FORM 27 Rev 6/99

State of Colorado
Oil and Gas Conservation Commission

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

#8025

FOR OGCC USE ONLY

RECEIVED 5/23/2013

OGCC Employee:

☐ Spill ☐ Complaint
☐ Inspection ☐ NOAV

Tracking No:

SITE INVESTIGATION AND REMEDIATION WORKPLAN

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

CAUSE OF CONDITION BEING INVESTIGATED AND REMEDIATED

☐ Spill or Release ☐ Plug & Abandon ☐ Central Facility Closure ☑ Site/Facility Closure ☐ Other (describe): _____

OGCC Operator Number: 100185
Name of Operator: Encana Oil & Gas (USA) Inc.
Address: 143 Diamond Avenue
City: Parachute State: CO Zip: 81635

Contact Name and Telephone:
Charlie Jensen
No: 970.285.2735
Fax: 970.285.2705

API Number: 045 13405 County: Garfield
Facility Name: M14 Well Pad (Location #335799) Facility Number: Location #335799 (pit # 277364)
Well Name: NA Well Number: NA
Location: (QtrQtr, Sec, Twp, Rng, Meridian): SWSW, Sec 14, 5S, 96W, 6th Latitude: 39.6107 Longitude: -108.144899

TECHNICAL CONDITIONS

Type of Waste Causing Impact (crude oil, condensate, produced water, etc): produced water and/or condensate

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

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

Soil type, if not previously identified on Form 2A or Federal Surface Use Plan: Rock outcrop - Torriorthents complex, very steep

Potential receptors (water wells within 1/4 mi, surface waters, etc.): West Parachute Creek - < 1/4 mile

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

Impacted Media (check):	Extent of Impact:	How Determined:
☑ Soils	Limited to borehole SVES01 at 15 to 20 feet below grade	Site assessment activities 4/9/13 through 4/11/13 (see attached)
☐ Vegetation		
☐ Groundwater		
☐ Surface Water		

REMEDIATION WORKPLAN

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

See Attached.

Describe how source is to be removed:

See Attached.

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

See Attached.

Submit Page 2 with Page 1

FORM
27
Rev 6/99

Page 2

State of Colorado
Oil and Gas Conservation Commission
1120 Lincoln Street, Suite 801, Denver, Colorado 80203
(303)894-2100 Fax:(303)894-2109

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

REMEDIATION WORKPLAN (Cont.)

OGCC Employee:

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

See attached.

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

See attached.

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

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

See attached.

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

See attached.

*TBD - To be determined.

IMPLEMENTATION SCHEDULE

Date Site Investigation Began: 4/9/2013	Date Site Investigation Completed: 4/11/2013	Date Remediation Plan Submitted: 5/20/2013
Remediation Start Date: 5/14/2013	Anticipated Completion Date: *TBD	Actual Completion Date: *TBD

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

Print Name: Charles H Jensen Jr, P.G., C.P.G. Signed: Charles H Jensen Jr.

Title: Environmental Field Coordinator Date: 5/20/2013

OGCC Approved: Carlos Lujan, Ph.D. Title: _____ Date: _____

Digitally signed by Carlos Lujan, Ph.D.
DN: cn=Carlos Lujan, Ph.D., o=COGCC, ou=EPS NW Region, email=carlos.lujan@state.co.us, c=US
Date: 2013.10.11 14:32:48 -06'00'

NARRATIVE ATTACHMENT
FORM 27 (SITE INVESTIGATION AND REMEDIATION WORKPLAN)

M14 Pit Closure (277364)
Document Date – 05/20/2013

This Form 27 (Site Investigation and Remediation Workplan) was prepared for the purpose of generating a remediation project number in support of the closure of the M14 produced water storage pit in Encana Oil & Gas (USA) Inc. (Encana's) North Parachute area of operations. This Form 27 is a Remediation Work Plan to close the pit #277364 on Location #335799 (API 045 13405), and to close two additional unpermitted pits (presumably drilling pits) located on the same pad.

The document provides an overview of Encana's general approach to remediation of potential below-liner impacts identified during pit closure activities. A topographic location map illustrating the location of the M14 storage pit(s) is provided.

REMEDIATION WORKPLAN

Describe initial action taken (if previously provided, refer to that form or document):
All activities conducted in support of this pit closure project were carried out in accordance with COGCC Rules 905, 907, and 909 for conducting a site investigation in support of pit closures.

Due to the historic aspect of the well pad to have a previously permitted pit and presumably two drilling pits, and the fact that the well pad was brought back to grade, a site assessment was conducted. Borehole locations were placed based on historic aerial photography which outlined the location(s) of the pits.

On April 9 through April 11, 2013, site assessment activities included the advancement of soil borings and the collection of soil samples. The soil samples were analyzed for the constituents in Table 910-1. A total of 14 soil samples from the six soil borings were analyzed. Soil analytical results showed all but one sample were below the COGCC Table 910-1 allowable limits for benzene, toluene, ethylbenzene, xylenes (BTEX), and total petroleum hydrocarbons (TPH). Sample ID M14-SVES01-040913 (15-20') reported TPH at 1,050 mg/kg. Table 1 and Figure 2 is attached for reference.

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

Encana has completed SVES01 and SVES02 as passive soil vapor extraction (SVE) wells. The passive SVE system involves affixing wind-driven turbines to induce air flow into the soil subsurface. The induced air flow promotes volatilization of hydrocarbons entrained on the soil and provides oxygen to indigenous and augmented microbes, thereby promoting remediation of impacted unsaturated soils. If limited air flow and remediation activity result from the passive SVE system, Encana will conduct a pilot test and have the necessary SVE wells in place to evaluate an active SVE system.

Encana will conduct air monitoring consisting of PID, carbon monoxide, oxygen, hydrogen sulfide, methane, carbon dioxide, and air velocity measurements from each well on a monthly basis.

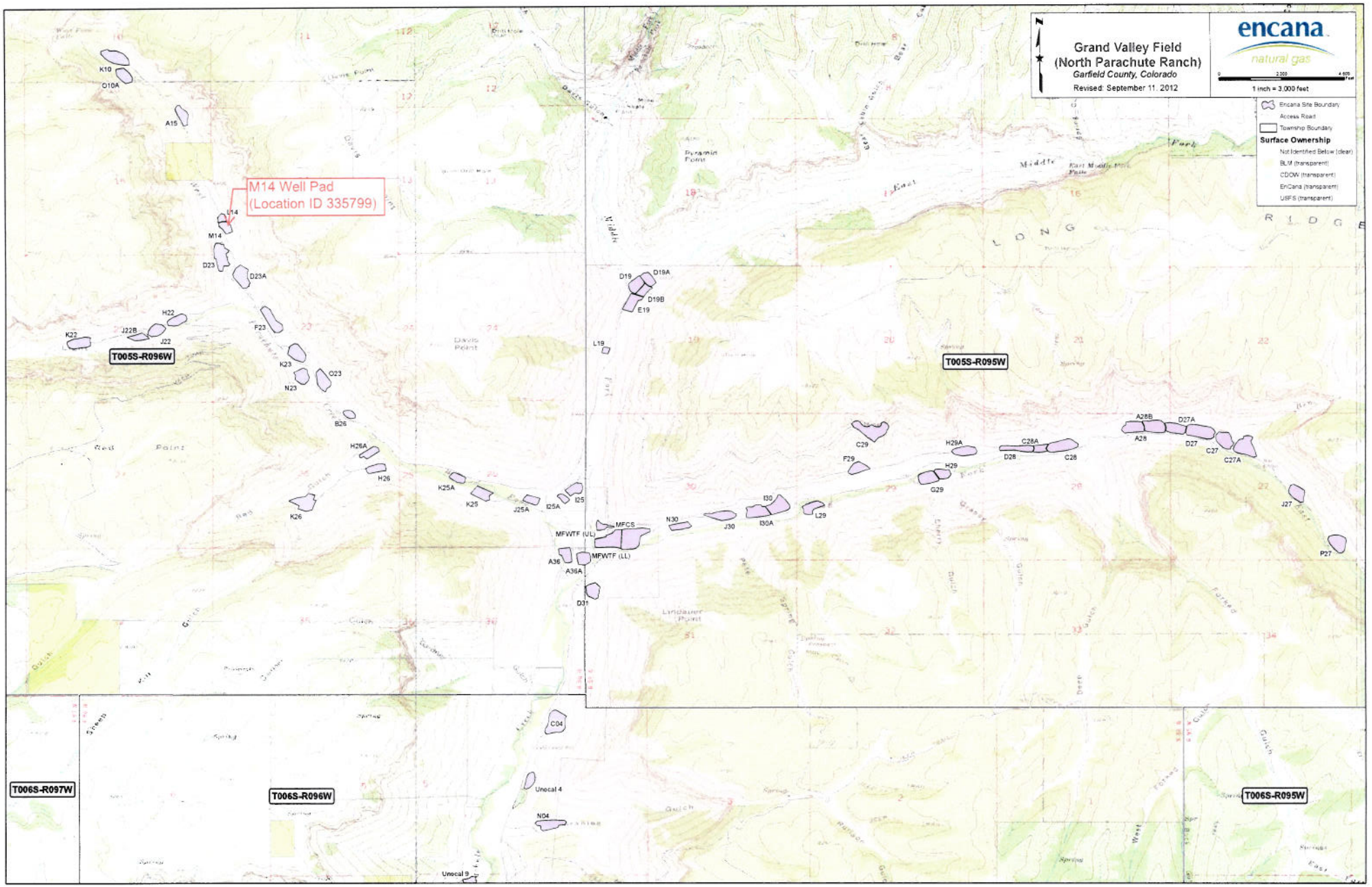
When monthly monitoring data indicates that a remediation endpoint has been achieved, a confirmation soil boring adjacent to borehole SVES01 to collect soil samples will be scheduled. All remediation activities are verified with sample collection and laboratory analysis, conducted in accordance with COGCC Rule 910. Specifics on the selected remediation approach and clearance results would be provided in a Form 4 (Sundry Notice or Notification of Completion) for this project.

If groundwater has been impacted, describe proposed monitoring plan (# of wells or sample points, sampling schedule, analytical methods, etc.):
Groundwater was not encountered during the site assessment activities on the M14 well pad.

Describe reclamation plan. Discuss existing and new grade recontouring; method and testing of compaction alleviation; and reseeding program, including location of new seed, seed mix and noxious weed prevention. Attach diagram or drawing. Use additional sheet for description if required.
The footprint for the backfilled pit occurs within the well pad boundary for this location. The Form 4 (Notification of Completion) submitted for this project will identify the reclamation status of the location at the time of pit closure. Interim and final reclamation activities will be carried out in accordance with COGCC 1000 Series (Reclamation Regulations).

Attach samples and analytical results taken to verify remediation of impacts. Show locations of samples on an onsite schematic or drawing. Is further site investigation required? If yes, describe:
Figure 2, Table 1 (Soil Analytical Results), and associated drilling logs are attached for reference. The laboratory reports are also attached to this Form 27.

Final disposition of E&P waste (landtreated and disposed onsite, name of licensed disposal facility, recycling, reuse, etc.):
Final onsite disposition of E&P waste would be detailed in a Form 4 (Sundry Notice or Notification of Completion).


Grand Valley Field
(North Parachute Ranch)
Garfield County, Colorado
Revised: September 11, 2012
encana
natural gas
1 inch = 3,000 feet
Encana Site Boundary
Access Road
Township Boundary
Surface Ownership
Not Identified Below (clear)
BLM (transparent)
CDOW (transparent)
EnCana (transparent)
USFS (transparent)
M14 Well Pad
(Location ID 335799)
T005S-R096W
T005S-R095W
T006S-R097W
T006S-R096W
T006S-R095W
K10
O10A
A15
M14
L14
D23
D23A
H22
J22B
J22
K22
F23
K23
N23
O23
B26
H26A
H26
K26
K25A
K25
J25A
I25A
I25
MFCS
MFWTF (UL)
MFWTF (LL)
A36
A36A
D31
N30
J30
I30
I30A
L29
F29
C29
H29A
H29
G29
C28A
D28
C28
A28B
A28
D27A
D27
C27
C27A
J27
P27
D19
D19A
D19B
E19
L19
C04
Unocal 4
ND4
Unocal 9

LEGEND

- SOIL BORING
- PREVIOUS PIT LOCATION

IMAGE COURTESY OF ESRI/BING MAPS

0 100 200

Feet

N

FIGURE 2
SITE MAP
M14
GARFIELD COUNTY, COLORADO

ENCANA OIL & GAS (USA) INC.

P:\Encana\GIS\MXD\033413010_M14\033413010_M14_PITS.mxd

TABLE 1
M14 PAD
SOIL ANALYTICAL RESULTS
ENCANA OIL & GAS (USA) INC

Sample ID	Date	Depth ft bgs	Benzene mg/kg	Toluene mg/kg	Ethylbenzene mg/kg	Xylenes mg/kg	TPH-GRO mg/kg	TPH-DRO mg/kg	TPH mg/kg	Arsenic mg/kg	pH	SAR	SC mmhos/cm
M14-SVES01-040913	4/9/2013	5-7	<0.0025	<0.025	<0.0025	<0.0075	<0.50	27	27	NA	NA	NA	NA
	4/9/2013	15-20	<1.2	<12	2.0	13	640	410	**1,050**	**8**	**12**	**48**	**4.2**
M14-SVES01-041013	4/10/2013	40-42	<0.0025	<0.025	<0.0025	0.012	<0.50	<80	<80.50	NA	NA	NA	NA
M14-SVES02-040913	4/9/2013	5-7	0.0067	<0.025	<0.0025	0.014	<0.50	54	54	NA	NA	NA	NA
	4/9/2013	10-12	0.020	<0.025	<0.0025	0.013	0.52	39	39.52	**7.8**	**12**	**31**	**4.2**
	4/9/2013	25-26	<0.0025	<0.025	<0.0025	0.033	0.80	120	120.80	NA	NA	NA	NA
M14-SVESE-041013	4/10/2013	15-17	0.0071	<0.025	<0.0025	0.017	1.3	<80	1.3	NA	NA	NA	NA
	4/10/2013	20-22	<0.0025	<0.025	<0.0025	<0.0075	<0.50	<80	<80.50	**16**	7.9	0.83	3.5
	4/10/2013	40-42	<0.0025	<0.025	<0.0025	0.014	0.74	<4	0.74	NA	NA	NA	NA
M14-SVEE-041113	4/11/2013	10-12	<0.0025	<0.025	<0.0025	<0.0075	<0.50	55	55	**5.1**	**12**	**55**	**6.2**
	4/11/2013	25-27	<0.0025	<0.025	<0.0025	<0.0075	<0.50	<100	<100.50	NA	NA	NA	NA
M14-SVEN-041113	4/11/2013	25-27	<0.0025	<0.025	<0.0025	<0.0075	<0.50	<20	<20.50	**12**	8.3	2.8	0.880
	4/11/2013	35-37	<0.0025	<0.025	<0.0025	<0.0075	<0.50	<20	<20.50	NA	NA	NA	NA
M14-SVESW-041113	4/11/2013	30-32	<0.0025	<0.025	<0.0025	<0.0075	<0.50	<100	<100.50	**13**	8.2	2.3	1.6
COGCC CONCENTRATION LEVELS			0.17	85	100	175	--	--	500	0.39	6-9	<12	4

Notes:

< - less than the stated reporting limit
BOLD - indicates result exceeds the COGCC concentration level
COGCC - Colorado Oil and Gas Conservation Commission
mg/kg - milligrams per kilogram
mmhos/cm - millimhos per centimeter
TPH-GRO - total petroleum hydrocarbons-gasoline range organics
TPH-DRO - total petroleum hydrocarbons-diesel range organics
SAR - sodium adsorption ration
SC - specific conductance
TPH - combination of TPH-GRO and TPH-DRO
ft - feet
bgs - below ground surface
NA - not analyzed

Location Map:

Compliance » Engineering » Remediation
LT Environmental, Inc.
820 Meagn Avenue Unit B
Rifle, Colorado 81650

BORING LOG/MONITORING WELL COMPLETION DIAGRAM

Boring/Well Number: SVES01		Project: M14	
Date: 4.9.2013/4.10.2013		Project Number: 03341306	
Logged By: Ryan Zernis/ Chris McKisson		Drilled By: Site Services CME-75 rig	
Elevation:	Detector: PID	Drilling Method: Hollow Stem Auger	Sampling Method: Split Spoon
Gravel Pack: Sillica Sand		Seal: Bentonite	Grout: NA
Casing Type: PVC		Diameter: 2" Length: 10'	Hole Diameter: 8" / Depth to Liquid: NA
Screen Type: PVC	Slot: 0.020	Diameter: 2" Length: 25'	Total Depth: 35' / Depth to Water: NA

Penetration Resistance	Vapor (ppm)	Staining	Time	Depth (ft. bgs.)	Soil/Rock Type	Lithology/Remarks
				0		Backfill to grade with cuttings
2/2/2/3	1.9	N	1143	6	SP/SC	Dark Brown clay. Colluvium No odor. No staining, shale and sandstone fragments.
4/4/6/7			1148	12		No sample material. Sample collected from cuttings During 10'-15' Auger flight
5/8/6/5	19.0	light	1200	16	SW/SC	Brown Dark clay moist/slight moist. odor
3/6/6/10	30.2	light	1000	22	SW/Fill	Colluvium, light Brown, odor slight moisture, shale and sandstone fragments.
9/6/6/6	1.3	N	1010	26	SW/Fill	SAA
9/6/6/9	1.0	N	1025	32	SW/Fill	Colluvium, Light Brown, No odor Dry, Sandy, gravel, shale and sandstone fragments, fines.
6/6/7/9	1.0	N	1035	36	SW/Fill	SSA
				40		Drilled to 40' Backfilled w/5' Sand
7/8/5/4	0.8	N	1050	42	SW/Fill	SSA

4.10.2013 | 4.9.2013

4.9.2013 | 4.10.2013

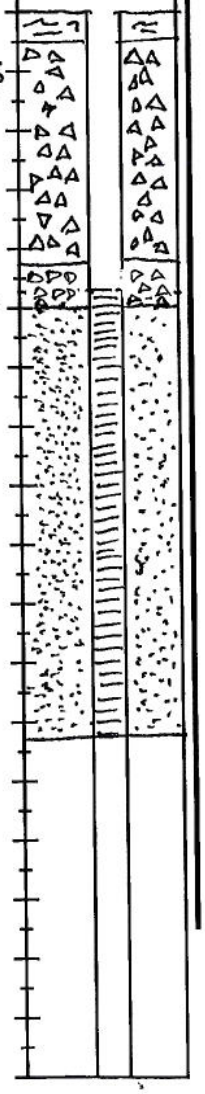
Location Map:

Compliance M Engineering M Remediation
LT Environmental, Inc.
820 Meagn Avenue Unit B
Rifle, Colorado 81650

BORING LOG/MONITORING WELL COMPLETION DIAGRAM

Boring/Well Number: SVES02	Project: M14
Date: 4.9.2013	Project Number: 033413010
Logged By: Ryan Zernis	Drilled By: Site Services CME-75 rig
Elevation:	Detector: PID
Drilling Method: Hollow Stem Auger	Sampling Method: Split Spoon
Gravel Pack: Sillica Sand	Seal: Bentonite
Grout: NA	
Casing Type: PVC	Diameter: 2" Length: 10'
Hole Diameter: 8"	Depth to Liquid: NA
Screen Type: PVC Slot: 0.020	Diameter: 2" Length: 15'
Total Depth: 24.5'	Depth to Water: NA

Penetration Resistance	Vapor (ppm)	Staining	Time	Depth (ft. bgs.)	Soil/Rock Type	Lithology/Remarks
				0		Back field to grade with cuttings
2/4/6/6	1.6	N	8:40	4	SW/Fill	Light Brown Colluvium; Sandy Gravel, clay SHALE & Sandstone fragments. No odor.
2/4/3/3	3.7	N	9:31	10	SW/SC	Brown - Dark Brown. clay, moisture odor, cuttings?
10/10/6/6	16.4	N	9:40	16	SW	light Brown, shale/sandstone FINES Colluvium. No odor, no staining
7/12/17/14	2.0	N	9:52	20	SW	light Brown, shale fragments Dry. No odor. NO staining NATIVE
25/50+	4.1	N	10:10	26	SW	light Brown SHALE fragments, FINES Dry, No odor. NO staining
				28		
				30		
				32		
				34		
				36		



Wellheads

• SVESE

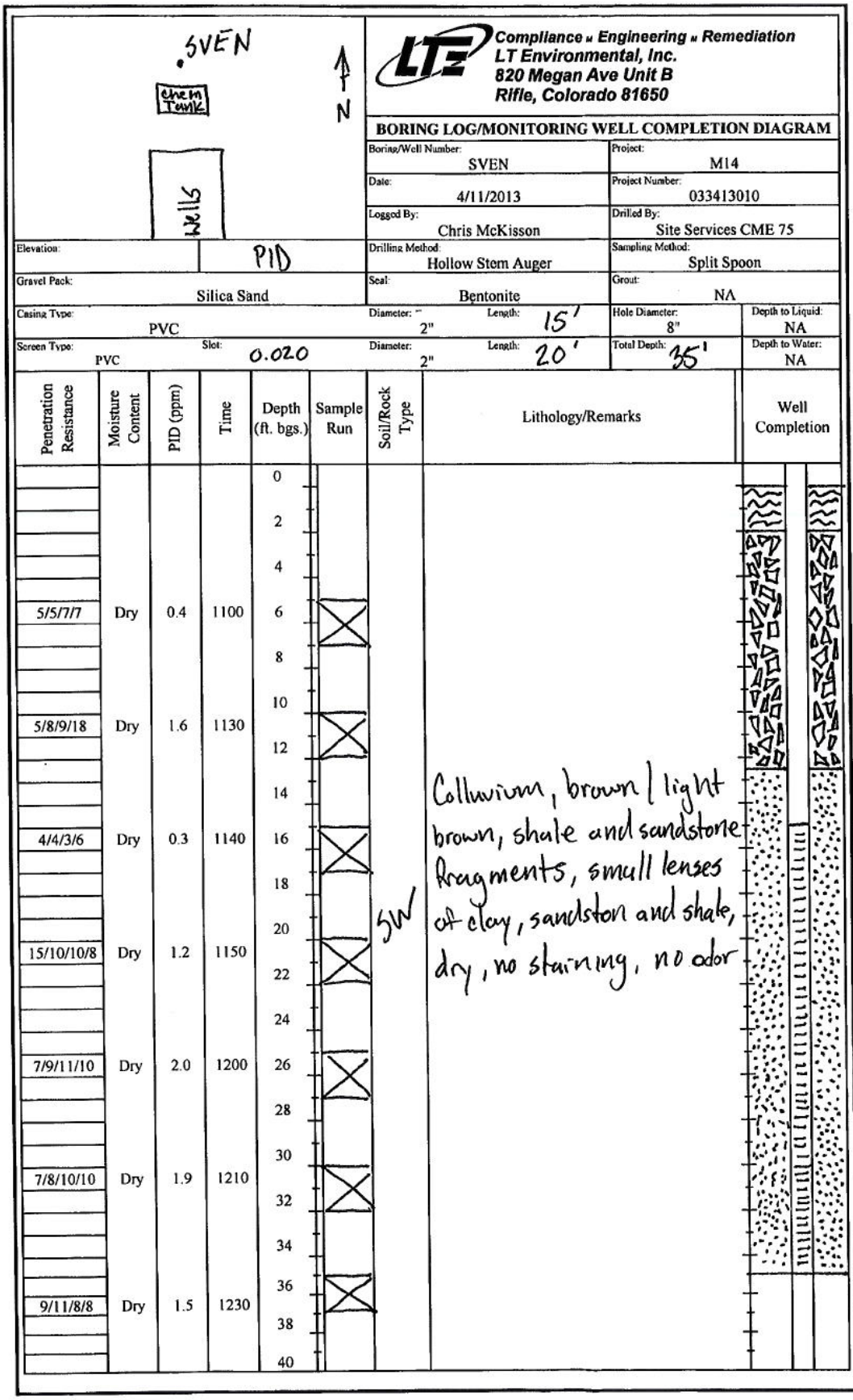
AST

Compliance « Engineering « Remediation
LT Environmental, Inc.
820 Megan Ave Unit B
Rifle, Colorado 81650

BORING LOG/MONITORING WELL COMPLETION DIAGRAM

Boring/Well Number: SVESE		Project: M14	
Date: 4/10/2013		Project Number: 033413010	
Logged By: Chris McKisson		Drilled By: Site Services CME 75	
Elevation:	PID	Drilling Method: Hollow Stem Auger	Sampling Method: Split Spoon
Gravel Pack: Silica Sand		Seal: Bentonite	Grout: NA
Casing Type: PVC	Diameter: 2" Length: 15'	Hole Diameter: 8"	Depth to Liquid: NA
Screen Type: PVC Slot: 0.020	Diameter: 2" Length: 20'	Total Depth: 40'	Depth to Water: NA

Penetration Resistance	Moisture Content	PID (ppm)	Time	Depth (ft. bgs.)	Sample Run	Soil/Rock Type	Lithology/Remarks	Well Completion
				0				Cuttings
				2				
				4				
5/7/4/6	Dry	0.2	1310	6				Bentonite
				8			Colluvium, brown/light brown shale/sandstone fragments, small lenses of shale/ sandstone/clay, no stain, no odor, dry	
				10				
4/3/4/3	Dry	0.0	1320	12				
				14				
5/3/4/4	Dry	1.2	1330	16		SW		
				18				
				20				
36/22/6/8	Dry	37.2	1335	22			odor	
				24				
				26				Sand
10/10/11/9	Dry	1.2	1345	28				
				30				
5/5/6/8	Dry	0.0	1400	32				
				34				
3/5/5/6	Slight	0.2	1410	36			Drilled to 40' bgs and backfilled with sand to 35' bgs	35'
				38				
				40				40'
6/8/10/16	Dry	0.1	1430	42				



Compliance » Engineering » Remediation
LT Environmental, Inc.
820 Megan Ave Unit B
Rifle, Colorado 81650

BORING LOG/MONITORING WELL COMPLETION DIAGRAM

Boring/Well Number: SVEN	Project: M14
Date: 4/11/2013	Project Number: 033413010
Logged By: Chris McKisson	Drilled By: Site Services CME 75
Elevation: PID	Drilling Method: Hollow Stem Auger
Sampling Method: Split Spoon	
Gravel Pack: Silica Sand	Seal: Bentonite
Grout: NA	
Casing Type: PVC	Diameter: 2" Length: 15'
Hole Diameter: 8"	Depth to Liquid: NA
Screen Type: PVC	Slot: 0.020 Diameter: 2" Length: 20'
Total Depth: 35'	Depth to Water: NA

Penetration Resistance	Moisture Content	PID (ppm)	Time	Depth (ft. bgs.)	Sample Run	Soil/Rock Type	Lithology/Remarks
5/5/7/7	Dry	0.4	1100	6	X		
5/8/9/18	Dry	1.6	1130	12	X		
4/4/3/6	Dry	0.3	1140	16	X		
15/10/10/8	Dry	1.2	1150	22	X	SW	Collluvium, brown / light brown, shale and sandstone fragments, small lenses of clay, sandston and shale, dry, no staining, no odor
7/9/11/10	Dry	2.0	1200	26	X		
7/8/10/10	Dry	1.9	1210	32	X		
9/11/8/8	Dry	1.5	1230	36	X		

Well Completion: Cuttings; Bentonite; Sand

N

Wellheads

SVEE

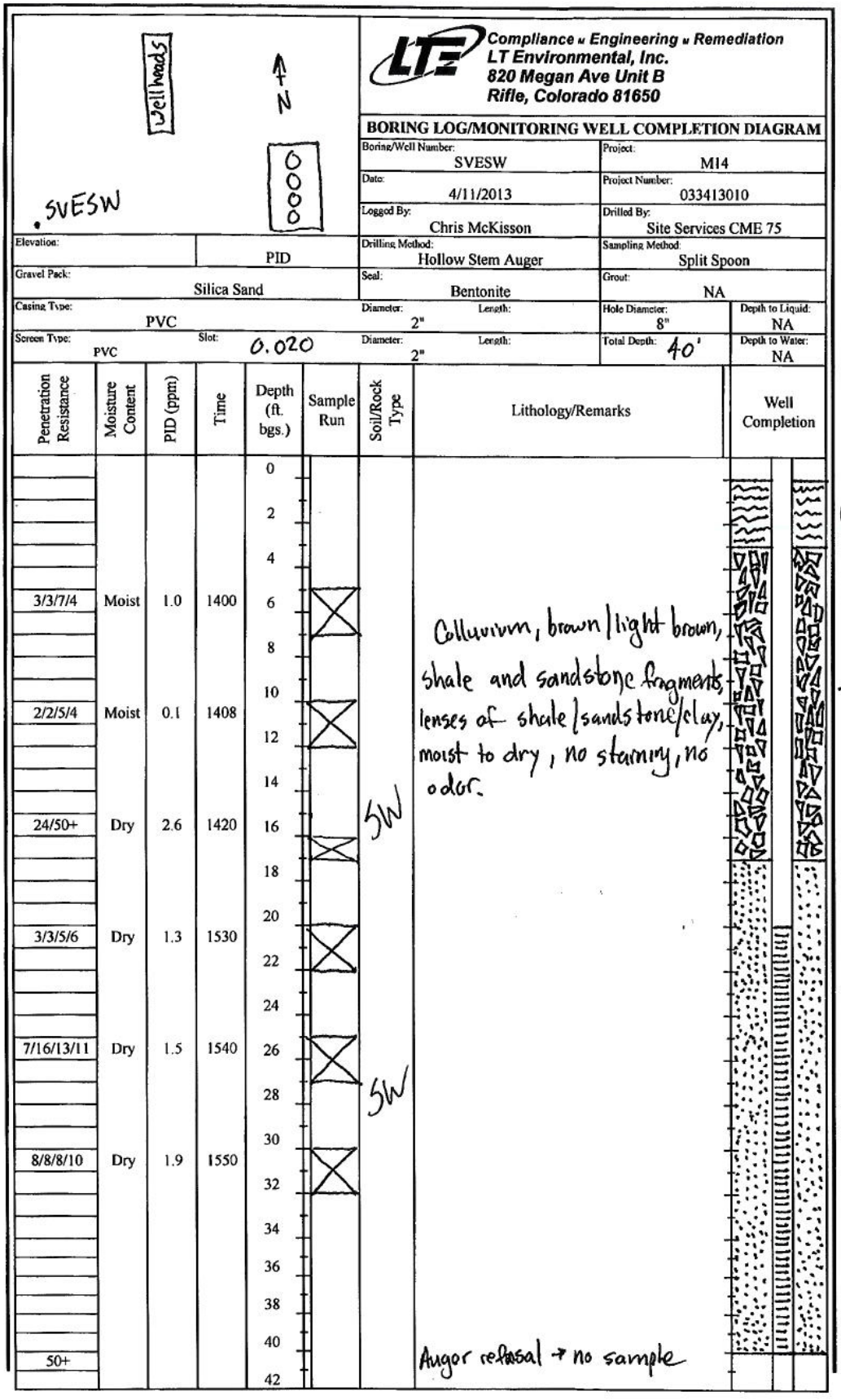
TB

Compliance » Engineering » Remediation
LT Environmental, Inc.
820 Megan Ave Unit B
Rifle, Colorado 81650

BORING LOG/MONITORING WELL COMPLETION DIAGRAM

Boring/Well Number: SVEE	Project: M14
Date: 4/11/2013	Project Number: 033413010
Logged By: Chris McKisson	Drilled By: Site Services CME 75
Elevation:	PID
Drilling Method: Hollow Stem Auger	Sampling Method: Split Spoon
Gravel Pack: Silica Sand	Seal: Bentonite
Grout: NA	
Casing Type: PVC	Diameter: 2" Length: 5'
Hole Diameter: 8"	Depth to Liquid: NA
Screen Type: PVC	Slot: 0.020 Diameter: 2" Length: 20'
Total Depth: 25'	Depth to Water: NA

Penetration Resistance	Moisture Content	PID (ppm)	Time	Depth (ft. bgs.)	Sample Run	Soil/Rock Type	Lithology/Remarks	Well Completion
				0				cuttings
				2				Bentonite
				4				
2/3/3/3	Slight	20.3	910	6	X	SW/SC	Dark gray/brown, clayey slurry-like silty gravel, no odor	
				8				
				10				
2/2/11/8	Slight	36.2	918	12	X		Light brown, sandstone lense	
				14		SW		Sand
5/3/4/5	Dry	0.8	925	16	X		lightbrown, colluvium, shale and sandstone fragments, no staining, no odor	
				18				
				20				
18/8/28/50	Dry	1.3	940	22	X			
				24				
8/8/10/10	Dry	1.2	950	26	X		TD:25'	
				28				
				30				
				32				
				34				
				36				
				38				
				40				


Wellheads
N
SVESW
Compliance ~ Engineering ~ Remediation
LT Environmental, Inc.
820 Megan Ave Unit B
Rifle, Colorado 81650
BORING LOG/MONITORING WELL COMPLETION DIAGRAM
Boring/Well Number: SVESW
Project: M14
Date: 4/11/2013
Project Number: 033413010
Logged By: Chris McKisson
Drilled By: Site Services CME 75
Elevation:
PID
Drilling Method: Hollow Stem Auger
Sampling Method: Split Spoon
Gravel Pack: Silica Sand
Seal: Bentonite
Grout: NA
Casing Type: PVC
Diameter: 2" Length:
Hole Diameter: 8"
Depth to Liquid: NA
Screen Type: PVC
Slot: 0.020
Diameter: 2" Length:
Total Depth: 40'
Depth to Water: NA
Penetration Resistance
Moisture Content
PID (ppm)
Time
Depth (ft. bgs.)
Sample Run
Soil/Rock Type
Lithology/Remarks
Well Completion
3/3/7/4 Moist 1.0 1400
2/2/5/4 Moist 0.1 1408
24/50+ Dry 2.6 1420
3/3/5/6 Dry 1.3 1530
7/16/13/11 Dry 1.5 1540
8/8/8/10 Dry 1.9 1550
50+
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
30
32
34
36
38
40
42
SW
SW
Colluvium, brown/light brown, shale and sandstone fragments, lenses of shale/sandstone/clay, moist to dry, no staining, no odor.
Auger refusal → no sample
Cuttings
Bentonite
Sand