



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 1

1 CONGRESS STREET, SUITE 1100
BOSTON, MASSACHUSETTS 02114-2023

October 4, 1999

Mr. Andrew Dassinger
Environmental Engineer
Sikorsky Aircraft Corp.
6900 Main St.
P.O. Box 9729
Stratford, CT 06487-9129

Subject: Sikorsky Aircraft Corporation, Bridgeport, Connecticut, Technical Review of Environmental Indicators RCRIS Status Codes CA 725 and CA 750.

Dear Mr. Dassinger:

We have conducted a review of the RCRA Corrective Action Environmental Indicator (EI) evaluations: RCRIS Code CA725, Current Human Exposures Under Control, and CA 750, Migration of Contaminated Groundwater Under Control, prepared by Sikorsky Aircraft Corporation (Sikorsky) for its Bridgeport Connecticut facility. As discussed below, at this time, for both EIs, a status code of "YE" (yes) will be entered into RCRIS. However, the status codes of "YE" will be revisited, should Sikorsky alter the current use of the facility in such a way that the current stabilization of the site comes into question, or results of groundwater monitoring reveal that the migration of contaminated groundwater is no longer under control.

RCRIS Code CA 725 (Current Human Exposures Under Control)

Our review of this document considered previous risk-based documents prepared in support of the voluntary corrective action program at this site. These documents included the risk evaluations contained in the RCRA Facility Investigation Phase I Final Report submitted April, 1998 (Phase I Investigation Report) to EPA New England, and the Phase II Investigation Report - Site Stabilization Assessment submitted July, 1999 (Phase II Investigation Report) to EPA New England. The CA 725 Evaluation Sheet was reviewed to determine whether any unacceptable human exposures to contamination can be reasonably expected under current land-use and groundwater-use conditions. The information in this letter follows the format of the information presented in the Environmental Indicator Evaluation Sheet CA 725 (CA 725 Evaluation Sheet).

In response to Question No. 2 on the CA 725 Evaluation Sheet, Sikorsky indicates that groundwater, surface soil, surface water, sediment and subsurface soil are contaminated above appropriately protective risk-based levels. Sikorsky has indicated that indoor and outdoor air are not contaminated above risk-based levels. Specifically, Sikorsky indicates that groundwater is contaminated above the Connecticut Department of Environmental Protection (CTDEP) surface water protection criteria (SWPC). The constituents identified as exceeding the SWPC are perchloroethene (PCE) and trichloroethene (TCE). Sikorsky does not identify any metal contamination, but review of the Phase II Investigation Report indicates that concentrations of arsenic, cadmium, hexavalent chromium, copper, and zinc in groundwater exceed the SWPC. Furthermore, Sikorsky does not indicate in the CA 725 Evaluation Sheet that concentrations of several chlorinated solvents in groundwater, including PCE, exceed the CTDEP volatilization criteria for industrial/commercial settings (VOL-I/C). The CA 725 Evaluation Sheet should be revised to clearly identify the metallic constituents in groundwater that exceed the CTDEP SWPC as well as the volatile organic compounds (VOCs) that exceed the CTDEP VOL-I/C.

The CA 725 Evaluation Sheet also indicates that surface soils have been contaminated with arsenic, chromium, PCBs, and total petroleum hydrocarbons (TPH) at levels that exceed the CTDEP direct exposure criteria for industrial/commercial settings (DEC-I/C). Surface water and sediments have not been sampled but are assumed to be contaminated based on the groundwater exceedance of SWPC. Subsurface soils are contaminated by arsenic, chromium, PCBs, and TPH above the DEC-I/C. Indoor air sampling indicates that contaminant concentrations detected in indoor air do not exceed OSHA PELs.

In response to Question No. 3 of the CA 725 Evaluation sheet, Sikorsky reasonably concludes that potentially complete exposure pathways exist for construction workers via exposure to groundwater and soils. Sikorsky notes that the site is currently used for industrial purposes and is likely to remain industrial in the future; the site is almost, entirely paved; the site is fenced and 24-hour security restricts access by residents, trespassers or recreational users; and groundwater is assumed to discharge to Cedar Creek, a class SC salt water body of limited recreational use. In addition, groundwater beneath the site is brackish, classified as GB by the CTDEP, and not used as a source of water supply. Based on these considerations, no other complete exposure pathways were identified at the site.

In response to Question No. 4 of the CA 725 Evaluation Sheet, Sikorsky correctly indicated that exposures to construction workers could be reasonably expected to be "significant" (i.e., potentially unacceptable). Construction workers were appropriately retained as receptors requiring additional risk analysis.

In response to Question No. 5 on the CA 725 Evaluation Sheet, Sikorsky reasonably determines that potential exposures to construction workers at the facility are within acceptable limits. Sikorsky notes that the only potentially significant exposure to construction workers under current conditions is through groundwater or residual non aqueous phase liquid (NAPL) volatilization in the source area. However, Sikorsky notes that there are no current or planned

construction activities in the source area. In addition, Sikorsky manages any potential exposure to construction workers on a case-by-case basis and controls risks through its internal environmental review procedure for construction projects. Sikorsky also notes that the results of the risk evaluation included in the Phase II Investigation Report indicate no significant exposures or risks to human receptors.

Finally, Sikorsky has responded to Question No. 6 with a “YE” (yes), indicating that current human exposures are under control at its Bridgeport facility. Based on the evaluation of contaminant concentrations presented in the risk evaluation contained in the Phase II Investigation Report, the presence of institutional controls at the facility, and Sikorsky’s knowledge of the nature and extent of the contamination, it is reasonable to assume that human exposures are currently being controlled at the Bridgeport Facility. Therefore, a “YE” (yes) will be assigned as the CA 725 RCRIS Status Code for the Sikorsky Bridgeport facility.

RCRIS Code CA 750 (Migration of Contaminated Groundwater Under Control)

Our review of this document considered previous site assessment and hydrogeologic documents prepared in support of RCRA voluntary corrective action at this property. These documents included the RCRA Facility Investigation Phase I Final Report submitted April, 1998 (Phase I Investigation Report) to EPA New England and the Phase II Investigation Report - Site Stabilization Assessment submitted July, 1999 (Phase II Investigation Report) to EPA New England. The CA 750 Evaluation Sheet was reviewed to determine whether groundwater migration underneath the Sikorsky’s Bridgeport facility is currently under control. The information in this letter follows the format of the information provided in Sikorsky’s Documentation of Environmental Determination submittal (CA 750 Evaluation Sheet).

In response to Question No. 2 on the CA 750 Evaluation Sheet, Sikorsky indicates that groundwater at the site is contaminated above appropriate levels. The appropriate levels were identified as the Connecticut Department of Environmental Protection (CTDEP) Remediation Standard Regulations (RSRs) Surface Water Protection Criteria (SWPC) and Volatilization Criteria for Industrial/Commercial settings (Vol-I/C). Tetrachloroethene (PCE), trichloroethene (TCE), and certain metals were identified as exceeding the CTDEP SWPC. PCE and TCE were identified as exceeding the CTDEP Vol-I/C.

Although Sikorsky did not identify the metals exceeding SWPC, review of the Phase II Investigation Report (Table 4.3-5) indicates that arsenic, cadmium, hexavalent chromium, copper, and zinc exceeded the SWPC. The CA 750 Evaluation Sheet should be revised to clearly identify the metallic constituents in groundwater exceeding the SWPC.

In response to Question No. 3 of the CA 750 Evaluation Sheet, Sikorsky reports that the migration of contaminated groundwater has stabilized (such that contaminated groundwater is expected to remain within the existing area of groundwater). Although Sikorsky appears to have justifiably concluded that the migration of contaminated groundwater has stabilized, Sikorsky

provides only a reference to Section 5 of the Phase II Investigation Report in support of this contention. Review of the Phase II Investigation Report indicates that a chlorinated solvent plume discharges into nearby Cedar Creek and, as a result, the existing area of groundwater contaminated by chlorinated solvents is not expected to increase. In addition, based on the isolated nature of the metal contamination identified in groundwater, metals do not appear to be migrating in groundwater. Although, the response to Question No. 3 appears to be correct based on review of Section 5 of the Phase II Investigation Report, the CA 750 Evaluation Sheet should be revised. The CA 750 Evaluation Sheet only references Section 5 of the Phase II Investigation Report. It does not provide any technical detail to justify the response of "yes" to Question No. 3.

In response to Question No. 4, Sikorsky correctly indicates that contaminated groundwater does discharge into surface water bodies. Cedar Creek was identified as the surface water body into which contaminated groundwater discharges.

In response to Question No. 5, Sikorsky responds that the discharge of the contaminated groundwater from its Bridgeport facility into Cedar Creek is insignificant. Sikorsky supports this contention by citing that the groundwater quality data from wells adjacent to Cedar Creek have not identified any contaminant levels that exceed 10 times the SWPC. Furthermore, Sikorsky has indicated that concentrations are stable or decreasing with time and references Section 5 of the Phase II Investigation Report in support of this conclusion. No further discussion is provided in the CA 750 Evaluation Sheet in support of this conclusion. However, review of the last two years of groundwater monitoring data has confirmed that no contaminants currently exceed 10 times the SWPC, and that groundwater contamination is not currently increasing at Cedar Creek.

Additionally, review of the Phase II Investigation Report indicates that Sikorsky has conducted detailed modeling analyses of the groundwater plume at the site. Results of these modeling efforts identified some uncertainty associated with the future migration of the groundwater plume at the site. However, Sikorsky concluded that (pp.5-16) that "although the processes involved in attenuating VOCs in groundwater at the site are complex, there is sufficient evidence to conclude that these combined responses are adequate to produce long-term reductions in VOC concentrations to acceptable levels." Although review of these modeling efforts did indicate some uncertainty regarding long-term predictions, it does appear reasonably certain, that no impacts in the near future are likely to occur.

In addition, current groundwater quality data have identified contaminant concentrations within 300 feet of Cedar Creek that only marginally exceed the SWPC. Moreover, data collected over the past two years indicate no increasing trend in contaminant levels in downgradient portions of the plume. Unretarded contaminant migration rates have been estimated to be only 20 feet/year. Thus, the current monitoring network, which contains wells located at approximately 300 feet from Cedar Creek, appears more than sufficient to give ample warning of any increases in contaminant concentrations that may occur. However, it is not expected that groundwater contaminant concentration would approach unacceptable levels in the vicinity of

Cedar Creek before a final remedy is chosen and implemented. Therefore, based on this extensive groundwater monitoring network, the slow rate of groundwater plume movement, and the current groundwater contaminant concentrations, Sikorsky's response of "yes" to Question No. 5 is reasonable. However, Sikorsky should revise the CA 750 Evaluation Sheet to include more detailed information in the response.

Based on its "yes" response to Question No. 5, Sikorsky has responded to Question No. 7 with a "yes," indicating that groundwater monitoring/measurement data will be collected in the future to verify that contaminated groundwater has remained within the horizontal and vertical dimensions of the "existing area of contaminated groundwater." Sikorsky has indicated that quarterly monitoring of all site wells is currently ongoing and that a long-term monitoring plan will be developed for the site and submitted to EPA New England for approval. Quarterly monitoring of all site wells is capable of verifying that groundwater contamination is remaining within the "existing area of contamination." Moreover such a program should be able to provide advanced warning of any increasing trends in contaminant concentrations in the plume in the area immediately upgradient of Cedar Creek, should they occur (see discussion of Question No. 5 above). Any long-term monitoring program proposed for the Bridgeport facility will need to similarly meet these objectives.

Finally, Sikorsky has responded to Question No. 8 with a "YE" (yes), indicating that the migration of contaminated groundwater is under control. Based on currently available data and analyses, this appears to be a reasonable conclusion; and a "YE" (yes) will be assigned as the CA 750 RCRIS Status Code for Sikorsky Bridgeport facility. However, to facilitate review by third parties, the CA 750 Evaluation Sheet should be revised to contain greater discussion of the data and conclusions as indicated by preceding discussion in this letter. Furthermore, it should be noted that the RCRIS Status Code of "YE" applies only to current conditions. If it becomes apparent based on future groundwater data that the groundwater conditions at the site have changed, this Status Code will need to be revisited.

Sincerely,


Robert A. O'Meara
RCRA Facility Manager

cc: Robert A. Araujo. Sikorsky

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: Sikorsky Aircraft Corporation
Facility Address: 1210 South Ave, Bridgeport, CT
Facility EPA ID #: CTD001449375

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.

Completion of this form drew upon information presented to the USEPA including:

- Building 10 RI, Fuss and O'Neill, 1992
- Current Assessment Summary, Marin Environmental, 1996
- RFI Phase I Report, ABB-ES, 1998
- RFI Phase II Investigation Report, Site Stabilization Assessment, HLA, 1999

If no - re-evaluate existing data, or

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

[Acronyms and references used in responses on this form are defined in the RFI Phase II Investigation Report.]

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).

**Current Human Exposures Under Control
Environmental Indicator (EI) RCRIS code (CA725)**

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>	___	___	PCE, TCE Exceed CT RSR SWPCs
Air (indoors) ²	___	<u>X</u>	___	OSHA PELS not exceeded
Surface Soil (e.g., <2 ft)	<u>X</u>	___	___	As, Cr, PCBs, and TPH exceed CT RSR I/C DECs
Surface Water	<u>X</u>	___	___	Assumed based on SWPC exceedances
Sediment	<u>X</u>	___	___	Assumed based on SWPC exceedances
Subsurf. Soil (e.g., >2 ft)	<u>X</u>	___	___	As, Cr, PCBs, and TPH exceed CT RSR I/C DECs
Air (outdoors)	___	<u>X</u>	___	No significant sources to outdoor air

___ 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): Within the Phase II Investigation Report, Section 4 documents the exceedances of regulatory standards, Section 5 provides the analysis and interpretation of the site data, and Section 6 provides the Risk Evaluation of the site.

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.

**Current Human Exposures Under Control
Environmental Indicator (EI) RCRIS code (CA725)**

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>	Off-Site Maint.						
	Residents	Workers	Day-Care	Construction	Trespassers	Recreation	Food ³
Groundwater	no	no	no	YES	no	no	no
Air (indoors)	XX						
Soil (surface, e.g., <2 ft)	no	no	no	YES	no	no	no
Surface Water	no	no	no	no	no	no	no
Sediment	no	no	no	no	no	no	no
Soil (subsurface e.g., >2 ft)	no	no	no	YES	no	no	no
Air (outdoors)	XX						

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. **Indoor and outdoor air not contaminated**
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):
- Site usage assumes continued industrial setting and operations and continued ownership by SAC.
 - Entire site is fenced with 24-hour security. No access to residents, trespassers, or recreational users.
 - Almost entire site is paved.
 - Groundwater is assumed to discharge to Cedar Creek, a Class SC salt water body of limited recreational use.

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

**Current Human Exposures Under Control
Environmental Indicator (EI) RCRIS code (CA725)**

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.”

 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):

The only potentially significant exposure under current conditions is to construction workers through groundwater or residual NAPL volatilization in the source area. There are no current or planned construction activities in the source area. SAC manages any potential exposure to construction workers on a case-by-case basis and controls risk through its internal Environmental Review procedure for construction projects.

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.

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

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):

Results of the Risk Evaluation, Section 6 of the Phase II Investigation Report, indicate no significant exposures or risks to human receptors.

**Current Human Exposures Under Control
Environmental Indicator (EI) RCRIS code (CA725)**

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 **Sikorsky Aircraft Corporation Bridgeport I** facility, EPA ID # **CTD001449375**, located at **1210 South Avenue, Bridgeport, CT** 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.

(Information provided by Facility)

Completed by (signature) *[Signature]* Date *12/4/99*
(print) *Robert A. O'Meara*
(title) *NEM*

Supervisor (signature) *[Signature]* Date *11/12/99*
(print) *Matthew R. Hayward*
(title) *Section Chief*
(EPA Region or State) *Region I*

Locations where References may be found:

Contact telephone and e-mail numbers
(name) _____
(phone #) _____
(e-mail) _____

DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

Interim Final 2/5/99

**RCRA Corrective Action
Environmental Indicator (EI) RCRIS code (CA750)
Migration of Contaminated Groundwater Under Control**

Facility Name: Sikorsky Aircraft Corporation
Facility Address: 1210 South Avenue, Bridgeport, CT
Facility EPA ID #: CTD001449375

1. Has all available relevant/significant information on known and reasonably suspected releases to the groundwater media, 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.

Completion of this form drew upon information presented to the agency including:

- Building 10 RI, Fuss and O'Neill, 1992
- Current Assessment Summary, Marin Environmental, 1996
- RFI Phase I Report, ABB-ES, 1998
- RFI Phase II Investigation Report, Site Stabilization Assessment, HLA,

1999

If no - re-evaluate existing data, or

if data are not available, skip to #8 and enter "IN" (more information needed) status code.

[Acronyms and references used in responses on this form are defined in the RFI Phase II Investigation Report.]

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 "Migration of Contaminated Groundwater Under Control" EI

A positive "Migration of Contaminated Groundwater Under Control" EI determination ("YE" status code) indicates that the migration of "contaminated" groundwater has stabilized, and that monitoring will be conducted to confirm that contaminated groundwater remains within the original "area of contaminated groundwater" (for all groundwater "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 "Migration of Contaminated Groundwater Under Control" EI pertains ONLY to the physical migration (i.e., further spread) of contaminated ground water and contaminants within groundwater (e.g., non-aqueous phase liquids or NAPLs). Achieving this EI does not substitute for achieving other stabilization or final

remedy requirements and expectations associated with sources of contamination and the need to restore, wherever practicable, contaminated groundwater to be suitable for its designated current and future uses.

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).

**Migration of Contaminated Groundwater Under Control
Environmental Indicator (EI) RCRIS code (CA750)**

2. Is groundwater known or reasonably suspected to be “contaminated”¹ above appropriately protective “levels” (i.e., applicable promulgated standards, as well as other appropriate standards, guidelines, guidance, or criteria) from releases subject to RCRA Corrective Action, anywhere at, or from, the facility?

If yes - continue after identifying key contaminants, citing appropriate “levels,” and referencing supporting documentation.

If no - skip to #8 and enter “YE” status code, after citing appropriate “levels,” and referencing supporting documentation to demonstrate that groundwater is not “contaminated.”

If unknown - skip to #8 and enter “IN” status code.

Rationale and Reference(s):

PCE, TCE and certain metals exceed CT RSR SWPCs. PCE and TCE exceed CT RSR I/C VCs. Within the Phase II Investigation Report, Section 4 documents the exceedances of regulatory standards, Section 5 provides the analysis and interpretation of the site data, and Section 6 provides the Risk Evaluation for the site.

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 appropriate “levels” (appropriate for the protection of the groundwater resource and its beneficial uses).

Migration of Contaminated Groundwater Under Control
Environmental Indicator (EI) RCRIS code (CA750)

3. Has the **migration** of contaminated groundwater **stabilized** (such that contaminated groundwater is expected to remain within "existing area of contaminated groundwater"² as defined by the monitoring locations designated at the time of this determination)?

X If yes - continue, after presenting or referencing the physical evidence (e.g., groundwater sampling/measurement/migration barrier data) and rationale why contaminated groundwater is expected to remain within the (horizontal or vertical) dimensions of the "existing area of groundwater contamination"².

If no (contaminated groundwater is observed or expected to migrate beyond the designated locations defining the "existing area of groundwater contamination"²) - skip to #8 and enter "NO" status code, after providing an explanation.

If unknown - skip to #8 and enter "IN" status code.

Rationale and Reference(s):

Section 5 of the Phase II Investigation Report concludes that the plume is stable based on current available data. Ongoing monitoring will be used to verify this finding.

² "existing area of contaminated groundwater" is an area (with horizontal and vertical dimensions) that has been verifiably demonstrated to contain all relevant groundwater contamination for this determination, and is defined by designated (monitoring) locations proximate to the outer perimeter of "contamination" that can and will be sampled/tested in the future to physically verify that all "contaminated" groundwater remains within this area, and that the further migration of "contaminated" groundwater is not occurring. Reasonable allowances in the proximity of the monitoring locations are permissible to incorporate formal remedy decisions (i.e., including public participation) allowing a limited area for natural attenuation.

**Migration of Contaminated Groundwater Under Control
Environmental Indicator (EI) RCRIS code (CA750)**

4. Does "contaminated" groundwater **discharge** into **surface water bodies**?

X If yes - continue after identifying potentially affected surface water bodies.

If no - skip to #7 (and enter a "YE" status code in #8, if #7 = yes) after providing an explanation and/or referencing documentation supporting that groundwater "contamination" does not enter surface water bodies.

If unknown - skip to #8 and enter "IN" status code.

Rationale and Reference(s):

Groundwater at the site is assumed to discharge to Cedar Creek. However, natural attenuation modeling and tidal influence modeling suggest that concentrations of contaminants in groundwater are and will continue to be significantly reduced prior to discharge to Cedar Creek (see Section 5 of the Phase II Investigation Report).

**Migration of Contaminated Groundwater Under Control
Environmental Indicator (EI) RCRIS code (CA750)**

5. Is the discharge of "contaminated" groundwater into surface water likely to be "insignificant" (i.e., the maximum concentration³ of each contaminant discharging into surface water is less than 10 times their appropriate groundwater "level," and there are no other conditions (e.g., the nature, and number, of discharging contaminants, or environmental setting), which significantly increase the potential for unacceptable impacts to surface water, sediments, or eco-systems at these concentrations)?

 X If yes - skip to #7 (and enter "YE" status code in #8 if #7 = yes), after documenting: 1) the maximum known or reasonably suspected concentration³ of key contaminants discharged above their groundwater "level," the value of the appropriate "level(s)," and if there is evidence that the concentrations are increasing; and 2) provide a statement of professional judgement/explanation (or reference documentation) supporting that the discharge of groundwater contaminants into the surface water is not anticipated to have unacceptable impacts to the receiving surface water, sediments, or eco-system.

 If no - (the discharge of "contaminated" groundwater into surface water is potentially significant) - continue after documenting: 1) the maximum known or reasonably suspected concentration³ of each contaminant discharged above its groundwater "level," the value of the appropriate "level(s)," and if there is evidence that the concentrations are increasing; and 2) for any contaminants discharging into surface water in concentrations³ greater than 100 times their appropriate groundwater "levels," the estimated total amount (mass in kg/yr) of each of these contaminants that are being discharged (loaded) into the surface water body (at the time of the determination), and identify if there is evidence that the amount of discharging contaminants is increasing.

 If unknown - enter "IN" status code in #8.

Rationale and Reference(s):

Concentration of contaminants discharging to Cedar Creek is less than 10 times SWPC as monitored in wells located along Cedar Creek (see Section 4 of the Phase II Investigation Report). Concentrations are stable or decreasing with time (see Section 5 of the Phase II Investigation Report).

- 3 As measured in groundwater prior to entry to the groundwater-surface water/sediment interaction (e.g., hyporheic) zone.

**Migration of Contaminated Groundwater Under Control
Environmental Indicator (EI) RCRIS code (CA750)**

6. Can the discharge of “contaminated” groundwater into surface water be shown to be “**currently acceptable**” (i.e., not cause impacts to surface water, sediments or eco-systems that should not be allowed to continue until a final remedy decision can be made and implemented⁴)?

_____ If yes - continue after either: 1) identifying the Final Remedy decision incorporating these conditions, or other site-specific criteria (developed for the protection of the site’s surface water, sediments, and eco-systems), and referencing supporting documentation demonstrating that these criteria are not exceeded by the discharging groundwater; OR 2) providing or referencing an interim-assessment,⁵ appropriate to the potential for impact, that shows the discharge of groundwater contaminants into the surface water is (in the opinion of a trained specialists, including ecologist) adequately protective of receiving surface water, sediments, and eco-systems, until such time when a full assessment and final remedy decision can be made. Factors which should be considered in the interim-assessment (where appropriate to help identify the impact associated with discharging groundwater) include: surface water body size, flow, use/classification/habitats and contaminant loading limits, other sources of surface water/sediment contamination, surface water and sediment sample results and comparisons to available and appropriate surface water and sediment “levels,” as well as any other factors, such as effects on ecological receptors (e.g., via bio-assays/benthic surveys or site-specific ecological Risk Assessments), that the overseeing regulatory agency would deem appropriate for making the EI determination.

_____ If no - (the discharge of “contaminated” groundwater can not be shown to be “**currently acceptable**”) - skip to #8 and enter “NO” status code, after documenting the currently unacceptable impacts to the surface water body, sediments, and/or eco-systems.

_____ If unknown - skip to 8 and enter “IN” status code.

Rationale and Reference(s):

⁴ Note, because areas of inflowing groundwater can be critical habitats (e.g., nurseries or thermal refugia) for many species, appropriate specialist (e.g., ecologist) should be included in management decisions that could eliminate these areas by significantly altering or reversing groundwater flow pathways near surface water bodies.

⁵ The understanding of the impacts of contaminated groundwater discharges into surface water bodies is a rapidly developing field and reviewers are encouraged to look to the latest guidance for the appropriate methods and scale of demonstration to be reasonably certain that discharges are not causing currently unacceptable impacts to the surface waters, sediments or eco-systems.

**Migration of Contaminated Groundwater Under Control
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7. Will groundwater **monitoring** / measurement data (and surface water/sediment/ecological data, as necessary) be collected in the future to verify that contaminated groundwater has remained within the horizontal (or vertical, as necessary) dimensions of the "existing area of contaminated groundwater?"

X If yes - continue after providing or citing documentation for planned activities or future sampling/measurement events. Specifically identify the well/measurement locations which will be tested in the future to verify the expectation (identified in #3) that groundwater contamination will not be migrating horizontally (or vertically, as necessary) beyond the "existing area of groundwater contamination."

If no - enter "NO" status code in #8.

If unknown - enter "IN" status code in #8.

Rationale and Reference(s):

Quarterly monitoring of all site wells is currently ongoing. A long-term monitoring plan will be developed for the site and submitted for agency approval.

**Migration of Contaminated Groundwater Under Control
Environmental Indicator (EI) RCRIS code (CA750)**

8. Check the appropriate RCRIS status codes for the Migration of Contaminated Groundwater Under Control EI (event code CA750), and obtain Supervisor (or appropriate Manager) signature and date on the EI determination below (attach appropriate supporting documentation as well as a map of the facility).

YE YE - Yes, "Migration of Contaminated Groundwater Under Control" has been verified. Based on a review of the information contained in this EI determination, it has been determined that the "Migration of Contaminated Groundwater" is "Under Control" at the **Sikorsky Aircraft Corporation Bridgeport I** facility, EPA ID# CTD00149375, located at 1210 South Avenue, Bridgeport, CT. Specifically, this determination indicates that the migration of "contaminated" groundwater is under control, and that monitoring will be conducted to confirm that contaminated groundwater remains within the "existing area of contaminated groundwater" This determination will be re-evaluated when the Agency becomes aware of significant changes at the facility.

___ NO - Unacceptable migration of contaminated groundwater is observed or expected.

___ IN - More information is needed to make a determination.

Completed by

(signature) *[Signature]*
 (print) Robert A. O'Meara
 (title) RPM

Date

12/4/99 *(Information provided by Facility)*

Supervisor

(signature) *[Signature]*
 (print) Matthew R. Hoagland
 (title) Section Chief
 (EPA Region or State) Region I.

Date

11/12/99

Locations where References may be found:

Contact telephone and e-mail numbers

(name) _____
 (phone #) _____
 (e-mail) _____