

DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

Interim Final 2/5/99

RCRA Corrective Action
Environmental Indicator (EI) RCRAInfo code (CA725)

Current Human Exposures Under Control
Last Revised: September 2011

Facility Name: Boeing Auburn Facility, Remaining Facility _____
Facility Address: 700 15th Street SW; Auburn, WA 98002 _____
Facility EPA ID #: WAD041337130 _____

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 RCRAInfo national database ONLY as long as they remain true (i.e., RCRAInfo 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)?

Media	Yes	No	?	Rationale / Key Contaminants
Groundwater	X			Volatile Organic Compounds (VOCs), diesel range hydrocarbons, and Arsenic exceed MTCA Method B standards for groundwater
Air (indoors) ²			X	As a result of vapor intrusion, TCE measured in indoor air <i>may</i> be detected in buildings over areas with shallow groundwater contamination.
Surface soil (e.g., <2 feet)		X		
Surface water			X	Volatile Organic Compounds, particularly TCE in groundwater, <i>may</i> be discharging to surface water in wetlands at concentrations greater than MTCA Method B standards protective of surface water
Sediment			X	Sediments underlying surface water in wetlands <i>may</i> be contaminated by VOCs, particularly by TCE in groundwater discharge through the sediments to surface water. The concentrations of VOCs may be greater than the freshwater standards set to be protective for sediments.
Subsurface soil (e.g., >2 feet)	X			Diesel range oil along with TCE and PCE, is detected above the MTCA Standards in soils at >2' depth below ground surface. Metals such as cadmium and cyanide are detected above MTCA Method B standards
Air (outdoors)		X		

_____ 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

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) suggests 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.

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: Trichloroethene (TCE), tetrachloroethene (PCE), cis -1,2-dichloroethene (cis-1,2-DCE), vinyl chloride, petroleum hydrocarbons, arsenic, and cadmium exceed the MTCA Method B standards (or Applicable, Relevant, and Appropriate Requirements (ARARs), whichever standard is lower). These contaminants are well-documented in the groundwater. (See: *Letter Status Report: No. 35, April Through June 2011 Activity Period*, Prepared for The Boeing Co. by Landau Associates; July 22, 2011; *Report, Summer 2010 Remedial Investigation Report; Boeing Auburn Fabrication Division Facility, Auburn, Washington*; Prepared for The Boeing Co. by Landau Associates; November 19, 2010. *Letter Status Report No. 31, April 2010 through June 2011 Activity Period*; Landau Associates; July 15, 2010; *Report, 2nd Revised Ecology Review Draft Remedial Investigation Report Boeing Auburn Fabrication Division Facility, Auburn, Washington*, The Boeing Company to the Department of Ecology, April 10, 2009; and Attachment A to this Report).

Indoor Air: Groundwater contaminated with TCE, the degradation products of TCE (such as vinyl chloride), and PCE are found in groundwater both on and off site of the Boeing Auburn Plant property. Boeing is in the process of determining the levels of VOCs in shallow, intermediate and deep groundwater zones and their full extent. Where these VOCs are located in shallow groundwater beneath buildings both on and off site, there is the possibility that volatile constituents can enter buildings through a process known as vapor intrusion and build up in indoor air to toxic levels.

Surface Water: Groundwater contaminated with TCE is potentially discharging to surface water in wetlands northwest of the Boeing Auburn Plant. Future investigations will provide more data regarding the concentrations of TCE and related VOCs, if any, present in surface water at the wetlands.

Sediment: Sediment that is associated with wetlands near the Boeing Auburn Plant may have groundwater contaminated with TCE flowing through it. Future investigations will provide more data regarding the concentrations of TCE and related VOCs, if any, present in the freshwater sediment at the wetlands.

Subsurface Soil: Soil sampling results indicate that concentrations of petroleum hydrocarbons, TCE, PCE, antimony, cadmium and cyanide are above the site soil screening levels in several locations. For the remedial investigation, the soil screening levels are set at the lowest of the Fixed Parameter 3-Phase Model for protection of groundwater [see WAC173-340-747(4)]; and the MTCA Method B Standard Formula Value (direct contact, ingestion-only pathway; unrestricted land use). For naturally occurring constituents (e.g. metals), the lowest level is adjusted upward to published background values for the Puget Sound Region.

At the Building 17-06 conveyance line, SWMU S-16, there are diesel and motor oil range petroleum hydrocarbons above the soil screening levels at depths from 10' to 18' below ground surface. TCE and PCE are also detected in soils above the screening level at this location. At the Building 17-07 acid scrubber drain line, there is cadmium and cyanide remaining in soil above the screening levels after a removal action was completed. At the Wastewater Pretreatment Plant, in three soil boring samples taken in April 1999, there is antimony in soils above the screening level that remain in subsurface soils at 4' depth. (See: *Report, 2nd Revised Ecology Review Draft Remedial Investigation Report Boeing Auburn Fabrication Division Facility, Auburn, Washington*; The Boeing Company to the Department of Ecology; April 10, 2009).

3. Are there **complete pathways** between “contamination” and human receptors such that exposures can be reasonably expected under the current (land- and groundwater-use) conditions?

Summary Exposure Pathway Evaluation Table

Potential Human Receptors (Under Current Conditions)

“Contaminated” media	Residents	Workers	Daycare	Construction	Trespassers	Recreation	Food ³
Groundwater	Unknown	No	No	Yes		No	No
Air (indoors)	Unknown	Yes	Yes	No		Yes	No
Surface soil (e.g., <2 feet)	No	No	No	Yes		No	No
Surface water	No	No	No	No		No	No
Sediment	No	No	No	No		No	No
Subsurface soil (e.g., >2 feet)	No	No	No	Yes		No	No
Air (outdoors)	No	No	No	Yes		No	No

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 – Potential 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).
- _____ If yes (pathways are complete for any “Contaminated” Media - Human Receptor combination) - continue after providing supporting explanation.
- X If unknown (for any “Contaminated” Media - Human Receptor combination) - skip to #6 and enter “IN” status code

Rationale and Reference(s):

Residents in the vicinity of the site could be exposed to contaminated groundwater if they use groundwater drawn from a private well completed in the uppermost aquifer. They might also be exposed to indoor air impacted by vapor intrusion if their homes overlie shallow groundwater contaminated with volatile constituents. (see: *Letter Status Report: No. 35, April Through June 2011 Activity Period*, Prepared for The Boeing Co. by Landau Associates; July 22, 2011; *Report, Summer 2010 Remedial Investigation Report; Boeing Auburn Fabrication Division Facility, Auburn, Washington*; Prepared for The Boeing Co. by Landau Associates; November 19, 2010; *Technical Memorandum: Critical Area/Wellhead Protection Ordinance Review*; Landau Associates; April 14, 2010; and *Letter Report, Proposed YMCA Property Transfer Investigation, Boeing Auburn Facility*; URS Consultants, February 25, 2003).

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

Day Care facilities are known to exist within the YMCA building located north of the Boeing Auburn Plant. Users of the day care could be exposed to indoor air impacted by vapor intrusion if the YMCA is located over shallow groundwater contaminated with volatile constituents. (see: *Letter Report, Proposed YMCA Property Transfer Investigation, Boeing Auburn Facility*; URS Consultants, February 25, 2003).

Food Production in the form of commercial agriculture is not located in the vicinity of this site. Food storage and distribution do exist either on-site or adjacent to the site. Restaurants are also located in the vicinity of this site. There are no complete pathways to contaminate food at these facilities.

Trespassers should not be exposed because the facility boundary is fenced and monitored such that undetected entry is highly unlikely. Also, the only potentially complete pathway would be to indoor air impacted by vapor intrusion if entry occurs; but a one-time exposure is unlikely to make this a significant pathway of exposure.

Industrial and Commercial workers located in buildings on, adjacent to, or in the vicinity of the facility could be exposed to indoor air impacted by vapor intrusion from shallow groundwater contaminated with volatile organic compounds (VOCs).

Construction workers could be exposed to contaminated soil or groundwater during excavations onsite or in the vicinity of the site. They might also be exposed to outdoor air impacted by multiple VOCs if they work in confined spaces such as excavations on site or in the vicinity of the site.

Users of recreational facilities in the vicinity of the site could be exposed to indoor air impacted by vapor intrusion coming from shallow groundwater contaminated with VOCs underlying the recreational facility.

(For this Section See: *Letter Status Report: No. 35, April Through June 2011 Activity Period*, Prepared for The Boeing Co. by Landau Associates; July 22, 2011; *Report, Summer 2010 Remedial Investigation Report; Boeing Auburn Fabrication Division Facility, Auburn, Washington*; Prepared for The Boeing Co. by Landau Associates; November 19, 2010; *Technical Memorandum: Critical Area/Wellhead Protection Ordinance Review*; Landau Associates; April 14, 2010; *Letter Report, Proposed YMCA Property Transfer Investigation, Boeing Auburn Facility*, URS Consultants, February 25, 2003; *Letter Status Report: No. 30, January 2010 through March 2010 Activity Period*, Landau Associates; April 15, 2010; *Report, 2nd Revised Ecology Review Draft Remedial Investigation Report Boeing Auburn Fabrication Division Facility, Auburn, Washington*, The Boeing Company to the Department of Ecology, April 10, 2009; *Memorandum, First Addendum to the 2nd Revised Ecology Review Draft Remedial Investigation Report*, Prepared for The Boeing Company by Landau Associates; December 16, 2009)

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 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

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.

(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.”

 X If unknown (for any complete pathway) - skip to #6 and enter “IN” status code

Rationale and Reference(s):

Construction Workers can be reasonably expected to encounter ‘significant’ exposures. These include exposure to elevated levels of VOCs (Trichloroethene, Tetrachloroethene, Vinyl Chloride) in groundwater. Some locations on site do have levels of VOCs in groundwater above the screening levels. Dermal contact with multiple contaminants in groundwater during construction activities (such as excavation dewatering), may represent an unacceptable additive risk. It is not believed that exposure to the groundwater represents a ‘significant’ risk for construction workers since the duration of the exposure will be limited to the amount of time it takes to complete the project. Construction Workers are also reasonably expected to encounter ‘significant’ exposure during excavation, particularly in confined spaces, where multiple volatile contaminants may build up in air to levels representing an unacceptable risk.

Construction workers can be reasonably expected to encounter contaminated soils during excavation onsite. Exposure to contaminated soil is not likely to represent a ‘significant’ pathway since contact can be avoided or prevented with proper personal protective equipment.

Residents may be potentially exposed to unacceptable risk through the vapor intrusion pathway. Boeing is in the process of, but has not completed, defining the full extent of the shallow VOC contamination in groundwater. While it is unlikely, it is still technically ‘**unknown**’ whether residents are living in houses or working in businesses overlying contaminated shallow groundwater and therefore are potentially impacted by ‘significant’ exposures to indoor air contamination.

There are several private wells in use east of the Boeing Auburn Plant boundary. Since the extent of VOC contamination has not been bounded off site to the east of the Auburn Plant property boundary, it is currently unlikely, but technically ‘**unknown**,’ whether or not these wells represent an unacceptable risk to ‘significant’ exposures through the contaminated groundwater pathway from the Boeing Auburn site.

Industrial Workers, Commercial Business Workers, Daycare Users and Recreational Users are potentially exposed to contaminants in indoor air that could result from vapor intrusion due to VOC contamination in shallow groundwater. It is not expected that the vapor intrusion pathway is ‘significant’ for these receptors. The reason is that the levels of contamination in groundwater beneath buildings are believed to be lower than the levels needed to create a build-up of contaminants in indoor air to unsafe levels. However, until investigations are completed to define the full nature and extent of contamination, the risk from this pathway cannot be ruled out.

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): _____

6. Check the appropriate RCRAInfo 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 _____ facility, EPA ID # _____, located at _____ 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 Robin Harrover Date Sept. 21, 2011
Robin Harrover
Hydrogeologist/Project Manager

Supervisor Julie Sellick Date 9/28/11
Julie Sellick, Section Manager
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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.

DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

Interim Final 2/5/99

RCRA Corrective Action
Environmental Indicator (EI) RCRA Info code (CA750)

Migration of Contaminated Groundwater Under Control
Last Revised: September 2011

Facility Name: Boeing Auburn Facility, Remaining Facility _____
Facility Address: 700 15th Street SW; Auburn, WA 98002 _____
Facility EPA ID #: WAD041337130 _____

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.
- If no - re-evaluate existing data, or
- if data are not available, skip to #8 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 "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 RCRAInfo national database ONLY as long as they remain true (i.e., RCRAInfo status codes must be changed when the regulatory authorities become aware of contrary information).

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?

 X 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):

At the Boeing Commercial Airplanes Group, Fabrication Division – Auburn Plant (BCA – Auburn Plant), the Boeing Company has identified contamination in the shallow, intermediate and deep zones of the uppermost aquifer to a depth of 90 to 100 feet below ground surface (bgs). This contamination is primarily Trichloroethene (TCE). Additional Volatile Organic Compounds (VOCs) detected in groundwater are: Cis-1, 2-Dichloroethene, Vinyl Chloride, 1,1,1-Trichloroethane, Tetrachloroethene, Benzene, Toluene, Ethylbenzene, and Xylene. Some of the metals detected in groundwater are: Arsenic, Cadmium and Lead. All of these contaminants have been detected in groundwater above the screening level for the contaminant. The screening level has been set at the lower of the MTCA Method B Standards [or Applicable, Relevant, and Appropriate Requirements (ARARs)]

Contamination in groundwater is documented in the remedial investigation report (see: *Report, 2nd Revised Ecology Review Draft Remedial Investigation Report, Boeing Auburn Fabrication Division Facility, Auburn, Washington*, The Boeing Company to the Department of Ecology, April 10, 2009). There are levels of VOCs above the screening levels along both the western and eastern property boundaries. TCE contamination and to a lesser extent, related VOCs have been discovered off site to the north and northwest of the Boeing Auburn Plant. Boeing has continued efforts to define the full nature and extent of off-site contamination in groundwater. There are two areas under continuing investigation: 1) the western property boundary including solid waste management unit (SWMU) S-13, and S-34 in Building 17-07; and 2) the eastern property boundary, east of Building 17-06 and SWMU S-15a/S-16 which is the aluminum chip briquetter and chip conveyance line. Off-site investigations to the north from the SWMUs in Building 17-07 in 2009 and 2010 have documented contamination in the intermediate and deep zones of the uppermost aquifer. The actual source area for this contamination is unknown and under investigation at this time. (see: *Status Report: No. 30, January through march 2010*, Landau Associates, April 15, 2010; and *Status Report: No. 31, April through June 2010*, Landau Associates, July 15, 2010; *Report, Summer 2010 Remedial Investigation Report; Boeing Auburn Fabriation Division Facility, Auburn, Washington*; Prepared for The Boeing Co. by Landau Associates; November 19, 2010; and *Letter Status Report: No. 35, April Through June 2011 Activity Period*, prepared for The Boeing Co. by Landau Associates; July 22, 2011.)

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

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).

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

locations designated at the time of this determination)?

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".

If no (contaminated groundwater is observed or expected to migrate beyond the designated locations defining the "existing area of groundwater contamination") - 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):

In December of 2007, Boeing completed a draft Remedial Investigation Report. Based on Ecology comments, Boeing conducted additional groundwater sampling and analysis to close remaining data gaps. The results of this field work revealed levels of TCE contamination in the intermediate zone of the uppermost aquifer which are above the MTCA Method B standards. Boeing continued to investigate the intermediate zone of the uppermost aquifer in 2008 and 2009. In 2009, Boeing discovered TCE offsite in the intermediate zone of the uppermost aquifer (40' - 60' BGS) along the western boundary of the BCA - Auburn Plant property. These results indicate that an unidentified source area is contributing to this off-site contamination. In the fall of 2009, the summer of 2010, and the summer of 2011, Boeing has continued groundwater sampling and analysis of the intermediate zone of the uppermost aquifer to define the full extent of the TCE contamination. In addition, Boeing is completing additional investigations to locate and characterize the source area for the TCE discovered offsite from the western boundary of the BCA - Auburn Plant. As of fall 2010 this work is on-going. [Refer to: *Agency Review Draft Work Plan Additional Remedial Investigation, Fall of 2009, Boeing Auburn*, by Landau Associates, September 11, 2009; *First Addendum to the 2nd Revised Ecology Review Draft Remedial Investigation Report*, by Landau Associates, December 16, 2009; *Agency Review Draft Work Plan Additional Remedial Investigation, Winter 2010, Boeing Auburn*, by Landau Associates, February 12, 2010; *Agency Review Draft Work Plan Boeing Auburn Remedial Investigation*, by Landau Associates, July 21, 2010; *Status Report: No. 29, October 2009 through December 2009*, Landau Associates, January 15, 2010; *Status Report: No. 30, January through March 2010*, Landau Associates, April 15, 2010; *Status Report: No. 31, April through June 2010*, Landau Associates, July 15, 2010; *Report, Summer 2010 Remedial Investigation Report, Boeing Auburn Fabrication Division Facility, Auburn, Washington*; prepared for The Boeing Co. by Landau Associates; November 19, 2010; and *Letter Status Report: No. 35, April Through June 2011 Activity Period*, prepared for The Boeing Co. by Landau Associates, July 22, 2011.]

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

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): _____

5. Is the discharge of "contaminated" groundwater into surface water likely to be "insignificant" (i.e., the

participation) allowing a limited area for natural attenuation.

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)?

_____ 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 judgment/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): _____

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 implemented)?⁴

_____ 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

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

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.

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 cannot 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): _____

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?"

_____ 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): _____

8. Check the appropriate RCRA Info 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 - 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 _____ facility, EPA ID # _____, located at _____. 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 Robin Harrover Date Sept. 21, 2011
Robin Harrover
Hydrogeologist/Project Manager

Supervisor Julie Sellick Date 9/1/11
Julie Sellick, Section Manager
Hazardous Waste and Toxics Reduction Program
Department of Ecology, Northwest Regional Office

Locations where References may be found:

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(425) 649-7232
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Boeing Commercial Airplanes Group, Fabrication Division – Remaining Facility

Attachment A: Rationale and References Updated September 2011

Rationale:

The Boeing Company has submitted a Remedial Investigation Report (RI Report) that covers SWMUs and AOCs which have not already been incorporated into another RI Report for expedited review of property sales. Therefore, these SWMUs and AOCs are referred to as the “remaining facility.” The SWMUs and AOCs referred to in this EI Report are required to undergo corrective action by the Agreed Order as reflected in Attachment 2 of the Amended Agreed Order No. 01HWTRNR-3345. This Agreed Order is incorporated into State of Washington Dangerous Waste Permit for Corrective Action No. WAD041337130 issued April 7, 2006. This EI Report for the “Remaining Facility” includes the following SWMUs and AOCs:

Remaining Facility: S-06, S-11, S-12d, S-12f, S-13, S-15, S-16, S-17, S-18, S-30, A-01, A-02b, A-02c, A-02d, A-03, A-04, A-05, A-06, A-07, A-09, A-10, A-12

The following SWMUs and AOCs are covered by other EI Reports:

Safeway Property: S-09 (Bldg 17-56, Bldg 17-55), S-14, S-28, A-02e, and A-02f
Area 1, Group I: S-09 (Bldg 17-05), S-12a, S-12c, S-19, S-20, S-31, S-32, A-02a
Area 1, Group II: S-12b, A-08

In December of 2007, Boeing submitted the revised remedial investigation report covering the “remaining” facility and including a synopsis of the work at Area 1. The Department of Ecology has completed review of the revised remedial investigation report, and has requested additional field work to complete the remedial investigation. Boeing completed the additional field work for the “remaining” facility in the fall of 2008. Boeing completed the 2nd Revised Ecology Review Draft Remedial Investigation Report on April 10, 2009. Ecology reviewed this report and submitted their comments to Boeing by letter dated June 19, 2009. Ecology requested additional field work to fill data gaps at SWMU S-06 and S-15A/S-16. The results of this additional field work revealed the presence of TCE in offsite groundwater (near the wastewater pretreatment plant) at a depth of 60.’ This TCE contamination has been documented at a maximum concentration of 15 ug/L. But at most well locations, the TCE concentration is below 5 ug/L.

During 2011, Boeing continued to define the full lateral and vertical extent of VOC contamination in groundwater beyond the plant property. The northern-most downgradient well is north of Highway 18 and near Main Street in the City of Auburn. This well is a capped artesian well. Within 300’ of the northernmost well, there is a wetlands area. The TCE concentration in the groundwater sample taken from the well was 5.1 µg/L. Boeing is completing additional investigation of Building 17-07. This work is intended to locate the source area for the TCE extending off the Boeing Auburn Plant property in groundwater northwest of this building. Additional remedial investigation work is being planned.

Ecology has also requested additional field work to define the full extent of VOC contamination in groundwater north of Area 1. The results of this work are detailed in the EI Report for Area 1, Group II.

References:

The following references document the major work milestones that have taken place for these units:

Work Plan, Additional Onsite Remedial Investigation, Summer 2011, Boeing Auburn, Auburn, Washington; Prepared for The Boeing Company by Landau Associates; August 23, 2011.

Email, Ecology Approval for the Subslab Vapor Sampling Work Plan Addendum, Summer 2011; Robin Harrover, Ecology, to Jim Bet, Boeing, August 05, 2011.

Technical Memorandum, Building 17-06 Sump Cleaning Inspection and Repairs, Boeing Auburn Facility; Prepared for The Boeing Co. by Landau Associates; July 28, 2011.

Technical Memorandum, Subslab Vapor Sampling Work Plan Addendum Summer 2011: Boeing Auburn Facility; Prepared for The Boeing Co. by Landau Associates; July 22 2011.

Letter Status Report: No. 35, April Through June 2011 Activity Period, Prepared for The Boeing Co. by Landau Associates; July 22, 2011

Letter, Proposed Phase V Groundwater Monitoring Program, Boeing Auburn, WAD041337130; Department of Ecology to Boeing; May 26, 2011.

Letter Report, Boeing Auburn Facility Groundwater Quality Data, Auburn, Washington; Boeing report to WA State Dept. of Health, Prepared for The Boeing Co. by Landau Associates; May 13, 2011.

Letter, Ecology review of and comment on the memorandum: Critical Area/Wellhead Protection Ordinance Review WAD041337130; Department of Ecology to Boeing, April 22, 2011.

Letter Status Report: No. 34, January through March 2011 Activity Period, Prepared for The Boeing Co. by Landau Associates; April 15, 2011.

Email, Ecology comment and approval of the additional RI Work Plan, Spring 2011; Robin Harrover, Ecology to Jim Bet, Boeing, April 7, 2011.

Work Plan, Additional Remedial Investigation, Spring 2011, Boeing Auburn; Prepared for The Boeing Company by Landau Associates; April 1, 2011.

Report, Proposed Phase V Groundwater Monitoring Program, Boeing Auburn, Auburn Washington; Landau Associates for Boeing; February 16, 2011.

Letter Status Report: No. 33, October through December 2010 Activity Period, Prepared for The Boeing Co. by Landau Associates; January 17, 2011.

Report, Summer 2010 Remedial Investigation Report; Boeing Auburn Fabrication Division Facility, Auburn, Washington; Prepared for The Boeing Co. by Landau Associates; November 19, 2010.

Letter Status Report: No. 32, July Through September 2010 Activity Period, Prepared for The Boeing Co. by Landau Associates; October 15, 2010.

Letter, Ecology approval of the Agency Review Draft Work Plan Boeing Auburn Remedial Investigation; Department of Ecology to Boeing, August 19, 2010.

Work Plan, Agency Review Draft Work Plan, Boeing Auburn Remedial Investigation; Prepared for The Boeing Co. by Landau Associates; July 21, 2010.

Letter Status Report: No. 31, April 2010 through June 2010 Activity Period; Landau Associates; July 15, 2010.

Letter, Ecology Comments Regarding the First Addendum to the 2nd Revised Ecology Review Draft Remedial Investigation Report; Department of Ecology to Boeing, May 21, 2010.

Letter Status Report: No. 30, January 2010 through March 2010 Activity Period; Landau Associates; April 15, 2010.

Technical Memorandum: Critical Area/Wellhead Protection Ordinance Review; Landau and Associates to Boeing, April 14, 2010.

Letter, Ecology approval of the Agency Review Draft Work Plan, Additional Remedial Investigation, Winter of 2010 Boeing Auburn; Department of Ecology to Boeing, February 19, 2010.

Work Plan, Agency Review Draft Work Plan, Additional Remedial Investigation Winter of 2010, Boeing Auburn; Prepared for The Boeing Co. by Landau Associates; February 12, 2010.

Letter, 1) A summary of points that the Department of Ecology wishes to emphasize from our meeting on December 17, 2009; 2) Ecology approval of the proposed locations for new wells; and 3) Comment and conditional approval of the Interim Groundwater Monitoring Plan (Phase IV, Groundwater Monitoring Program), by Landau Associates, November 20, 2009. WAD041337130; Department of Ecology to Boeing, January 27, 2010.

Letter Status Report: No. 29, October 2009 through December 2009 Activity Period; Landau Associates; January 15, 2010.

Memorandum, First Addendum to the 2nd Revised Ecology Review Draft Remedial Investigation Report; Prepared for The Boeing Company by Landau Associates; December 16, 2009.

Letter Report, Interim Groundwater Monitoring Plan (Phase IV Groundwater Monitoring Program), Boeing Auburn, Auburn, Washington; Prepared for The Boeing Co. by Landau Associates, November 20, 2009.

Letter Status Report: No. 28, July 2009 through September 2009 Activity Period; Landau Associates; October 15, 2009.

Letter, Department of Ecology Comment and Approval of the Agency Review Draft Work Plan, Additional Remedial Investigation, Fall of 2009, Boeing Auburn; AND Department of Ecology

Comment and Approval of the Proposed Modifications for Area 1 Interim Groundwater Monitoring, Boeing Auburn Area 1, Auburn Washington; WAD041337130; Department of Ecology to Boeing, October 8, 2009.

Work Plan, Agency Review Draft Work Plan, Additional Remedial Investigation, Fall of 2009 Boeing Auburn; Prepared for The Boeing Co. by Landau Associates; September 11, 2009.

Letter Status Report: No. 27, April 2009 through June 2009 Activity Period; Landau Associates, Inc.; July 15, 2009

Letter, Review and Comment regarding the document: 2nd Revised Ecology Review Draft Remedial Investigation Report, April 10, 2009, Boeing Auburn Fabrication Division Facility, Auburn, Washington WAD041337130; Department of Ecology to Boeing, June 19, 2009.

Letter Status Report: No. 26, January 2009 through March 2009 Activity Period; Landau Associates, Inc.; April 15, 2009.

Report, 2nd Revised Ecology Review Draft Remedial Investigation Report Boeing Auburn Fabrication Division Facility, Auburn, Washington; The Boeing Company to the Department of Ecology; April 10, 2009.

Letter Status Report: No. 24, July 2008 through September 2008 Activity Period; Landau Associates, Inc.; November 5, 2008.

Ecology Review Draft Supplemental Remedial Investigation Work Plan, Auburn Fabrication Division, Auburn, Washington; The Boeing Company to the Department of Ecology; August 20, 2008.

Letter Status Report: No. 23, April 2008 through June 2008 Activity Period, The Boeing Company to the Department of Ecology, July 15, 2008.

Letter Status Report: No. 22, January 2008 through March 2008 Activity Period, The Boeing Company to the Department of Ecology, April 15, 2008.

Letter Status Report: No. 21, October 2007 through December 2007 Activity Period, The Boeing Company to The Department of Ecology, January 15, 2008.

Revised Agency Review Draft, Remedial Investigation Report, Boeing Auburn Fabrication Division Facility; Landau Associates; December 28, 2007.

Letter Status Report: No. 20, July 2007 through September 2007 Activity Period, The Boeing Company to The Department of Ecology, October 5, 2007.

Letter Status Report: No. 19, April 2007 through June 2007 Activity Period, The Boeing Company to The Department of Ecology, July 13, 2007.

Letter Status Report: No. 18, January 2007 through March 2007 Activity Period, The Boeing Company to The Department of Ecology, April 13, 2007.

Letter Status Report: No. 17, October 2006 through December 2006 Activity Period, The Boeing Company to The Department of Ecology, January 15, 2007.

Letter, Status Report: No. 16, July 2006 through September 2006 Activity Period, The Boeing Company to The Department of Ecology, October 16, 2006.

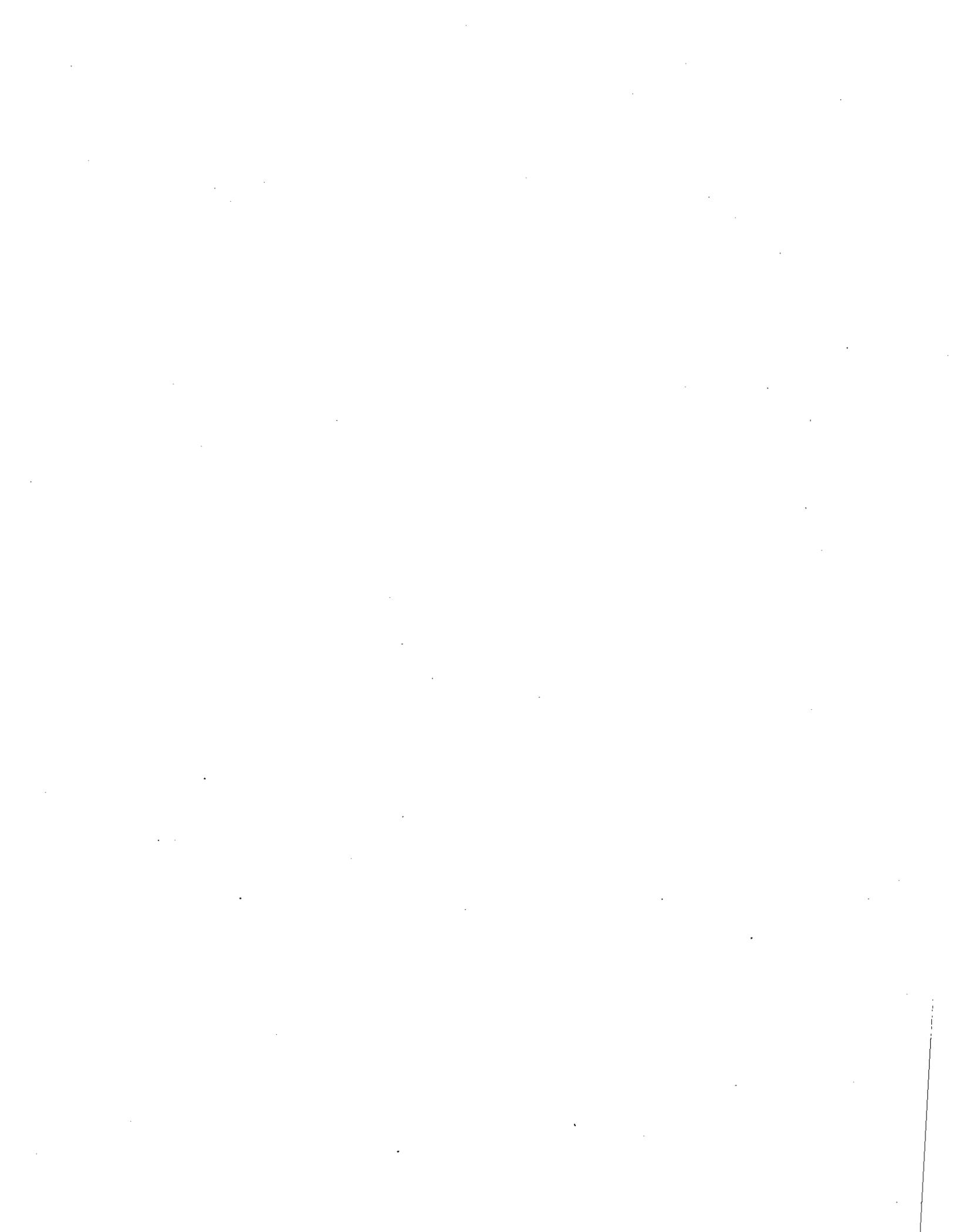
Letter, Status Report: No. 15, April 2006 through June 2006 Activity Period, The Boeing Company to The Department of Ecology, July 13, 2006.

Washington State Dangerous Waste Permit for Corrective Action No. WAD041337130, Department of Ecology, Effective Date, April 07, 2006.

First Amended Agreed Order No. 01HWTRNR-3345, Department of Ecology, Effective Date, April 07, 2006.

Remedial Investigation Report, Boeing Auburn Fabrication Division Facility, Auburn Washington; Landau Associates for The Boeing Company, September 19, 2005.

Final Report, Resource Conservation and Recovery Act, Facility Assessment; Tetra Tech for the U.S. Environmental Protection Agency, June 19, 1998.



DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

Interim Final 2/5/99

RCRA Corrective Action
Environmental Indicator (EI) RCRAInfo code (CA725)

Current Human Exposures Under Control
Last Revised: September 2011

Facility Name: Boeing Auburn Facility, Area I, Group II _____
Facility Address: 700 15th Street SW; Auburn, WA 98002 _____
Facility EPA ID #: WAD041337130 _____

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 RCRAInfo national database ONLY as long as they remain true (i.e., RCRAInfo 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)?

Media	Yes	No	?	Rationale / Key Contaminants
Groundwater	X			Volatile Organic Compounds (VOCs), diesel range hydrocarbons, and Arsenic exceed MTCA Method B standards for groundwater
Air (indoors) ²			X	As a result of vapor intrusion, TCE measured in indoor air may be detected in buildings over areas with shallow groundwater contamination.
Surface soil (e.g., <2 feet)		X		
Surface water		X		
Sediment		X		
Subsurface soil (e.g., >2 feet)		X		
Air (outdoors)		X		

_____ 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: Trichloroethene (TCE), tetrachloroethene (PCE), cis -1,2-dichloroethene (cis-1,2-DCE), vinyl chloride, petroleum hydrocarbons, arsenic, and cadmium exceed the MTCA Method B standards (or Applicable, Relevant, and Appropriate Requirements (ARARs), whichever standard is lower). These contaminants are well-documented in the groundwater. (See: *Letter Status Report No. 31, April 2010 through June 201 Activity Period*; Landau Associates; July 15, 2010; *Report, 2nd Revised Ecology Review Draft Remedial Investigation Report Boeing Auburn Fabrication Division Facility, Auburn, Washington*, The Boeing Company to the Department of Ecology, April 10, 2009; and Attachment A to this Report).

Indoor air: Contaminated groundwater exists beneath the AMB Distribution Center property (Area 1) in the City of Auburn. Due to the success of an interim action at the source area of a former TCE degreaser underlying the AMB

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) suggests 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.

Distribution Building, the levels of TCE at the source area initially dropped below the detection limits. Currently, levels of TCE in groundwater below the AMB Distribution Center Building remain below 5 ug/L, [the Maximum Contaminant Levels (MCL) established for TCE in drinking water by EPA]. Vapor Intrusion of volatile contaminants from groundwater into overlying buildings can occur and accumulate to toxic levels in indoor air. Because of this possibility, Attachment 11 of the First Amended Agreed Order No. 01HWTRNR-3345 establishes levels for TCE and Vinyl Chloride in groundwater above which indoor air sampling is required for the AMB Distribution Center. As of the date of this document, the requirement for indoor air sampling at the AMB Distribution Center Building has not been triggered. (See: *First Amended Agreed Order No. 01HWTRNR-3345*, Department of Ecology, Effective Date: April 07, 2006).

Groundwater contaminated with TCE and Vinyl Chloride is found off-site to the north of the Area 1 Property. Boeing is currently in the process of defining the full extent of contamination in groundwater. This includes sampling and analysis for levels of TCE and Vinyl Chloride in shallow groundwater. Based on the results of off-site shallow groundwater sampling, Boeing will evaluate, or in the case of the YMCA Building – re-evaluate, the potential for vapor intrusion into buildings off-site of the Boeing Auburn Plant. (See: *Letter Report, Proposed YMCA Property Transfer Investigation, Boeing Auburn Facility*; URS Consultants, February 25, 2003; and Attachment A to this report).

3. Are there complete pathways between “contamination” and human receptors such that exposures can be reasonably expected under the current (land- and groundwater-use) conditions?

Summary Exposure Pathway Evaluation Table

Potential Human Receptors (Under Current Conditions)

“Contaminated” media	Residents	Workers	Daycare	Construction	Trespassers	Recreation	Food ³
Groundwater	Unknown	No	No	Yes		No	No
Air (indoors)	Unknown	Yes	Yes	No		Yes	No
Surface soil (e.g., <2 feet)	No	No	No	Yes		No	No
Surface water	No	No	No	No		No	No
Sediment	No	No	No	No		No	No
Subsurface soil (e.g., >2 feet)	No	No	No	Yes		No	No
Air (outdoors)	No	No	No	Yes		No	No

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 – Potential 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

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

major pathways).

_____ If yes (pathways are complete for any "Contaminated" Media - Human Receptor combination) - continue after providing supporting explanation.

X If unknown (for any "Contaminated" Media - Human Receptor combination) - skip to #6 and enter "IN" status code

Rationale and Reference(s):

Residents in the vicinity of the site could be exposed to contaminated groundwater if they use groundwater drawn from a private well completed in the uppermost aquifer. They might also be exposed to indoor air impacted by vapor intrusion if their homes overlie shallow groundwater contaminated with volatile constituents. (see: *Technical Memorandum: Critical Area/Wellhead Protection Ordinance Review*; Landau Associates; April 14, 2010; and *Letter Report, Proposed YMCA Property Transfer Investigation, Boeing Auburn Facility*; URS Consultants, February 25, 2003).

Day Care facilities are known to exist within the YMCA building located north of the Boeing Auburn Plant. Users of the day care could be exposed to indoor air impacted by vapor intrusion if the YMCA is located over shallow groundwater contaminated with volatile constituents. (see: *Letter Report, Proposed YMCA Property Transfer Investigation, Boeing Auburn Facility*; URS Consultants, February 25, 2003).

Food Production in the form of commercial agriculture is not located in the vicinity of this site. Food storage and distribution do exist either on-site or adjacent to the site. Restaurants are also located in the vicinity of this site. There are no complete pathways to contaminate food at these facilities.

Trespassers should not be exposed because the facility boundary is fenced and monitored such that undetected entry is highly unlikely. Also, the only potentially complete pathway would be to indoor air impacted by vapor intrusion if entry occurs; but a one-time exposure is unlikely to make this a significant pathway of exposure.

Industrial and Commercial workers located in buildings on, adjacent to, or in the vicinity of the facility could be exposed to indoor air impacted by vapor intrusion from shallow groundwater contaminated with volatile organic compounds (VOCs).

Construction workers could be exposed to contaminated groundwater, and/ or soils during excavations onsite or in the vicinity of the site. They might also be exposed to outdoor air impacted by multiple VOCs if they work in confined spaces such as excavations on site or in the vicinity of the site.

Users of recreational facilities in the vicinity of the site could be exposed to indoor air impacted by vapor intrusion coming from shallow groundwater contaminated with VOCs underlying the recreational facility.

(For this Section See: *Report, Summer 2010 Remedial Investigation Report; Boeing Auburn Fabrication Division Facility, Auburn, Washington*; Prepared for The Boeing Co. by Landau Associates; November 19, 2010. *Letter Report, Proposed YMCA Property Transfer Investigation, Boeing Auburn Facility*, URS Consultants, February 25, 2003; *Letter Status Report: No. 30, January 2010 through March 2010 Activity Period*, Landau Associates; April 15, 2010; *Report, 2nd Revised Ecology Review Draft Remedial Investigation Report Boeing Auburn Fabrication Division Facility, Auburn, Washington*, The Boeing Company to the Department of Ecology, April 10, 2009; *Memorandum, First Addendum to the 2nd Revised Ecology Review Draft Remedial Investigation Report*, Prepared for The Boeing Company by Landau Associates; December 16, 2009)

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 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.”

 X If unknown (for any complete pathway) - skip to #6 and enter “IN” status code

Rationale and Reference(s):

Construction Workers may be reasonably expected to encounter ‘significant’ exposures. These include exposure to elevated levels of VOCs (Trichloroethene, Tetrachloroethene, Vinyl Chloride) in groundwater. Some locations on site do have levels of VOCs in groundwater above the screening levels. Dermal contact with multiple contaminants in groundwater during construction activities (such as excavation dewatering), may represent an unacceptable additive risk. It is not believed that exposure to the groundwater represents a ‘significant’ risk for construction workers since the duration of the exposure will be limited to the amount of time it takes to complete the project. Construction Workers are also reasonably expected to be exposed to contaminated air during excavation, particularly in confined spaces, where multiple volatile contaminants may build up in the outdoor air.

Construction workers can be reasonably expected to encounter contaminated soils during excavation onsite. Exposure to contaminated soil is not likely to represent a ‘significant’ pathway since contact can be avoided or prevented with proper personal protective equipment.

Residents may be potentially exposed to unacceptable risk through the vapor intrusion pathway. Boeing is in the process of, but has not completed, defining the full extent of the shallow VOC contamination in groundwater. While it is unlikely, it is still technically ‘unknown’ whether residents are living in houses or working in businesses overlying contaminated shallow groundwater and therefore are potentially impacted by ‘significant’ exposures to indoor air contamination.

There are several private wells in use east of the Boeing Auburn Plant boundary. Since the extent of VOC contamination has not been bounded off site to the east of the Auburn Plant property boundary, it is currently unlikely, but technically ‘unknown,’ whether or not these wells represent an unacceptable risk to ‘significant’ exposures through the contaminated groundwater pathway from the Boeing Auburn site.

Industrial Workers, Commercial Business Workers, Daycare Users and Recreational Users are potentially exposed to contaminants in indoor air that could result from vapor intrusion due to VOC

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.

6. Check the appropriate RCRAInfo 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 _____ facility, EPA ID # _____, located at _____ 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 Robin Harrover Date Sept. 21, 2011
Robin Harrover
Hydrogeologist/Project Manager

Supervisor Julie Sellick Date 9/21/11
Julie Sellick, Section Manager
Hazardous Waste and Toxics Reduction Program
Department of Ecology, Northwest Regional Office

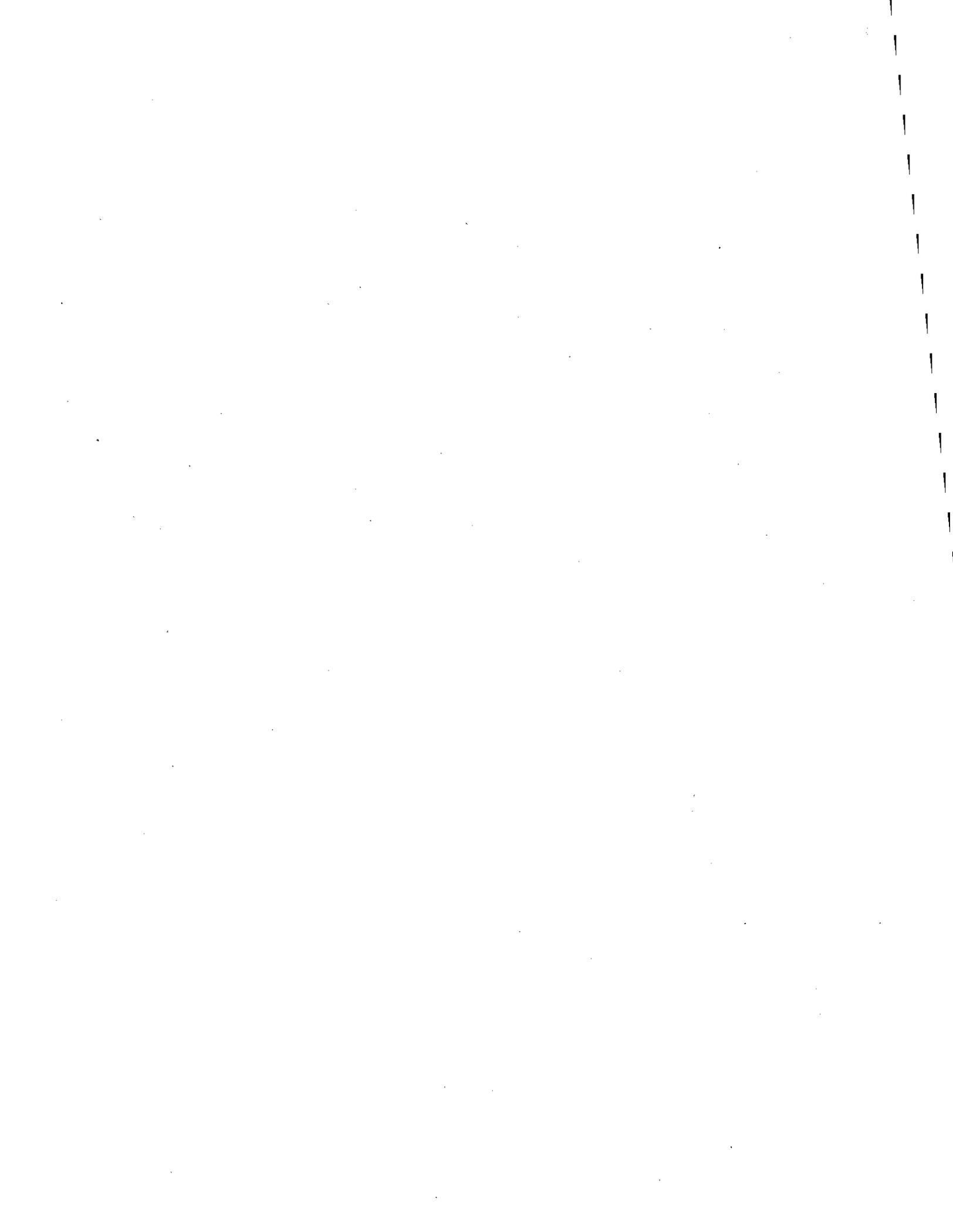
Locations where References may be found:

Department of Ecology, Northwest Regional Office
3190 160th Ave. SE
Bellevue, WA 98008-5452
(425) 649-7190

Contact telephone and e-mail numbers:

Robin Harrover
(425) 649-7232
robin.harrover@ecy.wa.gov

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.



DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

Interim Final 2/5/99

RCRA Corrective Action
Environmental Indicator (EI) RCRA Info code (CA750)

Migration of Contaminated Groundwater Under Control

Last Revised: September 2011

Facility Name: Boeing Auburn Facility, Area I, Group II _____
Facility Address: 700 15th Street SW; Auburn, WA 98002 _____
Facility EPA ID #: WAD041337130 _____

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.

If no - re-evaluate existing data, or

if data are not available, skip to #8 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 "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 RCRAInfo national database ONLY as long as they remain true (i.e., RCRAInfo status codes must be changed when the regulatory authorities become aware of contrary information).

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?

X 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):

The Boeing Company completed a remedial investigation of the AMB “Area 1” Property and documented the levels of contamination associated with the SWMUs and AOCs on this property in both soils and groundwater. The Group II SWMUs and AOCs included in the remedial investigation are as follows: S-12b and AOC A-08. The Department of Ecology reviewed the information provided by the Boeing Company and made a determination in an Ecology letter to Boeing, dated April 29, 2004, that further remedial investigation was required for the units identified above. This is also reflected in Attachment 2 of the Amended Agreed Order No. 01HWTRNR-3345 written for a site-wide remedial investigation of the Boeing Facility. The amended agreed order is incorporated into a State of Washington Dangerous Waste Permit for Corrective Action No. WAD041337130. Both the permit and the Agreed Order were issued on April 7, 2006. Please note that other units also within the Area 1 Property, S-09, S-12a, S-12c, S-19, S-20, S-31, S-32, AOC-02a, have not contaminated the soil and groundwater beneath the Area 1 Property above protective standards. These units are designated separately as Area 1, Group I and have a separate Environmental Determination.

At the Boeing Commercial Airplanes Group, Fabrication Division – Auburn Plant (BCA – Auburn Plant), the Boeing Company has identified contamination in the shallow, intermediate and deep zones of the uppermost aquifer to a depth of 90’ – 100’ below ground surface (bgs). This contamination is primarily Trichloroethene (TCE), but it also includes detected Volatile Organic Compounds (VOCs): Cis-1, 2-Dichloroethene, Vinyl Chloride, 1,1,1-Trichloroethane, and Tetrachloroethene. At the “Area 1, Group II” source of solvent contamination, Boeing has implemented groundwater treatment as part of an interim action. Since 2009, the following contaminants have been detected beyond the BCA-Auburn Plant property boundary in the intermediate and deep zones of the uppermost aquifer at levels exceeding the screening level: Trichloroethene, Tetrachloroethene, and Vinyl Chloride. “Area I, Group II” groundwater monitoring wells screened off-site in the deep aquifer are: AGW 138 (D), AGW 142(D). Groundwater monitoring wells screened off-site in the intermediate aquifer are: AGW 137(I), AGW 139(I), AGW 140(I), AGW 141(I), AGW 147(I), AGW 148(I), AGW 149(I), AGW151 (I), AGW 160(I), AGW 161(I), AGW 162(I), AGW 055r(I), AGW 057r(I), AGW 060r(I), AGW 072(I), AGW 095r(I), AGW126(I). (Refer to Attachment A to this Report and Status Report #30, January through March 2010 Activity Period, dated April 15, 2010, prepared by Landau Associates).

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

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).

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.

locations designated at the time of this determination)?

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").

If no (contaminated groundwater is observed or expected to migrate beyond the designated locations defining the "existing area of groundwater contamination") - 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):

In December of 2007, Boeing completed a draft Remedial Investigation Report. Based on Ecology comments, Boeing conducted additional groundwater sampling and analysis to close remaining data gaps. The results of this field work revealed levels of TCE contamination in the intermediate zone of the uppermost aquifer which are above the MTCA Method B standards. Boeing continued to investigate the intermediate zone of the uppermost aquifer in 2008 and 2009. In 2009, Boeing discovered TCE offsite in the intermediate zone of the uppermost aquifer (40' – 60' BGS) along the western boundary of the BCA – Auburn Plant property. These results indicate that an unidentified source area is contributing to this off-site contamination. In the fall of 2009, in the winter and summer of 2010, and in the Spring and Summer of 2011, Boeing has continued groundwater sampling and analysis of the intermediate and deep zone of the uppermost aquifer to define the full extent of the TCE contamination and to locate and characterize the source area for the newly discovered TCE offsite from the western boundary of the BCA – Auburn Plant. As of fall 2011 this work is on-going. [Refer to: *Letter Status Report: No. 35, April Through June 2011 Activity Period*, Prepared for The Boeing Co. by Landau Associates; July 22, 2011. *Report, Summer 2010 Remedial Investigation Report; Boeing Auburn Fabrication Division Facility, Auburn, Washington*; Prepared for The Boeing Co. by Landau Associates; November 19, 2010. *Agency Review Draft Work Plan Additional Remedial Investigation, Fall of 2009, Boeing Auburn*, by Landau Associates, September 11, 2009; *First Addendum to the 2nd Revised Ecology Review Draft Remedial Investigation Report*; by Landau Associates, December 16, 2009; *Agency Review Draft Work Plan Additional Remedial Investigation, Winter 2010, Boeing Auburn*, by Landau Associates, February 12, 2010; *Agency Review Draft Work Plan Boeing Auburn Remedial Investigation*, by Landau Associates, July 21, 2010; *Status Report: No. 29, October 2009 through December 2009*, Landau Associates, January 15, 2010; *Status Report: No. 30, January through March 2010*, Landau Associates, April 15, 2010; and *Status Report: No. 31, April through June 2010*, Landau Associates, July 15, 2010.]

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

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):

Wetlands exist north to northwest of the Area I, Group II source area. Groundwater flows north to northwest bringing TCE and related VOC contaminants from the onsite source area with it. At this point, it is not known whether contaminants are discharging to surface water. Additional investigations from future field studies will provide the information on which to make this determination. [Refer to: *Letter Status*

Report: No. 35, April Through June 2011 Activity Period, Prepared for The Boeing Co. by Landau Associates; July 22, 2011. Report, Summer 2010 Remedial Investigation Report; Boeing Auburn Fabrication Division Facility, Auburn, Washington; Prepared for The Boeing Co. by Landau Associates; November 19, 2010.]

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)?

_____ 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 judgment/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): _____

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 implemented)?⁴

_____ 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

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

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.

(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 cannot 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): _____

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?"

_____ 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.

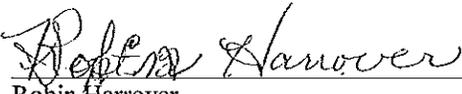
Rationale and Reference(s): _____

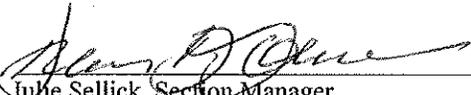
8. Check the appropriate RCRA Info status codes for the Migration of Contaminated Groundwater Under Control EI (event code CA750), and obtain Supervisor (or appropriate Manager) signature and date on the EI determination below (attach appropriate supporting documentation as well as a map of the facility).

YE - 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 _____ facility, EPA ID # _____, located at _____. 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  Date Sept. 21, 2011
Robin Harrover
Hydrogeologist/Project Manager

Supervisor  Date 9/24/11
Julie Sellick, Section Manager
Hazardous Waste and Toxics Reduction Program
Department of Ecology, Northwest Regional Office

Locations where References may be found:

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Boeing Commercial Airplanes Group, Fabrication Division – Area 1, Group II

Attachment A: Rationale and References Updated September, 2011

Rationale:

The Boeing Company completed a remedial investigation of the AMB “Area 1” Property and documented the levels of contamination associated with the SWMUs and AOCs on this property in both soils and groundwater. The Group II SWMUs and AOCs included in the remedial investigation are as follows: S-12b and AOC A-08. The Department of Ecology reviewed the information provided by the Boeing Company and made a determination in an Ecology letter to Boeing, dated April 29, 2004, that further remedial investigation was required for the units identified above. This is also reflected in Attachment 2 of the Amended Agreed Order No. 01HWTRNR-3345 written for a site-wide remedial investigation of the remainder of the Boeing Facility. The amended agreed order is incorporated into a State of Washington Dangerous Waste Permit for Corrective Action No. WAD041337130. Both the permit and the Agreed Order were issued on April 7, 2006. Please note that other units also within the Area 1 Property, S-09, S-12a, S-12c, S-19, S-20, S-31, S-32, AOC-02a, have not contaminated the soil and groundwater beneath the Area 1 Property above protective standards. These units are designated separately as Area 1, Group I and have a separate Environmental Determination.

Additional information is required for the units S-12b and AOC 1-08 in Area 1. The AMB Building has been constructed on the Area 1 property, and replacement wells have been installed to complete the groundwater monitoring system for compliance monitoring of TCE-contaminated groundwater. Compliance monitoring of the effectiveness of the interim action performed in 2004 has taken place during 2007 and 2008. Boeing submitted an update report in April of 2008 summarizing the results of additional groundwater monitoring. Ecology has completed an evaluation of the compliance monitoring and of the replacement wells. Ecology has determined that an additional monitoring well and some additional sampling and analysis are required to complete the remedial investigation for Area 1. An additional well will be installed north of the Area 1 Property.

In the fall of 2008, Boeing completed six additional wells north of the Area 1 Property. Boeing’s sampling and analysis of groundwater from these wells revealed TCE contamination above the screening levels for the remedial investigation. This is north of the Area 1 property where TCE was expected to drop below the screening level. Contamination is located primarily in the intermediate zone of the upper aquifer. There continues to be a need to define the full downgradient extent of the TCE contamination in groundwater. Boeing will continue the remedial investigation to close this data gap.

From late 2009 through 2011, Boeing installed new wells, and analyzed ground water from separate field work events. During each field work event, wells were installed further north. Results indicate that north of Highway 18 and east of the Interurban Trail, levels of TCE drop to below the MTCA Method B Cleanup Level protective of groundwater for TCE. West of the Interurban Trail, the Area 1 Plume appears to remain distinct from Plume 2 in the intermediate zone of the upper aquifer. The Area 1 Plume will still need additional wells to define the full extent of the plume. Additional wells may also be needed, screened in the shallow aquifer, to provide data for evaluating the risk of vapor intrusion into indoor air.

Please refer to the following references to learn more about the status of remediation at the Area 1 Property location. The Area 1 Property has been transferred from Boeing to the AMB Property

Corporation. AMB is named along with Boeing on the permit and agreed order that require corrective action to be completed at the Boeing Commercial Airplanes Group, Fabrication Division, Auburn Plant. For the purposes of corrective action, the Area 1 Property is still considered to be part of the RCRA Facility.

References:

The following references document the major work milestones that have taken place for these units:

Letter Status Report: No. 35, April Through June 2011 Activity Period, Prepared for The Boeing Co. by Landau Associates; July 22, 2011

Letter, Proposed Phase V Groundwater Monitoring Program, Boeing Auburn, WAD041337130; Department of Ecology to Boeing; May 26, 2011.

Letter Report, Boeing Auburn Facility Groundwater Quality Data, Auburn, Washington; Boeing report to WA State Dept. of Health, Prepared for The Boeing Co. by Landau Associates; May 13, 2011.

Letter, Ecology review of and comment on the memorandum: Critical Area/Wellhead Protection Ordinance Review WAD041337130; Department of Ecology to Boeing, April 22, 2011.

Letter Status Report: No. 34, January through March 2011 Activity Period, Prepared for The Boeing Co. by Landau Associates; April 15, 2011.

Email, Ecology comment and approval of the additional RI Work Plan, Spring 2011; Robin Harrover, Ecology to Jim Bet, Boeing, April 7, 2011.

Work Plan, Additional Remedial Investigation, Spring 2011, Boeing Auburn; Prepared for The Boeing Company by Landau Associates; April 1, 2011.

Report, Proposed Phase V Groundwater Monitoring Program, Boeing Auburn, Auburn Washington; Landau Associates for Boeing; February 16, 2011.

Letter Status Report: No. 33, October through December 2010 Activity Period, Prepared for The Boeing Co. by Landau Associates; January 17, 2011.

Report, Summer 2010 Remedial Investigation Report; Boeing Auburn Fabrication Division Facility, Auburn, Washington; Prepared for The Boeing Co. by Landau Associates; November 19, 2010.

Letter Status Report: No. 32, July Through September 2010 Activity Period, Prepared for The Boeing Co. by Landau Associates; October 15, 2010.

Letter, Ecology approval of the Agency Review Draft Work Plan, Boeing Auburn Remedial Investigation; Department of Ecology to Boeing, August 19, 2010.

Work Plan, Agency Review Draft Work Plan, Boeing Auburn Remedial Investigation; Prepared for The Boeing Co. by Landau Associates; July 21, 2010.

Letter Status Report: No. 31, April 2010 through June 2010 Activity Period; Landau Associates; July 15, 2010.

Letter, Ecology Comments Regarding the First Addendum to the 2nd Revised Ecology Review Draft Remedial Investigation Report; Department of Ecology to Boeing, May 21, 2010.

Letter Status Report: No. 30, January 2010 through March 2010 Activity Period; Landau Associates; April 15, 2010.

Technical Memorandum: Critical Area/Wellhead Protection Ordinance Review; Landau and Associates to Boeing, April 14, 2010.

Letter, Ecology approval of the Agency Review Draft Work Plan, Additional Remedial Investigation, Winter of 2010 Boeing Auburn; Department of Ecology to Boeing, February 19, 2010.

Work Plan, Agency Review Draft Work Plan, Additional Remedial Investigation Winter of 2010, Boeing Auburn; Prepared for The Boeing Co. by Landau Associates; February 12, 2010.

Letter, 1) A summary of points that the Department of Ecology wishes to emphasize from our meeting on December 17, 2009; 2) Ecology approval of the proposed locations for new wells; and 3) Comment and conditional approval of the Interim Groundwater Monitoring Plan (Phase IV, Groundwater Monitoring Program), by Landau Associates, November 20, 2009. WAD041337130; Department of Ecology to Boeing, January 27, 2010.

Letter Status Report: No. 29, October 2009 through December 2009 Activity Period; Landau Associates; January 15, 2010.

Memorandum, First Addendum to the 2nd Revised Ecology Review Draft Remedial Investigation Report; Prepared for The Boeing Company by Landau Associates; December 16, 2009.

Letter Report, Interim Groundwater Monitoring Plan (Phase IV Groundwater Monitoring Program), Boeing Auburn, Auburn, Washington; Prepared for The Boeing Co. by Landau Associates, November 20, 2009.

Letter Status Report: No. 28, July 2009 through September 2009 Activity Period; Landau Associates; October 15, 2009.

Letter, Department of Ecology Comment and Approval of the Agency Review Draft Work Plan, Additional Remedial Investigation, Fall of 2009, Boeing Auburn; AND Department of Ecology Comment and Approval of the Proposed Modifications for Area 1 Interim Groundwater Monitoring, Boeing Auburn Area 1, Auburn Washington; WAD041337130; Department of Ecology to Boeing, October 8, 2009.

Work Plan, Agency Review Draft Work Plan, Additional Remedial Investigation, Fall of 2009 Boeing Auburn; Prepared for The Boeing Co. by Landau Associates; September 11, 2009.

Letter Status Report: No. 27, April 2009 through June 2009 Activity Period; Landau Associates, Inc.; July 15, 2009.

Letter, Review and Comment regarding the document: 2nd Revised Ecology Review Draft Remedial Investigation Report, April 10, 2009, Boeing Auburn Fabrication Division Facility, Auburn, Washington WAD041337130; Department of Ecology to Boeing, June 19, 2009.

Letter Status Report: No. 26, January 2009 through March 2009 Activity Period; Landau Associates, Inc.; April 15, 2009.

Report, 2nd Revised Ecology Review Draft Remedial Investigation Report Boeing Auburn Fabrication Division Facility, Auburn, Washington; The Boeing Company to the Department of Ecology; April 10, 2009.

Memorandum: Intermediate and Deep Wells North of the Boeing Auburn Facility; From Landau Associates to The Boeing Company, January 23, 2009.

Letter Status Report: No. 25, October 2008 through December 2008 Activity Period; Landau Associates, Inc.; January 15, 2009.

Letter Report: Groundwater Sampling Results – Supplemental RI Well AGW 137, Airplane, Fabrication Division Auburn Plant; From Landau Associates to The Department of Ecology, December 1, 2008.

Letter Status Report: No. 24, July 2008 through September 2008 Activity Period; Landau Associates, Inc.; November 5, 2008.

Ecology Review Draft Supplemental Remedial Investigation Work Plan, Auburn Fabrication Division, Auburn, Washington; The Boeing Company to the Department of Ecology; August 20, 2008.

Letter Status Report: No. 23, April 2008 through June 2008 Activity Period, The Boeing Company to the Department of Ecology, July 15, 2008.

Report, Interim Remedial Action, Boeing Auburn Area 1, Auburn, Washington; Landau Associates, Inc.; April 22, 2008.

Letter, Review and Comment regarding the document: Revised Agency Review Draft Remedial Investigation Report, Boeing Auburn Fabrication Division Facility, Auburn, Washington WAD041337130; Department of Ecology to Boeing, April 16, 2008.

Letter Status Report: No. 22, January 2008 through March 2008 Activity Period, The Boeing Company to the Department of Ecology, April 15, 2008.

Letter Status Report: No. 21, October 2007 through December 2007 Activity Period, The Boeing Company to The Department of Ecology, January 15, 2008.

Revised Agency Review Draft, Remedial Investigation Report, Boeing Auburn Fabrication Division Facility; Landau Associates; December 28, 2007.

Letter Status Report: No. 20, July 2007 through September 2007 Activity Period, The Boeing Company to The Department of Ecology, October 5, 2007.

Letter Status Report: No. 19, April 2007 through June 2007 Activity Period, The Boeing Company to The Department of Ecology, July 13, 2007.

Letter Status Report: No. 18, January 2007 through March 2007 Activity Period, The Boeing Company to The Department of Ecology, April 13, 2007.

Letter Status Report: No. 17, October 2006 through December 2006 Activity Period, The Boeing Company to The Department of Ecology, January 15, 2007.

Letter, Status Report: No. 16, July 2006 through September 2006 Activity Period, The Boeing Company to The Department of Ecology, October 16, 2006.

Letter, Status Report: No. 15 April 2006 through June 2006 Activity Period, The Boeing Company to The Department of Ecology, July 13, 2006.

Letter, PLP Waiver Transmittal, AMB Property Corporation to Department of Ecology, December 20, 2005.

Letter, Notice of Potential Liability under the Model Toxics Control Act for the Release of Hazardous Substances at the Boeing Commercial Airplanes – Fabrication Division, Auburn Plant ..., Department of Ecology to The AMB Property Corporation, December 19, 2005.

Washington State Dangerous Waste Permit for Corrective Action No. WAD041337130, Department of Ecology, Effective Date, April 07, 2006.

First Amended Agreed Order No. 01HWTRNR-3345, Department of Ecology, Effective Date, April 07, 2006.

Ecology Review Draft Report, Supplement to the Final Interim Remedial Action Work Plan, Boeing Auburn, Landau Associates; October 11, 2005

Letter, Re: Ecology Approval of the Final Interim Remedial Action Work Plan, Boeing Auburn Area 1, 700 15th Street SW Auburn, WA, May 7, 2004, for implementation at the BCAG-Auburn Plant...., Department of Ecology to The Boeing Company, July 13, 2004.

Ecology Review Draft Interim Remedial Action Work Plan, Boeing Auburn Area 1...., Landau Associates, April 2, 2004

Letter, Re: Letter of Determination for SWMUs and AOCs within or near the Area 1 Property Boundary based on Ecology review of the expedited Area 1 Remedial Investigation Report and Supplemental Area 1 Remedial Investigation Report...., Department of Ecology to The Boeing Company, April 29, 2004.

Ecology Review Draft, Supplemental Area 1 Remedial Investigation Report, Boeing auburn Facility, Landau Associates, March 10, 2004.

Letter Report, Proposed YMCA Property Tansfer Investigation, Boeing Auburn Facility; URS Consultants, February 25, 2003.

Ecology Review Draft, Area 1 Remedial Investigtion Report, Boeing Auburn facility, Landau Associates, January 30, 2004.

Final Report, Resource Conservation and Recovery Act, Facility Assessment; Tetra Tech for the U.S. Environmental Protection Agency, June 19, 1998.