

DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

RCRA Corrective Action Environmental Indicator (EI) RCRIS code (CA725) Current Human Exposures Under Control

Facility Name: Pfizer Consumer Healthcare
Facility Address: 2248 Darbytown Road, Richmond, VA
Facility EPA ID #: VAD000820548 & VAD188141626

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 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).

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			<i>Chloroform, the primary constituent of potential concern (COPC) in groundwater/uppermost aquifer, currently does not exceed the applicable Safe Drinking Water Act Maximum Contaminant Level (MCL) at any location across the site, based on the most recent rounds of sampling results (Spring 2014). During early site investigations, it was detected at concentrations up to 470 ug/l, exceeding the MCL. Other COPCs, 1,1,2,2-TCA and 1,4-dioxane, have been detected at several locations onsite above their respective Regional Screening Levels(RSLs).</i>
Air (indoors) ²		X		<i>The results of subslab air samples collected from Building 2300 and analyzed for VOCs in September 2010 did not indicate unacceptable exposure for workers. Two factors are present at this location which mitigate or restrict the potential for vapors from the VOCs detected in subslab samples from migrating upward into the building: 1) The building is maintained under positive pressure due to the sensitive nature of pharmaceutical products stored inside. 2) The building foundation slab is 12-inch thick concrete that is maintained in good condition</i>
Surface Soil (e.g., <2 ft)	X			<i>PAHs have been detected in surface soil in a small, limited area of the site. One surface soil sample from this area contained dibenz(a,h)anthracene and benzo(a)pyrene at concentrations exceeding their respective industrial RSLs. A total of six surface soil samples contained benzo(a)pyrene at concentrations above its residential RSL .</i>
Surface Water		X		<i>No known or reasonably expected surface water impact.</i>

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Sediment	X	<i>PAHs were detected in sediment samples collected from Cornelius Creek in May 2008 at concentrations ranging from 55 ug/kg to 410 ug/kg. These concentrations do not exceed screening levels for Total PAHs contained in Table 5 EPA Region IV and OSWER Sediment Screening Levels, Toxicological Benchmarks for Screening Contaminants of Potential Concern for Effects on Sediment-Associated Biota: 1997 Revision. Oak Ridge National Laboratory, Oak Ridge TN. 34 pp. ES/ER/TM-95/R4. (Refer to http://www.esd.ornl.gov/programs/ecorisk/contaminated_sites.html) It is noted that the highest concentrations were detected in the sample location north of the former Pfizer facility, indicating an upgradient source not associated with the facility. An industrial plant with large paved parking lots is located immediately upgradient of this sample location, indicating stormwater runoff from the upgradient property is a potential source of impacts on sediments at this and other downgradient locations adjacent to the former Pfizer facility.</i>
Subsurface Soil (e.g., >2 ft)	X	<i>Unacceptable impacts to subsurface soils have not been detected during site investigation activities to date.</i>
Air (outdoors)	X	<i>Analytical results for sub slab air samples collected from below the Distribution Center (an area closest to peak known groundwater impacts), site groundwater, site soils, and tentatively identified compounds (TICs) in sub slab air samples and site groundwater do not indicate the potential for unacceptable impacts to outdoor air.</i>

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):

The primary contaminant of concern (COC) in site groundwater is chloroform. With the exception of one soil sample (out of 75 soil samples) where the detected concentration of chloroform was close to the instrument detection limit, chloroform only has been detected in groundwater. The applicable standard for chloroform in groundwater is the MCL of 80 ug/L (ppb). Most recent groundwater data collected from 26 wells across the site during Spring 2014 demonstrate that chloroform no longer exceeds the MCL at the site.

Secondary COCs in groundwater include tetrachloroethene (PCE), trichloroethene (TCE), 1,4-dioxane, and 1,1,2,2-tetrachloroethane (1,1,2,2-TCA). Based on the most recent results from May/June 2014, PCE and TCE

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concentrations were below the MCL of 5 ug/L for both constituents (maximum concentrations of 2 ug/L and 1 ug/L, respectively, at MW-7 located near the center of the site, more than 700 feet from the site boundary). 1,4-Dioxane and 1,1,2,2-TCA concentrations only minimally exceeded the respective RSLs (maximum 1,4-dioxane concentration of 1.9 ug/L in MW-12 exceeded the RSL of 0.78 ug/L. MW-12 is located more than 500 feet from the site boundary. The maximum 1,1,2,2-TCA concentration of 1.0 ug/L in MW-5 exceeded the RSL of 0.076 ug/L. MW-5 is located more than 1000 feet from the site boundary). Groundwater monitoring is planned to continue to provide periodic data on constituent concentrations and the potential for off-site migration.

PAHs were detected in near surface soil in a small area at AOC-1/SWMU-1 in May 2008 and December 2009. AOC 1/SWMU 1 is located northeast of the Distribution Center Extension, where waste water currently is treated prior to discharge to the east-west sewer line. Benzo(a)pyrene was detected at a concentration of 1400 ug/kg in the 0 to 0.5-foot below ground surface (bgs) interval, exceeding its industrial RSL of 210 ug/kg. Dibenz(a,h)anthracene was detected at 260 ug/kg in the same sample, exceeding its industrial RSL of 210 ug/kg. In addition to the sample that exceeded the industrial RSL, five surface soil samples (out of 15 samples total) from 0-0.5 feet bgs contained benzo(a)pyrene concentrations that exceeded the residential RSL of 15 ug/kg with concentrations ranging from 28 ug/kg to 190 ug/kg. These impacts are believed to be related to the historical overflow of the wastewater sump. Additional soil and groundwater sampling is planned in this area for PAH analysis.

References:

Groundwater data collected by Pfizer through October 2013 [(includes October 2013 Groundwater Summary Table and Historical Groundwater Summary Table (Data through February 2013)]

2011 Draft Vapor Technical Memorandum

2011 Draft Vapor Intrusion Report

2010 Summary of Field Investigations

2009 RCRA Facility Investigation Summary

2008 RCRA Facility Investigation Workplan

2006 Draft Voluntary Remediation Report

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
Groundwater	No	No	No	Yes	No	No	No
Air (indoors)	—	—	—	—	—	—	—
Soil (surface, e.g., <2 ft)	No	Yes	No	Yes	Yes	No	No
Surface Water	—	—	—	—	—	—	—
Sediment	—	—	—	—	—	—	—
Soil (subsurface e.g., >2 ft)	—	—	—	—	—	—	—
Air (outdoors)	—	—	—	—	—	—	—

Instructions for Summary Exposure Pathway Evaluation Table:

- Strike-out specific Media including Human Receptors’ spaces for Media which are not “contaminated” as identified in #2 above.
- 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):

Exposure pathways for groundwater are potentially complete only for construction workers that may be doing subsurface work at the site such as borings or excavations deeper than 10 feet bgs where they could directly encounter impacted groundwater. Depth to groundwater averages approximately 13 feet bgs across the facility. The surficial aquifer where impacts have been noted is not used for a drinking water source and has no other known uses at the facility.

Exposure pathways for surface soil are potentially complete for workers, construction workers, and trespassers in a small area of the site in the vicinity of the wastewater treatment plant (WWTP).

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

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 cannot 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):

Based on the possibility of intrusive or ground disturbing activities, two populations (construction/utility workers and commercial/industrial workers) have been identified as having the most likely potential for exposure to impacted and/or potentially impacted near surface soils. Construction/utility workers also have been identified as having the potential for exposure to impacted groundwater. It is noted that there is no current construction activity at the Facility.

To a lesser degree, trespassers have potential for exposure to impacted surface soil. Although the site is surrounded by woods and is monitored by facility security, there is a possibility that trespassers could enter the site and encounter impacted shallow soil. As such, this exposure would be of very limited duration and frequency, and therefore would not result in a significant exposure.

PAHs were found in shallow surface soil in a wooded area located east of the wastewater treatment plant (WWTP) and west of Cornelius Creek; this area is northeast of the Extension to the Distribution Center. Work is not routinely conducted in this wooded area and there is no anticipated significant worker exposure.

Impacts in groundwater detected to date include known COPCs which are present in concentrations close to the maximum contaminant level (MCL) and/or concentrations which are within the 1x10⁻⁴ to 1x10⁻⁶ acceptable carcinogenic risk range. In addition to known COPCs in groundwater, tentatively identified contaminants (TICs) were evaluated in groundwater during February 2013. Estimated total volatile organic analytes (VOAs) and semivolatile organic analytes (SVOAs) TIC concentrations generally ranged from 5 ug/l to 15 ug/l per sample location, with a maximum TIC concentration of 90 ug/L detected on site. Impacts to groundwater are anticipated to be restricted by the clay layer underlying the site at a depth of approximately 11-16 feet bgs. None of these impacts in groundwater are anticipated to be associated with a significant or unacceptable construction worker exposure for the duration of contact that may be experienced during any construction work.

Additional evaluations of recently identified areas of interest on the site are pending. If any impacts to site media are identified, they will be managed accordingly. Surface soil, subsurface soil, and groundwater

samples will be analyzed for chemical constituents, including tentatively identified compounds (TICs).

Unless additional information demonstrates to EPA that the potential for all soil exposures is not unacceptable, a site wide soil management plan will be implemented to protect commercial/industrial workers and construction workers from the potential for unacceptable exposures posed by onsite surface and subsurface soils as necessary. The Facility currently has measures in place to minimize any potential for significant exposure to impacted near surface soil. All workers coming onsite are made aware of the potential for exposures and facility EHS staff ensure the use of personal protective measures to mitigate the potential for any exposures. The area where near surface PAH impacts have been identified is a small, limited area (conservatively estimated at approximately 1000 square feet) where there are no routine facility operations, therefore reducing the potential for significant exposure. Furthermore, security services routinely monitor the grounds, thus any unauthorized activities are identified and deterred.

The potential for exposure to impacted groundwater is additionally controlled by semi-annual monitoring to demonstrate that COPCs are not migrating off site at concentrations of concern. Two tiers of the monitoring well network provide timely detection of the movement of COPCs in the vicinity of the site boundary. Sentinel wells located upgradient of the site boundary provide periodic data to determine if concentrations that could impact human health or the environment are migrating toward the property boundary. Two groundwater wells (MW-38 and MW-39) at the downgradient site boundary provide monitoring locations to determine if COPCs are reaching the site boundary. Although the uppermost aquifer is not used as a potable supply, this monitoring program supports the implementation of any measures required to mitigate the potential for exposure.

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?

N/A 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).

N/A 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):

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. Based on a review of the information contained in this EI Determination, “Current Human Exposures” are expected to be “Under Control” at the former Pfizer facility, EPA ID # VAD000820548 & VAD188141626, located in*

Richmond, Virginia under current and reasonably expected conditions.

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

IN - More information is needed to make a determination.

Completed by



Date: September 30, 2014

Diane Schott

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Supervisor



9/30/14

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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.