

DRAFT DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION
RCRA Corrective Action
Environmental Indicator (EI) RCRIS code (CA750)
Migration of Contaminated Groundwater Under Control
Page 1

Facility Name: *NOVA Chemicals Inc. – Indian Orchard Facility*
Facility Address: *Springfield, Massachusetts*
Facility EPA ID #: *MAD 981 887 268*

General Note:

As is demonstrated in NOVA Chemicals Inc.'s (NOVA's) September 9, 1999 petition (Exhibit 1) and USEPA's February 2, 2000 concurrence (Exhibit 2), the Indian Orchard Facility has not conducted a regulated activity requiring a RCRA permit, and therefore, is not subject to Corrective Action under RCRA. As a result, the Indian Orchard Facility mistakenly has been included in USEPA's RCRA Corrective Action Program, and its recently issued GPR Baseline. Pursuant to USEPA's request, NOVA is voluntarily submitting this Environmental Indicator ("EI") form to demonstrate that even if the Indian Orchard Facility were subject to Corrective Action, it is "stabilized" as that term is defined by USEPA. By submitting this information to the USEPA, NOVA in no way concedes that its Indian Orchard Facility is subject to Corrective Action and, to the contrary, specifically disclaims any such applicability and reserves all of its rights in that regard.

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. (See note below.)
- If no - re-evaluate existing data, or
- If data are not available, skip to #8 and enter "IN" (more information needed) status code.

NOTE:

Question Number 1 asks whether all information on known and reasonably suspected releases to groundwater media that are subject to RCRA Corrective Action has been considered in the EI determination. Because NOVA's Indian Orchard Facility is not subject to RCRA Corrective Action (Exhibits 1 and 2), the more accurate response to Question Number 1 is "No." However, so that a full analysis can be completed, NOVA has responded to this question as if it were subject to Corrective Action, and, in that context, a significant body of information has been collected and subsequently reviewed in this process. See references noted below that were prepared in accordance with the Massachusetts Contingency Plan (MCP). NOVA is participating in the MCP process as a result of certain reporting obligations that have been triggered over the years.

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 EIs 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)).

DRAFT DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION
RCRA Corrective Action
Environmental Indicator (EI) RCRIS code (CA750)
Migration of Contaminated Groundwater Under Control
Page 2

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).

DRAFT DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION
RCRA Corrective Action
Environmental Indicator (EI) RCRIS code (CA750)
Migration of Contaminated Groundwater Under Control
Page 3

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

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

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

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

EPA Footnotes:

¹"Contamination" and "contaminated" describes media containing contaminants (in any form, NAPL and/or dissolved, vapors, or solids, that are subject to RCRA) in concentrations in excess of appropriate "levels" (appropriate for the protection of the groundwater resource and its beneficial uses).

Rationale and Reference(s):

NOTE:

Question Number 2 requires an analysis of whether groundwater is known or reasonably suspected to be "contaminated" above appropriately protective "levels" from releases subject to RCRA Corrective Action. Because NOVA's Indian Orchard Facility is not subject to RCRA Correction Action (Exhibits 1 and 2), the more appropriate response to Question Number 2 is "No." Note that this response leads to the "Yes" status code being assigned to this EI Determination, indicating that "Migration of Contaminated Groundwater" is "Under Control" at the Indian Orchard Facility. However, so that a full analysis of available data can be completed, NOVA has responded to Question Number 2, and subsequently Questions Number 3 through 7, as if the Indian Orchard Facility were subject to Corrective Action.

Two constituents, ethylbenzene and styrene, have been detected in groundwater above applicable standards on the NOVA property. The lateral extent of the styrene has been defined based on groundwater analytical monitoring at eighteen-wells: TB-1 through TB-7, MW-83S through MW-86S, EPMW-1, EPMW-2, RW-1 through RW-3, DW-6, and DW-7, as described in the Phase II Report (Section 6.1.3 and Figure 6-1, BBL, 2000). The lateral extent of ethylbenzene has been defined based on groundwater monitoring at twenty-seven wells: TB-1 through TB-7, MW-83S through MW-87S, MW-92S, MW-93A, MW-93B, MW-94S through MW-99S, MW-58S, MW-59S, EPMW-1, EPMW-2, and RW-1 through RW-3 as described in the Phase II Report (Section 6.1.4 and Figure 6.2, BBL, 2000). No NAPL has been detected in monitoring wells since monitoring began in 1995.

The Massachusetts Contingency Plan (MCP) Phase II Comprehensive Site Assessment (CSA) Report (Phase II Report) (dated February 2000) completed for NOVA identified chemicals of concern (COCs) (Section 7.1.2, BBL, 2000) for an MCP Method 3 Risk Characterization. The COCs were conservatively selected based on the approach presented in the Massachusetts Department of Environmental Protection (MADEP) MCP Guidance Document (MADEP, 1997) with reference to the Risk Assessment Guidance Document for Superfund (RAGS, USEPA, 1989). This approach is described in detail in the Phase II Report (Section 7.1, BBL, 2000), but essentially included VOC or SVOC constituents detected at least once above method detection limits.

These COCs were selected during the risk assessment process to determine conservative cumulative human health risk for the Indian Orchard Facility for a site-specific MCP Method 3 Risk Characterization; however, only two of the COCs constitute "contamination" (e.g., present in concentrations in excess of applicable standards). To determine which COCs were indicative of "contamination," the list of COCs was screened against MCP Method 1 standards for GW-2 (groundwater at a depth of less than 15 feet from ground surface that is located within 30 feet of an existing occupied building or structure) and GW-3 (potential source of discharge to surface water) category.

DRAFT DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION
RCRA Corrective Action
Environmental Indicator (EI) RCRIS code (CA750)
Migration of Contaminated Groundwater Under Control
Page 4

groundwater (see Section 2.1.5 of the Phase II Report, BBL, 2000). Groundwater Categories GW-2 and GW-3, developed by Massachusetts, are a part of the Comprehensive State Groundwater Protection Program (CSGWPP) for Massachusetts, endorsed by USEPA (per the Handbook of Groundwater Policy for RCRA Corrective Action [update 4/20/2000]). A map of states with endorsed CSGWPPs is presented at <http://www.epa.gov/OGWDW/csgwpp.html>. Only those wells with COCs that exceeded the lower of the GW-2 or GW-3 MCP Method 1 standards were considered to be "contaminated" for this EI.

A summary of this comparison is presented below:

Chemical	Maximum Concentration (mg/L)	MADEP GW-2 /GW-3 Standard (mg/L)	Exceeds Applicable Standards
4-Chloro-3-methylphenol	0.025	50 / 30 ^a	No
Acetone	5.1	50 / 50	No
Acetophenone	0.054	50 / 30 ^b	No
Benzene	0.005	2 / 7	No
Benzyl alcohol	0.025	ND	No
bis(2-Ethylhexyl)phthalate	0.01	50 / 0.03	No
Chloroform	0.0024	0.4 / 10	No
Diethyl phthalate	0.032	NA / 0.03	No
Dimethyl phthalate	0.006	NA / 0.03	No
Di-n-Butylphthalate	0.006	NA / 0.03 ^c	No
Ethylbenzene	63	30 / 4	Yes
Methyl-tert-butyl-ether	0.011	50 / 50	No
Styrene	94	0.90 / 50	Yes
Tetrachloroethene	0.003	3 / 5	No
Toluene	0.18	6 / 50	No
Xylenes, Total	0.019	6 / 50	No

Source: MADEP, 1999. 310 CMR 40 Subpart 1: Risk Characterization. October 29, 1999. 310 CMR 40.0974(2).

^a For 4-Chloro-3-methylphenol, phenol was used as a surrogate; "systemic effects are presumably like phenol" (HSDB, 1999)

^b For Acetophenone, phenol was used as a surrogate because of structural similarities.

^c For Di-n-Butylphthalate, diethylphthalate was used as a surrogate because of structural similarities.

ND = Not considered volatile as per Region 9 PRG table (Region 9 Preliminary Remediation Goals, 1999. Website:

[Http://www.epa.gov/region09/waste/sfund/prg/index.htm](http://www.epa.gov/region09/waste/sfund/prg/index.htm))

Only the area of the Indian Orchard Facility referred to as the Styrene AST/Ethylbenzene Area (see Figure 1-2 of the Phase II Report, BBL, 2000) contains these constituents above applicable standards.

References

BBL, 2000. MCP Phase II Comprehensive Site Assessment Report (Phase II Report) for RTNs 1-10793, 1-10868, 1-10869, 1-11692, 1-11693, 1-11694, and 1-11901 Investigation Areas completed for NOVA Chemicals, Inc./Solutia Inc., Springfield, Massachusetts.

RCRA Corrective Action

Environmental Indicator (EI) RCRIS code (CA750)

Migration of Contaminated Groundwater Under Control

Page 5

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).

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.

EPA Footnotes:

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.

*Rationale and Reference(s):***NOTE:**

As noted in response to Questions Number 1 and 2, because NOVA's Indian Orchard Facility is not subject to RCRA Corrective Action, evaluation of the issues in this Question Number 3 is not required. However, for the purpose of complete analysis, this Question Number 3 has been evaluated as if the Indian Orchard Facility were subject to RCRA Corrective Action.

Historic and current data have been collected within and downgradient of the styrene and ethylbenzene source area and from the Chicopee River since the installation of the recovery system in 1995³. A program of quarterly detection monitoring within and downgradient of the Styrene AST/Ethylbenzene Area was conducted at the Indian Orchard Facility from July 1995 until March 1998. The sampling frequency was reduced to semi-annual in March 1998. These data points show that there have been no increases in the concentration of styrene or ethylbenzene along the edges of the plume (Appendix C - Tables 7 and 8, Tighe & Bond, January 2000), and concentrations within the plume have been generally decreasing.

Groundwater monitoring data suggest that the groundwater pump and treat system provides hydraulic containment and prevents migration of contamination beyond the existing area of "contaminated" groundwater, as defined by USEPA. Results of the capture zone analysis completed for the Indian Orchard Facility (Section 3.4.2.10, BBL, 2000) also supports containment of the plume. Using site-specific values for flow rate, aquifer thickness, hydraulic conductivity, and hydraulic gradient, the capture zone analysis shows that the current groundwater pump and treat system prevents the styrene and ethylbenzene from migrating beyond the existing area of "contaminated" groundwater (Figure 3-7, BBL, 2000). Near the Styrene AST/Ethylbenzene Area, the pump and treat system exerts an influence on hydraulic gradients, such that there is an inward gradient along the Chicopee River toward the recovery wells RW-1 and RW-2.

³ A soil vapor extraction system and a ground-water pump and treat system was installed in 1995 as a result of a release of styrene and ethylbenzene to the ground surface. Tighe & Bond. June 1995. Immediate Response Action Plan.

DRAFT DOCUMENTATION OF ENVIRONMENTAL INDICATOR TERMINATION
RCRA Corrective Action
Environmental Indicator (EI) RCRIS code (CA750)
Migration of Contaminated Groundwater Under Control
Page 6

References

BBL, 2000. MCP Phase II Comprehensive Site Assessment Report (Phase II Report) for RTNs 1-10793, 1-10868, 1-10869, 1-11692, 1-11693, 1-11694, and 1-11901 Investigation Areas completed for NOVA Chemicals, Inc./Solutia Inc., Springfield, Massachusetts.

Tighe & Bond. January 2000. Immediate Response Action (IRA) Site Status Report.

Tighe & Bond. June 1995. IRA Plan.

DRAFT DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION
RCRA Corrective Action
Environmental Indicator (EI) RCRIS code (CA750)
Migration of Contaminated Groundwater Under Control
Page 7

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):

NOTE:

As noted in response to Questions Number 1 and 2, because NOVA's Indian Orchard Facility is not subject to RCRA Corrective Action, evaluation of the issues in this Question Number 4 is not required. However, for the purpose of complete analysis, this Question Number 4 has been evaluated as if the Indian Orchard Facility were subject to RCRA Corrective Action.

There is currently no evidence of discharge of styrene or ethylbenzene to surface water upstream or downstream of the groundwater plume, which has been sampled quarterly beginning March 1995 and semi-annually since March 1998 (see Appendix C - Table 7, Tighe & Bond, January 2000). Although low levels of styrene and ethylbenzene (0.0037 mg/L at TB-2 in January 1999) (0.0024 mg/L at [EP] MW-2 in January 1999) have been detected infrequently (twice in eleven events) in monitoring wells directly upgradient of the Chicopee River (Appendix C - Table 6, Tighe & Bond, January 2000), the concentrations of these constituents are below MADEP GW-3 standards (0.90 mg/L and 4.0 mg/L, respectively). Surface water samples collected upstream and downstream of the groundwater plume in March 1998, October 1998, January 1999, and July 1999 do not have detections of styrene or ethylbenzene (Appendix C - Table 7, Tighe & Bond, January 2000).

References

Tighe & Bond. January 2000. Immediate Response Action (IRA) Site Status Report.

RCRA Corrective Action

Environmental Indicator (EI) RCRIS code (CA750)

Migration of Contaminated Groundwater Under Control

Page 8

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 judgement/explanation (or reference documentation) supporting that the discharge of groundwater contaminants into the surface water is not anticipated to have unacceptable impacts to the receiving surface water, sediments, or eco-system.

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

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

Rationale and Reference(s):

Not Applicable

EPA Footnotes:

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

RCRA Corrective Action

Environmental Indicator (EI) RCRIS code (CA750)

Migration of Contaminated Groundwater Under Control

Page 9

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

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

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

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

Rationale and Reference(s):

Not Applicable

EPA Footnotes:

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.

DRAFT DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION
RCRA Corrective Action
Environmental Indicator (EI) RCRIS code (CA750)
Migration of Contaminated Groundwater Under Control
Page 10

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)

NOTE:

As noted in response to Questions Number 1 and 2, because NOVA's Indian Orchard Facility is not subject to RCRA Corrective Action, evaluation of the issues in Questions Number 3 through 7 is not required. However, for the purpose of complete analysis, Question Number 7 has been evaluated as if the Indian Orchard Facility were subject to RCRA Corrective Action.

A program of detection monitoring is being conducted at the Indian Orchard Facility under the MCP program. This program includes monitoring wells MW-1, MW-2, TB-1, TB-2, TB-3, TB-4, TB-5, TB-6, and TB-7 and samples from the Chicopee River upstream and downstream of the Styrene AST/Ethylbenzene Area. This groundwater monitoring program will continue based on the guidance of NOVA's Licensed Site Professional and the Massachusetts Department of Environmental Protection.

Monitored natural attenuation will likely be part of the overall groundwater remedy for the Indian Orchard Facility upon demonstration of effectiveness via groundwater monitoring.

Ethylbenzene is potentially biodegradable in groundwater by means of both aerobic and anaerobic metabolic processes, with end products consisting primarily of carbon dioxide, water, and methane (Howard, 1989). Aerobic biodegradation of ethylbenzene in groundwater has been shown to be rapid, with laboratory half lives on the order of days to weeks. Ethylbenzene has been shown to be recalcitrant in groundwater under anaerobic conditions, with laboratory half lives on the order of months to years (Howard, 1989).

Styrene is potentially biodegradable in groundwater by means of both aerobic and anaerobic metabolic processes, with end products consisting primarily of carbon dioxide, water, and methane (Howard, 1989). Aerobic and anaerobic biodegradation of styrene in groundwater has been shown to be moderate, with disappearance times on the order of weeks to months (Howard, 1989).

DRAFT DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION
RCRA Corrective Action
Environmental Indicator (EI) RCRIS code (CA750)
Migration of Contaminated Groundwater Under Control
Page 11

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

YE YE - Yes, "Migration of Contaminated Groundwater Under Control" has been verified. Based on a review of the information contained in this EI determination, it has been determined that the "Migration of Contaminated Groundwater" is "Under Control" at the NOVA Chemicals Inc. Indian Orchard Facility, EPA ID # MAD 981 887 268, located in Springfield, Massachusetts. 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 NOVA FOR EPA

(signature) *Raphael Coy*
(print) RAPHAEL COY
(title) RFM

Date 8/22/00

Supervisor

(signature) *Matthew R. Hoagland*
(print) Matthew R. Hoagland
(title) Section Chief
(EPA Region or State) EPA-NE

Date 8/23/00

Locations where References may be found:

Massachusetts Department of Environmental Protection

Telephone: (____) ____-____
Office Hours: 8:00 A.M. to 4:00 P.M.
(Monday through Friday)

This concurrence is related solely to the technical and scientific basis relating to the environmental indicator and not intended to be a statement of agreement or disagreement with text relating to the applicability of Corrective Action to the Indian Point Facility.

MRH
8/23/00

Contact telephone and e-mail numbers

For NOVA: Mike Garvey
(413) ~~747~~ 4012
GARVEYMF@novachem.com

DRAFT DOCUMENT: DETERMINATION OF ENVIRONMENTAL INDICATOR DETERMINATION
RCRA Corrective Action
Environmental Indicator (EI) RCRIS code (CA725)
Current Human Exposures Under Control
Page 1

Facility Name: **NOVA Chemicals Inc. – Indian Orchard Facility**
Facility Address: **Springfield, Massachusetts**
Facility EPA ID #: **MAD 981 887 268**

General Note:

As is demonstrated in NOVA Chemicals Inc.'s (NOVA's) September 9, 1999 petition (Exhibit 1) and USEPA's February 2, 2000 concurrence (Exhibit 2), the Indian Orchard Facility has not conducted a regulated activity requiring a RCRA permit, and therefore, is not subject to Corrective Action under RCRA. As a result, the Indian Orchard Facility mistakenly has been included in USEPA'S RCRA Corrective Action Program, and its recently issued GPR Baseline. Pursuant to USEPA's request, NOVA is voluntarily submitting this Environmental Indicator ("EI") form to demonstrate that even if the Indian Orchard Facility were subject to Corrective Action, it is "stabilized" as that term is defined by USEPA. By submitting this information to the USEPA, NOVA in no way concedes that its Indian Orchard Facility is subject to Corrective Action and, to the contrary, specifically disclaims any such applicability and reserves all of its rights in that regard.

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. (See Note below.)

If no - re-evaluate existing data, or

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

NOTE:

Question Number 1 asks whether all information on known and reasonably suspected releases that are subject to RCRA Corrective Action has been considered in the EI determination. Because NOVA's Indian Orchard Facility is not subject to RCRA Corrective Action (see Exhibits 1 and 2), the more accurate response to Question Number 1 is "No." However, so that a full analysis can be completed, NOVA has responded to this question as if it were subject to Corrective Action, and, in that context, a significant body of information has been collected and subsequently reviewed in this process. See references noted below that were prepared in connection with the Massachusetts Contingency Plan (MCP). NOVA is participating in the MCP process as a result of certain reporting obligations that have been triggered over the years.

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 EIs 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)).

RCRA Corrective Action

Environmental Indicator (EI) RCRIS code (CA725)

Current Human Exposures Under Control

Page 2

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).

DRAFT DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION
RCRA Corrective Action
Environmental Indicator (EI) RCRIS code (CA725)
Current Human Exposures Under Control
Page 3

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)?

<i>Media Contaminated</i>	<i>Yes</i>	<i>No</i>	<i>?</i>	<i>Rationale/Key Comments</i>
<i>Groundwater</i>	X			<i>Styrene and ethylbenzene are detected at concentrations exceeding risk-based levels.</i>
<i>Indoor Air²</i>		X		<i>No buildings are located near (within 30 ft) the ethylbenzene/styrene plume. No volatile compounds were detected above risk-based levels in soils.</i>
<i>Surface Soil (e.g., < 2 ft)</i>		X		<i>No COCs exceed risk-based levels.</i>
<i>Subsurface Soil (e.g., > 2 ft)</i>	X			<i>Benzo(a)pyrene was detected at concentrations exceeding risk-based levels for surface soils.</i>
<i>Surface Water</i>		X		<i>No site-related constituents were currently detected in surface water.</i>
<i>Sediment</i>		X		<i>No complete migration pathway exists between the site and the river for site-related constituents.</i>
<i>Outdoor Air</i>		X		<i>NOVA's site Industrial Hygiene Program of workspace monitoring insures protectiveness of workers.</i>

EPA Footnotes:

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

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

_____ 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):

NOTE:

Question Number 2 requires an analysis of whether specified environmental media are known or reasonably suspected to be "contaminated" above risk-based "levels" from releases subject to RCRA Corrective Action. Because NOVA's Indian Orchard Facility is not subject to RCRA Corrective Action (see Exhibits 1 and 2), the more appropriate response to Question Number 2 is "No (for all media)." Note that this response leads to the "Yes" status code being assigned to this EI Determination, indicating that "Current Human Exposures are Under Control" at the Indian Orchard Facility. However, so that a

DRAFT DOCUMENT DETERMINATION OF ENVIRONMENTAL INDICATOR DETERMINATION
RCRA Corrective Action
Environmental Indicator (EI) RCRIS code (CA725)
Current Human Exposures Under Control
Page 4

full analysis of available data can be completed, and in the spirit of cooperation, NOVA has responded to Question Number 2, and subsequently, Questions Number 3 through 5, as if the Indian Orchard Facility were subject to Corrective Action.

Soils

The Massachusetts Contingency Plan (MCP) Phase II Comprehensive Site Assessment Report (dated February 2000) completed for NOVA identifies potential chemicals of concern (COCs) for an MCP Method 3 Risk Characterization (Section 7.1.2 of the Phase II Report; BBL, 2000). In the Phase II Report, COCs were selected based on frequency of detection, comparison to background, and their presence as field or laboratory contaminants (Section 7.1.2 of the Phase II Report). Consistent with MCP guidance, risk-based screening levels were not used in the selection of COCs in the Phase II Report. Therefore, comparison to Region 9 Preliminary Remediation Goals (PRGs) for soils was completed for this EI Determination (Tables 1 and 2 of this EI) consistent with Region 1 practices. This comparison was conducted in order to determine which compounds are present in excess of risk-based screening values, per the EI guidance. The maximum concentration detected on site was compared to industrial standards, as the current use of the Indian Orchard Facility is industrial in nature. Only benzo(a)pyrene detected at a depth of 6-8 feet exceeded the screening levels. It should be noted that these soil-screening values are based on direct contact with surficial soils, not subsurface soils. Accordingly, the exposure assumptions associated with direct contact used to derive these risk-based values are not reflective of actual or likely exposure conditions.

Table 1
Comparison of Maximum Subsurface Soil Concentrations on NOVA Property to Applicable Risk Based Screening Levels

Chemicals in Soil	Maximum Concentration (mg/kg)	Region 9 PRGs (mg/kg)	Exceeds Applicable Standards
1,2-Dichloroethane	0.007	0.76	No
2-Butanone	0.011	28000	No
4-methyl-2-pentanone (or MIBK)	0.16	2900	No
Acenaphthylene	0.18	190*	No
Acetone	0.066	6200	No
Benzo(a)anthracene	1.1	2.9	No
Benzo(a)pyrene	1.5	0.29	Yes
Benzo(b)fluoranthene	1.7	2.9	No
Benzo(g,h,i)perylene	1.3	190*	No
Benzo(k)fluoranthene	0.67	29	No
Chrysene	1.1	290	No
Dibenzo(a,h)Anthracene	0.23	0.29	No
Ethylbenzene	0.016	230	No
Fluoranthene	1.3	30000	No
Indeno(1,2,3-cd) pyrene	1.3	2.9	No
Phenanthrene	0.72	190*	No
Pyrene	1.7	54000	No
Styrene	0.018	1700	No

Source: **Region 9 Preliminary Remediation Goals. 1999.**

Website: <http://www.epa.gov/region09/waste/sfund/prg/index.htm>

* For acenaphthylene, benzo(g,h,i)perylene and phenanthrene, naphthalene was used as a surrogate, as per MADEP.

Table 2
Comparison of Maximum Surface Soil Concentrations on NOVA Property to Applicable Risk Based Screening Levels

Chemicals in Soil	Maximum Concentration (mg/kg)	Region 9 PRGs (mg/kg)	Exceed Applicable Standards
Acetone	0.038	6200	No
Ethylbenzene	0.016	230	No
Styrene	0.018	1700	No
Trichloroethene	0.075	6.1	No

Source: Region 9 Preliminary Remediation Goals. 1999.

Website: <http://www.epa.gov/region09/waste/sfund/prg/index.htm>

Groundwater

Groundwater at or in the vicinity of the Indian Orchard Facility is not used for drinking, as discussed in Section 2.1.4 of the Phase II Report. However, the only PRGs for groundwater available from Region 9 are for "tap water". Because the water on Indian Orchard Facility is not used as a drinking water source, comparison to Region 9 PRGs is inappropriate. As a result, MADEP Method 1 Groundwater Standards were used as screening values (Table 3 of this EI), which have been endorsed by the USEPA per the Handbook of Groundwater Policy for RCRA Corrective Action, update April 20, 2000. These standards allow for consideration of groundwater as a nonpotable source (e.g., GW-2 standards consider groundwater to be a potential source of vapors to indoor air). Ethylbenzene and styrene were the only constituents detected in groundwater at concentrations exceeding the GW-2 Method 1 standards.

Table 3
Comparison of Maximum Groundwater Concentrations on NOVA Property to Applicable Risk Based Screening Levels

Chemicals in Groundwater	Maximum Concentration (mg/L)	MADEP GW-2/GW-3 Standard (mg/L)	Exceed Applicable Standards
4-Chloro-3-methylphenol	0.025	50/30 ^a	No
Acetone	5.1	50/50	No
Acetophenone	0.054	50/30 ^b	No
Benzene	0.005	2/7	No
Benzyl alcohol	0.025	ND	No
Bis(2-Ethylhexyl)phthalate	0.01	50/0.03	No
Chloroform	0.0024	0.4/10	No
Diethyl phthalate	0.032	NA/0.03	No
Dimethyl phthalate	0.006	NA/0.03	No
Di-n-Butylphthalate	0.006	NA/0.03 ^c	No
Ethylbenzene	63	30/4	Yes
Methyl-tert-butyl-ether	0.011	50/50	No
Styrene	94	0.9/50	Yes
Tetrachloroethene	0.003	3/5	No
Toluene	0.18	6/50	No
Xylenes, Total	0.019	6/50	No

^a For 4-Chloro-3-methylphenol, phenol was used as a surrogate; "systemic effects are presumably like phenol" (HSDB, 1999).

^b For Acetophenone, phenol is used as a surrogate because of structural similarities.

^c For di-n-butylphthalate, diethylphthalate was used as a surrogate because of structural similarities.

ND = not considered volatile as per Region 9 PRG table (Region 9 Preliminary Remediation Goals. 1999. Website: <http://www.epa.gov/region09/waste/sfund/prg/index.htm>)

DRAFT DOCUMENT _TION OF ENVIRONMENTAL INDICAT _ DETERMINATION
RCRA Corrective Action
Environmental Indicator (EI) RCRIS code (CA725)
Current Human Exposures Under Control
Page 6

Surface Water

There is currently no evidence of discharge of styrene or ethylbenzene to surface water upstream or downstream of the groundwater plume. Although low levels of styrene (0.0037 mg/L at TB-2) and ethylbenzene (0.0024 mg/L at [EP]MW-2) have been detected infrequently in monitoring wells directly upgradient of the Chicopee River (Appendix C - Tables 7 and 8; T&B, January 2000), the concentrations of these constituents are below MCP GW-3 standards applicable to groundwater discharge to surface water (0.90 mg/L and 4.0 mg/L, respectively). Surface water samples collected upstream and downstream of the groundwater plume in March 1998, October 1998, January 1999, and January 2000 showed no evidence of styrene or ethylbenzene above the sample quantitation limit. These current analyses show that the compounds are not present in surface water, and therefore do not pose an unacceptable human exposure.

Sediment

As discussed in Section 7.1.3 of the Phase II Report, a review of available site data indicates that there is no observed complete migration pathway of constituents from the Indian Orchard Facility to the Chicopee River. Thus there is no potential for a receptor to come into contact with surface water or sediment constituents originating at the Indian Orchard Facility.

Ambient Air

The NOVA site has a permitting process in place to manage air emission during all phases of work on the property. All work must occur through the site's Safe Work process, which includes screening and monitoring of workspace atmospheric conditions to ensure workers are not exposed to hazardous levels of constituents. The Site's Industrial Hygiene program includes random monitoring of employees and contractors to confirm that the Safe Work process is effective in managing airborne exposure.

References

- BBL. 2000. MCP Phase II Comprehensive Site Assessment Report (Phase II Report) for RTNs 1-10793, 1-10868, 1-10869, 1-11692, 1-11693, 1-11694, and 1-11901 Investigation Areas completed for NOVA Chemicals, Inc/Solutia Inc., Springfield, MA.*
- Tighe & Bond Inc. Consulting Engineers. January 2000. Immediate Response Action (IRA) Site Status Report.*
- MADEP. 1997 (amended October 29, 1999). Massachusetts Contingency Plan (MCP). 310 Code of Massachusetts Regulation (CMR) 40.0000.*
- MADEP. 1999. 310 CMR 40 Subpart 1: Risk Characterization. October 29, 1999. 310 CMR 40.0974(2).*
- USEPA, Office of Solid Waste and Emergency Response. April 2000. Handbook of Groundwater Policies for RCRA Corrective Action (update April 20, 2000). EPA 530-D-00-001.*

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

Current Human Exposures Under Control

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 (utility)	Trespassers	Recreation	Food ³
Groundwater	No	No	No	Yes	No	No	No
Soil (surface e.g., <2.0 ft)	—	—	—	—	—	—	—
Surface Water	—	—	—	—	—	—	—
Sediment	—	—	—	—	—	—	—
Soil (subsurface e.g., >2 ft)	No	No	No	No	No	No	No
Air (indoor)	—	—	—	—	—	—	—
Air (outdoor)	—	—	—	—	—	—	—

EPA Footnote:

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

Instructions for Summary Exposure Pathway Evaluation Table:

1. Strikeout 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 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.

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

NOTE:

As noted in response to Questions Number 1 and 2, because the Indian Orchard Facility is not subject to RCRA Corrective Action, evaluation of the issues in this Question Number 3 is not required. However,

RCRA Corrective Action
Environmental Indicator (EI) RCRIS code (CA725)
Current Human Exposures Under Control
Page 8

for the purpose of complete analysis, this Question Number 3 has been evaluated as if the Indian Orchard Facility were subject to RCRA Corrective Action.

Rationale and Reference(s):

Residents (see Section 2.1.4 of the Phase II Report)

Groundwater (including air) - no complete pathway. There is no evidence of off-site contamination and there are no residents on site.

Soils (>2 feet) - no complete pathway. There is no evidence of off site contamination and there are no residents on the Indian Orchard Facility.

Workers (see Section 7.3.1 of the Phase II Report)

Groundwater (including air) - no complete exposure pathway. The groundwater is not currently being used as a drinking water source or for irrigation on Indian Orchard Facility. Workers are not involved in intrusive activities that would permit direct exposure to groundwater.

Soils (>2 feet) - no complete exposure pathway. This receptor would not be involved in intrusive activities. No volatile compounds detected in soils exceeded risk-based levels.

Day Care (or other non production related facilities) (see Section 2.1.4 of the Phase II Report)

Groundwater (including air) - no complete exposure pathway. There is no evidence of off-site contamination and there are no non-production-related facilities on Indian Orchard Facility.

Soils (>2 feet) - no complete exposure pathway. There is no evidence of off-site contamination and there are no non-production-related facilities on Indian Orchard Facility.

Construction Workers (or utility worker) (see Section 7.3.1 of the Phase II Report)

Groundwater (including air) - complete exposure pathway. The groundwater is not currently being used as a drinking water source or for irrigation on Indian Orchard Facility. There is currently no construction occurring at the Indian Orchard Facility; however, the intrusive activity associated with routine utility maintenance may result in direct contact with groundwater (dermal exposure and inhalation of volatiles). The utility worker exposure is limited to an exposure frequency of roughly 1 day/year (per MADEP). Any on-site intrusive activities would occur in accordance with the existing site Industrial Hygiene program.

Soils (>2 feet) - no complete exposure pathway. There is currently no construction occurring at the Indian Orchard Facility; however, the intrusive activity associated with routine utility maintenance may result in direct contact with subsurface soils. COCs exceeding risk-based screening levels were limited to a few areas on Indian Orchard Facility, specifically at the PAH area. This area is currently paved and, as a result, intrusive activities would not be expected. In rare cases, when intrusive activities might occur in this area, they would take place in accordance with the existing site Industrial Hygiene program. The only other potential area of concern would be at the active soil vapor extraction (SVE) area. Any work done in this area would be conducted in accordance with an existing health & safety plan prepared consistent with OSHA 1910.120 by a certified industrial hygienist. Styrene and ethylbenzene were detected in this area prior to remedial activities and SVE installation. For these compounds, the soil saturation limit is well below generic volatile inhalation screening levels (USEPA, 1996). Therefore, concentrations in air cannot exceed the inhalation screening levels. At soil saturation limits, the emission flux from soil to air reaches a plateau; as a result, the saturation limits correspond to the maximum soil emissions. In cases where the soil saturation limit is below inhalation screening values, as is the case for styrene and ethylbenzene, "the inhalation route is not likely to be of concern" (USEPA, 1996).

Trespassers (see Section 2.1.4 of the Phase II Report)

Groundwater (including air) - no complete exposure pathway. The groundwater is not currently being used as a drinking water source or for irrigation on site and there is no evidence of off-site contamination (see Section 2.1.4 of the Phase II Report). Trespassing is discouraged by Indian Orchard Facility security measures, which include well-maintained fence surrounding the Indian Orchard Facility, active remote surveillance of the property boundaries, and security patrols (see Section 2.1.4 of the Phase II Report).

Soils (>2 feet) – no complete exposure pathway. There is no evidence of off-site contamination and trespassing is discouraged by Indian Orchard Facility security measures, which include well-maintained fence surrounding the site, active remote surveillance of the property boundaries, and security patrols.

Recreation (see Section 7.3.1 of the Phase II Report)

Groundwater (including air) - no complete exposure pathway. There is no evidence of off-site contamination and the Indian Orchard Facility is currently an active industrial facility with no recreational uses.

Soils (>2 feet) – no complete exposure pathway. There is no evidence of off-site contamination and the Indian Orchard Facility is currently an active industrial facility with no recreational uses.

Food (see Figure 2-1 of the Phase II Report)

Groundwater - no complete exposure pathway. There is no evidence of off-site contamination and no food is being grown on Indian Orchard Facility.

Soils - no complete exposure pathway. There is no evidence of off-site contamination and no food is being grown on Indian Orchard Facility.

References

BBL. 2000. MCP Phase II Comprehensive Site Assessment Report (Phase II Report) for RTNs 1-10793, 1-10868, 1-10869, 1-11692, 1-11693, 1-11694, and 1-11901 Investigation Areas completed for NOVA Chemicals, Inc/Solutia Inc., Springfield, MA.

MADEP. 1995. Guidance for Disposal Site Risk Characterization in Support of the Massachusetts Contingency Plan. Interim Final Policy # WSC/ORS-95-141.

USEPA, Office of Solid Waste and Emergency Response. 1996. Soil Screening Guidance: Technical Background Document. EPA/540/R-95/128.

Tighe & Bond. 1997. Groundwater Remediation Health & Safety Plan completed for NOVA Chemicals, Inc., Springfield, MA.

DRAFT DOCUMENT EVALUATION OF ENVIRONMENTAL INDICATOR DETERMINATION
RCRA Corrective Action
Environmental Indicator (EI) RCRIS code (CA725)
Current Human Exposures Under Control
Page 10

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

 X If no (exposures 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.”

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

EPA Footnote:

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.

NOTE:

As noted in response to Questions Number 1 and 2, because the Indian Orchard Facility is not subject to RCRA Corrective Action, evaluation of the issues in this Question Number 4 is not required. However, for the purpose of complete analysis, this Question Number 4 has been evaluated as if the Indian Orchard Facility were subject to RCRA Corrective Action.

Rationale and Reference(s):

For utility workers, volatilization from groundwater to ambient air was considered in the Phase II Report. To assess ambient air concentrations, it was assumed that a hypothetical utility worker had excavated to groundwater, resulting in the groundwater coming into direct contact with the atmosphere. The following air concentrations were derived by modeling the release of compounds from water bodies (emission rate) using information from the Superfund Exposure Assessment Manual (USEPA, 1988). The emission rate was then used to calculate air concentrations by using a simple box model. This information is outlined in Section 7.3.3.2 of the Phase II Report.

Table 4

Chemical	Groundwater Concentrations (mg/L)	Modeled Air Concentrations (mg/m³)	ACGIH Threshold Limit Value (mg/m³)
<i>Styrene</i>	94	0.62	85
<i>Ethylbenzene</i>	63	0.43	435

*ACGIH, 1999. HSDB, 1999.

The resulting air concentrations are compared with acceptable occupational exposure concentrations; in this case, ACGIH values were used, as they were equal to or more conservative than OSHA values. The threshold limit values (TLVs) are “the time-weight average concentration[s] for a conventional 8-hour workday and a 40-hour workweek, to which it is believed that nearly all workers may be repeatedly exposed, day after day, without adverse effect”

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

Current Human Exposures Under Control

Page 11

(ACGIH, 1999). As illustrated in the above table, ambient concentrations modeled for the Indian Orchard Facility are well below the acceptable occupational standards.

Additionally, hypothetical dermal exposure to groundwater by the utility worker was assessed in the Phase II Report, and exposures (assuming direct contact with groundwater for short periods of time) resulted in an acceptable noncancer hazard of less than unity, 6E-02. In light of NOVA's existing Safe Work process, a direct contact with groundwater would not likely occur.

References

ACGIH. 1999. 1999 TLVs and BEIs, Threshold Limit Values for Chemical Substances and Physical Agents. Biological Exposure Indices. Cincinnati, OH.

USEPA, Office of Remedial Response. 1988. Superfund Exposure Assessment Manual. EPA-540/01.

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):

Not Applicable

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):

X 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 NOVA Chemicals Inc. Indian Orchard Facility, EPA ID #MAD 981 887 268, located at Springfield, MA 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 NOVA FOR EPA

(signature) Raphael Cody

Date 8/22/00

(print) RAPHAEL CODY

(title) RFM

Supervisor

(signature) Matthew R. Hoagland

Date 8/23/00

(print) Matthew R. Hoagland

(title) Section Chief.

(EPA Region or State) EPA-NE

Locations where References may be found:

Massachusetts Department of Environmental Protection

Telephone: () -

Office Hours: 8:00 A.M. to 4:00 P.M.

(Monday through Friday)

Contact telephone and e-mail numbers

For NOVA: Mike Garvey
(413) 747-4012
GARVEYMF@novachem.com

This concurrence is related solely to the technical and scientific basis relating to the environmental indicator, and not intended to be a statement of agreement or disagreement with text relating to the applicability of Corrective Action to the Indian Point facility.

MRF
8/23/00

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.