

10414 McKalla Place Environmental Assessment and Remediation Summary

Background

The 23.5 acre property was developed as a chemical manufacturing plant in 1956. Reichold Chemical manufactured and handled several chemicals used to react with polyester resins made for boat and fiberglass industries from 1957 to 1985. The site consisted of approximately 15 buildings, a tank farm, two drum storage areas, one surface wastewater treatment impoundment, several caliche and asphalt covered roads and parking areas. Additionally, Reichold constructed five earthen surface impoundments, and six lined surface impoundments as part of their manufacturing and wastewater handling processes. In response to repeated releases and environmental citations, Reichold ceased use of the earthen impoundments and constructed the concrete and fiberglass surface impoundment for processing of plant wastewater.

Reichold identified 20 waste streams, including methyl ethyl ketone peroxide (MEKP), benzoyl peroxide (BPO), tert-butyl perbenzoate (t-BP) and dimethyl phthalate (DMP), on their solid waste registration submitted to a TCEQ-predecessor agency in 1977. The waste streams were stored on-site; processed by the wastewater treatment system and discharged to the COA sanitary sewer; or shipped off-site to a licensed waste handling facility for disposal.

Reichold permanently ceased operations in 1985, following an explosion. Reichold submitted a closure plan to the TCEQ predecessor agency in March 1985, which outlined activities to permanently close all operations, decontaminate and remove all equipment associated with the manufacturing and processing operations, and remove all wastes from the property. The former earthen ponds were shut down sometime between 1978 and 1980. Two of the ponds were drained and the liners removed, one was treated with lime, one contained fresh water and was allowed to dry up on its own. Soil samples were collected and tested for MEK, which was not found in any of the samples collected above the detection limit. A letter of closure was issued to Reichold in December 1985 by TCEQ's predecessor agency. Another closure letter was issued in 1994.

Following plant decommissioning and closure, the property was unoccupied from 1985 to 1995.

As part of COA's environmental due diligence, Phase I and II Environmental Assessments were completed prior to purchasing the property in 1995. Soil borings were installed at various locations throughout the property. Samples were analyzed volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs), which were not detected, except for benzene and toluene in one (1) sample. Following these results, 18 additional soil borings were installed in the impoundment area. VOC and SVOC analysis run on the samples were below the applicable risk-based levels.

In 2001, COA completed additional assessment in the area of the former earthen ponds, installing 15 test pits in the same area as the previous soil borings. VOC and SVOC analyses run on the samples were below applicable risk based levels.

2003 Explosion

On November 3, 2003 an explosion occurred at the property during excavation activities, injuring several workers. Initial testing and interviews determined the explosion was likely caused by a backhoe bucket encountering a container or pocket of benzoyl peroxide (BPO). BPO is a highly reactive and, in some cases, flammable chemical that may explode when subject to shock, vibration or friction. The decomposition of BPO results in the formation of a dense white smoke, consisting of benzoic acid, phenyl benzoate, terphenyls, biphenyls, benzene and carbon dioxide. Research into the nature of BPO reactions indicated that the "gun powder" odor prevalent at the blast site is also indicative of a BPO reaction.

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Assessment

After the explosion, COA completed multiple investigations to determine the cause of the explosion.

Starting November 4, 2003, five soil samples were collected from the excavator bucket teeth, the bucket, and from soils that had been thrown from the trench during the explosion, as well as two samples of a resin material that had also been thrown from the trench. At the time of the sampling, no reliable, conventional method for the analysis of BPO was available through commercial laboratories. The samples were analyzed for VOCs, SVOCs, pH, Nitrates, and ignitability. The results indicated that several potential degradation products of BPO, MEKP, and t-BP were present in samples collected from the excavator bucket and teeth.

The initial subsurface investigation consisted of research into former operations and chemicals used by the former owner, a geophysical survey of the former earthen ponds using non-intrusive technology and the investigation of 179 geophysical anomalies located in/around the former earthen ponds. Because of the threat of explosion and the unstable nature of BPO, industry-accepted assessment strategies and conventional investigation techniques could not be employed. The investigative excavation work required special equipment and procedures during all geophysical anomaly excavation activities to oversee health and safety, and necessary support and monitoring equipment, as outlined in the Site-specific Health and Safety Plan (SSHSP). Additionally, a conventional analytical method had not yet been developed for the analysis of BPO in soil and in bulk form. Because of these factors, and to provide adequate safety measures for on-site personnel as well as to remove the threat to future workers and on-site occupants, it was determined the most efficient and safest method to further investigate the on-site property was to excavate the majority of soils. The excavated soils from the ground surface to the underlying limestone bedrock were processed to determine whether BPO was present based on visual and olfactory evidence.

Soil was removed incrementally, and then sifted through before setting it to either side of the excavation. When a subsurface object was uncovered, operations ceased to allow any rapid chemical reactions to occur. Once it was determined safe, the object was visually inspected. The excavation activities proceeded until native undisturbed material was reached. Following excavation, the spoil piles were examined to locate additional objects that might not have been seen during the excavation. Once the objects were collected and documented, the excavation was backfilled, unaffected soils were replaced on-site and compacted.

This investigation revealed the presence of buried containers containing BPO in a former wastewater treatment pond, and concluded there was a reasonable basis that bulk BPO buried in the subsurface caused the November 2003 explosion. Three areas were found to be affected as a result of the investigation and in need of remediation.

Affected Property No. 1 - Container Area

In September 2004, an approximate 20 ft. x 20 ft. area of soil/fill material containing various unknown containers was encountered to the east of the former Un-Numbered Ponds. The containers ranged in size from medical bottle/eye-dropper size to approximately one quart. The majority of the containers were glass, unlabeled and several contained unknown material.

Affected Property No. 2 - Southern Portion of Pond 1A

In September 2004, an approximate 90 ft. x 120 ft. area of soil located in the southern portion of the former Pond 1A was encountered that contained pieces of bulk BPO. The BPO ranged in size from pebbles to +5-inch diameter chunks. The presence of BPO was confirmed by analysis of wipe samples from the bulk BPO and

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later by analysis of samples of the bulk BPO. The analysis indicated that the material contained high-grade (or pure) BPO. Pieces of bulk BPO were observed within the soil matrix as well as within soil excavated from around the material.

Affected Property No. 3 - Un-Numbered Ponds Area

In October 2004, an approximate 150 ft. x 50 ft. area of soil/fill containing stiff plastic material was encountered in close proximity to the presumed location of the former Un-Numbered Ponds. The soils surrounding the plastic material appeared to be stained and a chemical odor was noticed by the excavation crew. During the excavation there were no visual indications of the presence of "bulk" BPO; however, field personnel detected odors consistent with those found in other areas on the site where BPO was present.

Remediation

Excavation of soils at the affected properties was determined to be the best and safest remedy due to the potential hazards posed to future occupants of the affected property by the reactive and potentially explosive nature of bulk BPO in the soils. Excavation and removal prevents the exposure of potential receptors to chemicals of concern (COCs) in soils and underlying groundwater. Excavation activities were initiated in October 2004 and completed in May 2005. Soil containing COCs above the cleanup level was removed from the affected property and properly disposed of at licensed off-site facilities. COCs were confirmed to be below appropriate cleanup level by verification sampling.

The excavated materials from the affected properties were segregated into two categories, A and B, based on the presence or potential presence of BPO. Category B soil and materials had some indication of the presence of BPO, such as the gunpowder odor, but did not show any visible indications of BPO in bulk. These materials were staged in PVC covered and lined stockpiles and sampled for the presence of reactive or explosive materials and companion chemicals to determine waste classification for disposal. Category B material was classified as Class II Non-hazardous industrial solid waste and was disposed of at the BFI Landfill located in Austin, Texas.

Category C soil and materials had obvious indications of the presence of BPO such as gunpowder odor and visible evidence of BPO in bulk as confirmed by the evaluation of relative density and ignition testing. These materials were staged on-site in PVC covered and lined stockpiles until the waste classification and final volume had been determined. Soil was visually inspected, and bulk pieces of BPO material were removed from the soil matrix. Once the bulk BPO and soil were segregated, the bulk BPO was classified as 0003 characteristic hazardous waste and transported off-site and incinerated at the ONYX Environmental Services facility located in Port Arthur, Texas.

The remaining soil was treated on-site with caustic (NaOH) and samples were collected for characterization of the waste prior to disposal. Based on the waste characterization data, the material was classified as Class II non-hazardous industrial solid waste and was disposed of at the BFI Landfill located in Austin, Texas.

Affected Property No. 1 - Container Area

Material excavation was conducted on October 8, 2004 in order to safely remove the container material and surrounding affected soil in the area. A "controlled crush" of excavated containers and surrounding material was performed in close proximity of the area where the container/soil mix was visually evident. The material was mixed and crushed in place using the excavator bucket to break the containers as much as possible. Once the material was crushed, blended and any physical and/or chemical reaction had taken place, the material was moved to a designated staging area. This operation was repeated until all visible container/soil mix was crushed, reacted, blended and staged.

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Approximately 28 tons of material and soil were removed, stockpiled, and analyzed for toxicity characteristics leaching procedures (TCLP) VOCs, SVOCs and selected metals; characteristics of ignitability, reactivity and corrosivity; and total petroleum hydrocarbons (TPH). Analytical results indicated that the soils met the requirements for disposal as Class II non-hazardous industrial waste, and were transported for disposal to the BFI Landfill in Austin, Texas, on May 4, 2005.

Verification soil samples were collected from the base of the excavation and submitted for chemical analysis. Samples were analyzed for concentrations of BPO, VOCs, SVOCs, and selected metals to verify that soils containing targeted chemicals at concentrations above appropriate cleanup levels were removed during excavation activities.

Affected Property No. 2 - Southern Portion of Pond 1A

From January 22 to January 25, 2005, bulk BPO and surrounding soils to near the soil/ limestone bedrock interface were removed, characterized, and disposed off-site. Due to the potential explosive hazards posed by bulk BPO, the area was soaked with water spray to increase the soil moisture and wet any bulk BPO present, reducing the potential for reaction. Excavation activities effectively removed all soil overlying the limestone bedrock within the affected property. These soils were temporarily staged on-site on PVC lined and covered stockpiles until the proper means of disposal was determined.

Both Category B and C material were excavated at the affected property. Approximately 9720 tons of Category B material were excavated, stockpiled, characterized and disposed of as Class II non-hazardous industrial solid waste. These soils were transported for disposal to the BFI Landfill in Austin, Texas from April 8 to April 15, 2005.

To handle the approximately 1318 tons of Category C material, a segregation pad was built to inspect the material in discrete batches. The Category C material was placed on the pad in six-inch lifts, and disturbed, turned and inspected manually. Visible pieces of bulk BPO were removed and securely stored in 5-gallon containers, immersed in water. Once the inspection and removal of bulk BPO was complete, a 10% caustic solution (NaOH) was applied to the soil to deactivate any BPO fragments that may have remained. The caustic solution was allowed time to react with potential oxidizers in the soils prior to removal of the material from the pad. These soils were then stockpiled for waste characterization sampling.

Approximately 475 pounds of bulk BPO was segregated from the Category C material and transported off-site for disposal as D003 hazardous waste at the ONYX Environmental Services facility, located in Port Arthur, Texas, on April 25, 2005.

The remaining 1318 tons of soil were analyzed for VOCs, SVOCs, selected metals, BPO, TPH, and characteristics of reactivity, ignitability and corrosivity. In addition, the material was tested to determine the presence of oxidizing solids as per the DOT requirements. Analytical results indicated that the soils met the requirements for disposal as Class II non-hazardous industrial waste. These soils were transported for disposal to the BFI Landfill in Austin, Texas, on May 3 and 4, 2005.

Verification samples were collected from remaining soil immediately above the limestone bedrock within the excavated area at the affected property. The sampling locations were based on a sampling grid system established over the affected property that was developed to collect samples at a frequency of one per 30 ft. x 30 ft. area. The samples were submitted for chemical analysis of BPO, VOCs, SVOCs, and characteristics of ignitability, reactivity and corrosivity to verify that soils containing targeted chemicals at concentrations above appropriate cleanup levels were removed during excavation activities.

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Affected Property No. 3 - Un-Numbered Ponds Area

Material and surrounding soil was removed in lifts to near the top of the limestone bedrock, observing for both visual and olfactory evidence of BPO or suspect material, and segregating the material for handling and disposal. On January 13, 2005, approximately 1173 tons of material and soil were removed, stockpiled and analyzed for waste characterization. Analytical testing was conducted for BPO, characteristics of ignitability and the presence of oxidizing solids as per the DOT requirements. Analytical results indicated that the soils met the requirements for disposal as Class II Non-hazardous Industrial waste, and were transported for disposal to the BFI Landfill in Austin, Texas, from April 15 to 18, 2005.

Verification soil samples were collected for chemical analysis from the base of the excavation immediately above the top of the limestone bedrock. Samples were collected at 25-foot intervals along the 150-foot length of the affected property. The samples were submitted for chemical analysis of VOCs, SVOCs and selected metals to verify that soils containing targeted chemicals at concentrations above appropriate cleanup levels were removed during excavation activities.

At Affected Property No. 3, VOCs, SVOCs and metal COC concentrations that were detected in verification samples were below critical PCLs, with the exception of selenium. The verification samples were collected from a thin veneer of soil that remained on the limestone bedrock after excavation activities. In essence, all soil that could practically be removed was excavated and disposed of off-site and, therefore, selenium concentrations in this thin soil veneer would not cause an unacceptable risk.

A Response Action Completion Report was submitted to Texas Commission on Environmental Quality (TCEQ) in October 2005, summarizing the remediation activities. TCEQ issued a no further action letter in March 2006. The majority of the property received closure under the Texas Risk Reduction Program (TRRP) for residential (or unrestricted) land use. A portion of the property was restricted to commercial/industrial land use, and had an institutional control filed on the deed.

In 2016, COA performed additional assessment to address the restricted land use. Two monitoring wells were installed at the site to develop a site-specific cleanup level for Selenium and BPO. The calculated cleanup levels allowed the land use restriction to be lifted, which means the entire property now has unrestricted/residential land use.
