DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

Interim Final 2/5/99

RCRA Corrective Action
Environmental Indicator (EI) RCRIS code (CA725)

Current Human Exposures Under Control

Facility Name:	Defense Distribution Susquehanna Pennsylvania
Facility Address:	2001 Mission Drive, New Cumberland, PA 17070
Facility EPA ID #:	PA8213820642

1. Has **all** available relevant/significant information on known and reasonably suspected releases to soil, groundwater, surface water/sediments, and air, subject to RCRA Corrective Action (e.g., from Solid Waste Management Units (SWMU), Regulated Units (RU), and Areas of Concern (AOC)), been **considered** in this EI determination?

X If yes – check here and continue with #2 below.

_____ If no – re-evaluate existing data, or

_____ If data are not available skip to #6 and enter "IN" (more information needed) status code

BACKGROUND

Definition of Environmental Indicators (for the RCRA Corrective Action)

Environmental Indicators (EI) are measures being used by the RCRA Corrective Action program to go beyond programmatic activity measures (e.g., reports received and approved, etc.) to track changes in the quality of the environment. The two EI developed to-date indicate the quality of the environment in relation to current human exposures to contamination and the migration of contaminated groundwater. An EI for non-human (ecological) receptors is intended to be developed in the future.

Definition of "Current Human Exposures Under Controls" EI

A positive "Current Human Exposures Under Control" EI determination ("YE" status code) indicates that there are no "unacceptable" human exposures to "contamination" (i.e., contaminants in concentrations in excess of appropriate risk-based levels) that can be reasonably expected under current land- and groundwater-use conditions (for all "contamination" subject to RCRA corrective action at or from the identified facility (i.e., site-wide)).

Relationship of EI to Final Remedies

While Final remedies remain the long-term objective of the RCRA Corrective Action program, the EI are near-term objectives which are currently being used as Program measures for the Government Performance and Results Act of 1993 (GPRA). The "Current Human Exposures Under Control" EI are for reasonably expected human exposures under current land- and groundwater-use conditions ONLY, and do not consider potential future land- or groundwater-use conditions or ecological receptors. The RCRA Corrective Action program's overall mission to protect human health and the environment requires that Final remedies address these issues (i.e., potential future human exposure scenarios, future land and groundwater uses, and ecological receptors).

Duration / Applicability of EI Determinations

EI Determinations status codes should remain in RCRIS national database ONLY as long as they remain true (i.e., RCRIS status codes must be changed when the regulatory authorities become aware of contrary information).

2. Are groundwater, soil, surface water, sediments, or air media known or reasonably suspected to be "contaminated"[1] above appropriately protective risk-based "levels" (applicable promulgated standards, as well as other appropriate standards, guidelines, guidance, or criteria) from releases subject to RCRA Corrective Action (from SWMUs, RUs or AOCs)?

	Yes	No	?	Rationale/Key Contaminants
Groundwater	X			See rationale below.
Air (indoors)[2]	X			See rationale below.
Surface Soil (e.g., <2 ft)	X			See rationale below.
Surface Water		X		Calculated impacts to adjacent surface water bodies and sediments have been shown to either be below applicable standards or not of significant impact to receptors. See rationale below.
Sediment		X		
Subsurface Soil (e.g., >2 ft)	X			See rationale below.
Air (outdoors)		X		No significant violations of air permits recorded.

X If no (for all media) – skip to #6, and enter "YE," status code after providing or citing appropriate "levels," and referencing sufficient support documentation demonstrating that these "levels" are not exceeded.

If yes (for any media) – continue after identifying key contaminants in each "contaminated" medium, citing appropriate "levels" (or provide an explanation for the determination that the medium could pose an unacceptable risk), and referencing supporting documentation.

If unknown (for any media) – skip to #6 and enter "IN" status code.

Rationale and Reference(s):

1. **Groundwater:** Previous groundwater investigations conducted at the Installation have identified eight distinct petroleum- and/or chlorinated-volatile organic compound (VOC) groundwater plumes, which are outlined in the following table. Constituents of concern (COCs) listed on this table are based on consistent exceedances of PADEP Residential and/or Non-Residential groundwater Medium-Specific Concentrations (MSCs) in wells from September 2004 through June 2006 as documented in Weston's groundwater summary tables (Weston, 2006b, 2006c, and 2006d). These groundwater plumes, which are summarized on the following table, are known to be the result of releases primarily from underground storage tanks (USTs) , sumps, or past disposal practices.

[1] "Contamination" and "contaminated" describes media containing contaminants (in any form, NAPL and/or dissolved, vapors, or solids, that are subject to RCRA) in concentrations in excess of appropriately protective risk-based "levels" (for the media, that identify risks within the acceptable risk range).

[2] Recent evidence (from the Colorado Dept. of Public Health and Environment, and others) suggest that unacceptable indoor air concentrations are more common in structures above groundwater with volatile contaminants than previously believed. This is a rapidly developing field and reviewers are encouraged to look to the latest guidance for the appropriate methods and scale of demonstration necessary to be reasonably certain that indoor air (in structures located above (and adjacent to) groundwater with volatile contaminants) does not present unacceptable risks.

PLUME LOCATION	PRIMARY COCs	PADEP NON-RESIDENTIAL GROUNDWATER MSC (UG/L)	PADEP RESIDENTIAL GROUNDWATER MSC (UG/L)
SWMU Nos. 3 and 4	TCE	5	5
	1,1,2,2-TCA	0.3	0.3
SWMU No. 6	PCE	5	5
	TCE	5	5
	1,2-DCE	70	70
	1,1,2,2-TCA	0.3	0.3
SWMU No. 17 (includes SWMU No. 2 and AOC M)	PCE	5	5
	TCE	5	5
	cis-1,2-DCE	70	70
	1,1,2,2-TCA	0.3	0.3
	1,1,2-TCA	5	5
	VC	2	2
SWMU No. 27	TCE	5	5
	1,2-DCE	70	70
	1,1,1-TCA	200	200
	1,1-DCA	110	27
	Carbon Tetrachloride	5	5
SWMU No. 42	TCE	5	5
	1,1-DCE	7	7
	1,2-DCE (P)	70	70
	VC	2	2
AOC N	BTEX	11,705†	11,705†
	MTBE	20	20
	1,2-DCA	70	70
	Carbon tetrachloride	5	5
IRP Site 60	PCE	5	5
	1,1,1-TCA	200	200
IRP Site 63	TCE	5	5

*(P) indicates sample was collected from piezometers that monitor Marsh Run Pond both on the Installation property and across Old York Road.

†MSC listed is total of MSCs for benzene, toluene, ethylbenzene, and total xylenes.

TCE – Trichloroethene
DCE – Dichloroethene
VC – Vinyl Chloride
BTEX – Benzene, Toluene, Ethylbenzene, and Xylenes
MTBE – Methyl Tert Butyl Ether
DCA – Dichloroethane
PCE – Tetrachloroethene
TCA – Trichloroethane

2. **Air (Indoors)**: Based on previous investigations of the SWMU No. 42 groundwater plume, volatilization of COCs (i.e., TCE and daughter products) to residences in Westfield Terrace was identified as a complete exposure pathway (Weston, 2003d). Sump water and air samples, and living space air samples, were collected from up to 46 residences in Westfield Terrace. In addition, one round of soil gas samples was collected from various locations around the foundation of one Westfield Terrace residence where an indoor air sample contained an anomalously high concentration of TCE (Weston, 2003d).

   The sampling indicated that no unacceptable risk levels of COCs were present in the monitored residences. As the plume changes and breakdown products of TCE increase (and more is learned about vapor intrusion) additional indoor air samples may be needed. Right now there is no unacceptable risk present to the residences. Therefore, the SWMU No. 42 Act 2 closure Post-Remedial Care Plan, which includes up to seven years of additional groundwater sampling, also includes a contingency for additional indoor air/soil gas sampling if groundwater results show increasing concentrations in the Westfield Terrace area.

   Indoor air quality concerns were also identified at several buildings in the vicinity of SWMU No. 17 and AOC N. Consequently, soil gas samples were collected from multiple locations around Buildings T-21, 400, 406, 411, and 412 (Weston, 2004f, 2005, and 2006a). Indoor air samples also were collected from buildings in the vicinity of the T-21 groundwater plume (Warehouse Building 84 and Heat Plant Building 86) (Weston, 2006a). Soil gas sample results indicated that there was not unacceptable risk by volatilization of COCs to buildings adjacent to AOC N (Weston, 2004f); however, indoor air and soil gas sample results associated with the SWMU No. 17 site indicated that vapor intrusion by volatilization of chloroform and 1,1,2,2-TCA into nearby buildings was a complete exposure pathway, though it was concluded by Weston that detected concentrations of these compounds were within the acceptable range for residential properties (Weston, 2006a).

   Because the PCE and TCE plume located in the vicinity of Building 85 (IRP Site 63) is a newly identified area of contamination at the Installation. In June 2009 a final RI/RA report for IRP Site 63 was submitted to PADEP. During this investigation vapor intrusion pathway was investigated. As stated in the report based on the VIP data evaluation, IRP Site 63 meets Act 2 SHS MSC_{IAQ} and MSC_{SG} criteria for both current and future use scenarios for all compounds. Indoor air data is the best indicator for current and possible vapor intrusion risk. As previously stated, no indoor air concentrations were detected above the Act 2 Non-Residential MSC_{IAQ}, therefore the IRP Site 63, does not pose a health risk.

   Lastly, exposure to on-Post workers via the indoor air pathway can also be attributed to regular Installation operations due to the usage of solvents, etc. It is presumed that this exposure is controlled by compliance with OSHA regulations, however documentation of this nature was not reviewed as part of the scope of this EI.

   As the plumes change on site additional Vapor Intrusion investigation will likely be necessary to evaluate exposure pathways. EPA and PADEP anticipate including a requirement for confirmatory sampling and a standard by which such sampling would be triggered.

3. **Surface and Subsurface Soils:** At the majority of the sites, impacted surface and subsurface soils have been excavated and disposed of off-Post; however, at several sites (e.g., SWMU No. 2, SWMU No. 4, SWMU No. 17, and AOC N, and possibly SWMU No. 42), some impacted surface and subsurface soils remain in place.

   SWMU No. 2: During site investigations conducted by Weston at SWMU No. 2, it was determined that polyaromatic hydrocarbons (PAHs) were present in the landfill materials inside of the historical landfill boundaries, and in surficial soils located outside of the historical landfill boundaries. These materials were not excavated nor are any in-situ treatments (e.g., soil vapor extraction or enhanced bioremediation) being conducted; however, direct contact with impacted soils was eliminated via installation of asphalt cover over exposed soils and limiting land development at SWMU No. 2 (Weston, 2004d).

   SWMU No. 4: Like soils at SWMU No. 2, PAHs are the primary COCs impacting SWMU No. 4 soils. No excavation was conducted at SWMU No. 4 and no in-situ soil treatments (e.g., soil vapor extraction or enhanced bioremediation) are being used at the site. The landfill was closed by installation of an 18-inch protective soil cover, six inches of topsoil, and vegetation, as well as implementation of pathway elimination via restricted land use in the area; therefore, impacted subsurface soils remain in-place (2004c).

IRP Site 63: The PCE and TCE contamination near Building 85 has been investigated and no unacceptable risk associated with this site has be determined. PADEP approved the Final report in August 2010. Groundwater and soil contamination pathway has been eliminated using institutional controls in DDSP's Master Plan.

SWMU No. 17: DDSP excavated approximately 19,300 tons of chlorinated VOC-impacted soils to depths between 13 and 15 feet bgs at SWMU No. 17; however, soil attainment samples collected from the floor and sidewalls of the excavation indicated that soils impacted with concentrations of TCE and TCA that exceeded PADEP Non-Residential Statewide Health Standards (NR SHS) remained. Bedrock and active Installation roads limited further excavation of impacted soils; therefore, these soils were allowed to remain in place. No in-situ soil treatments (e.g., soil vapor extraction or enhanced bioremediation) are being used at the site. PADEP approved DDSP's final report for attainment of SSS for soils at SWMU No. 17 on May 30, 1996 (2006a), which included implementation of institutional controls requiring appropriate use of personal protective equipment (PPE) if subsurface excavations are advanced in the area.

SWMU No. 42: During the mid to late 1980's, several buildings (i.e., hangars and warehouses) associated with helicopter maintenance operations performed on the western portion of the Installation (immediately east of the Westfield Terrace residential development) were demolished for the construction of a new warehouse building. During demolition of Warehouse 7, a below grade concrete sump, that was used to collect spills and overflow from operations conducted in the former plating shop, was discovered (2003d). Further investigation of the sump pit revealed a severely corroded chromium-plating tank. During removal of the chromium-plating tank, yellow-orange stained soils were observed. DDSP excavated approximately 1,440 cubic yards of chromium-impacted soils from the area of the former concrete sump.

URS found no documentation of post-excavation soil sampling for chromium within the original excavation area at SWMU No. 42; however, after DDSP observed fluctuating concentrations of chromium at a monitoring well located southwest of the initial excavation, this portion was overexcavated (DDSP, 1986). DDSP collected seven post-excavation samples from the overexcavated portion. Six revealed chromium concentrations less than 0.01 mg/kg while the seventh sample revealed a chromium concentration of 1.7 mg/kg (below the current PADEP Residential Direct Contact soil MSC of 94 mg/kg and Soil-to-Groundwater pathway MSC of 10 mg/kg, both for chromium VI). DDSP completed overexcavation and backfilled the chromium pit site in November 1986 (DDSP, 1986).

Soil sampling conducted by USATHAMA during a 1989 remedial investigation indicated that soils in the vicinity of SWMU No. 42 were not impacted by chromium (Weston, 2003d). These soil samples were collected from monitoring well boreholes installed during the investigation. The wells are located around the perimeter of the EDC building, not within the former chromium sump excavation. URS found no documentation that demonstrates attainment of an Act 2 standard for chromium in soils. Accordingly, it is unknown if soils impacted by chromium remain in the original excavation area above applicable risk-based concentrations.

During further groundwater investigation, TCE was identified in on-Post groundwater monitoring wells in the vicinity of the EDC building and at several off-Post groundwater monitoring wells and residential water supply wells at concentrations above the PADEP groundwater MSC (Weston, 2003d). URS found no documentation that clearly identifies or delineates a soil source area for TCE in this area, although a solvent sump and previously been located within SWMU No. 42. If a separate TCE soil source exists (i.e., outside of SWMU No. 42, but contributing to the TCE groundwater plume), it has not been characterized. Accordingly, soils may be present within or outside of SWMU No. 42 that contain concentrations of TCE above the appropriate PADEP risk-based levels. However, with DDSP Master Plan and pavement in the area eliminates the pathway for contaminants.

AOC N: After leaks were discovered in a gasoline UST and associated underground distribution lines in 1993, DDSP removed approximately 1,500 tons of petroleum-impacted soils from AOC N (Weston, 2004e and 2005). Soil attainment samples collected from the floor and walls of the excavation indicated that petroleum-related VOCs remained in the soils; however, these soils were located in an area where continued excavation could possibly undermine the foundation of an existing building. Therefore, PADEP allowed impacted soil to remain in place (Weston, 2004e and 2005).

Additional soil characterization conducted by Weston from 1995 through 1998 indicated that additional soils near the existing gas station building and the Installation Recreation Center were impacted with benzene at concentrations exceeding PADEP NR SHS (Weston, 2004e and 2005). Weston subsequently removed additional soil from these locations, but encountered contamination that extended into the previous excavation. Weston was directed by

PADEP not to re-excavate the area remediated in 1993. The open hole was lined with polyethylene to prevent migration of contaminants into the clean backfill. The excavation was finished with asphalt cover (Weston, 2004e and 2005).

In addition, excavation of impacted soils near the Recreation Center was halted when groundwater was encountered at 6 feet bgs. The soils remaining in this excavation were amended by layering ORC® over stone and geotextile fabric and backfilling the excavation with clean fill. This excavation was also completed with asphalt cover.

There is no active in-situ soil remediation (e.g., soil vapor extraction or enhanced bioremediation) occurring at this location. PADEP approved DDSP's final report for attainment of Non-Residential SSS for soils at AOC N on October 6, 2005, which included implementation of institutional controls requiring appropriate use of PPE if subsurface excavations are advanced in the area.

4. **Surface Water and Sediments**: The nearest surface water bodies to DDSP are Marsh Run Pond and Marsh Run Creek, which are located on Installation property. Surface water bodies in the vicinity of the Installation include the Yellow Breeches Creek, which is located approximately 0.75 river miles upgradient of the western Installation property boundary, and the Susquehanna River, which bounds the Installation to the north and east. Surface water intakes in the vicinity of the Installation on these two surface water bodies are all upstream of the facility.

   DDSP currently holds the following discharge to surface water permits:

   - General Permit #PAR803648: PAG-03 Discharge of Stormwater Associated with Industrial Activities to 20 Stormwater Discharge Points
   - NPDES Permit #PA0038385: Sewage Discharges Non-Municipal Minor to the Susquehanna River
   - NPDES Permit #PA0086070: Industrial Wastewater Discharge Minor to Marsh Run Pond

   To URS' knowledge, no violations of the regulations set forth by these permits have been recorded.

   Weston (1996) conducted surface water and sediment sampling from multiple locations along Marsh Run Pond and Marsh Run Creek for a Phase I RCRA Facility Investigation. Surface water and sediment samples collected along the surface water bodies (Marsh Run Pond/Creek) downgradient of SWMU Nos. 2, 3, and 4 indicated that the following constituents were detected above applicable screening values in Marsh Run Pond/Creek surface water and sediments:

   Sediments:
   - *SWMU No. 2 and SWMU No. 4*: Polyaromatic hydrocarbons (PAHs), total petroleum hydrocarbons (TPH), pesticides, and metals;
   - *SWMU No. 3*: PAHs, TPH, and metals.

   Surface Water:
   - *SWMU No. 2 and SWMU No. 3*: Metals;
   - *SWMU No. 4*: Metals and PAHS.

   Based on this information, Weston proposed to discontinue surface water and sediment sampling at Marsh Run Pond/Creek until a focused ecological assessment of these surface water bodies was conducted (Weston, 1996).

   Weston conducted the focused ecological assessment during their Phase II RCRA Facility Investigation to assess COC concentrations contained in fish inhabiting Marsh Run Pond/Creek and evaluate potential risks to the local bird population (Weston, 1997). For this assessment, Weston collected surface water and sediment samples from the marshy area between the upper and lower parking lots at SWMU No. 2, and collected fish tissue samples from fish found in Marsh Run Pond. The results of this sampling indicated that there was no significant contamination to the surface waters in the vicinity of SWMU No. 2 and that the risk to ecological receptors from exposure to site-related COCs through contact with surface water, sediments, or the fish habitat was minimal (Weston, 1997).

   Weston has been collecting surface water samples from Marsh Run Pond/Creek during quarterly groundwater sampling events since 2004 (Weston, 2006c). Weston compared the surface water sample results to the PADEP

Residential and Non-Residential groundwater MSC. No VOCs or dissolved metals were detected in the surface water samples above either of these groundwater screening values (Weston, 2006c).

During their previous investigative activities, Weston performed PENTOXSD modeling to evaluate diffuse impacted groundwater flow to Marsh Run Pond, Marsh Run Creek, and the Susquehanna River, the results of which are summarized in the following paragraphs.

Modeling of diffuse groundwater flow to Marsh Run Pond surface waters indicates current discharge concentrations of COCs related to SWMU Nos. 2 and 17 in excess of calculated waste load allocations (WLA), with 1,1,2,2-TCA concentrations entering Marsh Run Pond remaining slightly above the WLAs until 2010, declining to levels below the WLAs after 2015 (Weston, 2004d and 2006a). However, the Marsh Run Pond surface waters are located within DDSP property limits, access/use of the pond is restricted, and ecological risk assessment indicates that the only threatened species that may inhabit the site would not be endangered by potential discharge of these COCs to Marsh Run Pond surface waters.

Modeling of impacted groundwater at SWMU No. 42 indicates that discharge concentrations of COCs will not exceed the calculated WLAs. Based on these results, Weston eliminated this exposure pathway for SWMU No. 42 (Weston, 2003d).

TCE concentrations in groundwater samples collected from one monitoring well within SWMU No. 4 had shown an increasing trend (Weston, 2003a). Recent trend analyses for this well, however, indicate that COC concentrations are decreasing (Weston, 2006c). PADEP approved the Final Report in June 2007.

PENTOXSD modeling of diffuse groundwater flow from SWMU No. 6 and IRP Site 60 to the surface waters of the Susquehanna River indicated that, as expected based on its volume, discharge concentrations of COCs from these areas would not exceed the calculated WLAs (Weston, 2003b, 2004a, 2004b, and 2004e).

Contaminant fate and transport models prepared by Weston for impacted groundwater at SWMU No. 27 indicated that under natural attenuation conditions, the SWMU No. 27 groundwater plume would not reach nearby surface water bodies, or combine with other impacted groundwater plumes that may ultimately discharge to nearby surface water bodies. This same rationale was used for impacted groundwater at AOC N (Weston, 2001, 2003c, 2004f, and 2005).

As with the PENTOXSD modeling of diffuse groundwater flow from SWMU No. 6 and IRP Site 60, probable impacts to the surface waters of the Susquehanna River from IRP Site 63 are not expected to exceed the calculated WLAs due to the volume of the receiving waterway.

3. Are there complete pathways between "contamination" and human receptors such that exposures can be reasonably expected under the current (land- and groundwater-use) conditions?

Summary Exposure Pathway Evaluation Table

Potential **Human Receptors** (Under Current Conditions)

"Contaminated Media"	Residents	Workers	Daycare	Construction	Trespassers	Recreation	Food[3]
Groundwater	No	No	No	Yes*	No	No	No
Air (indoors)	Yes*	Yes*	No	No	No	No	No
Soil (surface, e.g., <2 ft)	No	Yes*	No	Yes*	No	No	No
Soil (subsurface e.g., >2 ft)	No	No	No	Yes*	No	No	No

Instructions for Summary Exposure Pathway Evaluation Table:

1. Strikeout specific Media including Human Receptors -- spaces for Media, which are not "contaminated" as identified in #2 above.
2. Enter "yes" or "no" for potential "completeness" under each "Contaminated" Media – Human Receptor combination (Pathway).

Note: In order to focus the evaluation to the most probable combinations, some potential "Contaminated" Media – Human Receptor combinations (Pathways) do not have check spaces ("_____"). While these combinations may not be probable in most situations, they may be possible in some settings and should be added as necessary.

_____ If no (pathways are not complete for any contaminated media –receptor combination) – skip to #6, and enter "YE" status code, after explaining and/or referencing condition(s) in-place, whether natural or man-made, preventing a complete exposure pathway from each contaminated medium (e.g., use optional Pathway Evaluation Work Sheet) to analyze major pathways.

X If yes (pathways are complete for any "Contaminated" Media – Human Receptor combination) – continue after providing supporting explanation.

_____ If unknown (for any "Contaminated" Media – Human Receptor combination) – skip to #6 and enter "IN" status code.

Rationale and Reference(s):

1. **Groundwater Exposure:** In its Master Plan, DDSP has included groundwater use restriction language, which prohibits use of groundwater for drinking and agricultural purposes on Installation grounds. DDSP employees and on-Post residents are currently furnished potable water via PA American Water Company's public water supply system. The control measure established in the Master Plan will follow any property transfers to non-federal entities via deed restriction.

   Off-Post groundwater exposure has been handled via an ordinance negotiated with Fairview Township. The

[3] Indirect Pathway/Receptor (e.g., vegetables, fruits, crops, meat and dairy products, fish, shellfish, etc.)

ordinance, enacted in October 2005, prohibits the use of groundwater by residents of Westfield Terrace (located immediately west of the Eastern Distribution Center [EDC]), and property owned by Hempt Brothers, Inc. (located across Old York Road). The Ordinance specifically defines groundwater use as "human consumption, including drinking and cooking, as well as other uses of water including, but not limited to, bathing, consumption by pets or animals, cleaning, irrigation or watering of vegetation, and all consumption or use of water within the [Westfield Terrace Water] District." All owners of improved property located in the established water district are required to connect to the public water supply system, and use of alternate water sources (i.e., well water) is strictly prohibited under penalty of law (Fairview Township Water Ordinance, 2005). To support the Township's ordinance, DDSP abandoned six residential wells located in Westfield Terrace according to PADEP well abandonment procedures in November 2005.

In addition, a deed restriction has been recorded for property owned by Pennsylvania Lines, LLC (Norfolk Southern Railways) prohibiting use of groundwater for drinking or agricultural purposes. The property included in the deed restriction is located adjacent to SWMU No. 6 and IRP Site 60.

Based on this information, exposure to contaminated groundwater on-Post and off-Post is limited to construction activities. Groundwater depths have been observed as shallow as 0.77 ft. bgs in on-Post wells and groundwater surfaces at a spring (managed by DDSP) in Westfield Terrace; therefore, exposure to impacted groundwater is possible during construction excavation/digging.

DDSP has sought SSS for groundwater at all SWMUs closed under the PADEP Act 2 program. These sites include SWMU No. 6, SWMU No. 17, SWMU No. 42, and IRP Site 60. In addition, it should be noted that land use controls identified in the Installation's Master Plan requires use of appropriate safety measures and proper PPE while performing intrusive work at locations where impacted soils remain (SWMU No. 17 and AOC N). These controls could limit significant exposure to impacted shallow groundwater at these two sites.

Direct contact with impacted shallow groundwater at the remaining sites (SWMU Nos. 2 and 4, SWMU No. 6, SWMU No. 42, IRP Site 60, and IRP Site 63) has not been formally addressed; however, exposure to groundwater during construction activities does not appear to be significant.

All deed restrictions will be maintained until concentrations of contaminants in groundwater are found to be below either the residential groundwater MSCs (Westfield Terrace residences) or the Non-Residential groundwater MSCs (Installation property and property owned by Pennsylvania Lines, LLC). This exception does not include SWMU Nos. 2 and 4 since deed restrictions cannot be lifted at landfill sites.

Relative to the newly-identified PCE and TCE plume located in the vicinity of Building 85 (IRP Site 63), based on the location of this area (northeast region of the Installation) and known hydrogeologic conditions, it is believed that impacted groundwater from this area will flow either south within the Installation or east to the Susquehanna River. Therefore, the institutional controls currently in place for the other groundwater impacts at the Installation will adequately address this plume, and the only probable complete pathway would be to construction workers and possible diffuse groundwater-to-surface water discharge, which will be evaluated per PADEP requirements.

2. **Air (indoors):** Indoor air and soil gas samples collected from neighboring residences (Westfield Terrace) and in the vicinity of AOC N have shown that indoor air quality is currently not unacceptably impacted by volatilization of VOC-impacted groundwater at the Installation (Weston, 2003d, 2004f, and 2005). Currently, there have been no indoor air exposure pathway controls instituted for the Westfield Terrace residences because all indoor air/soil vapor sampling has shown results below applicable standards. Based on modeling results, COC concentrations in groundwater migrating toward Westfield Terrace are expected to increase (Weston, 2003d). DDSP's post-remediation care plan for SWMU No. 42 includes provisions for future sampling of indoor air at Westfield Terrace, if/when COC concentrations increase in groundwater.

   Volatilization of COCs to indoor air was considered a concern at SWMU No. 17; however, the concentrations identified in samples were deemed to cause no unacceptable risk to human health (Weston, 2006a).

Because the PCE and TCE plume located in the vicinity of Building 85 (IRP Site 63) is a newly identified area of contamination at the Installation. In June 2009 a final RI/RA report for IRP Site 63 was submitted to PADEP. During this investigation vapor intrusion pathway was investigated. As stated in the report based on the VIP data evaluation, IRP Site 63 meets Act 2 SHS MSC_{IAQ} and MSC_{SG} criteria for both current and future use scenarios for all compounds. Indoor air data is the best indicator for current and possible vapor intrusion risk. As previously stated, no indoor air concentrations were detected above the Act 2 Non-Residential MSC_{IAQ}, therefore the IRP Site 63, does not pose a health risk.

2. **Surface and Subsurface Soils:** Land use restrictions were instituted in DDSP's Master Plan at SWMU Nos. 2 and 4 (landfills). The land use restriction limits future development within the footprints of these SWMUs.

   Three soil excavations took place at AOC N since leaks were identified emanating from a gasoline underground storage tank and associated distribution line (Weston, 2004f and 2005). Complete removal of impacted soils was not feasible because of an existing building foundation and groundwater infiltration. Confirmation samples collected from the remaining soils identified 1,2,4-trimethylbenzene (76,000 ug/kg) and 1,3,5-trimethylbenzene (58,000 ug/kg) at concentrations above the PADEP NR Soil-to-Groundwater pathway MSCs, which are 20,000 ug/kg and 6,200 ug/kg, respectively (Weston, 2004f and 2005). The site currently is primarily paved.

   Based on the concentrations of 1,2,4-trimethylbenzene and 1,3,5-trimethylbenzene identified in the remaining the soils underlying AOC N, DDSP sought SSS for these COCs (Weston, 2005). PADEP approved attainment of a SSS for soils on October 6, 2005.

   Soil was also excavated from impacted areas of SWMU No. 17 in 1998 and disposed of off-Post; however, the excavation was limited to the south by the foundation of an active Installation roadway (Weston, 2006a). Confirmation samples collected from the southern sidewalls and floor of the excavation indicated that TCE and 1,1,2,2-TCA were still present at concentrations above PADEP NR Soil-to-Groundwater pathway MSCs. Concentrations of TCE detected in the southern sidewall samples ranged from 550 ug/kg to 1,000 ug/kg and in the floor samples from 953 ug/kg to 3,100 ug/kg (Weston, 2006a). The PADEP NR Soil-to-Groundwater MSC is 500 ug/kg. Concentrations of TCA detected in the southern floor samples ranged from 28 ug/kg to 12,000 ug/kg and in the floor samples from 30 ug/kg to 32,000 ug/kg (Weston, 2006a). The PADEP NR Soil-to-Groundwater MSC is 30 ug/kg. Several buildings remain in the footprint of SWMU No. 17, but the majority of the site is grass/gravel covered.

   Based on the concentrations of TCE and TCA in soils remaining on-Post at SWMU No. 17, DDSP sought SSS for these COCs (Weston, 2006a). PADEP approved attainment of the SSS for soils on May 30, 1996.

   Land use controls were instituted, via DDSP's Master Plan, to address remaining impacted soils at AOC N and SWMU No. 17 (Weston, 2004f, 2005, and 2006a). The controls consist of an environmental notice alerting those performing excavation activities in these areas that contamination is present in surface and/or subsurface soils. The notice further indicates that appropriate safety measures must be followed and proper PPE is required while performing intrusive work at these locations.

   If any property listed under the land use restriction/controls clause of the Installation's Master Plan is transferred to a non-federal entity, a deed restriction will be recorded incorporating language as outlined above.

   Based on the information reviewed by URS, exposure to impacted surface and subsurface soils is limited to construction activities at AOC N and SWMU No. 17. The impacted soils remaining at these locations are covered by asphalt pavement and direct exposure to the impacted soils by Installation residents and workers, daycare operations, trespassers, recreational activities, or indirect exposure via ingestion of impacted food is not reasonably expected.

   The asterisk (*) in the construction column indicates that for SWMU Nos. 2 and 4, direct exposure to surface or subsurface soils is not reasonably expected for construction activities based on the land use restrictions placed on these locations. In addition, fill materials contained within SWMU No. 4 have been properly capped with 18 inches of protective soil cover, six inches of topsoil, and vegetation; therefore, any direct exposure to SWMU

No. 4 surface soils is contact with clean soil material.

Construction activities currently are not occurring and, to URS' knowledge, are not planned for SWMU No. 17 and AOC N. Consequently, although direct contact with impacted soils at these locations is possible during excavation/digging, based on current (and presumably future) land uses at SWMU No. 17 and AOC N and institutional controls levied by DDSP, it is not likely.

Although chromium-impacted soils were excavated from the area of the former concrete sump located within SWMU No. 42, no post-excavation sampling was conducted in the original excavation to confirm that all impacted soils were removed; however, a soil investigation conducted by USATHAMA during a 1989 remedial investigation indicated that soils in the vicinity of SWMU No. 42 were not impacted by chromium (Weston, 2003d). URS found no documentation demonstrating attainment for chromium-impacted soils at SWMU No. 42; therefore, it is unknown if soil impacted with chromium above the applicable Act 2 MSCs remains. Accordingly, a complete pathway between on-Post workers/construction workers and chromium-impacted soil is possible at SWMU No. 42.

In addition, URS found no documentation that clearly identifies/delineates a soil source for TCE in groundwater at SWMU No. 42; therefore, a possible complete pathway between on-Post workers/construction workers and TCE-impacted soils exists in this area.

Based on this information, direct exposure to impacted soils at the Installation is possible, such exposure is not reasonably expected to be significant. Land use controls will be implemented and mandated during any excavation/digging activities in remaining areas of soils contamination, including areas yet to be closed under Act 2.

4. Can the **exposures** from any of the complete pathways identified in #3 be reasonably expected to be **"significant"** (i.e., potentially[4] " unacceptable" levels) because exposures can be reasonably expected to be: 1) greater in magnitude (intensity, frequency and/or duration) than assumed in the derivation of the acceptable "levels" (used to identify the "contamination"); or 2) the combination of exposure magnitude (perhaps even though low) and contaminant concentrations (which may be substantially above the acceptable "levels") could result in greater than acceptable risks)?

_____ If no (exposures (can not be reasonably expected to be significant (i.e., potentially "unacceptable") for any complete exposure pathway) – skip to #6 and enter "YE" status code after explaining and/or referencing documentation justifying why the exposures (from each of the complete pathways) to "contamination" (identified in #3) are not expected to be "significant."

X If yes (exposures could be reasonably expected to be "significant" (i.e., potentially "unacceptable") for any complete exposure pathway) – continue after providing a description (of each potentially "unacceptable" exposure pathway) and explaining and/or referencing documentation justifying why the exposures (from each of the remaining complete pathways) to "contamination" (identified in #3) are not expected to be "significant."

_____ If unknown (for any complete pathway) – skip to #6 and enter "IN" status code.

Rationale and Reference(s):

No rationale warranted.

[4] If there is any question on whether the identified exposures are "significant' (i.e., potentially "unacceptable") consult a Human Health Risk Assessment specialist with appropriate education, training and experience.

5. Can the "significant" **exposures** (identified in #4) be shown to be within **acceptable** limits?

X — If yes (all "significant" exposures have been shown to be within acceptable limits) – continue and enter a "YE" after summarizing and referencing documentation justifying why all "significant" exposures to "contamination" are within acceptable limits (e.g., a site-specific Human Health Risk Assessment).

_____ If no (there are current exposures that can be reasonably expected to be "unacceptable") – continue and enter a "NO" status code after providing a description of each potentially "unacceptable" exposure.

_____ If unknown (for any potentially "unacceptable" exposure) – continue and enter "IN" status code.

Rationale and Reference(s):

No rationale warranted.

6. Check the appropriate RCRIS status codes for the Current Human Exposures Under Control EI event code (CA725), and obtain Supervisor (or appropriate Manager) signature and date on the EI determination below (and attach appropriate supporting documentation as well as a map of the facility):

X YE – Yes, "Current Human Exposures Under Control" has been verified.

_____ NO – "Current Human Exposures" are NOT "Under Control."

_____ IN – More information is needed to make a determination.

Completed by: _____ Date 9/19/2017

Catheryn Blankenbiller
Remedial Project Manger

Supervisor: _____ Date 9-21-17

Paul Gotthold
Associate Director Office of Pennsylvania Remediation
Region 3

Locations where References may be found:

_____

_____

Contact telephone and e-mail numbers:

Catheryn Blankenbiller
215-814-3464
Blankenbiller.Catheryn@epa.gov

FINAL NOTE: THE HUMAN EXPOSURES EI IS A QUALITATIVE SCREENING OF EXPOSURES AND THE DETERMINATIONS WITHIN THIS DOCUMENT SHOULD NOT BE USED AS THE SOLE BASIS FOR RESTRICTING THE SCOPE OF MORE DETAILED (E.G., SITE-SPECIFIC) ASSESSMENTS OF RISK.

Facility Name:
EPA ID #:
Location:

CURRENT HUMAN EXPOSURES UNDER CONTROL (CA 725)