

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: Lockheed Martin Corporation
Facility Address: 230 Mall Boulevard, King of Prussia, PA 19406
Facility EPA ID #: PAD001680719

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	<u>X</u>			Tetrachloroethene (PCE)
Air (indoors) ²		<u>X</u>		Air monitoring has not shown impact above protective levels
Surface Soil (e.g., <2 ft)		<u>X</u>		Known contaminated surface soil has been excavated.
Surface Water	<u>X</u>			PCE
Sediment	<u>X</u>			PCE
Subsurf. Soil (e.g., >2 ft)		<u>X</u>		Known contaminated subsurface soil has been excavated.
Air (outdoors)		<u>X</u>		No air emissions sources present at current facility.

_____ 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 beneath the northern half of the facility is contaminated with chlorinated volatile organics, primarily PCE at a maximum concentration of 851 ug/L at depth in 2013. Surface water and sediment within a sedimentation basin on the northern end of the facility are also suspected to be contaminated due to the presence of seeps that discharge groundwater into the basin.

Reference: Remedial Investigation Report and Risk Assessment Report for Lockheed Martin Corporation, prepared by the H&K Group, September 2014.

¹ “Contamination” and “contaminated” describes media containing contaminants (in any form, NAPLand/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

Contaminated Media	Potential Human Receptors (Under Current Conditions)						
	<u>Residents</u>	<u>Workers</u>	<u>Day-Care</u>	<u>Construction</u>	<u>Trespassers</u>	<u>Recreation</u>	<u>Food³</u>
Groundwater	Yes	No	No	Yes	No	No	No
Air (indoors)							
Soil (surface, e.g., <2 ft.)							
Surface Water	No	No	No	Yes	Yes	No	No
Sediment	No	No	No	Yes	Yes	No	No
Soil (subsurface e.g., >2 ft.)							
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 mediareceptor 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):

Groundwater: Residents could be exposed to contaminated groundwater through use of a private well downgradient of the facility for drinking purposes. Construction workers could be exposed to contamination through direct contact or incidental ingestion of groundwater during intrusive operations in the vicinity of the facility.

Surface water and sediment: Trespassers and construction workers could be exposed to contamination through direct contact or incidental ingestion of surface water or sediment from the sedimentation pond north of the facility.

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):

Surface water and sediment exposures are not expected to be of an intensity, frequency, or duration to constitute a significant exposure. Additionally, the sedimentation basin area is small and located on a fairly steep hill, and any stormwater runoff would dilute contaminated groundwater daylighting as seeps

Although some private and public supply wells exist in the vicinity of the facility, most are not downgradient of the facility, and no known wells appear to be close enough to be impacted by groundwater contamination from the facility. Additionally, a monitoring service is in place to notify the facility of any plans for the off-site installation of private wells in the downgradient vicinity to ensure adequate protection of any future groundwater users.

It is expected that construction workers engaging in intrusive activities would wear appropriate protective equipment and follow safe work practices to minimize exposure to impacted groundwater or surface water/sediment.

Reference: Sensitive Receptor Progress Report for Lockheed Martin Corporation, prepared by H&K Group, May 2016.

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.

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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):

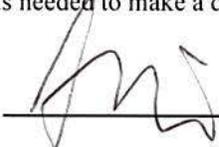
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6. Check the appropriate RCRIS status codes for the Current Human Exposures Under Control EI event code (CA725), and obtain Supervisor (or appropriate Manager) signature and date on the EI determination below (and attach appropriate supporting documentation 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 Lockheed Martin Corporation facility, EPA ID # PAD001680719, located at 230 Mall Boulevard, King of Prussia, PA 19406 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)  Date 9-20-16
(print) Griff Miller
(title) Remedial Project Manager

Supervisor (signature)  Date 9-21-16
(print) Paul Gotthold
(title) Associate Director
(EPA Region or State) EPA Region 3

Locations where References may be found:

USEPA Region III Land and Chemicals Management Division 1650 Arch Street Philadelphia, PA 19103	PADEP Southeast Regional Office 2 East Main Street Norristown, PA 19401
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Contact telephone and e-mail
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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.