

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: Sunoco, Inc. (R&M) Refinery Marcus Hook, PA
Facility Address: 2nd and Green Streets, Marcus Hook, PA 19061
Facility EPA ID #: PAD980550594

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)?

| | <u>Yes</u> | <u>No</u> | <u>?</u> | <u>Rationale / Key Contaminants</u> |
|-----------------------------|------------|-----------|----------|--|
| Groundwater | X | | | Subsurface LNAPL from petroleum refining is present at site. |
| Air (indoors) ² | | X | | OSHA workplace standards are applicable, protective, and are not exceeded. |
| Surface Soil (e.g., <2 ft) | X | | | See discussion below |
| Surface Water | X | | | Sheen has occurred occasionally in the past. See discussion below. |
| Sediment | | X | | See discussion below |
| Subsurf. Soil (e.g., >2 ft) | X | | | See discussion below |
| Air (outdoors) | | X | | OSHA workplace standards are applicable, protective, and are not exceeded |

— 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.

X 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):

GROUNDWATER: Details of the SWMU’s identified are contained in the Phase II Final RCRA Facility Assessment dated August 19, 1991. Characterization of groundwater conditions and ongoing monitoring are described in the Refinery Dissolved Sampling Report dated May 22, 2001 prepared by Handex and Quarterly Status Reports also prepared by Handex and submitted to PADEP and USEPA. The primary contaminant is subsurface separate-phase LNAPL which exists at several locations within the facility. LNAPL composition varies and has not been chemically characterized at all locations. The primary impact of the LNAPL would be dissolved concentration of benzene, toluene, ethylbenzene, and xylene (BTEX) in groundwater. These constituents may or may not be present in the subsurface LNAPL materials and/or groundwater found at the various locations. Groundwater is not used for drinking water or other uses (besides monitoring) at the facility.

AIR(INDOOR): Sunoco conducted air sampling at various locations during February 2001 and the results are reported in a Sunoco Interoffice Correspondence dated March 23, 2001. Analyses were performed for carbon dioxide, carbon monoxide, benzene, ethylbenzene, toluene and total hydrocarbons. As shown in the indicated Sunoco internal correspondence, all analytes were below permissible OSHA indoor air exposure limits.

SURFACE SOIL(<2 ft): Visible surface staining by petroleum products was described in the phase II Final RCRA Facility Assessment dated August 1991.

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SURFACE WATER: Although a potential pathway to surface water (Delaware River) exists at the southern perimeter of the refinery, only localized sheening has occurred in the past. Sunoco has installed recovery systems to mitigate these occurrences and additional recovery systems are to be installed. In addition, Sunoco has installed an oil sheen containment system of booms in certain areas of surface waters.

SUBSURFACE SOIL (>2 ft): Subsurface soils from monitoring wells installations have been reported to contain petroleum hydrocarbons at various locations.

SEDIMENT: Although groundwater from the site discharges to the river, due to the urban nature of the area and the historic and ongoing dredging operations in the river, no accumulation of sediments is expected to occur and no contaminants above background for the Delaware River are expected to be present.

Footnotes:

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.

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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)

| <u>“Contaminated” Media</u> | Residents | Workers | Day-Care | Construction | Trespassers | Recreation | Food ³ |
|------------------------------------|-----------|---------|----------|--------------|-------------|------------|-------------------|
| Groundwater | NO | NO | NO | YES | | | NO |
| Air (indoor) | --- | --- | --- | | | | |
| Soil (surface, e.g., <2 ft) | NO | YES | NO | YES | NO | NO | NO |
| Surface Water | NO | YES | | YES | NO | NO | |
| Sediment | --- | --- | | | --- | --- | --- |
| Soil (subsurface e.g., >2 ft) | | | | YES | | NO | |
| Air (outdoors) | --- | --- | --- | --- | --- | | |

Instructions for Summary Exposure Pathway Evaluation Table:

1. Strike-out 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):

RESIDENTS: No complete pathways for the groundwater or surface water media. There are no residents who are users of groundwater or surface water at or adjacent to the facility.

WORKERS: Yes, there are potential human receptors for the contaminated media of surface soil and surface water. The receptors for surface soil and surface water are a limited number of facility workers, however, exposure is limited through OSHA regulations, appropriate Health & Safety plans and use of PPE.

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There is no complete pathway for groundwater. There are no on-site wells for production or water supply (or other opportunities for production worker contact with contaminated groundwater).

DAY-CARE: No day-care facilities (or other non-production and possibly sensitive receptor uses such as schools or hospitals) exist at or near the facility or use the groundwater.

CONSTRUCTION: Pathway is complete for groundwater, surface water, surface soil and subsurface soil, however, exposure is limited through OSHA regulations, appropriate Health& Safety plans and use of proper PPE.

TRESPASSERS: The facility perimeter is fenced and/or bordered by a river. The perimeter is regularly patrolled.

RECREATION: There is no recreational swimming adjacent to facility property. There are no other recreational activities within the refinery perimeter.

FOOD: No complete pathways for groundwater or subsurface soil contaminated media; no food items (plant or animal) are grown/produced in contact with contaminated groundwater, surface or subsurface soil.

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

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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)?

 X 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):

WORKERS/CONSTRUCTION WORKERS: The contaminants involved with potential exposures are all constituents associated with the primary facility of petroleum refining. OSHA workplace standards and exposure controls are in place/applicable in all areas of the facility property, including overlying subsurface LNAPL and surface water. Since OSHA workplace standards and controls apply to ensure acceptable exposure levels are not exceeded for hydrocarbons, petroleum refining, and their associated hazards, these standards effectively control exposure to media contaminated by these materials and activities. Examples of types of exposure controls include training, personal protective equipment such as protective clothing and work area monitoring to ensure safe breathing levels in ambient air. Another example of exposure control is preparation and compliance with site health and safety plans prepared in conjunction with remediation activities. Since OSHA workplace standards and exposure controls are in place and applicable for all facility locations, and these controls are specific to the “contaminants” in the contaminated media, then worker exposures are effectively controlled and are within acceptable limits. As noted in #2, indoor air sampling has been performed at certain locations and all results were in acceptable limits.

*OWRB Rules and Regulations, OAC 785:45-5-20(b)(22)

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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?

_____ 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):

