**REGION 10 ANNOTATED VERSION -- JUNE 12, 2000**
**DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION**

Interim Final 2/5/99

**RCRA Corrective Action**
**Environmental Indicator (EI) RCRIS code (CA725)**

**Current Human Exposures Under Control**

**Facility Name:** **General Electric-Dawson Plant**
**Facility Address:** **220 S. Dawson Street, Seattle, WA 98108**
**Facility EPA ID #:** **WAD009278706**

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

**_X___** If yes - check here and continue with #2 below.

**_____** If no - re-evaluate existing data, or

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

EI determinations are intended to be a "snapshot" of current site conditions, and should NOT require additional data to be gathered at the time an EI determination is made. Even if available data are clearly insufficient to determine the nature and extent of contamination or whether cleanup standards are met, it is perfectly acceptable to check "yes" for question #1 as long as whatever data currently available has been considered. When data currently available are considered but are insufficient for EI determinations, such a conclusion should be indicated in question 3 for pathways and question 4 for exposures.

Note: Even though only currently available data should be used for EI determinations, the process of making EI determinations may well identify data gaps that need to be filled through the corrective action process.

## 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)?

| | Yes | No | ? | Rationale / Key Contaminants |
|---|---|---|---|---|
| Groundwater | _X_ | ___ | ___ | TCE, PCE, 12 DCE, 11 DCE, and vinyl chloride above MTCA B residential drinking water and surface water cleanup standards. |
| Air (indoors)[2] | ___ | ___ | _X_ | _____ |
| Surface Soil (e.g., <2 ft) | ___ | _X__ | ___ | Contaminated soils above water table excavated and disposed |
| Surface Water | ___ | _X_ | ___ | _____ |
| Sediment | ___ | _X_ | ___ | _____ |
| Subsurf. Soil (e.g., >2 ft) | ___ | _X_ | ___ | Contaminated soils above water table excavated and disposed |
| 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.

[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.

In many cases, available sampling and analytical data will be insufficient to fully document whether or not contaminant levels in the various media are above or below appropriate risk-based levels. For purposes of making EI determinations, it is entirely appropriate to use sound professional judgment as to whether particular media are or are not contaminated. For example, at a site with metal contamination in groundwater, professional judgment could easily be used to determine that no air (indoor or outdoor) contamination had occurred. This is particularly important when a phased approach is used for site characterization or corrective action - if characterization of a particular portion of a site has been deferred under a phased approach on the basis that that area is not believed to be contaminated and this belief is reasonably supported by an analysis of historical activities, process knowledge or other information, then it is quite reasonable to conclude that media in that area are not "contaminated" as part of a site-wide EI determination. Should data contradicting the initial phased-investigation presumption be gathered later in the site characterization process, it can easily be reflected in an updated EI determination. Deferral of a particular area as being low priority but still or likely to be contaminated should be reflected by a "no" or "in" EI.

The rationale/key contaminants should have a brief note of the "principle threat" contaminants (those that most significantly drive cleanup decisions), as well as a reference to key documents, if any. A note as to which particular risk-based standard is being used as the basis of comparison should also be included. For complex documents, a note to the particular section, table, etc. from which data or standards are selected should be provided, as it is often difficult to verify data out of context.

Rationale and Reference(s): Accessible contaminated subsurface soils above the water table were excavated and disposed off-site. As of the date of this evaluation, groundwater concentrations of TCE, PCE, vinyl chloride, and 11-DCE exceed MTCA Method B groundwater cleanup levels within the property boundary. Groundwater concentrations of TCE and 11-DCE exceed MTCA Method B surface water cleanup levels within the property boundary. Based on current data, TCE, 11-DCE, cis 1,2-DCE and vinyl chloride exceed MTCA Method B groundwater cleanup levels approximately 700 feet beyond the former GE downgradient property line. Exceedances of MTCA Method B surface water cleanup levels extend far less distance beyond the property boundary. *Refer to the 1998 through 2004 Quarterly Groundwater Monitoring Reports, the Additional December 1998 GW Sampling Results Report- dated 2/26/99, the October 1999 Additional GW Sampling Results Report – dated 11/22/99, the March/April 2000 Additional Groundwater Sampling Results Report-dated May 26, 2000, and the Results of the Downgradient Investigation-December 2002 Report dated June 18, 2003.*

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 | Day-Care | Construction | Trespassers | Recreation | Food[3] |
| Groundwater | ___ | ___ | ___ | __ | | | ___ |
| Air (indoors) | ___ | _?_ | ___ | | | | |
| Soil (surface, e.g., <2 ft) | ___ | ___ | ___ | ___ | ___ | ___ | ___ |
| Surface Water | ___ | ___ | | | ___ | ___ | ___ |
| Sediment | ___ | ___ | | | ___ | ___ | ___ |
| Soil (subsurface e.g., >2 ft) | | | | ___ | | | ___ |
| Air (outdoors) | ___ | ___ | ___ | ___ | ___ | | |

Instructions for Summary Exposure Pathway Evaluation Table:

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

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.

For sediments (if not other media like surface or groundwater), exposure should consider the potential for subsistence food source exposures, in addition to traditional exposure routes such as direct contact or direct ingestion.

_____ 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): Groundwater extraction wells at the downgradient boundary of the former GE property are operating to help capture groundwater contamination. However, a portion of the groundwater contaminant plume did migrate offsite prior to the installation of groundwater recovery wells. The Duwamish River is approximately 2000 feet from the former GE facility. Discharge rates to the Duwamish River are unknown at this time. The contaminated upper aquifer is not currently used as a drinking water source. There are no known residences (only industrial businesses) down gradient of the former GE facility. The owner of the former GE property and the area businesses are required to use city water for drinking water purposes. The owner of the former GE property and the most down gradient property owner (Liberty Ridge) are both aware of the contaminated groundwater. These two properties have the highest levels of contamination in the underlying aquifer. As of the time of this evaluation, there are no construction activities on these two properties that would expose workers to contaminated groundwater. The groundwater contamination is mostly located at depths of 20-40 feet below grade further down gradient of the Liberty Ridge building. Contact with this contaminated groundwater is unlikely unless groundwater extraction wells are installed to withdraw this water.

Future work in 2004 is focused on collection of groundwater data from recently installed groundwater monitoring wells to monitor the contaminant plume that migrated beyond the former GE property boundary (before the independent interim action groundwater extraction wells were installed) and particularly under the Liberty Ridge property. In late 2003, an additional groundwater extraction well was installed on the former GE property to improve on-site hydraulic containment and help facilitate groundwater remediation. The additional groundwater extraction well is expected to reduce the concentrations of CVOCs in the upper aquifer under the former GE building. Further analysis of on-site indoor air exposure pathway is planned after the TCE plume under the former GE building stabilizes. Based on results of this groundwater data, it is possible that indoor air and subslab soil gas is necessary to confirm that the groundwater to indoor air vapor pathway is not a concern.

Groundwater data from 2004 and 2005 from underneath the Liberty Ridge building (immediately downgradient of the former GE property) will be used to determine if indoor air and subslab soil gas is required to verify that the groundwater to indoor air vapor pathway is not a concern.

Ecology will need to verify that the groundwater contamination downgradient of the Liberty Ridge property has attenuated sufficiently such that the groundwater to indoor air pathway is not a concern.

*Refer to the 1998 through 2004 Quarterly Groundwater Monitoring Reports, the Additional December 1998 GW Sampling Results Report- dated 2/26/99, the October 1999 Additional GW Sampling Results Report – dated 11/22/99, the March/April 2000 Additional Groundwater Sampling Results Report- dated May 26, 2000, and the Results of the Downgradient Investigation-December 2002 report dated June 18, 2003.*

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)?

In general, EI's (if not cleanup standards themselves) can be met through a combination of reduction of contaminant concentrations (assuming that concentrations have been unacceptable) and (physical) engineering or institutional controls that interrupt an exposure pathway. For purposes of EI determinations, however, institutional or engineering controls do not need to have the sophistication, permanence, or legal defensibility as would be necessary for a final corrective action remedy. Rather, they need to be functional and reasonable - should the controls later be found to be no longer effective, the finding can easily be reflected in an updated EI determination.

An example might be the existence of off-site groundwater contamination that might pose risks to utility workers outside of the facility boundary. In this instance, evidence of an agreement between the facility and the utility that excavations would not occur in the contaminated area without appropriate protective gear would be acceptable for meeting the human exposures controlled EI.

_____ 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."

See Semantic Alert above.

_____ If yes (exposures could be reasonably expected to be "significant" (i.e., potentially "unacceptable") for any complete exposure pathway) - continue after providing a description (of each potentially "unacceptable" exposure pathway) and explaining and/or referencing documentation justifying why the exposures (from each of the remaining complete pathways) to "contamination" (identified in #3) are not expected to be "significant."

_____ If unknown (for any complete pathway) - skip to #6 and enter "IN" status code

Rationale and Reference(s):_____

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).

[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.

_____ 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):_____

| |
|---|
| The response to this question should include a brief description of the analysis and assumptions used in arriving at whatever conclusion is reached. The description does not have to be particularly detailed, but it should allow the reader to gain a basic understanding of the reasoning employed by the decision-maker. |

6. Check the appropriate RCRIS status codes for the Current Human Exposures Under Control EI event code (CA725), and obtain Supervisor (or appropriate Manager) signature and date on the EI determination below (and attach appropriate supporting documentation as well as a map of the facility):

____ YE - Yes, "Current Human Exposures Under Control" has been verified. Based on a review of the information contained in this EI Determination, "Current Human Exposures" are expected to be "Under Control" at the _____ _____ 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."

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

Completed by _____ Date: 06/21/04
Dean Yasuda
Environmental Engineer
Hazardous Waste and Toxics Reduction Program
Washington State Department of Ecology, Northwest Regional Office

Supervisor _____ Date _____
Julie Sellick
Hazardous Waste and Toxics Reduction Program, Section Supervisor
Washington State Department of Ecology, Northwest Regional Office

Locations where References may be found:

(1) Washington State Department of Ecology-Central Files Office
Northwest Regional Office
3190 160th Ave SE
Bellevue, WA 98008-5452
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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.**

**REGION 10 ANNOTATED VERSION -- JUNE 12, 2000**
**DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION**

Interim Final 2/5/99

**RCRA Corrective Action**
**Environmental Indicator (EI) RCRIS code (CA750)**

**Migration of Contaminated Groundwater Under Control**

**Facility Name:** **General Electric-Dawson Plant**
**Facility Address:** **220 S. Dawson Street, Seattle, WA 98108**
**Facility EPA ID #:** **WAD009278706**

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?

   **_X__** 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?

**_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): Accessible contaminated subsurface soils above the water table were excavated and disposed off-site. As of the date of this evaluation, groundwater concentrations of TCE, PCE, vinyl chloride, and 11-DCE exceed MTCA Method B groundwater cleanup levels within the property boundary. Groundwater concentrations of TCE and 11-DCE exceed MTCA Method B surface water cleanup levels within the property boundary. Based on current data, TCE, cis 1,2-DCE, 11-DCE and vinyl chloride exceed MTCA Method B groundwater cleanup levels approximately 700 feet beyond the former GE downgradient property line. Exceedances of MTCA Method B surface water cleanup levels extend far less distance beyond the property boundary. *Refer to the 1998 through 2004 Quarterly Groundwater Monitoring Reports, the Additional December 1998 GW Sampling Results Report- dated 2/26/99, the October 1999 Additional GW Sampling Results Report – dated 11/22/99, the March/April 2000 Additional Groundwater Sampling Results Report-dated May 26, 2000, and the Results of the Downgradient Investigation-December 2002 Report dated June 18, 2003.*

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

**_____** 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]").

[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.

_____ 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.

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

Rationale and Reference(s): Groundwater extraction wells at the downgradient boundary of the former GE property are operating to help capture groundwater contamination. An additional near-source onsite groundwater extraction well was installed in late 2003. Additional groundwater sampling in 2004 and early 2005 from recently installed downgradient groundwater wells will help **determine** if the offsite contaminant plume is stable. The Duwamish River is approximately 2000 feet from the former GE facility.

This question focuses ONLY on the movement of contaminated groundwater, not the level of contamination. A "YES" response should be arrived at if, through interpretation of groundwater flow data or sound professional judgment, groundwater contamination can be shown to not be expanding in spatial extent. It is perfectly acceptable to have a "YE" groundwater EI if:

1) contaminated groundwater is located off-site but not migrating further;
2) contaminated groundwater is contaminated above cleanup standards, but not migrating further;
3) natural attenuation is occurring such that the rate of attenuation (through any of the acceptable attenuation mechanisms and in accordance with EPA's Monitored Natural Attenuation Guidance, Directive 9200.4-17 - December 1997 Use of Monitored Natural Attenuation at Corrective Action Sites) is such that the outer boundaries of the plume are not expanding.

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 maximum concentration[3] 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)?

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

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_____ If yes - skip to #7 (and enter "YE" status code in #8 if #7 = yes), after documenting: 1) the maximum known or reasonably suspected concentration[3] 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 concentration[3] 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 concentrations[3] 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 water/sediment contamination, surface water and sediment sample results and comparisons to available and appropriate surface water and sediment "levels," as well as

[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.

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):_____
_____
_____
_____
_____
_____

When considering discharge of groundwater to surface water, it is important to remember that some discharges may be considered acceptable - it is not necessary to demonstrate that there are no discharges, or that groundwater meets surface water criteria at the point of discharge, as may be the case with final cleanup levels. As with human exposures controlled and other groundwater criteria, sound professional judgment may be used in evaluating the impact of groundwater to surface water.

The GW/SW component of the 750 EI really has three parts: 1) is there a discharge; 2) is the discharge insignificant; and 3) is the discharge currently acceptable (questions 4-6, respectively). A YE EI may be obtained if appropriate responses can be made through following this three-step analysis (no discharge, discharge insignificant, or discharge acceptable, respectively). Note that the level of supporting analysis and/or data increases as you progress through these three steps - a finding that a discharge is acceptable for a particular water body requires a considerably more complex analysis than a finding that there is no discharge.

Another point to recognize is that surface water issues often involve ecological risk considerations, and that such ecological evaluations often require specialized professional evaluation. Never the less, the quantity of data and effort required for analysis of groundwater/surface water EI questions should not be significantly different than what is required for human exposures or other groundwater questions. Evaluation of surface water from an EI perspective should not require a disproportionate effort.

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

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

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

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

Rationale and Reference(s): Onsite and offsite (downgradient) groundwater monitoring for chlorinated solvent constituents will part of the current and future remedial investigation and cleanup. *Refer to the 1998 through 2004 Quarterly Groundwater Monitoring Reports.*

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

_____ YE - 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.

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

Completed by _____ Date: 06/21/04
Dean Yasuda
Environmental Engineer
Hazardous Waste and Toxics Reduction Program
Washington State Department of Ecology, Northwest Regional Office

Supervisor _____ Date _____
Julie Sellick
Hazardous Waste and Toxics Reduction Program, Section Supervisor
Washington State Department of Ecology, Northwest Regional Office

Locations where References may be found:

(1) Washington State Department of Ecology-Central Files Office
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