



WEST VIRGINIA

DEPARTMENT OF ENVIRONMENTAL PROTECTION

FINAL DECISION AND RESPONSE TO COMMENTS

**Former Private Trucking Operations Union
Carbide Corporation NITRO, WEST
VIRGINIA**

EPA ID NO. WVD 000739722

July 2016

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I. INTRODUCTION

The West Virginia Department of Environmental Protection (WVDEP) is issuing this Final Decision and Response to Comments (FDRTC or Final Decision) for the Former Private Trucking Operations (PTO) Union Carbide Corporation Nitro, West Virginia. The Facility is subject to the Corrective Action program under the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act (RCRA) of 1976, and the Hazardous and Solid Waste Amendments (HSWA) of 1984, 42 U.S.C. Sections 6901 to 6992k. The Corrective Action program is designed to ensure that certain facilities subject to RCRA have investigated and cleaned up any releases of hazardous waste and hazardous constituents that have occurred at their property.

On June 3, 2016 WVDEP issued a Statement of Basis (SB) in which a proposed Final Remedy for PTO was proposed groundwater recovery, groundwater monitoring, engineering controls consisting of capping and fencing, and institutional controls to implement land and groundwater use restrictions.

Consistent with public participation provisions under RCRA, the WVDEP requested comments from the public on the proposed Final Remedy. The thirty (45) day public comment period began on June 3, 2016 and ended July 19, 2016. No comments were received by WVDEP during the comment period. Since no comments were received during the comment period, WVDEP has determined that it is not necessary to modify its proposed Final Remedy as set forth in the SB.

V. Final Remedy

The proposed remedy for PTO consists of various combinations of Institutional and Engineering Controls (both existing and potential future controls) groundwater recovery, and groundwater monitoring. Specifically the remedy for each Area consists of:

- SWMU 1 Area – maintain the soil cover, institutional controls restricting land and groundwater use, and groundwater monitoring;
- SWMU 3 Area – maintain the soil cover, institutional controls restricting land and groundwater use, groundwater recovery, and groundwater monitoring;
- SWMU 7 – institutional controls and groundwater monitoring;
- SWMU 9 – Former Surface Impoundments – in addition to the current post-closure care permit, institutional controls restricting the land and groundwater;
- Central Waste-In-Place Area – maintain the soil cover, institutional controls restricting land and groundwater use, and groundwater monitoring;
- Central Commercial/Industrial Use Area – institutional controls restricting land and groundwater use and groundwater monitoring.
- Ryan’s Branch Area – maintain soil cover, stormwater management, institutional controls restricting land and groundwater use, and groundwater monitoring.

A. Land and Groundwater Use Restrictions

Because contaminants remain in the soil and groundwater at PTO above levels appropriate for residential use, DEP's proposed remedy requires land and groundwater use restrictions to restrict activities that may result in exposure to those contaminants. DEP proposes that the restrictions be implemented and maintained through institutional controls (ICs). ICs are non-engineered instruments, such as administrative and legal controls, that minimize the potential for human exposure to contamination and/or protect the integrity of a remedy by limiting land or resource use.

DEP is proposing the following land and groundwater use restrictions be implemented through ICs:

- a) The PTO Facility shall only be used for non-residential;
- b) Impacted groundwater both onsite and offsite shall not be used for any purpose, including, but not limited to, use as a potable water source, other than to conduct the maintenance, remediation, and monitoring activities required by DEP and/or EPA;
- c) The owner shall notify DEP of all future construction activity at the facility in subsurface work restriction areas (reference figure 3-2, Institutional Controls), and demonstrate that such construction activity will not pose an unacceptable risk to human health or the environment. The construction activity shall not adversely affect the integrity of the selected remedy or the owner shall provide for the restoration of the selected remedy. The demonstration shall take into consideration existing site conditions including buried waste, impacted subsurface soils, impacted groundwater and potential vapor intrusion. The owner shall not commence construction activities until written approval is provided by DEP;
- d) Existing soil cover and cap shall be maintained to limit infiltration and prevent exposure in compliance with the approved Operations and Maintenance Plan;
- e) All earth moving activities at the PTO Facility, subsurface work restriction areas (reference figure 3-2, Institutional Controls) including excavation, drilling and construction activities, shall be conducted in compliance with the an approved Soil Management Plan that includes appropriate Personal Protective Equipment requirements sufficient to meet DEP's acceptable risk and complies with all applicable OSHA requirements in a manner such that the activity will not pose an unacceptable threat to human health and the environment or adversely affect or interfere with the integrity of the final remedy;
- f) The PTO Facility shall not be used in a way that will adversely affect or interfere with the integrity and protectiveness of the final remedy.
- h) In the event there are any newly occupied buildings or new construction, it will be required that a vapor control system along with a monitoring /maintenance system and plan shall be put into place.

The land and groundwater use restrictions necessary to prevent human exposure to contaminants at PTO will be implemented through enforceable ICs such as a permit and/or an Environmental Covenant pursuant to the West Virginia Uniform Environmental Covenants Act (WV Code Chapter 20 Article 22B). If DEP determines that additional maintenance and monitoring activities, institutional controls, or other corrective actions are necessary to protect human health or the environment, DEP has the authority to require and enforce such additional

corrective actions through an enforceable mechanism which may include a permit or Environmental Covenant, provided any necessary public participation requirements are met.

III. FACILITY OWNERSHIP AND HISTORY

PTO is located on State Route 25 in Nitro, West Virginia, which is approximately 2 miles west of Institute, West Virginia (Figure 1). The Facility is bounded on the south by the Kanawha River, to the north by State Route 25 and Gabbert's Branch Tributary, to the west by Gabbert's Branch, and to the east by Ryan's Branch and the Union Carbide Corporation Institute wastewater treatment plant (WWTP). The Facility is located within the Kanawha River 500-year floodplain. Because of onsite filling and grading, the land is relatively flat. North of the facility (northern side of State Route 25), the topography becomes steeper as the land transitions from the floodplain to the bedrock hills.

Between 1942 and the early 1970's, the Facility was used mainly by the Union Carbide Corporation (UCC) Institute Facility for the disposal and storage of chemicals, chemical byproducts, and construction debris. Disposal units for these chemicals and debris reportedly extended 10 to 15 feet below ground surface (bgs). Most disposal operations ceased after 1965 when the Goff Mountain Landfill opened. Between 1974 and 1975, a cleaning facility for tank trucks and rail cars was constructed in the eastern portion of the Facility. Cleaning fluids and rinsate from daily operations flowed into channel drains, which led to an onsite RCRA-regulated pretreatment system, Solid Waste Management Unit (SWMU) 9 that included three surface impoundments. The pretreatment system was taken out of service in 1985 after the cleaning facility ceased operations. With the exception of the active rail yard, the facility has been inactive since 1985.

IV. SUMMARY OF PREVIOUS ACTIONS AND INVESTIGATIONS

At one time, the facility operated three surface impoundments used for the storage and treatment of wastewater associated with the operation of an onsite wastewater pretreatment facility. The SWMUs at the facility initially were defined in the RCRA Part B permit application for the surface impoundments (SWMU 9). In August 1985, UCC submitted an RCRA Part B permit application to WVDEP for the wastewater pretreatment facility. Shortly after submittal, UCC decided to close the PTO facility, including the impoundments.

The former onsite wastewater pretreatment facility was used to treat wastewater generated from cleaning tank trailers and ancillary equipment, and wastewater from the four trailer heels storage tanks, steaming area, and railcar cleaning area. The SWMU was active from 1976 to 1985. The three surface impoundments were closed collectively as one unit in 1987. During closure, sludge wastes were combined into one basin, compacted and stabilized, and covered with a single engineered cap.

In 1987, the facility submitted an application for a post-closure permit for SWMU 9. The West Virginia Division of Natural Resources (WVDNR) requested modifications to the application, but the permit application was postponed so RCRA corrective action could be incorporated into the permit. In 1999, USEPA and UCC entered into a Facility Lead Agreement to conduct sitewide corrective action at the facility. In 2007, WVDEP requested that the facility apply for a post-closure permit for SWMU 9, which UCC submitted in June 2007. The January

2002 RCRA Facility Investigation Report defined the list of SWMUs to include thirteen SWMUs:

- SWMU 1 – Western Landfill
- SWMU 2 – Sodium Metal Area
- SWMU 3 – Former Clay-Lined Ponds
- SWMU 4 – Temik Disposal Area
- SWMU 5 – Ground Burner and Drum Disposal Area
- SWMU 6 – Incinerator (Teepee)
- SWMU 7 – Solid Waste Disposal Area
- SWMU 8 – Drum Storage Area
- SWMU 9 – Wastewater Pretreatment Facility
- SWMU 10 – Container Storage Pads
- SWMU 11 – Waste Oil Tank
- SWMU 12 – Heel Tanks and Dumpster
- SWMU 13 – Drum Disposal Area

A. SWMU 1 Area

Three SWMUs are collectively called the SWMU 1 Area. The three SWMUs, SWMU 1, SWMU 2, and SWMU 13 are collocated in the Western Landfill. The Western Landfill was in operation from approximately 1952 to 1978 and includes approximately 7 acres. The area was used for the disposal of Class II and Class III wastes; demolition wastes; anaerobic sludge and other solids from the Institute WWTP as well as sand, clay, and chemicals from plant spill/cleanup operations.

SWMU 2, the Sodium Metal Area, was created in the late 1970's when approximately 10,000 five-gallon cans of sodium metal waste packed in mineral oil were stored in a shed located within the eastern portion of SWMU 1. In 1977 and 1978, a fire involving the sodium metal occurred. The unburned containers might have been buried during efforts to extinguish the burning sodium metal.

In approximately 1975, the UCC South Charleston Facility sent 5,000 drums to PTO. The drums contained mostly solids and sludge's. Two trenches were excavated along an east-west axis about 8 to 14 feet deep within the northwestern portion of the Western Landfill. The drums were crushed with a bulldozer blade, pushed into the trench, and covered with approximately 4 feet of compacted clay. The approximately 0.9 acre area was defined as SWMU 13.

An interim measure was completed in the mid-1980s at the SWMU 1 Area consisting of cover improvements and regrading to improve surface water drainage characteristics. The regraded area was seeded, fertilized, and mulched to establish a vegetative cover.

In 2012 an evaluation was completed to characterize the thickness, permeability, and chemical composition of the cover material of the SWMU 1 Area. Surface soil was evaluated to confirm "clean fill" was used for the soil cover. The minimum cover thickness measured during the evaluation was 3 ½ feet of stiff clay overlain by vegetated topsoil. Analytical results

indicated arsenic, mercury, Aroclor-1260, and benzo(a)pyrene are present in surface soils at concentrations above the minimum, adjusted USEPA industrial soil regional screening level (RSL); however, it was concluded that the screening criteria exceedances do not preclude the cover material from being characterized as clean fill. Subsurface soil was not evaluated for the SWMU 1 Area because it is a waste management area.

Based on the cover evaluation, the soil cover is protective of human health and the environment; however, if intrusive activities are conducted within the SWMU 1 Area in the future, workers may potentially be exposed to buried waste or impacted soil. In addition, human receptors could be exposed to VOCs in buried waste through vapor intrusion (VI) if new buildings are constructed on the SWMU 1 Area. Groundwater associated with the SWMU 1 Area is impacted by VOCs (primarily TCE, cis-1,2-dichloroethene, vinyl chloride, and 1,4-dioxane) at concentrations exceeding human health screening levels. Based on current land use, the groundwater exposure pathways are incomplete; however, human receptors could be exposed to constituents in groundwater in the future if groundwater is used as a potable source of water. TCE concentrations in groundwater exceed the ecological screening level in the western portion of the SWMU 1 Area; however, TCE was not detected in November 2015 from the most downgradient monitoring well (MW-131). TCE concentrations show an increasing trend in two monitoring wells (TW-01 and MW-105); however, the plume is not expanding and concentrations in downgradient monitoring wells are stable or decreasing.

B. SWMU 3 Area

The SWMU 3 Area includes SWMU 3 and most of SWMU 4. SWMU 3 includes two basins, each approximately 1 acre in area, 17 feet deep, and lined with 2 feet of clay, operated between 1950 and 1968. Reportedly, the basins were used to store coal hydrogenation and dripolene wastes, but at times stored or had been used to dispose of off specification products manufactured at the adjacent Institute WWTP. These products included acrolein, plyols, Tergitol, UCON fluids, Sevin, and Flexol plasticizer filter papers. In 1965, some of the basin contents were trucked to Goff Mountain Landfill. The remaining contents reportedly were covered with fly ash, limestone, nickel catalyst, and copper chromium catalyst. The ponds were then filled with construction and demolition waste and covered.

In 1972, approximately 25,000 pounds of 2 percent Temik were treated with lime and tilled into the ground; the Temik Disposal Area became SWMU 4.

Surface soil in the SWMU 3 Area was evaluated to determine where cover improvements were needed. The interim remedy for SWMU 3 was to improve the existing soil cover to further reduce infiltration of precipitation. Twelve inches of clay material was added in two 6-inch lifts and compacted to optimum moisture content as determined by a standard Proctor test (ASTM D698) to permeability less than 1×10^{-7} centimeters per second (cm/sec). Six inches of topsoil was placed over the clay and established with grass. The cover improvements were completed across the majority of the SWMU in 2012. Subsurface soil was not evaluated for the SWMU 3 Area because it is a waste management area.

Investigation results indicate non-aqueous phase liquid (NAPL) is confined to the buried waste within SWMU 3 and is not present within the lower sand aquifer beneath SWMU 3. NAPL also has been observed on the UCC Institute property to the east. Based on the NAPL

observations in BCS-RW-01, the NAPL on UCC Institute property is residual and not mobile. Groundwater in the aquifer beneath the SWMU 3 Area is impacted by VOCs (primarily vinyl chloride and 1,4-dioxane) and SVOCs (primarily bis(2-ethylhexyl)phthalate [BEHP]) at concentrations exceeding the human health screening levels. Based on current land use, the groundwater exposure pathways are incomplete; however, human receptors could be exposed to constituents in groundwater in the future if groundwater is used as a potable source of water, or through VI if new buildings are constructed. BEHP concentrations in groundwater exceed the ecological screening level; however, BEHP concentrations in downgradient monitoring wells are below the ecological screening levels, confirming groundwater is not affecting the Kanawha River.

C. Central Waste-In-Place Area

The Central Waste-In-Place Area includes nearly all of SWMU 5, SWMU 11, the location of former Building 100, and areas north, east, and south of SWMU 5 where buried waste is known or suspected to be present.

SWMU 5 is the former ground burner and drum disposal area and was located near the building foundation of former Building 100. The unit is believed to have been in operation between 1950 and 1967. The former ground burner was used to dispose of waste, including experimental materials from research and development, and filter papers from silicate processes. The burned wastes included products from the adjacent Institute WWTP and UCC South Charleston facilities, and possibly oily wastes from SWMU 3. After the ground burner was dismantled, approximately 13,000 drums were drained, crushed, and buried in the area. The crushed drums contained materials such as silicon chloride, carbon black, toluene diisocyanate, acetone washings, ethyl silicate filter papers, arsenic weed killer, acetylides, styrene (traces), benzene (traces), and cobalt complexes. SWMU 5 contains buried waste that exceeds human health risk screening levels for arsenic; BEHP; benzene; cis-1,2-dichloroethene (1,2,-DCE); benzo(a) anthracene; benzo(a) pyrene; benzo(b) fluoranthene; dibenzo (a,h) anthracene; indeno (1,2,3- cd) pyrene; tetrachloroethene; mercury; naphthalene; and vinyl chloride. The area outside of SWMU 5 but within the Central Waste-In-Place Area contains buried waste that exceeds human health risk screening levels for arsenic; BEHP; benzo(a) anthracene; benzo(a) pyrene; benzo(b) fluoranthene; mercury; and naphthalene.

The area defined as SWMU 11 contained two 1,000-gallon aboveground waste oil tanks that were located on the western side of former Building 100. The tanks were used between 1976 and 1997. They were emptied, cleaned, and transported offsite for disposal in conjunction with the demolition of Building 100.

The cover over the Central Waste-In-Place Area contained areas where potential direct contact could occur because of relatively thin cover thickness. The interim remedy for the area was to maintain a soil cover over buried waste to eliminate direct contact and maintain institutional and engineering controls to limit potential exposures to the buried wastes and contaminated groundwater by adding an additional 12 inches of cover material (6 inches of clay and 6 inches of topsoil) to the existing soil cover in the area.

If intrusive activities are conducted within the Central Waste-In-Place Area in the future, workers may potentially be exposed to buried waste or impacted soil. Groundwater beneath the

Central Waste-In-Place Area is impacted by VOCs (primarily benzene, TCE including its degradation products, and 1,4-dioxane) at concentrations that exceed human health risk screening levels. Based on current land use, the groundwater exposure pathways are incomplete; however, human receptors could be exposed to constituents in groundwater in the future if groundwater is used as a potable source of water or through VI if new buildings are constructed.

D. Central Commercial/Industrial Use Area

This area consists of SWMUs 6, 8, 10, 12, the area surrounding these SWMUs and the area north and east of SWMU 9.

SWMU 6—Incinerator (Teepee) - The Teepee unit operated from 1956 to 1967. It was used to burn solid waste from the Institute WWTP and liquid waste prior to 1960. Waste included wood, paper, filter paper, and filter cake. No volatile materials were burned in this unit; volatiles were burned at SWMU 5.

SWMU 8—Drum Storage Area - Between 1976 and 1980, drums containing hazardous and nonhazardous waste were stored adjacent to the former heels shed area. During that time, drums were stored mainly on concrete, but some drums were stored on dirt and/or gravel. The drums were analyzed, treated, and removed in 1980.

SWMU 10—Container Storage Pads - Between 1976 and 1985, two container storage pads with concrete bases and curbing were used for storing drums. Details of the closure of container storage area were submitted in the WVDEP-approved closure/post-closure plan.

SWMU 12—Heel Tanks and Dumpster - Four 600-gallon heel tanks were located adjacent to the container storage pads. The tanks were used to store 2-ethylhexanol, acetone, methylhydropyran/LP40, and raw materials. The dumpster area near the former heels shed was used from 1976 to 1985 to handle nonhazardous solid waste. On occasion, heavy nonhazardous sludges were placed in the dumpster. These sludges were disposed of at Goff Mountain Landfill. Details of the closure storage tanks were submitted in the WVDEP approved closure/post-closure plan.

A screening-level Human Health Risk Assessment (HHRA) was performed to evaluate current and potential future exposures to soils in the Central Commercial/Industrial Use Area. Industrial workers were evaluated for potential exposure to surface soil (0 to 2 feet bgs) and construction workers were evaluated for potential exposure to surface and subsurface soil (2 to 12 feet bgs). The area was divided into two areas, Commercial/Industrial Use Area 1 and Commercial/Industrial Use Area 2, which are referred to as exposure area (EA) 1 and EA 2, respectively, in the screening-level HHRA. Potential cumulative carcinogenic risks and noncancer hazard indices (HIs) for surface soil were calculated for upper bound average concentrations (i.e., exposure point concentrations [EPCs]) for each area. Potential risks were within USEPA's risk management range of 1×10^{-6} to 1×10^{-4} , and noncancer HIs were reported below the threshold of 1.

E. SWMU 7

SWMU 7—Solid Waste Disposal Area - No records are available, but it is believed that

construction waste, including concrete, wood, rail ties, and copper tubing, was buried in this location. Based on review of aerial photographs, waste disposal activities took place circa 1971.

In SWMU 7, arsenic and benzo(a)pyrene were the primary constituents that exceeded human health screening levels in surface and subsurface soil. BEHP also was detected in one sample above the screening level. SWMU 7 soil samples also were compared with ecological screening levels, and the primary constituents that exceeded criteria included chromium, lead, mercury, silver, and selenium.

Potential exposures to surface soil (0 to 2 feet bgs) and subsurface soil (2 to 12 feet bgs) at SWMU 7 were evaluated in the Screening Level Risk Characterization Summary for SWMU 7; risk estimates were calculated based on EPCs and an industrial/construction worker exposure scenario. Carcinogenic risk estimates for surface and subsurface soils were within USEPA's risk management range of 1×10^{-6} to 1×10^{-4} , and the noncancer HIs were well below the noncancer HI threshold of 1. Groundwater in monitoring well OW-14, which is downgradient from SWMU 7, is impacted by VOCs (primarily 1,4-dioxane, tetrachloroethene, and TCE). Based on current land use, the groundwater exposure pathway is incomplete; however, human receptors could be exposed to constituents in groundwater in the future if groundwater is used as a potable source of water or if new buildings are constructed.

F. SWMU 9

SWMU 9—Wastewater Pretreatment Facility - The former onsite wastewater pretreatment facility comprises approximately 0.8 acre in the eastern portion of the facility along the SWMU 3 northern boundary and was used to treat wastewater generated from cleaning tank trailers and ancillary equipment, and wastewater from the four trailer heels storage tanks, steaming area, and railcar cleaning area. SWMU 9 was active from 1976 to 1985.

Wastewater was collected from the truck cleaning area, steaming area, and rail car cleaning area and transferred to the pretreatment facility. SWMU 9 consisted of pretreatment system components (i.e., tanks, sumps, piping, etc.) and three surface impoundments (equalization basin, sludge pond, and panic pond). Wastewater managed in the panic pond and equalization basin included spent cleaning materials and may have contained varying amounts of hazardous constituents from the facility or the trucks and tankers that were cleaned. Wastes managed in the sludge pond consisted of sludge from the oil separator and wastewater sumps.

The wastewater pretreatment facility was closed in accordance with RCRA standards in 1987. In 2009, WVDEP issued UCC a post-closure permit for the former surface impoundments. The post-closure permit serves as the enforceable mechanism that requires UCC to perform permit-related activities for the former surface impoundment. A RCRA cap was installed over the former surface impoundment when the SWMU was closed. Operation, maintenance, and monitoring of the former surface impoundments is completed in accordance with the post-closure permit.

G. Ryan's Branch Area

Soil in the Ryan's Branch Area was evaluated as part of the 2005 supplemental RCRA facility investigation and the Phase II RFI. The results from these investigations showed concentrations of BEHP and arsenic above the human health screening levels and concentrations of Aroclor-1260, mercury, and silver above ecological screening levels. Because of the findings an interim measure was completed in 2010.

In 1999, a recovery trench was installed on the embankment north of Ryan's Branch to intercept seepage from SWMU 3. The trench and associated piping were removed in 2010 when the soil cover system was installed. In 2005, a low-permeability wall was installed in the Ryan's Branch Area near the Norfolk Southern box culvert in an attempt to control NAPL migrating from SWMU 3. Once the trench was excavated, a 60-mil low-density polyethylene curtain, along with a low-permeability backfill, was placed in the trench to inhibit NAPL from migrating to Ryan's Branch near the wall. In 2005, a seep area found on the slope of the embankment adjacent to SWMU 3 was excavated. Following excavation of the area (8 feet wide by 8 feet long), low-permeability backfill was placed into the excavation. From September 2009 to April 2010, a barrier was installed to isolate contaminated soil and sediment and reduce infiltration. The barriers north of the railroad tracks included placing low-permeability soil in Ryan's Branch up to the surrounding grade and, as a result, cover the slope adjacent to SWMU 3. The barrier south of the railroad tracks included placing a geosynthetic clay liner overlain by low-permeability soil and lining the stream channel with articulated concrete block. The cover system also included installing a culvert to convey stormwater from the area north of the Norfolk Southern property. During installation of the cover system, approximately 371 cubic yards of visually contaminated soil were removed and disposed of offsite.

An ERA performed before installing the soil cover system identified SVOCs (primarily BEHP), Aroclor-1260, mercury, and silver in the sediment and floodplain soils at concentrations posing potential risks to lower and upper trophic level ecological receptors. A subsequent Kanawha River investigation in 2008 indicated PAHs and BEHP were present in Kanawha River sediment at one location in the immediate vicinity of Ryan's Branch; the likely source of these constituents was Ryan's Branch sediment and floodplain soil. The location had constituent concentrations that represent a potential moderate to high incidence of toxicity to ecological receptors.

NAPL-impacted soil and sediment are present in the Ryan's Branch Area from past seepages of oily material through the sides of SWMU 3. NAPL has been observed intermittently in surface water downstream of this culvert. To temporarily remove the NAPL, a boom has been placed in Ryan's Branch. It is suspected, based on inspections that the NAPL is coming from a deformed portion of the culvert. The culvert will be repaired or replaced in 2016.

Groundwater beneath the northern portion of the Ryan's Branch Area is impacted primarily by 1,4-dioxane and BEHP at concentrations exceeding either the human health or ecological screening levels. Downgradient monitoring wells (MW107, MW-111D, and MW-111S) do not contain constituent concentrations exceeding ecological screening levels.

V. GROUNDWATER MONITORING

A. Onsite Groundwater

Semiannual groundwater sampling has been conducted for approximately 25 years at the facility for VOCs, SVOCs, and metals. An updated groundwater monitoring plan was submitted to and approved by WVDEP in September 2008. The current groundwater monitoring program is designed to monitor potential releases to groundwater from SWMUs, assist in evaluating remedial alternatives for groundwater, and monitor remediation progress, plume activity, and potential flux to the Kanawha River.

Groundwater at the facility is sampled in accordance with the groundwater monitoring plan. The results from the groundwater sampling are compared to the USEPA maximum contaminant levels (MCLs) or, if no MCL is available, the adjusted USEPA tap water RSLs. In addition, the analytical results also are compared to ecological screening levels to evaluate if facility constituents may be affecting the Kanawha River. The ecological screening levels consist of the West Virginia water quality standards (chronic) or, if no West Virginia water quality standard was available, USEPA Region 3 Biological Technical Assistance Group freshwater benchmarks. Alternative screening levels, previously calculated for the UCC South Charleston Facility and UCC Institute Facility, are used for chlorobenzene, chloroform, 1,2-dichlorobenzene, 1,4-dioxane, and trichloroethene (TCE).

The most prominent constituents at the facility that exceed human health screening levels are TCE, vinyl chloride, 1,4-dioxane, and BEHP. The most prominent constituents at the facility that exceed ecological screening levels are TCE and BEHP. Other constituents that exceeded screening levels occur within the same boundaries of the plumes for the aforementioned constituents.

A summary of the 2014 groundwater monitoring results for the most prominent constituents at the facility is below:

- BEHP impacts are in the eastern portion of the facility associated with SWMU 3. BEHP was detected in samples from three monitoring wells at concentrations exceeding the human health screening level (6 micrograms per liter [$\mu\text{g/L}$]), with concentrations ranging from 9.35 to 74.2 $\mu\text{g/L}$. BEHP concentrations did not exceed the ecological screening level (16 $\mu\text{g/L}$) in samples collected from downgradient monitoring wells, including wells adjacent to the Kanawha River. Concentrations of BEHP at MW-85-5A show a decline over time and concentrations of BEHP in MW-85-4B fluctuate with no discernible trend. MW-85-4B is screened below SWMU 3, which is a historical source of BEHP in groundwater.
- TCE impacts are primarily in the western portion of the facility associated with the SWMU 1 Area. TCE concentrations exceed the ecological screening level (47 $\mu\text{g/L}$) in some monitoring wells within the SWMU 1 Area; however, concentrations are below the ecological screening level in the most downgradient monitoring well (MW-131). The maximum concentration of TCE was reported in the sample from MW-101 (734 $\mu\text{g/L}$). TCE concentrations for three monitoring wells (1B, MW-105, and TW-01) show an increasing trend while the concentrations in the other monitoring wells show a stable or decreasing trend. Groundwater impacts in monitoring well 1B are likely from an offsite source

because this monitoring well is upgradient of known sources at the facility.

Although there are some monitoring locations onsite with increasing concentration trends, the extent of all plumes at the Facility have remained stable and groundwater concentrations for downgradient monitoring wells nearest to the Kanawha River are stable and do not exceed ecological screening values. Direct contact human health risk was not evaluated for groundwater because the depth, 15 to 27 feet bgs, precludes future construction worker exposure and groundwater is not currently used as drinking water and will not be used in the future.

B. Offsite Groundwater

Groundwater in monitoring wells near the western boundary contain concentrations of 1,4-dioxane and arsenic above the human health screening levels. Investigations were completed in October 2013 and February 2014 through January 2015 to evaluate offsite groundwater impacts west of the facility. The results from these investigations showed that 1,4-dioxane concentrations were greater than the tap water RSL on several offsite parcels: WVDOT property (parcels 6, 7, 8, 9, and 10), and privately owned property (parcel 64). Parcels 11 and 12 are also suspected to be impacted based on the investigations. UCC finalized the purchase of parcels 11 and 12 in September 2015.

Arsenic was detected in four of thirteen samples, at concentrations ranging from 24.6 ug/L to 38.9 ug/L. All detected arsenic results were reported at concentrations greater than the MCL of 10 ug/L, but likely represent background rather than a contribution from historical site activities.

Groundwater in the eastern portion of the facility near SWMU 3 contains concentrations of TCE, vinyl chloride, 1,4-dioxane, and BEHP that exceed the human health screening levels. TCE and vinyl chloride are suspected to be from an offsite source; however, BEHP and 1,4-dioxane appear to be facility-related constituents that may be affecting a small portion of the UCC Institute Facility to the east and side gradient of the facility.

VI. EVALUATION OF WVDEP'S FINAL DECISION

WVDEP's Final Remedy is protective of human health and the environment and meets both the threshold criteria and balancing criteria. Overall protection of human health and the environment addresses the ability of an alternative to eliminate, reduce or control threats to public health or the environment through institutional controls, engineering controls, removal or treatment.

Institutional Controls (ICs) will maintain protection of human health and the environment over time by controlling exposure to the subsurface and groundwater. The Final Remedy requires the compliance with and maintenance of land use and groundwater use restrictions at the Facility. WVDEP anticipates that the land use and groundwater use restrictions will be implemented through orders and/or an environmental covenant to be recorded in the chain of title for the Facility property. If the mechanism is to be an environmental covenant, the environmental covenant will run with the land and as such, will be enforceable by WVDEP and/or other

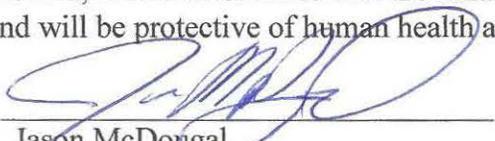
stakeholders against future land owners.

The Final Remedy involves construction activities, such as construction or excavation that would be managed with environmental procedures and health and safety plans to minimize/eliminate short-term risks to workers, residents, and the environment. The Final Remedy is readily implementable and the institutional controls will be implemented through an enforceable mechanism such as an order or an Environmental Covenant, pursuant to West Virginia Code Chapter 22, Article 22, and the Uniform Environmental Covenants Act, West Virginia Code Chapter 22, Article 22B. The Final Remedy is cost effective.

VII. DECLARATION

Based on the Administrative Record, I have determined that the Final Remedy as set forth in this Final Decision is appropriate and will be protective of human health and the environment.

9/7/2016
Date



Jason McDougal
Program Manager, Office of Environmental Remediation
WV Department of Environmental Protection

