

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:	<u>DuPont Beaumont Works</u>
Facility Address:	<u>Highway 347, Beaumont, Texas</u>
Facility EPA ID #:	<u>TXD008081101</u>
TCEQ Solid Waste Registration ID #:	<u>30010</u>

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?

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 Control" 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).

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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)?

Media	Yes	No	?	Rationale/Key Contaminants
Groundwater	√			Constituents of potential concern (COPCs) identified in groundwater at the site include: 1,2-dibromoethane (EDB), 1,2-dichloroethane (DCA), 1,1-dichloroethene, aniline, benzene, carbon tetrachloride, chloroform, cis-1,2-dichloroethene (DCE), methylene chloride, nitrobenzene, trans-1,2-DCE, tetrachloroethene (PCE), trichloroethene, vinyl chloride, arsenic and lead.
Air (indoors) ²	√			Volatile organic compounds (VOCs) have been detected in groundwater at the site. Where structures are located near the plume(s), two COPCs (carbon tetrachloride and vinyl chloride) were detected above occupational screening levels.
Surface Soil (e.g., <2 ft)	√			COPCs in surface soil include: COPCs identified included VOCs (benzene, carbon tetrachloride, chloroform, EDB, DCA, PCE and TCE), SVOCs (aniline and nitrobenzene), tetraethyl lead (TEL), organic lead salts, inorganic lead and mercury. COPCs were identified in the West WMA, TEL Burial Pit and Delta WMA and East WMA.
Surface Water	√			Three VOCs (carbon tetrachloride, methylene chloride and trans-1,2-DCE) were detected above screening levels at the West WMA. COPCs were not identified at other areas sampled.
Sediment	√			One constituent, mercury, was detected above screening levels at the West WMA. COPCs were not identified at other areas sampled.
Subsurface Soil (e.g., >2 ft)	√			Similar to surface soil, VOCs, SVOCs (Aroclor 1260), TEL, organic lead salts and metals were identified as COPCs.

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.

Media	Yes	No	?	Rationale/Key Contaminants
Air (outdoors)		√		Not considered a media of concern. See rationale for more information.

- _____ If no (for all media) - skip to #6, and enter "YE," status code after providing or citing appropriate "levels," and referencing sufficient supporting 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):

Data Set for EI Evaluation

Site data evaluated for this step included: Groundwater from 132 monitoring wells sampled during the most recent groundwater monitoring events (January 2005 through July 2007); Shallow dredge sand water from seven observation wells in the West WMA collected during May 2006 and three observation wells in the Wastewater Treatment Basins Management Area collected during January 2005 and February 2006; Surface soil samples (depending on the investigation, between 0-1, 0-2, 0.5-2 ft bgs interval) collected from approximately 272 boring locations and subsurface soil samples (> 2 ft bgs) collected from approximately 367 locations primarily during the RFI (1990), Phase II RFI (1991) and the Phase III RFI (1995/1998); Surface water samples collected from nine locations in the West WMA on-site drainage features during the Phase III RFI (1995/1998) and pond water collected from 22 locations during the RFI (1990) from SWMUs 3 and 16 in the Wastewater Treatment Basins WMA; Sediment samples collected from six locations in West WMA on-site drainage features during the Phase II RFI (1991); and Outdoor air samples collected from four locations during two sampling events in 2001 at SWMU 21 and from four locations during two sampling events in 2003 at SWMU 16. Both sampling events were in support of a Corrective Measures Study (CMS) at the units.

Monitoring well locations are detailed in Figure 9. Groundwater and shallow dredge sand water analytical data utilized in the EI evaluation is summarized in Appendix A. Soil, surface water, sediment and outdoor (ambient) air sample locations and analytical data are detailed in reports referenced at the end of this section.

Data collected in relation to the October 2006 hydrogen cyanide (HCN) Settler Tank Release was not utilized in the EI evaluation. Due to the response actions completed at the area, there are no residual impacts associated with the release.

Screening Levels Used to Evaluate Site Data

Concentrations of constituents detected in the EI evaluation data set were compared to appropriate screening levels to assess potential impact to human health and the environment and to identify COPCs. The following screening levels were utilized during the evaluation:

- Groundwater** - Groundwater within the upper flow system is not used for drinking water on or near the site; and, the discontinuous dredge sands contain perched groundwater, which is not likely to be a sustainable source of groundwater. However, constituents detected in groundwater were compared to Texas Medium Specific Concentrations (MSCs) for industrial use (GW-Ind). The MSCs are based on Federal Maximum Contaminant Levels (MCLs), where applicable, or calculated using risk-based equations based on exposure via groundwater ingestion.
- Soil and Sediment** - Surface and subsurface soil concentrations were compared to Texas MSCs for industrial soil (SAI-Ind). The MSC represents a combined exposure including inhalation of particulates and volatile compounds, dermal absorption, and ingestion. These criteria are considered overly conservative for evaluating sediment, since exposure to sediment would be less frequent than

the assumptions used in the development of the MSCs. Concentrations in soil were also compared to site-specific background soil concentrations.

- **Surface Water** – Surface water concentrations were compared to Texas Surface Water Quality Standards (TSWQS) as defined in Title 30 Texas Administrative Code (TAC) 307.6 for protection of human health (fish consumption). Where TSWQS Standards were unavailable, concentrations were compared to National Recommended Ambient Water Quality Criteria (NAWQC) (USEPA, 2006). The use of TSWQS protective of fish consumption is considered conservative for evaluating on-site surface water, since none of the on-site surface water features are used for recreational purposes (including fishing).
- **Indoor Air** – Occupational Safety and Health Administration (OSHA) permissible exposure levels (PELs) and the American Conference of Governmental Industrial Hygienist (ACGIH) threshold limit values (TLVs) were used to develop appropriate indoor air target concentrations for potential on-site exposure. OSHA and USEPA have agreed that OSHA generally will take the lead role in addressing vapor intrusion in occupational settings for all workers (USEPA, 2002) and all chemicals (USEPA 2003).

Constituents of Potential Concern

Groundwater: For the purpose of the evaluation and consistent with corrective action monitoring, groundwater was evaluated by WMA rather than by SWMU or AOC (Figure 8). Monitoring well locations are detailed in Figure 9. Constituents greater than the MSC were retained and identified as constituents of potential concern (COPCs). Tables 3 - 10 detail the evaluation. As presented in the tables, 12 volatile organic compounds (VOCs), two semivolatile organic compounds (SVOCs) and three metals were identified as COPCs in groundwater including but not limited to: carbon tetrachloride, chloroform, PCE, aniline, nitrobenzene, total arsenic, total lead and dissolved lead. Nine VOCs and seven metals were identified as COPCs in shallow dredge sand water, including but not limited to: 1,2-DCA, carbon tetrachloride, chloroform, PCE, vinyl chloride, total lead and total thallium.

Indoor Air: Volatile constituents have been reported in groundwater at different areas of the site. However, with the exception of the East WMA, the potential for vapor intrusion into buildings in most of these areas is incomplete, since locations where constituents in groundwater exceed screening levels do not extend under or are not within 100 feet of occupied buildings where workers spend any appreciable time.

At the East WMA, volatile constituents in the plume were screened against groundwater screening levels developed using the methodology outlined in USEPA guidance on vapor intrusion (USEPA, 2002) but assuming occupational exposures. Based on this evaluation, carbon tetrachloride and vinyl chloride exceeded occupational based screening levels (Appendix B). As a result, indoor air was retained as a medium of concern for further evaluation in the EI.

Soil data were excluded from the indoor air evaluation. The draft vapor intrusion guidance does not recommend the use of soil concentrations for assessing whether or not the vapor intrusion pathway is complete because of the large uncertainties associated with using them.

Surface soil: Site data evaluated for this pathway included surface soil samples (depending on the investigation, between 0-1, 0-2, 0.5-2 ft bgs interval) collected during the RFI activities at units associated with the East WMA, West WMA, Wastewater Treatment Basins WMA, and TEL Burial Pit and Delta WMA. Surface soil samples have also been collected at units not associated with any particular WMA (such as SWMUs 5 [Hypalon Waste Acid Neutralizer] and 14 [Acrylonitrile Wastewater Storage Tank Sump] and AOC E [Nitrobenzene Tank]). Constituents greater than the MSC (SAI-Ind) were retained and identified as COPCs. Table 11 details the evaluation. COPCs identified included VOCs (benzene, carbon tetrachloride, chloroform, EDB, DCA, PCE and TCE), SVOCs (aniline and nitrobenzene), tetraethyl lead (TEL), organic lead salts, inorganic lead and mercury.

Surface Water: Site data evaluated for this pathway included surface water samples collected from on-site drainage features in the West WMA and on-site ponds in the Wastewater Treatment Basins WMA. Three

VOCs were identified as COPCs at the West WMA. No COPCs were identified at the Wastewater Treatment Basins WMA.

Sediment: Site data evaluated for this pathway included sediment samples collected from on-site drainage features in the West WMA. Only mercury was identified as a COPC at the area. Sediment/sludge samples (ditch/basin bottoms) collected from SWMUs located in the Wastewater Treatment Basins WMA and TEL Burial Pit and Delta WMA were conservatively included in the subsurface soil data set for the EI evaluation.

Subsurface Soil: Site data evaluated for this pathway included subsurface soil/sludge samples (> 2 ft bgs) collected during RFI activities at units associated with the East WMA, West WMA, Wastewater Treatment Basins WMA, and TEL Burial Pit and Delta WMA. Subsurface soil samples have also been collected at units not associated with any particular WMA (such as SWMUs 5 and 14 and AOC E). Constituents greater than the MSC (SAI-Ind) were retained and identified as COPCs. Table 12 details the evaluation. VOCs, SVOCs (Aroclor 1260), TEL, organic lead salts and metals were identified as COPCs, which would be accessible only during intrusive activities. Excavation limitations are in place to ensure the appropriate personal protective equipment (PPE) is used if soil is disturbed.

Air (outdoors): Principal areas of contamination where constituents in soil (surface and subsurface) exceed MSCs are located away from active manufacturing operations or have standing water or some type of cover/cap present; thereby, minimizing potential exposure to soil. In addition to these covers, excavation limitations are in place to ensure the appropriate PPE is used if soil is disturbed.

Inhalation of volatile constituents released from the subsurface (soil or groundwater) to outdoor air is also considered insignificant due to the factors noted above. In addition, conservative modeling conducted in support of the BLRA at the West WMA demonstrated that modeled concentrations were below occupational endpoints (DuPont CRG, 2007c). This is further supported by ambient air sampling conducted at the Wastewater Treatment Basins WMA (SWMU 16 in August 2003 and SWMU 21 in March 2001), which confirmed that this pathway was incomplete (DuPont CRG, 2001 and DuPont CRG, 2006). Sampling at other WMAs would likely conclude the same. As a result, outdoor air is not considered a media of concern.

References (Location of Data Set Used for EI Evaluation):

DuPont Corporate Remediation Group (CRG). August 31, 1998a. Phase III RFI Report. Prepared for DuPont Beaumont Works.

DuPont CRG, 1998b. Baseline Risk Assessment for SWMU No. CP-1 and D-Ditch. DuPont Beaumont Works Industrial Park, Beaumont, Texas.

DuPont CRG, 1998c. Baseline Risk Assessment for SWMU 2 Wastewater Polishing Basin and SWMU 3 Wastewater Diversion Basin. DuPont Beaumont Works Industrial Park, Beaumont, Texas.

DuPont CRG, 1998d. Baseline Risk Assessment for SWMU 16 Dredging Basin. DuPont Beaumont Works Industrial Park, Beaumont, Texas.

DuPont CRG, 2001. Corrective Measures Study for SWMU 21 – Spoils Area Landfill. DuPont Beaumont Works Industrial Park, Beaumont, Texas.

DuPont CRG, 2006. Corrective Measures Study – SWMU 16 Dredging Basin. DuPont Beaumont Works Industrial Park, Beaumont, Texas.

DuPont CRG. 2007a. Semiannual Groundwater Monitoring Report January through June 2007. DuPont Beaumont Works Industrial Park, Beaumont, Texas.

DuPont CRG. 2007c. Human Health Baseline Risk Assessment West Waste Management Area DuPont Beaumont Works Industrial Park, Beaumont, Texas.

DuPont Environmental Remediation Services, Inc (DERS). November 1991. Supplemental (Phase II) RFI Report, Group III and IV Areas.

Law Engineering, Inc. January 1990. RCRA Facility Investigation for E.I. du Pont de Nemours & Company, Beaumont Works, Beaumont, Texas.

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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	Day-Care	Construction	Trespassers	Recreation	Food ³
Groundwater		No		Yes		N/L	No
Air (indoors)		Yes		No			
Soil (surface, e.g., <2 ft)		Yes		Yes		No	No
Surface Water		No		N/L		Yes	Yes
Sediment		No		N/L		No	No
Soil (subsurface e.g., >2 ft)		No		Yes		N/L	No
Air (outdoors)							

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). N/L = Not Likely
3. Indirect Pathway/Receptor (e.g., vegetables, fruits, crops, meat and dairy products, fish, shellfish, etc.)

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).

_____√ 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

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

Rationale and Reference(s):

Potential Human Receptors:

The majority of Beaumont Works is fenced and guarded, and access is controlled and limited to authorized personnel only. Routine security patrols are also conducted throughout the site and monitored security cameras are installed around the perimeter. Hence, trespassers were not considered potential receptors and the primary potential human receptors are on-site industrial or construction/excavation workers.

COPCs in upper flow system groundwater is contained on site by the groundwater recovery systems. As a result, no off-site migration of COPC-containing upper flow system groundwater is occurring and no downgradient users of off-site groundwater exist. However, shallow dredge sand water, present in portions of the West WMA and Wastewater Treatment Basins WMA, may discharge to the Neches River. Therefore, recreational users of the Neches River were also considered potential receptors.

Access to on-site marsh areas outside the security fence (such as the West Marsh) is limited due to the marshy/shallow waters and the presence of thick, impassable vegetation. The East Marsh is an active dredge material placement area for the US Army Corp of Engineers. As a result, recreational users of the marshes were not considered potential receptors.

Sensitive receptors (such as daycare) are not located on or adjacent to the site. Therefore, these receptors were not considered potential receptors.

In summary, potential human receptors include:

- (1) On-Site Industrial Workers
- (2) On-Site Construction/Excavation Workers
- (3) Recreational Users of Neches River

Potentially **Complete Exposure Pathways by Media:**

(1) **Groundwater:** The potential for exposure is low because groundwater is not used on-site for potable or industrial purposes and downgradient users of groundwater do not exist. However, due to the shallow depth of groundwater in some portions of the site, exposure may occur during construction/excavation activities.

Potentially complete exposure pathways, therefore, may include the following for the on-site construction/excavation worker - incidental ingestion of and dermal contact with groundwater, and inhalation of vapor phase chemicals released from groundwater to a confined space (trench).

(2) **Indoor Air:** The potential for vapor intrusion is limited to occupied structures in the East WMA.

Potentially complete exposure pathways for on-site industrial workers in the area may include inhalation of vapor phase chemicals released from groundwater vapor intrusion to indoor air.

(3) **Surface Soil:** There is limited potential for exposure to COPCs in surface soils for most receptors under current conditions since principal areas of contamination are located away from active manufacturing operations; standing water or some type of cover/cap is present at most units; and, access restrictions (including excavation permitting process) are in place limiting/prohibiting direct contact. The receptor with the greatest potential for exposure is the on-site construction/excavation worker, where a greater likelihood of direct contact with impacted soil is associated with intrusive activities.

Potentially complete exposure pathways, therefore, may include the following for the on-site industrial and construction/excavation workers – incidental ingestion of and dermal contact with surface soil and inhalation of soil-derived particulates or vapors.

(4) **Surface Water:** Shallow dredge sand water may discharge to the Neches River where exposure may occur for recreational users of the river.

Potentially complete exposure pathways, therefore, may include incidental ingestion of and dermal contact with river water while swimming and fishing and ingestion of harvested fish from the river.

(5) **Subsurface Soil:** Because subsurface soil contamination is only present on-site, and exposure to subsurface soil is only achieved during excavation and construction activities, the only potential receptor is the on-site construction/excavation worker.

Potentially complete exposure pathways, therefore, may include incidental ingestion of and dermal contact with subsurface soil and inhalation of soil-derived particulates and vapors.

Incomplete Exposure Pathways by Media:

(1) **Groundwater:** Groundwater is not used on-site for potable or industrial uses and no downgradient users of off-site groundwater exist since the groundwater pump-and-treat system captures COPC-containing groundwater before it leaves the site. Therefore, direct contact (ingestion or dermal contact) with potable and non-potable groundwater for off-site receptors is incomplete under current land use conditions.

(2) **Surface Soil:** No farms or gardens are present on or in the vicinity of the site. Therefore, exposure pathways associated with **food** are incomplete.

(3) **Surface Water and Sediment:** COPCs were identified in surface water and sediment of the West WMA. However, no activities (including landscaping) are conducted in the culvert downgradient of the Old "B" Outfall Ditch (AOC C) and the wetlands located adjacent to the three SWMUs. As a result, exposure pathways for the on-site industrial worker related to surface water and sediment are incomplete under current land use conditions.

(4) **Subsurface Soil:** Since the day-to-day operations of the on-site industrial worker do not include intrusive activities, direct contact (ingestion or dermal contact) with subsurface soil is not anticipated and is incomplete. Exposure pathways associated with **food** are also incomplete.

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4. Can the exposures from any of the complete pathways identified in #3 be reasonably expected to be “significant”⁴ (i.e., potentially “unacceptable” 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.”

 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):

Groundwater Exposure Pathways: Potential exposure for an on-site construction/excavation worker to groundwater is not significant due to the strict adherence to a rigorous system of policies and procedures employed at the Beaumont Works to protect against unacceptable exposures. The facility utilizes a permitting process that requires Beaumont Works authorization for any intrusive activities (boring, drilling, excavation, etc.) into the soils or building foundations at the facility. The purpose of the permitting process is to ensure that appropriate measures are taken for personnel protection should the intrusive activity encounter impacted soils or groundwater. The site environmental support personnel provide the requirements on appropriate PPE.

Indoor Air Exposure Pathways: Potentially complete exposure pathways for indoor air were identified for on-site industrial workers in the East WMA. As a result and consistent with USEPA guidance (USEPA, 2002), the USEPA spreadsheets that incorporate the J&E Model were used to further evaluate the vapor intrusion pathway for two COPCs (carbon tetrachloride and vinyl chloride) detected in East WMA groundwater above screening levels.

The J&E Model is a one-dimensional analytical solution to convective and diffusive vapor transport into indoor spaces and provides an estimated attenuation coefficient that relates the vapor concentration in the indoor space to the vapor concentration at the source of contamination. Modeled concentrations in indoor air derived utilizing site-specific conditions were well less than occupational endpoints (Table 13). Therefore, vapor intrusion of VOCs from groundwater to indoor air is not expected to be a potential concern.

Surface Soil Exposure Pathways: Principal areas of contamination where COPCs in surface soil exceed MSCs are located away from active manufacturing operations or have standing water or some type of cover/cap present; thereby, minimizing potential exposure to soil. In addition to these covers, excavation limitations are in place to ensure the appropriate PPE is used if soil is disturbed. Even in the highly unlikely event that a worker encountered impacted surface soil, the exposure frequency and duration assumptions inherent in the derivation of the risk-based criteria used to identify “contamination” are considerably greater in magnitude than the exposure a worker could

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.

realistically attain. As a result, potential on-site industrial worker and on-site construction/excavation worker exposures to impacted surface soil are not considered significant.

Surface Water Exposure Pathways: COPCs in upper flow system groundwater is contained on site by the groundwater recovery systems. As a result, no off-site migration of COPCs in upper flow system groundwater is occurring. However, shallow dredge sand water, present in portions of the West WMA and Wastewater Treatment Basins WMA, may discharge to the Neches River. As a result, an evaluation of groundwater release to the Neches River was performed in order to determine whether or not concentrations of COPCs in shallow dredge sand water are likely to result in exceedances of relevant surface water quality criteria in the river. The surface water quality criteria used in the evaluation was based on the Texas Surface Water Quality Standard (TSWQS) values as defined in 30 TAC 307.6 for protection of human health (fish consumption). The groundwater flux was calculated using conservative assumptions and site specific hydraulic information as detailed in the CA750 Report (DuPont CRG, 2007c). As shown in Table 15, groundwater concentrations when modeled to surface water do not exceed surface water screening criteria. As a result, exposure to recreational users of groundwater discharged to surface water in the Neches River is considered insignificant.

The potential exposure pathways related to food would be indirect exposure from fish or aquatic organisms in surface water. Since modeled surface water concentrations in the Neches River are below TSWQS criteria, exposure pathways associated with food are also considered insignificant.

Subsurface Soil Exposure Pathways: Due to the strict adherence to the intrusive activity permitting process that is required at the Beaumont Works, potential on-site construction/excavation worker exposures to impacted subsurface soil are not considered significant.

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

_____ If yes (all "significant" exposures have been shown to be within acceptable limits) – continue and enter "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 "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):

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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):

YE - Yes, "Current Human Exposures Under Control" has been verified. Based on a review of the information contained in this EI Determination, "Current Human Exposures" are expected to be "Under control" at the DuPont Beaumont Works, EPA ID # TXD008081101, located at Highway 347, Beaumont, Texas, under current and reasonably expected conditions. This determination will be re-evaluated when the Agency/State becomes aware of significant changes at the facility.

NO - "Current Human Exposures" are NOT "Under Control."

IN - More information is needed to make a determination.

Completed by (signature) Scott Settemeyer Date 2/3/09
 (print) Scott Settemeyer
 (title) Project Manager

Supervisor (signature) Joyce Sirota Date 2/4/09
 (print) Joyce SIROTA
 (title) Team Leader

Texas Commission on Environmental Quality

Locations where References may be found:

Texas Commission on Environmental Quality
 12100 Park 35 Circle, Building D
 Austin, TX 78753
 TCEQ Region 10 Office
 3870 Eastex Freeway
 Beaumont, TX 77703

Contact telephone and e-mail numbers

(name) Project Manager listed above
 (phone #) (312) 239-2200
 (e-mail) ssetteme@tceq.state.tx.us

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.