AP - 60

STAGE 1 REPORTS

DATE: 12-21-06

Hansen, Edward J., EMNRD

From: Mike Griffin [whearth@msn.com]
Sent: Thursday, December 28, 2006 11:21 AM
To: Hansen, Edward J., EMNRD
Cc: Price, Wayne, EMNRD; kpope@riceswd.com
Subject: Rice EUE K-33-1 Stage I Final Report AP-60
Attachments: Introduction.pdf; Executive Summary.pdf; Exhibits.pdf; Procedures.pdf; Lab. Analyticals.pdf

Good Morning, All:

Attached, please find an electronic version of a hard copy and DVD version of the above report for your review and approval.

Please advise if you've any questions or comments.

Best holiday wishes for everyone.

Mike Griffin

Whole Earth Environmental, Inc.
Phone: 281.394.2050
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Phase I Closure Report
EWE K-33-1
NMOCD Case No. 1RO427-92
AP-60
Rice Operating Company
Hobbs, New Mexico

Mike Griffin
President

Prepared for:
Rice Operating Company

Prepared By:
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Our Ref:
K-33-1

Date:
December 21, 2006

1. Executive Summary

The subject site is related to a junction box on the EME salt water disposal system, operated by Rice Operating Company (ROC). The site is located in the NE ¼ of the SW ¼ Section 33, Township 19 South, Range 37 East, south of the town of Monument, New Mexico. The disposal system transports produced water from oil and gas leases to a permitted well for disposal by subsurface injection.

Identification of soil impact occurred during line replacement performed as part of the approved Junction Box Upgrade Program. Soil investigation at the K-33-1 junction box was initiated in September, 2001with a backhoe by excavating a series of trenches around Junction Box K-33-1 to depths of up to 18' below ground surface (bgs) and soil borings to 22' bgs. A second soil investigation was conducted on February 14, 2005 to obtain background concentrations and delineate the areal extent of potential contamination.

A water monitor well was advanced at a location approximately 35' southeast of the K-33-1 junction box on November 3, 2001. Two additional delineation wells were advanced on October 6, 2006, developed and tested in accordance with NMOCD specifications. (Copies of all boring logs are included within the Exhibits section of this report). Water samples were obtained from the wells each quarter and consistently display elevated chloride concentrations and non-detectable concentrations of BTEX. The depth to water at the site is recorded to be 32' bgs. The soil investigation conducted on February 14, 2005 indicated minor lateral movement of chlorides away from the junction boxes; the plumes appear to be nearly vertical in geometry. The lack of any hydrocarbons within the water samples and the consistent chloride values measured both up and down-gradient from the leak source indicate that the constituents of concern have attenuated to background concentrations.

2. Chronology of Events

Initial delineation began in November, 2001 and was performed as part of the Junction Box Upgrade Program. Soil samples were collected and analyzed in the field for chlorides. A monitor well was advanced on January, 2002 to a depth of 42' bgs, and soil samples were collected and submitted for laboratory analysis for BTEX and chlorides. The monitor well has been sampled quarterly since installation and a Monitor Well Report has been submitted annually. On May 5, 2005, the site was designated as falling under Rule 19 and was given a Case Number of 1R0427-93 and AP-60. An investigation Work Plan was submitted to the NMOCD on March 23, 2005. A complete chronology table is included within the Exhibits section of this report.

3. Background

Identification of soil impacts occurred during line replacement being performed as part of the approved Junction Box Upgrade Program. Soil borings, excavations and a monitor well have been installed at the site, and the monitor well has been sampled quarterly since installation.

4. Geology and Hydrogeology

4.1 Regional and Local Geology

The subject site lies in south central Lea County southeast of the city of Monument, New Mexico within the Eunice Plain. The topography is unremarkable sloping gently at an average dip of 10' per mile. An estimated 80% of Southern Lea County is covered by sand. Shin oak, bear grass, and burr grass dominate the areas of sand cover. Elsewhere, the vegetation is gramma grass, burr grass and mesquite. The primary land use in the area is the grazing of cattle however extensive oil and gas exploration and productivities are found in abundance.

4.2 Regional and Local Hydrogeology

The Ogallala Formation is the principal source of groundwater in the subject area. Depth to groundwater in Lea County ranges from approximately 12 to approximately 300 feet bgs. The Ogallala consists of predominately course fluvial conglomerate and sandstone and fine-grained Eolian siltstone and clay. Where present in the subject area, the Ogallala unconformably overlies Triassic redbeds. The regional groundwater gradient is to the east / southeast. Depth to groundwater at the subject site is approximately 32' bgs. Subsurface geology in the subject area consists of seven feet of fine grained sand underlain by calichi to a depth of approximately 22 feet bgs.

5. Subsurface Soils

Three separate sub surface investigations have been conducted at the site. The first was conducted for Rice Operating by ETGI of Hobbs, New Mexico and consisted of a series of nine individual holes or trenches radiating from the original location of the K-33-1 junction box and extending to maximum depths of 14' bgs. The investigation revealed the presence of elevated chloride levels within the soil throughout the tested vertical horizon. Extensive excavation and disposal of the soils surrounding the junction box was undertaken concurrent with this initial investigation activity.

The second site investigation was conducted by Whole Earth Environmental on February 14, 2005 and consisted of a series of thirteen vertical excavations to depths of 20' bgs. Soil samples were analyzed in the field by Rice Operating Company environmental testing specialists. This testing revealed that the contamination was limited to the areas immediately surrounding the old junction box. A final series of analyses were obtained for the soils within the vadose zone above MW-2 to demonstrate that the soils above the background well were unaffected by surface contamination.

6. Groundwater Quality

The groundwater quality at the site was investigated through the installation of three monitor wells.

6.1 Monitoring Program

Monitor Well No. 1 (MW-1) was installed on November 3, 2001. The well is situated approximately 35 feet southeast (down-gradient) of the junction box. Two additional monitor wells were constructed on October 6, 2006. The first (MW-2) was located approximately 200 feet northwest of MW-1. MW-3 was advanced at an approximate distance of 170 feet southeast of MW-1. All wells were developed in accordance with NMOCD specifications and tested for the presence and concentrations of BTEX testing using USEPA Method 8021B and inorganic compounds (total alkalinity, total dissolved solids, sulfate, calcium magnesium, sodium and potassium) using USEPA Methods 310, 300, 160.1 and 6010B.

6.2 Hydrocarbons in Groundwater

No free phase hydrocarbons have been detected in groundwater. In twenty consecutive sampling events, no BTEX constituents have been detected in any of the wells.

6.3 Other Constituents of Concern

Concentrations of inorganic compounds including chlorides, TDS, sulfate and sodium are elevated in all groundwater samples collected from the monitoring wells.

7. Recommendations and Conclusions

The October 24, 2006 laboratory analytical results for the three monitoring wells clearly demonstrate that the affected area adjacent to the leak source has naturally attenuated to background concentrations for all COC's. No additional remediation of the area is indicated. We request that we be able to continue to demonstrate that the site poses no environment threat by sampling each monitor well for an additional three quarters until we achieve four consecutive quarters of similar results. The results of the Stage I Abatement Plan indicate that no additional remediation is required, therefore a Stage 2 Abatement plan is not necessary. If quarterly sampling results are consistent with this

conclusion, a final report will be submitted with a request for final closure in the third quarter of 2007.

Chronology of Major Events

1. **September 20, 2001** – Discovery of contamination at the junction box site. Notification to the NMOCD via standard Junction Box Disclosure Form.
2. **September 28, 2001** - Excavated approximately fifty cubic yards of chloride contaminated soils and transported to commercial disposal.
3. **November 20, 2001** – ROC submitted Junction Box Upgrade Work Plan to NMOCD.
4. **December 11, 2001** – NMOCD approves above Work Plan
5. **January, 2002** – Installation of MW-1.
6. **November 5, 2003** – Initial soil characterization by ETGI to determine lateral spread of contamination.
7. **January 19, 2005** – ROC submits 2004 Monitor Well Report/Sampling Summary to NMOCD
8. **March 23, 2005** – Whole Earth Environmental submits Investigation & Characterization Plan to NMOCD
9. **November 20, 2005** – Letter from ROC to NMOCD outlining additional delineation steps to be employed on the project.
10. **January 19, 2006** – Submitted evidence of public notification and Stage 1 Investigation Plan to NMOCD. Approved the same day and given designation as AP-**60**
11. **October 5, 2006** – Installation of Monitor Wells 2 and 3.
12. **December, 2006** – Submitted final Stage 1 Investigation Plan to NMOCD.

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`December 28, 2006

NMOCD
1625 No. French Dr.
Hobbs, NM 88241

Attn: Larry Johnson

Dear Mr. Johnson:

Enclosed, please find a copy of the Stage I Final Investigation Report for the Rice Operating Company's EWE K-33-1 site also carried on your records as 10R427-92 and AP-60.

In accordance with our investigation plan, we advanced delineation wells both up and down-gradient from the seep site and discovered that the chlorides appear to have faded to background levels across the entire site. We are proposing to continue to monitor the location to confirm the results for a total of four consecutive quarters before requesting final closure.

If you've any questions or comments, please do not hesitate to call.

Warmest personal regards,

Mike Griffin
President
Whole Earth Environmental, Inc.

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December 28, 2006

Rice Operating Company
122 West Taylor
Hobbs, NM 88240

Attn: Kristin Pope

Dear Kristin:

Enclosed, please find your copy of the Stage I Final Investigation Report sent to Sante Fe and the Hobbs office of the NMOCD. Copies of the transmittal letters are included within this section.

Thank you again for the assistance in composition.

Warmest personal regards,

Mike Griffin
President
Whole Earth Environmental, Inc.