



UNITED STATES

ENVIRONMENTAL PROTECTION AGENCY

REGION III

FINAL DECISION AND RESPONSE TO COMMENTS  
UNION CARBIDE CORPORATION  
TECHNOLOGY PARK

SOUTH CHARLESTON, WEST VIRGINIA

EPA ID NO. WVD 060 682 291

## TABLE OF CONTENTS

SECTION	PAGE
I. Introduction.....	3
II. Final Decision.....	3
III. Facility Background.....	6
IV. Summary of Environmental Investigations and Interim Measures .....	7
V. Evaluation of EPA's Remedy.....	14
VII. Financial Assurance.....	16
VIII. Declaration .....	17

### ATTACHMENT A - Public Comments and EPA Responses

#### **TABLES**

- 1 SWMU & Investigation Area Table

#### **FIGURES**

- 1 Facility Location Map
- 2 Proposed Future Land Use
- 3 Lower Ward Leachate Collection System
- 4 Offsite Groundwater Use Restrictions
- 5 Restrictions
- 6 Central Drain Sump and Associated Piping

## **I. INTRODUCTION**

The United States Environmental Protection Agency (EPA) is issuing this Final Decision and Response to Comments (FDRTC or Final Decision) in connection with the Union Carbide Corporation (UCC), Technology Park, South Charleston, West Virginia (hereinafter referred to as the Facility).

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 *et seq.* The Corrective Action program is designed to ensure that certain facilities subject to RCRA have investigated and addressed releases of hazardous waste and hazardous constituents that have occurred at their property.

On September 30, 2010, EPA issued a Statement of Basis (SB) in which EPA proposed the Final Remedy for the Facility. EPA's proposed Final Remedy consisted of remedial components which collectively address Facility-wide groundwater contamination and Facility-wide soil contamination.

Consistent with public participation provisions under RCRA, EPA requested comments from the public on the proposed Final Remedy. The thirty (30) day public comment period began on September 30, 2010 and ended October 30, 2010. All of the comments received by EPA during the public comment period were carefully reviewed by EPA and have been addressed in Attachment A, PUBLIC COMMENTS AND EPA RESPONSES, and are incorporated into this Final Decision.

Based on comments received during the public comment period, EPA has determined that it is not necessary to modify its proposed Final Remedy as set forth in the SB. EPA is, however, making minor modifications to the factual background and clarifying certain aspects of the proposed Final Remedy as described in more detail in Attachment A, PUBLIC COMMENTS AND EPA RESPONSES. The Final Decision as set forth in Section II, "Final Decision," below, incorporates those minor modifications and clarifications.

## **II. FINAL DECISION**

The Facility has been subdivided into four parcels, Tracts A, B, C and D, respectively. EPA's Final Remedy consists of the following remedial components for each Tract:

### **A. Tract A**

EPA's remedy for Tract A consists of the following institutional controls:

a) Industrial/Commercial Areas, as depicted in Figure 5, shall not be used for residential purposes unless it is demonstrated to WVDEP, in consultation with EPA, that such use will not pose a threat to human health or the environment and/or adversely affect or interfere with the selected remedy and WVDEP, in consultation with EPA, provides prior written approval for such use;

b) In the areas within Tract A that are identified on Figure 5 as requiring Vapor Intrusion and/or Subsurface Work restrictions, no earth moving activities, including construction and drilling, may be done unless such activities are conducted in accordance with a Health & Safety Plan that was approved by WVDEP, in consultation with EPA, and that was prepared by an appropriately qualified person familiar with the environmental conditions at the Facility, and

c) Groundwater from Tract A shall not be used for any purpose other than to conduct the operation and maintenance and monitoring activities required by WVDEP and/or EPA, unless it is demonstrated to WVDEP, in consultation with EPA, that such use will not pose a threat to human health or the environment or adversely affect or interfere with the selected remedy and WVDEP, in consultation with EPA, provides written approval for such use.

#### B. Tracts B and C

EPA's remedy for Tracts B and C consists of the installation of a vapor control system, the design of which shall be approved in advance by WVDEP, in consultation with EPA, in all new structures which are to be occupied in the areas identified on Figure 5 as requiring Vapor Intrusion and/or Subsurface Work restrictions and compliance with and maintenance of institutional controls.

The institutional controls for Tracts B and C contain the following elements:

a) Tracts B and C shall not be used for residential purposes unless it is demonstrated to WVDEP, in consultation with EPA, that such use will not pose a threat to human health or the environment or adversely affect or interfere with the selected remedy and WVDEP, in consultation with EPA, provides prior written approval for such use, and

b) Groundwater from Tracts B and C shall not be used for any purpose other than to conduct the operation and maintenance and monitoring activities required by WVDEP and/or EPA, unless it is demonstrated to WVDEP, in consultation with EPA, that such use will not pose a threat to human health or the environment or adversely affect or interfere with the selected remedy and WVDEP, in consultation with EPA, provides written approval for such use.

#### C. Tract D

EPA's remedy for Tract D consists of the following five components:

- 1) operation and maintenance of the Ward B central drain sump pumping system;
- 2) operation and maintenance of the Lower Ward leachate collection system in compliance with the EPA-approved Operation, Maintenance and Inspection Manual (OMII) dated, April 2010;
- 3) landfill inspections in compliance with the OMII;
- 4) long-term groundwater monitoring in compliance with the EPA-approved Groundwater Monitoring Plan dated December 2009; and
- 5) compliance with and maintenance of institutional controls.

The institutional controls for Tract D contain the following elements:

a) A restriction that the Lower Ward Landfill and Ward Hollow shall not be used for residential purposes unless it is demonstrated to WVDEP, in consultation with EPA, that such use will not pose a threat to human health or the environment or adversely affect or interfere with the selected remedy and WVDEP, in consultation with EPA, provides prior written approval for such use;

b) Tract D shall not be used in any way that will adversely affect or interfere with the integrity and protectiveness of the covers and the area within 100 feet of the landfill covers placed over the Lower Ward Landfill and Ward B Landfill and all associated pipes and wells unless it is demonstrated to WVDEP, in consultation with EPA, that such use will not pose a threat to human health or the environment or adversely affect or interfere with the selected remedy and WVDEP, in consultation with EPA, provides prior written approval for such disturbance;

c) Ward A and B Landfills and the area surrounding those landfills, as depicted in Figure 5, shall be limited to recreational uses that would result in only periodic limited use of the area such as hiking, jogging, wildlife viewing, and ecological studies (Figure 5). Based on a review of historical operations information, the area surrounding Ward A and B Landfills are not impacted by Facility related contamination. Nonetheless, the area will be limited to recreational use to ensure that the integrity and protectiveness of Ward A and B Landfills are maintained;

d) No earth moving activities, including construction and drilling, may be done on the area of Tract D depicted on Figure 5 unless such activities are conducted in accordance with a Health & Safety Plan that was approved by WVDEP, in consultation with EPA, and that was prepared by an appropriately qualified person familiar with the environmental conditions at the Facility, and

e) The contaminated groundwater from Tract D, including any groundwater that has migrated beyond the Facility boundary, shall not be used for any purpose other than to conduct the operation and maintenance and monitoring activities required by WVDEP and/or EPA, unless it is demonstrated to WVDEP, in consultation with EPA, that such use will not pose a threat to human health or the environment or adversely affect or interfere with the selected remedy and WVDEP, in consultation with EPA, provides written approval for such use.

#### D. Implementation of ICs

The ICs shall be implemented through an enforceable mechanism such as a permit, order, or an Environmental Covenant pursuant to the West Virginia Uniform Environmental Covenants Act, Chapter 22, Article 22.B, §§ 22-22B-1 through 22-22B-14 of the West Virginia Code (Environmental Covenant). UCC will be required to provide a coordinate survey as well as a metes and bounds survey of the Tracts and the Facility boundary. For properties located outside of the Facility boundary that are impacted by Facility-related contamination, WVDEP, in consultation with EPA, will require that UCC use its best efforts to obtain an Environmental Covenant from any such property owners.

If the Facility owner or subsequent owners fail to meet their obligations under the enforceable mechanisms selected or if EPA and/or WVDEP, in its sole discretion, deems that additional ICs are necessary to protect human health or the environment, EPA and/or WVDEP has the authority to require and enforce additional ICs, such as the issuance of an administrative order.

This Final Decision is supported by the information set forth in the Administrative Record (AR).

### **III. FACILITY BACKGROUND**

The Facility consists of approximately 574 acres in South Charleston, West Virginia (Figure 1). The land use for the area surrounding the Facility is primarily industrial and commercial to the north and residential to the east, south, and west of the Facility. Located downgradient from the Facility to the northwest are two parcels, owned by the West Virginia Department of Transportation (WVDOT) and CSX Transportation, respectively.

Between 1947 and 1974, UCC, a wholly owned subsidiary of The Dow Chemical Company (Dow), purchased individual parcels of land from the Kanawha Land Company, Westvaco Chemical Company, a dairy farm, and other parties. These parcels collectively comprise the Facility property. Prior to UCC's ownership, the Facility property was undeveloped with the exception of several brine wells which were located on the former Westvaco Chemical Company parcel and were used to extract brine for the manufacture of chlorine bleach.

Currently, approximately 110 acres of the Facility property are developed with laboratory buildings, pilot plant areas (areas where materials developed are manufactured on a small scale), waste packaging, storage facilities, and office buildings. Some buildings and portions of the Facility property are currently leased to other entities.

The remaining land at the Facility includes three inactive landfills, the Lower Ward Landfill, Ward A Landfill, and Ward B Landfill. The three landfills were constructed primarily to receive fly ash slurry from the Facility. The landfills also received oxide tails from the UCC South Charleston facility's propylene oxide production unit, and municipal sludge from the South Charleston publicly owned treatment works (POTW). The landfills were created by constructing upper and lower dikes across a hollow, designated as Ward Hollow. The Lower Ward Landfill is located between the upper and lower dikes, and the Ward A and B Landfills are located south of the upper dike (Figure 1). Use of the landfills was discontinued in 1973, after which the Lower Ward and Ward B Landfills were covered and the Ward A Landfill was turned into a scenic pond.

Between 2002 and 2003, UCC modified the central drainage channel at Ward B Landfill by installing perforated high-density polyethylene piping buried under aggregate cover. The perforated piping is referred to as the central drainage line, and it discharged into Ward A Landfill until 2007, when the discharge was rerouted to Holz Impoundment and the previously uncovered aggregate was covered with soil (Figure 6). Holz Impoundment is a 76-acre active solid waste impoundment that is used by UCC and the City of South Charleston but is not part of

the Facility.

For development purposes, the Facility has been subdivided into four tracts, Tracts A through D, which are depicted on Figure 2. Currently, there is a tentative agreement in place between UCC and the State of West Virginia to donate Tracts A and B to the State of West Virginia. UCC anticipates that this land transfer will be finalized in December 2010. In addition, in July 2010 a portion of Tract D (shown as "Area D-1" on Figure 2) was sold by UCC to United Disciples of Christ Church which plans to construct a church and other buildings on that property.

#### **IV. SUMMARY OF ENVIRONMENTAL INVESTIGATIONS AND INTERIM MEASURES**

A total of 70 solid waste management units (SWMUs) have been identified at the Facility. EPA identified sixty-two SWMUs during a 1988 RCRA Facility Assessment (RFA) conducted by EPA. The remaining eight SWMUs were later identified by UCC as part of a response to an EPA RCRA request for information. In addition to the 70 SWMUs, there are four areas with environmental impacts at the Facility (hereafter referred to as Investigation Areas) that were identified by UCC between 2005 and 2009.

Since the 1988 RFA, UCC has conducted multiple investigations including human and ecological risk assessments, to evaluate the releases from the Facility. The following EPA-approved reports summarize UCC's investigations:

*Solid Waste Management Unit Description and Investigation/Corrective Action Undertaken (1998)* – UCC evaluated the 70 SMWUs and placed them into four priority categories, A-High Priority; B- Low Priority; C- No Further Action and D-Not a SWMU. This report also includes a description of the voluntary corrective actions taken up to 1998.

*RCRA Facility Investigation Report (2001)* – This report documents UCC's investigations (soil, groundwater, surface water, sediment and waste material) for A-High Priority SWMUs.

*RCRA Facility Investigation Report (2005)* – This report documents the investigation (soil, groundwater, surface water and sediment ) at 11 SWMUs which were placed in the B, C or D categories, as described above.

*Ecological Risk Assessment Ward A and B Landfills (Solid Waste Management Units 3 and 4)(2006)*- This report documents the ecological evaluation of the fate and transport of constituents detected at the SWMUs through the ecological setting of the Facility.

*Summary of Ecological Risk for RCRA Solid Waste Management Units 5 and 70 (2007)* - These reports document the ecological evaluation of the fate and transport of constituents detected at the SWMUs through the ecological setting of the Facility.

*Current Conditions Report (2008)* – This report documents all the Facility investigations and corrective action work completed up to 2008.

*Technology Park Groundwater Screening-Level Assessment (2009)* - This report documents the human health risk assessment for current and future exposure to constituents in groundwater downgradient of the Facility.

*Buildings 706 and 707 Area Soil Investigation, Removal Action and Vapor Intrusion Human Health Risk Assessment (2009)* – This report documents the soil investigation and removal action. In addition, it documents the human health risk assessment for current and future exposure to constituents in indoor air in Buildings 706 and 707.

*Human Health Risk Assessment for Ward A Pond, Ward Branch, and Vapor Intrusion (2009)* – This report documents the human health risk assessment (HHRA) to assess the potential current and future human health risks from exposure to contaminants in surface water and sediment at Ward A Pond and Ward Branch and indoor air in Buildings 771, 2000, and 6000.

*Screening Level Risk assessment for Ward Branch and Baseline Risk Assessment for Ward A Pond (2010)* - This report documents the ecological evaluation of the fate and transport of constituents detected in Ward Branch and Ward A Pond thru the ecological setting of the Facility.

A description of the SWMUs and Investigation Areas along with a summary of investigation results and Interim Measures performed at these SWMUs and Investigation Areas are provided in Table 1.

As stated above, the Facility property has been subdivided into four tracts, Tracts A, B, C, and D, respectively. Tract A is located within the western portion of the Facility. The northern portion of Tract A is mostly developed; however, a large portion in the south and west of this tract is undeveloped. The majority of the SWMUs identified at the Facility are located within Tract A (Table 1).

Tracts B and C, located on the northeastern edge of the Facility, are the smallest tracts at the Facility. Currently, the primary use for these tracts is office space and parking. There are four SWMUs within these two tracts.

Tract D is the largest tract at the Facility. The southern and northern portions of Tract D are mostly undeveloped, while the central portion is comprised of the three landfills.

## A. Facility Soils

### 1. Tract A

Fifty-six of the 70 SWMUs and the 4 Investigation Areas are located on this Tract. Based on the 1988 RCRA Facility Assessment and the 2001 and 2005 RCRA Facility Investigations, EPA determined there have been no known releases from 45 of the 56 SWMUs located on Tract A. In addition, after reviewing analytical results from soil samples collected in 2004, 2006 and 2008, respectively, EPA determined that soils at many of the remaining 11 SWMUs did not show the presence of contaminants or contained contaminants at concentrations that did not exceed

residential or industrial screening levels.

The following describes the SWMUs and Investigation Areas located on Tract A where contaminants remain in the soil:

a. SWMU 70

This SWMU is referred to as the Timberland Dump Site #2. In 2004 and 2005, UCC conducted soil sampling which revealed that samples exceeded the industrial screening level for arsenic and that the residential screening level was exceeded for mercury. Because arsenic concentrations were below the maximum West Virginia background concentration (13 milligrams per kilogram (mg/kg)), the concentrations of arsenic are considered representative of regional background conditions.

A Screening Level Ecological Risk Assessment (SLERA) was completed in 2005 which initially identified barium and mercury as contaminants of potential concern (COPCs) posing risk to soil invertebrates and plants located at SWMU 70. No soil COPCs were associated with potential food web exposure. Potential ecological risks fell within the acceptable range for the constituents, with the exception of mercury. For mercury, a supplemental evaluation was conducted with surface soil samples collected in 2005 and 2006, that compares the detected results to a range of toxicological values. Based on the results of the supplemental evaluation, EPA and WVDEP concluded that no further action at SWMU 70 was needed.

b. Investigation Area – Building 722

In 2005, soil samples were collected in this area to facilitate leasing a portion of the Facility where Building 722 is located to a third party. Based on the analytical results from the 2005 soil sampling event, tetrachloroethene (PCE) was the only constituent detected that exceeded the industrial screening level and it was only exceeded at one location. Other samples collected within 50 feet of that same location had PCE concentrations that were either non-detect or two orders of magnitude below the industrial screening level.

c. Rocket Hollow Area

In 2008, UCC conducted soil sampling in this area of the Facility to support the prospective sale of portions of Tract A. Soil sampling revealed the presence of polycyclic aromatic hydrocarbons (PAHs) in the subsurface (4-6 feet below the ground) which exceeded their respective industrial screening levels at one location. Based on these exceedances, corrective measures to address potential human health risks related to direct contact with soil are warranted for this area.

d. SWMU 5

Three COPCs (barium, mercury, and silver) were initially identified in soil at SWMU 5 as potentially posing a risk to soil invertebrates and plants. No soil COPCs were associated with potential food web exposure. Based on the results of the evaluation for SWMU 5, EPA and WVDEP concluded that no further action was required to address risk to the ecological resources

in SWMU 5.

## 2. Tracts B and C

There are four SWMUs within Tracts B and C. Two of the SWMUs, Nos. 46 and 47, are cooling towers. Historical Facility information revealed that the third SWMU, No. 65, was not used to manage waste (Table 1). The fourth SWMU, No. 60, is shelving on a loading dock located on the north side of Building 2000 which is used as a waste transfer area to manage printing chemicals for short durations. EPA determined that there have been no known releases from these four SWMUs based on its review and evaluation of the Solid Waste Management Unit Description and Investigation/Corrective Action Undertaken Report (1998). In addition, 1996 soil sample results from SWMU 65 were non-detect for 40 CFR Part 261 Subpart E Appendix IX volatile, semi-volatiles and metals under the Toxicity Characteristic Leaching Procedure.

## 3. Tract D

### a. Lower Ward Landfill

In 1965, the Lower Ward Landfill was covered with an 18-inch clay cover and was seeded. In 1978, half of the Lower Ward Landfill was paved and converted into a parking lot. The 18-inch clay cover and the parking surface currently in place prevent direct contact with waste materials in Lower Ward Landfill, thus eliminating the pathway for human health exposure.

### b. Ward B Landfill

In the 1970s, a clay-soil mix cover was installed at the Ward B Landfill to reduce potential human or ecological exposure to waste material. The average cover thickness across the landfill is 5.75 feet. In 2002, UCC installed additional cover material where the cover was thin near the bottom of the drainage ditches. The clay-soil mix cover currently in place prevents direct contact with waste materials in the Ward B Landfill, thus eliminating the pathway for human health exposure to waste material.

In April 2006, UCC conducted a SLERA to evaluate previously identified pathways and receptors for surface water and sediment in the Ward B Landfill drainage ditches. Based on the results of the SLERA, EPA determined that there are no unacceptable risks and no further action is required to address the ecological resources associated with the Ward B Landfill.

### c. Ward A Landfill

The analytical results from investigations conducted at the Ward A Landfill between 2005 and 2008 were compared to EPA human health risk-based screening values. The results of the human health risk screening showed that constituent concentrations were above risk-based screening values; therefore, this area was evaluated as part of a 2009 Human Health Risk Assessment (HHRA) performed by UCC. The HHRA report for Ward A Landfill concluded that no unacceptable human health risks were associated with the current and proposed future land

use of the landfill as a scenic pond. For all these exposure scenarios, the non-carcinogenic hazards index (HI) and the carcinogenic risk are below EPA's target HI of 1, and within EPA's hazard target risk range of  $1 \times 10^{-6}$  to  $1 \times 10^{-4}$ .

In January 2010, UCC conducted a baseline ecological risk assessment (BERA) to evaluate the identified pathways and receptors for surface water, sediment, and surface soil. Based on the results of the BERA, EPA and WVDEP concluded that no further action is required to address risk to the ecological resources of Ward A Landfill.

## B. Facility Groundwater

There are two discrete areas of groundwater contamination at the Facility namely, Ward Hollow and the Greenhouse Area.

### 1. Ward Hollow Groundwater

Based on geologic and hydrogeologic investigations of the area, groundwater contamination in Ward Hollow is related to the three landfills and the former brine wells at the Facility. Contaminated groundwater is migrating from the landfills and former brine wells to the underlying weathered bedrock and then downgradient to the WVDOT property and potentially to the CSX Transportation property. The most prominent constituents within the Ward Hollow groundwater plume that are above their respective EPA Maximum Contaminant Levels (MCLs) codified at 40 C.F.R. Part 141 and promulgated pursuant to the Safe Drinking Water Act, 42 United States Code (USC) 300f *et seq.* or the EPA tap water Regional Screening Levels (RSLs) include 1,4-dioxane, benzene, bis(2 chloroisopropyl)ether, arsenic, and barium.

Based on groundwater sampling results conducted since the 1980s, the Ward Hollow groundwater plume extends downgradient approximately 300 feet to the northwest of the Facility onto WVDOT property and potentially onto CSX Transportation property. Consequently, UCC performed an HHRA to evaluate human health risks related to exposure to contaminated groundwater downgradient of the Facility. Results of the HHRA indicated that if the contaminated groundwater was used for drinking water it would result in unacceptable human health risks. However, groundwater under those properties is not used for potable purposes, and there are no known plans to do so in the future. In addition, the impacted aquifer is low yielding, so it is not a practical source of potable water. The hypothetical future construction worker exposure scenario was also quantitatively evaluated for incidental contact with groundwater given that it is possible that a future construction worker could have incidental exposure to groundwater during short-term construction activities (i.e., less than 1-year duration). For the construction worker exposure scenario, the non-carcinogenic hazards index (HI) and the carcinogenic risk are below EPA's target HI of 1, and within EPA's hazard target risk range of  $1 \times 10^{-6}$  to  $1 \times 10^{-4}$ . Based on the results of the HHRA, EPA and WVDEP concluded that the groundwater does not pose unacceptable human health risks for the hypothetical future construction worker.

### 2. Greenhouse Area Groundwater

The Greenhouse Area is located on Tract A above in the area of a former greenhouse.

Groundwater data from two monitoring wells located in the Greenhouse Area (Table 1, Figure 1) show concentrations of volatile organic compounds (VOCs) above MCLs or adjusted EPA tap water RSLs. Sample results collected in 2009 showed that VOCs did not exceed screening levels in one of the monitoring wells, and only two detected VOCs, chloroform and tetrachloroethene, exceeded screening levels in the second monitoring well. Soil results from samples collected near these wells did not show the presence of VOC soil contamination.

### C. Surface Water

#### 1. Ward Branch

In 1964, the Facility started using a 78-inch-diameter culvert pipe to capture leachate from the landfills and prevent it from discharging to Ward Branch. Leachate in the culvert (estimated to be 15 to 20 gallons per minute) is intercepted by the catch basin in Building 730 at the base of the Lower Ward northern dike and is transferred to the South Charleston POTW via the Holz Impoundment decant line (Figure 3). The culvert and the catch basin collectively are referred to as the Lower Ward leachate collection system and are part of SWMU 2.

The analytical results from investigations conducted for Ward Branch (Figure 1) were compared to EPA human health risk-based screening values. Since the results of the human health risk screening showed that constituent concentrations were above risk-based screening levels, this area was evaluated as part of a HHRA. The 2009 HHRA report for Ward Branch concluded that no unacceptable human health risks were associated with the current and proposed future land use of Ward Branch. For all these exposure scenarios, the non-carcinogenic hazards index (HI) and the carcinogenic risk are below EPA's target HI of 1, and within EPA's hazard target risk range of  $1 \times 10^{-6}$  to  $1 \times 10^{-4}$ .

In 2010, UCC conducted a SLERA at Ward Branch to evaluate pathways and receptors for surface water and sediment. Based on the results of the SLERA, EPA and WVDEP concluded that no further action is required to address risk to the ecological resources of Ward Branch.

#### 2. Tributary to Davis Creek

The 2007 SLERA also evaluated constituents detected in the surface water and sediment of a small stream downgradient of SWMUs Nos. 5 and 70. There were no exceedances of conservative ecological screening values observed in either the surface water or sediment therefore indicating that there is no potential for unacceptable ecological risk.

### D. Subsurface Vapor Intrusion

Generally, buildings located above a contaminated groundwater plume are vulnerable to subsurface vapor intrusion coming from the plume by entering through cracks, joints and utilities openings. The following sections discuss potential subsurface vapor intrusion associated with the two areas of groundwater contamination at the Facility which has been found in Ward Hollow and the Greenhouse Area, and with soil contamination in the vicinity of Buildings 706 and 707 located on Tract A:

## 1. Ward Hollow

Historical data regarding waste materials placed in Lower Ward Landfill, Ward A Landfill, and Ward B Landfill indicated that the landfills are the source of VOCs (1,4-dioxane and benzene) which have been detected in groundwater underlying and downgradient of the landfills. Consistent with the recommendations set forth in the EPA Draft Guidance for Evaluating the Vapor Intrusion from Groundwater and Soils (November 29, 2002), locations within 100 feet of potential sources for vapor intrusion (i.e., vapors from volatile chemicals contained in the landfill or groundwater affected by the landfills) were evaluated to determine if there are unacceptable risks. Locations that are within 100 feet of the landfills include buildings that were in use at the time of the investigation (Buildings 771, 2000, and 6000) and an undeveloped area west of the Lower Ward Landfill. Buildings 771, 2000, and 6000 are currently used for office space; portions of Building 771 are also used as a laboratory and a pilot plant.

For these locations, soil gas and/or indoor air samples were collected and evaluated as part of an HHRA using the indoor worker exposure pathway/scenario. For the indoor worker exposure scenario, the non-carcinogenic hazards index (HI) and the carcinogenic risk are below EPA's target HI of 1, and within EPA's hazard target risk range of  $1 \times 10^{-6}$  to  $1 \times 10^{-4}$ . Based on the sampling results and exposure assumptions in the HHRA, EPA and WVDEP concluded that current and future human health exposure would not result in unacceptable human health risks for the people occupying the buildings under the exposure pathways evaluated. Based on non-carcinogenic hazards and carcinogenic risk results for future subsurface vapor intrusion for the area west of the Lower Ward Landfill, EPA and WVDEP concluded that no further evaluation of the area is required.

Occupied buildings near the landfills have been evaluated for subsurface vapor intrusion; however, it is possible that additional occupied buildings may be constructed near the landfills in the future. Because of the presence of VOCs in the landfills and groundwater plume, corrective measures for potential unacceptable human health risks related to vapor intrusion are warranted for portions of the Facility that are located within 100 feet of the landfills.

## 2. Greenhouse Area / Building 740

In 2007, UCC collected soil gas samples around Building 740 in order to evaluate potential vapor intrusion related to the groundwater contamination in the Greenhouse Area. Building 740, located in the Greenhouse Area, is used as office space. Sampling revealed the presence of 2-butanone and PCE in the vicinity of Building 740. The maximum detected 2-butanone concentration ( $109 \mu\text{g}/\text{m}^3$ ) did not exceed its industrial air risk-based screening level ( $22,000 \mu\text{g}/\text{m}^3$ ) provided in the EPA RSL for chemical contaminants, assuming an Attenuation Factor (AF) of 0.1. The detected PCE soil gas concentration did not exceed the EPA industrial air RSL ( $210 \mu\text{g}/\text{m}^3$ ), assuming an AF of 0.01. Based on the sample results and exposure assumptions, EPA and WVDEP concluded that current and future human health exposure associated with vapor intrusion into Building 740 would not result in unacceptable human health risks.

### 3. Buildings 706 and 707

In 2008 and 2009, UCC removed soil contaminated with VOCs such as 1,2,4-trichlorobenzene; 1,2-dichlorobenzene; 1,3-dichlorobenzene; 1,4-dichlorobenzene; and chlorobenzene in the vicinity of Buildings 706 and 707 which are located on Tract A. Building 706 is an active chemical processing facility and Building 707 is a former manufacturing building that is currently used for office space. The analytical results for the post-removal soil samples indicated that exposure to soil would not result in unacceptable human health risks. However, there was a potential for vapor intrusion into Buildings 706 and 707 based on residual VOCs concentrations.

As a result, in July 2009, sub-slab soil gas, indoor air, and ambient air samples were collected in and around the buildings and evaluated as part of an HHRA. Human health risks for Buildings 706 and 707 were evaluated for exposure to VOCs in indoor air through subsurface vapor migration from exterior soil for current/future indoor workers. For the indoor worker exposure scenario the non-carcinogenic hazards index (HI) and the carcinogenic risk are below EPA's target HI of 1, and within EPA's hazard target risk range of  $1 \times 10^{-6}$  to  $1 \times 10^{-4}$ . Based on the sample results and exposure assumptions in the HHRA, EPA and WVDEP concluded that current and future human health exposure associated with vapor intrusion into Buildings 706 and 707 from VOCs did not pose unacceptable human health risks.

## V. EVALUATION OF EPA'S REMEDY

EPA evaluated the Final Remedy against ten criteria. The criteria were applied in two phases. In the first phase, EPA evaluates three criteria, known as threshold criteria. In the second phase, EPA evaluated seven balancing criteria.

The following is a summary of EPA's evaluation of the threshold criteria:

### A. Threshold Criteria

#### (1) Protect Human Health and the Environment

EPA's remedy protects human health and the environment by adequately eliminating, reducing, or controlling unacceptable risk through the combination of the operation and maintenance of the interim measures already in place at the Facility and through the implementation of institutional controls to prevent potential future exposure. These institutional controls protect and prevent the use of groundwater at the Facility and the affected offsite properties, prevent or control the exposure to impacted soil through direct contact or vapor intrusion, and control land use to prevent changes inconsistent with the remedy.

#### (2) Achieve Media Cleanup Objectives

EPA's remedy meets the appropriate cleanup objectives which is the protection of human health and the environment. The majority of Facility soils contain contaminant concentrations that are below the EPA residential or industrial soil RSLs and the mean natural background concentration for the State of West Virginia. For those areas where contaminant concentrations

are above the EPA residential and/or industrial soil RSL, institutional controls will be implemented to manage potential direct contact risks.

Groundwater exceeds the MCLs and/or the EPA tap water RSLs in Ward Hollow and the Greenhouse Area; however, groundwater use restrictions will be applied to the entire Facility and the affected offsite properties (WV DOT and potentially CSX Transportation) to manage human exposure to contaminated groundwater.

(3) Control the Source(s)

The landfills (Lower Ward, Ward A and Ward B) are the remaining sources of hazardous constituents at the Facility for which the remedy is being considered. These sources are being controlled through the interim measures described above in Section III.A.3. Groundwater monitoring data show that the groundwater plume is stable and is not expanding and that the constituent concentrations do not show an increasing trend. In addition, groundwater monitoring and inspections will continue to detect any release that may occur in the future.

B. Balancing Criteria

Balancing criteria are presented below to illustrate the suitability of the components of the remedy.

(1) Long-Term Reliability and Effectiveness

The long-term reliability and effectiveness standard is intended to address protection of human health and the environment over the long term. EPA's remedy meets this standard. The landfill covers are reliable and effective long-term solutions to manage direct contact with waste material in Lower Ward and Ward B Landfill. Long-term groundwater monitoring is because the data have demonstrated that the groundwater plumes are stable. In addition, such long-term monitoring will provide the opportunity and the data for the agencies to evaluate any changes in the conditions of the Facility.

EPA also considers ICs long-term components of a remedy. EPA's remedy includes the implementation and maintenance of ICs to restrict activities that may result in human exposure to contaminants. EPA will require the ICs to be maintained as long as those contaminants remain in place at the Facility.

(2) Reduction of Toxicity, Mobility or Volume of Wastes

EPA's remedy requires UCC to manage the waste in the landfills in place. The landfill covers have shown to be an effective remedy controlling the mobility of the contaminants, as demonstrated by the data of the groundwater monitoring showing that the plumes are stable.

(3) Short-Term Effectiveness

The short-term effectiveness standard is intended to address hazards posed during the implementation of corrective measures. Short-term effectiveness is designed to take into

consideration the impact to facility workers and nearby residents during construction. Since the components of the remedy as described in Section IV of this SB have been in place, there are no associated short term impacts. A component of the remedy is ICs. ICs are administrative and/or legal instruments and as such will not pose any hazards to facility workers. Furthermore, ICs will be implemented to reduce hazards posed by direct contact with contaminants that remain in place.

(4) Implementability

The implementability decision factor addresses the regulatory constraints in employing the cleanup approach. Since the remedy includes the operation and maintenance of measures which have been implemented, and there do not appear to be any regulatory hurdles that would impede the implementation of ICs, EPA anticipates that the remedy will be fully implementable.

(5) Cost

The cost for continued operation and maintenance of the interim measures and the implementation of the institutional controls is approximately \$145,000 per year.

(6) Community Acceptance

UCC currently meets with a Community Advisory Panel to foster an open dialogue, an exchange of ideas, better understanding and cooperation between UCC and the surrounding community regarding plant health, safety, and environmental protection programs. There have been no known conflicts within the community regarding the investigation, remediation efforts and community acceptance. Community acceptance of EPA's remedy will be evaluated based on comments received during the public comment period.

(7) State Acceptance

WVDEP has reviewed and concurred with the remedy for the Facility. Furthermore, EPA has solicited WVDEP's input and involvement throughout the investigation process at the Facility, and the remedy will be implemented pursuant to a modification by WVDEP of UCC's current permit.

## **VI. FINANCIAL ASSURANCE**

EPA anticipates that the Facility's RCRA Permit will be modified to include implementation of the corrective measures selected in this Final Decision and to require updated financial assurance to include any costs associated with these corrective measures.

**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.

Date: 12/15/10



Abraham Ferdas, Director  
Land and Chemicals Division  
U.S. Environmental Protection Agency, Region III

**ATTACHMENT A**

**ATTACHMENT A  
PUBLIC COMMENTS AND EPA RESPONSES  
UNION CARBIDE CORPORATION, TECHNOLOGY PARK  
SOUTH CHARLESTON, WEST VIRGINIA**

**I. PUBLIC COMMENTS AND EPA RESPONSES**

EPA received comments from the Union Carbide Corporation (UCC) on the proposed Final Remedy for the UCC, Technology Park, South Charleston, West Virginia (hereinafter referred to as the Facility). Those comments and EPA's responses to those comments are set forth below:

Comment 1: Section II. – Facility Background

Paragraph 1 states that the CSX Transportation parcel abuts the Facility; however, the CSX Transportation parcel is separated from the Facility by the West Virginia Department of Transportation parcel. UCC proposes that paragraph 1 be revised to state, "Located downgradient from the Facility to the northwest are two parcels, owned by the West Virginia Department of Transportation (WVDOT) and CSX Transportation, respectively." In addition, UCC proposes including an updated version of Figure 4 (attached) in the Statement of Basis and Final Decision Document. The updated figure shows the property owners for the area where offsite groundwater use restrictions are proposed.

EPA Response:

EPA agrees with the comment and has incorporated this change into the Final Decision.

Comment 2: Section II. – Facility Background

The parties listed in paragraph 2 are not inclusive of all the parties UCC purchased land from for the Facility. In addition, not all of the parcels were purchased in 1947. UCC proposes that paragraph 2 be revised to state, "Between 1947 and 1974, UCC purchased individual parcels of land from the Kanawha Land Company, Westvaco Chemical Company, a dairy farm, and other parties."

EPA Response:

EPA agrees with the comment and has incorporated this change into the Final Decision.

Comment 3: Section II. – Facility Background

Paragraph 4 incorrectly states, "The landfills also received oxide tails from the Facility's propylene oxide production unit..." The oxide tails came from the propylene oxide production

unit at the UCC South Charleston Facility not the UCC Technology Park. UCC proposes that paragraph 4 be revised to state, “The landfills also received oxide tails from the UCC South Charleston Facility propylene oxide production unit...”

EPA Response:

EPA agrees with the comment and has incorporate this change into the Final Decision.

Comment 4: Section II. – Facility Background

Paragraph 6 incorrectly lists the name for the church that purchased the parcel from UCC; the correct entity is the United Disciples of Christ Church.

EPA Response:

EPA agrees with the comment and has incorporated this change into the Final Decision

Comment 5: Section II. – Facility Background

Figure 2 does not show the area that was sold to the United Disciples of Christ Church. UCC proposes including an updated version of Figure 2 (attached) in the Statement of Basis and the Final Decision Document. The updated figure shows the area of Tract D that was sold in July 2010. In addition, UCC proposes that paragraph 6 be revised to state, “In addition, in July 2010, a portion of Tract D (shown as “Area D-1” on Figure 2) was sold by UCC...”

EPA Response:

EPA agrees with the comment and has incorporated this change into the Final Decision by including a revised Figure 2.

Comment 6: Section III. – Summary of Environmental Investigations and Interim Measures

The report titled Summary of Ecological Risk for SWMU 5 and 20 in paragraph 2 is incorrect. The correct title is Summary of Ecological Risk Evaluations for RCRA Solid Waste Management Units 5 and 70. In addition, the sentence following the title of this document should be changed to say, “This report documents...” instead of “These reports document...”

EPA Response:

EPA agrees with the comment and has incorporated this change into the Final Decision.

Comment 7: Section III. – Summary of Environmental Investigations and Interim Measures

The description in paragraph 2 for the report titled, Screening Level Ecological Risk Assessment for Ward Branch and Baseline Ecological Risk Assessment for Ward A Pond states, “This reports documents the ecological evaluation of the fate and transport of constituents detected at the SWMUs...” Ward Branch is not a solid waste management unit (SWMU); therefore, UCC proposes that paragraph 2 be revised to state, “This report documents the ecological evaluation of the fate and transport of constituents detected in Ward Branch and Ward A Pond...”

EPA Response:

EPA agrees with the comment and has incorporated this change into the Final Decision.

Comment 8: Section III. – Summary of Environmental Investigations and Interim Measures

Information from the following reports is included in the Statement of Basis; therefore, UCC proposes that the following text be added to Section III of the Statement of Basis and Final Decision Document:

Ecological Risk Assessment Ward A and B Landfills (Solid Waste Management Units 3 and 4) (2006) – This report documents the ecological evaluation of the fate and transport of constituents detected at the SWMUs through the ecological setting of the Facility.

Technology Park Groundwater Screening-Level Assessment (2009) – This report documents the human health risk assessment for current and future exposure to constituents in groundwater downgradient of the Facility.

Buildings 706 and 707 Area Soil Investigation, Removal Action, and Vapor Intrusion Human Health Risk Assessment (2009) – This report documents the soil investigation and removal action. In addition, it documents the human health risk assessment for current and future exposure to constituents in indoor air in Buildings 706 and 707.

EPA Response:

EPA agrees with the comment and has incorporated this change into the Final Decision.

Comment 9: Section III. – Summary of Environmental Investigations and Interim Measures

Paragraph 3 references Table 1; however, Table 1 is not included in the Statement of Basis. The attached table appears to be the table that is missing from the Statement of Basis.

EPA Response:

EPA agrees with the comment and has incorporated this change into the Final Decision by including Table 1.

Comment 10: Section III.A.2 – Tracts B and C

SWMU 60 is still used as a waste transfer area for printing chemicals. UCC proposes that this section be revised to state, “The fourth SWMU, No. 60, is shelving on a loading dock on the north side of Building 2000 which is used as a waste transfer area to manage printing chemicals for short durations.”

EPA Response:

EPA agrees with the comment and has incorporated this change into the Final Decision.

Comment 11: Section III.A.3.b – Tract D, Ward B Landfill

Paragraph 1 incorrectly states that the Ward B Landfill cover prevents human health exposure to soil. The cover prevents human health exposure to waste material not soil. UCC proposes that paragraph 1 be revised to state, "The clay-soil mix cover currently in place prevents direct contact with waste material in the Ward B Landfill, thus eliminating the pathway for human health exposure to waste material."

EPA Response:

EPA agrees with the comment and has incorporated this change into the Final Decision.

Comment 12: Section III.A.3.b – Tract D, Ward B Landfill

Paragraph 2 states the incorrect date for the screening level ecological risk assessment (SLERA). The SLERA for Ward B Landfill was conducted in April 2006.

EPA Response:

EPA agrees with the comment and has incorporated this change into the Final Decision.

Comment 13: Section III.B.1 – Ward Hollow Groundwater

The constituents listed in paragraph 1 are not inclusive of all constituents within the Ward Hollow groundwater plume that are above their respective U.S. Environmental Protection Agency maximum contaminant level or EPA tap water regional screening level. This list only includes the most prominent constituents. UCC proposes that paragraph 1 be revised to state, "The most prominent constituents within the Ward Hollow groundwater plume that are above their respective EPA maximum contaminant levels (MCLs) codified at 40 Code of Federal Regulations (CFR) Part 141 and promulgated pursuant to the Safe Drinking Water Act, 42 United States Code (USC) 300f et seq. or the EPA tap water regional screening levels (RSLs) include 1,4 dioxane; benzene; bis(2-chloroisopropyl)ether; arsenic; and barium."

EPA Response:

EPA agrees with the comment and has incorporated this change into the Final Decision.

Comment 14: Section III.B.2 – Greenhouse Area Groundwater

This section states that the Greenhouse Area is above the location of the former greenhouse; however, the Greenhouse Area encompasses the location of the former greenhouse. UCC proposes this section be revised to state, "The Greenhouse Area is located on Tract A in the area of the former greenhouse."

EPA Response:

EPA agrees with the comment and has incorporated this change into the Final Decision.

Comment 15: Section III.C.1 – Ward Branch

Paragraph 2 states, “The 2009 HHRA report for Ward A Landfill concluded that no unacceptable human health risks were associated with the current and proposed future land use of the landfill as a scenic pond.” This section is for Ward Branch not Ward A Landfill; therefore, UCC proposes that paragraph 2 be revised to state, “The 2009 HHRA report for Ward Branch concluded that no unacceptable human health risks were associated with the current and proposed future use of Ward Branch.”

EPA Response:

EPA agrees with the comment and has incorporated this change into the Final Decision.

Comment 16: Section III.C.2 – Tributary to Davis Creek

This section states the incorrect date for the SLERA. The SLERA for the tributary to Davis Creek was conducted in 2007.

EPA Response:

EPA agrees with the comment and has incorporated this change into the Final Decision.

Comment 17: Section III.D.1 – Ward Hollow

Paragraph 3 only references Tract D; however, there are portions of Tracts A, B, and C within 100 feet of the landfills. In addition, paragraph 3 states, “...corrective measures for potential unacceptable human health risks related to vapor intrusion will be evaluated...” Corrective measures already have been evaluated for potential unacceptable human health risks related to vapor intrusion, and a remedy has been proposed (i.e., installation of a vapor control system for all new structures which are to be occupied). UCC proposes that paragraph 3 be revised to state, “Occupied buildings near the landfills have been evaluated for subsurface vapor intrusion; however, it is possible that additional occupied buildings may be constructed near the landfills in the future. Because of the presence of VOCs in the landfills and groundwater plume, corrective measures for potential unacceptable human health risks related to vapor intrusion are warranted for portions of the Facility that are located within 100 feet of the landfills.”

EPA Response:

EPA agrees with the comment and has incorporated this change into the Final Decision.

Comment 18: Section III.D.2 – Greenhouse Area/Building 740

Table 1-1 is referenced in this section; however, Table 1-1 is not in the Statement of Basis. It appears this reference is not necessary.

EPA Response:

EPA agrees with the comment and has incorporated this change into the Final Decision.

Comment 19: Section IV.A – Introduction

Figure 5 of the Statement of Basis does not show all of the areas where UCC proposed subsurface work restrictions. UCC proposes including an updated version of Figure 5 (attached) in the Statement of Basis and Final Decision Document. The updated figure shows all of the areas where UCC proposed subsurface work restrictions.

EPA Response:

EPA agrees with the comment and has incorporated this change into the Final Decision by including an updated Figure 5.

Comment 20: Section IV.A – Introduction

In paragraph 3, the inactive landfills are referred to as closed surface impoundments. This is the first and only time the landfills are referred to as closed surface impoundments. To avoid confusion, it is recommended that the landfills not be referred to as closed surface impoundments in the Statement of Basis and Final Decision Document.

EPA Response:

EPA agrees with the comment and has incorporated this change into the Final Decision.

Comment 21: Section IV.B – Tract A

Paragraph 2, bullet b incorrectly states, “No earth moving activities, including construction and drilling, may be done on Tract A unless such activities are required by WVDEP, in consultation with EPA, or it is demonstrated to WVDEP, in consultation with EPA, that such activities will not pose a threat to human health or the environment or adversely affect or interfere with the selected remedy and WVDEP, in consultation with EPA, provides prior written approval for such activities.” The subsurface work restriction only applies to the areas of Tract A shown on Figure 5 as having subsurface work restrictions. In addition, UCC requests that written approval from WVDEP not be required for earth moving activities. UCC proposes that bullet b be revised to state: “Earth moving activities, including construction and drilling, may only be conducted in the areas of Tract A depicted on Figure 5 as having subsurface work restrictions if it is determined that such activities will not pose a threat to human health or the environment or adversely affect or interfere with the selected remedy.”

EPA Response:

When EPA proposed to require that UCC obtain written approval from WVDEP prior to any earth moving activities, it intended that UCC obtain and comply with a WVDEP-approved Health & Safety Plan prior to such activities. The requirement to develop and implement a Health & Safety Plan was described in the Subsection A (Introduction) of Section IV. (Summary of Proposed Corrective Measures) of the SB. For purposes of clarification, the Final Decision includes this requirement under in Sections IV, B and D, respectively. In addition, EPA agrees that the restriction on earth moving activities applies to the areas of Tract A which are shown on Figure 5.

Comment 22: Section IV.B – Tract A

UCC has proposed that the institutional controls for Tract A include a restriction on groundwater use. It is requested that a bullet be added to this section that states, “Groundwater from Tracts A shall not be used for any purpose other than to conduct the operation, maintenance and monitoring activities required by WVDEP and/or EPA, unless it is demonstrated to WVDEP, in consultation with EPA, that such use will not pose a threat to human health or the environment or adversely affect or interfere with the selected remedy and WVDEP, in consultation with EPA, provides written approval for such use.”

EPA Response:

EPA agrees with the comment. The Facility-wide groundwater restriction was provided for in the SB in Section IV. D (Tract D) which listed the proposed institutional controls for Tract D. For purposes of clarification, the Final Decision includes the groundwater restriction under each Tract in Sections IV, A, B and C, respectively.

Comment 23: Section IV.C – Tracts B and C

UCC has proposed that the institutional controls for Tracts B and C include a restriction on subsurface work within 100 feet of any of the landfills. It is requested that text be added to this section to state, “Earth moving activities, including construction and drilling, may only be conducted in the areas of Tracts B and C depicted on Figure 5 as having subsurface work restrictions if it is determined that such activities will not pose a threat to human health or the environment or adversely affect or interfere with the selected remedy.”

EPA Response: EPA disagrees with this comment. Based on historical information and soil sampling results, EPA determined that the areas on Tracts B and C that are within 100 feet of any of the landfills do not require a subsurface work restriction. Those areas do, however, pose a potential for unacceptable human health risks related to vapor intrusion. Figure 5 has been revised to clearly depict those areas where the potential for such vapor intrusion exists.

Comment 24: Section IV.C – Tracts B and C

UCC has proposed that the institutional controls for Tracts B and C include a restriction on groundwater use. It is requested that text be added to this section that states, “Groundwater from Tracts B and C shall not be used for any purpose other than to conduct the operation, maintenance and monitoring activities required by WVDEP and/or EPA, unless it is demonstrated to WVDEP, in consultation with EPA, that such use will not pose a threat to human health or the environment or adversely affect or interfere with the selected remedy and WVDEP, in consultation with EPA, provides written approval for such use.”

EPA Response:

EPA agrees with the comment. The Facility-wide groundwater restriction was provided for in the SB in Section IV. D (Tract D) which listed the proposed institutional controls for Tract D.

For purposes of clarification, the Final Decision includes the groundwater restriction under each Tract in Sections IV, A, B and C, respectively.

Comment 25: Section IV.D – Tract D

Paragraph 2, bullet b states, “Tract D shall not be used in any way that will adversely affect or interfere with the integrity and protectiveness of the caps and the area within 100 feet of the caps placed over the Lower Ward Landfill, Ward A Landfill and Ward B Landfill...” Ward A Landfill does not have a cover; therefore, UCC proposes the reference to Ward A Landfill be removed from this sentence.

EPA Response:

EPA agrees with the comment and has incorporated this change into the Final Decision.

Comment 26: Section IV.D – Tract D

The landfill covers are referred to as “caps” in this section. This could be misconstrued to mean they meet the requirements for a Resource Conservation and Recovery Act (RCRA) cap. To avoid confusion, UCC proposes the landfill covers not be referred as caps in the Statement of Basis and Final Decision Document.

EPA Response:

EPA agrees with the comment and has incorporated this change into the Final Decision.

Comment 27: Section IV.D – Tract D

Paragraph 2, bullet d incorrectly states, “No earth moving activities, including construction and drilling, may be done on Tract D unless such activities are required by WVDEP, in consultation with EPA, or it is demonstrated to WVDEP, in consultation with EPA, that such activities will not pose a threat to human health or the environment or adversely affect or interfere with the selected remedy and WVDEP, in consultation with EPA, provides prior written approval for such activities.” The subsurface work restriction only applies to the areas of Tract D shown on Figure 5 as having subsurface work restrictions. In addition, UCC requests that written approval from WVDEP not be required for earth moving activities. UCC proposes that bullet d be revised to state: “Earth moving activities, including construction and drilling, may only be conducted in the area of Tract D depicted on Figure 5 as having subsurface work restrictions if it is determined that such activities will not pose a threat to human health or the environment or adversely affect or interfere with the selected remedy.”

EPA Response: When EPA proposed to require that UCC obtain written approval from WVDEP prior to any earth moving activities, it intended that UCC obtain and comply with a WVDEP-approved Health & Safety Plan prior to such activities. The requirement to develop and implement a Health & Safety Plan was described in the Subsection A (Introduction) of Section IV. (Summary of Proposed Corrective Measures) of the SB. For purposes of clarification, the Final Decision includes this requirement under in Sections IV, B and D, respectively. In

addition, EPA agrees that the restriction on earth moving activities applies to the areas of Tract D which are shown on Figure 5.

**TABLE 1**

TABLE 1  
SWMUs and Investigation Areas Summary Table  
Statement of Basis  
UCC Technology Park  
South Charleston, West Virginia

SWMU No.	Tract	Unit Name	Unit Location	SWMU Classification <sup>1</sup>	Operational Status (as of March 2008) <sup>2</sup>	Wastes Managed	History of Release <sup>3</sup>	Interim Measures	Previous Investigation Results
1	D	Lower Ward Landfill	Located west of Building 2000	B	Inactive	The landfill was used for disposal of fly ash from the South Charleston Facility (SCF), municipal sludge, oxide tails from the SCF propylene oxide production unit, wastes from general chemical operations, and small amounts of organic chemicals.	This landfill and Ward A/B landfill are the sources for the groundwater contamination in Ward Hollow.	Covered with 18 inches of clay cover and seeded in 1965. Half the surface was paved in 1978. Since 1970s, some of the leachate has been collected in SWMU 2.	Groundwater in Ward Hollow is being impacted by Solid Waste Management Unit (SWMU) 1 and SWMU 3. Contaminated groundwater is migrating from these sources to the underlying weathered bedrock and then downgradient into Ward Hollow. The most prominent constituents that are present within the groundwater plume are: 1,4-dioxane; benzene; bis(2-chloroisopropyl)ether; arsenic; and barium.  To evaluate the potential for vapor intrusion into nearby buildings, soil gas and indoor air sampling was conducted. Human health risks were evaluated in a human health risk assessment (HHRA) which concluded that current and future human health exposure would not result in unacceptable human health risks (CH2M HILL 2009a).
2	D	Lower Ward Leachate Collection System	Located north of Lower Ward Landfill (SWMU 1) inside Building 730	B	Active	Leachate could contain constituents that were deposited in the Lower Ward Landfill.	Strong chemical odor was observed during the Resource Conservation and Recovery Act (RCRA) Facility Assessment (RFA) emanating from the leachate collected.	In 1970, two pumps were installed at Building 730 to pump the leachate from the leachate collection system to the South Charleston Publicly Owned Treatment Work (POTW).	Water samples collected from the Lower Ward leachate collection system show similar constituent found in Ward Hollow wells (CH2M HILL 2008).
3	D	Ward A/B Landfill	Located south of Lower Ward and the Main Technology Park complex	A	Ward A: Inactive Ward B: Inactive	The landfill was used for disposal of fly ash from the SCF, municipal sludge, and oxide tails from the SCF propylene oxide production unit.	This landfill and Lower Ward Landfill are the source of groundwater contamination in Ward Hollow.	(1) In 1969 and 1977 a flow of water was observed west of the upper dike; this was corrected after each observation. (2) Ward B was covered with a clay-soil mix in the 1970s. (3) Breached and thin areas in the cover at Ward B were repaired following the 2001 RFI investigation. (4) Central drain line sump pumping system was installed.	Soil, sediment, surface water, soil gas, and indoor air sampling have been conducted to evaluate impacts related to this SWMU. Ecological risks were evaluated in Ward A/B Screening Level Ecological Risk Assessment (SLERA) (CH2M HILL 2006) and the Ward A Pond Baseline Ecological Risk Assessment (CH2M HILL 2010a); these reports concluded that no unacceptable risks to ecological receptors are expected. Human health risks were evaluated in a HHRA which concluded that current and future human health exposure to evaluated media would not result in unacceptable human health risks (CH2M HILL 2009a).
4	D	Upper Ward A/B Landfills Overflow System Including Outfall 008	Located at north end of the pond that covers Ward A	A	Active	May contain constituents that were deposited in the Ward A/B Landfill.	None	None	Surface water and sediment sampling have been conducted to evaluate impacts related to SWMU 3. Ecological risks were evaluated in the Ward Branch SLERA (CH2M HILL 2010a); this evaluation concluded that no unacceptable risks to ecological receptors are expected. Human health risks were evaluated in a HHRA which concluded that current and future human health exposure to evaluated media would not result in unacceptable human health risks (CH2M HILL 2009a).
5	A	Timberland Landfill	Located approximately at the western edge of the Technology Park property in an area cleared for the power lines, southwest of Building 776	B	Inactive	Waste reportedly includes small quantities of laboratory sample bottles and latex polymer.	None	Wastes materials were reportedly removed from SWMU 5 and shipped off site (UCC 1998).	In 2004, a geophysical survey, two test pits to confirm the geophysical results, and soil sampling was completed. No waste was observed in the test pits or the soil borings. The analytical results from the soil sampling were evaluated in the Current Conditions Report (CCR) (CH2M HILL 2008), no industrial or residential screening level exceedances were observed. In addition, no unacceptable ecological risk was observed.  In 2008/2009, additional excavations were completed to further evaluate if there is any remaining waste material in the former landfill. During these excavations some trash (concrete, metal, and plastic) was uncovered; however, the limited amount of trash observed did not indicate that a landfill is present in the excavation area.
6	A	701 Waste Accumulation Shed (8723)	Located northwest of the incinerator (SWMU 55)	C	Inactive as a SWMU	Was used formerly to store wastes generated at Building 701 and in laboratories and pilot plants throughout the facility. Currently only raw materials are stored here.	None	None	In 2008, soil sampling was completed to support potential future divestitures. The analytical results did not exceed the residential or industrial screening levels (CH2M HILL 2010b).
7	A	740 Waste Accumulation Shed (8736)	Located off the northwest corner of Building 740	C	Inactive	Stored wastes generated at Building 740, and in laboratories and pilot plants throughout the facility.	None	In 1989, this area was cleaned up, partially demolished and reconstructed. The containment sump was removed and the drain pipe valved off. After this, the area was no longer used as a waste transition area (UCC 1998).	In 2006, one soil sample (TCF-0063) was collected from this SWMU as part of the Donation Area Investigation. The results for this soil sample were nondetect (CH2M HILL 2008).
8	A	770 Waste Accumulation Shed (8722)	Located off the northeast corner of Building 770	C	Inactive	Stored wastes generated at Building 770, and in laboratories and pilot plants throughout the facility.	None	In 1989 this area was cleaned up, partially demolished and reconstructed. The containment sump was removed and the drain pipe valved off. After this, the area was no longer used as a waste transition area (UCC 1998).	Not Applicable

**TABLE 1**  
**SWMUs and Investigation Areas Summary Table**  
**Statement of Basis**  
**UCC Technology Park**  
**South Charleston, West Virginia**

SWMU No.	Tract	Unit Name	Unit Location	SWMU Classification <sup>1</sup>	Operational Status (as of March 2008) <sup>2</sup>	Wastes Managed	History of Release <sup>3</sup>	Interim Measures	Previous investigation Results
9	A	9a. 722 Non-Hazardous Waste Accumulation Shed 9b. Dismantled Incinerator	These represent two units that occupied the same area at different times, the location is immediately southwest of the closed Incinerator (SWMU 55)	C	Inactive	9a. Stored non-hazardous waste from the pilot plant and laboratories. 9b. The incinerator burned mainly cardboard and other packing materials, but also took small lots of organic chemical sample bottles and 5-gallon cans.	None	Incinerator dismantled and closed in 1972. The foundation was cleaned and put in use as a pad under an accumulation shed. Waste accumulation shed was cleaned at the same time as the incinerator (UCC 1998).	Not Applicable
10	A	722 Waste Accumulation Pad	Located 50 feet west of the Incinerator (SWMU 55) and adjacent to the New Day Tank (SWMU 54)	C	Inactive	Stored wastes from all areas of the facility which were to be disposed of in the Incinerator (SWMU 55).	None	Cleaned and closed the same time as the Incinerator (SWMU 9b) (UCC 1998).	Not Applicable
11	A	706/707 Waste Accumulation Area	Located northeast of Building 707, on the east side of the Residue Tanks (SWMUs 48 and 49) and the Wastewater Tanks (SWMUs 51 and 52)	C	Inactive	Stored wastes from all areas of the facility which were designated to be emptied into either the Residue Tanks (SWMUs 48 & 49) or the Wastewater Tanks (SWMU 51 & 52).	Leaking drums were noted on an inspection (No date). The concrete base was cracked and stained at the time of the VSI.	None	In 2004, soil samples and a groundwater grab sample from a perched zone were collected. The analytical results were evaluated in the CCR (CH2M HILL 2008), no industrial or residential screening level exceedances were observed for soil. The groundwater grab sample did however exceed screening levels.  In 2006, additional borings were completed to further assess the possibility of a perched groundwater zone. None of the direct pushing boring showed any indication of a perched groundwater zone (CH2M HILL 2008).
12	A	726/727 Waste Accumulation Area	Located on the north side of Building 726	C	Active	Stores waste generated in Building 726 & 727	In 1982, one drum of waste isocyanate exploded at the east end of Building 726. No estimate on the amount released.	None	In 1992, a soil sample was collected. The analytical results were nondetect (UCC 1998).  In 2008, additional soil samples were collected from this area to support potential future divestitures. The results for these samples were also nondetect (CH2M HILL 2010b).
13	A	728 Waste Accumulation Area	Located at the west end of Building 728	C	Active	Stores waste generated in Building 728.	None	None	In 2008, soil samples were collected from this area to support potential future divestitures. The results for these samples were nondetect (CH2M HILL 2010b).
14	A	733 Waste Accumulation Area	Located west of Building 720 and north of Building 706	B	Inactive as a SWMU	Stored wastes generated from all areas of the facility. At the time of the VSI, lithium bromide and waste acetone were stored here. Currently only raw materials are stored in this area.	None	A closure plan was approved in 1997 (UCC 1998), but there is no record that the plan was implemented.	In 2004, soil sampling was completed. The analytical results from the soil sampling were evaluated in the CCR (CH2M HILL 2008), no industrial or residential screening level exceedances were observed.
15	A	740 Waste Oil Storage Area	Located east of Building 743	C	Inactive as a SWMU	Historically stored used vacuum pump oil, but currently stores acetone and drummed raw materials.	None	None	In 2006, one soil sample (TCF-0062) was collected from this SWMU as part of the Donation Area Investigation. The results for this soil sample were nondetect (CH2M HILL 2008).
16	A	770 Aldehydes Waste Accumulation Area	Located on the north side of the east wing of Building 770, approximately 1,000 feet west of Ward Hollow	C	Active	Stores waste aldehydes.	None	None	Not Applicable
17	A	771 Waste Accumulation Area	Located at the north end of Building 771	C	Active	Stores wastes generated in Building 771.	None	None	In 2008, soil sampling was completed to support potential future divestitures. The analytical results did not exceed residential or industrial screening levels (CH2M HILL 2010b).
18	A	773 Waste Accumulation Area	Located on the southwest side of Building 773	C	Active	Stores wastes generated in Building 773.	None	None	Not Applicable
19	A	776 Waste Accumulation Pad	Located on the north side of Building 776	C	Active	Stores wastes generated in Building 776 and other nearby buildings.	In 1987, 30 gallons of kerosene was spilled on the concrete pad. It was immediately absorbed and cleaned up.	The spilled kerosene was immediately absorbed and cleaned up. No long term impact occurred due to this release (A.T. Kearney, 1988).	Not Applicable
20	A	735 Waste Storage Pad	Located southwest of Building 720 and the 733 Waste Accumulation Pad (SWMU 14)	C	Active	Stores wastes generated from all areas of the facility. Wastes in accumulation areas (SWMUs 6-19) that are approaching 90-day storage limit are either incinerated or transferred to this unit.	None	None	Not Applicable
21	A	787 Waste Storage Bunker	Located approximately 50 feet north of Building 771	C	Active	Stores wastes and raw chemicals characterized as "highly ignitable, reactive, or toxic."	None	None	In 2008, soil sampling was completed to support potential future divestitures. The analytical results did not exceed the residential or industrial screening levels (CH2M HILL 2010b).
22	A	740 Area Sump	Located outside of the 740 Former Contaminated Oil Storage Area (SWMU 15)	C	Inactive	Received runoff from SWMU 15.	None	None	In 2006, one soil sample (TCF-0062) was collected from this SWMU as part of the Donation Area Investigation. The results for this soil sample were nondetect (CH2M HILL 2008).
23	A	776 Pad Sump	Located on the north side of Building 776	C	Active	Receives runoff from SWMU 19.	Sump was inspected and found not to contain any spill material	None	Not Applicable
24	A	787 Bunker Sump	Located immediately west of the 787 Waste Storage Bunker (SWMU 21)	C	Active	Receives runoff from SWMU 21.	None	None	In 2008, soil sampling was completed to support potential future divestitures. The analytical results did not exceed the residential or industrial screening levels (CH2M HILL 2010b).

TABLE 1  
 SWMUs and Investigation Areas Summary Table  
 Statement of Basis  
 UCC Technology Park  
 South Charleston, West Virginia

SWMU No.	Tract	Unit Name	Unit Location	SWMU Classification <sup>1</sup>	Operational Status (as of March 2008) <sup>2</sup>	Wastes Managed	History of Release <sup>3</sup>	Interim Measures	Previous Investigation Results
25	A	701 Shed Sump	Located behind the 701 Waste Accumulation Shed (SWMU 6)	C	Inactive as a SWMU	Received runoff from SWMU 6.	None	None	In 2008, soil sampling was completed to support potential future divestitures. The analytical results did not exceed the residential or industrial screening levels (CH2M HILL 2010b).
26	A	722 Shed Sump	Located immediately west of the 722 non-hazardous waste accumulation shed (SWMU 9)	C	Inactive	Received runoff from SWMU 7.	None	Cleaned and closed the same time as the Incinerator (SWMU 9b) (UCC 1998).	Not Applicable
27	A	740 Shed Sump	Located behind 740 Waste Accumulation Shed (SWMU 7)	C	Inactive	Received runoff from SWMU 8.	None	In 1989, this area was cleaned up, partially demolished and reconstructed. The containment sump was removed and the drain pipe valved off. After this, the area was no longer used as a waste transition area (UCC 1998).	In 2006, one soil sample (TCF-0063) was collected from this SWMU as part of the Donation Area Investigation. The results for this soil sample were nondetect (CH2M HILL 2008).
28	A	770 Shed Sump	Located behind 770 Waste Accumulation Shed (SWMU 8)	C	Inactive	Received runoff from SWMU 9.	None	In 1989 this area was cleaned up, partial demolished and reconstructed. The containment sump was removed and the drain pipe valved off. After this the area was no longer used as a waste transition area (UCC 1998).	Not Applicable
29	A	704 Empty Drum Area	Located on the east side of Building 704	D	Active	Stores empty drums from Building 704 and other nearby facilities.	None	None	Not Applicable
30	A	707 Empty Drum Rack	Located east of Building 706	D	Active	Stores only empty stainless steel drums that are steam cleaned at SWMU 59 prior to storage.	None	None	Not Applicable
31	A	706/707 Empty Drum Area	Located west of Building 707	D	Active	Stores empty drums from Building 706/707 and other nearby facilities.	None	None	Not Applicable
32	A	726 Empty Drum Area	Located on the north side of Building 726, just east of the 726/727 Waste Accumulation Area (SWMU 12)	D	Active	Stores empty drums from Building 726/727 and other nearby facilities.	Small amount of liquid from one drum appeared to have seeped onto the pad. Leak did not get transported off the pad.	None	In 2008, soil samples were collected from this area to support potential future divestitures. The results for these samples were nondetect (CH2M HILL 2010b).
33	A	742/743 Empty Drum Area	Located immediately east of Building 742	D	Active	Stores empty drums from Building 742/743 and other nearby facilities.	None	None	In 2006, one soil sample (TCF-0061) was collected from this SWMU as part of the Donation Area Investigation. The results for this soil sample were nondetect (CH2M HILL 2008).
34	A	770 Empty Drum Area	Located approximately 30 feet east of 771 Waste Accumulation Area (SWMU 17)	D	Active	Stores empty drums from Building 770 and other nearby facilities.	None	None	In 2008, soil sampling was completed to support potential future divestitures. The analytical results did not exceed the residential or industrial screening levels (CH2M HILL 2010b).
35	A	771 Empty Drum Area	Located approximately 20 feet north of 787 Waste Storage Bunker (SWMU 21)	D	Active	Stores empty drums from Building 771 and other nearby facilities.	None	None	In 2008, soil sampling was completed to support potential future divestitures. The analytical results did not exceed the residential or industrial screening levels (CH2M HILL 2010b).
36	A	776 Empty Drum Area	Located north of Building 773	D	Active	Stores empty drums from Building 776 and other nearby facilities.	None	None	Not Applicable
37	A	704 Cooling Tower Basin	Located approximately 100 feet west of the Incinerator (SWMU 55), and 30 feet west of 701 Waste Accumulation Shed (SWMU 6)	D	Active	Chromium compound was added to the cooling water from 1940s to 1980s. The basin is emptied once a year and any biological solids washed down the clean sewer (SWMU 61).	None	None	In 1989, TCLP analysis for metals was performed on cooling tower wood that was replaced. The results were nondetect except for barium and chromium, which were below RCRA characteristic and treatment standard levels (UCC 1998).
38	A	742 Cooling Tower Basin	Located approximately 100 feet west of Building 742	B	Inactive as a SWMU	Chromium compound was added to the cooling water from 1940s to 1980s. The basin is emptied once a year and any biological solids washed down the clean sewer (SWMU 61).	Cooling water was observed during the VSI dripping onto the soil near the southeast corner of the tower.	In 1990, minor cracks that penetrated the full thickness of the wall were repaired. Sometime in the 1980s, chromium compound was eliminated as an additive to the cooling water (UCC 1998).	In 2004, soil sampling was completed. The analytical results from the soil sampling were evaluated in the CCR (CH2M HILL 2008), no industrial or residential screening level exceedances were observed.
39	A	770 Cooling Tower Basin	Located approximately 100 feet north of Building 770	D	Active	Chromium compound was added to the cooling water from 1940s to 1980s. The basin is emptied once a year and any biological solids washed down the clean sewer (SWMU 61).	None	Chromium compounds are no longer used in the cooling water (UCC 1998).	Not Applicable
40	A	773 Cooling Tower Basin	Located approximately 100 feet west of Building 773	D	Active	Chromium compound was added to the cooling water from 1940s to 1980s. The basin is emptied once a year and any biological solids washed down the clean sewer (SWMU 61).	Cooling water was observed during the VSI dripping onto the soil on the west side of the tower basin.	Sometime in the 1980s, chromium compound was eliminated as an additive to the cooling water (UCC 1998).	In 2004, soil sampling was completed. The analytical results from the soil sampling were evaluated in the CCR (CH2M HILL 2008), no industrial or residential screening level exceedances were observed.
41	A	777 Cooling Tower Basin	Located on the northeast side of the 776 Waste Accumulation Pad (SWMU 19)	D	Active	Chromium compound was added to the cooling water from 1940s to 1980s. The basin is emptied once a year and any biological solids washed down the clean sewer (SWMU 61).	Cooling water was observed during the VSI dripping onto the soil on the east side of the tower basin.	Sometime in the 1980s, chromium compound was eliminated as an additive to the cooling water (UCC 1998).	In 2004, soil sampling was completed. The analytical results from the soil sampling were evaluated in the CCR (CH2M HILL 2008), no industrial or residential screening level exceedances were observed.

TABLE 1  
SWMUs and Investigation Areas Summary Table  
Statement of Basis  
UCC Technology Park  
South Charleston, West Virginia

SWMU No.	Tract	Unit Name	Unit Location	SWMU Classification <sup>1</sup>	Operational Status (as of March 2008) <sup>2</sup>	Wastes Managed	History of Release <sup>3</sup>	Interim Measures	Previous Investigation Results
42/43	A	791 Cooling Tower East Basin	Located behind Building 791 on the south side	D	Active	Chromium compound was added to the cooling water from 1940s to 1980s. The basin is emptied once a year and any biological solids washed down the clean sewer (SWMU 61).	Cooling water was observed during the VSI dripping onto the soil near the basin of the tower.	Sometime in the 1980s, chromium compound was eliminated as an additive to the cooling water (UCC 1998).	In 2004, soil sampling was completed. The analytical results from the soil sampling were evaluated in the CCR (CH2M HILL 2008), no industrial or residential screening level exceedances were observed.
44	A	705 Roof Cooling Tower Basin	Located on the roof of Building 705	D	Active	Chromium compound was added to the cooling water from 1940s to 1980s. The basin is emptied once a year and any biological solids washed down the clean sewer (SWMU 61).	None	Chromium compounds are no longer used in the cooling water (UCC 1998).	Not Applicable
45	A	770 Roof Cooling Tower Basin	Located on the roof of Building 770	D	Active	Chromium compound was added to the cooling water from 1940s to 1980s. The basin is emptied once a year and any biological solids washed down the clean sewer (SWMU 61).	None	Chromium compounds are no longer used in the cooling water (UCC 1998).	Not Applicable
46	B	2000 Roof Cooling Tower Basin	Located on the roof of Building 2000	D	Active	Chromium compound was added to the cooling water from 1940s to 1980s. The basin is emptied once a year and any biological solids washed down the clean sewer (SWMU 61).	None	Chromium compounds are no longer used in the cooling water (UCC 1998).	Not Applicable
47	C	6000 Roof Cooling Tower Basin	Located on the roof of Building 6000	D	Active	Chromium compound was added to the cooling water from 1940s to 1980s. The basin is emptied once a year and any biological solids washed down the clean sewer (SWMU 61).	None	Chromium compounds are no longer used in the cooling water (UCC 1998).	Not Applicable
48	A	Eastern Residue Tank	Located in a diked area 15 feet east of Building 707	C	Inactive	Tank stored ignitable or solvent wastes, including those with EPA hazardous waste code D001, F002, and F003.	None	In 1989, the tank and ancillary equipment were cleaned and closed. Closure was documented and submitted to WVDEP OMW, which acknowledged the closure on August 16, 1989 (UCC 1998).	Not Applicable
49	A	Western Residue Tank	Located in a diked area 15 feet east of Building 707	C	Inactive	Tank stored ignitable or solvent wastes, including those with EPA hazardous waste code D001, F002, and F003.	None	In 1989, the tank and ancillary equipment were cleaned and closed. Closure was documented and submitted to WVDEP OMW, which acknowledged the closure on August 16, 1989 (UCC 1998).	Not Applicable
50	A	Residue Tank Sump	Located directly beneath the Western Residue Tank (SWMU 48) in the southwest corner of the diked concrete pad beneath the tanks	C	Inactive	Managed spills from the residue tanks (SWMU 48 and 49).	None	In 1989, the tank and ancillary equipment were cleaned and closed. Closure was documented and submitted to WVDEP OMW, which acknowledged the closure on August 16, 1989 (UCC 1998).	Not Applicable
51	A	Wastewater Tank	Located North of the Residue Tanks (SWMU 49 and 50) on the East side of Building 707	C	Inactive	Tank stored process wastewater from all areas of the UCC Technology Park. Wastewater could contain variable amounts of potentially any chemical utilized at the site	None	In 1993 this tank was cleaned and removed (UCC 1998).	Not Applicable
52	A	Wastewater Tank	Located north of the Residue Tanks (SWMU 49 and 50) on the east side of Building 707	C	Inactive	Tank stored process wastewater from all areas of the UCC Technology Park. Wastewater could have contained variable amounts of any chemical utilized at the site.	None	In 1993 this tank was cleaned and removed (UCC 1998).	Not Applicable
53	A	709 Septic Tank	Located east of Building 709 near the Incinerator (SWMU 55)	No classified	Inactive	Tank received mainly sanitary wastes from toilets, showers, and sinks. It was also hooked to the floor drain and sink in building 709. Tank was not used after 1968.	None	None	Not Applicable
54	A	New Day Tank	Located approximately 50 feet west of the Incinerator (SWMU 55)	C	Inactive	Tank held and blended compatible chemical wastes before on-site incineration. The waste was piped directly to SWMU 55. The tank could have received any chemical utilized at the site.	None	Tank was cleaned and the waste from the cleaning was disposed of in accordance with applicable requirements. UCC submitted the certificate of closure of this unit to WVDEP OMW in 1993. The secondary containment area and its sump were cleaned and closed with the incinerator (SWMU 55) (UCC 1998).	Not Applicable
55	A	Incinerator	Located northeast of Building 722	C	Inactive	The incinerator handled a variety of chemical wastes generated in laboratories and pilot plants on-site, and occasional off-site waste from UCC facilities. Ash generated was deposited in a regulated hazardous waste landfill operated by UCC.	In 1992, a release of incinerator scrubber water occurred to the hillside soil on the east side of the incinerator. No contamination associated with this release as documented in the Clean Closure Certification.	The incinerator was clean closed in early 1996 in accordance with a modified closure plan approved by the WVDEP OWM in June 1995 (UCC 1998).	Not Applicable

TABLE 1  
 SWMUs and Investigation Areas Summary Table  
 Statement of Basis  
 UCC Technology Park  
 South Charleston, West Virginia

SWMU No.	Tract	Unit Name	Unit Location	SWMU Classification <sup>1</sup>	Operational Status (as of March 2008) <sup>2</sup>	Wastes Managed	History of Release <sup>3</sup>	Interim Measures	Previous Investigation Results
56	A	Building 704 Boiler	Located inside Building 704	B	Inactive	The Boiler handled mostly coal and paper trash, but also burned wastes from the Residue Tanks (SWMU 48 and 49). Prior to 1985.	None	In 1993, this boiler was cleaned and mothballed. Later on the boiler was removed (UCC 1998).	Not Applicable
57	A	Building 704 Boiler	Located inside Building 704	B	Inactive	The Boiler handled mostly coal and paper trash, but also burned wastes from the Residue Tanks (SWMU 48 and 49). Prior to 1985.	None	In 1993, this boiler was cleaned and mothballed. Later on the boiler was removed (UCC 1998).	Not Applicable
58	A	Boiler Ash Handling System	Unit is part of Building 704	B	Inactive	Managed ash from the boilers (SWMU 56 and 57).	None	In 1993, this boiler was cleaned and mothballed. Later on the boiler was removed (UCC 1998).	In 2004, soil sampling was conducted. The analytical results for TCF-SB004 exceeded the industrial screening level for arsenic and the residential screening level for mercury (CH2M HILL 2008). In 2005, additional soil samples were collected to confirm the results for arsenic at TCF-SB004 and evaluate the extent. All of the 2005 soil analytical results were below the industrial and residential screening level (CH2M HILL 2008).
59	A	Drum Rinsing Station	Located inside the diked area by the Wastewater Tanks (SWMUs 51 and 52)	C	Inactive	Managed rinsate from drum steam cleaning process. The rinsate was discharged to the sanitary sewer (SWMU 62).	None	None	Not Applicable
60	B	2000 Waste Transfer Area	Located within Building 2000 on the loading dock	C	Active	Manages printing chemicals for a short duration before they are transferred to waste operations for disposal.	None	None	Not Applicable
61	N/A	Clean Sewer	Located under the entire Technology Park	B	Active	Manages waste discharged from SWMU 10, 11, 14, 17, 29, 37-45, and 54. It also received plant stormwater run-off. This sewer system operates under the NPDES permit number WV0000124.	None	None	Not Applicable
62	N/A	Sanitary Sewer	Located under the entire Technology Park	B	Active	Manages mainly sanitary waste and small amount of industrial waste from SWMU 20, 22, 23, 48, and 49. This sewer operates under South Charleston Sanitary Board Permit number SBPT-01.	None	None	Not Applicable
63	A	Greenhouse Soil Filled Area	North of former Building 741	A	Inactive	Managed soil and waste material from Building 786, which may have contained pesticides and herbicides.	None	In 1983, the structure was removed. Only the concrete pad remains (UCC 1998).	In 2000, soil samples and a groundwater grab sample was collected. The analytical results were evaluated in the 2001 RFI Report (Key Environmental 2001), no industrial soil screening soil exceedances were observed and the analytical results for groundwater were nondetect.
64	D	Lower Ward Bottle Disposal Area	Located on the Northern dike of Lower Ward Landfill (SWMU 1)	B	Inactive	Unit was used to dispose of small chemical bottles by breaking them on the rocks. The unit could contain any chemical utilized at the site.	None	Area is presently covered and has been reworked several times with rip-rap (UCC 1998).	Not Applicable
65	C	6000 Dump Area	Located south of Building 6000	A	Inactive	Historical review, personnel interviews and aerial photo review determined that the SWMU area was utilized as a parking lot from 1958 until Building 6000 was constructed. No wastes were managed in this area.	None	None	In 1997, soil samples were collected. All samples came back non-detect (UCC 1998). This SWMU was determined to be used exclusively as a paved parking lot from 1958 until Building 6000 was constructed (Key Environmental 2001).

TABLE 1  
 SWMUs and Investigation Areas Summary Table  
 Statement of Basis  
 UCC Technology Park  
 South Charleston, West Virginia

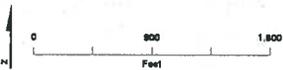
SWMU No.	Tract	Unit Name	Unit Location	SWMU Classification <sup>1</sup>	Operational Status (as of March 2008) <sup>2</sup>	Wastes Managed	History of Release <sup>3</sup>	Interim Measures	Previous Investigation Results
66	D	Ward A Dump Pond Burn Area #1	Southeast of Building 6000	A	Inactive	Unit was used to burn and dispose of used or spent chemicals. The unit may contain any chemical utilized at the site.	None	None	In 2000, a groundwater samples was collected from a piezometer installed at this SWMU. The analytical results showed that bis(2-chloroisopropyl)ether was the only constituent that exceeded screening criteria (Key Environmental 2001).
67	D	Ward A Dump Pond Burn Area #2	Located approximately 800 feet north of Ball Field #3, east of the Ward A pond	A	Inactive	Historical review, personnel interviews, and aerial photo review determined that the SWMU was either inaccessible (flooded from Ward A) or not used as a solid waste disposal area.	None	None	Not Applicable
68	D	Concrete Batch Mix Disposal Area	Located on the northwestern side of Lower Ward Landfill (SWMU 1), approximately 200 feet east of the southeastern corner of Building 771	B	Inactive	Unit used to dispose of concrete and chemicals mixed with concrete.	None	None	In 2004, soil sampling was completed. The analytical results from the soil sampling were evaluated in the CCR (CH2M HILL 2008), no industrial or residential screening level exceedances were observed.
69	A	Timberland Dump Site #1	Located on the west side of the facility in the Timberland area	C	Inactive	Unit was used to dispose of general facility refuse, construction debris, wooden pallets, and cut vegetation.	None	In 1992, a major cleanup of this area was undertaken; all trash was removed and properly disposed (UCC 1998).	Not Applicable
70	A	Timberland Dump Site #2	Located on the west side of the facility in the Timberland area	B	Inactive	Unit was used to dispose of general facility refuse, construction debris, wooden pallets, and cut vegetation.	None	None	In 2004, soil sampling and test pits were completed. In addition, nearby surface water and sediment was sampled. Additional soil samples were collected in 2005 to evaluate ecological risk related to mercury in surface soil. The analytical results from the soil sampling were evaluated in the CCR (CH2M HILL 2008). The industrial screening level was exceeded for arsenic and the residential screening level was exceeded for mercury. There were no surface water exceedances, but there were sediment exceedances for arsenic, barium, cadmium, chromium, and lead. Based on the ecological risk evaluation in the CCR, there is no unacceptable risk to ecological receptors.  In 2009, additional soil sampling was conducted and waste sampling was conducted to support potential future divestitures. The analytical results exceeded the industrial screening levels and background only for arsenic (CH2M HILL 2010b).
Not Applicable	A	Greenhouse Area	Located north of former Building 741	Not Applicable	Not Applicable	Not Applicable	None	None	Groundwater data from two monitoring wells (MW-104A and WVU-04) in this area have detected concentrations of volatile organic compounds (VOCs) above screening criteria. The 2009 sample results showed that no VOCs exceed screening criteria in MW-104A and only two detected VOCs (chloroform and tetrachloroethene) exceed screening criteria in WVU-MW04.
Not Applicable	A	Building 722 Area	Located north of Building 722	Not Applicable	Not Applicable	Not Applicable	None	None	In 2005, soil samples were collected to support leasing this area to an interested party. The analytical results from the soil sampling were evaluated in the CCR (CH2M HILL 2008), PCE was the only constituent that exceeded the industrial screening level and it was only exceeded at one location.
Not Applicable	A	Rocket Hollow Area	Located near SWMU 19 and 23	Not Applicable	Inactive	Historically, Rocket Hollow stored rocket fuel waste and fuel testing involving Resin B & Pyrolysis oil. Daily rocket fuel shots went off in the 1960s during these tests. Polypropylene glycol was identified as an inert binder used in this area.  Rocket Hollow is currently used to store machines, parts, and materials associated with landscape work.	None	None	In 2008, soil sampling was completed to support potential future divestitures (CH2M HILL 2010b). Several polycyclic aromatic hydrocarbons exceeded the industrial screening levels.

**TABLE 1**  
 SWMUs and Investigation Areas Summary Table  
 Statement of Basis  
 UCC Technology Park  
 South Charleston, West Virginia

SWMU No.	Tract	Unit Name	Unit Location	SWMU Classification <sup>1</sup>	Operational Status (as of March 2008) <sup>2</sup>	Wastes Managed	History of Release <sup>3</sup>	Interim Measures	Previous Investigation Results
Not Applicable	A	Building 707 Area	The drainage ditch located South of Building 707	Not Applicable	Inactive	According to a UCC employee, water from a former drum steam cleaning pad was washed into this drainage ditch.	None	Soil removal actions were performed in 2008 and 2009. A total of approximately 30 cubic yards of soil was removed from the drainage ditch (CH2M HILL 2009c).	<p>Soil contamination was identified during a 2007 investigation to support potential future divestitures. Follow-up soil sampling was conducted in 2008 and 2009. The analytical results were evaluated in the Buildings 706 and 707 Area Soil Investigation, Removal Action, and Vapor Intrusion Human Health Risk Assessment Report (CH2M HILL 2009b). No industrial exceedances were observed for samples collected outside the soil removal areas.</p> <p>To evaluate the potential for vapor intrusion into nearby buildings (Buildings 706 and 707), subslab soil gas, indoor air, and ambient air samples were collected. The results indicate that current and future human health exposure associated with vapor intrusion into existing buildings from VOCs does not pose unacceptable human health risks (CH2M HILL 2009b).</p>

1 - **Category A** = High Priority, **Category B** = Low Priority, **Category C** = No Further Action Needed, **Category D** = Does not meet the definition of a SWMU (UCC 1998)  
 2 - **Active** = still operates as SWMU, **inactive** = no longer in operation, **inactive as a SWMU** = these areas are still in operation, but not used for purposes that meet the definition of a SWMU.  
 3 - Draft RCRA Facility Assessment Report (A.T. Kearney 1988)

## FIGURES



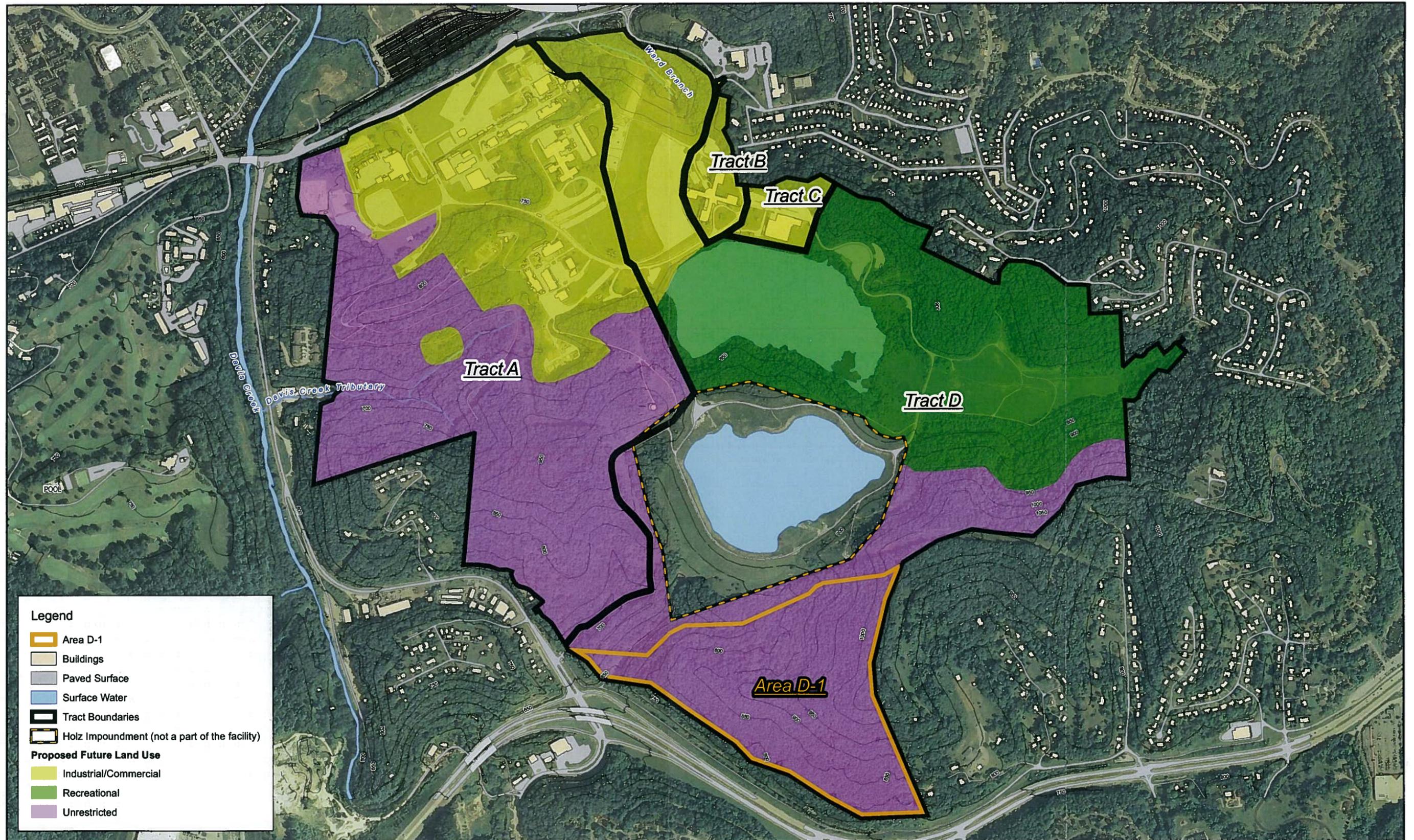


Figure 2  
 Proposed Future Land Use  
 Statement of Basis  
 UCC Technology Park  
 South Charleston, West Virginia

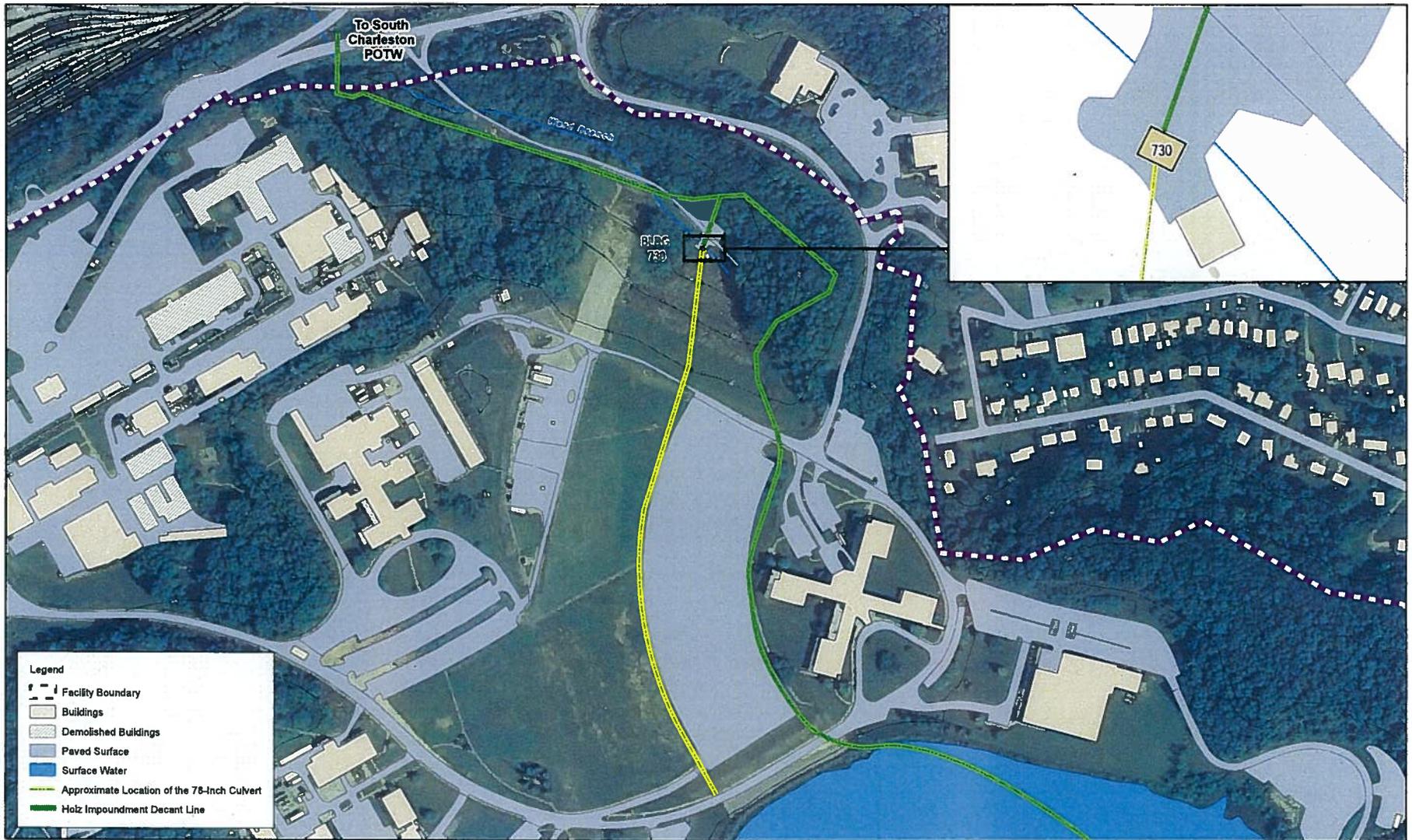


Figure 3  
 Lower Ward Leachate Collection System  
 Statement of Basis  
 UCC Technology Park  
 South Charleston, West Virginia

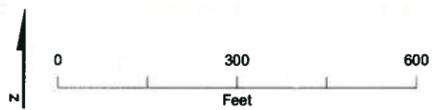
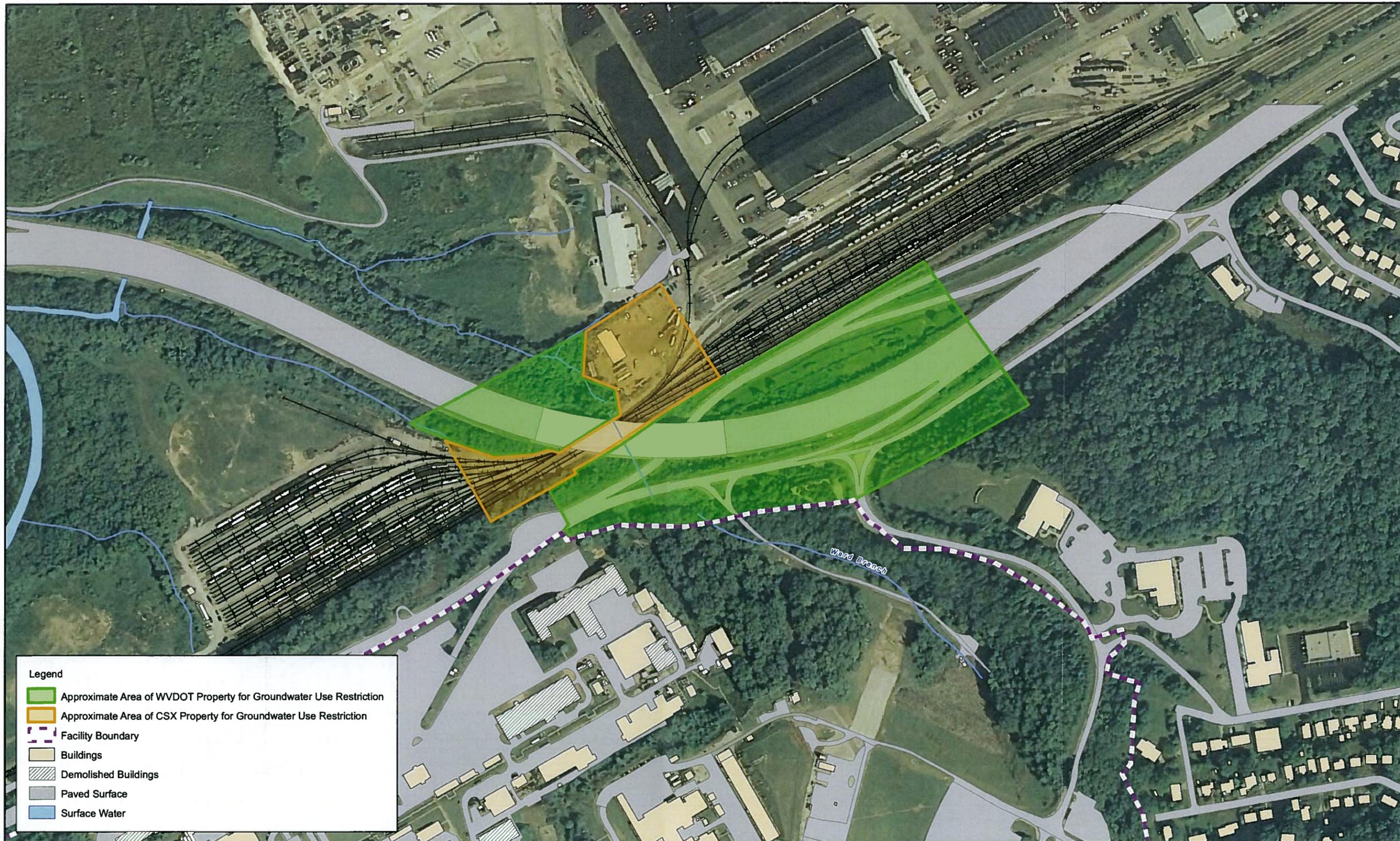


Figure 4  
Off-Site Groundwater Use Restrictions  
Statement of Basis  
UCC Technology Park  
South Charleston, West Virginia

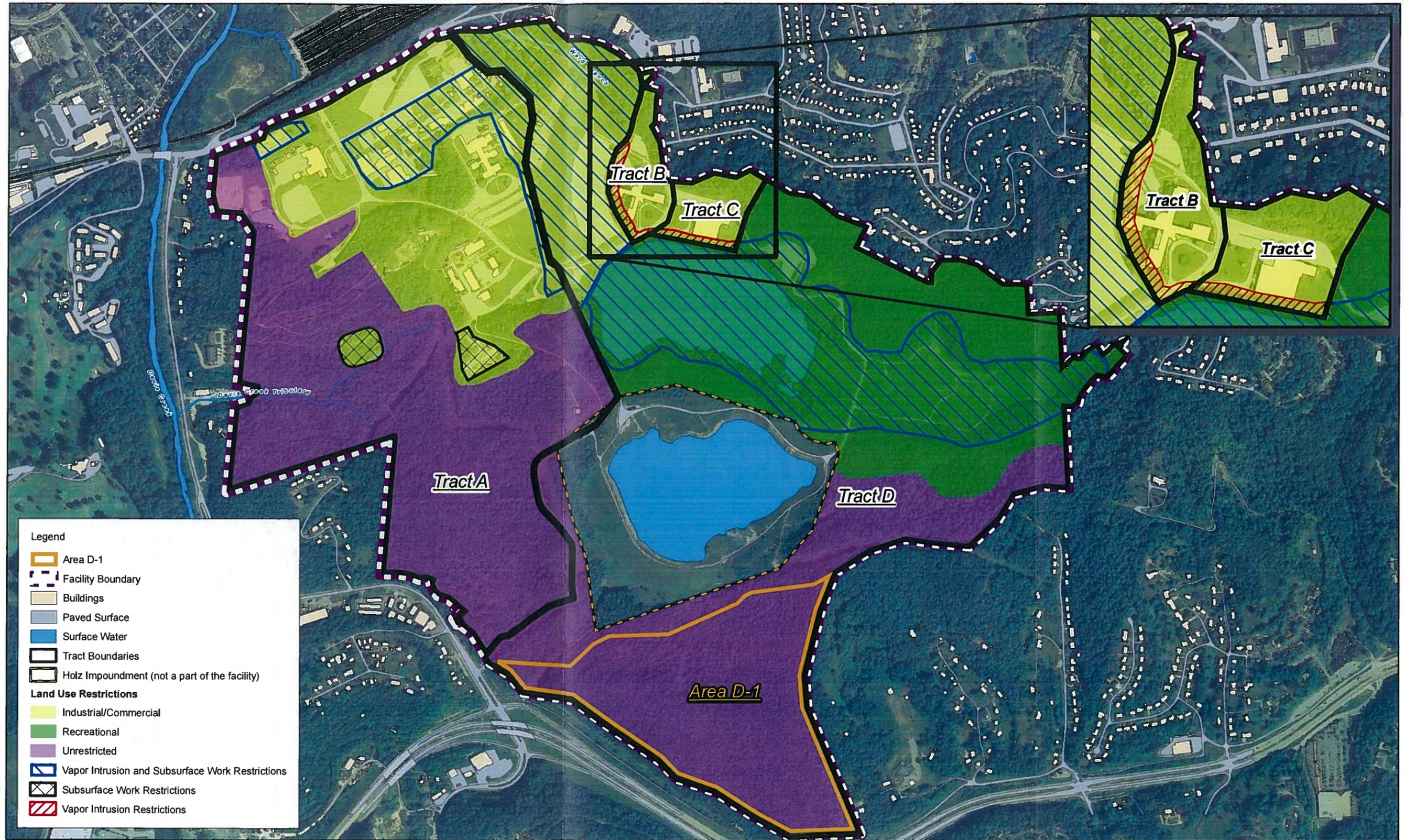


Figure 5  
 Restrictions  
 Statement of Basis  
 UCC Technology Park  
 South Charleston, West Virginia

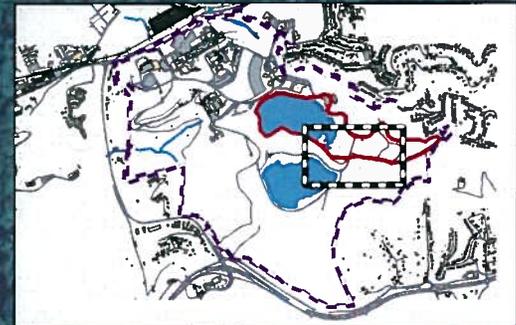


Figure 6  
 Central Drain Sump and Associated Piping  
 Statement of Basis  
 UCC Technology Park  
 South Charleston, West Virginia