

REMEDICATION SUMMARY
AND
SITE CLOSURE
FOR
ABO 16' INLET PIPELINE

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EH&S

January 30, 2016

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Frontier Field Services
65 Mercado St. Durango, CO 81301

I) Introduction:

Frontier Field Services is preparing this “Remediation Summary and Site Closure” for the Abo 16” Lateral Pipeline (Remediation Site). The legal description of this site is Section 6, Township 18S; Range 28E. The coordinates are Latitude 32.780425 North and Longitude -104.220458 West. The property is managed by the State of New Mexico and administered by the Land Office New Mexico, 602 N. Canal St. Carlsbad NM 88220-5826; Eddy County, phone, 575-885-1323. The gas feeding the Abo 16” Pipeline is from numerous producers and processed by the Abo Gas Plant located at 257 Empire Road (PO Box 70), Artesia, N.M. 88211.

II) Background Information:

On 8/10/2015, Frontier Field Services received a call from an oilfield employee about a possible leak located at Latitude: 32.780425N, Longitude: -104.220458W. Frontier identified the pipeline in question and immediately blocked in the Abo GP 16” Inlet. Frontier dispatched field personnel to identify the leak and upon arriving at the location, they discovered a puddle of heavy condensate gathered on the surface above a known underground condensate discharge pipeline. Notifications were made internally to the Environmental Group approximately 14:00 hundred hours.

On 8/11/2015, Frontier recovered an estimated 4bbl of released liquid from the Remediation Site surface using a hydro-vacuum truck. All free liquid recovered was disposed of at an OCD approved facility (Figure 1). Excavation was quickly commenced to delineate and remove contaminated soils and to restore the integrity of the pipeline. On 8/11/2015, it was determined the total release was to exceed 5bbl and made appropriate notifications to NMOCD. The Initial C-141 was presented to NMOCD Mike Bratcher on 08/17/2015 (Appendix 1).



Figure 1

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III) Soil Remediation Activities:

On 12/8/2015 Frontier Field Services retained the services of Rocky Peak (Contractor) to remediate the soil and transport all contaminated soil to R360 Environmental Solutions, Permian Basin Region, a New Mexico OCD approved facility. From 8/26/2015 to 12/15/2015, approximately 472 cubic yards of contaminated soils were removed from the Remediation Site (Appendix 2).

IV) Water Column/Average Depth to Water:

Per the New Mexico Office of the State Engineers database, the nearest measured water column is located 2.32 miles from Remediation Site at a depth of 250 feet (Appendix 3).

V) Soil Sampling:

Twelve samples were collected at the Remediation Site (Figure 2). All samples were carefully collected, documented, and preserved by Frontier EHS on 12/15/2015. The samples were promptly transported to Cardinal Labs located in Hobbs N.M. 88240, followed by a chain of custody form. Soil samples were analyzed for the following:

- BTEX – EPA Method 8021B.
- TPH – EPA Method 8015M
- Chlorides – EPA Method SM4500 Cl-B

Cardinal Labs returned the analytical results on 12/21/2015 (Appendix 4).

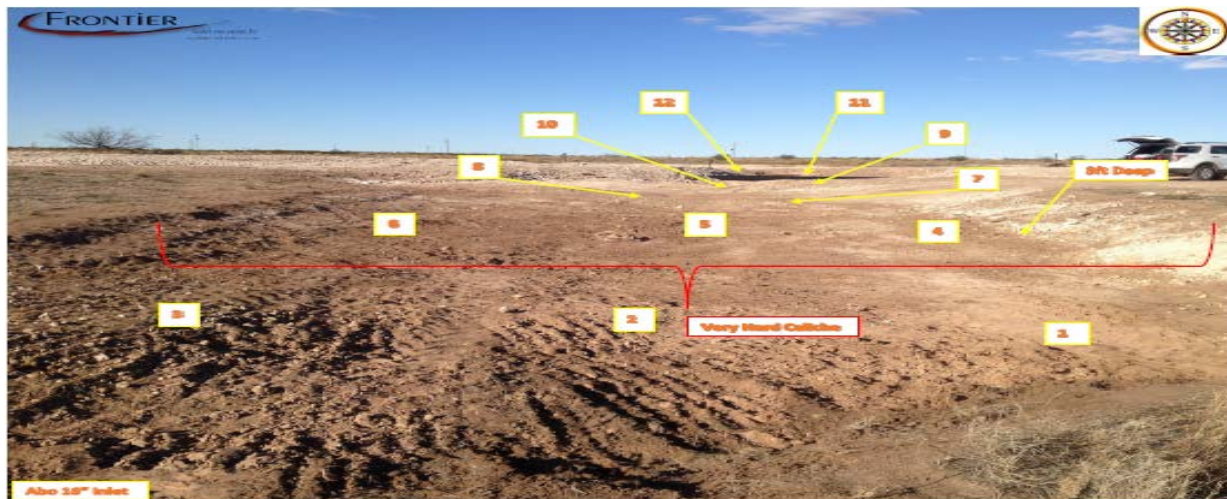


Figure 2

VI) Site Closure Request:

The cause and conditions of the leak were identified and alleviated by replacing a section of the 16" line. Soil samples 1(56.6), 2(45.6), 3(<10), 4(383), 6(124), 8(576), 11(28.2), and 12(337), were below the levels outlined in "NMOCD Guidelines for Remediation of Leaks, Spills, and

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Releases". Samples 5(6660), 7(4200), 9(2360) & 10(10800) were above the required TPH levels; however, the geological formation of these four sample areas is a very hard caliche formation and further remediation beyond existing depth is not practicable. Because the caliche formation provides a natural barrier, distance to surface water is > 1000ft, and depth to groundwater is > 100ft, the area does not pose significant risk to fresh water, public health, or to the environment.

On 1/7/2016 The Remediation Site was assigned reference # "2RP-3210" and NMOCD granted approval for the following remediation plan:

Excavation of impacted soils will continue until TPH, BTEX, and Benzene levels are below the levels outlined in the "NMOCD Guidelines for Remediation of Leaks, Spills, and Releases." Impacted soil will be transported to an OCD approved facility for disposal, and the area will be backfilled with clean soil. If the cap-rock (caliche) formation is reached, Frontier will discontinue excavating, obtain samples, and place a 20mil plastic liner over the area and backfill with clean soil. Should the depth of the excavation exceed six foot below the surface with a minimum of one foot under the pipeline, Frontier will discontinue excavating, collect samples, place a 20mil plastic liner over the area including under the pipeline and backfill with clean soil. Following completion, Frontier will submit a final C-141 requesting closure and including all supporting documentation.

VII) Final Site Closure:

A 20 mill-liner was laid on top of this natural caliche barrier approximately three feet under the natural surface and one foot under the newly replace pipeline (Figure 3). The Remediation Site was backfilled with clean soil and the area was seeded accordingly (Figure 4). The Final C-141 is included in this Remediation Summary and Site Closure for the Remediation Site (Appendix 5).



Figure 3



Figure 4

VIII) Seeding (pounds per acre)

On 1/30/2016, grass seeding was spread over the Remediation Site to retain the natural ecological system to preserve the biodiversity of the native plant species and conserve topsoil. Below is a formulated blend of various seeds used that will meet those conditions.

- Sand bluestem - (*Anthropogon Hallii*) – 0.5
- Little bluestem – (*Schizachyrium scoparium*) – 0.5
- Sideoats grama – (*Bouteloua curtipendula*) – 1.5
- Sand dropseed – (*Sporobolus cryptandrus*) – 0.5
- Spike dropseed – (*S. contrandrus*) – 0.5
- Mesa dropseed – (*S. flexuosus*) – 0.5
- Plains bristlegrass – (*Sentaria macrostachya*) – 2.0
- Desert or Scarlet Globermallow – (*Sphaeralcea ambigua*) or (*S. coccinea*) – 0.5
- Buckwheat – (*Eriogonum spp.*) – 1.5

Certified weed free seed. (Figure 5)

Seed Blend (dated April 4, 2006):		
Common Name and Preferred Variety	Scientific Name	Pounds of pure Live Seed Per acre
Sand bluestem	(<i>Andropogon hallii</i>)	0.5
Little bluestem	(<i>Schizachyrium scoparium</i>)	0.5
Sideoats grama	(<i>Bouteloua curtipendula</i>)	1.5
Sand dropseed	(<i>Sporobolus cryptandrus</i>)	0.5
Spike dropseed	(<i>S. contractus</i>)	0.5
Mesa dropseed	(<i>S. flexuosus</i>)	0.5
Plains bristlegrass	(<i>Setaria macrostachya</i>)	2.0
Desert or Scarlet Globemallow	(<i>Sphaeralcea ambigua</i>) or (<i>S. coccinea</i>)	0.5
Buckwheat	(<i>Eriogonum spp.</i>)	1.5
TOTAL POUNDS PURE LIVE SEED (pls) PER ACRE		8.00
Certified weed free seed		
If one species is not available increase all others proportionately. Use no less than six with a minimum of one (1) forb. Apply no less than 8.0 pounds pls per acre.		

Figure 5

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IX) Distribution:

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This concludes this report.