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Monzeglio, Hope, NMENV

From: Jim Lieb [Jim.Lieb@wnr.com]
Sent: Thursday, March 06, 2008 4:10 PM
To: Monzeglio, Hope, NMENV
Cc: Ed Riege; Chavez, Carl J, EMNRD
Subject: FW: Tank 101/102 Progress Memo
Attachments: 200803_Memo_Tank101_102_Progress.pdf

Hope:

Update on the Tank 101 and 102 investigation as per your request.

Jim Lieb
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From: Regina Allen [mailto:rmallen@trihydro.com]
Sent: Wednesday, March 05, 2008 5:02 PM
To: Jim Lieb
Cc: Grant Price
Subject: Tank 101/102 Progress Memo

Hi Jim,

I have attached the Memo updating the progress for the Tank 101/102 project. Let me know if you have any questions or concerns.

Regina Allen
Environmental Scientist

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memorandum

To:	Western Refining LLC
From:	Trihydro Corporation
CC:	
Date:	March 5, 2008
Re:	Tank 101 and 102 Soil Investigation

This memo has been prepared to provide a brief summary of field activities associated with the Tank 101 and 102 Soil Investigation. The investigation of this area was conducted in response to a request by the Giant Refining Company, Gallup Refinery (Gallup). Gallup requested that Trihydro identify the source of two water seeps located down-gradient of Tank 102 and to delineate the soil contamination associated with these seeps. The New Mexico Environmental Department (NMED) was verbally contacted by Gallup personnel as part of the project preparation activities and is aware of the seeps/soil contamination near Tanks 101 and 102. A work plan, in letter format, was submitted to NMED on August 16, 2007 (Work Plan).

Field Activities

Trihydro personnel were on-site during the week of August 20, 2007. Field activities associated with the Tank 101 and 102 Soil Investigation consisted of a site walk-through, an EM31-MK2 survey, surface water sampling, and soil sampling. These activities are described in detail below.

Site Walk-Through

A site walk-through was conducted with Gallup personnel prior to commencing the EM31-MK2 survey. During this walk through, the seeps were located and a plan was developed to conduct the EM31-MK2 survey. Trihydro personnel conducted a second site walk-through to identify any surface contamination. Some residuum was observed in and along the drainage ditch. These locations were logged with a global positioning system (GPS) and are included on Figure 1. Other features that had the potential to affect the results of the EM31-MK2 survey were also logged (e.g. test pits, rebar, fence, roadways, and tank berms).

EM31-MK2 Survey

An electromagnetic survey was performed on an area west of Tanks 101 and 102 which encompassed both seeps. The area was approximately 440 feet (north-south) by 625 feet (east-west) and is illustrated on Figure 1. The survey area was divided into a bi-directional grid with a grid spacing of approximately 15 feet. The grid was marked with 3 foot wooden stakes. The boundaries of the survey area and the boundary/grid line intersects were staked prior to conducting the survey.

The survey was performed by Trihydro personnel with a Geonics EM31-MK2 ground conductivity meter. Continuous conductivity measurements were recorded in conjunction with GPS navigation. The EM31-MK2 ground conductivity meter creates an electromagnetic induction field into the ground and measures two components of the return electromagnetic field which vary with changes in geology or other subsurface features. The two components are a quadrature-phase component and an in-phase component. The quadrature-phase component is a direct conductivity reading of subsurface geology measured in millisiemens per meter (mS/m). Since moisture content can affect conductivity of the subsurface geology, this phase may be useful in delineating soil contamination associated with the seeps. The in-phase component is a measurement of the magnetic susceptibility of subsurface features and is a good indicator of high-conductivity features such as metal objects. The in-phase is measured as the ratio of the secondary to primary magnetic field in parts per thousand (ppt). The effective depth of response is up to 18 ft bgs. Calibration of the EM31-MK2 ground conductivity meter was performed per the manufacturer's instruction.

The EM31-MK2 data was plotted and mapped using Geosoft's OasisMontaj software. A color grid was generated using the "minimum curvature" algorithm within the program. The color grid was overlain on an existing contour map of the refinery to assist in analyzing the image. This is illustrated on Figure 1.

Surface Water Sampling

Surface water samples collected from Seep 1 and Seep 2 were analyzed for Volatile Organic Compounds (VOCs), Semi-Volatile Organic Compounds (SVOCs), Diesel Range Organics (DRO), Gasoline Range Organics (GRO), Motor Oil Range Organics (MRO), and Resource Conservation and Recovery Act (RCRA) metals. Surface water samples were not collected from the West Ditch test pit because surface water was not present. Results are summarized in Table 1 and discussed below.

Soil Sampling

Three test pits were installed directly up-gradient of Tanks 101 and 102 inside the tank berm, three test pits were installed directly down-gradient of Tanks 101 and 102 inside the tank berm, one test pit was installed at Seep 1 (Seep 1 Test Pit), one test pit was installed in between Seep 1 and Seep 2 (Seep 2 Test Pit), and one test pit was installed west of the drainage ditch located directly west of Seep 2 (West Ditch Test Pit). The test pit sampling and logging procedures were conducted in accordance with the Work Plan and locations are shown on Figure 1.

The three test pits installed directly up-gradient of Tanks 101 and 102 were installed at the request of NMED to assist in determining if the source of the seeps was a result of these up-gradient tanks. The test pits are identified as TK 102_SE, TK Center, and TK 101_NE on Figure 1. These test pits were sampled at 2 and 8 feet below ground surface (ft bgs), 2 and 6 ft bgs, and 2 and 8 ft bgs, respectively and analyzed for DRO, MRO, GRO, and VOCs. The samples were also field-screened using a photo-ionization detector (PID) as outlined in the Work Plan. The results were logged on field forms that will be included in the final report. No elevated PID readings were identified. As shown in Table 1, analytical results from each discreet interval were reported as non-detect.

The three test pits installed directly down-gradient of Tanks 101 and 102 were installed to determine any potential connection between the seeps and contamination within the tank berms. These are identified as TK 101_W, TK 102_W, and Tank 102_SW on Figure 1. These test pits were sampled at 2 and 5.5 ft bgs, 2 and 6 ft bgs, and 2 and 6 ft bgs, respectively and analyzed for DRO, MRO, GRO, VOCs. The samples were also field-screened using a PID. The results were logged on field forms that will be included in the final report. As with the previous set of test pits, no elevated PID readings were identified. DRO and MRO were detected in TK 102_W and TK 102_SW as shown on Table 1.

Seep 1, Seep 2, and West Ditch test pits were excavated to a water-bearing sand lens. Seep 1 test pit was located against an embankment and was excavated to a total depth of 3 ft bgs. During the excavation a black seam was encountered. Soil samples were collected from above and below the black seam, directly from the black seam, and from the water-bearing sand lens. The water-bearing sand lens is located at approximately 1.5 to 2 ft bgs. Seep 2 test pit was excavated to a depth of 7 ft bgs and sampled at 2 and 6 ft bgs. A water-bearing sand lens was encountered at 7 ft bgs. The test pit became unstable at 7 ft bgs due to the high moisture content making it impossible to collect a sample below the water-bearing sand lens. The West Ditch test pit was excavated to a depth of 9 ft bgs and sampled at 4, 8, and 9 ft bgs. A water-bearing sand lens was encountered at 8 ft bgs. As with the Seep 1 test pit, this test pit became unstable at this depth due to the high moisture content; therefore collecting a sample deeper than 9 ft-bgs was not possible.

Photo Documentation

Field work was documented and recorded in Trihydro personnel's field log book in accordance with the Work Plan. Photos were taken at the test pits, residuum locations, and seeps. These photos will be included as part of the final report.

Analytical Data

Samples were shipped to Hall Environmental located in Albuquerque, New Mexico for analysis. The surface water samples collected from the seeps were analyzed for VOCs, SVOCs, DRO, GRO, MRO, Mercury, and RCRA metals. The soil samples collected from the test pits were analyzed for DRO, GRO, MRO, and VOCs. The analytical detections reported for soil and surface water are summarized in Table 1. A detailed summary of the analytical data will be presented in the final report.

Path Forward

Several meetings were held between Gallup and Trihydro personnel to evaluate the data collected during the field visit and to determine the most efficient cost effective path forward. Based on the field data already collected and recent discussions with refinery personnel, the source of the seeps may be the firewater line that runs parallel to the fence next to the tank berms or a source from within the tank berm. The following activities will be implemented to assist in determining the source of the seeps.

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- During the post-field work meetings, Gallup personnel indicated a firewater line runs parallel and just to the west of the fence that is shown in Figure 1. To determine if firewater is the water source for the seeps Trihydro personnel will work in conjunction with Gallup personnel to conduct conductivity tests on the firewater line water and the water from Tank 101/102 water draws. According to Gallup personnel, the source for the firewater line is groundwater. Therefore, the conductivity between the two potential sources should be different and, in theory, the conductivity of one of these suspected sources would be similar to the conductivity of the water in the seep.
- Trihydro personnel will work with Gallup personnel to obtain the firewater line specifications. Specifications include drawings or schematics to determine the depth of the firewater line, how old the line may be, and when the line was re-pressurized. If the specifications allow, environmentally safe dye will be dispersed into the system and the seep will be examined for the presence of dye.
- Trihydro personnel will work with Gallup to excavate a test pit between Seep 1 and the tank berm to see if the "black seam" and the water bearing sand lens stretches up-gradient (i.e. to the east) of Seep 1. The intent of this task is to determine if the sand lens and/or black seem can be correlated to the subsurface beneath the Tank 102 berm.
- Prepare an excavation plan to remove contaminated soil from within the Tank 102 bermed area. A plan will be developed in consultation with NMED to determine the best path forward for removing the soil within the Tank 102 bermed area.

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TABLE 1. TANK 101 AND 102 SOIL SAMPLE RESULTS,
GALLUP REFINERY, WESTERN REFINING, L.L.C., GALLUP, NEW MEXICO

Constituent	Seep 1	Seep 2	Units	Seep 1 under (3)	Seep 1_above (1)	Seep 1 Zone (1.5)	Black Seam (0.5)	Seep 2_2	Seep 2_6	West Ditch_4	West Ditch_8	West Ditch_9	Units
DRO	13.0	ND(1.0)	mg/L	ND(10.0)	ND(10.0)	ND(10.0)	3600	ND(10.0)	ND(10.0)	ND(10.0)	ND(10.0)	ND(10.0)	mg/kg
MRO	ND(5.0)	ND(5.0)	mg/L	ND(50.0)	ND(50.0)	ND(50.0)	ND(1000)	ND(50.0)	ND(50.0)	ND(50.0)	ND(50.0)	ND(50.0)	mg/kg
GRO	0.31	5.5	mg/L	ND(5.0)	ND(5.0)	ND(5.0)	ND(100)	ND(5.0)	90	ND(5.0)	ND(5.0)	ND(5.0)	mg/kg
Mercury	ND(0.0002)	ND(0.0002)	mg/L	Not analyzed	Not analyzed	Not analyzed	Not analyzed	Not analyzed	Not analyzed	Not analyzed	Not analyzed	Not analyzed	
Total RCRA Metals				Not analyzed	Not analyzed	Not analyzed	Not analyzed	Not analyzed	Not analyzed	Not analyzed	Not analyzed	Not analyzed	
Barium	0.15	1.1	mg/L										
SVOCs			µg/L	Not analyzed	Not analyzed	Not analyzed	Not analyzed	Not analyzed	Not analyzed	Not analyzed	Not analyzed	Not analyzed	
Phenanthrene	42.0	ND	µg/L										
VOCs				All ND	All ND	All ND		All ND	All ND	All ND	All ND	All ND	
Benzene	ND	240	µg/L				ND(0.25)						mg/kg
Ethylbenzene	4.5	190.0	µg/L				ND(0.25)						mg/kg
MTBE	33.0	210.0	µg/L				ND(0.25)						mg/kg
1,2,4-Trimethylbenzene	ND(1.0)	170.0	µg/L				ND(0.25)						mg/kg
1-Methylnaphthalene	110.0	ND(40.0)	µg/L				13.0						mg/kg
Acetone	12.0	ND(100)	µg/L				ND(3.8)						mg/kg
1,1-Dichloroethane	10.0	190.0	µg/L				ND(0.50)						mg/kg
1,1-Dichloroethene	1.3	20.0	µg/L				ND(0.25)						mg/kg
Isopropylbenzene	7.0	13.0	µg/L				0.44						mg/kg
n-Butylbenzene	1.6	ND(10.0)	µg/L				0.49						mg/kg
n-Propylbenzene	1.3	31.0	µg/L				ND(0.25)						mg/kg
sec-Butylbenzene	1.9	ND(10.0)	µg/L				0.34						mg/kg
1,1,1-Trichloroethane	2.1	50.0	µg/L				ND(0.25)						mg/kg
Vinyl chloride	ND(1.0)	30.0	µg/L				ND(0.25)						mg/kg
Xylenes, Total	ND(1.5)	20.0	µg/L				ND(0.50)						mg/kg

TABLE 1. TANK 101 AND 102 SOIL SAMPLE RESULTS,
GALLUP REFINERY, WESTERN REFINING, L.L.C., GALLUP, NEW MEXICO

Constituent	TK 102_SE_2	TK 102_SE_8	TK Center_2	TK Center_6	TK 101_NE_2	TK 101_NE_8	TK 101_W_2	TK 101_W_5.5	TK 102_W_2	TK 102_W_6	TK 102_SW_2	TK 102_SW_6	Units
DRO	ND(10.0)	ND(10.0)	ND(10.0)	ND(10.0)	ND(10.0)	ND(10.0)	ND(10.0)	ND(10.0)	60.0	ND(10.0)	13000.0	970.0	mg/kg
MRO	ND(50.0)	ND(50.0)	ND(50.0)	ND(50.0)	ND(50.0)	ND(50.0)	ND(50.0)	ND(50.0)	120.0	ND(50.0)	14000.0	710.0	mg/kg
GRO	ND(5.0)	ND(5.0)	ND(5.0)	ND(5.0)	ND(5.0)	ND(5.0)	ND(5.0)	ND(5.0)	ND(5.0)	ND(5.0)	ND(5.0)	ND(5.0)	mg/kg
Mercury	Not analyzed	Not analyzed	Not analyzed	Not analyzed	Not analyzed	Not analyzed	Not analyzed	Not analyzed	Not analyzed	Not analyzed	Not analyzed	Not analyzed	
Total RCRA Metals	Not analyzed	Not analyzed	Not analyzed	Not analyzed	Not analyzed	Not analyzed	Not analyzed	Not analyzed	Not analyzed	Not analyzed	Not analyzed	Not analyzed	
Barium													
SVOCs	Not analyzed	Not analyzed	Not analyzed	Not analyzed	Not analyzed	Not analyzed	Not analyzed	Not analyzed	Not analyzed	Not analyzed	Not analyzed	Not analyzed	
Phenanthrene													
VOCs	All ND	All ND	All ND	All ND	All ND	All ND	All ND	All ND	All ND	All ND	All ND	All ND	
Benzene													
Ethylbenzene													
MTBE													
1,2,4-Trimethylbenzene													
1-Methylnaphthalene													
Acetone													
1,1-Dichloroethane													
1,1-Dichloroethene													
Isopropylbenzene													
n-Butylbenzene													
n-Propylbenzene													
sec-Butylbenzene													
1,1,1-Trichloroethane													
Vinyl chloride													
Xylenes, Total													