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RAILROAD COMMISSION OF TEXAS

OIL AND GAS DIVISION

February 25, 2014

Mr. Gabriel Mussio
Environmental Management Section
General Services Department
City of Houston
900 Bagby, 2nd Floor
Houston, Texas 77002

RE: Former Cactus Pipe and Supply Property
Approximate 14.9-Acre Tract, 815 Dorsett Street
Houston, Harris County, Texas
Targeted Brownfields Assessment (TBA) #03-5007

Dear Mr. Mussio:

Staff of the Railroad Commission of Texas (RRC) Brownfields Response Program (BRP) is pleased to provide this no further action letter for the cleanup of naturally occurring radioactive materials (NORM) in soil at the above-referenced 14.9-acre tract. RRC BRP staff reviewed the following reports:

- *Technical Assistance for Sampling and Analytical Report, Dorsett and Market Streets Site, Parcel 20, Houston, Harris County, Texas,* dated May 1999
- *Supplemental Characterization and Data Validation of Houston Brownfields Site, Dorsett and Market – Parcel 085-020,* dated March 21, 2002
- *Site Assessment, Former Cactus Pipe and Supply Facility, 815 Dorsett Street, Houston Harris County, Texas,* dated November 2008
- *Final Report, Cactus Pipe and Supply, Cleanup Code CU-03-54012*, dated January 25, 2010
- *Field Delineation and Confirmation Sampling Report, Former Cactus Pipe and Supply Facility, 815 Dorsett Street, Houston, Harris County, Texas,* dated March 19, 2010
- *Groundwater Assessment, Cactus Pipe and Supply, 815 Dorsett Street, Houston, Harris County, Texas (TBA 03-5007)*, dated March 23, 2011

- *Report of Limited NORM Screening of Debris, Former Cactus Pipe and Supply Site, 815 Dorsett Street, Houston, Harris County, Texas*, dated June 20, 2011

- *Supplemental NORM Survey and Lead Sampling Report, Former Cactus Pipe and Supply Facility, 815 Dorsett Street, Houston, Harris County*, dated August 28, 2012

- *Final Report – Cactus Pipe and Supply Co. Inc. – 122185 – Harris County, Railroad Commission Cleanup Code – CU-03-217476, Req. No. 455-13-0344*, dated May 9, 2013

- *Remediation Oversight Assistance, Cactus Pipe and Supply, 815 Dorsett Street, Houston, Harris County, Texas*, dated July 16, 2013

History of Site

The subject Site is located at the intersection of Dorsett and Market Streets in Houston, Texas. The facility was used as an oilfield pipe salvage yard from at least 1953 through 1992. The facility also refurbished used oil field drill pipe and tubulars. The Site was sold to the City of Houston (COH) in May of 1986. Cactus continued to operate the Site as a pipe yard until approximately 1992. At the time of the RRC cleanup, the site contained several abandoned buildings, sumps, pipe racks, and other remnant debris, and was overgrown with vegetation. The site is fenced to prevent unauthorized access. Cactus Pipe and Supply, Inc. is no longer an active corporation in Texas. Since the closure of the facility, periodic dumping of solid waste has taken place on the Site, including dumped soil piles and a large number of abandoned tires.

Limited assessments were performed on behalf of the COH and Region 6 Environmental Protection Agency (EPA) between 1997 and 2002. The assessments revealed that the Site was contaminated with NORM waste above the exemption criteria of 30 picoCuries per gram (pCi/g). Elevated total petroleum hydrocarbons (TPH), lead, and other metals were also detected in surficial soils. Lead is believed to be associated with used pipe dope.

In 2005, the COH requested RRC assistance to assess and remediate the Site. Through consultation with the RRC Office of General Counsel, staff determined that the RRC has jurisdiction over the oil and gas NORM waste at the Site. It was further determined that the RRC could use its resources to characterize other waste intertwined with the oil and gas NORM waste. Based on this determination, the Site was selected for assessment and cleanup using the Oil and Gas Regulatory Cleanup (OGRC) fund. Additionally, a groundwater assessment was performed in 2010 using BRP funds.

Past RRC Assessments

In 2008, Terracon performed a soil assessment to verify the concentrations of the chemicals of concern (COCs) and determine the extent of the contamination at the Site. Terracon and their licensed NORM subcontractor, USA Environment, LP (USA), conducted a preliminary NORM screening of the stockpiled tires, buildings, and soils in accessible areas of the Site. The survey identified several areas as potentially being impacted with oil and gas NORM waste based on the site-specific soil screening criterion of 30 micro Roentgens (μR/hr).

Thirteen surface soil samples were collected from various locations across the site with varying gamma radiation measurements and analyzed for Radium-226 (Ra-226) using gamma spectroscopy in order to establish a correlation between the survey results and radionuclide concentrations. Select samples were tested for other radionuclides. Two additional soil samples were collected at approximately 2 to 5 feet bgs in the areas where the highest surface gamma radiation measurements were observed and analyzed for Ra-226 to evaluate the vertical extent of NORM impacted material. The Ra-226 results indicated NORM impacts. None of the other radionuclides exceeded the exemption criteria. The Ra-226 concentrations in the two deeper soil samples did not exceed 1 pCi/g indicating a substantial decrease in concentrations with depth.

Terracon installed an additional 96 soil borings to depths ranging from 4 to 8 feet below ground surface (bgs) to further delineate the extent of the contamination. A minimum of one soil sample was collected from each boring either from the surface material or from the depth interval exhibiting the highest evidence of contamination based on field screening. A second sample was collected from approximately 4 to 5 feet bgs at select locations to delineate the vertical extent of the contamination. Soil samples were analyzed for TPH and RCRA 8 metals. Select samples exhibiting elevated TPH concentrations were also analyzed for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), and TPH using Method TX 1006.

Arsenic, barium, cadmium and lead were detected at concentrations exceeding their respective Tier 1 soil-to-groundwater ($^{GW}Soil_{Ing}$) PCLs. Leachability testing was conducted using the Synthetic Precipitation Leaching Procedure (SPLP) and/or Tier 2 $^{GW}Soil_{Ing}$ PCLs were calculated using site-specific data to evaluate the potential for the metals in soil to impact groundwater. Based on the SPLP results and the calculated Tier 2 $^{GW}Soil_{Ing}$ PCLs, the Tier 1 residential human-health ($^{Tot}Soil_{Comb}$) PCLs were determined to be the critical PCLs. Metals were detected above their respective PCLs, with lead being the most widespread. The TPH results from the Method TX 1006 analyses were used to calculate a site-specific soil TPH PCL of 4,280 milligrams per kilogram (mg/kg) for residential land use or 48,000 mg/kg for commercial/industrial land use. TPH exceeded the site-specific PCLs in several soil samples, primarily in the southern portion of the site.

Soil Remediation and Confirmation Sampling

Based on the assessment activities, nine areas contaminated with NORM and 27 areas impacted with metals and/or TPH requiring remediation were identified. In 2009, approximately 565 cubic yards of NORM-impacted soils were excavated to depths ranging from one to three feet bgs and transported to an authorized disposal facility. Confirmation samples were collected from each of the excavations and analyzed for Ra-226. All of the results were below the exemption criteria of 30 pCi/g with the exception of "Area Nine" in the southwest corner of the Site. Concentrations from the west sidewall of the excavation along the west property boundary exceeded the exemption criteria for Ra-226, indicating that the NORM contamination extends beneath the COH's adjacent Pump Station property. The Pump Station property is currently paved. The NORM contamination does not present a risk to human-health as long as it is beneath the pavement. However, in the event the pavement is removed, the Pump Station property should be investigated for NORM.

In addition to NORM, the excavations were field screened for lead using an Innovex© XRF Analyzer (XRF), since it was the most widespread of the metals, and for TPH using an organic

vapor monitor (OVM). Areas with metals and TPH contaminated soils were excavated to depths ranging from 1 to 2.5 feet bgs. A total of approximately 6,870 cubic yards of metals and TPH affected soil were excavated and transported offsite to an authorized disposal/recycling facility. Confirmation samples from the excavations indicated barium and cadmium were below their respective PCLs in all of the samples. Arsenic was below the critical PCL in all but one sample collected from the west sidewall of "Area Nine." Lead exceeded the Tier 1 residential $^{Tot}Soil_{Comb}$ PCL of 500 mg/kg in the confirmation samples along the foundations of the Manufacturing Building and the Rattler Building No. 2, as well as in the west sidewall of "Area Nine." TPH exceeded the residential site-specific PCL in four of the confirmation samples collected along the building foundations. However, the remaining TPH concentrations were below the PCL for commercial/ industrial land use. All of the excavations were backfilled with clean fill material.

In May 2011, on behalf of the COH, Terracon performed an additional NORM screening survey of the tires, dumped soil piles and buildings to be removed to verify that the debris would not be characterized as NORM waste. Elevated gamma radiation levels were measured in three areas between the pipe racks and one area along the eastern property boundary in the southeast corner of the Site. The elevated NORM readings in these areas were attributed to the underlying soils, not the nearby debris. Therefore, it was determined that the debris and buildings would not have to be managed as NORM waste. The COH completed demolition of the buildings in 2011 and removed or relocated the dumped soil piles in early 2012 to provide RRC access to these areas.

Following the removal of the soil piles and the demolition of the onsite buildings by the City, a subsequent NORM survey confirmed the three soil areas with elevated gamma radiation measurements. One surface soil sample was collected from each of these areas and analyzed for Ra-226 and Ra-228. Based on the results, two of the areas were determined to be contaminated with NORM (RN-2 and RN-3). Sixty-four soil borings (RB-1 through RB-64) were advanced to a depth of four feet bgs in the former soil pile locations and from other potentially lead-impacted areas previously identified by the RRC. Soil cores were field screened for lead using an XRF and for NORM using a scintillator. Gamma radiation readings did not indicate the presence of any NORM. Twelve soil samples were collected from intervals where the XRF readings exceeded 400 parts per million (ppm). The soil samples were analyzed for total lead. Based on the analytical results, six of the soil sample locations exceeded the Tier 1 residential $^{Tot}Soil_{Comb}$ for lead. The field screening results indicated the lead impacts are limited to the upper three feet bgs.

In 2013, the two NORM impacted areas (RN-2 and RN-3) and the twelve areas exhibiting elevated XRF readings for lead were excavated to depths ranging from 1 to 3 feet bgs. The sidewalls of the excavation were field screened for NORM and lead to assist in determining the extent of the contamination. During the excavation activities, a third area of NORM contamination was also identified to the northeast of RN-3. This area was also excavated. One confirmation sample was collected from each of the excavations and analyzed for NORM radionuclides. Based on the analytical results, no radionuclides were detected above the exemption criteria. Field screening measurements from the sidewalls of the excavations still exceeded the lead screening level of 400 parts per million (ppm). Test trenches were excavated outside the boundaries of the excavations and field screened using the XRF in an attempt to delineate the lead contamination. However, the extent of the lead contamination was not determined.

Groundwater

In September 2010, a total of five monitor wells were installed at the Site to a depth of approximately 20 feet bgs using Brownfields grant funding. Two soil samples were collected from each wellbore at the surface and from the intervals with the highest PID readings. The surface samples were analyzed for RCRA 8 metals, and the samples from the intervals with the highest PID readings were analyzed for TPH, VOCs, and SVOCs. All of the COCs were below their respective PCLs in soil. Groundwater samples were collected from each of the five monitor wells and analyzed for TPH, VOCs, SVOCs, total RCRA 8 metals, and radionuclides. All of the COCs were below their respective groundwater ingestion ($^{GW}GW_{Ing}$) PCLs with the exception of chlorinated solvents (cis-1,2-dichloroethene, tetrachloroethene, trans-1,2-dichloroethene, and trichloroethene). These chemicals are not typically associated with oil and gas activities, and the impacted well is along the eastern property boundary away from the center of Site operations. Therefore, the groundwater contamination appears to be from an offsite source and is not subject to RRC jurisdiction. The Site was referred by the RRC to the TCEQ in 2011 to address the groundwater contamination.

Conclusions

Based on the data collected, the analytical results indicate that the onsite NORM waste on the 14.9-acre tract has been removed. Remaining TPH concentrations exceed the residential PCL, but are below the commercial/industrial PCL. If the property is to be used for residential purposes, additional assessment for TPH in the vicinity of the former buildings may be required. However, if the Site is deed restricted for commercial/industrial purposes no additional assessment or remediation of TPH-impacted soils is necessary. Lead concentrations at the Site exceed the Tier 1 $^{Tot}Soil_{Comb}$ residential and commercial/industrial PCLs over a widespread area and have not been fully delineated. However, since the remaining lead contamination at the Site does not appear to be commingled with oil and gas NORM waste it is not subject to RRC jurisdiction.

You may contact me at 512-475-0730 or kelly.wilson@rrc.state.tx.us if you have any questions.

Sincerely,

Kelly Wilson
Brownfields Response Program

cc: BRP Reading File
Charlie Teague, Director, RRC District 3, Houston (email)
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