LASERFICHE FILE TRANSMITTAL FORM
DIVISION OF WASTE MANAGEMENT
HAZARDOUS WASTE SECTION

Your Name: Mike Babuin

Document Category: Facility

Document Group: Corrective Action

Document Type: Environmental Indicators (EI)

EPA ID: NCD085074821

Facility Name/Subject: Clariant West

Document Date: 09/14/2016

Description: Environmental Indicators: CA725 and CA750

Author: M.L. Babuin

Branch/Unit: Facilities Management Branch

Facility/Site Address: 625 E. Catawba Ave.

Facility/Site City: Mt. Holly

Facility/Site State: North Carolina

Facility/Site Zipcode: 28120

Facility/Site County: Gaston

File Room Use Only

| | Month | Day | Year |
|---|---|---|---|
| Date Received by File Room: | | | |
| Date Scanned: | | | |

Scanner's Initial:

# MEMORANDUM

TO: Clariant Mt. Holly West Plant (General File)

FROM: Michael L. Babuin, PG

DATE: 9/14/2016

SUBJ: Evaluation of Clariant Mt. Holly West Plant's status under the Environmental Indicator Event Codes (CA725 and CA750)
NCD 085074821

## I. PURPOSE OF MEMO

This memo is written to formalize an evaluation of the Clariant Mt. Holly West Plant's status in relation to the following corrective action event codes defined in RCRAInfo:

1) Current Human Exposures Under Control (CA725) – IN

2) Migration of Contaminated Groundwater Under Control (CA750) – YES

## II. SUMMARY OF FOLLOW-UP ACTIONS

*Upon reviewing the CA725, Hart & Hickman believe human exposures are somewhat unknown. The HWS agrees with that determination and further agrees that near-slab soil gas sampling as identified under Vapor Intrusion in item 3 of the CA725 assessment is an appropriate step forward.*

*In addition, we recommend that PCB sampling in the Catawba river is needed. Specifically, we recommend that upstream, mid-facility, and downstream sampling be conducted in accordance with protocol outlined in the EPA Region 4 PCB Technical Guidance Document. As such, a work plan for the soil gas sampling and for the river sampling should be submitted to HWS staff for review and approval. While the H&H evaluation did identify the need for PCB sampling in the Catawba River, the NC Hazardous Waste Section has decided that the Contaminated Groundwater is Under Control.*

*The HWS also recognizes that the RFI Additional Assessment report currently under review constitutes another mechanism which may require additional investigation leading towards alleviation of potential human exposures. Specifically, these additional investigations will include the items identified above as well as possible additional air sampling.*

Attachments: 1. CA725: Current Human Exposures Unknown
2. CA750: Migration of Contaminated Groundwater Under Control

ec: John Johnston/US EPA Region 4
Michael DePalma/Clariant Corporation
Bud McCarty/NC Hazardous Waste Section
Jason Soban/Hart & Hickman, PC

**Via e-mail**

August 5, 2016

Hazardous Waste Section
Division of Waste Management
NC Department of Environmental Quality
1646 Mail Service Center
Raleigh, North Carolina 27699-1646

Attention: Mr. Michael L. Babuin, PG

Re: Environmental Indicator Determination – Revision 1
Clariant Corporation – Mount Holly West Plant
Mount Holly, North Carolina
Site Identification No. NCD085074821
H&H Job No. CLR-071

Dear Michael:

On behalf of Clariant Corporation (Clariant), Hart & Hickman, PC (H&H) is providing the following responses to the North Carolina Department of Environmental Quality (DEQ) comments regarding the Environmental Indicator (EI) Determination for the Mount Holy West Plant in Mount Holly, North Carolina. This letter addresses comments outlined in DEQs letter dated November 5, 2015, and incorporates additional details requested by DEQ in a July 21, 2016 phone call. For ease of reference, DEQs original comment is provided in i*talics* below, with our response following each comment. Please note that revised text in the EI Determination is identified in ***bold italics***.

> *Note: Previously, the HWS recommended that Clariant compare soil analytical results to the IHSB's "Preliminary Soil Remediation Goals (PSRG) Table." Clariant has revised recent reports to accommodate this recommendation. The EI evaluations should also be revised to be consistent with the reports.*

As requested by the North Carolina Department of Environmental Quality (DEQ) in their November 5, 2015 letter, the EI Determination has been revised to incorporate the IHSB Preliminary Soil Remediation Goals (PSRGs). The EI Determination text has been updated for comparison of constituent concentrations to PSRGs to be consistent with H&H's *2014 Additional Assessment Report – Revision 1*, dated September 23, 2015.

*Response #2 to Question #2 discusses the results of Hart & Hickman's 2012 Additional Assessment Report. In the section of Response #2 that addresses surface soil, the report mentions that the concentrations of PCBs and arsenic in some areas of the facility exceed EPA's Regions Screening Levels for the industrial-use scenario. At some point in the EI evaluation document, Hart & Hickman should list each area with surface soil impacted at constituent concentrations above industrial screening levels and discuss the potential for a complete surface soil-to-receptor exposure pathway for each of the contaminated areas.*

In response to this comment, additional text has been added to Response #4 of Question #2 of the CA725 EI Determination to identify the areas of the facility with surface soil impacts above IHSB Industrial PSRGs. A discussion of the potential for a complete surface soil-to-receptor exposure pathway for each of the impacted areas has also been added to Response #4 of Question #2.

*Response #4 to Question #2 summarizes the results of Hart & Hickman's 2014 Additional Assessment Report. The discussion of surface soil in Response #4 states that PCB-1248 was detected in surface soil at concentrations exceeding EPA's Regions Screening Level (RSL) for the industrial-use scenario. The surface soil samples were collected between the Warehouse and the Plant 1 Building.*

*The HWS is concerned about the soil analytical results reported in the 2014 Additional Assessment Report. In a number of cases, soil samples were collected in borings located immediately adjacent to borings advanced for the 2012 additional assessment. Although samples were collected at similar depths, analytical results were, on a number of occasions, significantly lower.*

*The HWS issued comments for the 2014 additional assessment report and asked Hart & Hickman to discuss the lower analytical results. Hart and Hickman's response to one of the Section's comments implies the existence of numerous, relatively small, areas of impacted soil. As far as the EI evaluations are concerned, Hart & Hickman should discuss how the presence of several small areas of soil contamination affect the EI evaluations and determinations.*

The presence of small, isolated areas of impacted soil is not thought to significantly affect the EI evaluations and determinations as the key contaminants detected in soil at concentrations above protective risk-based levels are identified in the EI. Based on current site conditions, exposure to these small isolated areas is not expected to be significant and is limited to construction activities which the facility has procedures and protocols in place to minimize potential human exposure. In addition, during potential construction activities, relatively larger volumes of soil are disturbed and mixed which minimizes the potential for worker exposure to isolated, higher concentration areas, if present.

*If groundwater or soil is impacted with volatile organic compounds (including their degradation products) that are not used in an industrial building, the potential for a complete vapor intrusion exposure pathway should be evaluated using DWM's Vapor Intrusion Guidance. This recommendation is consistent with the VI guidance document. (The guidance document can be accessed through http://portal.ncdenr.org/web/wm/sf/ihs/ihsguide). Conversely, the chemical constituents used in an industrial building should be regulated by OSHA.*

The EI text has been updated and the potential for a complete vapor intrusion pathway has been evaluated using DWM's Vapor Intrusion Guidance (see Response #1 to CA725 Question #3)

*The Section of the CA 725 EI evaluation titled "Response #1 – Soil (surface and subsurface)" states that a "responsible person" has authority for Clariant-West's Excavation Permit Procedure. While specific responsibilities are listed, the person's name or positon title are not given. At a minimum, Clariant should add the responsible employee's title to this section of the EI evaluation.*

The Environmental, Safety, and Health Affairs (ESHA) Manager has the authority to issue and oversee the implementation of work permits and authorization procedures at the Mount Holly West Plant. As requested, the referenced title has been added to this section of the EI evaluation.

*For the purposes of Question #5, ten times and 100 times the measured constituent concentrations in groundwater are compared to constituent concentrations in surface water. If a constituent's concentration in surface water is less than 10 times its concentration in groundwater, the discharge of impacted groundwater is "likely" to be insignificant. On the other hand, if a constituent's concentration in surface water is 100 times greater, or more, than its concentration in groundwater, the discharge of impacted groundwater into surface water is potentially significant.*

*As was done by Clariant, additional insights into CA 750 Question #5 and Question #6 can be gained by comparing the concentrations of constituents in groundwater to appropriate NC 2B Surface Water Standards. Clariant should incorporate a list of appropriate NC 2B Surface Water Standards, which in this case will be for Class WS surface water, into the responses for Question #5 or Question #6.*

The EI has been updated to reflect the comparisons of surface water to groundwater concentrations as noted in this comment and to incorporate a list of applicable NC 2B Surface Water Standards for a Class WS surface water within the response for CA750 Question #5.

*PCBs were detected in soil samples collected in an area east-northeast of the Stormwater Retention Basin. The area of PCB detections is immediately upgradient from the Catawba River. PCB concentrations in some of the soil samples exceeded the soil-to-groundwater screening levels listed in the EPA Regions Table. (The IHSB soil screening table does not*

*contain soil-to-groundwater screening values for PCBs.) Although some soil samples were analyzed by the SPLP method, groundwater samples have not been collected and analyzed for PCBs.*

*The results of a Catawba River surface water sampling program are discussed in Hart & Hickman's 2014 Additional Assessment Report. Surface water samples collected during this program were not analyzed for PCBs. It should be noted that PCB Fish Consumption Advisories for certain species of fish caught in Mountain Island Lake and Lake Wylie (North Carolina) have been issued by the NC Division of Public Health.*

The EI Determination text in response to CA750 Question #5 has been updated to incorporate the note above stating that PCB Fish Consumption Advisories for certain species of fish caught in Mountain Island Lake and Lake Wylie (North Carolina) have been issued by the NC Division of Public Health.

Should you have any questions or require any additional information concerning this submittal, please feel free to contact me at (704) 586-0007.

Sincerely,

***Hart & Hickman, PC***

Steve Hart, PG
Principal Hydrogeologist

Jason Soban, PG
Senior Project Geologist

Attachments

cc: Gil Insley, Clariant Corporation (digital copy via email)
Michael Depalma, Clariant Corporation (digital copy via email)
Michael Simpson, Celanese Corporation (digital copy via email)
Steven Simpson, Celanese Corporation (digital copy via email)

**DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION**
**RCRA Corrective Action**
**Environmental Indicator (EI) RCRAInfo code (CA725)**

**Current Human Exposures Under Control**

**Facility Name:** Clariant Mount Holly West
**Facility Address:** 625 East Catawba Avenue, Mount Holly, North Carolina
**Facility EPA ID #:** NCD 085 074 821

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

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

**Current Human Exposures Under Control**
**Environmental Indicator (EI) RCRAInfo code (CA725)**

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

| | Yes | No | ? | Rationale / Key Contaminants |
|---|---|---|---|---|
| Groundwater | **X** | ___ | ___ | **VOCs, SVOCs (see References 1, 2, and 4)** |
| Air (indoors) [(2)] | ___ | ___ | **X** | **Indoor Air is currently sampled by Clariant for health and safety purposes and the analytes do not coincide with impacts identified in soil and groundwater.** |
| Surface Soil (e.g., <2 ft) | **X** | ___ | ___ | **VOCs, SVOCs, PCBs (see References 2 and 4)** |
| Surface Water | ___ | **X** | ___ | **See References 3 and 4** |
| Sediment | ___ | **X** | ___ | **See Reference 4** |
| Subsurf. Soil (e.g., >2 ft) | **X** | ___ | ___ | **VOCs, SVOCs, metals, PCBs, formaldehyde (see References 2 and 4)** |
| Air (outdoors) | ___ | ___ | **X** | **Exterior air sampling has not been conducted to date.** |

____ 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.

**X** If unknown (for any media) - skip to #6 and enter "IN" status code.

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.

Rationale and Reference(s):

For reference, a site location map has been included as Figure 1 and a Site Map included as Figure 2.

1. Hart & Hickman, PC- *2011 Annual Groundwater Monitoring Report* dated February 16, 2012.

Site-wide groundwater sampling of existing monitoring wells performed in October 2011 indicated two primary areas of groundwater impacts at the site: 1) in and downgradient of Plant 1, and 2) the east-central portion of the site southwest of Plant 1 (*Figure 2*). The predominant compounds of concern above North Carolina 2L Groundwater Standards (2L groundwater standards) include the chlorinated ethenes tetrachloroethene (PCE) and its primary degradation products (trichloroethene (TCE), cis-1,2-dichloroethene (cDCE), and vinyl chloride (VC)) in both areas of impacts. In addition, benzene, 1,4-dichlorobenzene, and 2-chlorotoluene were identified primarily in the area of Plant 1. The SVOCs 3-&4-methylphenol, 2-methylnaphthalene, and bis(2-ethylhexyl)phthalate were also detected

above 2L groundwater standards in some site wells. Note that field parameter data collected during the 2011 annual sampling event (i.e. dissolved oxygen, oxidation-reduction potential) indicated favorable conditions for reductive dechlorination of chlorinated ethenes. In addition there was an overall decrease in contaminant concentrations over time in most areas of the site. The analytical data and geochemical data from this sampling event are summarized on *Tables 2* and *3* of the *2011 Annual Groundwater Monitoring Report.*

2. Hart & Hickman, PC- *2012 Additional Assessment Report* dated May 28, 2013.

H&H completed additional assessment activities at the property in 2012. Below is a summary of the key findings relating to the completion of the EIs.

*Groundwater* –The results of groundwater sampling during the 2012 investigation in addition to the data obtained in October 2011 (described above) confirmed the presence of commingled aromatic (including chloro-aromatic) and chlorinated (principally chlorinated ethenes) compound groundwater plumes at the site. The primary compounds detected above 2L groundwater standards are listed in #1 above. Consistent with the previous data, the two primary areas of groundwater impact are the area of Plant 1 and to the southwest of Plant 1. The groundwater data indicated that another primary source area for groundwater impact appears to be near Plant 3. Free product believed to be diesel fuel has historically been detected in monitoring well MW-2 located east of Plant 3 and, following the 2012 sampling activities, free product was identified in temporary well TMW-3 located west of Plant 3.

The groundwater data also indicated a source area north of the warehouse in the area of a sewer line release. In addition, groundwater analytical results indicated a possible source of chlorinated ethenes upgradient of MW-23 and temporary wells TMW-4 and TMW-5 in the southern portion of the site southeast of the wastewater pre-treatment plant.

*Surface Soil* – Soil analytical data is provided in the *2012 Additional Assessment Report*. During the 2012 assessment, seven shallow (<2 ft below grade) soil samples were collected. Results indicate several VOCs (2-chlorotoluene, 4-chlorotoluene, PCE, and vinyl chloride) above protection of groundwater screening criteria in the sample collected from DPT-30 (0-2 ft) located between the warehouse and Plant 1 (*Figure 2*). PCB-1248 was detected above ***the DEQ Inactive Hazardous Sites Branch (IHSB***) Industrial ***Preliminary Soil Remediation Goal (PSRG)*** in samples DPT-3 and DPT-4 (SWMU-5, between warehouse and Plant 1). SVOCs benzo(a)anthracene and benzo(a)pyrene were detected above protection of groundwater screening criteria in DPT-51 (SWMU-25, East of Plant 1).

A summary of historical soil analytical data is also included as an attachment to the *2012 Additional Assessment Report*. The historical soil analytical data indicate six sample locations where surficial soil samples (<2 ft below grade) were collected that contained PCE at concentrations above protection of groundwater screening criteria. Compounds detected above Industrial ***PSRGs*** included PCBs and arsenic. ***The areas of the facility with surface soil impacts above Industrial SRGs are identified in Reference #4 below (Hart & Hickman, PC - 2014 Additional Assessment Report dated February 27, 2015).***

*Sub-Surface Soil* – During the 2012 assessment, multiple subsurface soil samples were collected to address various SWMUs and areas of concern at the site. The SWMUs addressed included the following: 6, 11a, 13, 22, 23, 25, 26, 27, 28, 31, 43a, 43b, and 46. Compounds detected in subsurface soil above screening criteria included VOCs, SVOCs, metals, PCB-1248, and formaldehyde. Refer to the tables for a list of the specific compounds. Most concentrations exceeded only protection of groundwater screening criteria. However, at several locations, PCB-1248, arsenic (possibly background), naphthalene, and PCE exceeded the Industrial ***PSRGs***. More detailed information is provided in the *2012 Additional Assessment Report*.

As noted previously, a summary of historical soil analytical data is also provided as an attachment to the *2012 Additional Assessment Report*. The predominant compounds historically identified in subsurface soil above Industrial ***SRGs*** included ethylbenzene, xylene, PCBs, and arsenic.

3. CDM- *Groundwater and Surface Water Sampling Report* dated November 18, 2004.

Four surface water samples were collected from the Catawba River during this investigation in 2004. One sample was collected upgradient of the Mount Holly West facility (SW-1), and three samples were collected downgradient of outfalls that discharge from the property (SW-2, SW-3, and SW-4). MTBE was only detected in SW-1 (0.37 µg/L), collected upgradient of the facility. As this sample was located upstream of the facility, the presence of MTBE was

deemed to not be associated with the Mount Holly West facility. No other VOCs were detected in the surface water samples. Beryllium was detected at a concentration of 0.33 mg/L in the sample collected at location SW-4, which is above the NC 2B surface water standard of 0.0068 mg/L. Beryllium was not detected above method detection limits in any other surface water samples nor was it detected in the groundwater samples collected during the 2004 assessment. To Clariant's knowledge, beryllium has not been utilized in the manufacturing processes and; therefore, is not expected to be associated with the facility. Therefore, the beryllium detection was not considered to be associated with the Mount Holly West facility.

4. Hart & Hickman, PC - *2014 Additional Assessment Report* dated February 27, 2015.

H&H completed additional assessment activities at the property in 2014. Below is a summary of the key findings relating to the completion of the EIs.

*Groundwater* – The results of groundwater sampling during the 2014 investigation were similar to previous data obtained in October 2011 and April 2012 (described above) and indicate commingled aromatic (including chloro-aromatic) and chlorinated (principally chlorinated ethenes) compound groundwater plumes are present at the site. The primary compounds detected above 2L groundwater standards are listed in #1 above. Similar to previous investigations, the primary source areas for groundwater impact appear to be the following: the area of Plant 1, the area southwest of Plant 1, north of the warehouse (sewer release area), in the southern portion of the site southeast of the wastewater pre-treatment plant, and the area of Plant 3 (petroleum free product). Groundwater impacts appear to be delineated in the northern and western portions of the facility. Migration of impacts appears to correspond to groundwater flow direction toward the Catawba River located to the east-southeast of the facility.

*Surface Soil* – Based on 2012 surface soil results, soil borings were advanced to further delineate areas where compounds were previously detected above ***Industrial PSRGs*** and/or generic protection of groundwater screening levels, and to evaluate if site soil represents a site-specific leaching concern. Additionally, soil borings were advanced in historically undeveloped portions of the site to evaluate site specific metal concentrations in soil to address historical arsenic detections in shallow soils. Results of the 2014 soil assessment confirmed the presence of VOCs above protection of groundwater screening criteria and PCB-1248 above Industrial ***PSRGs*** in samples collected between the warehouse and Plant 1 and the SVOCs benzo(a)anthracene and benzo(a)pyrene above protection of groundwater screening criteria east of Plant 1. Results of 2014 delineation and site-specific leaching samples collected in these areas indicate that impacts are limited to shallow soils and shallow soil impacts do not pose a site-specific leaching concern for this area of the site. The soil metal background evaluation indicated that historical arsenic detections in potential areas of concern appear to be naturally occurring. 2012 and 2014 soil analytical data is summarized in Table 1 of the *2014 Additional Assessment Report.* ***As requested by DEQ, the areas of the site with surface soil impacts at concentrations above Industrial PSRGs, including naturally occurring arsenic, are discussed in the following paragraphs.***

***Arsenic has been detected in surface soil (<2 ft bgs) at concentrations that exceed the Industrial PSRG in the following plant locations: southeast of the warehouse, south of the warehouse and north of the wastewater treatment plant, and near the east-central property boundary. The area southeast of the warehouse and the area south of the warehouse and north of the wastewater treatment plant are covered with impervious surfaces (asphalt and concrete) or compacted crushed stone. The area along the east-central property boundary is covered with a maintained vegetative surface. As noted some of the arsenic detections are likely associated with naturally occurring arsenic concentrations.***

***PCB-1248 has been detected in surface soil (<2 ft bgs) at concentrations that exceed the Industrial PSRG in the following plant locations: south of Plant 1 and east of Plant 3. The area south of Plant 1 is covered with both maintained vegetative and impervious surfaces (asphalt and concrete). The area east of Plant 3 is covered with impervious surfaces (asphalt and concrete).***

***PCB-1254 has been detected in surface soil (<2 ft bgs) at concentrations that exceed the Industrial PSRG in the area between Plant 1 and the warehouse. This area is covered with impervious surfaces (asphalt and concrete).***

***The site is secure from unauthorized access; therefore, only on-site workers (construction or otherwise) could potentially be exposed during surface soil disturbance activities. Because the plant areas impacted with constituent concentrations above Industrial PSRGs are predominantly paved, direct contact by workers is not expected during***

***routine activities. Potential receptors (on-site workers) are also protected during soil disturbance activities through the implementation of site procedures that require appropriate precautions in consideration of potential environmental concerns (i.e., work permits and knowledge of site impacts). One of the precautions is that no excavation or soil disturbance activities at the facility occur without following appropriate site procedures and protocols. Therefore, human exposure with potentially contaminated surface soils is not reasonably expected to be significant under current site procedures and protocols, and human risk is minimized.***

*Sub-Surface Soil* – During the 2014 assessment, multiple subsurface soil samples were collected to address various SWMUs and areas of concern (AOCs) at the site. The SWMUs addressed included the following: 5, 6, 11a, 13, 18, 22, 23, 25, 26, 27, 28, and 46. The AOCs addressed included the area of former Plant 2 and the area downgradient of Plant 4. Summary and descriptions of the listed SWMUs and AOCs is provided in Appendix A of the *2014 Additional Assessment Report.* Compounds detected in subsurface soil above screening criteria included VOCs, SVOCs, metals, PCB-1248, and formaldehyde. Refer to the tables for a list of the specific compounds. Most concentrations exceeded only protection of groundwater screening criteria. However, at several locations, PCB-1248, naphthalene, and PCE exceeded the Industrial ***PSRGs***.

*Sediment and Surface Water* – In March 2014, H&H completed sediment and surface water assessment activities for the Clariant Mount Holly East Plant which is located in Mecklenburg County across the Catawba River from the subject site. Because this section of the Catawba River borders the Clariant Mount Holly West Plant to the east, the results of the sediment and surface water assessment are considered relevant to evaluation of the Clariant Mount Holly West Plant.

Results of the surface water assessment indicate that several metals were detected above laboratory reporting limits but below the NC 2B surface water standards for a Water Supply Classification surface water. The SVOC aniline was detected in a sample (CR-1A) collected at the effluent discharge point for the Clariant Mount Holly East Plant. Subsequent re-sampling conducted in April 2014 did not confirm the aniline detection. Aniline has not been detected in soil or groundwater at the Mount Holly West Plant at concentrations above the laboratory reporting limit. No VOCs or other SVOCs were detected above laboratory reporting limits in surface water.

Analytical results for sediment samples indicate that chlorobenzene was detected at a trace concentration in a sample (CR-1A) collected at the effluent discharge point for the Clariant Mount Holly East Plant, at a concentration below the protection of groundwater screening level. Chlorobenzene was not detected in the duplicate of this sample. No additional VOCs were detected in any of the sediment samples at concentrations above the laboratory reporting limit. The metals aluminum, barium, beryllium, calcium, total chromium, iron, lead, magnesium, mercury, nickel, potassium, vanadium, and zinc were also detected in the samples. Because the metals detected in the downgradient sample are comparable to concentrations of these metals in upgradient samples, the detections in the sediment samples appear to be naturally occurring.

Surface water and sediment assessment results indicate that discharging groundwater from the site is not having an impact on surface water or sediment quality in the Catawba River. More detailed information is provided in the *2014 Additional Assessment Report.*

**Current Human Exposures Under Control**
**Environmental Indicator (EI) RCRAInfo code (CA725)**

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 | Yes | No | No | No |
| Air (indoors) | No | Unknown | No | Unknown | No | No | No |
| Soil (surface, e.g., <2 ft) | No | Yes | No | Yes | No | No | No |
| Surface Water | No | No | No | No | No | ***Unknown*** | No |
| Sediment | No | No | No | No | No | ***Unknown*** | No |
| Soil (subsurface e.g., >2 ft) | No | Yes | No | Yes | No | No | No |
| Air (outdoors) | No | Unknown | No | Unknown | No | Unknown | No |

Instructions for Summary Exposure Pathway Evaluation Table:

1. Strike-out specific Media including Human Receptors' spaces for Media which are not "contaminated") as shown in Table 3 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).

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

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

Footnotes:

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

Rationale and Reference(s):

1. Hart & Hickman, PC *Conceptual Site Model*. Revision 1, May 3, 2010 (approved by DEQ, formerly known as DENR, HWS September 9, 2010), and Updated *Conceptual Site Model* provided in Hart & Hickman, PC *2014 Additional Assessment Report* dated February 27, 2015.

The property is zoned for industrial use and is bound to the south by Duke Power property and other industrial facilities, to the north and west by CSX railroad and residential properties beyond the railroad, and to the east by the Catawba River. The site is entirely fenced and has active security present at all times which restricts access.

*Groundwater*: Groundwater is typically 10 to 30 ft below ground surface across much of the site; however, shallower groundwater (approximately 5 ft bgs) has been identified along the river. Should construction activities be conducted in these areas, there is a potential risk to site construction workers to come into direct contact with impacted groundwater. As such, although unlikely, construction worker contact with shallow groundwater is considered a potential exposure pathway.

Groundwater is not utilized at the facility. A groundwater well survey has not been completed; however, the impacts to groundwater appear to be contained within the property boundary. Finally, groundwater flow is toward the Catawba River, and away from other nearby developed areas. Therefore, consumption of groundwater by human population is not considered a complete pathway.

*Indoor Air:* Indoor air has not been sampled at the facility for the specific site compounds of concern found in soil and groundwater. Based upon the presence of groundwater impacts near or below site buildings, the potential for VOCs in soil and groundwater to migrate into indoor air is a potentially complete exposure pathway. The site is secure from unauthorized access; therefore, only site workers or construction workers are likely to be potentially affected. Although a potentially complete exposure pathway, the potential for significant indoor air concerns is considered low given the industrial nature of the site for chemical production with ***ample*** ventilation ***and high air exchange rates inside areas of production.***

***To screen the vapor intrusion pathway, H&H completed USEPA's Vapor Intrusion Screening Level (VISL) Calculators (Version 3.45 based on November 2015 RSLs) for VOCs detected in groundwater near (within 100 ft) existing occupied site buildings to evaluate the potential cumulative risk associated with the detected groundwater concentrations. The VISL calculator is conservative and typically overestimates potential risk to indoor air from groundwater contamination. Please note that H&H has excluded chemicals that are currently used during production activities including the following: naphthalene is used during production activities in Plant 4 and Plant 5 and is stored in the Warehouse building; and xylenes are used during production activities in Plant 3 and Plant 5 and is stored in the Warehouse building. If present, these two chemicals were not included in the VISL Calculator for groundwater located near the above referenced site buildings.***

***The VISL Calculators indicate potential cumulative risks greater than threshold levels (i.e. carcinogenic risk greater than 1 x $10^{-4}$ and/or non-carcinogenic hazard index (HI) greater than 1) for industrial workers based on the groundwater concentrations detected in TMW-23 and MW-33 (area southeast and hydraulically downgradient of the Warehouse), MW-26 (area north and hydraulically upgradient of the Warehouse and east of Plant 4), and MW-6 (area southeast of Plant 1). Additionally, LNAPL has historically been observed in MW-25/TMW-3, located immediately west and hydraulically upgradient of Plant 3. As such, H&H recommends collecting near-slab (within 10 ft) soil gas samples to further evaluate the vapor intrusion pathway for Plant 1, Plant 3, Plant 4, and the Warehouse. H&H recommends this sampling to be conducted during future site assessment activities and a work plan for the sampling will be provided to DEQ prior to collection.***

*Soil (surface and subsurface):* Because the plant areas are predominantly paved, direct contact by workers is not expected during routine activities. ***Although a potentially complete exposure pathway exists, the potential for significant exposure to impacted surface and subsurface soil during possible construction activities is considered low because the duration of contact is limited during construction activities and the associated soil disturbance activities are implemented in consideration of potential environmental concerns (i.e., work permits and knowledge of site impacts). Prior to and during soil disturbance activities, steps to mitigate worker exposure are taken,***

***including, but not limited to, the implementation of site procedures to regulate and to require appropriate precautions.*** In addition, prior to soil excavation activities a work permit must be completed which aids in the evaluation of worker risk based on the specific area of the site. ***The Environmental, Safety and Health Affairs (ESHA) Manager*** is required to review the written request to determine if the excavation will be located in an ***AOC or*** SWMU and, if so, the ***ESHA Manager will*** ensure necessary soil samples are collected and analyzed, ***determine additional precautions or requirements specific to the job, and ensure site soils will not be disturbed in any manner without following appropriate site procedures and protocols. Therefore, human exposure with potentially contaminated soils (surface and subsurface) is not reasonably expected under current site procedures and protocols.***

*Surface Water:* Groundwater in the saprolite and bedrock aquifers is expected to discharge to the Catawba River where it is diluted by mixing with surface water and volatilizes. As noted previously, samples have been collected from the river and analyzed for VOCs, SVOCs, and metals, and the results indicate that the aromatic and chlorinated compounds detected in groundwater at the site are not impacting the river. Therefore, surface water is not considered a complete exposure pathway route ***for these compounds***. ***Surface water has not been analyzed for PCBs and it is currently unknown whether a complete exposure pathway for PCBs exists.***

*Sediment*: Sediment Samples have been collected from the river and analyzed for VOCs, SVOCs, and metals, and the results indicate that the aromatic and chlorinated compounds detected in groundwater at the site are not impacting the river. Therefore, Catawba River sediments are not considered a complete exposure pathway route ***for these compounds***. ***Sediment has not been analyzed for PCBs and it is currently unknown whether a complete exposure pathway for PCBs exists.***

*Outdoor Air*: Outdoor air samples from the facility have not been collected for the site compounds of concern; therefore, the potential for exposure cannot be determined. Unless the soil is disturbed, potential exposure to VOCs in outdoor air from underlying soil and groundwater is unlikely. Due to the types of SWMUs at the site, Clariant does not believe there is the potential for significant vapors from existing SWMUs. In addition, there are no open basins, vents, or stacks associated with these units. Because the site is predominantly paved or maintained with a grassy cover, dust generation is not expected to be a significant contributor to constituent migration. Dust is further controlled during construction activities because the associated soil disturbing activities are implemented in consideration of potential environmental concerns, including sampling and analysis of potentially affected soils and conducting activities in accordance with a site Health and Safety Plan. As such, wind transport is not considered a complete exposure pathway at the site.

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."

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

Footnotes:

(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.

Rationale and Reference(s):

Soil and Groundwater

Although there is potential for site or construction workers to come into contact with impacted soil and/or shallow groundwater, exposures to these media are not reasonably expected to be significant. The duration of contact is limited during construction activities because the associated soil disturbance activities are implemented in consideration of potential environmental concerns (i.e., work permits and knowledge of site impacts). Prior to construction activities, steps to mitigate worker exposure are taken, including, but not limited to, sampling and analysis of potentially affected media and conducting activities in accordance with a site Health and Safety Plan.

***Sediment and Surface Water***

***Catawba River sediment and surface water are not considered a complete exposure pathway route for VOCs, SVOCs, and metals. However, sediment and surface water have not been analyzed for PCBs and it is currently unknown whether a complete exposure pathway for these compounds exist.***

Unknown for Indoor Air

No indoor air samples have been collected; therefore, vapor intrusion risks to workers inside site buildings are unknown. ***As previously discussed, conservative VISL calculators based on groundwater concentrations near buildings indicate the potential for vapor intrusion at levels of possible concern. Therefore, further investigation is needed to evaluate the potential for indoor air exposures to be significant.***

**Current Human Exposures Under Control**
**Environmental Indicator (EI) RCRAInfo code (CA725)**

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.

__X__ If unknown (for any potentially "unacceptable" exposure) - continue and enter "IN" status code

Rationale and Reference(s):

For the media with potentially complete exposure pathways other than indoor air, no significant exposures were identified in Question #4.

Question #5 is unknown for indoor air.

**Current Human Exposures Under Control**
**Environmental Indicator (EI) RCRAInfo code (CA725)**

6. Check the appropriate RCRAInfo 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 **Clariant Mount Holly West** facility, EPA ID **#085 074 821,** located at **625 East Catawba Avenue, Mount Holly, North Carolina**, under current and reasonably expected conditions. This determination will be re-evaluated when the Agency/State becomes aware of significant changes at the facility.

____ NO - "Current Human Exposures" are NOT "Under Control."

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

Completed by:

(signature) _____ Date 8/5/16
(print) Jason Soban, P.G.
(title) Senior Project Geologist
(company) Hart & Hickman, PC

Supervisor:

(signature) _____ Date 8/5/16
(print) Michael Depalma, PE
(title) Regional ESHA Manager
(company) Clariant Corporation

Contact at NC Hazardous Section:

Michael L. Babuin, PG
Hydrogeologist
919-707-8211
Michael.Babuin@ncdenr.gov

Locations where References may be found:

Attn: Scott Ross
NC Hazardous Waste Section File Room
217 West Jones Street
Raleigh, NC 27603
919-707-8272
Scott.Ross@ncdenr.gov

**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.**

**DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION**
**RCRA Corrective Action**
**Environmental Indicator (EI) RCRAInfo code (CA750)**

**Migration of Contaminated Groundwater Under Control**

**Facility Name:** Clariant Mount Holly West
**Facility Address:** 625 East Catawba Avenue, Mount Holly, North Carolina
**Facility EPA ID #:** NCD 085 074 821

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

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

   _____ If no - re-evaluate existing data, or

   _____ If data are not available, skip to #8 and enter "IN" (more information needed) status code.

## BACKGROUND

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

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

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

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

### Relationship of EI to Final Remedies

While Final remedies remain the long-term objective of the RCRA Corrective Action program the EI are near-term objectives which are currently being used as Program measures for the Government Performance and Results Act of 1993, GPRA). The "Migration of Contaminated Groundwater Under Control" EI pertains ONLY to the physical migration (i.e., further spread) of contaminated 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 **RCRAInfo** national database ONLY as long as they remain true (i.e., **RCRAInfo** status codes must be changed when the regulatory authorities become aware of contrary information).

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

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.

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).

Rationale and Reference(s):

1. Hart & Hickman, PC - *2011 Annual Groundwater Monitoring Report* dated February 16, 2012.

Site-wide groundwater sampling of existing monitoring wells performed in October 2011 identified two primary areas of groundwater impacts at the site: 1) in and downgradient of Plant 1, and 2) the east-central portion of the site southwest of Plant 1 (Figure 2). The predominant compounds of concern above North Carolina 2L Groundwater Standards (2L groundwater standards) include the chlorinated ethenes PCE and its primary degradation products (TCE, cDCE, and VC) in both areas of impact. Benzene, 1,4-dichlorobenzene, and 2-chlorotoluene were also identified above 2L groundwater standards primarily in the area of Plant 1. The SVOCs 3-&4-methylphenol, 2-methylnapthalene, and bis(2-ethylhexyl)phthalate were also detected above 2L groundwater standards in some site wells. The analytical data and geochemical data from this sampling event are summarized on *Tables 2* and *3* of the *2011 Annual Groundwater Monitoring Report*.

2. Hart & Hickman, PC -*2012 Additional Assessment Report* dated May 28, 2013.

In 2012, H&H completed additional assessment at the property and identified soil and groundwater impacts. Below is a summary of the major findings as applicable to this EI.

The results of groundwater sampling during the 2012 investigation in addition to the data obtained in October 2011 (described above) confirmed the presence of commingled aromatic (including chloro-aromatic) and chlorinated (principally chlorinated ethenes) compound groundwater plumes at the site. The primary compounds detected above 2L groundwater standards are listed in #1 above. Consistent with the previous data, two primary areas of groundwater impact are the area of Plant 1 and to the southwest of Plant 1. The groundwater data indicated that another primary source area for groundwater impact appears to be near Plant 3. Free product believed to be diesel fuel has historically been detected in monitoring well MW-2 located east of Plant 3 and, following sampling activities, free product was identified in temporary well TMW-3 located south of Plant 3.

The groundwater data also indicated a source area north of the warehouse in the area of a sewer line release. Both chloro-aromatic and chlorinated compounds listed in #1 above were identified above 2L groundwater standards in this area of the site In addition, groundwater analytical results indicated a possible source of chlorinated ethenes upgradient of MW-23 and temporary wells TMW-4 and TMW-5 in the southern portion of the site southeast of the wastewater pre-treatment plant. The groundwater analytical data from the 2012 assessment are summarized on *Table 4* of the *2012 Additional Assessment Report*.

3. Hart & Hickman, PC- *2014 Additional Assessment Report* dated February 27, 2015.

In 2014, H&H completed additional assessment at the property. Below is a summary of the key findings relating to the completion of this EI.

The results of the groundwater sampling during the 2014 investigation were similar to previous data obtained in October 2011 and April 2012 (described above) and indicate commingled aromatic (including chloro-aromatic) and chlorinated (principally chlorinated ethenes) compound groundwater plumes are present at the site. The primary compounds detected above 2L groundwater standards are listed in #1 above. Similar to previous investigations, the primary source areas for groundwater impact appear to be the following: the area of Plant 1, the area southwest of Plant 1, north of the warehouse (sewer release area), in the southern portion of the site southeast of the wastewater pre-treatment plant, and the area of Plant 3 (petroleum free product).

The primary source areas for the chloroaromatics 2-chlorotoluene and 4-chlorotoluene are the area north of the warehouse (sewer release area) and the area to the southwest of Plant 1. Petroleum free product was confirmed in groundwater south of Plant 3 in permanent monitoring well MW-25. The free product is not migrating but is likely a continuing source of low level aromatic groundwater impact. The groundwater analytical data from the 2014 assessment are summarized on *Table 4* of the *2014 Additional Assessment Report*.

Note that additional groundwater assessment at the site may be necessary to further define the extent of impacts.

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

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.

Footnotes:

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

Rationale and Reference(s):

1. Hart & Hickman, PC- *2014 Additional Assessment Report* dated February 27, 2015.

The lateral extent of impacts to shallow groundwater in the saprolite zone is predominantly understood at the site and data indicate that the extent of shallow groundwater is stable to receding (see *Appendix C* for historical groundwater data). Groundwater analytical data indicate that concentrations of key constituents detected in deep groundwater (bedrock aquifer) at the site are generally lower when compared to shallow groundwater (saprolite aquifer). The migration of impacts in deep groundwater at the site is generally controlled by fracture orientation and based on site data groundwater in the bedrock zone appears to flow to the southeast towards the Catawba River. Groundwater in the saprolite and bedrock aquifers is expected to discharge to the Catawba River which serves as a regional groundwater discharge boundary. Based upon the stable to receding groundwater compound concentrations and hydraulic barrier east and southeast of the site, impacted groundwater in both saprolite and bedrock aquifers is expected to stay within the area of current impacts and is considered stable.

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

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

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

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

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

Rationale and Reference(s):

1. Hart & Hickman, PC *Conceptual Site Model*. Revision 1, May 3, 2010.

Groundwater in the saprolite and bedrock aquifers is expected to discharge to the Catawba River where it is diluted by mixing with surface water and volatilizes. Samples have been collected from the river and analyzed for VOCs, SVOCs, and metals, and the results indicate that the aromatic and chlorinated compounds detected in groundwater at the site are not impacting the river.

2. Hart & Hickman, PC- *2014 Additional Assessment Report* dated February 27, 2015.

In March 2014, H&H completed sediment and surface water assessment activities in the Catawba River east of the Mount Holly West facility. Surface water and sediment samples were collected upgradient, adjacent, and downgradient of the site. Results of the assessment indicate that discharging groundwater from the site is not having an impact on surface water or sediment quality in the Catawba River. More detailed information is provided in the *2014 Additional Assessment Report*.

5. Is the **discharge** of "contaminated" groundwater into surface water likely to be **"insignificant"** (i.e., the maximum concentration 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)?

__X__ 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 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.

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

Footnotes:

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

Rationale and Reference(s):

1. CDM- *Groundwater and Surface Water Sampling Report* dated November 18, 2004.

*Surface Water:* Four surface water samples were collected from the Catawba River during this investigation. One sample was collected upgradient of the Mount Holly West facility (SW-1), and three were collected downgradient of outfalls that discharge from the property (SW-2, SW-3, and SW-4). MTBE was only detected in SW-1 (0.37 µg/L), collected upgradient of the facility. As this sample was located upstream of the facility, the presence of MTBE was deemed to not be associated with the Mount Holly West facility. No other VOCs were detected in the surface water. Beryllium was detected at a concentration of 0.33 mg/L in the sample collected at location SW-4, which is above the NC 2B surface water standard of 0.0068 mg/L. Beryllium was not detected above method detection limits in any other surface water samples nor was it detected in the groundwater samples collected during this assessment. Therefore, the beryllium detection was not considered to be associated with the Mount Holly West facility.

2. Hart & Hickman, PC- *2014 Additional Assessment Report* dated February 27, 2015

*Surface Water:* In March 2014, H&H completed surface water assessment activities for the Clariant Mount Holly East Plant which is located in Mecklenburg County across the Catawba River from the subject site. Because this section of the Catawba River borders the Clariant Mount Holly West Plant to the east, the results of the sediment and surface water assessment are considered relevant to evaluation of the Clariant Mount Holly West Plant. Based on historical and recent surface water analytical data, it appears that compounds detected in groundwater at the site are not impacting the river.

Results of the surface water assessment indicate that several metals were detected above laboratory reporting limits but below the NC 2B surface water standards for a Water Supply Classification surface water. The SVOC aniline was detected in a sample (CR-1A) collected at the effluent discharge point for the Clariant Mount Holly East Plant. Subsequent re-sampling conducted in April 2014 did not confirm the aniline detection. Aniline has not been detected in soil or groundwater at the Mount Holly West Plant at concentrations above the laboratory reporting limit. No VOCs or other SVOCs were detected above laboratory reporting limits in surface water.

***PCBs have been detected in soil samples collected from the Area East of Plant 1 (southeast of the stormwater detention basin) at concentrations that exceed protection of groundwater and Industrial PSRGs. This area is located upgradient of the Catawba River. The results of site-specific leach testing of samples collected from this area indicate that soil contained leachate concentrations greater than the 2L Standard for PCBs. Groundwater, surface water, and sediment samples collected during the 2014 assessment were not analyzed for PCBs. Therefore, the potential for PCB impacted groundwater (if present) to discharge from the site to the Catawba River is currently unknown. Although unlikely related to the site, please note that the NC Division of Public Health has issued PCB Fish Consumption Advisories for certain species of fish caught in Mountain Island Lake and Lake Wylie (North Carolina).***

Analytical results for sediment samples indicate that chlorobenzene was detected at a trace concentration in a sample (CR-1A) collected at the effluent discharge point for the Clariant Mount Holly East Plant, at a concentration below the protection of groundwater screening level. Chlorobenzene was not detected in the duplicate of this sample. No additional VOCs were detected in any of the sediment samples at concentrations above the laboratory reporting limit. The metals aluminum, barium, beryllium, calcium, total chromium, iron, lead, magnesium, mercury, nickel, potassium, vanadium, and zinc were also detected in the samples. Because the metals detected in the downgradient sample are comparable to concentrations of these metals in upgradient samples, the detections in the sediment samples appear to be naturally occurring.

Surface water and sediment assessment results indicate that discharging groundwater from the site is not having an impact on surface water or sediment quality in the Catawba River. More detailed information is provided in the *2014 Additional Assessment Report*.

*Groundwater:* Shallow monitoring wells MW-3/3R, MW-8/8R, MW-9, MW-19, MW-22, and MW-23 are representative of the groundwater near the groundwater/surface water interface between the impacted areas of the site and the Catawba River (*Figure 2*). A summary of historical groundwater analytical results from these wells is provided as *Appendix C* to the *2014 Additional Assessment Report*. The key constituents detected in these downgradient wells at concentrations above 2L groundwater standards are PCE (MW-3/3R, MW-9, MW-19, and MW-23) and its degradation products TCE (MW-3/3R, MW-19, and MW-23), cDCE (MW-19 and MW-23), and VC (MW-8R, MW-9, and MW-19), and benzene (MW-22). Review of historical data indicate that concentrations of key constituents at wells MW-9, MW-19, MW-22, and MW-23 have decreased over time. However, concentrations of PCE and VC are currently higher in replacement wells MW-3R and MW-8R, respectively, when compared to historical data from their original well locations (i.e., MW-3 and MW-8). Because only one groundwater sample has been collected from these replacement wells, additional data may be necessary to establish concentration trends at these locations, and the increase in concentrations when comparing data from original wells with replacement well is not judged to be significant. ***As noted above, key constituent VOCs have not been detected in surface water. As such, the discharge of impacted groundwater to surface water is likely insignificant.***

***To provide additional insight into the potential for impacted groundwater discharge to surface water, H&H also compared groundwater concentrations near the groundwater/surface water interface to NC Surface Water Standards.*** Based on the most recent groundwater sampling event conducted in 2014, the maximum concentrations of key constituents detected in groundwater at concentrations that exceed 2L groundwater standards prior to entry to the hyporheic zone were PCE and TCE detected in shallow monitoring well MW-23 (128 µg/l and 24.9 µg/l, respectively), cDCE and VC detected in shallow monitoring well MW-19 (351 µg/l and 69.4 µg/l, respectively), and benzene detected in shallow monitoring well MW-22 (9.66 µg/l). The maximum concentrations of the above constituents detected in groundwater nearest the Catawba River were compared to 10x and 100x their respective NC 2B surface water standards for a Water Supply Classification surface water. Based on this comparison, the maximum concentrations of TCE, cDCE, and benzene do not exceed 10x their 2B Standard for surface water. However, PCE

and VC concentrations exceed 100x their 2B Standards. ***The NC 2B Surface Water Standards for the constituents discussed in this section are listed below:***

| ***Constituent*** | ***NC 2B Standard*** |
|---|---|
| ***PCE*** | ***0.7 µg/l*** |
| ***TCE*** | ***2.5 µg/l*** |
| ***cDEC*** | ***60 µg/l*** |
| ***VC*** | ***0.025 µg/l*** |
| ***Benzene*** | ***1.19 µg/l*** |

Although the ***concentrations of*** certain constituents (PCE and VC) ***exceed 100x the surface water standards***, the volume of groundwater from the site that discharges to the Catawba River and thus the max flux to the river is insignificant when compared to the size and volume of the Catawba River. Groundwater in the saprolite and bedrock aquifers that discharge to the river will be greatly diluted by mixing with surface water. As shown in results of surface water sampling conducted in 2004, and surface water/sediment sampling conducted in 2014, the results indicate that discharging groundwater from the site is not having an impact on surface water or sediment quality in the Catawba River ***and is therefore likely insignificant***.

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)])?

__X__ 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.

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

Footnotes:

(4) Note, because areas of inflowing groundwater can be critical habitats (e.g., nurseries or thermal refugia) for many species, appropriate specialist (e.g., ecologist) should be included in management decisions that could eliminate these areas by significantly altering or reversing groundwater flow pathways near surface water bodies.

(5) The understanding of the impacts of contaminated groundwater discharges into surface water bodies is a rapidly developing field and reviewers are encouraged to look at 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.

Rationale and Reference(s):

1. CDM- *Groundwater and Surface Water Sampling Report* dated November 18, 2004.

Please see details outlined in #5 above.

2. Hart & Hickman, PC- *2014 Additional Assessment Report* dated February 27, 2015

Please see details outlined in #5 above.

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

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

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

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

Rationale and Reference(s):

Yes, continued groundwater monitoring is planned at the site to monitor the extent of groundwater impacts, concentration trends, and natural attenuation processes. A monitoring schedule and scope has not been finalized for the site, but will be discussed with ***DEQ*** during upcoming meetings.

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

8. Check the appropriate RCRAInfo 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 Clariant Corporation Mount Holly West facility, EPA ID NCD085074821, located at 625 East Catawba Avenue in Mount Holly, North Carolina. Specifically, this determination indicates that the migration of "contaminated" groundwater is under control, and that monitoring will be conducted to confirm that contaminated groundwater remains within the "existing area of contaminated groundwater" This determination will be re-evaluated when the Agency becomes aware of significant changes at the facility.

_____ NO - Unacceptable migration of contaminated groundwater is observed or expected.

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

Completed by:

(signature) Jason Soban — Date 8/5/16
(print) Jason Soban, P.G.
(title) Senior Project Geologist
(company) Hart & Hickman, PC

Supervisor:

(signature) — Date 8/5/16
(print) Michael Depalma, PE
(title) Regional ESHA Manager
(company) Clariant Corporation

Contact at NC Hazardous Section:

Michael L. Babuin, PG
Hydrogeologist
919-707-8211
Michael.Babuin@ncdenr.gov

Locations where References may be found:

Attn: Scott Ross
NC Hazardous Waste Section File Room
217 West Jones Street
Raleigh, NC 27603
919-707-8272
Scott.Ross@ncdenr.gov