Bratcher, Mike, EMNRD

From: Rick Railsback [rick@curaes.com]
Sent: Sunday, April 08, 2012 4:33 PM
To: tgregsto@blm.gov
Cc: Bratcher, Mike, EMNRD; 'Hoffman, Bill'; 'Chris Leney'; maribel@curaes.com; 'Alycia CURA'
Subject: Saltwater Spill, COG Operating, Electra Federal #5 Flowline, Eddy Co., NM; Federal Tracking No. 11NU010TG
Attachments: Proposal for Assessment of Chloride Background Concentrations, COG Operating, Electra #5 Flowline, Eddy County, NM Complete with cover letter.doc.pdf

Please find attached an amended workplan for the above-captioned project. We respectfully request your approval for this amended workplan.

If you have any questions or require additional information, please contact me.

Rick Railsback

CURA Emergency Services
Texas Professional Geoscientist No. 299
Direct (972) 378-7340
Cell (214) 914-7263
rick@curaes.com

CURA
EMERGENCY SERVICES

ENVIRONMENTAL

March 6, 2012

Mr. Mike Bratcher
New Mexico Oil Conservation Division, District 2
811 South First Street
Artesia, New Mexico 88210

RE: Cover Letter for Proposal and Workplan for the Assessment of Chloride Background Concentrations within the Surficial Soil, Saltwater Spill, COG Operating, Electra Federal #5 Flowline, Section 21, Township 17 South, Range 30 East, Eddy County, New Mexico (site); Federal Tracking No. 11NU010TG

Please find the formal proposal and workplan attached. On January 16, 2012 Tetra Tech submitted an initial proposal for remediation for this site. A response (approval with conditions) to that proposal was sent via email by Terry Gregston of the BLM on January 30, 2012. A detailed review of this original proposal and the site assessment work done to date and a review of the surficial geology of this area of New Mexico has prompted a reconsideration of this original proposal. Therefore, we intend to implement the attached proposal in lieu of the original Tetra Tech proposal. Pending the results of the attached assessment of chloride background concentrations, additional assessment or remedial work may be proposed.

If you have questions concerning this new proposal, please do not hesitate to contact me at (214) 914-7263 or rick@curaes.com. Upon receipt of your approval of this proposal, CURA will mobilize to the site and conduct this additional assessment work.

Respectfully submitted,

Rick Railsback

Rick Railsback

CURA Environmental & Emergency Services

Attachments: Proposal and Workplan for the Assessment of Chloride Background Concentrations with the Surficial Soil, Saltwater Spill, COG Operating, Electra Federal #5 Flowline dated February 27, 2012

6205 Chapel Hill Blvd., Suite 100, Plano, TX 75093

(972) 378-7333 • 972.378.6789 fax

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ENVIRONMENTAL

February 27, 2012

Mr. Mike Bratcher
New Mexico Oil Conservation Division, District 2
811 South First Street
Artesia, New Mexico 88210

RE: Proposal and Workplan for the Assessment of Chloride Background Concentrations within the Surficial Soil, Saltwater Spill, COG Operating, Electra Federal #5 Flowline, Section 21, Township 17 South, Range 30 East, Eddy County, New Mexico (site)

CURA Emergency Services, Inc. (CURA) on behalf of COG Operating is pleased to submit this proposal for the assessment of chloride background concentrations within the surficial soil at the above-captioned location.

Background

According to Tetra Tech, Inc. (Tetra Tech) *Workplan for the COG Operating LLC., Electra Federal #5 Flow line, Unit A, section 21, Township 17 south, Range 30 East, Eddy County, New Mexico*, produced water was released from a 4-inch poly line associated with the Electra Federal #5 well site on November 03, 2010. Apparently, approximately 30 bbls was released and 25 bbls of produced water was recovered by vacuum trucks. An initial assessment and subsequent delineation activities were conducted to assess the vertical and horizontal delineation of the contaminants of concern. A total of 58 soil samples were collected within the immediate vicinity of the release area to a maximum depth of 70 feet. The soil samples were sampled for Total Petroleum Hydrocarbons (TPH), benzene, toluene, ethyl benzene, xylenes (BTEX), and chloride. All analytical results were below the Recommended Remediation Action Levels (RRALs) for TPH and BTEX. The chloride analytical results ranged from less than 200 mg/kg to 14,900 mg/kg. Extreme variability between sample locations and depths of samples was observed.

The Tetra Tech workplan further recommends extensive excavation of soil impacted by this saltwater release. Background levels for chlorides in surficial soil have not been established for this site. The attached Memorandum on Naturally Occurring Chlorides in Southeastern New Mexico dated February 15, 2012 summarizes the facets of this geologic issue. Naturally occurring chlorides concentrations in surficial soil may show extreme variations in this area of New Mexico. CURA recommends that further site assessment be conducted in order to establish background concentrations for chlorides in the site vicinity.

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Proposed Assessment of Chloride Background Concentrations

The assessment conducted by Tetra Tech and summarized in the workplan cited above did not include the collection and analysis of surficial soil samples in areas not affected by the spill. In light of the extreme variability of chloride concentrations within the affected areas sampled, background concentrations of chlorides in unaffected areas should be assessed. Therefore, CURA proposes to install three soil borings in unaffected areas to the north, south, and west of the release area. Soil borings will be installed by hand augering or push probing to a depth of 5.5 feet below ground surface (bgs). A total of 6 soil samples will be collected from each boring at depths corresponding to the sample depths of the Tetra Tech assessment (0-1', 1-1.5', 2-2.5', 3-3.5', 4-4.5', 5-5.5'). The samples will be analyzed for chlorides by EPA Method 300.0. Soil samples will be collected in accordance with the New Mexico Oil Conservation Division (NMOCD) Guidelines for Remediation of Leaks, Spills and Releases, dated August 13, 1993 Section 2.a Sampling Procedures.

The analytical results from these three background soil borings will determine the next step of remedial action. As this area of New Mexico has documented highly variable chloride concentrations in surficial soils, CURA anticipates that the chlorides concentrations documented in the Tetra Tech assessment may be naturally occurring and may not the result of impact from the minimal spill from the Electra Federal #5 flowline.

Your review and approval of this workplan will be very much appreciated. If you have any questions pertaining to the above proposed scope of work, please do not hesitate to contact me at (214) 914-7263 or rick@curaes.com. Upon receipt of your approval of this proposal, CURA will mobilize to the site and conduct this additional assessment work.

Respectfully submitted,

Rick Railsback

CURA Environmental & Emergency Services

Attachments: Memorandum on Naturally Occurring Chlorides in Southeastern New Mexico dated February 15, 2012

Memorandum

February 15, 2012

Mr. Rick Railsback
CURA Emergency Services
6205 Chapel Hill Boulevard
Suite 100
Plano, Texas 75093

RE: Naturally Occurring Chlorides in Southeastern New Mexico

This memorandum was developed to assess the naturally occurring chloride and/or the physical setting that would contribute to the naturally occurring chloride in the immediate vicinity of Electra Federal #5 well site located in Unit A, Section 21, Township 17 South, Range 30 East, Eddy County, New Mexico (site).

According to Tetra Tech, Inc. (Tetra Tech) *Workplan for the COG Operating LLC., Electra Federal #5 Flow line, Unit A, section 21, Township 17 south, Range 30 East, Eddy County, New Mexico*, produced water was released from a 4-inch poly line associated with the Electra Federal #5 well site on November 03, 2010. Apparently, approximately 30 bbls was released and 25 bbls of produced water was recovered by vacuum trucks. An initial assessment and subsequent delineation activities were conducted to assess the vertical and horizontal delineation of the contaminants of concern. A total of 58 soil samples were collected within the immediate vicinity of the release area to a maximum depth of 70 feet. The soil samples were sampled for Total Petroleum Hydrocarbons (TPH), benzene, toluene, ethyl benzene, xylenes (BTEX), and Chloride. *For the purposes of this memorandum only the Chloride analytical results will be discussed.* The Chloride analytical results ranged from less than 200 mg/kg to 14,900 mg/kg. Extreme variability between sample locations and depths of samples was observed.

In order to assess the release site, an understanding of the physical setting is essential.

PHYSICAL SETTING

The site is within the southwestern portion of the Great Plains a subsection of the Interior Plains Physiographic Region. The Great Plains are broad expanse of flat land, much of it covered in prairie, steppe and grassland, which lies west of the Mississippi River and east of the Rocky Mountains. The site is also located within the Pecos River Basin, west of Mescalero Ridge.

SOILS

According to the United States Department of Agriculture (USDA) Soil Conservation Service, *Soil Survey for Eddy Area, New Mexico* issued March 1971; the site is part of the Kermit-Berino association which generally consists of sandy, deep soils from wind-worked mixed sand deposits. This association consists of very sandy soils (Figure 7, below) on undulating plains and low hills of the "Sandy Country" in eastern part of the Eddy County.

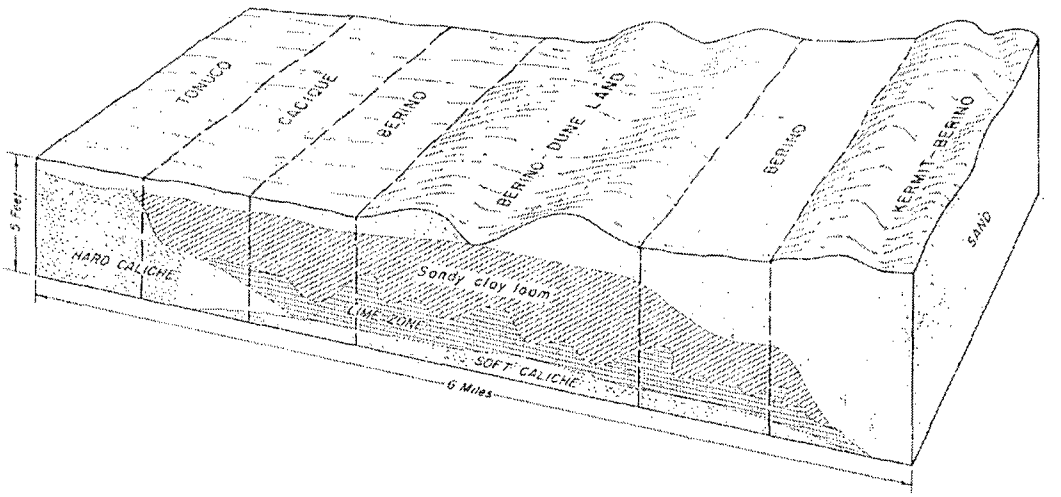

Figure 7.—Typical pattern of soils in the Kermit-Berino association.

In general the Berino series consists of deep, noncalcareous, yellowish-red to red, sandy soils that developed in wind-worked material of mixed origin. These soils occur as gently sloping, undulating to hummocky areas in the "Deep Sand Country" east of the Pecos River. These are the most extensive of the deep, sandy soils in the Eddy Area. Specifically, the site is underlain by the Berino complex, 0 to 3 percent slopes, eroded (BB). The Berino complex, 0 to 3 percent slopes, eroded is described as consisting mostly of the typical Berino series soil profile, detailed in the table below. It occurs, in association with Pajarito soils, as the smoother areas in swales and depressions between the dunes of Kermit soils. The following is the typical series profile:

A1 - 0 to 17 inches	Yellowish red, fine sand, yellowish red when moist; single grain; loose when dry or moist, nonsticky and nonplastic when wet; noncalcareous; neutral; abrubt, smooth boundary.
B2lt - 17 to 23 inches	Yellowish red, fine sandy loam, dark red when moist; weak, coarse, prismatic structure; very hard when dry, friable when moist, slightly sticky and nonplastic when wet; thin, continuous clay films on all ped surfaces; noncalcareous; neutral; clear, smooth boundary.
B22t - 23 to 36 inches	Red, sandy clay loam, dark red when moist; moderate, coarse, prismatic structure breaking to weak, medium and coarse, subangular blocky; extremely hard when dry, firm when moist, sticky and plastic when wet; thin continuous clay films on all ped surfaces; noncalcareous; neutral; clear, wavy boundary
B3t - 36 to 50	Dark red light sandy clay loam, dark red when moist; weak, coarse, prismatic structure; extremely hard when dry, firm when moist, sticky

inches	and plastic when wet; thin, continuous clay films on all ped surfaces; few distinct splotches of lime; noncalcareous; neutral to mildly alkaline; abrupt, way boundary.
Cca - 50 to 58 inches	Pink clay loam (soft caliche), light reddish brown when moist; massive; extremely hard when dry, firm when moist, sticky and plastic when wet; strongly calcareous; moderately alkaline.

Additionally, the Survey states under the Formation and Classification of the Soils section, that the parent material associated with the Berino Series is part of the Quaternary System. "Some of the materials representing the Quaternary System consist mostly of bolson deposits, dune sand, alluvium, and other surface deposits. ... Some of the areas have karst topography; playas and potholes are common".

GEOLOGIC SETTING

According to the New Mexico Bureau of Geology and Mineral Resources, Geologic Map of New Mexico, the Site is underlain by Sandy Quaternary deposits. The descriptions states "Eolian and piedmont deposits (Holocene to middle Pleistocene) - Interlayed eolian sands and piedmont - slope deposits along the eastern plank of the Pecos River valley, primarily between Roswell and Carlsbad. Typically, capped by thin eolian deposits".

The site appears to be located within "the stratigraphic trap on the south flank of an east-west anticlinal structure known as the Artesia-Vacuum trend. The stratigraphic section for the Loco Hills field is restricted to the sediments between the surface and the upper part of the San Andres Formation. The upper part of the section consists of 200 feet of Holocene alluvial desposits of caliche, sand, gravel, and clay. Included in this interval but not shown separately are red sandstone and shale of the Chinle Formation (Triassic) and Santa Rosa Sandstone (Triassic) and similar deposits of the Dewey Lake Formation (Permian)" (NMBMMR, 1976).[1]

According to Figure 5 - Generalized Section: Loco Hills Field, of the *Geology of Loco Hills Sand, Loco Hills Field Eddy County, New Mexico* by Roy W. Foster of the New Mexico Bureau of Mines & Mineral Resources dated December 1976 the stratigraphic representation, from the ground surface to approximately 245 feet is alluvium from Triassic sediments and Dewey Lake Formation not differentiated.

"The Artesia-Vacuum arch is a shallow structure that overlies the deeper Abo shelf edge reef trend and Bone Spring flexure. Reservoir position with respect to the crest of the arch determines whether the San Andres or the Grayburg dominates production in any given field. The fields located in structurally higher positions will have substantial production from the Grayburg as well as the

[1] Geology of Loco Hills Sand, Loco Hills Field Eddy County, New Mexico, Roy W. Foster, New Mexico Bureau of Mines & Mineral Resources, December 1976.

underlying San Andres. Fields occupying a structural position lower on the arch tend to be productive mostly from the Grayburg with the underlying San Andres mostly wet. The regional vertical seals are impermeable facies in the upper Grayburg and Queen Formations".(http://www.searchanddiscovery.com/documents/2004/broadhead/index.htm#00%20Abstract) .

San Andreas/Grayburg Artesia Vacuum Trend Play

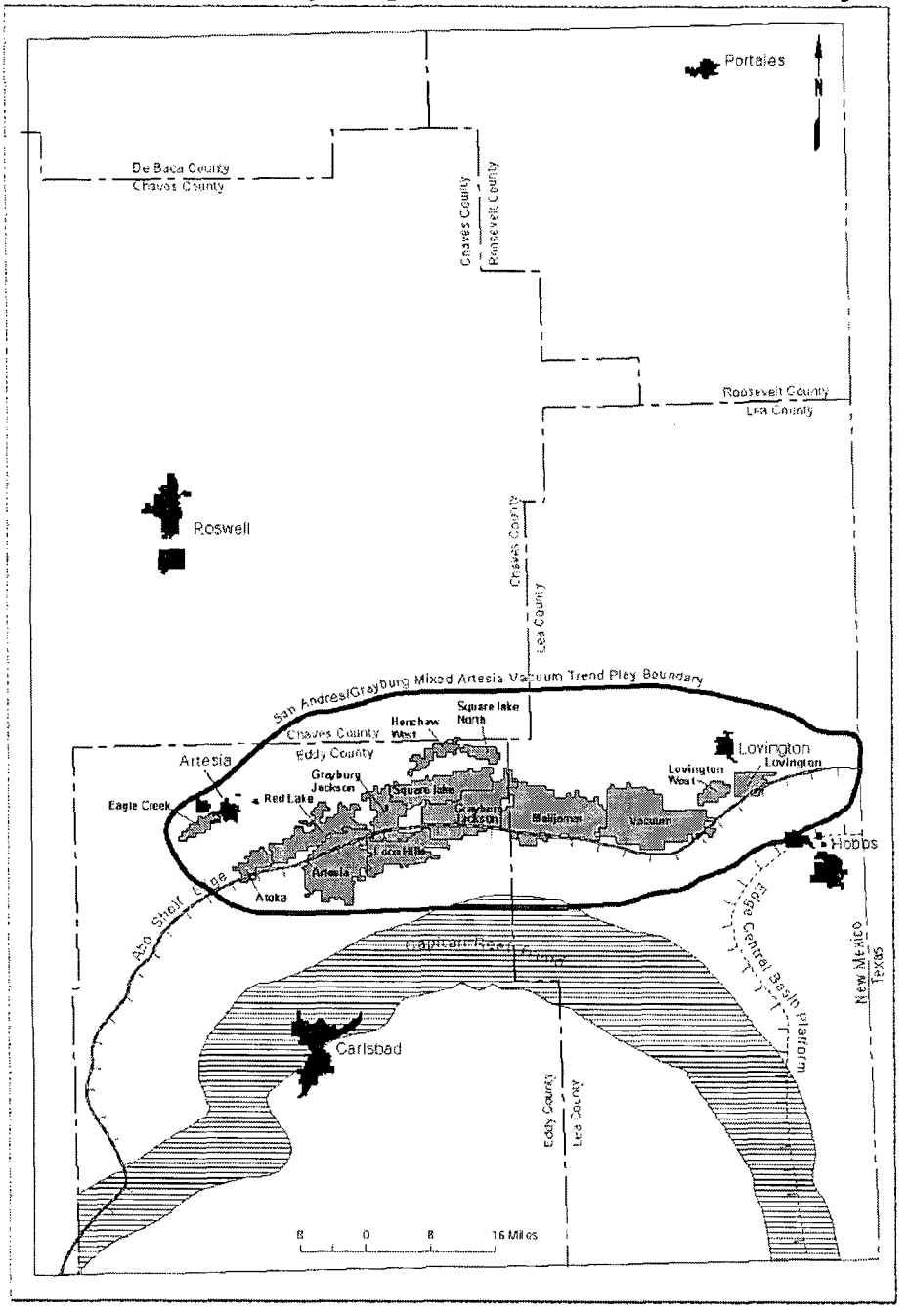

Figure 1.5 – Map of Sand Andres/Grayburg – Artesia Vacuum Trend Play
(http://www.searchanddiscovery.com/documents/2004/broadhead/images/105lg.jpg)

HYDROGEOLOGIC SETTING

The site lies approximately five miles north of the Clayton Basin. According to *Collection of Hydrologic Data Eastside Roswell Range EIS Area New Mexico* by Geohydrology Associates, Inc. dated June 1978, a well defined groundwater divide is located beneath Pavo Mesa and Fade Away Ridge east of Artesia. East of this divide the groundwater generally moves toward Clayton Basin; west of the ridge the groundwater flows directly toward the Pecos River. East of the Pecos Valley, wells range in depth from less than 50 feet to more than 500 feet near Snyder Twin Wells in Township 24 South, Range 31 East. An area of shallow wells is present along the northern border of the county. A few miles south there is an east-west zone of deep wells near Loco Hills and east of Chalk Bluffs. ... Wells in the Clayton Basin and Nash Draw are generally shallow. There is very little potable water in these areas. High well yields from brine-producing wells have been reported.

It is documented that in much of Chaves and Eddy Counties, water bearing formations contain evaporate deposits which are quite soluble. The principal salts in the water bearing formations are halite and gypsum. According to Table 6 – Chemical Analyses of Water in *Collection of Hydrologic Data Eastside Roswell Range EIS Area New Mexico*, samples collected in Eddy County from wells located in Township 17 South, Range 31 East; Township 18 South, Range 29 East; and Township 18 South, Range 30 East, between 1948 through 1971 indicated that Chloride results ranged from 54 to 6,300 mg/L.

In general samples collected from alluvial aquifers illustrated varying degrees of mineralization. This is because much of the water within these aquifers are derived from surface water sources, such as the Pecos River, but other instances the recharge originates from spring discharge, which is locally very highly mineralized. Sodium is the principal cation found in alluvial samples. The predominant anions are sulfate and chloride.

CONCLUSIONS

The site is located within the southwestern portion of the Great Plains and on the eastern portion of the Pecos Valley. The underlying soils consists of deep, noncalcareous, yellowish-red to red, sandy soils that developed in wind-worked material of mixed origin of the Beries Series. These soils occur as gently sloping, undulating to hummocky areas in the "Deep Sand Country" east of the Pecos River. Below the Beries soils are eolian and piedmont alluvium deposits from the Holocene to middle Pleistocene age. Groundwater is documented on average to be encountered at a depth of approximately 300 feet below ground surface; however, within the alluvium aquifers, it has been recorded that groundwater as been as shallow as 20 feet below ground surface. Alluvial aquifers illustrated varying degrees of mineralization, because the water within these aquifers are derived from surface water sources, such as the Pecos River. Sodium is the principal cation found in alluvial samples. The predominant anions are sulfate and chloride.

Due to the fact that chlorides are very soluble in water, it is not surprising the variability of chloride analytical results in Geohydrology Associates, Inc. assessment. Without obtaining background chloride concentrations within the soils in the immediate vicinity of the release and/or reviewing the concentration of chlorides within the produced water released, it would be extremely difficult to assess which chloride concentrations are associated with naturally occurring chlorides versus chlorides released from the produced water.