

DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

Interim Final 2/5/99

Revised 11/8/00

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

Current Human Exposures Under Control

Facility Name: _____ Brunswick Corporation _____
Facility Address: _____ Lincoln, Nebraska _____
Facility EPA ID #: _____ NED043534635 _____

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

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

If no - re-evaluate existing data, or

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

BACKGROUND

Definition of Environmental Indicators (for the RCRA Corrective Action)

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

Definition of "Current Human Exposures Under Control" EI

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

Relationship of EI to Final Remedies

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

Duration / Applicability of EI Determinations

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

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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 [e.g., Maximum Contaminant Levels (MCLs), the maximum permissible level of a contaminant in water delivered to any user of a public water system under the Safe Drinking Water Act] from releases subject to RCRA Corrective Action (from SWMUs, RUs or AOCs)?

	Yes	No	?	Rationale / Key Contaminants
Groundwater	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	TCE, PCE, DCE, VC
Air (indoors) ²	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____
Surface Soil (e.g., <2 ft)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____
Surface Water	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____
Sediment	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____
Subsurf. Soil (e.g., >2 ft)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____
Air (outdoors)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____

- _____ 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.
- ___ ___ 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):

The Resource Conservation and Recovery Act (RCRA) Facility Investigation and Risk Assessment, dated July 24, 1996, (RFI Report) summarizes that six solid waste management units (SWMUs) were identified at the facility. Per the RFI Report, corrective action was not required at three of these SWMUS and corrective action was completed for two other SWMUs. The remaining SWMU to be addressed was a chlorinated solvent plume in groundwater.

Groundwater: A RCRA Corrective Action permit was issued by the EPA to Brunswick on June 30, 1998, to address contaminated groundwater. The RCRA permit includes groundwater protection standards for site related contaminants: trichloroethene (TCE), tetrachloroethene (PCE), 1,1-dichloroethene (1,1-DCE), and vinyl chloride (VC). The permit standards are based on protection of aquatic organisms in Salt Creek from migration of contaminated groundwater and their resulting use (e.g., fish consumption). Based upon data from the existing monitoring system, groundwater protection standards established in the permit are not currently exceeded at the site. However, drinking water standards under the Safe Drinking Water Act (applicable to human consumption) have been exceeded in both on-site and off-site monitoring wells, [see attached table and site map, and April 2002 Semi-annual Progress Report].

Air, soil, sediment, surface water: Air samples have not been collected at the site. Any potential soil contamination would be associated with the source of the groundwater plume, i.e., beneath the existing manufacturing building. Soil samples were not collected to evaluate this source. Surface water and sediment samples have not been collected from Salt Creek.

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.

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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	no	no	no	no			no
Air (indoors)	no	no	no				
Soil (surface, e.g., <2 ft)	no	no	no	no	no	no	no
Surface Water	no	no			no	no	no
Sediment	no	no			no	no	no
Soil (subsurface e.g., >2 ft)		no		no			no
Air (outdoors)	no	no	no	no	no	no	

Instructions for Summary Exposure Pathway Evaluation Table:

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

Rationale and Reference(s):

Groundwater: The site has shallow and deep groundwater aquifer units that are separated by a clay till (glacial till) unit. Shallow groundwater flow downgradient of the site is controlled by Salt Creek, which appears to serve as the discharge point for shallow groundwater, i.e., groundwater above the till unit.

In late 2001, a monitoring well was installed with the screen interval below the till unit, i.e., into the deeper aquifer unit. Contamination was not detected in groundwater from this well. Assuming that flow direction in the deep unit is consistent with that in the shallow portion of the aquifer, contamination appears to be limited to the shallow aquifer and is anticipated to discharge to Salt Creek, based upon the available data.

Other than project wells, there are no groundwater wells between the facility and Salt Creek. The Lower Platte Natural Resource District owns the property directly adjacent to Salt Creek (i.e., levee). The City of Lincoln owns a walking trail directly downgradient from Brunswick that traverses the area, north to south. Wells on these properties are not likely. The major portion of the property between the Brunswick facility and Salt Creek is privately owned (by Mr. Miller) and currently undeveloped. The installation of new drinking water wells is restricted by city ordinance and therefore not likely. However, other wells are possible, such as for irrigation or other non-domestic use. According to a December 8, 2000, letter from the current owner (partner-Mr. Don Miller), there are plans for major development of the downgradient property with retail and office buildings which will not rely on groundwater for any use. Based on this information, there are no current or anticipated human receptors to contaminated groundwater.

Air: Outdoor: The facility is an active production plant that is primarily occupied by workers inside the manufacturing and support buildings, and there is no significant occupation on the downgradient properties. Therefore, outdoor air exposure is not considered an issue. Indoor: There are no buildings on the downgradient properties. Part of the source area of groundwater contamination lies under the existing manufacturing building. Although indoor air samples have not been collected at the site; the current owner, General Dynamics, has a TCE degreasing unit that is located in the portion of the building above the contaminant plume source. Therefore, even if sampling were conducted, it would not be possible to distinguish between contaminant plume and occupational exposure contributions. OSHA requirements apply to the active manufacturing facility and, therefore, any potential indoor air exposure resulting from the contaminant plume is not considered a significant exposure pathway.

Soil: If contaminated surface or subsurface soil remains on the site related to the groundwater contamination, it would be in the anticipated source area that lies directly under the manufacturing building. Soil samples have not been collected, so concentrations are unknown. However, because the potentially affected soil lies under the floor, human contact will not occur.

Surface water and sediment: Title 117, Chapter 5 of Nebraska regulations provides surface water use classifications. Salt Creek, directly downgradient from the Brunswick facility, is segment 20000 of LP2 of the Lower Platte River Basin. This segment of Salt Creek is not classified as a source for public water supply, but is classified for recreational purposes. However, these classifications are not intended to represent actual stream uses, but beneficial uses that should be attained. Streams classified for recreational use have sufficient volume for a person to have full body contact with the water. The area at and downgradient of the Brunswick site has not been developed for recreational use (i.e. no boat ramps, docks, or swim areas have been installed and a levee system is present that limits easy access to the creek). Based on this information, human exposure to sediment and surface water downgradient to Salt Creek is not anticipated to occur.

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

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

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

_____ 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):

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.

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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): _____

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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 **Technical Products Group (Brunswick)** facility, EPA ID # **NED043534635**, located at **Lincoln, NE** 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 (signature) Original signed by _____ Date 8/28/02 _____
(print) **Mary Reilly Grisolano**
(title) **Project Manager**

Supervisor (signature) Original signed by _____ Date 8/28/02 _____
(print) **John Smith**
(title) **Chief, RCRA Corrective Action and Permits Branch**
(EPA Region or State) **EPA, Region 7**

Locations where References may be found:

U.S. EPA Records Center, 901 N. 5th St., Kansas City, KS 66101

Contact telephone and e-mail numbers

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FINAL NOTE: THE HUMAN EXPOSURES EI IS A QUALITATIVE SCREENING OF EXPOSURES AND THE DETERMINATIONS WITHIN THIS DOCUMENT SHOULD NOT BE USED AS THE SOLE BASIS FOR RESTRICTING THE SCOPE OF MORE DETAILED (E.G., SITE-SPECIFIC) ASSESSMENTS OF RISK.