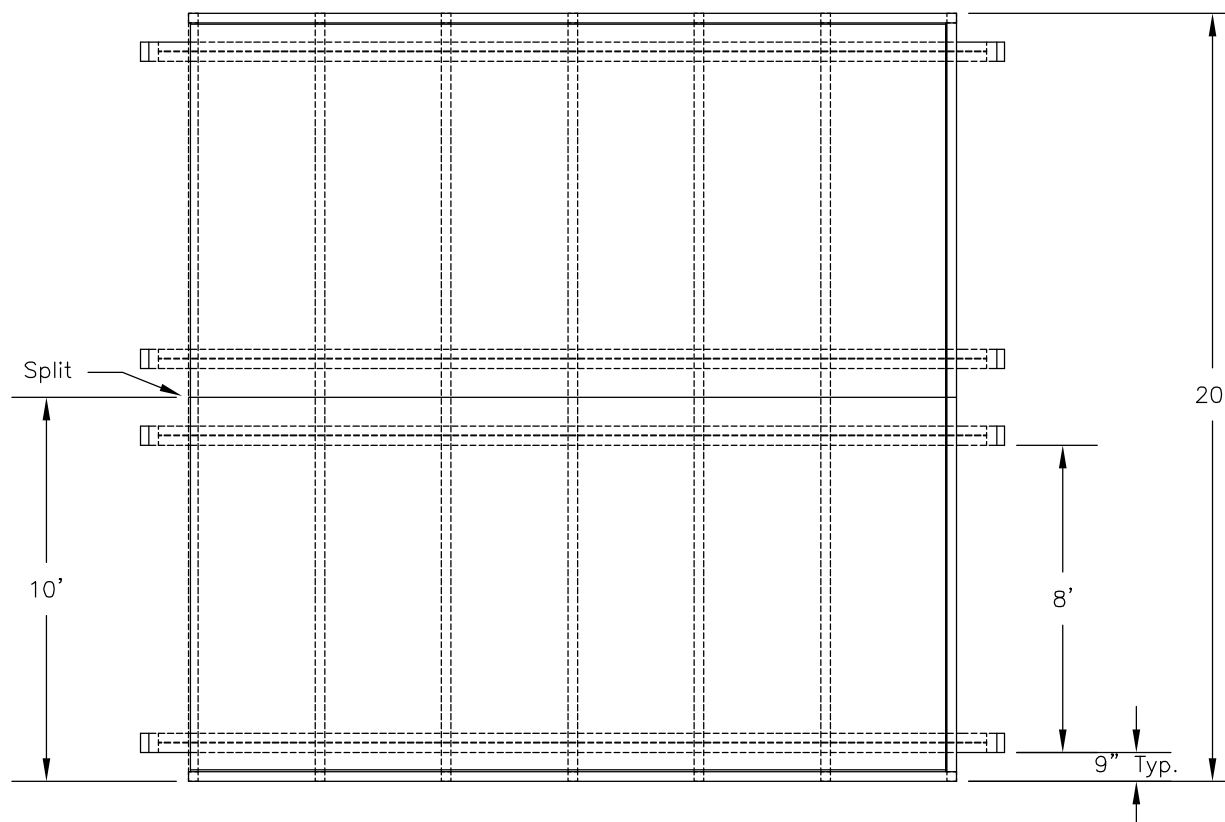


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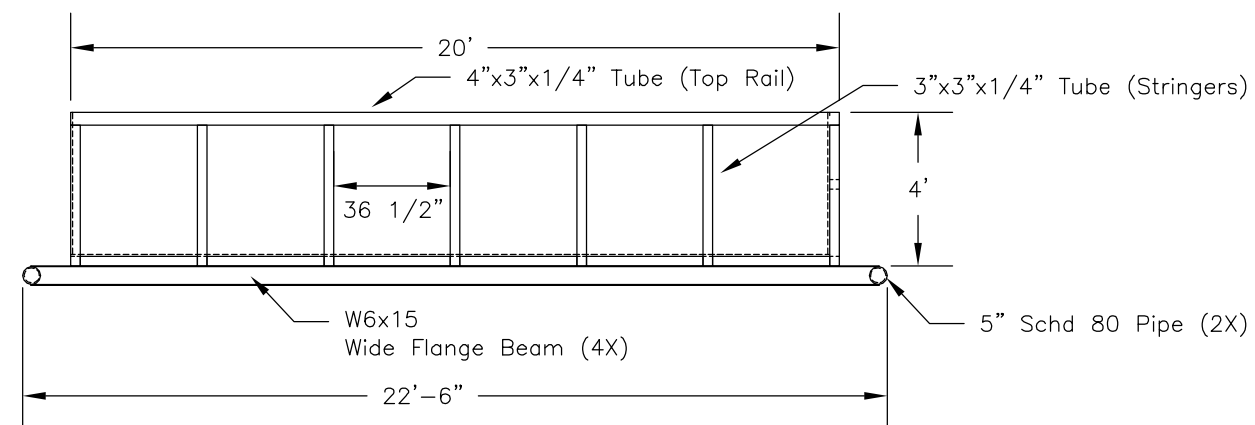


STORAGE BIN

TOP



SIDE



NOTES: Build In 2 Pieces and Field Weld Together
Interior Sides and Floor 1/2" Plate
Interior Welds To Be Water Tight
Close All Tubing Ends



ATTACHMENT D

Waste Profile

March 29, 2012

Mr. Brett Middleton
Encana Oil & Gas (USA)
2717 County Road 215, suite 100
Parachute, CO 81635

Re: Encana NSF Waste Characterization

Dear Mr. Middleton:

The characterization of the Waste Streams to be managed at the North Parachute Ranch (NPR) Solidification Facility by Encana Oil and Gas (USA), Inc. (Encana) is summarized in this letter by Rule Engineering, LLC (Rule). The objective was to sample the Exploration and Production (E&P) Waste Streams that will be managed at the NSF in order to develop a profile of the waste characteristics. The solids from the Waste Streams generated by Encana's operations are currently being disposed of at offsite commercial waste disposal facilities. The liquids from the Waste Streams will be transported to the Encana NPR Water Treatment Facility for treatment.. The Waste Streams to be managed at the NSF are:

- Frac Tank Bottoms
- Production Tank Bottoms
- Drilling Pit Bottoms (solids above the liner)

Figure 1 is a Process Flow Diagram that illustrates the management of the wastes at the NSF. Summary Tables are provided with the results of the waste characterization laboratory analysis. Analytical Laboratory Reports and Chain of Custody's (COC's) for the sampling are provided in Appendix A. (Note some waste streams not managed by Encana at the NSF were also analyzed by the laboratory in the included reports but are not discussed for the purposes of the Waste Stream Characterization for this facility)

Sampling Activities

Sampling was conducted to characterize each of the above mentioned Waste Streams for the NSF. A total of three Waste Stream samples were collected:

- North Frac Tank Bottoms & Produced Tank Bottoms(operations north of I-70)

- South Frac Tank Bottoms and Produced Tank Bottoms (operations south of I-70)
- Drilling Pit Bottoms

North Frac Tank Bottom & Produced Tank Bottoms

The North Frac Tank Bottom & Produced Tank Bottoms waste was sampled on July 5, 2011. A stockpile of approximately 11 cubic yards of material was sampled. A total of four composite samples were collected from the stockpile. The sample was identified as NPR-SLO-070511. The analytical results are provided in Table 1.

South Frac Tank Bottom & Produced Tank Bottoms

The South Frac Tank Bottom & Produced Tank Bottoms waste was sampled on July 5, 2011. A stockpile of approximately 9 cubic yards of material was sampled. A total of three composite samples were collected from the stockpile. The sample was identified as HM-SLO-070511. The analytical results are provided in Table 2.

Pit Bottoms

The Pit Bottoms waste was sampled on July 13, 2011 from the Encana NO7 pit. A stockpile of approximately 1.75 cubic yards of was sampled. A total of three composites samples were collected from the stockpile. The sample was identified as NPR-LO-PB-071311. The analytical results are provided in Table 3.

Sampling and Analytical Protocols

The samples were taken within each waste pile area by removing the overburden waste and sampling with a nitrile glove directly from each sample location. The samples collected each location were composited by mixing in a stainless steel bowl. Sample collection was documented in field notes, and chain of custody forms. Samples were placed on ice in a cooler and transported to the laboratory by overnight shipment.

The waste samples were analyzed by ESC (Environmental Science Corporation) for the following parameters by the indicated analytical methods:

- Corrosivity (Method 9045D);
- Chromium-Hexavalent, Chromium-Trivalent (Method 3060A/7196A, Calculation respectively);
- Ignitability, Burn Rate (Method D93/1010A, 1030B respectively);
- ORP (Method 2580);
- pH (Method 9045D)
- Paint Filter Test (Method 9095B);
- Reactive CN (Method 9012B);

Mr. Brett Middleton
NSF Waste Streams Characterization
March 29, 2012
Page 3 of 3

- Reactive Sulfide (Method 9034/9030B);
- Sodium Adsorption Ratio (Method Calculation);
- Specific Conductance (Method 9050AMod);
- Metals: Hg, As, Ba, Cd, Cr, Cu, Pb, Ni, Se, Ag, Zn (Method 6010B)
- TPH (method(s) GRO, 3546/DRO);
- Methanol, Ethanol (Method 8015M)
- VOC's, SVOC's (Method 8260B, 8270C respectively)
- TCLP Hg, As, Ba, Cd, Cr, Cu, Pb, Se, Ag (Method 7470B-Hg, 6010B)

Samples were received in good condition, at appropriate temperatures, and analyzed within appropriate holding times.

Rule Engineering appreciates the opportunity to provide services to Encana Inc. If you have any questions please contact me at 970-244-8500.

Sincerely,
Rule Engineering, LLC

Scotty Mann
Hydrogeologist/Project Manager

cc: Russell Knight – Rule

ATTACHMENT E

Land Use and Water Quality Information

SL-01 ✓
Unocal Corporation
Real Estate, Remediation Services, Mining Operations
546 Main St. #404
Grand Junction, Colorado 81501
Telephone: (970) 241-7632
Facsimile (970) 241-0065

RECEIVED

JUL 22 2002 ✓

Division of Minerals and Geology

UNOCAL 76 ✓

July 18, 2002

Richard L. Brammer
Area Manager
Eastern Region

Colorado Department of Natural Resources
Division of Mineral and Geology
1313 Sherman St. Room 215
Denver, CO 80203

Permit No. M-1978-263-UG ✓

Dear Greg:

✓
Here is the request of release for the permit associated with the Long Ridge Shale Oil Mine. It has been a long time coming and hope that this is adequate and conclusive for the termination of the reclamation bond, or at least a big reduction of future commitment for Unocal.

In reality, this is sad. A big part of life has been involved in this place.

When you and Carl want to make the last trip, please let me know.

Sincerely,


Richard Brammer

NOV = NONE
AF = 8/2/02

**Notice of Completion of Reclamation and Request for
Release of Reclamation Responsibility for the
Parachute Creek Shale Oil Program
Permit No. M78-263-UG**

The Unocal Corporation (Unocal) has completed reclamation obligations pertaining to the Parachute Creek Shale Oil Program (Colorado Mined Land Reclamation Board Permit No. M78-263-UG). Reclamation with respect to all Affected Lands within the Phase I Permit Area has been completed in accordance with the requirements of the Colorado Mined Land Reclamation Act; Mineral Rules and Regulations of the Colorado Mined Land Reclamation Board for Hard Rock, Metal and Designated Mining Operations; and the approved Reclamation Plan for Phase I of the Parachute Creek Shale Oil Program. Although Phase II of the program was permitted through the Colorado Mined Land Reclamation Board (MLRB), Phase II operations were not implemented, and therefore, reclamation was not necessary for the proposed Phase II operations.

This Notice provides the information required under Rule 4.16 (Release of Performance and Financial Warranties for Mining Operations) of the MLRB Mineral Rules and Regulations for Hard Rock, Metal and Designated Mining Operations. In addition, the Notice presents general descriptions of operational activities, a summary of reclamation actions, and a number of photographs documenting the completion of reclamation.

Owners of Record to All Affected Lands

Unocal is the sole owner of record to all affected lands and may be contacted at the following address.

Unocal Corporation
Real Estate, Remediation Services, Mining Operations
546 Main Street, No. 404
Grand Junction, Colorado 81501

Attention: Richard L. Brammer
(970) 241-7632 (extension 222)

Background

Unocal's MLRB-permitted area for the Parachute Creek Shale Oil Program is located approximately 11 miles north of the Town of Parachute, Colorado. The permit area encompasses approximately 5,280 acres and includes the western portion of Long Ridge, southern portion of the Middle Fork of Parachute Creek valley, and western portion of the East Fork of Parachute Creek valley (Figure 1). The permit area lies entirely within lands owned by Unocal.

Unocal was issued a reclamation permit for the Long Ridge Mine (a component of the Parachute Creek Shale Oil Program) on August 2, 1978. Three Amendments and 23 Technical Revisions were approved by the MLRB during the duration of the permit. A summary of the Technical Revisions and Amendments are presented in Tables 1 and 2, respectively. Several of the actions approved under the Technical Revisions and Amendments were never implemented by Unocal.

Table 1: Summary of Technical Revisions to Permit No. M-78-263UG

Technical Revision	Description
TR-1	Access roads and mine bench construction
TR-2	Withdrawn
TR-3	Affected lands area modification
TR-4	Water well No. 4 and pipeline configuration and raw shale oil pipeline
TR-5	Power line re-routing and addition of surge pond
TR-6	Temporary storage of topsoil within retorted shale pile footprint
TR-7	Realignment of maintenance access road in East Fork valley
TR-8	Retorted shale pile design
TR-9	Addition of topsoil stockpile in the East Fork area
TR-10	Extension of East Fork access road
TR-11	Drainage control along mine access, wetter, and East Fork roads
TR-12	Lean-grade oil shale adit
TR-13	Disposal of partially retorted (off-spec.) shale
TR-14	Use of topsoil to reclaim retorted shale disposal area
TR-15	Withdrawn
TR-16	Change in retorted shale handling
TR-17	Retorted shale pile drainage ditch modification
TR-18	Wetter bench access road modification
TR-19	Construct/operate Surge Water Pond and use of pond water for dust control
TR-20	Construction of two additional mine ventilation adits
TR-21	Changes in monitoring and reporting of hydrologic data
TR-22	Change in permit operating status from continued operation to intermittent operation
TR-23	Relocation of meteorological station and climatologic parameter monitoring
TR-24	Reduction of monitoring program and reporting frequency
TR-25	Underground disposal of non-hazardous material from Temporary Basin No. 3

Table 2: Summary of Amendments to Permit No. M-78-263UG

Amendment	Description
Amendment 1	Expansion of mining on Long Ridge and construction of new mine and retorts on Old Mountain
Amendment 2	Addition of six acres of land to the permit area and work necessary to stabilize the stream bank along a portion of the Middle Fork of Parachute Creek
Amendment 3	Disposal of Unishale C (de-carbonized shale) on Long Ridge

Unocal suspended production operations at the mine in 1991. Technical Revision 22, which was approved by the MLRB in 1991, led to a change in the mine's permit status to "intermittent operations". Since that time, onsite activities have focused on site reclamation and environmental monitoring.

Unocal will continue to conduct proper land stewardship through continued management of the property following release of its reclamation responsibilities at the site. Under mutual agreement with the Colorado Division of Wildlife, Unocal will prevent domestic livestock use of the property to allow continued evaluation of wildlife population trends in the area.

Summary of Operational Activities and Reclamation Actions

The Reclamation Plan described 11 separate features/areas that were to be reclaimed following cessation of site activities. The features/areas identified in the Reclamation Plan included the following:

1. East Fork Disposal Area
2. Long Ridge Disposal Area and Associated Facilities
3. Retort Facility
4. Wetter Facility and Road
5. Mine Portals
6. Union Meadow and Ranch Area
7. East Fork Roads, Retorted Shale Drainage Ditch, and Retorted Shale Drainage Pond
8. Long Ridge Mine Road
9. Long Ridge Access Road
10. Utilities
11. Surge Pond

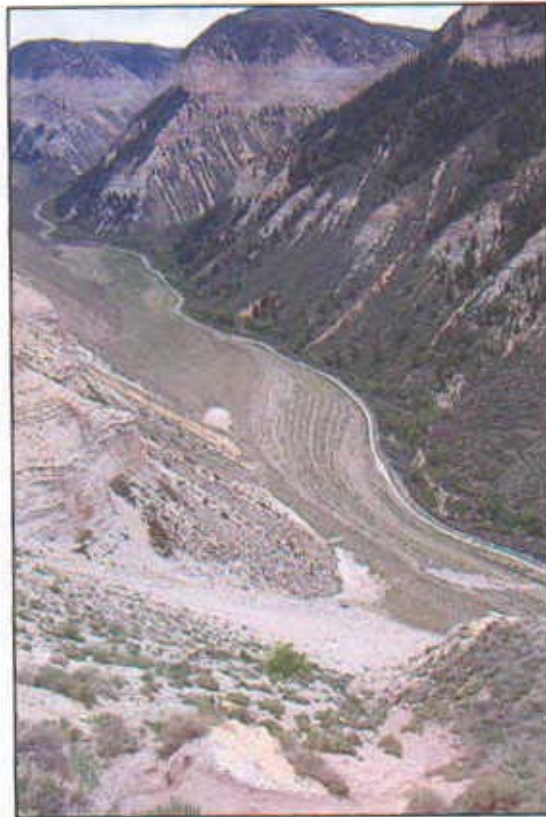
Operational activities and the reclamation actions completed for each of these features/areas are discussed separately below.

East Fork Disposal Area

The East Fork Disposal Area was constructed along the south flank of Long Ridge in the valley formed by the East Fork of Parachute Creek. The disposal area covers approximately 300 acres and forms a bench on the lower slopes of the valley margin at an elevation of approximately

6,000 feet above mean sea level (amsl). The area was constructed by excavating material from alluvial fans and terraces within the footprint of the pile. Suitable soil material encountered during the excavation process was salvaged for subsequent use during reclamation. As disposal operations progressed (placement of retorted and decarbonized shale in the excavation), the salvaged soil was hauled directly back to the pile and used as cover material. A minimum of four feet of soil was placed over the pile. Revegetation of the pile was accomplished in accordance with the specifications presented in the Reclamation Plan. Rock-armored flow ways were constructed over the surface of the pile to allow stormwater to pass without erosion. Excess soil material generated during the excavation process was hauled to a soil stockpile near the mouth of Ben Good Creek. The stockpiled soil was fertilized, mulched, and seeded in accordance with the specification provided in the Reclamation Plan for valley areas.

The soil material utilized as the reclamation zone of the disposal area and soil stockpile have been augmented with nitrogen fertilizers for a minimum of 10 years of annual applications. The soils have evolved as self-supporting plant media. The vegetative reclamation established on the disposal area and soil stockpile has developed to a maturity of being self-sustaining. The roots and vegetative litter of the establishing planted species has sequentially developed with the vegetation. The dynamic plant community continues to naturally evolve in response to weather cycles and animal usage. The reclaimed disposal area is shown in Photographs 1 and 2.



Photograph 1: Reclaimed East Fork Disposal Area.



Photograph 2: Reclaimed East Fork Disposal Area (view looking west along East Fork Parachute Creek valley)

Long Ridge Disposal Area and Associated Facilities

The Long Ridge disposal area and associated facilities were not constructed because the disposal capacity of the East Fork disposal area was not reached during operations. Therefore, no reclamation is necessary since no land has been disturbed in the area.

Retort Facility

The retort facility is located on a constructed bench along the south flank of Long Ridge, approximately halfway between the valley floor and the top of the upland plateau. The facility is situated at an elevation of approximately 7,200 feet amsl. The facility is contained within a paved surface that drains to a stormwater catchment basin and is secured with fencing and locked access gates.

The retort facility consisted of a variety of concrete and metal structures, machinery, process piping, conveyors, vessels, and ancillary equipment associated with retort operations. Reclamation operations (decommissioning/demolition) were initiated at the facility in 1996 and completed in 2000. Reclamation was accomplished by removing residual oils and process materials during facility decommissioning/cleaning; dismantling and disposal of structures, including buildings, vessels, conveyors, process piping and associated pipe racks, and towers; and removal of ancillary equipment. Equipment, machinery, vessels, and construction materials were salvaged for reuse at other sites when possible. Removal operations focused on the facility components that had the potential to contain residual oils and other potential contaminants. The retort unit, consisting of the retort itself and ancillary process piping, was decommissioned but left in place. The decommissioned retort unit is shown in Photographs 3 and 4.



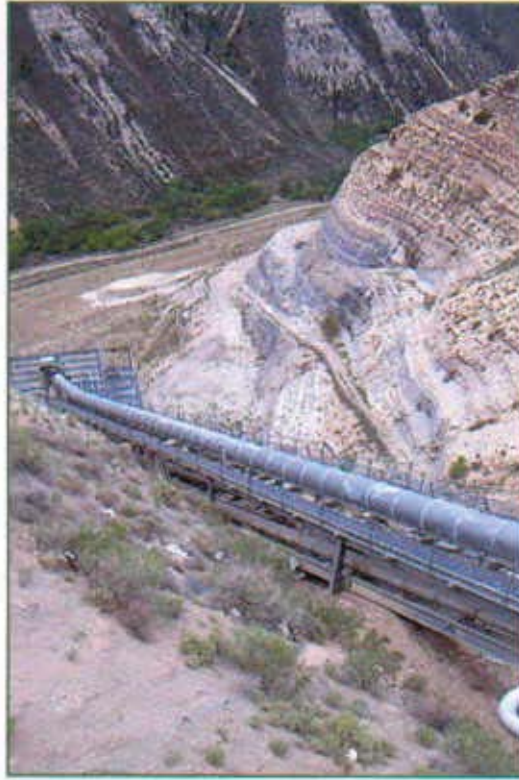
Photographs 3 and 4: Decommissioned Retort Unit.

In addition to the retort unit, the only other structures remaining at the facility include structures that either did not contact the raw shale oil or have been decommissioned and sealed after cleaning. These remaining structures are the gas heater, sponge oil heater, several clean tanks, and the pipe rack extending from the retort bench to the spent shale adit.

During a DMG inspection conducted on July 9, 1999, the DMG representatives identified the additional reclamation measures that would need to be completed before reclamation of the facility could be considered complete. The additional measures included removal of specific piping near the retort unit and portions of the sheet metal on the screening tower. These additional measures were completed in the fall of 1999, when Unocal removed the piping identified by DMG during the inspection and demolished the entire screening tower as well as demolished the elevator building and removed the aerial coolers.

Wetter Facility and Road

The wetter facility and road are located on the steep slopes of the south flank of Long Ridge above the East Fork of Parachute Creek valley, at an elevation of approximately 6,600 feet amsl. The facility consisted of a wetter structure, control room, bag house and dust collector, and connecting pipe racks and conveyors. The bag house and dust collector were located on the steep hill slope between the wetter bench and the spent shale adit. The bag house and dust collector were connected to the spent shale adit with a shale chute/pipe rack and to the wetter structure with a combination pipe rack and air-ride conveyor. A radial stacker conveyor extended down the hill slope from the wetter structure to the surge pile. All structures associated with the wetter facility have been dismantled and removed, and the site has been graded to establish drainage. The wetter road has been reclaimed by blading the safety berm soil material against the cut slope, blending the cut slope into the fill slope, ripping the former road surface, and fertilizing and reseeding the ripped surface. The reclaimed wetter bench is shown in Photograph 5, and the reclaimed wetter road is shown in Photograph 6.



Photograph 5: Reclaimed wetter facility bench (center of photograph) and pipe rack remaining from retort bench to spent shale adit.



Photograph 6: Reclaimed wetter road.

Mine Portals

Four portals were constructed into the cliff-forming Mahogany Zone of the Green River Formation. The portals include a man way, a vehicle entrance, an exhaust/ventilation adit, and an ore passage. The portals are located on the retort bench at an elevation of approximately 7,200 feet amsl. The openings range in size from 12 x 12 feet to 50 x 30 feet. All portals have been sealed with locked steel doors.

Union Meadow and Ranch Area

Union meadow and the ranch area are located near the mouth of the East Fork of Parachute Creek at an elevation of approximately 5,800 feet. The only Unocal structures with the meadow are five project water supply wells. Elsewhere, the meadow is in irrigated hay production. The ranch area contained structures/facilities in two separate areas. The structures at the lower area, located on the valley floor, included offices, shops, parking areas, aboveground storage tanks, fueling area, spent oil underground storage tank, guard house, warehouses, and electrical substation. At the upper area, located on a constructed bench approximately 100 feet above the valley floor, contained structures associated with the Semi-works Pilot Retort, pump house, and aboveground water storage tank.

The Union Meadow area was originally permitted for disturbance for construction activities associated with the project. Except for construction of water supply wells, most of the meadow area was never disturbed. The five water supply wells constructed in the Union Meadow remain in place. The wells are currently used by American Soda, L.L.C. under an operation and service agreement with Unocal. The wells are used to supply process water for American Soda's operations. Use of the wells provides the diligence necessary for Unocal to maintain its water rights associated with the wells.

In January 1996, Unocal entered into Compliance Order on Consent No. 95-12-21-01 (Order on Consent) with the Colorado Department of Public Health and Environment (CDPHE), pursuant to CDPHE's authority under section 25-15-308(2), Colorado Revised Statutes (CRS) of the Colorado Hazardous Waste Act, sections 25-15-301 to 316 CRS. The Order on Consent addressed two operational areas at the Facility: (1) the ranch area (also referred to as Lindauer Ranch) and (2) the Parachute Creek Upgrade Facility (Upgrade Facility). A RCRA Facility Investigation (RFI) was conducted in each area to assess the potential for releases of hazardous constituents to have occurred within identified solid waste management units (SWMUs). The RFI findings indicated that there was no evidence that releases of hazardous constituents had occurred at seven of the 10 SWMUs identified at the ranch area. Evidence that potential releases of hazardous constituents may have occurred was found at three of the SWMUs: (1) Semi-works Pilot Retort, (2) Raw Shale Oil (RSO) Pit, and (3) Overflow Basin. In response to these findings, Unocal implemented corrective measures to mitigate any unacceptable risks associated with potential releases of hazardous constituents from these three SWMUs. The measures included excavation and removal of approximately 25 cubic yards of potentially contaminated soil and brick from the Semi-works Pilot Retort and installation of wells and quarterly groundwater monitoring in the vicinity of the RSO Pit and Overflow Basin. In 2000, Unocal received CDPHE certification that the corrective measures had been properly implemented and that no further reclamation actions were necessary under the Order on Consent.

All structures at the ranch area that have no potential for future use have been dismantled and removed from the site. The substation at the ranch area was removed by the Public Service Company of Colorado. In addition, all utilities have been removed with the exception of one single-phase Public Service Company line that serves the former Unocal office and shop. The

only structures currently remaining include the pump house and associated aboveground water tank, a small security structure at the main gate, and the former office/shop building. The pump house and associated water tank are currently being used by American Soda, LLC under a lease agreement with Unocal. The small security structure at the main gate will remain for the potential use of future site tenants or owners. Although the former office/shop building could serve future beneficial use, Unocal intends to dismantle and remove the structure to eliminate the potential for unauthorized use of the building and health hazards associated with rodent infestation.

Disturbed portions of the ranch area have been reclaimed by grading to promote natural drainage, ripping the disturbed ground surface, and fertilizing and reseeding the ripped surface. The successful re-establishment of vegetation in the disturbed areas is shown in Photograph 7.



Photograph 7: Reclaimed former parking, laydown, and ore stockpile area at the ranch area.

East Fork Roads, Retorted Shale Drainage Ditch, and Retorted Shale Drainage Pond

The East Fork road, ditch, and drainage pond are located in the East Fork valley of Parachute Creek at an elevation of approximately 5,800 to 6,390 feet amsl. The ditch and drainage pond were constructed to support operations. The road was present for many years prior to the project and used to transport livestock up the East Fork valley to and from summer range. However, the road was upgraded and widened to 50 feet (80 feet including berms) to accommodate equipment traffic during operations.

The East Fork road has been reclaimed by reducing the width of the alignment from the constructed 50-foot width to a 12-foot width which is similar to the original size of the road prior to initiation of the project. A 38-foot width along the road alignment was reclaimed by ripping, fertilizing, and seeding the surface of the road. The remaining portion of the roadway will remain

in place to provide access for ranching operations. The re-establishment of vegetation along the reclaimed portion of the road is shown Photograph 8.

The retorted shale drainage ditch extends along the toe of the reclaimed East Fork disposal area. The ditch remains in place and is used to convey stormwater drainage from the surface of the reclaimed disposal area to the retorted shale drainage pond. The reclamation actions conducted along the ditch alignment included fertilizing and seeding the ground surface to promote the establishment of vegetation which in turn dissipates flow velocities and retards erosion. The retorted shale drainage pond also remains in place and is used as a sediment retention basin.



Photograph 8: Reclaimed East Fork road alignment.

Long Ridge Mine Road

The Long Ridge mine road traverses the steep slopes of Long Ridge and extends from the ranch area to the retort bench and mine portals. The road was in place prior to initiation of the project. However, the road was upgraded and widened to accommodate equipment during operations. An earthen berm approximately four feet high was constructed along the outside edge of the road as a safety measure.

The Long Ridge mine road will remain in place to allow minimal access by Unocal for property management. Some minor grading to clear rocks and debris from the steep hill slope above the road will likely be required when access to the bench is needed in the future. Natural vegetation

has re-established itself along much of the road berm, which will also be left in place as safety measure during future use of the road.

Long Ridge Access Road

The Long Ridge access road is located in the steeply sloping terrain along the upper slopes of Long Ridge and intersects the upper portion of the Long Ridge mine road. The road was constructed with a safety berm, and water bars were constructed as necessary to prevent erosion of the roadbed and the slopes below the road.

The Long Ridge access road will remain in place to allow minimal access by Unocal for property management. Some minor grading to clear rocks and debris from the steep hill slope above the road will likely be required when access to the bench is needed in the future. Natural vegetation has re-established itself along much of the road berm, which will also be left in place as safety measure during future use of the road.

Utilities

Unocal owned utilities such as gas, sewer, telephone, electric, water, and product lines were constructed throughout the project area to support operations. The utilities included both buried (belowground) and aboveground lines. The ground surface overlying the buried utilities was reclaimed following installation. Vegetation has successfully been re-established along the buried utility alignments, and therefore, the buried utilities will be left in place.

All aboveground utilities that have no projected future use have been removed. Following removal, the areas containing aboveground utilities were graded to establish natural drainage and to blend with the surrounding land, ripped, fertilized, and seeded. The only aboveground utilities remaining at the site are one single-phase Public Service Company line supplying power to the existing ranch office/shop and the Unocal-owned portion of the 230-KVA, 3-phase line extending from the property boundary to the retort bench. The portion of the 230-KVA, 3-phase line extending to the property boundary is owned by American Soda, LLC. The Unocal-owned portion of the 3-phase line is permitted under both Unocal's existing MLRB permit and a Garfield County Special Use Permit. At this time, the potential exists for the line to be used by American Soda or others in the future; therefore, Unocal intends to leave the line in place. However, Unocal's obligation to remove the line will remain in effect under the Garfield County permit following Unocal's release of reclamation responsibility under the MLRB permit. If the potential for use of the line diminishes in the future, Unocal will remove the line as required by the Garfield County Special Use Permit.

Surge Pond

The surge pond was located in the lower East Fork valley at an elevation of approximately 6,000 feet amsl. The surge pond was closed in accordance with TR-19 in fall of 1996. Closure activities included removing all aboveground utilities, liner removal and disposal, backfilling the excavation with the material removed during construction, grading the area to provide natural drainage, and fertilization and revegetation.

A series of high intensity storms impacted the Parachute Creek valley from August 9, 2001 through August 14, 2001. The storms produced flash-flood level flows along the natural drainages on the steep hill slopes above the former surge pond. The flows deposited vegetation debris, cobbles, boulders, and sediment in the former surge pond area. The reclaimed surge pond area and flood debris resulting from the storms is shown Photographs 9 and 10.



Photograph 9: Gully erosion on steep hill slope above reclaimed surge pond following intense storms of August 9-14, 2001



Photograph 10: Reclaimed surge pond area showing debris resulting from intense storms of August 9-14, 2001.

Acknowledgment

With regards to the Parachute Creek Shale Oil Program (Permit No. M78-263-UG), all applicable portions of the Reclamation Plan requirements have been satisfied in accordance with the Mineral Rules and Regulations of the Colorado Mined Land Reclamation Board and all applicable requirements under the Colorado Mined Land Reclamation Act.

A handwritten signature in dark ink, appearing to read "Richard L. Brammer", is written over a horizontal line.

Richard L. Brammer
Asset Manager – Parachute
Unocal Corporation



7002 0460 0002 6885 6826

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*To: Colorado Department of Natural Resources
Division of Mineral and Geology
Greg Squire
1313 Sherman St. Room 215
Denver, CO 80203*

UNOCAL 73

Unocal
We've Moved
Our New Address Is
546 Main Street #404
Grand Junction, CO 81501

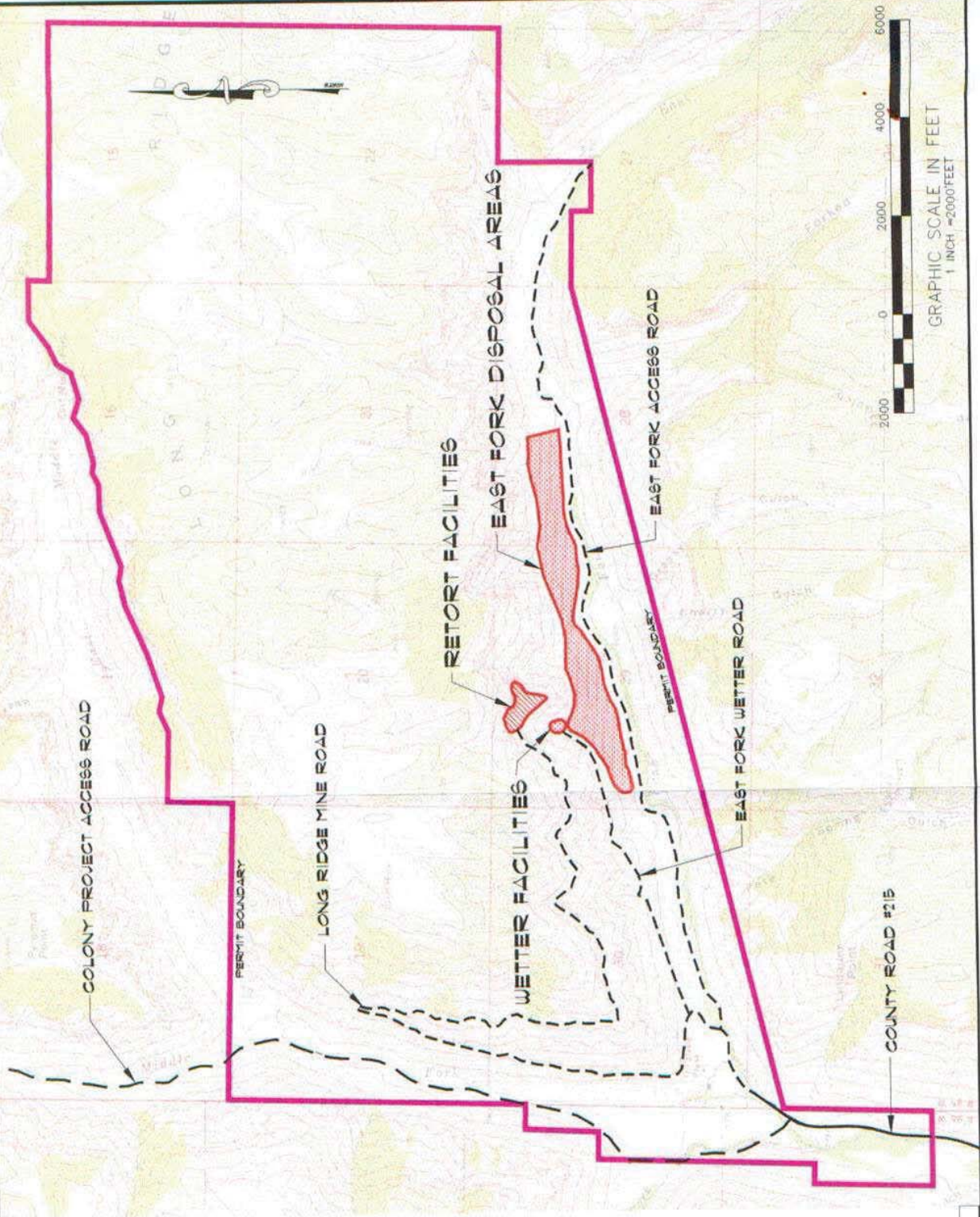
FORM 1 5478BY (REV. 7-85) PRINTED IN U.S.A.

UNOCAL LONG RIDGE MINE
 PERMIT AREA (M-78-263-UG)

RECEIVED

JUL 22 2002

Division of Minerals and Geology



CONSTRUCTION SURVEYS, INC.

20012 SUNRISE BLVD

SILT, CO 81652

910-876-5753



PREPARED FOR:

ASSET MANAGEMENT GROUP

Union Oil Company of California

UNOCAL

SCALE: 1" = 2000'

DATE: 08/03/01

BDC
Unocal Corporation
Real Estate, Remediation Services, Mining Operations
546 Main St. #404
Grand Junction, Colorado 81501
Telephone: (970) 241-7632
Facsimile (970) 241-0065

SL-2 ✓
✓ M-1978-263-UG
✓ Full Release Request

UNOCAL 76 ✓

RECEIVED

October 10, 2003

OCT 14 2003 ✓

Richard L. Brammer
Area Manager
Eastern Region

Mr. Gregg Squire
Division of Minerals and Geology
Colorado Department of Natural Resources
Minerals and Geology Division
1313 Sherman Street, Room 215
Denver, Colorado 80203

Dear Mr. Squire:

Unocal is requesting the Final Termination of the Colorado Mined Land Reclamation Permit No. M78-263-UG. The request document from last year is attached and the following items have been accomplished as the inspection report from 2002 indicated as the remaining items of conclusion.

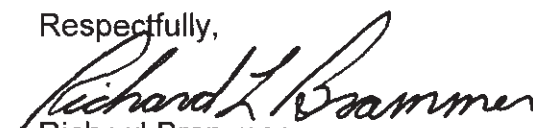
1. Shop/Office Building is gone.
 2. Guard House is gone.
 3. Fuel Tank and fuel-island are gone.
 4. All utility/light poles at Shop Area are gone.
 5. Steps on Shale Disposal Area are gone.
 6. Power lines 230KV & 69KV going up Long Ridge are gone.
- The building footings are broken in place, buried and seeded.

As per Technical Revision 26, the Mine Portals are closed in a secure manner with concrete bulkheads.

The Pump house located by the Water Tank is gone. General clean-up of materials has been accomplished.

This shall conclude the remaining issues for approval of the Termination of this Permit. The years of association with The Division has been a pleasure.

Respectfully,


Richard Brammer

NOV=NONE
AF=8/2/04

**Notice of Completion of Reclamation and Request for
Release of Reclamation Responsibility for the
Parachute Creek Shale Oil Program
Permit No. M78-263-UG.**

RECEIVED

OCT 14 2003

Division of Minerals and Geology

The Unocal Corporation (Unocal) has completed reclamation obligations pertaining to the Parachute Creek Shale Oil Program (Colorado Mined Land Reclamation Board Permit No. M78-263-UG). Reclamation with respect to all Affected Lands within the Phase I Permit Area has been completed in accordance with the requirements of the Colorado Mined Land Reclamation Act; Mineral Rules and Regulations of the Colorado Mined Land Reclamation Board for Hard Rock, Metal and Designated Mining Operations; and the approved Reclamation Plan for Phase I of the Parachute Creek Shale Oil Program. Although Phase II of the program was permitted through the Colorado Mined Land Reclamation Board (MLRB), Phase II operations were not implemented, and therefore, reclamation was not necessary for the proposed Phase II operations.

This Notice provides the information required under Rule 4.16 (Release of Performance and Financial Warranties for Mining Operations) of the MLRB Mineral Rules and Regulations for Hard Rock, Metal and Designated Mining Operations. In addition, the Notice presents general descriptions of operational activities, a summary of reclamation actions, and a number of photographs documenting the completion of reclamation.

Owners of Record to All Affected Lands

Unocal is the sole owner of record to all affected lands and may be contacted at the following address.

Unocal Corporation
Real Estate, Remediation Services, Mining Operations
546 Main Street, No. 404
Grand Junction, Colorado 81501

Attention: Richard L. Brammer
(970) ~~241-7632 (extension 222)~~

241-7310

Background

Unocal's MLRB-permitted area for the Parachute Creek Shale Oil Program is located approximately 11 miles north of the Town of Parachute, Colorado (Figure 1). The permit area encompasses approximately 5,280 acres and includes the western portion of Long Ridge, southern portion of the Middle Fork of Parachute Creek valley, and western portion of the East Fork of Parachute Creek valley (Figure 2). As shown in Figure 2, the permit area lies entirely within lands owned by Unocal.

Unocal was issued a reclamation permit for the Long Ridge Mine (a component of the Parachute Creek Shale Oil Program) on August 2, 1978. Three Amendments and 23 Technical Revisions were approved by the MLRB during the duration of the permit. A summary of the Amendments and Technical Revisions is presented in Table 1. Several of the actions approved under the Technical Revisions and Amendments were never implemented by Unocal.

Table 1: Summary of Technical Revisions to Permit No. M-78-263UG

Technical Revision	Description
TR-1	Access roads and mine bench construction
TR-2	Withdrawn
TR-3	Affected lands area modification
TR-4	Water well No. 4 and pipeline configuration and raw shale oil pipeline
TR-5	Power line re-routing and addition of surge pond
TR-6	Temporary storage of topsoil within retorted shale pile footprint
TR-7	Realignment of maintenance access road in East Fork valley
TR-8	Retorted shale pile design
TR-9	Addition of topsoil stockpile in the East Fork area
TR-10	Extension of East Fork access road
TR-11	Drainage control along mine access, wetter, and East Fork roads
TR-12	Lean-grade oil shale adit
TR-13	Disposal of partially retorted (off-spec.) shale
TR-14	Use of topsoil to reclaim retorted shale disposal area
TR-15	Withdrawn
TR-16	Change in retorted shale handling
TR-17	Retorted shale pile drainage ditch modification
TR-18	Wetter bench access road modification
TR-19	Construct/operate Surge Water Pond and use of pond water for dust control
TR-20	Construction of two additional mine ventilation adits
TR-21	Changes in monitoring and reporting of hydrologic data
TR-22	Change in permit operating status from continued operation to intermittent operation
TR-23	Relocation of meteorological station and climatologic parameter monitoring
TR-24	Reduction of monitoring program and reporting frequency
TR-25	Underground disposal of non-hazardous material from Temporary Basin No. 3

Table 1: Summary of Amendments to Permit No. M-78-263UG

Amendment	Description
Amendment 1	Expansion of mining on Long Ridge and construction of new mine and retorts on Old Mountain
Amendment 2	Addition of six acres of land to the permit area and work necessary to stabilize the stream bank along a portion of the Middle Fork of Parachute Creek
Amendment 3	Disposal of Unishale C (de-carbonized shale) on Long Ridge

Unocal suspended production operations at the mine in 1991. Technical Revision 22, which was approved by the MLRB in 1991, led to a change in the mine's permit status to "intermittent operations". Since that time, onsite activities have focused on site reclamation and environmental monitoring.

Unocal will continue to conduct proper land stewardship through continued management of the property following release of its reclamation responsibilities at the site. Under mutual agreement with the Colorado Division of Wildlife, Unocal will prevent domestic livestock use of the property to allow continued evaluation of wildlife population trends in the area.

Summary of Operational Activities and Reclamation Actions

The Reclamation Plan described 11 separate features/areas that were to be reclaimed following cessation of site activities. The features/areas identified in the Reclamation Plan included the following:

1. East Fork Disposal Area
2. Long Ridge Disposal Area and Associated Facilities
3. Retort Facility
4. Wetter Facility and Road
5. Mine Portals
6. Union Meadow and Ranch Area
7. East Fork Roads, Retorted Shale Drainage Ditch, and Retorted Shale Drainage Pond
8. Long Ridge Mine Road
9. Long Ridge Access Road
10. Utilities
11. Surge Pond

Operational activities and the reclamation actions completed for each of these features/areas are discussed separately below.

East Fork Disposal Area

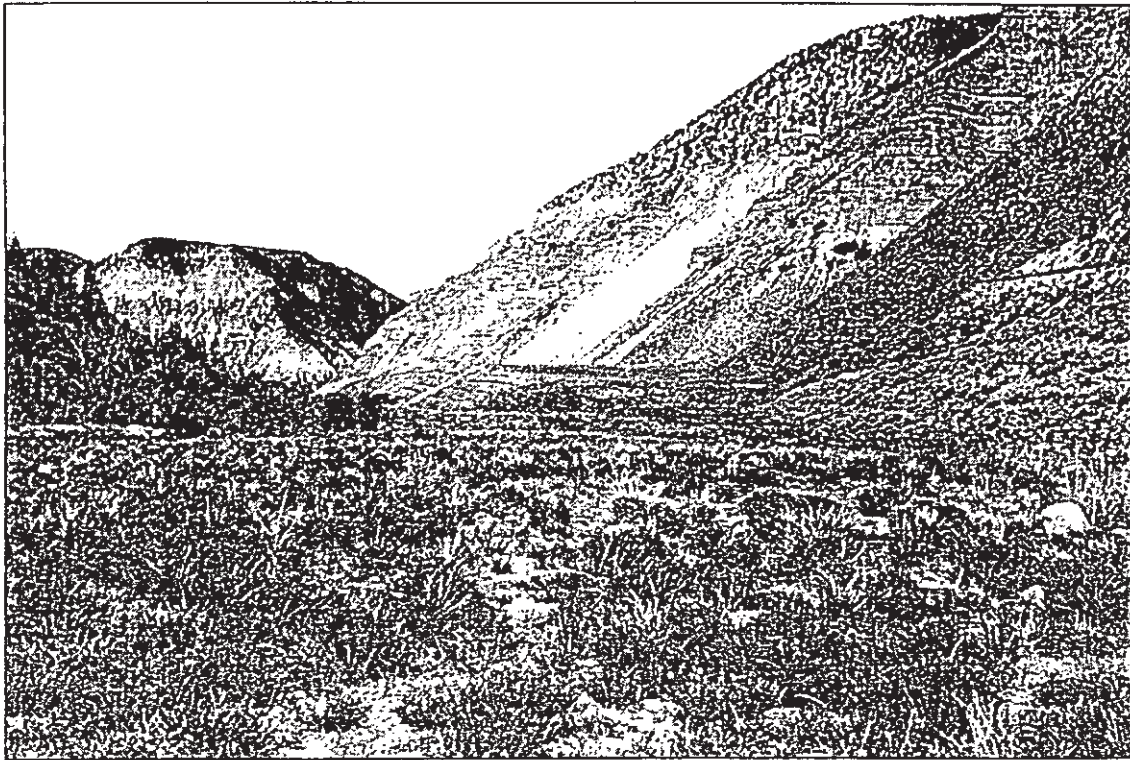
The East Fork Disposal Area was constructed along the south flank of Long Ridge in the valley formed by the East Fork of Parachute Creek. The disposal area covers approximately 300 acres and forms a bench on the lower slopes of the valley margin at an elevation of approximately

6,000 feet above mean sea level (amsl). The area was constructed by excavating material from alluvial fans and terraces within the footprint of the pile. Suitable soil material encountered during the excavation process was salvaged for subsequent use during reclamation. As disposal operations progressed (placement of retorted and decarbonized shale in the excavation), the salvaged soil was hauled directly back to the pile and used as cover material. A minimum of four feet of soil was placed over the pile. Revegetation of the pile was accomplished in accordance with the specifications presented in the Reclamation Plan. Rock-armored flow ways were constructed over the surface of the pile to allow stormwater to pass without erosion. Excess soil material generated during the excavation process was hauled to a soil stockpile near the mouth of Ben Good Creek. The stockpiled soil was fertilized, mulched, and seeded in accordance with the specification provided in the Reclamation Plan for valley areas.

The soil material utilized as the reclamation zone of the disposal area and soil stockpile have been augmented with nitrogen fertilizers for a minimum of 10 years of annual applications. The soils have evolved as self-supporting plant media. The vegetative reclamation established on the disposal area and soil stockpile has developed to a maturity of being self-sustaining. The roots and vegetative litter of the establishing planted species has sequentially developed with the vegetation. The dynamic plant community continues to naturally evolve in response to weather cycles and animal usage. The reclaimed disposal area is shown in Photographs 1 and 2.



Photograph 1: Reclaimed East Fork Disposal Area.



Photograph 2: Reclaimed East Fork Disposal Area (view looking west along East Fork Parachute Creek valley)

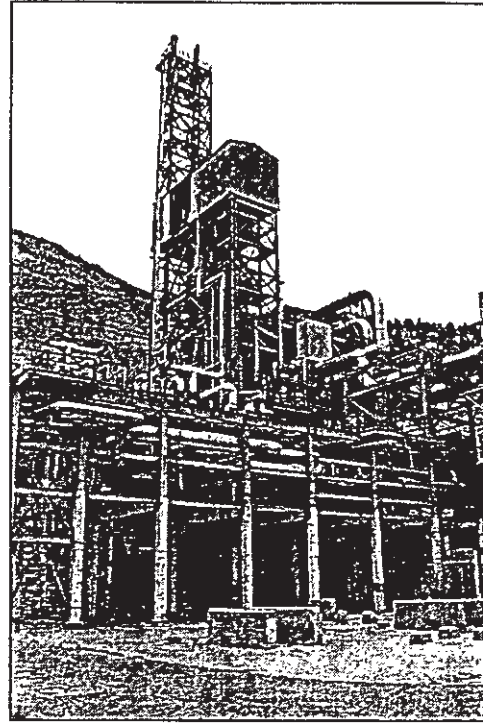
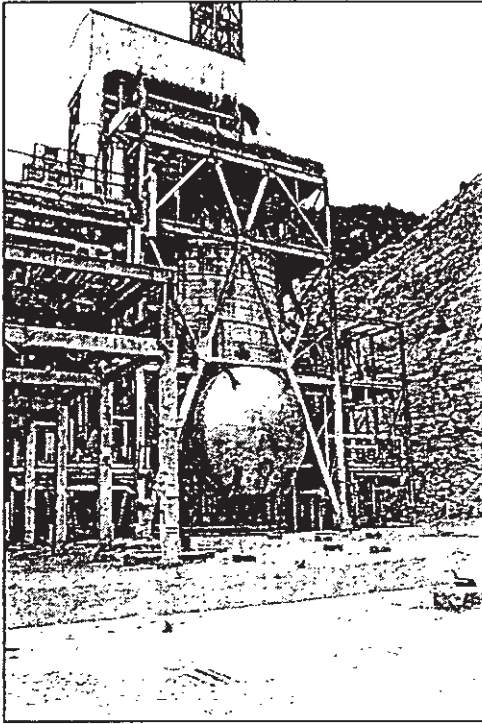
Long Ridge Disposal Area and Associated Facilities

The Long Ridge disposal area and associated facilities were not constructed because the disposal capacity of the East Fork disposal area was not reached during operations. Therefore, no reclamation is necessary since no land has been disturbed in the area.

Retort Facility

The retort facility is located on a constructed bench along the south flank of Long Ridge, approximately halfway between the valley floor and the top of the upland plateau. The facility is situated at an elevation of approximately 7,200 feet amsl. The facility is contained within a paved surface that drains to a stormwater catchment basin and is secured with fencing and locked access gates.

The retort facility consisted of a variety of concrete and metal structures, machinery, process piping, conveyors, vessels, and ancillary equipment associated with retort operations. Reclamation operations (decommissioning/demolition) were initiated at the facility in 1996 and completed in 2000. Reclamation was accomplished by removing residual oils and process materials during facility decommissioning/cleaning; dismantling and disposal of structures, including buildings, vessels, conveyors, process piping and associated pipe racks, and towers; and removal of ancillary equipment. Equipment, machinery, vessels, and construction materials were salvaged for reuse at other sites when possible. Removal operations focused on the facility components that had the potential to contain residual oils and other potential contaminants. The retort unit, consisting of the retort itself and ancillary process piping, was decommissioned but left in place. The decommissioned retort unit is shown in Photographs 3 and 4.



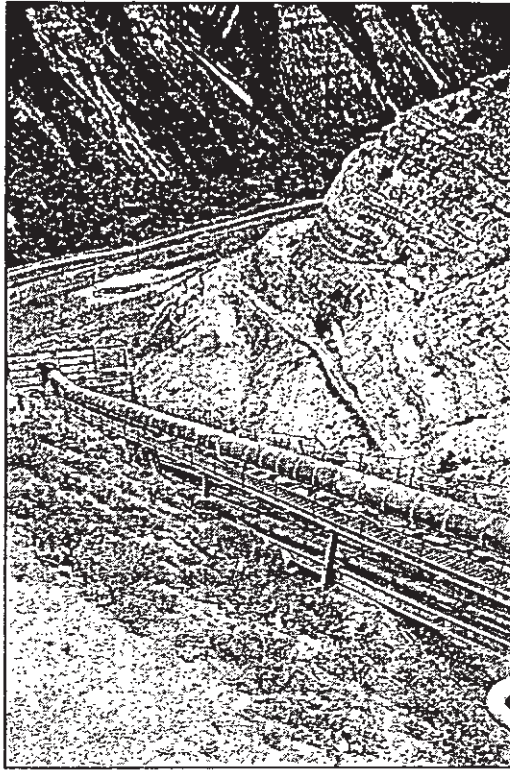
Photographs 3 and 4: Decommissioned Retort Unit.

In addition to the retort unit, the only other structures remaining at the facility include structures that either did not contact the raw shale oil or have been decommissioned and sealed after cleaning. These remaining structures are the gas heater, sponge oil heater, several clean tanks, and the pipe rack extending from the retort bench to the spent shale adit.

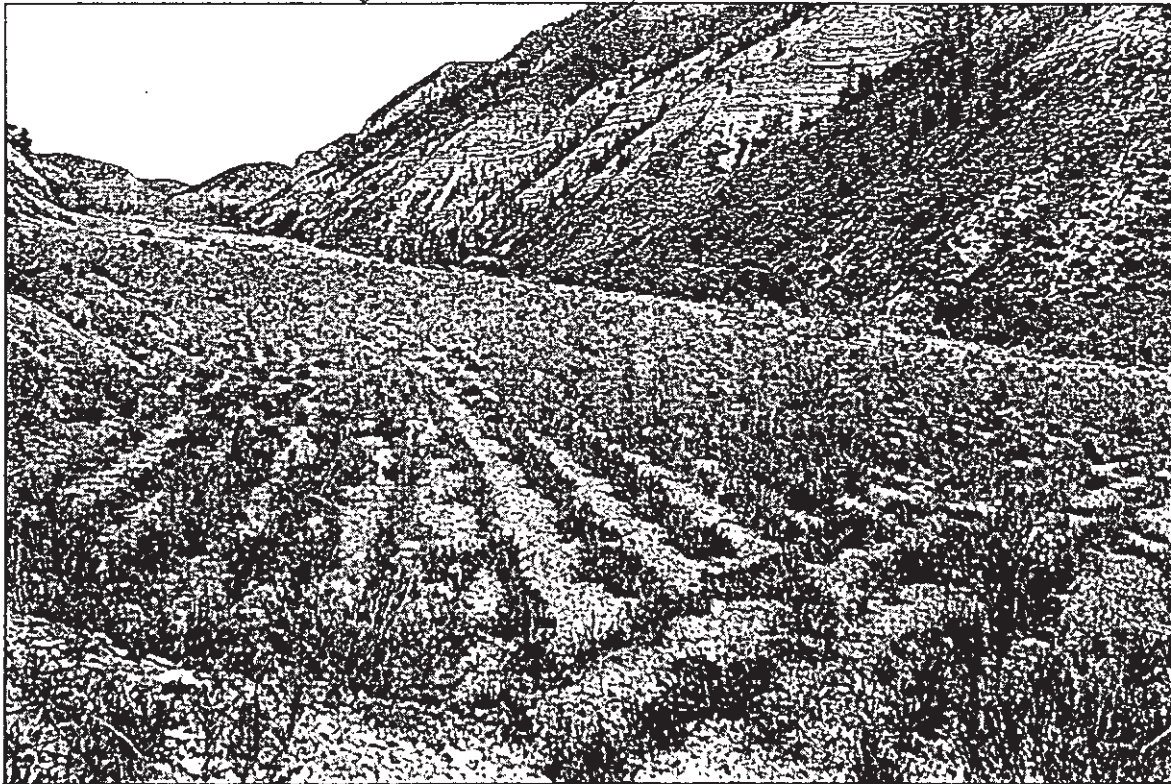
During a DMG inspection conducted on July 9, 1999, the DMG representatives identified the additional reclamation measures that would need to be completed before reclamation of the facility could be considered complete. The additional measures included removal of specific piping near the retort unit and portions of the sheet metal on the screening tower. These additional measures were completed in the fall of 1999, when Unocal removed the piping identified by DMG during the inspection and demolished the entire screening tower as well as demolished the elevator building and removed the aerial coolers.

Wetter Facility and Road

The wetter facility and road are located on the steep slopes of the south flank of Long Ridge above the East Fork of Parachute Creek valley, at an elevation of approximately 6,600 feet amsl. The facility consisted of a wetter structure, control room, bag house and dust collector, and connecting pipe racks and conveyors. The bag house and dust collector were located on the steep hillslope between the wetter bench and the spent shale adit. The bag house and dust collector were connected to the spent shale adit with a shale chute/pipe rack and to the wetter structure with a combination pipe rack and air-ride conveyor. A radial stacker conveyor extended down the hill slope from the wetter structure to the surge pile. All structures associated with the wetter facility have been dismantled and removed, and the site has been graded to establish drainage. The wetter road has been reclaimed by blading the safety berm soil material against the cut slope, blending the cut slope into the fill slope, ripping the former road surface, and fertilizing and reseeding the ripped surface. The reclaimed wetter bench is shown in Photograph 5, and the reclaimed wetter road is shown in Photograph 6.



Photograph 5: Reclaimed wetter facility bench (center of photograph) and pipe rack remaining from retort bench to spent shale adit



Photograph 6: Reclaimed wetter road.

Mine Portals

Four portals were constructed into the cliff-forming Mahogany Zone of the Green River Formation. The portals include a manway, a vehicle entrance, an exhaust/ventilation adit, and an ore passage. The portals are located on the retort bench at an elevation of approximately 7,200 feet amsl. The openings range in size from 12 x 12 feet to 50 x 30 feet. All portals have been sealed with locked steel doors.

Union Meadow and Ranch Area

Union meadow and the ranch area are located near the mouth of the East Fork of Parachute Creek at an elevation of approximately 5,800 feet. The only Unocal structures with the meadow are five project water supply wells. Elsewhere, the meadow is in irrigated hay production. The ranch area contained structures/facilities in two separate areas. The structures at the lower area, located on the valley floor, included offices, shops, parking areas, aboveground storage tanks, fueling area, spent oil underground storage tank, guard house, warehouses, and electrical substation. At the upper area, located on a constructed bench approximately 100 feet above the valley floor, contained structures associated with the semi-works pilot retort, pump house, and aboveground water storage tank.

The Union Meadow area was originally permitted for disturbance for construction activities associated with the project. Except for construction of water supply wells, most of the meadow area was never disturbed. The five water supply wells constructed in the Union Meadow remain in place. The wells are currently used by American Soda, L.L.C. under an operation and service agreement with Unocal. The wells are used to supply process water for American Soda's operations. Use of the wells provides the diligence necessary for Unocal to maintain its water rights associated with the wells.

In January 1996, Unocal entered into Compliance Order on Consent No. 95-12-21-01 (Order on Consent) with the Colorado Department of Public Health and Environment (CDPHE), pursuant to CDPHE's authority under section 25-15-308(2), Colorado Revised Statutes (CRS) of the Colorado Hazardous Waste Act, sections 25-15-301 to 316 CRS. The Order on Consent addressed two operational areas at the Facility: (1) the ranch area (also referred to as Lindauer Ranch) and (2) the Parachute Creek Upgrade Facility (Upgrade Facility). A RCRA Facility Investigation (RFI) was conducted in each area to assess the potential for releases of hazardous constituents to have occurred within identified solid waste management units (SWMUs). The RFI findings indicated that there was no evidence that releases of hazardous constituents had occurred at seven of the 10 SWMUs identified at the ranch area. Evidence that potential releases of hazardous constituents may have occurred was found at three of the SWMUs: (1) Semiworks Pilot Retort, (2) Raw Shale Oil (RSO) Pit, and (3) Overflow Basin. In response to these findings, Unocal implemented corrective measures to mitigate any unacceptable risks associated with potential releases of hazardous constituents from these three SWMUs. The measures included excavation and removal of approximately 25 cubic yards of potentially contaminated soil and brick from the Semiwork Pilot Retort and installation of wells and quarterly groundwater monitoring in the vicinity of the RSO Pit and Overflow Basin. In 2000, Unocal received CDPHE certification that the corrective measures had been properly implemented and that no further reclamation actions were necessary under the Order on Consent.

All structures at the ranch area that have no potential for future use have been dismantled and removed from the site. The substation at the ranch area was removed by the Public Service Company of Colorado. In addition, all utilities have been removed with the exception of one single-phase Public Service Company line that serves the former Unocal office and shop. The

only structures currently remaining include the pump house and associated aboveground water tank, a small security structure at the main gate, and the former office/shop building. The pump house and associated water tank are currently being used by American Soda, LLC under a lease agreement with Unocal. The small security structure at the main gate will remain for the potential use of future site tenants or owners. Although the former office/shop building could serve future beneficial use, Unocal intends to dismantle and remove the structure to eliminate the potential for unauthorized use of the building and health hazards associated with rodent infestation.

Disturbed portions of the ranch area have been reclaimed by grading to promote natural drainage, ripping the disturbed ground surface, and fertilizing and reseeded the ripped surface. The successful re-establishment of vegetation in the disturbed areas is shown in Photograph 7.



Photograph 7: Reclaimed former parking, laydown, and ore stockpile area at the ranch area.

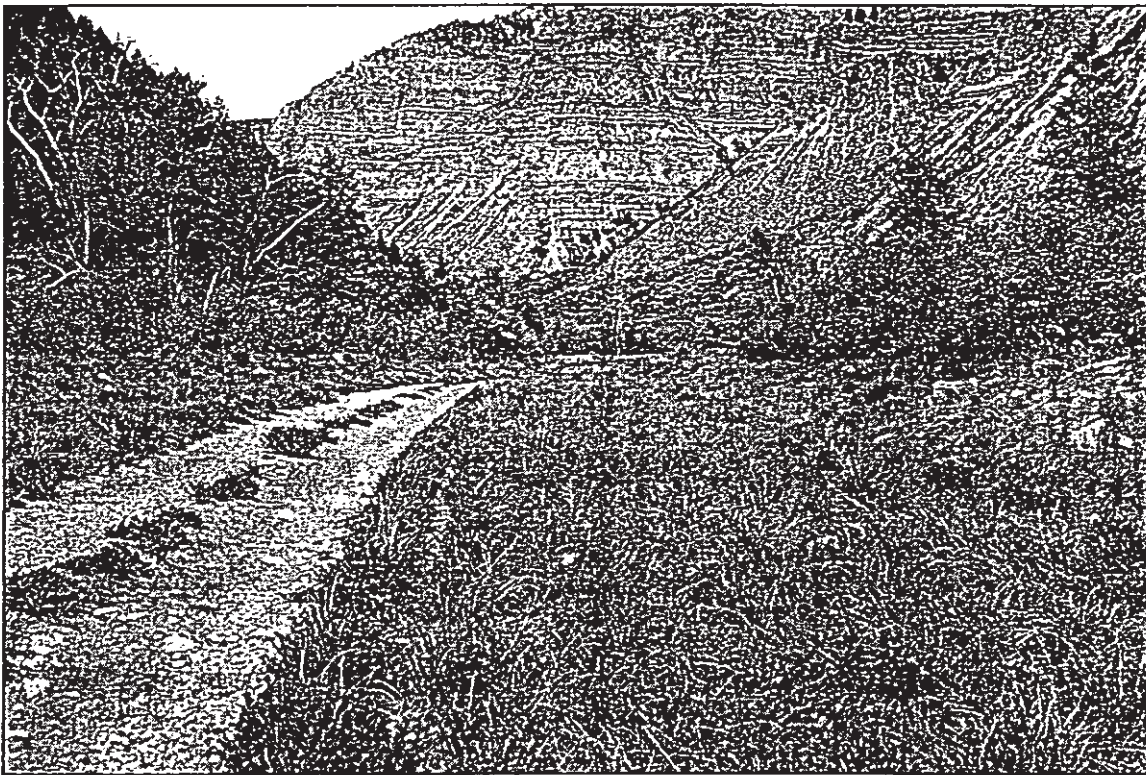
East Fork Roads, Retorted Shale Drainage Ditch, and Retorted Shale Drainage Pond

The East Fork road, ditch, and drainage pond are located in the East Fork valley of Parachute Creek at an elevation of approximately 5,800 to 6,390 feet amsl. The ditch and drainage pond were constructed to support operations. The road was present for many years prior to the project and used to transport livestock up the East Fork valley to and from summer range. However, the road was upgraded and widened to 50 feet (80 feet including berms) to accommodate equipment traffic during operations.

The East Fork road has been reclaimed by reducing the width of the alignment from the constructed 50-foot width to a 12-foot width which is similar to the original size of the road prior to initiation of the project. A 38-foot width along the road alignment was reclaimed by ripping, fertilizing, and seeding the surface of the road. The remaining portion of the roadway will remain

in place to provide access for ranching operations. The re-establishment of vegetation along the reclaimed portion of the road is shown Photograph 8.

The retorted shale drainage ditch extends along the toe of the reclaimed East Fork disposal area. The ditch remains in place and is used to convey stormwater drainage from the surface of the reclaimed disposal area to the retorted shale drainage pond. The reclamation actions conducted along the ditch alignment included fertilizing and seeding the ground surface to promote the establishment of vegetation which in turn dissipates flow velocities and retards erosion. The retorted shale drainage pond also remains in place and is used as a sediment retention basin.



Photograph 8: Reclaimed East Fork road alignment.

Long Ridge Mine Road

The Long Ridge mine road traverses the steep slopes of Long Ridge and extends from the ranch area to the retort bench and mine portals. The road was in place prior to initiation of the project. However, the road was upgraded and widened to accommodate equipment during operations. An earthen berm approximately four feet high was constructed along the outside edge of the road as a safety measure.

The Long Ridge mine road will remain in place to allow minimal access by Unocal for property management. Some minor grading to clear rocks and debris from the steep hill slope above the road will likely be required when access to the bench is needed in the future. Natural vegetation

has re-established itself along much of the road berm, which will also be left in place as safety measure during future use of the road.

Long Ridge Access Road

The Long Ridge access road is located in the steeply sloping terrain along the upper slopes of Long Ridge and intersects the upper portion of the Long Ridge mine road. The road was constructed with a safety berm, and water bars were constructed as necessary to prevent erosion of the roadbed and the slopes below the road.

The Long Ridge access road will remain in place to allow minimal access by Unocal for property management. Some minor grading to clear rocks and debris from the steep hill slope above the road will likely be required when access to the bench is needed in the future. Natural vegetation has re-established itself along much of the road berm, which will also be left in place as safety measure during future use of the road.

Utilities

Unocal owned utilities such as gas, sewer, telephone, electric, water, and product lines were constructed throughout the project area to support operations. The utilities included both buried (belowground) and aboveground lines. The ground surface overlying the buried utilities was reclaimed following installation. Vegetation has successfully been re-established along the buried utility alignments, and therefore, the buried utilities will be left in place.

All aboveground utilities that have no projected future use have been removed. Following removal, the areas containing aboveground utilities were graded to establish natural drainage and to blend with the surrounding land, ripped, fertilized, and seeded. The only aboveground utilities remaining at the site are one single-phase Public Service Company line supplying power to the existing ranch office/shop and the Unocal-owned portion of the 230-KVA, 3-phase line extending from the property boundary to the retort bench. The portion of the 230-KVA, 3-phase line extending to the property boundary is owned by American Soda, LLC. The Unocal-owned portion of the 3-phase line is permitted under both Unocal's existing MLRB permit and a Garfield County Special Use Permit. At this time, the potential exists for the line to be used by American Soda or others in the future; therefore, Unocal intends to leave the line in place. However, Unocal's obligation to remove the line will remain in effect under the Garfield County permit following Unocal's release of reclamation responsibility under the MLRB permit. If the potential for use of the line diminishes in the future, Unocal will remove the line as required by the Garfield County Special Use Permit.

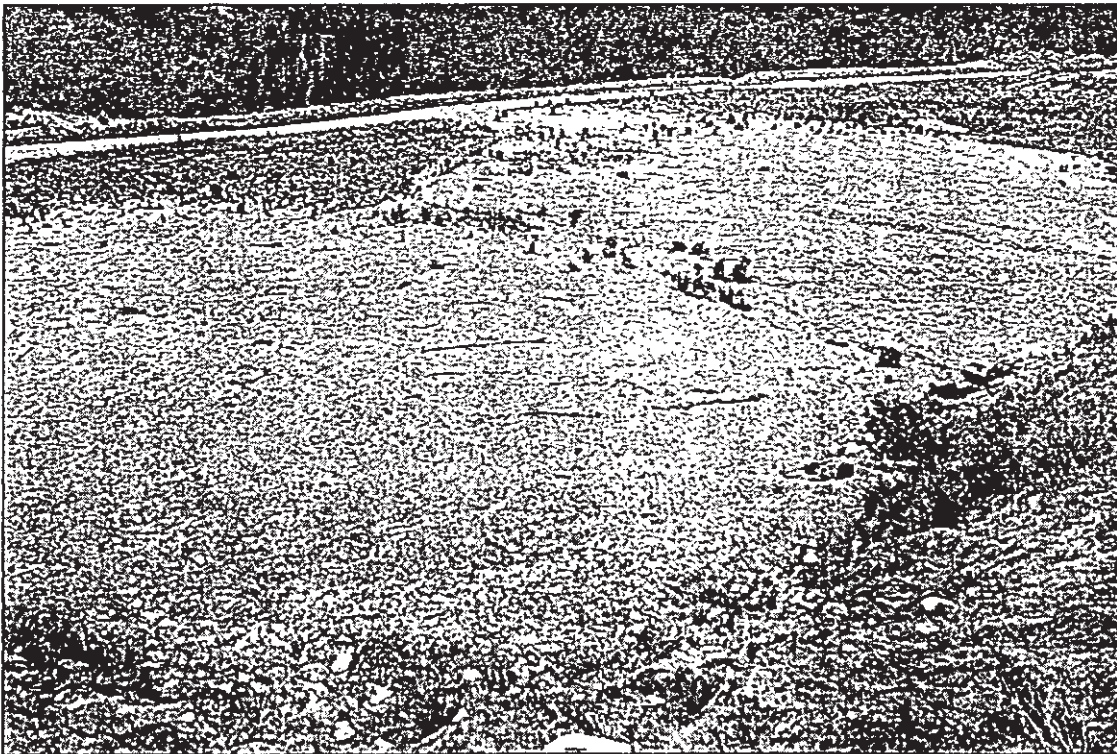
Surge Pond

The surge pond was located in the lower East Fork valley at an elevation of approximately 6,000 feet amsl. The surge pond was closed in accordance with TR-19 in fall of 1996. Closure activities included removing all aboveground utilities, liner removal and disposal, backfilling the excavation with the material removed during construction, grading the area to provide natural drainage, and fertilization and revegetation.

A series of high intensity storms impacted the Parachute Creek valley from August 9, 2001 through August 14, 2001. The storms produced flash-flood level flows along the natural drainages on the steep hill slopes above the former surge pond. The flows deposited vegetation debris, cobbles, boulders, and sediment in the former surge pond area. The reclaimed surge pond area and flood debris resulting from the storms is shown Photographs 9 and 10.



Photograph 9: Gully erosion on steep hill slope above reclaimed surge pond following intense storms of August 9-14, 2001



Photograph 10: Reclaimed surge pond area showing debris resulting from intense storms of August 9-14, 2001.

Acknowledgment

With regards to the Parachute Creek Shale Oil Program (Permit No. M78-263-UG), all applicable portions of the Reclamation Plan requirements have been satisfied in accordance with the Mineral Rules and Regulations of the Colorado Mined Land Reclamation Board and all applicable requirements under the Colorado Mined Land Reclamation Act.

Richard L. Brammer
Asset Manager – Parachute
Unocal Corporation

Encana Water Quality Monitoring Analyte List

Analyte

Alkalinity

Alkalinity, Bicarbonate

Alkalinity, Carbonate

Alkalinity, Total as CaCO

Ammonia Nitrogen

Arsenic

Barium

Benzene

Bromide

Cadmium

Calcium

Chloride

Chromium

Copper,Dissolved

Dissolved Solids

Ethane

Ethene

Ethylbenzene

Fluoride

Iron,Dissolved

Lead

m,p-Xylene

Magnesium

Manganese,Dissolved

Methane

Methyl tert-butyl ether

Nitrate

Nitrite

pH

Potassium,Dissolved

Selenium

Silver

Sodium

Specific Conductivity

Sulfate

Sulfide

Toluene

Xylene (total)

SiteID ▾											
ENPR14ST											
		Datecollected ▾									
		9/1/2011		6/27/2011		3/22/2011		12/7/2010		Grand	
		+ -		+ -		+ -		+ -		+ -	
Analyte ▾		Result ▾	Units ▾	Result ▾	Units ▾	Result ▾	Units ▾	Result ▾	Units ▾	No To	
Alkalinity	+ -			330.00	mg/l						
Alkalinity, Bicarbonate	+ -	278.00	mg/l	330.00	mg/l	263.00	mg/l	277.00	mg/l		
Alkalinity, Carbonate	+ -	-999.90	mg/l	-999.90	mg/l	-999.90	mg/l	-999.90	mg/l		
Alkalinity, Total as CaCO	+ -	278.00	mg/l			263.00	mg/l	277.00	mg/l		
Ammonia Nitrogen	+ -	-999.90	mg/l	0.10	mg/l	-999.90	mg/l	-999.90	mg/l		
Arsenic	+ -	-999.90	mg/l	-999.90	mg/l	-999.90	mg/l	-999.90	mg/l		
Barium	+ -	0.07	mg/l	0.07	mg/l	0.06	mg/l	0.06	mg/l		
Benzene	+ -	-999.90	µg/L	-999.90	µg/L	-999.90	µg/L	-999.90	µg/L		
Bromide	+ -	-999.90	mg/l	-999.90	mg/l	-999.90	mg/l	-999.90	mg/l		
Cadmium	+ -	-999.90	mg/l	-999.90	mg/l	-999.90	mg/l	-999.90	mg/l		
Calcium	+ -	65.40	mg/l	60.00	mg/l	57.50	mg/l	54.70	mg/l		
Chloride	+ -	18.00	mg/l	16.00	mg/l	18.60	mg/l	15.60	mg/l		
Chromium	+ -	-999.90	mg/l	-999.90	mg/l	-999.90	mg/l	-999.90	mg/l		
Copper,Dissolved	+ -	-999.90	mg/l	-999.90	mg/l	-999.90	mg/l	-999.90	mg/l		
Dissolved Solids	+ -	444.00	mg/l	440.00	mg/l	416.00	mg/l	410.00	mg/l		
Ethane	+ -			-999.90	mg/l						
Ethene	+ -			-999.90	mg/l						
Ethylbenzene	+ -	-999.90	µg/L	-999.90	µg/L	-999.90	µg/L	-999.90	µg/L		
Fluoride	+ -	0.62	mg/l	0.37	mg/l	0.65	mg/l	0.69	mg/l		
Iron,Dissolved	+ -	-999.90	mg/l	-999.90	mg/l	-999.90	mg/l	-999.90	mg/l		
Lead	+ -	-999.90	mg/l	-999.90	mg/l	-999.90	mg/l	-999.90	mg/l		
m,p-Xylene	+ -							-999.90	mg/l		
Magnesium	+ -	36.60	mg/l	31.00	mg/l	33.70	mg/l	31.40	mg/l		
Manganese,Dissolved	+ -	-999.90	mg/l	-999.90	mg/l	-999.90	mg/l	-999.90	mg/l		
Methane	+ -	-999.90	mg/l	-999.90	mg/l	-999.90	mg/l	-999.90	mg/l		
Methyl tert-butyl ether	+ -	-999.90	µg/L	-999.90	µg/L	-999.90	µg/L	-999.90	µg/L		
Nitrate	+ -	2.30	mg/l	1.90	mg/l	1.10	mg/l	0.88	mg/l		
Nitrite	+ -	-999.90	mg/l	-999.90	mg/l	-999.90	mg/l	-999.90	mg/l		
pH	+ -	7.93	su	7.40	su	7.80	su	7.98	su		
Potassium,Dissolved	+ -	2.53	mg/l	2.10	mg/l	2.18	mg/l	2.15	mg/l		
Selenium	+ -	-999.90	mg/l	-999.90	mg/l	-999.90	mg/l	-999.90	mg/l		
Silver	+ -	-999.90	mg/l	-999.90	mg/l	-999.90	mg/l	-999.90	mg/l		
Sodium	+ -	44.90	mg/l	37.00	mg/l	44.90	mg/l	46.30	mg/l		
Specific Conductivity	+ -	572.00	umhos/	680.00	umhos/	644.00	umhos/	549.00	umhos/		
Sulfate	+ -	87.60	mg/l	78.00	mg/l	78.80	mg/l	63.00	mg/l		
Sulfide	+ -	-999.90	mg/l	-999.90	mg/l	-999.90	mg/l	-999.90	mg/l		
Toluene	+ -	-999.90	µg/L	-999.90	µg/L	-999.90	µg/L	-999.90	µg/L		
Xylene (total)	+ -	-999.90	µg/L	-999.90	µg/L	-999.90	µg/L	-999.90	µg/L		
Grand Total	+ -										


Note: non-detect = -999.90

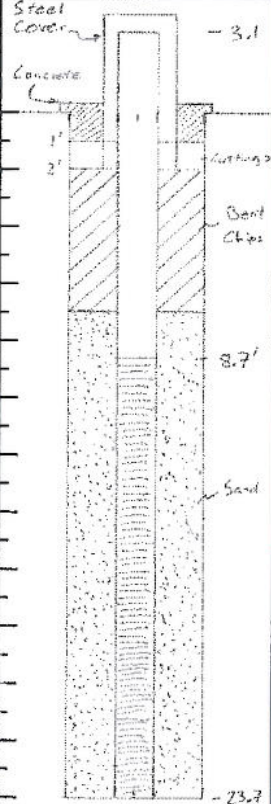
Note: non-detect = -999.90

Note: non-detect = -999.90

Note: non-detect = -999.90

Note: non-detect = -999.90

LOCATION MAP				Office Address & Phone:			
		TEST HOLE/WELL LOG				Page <u>1</u> of <u>1</u>	
		Test/Well Number: <u>MW7</u>		Project: <u>Unocal Baseline WQ</u>			
		Date: <u>17 NOV 2004</u>		Project Number: <u>6604250</u>			
Elevation:		Detector: <u>N/A</u>		Drilling Method: <u>HSA 4 1/4" ID</u>		Sampling Method: <u>SPT</u>	
Gravel Pack: <u>Colorado Silica Sand</u>		Seal: <u>Bent Chips</u>		Length: <u>5 ft</u>		Grout:	
Casing Type: <u>Sch 40 PVC</u>		Diameter: <u>2 INCH</u>		Length: <u>11.8'</u>		Hole Dia.: <u>7 INCH</u>	
Screen Type: <u>Sch 40 PVC 0.020 SLOT</u>		Diameter: <u>2 INCH</u>		Length: <u>15'</u>		Total Depth: <u>23.7 ft</u>	
						Depth to Liquid: <u>DRY</u>	
						Depth to Water: <u>DRY</u>	

Moisture Content	% Fines	Vapor (ppm)	Staining	Sample #	Depth (bgs)	Sample Recovery	Penetration Resistance	LITHOLOGY/REMARKS	WELL COMPLETION
					0			<p>Note: This well may only have water during spring runoff.</p>	
					10	0.5	13 50%		
					20	13	26 29 26	19-20.5 Alternating layers 0.5" thick • Brown Sandy CLAY, moist, medium plasticity (CL) firm • Gray & Brown shale	
					30			Drill shale from 15' to TD @ 24' progressively harder & slower, stop drilling @ 24' 8 sacks of sand to 7' BGS 2 sacks of bentonite chips to 2' BGS	
								+ Note existing 4" PVC standpipe in woods ~ 100' south of MW7	

1922 Martin

TEST HOLE/WELL LOG

Page__of__

Test/Well Number: MW 8

Project: Unocal Baseline WQ

Date: 17 NOV 2004

Project Number: EG04250

Logged By: DTG

Drilled By: DA Smith, Nathan & John

Elevation:

Detector: *N/A*

Drilling Method: HSA

Sampling Method: SPT

Gravel Pack: Colorado Silicea Sand

Seal: Bent chips Length: 21'

Grout:

Casing Type: Sch 40 PVC

Diameter: 7.1 Length: 77.7

Hole
Dia.: 7 inch

Depth to
Liquid:

Screen Type: Sch 40 PVC 0.020" SLOT

Diameter: 2×10^2

Total Depth: 343

Depth to Water: DRY

Moisture Content	% Fines	Vapor (ppm)	Staining	Sample #	Depth (logs)	Sample Recovery	Penetration Resistance	LITHOLOGY/REMARKS	WELL COMPLETION	
									Steel Casing	Concrete
					0			Note: this well may have water only during spring runoff	0	+3.3'
					10	6 11 14		9-10 ⁵ 80% Brown Sandy (A) CLAY, CL, moist, firm 20% Broken shale gray	10	1' cuttings 2'
					20	6 2 6		19-20 ⁵ 50% Brown Sandy (A) CLAY, CL, moist, low-med plasticity 50% Broken Gray shale	20	
					30	7 6 7		29-30 ⁵ Alternating layers ~ 0.1' each. Brown sandy CLAY Brown silty SAND (A) Broken Shale gray	30	23' 24.2' Sand 34.2'

LOCATION MAP

See Master



Office Address & Phone:

TEST HOLE/WELL LOG

Page 1 of 1

Test/Well Number: MW9

Project: Unequal Baseline WG

Date: 11/17/04

Project Number: EG04250

Logged By: DTM

Drilled By: DA Smith, Nathan F. John

Elevation:

Detector: N/A

Drilling Method: HSA 4 1/4" ID

Sampling Method: SPT

Gravel Pack: Colorado Silica Sand

Seal: Bent chips Length: 20'

Grout:

Casing Type: Sch 40 PVC

Diameter: 2" Length: 27.1'

Hole Dia.: 7 inch

Depth to Liquid:

Screen Type: Sch 40 PVC 0.020" slot

Diameter: 2" 10'

Total Depth: 33.6 ft

Depth to Water: -25' BGS

Moisture Content	% Fines	Vapor (ppm)	Staining	Sample #	Depth (bgs)	Sample Recovery	Penetration Resistance	LITHOLOGY/REMARKS	WELL COMPLETION
					0				Steel Casing Concrete +3.5'
					10	13 13 9		9-10' Tan Sandy (A) SILT with gravel-sized shale pieces, LP-MP, dry (ML)	1' cutting 2'
					20	4 6 3		19-20' Tan Sandy (A) CLAY w/ gravel-sized shale pieces, MP, moist wet @ tip (CL)	22'
					30	9 3 4		29-30' Tan Silty SAND w/ gravel-sized shale pieces (grey/orange), saturated, low-med plasticity, SC-SW	23.6'
								TD = 34' 10' Screen 25' Blank = 27.1 ft PVC stickup = 14' + 25" (2") added "A" 9 sacks of sand to 22' BGS 9 sacks of bent chips to 2' BGS GSL @ MW 9 is ~ 24' above water in adjacent East Fork	33.6'

ATTACHMENT F

Stormwater Management Plan

Prepared by:
EnCana Oil & Gas (USA) Inc.
Parachute, Colorado

Volume 1
Master Stormwater Management Plan
North Parachute Ranch
COR-037689

Revised May 2008

Prepared for:
EnCana Oil & Gas (USA) Inc.
Parachute, Colorado

Volume 1

Master Stormwater Management Plan

North Parachute Ranch

COR-037689

Prepared By Dustin Forsling

Reviewed By Lindsey Kruckenberg

Revised May 2008

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Appendix C	Existing Soil and Vegetation Data
Appendix D	Master SWMP Permit Area Map
Appendix E	Stormwater Manual of Best Management Practices (BMPs)
Appendix F	Final Stabilization Certification
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1.0 Introduction

This Master Stormwater Management Plan (Master SWMP) satisfies the Colorado Department of Public Health and Environment (CDPHE) Water Quality Control Division (WQCD) General Permit No. COR-030000 issued on May 31, 2007 for Stormwater Discharges Associated with Construction Activities (the Stormwater Construction Permit). EnCana Oil & Gas (USA) Inc. (EnCana) has submitted a General Permit Application to WQCD, a copy of which is provided as Appendix A.

This Master SWMP has been prepared in compliance with CDPHE WQCD, the Federal Clean Water Act (CWA), and the National Pollutant Discharge Elimination Permit (NPDES) regulations found in 40 CFR, Part 122.26 for stormwater discharges.

The objectives of this Master SWMP are to:

1. Identify all potential sources of pollution which may reasonably be expected to affect the quality of stormwater discharges associated with construction activity within this Master SWMP permit area at each project site;
2. Describe the practices to be used to reduce the pollutants in stormwater discharges associated with construction activity within this Master SWMP permit area at each project site (also known as Best Management Practices (BMPs)); and ensure the practices are selected and described in accordance with good engineering practices, including the installation, implementation and maintenance requirements;
3. Be properly prepared and updated to ensure compliance with the terms and conditions of the Stormwater Construction Permit;
4. Work hand in hand with the Site Specific Records, as described in the following section; and
5. Serve as an education tool and comprehensive reference/guide to stormwater management for inspectors, surveyors, engineers, and EnCana employees and contractors.

EnCana construction activities fall under one of two types. Exploration and Production (E&P) sites involve the construction of well pads, roads, and other facilities. Midstream Services (also referred to as Gas Gathering) sites involve the construction of pipelines and compressor, treatment, and other facilities. This Master SWMP is intended to address stormwater management for any and all of these sites within this Master SWMP's Permit Coverage Area.

1.1 Site Specific Records

While Volume 1 of the Master SWMP contains all of the general permit area information, Volume 2 of the Master SWMP contains all of the Site Specific Records including all Individual Stormwater Site Plans (Site Plans), as discussed in Section 2.8, and all Inspection and Maintenance Reports (discussed in Section 5.4). These Site Specific Records contain information specific to each site (each well pad, compressor station, section of road/pipeline, etc.), including information on areas of disturbance, ecosystems and vegetation, soil types, percent pre-disturbance vegetation, etc. Any changes to the design of individual sites or the BMPs used at those sites will be noted on the Site Plans as those changes occur, and kept with the Site Specific Records.

The Site Specific Records (Volume 2 of the Master SWMP) are bound separately from the body of this Master SWMP; however, both are readily available during any inspection. Both the body of this SWMP (Volume 1) and the Site Specific Records (Volume 2) comprise the entire SWMP, and go hand in hand in keeping EnCana in compliance with stormwater regulations. The Site Specific Records will be kept at the EnCana Field office in Parachute during active construction and site inspections to ensure accurate implementation, inspections, and maintenance of BMPs, as well as timely revisions to the Site Specific Records.

1.2 SWMP Administrator

The SWMP Administrator is responsible for the process of developing, implementing, maintaining, and revising this SWMP as well as serving as the comprehensive point of contact for all aspects of the facility's SWMP.

SWMP Administrators:

- E&P Sites: Terry Gosney, Regional Environmental Coordinator
2717 County Road 215, Suite 100, Parachute, CO 81635
(970)285-2600
- Midstream Services: Brad Ankrum, Piceance Midstream Operations Manager
2717 County Road 215, Suite 100, Parachute, CO 81635
(970)285-2600

2.0 Narrative Description of Master SWMP Permit Coverage Area

Name of Permit Coverage Area: North Parachute Ranch

Permit Number: COR-037689

Location of the Permit Coverage Area:

- County: Garfield County
- City: Located in Colorado approximately 10 miles West/ North West of Parachute. (See Site Maps for distance to the waters of the state.)
- Township/Section/Range: Township 5S, Range 95W, Sections 5-36. Township 6S, Range 96W, Sections 1-28.
- Latitude/Longitude: Latitude 39.5731, Longitude 108.1093.

Activities at the Permit Coverage Area will likely involve the construction of:

- Well pads
- Access roads
- Pipelines
- Compressor stations

The above construction activities are only typical and may vary once construction begins. Up-to-date information on the construction of well pads, roads, pipelines, etc. will be kept with the Site Specific Records (Volume 2 of the Master SWMP).

2.1 Sequence of Major Activities

Site specific, scheduling, surface use agreements, and/or other constraints can and/or may dictate changes in construction sequences. Significant sequence changes are addressed in the Site Specific Records (Volume 2 of the Master SWMP). Specific details on the construction and maintenance of BMPs mentioned below are provided in the Stormwater Manual of Best Management Practices (BMP Manual) as discussed in Section 3.3.

2.1.1 Well Pads and Roads

Construction activities for well pads and roads are generally completed in the following sequence:

Preconstruction:

1. **Surveys.** Topographic, vegetation, wildlife and archeology, as dictated.
2. **Temporary BMP's.** Where physical access is available, installation of terminal perimeter and temporary sediment controls, such as wattles, silt fence and/or other as necessary. Actual BMPs used for each site are shown on the Site Plans (discussed in Section 2.8) and kept with the Site Specific Records (Volume 2 of the Master SWMP).

Construction:

3. **Vegetation Clearing.** Vegetation will be cleared/grubbed and placed along the perimeter at the terminal discharge edges/points in a windrow and/or dam beyond the edge of excavation and at any run-on-protection discharge points, and/or chipped or other depending on landowner requirements.

4. **Diversions and Retention Reservoirs.** After vegetation clearing and prior to topsoil stockpiling, diversions are to be placed for run-on-protection (ROP) to prevent the greater landscape from discharging onto the planned disturbance. Temporary sediment control BMPs shall be placed at the discharge points of the ROP until permanent erosion controls can be installed along the entire length of the ROP. Diversions are to be installed along the terminal discharge edge inside of the vegetation windrows to convey site water/sediment to terminal discharge points where rough retention reservoirs are to be installed. The retention reservoir outlets are to receive temporary sediment control BMPs until permanent retention reservoirs and erosion, drainage, and sediment BMPs can be installed.
5. **Topsoil Stripping/Conservation.** All ACCESSIBLE TOPSOIL is to be removed from areas that are to be excavated, covered in subsoils, or turned into stabilized unpaved surfaces. If initial topsoil stockpile areas are insufficient to accommodate the quantities of topsoil being generated, the excess is to be placed at either end of the subsoil stockpile and segregated as much as possible. After major earthwork, grading, and erosion/drainage/sediment controls are complete, any areas that can be identified for immediate interim reclamation shall receive topsoil.
6. **General Rough Grading.** The site location will be graded to provide suitable surfaces for vehicle traffic and/or building sites, and may be graded to establish surface drainage patterns, such as berms or roadside ditches as necessary.
7. **Facility Specific Grading.** Individual facilities may require additional excavation to allow for construction of foundations. Excess soil will typically be used in general site grading.
8. **Foundation Construction.** To support facilities (such as tanks, processing equipment, etc), foundations will be constructed. Foundations may consist of select backfill, concrete spread footings, or piles. Finished support elevations are to be installed twelve to eighteen inches (12-18") above finished grade or the lowest point of the facility.
9. **Facility Construction.** Tanks, processing equipment, etc. will be constructed.

Interim Reclamation:

10. **Gravel Surfacing.** Areas used for access, parking, or materials staging will typically be gravel surfaced.
11. **Reclamation of Unused Areas.** Areas not needed for facilities, roads, parking, or materials staging will generally be reclaimed. Salvaged topsoil will be spread and the vegetative seed mix will be applied.
12. **Application of Erosion Stabilization.** Depending on terrain (e.g. steep slopes and drainage crossings) additional measures may be applied to increase stability of the reclaimed area.

Final Reclamation:

13. **Reclamation of Post-Operation Areas.** When operation of well pad or road is no longer necessary, the area will be decommissioned and all newly disturbed areas will be reclaimed. Any remaining topsoil will be spread and the vegetative seed mix will be applied. This may occur after termination of this permit and under the coverage of a new construction permit.

2.1.2 Pipelines

Construction activities for pipelines are generally completed in the following sequence:

Preconstruction:

1. **Surveys.** Topographic, vegetation, wildlife and archeology, as dictated.
2. **Mark Right-Of-Way.** The construction right-of-way (ROW) will be marked prior to construction with laths and/or flagging.
3. **Temporary BMPs.** EnCana's stormwater inspectors will determine locations to install preconstruction temporary erosion control devices, per site specific BMP installation plans and as necessary.

EnCana's contractor will maintain the erosion control structures as directed by the stormwater inspectors throughout all phases of construction, or until permanent erosion control measures are installed. Actual BMPs used for each site are shown on the Site Plans, which are kept with the Site Specific Records (Volume 2 of the Master SWMP).

Construction:

4. **Vegetation Clearing.** If necessary, vegetation will be cleared and placed in a windrow at the edge of the work area to be used later in reclamation activities, removed from the construction site, or burned/chipped depending on landowner requirements. Details for windrows are provided within the Stockpiling BMP of the BMP Manual (discussed in Section 3.3).
5. **Topsoil Stripping.** All ACCESSIBLE TOPSOIL (from the entire width of the right-of-way) will be removed and temporarily stockpiled along the up-hill side of the right-of-way (if terrain grades will allow) for later use in reclamation activities.
6. **General Grading.** For pipeline segments that occur in relatively rough terrain, general grading will be conducted to create a safe and workable ground surface. This is generally done to form a relatively level work surface on steep cross slopes and to reduce slopes in undulating terrain (arroyo and wash crossings). The site location will be graded to provide suitable surfaces for vehicle traffic and/or building sites, and may be graded to establish surface drainage patterns, such as berms or roadside ditches as necessary.
7. **Trench Excavation.** The trench needed for pipeline installation is almost always off-set in the ROW. The surveyors may indicate the location of the trench on their pipeline lateral. Generally, the trench will be located in the first third of the ROW. The remaining two thirds of the ROW will be used for working space. The trench depth and width will vary with the number of pipes to be installed and the pipe diameter. Generally, a 4-foot deep trench will be excavated by track-mounted excavators. The ditch will be excavated and sloped in accordance with OSHA specifications. The cover from top of pipe to ground level will be a minimum of 36 inches. Where rock is encountered, tractor-mounted mechanical rippers or rock trenching equipment may be used to facilitate excavation. The trench will be excavated and subsoil material stockpiled within the confines of the approved right-of-way limits unless a temporary use area is approved from the proper agency. Trench spoil will be stored in a separate location from the previously segregated topsoil.
8. **Pipe Installation.** Pipe installation will include stringing, bending for horizontal or vertical angles in the alignment, welding the pipe segments together, coating the joint areas to prevent corrosion, and then lowering-in and padding.
9. **Stringing.** Pipe will be hauled by truck to the pipeline ROW. Each joint of pipe will be unloaded and placed parallel to the ditch.
10. **Bending.** After the joints of pipe are strung along the ditch, individual joints of pipe may need to be bent to accommodate horizontal and vertical changes in direction. Field bends will be made utilizing a hydraulically operated bending machine. Where the deflection of a bend exceeds the allowable limits for a field-bent pipe, factory (induction) bends will be installed.
11. **Welding.** After the pipe joints are bent, the pipe is lined up end-to-end and clamped into position. The pipe is then welded in conformance with 49 CFR Part 192, Subpart E. "Welding of Steel Pipelines" and API 1104, "Standard for Welding Pipelines and Related Facilities".
12. **Welding Inspection.** Welds will be visually inspected by a qualified inspector. Any defects will be repaired or cut out as required under the specified regulations and standards.
13. **Coating.** To prevent corrosion, the pipe will be externally coated with fusion bonded epoxy coating prior to delivery. After welding, field joints will be coated with fusion bond epoxy coating, tape and primer, or shrink sleeves. Before the pipe is lowered into the ditch, the pipeline coating will be visually inspected and tested with an electronic detector, and any faults or scratches will be repaired.
14. **Lowering-In and Padding.** Once the pipe coating operation has been completed, a section of the pipe will be lowered into the ditch. Side-boom tractors may be used to simultaneously lift the pipe, position it over the ditch, and lower it in place. Inspection will be conducted to verify: that minimum cover is provided; the trench bottom is free of rocks, debris, etc.; external pipe coating is not damaged;

and the pipe is properly fitted and installed into the ditch. Specialized padding machines will be used to sift soil fines from the excavated subsoil to provide rock-free pipeline padding and bedding. In rocky areas, padding material or a rock shield will be used to protect the pipe. Topsoil will not be used to pad the pipe. At the completion of lowering-in and padding activities the contractor may install trench breakers around the pipelines to minimize subsurface water flow. Details for trench breakers are provided within the BMP Manual (discussed in Section 3.3).

15. **Backfilling.** Backfilling will begin after a section of the pipe has been successfully placed in the ditch and final inspection has been completed. Backfilling will be conducted using a bulldozer, rotary auger backfill, padding machine or other suitable equipment. Backfilling the trench will use the subsoil previously excavated from the trench. Backfill will be graded and compacted, where necessary for ground stability, by being tamped or walked in with a wheeled or track vehicle. Compaction will be performed to the extent that there are no voids in the trench. Any excavated materials or materials unfit for backfill will be utilized or properly disposed of in conformance with applicable laws or regulations.
16. **General Grading.** If general grading was conducted to facilitate pipeline construction, these materials will be replaced and graded to recreate the preconstruction topography.

Final Reclamation:

17. **Cleanup.** Cleanup activities will be initiated as soon as practicable after backfilling activities have been completed. All construction-related debris will be removed and disposed of at an approved disposal facility.
18. **Subsoil and Topsoil Placement.** Subsoil will be evenly re-contoured across the right-of-way to pre-construction conditions. After the subsoil has been re-spread the contractor will spread the previously segregated topsoil back across the right-of-way. The topsoil will be evenly spread to original contours.
19. **Vegetation.** After any remaining topsoil is spread, the vegetative seed mix will be applied. The area will be revegetated according to private landowner Surface Use Agreements and/or according to the BLM/Forest Service reclamation requirements. Details for revegetation are provided within the BMP Manual (discussed in Section 3.3) and the Revegetation Manual (provided as Appendix B).
20. **Application of Erosion Stabilization.** Depending on terrain (e.g. steep slopes and drainage crossings) additional measures may be applied to increase stability of the reclaimed area. Possible erosion stabilization methods are provided within the BMP Manual (discussed in Section 3.3). Actual locations and measures used are shown on the Site Plans, which are kept with the Site Specific Records (Volume 2 of the Master SWMP).

2.1.3 Compressor Stations, Treatment Facilities, or Other Facilities.

Construction activities for compressor stations, treatment facilities, and other facilities are generally completed in the following sequence:

Preconstruction:

1. **Surveys.** Topographic, vegetation, wildlife and archeology, as dictated.
2. **Temporary BMP's.** Where physical access is available, installation of terminal perimeter and temporary sediment controls, such as wattles, silt fence and/or other as necessary. Actual BMPs used for each site are shown on the Site Plans, which are kept with the Site Specific Records (Volume 2 of the Master SWMP).

Construction:

3. **Vegetation Clearing.** Vegetation will be cleared/grubbed and placed along the perimeter at the terminal discharge edges/points in a windrow and/or dam beyond the edge of excavation and at any run-on-protection discharge points, and/or chipped or other depending on landowner requirements.
4. **Diversions and Retention Reservoirs.** After vegetation clearing and prior to topsoil stockpiling,

diversion are to be placed for ROP to prevent the greater landscape from discharging onto the planned disturbance. Temporary sediment control BMP's shall be placed at the discharge points of the ROP until permanent erosion controls can be installed along the entire length of the ROP. Diversions are to be installed along the terminal discharge edge inside of the vegetation windrows to convey site water/sediment to terminal discharge points where rough retention reservoirs are to be installed. The retention reservoir outlets are to receive temporary sediment control BMP's until permanent retention reservoirs and erosion, drainage, and sediment BMP's can be installed.

5. **Topsoil Stripping/Conservation.** All ACCESSIBLE TOPSOIL is to be removed from areas that are to be excavated, covered in subsoils, or turned into stabilized unpaved surfaces. If initial topsoil stockpile areas are insufficient to accommodate the quantities of topsoil being generated, the excess is to be placed at either end of the subsoil stockpile and segregated as much as possible. After major earthwork, grading, and erosion/drainage/sediment controls are complete, any areas that can be identified for immediate interim reclamation shall receive topsoil.
6. **General Rough Grading.** The site location will be graded to provide suitable surfaces for building sites and vehicle traffic, and may be graded to establish surface drainage patterns, such as berms or roadside ditches as necessary.
7. **Excavation.** Soil will be excavated to allow for the construction of foundations. Trenches will be excavated for all underground piping and conduit. Excess soil will typically be used in general site grading.
8. **Foundation Construction.** Foundations will be constructed to support facility buildings. Foundations may consist of select backfill, concrete spread footings, piles, etc. Finished support elevations are to be installed according to engineered drawings or twelve to eighteen inches (12-18") above finished grade or the lowest point of the facility.
9. **Facility Construction.** Buildings, tanks, processing equipment, etc. will be constructed. Utilities will be installed.

Interim Reclamation:

10. **Landscaping.** If necessary, certain areas will be spread with topsoil and landscaped.
11. **Gravel Surfacing.** Areas used for access, parking, or materials staging will typically be gravel surfaced.
12. **Reclamation of Unused Areas.** Areas not needed for facilities, roads, parking, or materials staging will generally be reclaimed. Salvaged topsoil will be spread and the vegetative seed mix will be applied.
13. **Application of Erosion Stabilization.** Depending on terrain (e.g. steep slopes and drainage crossings) additional measures may be applied to increase stability of the reclaimed area. Possible erosion stabilization methods are provided within the BMP Manual (discussed in Section 3.3). Actual locations and measures used are shown on the Site Plans, which are kept with the Site Specific Records (Volume 2 of the Master SWMP).

Final Reclamation:

14. **Reclamation of Closed Facilities.** When facilities are no longer necessary, the buildings may be demolished, according to approved procedures. All construction materials will be removed and the newly disturbed areas will be reclaimed. Any remaining topsoil will be spread and the vegetative seed mix will be applied. This may occur after termination of this permit and under the coverage of a new construction permit.

2.1.4 Man Camps and Helicopter Pads

Construction activities for man camps, helicopter pads, and other small areas are generally completed in the following sequence:

Preconstruction:

1. **Surveys.** Topographic, vegetation, wildlife and archeology, as dictated.
2. **Temporary BMPs.** Where physical access is available, installation of terminal perimeter and temporary sediment controls, such as wattles, silt fence and/or other as necessary. Actual BMPs used for each site are shown on the Site Plans, which are kept with the Site Specific Records (Volume 2 of the Master SWMP).

Construction:

3. **Vegetation clearing.** Vegetation will be cleared/grubbed and placed along the perimeter at the terminal discharge edges/points in a windrow and/or dam beyond the edge of excavation and at any run-on-protection discharge points, and/or chipped or other depending on landowner requirements.
4. **Diversions and Retention Reservoirs.** After vegetation clearing and prior to topsoil stockpiling, diversions may be placed for ROP to prevent the greater landscape from discharging onto the planned disturbance. Temporary sediment control BMPs shall be placed at the discharge points of the ROP until permanent erosion controls can be installed along the entire length of the ROP. Diversions may be installed along the terminal discharge edge inside of the vegetation windrows to convey site water/sediment to terminal discharge points where rough retention reservoirs are to be installed. The retention reservoir outlets may receive temporary sediment control BMPs until permanent retention reservoirs and erosion, drainage, and sediment BMPs can be installed.
5. **Topsoil Stripping/Conservation.** All ACCESSIBLE TOPSOIL is to be removed from areas that are to be excavated, covered in subsoils, or turned into stabilized unpaved surfaces. If initial topsoil stockpile areas are insufficient to accommodate the quantities of topsoil being generated, the excess is to be placed at either end of the subsoil stockpile and segregated as much as possible. After major earthwork, grading, and erosion/drainage/sediment controls are complete, any areas that can be identified for immediate interim reclamation shall receive topsoil.
6. **General Rough Grading.** The site location will be graded to provide suitable surfaces for vehicle traffic, trailers, etc. and may be graded to establish surface drainage patterns, such as berms or roadside ditches as necessary.
7. **Facility Construction.** Trailers, buildings, or other structures will be installed or constructed.

Interim Reclamation:

8. **Gravel Surfacing.** Areas used for access, parking, or materials staging will typically be gravel surfaced.
9. **Reclamation of Unused Areas.** Areas not needed for facilities, roads, parking, or materials staging will generally be reclaimed. Salvaged topsoil will be spread and the vegetative seed mix will be applied.
10. **Application of Erosion Stabilization.** Depending on terrain (e.g. steep slopes and drainage crossings) additional measures may be applied to increase stability of the reclaimed area. Possible erosion stabilization methods are provided within the BMP Manual (discussed in Section 3.3). Actual locations and measures used are shown on the Site Plans, which are kept with the Site Specific Records (Volume 2 of the Master SWMP).

Final Reclamation:

11. **Reclamation of Post-Operation Areas.** When operation of man camp or helicopter pad is no longer necessary, the area may be decommissioned and all newly disturbed areas will be reclaimed. Any remaining topsoil will be spread and the vegetative seed mix will be applied. This may occur after termination of this permit and under the coverage of a new construction permit.

2.2 Area Estimates

The total Permit Coverage Area is estimated to be approximately 27,000 Acres. The area that will undergo clearing, excavation, and/or grading is estimated to be approximately 400 acres. Because the area will vary

over time, these are only approximate estimates. This information is used to help determine the extent of control measures (BMPs) needed.

2.3 Description of Existing Topography and Soils

The Permit Coverage Area consists of three climatic zones and are referred to as the Upper, Middle and Lower Zones.

The Upper Zone exists at elevations between 7,500 to 8,500 feet ASL; excluding southern facing slopes greater than 20%. Annual precipitation within this zone ranges from 16 to 25 inches annually. The soils within the Upper Zone are primarily loam textured soils within the Parachute-Rhone-Irigul series. These soils are mostly well drained, cool soils with dark-colored organic-rich surface layers derived from shale and sandstone. Soil textures above the rim are generally loam with loam to clay loam sub-soils and range in depth from <20" on ridges to >60" in swales. All of the upland soils above the rim are in low to medium erosion classes.

The Middle Zone exists at elevations between 7,500 to 6,000 feet ASL; including southern facing slopes greater than 20%. Annual precipitation within this zone ranges from 13 to 14 inches annually. The area below the rim encompassing the cliffs, talus and steep colluvial slope at the base of the cliffs are derived from the Green River shale. Below the cliffs and talus is a zone of soils formed from colluvium and Wasatch Formations. Soils are shallow, poorly developed and there are many rock outcrops and badlands. Badlands are steep, nearly barren areas dissected by many ephemeral drainages. Soils on the upper slopes of this zone have a thin, organic-rich surface layer and little development of soil horizons. Soils on lower slopes are shallow to moderately deep and are well-drained. Surface texture is loam, clay loam, or silty clay loam with variable amounts of gravel, cobbles and boulders, talus slopes and colluvial slopes below rock outcrops. Soils are moderate to highly alkaline. Sub-soils usually have higher clay content and are calcareous. Erosion hazard is usually severe.

The Lower Zone exists at elevations below 6,000 feet ASL and consists of lower terraces and floodplains along the valley bottoms of major drainages. Annual precipitation within this zone ranges from 10 to 13 inches annually. Soils in the Lower Zone are calcareous, moderate to strongly alkaline, some highly saline, loams and silty clay loams on benches, terraces and alluvial fans. Floodplain soils are sandy loam or loam stratified with sand, gravel or cobbles derived from shale or sandstone. Soils formed in the alluvium are derived from sandstones, shale's and marls and appear on benches, terraces, alluvial fans and floodplains in the Lower Zone. Surface texture ranges from loam and sandy loam to clay loam with sub-soils of sandy loam to clay.

A map and table summarizing the existing soils within the Permit Coverage Area (including permeability, available water capacity, surface runoff, and erosion hazard of those soils) are provided in Appendix C.

2.4 Description of Existing Vegetation

The existing percent vegetative ground cover for each well pad, section of roadway/pipeline, etc. within the Permit Coverage Area is estimated on each inspection and maintenance report form (discussed in Section 5.4), which are kept with the Site Specific Records (Volume 2 of the Master SWMP). A map indicating the existing ecosystem types within the Permit Coverage Area is provided in Appendix C.

A description of the existing vegetation within each ecosystem (Mutel, 1992) is as follows:

Mountain Grasslands and Meadows. Natural wet meadows and fens are dominated by moisture-loving species, primarily members of the sedge and rush families. Spike-rush (*Eleocharis palustris*), sedges, Canadian reedgrass (*Calamagrostis canadensis*), and tufted hairgrass (*Deschampsia cespitosa*) are common. Natural dry meadows are filled with members of the grass family. Bunchgrasses dominate at low elevations. Needle-and-thread, mountain muhly (*Muhlenbergia montana*), Junegrass, blue grama, and species of wheatgrass and bluegrass are common. Successional meadows contain a combination of weedy, introduced plants and plants typical of dry, rocky slopes, such as common dandelion (*Taraxacum officinale*), golden banner (*Thermopsis divaricarpa*), Colorado locoweed (*Oxytropis sericea*), mountain pussytoes (*Antennaria parvifolia*),

showy daisies (*Erigeron speciosus*), stonecrop (*Sedum lanceolatum*), and some sedges (*Carex* spp.). Mountain grasslands, where Thurber fescue (*Festuca thurberi*) and mountain muhly were once the dominant grasses, are now largely dominated by blue grama, Canada bluegrass (*Poa compressa*), foxtail barley (*Critesion jubatum*), and other species as a result of grazing.

Riparian Ecosystems

- a. **Lowland Riparian Ecosystems.** The lowland riparian ecosystem is dominated by the plains cottonwood (*Populus deltoidea* ssp. *occidentalis*), the valley cottonwood (*Populus deltoidea* ssp. *wislizenii*) and the peach-leaved willow (*Salix amygdaloides*). Common shrubs and herbaceous plants include snowberry (*Symphoricarpos occidentalis*), sandbar willow (*Salix exigua*), bulrush (*Schoenoplectus lacustris*), broad-leaved cat-tail (*Typha latifolia*), prairie cord-grass (*Spartina pectinata*), and western wheatgrass.
- b. **Mountain Riparian Ecosystems.** The mountain riparian ecosystem is dominated by quaking aspen (*Populus tremuloides*), lanceleaf cottonwood (*Populus X acuminata*), narrowleaf cottonwood (*Populus angustifolia*), and Colorado blue spruce (*Picea pungens*). Common shrubs include alder (*Alnus incana*), river birch (*Betula fontinalis*), chokecherry (*Padus virginiana*), common gooseberry (*Ribes inerme*), bush honeysuckle (*Distegia involucrata*), and mountain maple (*Acer glabrum*). The lush riparian herbaceous understory includes forbs, grasses, sedges, rushes, climbing vines, mosses, lichens, and liverworts. Weedy invaders are also common.

Shrublands. Shrub communities include semidesert shrublands found in dry lowlands, sagebrush shrublands that occupy a wide range of elevation from the Colorado Plateau to high mountain valleys, and montane shrublands other than sagebrush, characteristic of foothills and mountain regions.

- a. **Semidesert Shrublands.** Common shrubs include Great Basin big sagebrush (*Seriphidium tridentatum*), greasewood (*Sarcobatus vermiculatus*), rabbitbrush (*Chrysothamnus*), four-winged saltbush (*Atriplex canescens*), and shadscale (*Atriplex confertifolia*). Common grasses and forbs include galletagrass (*Hilaria jamesii*), blue grama, alkali sacaton (*Sporobolus airoides*), nodding eriogonum (*Eriogonum cernuum*), copper mallow (*Sphaeralcea coccinea*), and prince's plume (*Stanleya pinnata*).
- b. **Sagebrush Shrublands.** Common shrubs include Great Basin big sagebrush, mountain big sagebrush (*Seriphidium vaseyanum*), rabbitbrush, and serviceberry (*Amelanchier alnifolia*). Common grasses and forbs include nodding eriogonum, copper mallow, and Indian Paintbrush (*Castilleja* spp.).
- c. **Montane Shrublands.** Common shrubs include mountain mahogany (*Cercocarpus*), Gambel oak (*Quercus gambelii*), rabbitbrush, serviceberry, and skunkbrush (*Rhus aromatica*). Common grasses and forbs include needle-and-thread, western wheatgrass, copper mallow, and Indian Paintbrush.

Pinyon-Juniper Woodlands. Pinyon-juniper woodlands consist of scattered Utah juniper interspersed with big sagebrush. Pinyon pine is a minor component. Several other shrub species also occur in this community, including snowberry, bitterbrush (*Purshia tridentata*), snakeweed (*Gutierrezia sarothrae*), and serviceberry. In general, the sparse herbaceous layer consists of graminoids such as cheatgrass (*Anisantha tectorum*), Kentucky bluegrass (*Poa pratensis*), western wheatgrass, Indian ricegrass (*Oryzopsis hymenoides*), and squirreltail (*Elymus elymoides*). Forbs include Tracy's thistle (*Cirsium tracyi*), mariposa lily (*Calochortus nuttallii*), western wallflower (*Erysimum capitatum*), tapertip onion (*Allium acuminatum*), yarrow (*Achillea lanulosa*), stemless four-nerve daisy (*Tetranneuris acaulis*), and sharpleaf twinpod (*Physaria acutifolia*). All of these are native species, except for cheatgrass (an invasive, non-native annual species) and Kentucky bluegrass (a widely naturalized non-native perennial species).

Montane Forests

- a. **Ponderosa Pine Forests.** These forests are dominated by the ponderosa pine (*Pinus ponderosa*) and the Rocky Mountain juniper (*Savina scopulorum*). Common shrubs and herbaceous plants include the wax currant (*Ribes cereum*), blue grama, side-oats grama, Junegrass, needle-and-thread, spike fescue (*Leucopoa kingii*), and sulphur flower (*Eriogonum umbellatum*).
- b. **Douglas Fir Forests.** These forests are dominated by the Douglas fir (*Pseudotsuga menziesii*). Common shrubs and herbaceous plants include common juniper (*Juniperus communis*), kinnikinnik (*Arctostaphylos*), mountain maple (*Acer glabrum*), mountain lover (*Paxistima myrsinites*), heart-leaved arnica (*Arnica cordifolia*), and false Solomon's seal (*Maianthemum* spp.).
- c. **Aspen forests.** Quaking aspen generally occur on north-facing slopes, and along drainage swales. The aspen forest generally has an understory of Wood's rose (*Rosa woodsii*), Colorado blue columbine (*Aquilegia caerulea*), showy daisy, Thurber fescue, white geranium (*Geranium richardsonii*), common lupine (*Lupinus argenteus*), Fendler meadowrue (*Thalictrum fendleri*), and American vetch (*Vicia americana*).
- d. **Lodgepole Pine Forests.** These forests are dominated by the lodgepole pine (*Pinus contorta*). Common shrubs and herbaceous plants include broom huckleberry (*Vaccinium scoparium*), common juniper, kinnikinnik, sticky-laurel (*Ceanothus velutinus*), and heart-leaved arnica.

Urban Areas. Urban areas contain an increased density of human-created structures in comparison to the areas surrounding it. Depending on the area, vegetation may account for anywhere between 20 and 70 percent of the total land cover, with the remaining portion being constructed materials. Types of vegetation within urban areas may be any combination of the above ecosystems, and may include areas of blue grass yards and parks.

Cropland. Cropland vegetation may consist of wheat, corn, soybeans, or a variety of many other crops. Cropland may either lie fallow (bare of any crops) or contain crops at any stage of growth from seedlings to mature plants.

2.5 Identification of Potential Pollution Sources

Potential sources of pollution are associated with all phases of the project from the start of construction through interim reclamation and up until final stabilization has occurred. Final stabilization occurs when construction activities have been completed and all disturbed areas have been either built on, paved, or a uniform vegetative cover has been established with a density of at least 70 percent of pre-disturbance levels, or equivalent permanent, physical erosion reduction methods have been employed.

The most common source of pollution during construction is sediment resulting from the erosion of recently cleared and/or graded areas, such as cut/fill slopes and soil stockpiles. However, there may be many potential pollution sources at any given site. The following types of conditions that might affect the potential for a pollutant source to contribute pollutants to stormwater (CDPHE, 2007B) shall be evaluated:

- The frequency of the activity (i.e., does it occur every day or just once a month? can it be scheduled to occur only during dry weather?);
- Characteristics of the area where the activity takes place (i.e., surface type (pavement, gravel, vegetation, etc.), physical characteristics (site gradients, slope lengths, etc.);
- Ability of primary and secondary containment (fuel tanks, drum storage, etc.) at product storage and loading/unloading facilities to prevent and contain spills and leaks;
- Proximity of product storage and loading/unloading facilities to waterways or drainage facilities;
- Concentration and toxicity of materials which may be found in the site's stormwater runoff; and
- Contamination of storage facilities/containment with stored materials (i.e., used oil drums or tanks coated with spilled oil).

The following items are potential sources of pollutants at the North Parachute Ranch. Each of the potential sources of pollutants will be controlled using one or more of the following types of BMPs: Erosion Controls, Drainage Controls, Sediment Controls or Non-Stormwater Controls. Descriptions and details for each of these types of BMPs are provided in the BMP Manual (discussed in Section 3.3). Actual BMPs used at each site are shown on the Site Plans (discussed in Section 5.4).

Construction:

- All Disturbed and Stored Soils: Erosion Controls, Drainage Controls, Sediment Controls.
- Vehicle Tracking of Sediments: Sediment Controls, Non-Stormwater Controls.
- Management of Contaminated Soils: Non-Stormwater Controls.
- Loading and Unloading Operations: Non-Stormwater Controls.
- Outdoor Storage Activities (Building Materials, Fertilizers, Chemicals, etc.): Non-Stormwater Controls.
- Vehicle and Equipment Maintenance and Fueling: Non-Stormwater Controls.
- Significant Dust or Particulate Generating Processes: Non-Stormwater Controls.
- Routine Maintenance Activities Involving Fertilizers, Pesticides, Detergents, Fuels, Solvents, Oils, etc.: Non-Stormwater Controls.
- On-Site Waste Management Practices (Waste Piles, Liquid Wastes, Dumpsters, etc.): Non-Stormwater Controls.
- Concrete Truck/Equipment Washing, Including the Concrete Truck Chute and Associated Fixtures and Equipment: Non-Stormwater Controls.
- Dedicated Asphalt and Concrete Batch Plants: There will be no asphalt or concrete batch plants located within the Permit Coverage Area of this SWMP.
- Non-Industrial Waste Sources Such as Worker Trash and Portable Toilets: Non-Stormwater Controls.

Interim/Final Reclamation:

- All Disturbed and Stored Soils: Erosion Controls, Drainage Controls, Sediment Controls.
- Vehicle Tracking of Sediments: Sediment Controls, Non-Stormwater Controls.
- Vehicle and Equipment Maintenance and Fueling: Non-Stormwater Controls.
- Significant Dust or Particulate Generating Processes: Non-Stormwater Controls.
- Non-Industrial Waste Sources such as Worker Trash and Portable Toilets: Non-Stormwater Controls.

2.6 Allowable Sources of Non-Stormwater Discharge

Allowable sources of non-stormwater discharge within the Permit Coverage Area include the following:

- **Uncontaminated Springs.** Although there are several springs within the Permit Coverage Area, None of these springs are currently located in areas where soil disturbance will occur. If this changes in the future, the controls used at any such location will be noted in the Site Specific Records. (Volume 2)
- **Landscape Irrigation Return Flow.** There are several locations in the Lower Zone where pipelines are within irrigated fields. These locations will be treated similarly to any water crossing with the use of an appropriate control which will be noted in the Site Specific Records.
- **Construction Dewatering.** Construction dewatering is described and discussed in Section 3.2.5.
- **Concrete Washout.** Concrete washout is described and discussed in Section 3.2.4.

- **Emergency Fire Fighting Water.** Water used to put out any type of fire is considered an allowable source of non-stormwater discharge.

No other non-stormwater discharges are allowed under the Stormwater Construction Permit. Other types of non-stormwater discharges must be addressed in a separate permit issued for that discharge.

2.7 Receiving Water

Runoff from disturbed areas during construction will be controlled and/or routed through the use of one or more BMPs, as described later in this plan, prior to being discharged to receiving waters. However, it may be expected that runoff from certain areas will infiltrate into the earth and is not expected to contribute to receiving waters.

In general, runoff from the Permit Coverage Area comes from springs and tributaries that lead to three different forks. West Fork will flow east to south east; Middle Fork will flow south to south east and East Fork will flow west to south west. All tributaries will flow to Parachute Creek and then in to the Colorado River.

2.8 Master SWMP Permit Area Map and Individual Stormwater Site Plans

An overall Master SWMP Permit Area Map is provided as Appendix D. This map is likely to change constantly and will be updated at least annually. The Master SWMP Permit Area Map includes:

- Contours and elevations (topography) with existing drainage patterns;
- Locations and names of major surface waters such as streams, wetlands, irrigation ditches, canals, etc...;
- Master SWMP permit area boundaries; and
- Construction area locations including roads, pipelines, well pads, compressor station facilities, treatment facilities, water parks, and all other facilities.

Individual Stormwater Site Plans (Site Plans) of each site (well pad, access road, section of pipeline, etc.) are provided with the Site Specific Records (Volume 2 of the Master SWMP) Separate Site Plans will be developed for each phase of construction: preconstruction, construction, interim reclamation (if applicable), final stabilization (if applicable) and final reclamation (if applicable). These Site Plans include:

- Construction site boundaries (this is the area expected to be disturbed by clearing, excavating, grading, or other construction activities);
- Contours and elevations (topography) with existing and proposed drainage patterns;
- Limits of well pads and locations of reserve pits and well heads (if applicable);
- All areas of ground surface disturbance, including areas of cut and fill;
- Locations of all potential pollutant sources listed in Section 2.5 (including areas used for vehicle fueling, the storage of materials, equipment, soil, or waste, etc...);
- Locations of all minor surface waters and all anticipated allowable sources of non-stormwater discharge (including springs, dewatering, concrete washout, etc...);
- Locations of all existing and planned BMPs (including erosion, drainage, and sediment controls);
- Locations, names, and distances to streams, wetlands, irrigation ditches, canals, and other surface waters; and
- The size, type and location of any outfall(s). If the stormwater discharge is to a municipal separate stormwater system, name that system, the location of the storm sewer discharge, and the ultimate receiving water(s).

Figures showing typical BMP locations along roadways and pipelines are provided as part of the BMP Manual (discussed in Section 3.3).

3.0 Best Management Practices (BMPs)

A key component of this Master SWMP is employing BMPs to improve stormwater quality. Local factors will be evaluated to determine what BMPs are suitable and practical at different locations. BMPs will be employed in different combinations during construction activities and phases as conditions warrant. Due to the fact that this Master SWMP is likely to cover more than one ecosystem (as described in Section 2.4), the selection of BMPs (including type, quantity, sequence/combination, etc.) will vary at each site within the Master SWMP Permit Area. Specific BMPs to be employed at each well pad, road, pipeline, or other facility are identified on the Site Plans, which are kept with the Site Specific Records (Volume 2 of the Master SWMP).

3.1 Erosion, Drainage, and Sediment Control BMPs

The primary method for controlling erosion, drainage, and sediment transport consists of minimizing initial disturbance of the soil and ground cover. However, many other methods can also be used. All stormwater-related BMPs will fall under at least one of the following three types of controls:

- **Erosion Control.** Any source control practice that protects the soil surface and/or strengthens the subsurface in order to prevent soil particles from being detached by rain or wind, thus controlling raindrop, sheet, and/or rill erosion.
- **Runoff Control.** Any practice that reduces or eliminates gully, channel, and stream erosion by minimizing, diverting, or conveying runoff.
- **Sediment Control.** Any practice that traps the soil particles after they have been detached and moved by wind or water. Sediment control measures are usually passive systems that rely on filtering or settling the particles out of the water or wind that is transporting them prior to leaving the site boundary.

BMPs may also be classified as either structural or non-structural controls:

- **Structural Control.** Handles sediment-laden stormwater prior to it leaving each site. Structural BMPs are used to delay, capture, store, treat, or infiltrate stormwater runoff. Some examples of structural BMPs include sediment traps, diversions, and silt fences. Most Runoff Controls and Sediment Controls can also be classified as Structural Controls.
- **Non-structural Control.** Reduces the generation and accumulation of pollutants, including sediment, from a construction site by stabilizing disturbed areas and preventing the occurrence of erosion. Some examples of non-structural BMPs include revegetation, mulching, and surface roughening. These types of stabilization techniques are not only the most effective method for reducing soil loss, but they are also normally the most cost effective due to low initial cost and reduced maintenance requirements. Most, but not all, Erosion Controls can also be classified as Non-structural Controls.

The Site Plans, as mentioned previously and kept with the Site Specific Records (Volume 2 of the Master SWMP), show the proposed locations of all erosion, drainage, and sediment control BMPs (both structural and non-structural). Detailed descriptions, design criteria, construction specifications, and maintenance information for all BMPs are provided in the BMP Manual (discussed in Section 3.3).

3.2 Non-Stormwater Control BMPs

Non-stormwater controls include general site and materials management measures that indirectly aid in the minimization of water pollution. Types of pollution sources include, but are not limited to, litter, oil and grease, hazardous material spills, and sediment.

3.2.1 Materials Delivery and Storage

The good housekeeping practices listed below will be followed on site during construction and operation:

- An effort will be made to store only enough product required for task completion.
- All materials stored on site will be stored in a neat and orderly manner in appropriate containers and, where possible, under a roof or other enclosure, and/or within secondary containment areas to avoid contact with stormwater.
- Products will be kept in their original containers with the original manufacturer's label.
- Substances will not be mixed with one another unless recommended by the manufacturer.
- Whenever possible, all of the product will be used before disposing of the container.
- Manufacturer's recommendations for proper use and disposal will be followed.

Additional information on material delivery and storage is available in the BMP Manual (discussed in Section 3.3).

3.2.2 Material Handling and Spill Prevention

In addition to the material storage practices (listed in the previous section) that will be used to reduce the risk of spills or other accidental exposure of materials and substance, the BMP Manual (discussed in Section 3.3) will provide more detailed information on spill prevention and control. Furthermore, the Spill Prevention, Control and Countermeasure (SPCC) Plan will be followed for the control of hydrocarbons. In general, spill prevention and response procedures will include notification (CDPHE 24-hour spill reporting line – 877-518-5608), clean-up with the use of spill kits and absorbents, and ensuring that materials and wash water can not discharge from the site, and never into a storm drain system or stream.

3.2.3 Vehicle Cleaning, Fueling, Maintenance, and Tracking Controls

As required by EnCana Oil & Gas (USA), Inc. master service agreement(s) and drilling contract(s), contracting companies and/or vendors are required to service all vehicles and equipment prior to entering EnCana facilities. However, in the event maintenance procedures are required at EnCana facilities, all fluids transferred must utilize secondary containment and drip pans to minimize a release of materials and properly dispose or recycle spent materials in compliance with local, state, and federal guidelines.

While on site, equipment will be parked, serviced, and fueled within designated areas. Equipment fueling on pipeline rights-of-way will be completed where necessary during active construction. Periodic inspections of equipment and control procedures will be implemented. Selected equipment may be fueled in place using fuel trucks. When necessary, equipment and machinery will be decontaminated at an on-site decontamination area prior to removal from the construction area. Areas will be provided with adequate waste disposal receptacles for liquid as well as solid waste.

Vehicle tracking of sediments is not expected to be a problem due to construction scheduling. Construction vehicles will remain on site throughout earth-moving activities. All other vehicles remain in stabilized areas and do not enter the construction area until that area is stabilized. However, applicable BMPs (such as scheduling (to minimize site access), stabilized construction entrances, vehicle cleaning, etc.) will be utilized if sediment tracking does become a problem.

In addition to the typical practices listed above, the BMP Manual (discussed in Section 3.3) provides more detailed information on vehicle cleaning, fueling, maintenance, and tracking controls.

3.2.4 Waste Management and Disposal

As required by EnCana Oil & Gas (USA), Inc. master service agreement(s) and drilling contract(s), contracting companies and/or vendors are required to manage all waste generated by their activities at EnCana facilities in

compliance with local, state, and federal guidelines. EnCana Oil & Gas (USA) utilizes a periodic inspection program to ensure waste management requirements are fulfilled and inspections are documented.

A few of the waste management procedures that will be followed include the following:

- Proper bins will be provided for trash collection and disposal in compliance with local, state, and federal guidelines.
- Contaminated soils will be placed into a lined and bermed area. Samples of the impacted soil will be collected and a complete characterization analysis will be performed. When applicable, the impacted soil will be sent to a licensed disposal facility.
- The contractor will provide portable toilets. Sanitary waste will be regularly collected by a licensed sanitary waste management contractor and disposed of in an approved manner.
- In the event that sediment is inadvertently transported off the construction site, it will be collected and returned to the site and placed on the soil stockpile or spread over the construction pad area and compacted.

On well pads and access roads concrete washout is used as an interior conductor pipe ballast. Concrete washout water can NOT be discharged to surface waters or to storm sewer systems without separate permit coverage. However, discharge to the ground of concrete washout water from washing of tools and concrete mixer chutes may be authorized by this permit, provided that (CDPHE, 2007a):

1. The source is identified in the SWMP;
2. BMPs are included in the SWMP to prevent pollution of groundwater; and
3. These discharges do not leave the site as surface runoff or to surface waters.

Locations where concrete washout activities take place are shown on the Site Plans.

Additional waste management procedures, including solid waste, hazardous waste, contaminated soil, concrete washout, and septic and sanitary waste, are included in the BMP Manual (discussed in Section 3.3).

3.2.5 Dewatering

Dewatering refers to the mechanical removal of water from an excavation or other structure. Both groundwater and stormwater may require dewatering during construction. Dewatering of pipelines at the completion of hydrostatic testing will be required for most pipeline installations.

3.2.5.1 Groundwater Dewatering

Groundwater is very rarely encountered during the construction activities associated with either E&P sites or Midstream Services. If groundwater is encountered, it is typically during construction of a pipeline across a stream crossing. These pipelines are either bored under the stream or a flume is utilized.

Non-stormwater construction dewatering of groundwater can NOT be discharged to surface waters or to storm sewer systems without separate permit coverage. However, discharges to the ground of water from construction dewatering activities may be authorized by this permit, provided that (CDPHE, 2007a):

1. The source is groundwater and/or groundwater combined with stormwater that does not contain pollutants in concentrations exceeding the State groundwater standards in Regulations 5 CCR 1002-41 and 42;
2. The source is identified in the SWMP;

3. BMPs are included in the SWMP; and
4. These discharges do not leave the site as surface runoff or to surface waters.

Dewatered groundwater shall be pumped or diverted to a sediment control BMP prior to discharge to the ground. Locations of groundwater dewatering, as well as any BMPs utilized, will be noted on the Site Plans as soon as such dewatering occurs. Additional information on groundwater dewatering is provided in the BMP Manual, discussed in Section 3.3.

3.2.5.2 Stormwater Dewatering

The discharge of pumped stormwater (not including groundwater or other non-stormwater sources) from excavations, ponds, depressions, etc., to surface water, or to a municipal separate storm-sewer system is allowed by the Stormwater Construction Permit, as long as the dewatering activity and associated BMPs are identified in the SWMP (including location of the activity), and BMPs are implemented in accordance with the BMP Manual, discussed in Section 3.3 (CDPHE, 2007c).

Stormwater that collects in open depressions or trenches during construction activities will be dewatered into an existing sediment control, such as a detention pond, a sediment trap, or simply into a well-vegetated area to percolate into the ground and catch suspended sediment. The quality, source, and location of dewatering, as well as any BMPs utilized, will be noted on the Site Plans as soon as such dewatering occurs. Additional information on stormwater dewatering is provided in the BMP Manual, discussed in Section 3.3.

3.2.5.3 Pipeline Dewatering

New Department of Transportation (DOT) pipelines are hydrostatically tested with water upon completion of construction. Once the hydrostatic testing has been completed, dewatering of the pipeline must occur. This will involve the insertion of a displacer, commonly referred to as a pig, in the pipeline. The discharge rate will be regulated, and energy dissipation devices, and/or sediment controls will be used, as necessary, to prevent erosion, streambed scour, suspension of sediments, or excessive stream flow. Locations on pipeline dewatering, as well as any BMPs utilized, will be noted on the Site Plans as soon as such dewatering occurs. Additional information on stormwater dewatering is provided in the BMP Manual, discussed in Section 3.3.

3.3 Stormwater Manual of BMPs

A Stormwater Manual of Best Management Practices (BMP Manual) is provided as Appendix E. The BMP Manual has been prepared to provide EnCana personnel, contractors, and subcontractors with information on the proper selection, design, installation, and maintenance of BMPs to manage oil and gas related stormwater and to meet federal and state SWMP implementation requirements. The main objectives of the BMP manual are to:

- Serve as an easy-to-use guide for selecting, designing, installing, and maintaining BMPs.
- Function as a reference for construction plans and specifications.
- Ultimately lead to the avoidance of any net increase in off-site erosion and sedimentation of waters of the U.S.

The BMPs within this BMP Manual are organized into four main types of controls for easy reference: Erosion Controls, Runoff Controls, Sediment Controls, and Non-stormwater Controls. Each of these types of controls has been discussed earlier in this section of the SWMP.

3.4 Phased BMP Implementation

Various BMPs will be implemented and maintained during different phases of the project. A description of each phase is as follows:

- **Preconstruction.** The preconstruction phase involves the installation of BMPs (temporary and/or permanent) around each site perimeter and at discharge points (such as vegetation buffers (no installation required for this BMP), slash, wattles, diversions, sediment basins and reservoirs, etc...).
- **Construction.** The construction phase involves the stripping and stockpiling of topsoil, the excavation and backfill for access roads, pipelines, and well pads, and the installation of additional BMPs (preferably permanent BMPs) to control erosion and sedimentation (such as tracking topsoil piles and the installation of roadside channels, culverts, diversions, etc...).
- **Interim Reclamation.** The interim reclamation phase primarily involves seeding of all disturbed areas not needed during operation of the well pads. However, this phase also involves the installation of any additional permanent BMPs that may be needed, as well as the continued maintenance and inspections of all BMPs until final stabilization occurs. Final stabilization occurs once all surfaces are built on, paved or graveled, and/or a uniform stabilized vegetative cover with a density of 70 percent of pre-disturbance levels has been established or when an equivalent permanent, physical erosion reduction method has been employed. A further explanation of final stabilization is provided as section 4 of this plan.
- **Final Reclamation.** For pipelines, this phase involves seeding of all disturbed areas, and the installation of any additional permanent BMPs that may be needed, as well as the continued maintenance and inspections of all BMPs until final stabilization occurs. For other areas (roads, well pads, facilities, etc...), this phase (which may occur after termination of this permit and under the coverage of a new construction permit) occurs when operation of the area is no longer necessary. In these cases, this phase will include the installation of any additional BMPs required during facility decommissioning as well as the spreading of any remaining topsoil, the application of seed, and the inspection/maintenance of all BMPs until final stabilization occurs.

Temporary controls, such as silt fencing, may be used to control sediment and erosion during preconstruction and construction activities. Permanent controls, such as diversions and sediment traps, may also be used during the initial phases of the project. However, only permanent controls will be used during interim reclamation and final stabilization. Temporary controls may be converted into permanent controls (such as revegetating a diversion) if needed. The primary control used during interim and final stabilization will be revegetation. Seeding will occur as soon as possible after disturbance of an area is complete. If the seeding is not successful, the area will either be reseeded or other controls will be put in place until reseeding can occur.

4.0 Interim Reclamation and Final Stabilization

As soon as practicable after construction activities have been completed in a disturbed area, interim (for well pads, or other facilities) or final (for roads and pipelines) reclamation will be started to prevent further erosion of soil from that area. This typically occurs immediately upon completion of earthwork activities. All disturbed areas (except for the surface of dirt roads, those portions covered by pavement or a structure, and those areas used during operation of a well) will be stabilized with permanent controls. The most common measure used to achieve final stabilization is revegetation. Mulching, erosion control blankets, surfacing with gravel or slash, and/or other methods may also be used. Structural controls (such as diversions, berms, and sediment traps) may be revegetated and used as permanent measures to control pollutants in stormwater discharges that will occur after construction operations have been completed. Appendix E includes detailed information on each of the previously discussed BMPs. In addition, a revegetation manual is provided as Appendix B, which provides guidance as to possible methods and materials needed to accomplish revegetation on differing site conditions. The specific BMPs used at each site are shown on the Site Plans which are kept with the Site Specific Records (Volume 2 of the Master SWMP).

Final stabilization means that all ground surface disturbing activities at the site have been completed, and all disturbed areas have been either built on, paved, or a uniform vegetative cover has been established with an individual plant density of at least 70 percent of pre-disturbance levels, or equivalent permanent, physical erosion reduction methods have been employed. For purposes of this permit, establishment of a vegetative cover capable of providing erosion control equivalent to pre-existing conditions at the site will be considered final stabilization. Areas developed as stabilized unpaved surfaces as needed for operation of the facility after interim reclamation, will also qualify as “finally stabilized.” This includes dirt road surfaces and the portions of the well pad surfaces that cannot be revegetated due to operational necessity, but does not include slopes, ditches, and other areas where revegetation is necessary. Stabilized unpaved surfaces will be prepared in such a way as to prevent ongoing erosion issues.

Coverage under the Stormwater Construction Permit may be inactivated for any individual site or a portion/section of that site (i.e. the access road to a well pad) when the area has attained final stabilization and all temporary erosion and sediment control measures associated with that area have been removed. An area will be considered finally stabilized when construction and interim reclamation is complete and when the above final stabilization criteria have been met, even though the site may be disturbed again in the future for final reclamation. However, future land disturbances that follow final stabilization and result in disturbance of one acre or greater (such as final reclamation) will require new permit coverage at that time.

Upon final stabilization of any site or portion/section of a site, a signed certification sheet (provided in Appendix F) will be placed into the Site Specific Records binder to replace the Site Plans and the inspection and maintenance records for that area. However, the Site Plans and inspection reports shall be retained in a separate location for a period of three years following final stabilization of the Permit Coverage Area. These documents will be made available to WQCD or EPA upon request and at the time of inspection.

5.0 Inspection and Maintenance

Inspections and maintenance is an extremely important part of the Stormwater Construction Permit.

The Construction Manager will ensure that all stormwater management controls are constructed or applied in accordance with governing specifications or good engineering practices. Experienced teams will be used for construction. A first inspection will occur upon installation of the controls. In addition, all workers on the site will be trained as to the location and use of the controls, especially those controls that will be disturbed as construction proceeds across the site. The goal is to minimize the potential for inadvertent removal or disturbance of BMPs and to prevent the off site transport of sediment and other pollutants.

5.1 Inspection Schedule

Inspections are required as soon as the first soil disturbance occurs at the site. Once final stabilization of the site has occurred and the EnCana inspector has filled out the final stabilization certification sheet (see Section 4), inspections are no longer necessary. Specific information regarding inspection schedules are provided in the following sections.

5.1.1 Minimum Inspection Schedule for active sites

The minimum inspection schedule applies to those sites under active construction, which includes the period from when the ground is initially disturbed to when construction activity is completed, and also includes the preparation of areas that will be revegetated for interim reclamation. During the Active Site period, a thorough inspection of the site stormwater management system (which includes all utilized BMPs) must be conducted at least every 14 calendar days. Also, post-storm event inspections must be conducted within 24 hours after the end of any precipitation or snowmelt event that causes surface erosion.

There are three exceptions to the minimum inspection schedule which are described in detail within the next three sections: post-storm event inspections at temporarily idle sites (inspections required within 72 hours after a storm), inspections at completed sites (inspections required monthly), and inspections during certain winter conditions (inspections may not be required). Any use of an exception is temporary, and does not eliminate the requirement to perform routine maintenance due to the effects of a storm event or other conditions that may impact BMP performance, including maintaining vehicle tracking controls and removing sediment from impervious areas. Inspections, as described above, are required at all other times.

5.1.2 Post-Storm Event Inspections at Temporarily Idle Sites

Temporarily idle sites are those where there are no construction activities occurring following a storm event. At such sites, post-storm event inspections must be conducted prior to restarting construction activities at the site, but no later than 72 hours following the storm event, and the delay noted in the inspection report. Routine inspections still must be conducted at least every 14 calendar days.

5.1.3 Completed Sites

Once construction is completed and the site has been prepared for interim or final stabilization (including completion of appropriate soil preparation, amendments and stabilization practices), the site (or portion of the site) is considered a Completed Site (for purposes of the stormwater permit). Note: only construction activities that result in a disturbance of the ground surface must be completed. Construction activities that can be conducted without disturbance of the ground surface, such as certain well completion activities, would not prohibit a site from otherwise qualifying as a Completed Site. (Completed Sites still require permit coverage until the final stabilization criteria have been met)

Completed Sites qualify for a reduced inspection schedule, as the potential for pollution is reduced if the site has been adequately prepared and/or seeded. However, because slopes and other disturbed areas may not be fully vegetated, erosion in these areas still occurs which requires maintenance activities such as regrading

and seeding of problem areas. As such, inspections must continue in order to address these situations. During the Completed Site period, a thorough inspection of the site stormwater management system (which included all utilized BMPs) is required at least once every month. The SWMP must be amended to indicate those areas that will be inspected at this reduced frequency.

5.1.4 Winter Conditions Inspections Exclusion

Inspections are not required at sites where construction activities are temporarily halted, snow cover exists over the entire site for an extended period, and melting conditions posing a risk of soil erosion do not exist. This temporary exclusion is applicable only during the period where melting conditions do not exist, and applies to the routine 14-day and monthly inspections, as well as the post-storm-event inspections. It is typical that when snow cover exists, even at a Completed Site, significant potential for erosion and BMP failure exists when melting does finally occur. Therefore, the site should be prepared prior to snow cover to ensure it is as stabilized as possible, and be prepared to perform site maintenance when melt-off occurs, to alleviate any potential problems. Inspection records (see Section 5.4) must document the following information when this exclusion is used: dates when snow cover occurred, date when construction activities ceased, and date melting conditions began.

5.2 Performing Inspections

Inspections will be conducted by qualified personnel on the following areas:

- All vegetated areas until 70% of pre-disturbance vegetation levels are reached.
- All BMP measures identified in this document.
- Construction site perimeter and discharge points.
- All disturbed areas.
- Areas used for storage of material/waste that are exposed to precipitation.
- Other areas determined to have a significant potential for stormwater pollution, such as demolition areas or concrete washout locations, or locations where vehicles enter or exit the site.

These areas will be inspected to determine if there is evidence of, or the potential for, pollutants leaving the construction site boundaries, entering the stormwater drainage system, or discharging to state waters. All BMPs will be evaluated to determine if they still meet the design and operational criteria in the SWMP and if they continue to adequately control pollutants at the site. Any BMPs not operating in accordance with Appendix E of this SWMP will be repaired or replaced (according to the following section) and the Site Specific Records will be updated.

5.3 Maintenance

Maintenance activities will ensure that all control measures are functioning at optimum levels and that all procedures and techniques will be in proper working order during a runoff event or spill condition. Any maintenance, repairs, or replacements deemed necessary after required inspections will be corrected as soon as possible (if not immediately), to minimize the discharge of pollutants. Certain maintenance procedures may take a short period of time to make sure that all the proper safety precautions are in place, such as a "one call" for utilities, if the maintenance involves excavation of sediment located above a buried pipeline.

Maintenance will include, but is not limited to:

- Pickup or otherwise prevention of litter, construction debris, and construction chemicals from becoming a pollutant source prior to anticipated storm events.
- Removal of sediment from silt fences, sediment traps, and other sediment controls.
- Reseeding of any bare spots where vegetation has failed to establish.

- Repairs and/or adjustments to any erosion and sediment control that is deteriorating or found to be performing inadequately.

Detailed maintenance requirements for each BMP are identified in Appendix E.

When maintenance is required, the following process will typically be followed:

1. Perform inspections according to the minimum inspection schedule discussed in Section 5.1.
2. Note the need for maintenance on the inspection and maintenance report form.
3. If necessary, collect the additional materials and/or resources needed to perform the maintenance activity.
4. Perform maintenance and note the date performed on the inspection and maintenance report form.
5. Re-inspect the area to ensure compliance.

5.4 Documenting Inspections and Maintenance

The permittee must document inspection results, maintenance activities, and maintain a record of the results for a period of 3 years following expiration or inactivation of permit coverage. A typical inspection and maintenance report form is provided in Appendix G. Although the site may have a phased construction schedule, all construction areas may be inspected at the same time and on one form. Each well pad, road, pipeline, or other facility which is inspected shall be clearly noted on the inspection form. Inspection reports will include the following:

- Date of inspection, name of inspector, and title of inspector
- The area inspected (Site ID), type of area (well pad, access road, pipeline, etc.), phase of construction (preconstruction, construction, etc.), and type of inspection (active, completed, etc.)
- Site specific information including disturbed area, soil type(s), ecosystem/vegetation type(s), receiving waters, etc.
- Vegetation observations including the percent pre-disturbance vegetation and whether or not vegetation growth has reached 70% of pre-disturbance levels
- Specific inspection requirements (all BMPs and areas of potential pollutant sources)
- Observed conditions including:
 - Location(s) of discharges of sediment or other pollutants from the site
 - Location(s) of BMPs that need to be maintained
 - Location(s) of BMPs that failed to operate as designed or proved inadequate for a particular location
 - Location(s) where additional BMPs are needed that were not in place at the time of inspection
- Description and date(s) of corrective action(s) taken, and measures taken to prevent future violations
- Changes necessary to the SWMP

A hand drawn Site Plan shall be included, if necessary, to show the location(s) of any observed condition (as listed above).

After adequate corrective action(s) has been taken and recorded, or where a report does not identify any incidents requiring corrective action, the report will contain a signed statement indicating the site is in compliance with the permit to the best of the signer's knowledge and belief.

All completed inspection and maintenance report forms (a blank copy of which is included in Appendix G) are kept with the Site Specific Records (Volume 2 of the Master SWMP).

6.0 Plan Revisions and Retention

When BMPs or site conditions change, the Master SWMP (Volume 1) and/or the Site Specific Records (Volume 2) will be amended to accurately reflect the actual field conditions. Examples include, but are not limited to, removal of BMPs, identification of new potential pollutant sources, addition of BMPs, modification of BMP installation/implementation specifications or maintenance procedures, and changes in items included in the Site Plans. Changes to the Master SWMP (Volume 1) shall be noted on the SWMP Revisions log at the front of this plan. Changes to individual site conditions will be noted in the Site Specific Records (Volume 2) on the applicable inspection and maintenance report form. All changes in Volume 1 and Volume 2 shall be made prior to actual changes in the site conditions, except for responsive SWMP changes, which shall be made immediately after changes are made in the field or as soon as practical, but in no case more than 72 hours after the change(s) in BMP installation and/or implementation occur at the site that require development of materials to modify the SWMP. At a minimum, the Master SWMP will be updated annually.

The Master SWMP and the Site Specific Records will be retained at the EnCana field office in Parachute during active construction and site inspections to ensure accurate implementation and maintenance of BMPs, and required revisions. These documents will be retained for a period of three years following final stabilization of the Permit Coverage Area. These reports will be made available to WQCD or EPA upon request and at the time of inspection.

7.0 Inactivation Notice

When all disturbed areas associated with the Stormwater Construction Permit have reached “final stabilization” (as described in Section 4), all temporary erosion and sediment control measures have been removed, and all components of the SWMP are complete, the area no longer requires coverage under the permit terms. At that time, EnCana will submit an Inactivation Notice that closes this permit to the WQCD upon final stabilization of all areas covered by the permit. A blank copy of this form is included in Appendix H of this document.

Upon receipt of the Inactivation Notice, the WQCD will provide written confirmation that coverage under this permit has been terminated. This historical documentation will be maintained at the EnCana field office in Parachute for a period of at least three years following termination of permit coverage.

8.0 Signature

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted, to the best of my knowledge and belief, is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment or knowing violations."

Printed name	Title
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Signature	Date
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Printed name	Title
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Signature	Date
-----------	------

9.0 References

- CDPHE, 2007a. *CDPS General Permit, Authorization to Discharge under the Colorado Discharge Permit System*. Colorado Department of Public Health and Environment. Water Quality Control Division. Issued May 31, 2007.
<http://www.cdphe.state.co.us/wq/PermitsUnit/stormwater/SWConstructionPermit.pdf>
- CDPHE, 2007b. *General Permit Application and Stormwater Management Plan Preparation Guidance*. Colorado Department of Public Health and Environment. Water Quality Control Division. Revised July, 2007. <http://www.cdphe.state.co.us/wq/PermitsUnit/stormwater/SWConstructionApplication.pdf>
- CDPHE, 2007c. *Rationale*. Colorado Department of Public Health and Environment. Water Quality Control Division. 2007.
<http://www.cdphe.state.co.us/wq/PermitsUnit/stormwater/SWConstructionRationale.pdf>
- CDPHE, 2007d. *Stormwater Fact Sheet – Construction at Oil and Gas Facilities*. Colorado Department of Public Health and Environment. Water Quality Control Division. Revised July, 2007.
<http://www.cdphe.state.co.us/wq/PermitsUnit/stormwater/OGfactsheet.pdf>
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- Mutel, C.F., and Emerick, J.C., 1992. From Grassland to Glacier - The Natural History of Colorado and the Surrounding Region.
- USEPA, 1990. *NPDES Stormwater Regulations*, 40 CFR Parts 122.26. U.S. Environmental Protection Agency.

ATTACHMENT G

NSF Operating Plan



**Centralized E&P Waste Management Facility
NPR Solidification Facility
Operating Plan**

April 13, 2012

This Operating Plan was developed for the Encana Oil and Gas (USA), Inc. (Encana) North Parachute Ranch (NPR) Solidification Facility (NSF) located in the Piceance Basin in Garfield County, Colorado. The Operating Plan describes the procedures to be implemented to provide for efficient operation of this facility. The NSF is a Centralized E&P Waste Management Facility permitted under Colorado Oil and Gas Conservation Commission (COGCC) Rule 908 requirements. This facility will also be permitted under a Major Impact Land Use Permit with Garfield County and a Colorado Department of Public Health and Environment (CDPHE) Air Pollutant Emissions Notice (APEN) based on emission estimates calculating a permit is not required. The anticipated duration of the facility operation is 10 years but this could change as conditions change regarding gas production and waste management options.

General Operations

The purpose of the treatment at this facility is to solidify some of the waste created by Encana's gas production operations in a single location to provide more efficient management of waste streams. The semi-solid waste is generated at Encana well pads from produced water tanks, frac tanks and production pit bottoms. The sediment along with some liquid in the tanks and pits is removed at each individual well pad using a vac truck. The vac trucks transport the solid/liquid mixture to the NSF. The waste mixture from the vac trucks is deposited in a mixing bin that is sloped to allow separation of the solid and liquid by gravity. The liquid accumulates in the lowest part of the mixing bin where it is removed daily using a vac truck and the liquid is then transported to the NPR Water Treatment Facility. The NPR Water Treatment Facility is located approximately one (1) mile west of the NSF and is an Encana Centralized E&P Waste Treatment Facility (COGCC Facility ID 120803). After the liquid is removed from the mixing bin sawdust is added to the sediment/sand waste to absorb excess moisture with the objective being to allow the waste mixture to pass the Paint-Filter Test. The Paint-Filter Test is used to characterize the waste as having no free liquids which is a requirement for transportation and disposal of E&P waste. The solidification of the waste using sawdust is accomplished using heavy equipment to combine the sawdust and waste in the mixing bin. The solidified waste is then removed from the mixing bin and placed in the storage bin. The solidified waste accumulates in the storage bin until a sufficient volume is present to transport off-site for disposal. The solidified waste is removed from the storage bin using heavy equipment and loaded on trucks for transportation to a disposal facility off-site. The disposal will be at permitted E&P waste disposal sites, not the Garfield County public landfill. Information regarding acceptable disposal facilities and required waste characterization for disposal is provided below.

Prior to waste being delivered to the NSF, the NSF Supervisor or Encana Waste Management Coordinator will be notified of the anticipated schedule and source of the waste stream to be sent via hydrovac truck to the facility. The NSF Supervisor will be responsible for ensuring an equipment operator for the NSF is on-site and a vac truck for removal of the liquids from the Mixing Bin is available. The delivery of the wastes to the NSF will vary on a daily basis depending on operations, but the anticipated average monthly volume of wastes delivered to the NSF is 400 bbls. The amount of liquid versus solid in the waste also varies but it is anticipated that approximately 75% of the waste volume is liquid that is removed to the NPR Water Treatment Facility, therefore, it is estimated approximately 300 bbls of liquid will be generated monthly. The solidified waste is placed in the Storage Bin until sufficient volume is present for transportation to the off-site disposal. The Encana Waste Management Coordinator is responsible for monitoring the volume of waste in the Storage Bin and scheduling off-site disposal. The NSF Supervisor will coordinate the loading and manifesting of the trucks for off-site disposal. The loading rates will vary on a daily basis, but it is anticipated that approximately 200 cubic yards of waste will be generated every month.

Responsibilities

The Encana Waste Coordinator for the NSF is responsible for monitoring the operations at the facility and ensuring proper off-site disposal. The NSF Supervisor will manage the daily incoming loads and outgoing loads at the facility, conducting inspections and properly tracking the waste logs and manifests. The NSF Supervisor will communicate with the NSF Operators, Encana production staff to track the volumes of incoming E&P waste and report to the Encana Waste Coordinator. The NSF Equipment Operators are responsible for proper equipment operation to mix the waste material with sawdust and loading trucks for off-site transport. The contacts for the NSF are:

Encana Waste Coordinator
Mr. Brett Middleton
(970) 285-2739 office
(970) 987-4650 mobile

NSF Supervisor
Mr. Rory Irish
(970) 987-4650 mobile

NSF Equipment Operators Supervisor
Mr. Camron Lente
(970) 366-1884 mobile

Road Access Management

The Facility Management will include maintenance of the access roads to the NSF. Encana Operations are responsible for maintaining all roads in the NPR property. The road maintenance includes grading, dust control, and maintenance of stormwater

control structures. Grading will be conducted as necessary to allow safe access of trucks and other equipment to the NSF and associated well pads in this area. Dust control measures will be conducted on the road accessing the facility by applying water as needed. The water for all the Encana roads in the NPR area is obtained from approved water supplies. The stormwater controls along the roads are inspected and maintained by the Encana Stormwater Group.

Waste Characterization and Disposal

All the waste managed at the NSF is E&P exempt. The waste characterization requirements depends on the waste profile criteria for each facility where waste will be sent to for disposal. At this time there are three facilities where Encana anticipates disposing of the waste, each of these facilities is permitted to accept E&P Exempt Wastes. The facilities and characterization requirements are listed below:

Reams Construction of Colorado (awaiting permit approval)

PO Box 106
Naturita, CO 81422
970-865-2886

Testing Parameters

- 8 RCRA metals (total or TCLP)
- VOC's (8260)
- SVOC'S (8270)
- TPH (gasoline range and diesel range)
- Methanol
- Gross alpha

Testing rate

One 5-point composite sample for the first 1,000 yd³ and then one composite sample (8 RCRA metals, VOC's, and TPH only) for each 3,000 yd³ thereafter. Gross alpha will be tested at a rate of one sample per project.

R N Industries

244 West Hwy 40
PO Box 98
Roosevelt, UT 84066
(435) 722-2800

Testing Parameters

- 8 RCRA Metals
- VOC's (8260)
- TPH (GRO/DRO 8015)

Testing Rate

One composite sample per 1,000 cubic yards.

ECDC

1111 West Highway 123
PO Box 69
East Carbon City, Utah 94520
Phone: 435-888-4451
Fax: 435-888-5557

Testing Parameters

Generator must certify that it is RCRA exempt E&P Waste.
No testing rate.

Inspections, Training and Record Keeping

During normal operations, daily inspections will be performed by the NSF Supervisor or designated representative. During the daily inspection the NSF Supervisor will complete the information detailed in the Daily Checklist. The daily inspections will consist of recording the daily quantities of incoming loads, mixing bin levels, storage pad quantities, outgoing quantities of loads, bird netting, and quantities of outgoing water loads. The equipment operator will ensure that all equipment is in proper working order and that the inspection is documented. If there are any irregularities noted during the inspection, the Encana Waste Management Coordinator shall be notified and (if required) an appropriate response will be coordinated to resolve the irregularities.

In addition to daily inspection the NSF Supervisor will conduct monthly inspections of in accordance with the monthly checklist. The monthly checklist will consist of inspecting the berms, access roads, and wildlife netting. If there are any irregularities noted during the inspection, a supervisor shall be notified and (if required) an appropriate response will be coordinated to resolve the irregularities.

The Encana Waste Coordinator is responsible for providing training annually to all the staff involved with the NSF operations as provided in this Operating Plan. The training will be documented and records maintained in the facility files. An audit of the facility will be conducted annually by the Encana Waste Coordinator to review records of site inspections, training records and waste management records. The results of this annual audit will maintained in the facility files.

All records of the site inspections, including the daily logs, are first created/filled in manually, signed by the responsible operator. The field records are scanned and filed electronically at Encana's Regional Office in Parachute, Colorado for storage. All records will be made available to the COGCC on request.

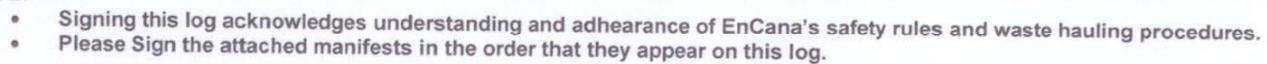
Operational Hours and Security

The NSF will operate only during daylight hours, 365 days a year as Encana operations require and weather allows. During adverse weather conditions when trucks cannot operate safely on the Encana roads in this area, no operations will be conducted at the NSF. The work will be conducted at the NSF by heavy equipment operators and vac truck drivers under the oversight of the NSF Supervisor. Security for the site is provided by a guard station located on County Road 215 approximately 1.5 miles from the NSF. The guard station is manned 24-hours per day and only authorized personnel are

allowed access with a valid electronic identification card. Access to the Mixing Bin for waste transfer by the hydrovac trucks will be controlled by a locked gate to ensure control of use of the NSF. The Mixing Bin is secured from wildlife by the gate and bird netting that is secured each day after operations are finished. The Mixing Bin is the only unit where free liquids are present and the liquids are removed at the end of each day of operations.

Contingency Plan and Safety

The Contingency Plan for the NSF consists of actions to respond to a spill of waste material. A spill kit will be maintained at the site and will be used to contain a spill of liquids. A list of spill kit contents is attached. In the event of a spill of solidified waste outside of one of the steel containers, the heavy equipment used for mixing and loading will be used to excavate the spilled material and place it the excavated material in the Storage Bin. The Piceance Emergency Response Plan (ERP) provides the procedures to be followed in the event of a emergency including notifications. The NSF is a Production or Construction facility for the contacts in the Emergency Response Plan. A current copy of the Quick Reference Guide will be maintained at the NSF. A copy of the Site-Specific ERP for the NSF is attached. Each day during operations at the NSF a Job Safety Analysis (JSA) will be completed and activities reviewed with all staff on site. This JSA forms will be documented by the NSF Operators and kept on file with project information. This facility is located on Encana property over one mile from any adjacent properties so there are no potential noise or odor issues to address as confirmed in the Land Use review with Garfield County.



Encana Oil and Gas (USA) Inc.
North Solidification Facility
Daily Checklist

Date _____

NSF Operator _____

Mixing Bin	Comments
Waste Loads In	
Fluid Loads Out	
Fluid Removal Completed	
Bird Netting Installation Complete	
Storage Bin	
Waste Volume in Bin	
Waste Loads Out	
Safety	
JSA Completed	

Inspection Completed by _____

Encana Oil and Gas (USA) Inc.
North Solidification Facility
Monthly Checklist

Date _____

Mixing Bin	Comments
Bin Condition	
Bird Netting Condition	
Gate Condition	
Storage Bin	
Bin Condition	
Sawdust Storage	
Bin Condition	
Buffer Area	
Stormwater Detention	
Gravel Surface Condition	

Inspection Completed by _____

Encana Oil and Gas (USA) Inc.
North Solidification Facility
Audit Checklist

Date _____

Waste Records	Comments
Waste Origin Logs Complete	
Waste Characterization Complete	
Waste Manifests Complete	
Inspections	
Daily Inspections Complete	
Monthly Inspections Complete	
Safety	
JSA's Complete	
Training	
Annual Training Complete	

Audit Completed by _____

Follow up Actions required: _____



SITE SAFETY/ EVACUATION PLAN

FACILITY/ SITE INFORMATION		GPS Information
Site Location Name: North Solidification Facility		Latitude: 39.58713
Emergency Notification Number: (970)285-2615		Longitude: -108.07752
Site Phone Number:		Elevation:
Legal Description: Qtr <u>SE</u> Qtr <u>NW</u> Sec <u>29</u> Twn <u>5S</u> Rng <u>95W</u>		
Mailing Address: 2717 County Road 215, Suite 100 Parachute, CO 81635		

DIRECTIONS TO SITE:	From Parachute CO, take county road 215 north approximately 9 miles. Proceed past the guard shack turn right on East fork Road to haul road to facility just past the F29 well pad.
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EMERGENCY RESPONSE NUMBERS		
Contact	Location	Number
Police/ Sheriff	Parachute	(970)285-7630
Fire	Parachute	(970)285-7711
Ambulance	Parachute	(970)285-7711
Hospital	Rifle	(970)625-1510
Is "911" accessible from this location? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

COMPANY CONTACTS				
Name	Position	Location	Telephone	Cellular/ Other
Brett Middleton	Waste Coordinator	Parachute	(970)285-2739	(970)987-4650
Rory Irish	NSF Supervisor	Parachute		(970)589-4411
Doug Rosa	Operations Field Lead	Parachute	(970) 285-2686	(970)210-2073
Safety on-call	Safety Coordinator	Parachute	(970)210-8755	
Nearest EnCana Field Office:		Parachute	(970)285-2600	
Nearest EnCana Control Room Number:		Parachute	(970)-301-1319	
Union Telephone (24-Hour Emergency Call Center)			877-386-2200	
Crisis Manager, North America		Calgary	403-645-3333	

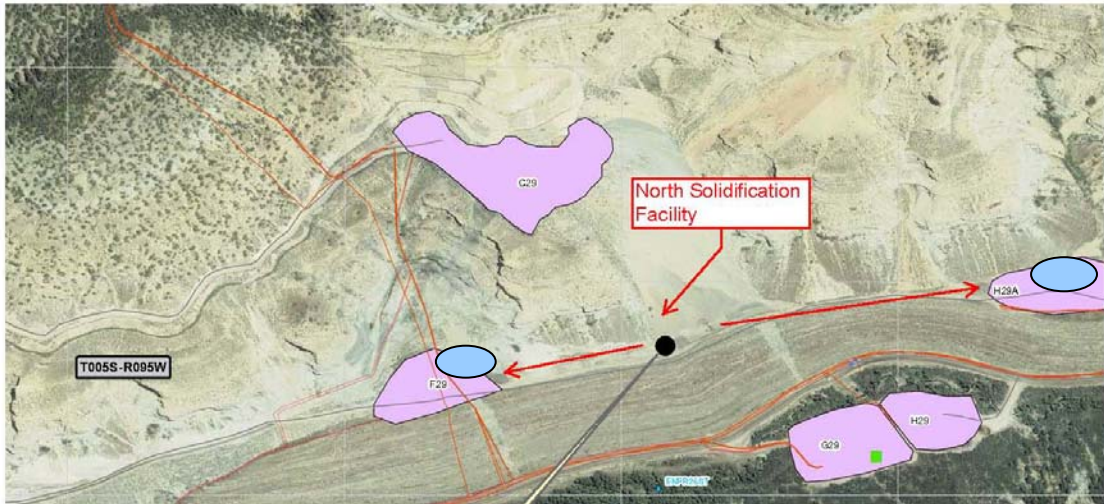
DESIGNATED MUSTERING POINTS (Worker assembly areas)	
Primary:	F29 well pad
Secondary:	H29A well pad
Alarm Procedures:	

Prepared By: Brett Middleton	Date: 4/11/2012
Revision Date:	

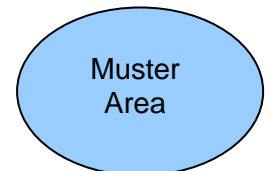
SITE SAFETY/ EVACUATION PLAN

Site Location Name:

North Solidification Facility



LEGEND



MUSTER AREA

ATTACHMENT H

Contingency Plan

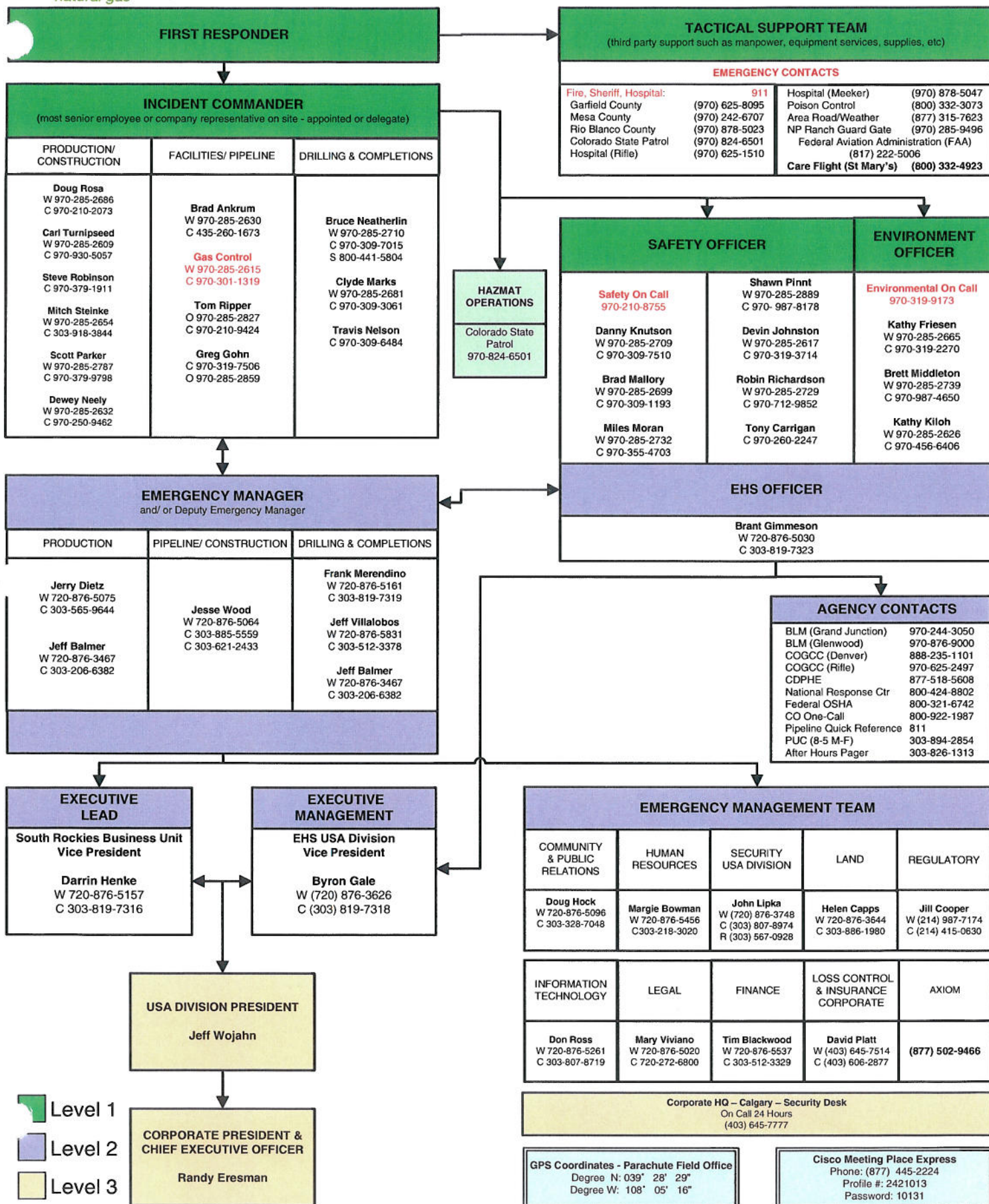



Piceance Emergency Response Quick Reference Guide

August 2010


Gas Control 970-285-2615
Safety On Call 970-210-8755
Environmental On Call 970-319-9173

(condensed copy for permit submittals)
Encana's Piceance Emergency Response Plan is on file with
all applicable Fire Districts



	EMERGENCY RESPONSE PLAN U.S.A. DIVISION	Document No: ERP-0042 SRBU
	SRBU EMERGENCY RESPONSE REPORTING TEMPLATE	Revised By/Date:
		Reviewed By/Date: ERPComm/05.26.2010
		Approved By/Date: ERPComm/05.26.2010

SBU:	_____
Name of Event:	_____
Date:	_____, 2010
Location:	_____
	Secured : <input type="checkbox"/> Yes <input type="checkbox"/> No
Town, State:	_____, _____
1. Time of the call.	_____ : _____ (Military Time)
2. What is the location of the emergency? What has happened?	Location?: _____ What Happened?: _____
3. Has anyone been hurt?	<input type="checkbox"/> No <input type="checkbox"/> Yes If so, Who? _____ How? _____
4. Who is the most senior Encana or Company representative on location?	_____
5. Who is the most senior Encana or company representative on location who will be the INCIDENT COMMANDER ? Do they have the proper Incident Commander Training?	_____ _____ _____ Incident Commander Trained? No <input type="checkbox"/> Yes <input type="checkbox"/>
6. Based on your assessment, what Level of Emergency are you declaring?	Level 1 <input type="checkbox"/> Level 2 <input type="checkbox"/> Level 3 <input type="checkbox"/>
7. Who are you appointing as OPERATION CHIEF ?	_____
8. Do not respond to a man down, or to the emergency, until you have completed a Risk Assessment , gained control and understanding of the emergency, and can assure life safety of the responders.	Have you completed a Risk Assessment? N <input type="checkbox"/> Y <input type="checkbox"/> _____

	EMERGENCY RESPONSE PLAN U.S.A. DIVISION	Document No: ERP-0042 SRBU
	SRBU EMERGENCY RESPONSE REPORTING TEMPLATE	Revised By/Date:
		Reviewed By/Date: ERPComm/05.26.2010
		Approved By/Date: ERPComm/05.26.2010

9. Are there FIRST RESPONDERS on location?	<input type="checkbox"/> No <input type="checkbox"/> Yes Time of Arrival: _____ : _____ Who arrived? _____
10. Have you set up an INCIDENT COMMAND POST , if so, where?	<input type="checkbox"/> No <input type="checkbox"/> Yes Location of the Incident Command Center? _____
11. Based on your initial assessment, what is your proposed preliminary response strategy?	_____ _____ _____
12. I will act as EMERGENCY MANAGER , and activate the EOC. Plan on calling in to the EOC, using the Emergency Notification Conference Call Number , within 15 minutes.	Emergency Manager Activated at: _____ Emergency Operations Center Activated at: _____ We will be using EOC Conference Line: EOC 1 and EOC 2: 1-877-445-2224 EOC 1: <input type="checkbox"/> Profile # 2421013 Password 10131 EOC 2: <input type="checkbox"/> Profile # 2421014 Password 10141 EOC 3: <input type="checkbox"/> {20 or more incoming calls} North American Dial-In: 1-866-400-1788 International Dial-In: (647) 427-2433 Conference code: 835 298 4806 Leader PIN: 2846
13. I will notify EXECUTIVE LEAD, EHS OFFICER , and put together the EMERGENCY MANAGEMENT TEAM .	Executive Lead Notified: No <input type="checkbox"/> Yes <input type="checkbox"/> Time: _____ EHS Officer Notified: No <input type="checkbox"/> Yes <input type="checkbox"/> Time: _____ EMT Notified: No <input type="checkbox"/> Yes <input type="checkbox"/> Time: _____
14. Start to put together a local INCIDENT COMMAND TEAM .	Incident Commander: _____ Deputy Incident Commander: _____ Safety Officer: _____ Liaison Officer: _____ Public Information Officer: _____ Operations Section Chief: _____ Planning Section Chief: _____ Logistics Section Chief: _____

Emergency Classification / Levels

EMERGENCY LEVELS	
Definition / Criteria	Examples <i>(may not reflect area-specific risks or threats)</i>
LEVEL 1 - Onsite incidents where control of the hazard has been obtained but the potential exists for the imminent loss of control due to deteriorating conditions.	
<ul style="list-style-type: none"> ○ Immediate control of the hazard has been established using available resources, however, conditions are not improving and/or resources are being depleted. ○ Injuries to onsite personnel that are of a moderate impact. ○ Public safety is not threatened, however there is, or may be, a public perception of moderate risk to human health or the environment. ○ Environmental impacts are confined to the site and have limited potential to impact offsite. ○ All control and relief systems are functioning normally. 	<ul style="list-style-type: none"> ○ Any controlled situation, outside of normal operation conditions, where the ability to maintain control using onsite resources is in question or offsite resources are required to maintain control such as a fire or explosion where imminent control of the fire is probable. ○ Injuries to personnel requiring offsite medical attention.- ○ Spills and releases that are contained onsite but have the potential to extend offsite. ○ Any incident requiring the advisory notification of the public of a non-routine, onsite occurrence. ○ Weather conditions (i.e., tornado) which may threaten personnel and operations. ○ Potential social / political unrest, labor disputes

LEVEL 2 - An incident where control of the hazard has been lost but where imminent and/or intermittent control of the hazard is possible.

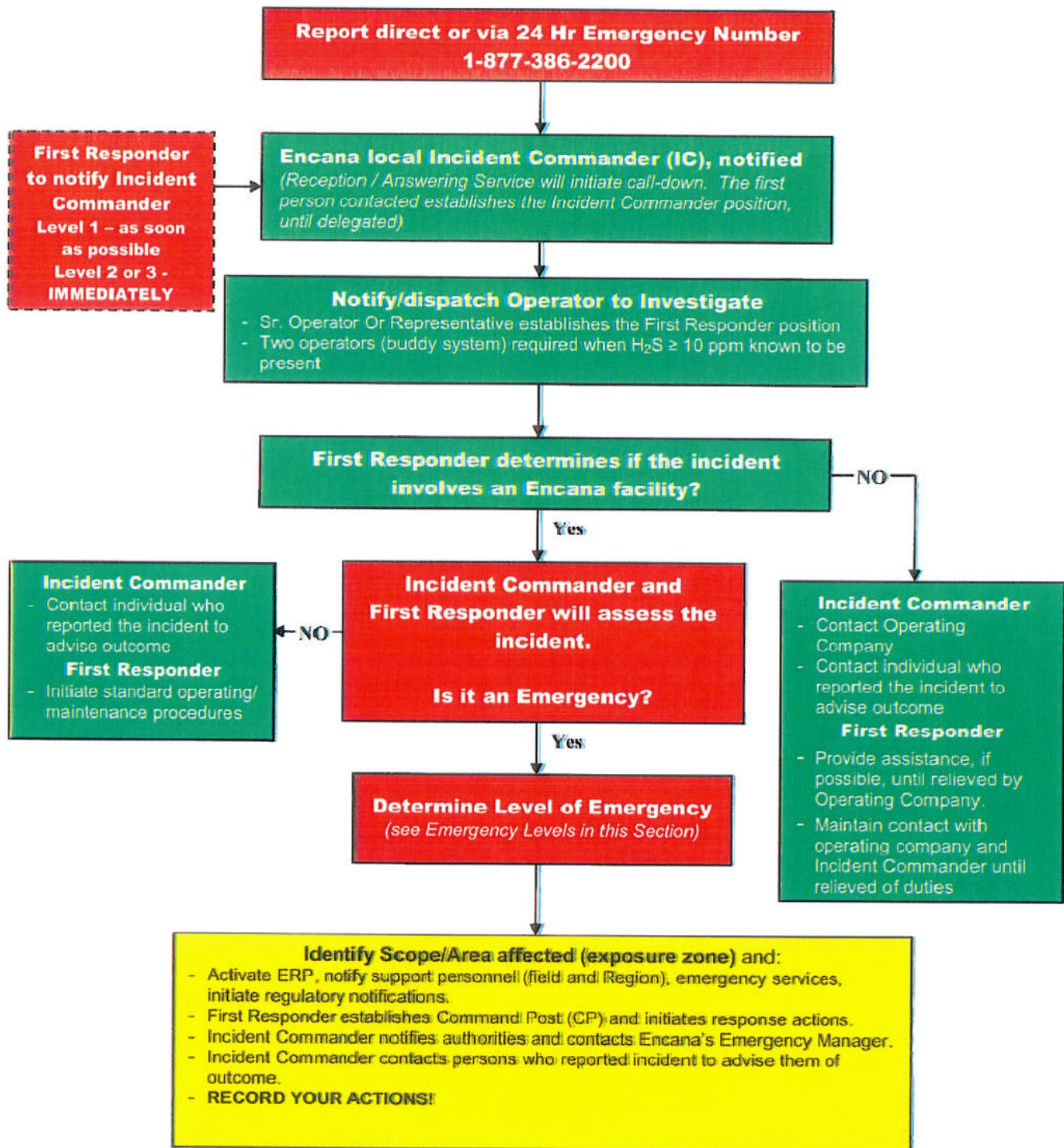
- Control of the hazard has been lost, however, through the application of available resources, intermittent control is being obtained or hazard control is imminent.
- Injuries to onsite personnel that are of a major impact.
- Public safety is not threatened, however, there is or may be a public perception of significant risk to human health or the environment.
- Environmental effects extend offsite and are resulting in minor or short-term detrimental impacts.
- Some control and relief systems are not operational.
- Any uncontrolled hazard where the ability to regain control using available resources is imminent or intermittent control is being achieved using available resources such as pipeline integrity failure.
- Injuries to personnel which have or are likely to result in a lost time (beyond the day off the occurrence) injury or short term health impact.
- Spills or releases that extend offsite and are, or will, result in minor or short-term detrimental impacts.
- Any incident requiring the notification of the public of a potential or imminent threat to human health or the environment, such as or pipeline rupture.
- Some control and/or relief systems are not operational.
- Imminent security threats, social / political unrest, and labor disputes.
- Severe weather threats which threatens personnel and/or operations.
- Overdue vehicle or aircraft.

LEVEL 3 - An incident where control of the hazard has been lost, imminent control is not possible and public safety is, or has the potential, to be threatened.

- Control of the hazard has been lost and regaining control is not imminently possible.
- Onsite personnel have sustained injuries with a serious impact.
- Public safety is being, or has the imminent potential to be, jeopardized.
- Environmental impacts are significant, extend offsite and have the potential to result in long-term environmental degradation.
- Key control and relief functions have failed and are not operating correctly.
- Any situation where control of a hazard has been lost and regaining control is not imminently possible such as loss of well control or failure of essential well control equipment.
- Injuries to personnel which have or are likely to result in permanent disability, long term health impacts or death.
- Any incident that has necessitated the evacuation or sheltering of public such as or a catastrophic facility fire or loss of process control.
- Spills or releases that have extended off site and are, or likely to, result in significant and substantial detrimental impact to the environment.
- Key control and relief systems are not operational.
- Act of terrorism, violence, social/political unrest.
- Severe weather impacting personnel and/or operations.
- Overdue vehicle or aircraft, missing person.

ACTIVATION AND NOTIFICATION REQUIREMENTS

Receiving an Emergency Call - Typical Notification



First Responder Actions

Protect Yourself

- ☐ Approach the incident from upwind and uphill, if possible.
- ☐ Position vehicle far enough away from the release, allowing for a safe retreat, if necessary.
- ☐ Resist the urge to rush in, others cannot be helped if you are injured.
- ☐ Avoid any contact with liquids, mists, sludge's, gases, vapors and smoke.

Sound the Alarm

- ☐ Announce level of emergency.
- ☐ Direct others to safe areas and alert other personnel.

Call for Help

- ☐ Notify control room, local office and or the on-call supervisor.
- ☐ Confirm emergency services has been dispatched.
- ☐ Activate Emergency Response Plan.

Assume Command

- ☐ Size up incident and make report.
- ☐ Confirm location (if necessary).
- ☐ Situation found.
- ☐ Make assignments (as necessary). Summon additional help and technical assistance as required. Do not hesitate to summon assistance; it can always be canceled if not needed.
- ☐ Tactical considerations:
 - Life safety,
 - Incident stabilization,
 - Environmental protection, and
 - Property conservation.
- ☐ Zoning:
 - Utilize, with caution, the U.S. DOT Emergency Response Guidebook for recommended actions if MSDSs are unavailable for released material,
 - Establish hazard / hot zone (use fire line tape for **hot line**),
 - Establish and mark warm zone (**decontamination corridor**), and
 - Establish cold zone (set **security line**).
- ☐ Immediately provide for proper decontamination of responders and/or injured.
- ☐ Transfer command (as necessary).

Assess Hazard

- ☐ If immediate rescue is required, it should only be attempted when the rescuers are fully aware of the risks posed to them, they are wearing protective clothing, as required, utilizing a bare minimum number of personnel. If the hazards are unknown or exceptionally life-threatening, the rescuer should consider waiting until the situation has been assessed by the IC, SO, and the EHS/HazMat Unit.

Secure the Area

- ☐ Restrict access to location or area.
- ☐ Utilize law enforcement agencies (Emergency Alert System) and any other available resources to evacuate or shelter in-place exposed victims.

Transfer of Command

The process of moving the responsibility for incident command from one Incident Commander (IC) to another is called "transfer of command." It should be recognized that transition of command on an expanding incident is to be expected. It does not reflect on the competency of the current IC. The most important steps in effectively assuming command of an incident in progress are:

Assessment & Briefing

- ☐ Perform assessment of incident situation with existing IC.
- ☐ Receive adequate briefing by the current IC in face-to-face meeting. The briefing must cover the following items:
 - Incident history (what has happened),
 - Priorities and objectives,
 - Current plan,
 - Resource assignments,
 - Incident organization,
 - Resources ordered/needed,
 - Facilities established,
 - Status of communications,
 - Any constraints or limitations,
 - Incident potential, and
 - Delegation of Authority.

Written Summary Report

- ☐ Incoming IC to receive written summary to assist in incident briefings. This form contains:
 - Incident objectives,
 - A place for a sketch map,
 - Summary of current actions,
 - Organizational framework, and
 - Resources summary.

Notice of Command Change

- ☐ Determine an appropriate time for transfer of command.
- ☐ Provide notice of a change in incident command to:
 - Emergency Management Team (through dispatch),
 - General Staff members (if designated),
 - Command Staff members (if designated), and
 - All incident personnel and agencies.The incoming IC may give the out-going IC another assignment on the incident.
- ☐ There are several advantages of this:
 - The out-going IC retains first-hand knowledge at the incident site, and
 - This strategy allows the out-going IC to observe the progress of the incident and to gain experience.

ATTACHMENT I

Closure Cost Estimate

Encana NPR Solidification Facility

Closure Cost Estimate

Date: April 16, 2012

Key Assumptions:

- 1 Bins removed for salvage or reuse by Encana, salvage cost greater than or equal to removal costs
- 2 Facility will be regraded to conditions similar to pre-existing roadway
- 3 Four total soil samples will be collected, two from below each of the two bins
- 4 No vegetation reclamation will be required, site will be maintained as roadway

Task (Line Item Description):

Project Management/Reporting					<u>TOTAL</u>		
	<u>Qty</u>	<u>Unit</u>	<u>Unit price</u>	<u>Description</u>			
Program Manager	1	hour	\$ 125.00	Project Staffing/Data review			
Project Manager	4	hour	\$ 100.00	Project coordination and Report Review			
Project Professional	8	hour	\$ 90.00	Project supervision, Report Preparation			
Administrative Assistant	2	hour	\$ 45.00	Billing, Administrative input			
Subtotals				1,335.00			
Site Labor					<u>TOTAL</u>		
	<u>Qty</u>	<u>Unit</u>	<u>Unit price</u>				
Project Professional	8	hour	\$ 90.00	Construction oversight and communication			
Field Tech	6	hour	\$ 60.00	sample collection			
Subtotals				1,080.00			
Subcontractors					<u>TOTAL</u>		
	<u>Qty</u>	<u>Unit</u>	<u>Unit price</u>				
ESC Soil Samples	4	each	\$ 150.00	A total of 4 BTEX/GRO/DRO Samples			
Construction Contractor	1	Project	\$ 2,000.00	Price includes Mob/de-mob, Grading NSF			
Subtotals				2,600.00			
Non-Labor Items					<u>TOTAL</u>		
	<u>Qty</u>	<u>Unit</u>	<u>Unit price</u>	<u>SUBS</u>	<u>EQUIP</u>	<u>ODC</u>	<u>TRAVEL</u>
Sampling Supplies	1.0	Project	\$ 12.00				Various Sampling Supplies
Truck	3.0	Project	\$ 75.00				Total Truck Usage for project
Truck Mileage	360.0	Project	\$ 0.65				Total Miles for Project
Subtotals							471.00
SUBTOTAL Task					5,486.00		

ATTACHMENT J

Permit Documents

Garfield Board of County Commissioners- Public Hearing Exhibits

Encana Oil and Gas (USA) Inc. North Solidification Facility

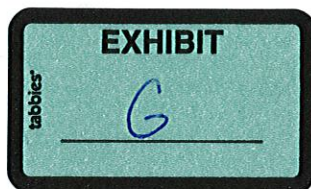
Encana Oil and Gas (USA) Property Owner

Major Impact Review

April 2, 2012

(File MIPA-7066)

Exhibit Letter (A to Z)	Exhibit Description
A	Proof of Publication
B	Return Receipts from Mailing Notice
C	Photo evidence of Public Notice Posting
D	Garfield County Unified Land Use Resolution of 2008, as amended
E	Garfield County Comprehensive Plan of 2030
F	Application
G	Staff Report
H	Staff Presentation
I	Referral Comments from Garfield County Consulting Engineer
J	Referral Comments from Garfield County Vegetation Manager
K	Referral Comments from Garfield County Road and Bridge Department
L	Referral Comments from Garfield County Environmental Health Manager
M	Encana Email Response to County Environmental Health Manager, dated 3/5/12 from Bret Middleton
N	Colorado Department of Public Health and Environment (CDPHE) Letter
O	Supplemental Email Comments from County Environmental Health
P	Encana Email Response to Flood Plain Question (dated 3/12/12
Q	Encana Email Response to County Environmental Health Questions (dated 3/7/12 and 3/8/12)
R	
S	
T	
U	
V	
W	
X	



Board of County Commissioners
April 2, 2012
MIPA-7066 GH

PROJECT INFORMATION AND STAFF COMMENTS

TYPE OF REVIEW	Major Impact Review – Land Use Change Permit for Material Handling and Solid Waste Transfer Facility
APPLICANT (OWNER)	Encana Oil and Gas (USA)
PLANNER/CONSULTANT	Rule Engineering, Katy Middleton and Russell Knight,
LOCATION	The site is approximately 11 miles north of Parachute off of County Road 215, located 2 miles northeast of the end of the County Road 215
LEGAL DESCRIPTION	A tract of land being situated in the SE1/4NE1/4 Section 29, T5S, R95W and also known by Assessor's Parcel No. 2135-273-00-015.
ACRES	The site consists of 1.49 acres, of which approximately ½ acre will be developed for the facility. The site is part of an overall property of approximately 26,442 acres.
ZONING	Resource Lands

I. DESCRIPTION OF THE PROPOSAL AND BACKGROUND

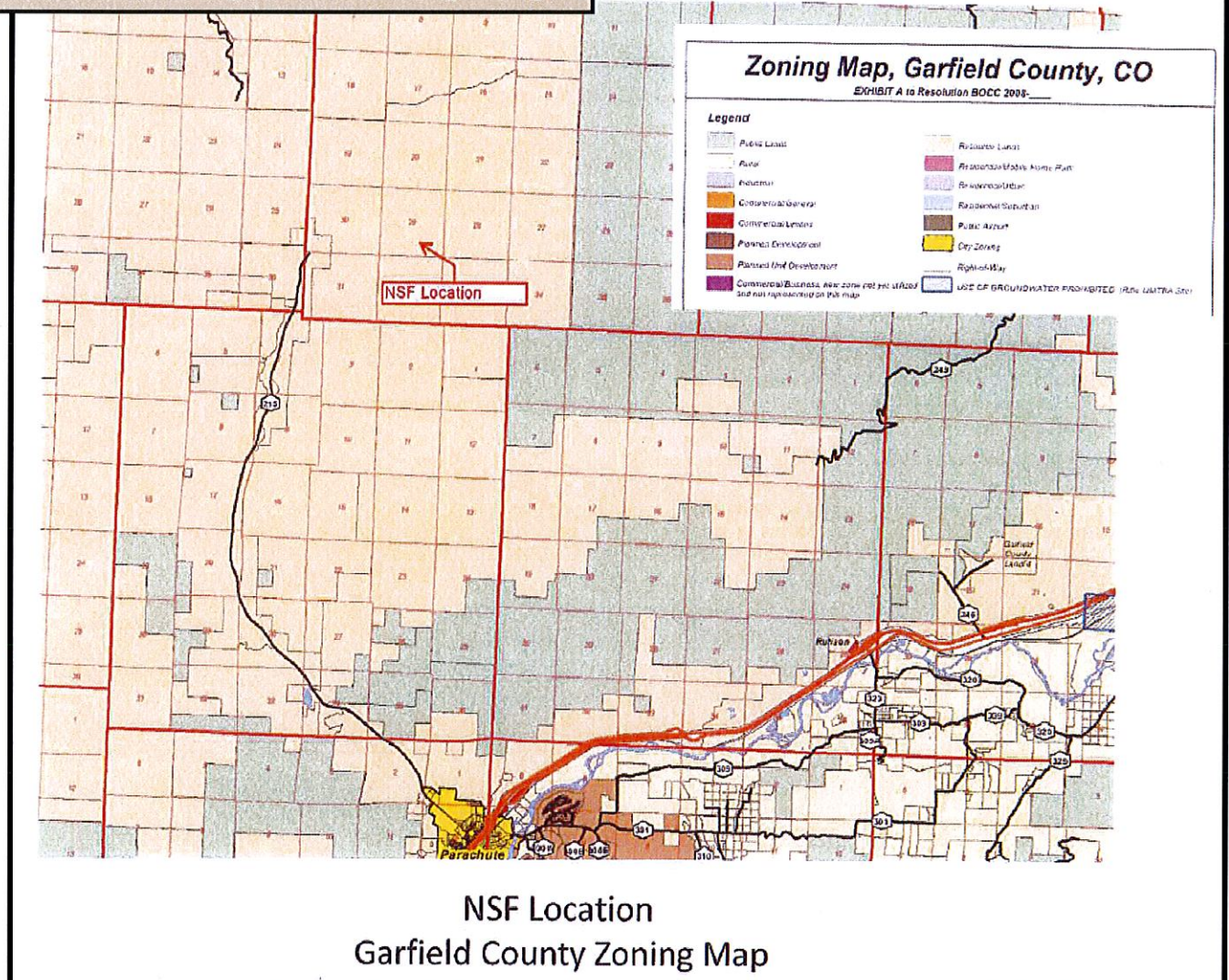
Project Description

The Application requests Major Impact Review approval for a Material Handling and Solid Waste Transfer Facility. The site is proposed for the operation of a centralized material handling facility for residual exploration and production waste prior to transportation to a permanent solid waste disposal site. The facility is regulated by the Colorado Oil and Gas Conservation Commission (COGCC) Rule 908 as a Centralized E&P Waste Management Facility.

Waste will be transported to the site, temporarily stored and mixed with sawdust to reduce the moisture content. The facility will be able to store approximately 60 cubic yards of material before transportation. The waste material will be removed every 2 – 5 days. Currently the solidification process is being conducted on individual well pads and at water

treatment facilities throughout the Encana property. The proposal is to consolidate the operations, reduce truck traffic and increase efficiency. The site is located within a secure area of Encana's operations. The site is located adjacent to an existing roadway and is developed at this time (graded and leveled) for industrial and/or roadway operations.

Vicinity Map and Zoning Map



The Application represents that "The NSF will reduce the amount of vehicles needed to deliver sawdust and transporting waste off Encana's property....One centralized facility will operate more efficiently than several smaller widespread areas."

Facilities and equipment used at the site are outlined below and shown on the site plan:

- Steel Mixing Bin (30' x 10' x 3.5') – three sided, 300 cubic ft. capacity
- Steel Storage Bin (20'x 20'x 4')
- Sawdust storage area (contained by concrete barriers)

- Track hoe
- 3 monitoring wells
- Pump for removing liquids
- Vehicle circulation and parking areas
- Fire Access areas
- Containment Berms – Storm Water Management Improvements

A copy of the Applicant's Site Plan is attached to this Report as an Exhibit and includes drainage information, access, circulation, surfacing, and fire access areas.

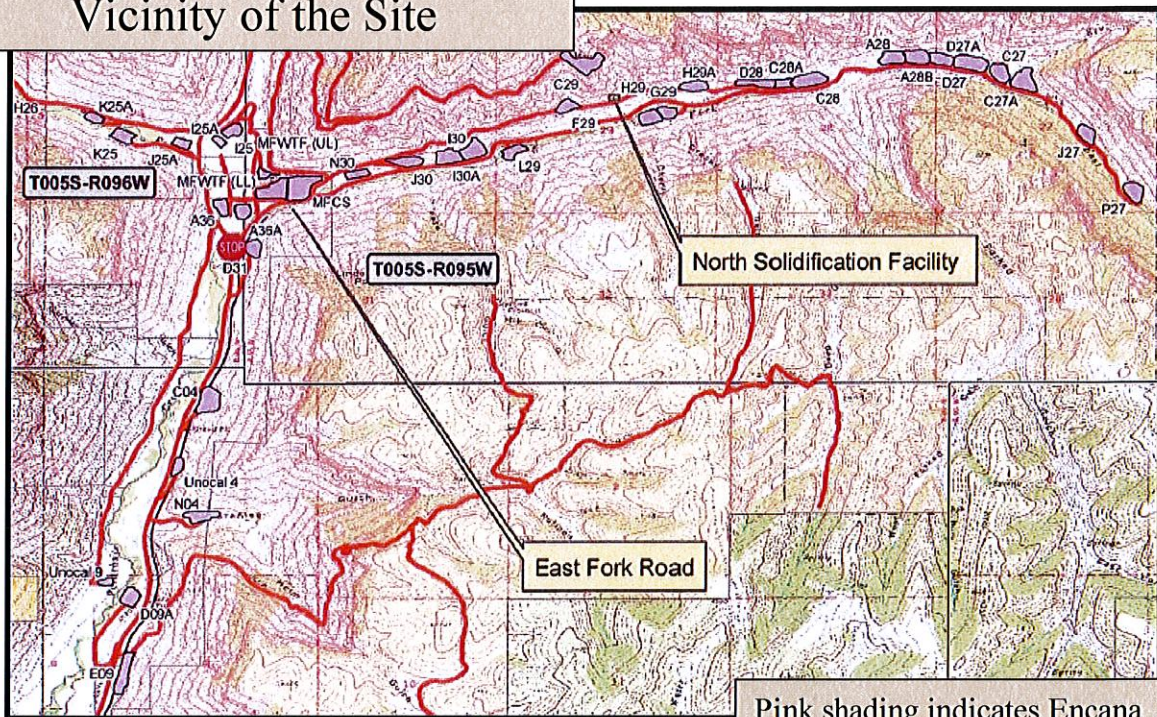
II. SITE DESCRIPTION AND ADJACENT USES

The site is located on the East Fork Parachute Creek. It is situated on a south facing bench above the valley bottom. The site is located on previously disturbed lands and the facility will not result in any reduction in wildlife habitat. Reclamation of the area was completed in 2003 as required/approved by the Colorado Mined Land Reclamation Board .

View of the Facility Site



Encana Operations in the Vicinity of the Site



Pink shading indicates Encana facilities such as well pads and water treatment facilities.

Adjacent properties and land uses are owned by Encana and improved for a variety of oil and gas exploration, production, and access uses. There are no other land uses (i.e. residential uses) in the vicinity of the site.

Zoning adjacent to the site is entirely Resource Lands. Based on topography areas to the south would be classified as Valley Floor and areas north of the site would be in the Talus Slope designation.

III. AUTHORITY AND APPLICABLE REGULATIONS

A. The Land Use Tables contained in Section 3-501 of the ULUR, designate Material Handling as a Limited Impact Use and Solid Waste Transfer as a Major Impact Review Use in the Resource Lands Zone District. The combined activities associated with this proposal are being processed jointly through the Major Impact Review Process.

B. Section 4-106 of the ULUR outlines the Major Impact Review Procedures including public notice requirements. The process includes public hearings before both the Planning Commission and the Board of County Commissioners.

C. Article 7 of the ULUR includes general standards for review in Divisions 1, 2, and 3. Article 7, Division 8 also includes standards for specific uses including Section 7-810, Industrial Uses. (see excerpts below).

SECTION 7-810 ADDITIONAL STANDARDS APPLICABLE TO INDUSTRIAL USE.

A. Enclosed Building.

All fabrication, service and repair operations shall be conducted within an enclosed building or obscured by a fence, natural topography or landscaping.

B. Loading and Unloading.

All operations involving loading and unloading of vehicles shall be conducted on private property and shall not be conducted on a public right-of-way.

C. Outdoor Storage Facilities.

All outdoor storage facilities for fuel, raw materials and products shall be screened by natural topography or enclosed by a fence or wall adequate to conceal such facilities from adjacent property.

1. All outside storage abutting or facing a lot in a residential or commercial zone shall be screened by natural topography or enclosed by a site-obscuring fence to obstruct the storage area from view. The fence shall be of material and design that will not detract from adjacent residences.

D. Industrial Wastes.

All industrial wastes shall be disposed of in a manner consistent with statutes and requirements of CDPHE.

E. Sound.

The volume of sound generated shall comply with the standards set forth in the Colorado Revised Statutes.

F. Ground Vibration.

Every use shall be operated so that the ground vibration inherently and recurrently generated is not perceptible without instruments at any point of any boundary line of the property

G. Interference, Nuisance or Hazard.

Every use shall be so operated that it does not emit heat, glare, radiation or fumes which substantially interfere with the existing use of adjoining property or which constitutes a public nuisance or hazard. Flaring of gases, aircraft warning signal and reflective painting of storage tanks, or other legal requirements for safety or air pollution control measures shall be exempted from this provision.

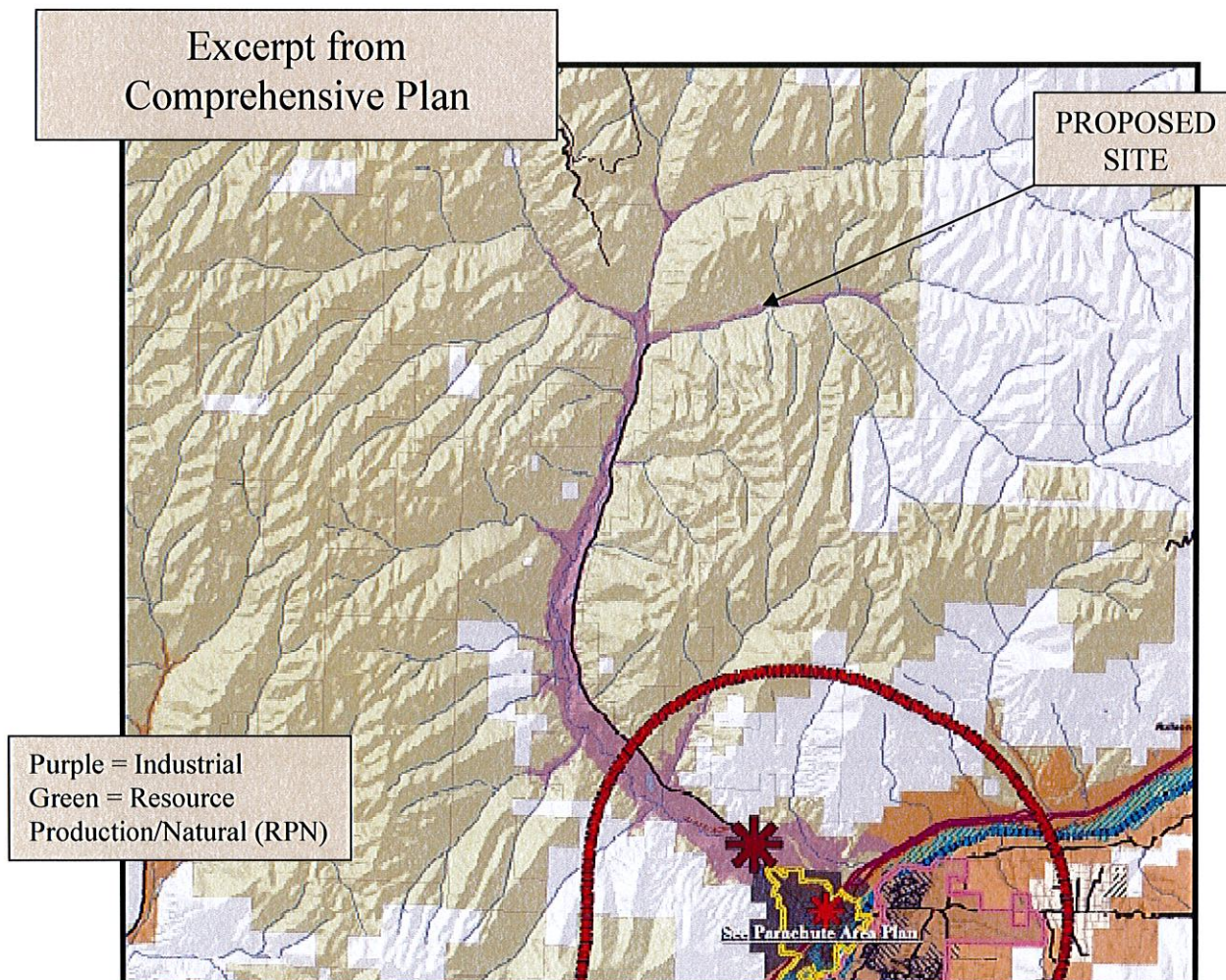
IV. COMPREHENSIVE PLAN

The Site is designated by the Comprehensive Plan of 2030 as Industrial (I) and Resource Production/Natural (RPN). The Industrial Designation includes “energy processing” and uses that produce odor, noise, light, and/or emissions. Section 9, Mineral Extraction includes several Goals and Policies relevant to this Application.

Goal #2: Ensure that mineral extraction activities mitigate their effects on the natural environment....

Goal #3: In working with mineral extraction projects the county will protect the public health, safety and welfare of its citizens.

Policy #4: Facilities that are appurtenances to oil/gas development activities (compressors, etc.) are considered appropriate in all land uses so long as they meet the respective mitigation requirements of the ULUR to maintain compatibility with surrounding land uses.



V. STAFF ANALYSIS

A. Public and Referral Comments: No public comments have been received in response to the public notice which included posting the site and mailed notice to property owners adjacent and within 200 ft. of the site and mineral rights owners. Referral packets were sent to the following agencies with comments summarized below and included as exhibits. The Applicant has provided responses to a number of the agencies/issues which are also included as exhibits.

1. Garfield County Vegetation Manager: Indicated that the weed management plan is acceptable, noted that no long term reclamation security would be required, noted the potential for rare plants in the vicinity of the site and endorsed the applicant's consultant recommendation for protection of said plants.
2. Garfield County Environmental Manager: Noted several questions regarding transportation of the semi-solid waste to the centralized facility, prevention of leakage of any liquids during transportation and handling at the site, and air quality permitting requirements by CDPHE (Colorado Department of Public Health and Environment). The Applicant has responded to the referral comments with clarification of the type of equipment used for hauling waste materials and related information.
3. Garfield County Consulting Engineer: Noted in his preliminary comments the need to clarify flood plain mapping.
4. Garfield County Road and Bridge: Indicated that there would not be a significant amount of traffic increase or impacts and saw no reason not to proceed with the project.
5. Town of Parachute: The Town provided verbal comments indicating that they had no objection to the project.
6. Colorado Department of Public Health and Environment (CDPHE): Provided general information on the Air Quality Permitting program and Air Pollutant Emission Notices (APEN).
7. Referrals were sent to the following entities with no comments received.
 - Bureau of Land Management
 - Grand Valley Fire Protection District
 - Colorado Division of Parks and Wildlife
 - Colorado Division of Water Resources

B. Site Suitability: The Applicant's Site Suitability analysis meets the ULUR requirements and addresses key issues for the site as follows:

1. Access is well documented on the existing Encana Road System.
2. No Additional permitting with the County Road and Bridge is being requested.
3. The site is owned by Encana with no utility easements or service on the site.
4. The topography of the site footprint is level. The area of activity is limited to the roadway bench to avoid steeper slopes above and below the site.

5. Natural features on the site are well documented in the submittals. The Applicant's consultants, Rule Engineering have analyzed the site and no hazardous conditions are identified for the site.
6. Drainage improvements in accordance with the Stormwater Management Plan and Best Management Practices will be required.
7. Potable water for employees will be provided by bottled water. A portable toilet will also be provided.
8. No flood plains are mapping on the site.
9. Soils information has been provided for the site. The Applicant's consultant, Rule Engineering has not identified any significant soils constraints.
10. No major geologic hazards have been identified for the site. The Application represents that steep slopes above the site are stable with no evidence of hazardous conditions.
11. The Application includes an analysis of environmental effects completed by West Water Engineering Inc., dated 10/11. The analysis identifies a variety of minor issues noting that the "...facility is not expected to significantly affect any critical wildlife habitat for any wildlife species." The study also identified three sensitive plant species could potential occur with the project area. The study recommends that the Applicant avoid potential impacts by limiting construction activities to the area south of the rubble piles and through dust control.
12. Noxious weeds were noted adjacent to the site and care should be taken to implement the applicant's weed management plans - treatment and control recommendations contained in the West Water Engineering Environmental Impacts Study (pg. 14).

C. Impact Analysis: The Applicant's Impact Analysis addresses the requirements of the ULUR and identifies the following attributes in support of the application:

1. Adjacent properties and mineral rights owners have been identified per code.
2. Adjacent land uses have been noted and are a mix of oil and gas mineral exploration and production and access.
3. The Application anticipates no significant change to the existing grade.
4. Soils information has been provided and does not identify any significant constraints.
5. Hazards have been evaluated by the Applicant's Engineers with no significant hazards noted.
6. Three test wells are proposed to monitor any impacts on ground water from associated with seepage from the site. The facility is designed to contain and remove from the site any residual water from the material handling operation.
7. The Applicant has provided an updated Traffic analysis and copies of previous studies on the Encana North Parachute Ranch property. The updated analysis by Drexel, Barrell & Co. indicates that the traffic generated off-site will be negligible and that it is anticipated that the existing roadway can handle the negligible increase in construction and operational traffic.

8. The Applicant has provided an updated noise analysis letter, from HRP Acoustical Consultants Inc. (dated 10/28/11). The analysis indicates that the noise associated with the operation (track hoe, loading and mixing operations) will be inaudible at the nearest residence approximately 5 miles from the site. The estimated decibel level is 11 dBA at the nearest residence.
9. No new areas of disturbance are proposed by the Applicant and no post construction revegetation is anticipated.

D. General ULUR Standards

The Applicant as proposed is in general compliance with Division I and II standards from Article 7 of the ULUR. Location of the site within the overall Encana North Parachute Ranch Property and industrial operations, addresses many of the compatibility and general zoning provisions. Specific concerns are addressed under the Staff Analysis, Land Suitability and Impact Report sections of the Application and Staff Report. Several key topics are covered in the summary below:

1. The site is covered by the North Parachute Ranch Reclamation Plan and the Applicant shall be required to comply with the "lower zone benches" recommendation of said plan. A copy of the plan is included in the Application.
2. The site is covered by the Master Stormwater Management Plan for the North Parachute Ranch and compliance with said plan shall be required, including site drainage, off-site management of road run-off and management of drainage from the slopes above the site.
3. Monitoring wells are proposed and shall be required to address potential ground water impacts. The mixing and storage facilities are designed to contain any water or seepage and no impacts are anticipated.
4. The Applicant's have documented the CDPHE requirements for the facility and will comply with any applicable CDPHE regulations.
5. Access to the site is via private roads constructed and maintained by the Applicant. The Application includes representations from Encana's Contract Construction Coordinator that the roads to the site are "adequate to accommodate regular daily traffic and emergency vehicle access associated with the North Solidification Facility".

E. Specific Industrial Use Standards – Section 7-810 of the Unified Land Use Resolution of 2008 as Amended

Compliance with Section 7-810 standards will be required and is generally demonstrated by the Application Submittals with key topics summarized below:

1. No buildings are proposed and the topography and slopes will minimize any visibility to the site.
2. All operations including loading and unloading are accommodated on the site.

3. Proper disposal of industrial waste in accordance with the Colorado Department of Public Health and Environment shall be required and is part of the operations plan.
4. The applicant's sound/noise analysis indicates that the facility will not be audible at the nearest residence.
5. Impacts from ground vibration or other nuisances are mitigated by the size of the North Parachute Ranch Industrial operation.

VI. PLANNING COMMISSION REVIEW

The Planning Commission discussion included the following topics and issues at the March 14th Public Hearing on the Application:

- Review of Referral Comments including regulations for transporting waste materials.
- Staff recommended edit to Condition #5 on CDPHE Permitting
- Clarification of ULUR Requirements for demonstrating adequate water and sewer service.
- In response to Commissioner questions the Applicant clarified that the solidification facility will only accept material from Encana wells and facilities located within the North Parachute Ranch area.
- The Applicant represented the purpose of the facility is to serve only Encana operations.
- Results from the monitoring wells will be submitted to and analyzed by certified labs.
- Location of the facility central to Encana Oil and Gas operations, the lack of visual impacts on other property owners, and the purpose of painting the facility with non-reflective neutral colors.

Based on the Staff Report and referral comments, Staff presented a draft finding and suggested conditions to the Planning Commission for consideration. Staff presented the suggested edit to Condition #5 and the Commission discussed a number of key topics and recommended edits to the draft conditions.

Condition #5: The edit presented by Staff clarified the timing for submittal of Colorado Department of Public Health and Environment "AIRS" ID Assignment for the facility and was in response to feedback from the Applicant.

Condition #6: The Commission edited this condition to simply require transportation of the waste material to comply with COGCC and Department of Transportation Regulations.

Condition #9: This condition was discussed by the Commission and remained in the motion based on input from the County Attorney's Office regarding demonstration of compliance with the ULUR Standards for adequate water and sanitary service.

Condition #10: The Commission edited this condition to only require the containment bins to be painted a non-reflective neutral color, clarifying that the color requirement did not apply to other equipment such as the track hoe.

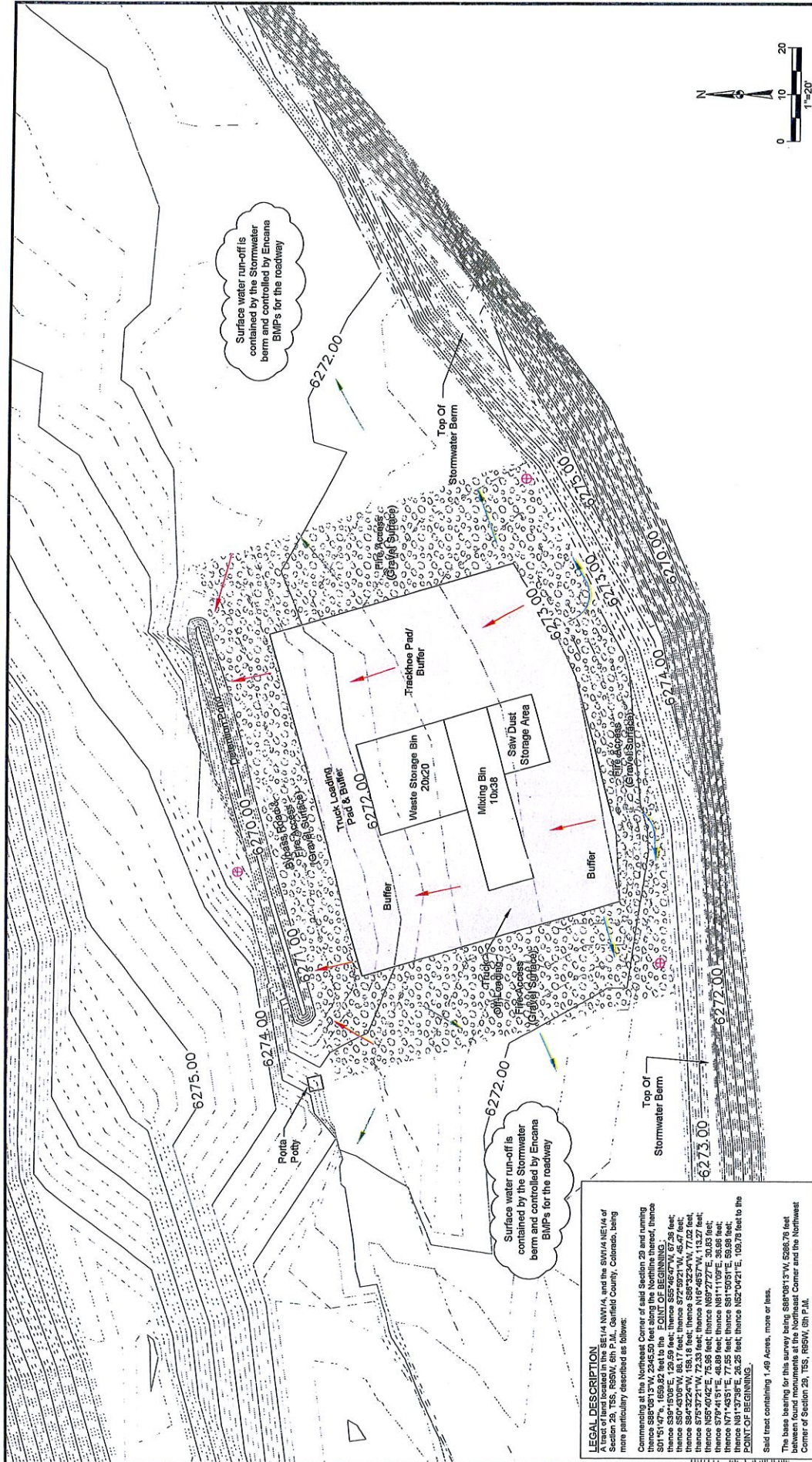
VII. PLANNING COMMISSION RECOMMENDATION

At their Public Hearing the Planning Commission forwarded a recommendation to the Board of County Commissioners for approval of the Major Impact Review Land Use Change Permit for Encana Oil and Gas (USA) Inc. for a Material Handling and Solid Waste Transfer facility at the proposed site.

The recommendation is subject to a finding that the Application is in compliance with all applicable provisions of the Unified Land Use Resolution of 2008 as amended and is in general conformance with the Goals and Policies of the Garfield County Comprehensive Plan 2030, subject to the edited conditions of approval outlined as follows:

1. That all representations made by the Applicant in the application, and at the public hearing before the Planning Commission shall be conditions of approval, unless specifically altered by the Board of County Commissioners;
2. The operation of this facility and any future amendments shall be done in accordance with all applicable Federal, State and Local regulations governing the operation of this type of facility.
3. The Applicant shall maintain compliance with the provisions of the Unified Land Use Resolution of 2008 including but not limited to 7-810, Standards for Industrial Uses.
4. The Applicant shall comply with their weed management plan and the recommendations of the County Vegetation Manager including protection of sensitive plant species by restricting construction activities to the south side of the detention pond on the north side of the site and compliance with dust control plans.
5. Prior to construction activity on the site the Applicant shall provide documentation of Colorado Department of Public Health (CDPHE) Air Pollution Control Division approval of the facility as either being permit exempt or by issuance of any required permits. The Applicant shall submit to the County, CDPHE compliance documentation within 6 months of the start of operation, in accordance with CDPHE procedures for AIRS ID assignment.
6. The Applicant shall comply with all COGCC and DOT (Department of Transportation) transportation standards.
7. The site shall be maintained in accordance with dust management plans for Encana's North Parachute Ranch property with particular care exercised to manage dust during construction activities.
8. The "bypass roadway" north of the site shall maintain an adequate width pursuant to Encana operations plans/standards, for on-site operations to be conducted without conflicting with drive through traffic.

9. Potable water will be provided on site for employees as bottled water and a portable toilet will be provided as shown on the site plan.
10. The containment bins shall be painted with non-reflective paint in neutral colors to reduce glare and mitigate any visual impacts.
11. The Applicant shall implement all storm water management improvements as represented in the Application and contained in the Stormwater Management Plan, including Best Management Practices. The Applicant shall provide a barrier or additional berms on the north side of the site to restrict access into areas of native vegetation and avoid drainage and related debris from impacting the site and adjacent roadway.
12. Monitoring wells as proposed shall be required to assess any impacts on ground water. Should impacts be discovered the Applicant shall cease operation of the facility until all remediation as required by Federal, State, and Local regulations including the COGCC are completed and corrective operational measures implemented to prevent reoccurrence.
13. The Applicant shall comply with and update as necessary the Piceance Emergency Response Guide to include the proposed facility. The facility shall be maintained and operated to minimize safety concerns and potential for wildfire including weed control, separation from native vegetation, and heat and spark mitigation on equipment.
14. Prior to operation of the facility the Applicant shall provide documentation of final approvals from the COGCC associated with their Rule 908 review.
15. Installation of the facilities shall be done in accordance with applicable engineering specification including manufacturers/fabricators recommendations for the steel containment bins.



LEGAL DESCRIPTION
 A tract of land located in the SE1/4 NW1/4, and the SW1/4 NE1/4 of Section 29, T5S, R55W, 6th P.M., Garfield County, Colorado, being more particularly described as follows:
 Commencing at the Northeast Corner of said Section 29 and running S89°08'13"W, 2345.59 feet along the Northing line, thence S81°51'47"E, 1699.82 feet to the POINT OF BEGINNING, thence S89°08'13"W, 2345.59 feet to the Northeast Corner of said Section 29, thence S89°08'13"W, 18.17 feet, thence S89°08'13"W, 45.47 feet, thence S84°32'24"W, 158.18 feet, thence S85°32'24"W, 77.02 feet, thence S75°37'21"W, 72.33 feet, thence N19°48'57"W, 113.27 feet, thence N55°40'42"E, 75.98 feet, thence N85°27'27"E, 30.03 feet, thence N85°27'27"E, 30.03 feet, thence N85°27'27"E, 30.03 feet, thence N71°43'51"E, 77.55 feet, thence S81°50'51"E, 59.88 feet, thence N81°37'38"E, 26.25 feet, thence N52°04'21"E, 105.78 feet to the POINT OF BEGINNING.
 Said tract containing 1.49 Acres, more or less.
 The base bearing for this survey being: S89°08'13"W, 5286.76 feet between found monuments at the Northeast Corner and the Northwest Corner of Section 29, T5S, R55W, 6th P.M.

		North Solidification Facility Grading and Drainage Plan		FIGURE: C1
DATE: 1/5/12		FILE: ACAD-NSF-Site-Jan-12.dwg		
Rule Engineering, LLC Solutions to Regulations for Industry		LEGEND <div style="display: flex; justify-content: space-around; align-items: center;"> <div> SURFACE WATER FLOW (NSF BUFFER ZONE TO DETENTION POND) SURFACE WATER FLOW (OUTSIDE NSF TO ROAD BMPs) </div> <div> PROPOSED MONITORING WELL BUFFER AREA </div> </div>		

RECEIVED
MAR 09 2012
GARFIELD COUNTY
BUILDING & PLANNING



**MOUNTAIN
ENGINEERING**
CIVIL AND ENVIRONMENTAL CONSULTING AND DESIGN



March 1, 2012

Mr. Glenn Hartmann
Garfield County Planning
108 8th Street, Suite 401
Glenwood Springs, CO 81601

RE: Review of North Solidification Facility: MIPA-7066

Dear Glenn:

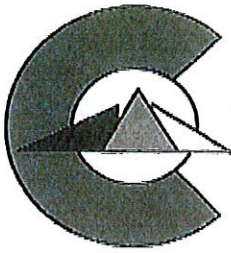
This office has performed a review of the documents provided for the Major Impact Review Application of the North Solidification Facility (NSF) by Encana Oil and Gas, Inc. The submittal was found to be thorough and well organized. The following comment was generated:

- The narrative states that the NSF is not adjacent to a 100-Year Floodplain. The map provided as evidence appears to be mislabeled and makes it difficult to verify. The Applicant should provide a map with a more appropriate scale to clarify the location of the project in relation to the floodplain.

Feel free to call if you have any questions or comments.

Sincerely,
Mountain Cross Engineering, Inc.

Chris Hale, PE



Garfield County

Vegetation Management



March 2, 2012

Glenn Hartmann
Garfield County Building & Planning Department

RE: Encana North Solidification Facility

Dear Glenn,

Thanks for the opportunity to comment.

- The Weed Management Plan and inventory is acceptable
- It appears that there will be no temporary seeding and that all reclamation will occur post-operation of the facility, therefore we will not be recommending a long term security.
- A rare plant inventory has been provided. Two sensitive plant species are located either on-site or close by. These plants are:
 - Cathedral bluff meadowrue - 2 locations
 - Roan cliffs blazingstar -- 1 location

The applicant's consultant states in the permit that: "No TESS (*threatened, endangered, or sensitive species*) plants will be affected if no construction activities are conducted north of the rubble piles and dust is minimized during construction".

Staff encourages the applicant to adhere to their consultant's recommendation regarding these sensitive plant species.

Please let me know if you have any questions.

Sincerely,

Steve Anthony
Garfield County Vegetation Manager



Glenn Hartmann

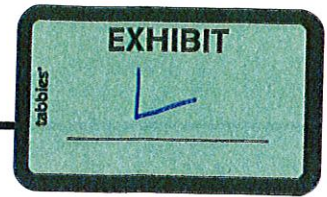
From: Wyatt Keesbery
Sent: Friday, February 17, 2012 9:32 AM
To: Glenn Hartmann
Subject: Encana North Solidification Facility

Glen,

After reviewing Encana's plan, and reviewing the site map, Road and Bridge has no reason not to let them proceed in their Material Handling and Solid Waste Transfer Facility, 11 miles north of Parachute and 2 miles northeast of the end of county road 215. There will not be a significant amount of traffic increase that will make a impact on CR 215.

wyatt

Glenn Hartmann



From: Jim Rada
Sent: Tuesday, February 28, 2012 2:13 PM
To: Glenn Hartmann
Subject: MIPA- 7066, EnCana North Solidification Facility

Glenn,

I offer these questions/comments on the above referenced facility.

1. EnCana states that this solidification process is currently taking place on several other sites on and off the NPR. That said, they then haul solidified waste from these sites to a waste disposal facility. With this application, I am curious as to how they are containing the liquid waste during the transportation to the new NSF. What measures are taken to prevent liquid leakage or spillage on roads and on the surface during transportation to the NSF? From NSF to disposal site. I recommend a COA that requires transportation of these materials both to and from each site in vehicles/trailers that will prevent leakage of any liquids that may be part of the waste stream or may enter the waste after treatment/during transport for disposal.
2. EnCana plans monitoring wells at the site and suggests sampling of the soils upon closure of the facility(COGCC Form 28 Section 908.g.1) The Pre app summary, Page 10 says there will be concrete pads under the bins. The Rule, Layout map indicates liner sumps. Just want to understand if this operation will take place on lined area, concrete pads or something else. In light of the shallow surface soils it makes sense that some impervious materials be used under this operation to prevent migration of contaminants in the subsoils.
3. There is some discussion that no air permits are needed although there is not documentation as to how that determination was made or documentation from CDPHE APCD regarding this issue. Appears from the lab analytical information that there is some VOC content in these materials. I recommend at minimum some type of documentation be required as to how this determination was made.

A long application but I have no other concerns at this time. Thanks for the opportunity to review.

Jim

Jim Rada

Environmental Health Manager
Garfield County Public Health
195 W. 14th Street
Rifle, CO 81650
Phone - 970-625-5200 x8113
Direct - 970-665-6380
Fax - 970-625-8304

Glenn Hartmann



From: Middleton, Brett A. [Brett.Middleton@encana.com]
Sent: Monday, March 05, 2012 5:19 PM
To: Jim Rada
Cc: Glenn Hartmann; 'Kathleen Middleton'
Subject: Re: North Solids Facility concerns

Hey Jim,

Thought I would just respond directly to your concerns.

1. EnCana states that this solidification process is currently taking place on several other sites on and off the NPR. That said, they then haul solidified waste from these sites to a waste disposal facility. With this application, I am curious as to how they are containing the liquid waste during the transportation to the new NSF. [All material will be transferred to the NSF with the use of a hydro excavating truck.](#) What measures are taken to prevent liquid leakage or spillage on roads and on the surface during transportation to the NSF? [Hydro trucks are sealed/DOT approved for transport of liquids.](#) From NSF to disposal site. [The material leaving the NSF will be transported in covered side dump trailers and all material leaving the NSF will be solidified with sawdust in order to pass paint filter and to be excepted into the disposal facility.](#) I recommend a COA that requires transportation of these materials both to and from each site in vehicles/trailers that will prevent leakage of any liquids that may be part of the waste stream or may enter the waste after treatment/during transport for disposal.

2. EnCana plans monitoring wells at the site and suggests sampling of the soils upon closure of the facility(COGCC Form 28 Section 908.g.1) The Pre app summary, Page 10 says there will be concrete pads under the bins. The Rule, Layout map indicates liner sumps. Just want to understand if this operation will take place on lined area, concrete pads or something else. In light of the shallow surface soils it makes sense that some impervious materials be used under this operation to prevent migration of contaminants in the subsoils. [A change in design occurred after the pre application meeting please see February 2012 submitted application. All material will be offloaded into a 1/2 inch thick impervious steel containment "designed for purpose", sawdust will be added to solidify and that material will then be stored in a second 1/2 inch thick impervious steel containment prior to being loaded into the side dump transport trucks. Please refer to the design plans, Items #6 and #7, in the Maps and Plans Tab in the February 2012 complete application. A written explanation can be found in the NSF Narrative located in the Application Materials Tab.](#)

3. There is some discussion that no air permits are needed although there is not documentation as to how that determination was made or documentation from CDPHE APCD regarding this issue. Appears from the lab analytical information that there is some VOC content in these materials. I recommend at minimum some type of documentation be required as to how this determination was made. [Rule collected samples to perform a mass balance equation, which determined that the emissions are a de minimus source. Once the APEN has been review by the APCD, the facility will receive an AIRS ID, the facility is permit exempt.](#) A long application but I have no other concerns at this time. Thanks for the opportunity to review.

Please let me know if you have any other questions.

*Brett Middleton
Encana Oil & Gas (USA) Inc.
Environmental Field Coordinator
970.987.4650 Cell
970.285.2739 Office*

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STATE OF COLORADO



John W. Hickenlooper, Governor
Christopher E. Urbina, MD, MPH
Executive Director and Chief Medical Officer

Dedicated to protecting and improving the health and environment of the people of Colorado

4300 Cherry Creek Dr. S. Laboratory Services Division
Denver, Colorado 80246-1530 8100 Lowry Blvd.
Phone (303) 692-2000 Denver, Colorado 80230-6928
Located in Glendale, Colorado (303) 692-3090

<http://www.cdphe.state.co.us>



Colorado Department
of Public Health
and Environment

March 5, 2012

Glenn Hartmann
Garfield County Building and Planning Department
108 8th St., Suite 401
Glenwood Springs, CO 81601

RE: Encana North Solidification Facility

Dear Mr. Hartmann:

On February 10, 2012, the Colorado Air Pollution Control Division received a request for an air quality determination concerning Encana North Solidification Facility. Thank you for taking the time to inquire about air quality requirements in this area. The following information pertains to air quality issues only.

All sources of air emissions in Colorado are required to obtain a construction permit unless they are specifically exempted by the provision of **Regulation No. 3**. The link to Regulation No. 3 is:
<http://www.cdphe.co.us/regulations/airreg>. Choose Air Quality Control Commission Regulations, then choose Regulation No. 3.

The first phase of air permitting involves submission of an Application for Construction Permit for each facility and one **Air Pollution Emission Notices (APEN)** for each emission source. For purposes of Air Pollution Emission Notice reporting, a source can be an individual emission point or group of similar emission points (Ref: Regulation No. 3, Part A) Both APEN reporting and permit requirements are triggered by uncontrolled actual emission rates. Uncontrolled actual emissions are calculated based on the requested production/operating rate assuming no control equipment is used. In general, an APEN is required for an emission point with uncontrolled actual emissions of any criteria pollutant equal to or greater than the quantity listed in the table below:

AREA	UNCONTROLLED ACTUAL EMISSIONS
Attainment Areas	2 Tons Per Year
Non-attainment Areas	1 Ton Per Year
All Areas	Lead Emissions: 100 pounds per year

Please consult <http://www.cdphe.state.co.us/ap/attainmaintain.html> to determine if your project will be located within an attainment or non-attainment area. Other exemptions may be found in Regulation No. 3, Part A, Section II.D.1 However, a source may not be exempted if the source would otherwise be subject to any specific federally applicable requirement.

Sources of non-criteria reportable pollutants have different reporting levels depending on the pollutant, release point height, and distance to property line. Please see **Appendix A and Appendix C of Regulation No. 3** for determining the appropriate reporting level for each pollutant and for the list of non-criteria reportable air pollutants. The following chart will assist you in determining your reportable non-criteria pollutant levels from your project.

However, none of the exemptions from Air Pollution Emission Notice filing requirements described above shall apply if a source would otherwise be subject to any specific federal or state applicable requirement. Information concerning submittal of revised Air Pollution Emission Notices is also given in Regulation No. 3, Part A. An Air Pollutant Emission Notice is valid for a period of five years. The five-year period recommences when a revised APEN is received by the Division.

If you have any questions regarding your reporting and permitting obligations please call the Small Business Assistance Program at 303-692-3148 or 303-692-3175.

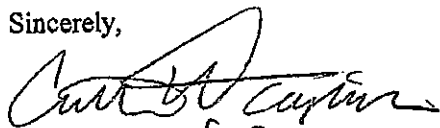
Land development (earth moving) activities that are greater than 25 acres or more than 6 months in duration will most likely be required to submit an APEN to the Division and may be required to obtain an air permit. In addition a startup notice must be submitted 30 days prior to commencement of the land development project.

Please refer to the following link for additional information:
<http://www.cdphe.state.co.us/ap/downloadforms.html>, **Permit Application and APEN Forms**, then scroll to: Land Development – Specialty APEN for the form and guidance.

If you have any questions or feel as though you need more information on possible air pollution permits or notice requirements, please contact me directly at 303-692-3127 or the Colorado Air Pollution Control Division's Stationary Source Program at 303-692-3150. I can also be reached via email at jim.dileo@state.co.us.

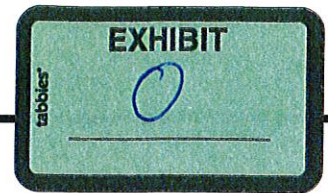
Again, thank you for taking the time to contact the Division about this project.

Sincerely,



James A DiLeo *for*
NEPA Coordinator
Colorado Air Pollution Control Division

Glenn Hartmann



From: Jim Rada
Sent: Tuesday, March 06, 2012 4:57 PM
To: Middleton, Brett A.
Cc: Glenn Hartmann; 'Kathleen Middleton'
Subject: RE: North Solids Facility concerns

Brett,

Thanks for the response. All of your comments seem reasonable to me. Just a few clarifications....

1. Are the side dump trailers water tight and are covers impervious? Just wondering what happens when one of these truck gets caught in a gully washer? Does the solidified material get soaked? Can liquids re-entrain any hydrocarbons and/or chemical constituents? Will these liquids leak out?
2. Are the steel containment units water tight and periodically leak tested?
3. With regard to air emissions, I understand that this may be de minimus, but I still recommend that the County put a COA requiring documentation of CDPHE APCD approval and AIRS ID assignment to show proof that State regulations are being followed.

No other concerns at this time.

Jim Rada

Environmental Health Manager
Garfield County Public Health
195 W. 14th Street
Rifle, CO 81650
Phone - 970-625-5200 x8113
Direct - 970-665-6380
Fax - 970-625-8304
Cell - 970-319-1579
jrada@garfield-county.com
www.garfield-county.com

From: Middleton, Brett A. [<mailto:Brett.Middleton@encana.com>]
Sent: Monday, March 05, 2012 5:19 PM
To: Jim Rada
Cc: Glenn Hartmann; 'Kathleen Middleton'
Subject: Re: North Solids Facility concerns

Hey Jim,

Thought I would just respond directly to your concerns.

1. EnCana states that this solidification process is currently taking place on several other sites on and off the NPR. That said, they then haul solidified waste from these sites to a waste disposal facility. With this application, I am curious as to how they are containing the liquid waste during the transportation to the new NSF. All material will be transferred to the NSF with the use of a hydro excavating truck. What measures are taken to prevent liquid leakage or spillage on roads and on the surface during transportation to the NSF? Hydro trucks are sealed/DOT approved for transport of liquids. From NSF to disposal site. The material leaving the NSF will be transported in covered side dump trailers and all material

leaving the NSF will be solidified with sawdust in order to pass paint filter and to be excepted into the disposal facility. I recommend a COA that requires transportation of these materials both to and from each site in vehicles/trailers that will prevent leakage of any liquids that may be part of the waste stream or may enter the waste after treatment/during transport for disposal.

2. EnCana plans monitoring wells at the site and suggests sampling of the soils upon closure of the facility(COGCC Form 28 Section 908.g.1) The Pre app summary, Page 10 says there will be concrete pads under the bins. The Rule, Layout map indicates liner sumps. Just want to understand if this operation will take place on lined area, concrete pads or something else. In light of the shallow surface soils it makes sense that some impervious materials be used under this operation to prevent migration of contaminants in the subsoils. A change in design occurred after the pre application meeting please see February 2012 submitted application. All material will be offloaded into a 1/2 inch thick impervious steel containment "designed for purpose", sawdust will be added to solidify and that material will then be stored in a second 1/2 inch thick impervious steel containment prior to being loaded into the side dump transport trucks. Please refer to the design plans, Items #6 and #7, in the Maps and Plans Tab in the February 2012 complete application. A written explanation can be found in the NSF Narrative located in the Application Materials Tab.

3. There is some discussion that no air permits are needed although there is not documentation as to how that determination was made or documentation from CDPHE APCD regarding this issue. Appears from the lab analytical information that there is some VOC content in these materials. I recommend at minimum some type of documentation be required as to how this determination was made. Rule collected samples to perform a mass balance equation, which determined that the emissions are a de minimus source. Once the APEN has been review by the APCD, the facility will receive an AIRS ID, the facility is permit exempt. A long application but I have no other concerns at this time. Thanks for the opportunity to review.

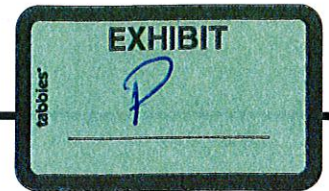
Please let me know if you have any other questions.

Brett Middleton
Encana Oil & Gas (USA) Inc.
Environmental Field Coordinator
970.987.4650 Cell
970.285.2739 Office

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<http://www.encana.com>

Glenn Hartmann



From: Kathleen Middleton [kmiddleton@ruleengineering.com]
Sent: Monday, March 12, 2012 7:19 PM
To: Glenn Hartmann
Cc: Middleton, Brett A.; rknight@ruleengineering.com
Subject: Mountain Cross Engineering Comments
Attachments: NSF Surface Water Features.pdf; 5.NSF-Encana-Hydro-Features-Fig4.pdf; 3.GarCo 100-Year Flood Plain Map.pdf

Glenn,

In response to the referral comments provided by Mountain Cross Engineering the Hydrologic Features Figure is attached. The location of the proposed NSF is approximately 200 feet above East Parachute Creek. According to the 100-year floodplain map provided by Garfield County, the proposed site location is not in a 100-year floodplain. Please let me know if there is any additional information I can provide.

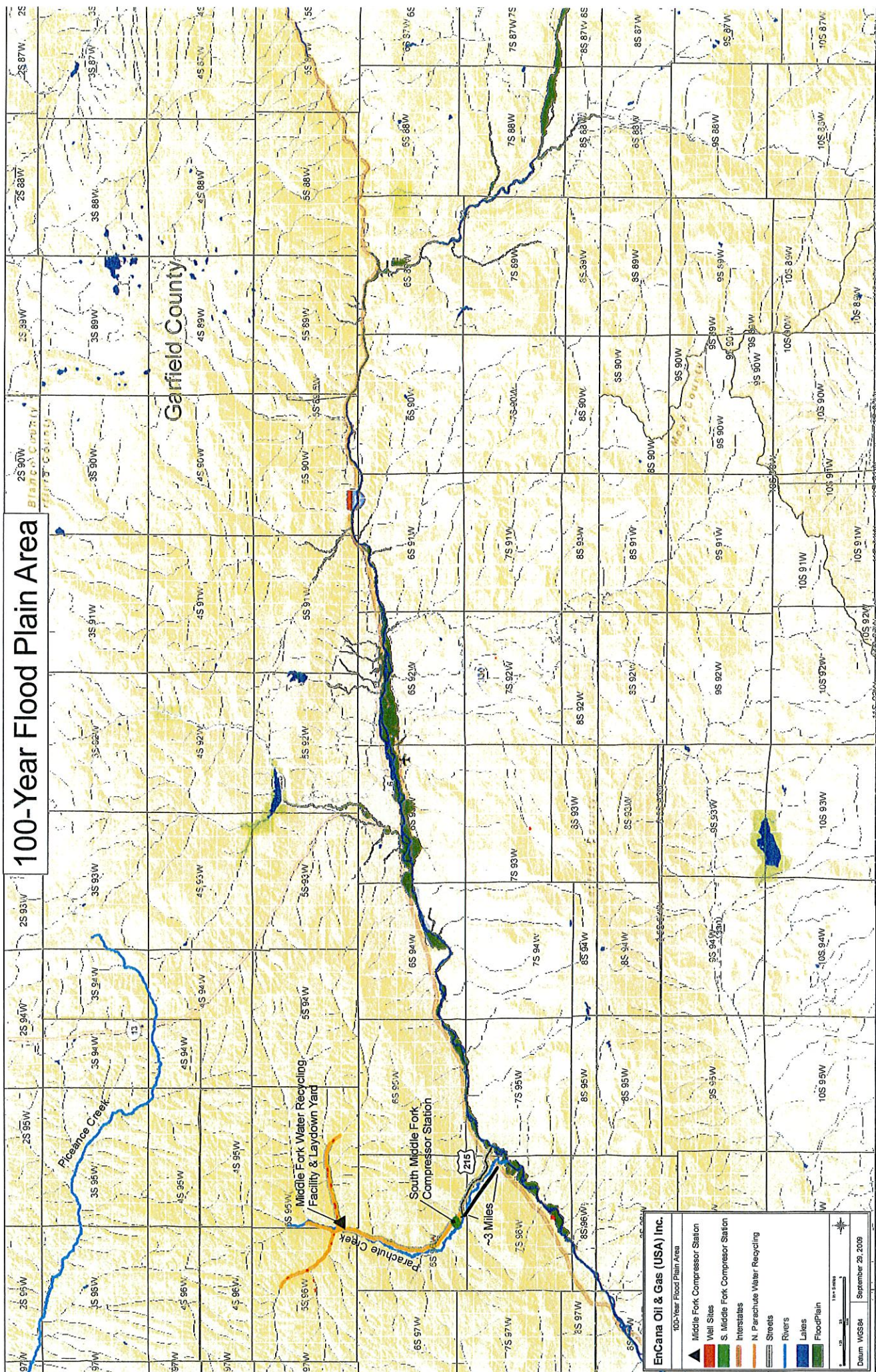
Katy Middleton

(970) 985-8240

kmiddleton@ruleengineering.com

Rule Engineering, LLC

100-Year Flood Plain Area



EnCana Oil & Gas (USA) Inc.

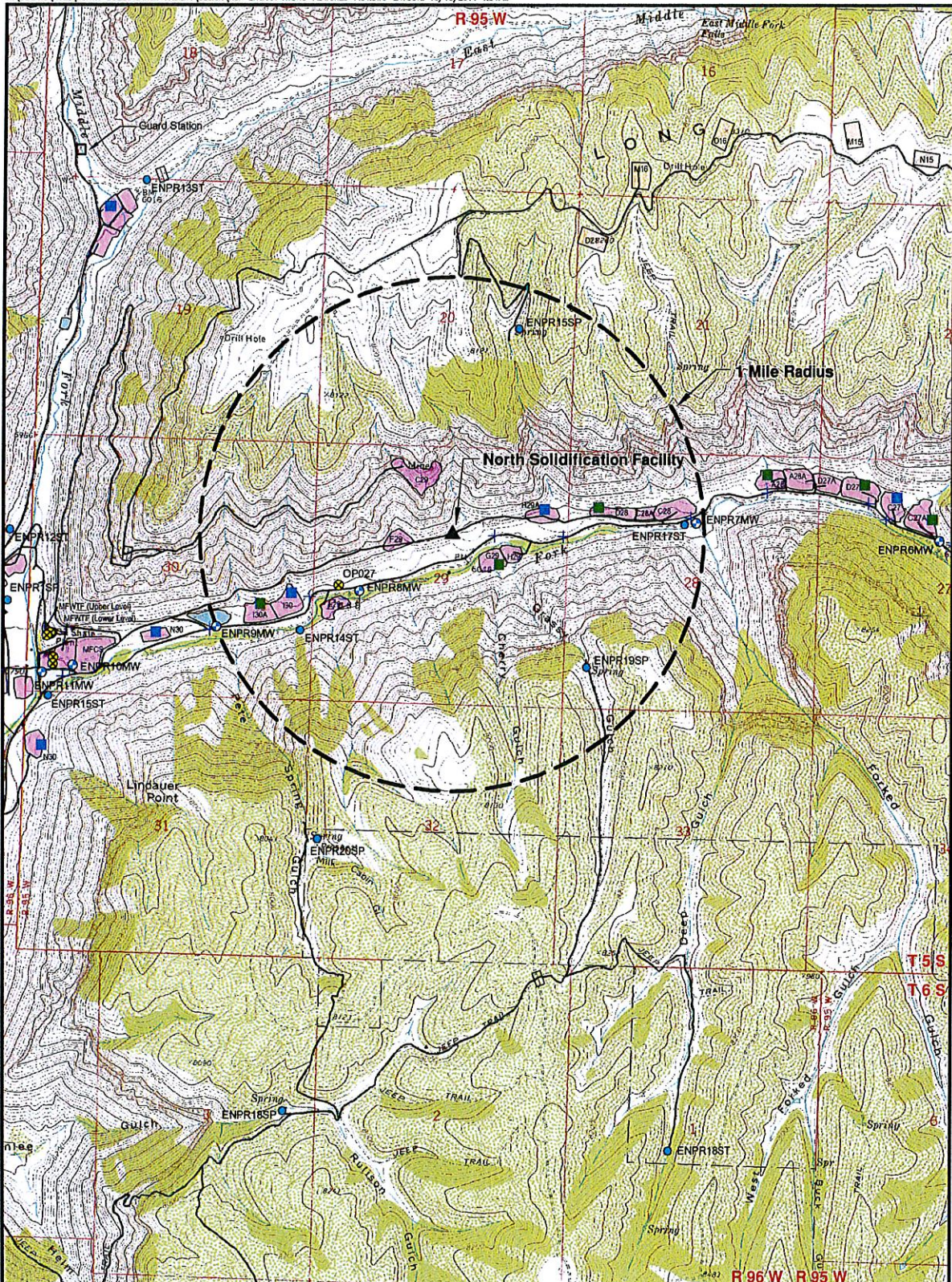
100-Year Flood Plain Area

- Middle Fork Compressor Station
- Well Sites
- S. Middle Fork Compressor Station
- Interstates
- N. Parachute Water Recycling
- Streets
- Rivers
- Lakes
- Flood Plain

0 10 20 Miles

September 28, 2009

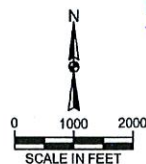
Datum: WGS84



LEGEND

- | | |
|--|--|
| Encana Site Boundary | Gate |
| Williams Site Boundary | Access Road |
| Berry Site Boundary | Confirmed Surface Water Quality Sampling Point |
| Produced Water Storage Pit - Active | Confirmed Monitoring Well Water Quality Sampling Point |
| Produced Water Storage Pit - Inactive/Closed | Spill Kit Location |
| Headgate Location | |

Rule Engineering, LLC
Solutions to Regulations for Industry



ENCANA

Encana Oil & Gas (USA) Inc.

**North Solidification Facility
Hydrologic Features**

DATE: 10/5/11

FILE: NSF-Encana-Hydro-Features-Fig4.dwg

FIGURE: 4



 **Proposed Site Location**

CORQ 215

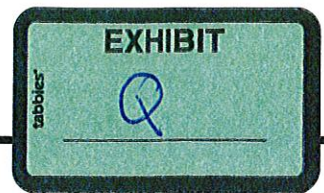
© 2012 Google

Google earth

Imagery Date 8/8/2011

39°35'24.83" N 108°03'55.74" W elev 6570 ft

Eye alt 13119 ft



Glenn Hartmann

From: Jim Rada
Sent: Thursday, March 08, 2012 11:31 AM
To: Middleton, Brett A.; Glenn Hartmann; Kathleen Middleton
Subject: RE: North Solids Facility concerns

Thanks Brett, Sounds like EnCana intends to operate a good facility and be hands on from cradle to grave.

Jim Rada

Environmental Health Manager
Garfield County Public Health
195 W. 14th Street
Rifle, CO 81650
Phone - 970-625-5200 x8113
Direct - 970-665-6380
Fax - 970-625-8304
Cell - 970-319-1579
jrada@garfield-county.com
www.garfield-county.com

From: Middleton, Brett A. [<mailto:Brett.Middleton@encana.com>]
Sent: Thursday, March 08, 2012 9:06 AM
To: Jim Rada
Subject: Re: North Solids Facility concerns

Encana internal manifest
Sent from my Blackberry
Brett Middleton
EHS Field Coordinator
Brett.Middleton@encana.com
970-987-4650

From: Jim Rada [<mailto:jrada@garfield-county.com>]
Sent: Thursday, March 08, 2012 09:02 AM
To: Middleton, Brett A.
Cc: Glenn Hartmann <ghartmann@garfield-county.com>; Kathleen Middleton <kmiddleton@ruleengineering.com>
Subject: RE: North Solids Facility concerns

Thanks Brett,

Is this manifest system part of the COGCC rules of just internal to EnCana?

Jim Rada

Environmental Health Manager
Garfield County Public Health
195 W. 14th Street
Rifle, CO 81650

Phone - 970-625-5200 x8113
Direct - 970-665-6380
Fax - 970-625-8304
Cell - 970-319-1579
jrada@garfield-county.com
www.garfield-county.com

From: Middleton, Brett A. [mailto:Brett.Middleton@encana.com]
Sent: Wednesday, March 07, 2012 12:45 PM
To: Jim Rada
Cc: Glenn Hartmann; Kathleen Middleton
Subject: RE: North Solids Facility concerns

Yes, but they are required to follow our loading/offloading procedures since there are hauling our product. The solids that leave the NSF are manifested and the disposal facility is responsible for returning the signed manifest to encana with the invoice in order to be paid. The disposal facility owns hauling company so they are paid from the same invoice.

In the event that "something" happened our contractors are required to call the 24 hr Environmental on-call phone to ensure it is properly dealt with.

From: Jim Rada [mailto:jrada@garfield-county.com]
Sent: Wednesday, March 07, 2012 10:52 AM
To: Middleton, Brett A.
Cc: Glenn Hartmann; Kathleen Middleton
Subject: RE: North Solids Facility concerns

Thanks Brett,

I guess that any liquids that arrive at the disposal facility are the responsibility of the hauler, correct? If so, does this create a situation where a hauler might dump/pump liquids out somewhere other than the disposal facility? I agree that is is not likely to be the normal scenario. Just considering how to make this as issue proof as possible for all involved.

Jim Rada

Environmental Health Manager
Garfield County Public Health
195 W. 14th Street
Rifle, CO 81650
Phone - 970-625-5200 x8113
Direct - 970-665-6380
Fax - 970-625-8304
Cell - 970-319-1579
jrada@garfield-county.com
www.garfield-county.com

From: Middleton, Brett A. [mailto:Brett.Middleton@encana.com]
Sent: Wednesday, March 07, 2012 10:47 AM
To: Jim Rada
Cc: Glenn Hartmann; Kathleen Middleton
Subject: RE: North Solids Facility concerns

see below

From: Jim Rada [mailto:jrada@garfield-county.com]
Sent: Tuesday, March 06, 2012 4:57 PM
To: Middleton, Brett A.
Cc: Glenn Hartmann; Kathleen Middleton
Subject: RE: North Solids Facility concerns

Brett,

Thanks for the response. All of your comments seem reasonable to me. Just a few clarifications....

1. Are the side dump trailers water tight and are covers impervious? the trailer are water tight, the covers are typically mesh
Just wondering what happens when one of these truck gets caught in a gully washer?
Does the solidified material get soaked? yes
Can liquids re-entrain any hydrocarbons and/or chemical constituents? The NOAA website shows that for a "25 year - 24 hour" storm event the rain would contribute 2.2 inches of water. The saw dust is not fully saturated but the moisture content would increase.
Will these liquids leak out? We leave approximate 8 inches of "freeboard" in the trailers due to weight restriction, so additional volume would not be an issue. The waste is mostly frac sands so the liquids would settle on the bottoms of the trailers.
2. Are the steel containment units water tight and periodically leak tested? they are water tight we have done initial leak testing did not plan future testing, however they will be inspected on a regular basis/each time they emptied.
3. With regard to air emissions, I understand that this may be de minimus, but I still recommend that the County put a COA requiring documentation of CDPHE APCD approval and AIRS ID assignment to show proof that State regulations are being followed. Not a problem we can provide approval and AIRS ID when received.

No other concerns at this time.

Jim Rada

Environmental Health Manager
Garfield County Public Health
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Rifle, CO 81650
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Direct - 970-665-6380
Fax - 970-625-8304
Cell - 970-319-1579
jrada@garfield-county.com
www.garfield-county.com

From: Middleton, Brett A. [mailto:Brett.Middleton@encana.com]
Sent: Monday, March 05, 2012 5:19 PM
To: Jim Rada
Cc: Glenn Hartmann; 'Kathleen Middleton'
Subject: Re: North Solids Facility concerns



Encana Oil & Gas (USA) Inc.
370 17th Street, Suite 1700
Denver, CO 80202

tel: 303-623-2300

fax: 303-623-2400

www.Encana.com

April 5, 2012

Air Pollution Control Division
Stationary Sources Program
Colorado Department of Public Health and the Environment
4300 Cherry Creek Drive South APCD-SS-B1
Denver, CO 80246-1530

**RE: Air Pollutant Emissions Notice
North Solidification Facility
Garfield County, Colorado**

Dear Sir or Madam:

Encana Oil and Gas (USA), Inc. is submitting an Air Pollutant Emissions Notice for its North Solidification Facility (NSF). Emissions from the facility are above APEN reporting thresholds but below permitting thresholds. A check in the amount of \$152.90 for APEN fees is also enclosed.

The NSF is used to prepare exploration and production wastes for shipment to third-party disposal facilities. The waste streams include tank bottoms, contaminated soil, and other BS&W (basic sediment & water) materials. The waste streams are delivered to an open top, steel tank. Following gravity separation, liquids are decanted from the solids. The liquid stream is removed and transported to an Encana water management facility. Saw dust is then added to the solids and the solids are temporarily stored on a concrete pad pending truck transport to an off-site, third party disposal facility.

Thank you for your cooperation in this matter. If you should have any questions, please contact me at 720-876-5172 or via email at ronald.leplatt@encana.com.

Sincerely,

A handwritten signature in black ink, appearing to read "Ronald R. LePlatt". The signature is fluid and cursive, with a long horizontal stroke at the end.

Ronald R. LePlatt, P.E.
Air Quality Lead, Piceance

AIR POLLUTANT EMISSION NOTICE (APEN) & Application for Construction Permit – General

Permit Number: _____ [Leave blank unless APCD has already assigned a permit # & AIRS ID] **Emission Source AIRS ID:** _____ / _____ / _____
Facility Equipment ID: NSF _____ [Provide Facility Equipment ID to identify how this equipment is referenced within your organization.]

Section 01 – Administrative Information

Company Name: Encana Oil & Gas (USA), Inc. **NAICS, or SIC Code:** 1311
Source Name: North Solidification Facility
Source Location: SE1/4, NE1/4, Sec 29, T5S, R95W, 6th PM **County:** Garfield
Lat/Long: 39.58713/-108.07752 **Elevation:** 6,275 Feet
Portable Source Home Base: _____
Mailing Address: 370 17th St, Ste 1700 **ZIP Code:** 80202 **Denver, CO**
Person To Contact: Ronald R. LePlatt **Phone Number:** (720)876-5172
E-mail Address: ronald.leplatt@encana.com **Fax Number:** (720)876-6172

Section 02 – Requested Action (check applicable request boxes)

- ☒ **Request for NEW permit or newly reported emission source**
☐ **Request PORTABLE source permit**
☐ **Request MODIFICATION to existing permit (check each box below that applies)**
☐ Change fuel or equipment ☐ Change company name
☐ Change permit limit ☐ Transfer of ownership ☐ Other
☐ **Request to limit HAPs with a Federally enforceable limit on PTE**
☐ **Request APEN update only (check the box below that applies)**
☐ Revision to actual calendar year emissions for emission inventory
☐ Update 5-Year APEN term without change to permit limits or previously reported emissions
Additional Info. & Notes: Centralized E&P waste management facility emitting less than 5 TPY VOC

Section 03 – General Information

For existing sources, operation began on: _____ / _____ / _____ For new or reconstructed sources, the projected startup date is: 5 / 1 / 2012
 Normal Hours of Source Operation: 16 hours/day 7 days/week 52 weeks/year
 General description of equipment and purpose: E&P sludges are solidified in a tank and stored for off-site solids disposal. Liquids are removed daily and treated in a remote permitted facility.

Will this equipment be operated in any NAAQS nonattainment area? ☐ Yes ☒ No ☐ Don't know
 (<http://www.cdphe.state.co.us/ap/attainment.html>)

Section 04 – Processing/Manufacturing Equipment Information & Material Use

Description of equipment¹:

Manufacturer: 2K Waste Container Model No.: N/A Serial No.: N/A

Description	Actual Level (For Data Year)	Annual Requested Permitted Level ² (Specify Units)	Design Process Rate (Specify Units/Hour)
Raw Materials:			
Finished Products:			
Other Process:	sludges/soils 1886 tons		0.32 tons/hr

¹If additional space is required, please attach a separate list of equipment, materials and throughputs.

²Requested values will become permit limitations. Requested level should consider process growth over the next five years.

Colorado Department of Public Health and Environment Air Pollution Control Division (APCD)

This notice is valid for five (5) years. Submit a revised APEN prior to expiration of five-year term, or when a significant change is made (increase production, new equipment, change in fuel type, etc).

Mail this form along with a check for \$152.90 to:

Colorado Department of Public Health & Environment
 APCD-SS-BI
 4300 Cherry Creek Drive South
 Denver, CO 80246-1530

For guidance on how to complete this APEN form:

Air Pollution Control Division: (303) 692-3150
 Small Business Assistance Program (SBAP): (303) 692-3148 or (303) 692-3175

APEN forms: <http://www.cdphe.state.co.us/ap/downloadforms.html>

Application status: <http://www.cdphe.state.co.us/ap/ss/sspcpt.html>

- ☐ Check box to request copy of draft permit prior to issuance.
☐ Check box to request copy of draft permit prior to public notice.

AIR POLLUTANT EMISSION NOTICE (APEN) & Application for Construction Permit – General

Permit Number: _____ Emission Source AIRS ID: _____ / _____ / _____

Section 05 – Emission Release Information (Attach a separate sheet with relevant information in the event of multiple releases; provide datum & either Lat/Long or UTM)

Operator Stack ID No.	Base Elevation (feet)	Discharge Height Above Ground Level (feet)	Temp. (°F)	Flow Rate (ACFM)	Velocity (ft/sec)	Moisture (%)	Horizontal Datum (NAD27, NAD83, WGS84)	UTM Zone (12 or 13)	UTM Easting or Longitude (meters or degrees)	UTM Northing or Latitude (meters or degrees)	Method of Collection for Location Data (e.g. map, GPS, GoogleEarth)
NSF	6,275	5					NAD83		-108.07752	39.58713	GoogleEarth

Direction of outlet (check one): ☐ Vertical ☐ Horizontal ☐ Other (Describe): _____

Exhaust Opening Shape & Size (check one): ☐ Circular: Inner Diameter (inches) = _____ ☐ Other: Length (inches) = _____ Width (inches) = _____

Section 06 – Combustion Equipment & Fuel Consumption Information

Company equipment Identification No.: _____ Manufacturer: _____ Model: _____ Serial No.: _____

Fuel Type	Design Input Rate (10 ⁶ Btu/hr)	Actual Level (For Data Year)	Annual Requested Permitted Level ² (Specify Units)	Fuel Heating Value (Indicate: Btu/lb, Btu/gal, Btu/SCF)	Percent by Weight		Seasonal Fuel Use (% of Annual Use)			
					Sulfur	Ash	Dec-Feb	Mar-May	Jun-Aug	Sep-Nov

²Requested values will become permit limitations. Requested level should consider process growth over the next five years.

Section 07 – Emissions Inventory Information & Emission Control Information

Attach any emission calculations and emission factor documentation to this APEN form.

☒ Emission Factor Documentation attached Data year for actual calendar yr. emissions below & throughput above (e.g. 2007): 2011

Pollutant	Control Device Description		Overall Collection Efficiency	Control Efficiency (% Reduction)	Emission Factor		Actual Calendar Year Emissions ³		Requested Permitted Emissions ⁴		Estimation Method or Emission Factor Source
	Primary	Secondary			Uncontrolled Basis	Units	Uncontrolled (Tons/Year)	Controlled (Tons/Year)	Uncontrolled (Tons/Year)	Controlled (Tons/Year)	
TSP											
PM ₁₀											
PM _{2.5}											
SO _x											
NO _x											
VOC					5.2	lb/ton					Mass Balance
CO											

Please use the APCD Non-Criteria Reportable Air Pollutant Addendum form to report pollutants not listed above.

³ Annual emission fees will be based on actual emissions reported here. If left blank, annual emission fees will be based on requested emissions.

⁴ If Requested Permitted Emissions is left blank, the APCD will calculate emissions based on the information supplied in sections 03 - 07.

Section 08 – Applicant Certification - I hereby certify that all information contained herein and information submitted with this application is complete, true and correct.

Signature of Person Legally Authorized to Supply Data: Ronald R. LePlatt Date: 4/6/2012

Name of Legally Authorized Person (Please print): Ronald R. LePlatt Title: Air Quality Lead, Piceance

Emissions Calculations - Soil			
Parameter	Soil In grams per year	Soil Out grams per year	Emissions grams per year
GRO	2,138,944	592,323	1,546,621
DRO	4,771,491	3,590,959	1,180,533
Benzene	411		411
Toluene	13,985	11,003	2,982
Ethylbenzene	5,512	2,180	3,332
Xylenes, Total	148,081	36,198	111,883
n-Hexane	-	-	-
Methanol	106,947	17,424	89,523
Emissions Calculations - Water			
Parameter	Water In grams per year	Water Out grams per year	Emissions grams per year
GRO	102,157	34,052	68,105
DRO	74,591	35,674	38,917
Benzene	697	422	276
Toluene	6,162	5,189	973
Ethylbenzene	519	470	49
Xylenes, Total	7,946	7,135	811
n-Hexane	-	-	-
Methanol	1,524,250	46	1,524,204

Estimated Annual Emissions		
Soils and Water		
	g/yr	lb/yr
GRO	1,614,726	3,560
DRO	1,219,450	2,688
Benzene ¹	687	2
Toluene ²	3,955	9
Ethylbenzene ²	3,380	7
Xylenes, Total ²	112,694	248
n-Hexane ²	-	-
Methanol ³	1,613,727	3,558
Total Emissions ⁴	4,447,902	9,806
Tons per year	4.9	

¹ Bin A HAP, Qualifies for Scenario 1 De Minimis of 50 lb/yr

² Bin C HAP, Qualifies for Scenario 1 De Minimis of 1,000 lb/yr

³ Bin C HAP, Qualifies for Scenario 3 De Minimis of 5,000 lb/yr

⁴ Less than 5 TPY VOC emissions require an APEN but no permit

	Water In			Water Out		
	Mass (g)	Concentration (mg/L)	Constituent Mass (g)	Mass (g)	Concentration (mg/L)	Constituent Mass (g)
GRO	1,135,079,435	63	71,510	1,135,079,435	21	23,837
DRO	1,135,079,435	46	52,214	1,135,079,435	22	24,972
Benzene	1,135,079,435	0	488	1,135,079,435	0	295
Toluene	1,135,079,435	4	4,313	1,135,079,435	3	3,632
Ethylbenzene	1,135,079,435	0	363	1,135,079,435	0	329
Xylene	1,135,079,435	5	5,562	1,135,079,435	4	4,994
Methanol	1,135,079,435	940	1,066,975	1,135,079,435	46	52,214

	Soil In			Soil Out		
	Mass (g)	Concentration (mg/L)	Constituent Mass (g)	Mass (g)	Concentration (mg/L)	Constituent Mass (g)
GRO	575,869,634	2600	1,497,261	575,869,634	720	414,626
DRO	575,869,634	5800	3,340,044	575,869,634	4365	2,513,671
Benzene	575,869,634	0.5	288	575,869,634	0	-
Toluene	575,869,634	17	9,790	575,869,634	13.375	7,702
Ethylbenzene	575,869,634	6.7	3,858	575,869,634	2.65	1,526
Xylene	575,869,634	180	103,657	575,869,634	44	25,338
Methanol	575,869,634	130	74,863	575,869,634	21.18	12,197

STATE OF COLORADO

John W. Hickonlooper, Governor
Christopher E. Urbina, MD, MPH
Executive Director and Chief Medical Officer

Dedicated to protecting and improving the health and environment of the people of Colorado

4300 Cherry Creek Dr. S. Laboratory Services Division
Denver, Colorado 80246-1530 8100 Lowry Blvd.
Phone (303) 692-2000 Denver, Colorado 80230-6928
Located in Glendale, Colorado (303) 692-3090
<http://www.cdphe.state.co.us>



Colorado Department
of Public Health
and Environment

April 18, 2012

Ronald LePlatt
Encana Oil & Gas (USA) Inc.
370 17th Street, Suite 1700
Denver, CO 80202

Re: North Solidification Facility, Permit Number 12GA1476

Dear Applicant:

The Colorado Air Pollution Control Division has received and logged in your construction permit application for the E&P sludge tank located at the North Solidification Facility in Garfield County. Your application has been assigned permit number 12GA1476 and AIRS ID 045-240-001, and is now ready for initial review.

If you should have any questions concerning the status of your permit application, please contact me at (303)691-4093. When calling, please reference the permit number listed above. You can also research the status of your application online at <http://www.cdphe.state.co.us/ap/ss/sspcpt.html>.

The next step in processing your construction permit application is to determine if all of the information we need is contained within your application. If so, we will begin our preliminary engineering analysis. If any information is missing, however, we will contact you in the near future to obtain the needed material.

State law requires that the Division determine the completeness of an application within 60 days of receipt. If you do not hear from the Division by 6/8/2012, you can assume that your application is complete.

Sincerely,

Jonathan Brickey
Construction Permit Unit