



APPENDIX D: SECTION N2 INDUSTRIAL PROPERTY INFORMATION

Environmental Conditions at US Hwy 190 Bridge Crossing

A review of environmental conditions was conducted around the major industrial properties on the east side of the Mississippi River adjacent to the south side of the existing U.S. Highway 190 Bridge. The objective of this review was to assess whether there is subsurface contamination in the vicinity of these areas that could significantly impede or increase the costs of construction of a new bridge. The review is based on selected documents from the Louisiana Department of Environmental Quality (LDEQ) Environmental Data Management System (EDMS).

The review included the following facilities/media:

- CEMUS (former Kaiser facility) and Kaiser landfill - soil and groundwater
- UOP (former LaRoche and Kaiser facility) - soil and groundwater
- Ethyl/Albemarle - groundwater
- Rhodia - groundwater
- Formosa - groundwater

The purpose of reviewing soil and groundwater conditions at CEMUS, the former Kaiser Landfill and UOP is that there is a potential for a new bridge to be constructed within the footprint of these facilities and therefore any related contaminated soils could be encountered during construction. Rhodia, Ethyl, and Formosa are not directly within the expected alignment of the new bridge, so if there were impacts to the construction from these facilities, the impacts would likely be from contaminated groundwater that had migrated from the sites to the potential bridge construction area.

Based on the review of environmental conditions at these industrial properties, URS has also developed general unit costs for handling and managing the soils during construction activities.

CEMUS (FORMER KAISER FACILITY)

The former Kaiser Aluminum facility is located on approximately 60 acres directly to the east of the Mississippi River and to the south of US Hwy 190 (Figure D-1). At one time, the Kaiser facility also included the current UOP property (discussed below) and the Kaiser East Landfill, which is located directly south of US Hwy 190 to the east of the current UOP facility as shown on Figure D-1. It should be noted that the facility boundaries on Figure D-1 may not exactly coincide with the actual legal boundaries.



The Kaiser Aluminum facility operated from the 1940's until 1983 when it was shut down. Therefore, the LDEQ EDMS files do not contain much information related to their operations. Based on a review of the UOP files, information on the landfill and the materials that are known to have been handled at the Kaiser facility during operations, it is expected that the site would have areas with high pH soils and possibly high-pH shallow groundwater. UOP indicated in one of their reports that the expected source of high-pH on the UOP property was the former caustic precipitators at the closed Kaiser facility directly to the west. Any excavation within the footprint of the former Kaiser site could encounter these high-pH soils.

Kaiser sold the property to Formosa in 2000, and at that time, it was permitted as an "inactive industrial inorganic chemicals alumina - manufacturing plant". Ownership was transferred from Formosa to CEMUS in 2007. The CEMUS facility is operating as an ethanol transfer facility. The 2007 Water Permit indicated future plans to store asphalt, residual fuel, and petroleum black.

THE KAISER EAST LANDFILL

The Kaiser East Landfill is approximately 30 acres. It was opened during 1943 and was used as settling basins for spent bauxite (red muds). Two ponds existed, separated by crown levees on all sides. Shortly after opening, the land was converted into a landfill for plant wastes, including construction debris, asbestos insulation, caustic scale from pipes and vessels, alumina and pisolites (a coarse, sandy fraction of the spent bauxite separated prior to the settling process) and lime. The estimated thickness of the waste varies from about 35 ft along Monte Sano Bayou to about 20 ft adjacent to US Hwy190.

The landfill was closed in 1985 by capping with a 30 mil PVC liner and soil. At the time of the closure, the waste in the landfill was interpreted to be hazardous waste because of the presence of demolition debris containing asbestos insulation and spent bauxite, and other caustic materials. In the early 1980s, Kaiser submitted a Hazardous Waste Permit Application to the State of Louisiana and initiated compliance with the State and Federal operating standards for interim status hazardous waste landfills. Kaiser submitted the permit application as a conservative measure because the regulatory classifications (i.e., hazardous or nonhazardous) of asbestos and spent bauxite were unknown at the time.

In January 1990, the USEPA issued a final ruling on mining waste that specifically excluded spent bauxite from regulation as a hazardous waste (January 23, 1990 Federal Register Part III). Discarded asbestos is also not classified as hazardous waste. In October 1992, Kaiser received approval from the LDEQ officially reclassifying the East Landfill from a hazardous waste landfill to a nonhazardous solid waste landfill.



It should be noted that in 2004, ownership of the landfill was transferred from Kaiser to C&E Holdings Company and operation of the landfill was transferred to TRC Environmental. The site is now identified as the “TRC East Landfill” with a different Agency Interest Number differentiating it from the former Kaiser Facility.

Groundwater monitoring wells for the East Landfill range from 129 to 152 feet deep. A review of the analytical data from the August 2009 groundwater report indicates that the results were all below the established groundwater standards for the site. Three “leachate” wells that are screened within the landfill were also sampled. The leachate wells had elevated pH ranging from about 10 - 12 s.u. There is also evidence in the LDEQ files regarding potential seepage of high pH water from the landfill. A remediation report to fix the seepage was submitted by TRC to LDEQ in November 2008.

If construction of the bridge were to occur through the landfill, the buried debris, including asbestos, may have to be managed. These waste materials would likely be classified as nonhazardous although there may be special handling, and monitoring procedures required for the asbestos. In addition, there could be areas of high pH material related to the spent bauxite and/or caustic scale. The high-pH soils and debris would likely have to be disposed of offsite at a nonhazardous waste landfill. Runoff and seepage from water generated during construction through the landfill could have a high pH, which may require treatment prior to discharge, or could be hazardous waste if the pH in the runoff exceeds 12.5 s.u.

UOP

The UOP facility is located on approximately 50 acres south of US Hwy190, between the former Kaiser facility and the Kaiser East Landfill (Figure D-1). It is an inorganic chemical plant that manufactures specialty grade alumina trihydrate and reduction grade alumina ore. The plant was originally built in the 1940s for the U.S. Department of Defense and was later operated by Alcoa. Kaiser purchased the plant in the 1960s. LaRoche Industries purchased a portion of the plant from Kaiser in 1988. UOP acquired the facility from LaRoche in June 1999.

Phase I and Phase II investigations were done for the sale of the property to UOP. There were two soil remediation projects related to this sale that are documented in LDEQ files. Both of these projects were to remediate high pH soils. In the Demineralizer Area, soils were excavated and transported offsite for disposal. A 3-year groundwater-monitoring program down gradient of the area was conducted. The results were satisfactory, and LDEQ required no further action. In another area of high pH (identified as Area 50), the high pH soils were neutralized by injecting acid. The source of the high pH soils was expected to be from releases to ground surface from caustic precipitators that were on the adjacent property that was formerly operated by Kaiser. A review of the LDEQ files did not indicate any other soil or groundwater contamination on the property.



ETHYL/ALBERMARLE

The Ethyl facility is located on 193 acres to the south of the Kaiser landfill as shown on Figure D-1. Monte Sano Bayou flows through the north portion of the property. Ethyl was an active chemical plant from 1937 to 1985. In 1985, the manufacturing operations were shut down. Current manufacturing on the property is limited to the southeastern corner where Albemarle Corporation conducts research and pilot plant operations. Historical chemical production and/or use included chlorine, sodium, tetraethyl lead, solvents (including ethylene dichloride, perchlorethylene, methylene chloride, methyl chloride, carbon tetrachloride, and chloroform).

Groundwater contamination occurs from the historical Ethyl operations. Extensive subsurface soil and groundwater investigations have been conducted at the site since the 1980s and the first groundwater recovery wells were installed in 1983. The current groundwater recovery system includes 16 wells that recover contaminated groundwater in the 60-foot zone, 100-foot zone and 129-foot zone.

It is expected that the bridge alignment would not be directly within the Ethyl property, so the evaluation considered the potential for the groundwater contamination plumes to encroach on the area of potential bridge construction specifically whether the contamination has migrated northward toward US Hwy190. The September 2009 semiannual groundwater report was reviewed to evaluate constituent concentrations on the property. Ethyl monitors seven zones (30-foot zone, 60-foot zone, 100-foot zone, 120-foot zone 190-foot zone 400-foot zone, and 600-foot zone). Groundwater flow is generally to the north except within the influence of the recovery wells, which have developed cones of depression.

Monitor wells on the northern portion of the property are screened in the 30-foot zone, 60-foot zone and 100-foot zone. Chlorinated organics were detected in one of the northern wells within the 30-foot zone (maximum concentration of 1.3 mg/l of 1, 1-dichloroethane). Low concentrations (<0.25 µg/l) of pesticides including alpha-BHC (benzene hexachloride), beta-BHC and gamma BHC were detected in one of the northern 60-foot zone wells. These data indicate the potential for low concentrations of constituents within the upper 60 feet in the area north of the former Ethyl site. If bridge construction is planned for the area north of Ethyl, assessment of groundwater conditions within the construction area may be required to plan for worker protection and management of the soils and water that are generated during construction.

RHODIA

The Rhodia Baton Rouge Facility occupies approximately 100 acres of land to the north of US Hwy190, east of the Mississippi River as shown on Figure D-1. The Baton Rouge Facility manufactures sulfuric acid, liquid sulfur dioxide, synthetic vanilla, hydroquinone, pyrocatechol and veratol.



The Baton Rouge Facility is actually composed of two separate operations: Sulfuric Acid Plant producing sulfuric acid and other sulfur products since 1926 and the Cathyval Plant that began production of vanillin in 1990. The Baton Rouge Facility produces various grades of sulfuric acid and oleum using two sulfuric acid regeneration units (SARUs). The two SARUs produce sulfuric acid and other related products by in large part recycling spent acid obtained from refineries and business concerns. This recycling process requires the use of an industrial furnace to drive the reactions. The industrial furnace burns natural gas for fuel, but also burns hazardous waste as an alternative fuel.

Rhodia Inc. obtained the first operating permit for the Baton Rouge Facility effective January 28, 1989. The operating permit was issued with the Hazardous and Solid Waste Amendment (HSWA) provisions addressing site-wide corrective action at the Baton Rouge Facility. The permit required the submittal of a Remedial Field Investigation (RFI) report, dated July 15, 1992, addressing all the SWMUs listed with the exception of Impoundment 001. LDEQ approved the RFI report and concurred that no further action was required for the Solid Waste Management Units (SWMUs) addressed in the RFI. Impoundment 001 was a RCRA regulated treatment, storage, and disposal facility that was certified closed by the Department on December 24, 2003. Thus, Rhodia does not have any AOCs/SWMUs requiring corrective action at the Baton Rouge Facility. Review of the LDEQ files did not indicate significant groundwater issues that would affect construction of a bridge on the south side of US Hwy190.

FORMOSA

Formosa operates a chemical manufacturing facility on approximately 130 acres south of the CEMUS and UOP sites as shown on Figure D-1. The facility is south of Monte Sano Bayou and adjacent to the Mississippi River. Therefore, the facility is outside of the footprint of where the bridge would likely be constructed. If there were any impacts to the area of planned bridge construction resulting from Formosa, it would likely be from contaminated groundwater that had migrated from the site to the potential bridge construction area.

Historical chemical production and/or use at Formosa included caustic soda/chlorine production, ethylene dichloride/vinyl chloride monomer (EDC/VC) production, and polyvinyl chloride (PVC) production. Twenty solid waste management units have been identified at the facility. Based on the 2007 Hazardous Waste Post-closure Permit, there is ongoing corrective action at five of these areas.



Formosa also has ongoing groundwater monitoring and corrective action programs required by their Hazardous Waste and Solid Waste Permits. Formosa maintains eighty wells at the Baton Rouge plant site. Thirty of these wells (12 monitor wells, 3 recovery wells, and 15 piezometers) are screened in the "30 Foot" Sand. Thirty-seven wells (6 monitor wells, 10 recovery wells, and 21 piezometers) are screened in the "60-Foot" Sand. Four piezometers are screened in the "90-Foot" Sand and "120-Foot" Sand. One monitor well is screened in the "200-Foot" Sand, four wells (3 monitor wells and 1 recovery well) are screened in the "400-Foot" Sand, and two monitor wells are screened in the "600-Foot" Sand. One deep well (PW-19) is a process well and is screened in both the "400-Foot" Sand and the "600-Foot" Sand. A potable water well is screened in the "1,200-Foot" Sand.

Based on the Second Quarter 2009 groundwater monitoring report, groundwater flow is generally to the north and west across the site, which is towards US Hwy190. There does appear to be some radial flow toward the recovery pumping area at the northwestern area of the property. There are high concentrations of EDC (up to 3,000 ppm) in the area near this pumping center, which is about 1,800 feet south of US Hwy190. It is not evident from the data provided in the quarterly report that the northern boundary of the EDC plume is defined. However, LDEQ does provide oversight of the groundwater-monitoring program and would typically require delineation of the horizontal extent. If bridge construction is planned for the area north of Formosa, assessment of groundwater conditions within the construction area may be required to plan for worker protection and management of the soils and water that are generated during construction.

Summary of Environmental Issues

Figure D-1 shows known sources in the industrial area surrounding the US Hwy 190 Bridge crossing that could potentially have impacts on Corridor Section N2.

- Rhodia (formerly Rhone Poulenc): Review of the LDEQ files did not indicate significant groundwater issues that would affect construction of a bridge on the south side of US Hwy190;
- UOP (formerly Kaiser): High-pH soils have been remediated and there are no known current impacts;
- CEMUS (formerly U.S. Department of Defense, Alcoa, Kaiser and Laroche): Likely potential for high-pH soils and possible high pH in shallow groundwater;
- TRC East Landfill (former Kaiser East Landfill): Landfill contains construction debris, high pH soils, spent bauxite, alumina pisolites (a coarse, sandy friction of the spent bauxite separated prior to the settling process), lime, and asbestos. Seepage from the landfill has resulted in high pH readings in nearby surface water bodies.



- Formosa has ongoing monitoring and corrective action programs for ethylene dichloride in groundwater. LDEQ documentation indicated high concentrations within approximately 1800 feet of the southern boundary of N2.
- Ethyl/Albermarle has potential for low concentrations of chlorinated organics and pesticides in groundwater within the upper 60 feet in the area north of the former Ethyl site.

Construction Impacts

There are several issues that may impact construction of bridge columns in the area of the CEMUS, UOP, and TRC East Landfill facilities. These include the presence of high pH in soil and shallow groundwater from the former Kaiser facility and the potential for chlorinated organics and pesticides in groundwater from the Formosa and Albermarle facilities. Additionally, there may be potential conflicts with existing underground concrete structures (WWII era bunkers) at the CEMUS and UOP facilities.

Impacts to construction from these environmental issues include:

- Costs of excavating existing waste, soil and debris, if required, and transporting to an offsite landfill;
- Cost to bring in fill material suitable for construction of bridge columns.
- Worker protection methods would need to be employed during the handling of this material.
- Cost to encapsulate piles driven in areas of high pH soils.

At this time, the exact location of the bridge columns is not known nor is the location of the underground bunkers. During the final alignment study phase of this project, a detailed investigation of the soil and groundwater conditions in the area of the proposed columns should be conducted to evaluate impacts and determine the most feasible remediation requirements.

Some environmental impacts that may result from construction in this area include:

- Potential for high pH to affect soil strength characteristics and the ability of the soil to support foundation elements;
- Creating a vertical conduit that would accelerate transfer of constituents to a lower aquifer; and
- Possible leaching of high pH soils into Monte Sano Bayou.



Estimates of Environmental Remediation Costs

Unit costs were developed for excavation within the CEMUS site (former Kaiser Property) and the TRC East Landfill (former Kaiser East Landfill). These costs were developed using readily available information and do not take into account unknown conditions that were not identified during the LDEQ documentation review for these industrial facilities.

The assumptions used for onsite management of high pH soils from the CEMUS site (former Kaiser Facility) include:

- High pH would occur typically in the upper 15 feet;
- Offsite transportation would not be required. Soils could be managed and left onsite (includes excavation/handling/grading); and
- Limited groundwater management would be required.

If the soil from the CEMUS site requires excavation and can be managed on site, the estimated cost to excavate, handle and grade the material would range from \$7 to \$10 per cubic yard.

The assumptions used for offsite transportation and disposal of high pH soils from the CEMUS site (former Kaiser Facility) include:

- High pH would occur typically in the upper 15 feet;
- Soils would be required to be excavated and transported to an offsite solid waste landfill (within 50 miles) for disposal; and
- Limited groundwater management would be required.

Based on these assumptions, the estimated cost to excavate, handle, transport and dispose of materials from the CEMUS site would range from about \$130 to \$170 per cubic yard and includes a 30% contingency. Costs for oversight, management of the work, and reporting are assumed to range from \$760,000 to \$2,000,000.

The assumptions for removal of high pH soil/debris, spent bauxite, and asbestos from the TRC East Landfill include:

- Material excavated from the landfill would typically occur in the upper 15 feet;
- Material excavated could be disposed of as nonhazardous in a solid waste landfill;
- The solid waste landfill would be located within about 50 miles of the work; and
- Groundwater management would be required.



Based on these assumptions, the estimated cost to excavate, handle, transport and dispose of materials from the TRC East Landfill would range from about \$130 to \$170 per cubic yard and includes a 30% contingency. Costs for oversight, management of the work, and reporting are assumed to range from \$760,000 to \$2,000,000. There may also be permitting and design costs for material left in-place at the East Landfill of about \$260,000.

The above estimates assumes all material encountered would be managed as nonhazardous solid waste. In the event that hazardous waste is encountered either from the adjacent sites with chlorinated organics in the groundwater or due to conditions that were not identified in the review, the unit cost would be about \$390 per cubic yard for excavation, handling, transportation and disposal at a permitted hazardous waste landfill. This cost assumes all material would meet treatment standards and could be disposed of in a landfill without prior treatment.

If the excavated material has constituent concentrations that are higher than the land disposal treatment standards the material either would have to be treated prior to land disposal, or a different disposal method would have to be selected. Additional treatment/disposal options were considered to meet these criteria and the unit cost (including a 30% contingency) is estimated as follows:

- Macroencapsulation (for hazardous debris) at about \$520 per cubic yard (includes excavation, transportation and disposal);
- Bioremediation at about \$1,000 per cubic yard (includes excavation, transportation, and disposal); and
- Bulk incineration at \$1,400 per cubic yard (includes excavation, transportation, and disposal).

If hazardous waste is encountered, there would be additional considerations including the requirement that the work be done under CFR 1910.120 using contractors qualified for Hazardous Waste Operations (HAZWOPER).

Limitations

The information and interpretations provided in this document are based on a limited review of selected available documentation in the LDEQ files. The intended purpose is to provide a general overview of the environmental conditions at these industrial facilities for planning purposes. The regulatory interpretations for disposal options and costs are also of a general nature and may not reflect site-specific conditions that were not identified in the review. It should be noted that property boundaries in Figure D-1 may not coincide with actual legal property boundaries.



Figure D-1: Potential Facility Impact Area