

WMD

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: Dow Chemical Company, LA  
Facility Address: Plaquemine, Louisiana  
Facility EPA ID #: LAD 008187080

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, GPRRA). 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"<sup>1</sup> above appropriately protective risk-based "levels" (applicable promulgated standards, as well as other appropriate standards, guidelines, guidance, or criteria) from releases subject to RCRA Corrective Action (from SWMUs, RUs or AOCs)?

	<u>Yes</u>	<u>No</u>	<u>?</u>	<u>Rationale / Key Contaminants</u>
Groundwater	✓	—	—	LDEQ RECAP Screening Standards exceeded/chlorinated organics.
Air (indoors) <sup>2</sup>	—	✓	—	Employee medical monitoring data/chlorinated organics.
Surface Soil (e.g., <2 ft)	✓	—	—	LDEQ RECAP Screening Standards exceeded/chlorinated organics.
Surface Water	—	✓	—	Meets NPDES requirements/Not Applicable (NA).
Sediment	—	✓	—	Not applicable to site/NA.
Subsurf. Soil (e.g., >2 ft)	✓	—	—	LDEQ RECAP Screening Standards likely exceeded/chlorinated organics in saturated soils.
Air (outdoors)	—	✓	—	Outdoor chemical monitors, employee medical monitoring data/chlorinated organics.

\_\_\_\_\_ 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): Constituents that exceed LDEQ RECAP Screening Standards (SS):**

<u>Constituent</u>	<u>Groundwater SS (mg/l)</u>	<u>Soil SS</u>
Vinyl Chloride	0.002	(Not applicable)
Trichloroethene	0.005	due to saturated
Tetrachloroethene	0.005	nature of soil)
Chloroform	0.1	
1,2-Dichloropropane	0.005	
1,1,2-Trichloroethane	0.005	
Benzene	0.005	
1,1-Dichloroethene	0.81	
t-1,2-Dichloroethene	0.1	
Chloroethane	0.86	
Bromoform	0.1	
Tetrachloroethane	0.0005	
Hexachlorobenzene	0.001	
Hexachlorobutadiene	0.00085	
Hexachloroethane	0.00079	
1,2-Dichloroethane	0.005	
bis (2-Chloroisopropyl) ether	0.01	
bis (2-Chloroethyl) ether	0.01	
Chloride	NA (Secondary drinking water standard of 250 ppm exceeded)	

**References:**

- Louisiana Department of Environmental Quality Risk Evaluation/Corrective Action Program (RECAP), LDEQ, December 20, 1998
- Corrective Action Agreement (GW-89-003) Quarterly Reports, The Dow Chemical Company, 4<sup>th</sup> Quarter 1990 through Present date
- Block 49 Remedial Action Plan and Computer Model Study, The Dow Chemical Company, December 12, 1986
- Status Report on Block 49, The Dow Chemical Company, February 4, 1991

Lighthouse Road Assessment Results and Proposed Remedial Plan, The Dow Chemical Company, April 8, 1994  
700 Railyard Assessment Results and Remediation Plan, The Dow Chemical Company, October 30, 1992  
Chlorine I Plant Brine Assessment and Remediation Plan, The Dow Chemical Company, October 5, 1985  
Northwest Landfill Remediation Plan, The Dow Chemical Company, January 12, 1992  
Preliminary Report on the Subsurface Investigation at the Block 80 EC-1 Solid Waste Surface Impoundment, The Dow Chemical Company, December 30, 1986

Footnotes:

<sup>1</sup> "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).

<sup>2</sup> 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)

<u>"Contaminated" Media</u>	Residents	Workers	Day-Care	Construction	Trespassers	Recreation	Food <sup>3</sup>
	<u>No</u>	<u>No</u>	<u>No</u>	<u>Yes</u>			<u>No</u>
Groundwater	<u>No</u>	<u>No</u>	<u>No</u>	<u>Yes</u>			<u>No</u>
Air (indoors)	<u>X</u>	<u>X</u>	<u>X</u>				
Soil (surface, e.g., <2 ft)	<u>No</u>	<u>No</u>	<u>No</u>	<u>Yes</u>	<u>No</u>	<u>No</u>	<u>No</u>
Surface Water	<u>X</u>	<u>X</u>			<u>X</u>	<u>X</u>	<u>X</u>
Sediment	<u>X</u>	<u>X</u>			<u>X</u>	<u>X</u>	<u>X</u>
Soil (subsurface e.g., >2 ft)				<u>Yes</u>			<u>No</u>
Air (outdoors)	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>		

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): Air exposure pathways are not likely based on employee medical monitoring program results and lack of response from chemical specific outdoor monitors. Construction workers may potentially come into contact with contaminated groundwater, surface soils, and subsurface soils for a short duration during excavation type projects. Exposure of construction workers to contaminated media is minimized by utilizing personnel protective equipment and organic vapor monitoring as appropriate.

References:

Lighthouse Road Assessment Results and Proposed Remedial Plan, The Dow Chemical Company, April 8, 1994  
700 Railyard Assessment Results and Remediation Plan, The Dow Chemical Company, October 30, 1992  
Corrective Action Agreement (GW-89-003) Quarterly Reports, The Dow Chemical Company, 4<sup>th</sup> Quarter

1990 through Present date

Block 49 Remedial Action Plan and Computer Model Study, The Dow Chemical Company, December 12, 1986

Status Report on Block 49, The Dow Chemical Company, February 4, 1991

Chlorine I Plant Brine Assessment and Remediation Plan, The Dow Chemical Company, October 5, 1985

Northwest Landfill Remediation Plan, The Dow Chemical Company, January 12, 1992

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Impoundment, The Dow Chemical Company, December 30, 1986

<sup>3</sup> 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"<sup>4</sup> (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): Air exposure pathways are not likely based on employee medical monitoring program results and lack of response from chemical specific outdoor monitors.

Construction workers may potentially come into contact with contaminated groundwater, surface soils, and subsurface soils for a short duration during excavation type projects. Exposure of construction workers to contaminated media is minimized by utilizing personnel protective equipment and organic vapor monitoring as appropriate.

References:

Lighthouse Road Assessment Results and Proposed Remedial Plan, The Dow Chemical Company, April 8, 1994

700 Railyard Assessment Results and Remediation Plan, The Dow Chemical Company, October 30, 1992

Corrective Action Agreement (GW-89-003) Quarterly Reports, The Dow Chemical Company, 4<sup>th</sup> Quarter 1990 through Present date

Block 49 Remedial Action Plan and Computer Model Study, The Dow Chemical Company, December 12, 1986

Status Report on Block 49, The Dow Chemical Company, February 4, 1991

Chlorine I Plant Brine Assessment and Remediation Plan, The Dow Chemical Company, October 5, 1985

Northwest Landfill Remediation Plan, The Dow Chemical Company, January 12, 1992

Preliminary Report on the Subsurface Investigation at the Block 80 EC-1 Solid Waste Surface

Impoundment, The Dow Chemical Company, December 30, 1986

<sup>4</sup> 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.



**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.**

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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 The Dow Chemical Company Louisiana Operations facility, EPA ID # LAD 008187080, located at Plaquemine, LA 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) Donald Y. Nugent Date 12-14-1999  
(print) Donald Y. Nugent  
(title) Geologist 3 Environmental Technology Division 66-2

Supervisor (signature) Steve Christz Date 1/7/2000  
(print) Steve Christz  
(title) Geologist Supervisor  
(EPA Region or State) \_\_\_\_\_

Locations where References may be found:

References, including facility maps, are available in LDEQ's files in most of the following documents.  
Louisiana Department of Environmental Quality Risk Evaluation/Corrective Action Program (RECAP),  
LDEQ, December 20, 1998  
Corrective Action Agreement (GW-89-003) Quarterly Reports, The Dow Chemical Company, 4<sup>th</sup> Quarter  
1990 through Present date, LDEQ GWPD files  
Block 49 Remedial Action Plan and Computer Model Study, The Dow Chemical Company, December 12,  
1986, LDEQ GWPD files  
Status Report on Block 49, The Dow Chemical Company, February 4, 1991, LDEQ GWPD files  
Lighthouse Road Assessment Results and Proposed Remedial Plan, April 8, 1994, LDEQ GWPD files  
700 Railyard Assessment Results and Remediation Plan, October 30, 1992, LDEQ GWPD and HWD files  
Chlorine I Plant Brine Assessment and Remediation Plan, The Dow Chemical Company, October 5, 1985,  
LDEQ GWPD files  
Northwest Landfill Remediation Plan, The Dow Chemical Company, January 12, 1992, LDEQ GWPD files  
Preliminary Report on the Subsurface Investigation at the Block 80 EC-1 Solid Waste Surface  
Impoundment, The Dow Chemical Company, December 30, 1986, LDEQ SWD files

Contact telephone and e-mail numbers

(name) \_\_\_\_\_  
(phone #) \_\_\_\_\_  
(e-mail) \_\_\_\_\_

**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: Dow Chemical Company, LA  
Facility Address: Plaquemine, Louisiana  
Facility EPA ID #: LAD 008187080

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

- If yes - check here and continue with #2 below.  
 If no - re-evaluate existing data, or  
 If data are not available, skip to #8 and enter "IN" (more information needed) status code.

**BACKGROUND**

**Definition of Environmental Indicators (for the RCRA Corrective Action)**

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

**Definition of "Migration of Contaminated Groundwater Under Control" EI**

A positive "Migration of Contaminated Groundwater Under Control" EI determination ("YE" status code) indicates that the migration of "contaminated" groundwater has stabilized, and that monitoring will be conducted to confirm that contaminated groundwater remains within the original "area of contaminated groundwater" (for all groundwater "contamination" subject to RCRA corrective action at or from the identified facility (i.e., site-wide)).

**Relationship of EI to Final Remedies**

While Final remedies remain the long-term objective of the RCRA Corrective Action program the EI are near-term objectives which are currently being used as Program measures for the Government Performance and Results Act of 1993, GPRA). The "Migration of Contaminated Groundwater Under Control" EI pertains ONLY to the physical migration (i.e., further spread) of contaminated ground water and contaminants within groundwater (e.g., non-aqueous phase liquids or NAPLs). Achieving this EI does not substitute for achieving other stabilization or final remedy requirements and expectations associated with sources of contamination and the need to restore, wherever practicable, contaminated groundwater to be suitable for its designated current and future uses.

**Duration / Applicability of EI Determinations**

EI Determinations status codes should remain in 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).

**Migration of Contaminated Groundwater Under Control  
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2. Is groundwater known or reasonably suspected to be "contaminated" 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.

Rationale and Reference(s): The Dow Chemical Company performed a number of investigations and assessments in areas of known groundwater contamination, which ultimately led to a facility-wide investigation. During the period from March 1991 to March 1994, Dow conducted a facility-wide groundwater assessment to determine the horizontal and vertical extent of groundwater contamination. The first phase of the assessment entailed screening the shallow groundwater across the site for contamination. During the second phase, the areas with contamination were prioritized and the limits of contamination in the shallow and deep zones were delineated. The results of the assessment were submitted to LDEQ in Corrective Action Agreement (GW-89-003) Quarterly reports and public noticed. Constituents that exceed LDEQ RECAP Screening Standards (SS) are as follows:

Constituent	Groundwater SS (mg/l)
Vinyl Chloride	0.002
Trichloroethene	0.005
Tetrachloroethene	0.005
Chloroform	0.1
1,2-Dichloropropane	0.005
1,1,2-Trichloroethane	0.005
Benzene	0.005
1,1-Dichloroethene	0.81
t-1,2-Dichloroethene	0.1
Chloroethane	0.86
Bromoform	0.1
Tetrachloroethane	0.0005
Hexachlorobenzene	0.001
Hexachlorobutadiene	0.00085
Hexachloroethane	0.00079
1,2-Dichloroethane	0.005
bis (2-Chloroisopropyl) ether	0.01
bis (2-Chloroethyl) ether	0.01
Chloride	NA (Secondary drinking water standard of 250 ppm exceeded)

References:

- Louisiana Department of Environmental Quality Risk Evaluation/Corrective Action Program (RECAP), LDEQ, December 20, 1998
- Corrective Action Agreement (GW-89-003) Quarterly Reports, The Dow Chemical Company, 4<sup>th</sup> Quarter 1990 through Present date
- Block 49 Remedial Action Plan and Computer Model Study, The Dow Chemical Company, December 12, 1986
- Status Report on Block 49, The Dow Chemical Company, February 4, 1991
- Chlorine I Plant Brine Assessment and Remediation Plan, The Dow Chemical Company, October 5, 1985
- Northwest Landfill Remediation Plan, The Dow Chemical Company, January 12, 1992
- Preliminary Report on the Subsurface Investigation at the Block 80 EC-1 Solid Waste Surface Impoundment, The Dow Chemical Company, December 30, 1986

**Footnotes:**

<sup>1</sup>“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).

**Migration of Contaminated Groundwater Under Control  
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3. Has the migration of contaminated groundwater stabilized (such that contaminated groundwater is expected to remain within "existing area of contaminated groundwater"<sup>2</sup> 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"<sup>2</sup>.
- If no (contaminated groundwater is observed or expected to migrate beyond the designated locations defining the "existing area of groundwater contamination"<sup>2</sup>) - skip to #8 and enter "NO" status code, after providing an explanation.
- If unknown - skip to #8 and enter "IN" status code.

Rationale and Reference(s): Site-specific hydrogeologic conditions and groundwater corrective action efforts have effectively controlled the migration of contaminated groundwater. Horizontal recovery wells and French drains have been installed in prioritized areas of groundwater contamination and have successfully controlled groundwater contamination in both the shallow pervious and deep pervious zones. The groundwater recovery system is monitored and the data reported to LDEQ's Ground Water Protection Division in Corrective Action Agreement (GW-89-003) Quarterly groundwater monitoring reports. A groundwater recovery trench is in operation at the Northwest Landfill to address identified contamination in the shallow groundwater near the landfill. Seven vertical recovery wells are utilized at the Chlorine plant to address chloride contamination in the shallow pervious zone.

References:

Corrective Action Agreement (GW-89-003) Quarterly Reports, The Dow Chemical Company, 4<sup>th</sup> Quarter 1990 through Present date

Block 49 Remedial Action Plan and Computer Model Study, The Dow Chemical Company, December 12, 1986

Status Report on Block 49, The Dow Chemical Company, February 4, 1991

Priority Areas 1 and 2 and Vinyl II Corrective Action Plan, The Dow Chemical Company, June 17, 1994

Phase II Corrective Action Plan, The Dow Chemical Company, December 12, 1995

Chlorine I Plant Brine Assessment and Remediation Plan, The Dow Chemical Company, October 5, 1985

Chloride Remedial Activities Update - Chloride Plant Quarterly Reports, The Dow Chemical Company, 4<sup>th</sup> Quarter 1990 - Present date

Northwest Landfill Remediation Plan, The Dow Chemical Company, January 12, 1992

Northwest Landfill and Block 80 Hazardous Waste Landfill Semi-Annual Groundwater Monitor Well Sampling and Analyses Report, The Dow Chemical Company, 3<sup>rd</sup> Quarter 1993 through Present date

<sup>2</sup> "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.



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5. Is the discharge of "contaminated" groundwater into surface water likely to be "insignificant" (i.e., the maximum concentration<sup>3</sup> 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 concentration<sup>3</sup> 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 concentration<sup>3</sup> 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<sup>3</sup> 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): \_\_\_\_\_  
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<sup>3</sup> As measured in groundwater prior to entry to the groundwater-surface water/sediment interaction (e.g., hyporheic) zone.

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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<sup>4</sup>)?

\_\_\_\_\_ 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,<sup>5</sup> 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 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): \_\_\_\_\_  
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<sup>4</sup> 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.

<sup>5</sup> 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.

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

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

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

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

Rationale and Reference(s): Vertical recovery wells, horizontal recovery wells, French drains, and a recovery trench have been installed in prioritized areas of groundwater contamination and have successfully controlled groundwater contamination in both the shallow pervious and deep pervious zones. Dow utilizes data from forty-eight monitoring wells (screened in the shallow pervious zone, deep pervious zone, and Plaquemine Aquifer), seven vertical recovery wells, thirty horizontal recovery wells, three French drains, and one recovery trench to monitor the effectiveness of the recovery systems. Dow also evaluates the effectiveness of the recovery systems by monitoring groundwater levels in the shallow and deep pervious zones and preparing potentiometric maps quarterly. Rather than evaluate the hydraulic conditions of each individual area of concern, Dow evaluates the hydraulics of the entire Louisiana Division including the internal water supply canal systems, the surface water features, and the drawdown produced by the horizontal recovery wells and French drains. The recovery system data is reported to LDEQ's Ground Water Protection Division in Corrective Action Agreement (GW-89-003) Quarterly groundwater monitoring reports and quarterly reports for the Chlorine Plant. Northwest Landfill monitoring data is reported to LDEQ's Hazardous Waste Division in the semi-annual groundwater monitoring report for the landfill. Monitoring wells used to evaluate the groundwater recovery systems are as follows:

Chlorine Plant: NB1, NB2, NB3, NB4, NB5

Northwest Landfill: UN1, UN2, DN3, DN4, NN5, DN6, DN7, DN8, LD2, LD3, LD4, LD5, LD6, LD7, LD8

Block 49: 101A, 101B, 101C, 102A, 102B, 102C, 104A, 104B, 104C, 105A, 105B, 105C

Vinyl II: DSV1, DDV1, USV1, UDV1

Perimeter: UP1, UP2, UP3, UP4, DP5, DP6, DP7, DP8, DDP1, DDP2, DDP3, DDP4

References:

Corrective Action Agreement (GW-89-003) Quarterly Reports, The Dow Chemical Company, 4<sup>th</sup> Quarter 1990 through Present date

Northwest Landfill and Block 80 Hazardous Waste Landfill Semi-Annual Groundwater Monitor Well Sampling and Analyses Report, The Dow Chemical Company, 3<sup>rd</sup> Quarter 1993 through Present date

Chloride Remedial Activities Update - Chloride Plant Quarterly Reports, The Dow Chemical Company, 4<sup>th</sup> Quarter 1990 - Present date

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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 The Dow Chemical Company Louisiana Operations facility, EPA ID # LAD 008187080, located at Plaquemine, Louisiana. 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 (signature) Donald Y. Nugent Date 12-14-1999  
(print) Donald Y. Nugent  
(title) Geologist 3 Environmental Technology Division 66-2

Supervisor (signature) Steve Christy Date 1/7/2000  
(print) Steve Christy  
(title) Geologist Supervisor  
(EPA Region or State)

Locations where References may be found:

References, including facility maps, are available in LDEQ's files in most of the following documents.  
Louisiana Department of Environmental Quality Risk Evaluation/Corrective Action Program (RECAP), LDEQ, December 20, 1998  
Corrective Action Agreement (GW-89-003) Quarterly Reports, The Dow Chemical Company, 4<sup>th</sup> Quarter 1990 through Present date, LDEQ GWPD files  
Block 49 Remedial Action Plan and Computer Model Study, The Dow Chemical Company, December 12, 1986, LDEQ GWPD files  
Status Report on Block 49, The Dow Chemical Company, February 4, 1991, LDEQ GWPD files  
Priority Areas 1 and 2 and Vinyl II Corrective Action Plan, The Dow Chemical Company, June 17, 1994, LDEQ GWPD files  
Phase II Corrective Action Plan, The Dow Chemical Company, December 12, 1995, LDEQ GWPD files  
Chlorine I Plant Brine Assessment and Remediation Plan, The Dow Chemical Company, October 5, 1985, LDEQ GWPD files  
Chloride Remedial Activities Update - Chloride Plant Quarterly Reports, The Dow Chemical Company, 4<sup>th</sup> Quarter 1990 - Present date, LDEQ GWPD files  
Northwest Landfill Remediation Plan, The Dow Chemical Company, January 12, 1992, LDEQ HWD files  
Northwest Landfill and Block 80 Hazardous Waste Landfill Semi-Annual Groundwater Monitor Well Sampling and Analyses Report, The Dow Chemical Company, 3<sup>rd</sup> Quarter 1993 through Present date, LDEQ HWD files  
Preliminary Report on the Subsurface Investigation at the Block 80 EC-1 Solid Waste Surface Impoundment, The Dow Chemical Company, December 30, 1986, LDEQ SWD files

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Attachments  
Available  
Upon Request