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:	Albemarle Corporation South Plant (formerly Ethyl Corporation)
Facility Address:	P. O. Box 729, Magnolia, AR 71754-0729
Facility EPA ID #:	ARD052528809

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

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

   _____ If no - re-evaluate existing data, or

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

BACKGROUND

The Albemarle Corporation South Plant Facility, located 7 miles south of Magnolia, Arkansas is completing facility-wide corrective action under a Consent Administrative Order (CAO) LIS 98-167. The former Ethyl Magnolia facility was constructed in 1969 to take advantage of the natural brine deposits of the underlying Smackover Formation. The facility has produced bromine 1,2-dibromoethane, hydrogen sulfide gas, methane, vinyl bromide, alkyl dimethylamines, calcium bromide, diethylchlorothiophosphate, decabromodiphenyloxide, tetrabromobisphenol, methyl bromide, dibromoneopentyl glycol, dibromomethane, and bromochloromethane. Chemicals of concern have been identified as chlorides, bromides and ethylene dibromide (EDB).

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).

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

	Yes	No	?	Rationale / Key Contaminants
Groundwater	X			Upper water-bearing unit is the Cockfield Formation which ranges from 8 to 78 feet in thickness at the facility. COCs in the Cockfield include: Chlorides, bromides and ethylene dibromide (EDB). Lower section of the Sparta is the predominant source of usable groundwater in Colombia County. The Albemarle facility is located in an area that does not serve as an important recharge zone for the Sparta Formation. The Cook Mountain is the confining layer above the Sparta which is about 300 feet thick at this location. Thirteen wells are located in a 3-mile radius. All wells are screened in the Sparta except for wells 18S20W22DDA1 and 18S21W03BCA1.(Ref. 1) Locations of these wells are listed in Attachment 1. Land use in the surrounding area is forestland/undeveloped.
~~Air (indoors)~~[2]				
Surface Soil (e.g., <2 ft)	X			Areas of surface soil contamination are limited to onsite locations and include: SWMU #8 Railroad Load/Unload Area, SWMU #9 Old Laboratory Waste Disposal Area, SWMUs #31, 32, and 33 Tail Brine Ponds, SWMU # 43 Sand Bed Filter, SWMU #36 South Landfill, SWMU #65 Westside Fill Area, AOC Railroad track area south of the Bromine Recovery Unit, AOC PSV#1 Drainage ditches. COCs are chlorides and bromide. (Ref. 1).
Surface Water	X			Storm water runoff may have some COCs as listed above from "contaminated" surface soils. Storm water runoff is collected and treated in the Artificial Marsh (NPDES permit AR0038857). From the NPDES outfall, surface water runs to Horsehead Creek. (See Figure 1-3 in Ref. 2).
~~Sediment~~				
Subsurf. Soil (e.g., >2 ft)	X			Areas of subsurface soil contamination are limited to onsite locations and include: SWMU #8 Railroad Load/Unload Area, SWMU #9 Old Laboratory Waste Disposal Area, SWMUs #31, 32, and 33 Tail Brine

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[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.

Ponds, SWMU # 43 Sand Bed Filter, SWMU #36 South Landfill, SWMU #65 Westside Fill Area, AOC Railroad track area south of the Bromine Recovery Unit
COCs are chlorides and bromide (Ref.1).

~~Air (outdoors)~~ (Draft Title V permit has been issued)

____ 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.

Reference(s): References for the above information are:

1 - "Albemarle Corporation, South Plant Facility. Facility Investigation Workplan". May 2001. URC Corporation
2 - "Description of Current Conditions Report, South Plant Facility". May 2001. IT Corporation.

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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	N	N	N	N	N	N	N
~~Air (indoors)~~							
Soil (surface, e.g., <2 ft)	N	Y	N	Y	N	N	N
Surface Water	N	N	N	N	N	N	N
~~Sediment~~							
Soil (subsurface e.g., >2 ft)	N	N	N	Y	N	N	N
~~Air (outdoors)~~							

Instructions for Summary Exposure Pathway Evaluation Table:

1. Strike-out specific Media including Human Receptors' spaces for Media which are not "contaminated" as identified in #2 above.

2. enter "yes" or "no" for potential "completeness" under each "Contaminated" Media -- Human Receptor combination (Pathway).

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

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).

__X__ If yes (pathways are complete for any "Contaminated" Media - Human Receptor combination) - continue after providing supporting explanation.

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

Rationale and Reference(s):

Groundwater: Exposure pathways for residents, daycare facilities, recreation or food pathways are incomplete because there is no evidence that contaminated groundwater from the shallow uppermost water-bearing unit (the Cockfield) has migrated offsite. Also, offsite migration is not expected because the facility has installed a Leachate Interception System (LIS) which collects contaminated groundwater from the Cockfield Formation. Figure 3-5 in the DOCC(Ref. 2) is a potentiometric map which shows that groundwater in the Cockfield flows in a general eastward direction. The LIS was installed in 90's and updated in '95, and consists of a french drain/slurry wall system and sumps located along the easternmost boundary of the facility. The slurry wall is keyed into the Cook Mountain Formation clay layer in order to capture groundwater in saturated zones of the Cockfield. In 1999 the groundwater monitoring system was expanded with the installation of 2 additional wells to insure additional coverage. Exposure pathways for workers and construction workers onsite is considered to be incomplete because the depth to groundwater at the facility averages from 25 to 30 feet below ground surface. (Ref. 1)

Surface soils: Exposure pathways for contaminated surface soil are considered complete for the onsite worker and construction workers. The trespasser scenario is considered incomplete because the site is fenced and maintains 24-hour controls. Exposure pathways for residents, daycare facilities, recreation and food are considered incomplete because there is no offsite contaminated surface soils, according to the documents reviewed. Also, the surrounding land use is undeveloped and forestland.

Subsurface soils: Exposure pathways for contaminated subsurface soil is considered complete for the onsite construction worker. All other exposure scenarios are considered incomplete because contaminated subsurface soils are only onsite.

Surface water: Exposure pathways for surface water exposure which may contain elevated levels of COCs are not considered complete because the surface water runoff at the facility is controlled through the use of a storm water drainage system. All surface water is collected and treated in the Artificial Marsh and is discharged through a NPDES outfall (NPDES permit AR0038857).

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 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):

Exposure pathways considered complete were: 1)onsite worker to contaminated surface soils, 2)onsite construction worker to contaminated surface and subsurface soils. Exposures for the complete pathways described are considered to be **insignificant** because of the following rationale:
1) For the onsite worker, Albemarle South facility has a controlled environment where workers are required to complete worker safety training which informs them of contaminants of concern and how to prevent exposures through the use of proper protocol for entry into a "contaminated area" and the use of proper protective equipment.
2) For the construction worker, Albemarle South facility has specific contractor requirements for using proper protocol (such as obtaining worker permits before any excavation activity) along with the use of required employee training.

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

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

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

_____ 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):

Current Human Exposures Under Control
Environmental Indicator (EI) RCRIS code (CA725)
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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):

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 Albemarle South facility, EPA ID ARD052528809, located at Magnolia, Arkansas 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)		Date	
	(print)	Ali Dorobati	6/1/04	
	(title)	Engineer II		

Supervisor	(signature)		Date	
	(print)	Daniel Clanton P.E.	6/1/04	
	(title)	Engineering Supervisor		
	(EPA Region or State)	Arkansas Dept. of Environmental Quality		

Locations where References may be found:
References may be found at the offices of the Arkansas Department of Environmental Quality (ADEQ) 8001 National Drive, Little Rock, AR 72209 P.O. Box 8913, Little Rock, AR 72219 (501) 682-0744

Contact telephone and e-mail numbers

(name)	Ali Dorobati
(phone #)	501-682-0836
(e-mail)	ali@adeq.state.ar.us

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.

ATTACHMENT 1

Existing Water Wells Within A 3-Mile Radius of South Plant

Local Well No.	Ladtude (Degrees)	Longitude (Degrees)	Type of Site	Aquifer Code	Surface Elevation (Feet)	Depth of Well (Feet)	Construction Date	Date Water Level Measured
18S2W06DDC1	331142	0931248	W	124SPRT	300.00	502	05-01-57	07-19-68
18S20W18ABD1	331039	0931255	W	124SPRT	276.00	578	10-01-68	01-10-69
18S20W18ADC1	331025	0931255	W	124SPRT	273.00	457	01-01-68	01-10-69
18S20W20DBC1	330922	0931210	W	124SPRT	253.00	168	05-08-79	06-20-79
18S20W21DDB1	330915	0931048	W	124SPRT	290.00	96	N/A	06-18-91
18S20W22DDA1	330913	0930935	W	124CCKF	328.00	20.3	12-31-89	10-20-77
18S21W03BCA1	331224	0913628	W	124CKM N	291.00	314	12-31-89	10-12-77
18S21W04DDD1	331150	0931641	W	124SPRT	304.00	450	01-01-45	N/A
18S21W09AAA1	331146	0931647	W	124SPRT	310.00	485	05-26-43	10-12-67
18S2W09AAA3	331211	0931702	W	124SPRT	310.00	485	06-01-43	N/A
18S21W09AAD1	331202	0931710	W	124SPRT	310.00	523	04-03-59	04-03-59
18S21W09ADB1	331136	0931648	W	N/A	315.00	N/A	N/A	04-28-88
18S21W19DAC1	330937	0931903	W	124SPRT	315.00	513	09-01-48	08-03-50

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:	Albemarle Corporation South Plant (formerly Ethyl Corporation)
Facility Address:	P. O. Box 729, Magnolia, AR 71754-0729
Facility EPA ID #:	ARD052528809

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

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

   _____ If no - re-evaluate existing data, or

   _____ if data are not available skip to #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 "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).

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

   __X__ If yes - continue after identifying key contaminants, citing appropriate "levels," and referencing supporting documentation.
   ____ If no - skip to #8 and enter "YE" status code, after citing appropriate "levels," and referencing supporting documentation to demonstrate that groundwater is not "contaminated."
   ____ If unknown - skip to #8 and enter "IN" status code.

Rationale and Reference(s):

The upper water-bearing zone at the Albemarle South facility has elevated levels of the following constituents at these approximate concentrations, as measured from a recent sampling event; (Ref. 1 and Ref. 2 at end of document)

COC	
total chlorides	69,000 mg/l
bromide	640 mg/l
EDB	4.4 mg/l

Upper water-bearing unit is the Cockfield Formation which ranges from 8 to 78 feet in thickness at the facility. COCs in the Cockfield include: Chlorides, bromides and ethylene dibromide (EDB). Lower section of the Sparta is the predominant source of usable groundwater in Colombia County. The Albemarle facility is located in an area that does not serve as an important recharge zone for the Sparta Formation. The Cook Mountain is the confining layer above the Sparta which is about 300 feet thick at this location (Ref.1).

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

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

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

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

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

Rationale and Reference(s):

Offsite migration of groundwater from the Cockfield is not expected because the facility has installed a Leachate Interception System (LIS)which collects contaminated groundwater from the Cockfield Formation. Figure 3-5 in the DOCC (Ref. 2) is a potentiometric map which shows that groundwater in the Cockfield flows in a general eastward direction. The LIS was installed in 90's and updated in '95, and consists of a french drain/slurry wall system and sumps located along the easternmost boundary of the facility. The slurry wall is keyed into the Cook Mountain Formation clay layer in order to capture groundwater in saturated zones of the Cockfield. In 1999 the groundwater monitoring system was expanded with the installation of 2 additional wells to insure additional coverage.

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[2] "existing area of contaminated groundwater" is an area (with horizontal and vertical dimensions) that has been verifiably demonstrated to contain all relevant groundwater contamination for this determination, and is defined by designated (monitoring) locations proximate to the outer perimeter of "contamination" that can and will be sampled/tested in the future to physically verify that all "contaminated" groundwater remains within this area, and that the further migration of "contaminated" groundwater is not occurring. Reasonable allowances in the proximity of the monitoring locations are permissible to incorporate formal remedy decisions (i.e., including public participation) allowing a limited area for natural attenuation.

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

____ If yes - continue after identifying potentially affected surface water bodies.

_X_ If no - skip to #7 (and enter a "YE" status code in #8, if #7 = yes) after providing an explanation and/or referencing documentation supporting that groundwater "contamination" does not enter surface water bodies.

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

Rationale and Reference(s):

Offsite migration of groundwater from the Cockfield is not expected because the facility has installed a Leachate Interception System (LIS)which collects contaminated groundwater from the Cockfield Formation. Figure 3-5 in the DOCC (Ref. 2) is a potentiometric map which shows that groundwater in the Cockfield flows in a general eastward direction. The LIS was installed in 90's and updated in '95, and consists of a french drain/slurry wall system and sumps located along the easternmost boundary of the facility. The slurry wall is keyed into the Cook Mountain Formation clay layer in order to capture groundwater in saturated zones of the Cockfield. In 1999 the groundwater monitoring system was expanded with the installation of 2 additional wells to insure additional coverage.

5. Is the **discharge** of "contaminated" groundwater into surface water likely to be **"insignificant"** (i.e., the maximum concentration[3] of each contaminant discharging into surface water is less than 10 times their appropriate groundwater "level," and there are no other conditions (e.g., the nature, and number, of discharging contaminants, or environmental setting), which significantly increase the potential for unacceptable impacts to surface water, sediments, or eco-systems at these concentrations)?

____ If yes - skip to #7 (and enter "YE" status code in #8 if #7 = yes), after documenting: 1) the maximum known or reasonably suspected concentration[3] of key contaminants discharged above their groundwater "level," the value of the appropriate "level(s)," and if there is evidence that the concentrations are increasing; and 2) provide a statement of professional 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[3] of each contaminant discharged above its groundwater "level," the value of the appropriate "level(s)," and if there is evidence that the concentrations are increasing; and 2) for any contaminants discharging into surface water in concentrations[3] greater than 100 times their appropriate groundwater "levels," the estimated total amount (mass in kg/yr) of each of these contaminants that are being discharged (loaded) into the surface water body (at the time of the determination), and identify if there is evidence that the amount of discharging contaminants is increasing.

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

Rationale and Reference(s):

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

6. Can the **discharge** of "contaminated" groundwater into surface water be shown to be **"currently acceptable"** (i.e., not cause impacts to surface water, sediments or eco-systems that should not be allowed to continue until a final remedy decision can be made and implemented[4])?

____ If yes - continue after either: 1) identifying the Final Remedy decision incorporating these conditions, or other site-specific criteria (developed for the protection of the site's surface water, sediments, and eco-systems), and referencing supporting documentation demonstrating that these criteria are not exceeded by the discharging groundwater; OR 2) providing or referencing an interim-assessment,[5] appropriate to the potential for impact, that shows the discharge of groundwater contaminants into the surface water is (in the opinion of a trained specialists, including ecologist) adequately protective of receiving surface water, sediments, and eco-systems, until such time when a full assessment and final remedy decision can be made. Factors which should be considered in the interim-assessment (where appropriate to help identify the impact associated with discharging groundwater) include: surface water body size, flow, use/classification/habitats and contaminant loading limits, other sources of surface water/sediment contamination, surface water and sediment sample results and comparisons to available and appropriate surface water and sediment "levels," as well as 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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[4] Note, because areas of inflowing groundwater can be critical habitats (e.g., nurseries or thermal refugia) for many species, appropriate specialist (e.g., ecologist) should be included in management decisions that could eliminate these areas by significantly altering or reversing groundwater flow pathways near surface water bodies.

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

7. Will groundwater **monitoring** / measurement data (and surface water/sediment/ecological data, as necessary) be colleted 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):

Groundwater monitoring is routinely carried out at the Albemarle South facility as part of their Consent Administrative Order (CAO) LIS 98-167.

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).

_X_ 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 Albemarle South facility , EPA ID ARD052528809, located at Magnolia, Arkansas. 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.

REFERENCES:

1) Albemarle Corporation, Document of Current Conditions, South Plant Facility, dated April, 1999, revised May 8, 2003.
2) Albemarle Corporation, South Plant Facility, Facility Investigation Work Plan, dated May 2001, revised March, 2004.

Completed by	(signature)		Date	
	(print)	Linda A. Hanson	7-Jun-04	
	(title)	Geologist, MSc., P.G.		

Supervisor	(signature)		Date	
	(print)	Jim Rigg		
	(title)	Geologist Supervisor		
	(EPA Region or State)	Arkansas Dept. of Environmental Quality		

Locations where References may be found:
References may be found at the offices of the Arkansas Department of Environmental Quality (ADEQ) 8001 National Drive, Little Rock, AR 72209 P.O. Box 8913, Little Rock, AR 72219 (501) 682-0744

Contact telephone and e-mail numbers

(name)	Linda A. Hanson
(phone #)	(501)682-0789
(e-mail)	hanson@adeq.state.ar.us

Migration of Contaminated Groundwater Under Control
Environmental Indicator (EI) RCRIS code (CA750)

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).

X 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 Albemarle South facility, EPA ID ARD052528809, located at Magnolia, Arkansas. 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.

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Completed by	(signature)		Date	
	(print)	Linda A. Hanson	7-Jun-04	
	(title)	Geologist, MSc., P.G.		

Supervisor	(signature)		6/9/04 Date	
	(print)	Jim Rigg		
	(title)	Geologist Supervisor		
	(EPA Region or State)	Arkansas Dept. of Environmental Quality		

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