

DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

Interim Final 2/5/99

RCRA Corrective Action Environmental Indicator (EI) RCRIS code (CA 725)

Current Human Exposures Under Control

1. Has **all** available relevant/significant information on known and **reasonably suspected** releases to soil, groundwater, surface water/sediments, and air, subject to RCRA Corrective Action (e.g., from Solid Waste Management Units (SWMU), Regulated Units (RU), and Areas of Concern (AOC)), been **considered** in this EI determination?

If yes – check here and continue with #2 below.

If no – re-evaluate existing data, or

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

BACKGROUND

Definition of Environmental Indicators (for the RCRA Corrective Action)

Environmental Indicators (EI) are measures being used by the RCRA Corrective Action program to go beyond programmatic activity measures (e.g., reports received and approved, etc.) to track changes in the quality of the environment. The two EI developed to-date indicate the quality of the environment in relation to current human exposures to contamination and the migration of contaminated groundwater. An EI for non-human (ecological) receptors is intended to be developed in the future.

Definition of “Current Human Exposures Under Control” EI

A positive “Current Human Exposures Under Control” EI determination (“YE” status code) indicates that there are no “unacceptable” human exposures to “contamination” (i.e., contaminants in concentrations in excess of appropriate risk-based levels) that can be reasonably expected under current land- and groundwater-use conditions (for all “contamination” subject to RCRA corrective action at or from the identified facility (i.e., site-wide)).

Relationship of EI to Final Remedies

While Final remedies remain the long-term objective of the RCRA Corrective Action program the EI are near-term objectives which are currently being used as Program measures for the Government Performance and Results Act of 1993 (GPRA). The “Current Human Exposures Under Control” EI are for reasonably expected human exposures under current land- and groundwater-use conditions ONLY, and do not consider potential future land- or groundwater-use conditions or ecological receptors. The RCRA Corrective Action program’s overall mission to protect human health and the environment requires that Final remedies address these issues (i.e., potential future human exposure scenarios, future land and groundwater uses, and ecological receptors).

Duration/Applicability of EI Determinations

EI Determinations status codes should remain in RCRIS national database ONLY as long as they remain true (i.e., RCRIS status codes must be changed when the regulatory authorities become aware of contrary information).

2. Are groundwater, soil, surface water, sediments, or air **media** known or reasonably suspected to be **“contaminated”**¹ above appropriately protective risk-based “levels” (applicable promulgated standards, as well as other appropriate standards, guidelines, guidance, or criteria) from releases subject to RCRA corrective action (from SWMUs, RUs, or AOCs)?

	<u>Yes</u>	<u>No</u>	<u>?</u>	<u>Rationale/Key Contaminants</u>
Groundwater	<u>X</u>	—	—	<i>Toluene and metals contaminants are present above screening criteria.</i>
Air (indoors) ²	—	<u>X</u>	—	<i>No structures remain on-site. This pathway must be reevaluated in the event that new buildings are constructed or land use changes.</i>
Surface Soil (e.g., <2 ft)	<u>X</u>	—	—	<i>Copper is known to be present in the surface soils at levels which exceed MTCA’s industrial standards.</i>
Surface Water	—	—	<u>X</u>	<i>Metals were detected in seeps at levels exceeding surface water criteria prior to construction of the barrier wall. Seeps have not been sampled subsequent to construction.</i>
Sediment	<u>X</u>	—	—	<i>PCBs, semi-VOAs, metals, and pesticides have been detected in sediments offshore of the facility. PCBs and pesticides are present above the Sediment Quality Standard.</i>
Subsurf. Soil (e.g., >2 ft)	<u>X</u>	—	—	<i>Multiple contaminants and caustic pH are known to be present in the subsurface at levels exceeding criteria for the protection of trench workers.</i>
Air (outdoors)	—	<u>X</u>	—	<i>Toluene was detected in ambient air near OSHA levels during the RFI. Since that time, the plant has shut down and is no longer operating. Ambient air is not expected to be contaminated at this time.</i>

_____ If no (for all media) – skip to #6, and enter “YE,” status code after providing or citing appropriate “levels,” and referencing sufficient supporting documentation demonstrating that these “levels” are not exceeded.

X If yes (for any media) – continue after identifying key contaminants in each “contaminated” medium, citing appropriate “levels” (or provide an explanation for the determination that the medium could pose an unacceptable risk), and referencing supporting documentation.

_____ If unknown (for any media) – skip to #6 and enter “IN” status code.

Rationale and Reference(s): *Sampling results are documented in the RFI Report, the PCB Sewer Report, the Sediment & Porewater Investigation Report, and the quarterly groundwater monitoring reports located in EPA’s facility files. Groundwater sampling results were compared to federal and state aquatic water quality criteria, and to MTCA levels, although groundwater is contained at this time and no longer discharges to the Duwamish Waterway. Soil sampling results were compared to EPA R6 screening levels for direct contact, MTCA levels for direct contact and ingestion (both residential and industrial), MTCA Ecological Indicator soil protective levels, and MTCA “10x groundwater” criteria for protection of groundwater.*

Notes:

¹ “Contamination” and “contaminated” describes media containing contaminants (in any form, NAPL and/or dissolved, vapors, or solids, that are subject to RCRA) in concentrations in excess of appropriately protective risk-based “levels” (for the media, that identify risks within the acceptable risk range).

² Recent evidence (from the Colorado Dept. of Public Health and Environment, and others) suggest that unacceptable indoor air concentrations are more common in structures above groundwater with volatile contaminants than previously believed. This is a rapidly developing field and reviewers are encouraged to look to the latest guidance for the appropriate methods and scale of demonstration necessary to be reasonably certain that indoor air (in structures located above (and adjacent to) groundwater with volatile contaminants) does not present unacceptable risks.

3. Are there **complete pathways** between “contamination” (verified or reasonably suspected) 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	Day-Care	Construction	Trespassers	Recreation	Food ³
Groundwater	—	—	—	<u>X</u>			—
Air (indoors)	—	—	—				
Soil (surface, e.g., <2 ft)	—	—	—	<u>X</u>			
Surface Water	—	—			<u>X</u>	<u>X</u>	<u>X</u>
Sediment	—	—			<u>X</u>	<u>X</u>	<u>X</u>
Soil (subsurface e.g., >2 ft)	—	—		<u>X</u>			—
Air (outdoors)	—	—	—	—	—		

Instructions for Summary Exposure Pathway Evaluation Table:

1. Strike-out specific Media including Human Receptors’ spaces for Media which are not “contaminated” as identified in #2 above.
2. Enter “yes” or “no” for potential “completeness under each “Contaminated” Media – Human Receptor combination (Pathway).

Note: In order to focus the evaluation to the most probable combinations some potential “Contaminated” Media – Human Receptor combinations (Pathways) do not have check spaces (“___”). While these combinations may not be probable in most situations they may be possible in some settings and should be added as necessary.

- ___ If no (pathways are not complete for any contaminated media-receptor combinations) – skip to #6 and enter “YE” status code, after explaining and/or referencing condition(s) in-place, whether natural or man-made, preventing a complete exposure pathway from each contaminated medium (e.g., use optional Pathway Evaluation Work Sheet to analyze major pathways).
- X If yes (pathways are complete for any “Contaminated” Media – Human Receptor combination) – continue after providing supporting explanation.
- ___ If unknown (for any “Contaminated” Media – Human Receptor combination) – skip to #6 and enter “IN” status code.

Rationale and Reference(s): *This facility is located on the Duwamish Waterway and includes several acres of tidal mudflats. There are known recreational and subsistence users of the Waterway, including American Indians with treaty fishing rights and Asian-Pacific Islanders known to harvest fish, shellfish, and seaweed for consumption. Site workers and construction workers are also present on-site. The Western Parcel was re-graded and paved in 2007, thereby controlling exposure to contaminated soils, except right along the riverbank, where access is limited by security fencing and thick stands of blackberry brush.*

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

4. Can the **exposures** from any of the complete pathways identified in #3 be reasonably expected to be “**significant**”⁴ (i.e. potentially “unacceptable” because exposures can be reasonably expected to be: 1) greater in magnitude (intensity, frequency, and/or duration) than assumed in the derivation of the acceptable “levels” (used to identify the “contamination”); or 2) the combination of exposure magnitude (perhaps even though low) and contaminant concentrations (which may be substantially above the acceptable “levels”) could result in greater than acceptable risks?

_____ If no (exposures can not be reasonably expected to be significant (i.e., potentially “unacceptable”) for any complete exposure pathway) – skip to #6 and enter “YE” status code after explaining and/or referencing documentation justifying why the exposures (from each of the complete pathways) to “contamination” (identified in #3) are not expected to be “significant.”

X If yes (exposures could reasonably be 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 expected to be “significant.”

_____ If unknown (for any complete pathway) – skip to #6 and enter “IN” status code.

Rationale and Reference(s): *Areas of surficial soil contamination exceeding applicable MTCA standards are known to exist on site (see RFI Report and draft Upland Areas CMS). Site security has improved, although the mudflats are easily accessed by boat.*

EPA’s Sediment and Porewater Investigation Report (September 2005) confirms the presence of PCBs and multiple semi-VOA constituents in the tidal mudflats and sediments offshore of the Facility. As noted above, there are known fishing and recreational uses of the Waterway. Food-web modeling was performed to estimate site-specific fish tissue concentrations. A screening-level risk analysis was then conducted with the modeled tissue concentrations. This work confirms that potentially unacceptable risks (in the range of 10-3 to 10-4) exist for tribal and Asian and Pacific Islander populations due to PCB contamination in the tidal mudflats.

⁴ If there is any question on whether the identified exposures are “significant” (i.e., potentially “unacceptable”) consult a human health Risk Assessment specialist with appropriate education, training and experience.

5. Can the “significant” **exposures** (identified in #4) be shown to be within **acceptable** limits?

_____ If yes (all “significant” exposures have been shown to be within acceptable limits) – continue and enter “YE” after summarizing and referencing documentation justifying why all “significant” exposures to “contamination” are within acceptable limits (e.g., a site-specific Human Health Risk Assessment).

X 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): *See above.*

**Current Human Exposures Under Control
Environmental Indicator (EI) RCRIS code (CA 725)**

Facility Name: Rhone-Poulenc, Inc.
Facility Address: 9229 East Marginal Way South, Tukwila, Washington
Facility EPA ID #: WAD 00928 2302

6. Check the appropriate RCRIS status codes for the Current Human Exposures Under Control EI event code (CA 725) 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” 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: /s/ Christy Brown Date 9/17/07
RCRA Corrective Action Project Manager

Supervisor: /s/ Rick Albright, Director Date 9/20/07
Office of Air, Waste and Toxics
EPA Region 10

Narrative including locations where References may be found:

See facility file and administrative record located at EPA Region 10, Seattle WA.

Contact telephone and email numbers

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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) RCRIS code (CA 750)

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 groundwater and contaminants within groundwater (e.g., non-aqueous phase liquids or NAPLs). Achieving this EI does not substitute for achieving other stabilization or final remedy requirements and expectations associated with sources of contamination and the need to restore, wherever practicable, contaminated groundwater to be suitable for its designated current and future uses.

Duration/Applicability of EI Determinations

EI Determinations status codes should remain in RCRIS national database **ONLY** as long as they remain true (i.e., RCRIS status codes must be changed when the regulatory authorities become aware of contrary information).

2. Is **groundwater** known or reasonably suspected to be “**contaminated**”¹ above appropriately protective “levels” (i.e., applicable promulgated standards, as well as other appropriate standards, guidelines, guidance, or criteria) from releases subject to RCRA Corrective Action, anywhere at, or from, the facility?
 If yes – continue after identifying key contaminants, citing appropriate “levels,” and referencing supporting documentation.
 If no – skip to #8 and enter “YE” status code, after citing appropriate “levels,” and referencing documentation to demonstrate that groundwater is not “contaminated.”
 If unknown – skip to #8 and enter “IN” status code.

Rationale and Reference(s): *Sampling results are documented in numerous reports in the facility file and administrative record, including the RFI Report and quarterly ground water sampling reports. A groundwater data assessment was performed in spring of 2000 to determine whether interim measures were necessary at the site. Site data, including Round 6 data, were compared to federal surface water quality criteria and MTCA surface water clean up levels as facility groundwater discharges to the Duwamish Waterway. This comparison was performed to determine whether there was a need to stabilize continuing releases and control exposure to these releases while long-term corrective action alternatives are being evaluated. The necessity of preventing the ongoing migration of contaminants is heightened by the presence of several endangered species and critical habitat at the facility.*

The Round 6 data (January, 2000) indicated that a number of constituents had exceeded these criteria at monitoring well DM-8, located approximately fifty feet from the Duwamish Waterway. As shown below, copper and lead exceeded the federal surface water criteria by one or more orders of magnitude, and significantly exceeded site background concentrations. Vanadium exceeded estimated surface water criteria and background concentrations. Arsenic and mercury exceeded MTCA surface water clean up levels.

<i>Constituent</i>	<i>Screening Criteria (ppb)</i>	<i>Round 6, Monitoring Well DM-8 (ppb)</i>	<i>Average Background (ppb)</i>
<i>Copper</i>	<i>2.4</i>	<i>190</i>	<i>2.1</i>
<i>Lead</i>	<i>2.5</i>	<i>22</i>	<i><0.2</i>
<i>Vanadium</i>	<i>80</i>	<i>690</i>	<i>21</i>
<i>Arsenic</i>	<i>0.004</i>	<i>27</i>	<i><5</i>
<i>Mercury</i>	<i>0.00179</i>	<i>0.3</i>	<i><10</i>

Significant levels of toluene were also present in monitoring well DM-8. Several samples have been obtained from this monitoring well which exceeded the federal surface water quality criteria for toluene of 5,000 ppb. Specifically, the October 1997 sample had 8,200 ppb toluene. Additional groundwater sampling was conducted in November 1997 to verify this sampling result; this sampling showed toluene present at 9,100 ppb at a depth of 23 feet below land surface (“bls”), and 572 ppb at 33 feet bls. GeoProbe sampling conducted at that same time (November 1997) provided additional confirmation that toluene exists at high levels in this vicinity; sample point GP-8-2 had 100,000 ppb toluene at 26 feet bls, and GP-4-2 had 174,000 ppb toluene at 26 feet bls. Monitoring results from within the “toluene plume” area at the facility, upgradient of monitoring well DM-8, ranged in value from 250,000 ppb (MW-15) to 570,000 ppb (MW-17).

This analysis served as the basis for requiring a hydraulic control interim measure at the facility in the spring of 2000.

Notes: 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).

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

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

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

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

Rationale and Reference(s): *An interim measure was constructed in 2003, and is currently in operation. The interim measure includes a barrier wall which encircles the contamination plume and is keyed into the aquitard, and an associated pump-and-treat system designed to maintain an inward gradient within the wall. Migration of contaminated groundwater located within the barrier wall and pump-and-treat system has stabilized. See “Performance Monitoring Report, Round 32” (August 7, 2006).*

Migration of contaminated groundwater which lies between the river and the barrier wall is also expected to have stabilized, as groundwater no longer moves through this area. Residual contamination in the riverbank (outside of the barrier wall) is being monitored closely to determine its response to the interim measure. The most recent monitoring indicates that, overall, residual contaminants are decreasing in concentration in this area. Toluene is no longer detected in Monitoring Well DM-8. Metals contaminant levels are shown below. See “Performance Monitoring Report, Round 36” (August 23, 2007).

Constituent	Screening Criteria (ppb)	Round 6, Monitoring Well DM-8 (ppb)	Average Site Background (ppb)	Round 36, Monitoring Well DM-8 (ppb)
Copper	2.4	190	2.1	29
Lead	2.5	22	<0.2	2
Vanadium	80	690	21	115
Arsenic	0.004	27	<5	5
Mercury	0.00179	0.3	<10	<0.1 (not detected)

Notes: 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.

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

_____ If yes – continue after identifying potentially affected surface water bodies.

X 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): *A physical barrier and pump-and-treat system is in place, preventing further migration of contaminated groundwater.*

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/year) 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 contamination is increasing.

_____ If unknown – enter “IN” status code in #8.

Rationale and Reference(s):

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

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

_____ If yes – continue after either: 1) identifying the Final Remedy decision incorporating these conditions, or other site-specific criteria (developed for the protection of the site’s surface water, sediments, and eco-systems), and referencing supporting documentation demonstrating that these criteria are not exceeded by the discharging groundwater; OR 2) providing or referencing an interim-assessment⁵, appropriate to the potential for impact, that shows the discharge of groundwater contaminants into the surface water is (in the opinion of a trained specialist, including ecologists) adequately protective of receiving surface water, sediments, and eco-systems, until such time when a full assessment and final remedy decision can be made. Factors which should be considered in the interim-assessment (where appropriate to help identify the impact associated with discharging groundwater) include: surface water body size, flow, use/classification/habitats and contaminant loading limits, other sources of surface water/sediment contamination, surface water and sediment sample results and comparisons to available and appropriate surface water and sediment “levels,” as well as any other factors, such as effects on ecological receptors (e.g., via bio-assays/benthic surveys or site-specific ecological Risk Assessments), that the overseeing regulatory agency would deem appropriate for making the EI determination.

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

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

Rationale and Reference(s):

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

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

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

 X If yes – continue after providing or citing documentation for planned activities or future sampling/measurement events. Specifically identify 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): *Groundwater monitoring is required to be conducted pursuant to the approved Interim Measures Performance Monitoring Plan (June, 2003). Monitoring includes monthly measurement of water levels within and outside of the barrier wall, in addition to quarterly water quality sampling. Sampling locations include 11 monitoring wells located outside of the barrier wall – five well pairs located between the barrier wall and the Duwamish, and one upgradient well.*

