Five-Year Review Report

Fifth Five-Year Review Report
for
Celanese Corporation (Shelby Fiber Operations)
EPA ID NCD003446721

Grover
Cleveland County, North Carolina

August 2011

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For:
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Date: 8/31/11

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2525 Blacksburg Road
Grover
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List of Acronyms

ARAR	Applicable or Relevant and Appropriate Requirement
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
Celanese	Celanese Corporation
CFR	Code of Federal Regulations
CIC	Community Involvement Coordinator
CNA	CNA Holdings, Inc.
COC	Contaminant of Concern
EPA	United States Environmental Protection Agency
ESD	Explanation of Significant Differences
FYR	Five-Year Review
GRUB	Glycol Recovery Unit Bottoms
IC	Institutional Control
IDR	Independent Design Review
IT	Inner Tier
MCL	Maximum Contaminant Level
mg/L	milligrams per liter
MNA	Monitored Natural Attenuation
NCAC	North Carolina Administrative Code
NCDENR	North Carolina Department of Environment and Natural Resources
NCP	National Contingency Plan
NPDES	National Pollution Discharge Elimination System
NPL	National Priorities List
O&M	Operation and Maintenance
OT	Outer Tier
OU	Operable Unit
PAH	Polynuclear Aromatic Compound
PCE	Tetrachloroethylene
PRP	Potentially Responsible Party
RA	Remedial Action
RAO	Remedial Action Objective
RCRA	Resource Conservation and Recovery Act
RD	Remedial Design
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
RPM	Remedial Project Manager
SARA	Superfund Amendments and Reauthorization Act
SDWA	Safe Drinking Water Act
S&ME	Soil & Material Engineers, Inc.
TBC	To-Be-Considered Criteria
TCE	Trichloroethylene
VOC	Volatile Organic Compound

Executive Summary

Introduction

The Celanese Corporation (Shelby Fiber Operations) Site (the Site) is located near Shelby in Grover, Cleveland County, North Carolina. The 450-acre Site has an active manufacturing facility owned and operated by Ticona, which is a subsidiary of the Celanese Corporation (Celanese). CNA Holdings, Inc., another subsidiary of Celanese, owns the site property and is responsible for environmental work conducted at the Site. The manufacturing facility has been operating at the Site since 1960. The Celanese plant originally produced filament thread and polyester staple, which was used for a wide range of apparel and bedding products.

In the 1960s, the facility's wastewater treatment plant discharged chemical wastes through an eastward-draining ditch. Combustible materials including oils and solvents were burned in the open in a small area of the plant prior to 1970. Celanese used a three-acre portion of the Site for the storage of drums containing waste chemicals and solvents between 1970 and 1979.

In October 1981, Celanese installed ground water monitoring wells, conducted a hydrogeological evaluation and electromagnetic survey, and excavated test pits to investigate site conditions. Results indicated that site ground water, soil and sediment were contaminated. Due to the presence of contamination, the Site was proposed for inclusion on the United States Environmental Protection Agency (EPA)'s National Priorities List (NPL) in October 1984 and finalized on the NPL in June 1986. Contaminants of concern (COCs) at the Site include heavy metals and other inorganic chemicals, polycyclic aromatic hydrocarbons (PAHs) and volatile organic compounds (VOCs). CNA Holdings, Inc. (CNA), a Celanese subsidiary, manages the Site's environmental work. The Site consists of two operable units (OUs). OU1 addresses ground water contamination, while OU2 addresses source contamination at the Site. The triggering action for this Five-Year Review (FYR) was the signing of the previous FYR report on August 24, 2006.

The 1988 Record of Decision (ROD) for OU1 selected a remedy consisting of an extraction and treatment system to remove contaminants from site ground water. The ground water extraction and treatment system originally consisted of a two-tier extraction well system with an inner tier (IT) and outer tier (OT) of extraction wells. The ground water system began operating in August 1989. The OT wells operated until April 1998, while the IT wells operated until February 2004. In 2004, EPA signed an Explanation of Significant Differences (ESD) which changed the OU1 remedy to a two-year trial period for monitored natural attenuation (MNA) and modified the treatment approach for ground water extraction after the demonstration program. Under the revised treatment approach, the stand-alone ground water system would remain deactivated, and the IT area ground water would be pumped directly to the head of the plant's aerobic industrial wastewater treatment plant. The MNA study period was extended in 2006, and, additional options are currently being evaluated.

In 1989, the ROD for OU2 selected a remedy to address soil and sediment contamination at the Site. The objective of the OU2 remedy was to remove and treat the major source of contamination at the Site, rather than completely remove all contaminants, so that the operational

phase of the ground water extraction and treatment system for OU1 could be reduced. The major component of the remedy included the excavation of glycol unit recovery bottoms (GRUB) and adjacent soils that were incinerated on site. The incinerator ash and other waste materials were then solidified and stabilized with Portland cement, and used as backfill in the excavation areas on site. Source areas were then regraded and monitored. The remedy for OU2 was completed between 1991 and 1992. OU2 and the OT portion of the extraction and treatment system of the OU1 remedy at the Site were deleted from the NPL in 1998.

Remedial Action Objectives (RAOs)

Although no RAOs were specified in the OU1 ROD, the 1988 OU1 feasibility study (FS) stated that the remedial alternatives were developed to eliminate or reduce the waste source and abate contaminant migration through ground water and surface water routes. In addition, the OU1 ROD requires removal of all compounds detected in ground water above the maximum contaminant levels (MCLs) or North Carolina 2L standards (whichever is more stringent), which are not naturally occurring, "until the concentration of that compound has fallen below the lowest analytical method detection limit published by EPA for that particular compound."

EPA set the RAOs for OU2 in the 1989 OU2 FS. The RAOs established for OU2 include:

- Protect public health and the environment from exposure to contaminated soils and sediments through inhalation, ingestion and direct dermal contact.
- Remove the primary source of contamination to minimize the spread of contaminants into the soils, ground water, sediments and surface water.

Technical Assessment

The review of documents, applicable or relevant and appropriate requirements (ARARs), risk assumptions and the site inspection indicate that the Site's remedy for OU1 is not operating and functioning as designed by the decision documents. However, no completed exposure pathways currently exist at the Site. MNA and long-term monitoring are currently being used to address the remaining ground water contamination and their effectiveness is being evaluated. At this time, the MNA pilot study has been completed and the ground water extraction system has not been restarted as required by the ESD. In addition, an Independent Design Review (IDR) also determined that MNA may not be sufficient to address all of the contaminants detected at the Site, including diethylene dioxide (i.e., 1,4-dioxane) and trichloroethylene (TCE). In addition, ground water monitoring data indicate that COC concentrations may not be attenuating at a substantial rate for all COCs. Because MNA may not address all contamination remaining at the Site, ground water extraction should resume and the placement of extraction wells in the system should be evaluated to determine the most appropriate locations to be able to adequately remove the remaining contamination.

Ethylene glycol, diethylene dioxide and 1,1-biphenyl have been detected at concentrations above North Carolina ground water standards in wells located on site in areas that include the former burn pits and former GRUB disposal area. Biphenyl ether has also been detected in wells located

within the site property. There is no North Carolina or federal ground water standard for this constituent.

Diethylene dioxide concentrations exceeding North Carolina ground water standards were detected in several ground water monitoring wells located along Stream C during a stream inflow investigation. During the stream flow investigation, diethylene dioxide was also detected in Stream C. However, none of the stream concentrations exceeded North Carolina surface water standards. Because water supply agreements have been put in place as institutional controls on residential properties downgradient of the Site and diethylene dioxide concentrations meet surface water standards, there are no completed exposure pathways for this contaminant.

The potentially responsible party (PRP) has requested EPA to issue a decision document to delete metals as COCs. EPA has considered the request to delete metals as COCs as cleanup goals are achieved and determined that a formal remedy change (i.e. ESD) is not needed to document such action. Metals continue to be monitored as part of the expanded sampling events completed in September 2010 and March 2011 to provide additional data. If EPA determines that clean up goals have been achieved for metals or any COCs, monitoring programs may be modified, but remedy changes are not needed. The expanded sampling events completed in September 2010 and March 2011 to characterize existing contamination at the Site included additional sampling of manganese and arsenic to gather data to further support the removal of metals as site COCs. The findings from the expanded sampling event will be submitted to EPA in a technical memorandum in September 2011 and used to determine whether metals should continue to be monitored. It should be noted that the ground water ARARs for lead, chromium, barium and nickel have become more stringent since the signing of the 1988 ROD for OU1 and their cleanup goals should be updated.

TCE continues to be detected in monitoring wells HH-48 and HH-77, which are located outside of the facility property boundaries by a residential property. The source of TCE has been questioned by the PRPs and is currently being investigated as part of the expanded sampling event. The findings will be submitted in the September 2011 technical memorandum to EPA. Because TCE is a VOC, there is potential for vapor intrusion to occur on the residential property. To determine whether there was a current risk or an exposure pathway associated with the TCE in the ground water, EPA's remedial project manager (RPM) for the Site had a limited vapor intrusion assessment completed by an EPA vapor intrusion expert. The vapor intrusion assessment determined that there is no immediate risk of vapor intrusion based on review of TCE data available for monitoring well HH-48, the shallow well in the HH well cluster, and no further vapor intrusion evaluation is needed. Additionally, although there are VOCs besides TCE that have been detected in ground water at the Site, the risk of vapor intrusion on the site property is not likely because no enclosed buildings exist in the former GRUB area, and the production area is not enclosed.

An active manufacturing facility owned and operated by Ticona operates at the Celanese property, while CNA conducts the environmental work . The facility property is well-maintained and surrounded by a fence, and active security ensures that unauthorized visitors do not have access to the facility property. However, there are no institutional controls on the facility

property restricting the future use of ground water and the source area, or preventing any activity that could compromise the integrity of the selected remedy in the future.

Conclusion

The Site's remedy for OU1 currently protects human health and the environment in the short term. Institutional controls prohibiting ground water use are in place at residential properties downgradient of the facility property and these properties are connected to the municipal water supply. Ground water is also not in use on site. Therefore, there are currently no completed exposure pathways at the Site. MNA and long-term monitoring are currently being used to address remaining ground water contamination at the Site and their effectiveness is being evaluated. The IDR determined that MNA may not sufficiently address all contaminants detected at the Site, including diethylene dioxide and TCE. Because MNA may not address all contamination remaining at the Site, ground water extraction should resume and the placement of extraction wells in the system should be evaluated to determine the most appropriate locations to be able to adequately remove the remaining contamination.

The Site's remedy for OU2 currently protects human health and the environment in the short term. The area of source contamination addressed under OU2 at the Site has been regraded and revegetated following excavation and treatment of source contamination, as required by the selected remedy. Following remediation activities, EPA concluded that the OU2 remedy was protective of human health and the environment because the major source of contamination was removed and residual contamination that leaches into ground water would be addressed by the OU1 ground water remedy. OU2 was deleted from the NPL. Because contaminated soil and ground water remain on the facility property, institutional controls are needed to ensure that remaining contamination in the source areas is not disturbed.

For the Site's remedy to be protective in the long term, the remedy needs to be updated to ensure it effectively addresses remaining ground water contamination; remaining contamination at the Site needs to be completely characterized; and the potential for migration of diethylene dioxide off the facility property needs to be addressed. Additionally, institutional controls are needed on the facility property to limit future uses of ground water and the source area, and to ensure that the integrity of the selected remedy is not compromised in the future.

Five-Year Review Summary Form

SITE IDENTIFICATION		
Site name *(from WasteLAN)*: Celanese Corporation (Shelby Fiber Operations)		
EPA ID *(from WasteLAN)*: NCD003446721		
Region: 4	**State:** NC	**City/County:** Shelby/Cleveland

SITE STATUS	
NPL status: ☒ Final ☒ Deleted (OU2 and portion of OU1) ☐ Other (specify)	
Remediation status (choose all that apply): ☐ Under Construction ☐ Operating ☒ Complete	
Multiple OUs?* ☒ YES ☐ NO	**Construction completion date:** 3/25/1993
Has site been put into reuse? ☒ YES (continued use) ☐ NO	

REVIEW STATUS	
Lead agency: ☒ EPA ☐ State ☐ Tribe ☐ Other Federal Agency	
Author name: Christy Fielden and Treat Suomi (Reviewed by EPA)	
Author title: Associate and Senior Associate	**Author affiliation: Skeo Solutions**
Review period:** 11/29/2010 to 8/24/2011	
Date(s) of site inspection: 2/23/2011	
Type of review: ☒ Post-SARA ☐ Pre-SARA ☐ NPL-Removal only ☐ Non-NPL Remedial Action Site ☐ NPL State/Tribe-lead ☐ Regional Discretion	
Review number: ☐ 1 (first) ☐ 2 (second) ☐ 3 (third) ☒ Other (specify) 5 (fifth)	
Triggering action: ☐ Actual RA On-site Construction at OU# ☐ Actual RA Start at OU# ☐ Construction Completion ☒ Previous Five-Year Review Report ☐ Other (specify)	
Triggering action date *(from WasteLAN)*: 8/24/2006	
Due date *(five years after triggering action date)*: 8/24/2011	

* ["OU" refers to operable unit.]

** [Review period should correspond to the actual start and end dates of the Five-Year Review in WasteLAN.]

Five-Year Review Summary Form (continued)

Issues:

1. The selected remedy for OU1 needs to be updated to address remaining ground water contamination since the Independent Design Review (IDR) determined that MNA may not be sufficient to address diethylene dioxide and TCE contamination.
2. The ground water extraction system has not been restarted as required by the ESD.
3. Ground water ARARs for the metals lead, chromium, barium and nickel have become more stringent since the signing of the 1988 ROD for OU1.
4. Institutional controls were not called for in site decision documents and have not been implemented to limit the future use of ground water and the source area at the facility property and to ensure that the integrity of the selected remedy is not compromised in the future.
5. Diethylene dioxide has consistently been detected at concentrations which exceed the North Carolina ground water standard in monitoring wells along Stream C, and the extent of contamination has not been fully characterized at the Site.
6. The source of TCE in wells HH-48 and HH-77 located by a residence has been questioned by the PRP.

Recommendations:

1. Evaluate whether the current extraction wells can capture remaining contamination while a final decision is made in regards to updating the remedy in order to address remaining ground water contamination at the Site.
2. Resume ground water extraction and treatment.
3. Update site documents to reflect the more stringent ARARs for lead, chromium, barium and nickel.
4. Update site decision documents to include institutional controls and implement them to limit the future use of ground water and the source area at the Site, and to ensure that the integrity of the selected remedy is not compromised in the future.
5. Determine the source and fully characterize the extent of diethylene dioxide contamination at the Site and develop follow-up actions to address remaining contamination and mitigate the migration of contamination from the Site.
6. Determine the TCE source in wells HH-48 and HH-77 and determine if follow-up actions will be needed to address remaining TCE contamination at these wells.

Protectiveness Statement(s):

The Site's remedy for OU1 currently protects human health and the environment in the short term. Institutional controls prohibiting ground water use are in place at residential properties downgradient of the facility property and these properties are connected to the municipal water supply. Ground water is also not in use on site. Therefore, there are currently no completed exposure pathways at the Site. MNA and long-term monitoring are currently being used to address remaining ground water contamination at the Site and their effectiveness is being evaluated. The IDR determined that MNA may not sufficiently address all contaminants detected at the Site, including diethylene dioxide and TCE. Because MNA may not address all contamination remaining at the Site, ground water extraction should resume and the placement of extraction wells in the system should be evaluated to determine the most appropriate locations to be able to adequately remove the remaining contamination.

The Site's remedy for OU2 currently protects human health and the environment in the short term. The area of source contamination addressed under OU2 at the Site has been regraded and revegetated following excavation and treatment of source contamination, as required by the selected remedy. Following remediation activities, EPA concluded that the OU2 remedy was protective of human health and the environment because the major source of contamination was removed and residual contamination that leaches into ground water would be addressed by the OU1 ground water remedy. OU2 was deleted from the NPL. Because contaminated soil and ground water remain on the facility property, institutional controls are needed to ensure that remaining contamination in the source areas is not disturbed.

Five-Year Review Summary Form (continued)

Protectiveness Statement (continued)
For the Site's remedy to be protective in the long term, the remedy needs to be updated to ensure it effectively addresses remaining ground water contamination; remaining contamination at the Site needs to be completely characterized; and the potential for migration of diethylene dioxide off the facility property needs to be addressed. Additionally, institutional controls are needed on the facility property to limit future uses of ground water and the source area, and to ensure that the integrity of the selected remedy is not compromised in the future.

Other Comments:
Environmental Indicators
- Current human exposures at the Site are under control.
- Contaminated ground water migration is under control.

Note: The status of environmental indicators reflects the information available in CERCLIS for contaminants that have been identified as COCs for the Site. The indicators chemicals identified in the 1988 ROD (benzene, TCE, bis(2-ethylhexyl)phthalate, lead and chromium) are the only contaminants listed as COCs in CERCLIS although there are additional COCs as listed in Table 2 of this report that meet the criteria established in the 1988 ROD. The contaminant diethylene dioxide is known to be migrating off the facility property, but is not listed in CERCLIS as a site COC.

Are Necessary Institutional Controls in Place?
☐ All ☒ Some ☐ None
The remedies for OU1 and OU2 did not include institutional controls. However, off-site properties adjacent to the Site were connected to Cleveland County's municipal water system in 1996, and deed restrictions were placed on affected properties prohibiting the use or installation of private wells for any type of ground water use as long as a public water source is available. Institutional controls at the facility property are being pursued by Ticona and CNA in cooperation with the North Carolina Department of Environment and Natural Resources (NCDENR).

Has the Site Been Designated as Site-Wide Ready for Anticipated Use? ☐ Yes ☒ No

Fifth Five-Year Review Report
for
Celanese Corporation (Shelby Fiber Operations) Superfund Site

1.0 Introduction

The purpose of a Five-Year Review (FYR) is to evaluate the implementation and performance of a remedy in order to determine if the remedy will continue to be protective of human health and the environment. The methods, findings and conclusions of FYRs are documented in FYR reports. In addition, FYR reports identify issues found during the review, if any, and document recommendations to address them.

The United States Environmental Protection Agency (EPA) prepares FYRs pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 121 and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). CERCLA Section 121 states:

> "If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgment of the President that action is appropriate at such site in accordance with section [104] or [106], the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews."

EPA interpreted this requirement further in the NCP; 40 Code of Federal Regulations (CFR) Section 300.430(f)(4)(ii), which states:

> "If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such actions no less often than every five years after the initiation of the selected remedial action."

Skeo Solutions, an EPA Region 4 contractor, conducted the FYR and prepared this report regarding the remedy implemented at the Celanese Corporation (Shelby Fiber Operations) site (the Site) near Shelby in Grover, Cleveland County, North Carolina. This FYR was conducted from November 2010 to August 2011. EPA is the lead agency for developing and implementing the remedy for the potentially responsible party (PRP)-financed cleanup at the Site. The North Carolina Department of Environment and Natural Resources (NCDENR), as the support agency representing the State of North Carolina, has reviewed all supporting documentation and provided input to EPA during the FYR process.

This is the fifth FYR for the Site. The triggering action for this statutory review is the previous FYR. The FYR is required due to the fact that hazardous substances, pollutants or contaminants

remain at the Site above levels that allow for unlimited use and unrestricted exposure. The Site consists of two operable units (OUs), both of which are addressed in this FYR.

2.0 Site Chronology

Table 1 lists the dates of important events for the Site.

Table 1: Chronology of Site Events

Event	Date
Initial discovery	April 1, 1984
EPA proposed the Site for listing on the National Priorities List (NPL)	October 15, 1984
Remedial investigation / feasibility study (RI/FS) began for OU1 and OU2	February 15, 1986
EPA issued Administrative Order on Consent to PRP to perform the RI/FS	March 10, 1986
EPA listed the Site on the NPL	June 10, 1986
RI/FS completed for OU1; EPA signed the Record of Decision (ROD) selecting the remedy for OU1	March 23, 1988
Remedial design (RD) began for OU1	June 30, 1988
RD completed for OU1	October 20, 1988
EPA and PRP entered into a Consent Decree	October 21, 1988
Remedial action (RA) began for OU1	October 24, 1988
RI/FS completed for OU2; EPA signed the ROD selecting the remedy for OU2	March 28, 1989
RD began for OU2	June 19, 1989
EPA and PRP enter into a Consent Decree	November 24, 1989
RD began for OU2; RA began for OU2	September 24, 1990
EPA prepared Preliminary Close-Out Report for OU1	March 25, 1993
RA completed for OU1 and OU2	July 2, 1993
EPA completed the first FYR for OU1	September 8, 1994
EPA completed the first FYR for OU2	December 4, 1995
EPA completed a partial deletion of the Site from the NPL (OU2 and portions of OU1)	April 17, 1998
EPA completed the second FYR for OU1	August 29, 2001
EPA issued an Explanation of Significant Differences (ESD) for OU1	April 23, 2004
EPA completed the first site-wide FYR	August 24, 2006

3.0 Background

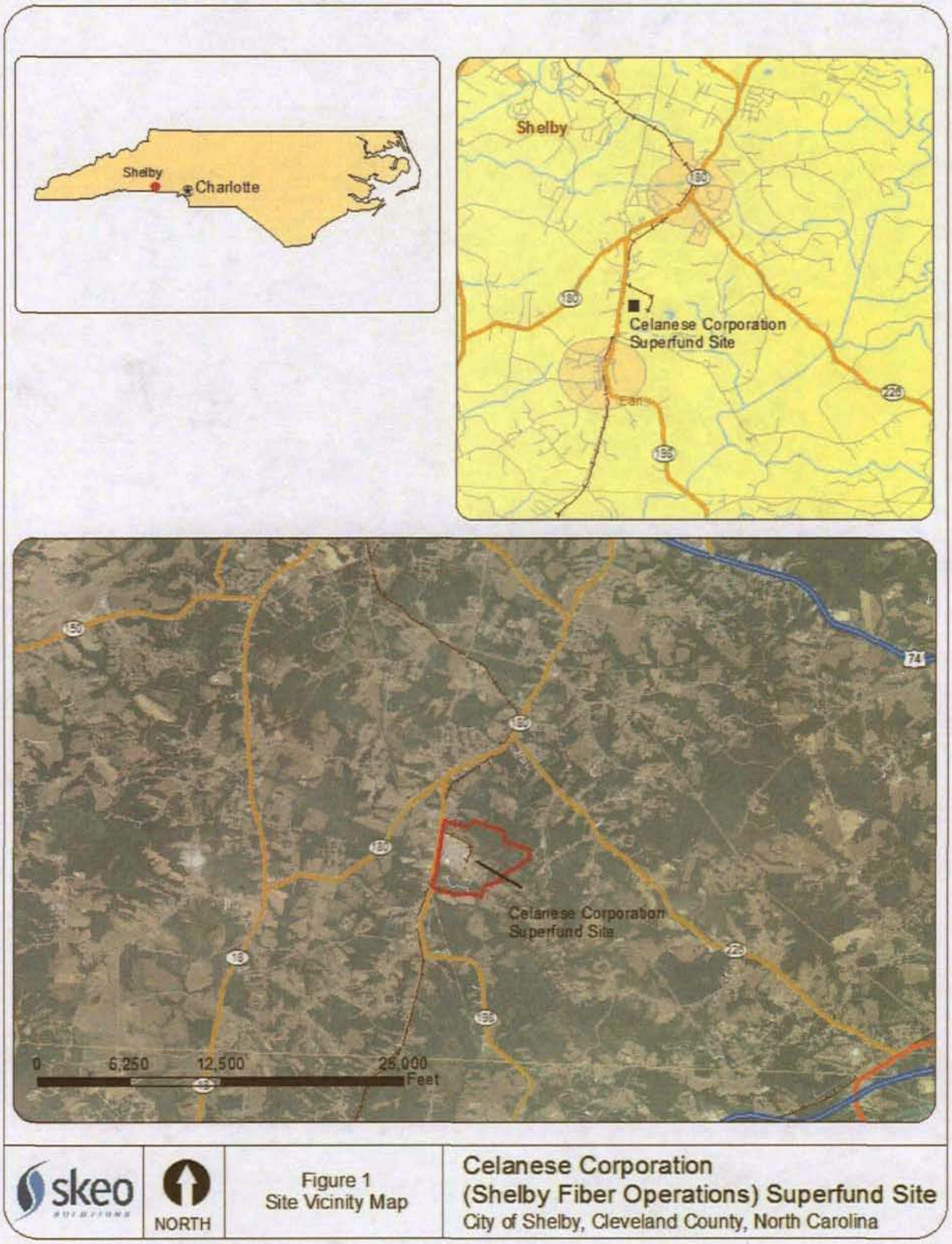
3.1 Physical Characteristics

The Site is located six miles south of the City of Shelby, Cleveland County, in south-central North Carolina (Figure 1). The Site is approximately 450 acres in size and consists of a main plant production area, a wastewater treatment area, former waste disposal areas and recreational and wooded areas. The plant production area includes buildings and paved and graveled areas. The wastewater treatment area consists of grassy areas and roads (Figure 2). The recreation area is a wooded area with no structures present. CNA Holdings, Inc. (CNA), a subsidiary of the Celanese Corporation (Celanese), owns the site property (Cleveland County parcel number 4512) and is responsible for environmental work conducted at the Site. Ticona, another subsidiary of Celanese owns and operates the active manufacturing facility at the Site. The Site is located in a predominantly rural area in Cleveland County. Surrounding land uses include residential and agricultural land uses.

The geology at the Site primarily consists of low permeable saprolite overlying bedrock. The saprolite is generally thickest beneath the plant and thins toward the east and in the vicinity of the adjacent streams. Ground water is present in the saprolite under water table conditions and in fractures of the bedrock. The direction of ground water movement in the shallow saprolite zone is to the east, northeast, and southeast from upgradient areas along North Carolina Highway 198 toward discharge areas along unnamed tributaries of Buffalo Creek. Direction of ground water movement in the deeper saprolite and upper bedrock zone is in the same general direction.

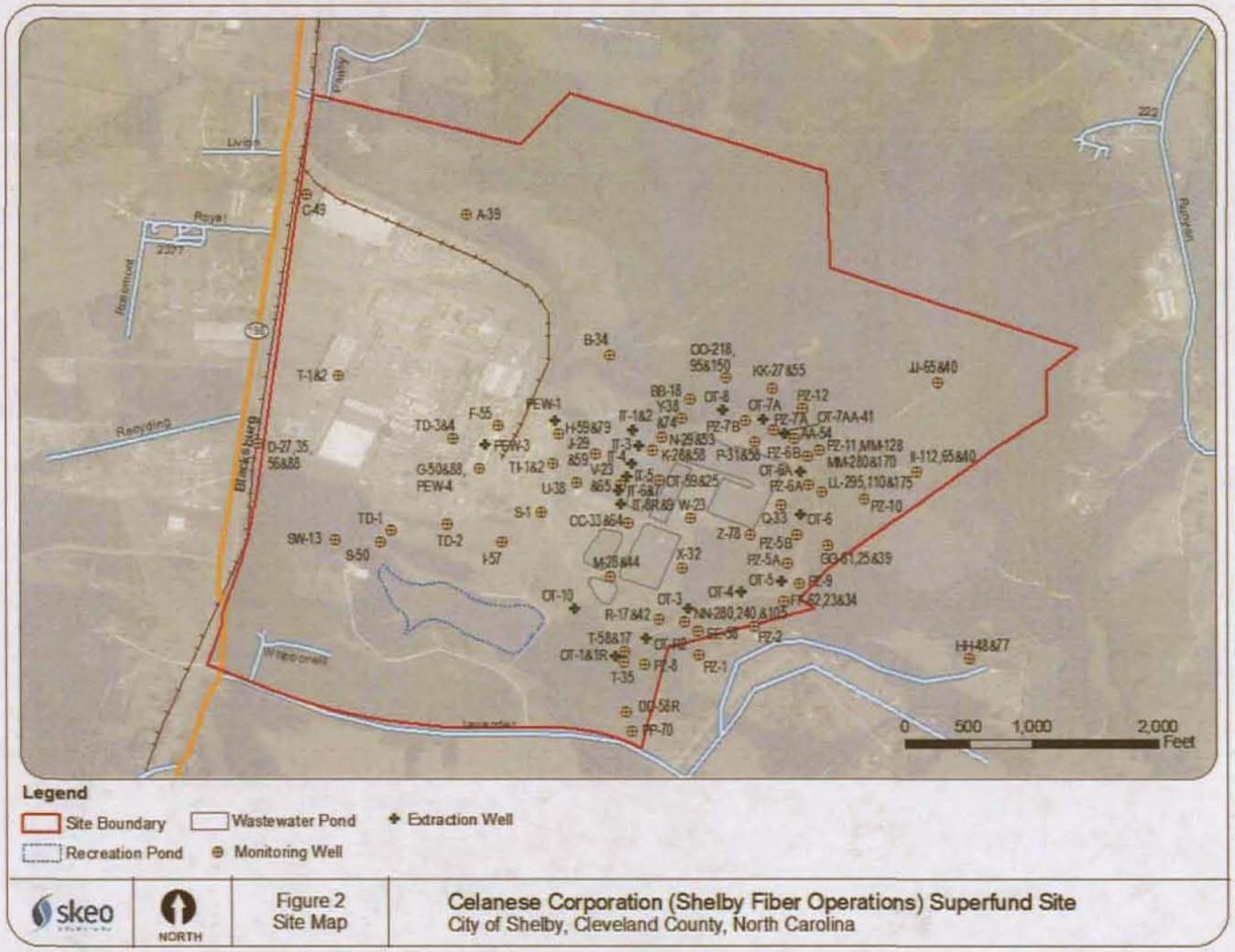
Fracturing of the bedrock reportedly decreases in intensity with depth below the top of rock. Ground water in the saprolite generally parallels the ground surface slope, which is also the case in shallow bedrock. Ground water flow becomes more regional in the deeper bedrock below the elevation of local creek bottoms, although discharge to the major creeks appears to be dominant.

Figure 1: Site Location Map



Disclaimer: This map and any boundary lines within the map are approximate and subject to change. The map is not a survey. The map is for informational purposes only regarding EPA's response actions at the Site, and is not intended for any other purpose.

Figure 2: Detailed Site Map



Disclaimer: This map and any boundary lines within the map are approximate and subject to change. The map is not a survey. The map is for informational purposes only regarding EPA's response actions at the Site, and is not intended for any other purpose.

3.2 Land and Resource Use

Fiber Industries, Inc., a joint venture of Celanese and Imperial Chemicals, Inc., was the original owner of the plant and operated at the Site from 1960 until 1983, when Celanese became sole owner of the facility. Manufacturing operations at the Site included the production of polyester polymer chip and filament yarn. Ticona, a Celanese operating subsidiary, continues to operate a specialty polymer plant at the Site. Land uses surrounding the Site include residential and agricultural uses, and are not expected to change in the future. An elementary school and a lumber yard are also located nearby.

The ground water aquifer underlying the Site is not currently used as a drinking water source. In 1995, Celanese signed agreements to connected nearby off-site residents to Cleveland County's municipal water system and abandoned domestic water supply wells for residents considered to be at potential risk of exposure to ground water contamination.

The nearest surface water bodies include the recreation pond just south of the plant production area and several streams located on site. There are two small, perennial, unnamed streams draining east-northeast and east-southeast from the production area. These streams discharge to a larger northwest-southeast trending unnamed tributary to Buffalo Creek traversing the eastern portion of the Site. The east-northeast trending stream and an ephemeral tributary were remediated as part of the OU2 remediation. Buffalo Creek is located approximately 7,400 feet southeast of the Site.

3.3 History of Contamination

In April 1960, manufacturing operations for the production of polyester polymer staple and filament yarn began at the Site. The primary chemicals involved in the polymer production process included dimethyl terephthalate and ethylene glycol. Other additives used in small quantities during the process included titanium dioxide and antimony.

A wastewater treatment plant was constructed concurrently with the manufacturing plant. During early production years, chemical wastes were discharged through a drainage ditch that began near the western edge of an area now known as the former drum storage area. The chemical waste traveled east to the area that is now the northeast corner of the emergency spill ponds. When the wastewater treatment plant became fully operational in the mid-1960s, the drainage ditch was replaced with pipes. The treated effluent from the wastewater treatment plant is piped to a discharge point on Buffalo Creek. An NCDENR permit covers this discharge.

In 1973, the plant expanded to include a polishing pond, two emergency spill ponds and an additional aeration basin. The concrete-lined portions of the wastewater treatment facility include: a chromate reduction pond that is no longer in use, a digester, three equalization basins, two aeration basins and two clarifiers. The unlined plant units include the three polishing ponds, two sludge ponds and two emergency spill ponds.

Several areas around the plant have been used for waste disposal. Plant wastes (primarily polyester and miscellaneous trash) were previously disposed of in old burning pits located just north of the aeration basins. North and east of the burning pits, glycol recovery unit bottoms (GRUB) was buried during the 1960s in trenches. A former drum storage and staging area is located west of the former GRUB area. Solutions that failed to polymerize during the production process were stored in this area during the early 1960s. The drums were removed in the mid-1960s and the storage area was backfilled. Two soak-away ponds located west of the existing aeration basins were used to contain treated sanitary sewage from 1960 to 1969.

Four areas of buried waste are located to the north and outside of the main plant perimeter fence. The polymer and fiber landfill contains primarily non-hazardous inert materials such as excavation soil, polymer and waste yarn. The construction debris landfill contains items such as old cinder blocks and steel strapping bands. In 1978, approximately 21 acres of the northwest quadrant of the property had permits from the North Carolina Department of Natural Resources (now NCDENR) for wastewater sludge disposal.

From 1970 to 1978, approximately 2,000 to 3,000 drums of waste chemicals and solvents, including lab packs, were stored temporarily in the area known as the drum storage area near the former burning pits. All drums were removed from the area by 1978 and sent to outside disposal facilities.

Site investigations began in October 1981 when Celanese contracted with the firm Soil & Material Engineers, Inc. (S&ME) to install 23 ground water monitoring wells. In conjunction with the ground water monitoring well installation program, S&ME also conducted a hydrogeologic evaluation. Subsequently, Celanese initiated a ground water sampling and analysis program under the supervision of Davis & Floyd Laboratories, Inc. S&ME also conducted an electromagnetic survey and excavated test pits at the Site.

3.4 Initial Response

In October 1984, the Site was proposed for inclusion on the NPL. EPA and Celanese discussed the preparation of a work plan for a remedial investigation and feasibility study (RI/FS) by S&ME. EPA contractor Camp Dresser & McKee, Inc., concurrently prepared a report that included a review of the data collected during previous site investigations and identified information deficiencies and data gaps to provide a basis for development of RI activities. These events resulted in the submission of a draft work plan by S&ME, on behalf of Celanese, with a final work plan submitted to EPA in November 1985. In March 1986, Celanese signed an Administrative Order on Consent with EPA to perform the RI/FS. The Site was finalized on the NPL in June 1986.

3.5 Basis for Taking Action

The RI Report for the Site was finalized in July 1987 and determined that two areas of the Site needed to be addressed: the former GRUB area and other scattered disposal pits,

and ground water contaminated by the waste in those pits. The RI Report concluded that ground water had not migrated past site boundaries. However, the RI Report did not find that future migration was prevented. Because of the potential for contaminated ground water to migrate off site, EPA decided to implement a two-phased remedial action. The first phase was designed to address contaminated ground water as well as to control the off-site migration of the contaminated ground water plume. The FS for phase one was completed in March 1988. The second phase was designed to address source wastes in site pits, trenches and streambeds. The phase two FS was completed in March 1989.

A health assessment was conducted during the FS and identified the major exposure pathways at the Site. Ingestion of site soil was determined not to be a pathway of concern due to lack of access for children. In addition, project documentation indicated that potential human exposure to site soils was not a potential exposure pathway for several reasons: site access was restricted, contaminated soils were below the site surface, and soil remediation was to be implemented. Exposure assumptions used in the assessment included exposure to air, ground water and surface water runoff for sensitive subpopulations (children and the elderly), residents and recreational users. The assessment identified benzene, trichloroethylene (TCE), bis(2-ethylhexyl)phthalate, lead and chromium as indicator chemicals for ground water and near-surface soil. Indicator chemicals were selected to represent the hazards associated with the Site based on concentration in the environmental medium of concern and a relative toxicity constant.

During the RI, contaminants that exceeded North Carolina ground water standards identified in the North Carolina Administrative Code (15A NCAC 2L .0202) were identified in at least one monitoring well. These contaminants included: 1,1-dichloroethane, 1,1-dichloroethene, trans-1,2-dichloroethene, benzene, methylene chloride, vinyl chloride, chloroform, chlorobenzene, chloromethane, carbon tetrachloride, phenols, tetrachloroethylene (PCE), chlordane, chromium, barium, iron, manganese, nickel and selenium.

Contaminants detected in site soils and waste included phthalates, benzene and other non-phenolic aromatic compounds, polynuclear aromatic compounds (PAHs), phenol, ketone compounds and dibenzofuran. The assessment conducted at the Site indicated that aquatic life could experience toxic effects from exposure to bis(2-ethylhexyl)phthalate and chromium in the surface water.

4.0 Remedial Actions

In accordance with CERCLA and the NCP, the overriding goals for any remedial action are protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). A number of remedial alternatives were considered for the Site, and final selection was made based on an evaluation of each alternative against nine evaluation criteria that are specified in Section 300.430(e)(9)(iii) of the NCP. The nine criteria include:

1. Overall Protectiveness of Human Health and the Environment.
2. Compliance with ARARs.
3. Long-Term Effectiveness and Permanence.
4. Reduction of Toxicity, Mobility or Volume of Contaminants through Treatment.
5. Short-term Effectiveness.
6. Implementability.
7. Cost.
8. State Acceptance.
9. Community Acceptance.

4.1 Remedy Selection

OU1

Although no Remedial Action Objectives (RAOs) were specified in the OU1 ROD, the Site's 1988 FS Report stated that remedial alternatives were developed to eliminate or reduce the waste source and abate contaminant migration through ground water and surface water routes. In addition, the OU1 ROD requires removal of all compounds detected in ground water above the maximum contaminant levels (MCLs) or North Carolina 2L standards (whichever is more stringent), which are not naturally occurring, "until the concentration of that compound has fallen below the lowest analytical method detection limit published by EPA for that particular compound."

The remedy selected in the Site's 1988 Record of Decision (ROD) for OU1 addressed ground water contamination. As built, the remedial components for OU1 include:

- Installation of extraction wells into bedrock at the perimeter of the Site.
- Installation of deep saprolite extraction wells directly downgradient of the source area.
- Pumping of contaminated water from interior wells to a common holding tank, through an inclined plate separator for iron removal, to a biological sequencing batch reactor, through an air stripper, and then through a granulated activated carbon canister prior to discharge to the plant's polishing pond system.
- Pumping of contaminated ground water from the outer tier (OT) wells to a common holding tank, through an air stripper, and then through a granulated activated carbon canister prior to discharge to the plant's polishing pond system.

- The treated ground water from both the inner tier (IT) and OT extraction systems was discharged through a common discharge line to the first in a series of three polishing ponds that also received the treated wastewater from the plant's industrial wastewater treatment plant.
- The combined effluent from the ground water and industrial wastewater treatment plants was discharged under a NPDES permit after passing through the three treated wastewater-polishing ponds.

Table 2 lists the contaminants exceeding ground water standards during the RI and the 1988 clean up goal.

Table 2: Ground Water COC Cleanup Goals

Ground Water COC	1988 Cleanup Goal (milligrams per liter; mg/L)[a]
Indicator chemicals	
Benzene	0.0007
Trichloroethylene (TCE)	0.0028
Bis(2-ethylhexyl)phthalate	NA
Lead	0.05
Chromium	0.05
Chemicals detected above ground water standards that were not identified as indicator chemicals[a]	
1,1-dichloroethene	0.007
1,1-dichloroethane	NA
Trans-1,2-dichlorothene	0.07
Methylene chloride	NA
Vinyl chloride	0.000015
Chloroform	NA
Chlorobenzene	0.00041
Carbon tetrachloride	0.0003
Phenols	0.001
Tetrachoroethylene	0.0007
Chlordane	0.000027
Barium	1
Iron	0.3
Manganese	0.05
Nickel	0.15
Selenium	0.01
Chloromethane	NA

NA: Not Applicable
a. These standards were proposed standards obtained from a draft of a document by the State of North Carolina identified in the 1988 Final FS Report completed for OU1.

In 2004, EPA signed an Explanation of Significant Differences (ESD) for the Site's 1988 OU1 ROD. The ESD allowed the Site's ground water treatment system to be temporarily shut down to allow the aquifer to recover and provide an opportunity to investigate other potential remedies for site ground water. CNA proposed implementing a temporary monitored natural attenuation (MNA) demonstration project for ground water treatment. The ESD permitted the ground water extraction and treatment system to be shut down for a 24-month period to evaluate the effectiveness of MNA as an alternative remedy to address remaining ground water contamination at the Site. In addition, the ESD modified the treatment approach to remove the freestanding ground water treatment system from

the remedy and allowing ground water to pump directly to the headworks of the existing industrial wastewater treatment plant for biological treatment. The treated effluent from this system is then discharged to the first (A Pond) of the three wastewater polishing ponds. This is the same pond that received the treated ground water from the freestanding ground water treatment plant.

OU2

EPA set the RAOs for OU2 in the Site's 1989 OU2 FS. RAOs established for OU2 include:

- Protect the public health and environment from exposure to contaminated soils and sediments through inhalation, ingestion and direct dermal contact.
- Remove the primary source of contamination to minimize the spread of contaminants into the soils, ground water, sediments and surface water.

The remedy selected in the 1989 ROD for OU2 addressed source contamination. The remedial components for OU2 include:

- Excavation of GRUB sludges, plastic chips, burn pit residuals and stream sediments.
- On-site incineration of contaminated soils and GRUB sludges.
- Chemical fixation (solidification) of incinerator ash, plastic chips, burn pit residuals and stream sediments.
- On-site disposal of inert, solidified material.
- Regrading.
- Monitoring.

The remedy for OU2 was designed to remove and treat the major source of contamination to reduce the operational time of the ground water extraction and treatment system selected in the OU1 remedy. The OU2 remedy was not designed to remove all source contamination, due to its depth and the difficulty of excavating the material. The objectives of the source excavation were to minimize the spread of contaminants, minimize the moisture content of the incinerator feed, control surface runoff to keep water away from excavated areas, and minimize the time that excavation areas were left open. When selecting the OU2 remedy, it was anticipated that remaining contaminants or residuals left in the source area after the completion of the OU2 remedial action would be treated by the OU1 ground water treatment system. No cleanup goals were established for soil at the Site. However, RI analyses did identify a variety of organic compounds in soil, waste and ground water, documenting the leachability of some organics.

4.2 Remedy Implementation

OU1

The remedial design (RD) for OU1 was approved by EPA on October 20, 1988. Construction of the ground water extraction and treatment system began in October 1988 and the system began operating on August 1, 1989. The ground water extraction and treatment system originally consisted of a two-tier extraction well system located on site. IT wells are located adjacent to, and hydraulically downgradient from, the source waste areas. OT wells are located near the southern and eastern plant boundaries of the site property. Although the IT and OT treatment systems operated independently of each other, both are located in the same building. When operational, contaminated ground water from the IT and OT systems was treated separately and then discharged to the first (A Pond) of the manufacturing plant's three wastewater polishing ponds, where it was combined with treated plant process wastewater. This combined wastewater stream was then discharged from the third (C Pond) polishing pond via the plant's National Pollution Discharge Elimination System (NPDES) permitted outfall.

The OT portion of the treatment system operated until April 21, 1998, when it was shut down as part of a partial deletion petition approved by EPA. The petition deleted the OT extraction and treatment system along with the OU2 source remediation area from the NPL.

The IT treatment system continued to operate until 2004, when EPA signed an ESD permitting it to be temporarily shut down while a 24-month MNA demonstration project was completed. In March 2004, the IT treatment system was shut down and the wells have since been maintained on "standby" status, so that the system could be turned on, if needed. In May 2004, EPA authorized the implementation of the MNA demonstration project, which consisted of quarterly sampling events and reporting. The 24-month period ended in March 2006, and MNA Quarterly Sampling Report #7 was submitted in March 2006 to summarize data from the seventh quarter of monitoring and to provide a detailed discussion of MNA lines of evidence based on the data accumulated from all seven quarters of monitoring. In MNA Quarterly Sampling Report #7, the PRP submitted a request to EPA to extend the MNA demonstration period to March 1, 2007. EPA approved the extension in June 2006 and the eighth ground water sampling event was conducted in March 2007. Ground water sampling was completed on a quarterly basis in 2007 and 2008, and reports were submitted to EPA on a semi-annual basis for those years. In March and November 2009 and March 2010, ground water was sampled and semi-annual reports were completed for each sampling event.

On September 12, 2006, in a meeting between EPA, NCDENR, Celanese and PRP contractor Earth Tech, general agreements were reached regarding site conditions and future cleanup actions. During the meeting, it was agreed that a transition to MNA appeared to be an appropriate remedy for site ground water. However, site decision documents were not updated; in 2007, it was determined that additional characterization of soil and ground water contamination at the Site would be beneficial, including the former GRUB area where excavation activities were completed as part of the OU2 remedy. In 2007, a Conceptual Model Report including a risk assessment and ground water flow and transport model for the Site was developed; monitoring also continued at the Site from 2007 through 2009 to further characterize ground water at the Site.

In 2009, EPA contractor GeoTrans, Inc. conducted an independent review of the OU1 remedy and presented the evaluation of the remedy in an Independent Design Review (IDR). The findings of the IDR were intended to identify opportunities for improvement of the remedy by providing recommendations. The IDR also determined that the IT treatment system operated with minimal effectiveness, and attributed this to the system's low extraction yield in relation to the amount of water flowing through the aquifer. As a result, the mass control and source recovery offered by the system were likely negligible. Another potential cause for the system's minimal effectiveness was the placement of extraction wells in relation to the areas where source contamination remains in place at the Site.

The IDR found that additional characterization was needed to delineate the diethylene dioxide plume in the northeast and southeast portions of the Site and that additional sampling in monitoring wells was needed to further characterize TCE and ethylene glycol contamination. To further characterize contamination at the Site, PRP contractors developed the Work Plan and Field Sampling Plan for Supplemental Investigation and Long-Term Groundwater Monitoring in June 2010. The tasks included in the work plan are in the process of being completed. Table 3 describes the status of each of the tasks outlined in the work plan. Findings from these tasks will be used to evaluate the remedy, and determine the best way to address remaining contamination at the Site.

Table 3: Status of Tasks to Characterize Site Contamination

Task	Status
Direct Push Technology Investigation • Evaluate if the GRUB material is contributing to elevated concentrations of diethylene dioxide and ethylene glycol. • Delineate the horizontal and vertical extent of diethylene dioxide and ethylene glycol in soil and determine if there are any localized impacts to ground water. • Evaluate the adequacy of existing wells to monitor any existing plumes in the former GRUB area.	Completed between August and September 2009. EPA has received and commented on a draft technical memorandum. A revised version of the technical memorandum is being completed.
Monitoring Well Installation • Install a monitoring well near well cluster II-40 and II-65 to vertically delineate diethylene dioxide and the flow conditions in the vicinity of the well cluster.	Completed in September 2009. The monitoring well has been sampled since November 2009 as part of the long-term monitoring program.

Task	Status
Stream Sampling Pilot Test • Collect samples representative of the ground water beneath the streambed of Stream C. • Collect surface water samples from Stream C. • Confirm ground water discharges to Stream C as suggested by the slope aquifer model.	Completed in April 2009 and reported in a technical memorandum dated May 2, 2009. A full-scale stream investigation was completed in September 2009, and a technical memorandum was submitted to EPA on October 5, 2010. Results of the stream investigation are discussed in further detail in Section 6.4 of this FYR Report.
Stream Gauge Installation • Install additional stream gauges along Stream A and Steam C to provide water elevation data for use in contouring of the shallow ground water and adjacent streams and creeks.	Completed in March 2009.
Ground Water Monitoring and Sampling • Implement a long-term water elevation monitoring program. • Complete general sitewide sampling and analysis to comply with the requirements of the CERCLA monitoring program. • Expand the monitoring program to characterize the distribution of diethylene dioxide, ethylene glycol, semivolatile organic compounds, selected metals and TCE at the Site.	Expanded sampling events to characterize contamination were completed in September 2010 and March 2011. A technical memorandum summarizing the findings from the data is scheduled for submittal in September 2011.

OU2

The RD for OU2 was approved by EPA on September 24, 1990. The remedial action for OU2 began in January 1991 and was completed in September 1992. Activities completed during the remedial action included:

- Excavation of 4,529 tons of GRUB sludges underlying native soil.
- Excavation of 3,259 tons of burn pit residuals and plastic chips.
- Excavation of between 39 and 54 cubic yards of stream sediments from two intermittent streams north of the OU2 source areas.
- Incineration of GRUB sludges, soils, burn pit residuals, plastic chips, stream sediments and wastewater treatment plant solids in an on-site rotary kiln.
- Solidification of the incinerated wastes on site.
- On-site disposal of the stabilized materials in the excavated pits.

Following EPA's approval of a trial burn, which was conducted during the week of June 10, 1991, the incinerator operated from April 1991 through December 1991. The bench-scale solidification study work plan was submitted to EPA in July 1990. Full-scale solidification took place from June 1991 to August 1992. Upon completion of the

solidification and backfilling in September 1992, the Site was regraded and revegetated. Streambed remediation was completed between in May 1991.

The soil remedy was implemented for source control to address leaching of contaminants to ground water. GRUB sludges, burn pit residuals and plastic chips were excavated, along with contaminated soils up to one foot below buried wastes based on visual observation. Treatment of the excavated source material was completed in accordance with Resource Conservation and Recovery Act (RCRA) 40 C.F.R. Subpart O, which applies to mobilization, operation and closing of thermal destruction units. These requirements, though not applicable, were determined to be relevant and appropriate due to the similarity of the wastes being managed and the actions being taken. Because fixation of the treated source materials would result in increased volumes, any lateral extensions of the area also required that the entire disposal area comply with RCRA.

The ground water extraction system for OU1 was intended to remediate residual contamination associated with waste below this depth because of the difficulty in excavating soil at greater depth. Because the OU2 remedy was designed to remove major areas of source contamination, no subsurface sampling was conducted for confirmation purposes during the implementation of the remedy. As a result, no additional sampling has been conducted for the OU2 remedy since implementation. Toxicity characteristic leaching procedure testing of all stabilized material disposed of in the excavated pits indicated that the material passed regulatory standards.

In March 25, 1993, EPA signed a Preliminary Close-Out Report documenting that all construction activities for OU1 and OU2 had been completed. On April 17, 1998, the former source area and remediated streams of OU2 and the OT ground water extraction well system and associated treatment systems for OU1 were deleted from the NPL. OU2 was deleted because CERCLIS response activities as outlined in the 1989 ROD had been concluded and the OU2 remedy was protective of human health and the environment.

4.3 Operation and Maintenance (O&M)

The Site's ground water treatment system has not been in operation during this FYR period; the system has been shut off to allow for the MNA pilot study. However, the IT treatment system continues to be maintained in the event that the system is returned to use, based on the ongoing evaluation of the remedy for OU1. Ground water sampling has continued to be conducted semiannually at the Site. When a sampling event is conducted, monitoring wells are inspected and repairs are completed on an as-needed basis.

The 1988 ROD for OU1 estimated that O&M to operate the ground water treatment system would cost approximately $1,100,000 for a 30-year period. Because MNA and long-term monitoring are currently being used to address ground water contamination at the Site, a direct comparison of actual O&M costs and estimated costs is not possible. Table 4 provides the actual costs for O&M during the past five years. Annual costs between 2006 and 2010 include ground water sampling and reporting. Additional costs during 2006 through 2008 were associated with the expansion of the sampling program to include diethylene dioxide. Additional costs in 2006 were associated with the completion

of a direct push technology (DPT) evaluation downgradient of wells F-55 and K-28, the replacement of well DD-58R, a resurvey of site sampling points and the completion of a storm sewer evaluation.

Additional 2007 costs included the development of the Conceptual Model Report, which included a risk assessment and ground water flow and transport model for the Site. In 2009, activities in response to the IDR were completed, which included a former GRUB area DPT study, construction of additional monitoring wells, establishment of surface water gauging locations and stream inflow testing. Additional work in response to the IDR included the expansion of ground water and surface water sampling, planning for the TD work area and well construction downgradient of DD-58R in 2010. Costs in 2011 have included resurveying ground water use downgradient of the Site.

Table 4: Annual O&M Costs

Date Range		Total Cost (rounded to the nearest $1,000)
January 2006	December 2006	$801,000
January 2007	December 2007	$814,000
January 2008	December 2008	$496,000
January 2009	December 2009	$601,000
January 2010	December 2010	$509,000
January 2011	April 11, 2011	$158,000

5.0 Progress Since the Last Five-Year Review

The protectiveness statement from the 2006 FYR for the Site stated:

"All immediate threats at the site have been addressed and the site is protective in the short term."

Long-term Protectiveness:

"The anticipated period of 30 years required to attain the groundwater remediation goals is questionable. In the interim, exposure pathways that could result in unacceptable risks are being controlled. However, institutional controls should be implemented to address potential future unacceptable risks associated with exposure to contaminated groundwater."

The 2006 FYR included nine issues and recommendations. Each recommendation and its current status are discussed below.

Table 5: Progress on Recommendations from the 2006 FYR

Section	Recommendation	Party Responsible	Milestone Date	Action Taken and Outcome	Date of Action
5.1	Evaluate analytical methods, such as EPA methods 502.2 and 606, to obtain lower detection limits.	PRP	Next sampling event	Beginning with the sampling event completed for the March 2007 semiannual report, the PRP evaluated analytical data using method-specific quality control criteria agreed upon with EPA. When additional guidance is needed, EPA's National Functional Guidelines for organic data review and for inorganic data review are used. Detection limits below North Carolina ground water standards are now used in the updated MNA monitoring program.	3/31/07
5.2	The PRP has requested an extension [of the MNA pilot study]. In the interim, complete the MNA modeling, provide a recommendation for MNA applicability, and decide if the ground water treatment system should be restarted.	PRP	Report was to be available for review in the first quarter calendar year 2007	The PRP received an extension to complete MNA modeling. The MNA modeling conclusions have not been approved by EPA. An IDR was completed at the Site and additional recommendations were made that need to be addressed before deciding on the final recommendation to update the remedy. Section 4.2 above provides details of the findings of the IDR.	10/31/06
5.3	Improve the monitoring well network to confirm the extent of the initial plume and F-55 plume and provide sentinel wells.	PRP	Fourth quarter calendar year 2006	A work plan was developed in response to the IDR, and includes completing expanded sampling events to characterize contamination. Monitoring well II-112 was installed in September 2009 and has been sampled since November 2009. Expanded sampling events were also completed in September 2010 and March 2011. A technical memorandum summarizing the findings from the data is scheduled for submittal in September 2011.	9/30/09
5.4	Consider ethylene glycol and 1,1-biphenyl for inclusion as site COCs.	PRP	Before next FYR	It was determined that Ethylene glycol and 1,1-biphenyl are COCs and were included in the monitoring program for the OU1 remedy.	8/19/10

Section	Recommendation	Party Responsible	Milestone Date	Action Taken and Outcome	Date of Action
5.5	Complete the deed review and perform a regular reconnaissance of potential downgradient drinking wells.	PRP	Before next FYR	Field work to complete the deed review and downgradient drinking water well survey was performed on December 21, 2010, and additional follow-up with Cleveland County was completed in January 2011. The findings of the deed review and survey were submitted to EPA in a technical memorandum. No private wells were found to be in use and properties with water supply agreements were connected to Cleveland County's municipal water supply.	4/11/11
5.6	Complete a formal change (i.e., an ESD) documenting elimination of metals as listed site COCs.	PRP	Before next sampling event	EPA has considered the recommendation and determined that a formal remedy change (i.e. ESD) is not needed to document such action. Metals continue to be sampled for during the expanded sampling events in September 2010 and March 2011 to provide additional data. If EPA determines that clean up goals have been achieved for any COCs, monitoring programs may be modified, but remedy changes are not needed.	5/17/11
5.7	Implement institutional controls in the form of deed restrictions to prevent potential future exposure pathways to contaminated ground water or the source area.	PRP	Before next FYR	Institutional controls have not formally been implemented at the facility to prevent the creation of exposure pathways to contaminated ground water or the source area.	Incomplete
5.8	Investigate to confirm and reach concurrence regarding responsibility of TCE at these locations [monitoring wells HH-48 and HH-77].	PRP	Before next FYR	The source of TCE has been questioned by the PRPs. A technical memorandum was submitted to EPA in October 2006 providing existing data as evidence that the TCE contamination was not site-related. However, during the IDR, it was determined that further investigations were needed to demonstrate that TCE was not site-related. TCE is being investigated through the expanded sampling program. Based on the findings of the expanded sampling program, the responsibility for addressing the source of TCE in wells HH-48 and HH-77 will be determined.	Incomplete

Section	Recommendation	Party Responsible	Milestone Date	Action Taken and Outcome	Date of Action
5.9	Vapor intrusion is an emerging pathway of concern and additional evaluation may be necessary.	PRP	Before next FYR	EPA's RPM had a limited vapor intrusion assessment (Appendix I) completed by an EPA vapor intrusion expert to determine whether there was a current risk or an exposure pathway associated with the TCE in ground water near wells HH-48 and HH-77. The vapor intrusion assessment determined that there is no immediate risk of vapor intrusion based on review of TCE data available for the shallow well, HH-48, and no further vapor intrusion evaluation is needed.	5/20/11

5.1 Analytical Method Evaluation

Beginning with the sampling completed for the March 2007 semiannual report, the PRP evaluated analytical data using method-specific quality control criteria agreed upon with EPA. When additional guidance is needed, EPA's National Functional Guidelines are used for organic data review and inorganic data review. Detection limits below the North Carolina ground water standards are now used in the updated MNA monitoring program.

5.2 MNA Modeling

The PRP received an extension to complete MNA modeling. The MNA modeling conclusions have not been approved by EPA. An IDR was completed at the Site and additional recommendations were made that need to be addressed before deciding on the final recommendation to update the remedy. Section 4.2 above provides details of the findings of the IDR.

5.3 Ground Water Monitoring Well Network Improvement

A work plan developed in response to the IDR includes completing expanded sampling events to characterize contamination. Monitoring well II-112 was installed in September 2009 and has been sampled since November 2009. Expanded sampling events were also completed in September 2010 and March 2011. A technical memorandum summarizing the findings from the data is scheduled for submittal in September 2011.

5.4 Potential Inclusion of Ethylene Glycol and 1,1-Biphenyl as COCs

It was determined that ethylene glycol and 1,1-biphenyl are COCs and were included in the monitoring program for the OU1 remedy.

5.5 Deed Review and Well Survey

Field work to complete the deed review and downgradient drinking water well survey was performed on December 21, 2010, and additional follow-up with Cleveland County was completed in January 2011. The findings of the deed review and survey were submitted to EPA in a technical memorandum. No private wells were found to be in use and properties with water supply agreements were connected to Cleveland County's municipal water supply.

5.6 Removal of Metals as Site COCs

EPA has considered the recommendation and determined that a formal remedy change (i.e. ESD) is not needed to document such action. Metals continue to be sampled for, as requested by EPA, as part of the expanded sampling events in September 2010 and March 2011 to provide additional data. If EPA determines that clean up goals have been achieved for metals, or any other COCs, monitoring programs may be modified, but remedy changes are not needed.

5.7 Institutional Control Implementation for Site Property

Institutional controls have not formally been implemented at the facility property to prevent the creation of exposure pathways to contaminated ground water or the source area. Nevertheless, the facility property is well-maintained, fenced and access is controlled. The facility operating at the Site has security that ensures that unauthorized visitors do not have access to the Site.

Although institutional controls are still needed on the facility property, there are currently water supply agreements in place and Celanese has connected residents downgradient of the facility property to Cleveland County's municipal water supply. By entering into the water supply agreements, residents also agreed to plug private wells, which was financed by Celanese, and agreed not to drill new wells on their properties. Field work for a deed review and a survey of downgradient wells was completed in December 21, 2010, and additional follow-ups with Cleveland County were completed in January 2011. The findings of the deed review and survey were submitted to EPA in a technical memorandum. No private wells were found to be in use and properties with water supply agreements were connected to Cleveland County's municipal water supply.

5.8 Investigation of Source of TCE Detected in Monitoring Wells HH-48 and HH-77

The source of TCE has been questioned by the PRPs. A technical memorandum was submitted to EPA in October 2006 providing existing data as evidence that the TCE contamination was not site-related. However, during the IDR, it was determined that further investigations were needed to demonstrate that TCE was not site-related.

TCE is being investigated through the expanded sampling program. Based on the findings of the expanded sampling program, responsibility for addressing the source of TCE in HH-48 and HH-77 will be determined.

5.9 Vapor Intrusion Evaluation in Area Near HH-48 and HH-77

To determine whether there was a current risk or an exposure pathway associated with the TCE in the ground water located at the residential property near monitoring wells HH-48 and HH-77, EPA's RPM for the Site had a limited vapor intrusion assessment (Appendix I) completed by an EPA vapor intrusion expert. The vapor intrusion assessment used the TCE data and ground water levels available for monitoring well HH-

48, the shallow well in the HH well cluster, to calculate the risk through potential vapor intrusion at the residential property using the J&E model. The calculated risk for 2005 and current TCE concentrations was 5.1×10^{-7} and 2.5×10^{-7}, respectively. Both values are below EPA's acceptable risk level of 1.0×10^{-4} that would trigger immediate remedial action. Therefore, the vapor intrusion assessment determined that there is no immediate risk of vapor intrusion, and no further vapor intrusion evaluation is needed.

6.0 Five-Year Review Process

6.1 Administrative Components

EPA Region 4 initiated the FYR in December 2010 and scheduled its completion for August 2011. The EPA site review team was led by EPA Remedial Project Manager (RPM) Luis E. Flores and also included EPA site attorney Matthew Hicks, EPA Community Involvement Coordinator (CIC) Angela Miller, and contractor support provided to EPA by Skeo Solutions. In April 2011, EPA held a scoping call with the review team to discuss the Site and items of interest as they related to the protectiveness of the remedy currently in place. A review schedule was established that consisted of the following activities:

- Community notification.
- Document review.
- Data collection and review.
- Site inspection.
- Local interviews.
- FYR Report development and review.

6.2 Community Involvement

In April 2010, a public notice was published in the *Shelby Star* newspaper announcing the commencement of the FYR process for the Site, providing contact information for EPA RPM Luis Flores and CIC Angela Miller, and inviting community participation. The press notice is available in Appendix B. No one contacted EPA as a result of this advertisement.

The FYR Report will be made available to the public once it has been finalized. Copies of this document will be placed in the designated site repository: Cleveland County Memorial Library, 104 Howie Drive, Shelby, North Carolina 28150.

6.3 Document Review

This FYR included a review of relevant site-related documents, including RODs, ESDs, remedial action reports and recent monitoring data. A complete list of the documents reviewed can be found in Appendix A.

ARARs Review

CERCLA Section 121(d)(1) requires that Superfund remedial actions attain "a degree of cleanup of hazardous substances, pollutants, and contaminants released into the environment and of control of further release at a minimum which assures protection of human health and the environment." The remedial action must achieve a level of cleanup that at least attains those requirements that are legally applicable or relevant and appropriate. Applicable requirements are those cleanup standards, standards of control,

and other substantive requirements, criteria, or limitations promulgated under federal environmental or state environmental or facility siting laws that specifically address a hazardous substance, remedial action, location, or other circumstance found at a CERCLA site. Relevant and appropriate requirements are those standards that, while not "applicable," address problems or situations sufficiently similar to those encountered at the CERCLA site that their use is well suited to the particular site. Only those state standards that are more stringent than federal requirements may be applicable or relevant and appropriate. To-Be-Considered (TBC) criteria are non-promulgated advisories and guidance that are not legally binding, but should be considered in determining the necessary remedial action. For example, TBCs may be particularly useful in determining health-based levels where no ARARs exist or in developing the appropriate method for conducting a remedial action.

Chemical-specific ARARs are health- or risk-based numerical values or methodologies which, when applied to site-specific conditions, result in the establishment of numerical values. These values establish an acceptable amount or concentration of a chemical that may remain in, or be discharged to, the ambient environment. Examples of chemical-specific ARARs include maximum contaminant levels (MCLs) under the federal Safe Drinking Water Act and ambient water quality criteria enumerated under the federal Clean Water Act.

Action-specific ARARs are technology- or activity-based requirements or limits on actions taken with respect to a particular hazardous substance. These requirements are triggered by a particular remedial activity, such as discharge of contaminated ground water or in-situ remediation.

Location-specific ARARs are restrictions on hazardous substances or the conduct of the response activities solely based on their location in a special geographic area. Examples include restrictions on activities in wetlands, sensitive habitats, and historic places.

Remedial actions are required to comply with the ARARs identified in the ROD. In performing the FYR for compliance with ARARs, only those ARARs that address the protectiveness of the Site's remedy are reviewed.

Ground Water ARARs

According to the Site's 1988 OU1 ROD, cleanup goals for ground water COCs were based on the North Carolina Administrative Code (15A NCAC 2L .0202). The ROD specified that all compounds detected in ground water which were not naturally occurring must be removed. At the time of the RI/FS, five indicator parameters were identified for ground water: trichloroethylene, benzene, bis(2-ethylhexyl)phthalate, lead and chromium. Seventeen additional contaminants were detected above the 1988 North Carolina ground water standards. An additional five contaminants have since been detected above current North Carolina ground water standards.

ARARs from the 1988 OU1 ROD were compared to current ARARs (Table 6). Of the indicator parameters, current ARARs for benzene and trichloroethylene are now less stringent and ARARs for chromium and lead are more stringent. No standard existed for bis(2-ethylhexyl)phthalate when the ROD was signed, but a standard has since been added. Of the non-indicator parameters identified during the OU1 RI, standards for 1,1-dichloroethane, methylene chloride, chloroform, nickel and barium are now more stringent. Standards for trans-1,2-dichloroethene, vinyl chloride, chlorobenzene, phenol, chlordane and selenium are less stringent. Previous and current standards for identified COCs are presented in Table 6.

Table 6: Previous and Current ARARs for Identified Ground Water COCs

Contaminant	1988 NC Ground Water Standard (mg/L)	2010 NC Ground Water Standard (mg/L)[a]	ARARs Change
Indicator Parameters			
Trichloroethylene	0.0028	0.003	Less stringent
Benzene	0.0007	0.001	Less stringent
Bis(2-ethylhexyl) phthalate	Not listed	0.003	More stringent
Lead	0.05	0.015	More stringent
Chromium	0.05	0.01	More stringent
Contaminants Detected above North Carolina Standards during RI that Were Not Identified as Indicator Chemicals			
1,1-Dichloroethene	0.007	0.007	No change
1,1-Dichoroethane	Not listed	0.006	More stringent
Trans-1,2-Dichloroethene	0.07	0.1	Less stringent
Methylene Chloride	Not listed	0.005	More stringent
Vinyl Chloride	0.000015	0.00003	Less stringent
Chloroform	Not listed	0.07	More stringent
Chlorobenzene	0.00041	0.05	Less stringent
Carbon Tetrachloride	0.0003	0.0003	No change
Phenol	0.001	0.03	Less stringent
Tetrachloroethylene	0.0007	0.0007	No change
Chlordane	0.000027	0.0001	Less stringent
Barium	1	0.7	More stringent
Iron	0.3	0.3	No change
Manganese	0.05	0.05	No change
Nickel	0.15	0.1	More stringent
Selenium	0.01	0.02	Less stringent
Chloromethane	Not listed	0.003	NA
Contaminants Detected Above North Carolina Standards after ROD Signed			
1,1-Biphenyl[b]	Not listed	0.4	NA
Biphenyl Ether	Not listed	Not listed	NA
Ethylene Glycol	Not listed	10	NA
Acetone	Not listed	6	NA
Diethylene Dioxide	Not listed	0.003	NA
Arsenic	Not listed	0.01	NA

a. Based on the North Carolina ground water standards: http://h2o.enr.state.nc.us/csu/documents/2L_Eff_Jan_1_2010_Secure.pdf. Last accessed 3/16/2011.
b. 1,1-Biphenyl = 1,1-diphenyl

Soil ARARs

According to the Site's 1989 OU2 ROD, no cleanup goals were established for soil at the Site. However, RI analyses did identify a variety of organic compounds in site soil, waste and ground water, documenting the leachability of some organics.

6.4 Data Review

Soils and Sediment

Since the deletion of OU2 from the NPL in 1998, there has not been any data collected for OU2 soils or sediment.

Ground Water

Ground water monitoring has been conducted at the Site since the early 1980s. This FYR evaluated semiannual monitoring events from March 2006 to March 2010. The March 2006 MNA Demonstration Project Report was also included in this FYR. Analytic parameters monitored include VOCs, 1,1-biphenyl, biphenyl ether, diethylene dioxide, ethylene glycol, iron and manganese. Complete ground water monitoring data and sample location maps are included in Appendix F.

Of the five indicator chemicals mentioned in the ROD (benzene, bis(2-ethylhexyl)phthalate, chromium, lead and TCE), only benzene and TCE are among the analytic parameters regularly included in the ground water monitoring during the past five years. Although bis(2-ethylhexyl)phthalate and metals have been monitored during the past five years, monitoring of these indictor chemicals has not been completed regularly. In the ROD, indicator chemicals were selected to represent the hazards associated with the Site based on concentrations in the environmental medium of concern and a relative toxicity constant. Because the OU1 ROD requires removal of all compounds detected in ground water above North Carolina 2L standards, which are not naturally occurring, contaminants in addition to the indicator chemicals continue to be monitored at the Site. This FYR discusses the exceedances of indicator chemicals and the other chemicals that have been detected above current North Carolina ground water standards, which are considered COCs.

During the first quarter sampling event in 2006, bis(2-ethylhexyl)phthalate was detected in only one of 34 monitored locations at the Site, and the Operable Unit 1 – Semiannual Report January 2006 – June 2006 recommended that it be removed from the analytic parameters monitored during ground water monitoring. However, this recommendation has not been approved by EPA and bis(2-ethylhexyl)phthalate continues to be monitored as part of the monitoring program.

Although the PRP has requested EPA to issue a decision document to delete metals as COCs, EPA has considered the requests and determined that a formal remedy change (i.e.

ESD) is not needed to document such action. Metals continue to be monitored as part of the expanded sampling events in September 2010 and March 2011 to provide additional data. If EPA determines that clean up goals have been achieved for metals or any COCs, monitoring programs may be modified, but remedy changes are not needed.

Benzene

Benzene concentrations consistently remain above the North Carolina ground water standard in 10 site wells sampled in the past five years (Table 7; see Appendix F for complete data). Wells F-55, PEW-4 and TD-4 are located east of the plant production area, while remaining wells are located near the former GRUB area. Concentrations of benzene have fluctuated or declined in most of these 10 wells, but have been consistently elevated in wells F-55, K-28 and V-23. Concentrations in these wells are comparable to those found in the previous FYR, suggesting that benzene is not attenuating in these wells. During March 2010 sampling, the detection limits for benzene in monitoring wells were above the 1988 North Carolina ground water standard as well as the current ARAR. As a result, benzene concentrations below the detection limit cannot be assessed relative to the cleanup goal. However, the detection limit used in sampling from 2006 to 2009 allowed benzene concentrations to be compared to relevant cleanup goals. In monitoring wells other than these 10 wells, benzene was not detected, was detected below standards, or was detected at low concentrations that were above the standard. However, the concentrations in these wells remain low and no trends were observed.

Table 7. Ground Water Sampling Results for Wells with Benzene Concentrations that Exceed ARAR

Contaminant	Sampling Date	Monitoring Well									
		F-55	K-28	V-23	V-65	CC-33	IT-5	IT-6	IT-7	PEW-4	TD-4
Benzene (1988 NC Ground Water Standard = 0.0007 mg/L; Current ARAR = 0.001 mg/L)	3/2006	**0.0522**	**0.0102**	**0.019**	NA	**0.0016**	NA	NA	NA	**0.0014**	<0.001
	8/2006	**0.0543**	**0.0108**	**0.0214**	NA	**0.0022**	NA	NA	NA	**0.0024**	**0.0047**
	1/2007	**0.0574**	**0.0109**	**0.0145**	NA	**0.0018**	NA	NA	NA	**0.0016**	**0.0028**
	7/2007	**0.0504**	**0.01**	**0.0188**	NA	**0.0017**	NA	NA	NA	**0.0016**	<0.001
	1/2008	**0.0392**	**0.0083**	**0.0177**	NA	**0.0014**	NA	NA	NA	<0.001	**0.0039**
	7/2008	**0.0594**	**0.0076**	**0.0202**	NA	**0.0012**	NA	NA	NA	<0.001	**0.0036**
	3/2009	**0.057**	**0.01**	**0.01**	**0.002**	<0.001	**0.004**	**0.02**	**0.058**	<0.001	<0.001
	11/2009	**0.0535**	**0.0093**	**0.0174**	**0.00216**	**0.00193**	**0.00506**	**0.0154**	**0.0454**	<0.001	**0.0047**
	3/2010	<0.1	**0.252**	<0.005	<0.005	<0.005	**0.182**	<0.005	<0.005	<0.005	<0.005

All units are in mg/L.
Bold = Exceedance of current ARAR.
Shaded = Exceedance of 1988 North Carolina ground water standard.
NA = Not analyzed; the IT wells were analyzed for MNA parameters, which did not originally include monitoring for benzene.

TCE

In the past five years, TCE concentrations have consistently been detected above the North Carolina ground water standard in seven wells (Table 8; see Appendix F for complete data). Wells HH-48 and HH-77 are located off site on residential property, while remaining wells are located on site near the production area and former GRUB area. TCE is primarily detected in two different locations: a suspected but unidentified source area that is currently being investigated near monitoring wells TD-3 and TD-4 in the processing area and an area approximately 1,000 feet downgradient of the Site at wells HH-48 and HH-77. TCE concentrations in wells TD-3 and TD-4 have increased during the current FYR period. TCE concentrations have been stable in HH-48 and HH-77. However, no data from these wells for 2009 and 2010 were available for this FYR. The June 2010 work plan includes additional data gathering to establish whether the historic presence of TCE in off-site wells HH-48 and HH-77 is site-related. Additionally, TCE concentrations in PEW-1, PEW-4 and TI-2 have increased slightly during the current FYR period. In monitoring wells other than these seven wells, TCE concentrations were not detected, were detected below standards, or were detected at low concentrations that were above standards. However, the concentrations in these wells remain low and no trends were observed.

Table 8. Ground Water Sampling Results for Wells with TCE Concentrations that exceed ARAR

Contaminant	Sampling Date	Monitoring Well						
		HH-48	HH-77	PEW-1	PEW-4	TD-3	TD-4	TI-2
TCE (1988 NC Ground Water Standard = 0.0028 mg/L; Current ARAR = 0.003 mg/L)	3/2006	**0.0954**	**0.402**	**0.0047**	**0.0292**	NA	NA	NA
	8/2006	**0.118**	**0.395**	**0.008**	**0.163**	NA	NA	NA
	11/2006	NA	NA	NA	NA	**0.202**	**2.74**	NA
	1/2007	**0.0824**	**0.17**	**0.0078**	**0.0227 J**	**0.178**	**2.53 J**	NA
	4/2007	NA	NA	NA	NA	**0.18**	**2.7**	NA
	7/2007	**0.0859**	**0.36**	NA	**0.0157**	**0.416**	**2.28**	NA
	1/2008	< 0.001	**0.242**	NA	NA	**0.149**	NA	NA
	4/2008	NA	NA	NA	NA	**0.14**	**2.07**	NA
	7/2008	**0.0655**	**0.32**	**0.0109**	**0.0469**	**0.0974**	**2.95**	NA
	10/2008	NA	NA	NA	NA	**0.202**	**2.76**	NA
	3/2009	NA	NA	**0.0128**	**0.0524**	**0.208**	**3.74**	**0.0072**
	11/2009	NA	NA	**0.0129**	**0.0379**	**0.0688**	**3.84**	**0.00817**
	3/2010	NA	NA	**0.0142**	**0.0429**	**0.375**	**3.56**	**0.0083**

All units are in mg/L.
Bold = Exceedance of current ARAR.
Shaded = Exceedance of 1988 North Carolina ground water standard.
NA = Not analyzed.
J indicates an estimated concentration.

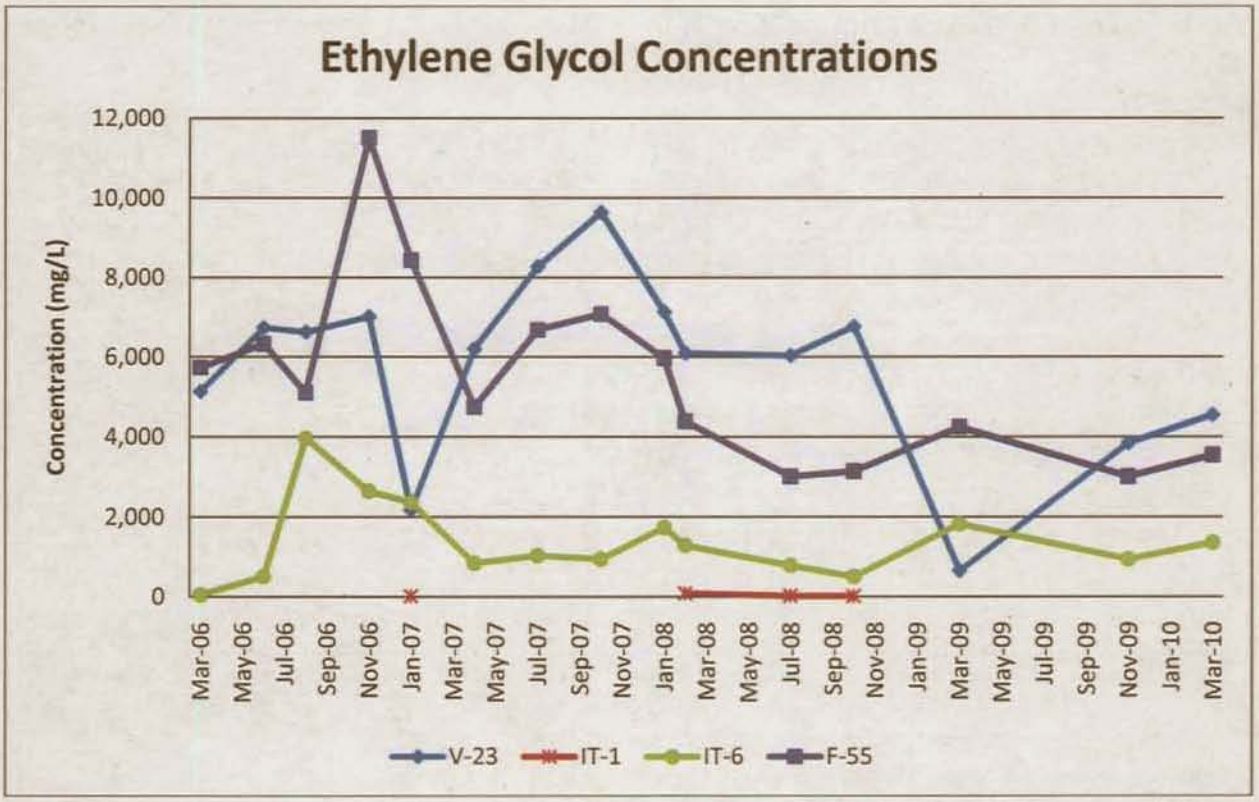
Other Contaminants exceeding NC 2L Standards

Other contaminants have been detected at elevated concentrations and concentrations exceeding North Carolina ground water standards. These contaminants include ethylene glycol, diethylene dioxide, 1,1-biphenyl and biphenyl ether.

Ethylene glycol

In the past five years, ethylene glycol has been consistently detected in three wells (V-23, IT-6 and F-55) at levels substantially greater than the current North Carolina ground water standard of 10 mg/L (Figure 3). Ethylene glycol has also periodically been detected above the North Carolina ground water standard in a fourth well, IT-1 (Table 9; see Appendix F for complete data). Ethylene glycol concentrations at other monitoring wells were not detected, were detected below the standard or were detected at low concentrations that were above standards. However, the concentrations in these wells remain low and no trends were observed in these wells.

Figure 3. Trend in Wells with High Ethylene Glycol Concentrations



Wells V-23 and IT-6 are located on site in the vicinity of the former burn pits and the former GRUB area. Ethylene glycol concentrations detected in these wells during the current FYR review period have exceeded the North Carolina ground water standard, have fluctuated over time and have not shown consistent decline. Concentrations in

March 2010 remain comparable to concentrations in March 2006, with the exception of IT-6, which had a higher concentration of 1,370 mg/L in March 2010 compared to 55.4 mg/L in March 2006. Concentrations in F-55 indicate a downward trend, but remain 350 times greater than the current North Carolina ground water standard. Ethylene glycol was also detected in well IT-1 at concentrations above the current standard during four sampling events: January 2007, February 2008, July 2008 and October 2008.

Table 9. Ground Water Sampling Results for Wells with High Ethylene Glycol Concentrations

Contaminant	Sampling Date	Monitoring Well			
		V-23	IT-1	IT-6	F-55
Ethylene glycol (Current NC Ground Water Standard = 10 mg/L)	3/2006	**5,140**	<7	**55.4**	**5,740**
	6/2006	**6,740**	<7	**514**	**6,330**
	8/2006	**6,630**	<7	**3,970**	**5,110**
	11/2006	**7,020**	<7	**2,650**	**11,500**
	1/2007	**2,180**	**17**	**2,370**	**8,440**
	4/2007	**6,210**	<7	**845**	**4,750**
	7/2007	**8,280**	<7	**1,040**	**6,680**
	10/2007	**9,640**	<7	**954**	**7,080**
	1/2008	**7,140**	<7	**1,740**	**5,970**
	2/2008	**6,100**	**84.6**	**1,300**	**4,390**
	7/2008	**6,040**	**25.8**	**794**	**3,010**
	10/2008	**6,770**	**11.7**	**514**	**3,140**
	3/2009	**653**	<7	**1,830**	**4,250**
	11/2009	**3,850**	<7	**948**	**3,010**
	3/2010	**4,560**	<7	**1,370**	**3,550**

All units are in mg/L.
Bold = Exceedance of current North Carolina ground water standard.

Diethylene dioxide

Diethylene dioxide has been detected above North Carolina ground water standards in 60 of 78 ground water samples collected between March 2009 and March 2010 (Table 10). The March 2009 sampling event was the first to include diethylene dioxide as an analytic parameter. Concentrations in wells with exceedances were generally 100 times greater than the standard, with the exception of wells V-23 and IT-6. Concentrations in these two wells are approximately 2.5 mg/L in the most recent sampling event, nearly 1,000 times greater than the ground water standard. Since only three sampling events have occurred, no trends were identified in the data. Additional sampling will be conducted to better characterize the diethylene dioxide contamination.

Table 10. Ground Water Sampling Results for Diethylene Dioxide

Contaminant	Monitoring Well	Sampling Date		
		Mar-09	Nov-09	Mar-10
Diethylene dioxide (Current NC Ground Water Standard = 0.003 mg/L)	C-49	<0.002	**0.00365**	<0.002
	F-55	**0.276**	**0.313**	**0.319**
	G-50	**0.73**	**0.562**	**0.573**
	I-57	**0.359**	**0.36**	**0.509**
	K-28	**0.25**	**0.738**	**0.41**
	T-35	**0.0417**	**0.0452**	**0.0493**
	V-23	**1.03**	**2.94**	**2.5**
	V-65	**0.322**	**0.47**	**0.396**
	AA-54	**0.226**	**0.199**	**0.21**
	CC-33	**0.08**	**0.128**	**0.0894**
	DD-58R	**0.0826**	**0.0789**	**0.0852**
	GG-61	**0.115**	**0.0377**	**0.0416**
	II-65	**0.0492**	**0.235**	**0.301**
	II-112	**0.27**	**0.00633**	**0.00504**
	KK-55	**0.142**	**0.104**	**0.121**
	IT-5	**0.453**	**0.856**	**0.907**
	IT-6	**2.45**	**2.46**	**2.43**
	IT-7	**0.366**	**0.429**	**0.452**
	OT-2R	**0.09**	**0.0872**	**0.101**
	PEW-1	**0.028**	**0.0216**	**0.344**
	PEW-3	<0.002	< 0.002	<0.002
	PEW-4	**0.0655**	**0.0426**	**0.0569**
	TD-2	<0.002	< 0.002	<0.002
	TD-3	<0.002	< 0.002	<0.002
	TD-4	<0.002	< 0.002	<0.002
	TI-2	<0.002	0.00478	0.00285

All units are in mg/L.
Bold = Exceedance of current North Carolina ground water standard.

During the full-scale Stream C investigation to evaluate ground water discharge into the stream, diethylene dioxide was detected at concentrations above the North Carolina ground water standard in 18 of 22 wells sampled in September 2009 (Table 11; see Appendix G for the Stream Inflow Technical Memorandum). The highest concentration of diethylene dioxide detected during the investigation was 0.086 mg/L in SI-5D-GW, which is located east of the recreation pond on site. Concentrations of diethylene dioxide were lower in samples collected downstream at a residential area where Celanese has conducted sampling (Figure 3). Additional sampling should be conducted to monitor diethylene dioxide in ground water along Stream C. Surface water in Stream C was also evaluated during the investigation, and diethylene dioxide in all surface water samples

was below the North Carolina Surface Water Standard for Class C water, which is 0.110 mg/L.

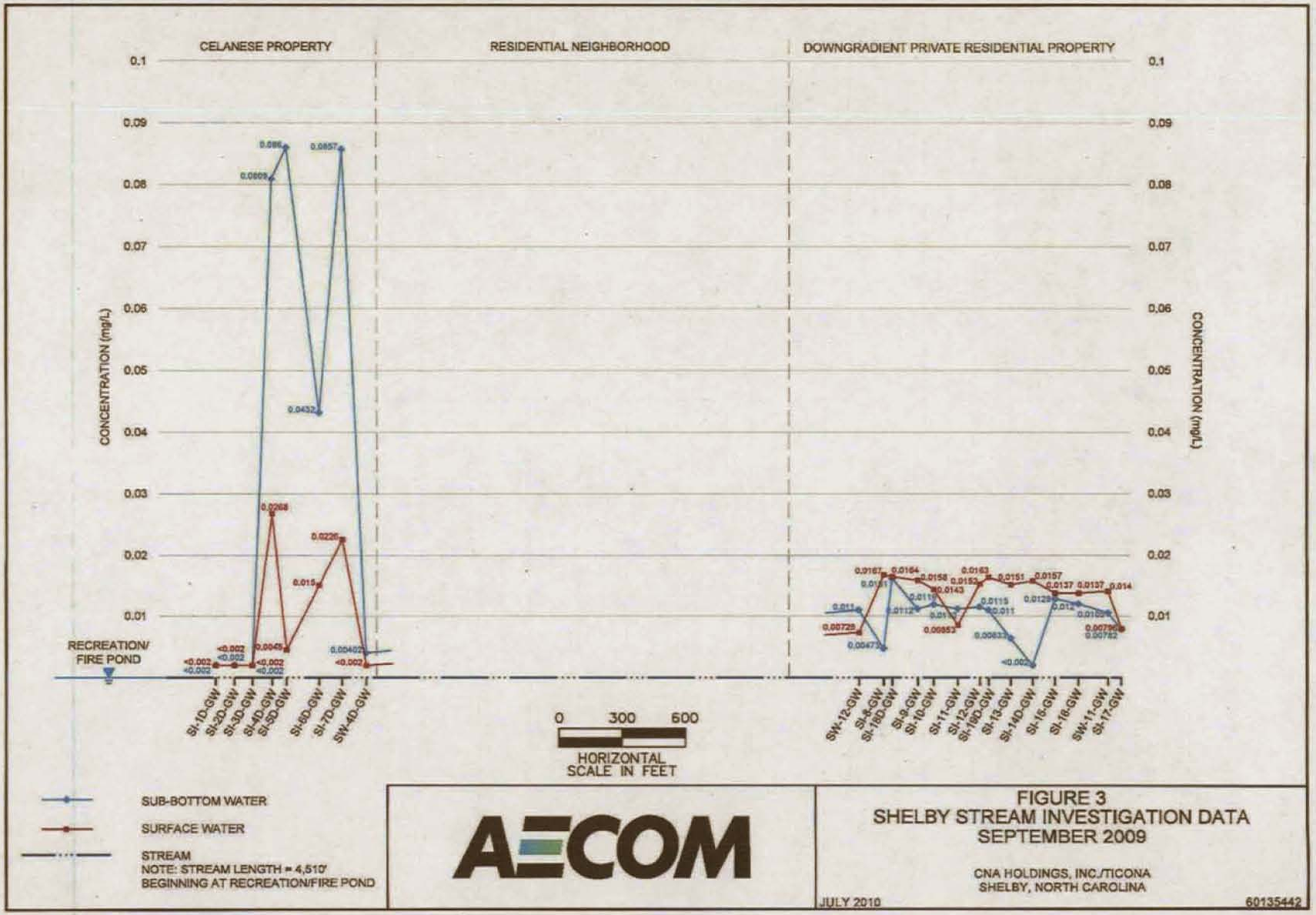
Table 11. Ground Water and Surface Water Sampling Results for Stream C

Ground Water		Surface Water	
Monitoring Well	Concentration of Diethylene Dioxide (mg/L) (Current NC Ground Water Standard = 0.003 mg/L)	Location	Concentration of Diethylene Dioxide (mg/L)[a]
SI-1D-GW	<0.002	SI-1D	<0.002
SI-2D-GW	<0.002	SI-2D	<0.002
SI-3D-GW	<0.002	SI-3D	<0.002
SI-4D-GW	**0.0809**	SI-4D	0.0268
SI-5D-GW	**0.086**	SI-5D	0.0045
SI-6D-GW	**0.0432**	SI-6D	0.015
SI-7D-GW	**0.0857**	SI-7D	0.0226
SW-4D-GW	**0.00402**	SW-4D	<0.002
S2-12-GW	**0.011**	S2-12	0.00729
SI-8-GW	**0.00473**	SI-8	0.0167
SI-18D-GW	**0.0161**	SI-18D	0.0164
SI-9-GW	**0.0112**	SI-9	0.0158
SI-10-GW	**0.0119**	SI-10	0.0143
SI-11-GW	**0.0112**	SI-11	0.00853
SI-12-GW	**0.0115**	SI-12	0.0152
SI-19D-GW	**0.011**	SI-19D	0.0163
SI-13-GW	**0.00633**	SI-13	0.0151
SI-14D-GW	<0.002	SI-14D	0.0157
SI-15-GW	**0.0128**	SI-15	0.0137
SI-16-GW	**0.012**	SI-16	0.0137
SW-11-GW	**0.015**	SW-11	0.014
SI-17-GW	**0.00782**	SI-17	0.00796

Bold = Exceedance of current North Carolina ground water standard.

a. The current surface water quality standard for diethylene dioxide for Class C water is 0.110 mg/L. This information is available at: http://portal.ncdenr.org/c/document_library/get_file?folderId=521751&name=DLFE-14919.pdf (last accessed on April 11, 2011).

Figure 4. Diethylene Dioxide Ground Water Concentrations for Stream C



1,1-Biphenyl and Biphenyl Ether

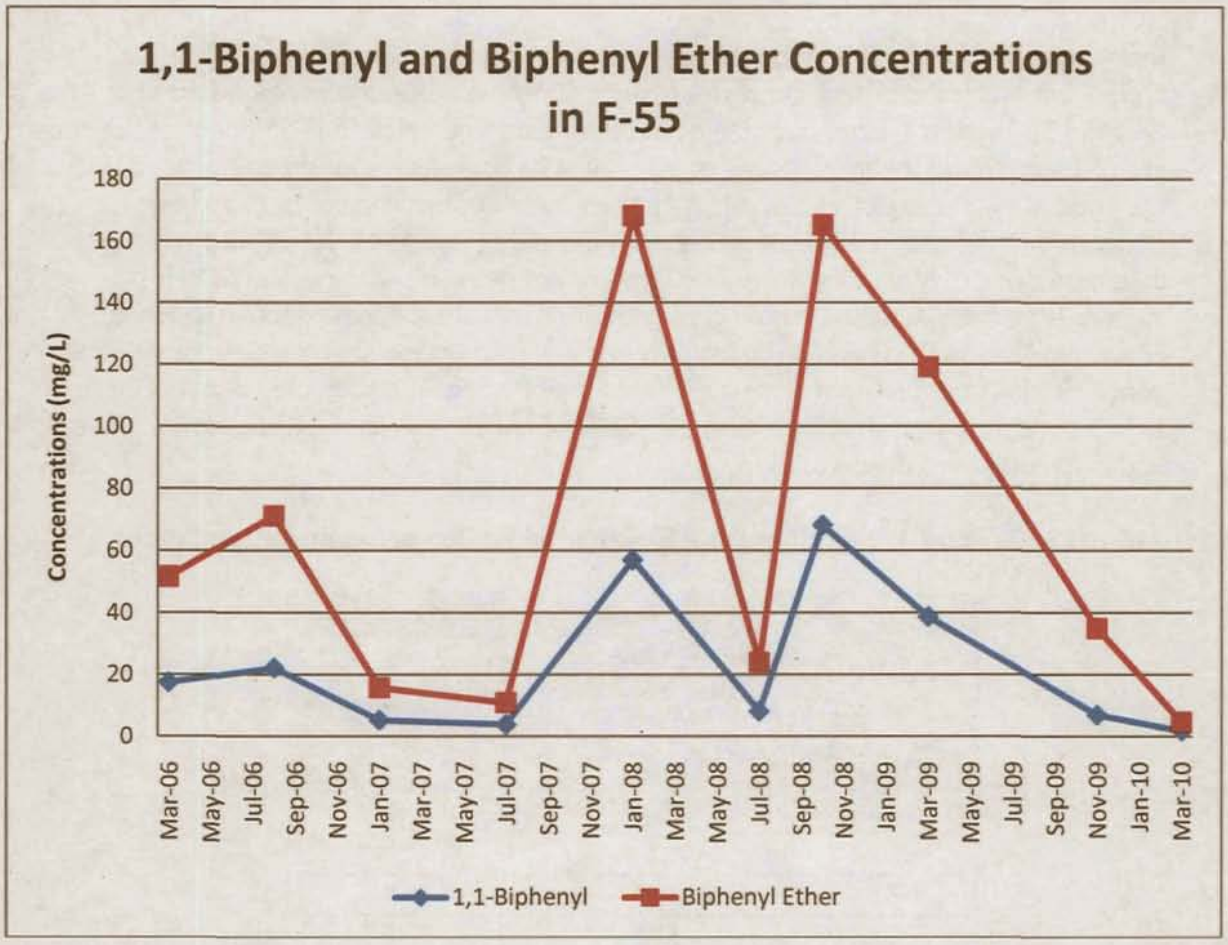
In the past five years, 1,1-biphenyl has been consistently detected in well F-55 at concentrations greater than the current North Carolina ground water standard of 0.4 mg/L (Table 12). Biphenyl ether has also been consistently detected in F-55 at concentrations above background levels. There is no current state or federal ground water standard for the constituent. Concentrations of 1,1-biphenyl and biphenyl ether in F-55 have fluctuated in the past five years and remain elevated (Figure 4). 1,1-biphenyl concentrations at other monitoring wells were not detected, were detected below standards or were detected at low concentrations that were above standards. However, the concentrations in these wells remain low and no trends were observed. Biphenyl ether concentrations at other monitoring wells were not detected or detected at concentrations below concentrations detected in well F-55. The concentrations in these wells remain low and no trends were observed.

Table 12. Ground Water Sampling Results for 1,1-Biphenyl and Biphenyl Ether

	Monitoring Well F-55	
Sampling Date	**1,1-biphenyl (Current NC Ground Water Standard = 0.4 mg/L)**	**Biphenyl Ether[a]**
3/2006	**17.4**	51.7
8/2006	**22**	71.2
1/2007	**5.16**	15.8
7/2007	**3.75**	11
1/2008	**56.8**	168
7/2008	**8.04**	24
10/2008	**68.1**	165
3/2009	**38.6**	119
11/2009	**6.88**	35
3/2010	**1.73**	4.68

All units are in mg/L.
Bold = Exceedance of current North Carolina ground water standard.
a. No federal or state ground water standard was identified for biphenyl ether.

Figure 5. Trends of 1,1-Biphenyl and Biphenyl Ether in F-55



Future Data Collection

According to the June 2010 work plan, additional data related to source area evaluation, delineation of contaminant plumes, ground water flow conditions and surface water impacts are to be collected. Sampling was completed in September 2010 and March 2011 as part of the extended ground water sampling program designed to provide data for additional characterization for diethylene dioxide, ethylene glycol, VOCs, 1,1-biphenyl, biphenyl ether, arsenic and manganese. An interim monitoring plan was implemented while other investigation activities and finalization of the characterization monitoring plan were completed. At the time of this FYR, interim monitoring events had been completed in March 2009, November 2009 and March 2010. Another interim monitoring event will be repeated in late 2011 and these events may continue to be repeated on a semiannual basis while the characterization data are assessed for development and approval of the long-term monitoring plan. Additional remedial actions may be considered based on the results of the expanded monitoring.

6.5 Site Inspection

On February 23, 2011, EPA RPM Luis Flores; David Mattison of NCDENR; Everett Glover and Bryon Dahlgren of AECOM; PEM Carter and Steven Simpson of Celanese; and Christy Fielden and Treat Suomi of Skeo Solutions met at the Site. CNA (the site PRP and current site property owner) and PRP contractor AECOM gave a tour of the remedial components at the Site for OU1 (ground water remediation) and OU2 (source control), including the former GRUB area, the former inner and outer tier ground water treatment systems, monitoring wells, and the stream on the site property where sampling is performed. Residential properties downgradient of the Site where Celanese financed the installation of municipal water supply connections were also visited during the tour. General site conditions were noted and photographed (Appendix E). Results of the site inspection are available in the completed site inspection checklist in Appendix D.

Because operations are ongoing at the Site, visitors are required to check in with security to prevent unauthorized access to the Site. The property is fenced and regular inspections are completed by security. The monitoring wells associated with the Site's ground water monitoring system were found to be secured and clearly labeled. Although the IT and OT ground water systems were not in operation, the IT system is kept in standby mode so that it can be returned to operation, if necessary. There was no indication of trespassing at the Site or in the area of the stream where sampling is completed. The former GRUB area was regraded and covered with soil following the excavation of source material. This area now includes a vegetative cover that is well-maintained as part of site O&M activities.

Following the tour, a meeting was held with site inspection participants to discuss the current status of the recommendations from the 2006 FYR and the IDR. MNA and long-term ground water monitoring are currently being used to address remaining ground water contamination at the Site and their effectiveness is still being evaluated.

On February 23, 2011, Skeo Solutions staff visited the designated site repository, Cleveland County Memorial Library, as part of the site inspection. All site-related documents were found to be up-to-date, with the exception of the 2006 FYR Report. The library had a letter confirming that a data disc with the 2006 FYR had been sent to the library to keep on file. However, library staff verified that the data disc could not be located and a copy of the 2006 FYR was not available.

Skeo Solutions staff conducted research at the Cleveland County Public Records Office and found the water supply agreements and consent decree pertaining to the Site listed in Table 13. Appendix H includes examples of the various types of water supply agreements recorded.

Table 13: Agreements from the Cleveland County Public Records Office

Date	Book	Page Number	Impacted Parcel

Water Supply Agreements: Celanese agreed to connect neighboring residential properties to Cleveland County's municipal water supply. By entering into the agreement, the residents received financing from Celanese and agreed to the capping and sealing of any wells located on their properties. Future drilling of wells or reopening of existing wells on these properties is prohibited as long as a public source of water is available.			
July 1995	1170	1005	71061
July 1995	1168	1088	71045
July 1995	1166	2150	71058
July 1995	1166	2154	73375
July 1995	1166	2158	71052
July 1995	1166	2162	70848, 70849,70850, 5377
July 1995	1166	2166	5372
July 1995	1166	2174	71051
July 1995	1166	2186	73376
July 1995	1166	2190	40956
July 1995	1166	2194	71055
August 1995	1170	994	71060, 71061, 71048, 71053
August 1995	1170	996	71060
August 1995	1170	984	72859, 58117
August 1995	1170	982	72859, 58117
August 1995	1170	1011	71053
August 1995	1168	1104	5331, 5330, 5329
August 1995	1168	1098	5332, 60255
August 1995	1168	1093	5365, 44856
August 1995	1168	1084	58298, 71056, 71057
August 1995	1168	1080	5333, 57013, 53276
August 1995	1166	2146	5380, 5381
August 1995	1166	2170	71049
August 1995	1166	2178	71046
August 1995	1166	2182	71059
August 1995	1168	1076	71050
September 1995	1170	989	71047
September 1995	1170	987	71047
September 1995	1170	1016	71054
September 1995	1170	1000	71048
September 1995	1168	1070	71056
September 1995	1168	1073	71045
Consent Decree: Celanese agreed to conduct the remedial action to address contamination associated with OU2 at the Site.			
November 1989	1235	2145	4512

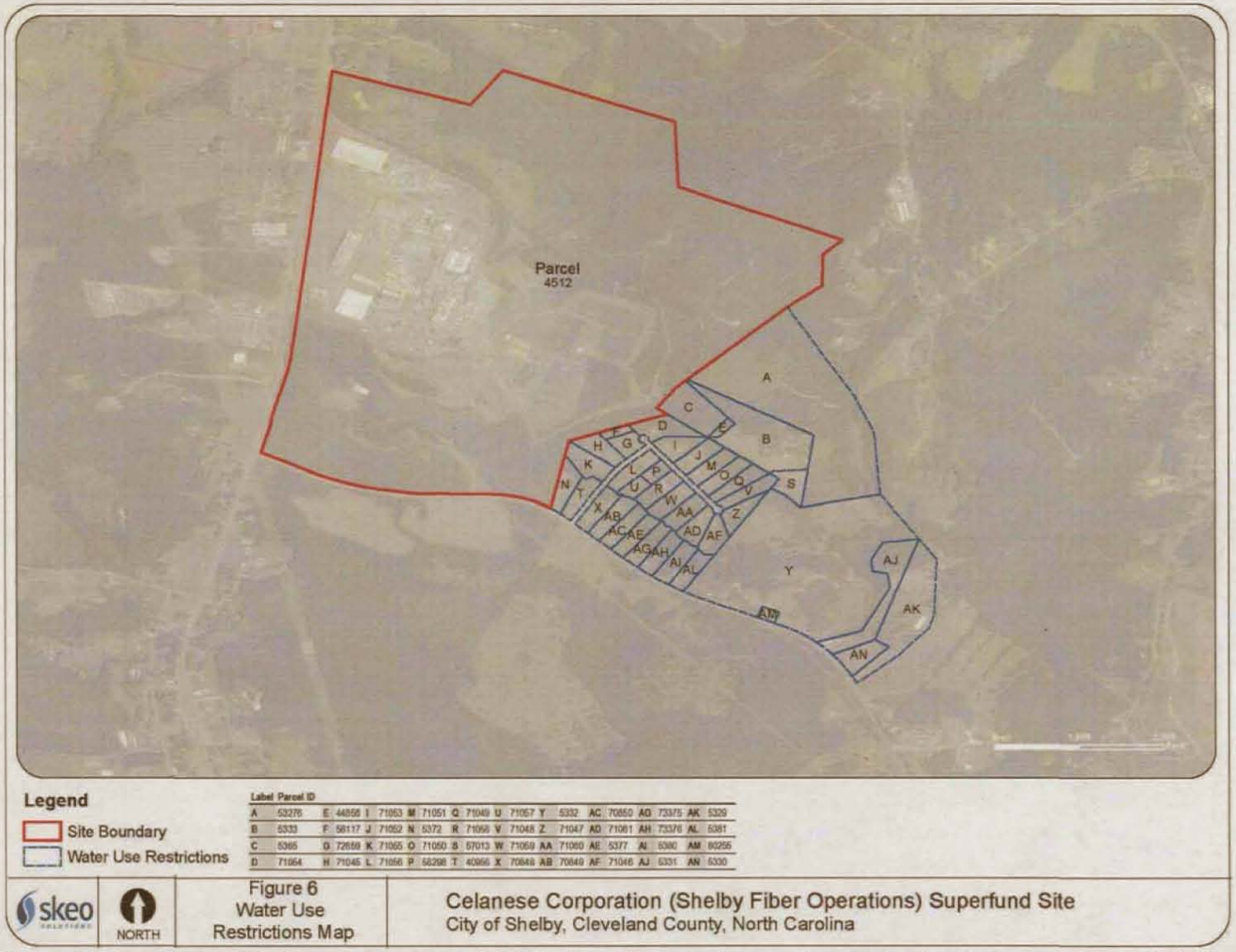
There are currently water supply agreements in place on residential properties located downgradient of the Site. The water supply agreements on these properties act as institutional controls. Celanese connected these properties to Cleveland County's municipal water supply, and provided financing for residents who agreed to cap and seal private wells on their properties. The agreements prohibit well drilling or the reopening of existing wells as long as a public water source is available. Although there are institutional controls in place off site, there are no institutional controls on the site property to prevent the creation of an exposure pathway to remaining ground water or source contamination on site, or to prevent any activity that could compromise the integrity of the selected remedy in the future. No institutional controls are needed or

required for surface water at the Site. Tables 14 list the institutional controls associated with areas of interest at the Site.

Table 14: Institutional Control (IC) Summary Table

Area of Interest – OU1 and OU2 Ground Water and Source Control						
Media	**ICs Needed**	**ICs Called for in the Decision Documents**	**Impacted Parcel(s)**	**IC Objective**	**Instrument in Place**	**Notes**
Ground Water	Yes	No	See Figure 6	Restrict installation of ground water wells and ground water use.	Water supply agreements are in place between Celanese and residents located downgradient of the Site. No ground water restrictions are currently in place on the site property.	Celanese connected residents located downgradient of the Site to Cleveland County's municipal water supply. Residents agreed to cap and seal any private wells, and future drilling or reopening of wells on the properties is prohibited as long as a public source of water is available.
Soil	Yes	No	4512	Restrict any use of the site property that would create an exposure pathway to source contamination or disturb the remedy in place at the Site.	None	None

Figure 6: Institutional Control Base Map



Disclaimer: This map and any boundary lines within the map are approximate and subject to change. The map is not a survey. The map is for informational purposes only regarding EPA's response actions at the Site, and is not intended for any other purpose.

6.6 Interviews

During the FYR process, interviews were conducted with parties impacted by the Site, including the current landowners and regulatory agencies involved in site activities or aware of the Site. The purpose of the interviews was to document the perceived status of the Site and any perceived problems or successes with the phases of the remedy that have been implemented to date. Interviews with site inspection participants were conducted during the site inspection on February 23, 2011, and by e-mail following the site inspection. Residents near the Site were contacted for interviews as part of the FYR process. However, there was no interest from residents to be interviewed regarding the Site. Interviews are summarized below and complete interviews are included in Appendix C.

PEM Carter and Charles Thomas: Ms. Carter is the Senior Environmental Engineer for Celanese and Mr. Thomas is the Utilities Manager for Celanese at the Site. Ms. Carter and Mr. Thomas believe the project is going well because remediation is being conducted and a good plan is in place and being followed. A knowledgeable group is working on the project and EPA and NCDENR representatives are willing to meet and discuss the remediation efforts, and understand how the current economic situation for Celanese impacts the remediation efforts underway. The community has been supportive of the project and Celanese has a property protection program in place for the neighboring community impacted by the Site. Ms. Carter and Mr. Thomas believe that MNA continues to address contamination and contaminants are not migrating. They feel well-informed about site activities, remedial progress and the roles and responsibilities of the remediation group working at the Site.

David Mattison: Mr. Mattison of NCDENR believes the project is reaching a point where assessment activities have been completed and decisions can be made regarding how to address the cleanup at the Site. He believes the current remedy is unacceptable, not because of lack of work being completed by the PRPs and related bodies, but because no final decisions have been made about the cleanup at the Site. He is unaware of any complaints from the community about the Site. NCDENR has not conducted any activities at the Site in the past five years. Mr. Mattison stated that institutional controls are still needed for the plant area, and that current institutional controls in place on properties off site should be updated to meet NCDENR requirements. Mr. Mattison acknowledged the difficulty in updating the current institutional controls in place. Mr. Mattison believes that remediation at the Site is progressing in the right direction and decisions will need to be made beyond completing investigations.

Everett Glover and Bryon Dahlgren: Mr. Glover of AECOM is the Project Manager and Mr. Dahlgren of AECOM is the Project Engineer at the Site. Mr. Glover and Mr. Dahlgren believe the project is progressing steadily; although some administrative issues have slowed the process, progress continues to be made. Celanese is interested in taking the project to completion in the most environmentally safe and economical way. Their assessment of the MNA and the long-term monitoring program currently being used as the remedy at the Site are functioning and are an appropriate solution to address

remaining contamination. Historic data has shown decreasing contaminant levels in some areas and stable contaminant levels in others. There is a continuous O&M presence at the Site. Regular inspections of the monitoring wells are conducted and maintenance activities are completed during semiannual sampling, as needed. Work is currently being done to develop optimal sampling frequencies so that a long-term monitoring schedule can be developed for use. This work has caused an increase in initial cost, but is expected to provide long-term savings. Once contaminant characterization has been completed, the O&M activities will be optimized.

7.0 Technical Assessment

7.1 Question A: Is the remedy functioning as intended by the decision documents?

The review of relevant documents, ARARs and risk assumptions and the site inspection indicate that the Site's remedy is not operating and functioning as designed by site decision documents. MNA and long-term monitoring are currently being used to address remaining ground water contamination at the Site and their effectiveness is being evaluated. However, a final determination regarding a remedy that effectively addresses all contaminants in ground water has not been made following the completion of the MNA pilot study that was conducted in accordance with the 2004 ESD. Additionally, the IDR determined that MNA may not sufficiently address all contaminants detected at the Site, including diethylene dioxide and TCE. Because MNA may not address all contamination remaining at the Site, ground water extraction should resume, as previously required by the 2004 ESD. The current placement of extraction wells in the system should also be evaluated to determine if the wells are in appropriate locations to be able to adequately remove the remaining contamination. After the final determination regarding the remedy is made, the remedy needs to be updated and the appropriate site documents will be revised.

An expanded ground water sampling program is being completed at the Site and the findings will be used to develop an appropriate schedule for a long-term ground water monitoring program. However, monitoring data from the past five years does not show that contaminant concentrations of remaining COCs are decreasing at substantial rates. Sampling has shown that benzene and TCE have been detected above cleanup goals in on-site wells. Benzene has consistently been detected at concentrations comparable to concentrations found in the previous FYR in wells F-55, K-28, and V-23, which suggests that benzene may not be attenuating in these wells. Wells K-28 and V-23 are located near the former GRUB area. TCE continues to be detected at the Site in monitoring wells TD-3 and TD-4 in the process area and in HH-48 and HH-77 located downgradient of the site. TCE concentrations in wells TD-3 and TD-4 have increased in recent sampling events, while TCE concentrations in HH-48 and HH-77 have been stable. Monitoring data do not suggest that benzene or TCE are migrating from the Site.

According to the Site's ROD, "for the purposes of this remedy, all compounds detected in ground water, which are not naturally occurring, must be removed from ground water until the concentration of that compound has fallen below the lowest analytical method detection limit published by EPA for that particular compound." The current ground water monitoring program samples for ethylene glycol, diethylene dioxide and 1,1-biphenyl. Because these contaminants continue to be detected at concentrations that exceed North Carolina ground water standards, they are considered site COCs and will be addressed in the remedial actions. Additionally, biphenyl ether has also been detected in on-site wells. However, there is no state or federal ground water standard for the constituent. The appropriate site documents have been updated to include the contaminants as Site COCs.

Contaminant concentrations exceeding North Carolina ground water standards for ethylene glycol, diethylene dioxide, 1,1-biphenyl and biphenyl ether have been detected only in wells within the facility property, specifically in the former burn pit area and the GRUB area. Diethylene dioxide concentrations exceeding North Carolina ground water standards have also been detected in several ground water monitoring wells located along Stream C during a stream inflow investigation (see Appendix G for Stream Inflow Technical Memorandum). Based on findings of the stream inflow investigation, the primary source of diethylene dioxide is believed to be the former GRUB area. Follow-up actions will need to be developed to confirm the source of diethylene dioxide and to fully characterize diethylene dioxide contamination. Follow-up activities will be necessary to ensure that contamination above cleanup goals does not migrate off site and that concentrations of diethylene dioxide in surface water do not exceed surface water quality standards.

Because MNA is ongoing at the Site, O&M activities at the Site consist of maintaining monitoring wells and the IT ground water treatment system in the event that the system is required to be put back into operation. Inspections are conducted on a regular basis, and any monitoring well maintenance or repairs are completed on an as-needed basis during semiannual sampling events. Institutional controls in the form of water supply agreements are currently in place on residential properties downgradient from the facility property. Celanese agreed to connect downgradient residents to Cleveland County's municipal water supply; in exchange residents agreed to plug private drinking water wells as well as not drill new wells in the future as long as the municipal water supply is available. No institutional controls have been implemented to limit the future use of ground water or the source area in the facility property. The facility is fenced, and there is a security protocol in place that ensures unauthorized visitors do not have access to the property. However, institutional controls need to be implemented to ensure that an exposure pathway is not created through ground water or remaining source contamination in the future, and to ensure that the integrity of the selected remedy is not compromised in the future, if the facility property is transferred to a new owner or land use changes.

7.2 Question B: Are the exposure assumptions, toxicity data, cleanup levels and remedial action objectives (RAOs) used at the time of remedy selection still valid?

Ground water ARARs for lead, chromium, barium and nickel have become more stringent since the signing of the 1988 ROD for OU1 and their cleanup goals should be updated. The PRP has requested EPA to issue a decision document to delete metals as COCs. EPA has considered the request to delete metals as COCs as cleanup goals are achieved and determined that a formal remedy change (i.e. ESD) is not needed to document such action. Metals continue to be monitored as part of the expanded sampling events completed in September 2010 and March 2011 to provide additional data. If EPA determines that clean up goals have been achieved for metals or any COCs, monitoring programs may be modified, but remedy changes are not needed. The expanded sampling events completed in September 2010 and March 2011 to characterize existing contamination at the Site included additional sampling of manganese and arsenic to further support the removal of metals as site COCs. The findings from the expanded

sampling event will be submitted to EPA in a technical memorandum in September 2011 and used to determine whether metals should continue to be monitored.

TCE continues to be detected in wells HH-48 and HH-77, which are located outside of the facility property boundaries by a residential property. The source of TCE has been questioned by the PRP and is being investigated as part of the expanded sampling event. Findings will be submitted in the September 2011 technical memorandum to EPA. Because TCE is a VOC, there is potential for vapor intrusion to occur on the residential property. To determine whether there was a current risk or an exposure pathway associated with the TCE in the ground water, EPA's RPM for the Site had a limited vapor intrusion assessment (Appendix I) completed by an EPA vapor intrusion expert. The vapor intrusion assessment used the TCE data and ground water levels available for monitoring well HH-48, the shallow well in the HH well cluster, to calculate the risk through potential vapor intrusion at the residential property using the J&E model. The calculated risk for 2005 and current TCE concentrations was 5.1×10^{-7} and 2.5×10^{-7}, respectively. Both values are below EPA's acceptable risk level of 1.0×10^{-4} that would trigger immediate remedial action. Therefore, the vapor intrusion assessment determined that there is no immediate risk of vapor intrusion, and no further vapor intrusion evaluation is needed. Additionally, although there are VOCs besides TCE that have been detected in ground water at the Site, the risk of vapor intrusion on the site property is not likely because no enclosed buildings exist in the former GRUB area, and the production area is not enclosed.

7.3 Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

No new information has come to light that could call into question the protectiveness of the remedy.

7.4 Technical Assessment Summary

The review of documents, ARARs, risk assumptions and the site inspection indicate that the Site's remedy for OU1 is not operating and functioning as designed by the decision documents. However, no completed exposure pathways currently exist at the Site. MNA and long-term monitoring are currently being used to address the remaining ground water contamination and their effectiveness is being evaluated. At this time, the MNA pilot study has been completed and the ground water extraction system has not been restarted as required by the ESD. In addition, an IDR also determined that MNA may not be sufficient to address all of the contaminants detected at the Site, including diethylene dioxide (i.e., 1,4-dioxane) and TCE. In addition, ground water monitoring data indicate that COC concentrations may not be attenuating at a substantial rate for all COCs. Because MNA may not address all contamination remaining at the Site, ground water extraction should resume and the placement of extraction wells in the system should be evaluated to determine the most appropriate locations to be able to adequately remove the remaining contamination.

Ethylene glycol, diethylene dioxide and 1,1-biphenyl have been detected at concentrations above North Carolina ground water standards in wells located on site in areas that include the former burn pits and former GRUB disposal area. Biphenyl ether has also been detected in wells located within the site property. There is no North Carolina or federal ground water standard for this constituent.

Diethylene dioxide concentrations exceeding North Carolina ground water standards were detected in several ground water monitoring wells located along Stream C during a stream inflow investigation. During the stream flow investigation, diethylene dioxide was also detected in Stream C. However, none of the stream concentrations exceeded North Carolina surface water standards. Because water supply agreements have been put in place as institutional controls on residential properties downgradient of the Site and diethylene dioxide concentrations meet surface water standards, there are no completed exposure pathways for this contaminant.

The PRP has requested EPA to issue a decision document to delete metals as COCs. EPA has considered the request to delete metals as COCs as cleanup goals are achieved and determined that a formal remedy change (i.e. ESD) is not needed to document such action. Metals continue to be monitored as part of the expanded sampling events completed in September 2010 and March 2011 to provide additional data. If EPA determines that clean up goals have been achieved for metals or any COCs, monitoring programs may be modified, but remedy changes are not needed. The expanded sampling events completed in September 2010 and March 2011 to characterize existing contamination at the Site included additional sampling of manganese and arsenic to gather data to further support the removal of metals as site COCs. The findings from the expanded sampling event will be submitted to EPA in a technical memorandum in September 2011 and used to determine whether metals should continue to be monitored. It should be noted that the ground water ARARs for lead, chromium, barium and nickel have become more stringent since the signing of the 1988 ROD for OU1 and their cleanup goals should be updated.

TCE continues to be detected in monitoring wells HH-48 and HH-77, which are located outside of the facility property boundaries by a residential property. The source of TCE has been questioned by the PRPs and is currently being investigated as part of the expanded sampling event. The findings will be submitted in the September 2011 technical memorandum to EPA. Because TCE is a VOC, there is potential for vapor intrusion to occur on the residential property. To determine whether there was a current risk or an exposure pathway associated with the TCE in the ground water, EPA's RPM for the Site had a limited vapor intrusion assessment completed by an EPA vapor intrusion expert. The vapor intrusion assessment determined that there is no immediate risk of vapor intrusion based on review of TCE data available for monitoring well HH-48, the shallow well in the HH well cluster, and no further vapor intrusion evaluation is needed. Additionally, although there are VOCs besides TCE that have been detected in ground water at the Site, the risk of vapor intrusion on the site property is not likely because no enclosed buildings exist in the former GRUB area, and the production area is not enclosed.

An active manufacturing facility owned and operated by Ticona operates at the Celanese property, while CNA conducts the environmental work . The facility property is well-maintained and surrounded by a fence, and active security ensures that unauthorized visitors do not have access to the facility property. However, there are no institutional controls on the facility property restricting the future use of ground water and the source area, or preventing any activity that could compromise the integrity of the selected remedy in the future.

8.0 Issues

Table 15 summarizes current site issues.

Table 15: Current Site Issues

Issue	Affects Current Protectiveness (Yes or No)	Affects Future Protectiveness (Yes or No)
The selected remedy for OU1 needs to be updated to address remaining ground water contamination since the IDR determined that MNA may not be sufficient to address diethylene dioxide and TCE contamination.	No	Yes
The ground water extraction system has not been restarted as required by the ESD.	No	Yes
Ground water ARARs for the metals lead, chromium, barium and nickel have become more stringent since the signing of the 1988 ROD for OU1.	No	Yes
Institutional controls were not called for in site decision documents and have not been implemented to limit the future use of ground water and the source area at the facility property and to ensure that the integrity of the selected remedy is not compromised in the future.	No	Yes
Diethylene dioxide has consistently been detected at concentrations which exceed the North Carolina ground water standard in monitoring wells along Stream C, and the extent of contamination has not been fully characterized at the Site.	No	Yes
The source of TCE in wells HH-48 and HH-77 located by a residence has been questioned by the PRP.	No	Yes

10.0 Protectiveness Statements

The Site's remedy for OU1 currently protects human health and the environment in the short term. Institutional controls prohibiting ground water use are in place at residential properties downgradient of the facility property and these properties are connected to the municipal water supply. Ground water is also not in use on site. Therefore, there are currently no completed exposure pathways at the Site. MNA and long-term monitoring are currently being used to address remaining ground water contamination at the Site and their effectiveness is being evaluated. The IDR determined that MNA may not sufficiently address all contaminants detected at the Site, including diethylene dioxide and TCE. Because MNA may not address all contamination remaining at the Site, ground water extraction should resume and the placement of extraction wells in the system should be evaluated to determine the most appropriate locations to be able to adequately remove the remaining contamination.

The Site's remedy for OU2 currently protects human health and the environment in the short term. The area of source contamination addressed under OU2 at the Site has been regraded and revegetated following excavation and treatment of source contamination, as required by the selected remedy. Following remediation activities, EPA concluded that the OU2 remedy was protective of human health and the environment because the major source of contamination was removed and residual contamination that leaches into ground water would be addressed by the OU1 ground water remedy. OU2 was deleted from the NPL. Because contaminated soil and ground water remain on the facility property, institutional controls are needed to ensure that remaining contamination in the source areas is not disturbed.

For the Site's remedy to be protective in the long term, the remedy needs to be updated to ensure it effectively addresses remaining ground water contamination; remaining contamination at the Site needs to be completely characterized; and the potential for migration of diethylene dioxide off the facility property needs to be addressed. Additionally, institutional controls are needed on the facility property to limit future uses of ground water and the source area, and to ensure that the integrity of the selected remedy is not compromised in the future.

11.0 Next Review

The Site is a statutory site that requires ongoing FYRs as long as waste is left on site that does not allow for unrestricted use and unlimited exposure. The next FYR will be due within five years of the signature/approval date of this FYR.

9.0 Recommendations and Follow-up Actions

Table 16 provides recommendations to address current site issues.

Table 16: Recommendations to Address Current Site Issues

Issue	Recommendations / Follow-Up Actions	Party Responsible	Oversight Agency	Milestone Date	Affects Protectiveness? (Yes or No)	
					Current	Future
The selected remedy for OU1 needs to be updated to address remaining ground water contamination since the IDR determined that MNA may not be sufficient to address diethylene dioxide and TCE contamination.	Evaluate whether the current extraction wells can capture remaining contamination while a final decision is made in regards to updating the remedy in order to address remaining ground water contamination at the Site.	EPA and PRP	EPA	8/24/2014	No	Yes
The ground water extraction system has not been restarted as required by the ESD.	Resume ground water extraction and treatment.	PRP	EPA	8/24/2012	No	Yes
Ground water ARARs for the metals lead, chromium, barium and nickel have become more stringent since the signing of the 1988 ROD for OU1.	Update site documents to reflect the more stringent ARARs for lead, chromium, barium and nickel.	PRP	EPA	8/24/2012	No	Yes
Institutional controls were not called for in site decision documents and have not been implemented to limit the future use of ground water and the source area at the facility property and to ensure that the integrity of the selected remedy is not compromised in the future.	Update site decision documents to include institutional controls and implement them to limit the future use of ground water and the source area at the Site, and to ensure that the integrity of the selected remedy is not compromised in the future.	EPA and PRP	EPA	8/24/2015	No	Yes
Diethylene dioxide has consistently been detected at concentrations which exceed the North Carolina ground water standard in monitoring wells along Stream C, and the extent of contamination has not been fully characterized at the Site.	Determine the source and fully characterize the extent of diethylene dioxide contamination at the Site and develop follow-up actions to address remaining contamination and mitigate the migration of contamination from the Site.	PRP	EPA	8/24/2014	No	Yes

Issue	Recommendations / Follow-Up Actions	Party Responsible	Oversight Agency	Milestone Date	Affects Protectiveness? (Yes or No)	
					Current	Future
The source of TCE in wells HH-48 and HH-77 located by a residence has been questioned by the PRP.	Determine the TCE source in wells HH-48 and HH-77 and determine if follow-up actions will be needed to address remaining TCE contamination at these wells.	PRP	EPA	8/24/2014	No	Yes

Appendix A: List of Documents Reviewed

EPA Record of Decision: Celanese Corp. (Shelby Fiber Operations. Operable Unit 1. EPA ID: NCD003446721. Prepared by U.S. EPA Region 4. March 23, 1988.

EPA Record of Decision: Celanese Corp. (Shelby Fiber Operations. Operable Unit 2. EPA ID: NCD003446721. Prepared by U.S. EPA Region 4. March 28, 1989.

Explanation of Significant Difference in Site Remedy, Celanese Fiber Operations Site. Shelby, North Carolina. April 2004.

Final Feasibility Study Report Operable Unit 1 – Ground Water Public Health Assessment for Celanese Fibers Operations. S&ME, Inc. February 26, 1988.

Final Feasibility Study Report Operable Unit 2 – Source Material Hoechst Celanese Facility. Shelby, North Carolina. S&ME, Inc. January 27, 1989.

Final Remedial Investigation Report. Prepared by S&ME, Inc. Prepared for the U.S. Environmental Protection Agency on Behalf of Celanese Fibers Operations, Shelby, North Carolina. June 1987.

Fourth Five-Year Review Report for Celanese Fiber Operations Site, Shelby, Cleveland County, North Carolina. Prepared by U.S. Army corps of Engineers. August 2006.

Independent Design Review, Celanese Fiber Operations Superfund Site. Shelby, North Carolina. Prepared by GeoTrans, Inc. for the U.S. Environmental Protection Agency. January 21, 2009.

Monitored Natural Attenuation Demonstration Project Data Report for Quarterly Sampling Event #8 (Q1 2006) Operable Unit 1. CNA Holdings, Inc./Ticona (F.K.A. Celanese Fibers Operations). Shelby, North Carolina. Prepared for: CNA Holdings, Inc./Ticona. Prepared by Earth Tech, Inc. June 2006.

Operable Unit 1 – Semiannual Report January 2006 – June 2006. CNA Holdings, Inc./Ticona (F.K.A. Celanese Fibers Operations). Shelby, North Carolina. Prepared for: CNA Holdings, Inc./Ticona. Prepared by Earth Tech, Inc. October 2006.

Operable Unit 1 – Semiannual Report July 2006 – December 2006. CNA Holdings, Inc./Ticona (F.K.A. Celanese Fibers Operations). Shelby, North Carolina. Prepared for: CNA Holdings, Inc./Ticona. Prepared by Earth Tech, Inc. October 2006.

Operable Unit 1 – Semiannual Report January 2007 – June 2007. CNA Holdings, Inc./Ticona (F.K.A. Celanese Fibers Operations). Shelby, North Carolina. Prepared for: CNA Holdings, Inc./Ticona. Prepared by Earth Tech, Inc. October 2006.

Operable Unit 1 – Semiannual Report July 2007 – December 2007. CNA Holdings, Inc./Ticona (F.K.A. Celanese Fibers Operations). Shelby, North Carolina. Prepared for: CNA Holdings, Inc./Ticona. Prepared by Earth Tech, Inc. October 2006.

Celanese Fibers Operations Site – Shelby, North Carolina. OU-1 Semiannual Report. January 2008 – June 2008. Prepared by AECOM. March 2009.

Celanese Fibers Operations Site – Shelby, North Carolina. OU-1 Semiannual Report. July 2008 – December 2008. Prepared by AECOM. March 2009.

Celanese Fibers Operations Site – Shelby, North Carolina. OU-1 Semiannual Report. January 2009 – June 2009. Prepared by AECOM. March 2009.

Celanese Fibers Operations Site – Shelby, North Carolina. OU-1 Semiannual Report. July 2009 – December 2009. Prepared by AECOM. March 2009.

Celanese Fibers Operations Site – Shelby, North Carolina. OU-1 Semiannual Report. January 2010 – June 2010. Prepared by AECOM. March 2010.

Remedial Action Report, Operable Unit One Remedial Action, Celanese Shelby Fiber Operations Superfund Site. Presented by Rust Environment & Infrastructure. Prepared for the U.S. Environmental Protection Agency Region 4. June 24, 1993.

Remedial Action Report, Operable Unit 2 Remedial Action, Celanese Shelby Fiber Operations Superfund Site. Prepared for the U.S. Environmental Protection Agency Region 4 – Atlanta, Georgia. Prepared by SEC Donahue Inc. on behalf of Hoechst Celanese Corporation. June 30, 1993.

Superfund Preliminary Close-Out Report (Long-term Remedial Action). Celanese Shelby Fibers Operations. Shelby, Cleveland County, North Carolina. March 25, 1993.

Supplemental Characterization and Long-Term Monitoring Revision 2. Celanese Fibers Operations Site Prepared by AECOM for CNA Holdings, Inc. Celanese Fibers Operations Site. Shelby, North Carolina. August 2010.

Technical Memorandum: TCE Concentrations at Off-Site HH Wells. Celanese Fiber Operations Site – Shelby, North Carolina. October 10, 2006.

Technical Memorandum: Stream Investigation Pilot Test. Celanese Fiber Operations Site, Shelby, North Carolina. May 12, 2009.

Technical Memorandum: Downgradient Groundwater Use Update, U.S. Environmental Protection Agency 5 Year Review, Celanese Fibers Operations Site, Shelby, North Carolina. April 11, 2011.

Work Plan and Field Sampling Plan for Supplemental Investigation and Long-Term Groundwater Monitoring. Prepared by AECOM for CNA Holdings, Inc. Celanese Fibers Operations Site. Shelby, North Carolina. June 2010.

Appendix B: Press Notices

The U. S. Environmental Protection Agency, Region 4 Announces a Five-Year Review for the Celanese Corp. (Shelby Fibers Operations) Superfund Site, Shelby, Cleveland County, North Carolina

Purpose/Objective: The U.S. Environmental Protection Agency (EPA) is conducting a Five-Year Review of the remedy for the Celanese Corp. (Shelby Fibers Operations) Superfund site (the Site) in Shelby, North Carolina. The purpose of the Five-Year Review is to ensure that the selected cleanup actions effectively protect human health and the environment.

Site Background: The 450-acre Site is located approximately 35 miles west of Charlotte. An active manufacturing facility owned by the Celanese Corporation has been operating at the Site since 1960. The Celanese plant originally produced filament thread and polyester chip, which is used for a wide range of molded products, such as typewriter keys and automotive parts. In the 1960s, the facility's waste treatment plant discharged chemical wastes through an eastward-draining ditch. Additionally, combustible materials including oils and solvents were burned in the open in a smaller area at the plant. Between 1970 and 1979, Celanese used a three-acre portion of the Site for the storage of drums containing waste chemicals and solvents. Site investigations began in October 1981, when Celanese installed ground water monitoring wells and conducted a hydrogeological evaluation, an electromagnetic survey and test pits. Results indicated that site ground water, soil and sediment were contaminated. Contaminants of concern at the Site included heavy metals, polycyclic aromatic hydrocarbons, inorganic chemicals and volatile organic compounds. EPA proposed the Site for inclusion on the National Priorities List (NPL) in October 1984; the Site was finalized on the NPL in June 1986.

Cleanup Actions: EPA designated two operable units (OUs) to address the Site's ground water, soil and sediment contamination. EPA signed the Site's OU1 Record of Decision (ROD) in March 1988, selecting a remedy to treat ground water contamination. The major components of the OU1 remedy included the use of an extraction and treatment system to remove contaminants from site ground water. The OU1 remedy was constructed in 1989 and continued to operate until 2004. In April 2004, EPA signed an Explanation of Significant Differences, changing the OU1 remedy to a two-year trial period for monitored natural attenuation (MNA). The MNA study period was extended in 2006; additional ground water treatment technologies are currently under review. EPA signed the Site's OU2 ROD in March 1989, selecting a remedy to address soil and sediment contamination at the Site. The major components of the remedy included excavation of glycol recovery unit sludges, plastic chips, burn pit residuals and stream sediments; on-site incineration of contaminated soils and sludges; chemical fixation of incinerator ash, plastic chips, burn pit residuals and stream sediments; and regrading and monitoring. The remedy for OU2 was completed between 1991 and 1992, when approximately 10,000 cubic yards of contaminated source waste was excavated and treated. In 1998, a remediated portion of the Site was deleted from the NPL.

Five-Year Review Schedule: The National Contingency Plan requires that remedial actions that result in any hazardous substances, pollutants or contaminants remaining at the Site above levels that allow for unlimited use and unrestricted exposure be reviewed every five years to ensure the protection of human health and the environment. The fifth of the Five-Year Reviews for the Site will be completed by August 2011.

EPA Invites Community Participation in the Five-Year Review Process: EPA is conducting this Five-Year Review to evaluate the effectiveness of the Site's remedy and to ensure that the remedy remains protective of human

health and the environment. As part of the Five-Year Review process, EPA staff are available to answer any questions about the Site. Community members who have questions about the Site or the Five-Year Review process, or who would like to participate in a community interview, are asked to contact:

Luis Flores, EPA Remedial Project Manager
Coordinator
Phone: 404-562-8807
E-mail: flores.luis@epa.gov

Angela Miller, EPA Community Involvement

Phone: 404-562-8561
E-mail:miller.angela@epa.gov

Mailing Address: EPA Region 4, 61 Forsyth Street, S.W., 11th Floor, Atlanta, GA 30303-8960

Additional site information is available at the Site's local document repository, located at Cleveland County Memorial Library, 104 Howie Drive, Shelby, North Carolina 28150 and online at: http://www.epa.gov/region4/waste/npl/nplnc/celanenc.htm.

Appendix C: Interview Forms

Celanese Corp. (Shelby Fiber Operations) Superfund Site — **Five-Year Review Interview Form**

Site Name:	Celanese Corp. (Shelby Fiber Operations) Superfund Site	**EPA ID No.:**	NCD003446721
Interviewer Name:	Christy Fielden	**Affiliation:**	Skeo Solutions
Subject Name:	Pem Carter and Charles Thomas	**Affiliation:**	Celanese/Ticona

Subject Contact Information: (704) 480-5726; (704) 480-5054
Time: 12:15pm **Date:** 2/23/11
Interview Location: The Site

Interview Format (circle one): In Person Phone Mail Other:

Interview Category: Potentially Responsible Parties (PRPs)

1. What is your overall impression of the remedial activities at the Site?

   The project is going well. Remediation is being conducted as agreed, a good plan is in place and is being followed, and notifications are going out. Celanese has a knowledgeable group working on the project. EPA and NCDENR are willing to meet to discuss the remediation efforts and understand the current economic situation for Celanese and how that impacts remediation efforts.

2. What have been the effects of this Site on the surrounding community, if any?

   The community has been supportive of the project. There is a property protection program in place for the community neighboring the Site, and Celanese has worked to communicate the status of the Site to the community.

3. What is your assessment of the current performance of the remedy in place at the Site?

   When the inner tier treatment system was not as effective as expected, MNA was selected as an alternative to using the treatment system. By using MNA, contamination is still being addressed and contamination is not migrating downstream. Although MNA is a long process, so is using a pump-and-treat system.

4. Are you aware of any complaints or inquiries regarding environmental issues or the remedial action from residents since implementation of the cleanup?

   No.

5. Do you feel well-informed regarding the Site's activities and remedial progress? If not, how might EPA convey site-related information in the future?

   The remediation group, EPA, NCDENR and AECOM keeps Celanese well-informed by

letting us know their roles and responsibilities.

6. Do you have any comments, suggestions or recommendations regarding the management or operation of the Site's remedy?

   No.

Celanese Corp. (Shelby Fiber Operations) Five-Year Review Interview Form Superfund Site

Site Name:	Celanese Corp. (Shelby Fiber Operations) Superfund Site	**EPA ID No.:**	NCD003446721
Interviewer Name:	Christy Fielden	**Affiliation:**	Skeo Solutions
Subject Name:	David Mattison	**Affiliation:**	NCDENR
Subject Contact Information:	(919) 508-8466		
Time:	12:30pm	**Date:**	2/23/11
Interview Location:	The Site		

Interview Format (circle one): **In Person** **Phone** **Mail** **Other:**

Interview Category: **State Agency**

1. What is your overall impression of the project; including cleanup, maintenance and reuse activities (as appropriate)?

   The project is finally getting to a point where the reassessment activities have been completed so decisions can be made regarding how to address the cleanup at the Site.

2. What is your assessment of the current performance of the remedy in place at the Site?

   The current remedy is unacceptable, not because of lack of effort from the PRPs or related bodies. However, the Site must be looked at in its entirety and a decision made about its cleanup.

3. Are you aware of any complaints or inquiries regarding site-related environmental issues or remedial activities from residents in the past five years?

   No. There is very little comment from the community.

4. Has your office conducted any site-related activities or communications in the past five years? If so, please describe the purpose and results of these activities.

   No.

5. Are you aware of any changes to state laws that might affect the protectiveness of the Site's remedy?

   No.

6. Are you comfortable with the status of the institutional controls at the Site? If not, what are the associated outstanding issues?

   Institutional controls for the plant proper are needed. NCDENR would like the institutional controls currently in place on properties off site to be updated to meet 2011 standards for institutional controls, but recognizes the difficulty that presents.

7. Are you aware of any changes in projected land use(s) at the Site?

   No.

8. Do you have any comments, suggestions or recommendations regarding the management or operation of the Site's remedy?

   No. The project is on the right path and hard decisions will need to be made beyond completing investigations.

Celanese Corp. (Shelby Fiber Operations) Five-Year Review Interview Form Superfund Site

Site Name:	Celanese Corp. (Shelby Fiber Operations) Superfund Site	**EPA ID No.:**	NCD003446721
Interviewer Name:	Christy Fielden	**Affiliation:**	Skeo Solutions
Subject Name:	Everett Glover and Bryon Dahlgren	**Affiliation:**	AECOM
Subject Contact Information:	(404) 965-9687; (404) 965-9657		
Time:	12:40pm	**Date:**	2/23/11
Interview Location:	The Site		
Interview Format (circle one):	In Person	Phone	Mail Other:

Interview Category: O&M Contractor

1. What is your overall impression of the project; including cleanup, maintenance and reuse activities (as appropriate)?

   The project is going steadily and amicably. Some administrative issues have slowed the process, but good progress continues to be made on the project. Celanese wants to take the project to completion in the most economic and environmentally safe way.

2. What is your assessment of the current performance of the remedy in place at the Site?

   The ground water remedy (MNA and long-term monitoring) is functioning and is an appropriate solution to address remaining contamination. Chemicals in ground water are attenuating.

3. What are the findings from the monitoring data? What are the key trends in contaminant levels that are being documented over time at the Site?

   Historic data shows that contaminant levels are declining, while it remains stable in other places.

4. Is there a continuous on-site O&M presence? If so, please describe staff responsibilities and activities. Alternatively, please describe staff responsibilities and the frequency of site inspections and activities if there is not a continuous on-site O&M presence.

   Routine inspections are completed daily by site security. The wells are maintained, and maintenance activities are completed during semiannual sampling, as needed.

5. Have there been any significant changes in site O&M requirements, maintenance schedules or sampling routines since start-up or in the last five years? If so, do they affect the protectiveness or effectiveness of the remedy? Please describe changes and impacts.

   There have been changes since startup, but they do not affect the protectiveness or effectiveness of the remedy.

6. Have there been unexpected O&M difficulties or costs at the Site since start-up or in the last five years? If so, please provide details.

   Yes, since MNA is currently being used instead of the treatment system.

7. Have there been opportunities to optimize O&M activities or sampling efforts? Please describe changes and any resulting or desired cost savings or improved efficiencies.

   Yes. There has been a focus on developing optimal sampling frequencies to figure out an appropriate long-term monitoring schedule. This has caused an increase in cost, but is expected to provide long-term savings.

8. Do you have any comments, suggestions or recommendations regarding O&M activities and schedules at the Site?

   The end product will optimize O&M activities once the contaminant characterization has been completed in September.

Appendix D: Site Inspection Checklist

FIVE-YEAR REVIEW SITE INSPECTION CHECKLIST

I. SITE INFORMATION

Site name: Celanese Corporation (Shelby Fiber Operations)	**Date of inspection: February 23, 2011**
Location and Region: Shelby, NC/Region 4	**EPA ID: NCD003446721**
Agency, office, or company leading the five-year review: EPA Region 4	**Weather/temperature: Mostly Sunny/50s**

Remedy Includes: (Check all that apply)

- ☒ Landfill cover/containment
- ☒ Access controls
- ☐ Institutional controls
- ☒ Groundwater pump and treatment
- ☐ Surface water collection and treatment
- ☐ Monitored natural attenuation
- ☐ Groundwater containment
- ☐ Vertical barrier walls
- ☒ Other Although the current remedy does not require institutional controls, ground water use restrictions are currently in place at impacted properties downgradient from the Site. MNA and long-term monitoring are currently being used to address ground water contamination at the Site until a final remedy is selected to address remaining contamination.

Attachments: ☐ Inspection team roster attached ☐ Site map attached

II. INTERVIEWS (Check all that apply)

1. **O&M site manager**	Charles Thomas Name	Utilities Manager Title	2/23/2011 Date

Interviewed ☒ at site ☐ at office ☐ by phone Phone no. (704) 480-5054
Problems, suggestions; ☒ Report attached See Appendix C

2. **O&M staff**	Pem Carter Name	Senior Environmental Engineer Title	2/23/2011 Date

Interviewed ☐ at site ☐ at office ☐ by phone Phone no. (704) 480-5726
Problems, suggestions; ☒ Report attached See Appendix C

3. **Local regulatory authorities and response agencies** (e.g., state and tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices). Fill in all that apply.

Agency North Carolina Department of Environment and Natural Resources

Contact	David Mattison	Superfund Section Division of Waste Mangement	2/23/11	(919) 508-8466
	Name	Title	Date	Phone No.

Problems; suggestions; ☒ Report attached see Appendix C

Agency AECOM

Contact	Everett Glover	Senior Project Director	2/23/11	(404) 965-9687
	Name	Title	Date	Phone No.

Problems; suggestions; ☒ Report attached see Appendix C

Agency AECOM

Contact	Bryon Dahlgren	Senior Engineer	2/23/11	(404) 965-9657
	Name	Title	Date	Phone No.

Problems; suggestions; ☒ Report attached see Appendix C

Agency EPA

Contact	Luis Flores	RPM	_____	(404) 562-8807
	Name	Title	Date	Phone No.

Problems; suggestions; ☒ Report attached See Appendix C

Agency _____

Cont□c t	_____	_____	_____	_____
	Name	Title	Date	Phone No

Problems; suggestions; ☐ Report attached _____

4. **Other interviews** (optional) ☐ Report attached

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)

1. **O&M Documents**

☒ O&M manual	☒ Readily available	☒ Up to date	☐ N/A
☒ As-built drawings	☒ Readily available	☒ Up to date	☐ N/A
☒ Maintenance logs	☒ Readily available	☒ Up to date	☐ N/A

Remarks: _____

2. **Site-Specific Health and Safety Plan** ☒ Readily available ☒ Up to date ☐ N/A

☒ Contingency plan/emergency response plan ☒ Readily available ☒ Up to date ☐ N/A

Remarks: _____

3. **O&M and OSHA Training Records** ☐ Readily available ☒ Up to date ☐ N/A

Remarks: _____

4.	**Permits and Service Agreements**			
	☐ Air discharge permit	☐ Readily available	☐ Up to date	☒ N/A
	☒ Effluent discharge	☒ Readily available	☒ Up to date	☐ N/A
	☒ Waste disposal, POTW	☒ Readily available	☒ Up to date	☐ N/A
	☐ Other permits _____	☐ Readily available	☐ Up to date	☒ N/A
	Remarks: _____			
5.	**Gas Generation Records**	☐ Readily available	☐ Up to date	☒ N/A
	Remarks: _____			
6.	**Settlement Monument Records**	☐ Readily available	☐ Up to date	☒ N/A
	Remarks: _____			
7.	**Groundwater Monitoring Records**	☒ Readily available	☒ Up to date	☐ N/A
	Remarks: _____			
8.	**Leachate Extraction Records**	☐ Readily available	☐ Up to date	☒ N/A
	Remarks: _____			
9.	**Discharge Compliance Records**			
	☐ Air	☐ Readily available	☐ Up to date	☒ N/A
	☒ Water (effluent)	☒ Readily available	☒ Up to date	☐ N/A
	Remarks: _____			
10.	**Daily Access/Security Logs**	☒ Readily available	☒ Up to date	☐ N/A
	Remarks: _____			

IV. O&M COSTS

1.	**O&M Organization**	
	☐ State in-house	☐ Contractor for State
	☐ PRP in-house	☒ Contractor for PRP
	☐ Federal Facility in-house	☐ Contractor for Federal Facility
	☐ _____	

2. **O&M Cost Records**

☒ Readily available ☒ Up to date

☐ Funding mechanism/agreement in place ☐ Unavailable

Original O&M cost estimate _____ ☐ Breakdown attached

Total annual cost by year for review period if available

From mm/dd/yyyy	To mm/dd/yyyy	_____	☐ Breakdown attached
Date	Date	Total cost	
From mm/dd/yyyy	To mm/dd/yyyy	_____	☐ Breakdown attached
Date	Date	Total cost	
From mm/dd/yyyy	To mm/dd/yyyy	_____	☐ Breakdown attached
Date	Date	Total cost	
From mm/dd/yyyy	To mm/dd/yyyy	_____	☐ Breakdown attached
Date	Date	Total cost	
From mm/dd/yyyy	To mm/dd/yyyy	_____	☐☐Breakdown attached
Date	Date	Total cost	

3. **Unanticipated or Unusually High O&M Costs During Review Period**

Describe costs and reasons: _____

V. ACCESS AND INSTITUTIONAL CONTROLS ☒ Applicable ☐ N/A

A. Fencing

1. **Fencing damaged** ☐ Location shown on site map ☒ Gates secured ☐ N/A

Remarks: The Site is an operating facility and is surrounded by a fence. Visitors are required to sign in at gate to prevent unauthorized access.

B. Other Access Restrictions

1. **Signs and other security measures** ☐ Location shown on site map ☒ N/A

Remarks: _____

C. Institutional Controls (ICs)

1. ***Implementation and enforcement***

Site conditions imply ICs are not properly implemented ☐ Yes ☐ No ☒ N/A

Site conditions imply ICs are not being fully enforced ☐ Yes ☐ No ☒ N/A

Type of monitoring (e.g., self-reporting, drive by) _____

Frequency _____

Responsible party/agency _____

Contact _____ _____ mm/dd/yyyy _____

Name Title Date Phone no.

Reporting is up-to-date ☐ Yes ☐ No ☒ N/A

Reports are verified by the lead agency ☐ Yes ☐ No ☒ N/A

Specific requirements in deed or decision documents have been met ☒ Yes ☐ No ☐ N/A

Violations have been reported ☐ Yes ☐ No ☒ N/A

Other problems or suggestions: ☐ Report attached

2. **Adequacy** ☐ ICs are adequate ☒ ICs are inadequate ☐ N/A

Remarks: Although the PRP has extended municipal water to residents downgradient from the Site, ICs are still needed on the site property to ensure that exposure pathways to contaminated ground water or source material are not created.

D. General

1. **Vandalism/trespassing** ☐ Location shown on site map ☒ No vandalism evident

Remarks: _____

2. **Land use changes on site** ☒ N/A

Remarks: _____

3. **Land use changes off site** ☒ N/A

Remarks: _____

VI. GENERAL SITE CONDITIONS

A. Roads ☒ Applicable ☐ N/A

1. Roads damaged ☐ Location shown on site map ☒ Roads adequate ☐ N/A

Remarks: _____

B. Other Site Conditions

Remarks: _____

VII. LANDFILL COVERS ☒ Applicable ☐ N/A

A. Landfill Surface

1.	**Settlement** (Low spots)	☐ Location shown on site map	☒ Settlement not evident
	Arial extent _____		Depth _____
	Remarks: _____		
2.	**Cracks**	☐ Location shown on site map	☒ Cracking not evident
	Lengths _____	Widths _____	Depths _____
	Remarks: _____		
3.	**Erosion**	☐ Location shown on site map	☒ Erosion not evident
	Arial extent _____		Depth _____
	Remarks: _____		
4.	**Holes**	☐ Location shown on site map	☒ Holes not evident
	Arial extent _____		Depth _____
	Remarks: _____		
5.	**Vegetative Cover**	☒ Grass	☒ Cover properly established
	☐ No signs of stress	☐ Trees/Shrubs (indicate size and locations on a diagram)	
	Remarks: A grass cover has been well-established in the former GRUB area where excavation occurred. The grass is mowed reguarly and was found to be well maintained.		
6.	**Alternative Cover** (armored rock, concrete, etc.)		☒ N/A
	Remarks: _____		
7.	**Bulges**	☐ Location shown on site map	☒ Bulges not evident
	Arial extent _____		Height _____
	Remarks: _____		
8.	**Wet Areas/Water Damage**	☒ Wet areas/water damage not evident	
	☐ Wet areas	☐ Location shown on site map	Arial extent _____
	☐ Ponding	☐ Location shown on site map	Arial extent _____
	☐ Seep	☐ Location shown on site map	Arial extent _____
	☐ Soft subgrade	☐ Location shown on site map	Arial extent _____
	Remarks: _____		
9.	**Slope Instability**	☐ Slides	☐ Location shown on site map
	☒ No evidence of slope instability		
	Arial extent _____		
	Remarks: _____		

B. Benches ☐ Applicable ☒ N/A

(Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)

1.	**Flows Bypass Bench**	☐ Location shown on site map	☐ N/A or okay
	Remarks: _____		
2.	**Bench Breached**	☐ Location shown on site map	☐ N/A or okay
	Remarks: _____		
3.	**Bench Overtopped**	☐ Location shown on site map	☐ N/A or okay
	Remarks: _____		
C. Letdown Channels		☐ Applicable	☒ N/A
	(Channel lined with erosion control mats, riprap, grout bags, or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.)		
1.	**Settlement** (Low spots)	☐ Location shown on site map	☐ No evidence of settlement
	Arial extent _____		Depth _____
	Remarks: _____		
2.	**Material Degradation**	☐ Location shown on site map	☐ No evidence of degradation
	Material type_____		Arial extent _____
	Remarks: _____		
3.	**Erosion**	☐ Location shown on site map	☐ No evidence of erosion
	Arial extent _____		Depth _____
	Remarks: _____		
4.	**Undercutting**	☐ Location shown on site map	☐ No evidence of undercutting
	Arial extent _____		Depth _____
	Remarks: _____		
5.	**Obstructions**	Type _____	☐ No obstructions
	☐ Location shown on site map	Arial extent _____	
	Size _____		
	Remarks: _____		
6.	**Excessive Vegetative Growth**	Type _____	
	☐ No evidence of excessive growth		
	☐ Vegetation in channels does not obstruct flow		
	☐ Location shown on site map	Arial extent _____	
	Remarks: _____		
D. Cover Penetrations		☒ Applicable	☐ N/A

1.	**Gas Vents**	☐ Active	☐ Passive	
	☐ Properly secured/locked	☐ Functioning	☐ Routinely sampled	☐ Good condition
	☐ Evidence of leakage at penetration		☐ Needs maintenance	☒ N/A
	Remarks: _____			
2.	**Gas Monitoring Probes**			
	☐ Properly secured/locked	☐ Functioning	☐ Routinely sampled	☐ Good condition
	☐ Evidence of leakage at penetration		☐ Needs maintenance	☒ N/A
	Remarks: _____			
3.	**Monitoring Wells** (within surface area of landfill)			
	☒ Properly secured/locked	☒ Functioning	☒ Routinely sampled	☒ Good condition
	☐ Evidence of leakage at penetration		☐ Needs maintenance	☐ N/A
	Remarks: _____			
4.	**Extraction Wells Leachate**			
	☐ Properly secured/locked	☐ Functioning	☐ Routinely sampled	☐ Good condition
	☐ Evidence of leakage at penetration		☐ Needs maintenance	☒ N/A
	Remarks: _____			
5.	**Settlement Monuments**	☐ Located	☐ Routinely surveyed	☒ N/A
	Remarks: _____			
E. Gas Collection and Treatment		☐ Applicable	☒ N/A	
1.	**Gas Treatment Facilities**			
	☐ Flaring	☐ Thermal destruction		☐ Collection for reuse
	☐ Good condition	☐ Needs maintenance		
	Remarks: _____			
2.	**Gas Collection Wells, Manifolds and Piping**			
	☐ Good condition	☐ Needs maintenance		
	Remarks: _____			
3.	**Gas Monitoring Facilities** (e.g., gas monitoring of adjacent homes or buildings)			
	☐ Good condition	☐ Needs maintenance	☐ N/A	
	Remarks: _____			
F. Cover Drainage Layer		☐ Applicable	☒ N/A	
1.	**Outlet Pipes Inspected**	☐ Functioning	☐ N/A	
	Remarks: _____			
2.	**Outlet Rock Inspected**	☐ Functioning	☐ N/A	
	Remarks: _____			
G. Detention/Sedimentation Ponds		☐ Applicable	☒ N/A	

1.	**Siltation**	Area extent _____	Depth _____	☐ N/A
	☐ Siltation not evident			
	Remarks: _____			
2.	**Erosion**	Area extent _____	Depth _____	
	☐ Erosion not evident			
	Remarks: _____			
3.	**Outlet Works**	☐ Functioning		☐ N/A
	Remarks: _____			
4.	**Dam**	☐ Functioning		☐ N/A
	Remarks: _____			
H. Retaining Walls		☐ Applicable	☒ N/A	
1.	**Deformations**	☐ Location shown on site map		☐ Deformation not evident
	Horizontal displacement _____		Vertical displacement _____	
	Rotational displacement _____			
	Remarks: _____			
2.	**Degradation**	☐ Location shown on site map		☐ Degradation not evident
	Remarks: _____			
I. Perimeter Ditches/Off-Site Discharge		☐ Applicable	☒ N/A	
1.	**Siltation**	☐ Location shown on site map		☐ Siltation not evident
	Area extent _____			Depth _____
	Remarks: _____			
2.	**Vegetative Growth**	☐ Location shown on site map		☐ N/A
	☐ Vegetation doe□□not impede flow			
	Area extent _____			Type _____
	Remarks: _____			
3.	**Erosion**	☐ Location shown on site map		☐ Erosion not evident
	Area extent _____			Depth _____
	Remarks: _____			
4.	**Discharge Structure**	☐ Functioning		☐ N/A
	Remarks: _____			
VIII. VERTICAL BARRIER WALLS		☐ Applicable	☒ N/A	
1.	**Settlement**	☐ Location shown on site map		☐ Settlement not evident
	Area extent _____			Depth _____
	Remarks: _____			

2. **Performance Monitoring** Type of monitoring _____

☐ Performance not monitored

Frequency _____ ☐ Evidence of breaching

Head differential _____

Remarks: _____

IX. GROUNDWATER/SURFACE WATER REMEDIES ☒ Applicable ☐ N/A

A. Groundwater Extraction Wells, Pumps, and Pipelines ☒ Applicable ☐ N/A

1. **Pumps, Wellhead Plumbing, and Electrical**

☒ Good condition ☐ All required wells properly operating ☐ Needs Maintenance ☐ N/A

Remarks: In accordance with the 2004 ESD, the Site's ground water treatment system is not currently operating because it was shut off while an MNA evaluation was being completed. The system has not been turned back on.

2. **Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances**

☐ Good condition ☐ Needs maintenance

Remarks: _____

3. **Spare Parts and Equipment**

☐ Readily available ☐ Good condition ☐ Requires upgrade ☐ Needs to be provided

Remarks: _____

B. Surface Water Collection Structures, Pumps, and Pipelines ☐ Applicable ☒ N/A

1. **Collection Structures, Pumps, and Electrical**

☐ Good condition ☐ Needs maintenance

Remarks: _____

2. **Surface Water Collection System Pipelines, Valves, Valve Boxes, and Other Appurtenances**

☐ Good condition ☐ Needs maintenance

Remarks: _____

3. **Spare Parts and Equipment**

☐ Readily available ☐ Good condition ☐ Requires upgrade ☐ Needs to be provided

Remarks: _____

C. Treatment System ☒ Applicable ☐ N/A

1. **Treatment Train** (Check components that apply)

☐ Metals removal ☐ Oil/water s□paration ☐ Bioremediation

☒ Air stripping ☒ Carbon adsorbers

☐ Filters _____

☐ Additive (e.g., chelation agent, flocculent) _____

☐ Others _____

☒ Good condition ☐ Needs maintenance

☐ Sampling ports properly marked and functional

☐ Sampling/maintenance log displayed and up to date

☐ □Equipment properly identified

☐ Quantity of groundwater treated annually _____

☐ Quantity of surface water treated annually _____

Remarks: In accordance with the 2004 ESD, the Site's ground water treatment system is not currently operating because it was shut off while an MNA evaluation was being completed. The system has not been turned back on.

2. **Electrical Enclosures and Panels** (properly rated and functional)

☐ N/A ☒ Good condition ☐ Needs maintenance

Remarks: _____

3. **Tanks, Vaults, Storage Vessels**

☒ N/A ☐ Good condition ☐ Proper secondary containment ☐ Needs maintenance

Remarks: _____

4. **Discharge Structure and Appurtenances**

☐ N/A ☒ Good condition ☐ Needs maintenance

Remarks: _____

5. **Treatment Building(s)**

☐ N/A ☒ Good condition (esp. roof and doorways) ☐ Needs repair

☐ Chemicals and equipment properly stored

Remarks: _____

6. **Monitoring Wells** (pump and treatment remedy)

☒ Properly secured/locked ☒ Functioning ☒ Routinely sampled ☒ Good condition

☐ All required wells located ☐ Needs maintenance ☐ N/A

Remarks: _____

D. Monitoring Data

1. **Monitoring Data**

☒ Is routinely submitted on time ☒ Is of acceptable quality

2. **Monitoring data suggests:**

☐ Ground water plume is effectively contained ☐ Contaminant concentrations are declining

E. Monitored Natural Attenuation

1. **Monitoring Wells** (natural attenuation remedy)

☒ Properly secured/locked ☒ Functioning ☒ Routinely sampled ☒ Good condition

☐ All required wells located ☐ Needs maintenance ☐ N/A

Remarks: _____

X. OTHER REMEDIES

If there are remedies applied at the site and not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (e.g., to contain a contaminant plume, to minimize infiltration and gas emission).

The 2004 ESD for the Site allowed the implementation of a temporary MNA system in place of the ground water treatment system to determine if MNA could be used as an alternative remedy. Although the study period has ended, MNA and long-term monitoring continue to be used while additional remediation options are being evaluated. In accordance with the 2004 ESD, the ground water extraction system should be restarted since the MNA pilot study period has been completed. While MNA is able to address some of the remaining ground water contaminants, the IDR identified that MNA may not be appropriate to address the remaining diethylene dioxide and TCE contamination at the Site. While there are no exposure pathways, the remedy need to be updated to ensure that ground water contamination is properly addressed and does not migrate off the facility property.

B. Adequacy of O&M

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

There is a constant presence on site since there is an active operation at the Site. O&M is performed regularly.

C. Early Indicators of Potential Remedy Problems

Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs that suggest that the protectiveness of the remedy may be compromised in the future.

_____

D. Opportunities for Optimization

Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

_____

Appendix E: Photographs from Site Inspection Visit

View of the entrance to the active facility at the Site.

Wells TD-4 and TD-3.

View of well F-55.

Former GRUB area.

IT extraction well 4.

Building containing the former ground water treatment system.

Creek location where sampling is completed on site.

Appendix F: Ground Water Monitoring Data

Table 2-2
Summary of Chemical Data
MNA Quarterly Sampling Event #8/Q1 2006
CNA Holdings, Inc./Ticona, Shelby, NC
Earth Tech Project No. 79750

Analyte	Unit	AA-54 3/8/2006	C-49 3/8/2006	CC-33 3/8/2006	EE-58 3/8/2006	F-55 3/8/2006	FF-34 3/7/2006	FF-62 3/8/2006	GG-61 3/8/2006	HH-48 3/7/2006	HH-77 3/8/2006	IT-1 3/7/2006
Semivolatile Organics												
ethylene glycol	mg/L	NA	NA	<7	NA	5740	NA	NA	NA	NA	NA	<7
Inorganics												
iron	mg/L	NA	NA	50.1	NA	573	NA	NA	NA	NA	NA	117
manganese	mg/L	NA	NA	3	NA	211	NA	NA	NA	NA	NA	1.9
Wet Chemistry												
alkalinity	mg/L	NA	NA	36.9	NA	929	NA	NA	NA	NA	NA	54.5
methane	mg/L	NA	NA	0.23	NA	1.3	NA	NA	NA	NA	NA	16
nitrate nitrogen	mg/L	NA	NA	<0.1	NA	<0.1	NA	NA	NA	NA	NA	<0.1
sulfate	mg/L	NA	NA	5.8	NA	0.79	NA	NA	NA	NA	NA	<0.5
total organic carbon	mg/L	NA	NA	<1	NA	5470	NA	NA	NA	NA	NA	5.4
Field Indicators												
dissolved oxygen	mg/L	1.99	7.2	0	0	1.8	4.39	2.6	0	9.61	2.88	0.33
ferrous iron	mg/L	0	0	6	0	2.4	0	0	0	0	0	3
groundwater elevation	feet MSL	749.68	847.83	791.08	758.75	812.37	761.61	761	752.23	715.83	716.12	800.92
ORP	mV	212	254	-90	78	23	267	84	43	191	137	-109
pH	su	5.03	5.2	6.82	6.14	5.35	4.79	8.2	6.16	9.8	9.69	6.34
specific conductance	umhos/cm	304	22	352	96	2740	64	120	197	74	102	413
temperature	degrees C	15.42	15.54	16.21	18.51	18.98	15.32	16.04	15.28	18.17	18.13	13.64
turbidity	NTU	9	1.6	2.17	18.2	15.5	0.86	1.98	1.53	3.68	10.44	16

(1) Ferrous iron data is not able to be collected due to the decoloring (black) of water and the decoloring interferes with the ferrous iron reading using colormetric meter
X: Matrix Interference
NA: not analayzed
degrees C - degrees Celsius
feet MSL - feet above mean sea level
mV - millivolt
mg/L - milligram per liter
NTU - nepheloimetric turbidity unit
ORP - oxidation-reduction potential
su - standard unit
umhos/cm - micromhos per centimeter

Table 2-2
Summary of Chemical Data
MNA Quarterly Sampling Event #8/Q1 2006
CNA Holdings, Inc./Ticona, Shelby, NC
Earth Tech Project No. 79750

Analyte	Unit	IT-2 3/7/2006	IT-3 3/7/2006	IT-4 3/7/2006	IT-5 3/6/2006	IT-6 3/6/2006	IT-7 3/6/2006	IT-8R 3/7/2006	IT-9 3/6/2006	J-29 3/7/2006	K-28 3/6/2006	N-29 3/6/2006	O-25 3/7/2006
Semivolatile Organics													
ethylene glycol	mg/L	<7	<7	<7	<7	55.4	<7	<70 X	<7	<7	12.5	<7	12.5
Inorganics													
iron	mg/L	71	109	98.1	86.2	1240	166	1420	44.7	<0.1	783	<0.1	56.3
manganese	mg/L	14	0.62	1.1	11.2	652	40.2	284	35.8	0.43	12.1	0.23	0.45
Wet Chemistry													
alkalinity	mg/L	57.6	123	84.8	972	1760	402	1770	93.9	566	944	6.1	62.6
methane	mg/L	14	18	14	14	9	7	12	18	0.034	13	0.45	0.96
nitrate nitrogen	mg/L	<0.1	<0.1	<0.1	<0.1	<0.5 X	<0.1	<0.5 X	<0.1	1.5	<0.1	0.67	<0.1
sulfate	mg/L	1.8	<0.5	<0.5	<0.5	10.6	<0.5	2.9	<0.5	27.3	0.83	1.2	171
total organic carbon	mg/L	9.9	7	8.8	67.1	5770	233	2760	30.5	1.3	1020	<1	24
Field Indicators													
dissolved oxygen	mg/L	0.31	0.4	0.36	0	0.9	0	0	0	0	1.92	3.22	0
ferrous iron	mg/L	5.5	2	2.7	2.8	(1)	2.4	2.9	7	2.4	4	2	7
groundwater elevation	feet MSL	802.57	800.96	801.31	802.51	803.01	802.78	799.34	796 93	806.76	796.6	791.68	793.84
ORP	mV	-62	-207	-183	-145	24	-92	27	-85	47	-146	532	-155
pH	su	6.04	6.87	6.8	6.98	5	6.23	5.01	7.28	6.67	6.79	5.04	6.78
specific conductance	umhos/cm	472	478	355	1810	4490	1050	4660	570	1010	1800	70	990
temperature	degrees C	15.41	15.62	16.36	17.86	18.72	17.49	17.28	18.65	17.53	22.36	16.35	15.36
turbidity	NTU	50	50	92	99.4	430	55.5	54 6	102	54.6	8.98	1.63	1.31

(1) Ferrous iron data is not able to be coll
X: Matrix Interference
NA: not analayzed
degrees C - degrees Celsius
feet MSL - feet above mean sea level
mV - millivolt
mg/L - milligram per liter
NTU - nephelometric turbidity unit
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(1) Ferrous iron data is not able to be collected due to the decoloring (black) of water and the decoloring interferes with the ferrous iron reading using colormetric meter
NA: not analayzed

(1) Ferrous
NA: not ana

Table 2-2
Summary of Chemical Data
MNA Quarterly Sampling Event #8/Q1 2006
CNA Holdings, Inc./Ticona, Shelby, NC
Earth Tech Project No. 79750

Analyte	Unit	P-58 3/6/2006	PEW-1 3/7/2006	PEW-3 3/7/2006	PEW-4 3/8/2006	Q-33 3/6/2006	T-35 3/7/2006	TI-1 3/7/2006	U-38 3/7/2006	V-23 3/6/2006	V-65 3/6/2006	W-23 3/8/2006
Semivolatile Organics												
ethylene glycol	mg/L	NA	NA	NA	NA	<7	NA	<7	<7	5140	<7	<7
Inorganics												
iron	mg/L	NA	NA	NA	NA	<0.1	NA	<0.1	0.66	1730	32.5	0.91
manganese	mg/L	NA	NA	NA	NA	0.087	NA	0.036	0.18	774	1.4	2.7
Wet Chemistry												
alkalinity	mg/L	NA	NA	NA	NA	90.9	NA	25.8	6.1	2190	248	10.6
methane	mg/L	NA	NA	NA	NA	0.048	NA	0.11	0.005	15	21	0.005
nitrate nitrogen	mg/L	NA	NA	NA	NA	<0.1	NA	2.2	0.79	<0.5 X	<0.1	0.76
sulfate	mg/L	NA	NA	NA	NA	71.9	NA	<0.5	0.8	37.1	<0.5	64.5
total organic carbon	mg/L	NA	NA	NA	NA	2.6	NA	<1	<1	9860	4.3	<1
Field Indicators												
dissolved oxygen	mg/L	0.5	0	5.91	0.61	1.24	0	0	0.22	0.36	0.32	5.71
ferrous iron	mg/L	3.7	0	0	2.7	0	3	0	1	3.2	4	0
groundwater elevation	feet MSL	764.39	802.63	813.17	814.96	762.95	766.07	807.94	806.88	801.92	801.89	783.39
ORP	mV	-100	165	79	86	109	62	231	190	36	-105	210
pH	su	6.6	6.2	6.94	5.42	6.08	5.68	5.01	5.7	5	6.51	5.17
specific conductance	umhos/cm	638	80	78	64	622	709	113	64	6460	430	182
temperature	degrees C	17.23	18.12	20.49	18.98	16.71	16.98	22.28	17.55	15.58	17.6	16.13
turbidity	NTU	0.62	5.47	8.27	1.2	0.16	6.83	5	2.29	2.66	13	9.9

(1) Ferrous iron data is not able to be coll

X: Matrix Interference

NA: not analayzed

iron data is not able to be collected due to the decoloring (black) of water and the decoloring interferes with the ferrous iron reading usi

degrees C - degrees Celsius

nalyzed

feet MSL - feet above mean sea level

mV - millivolt

mg/L - milligram per liter

NTU - nephelometric turbidity unit

ORP - oxidation-reduction potential

su - standard unit

umhos/cm - micromhos per centimete

Table 4-1
Summary of Selected Natural Attenuation Indicator Parameters
MNA Quarterly Sampling Event #8/Q1 2006
CNA Holdings, Inc./Ticona, Shelby, NC
Earth Tech Project No. 79750

Parameter	*Background*		*Plume Area*		*Downgradient*	
	TI-1	**U-38**	**V-23**	**K-28**	**O-25**	**W-23**
Ethylene Glycol	<7	<7	5140	12.5	12.5	<7
Nitrate	2.2	0.8	<0.5X	<0.1	<0.1	0.76
Manganese	0.036	0.18	774	12.1	0.45	2.7
Ferrous Iron	0	1	3.2	4	7	0
Sulfate	<0.5	0.8	37.1	0.83	171	64.5
Methane	0.11	0.005	15.0	13.0	0.96	0.005
Alkalinity	25.8	6.1	2190	944	62.6	10.6

Notes:

X = Reporting limit raised due to interference caused by non-target compounds

Concentration Unit: mg/L

Table 3
CNA Holdings Inc. / Ticona Shelby Facility
Quarter 1 2006
Groundwater Analytical Summary
Earth Tech Project No. 79750

Parameter	Unit	EPA Drinking Water Standard	North Carolina 2L Standard	C-49 3/8/2006	K-28 3/6/2006	P-58 3/6/2006	T-35 3/7/2006	V-23 3/6/2006	AA-54 3/8/2006	CC-33 3/8/2006
acetone	mg/L	--	0.7	<0.005	**0.256**	<0.005	<0.005	<0.005	<0.005	<0.005
benzene	mg/L	0.005	0.001	<0.001	**0.0102**	<0.001	<0.001	**0.019**	<0.001	**0.0016**
2-butanone	mg/L	--	4.20	<0.005	**0.169**	<0.005	<0.005	<0.005	<0.005	<0.005
carbon disulfide	mg/L	--	0.7	<0.001	<0.001	<0.001	<0.001	**0.009**	<0.001	<0.001
chlorobenzene	mg/L	0.1	0.05	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	**0.0021**
cis-1,2-dichloroethene	mg/L	0.07	0.07	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	**0.0033**
ethylbenzene	mg/L	0.7	0.550	<0.001	<0.001	<0.001	<0.001	**0.0031**	<0.001	<0.001
methylene chloride	mg/L	0.005	0.005	**0.0022**	<0.001	<0.001	<0.001	<0.001	**0.0019**	**0.002**
tetrachloroethene	mg/L	0.005	0.0007	<0.001	<0.001	<0.001	**0.0014**	<0.001	<0.001	<0.001
toluene	mg/L	1.0	1.0	<0.001	**0.0028**	<0.001	<0.001	**0.0099**	<0.001	<0.001
trichloroethene	mg/L	0.005	0.0028	<0.001	<0.001	<0.001	**0.0015**	<0.001	<0.001	<0.001
xylenes	mg/L	10	0.53	<0.002	<0.002	<0.002	<0.002	**0.0127**	<0.002	<0.002
total organic carbon	mg/L	--	--	NA	**1,020**	NA	NA	**9,860**	NA	<1

NA - Not Analyzed
mg/L - milligrams per Liter
Note: Detections are bolded.

Table 3
CNA Holdings Inc. / Ticona Shelby Facility
Quarter 1 2006
Groundwater Analytical Summary
Earth Tech Project No. 79750

Parameter	Unit	EPA Drinking Water Standard	North Carolina 2L Standard	EE-58 3/8/2006	FF-34 3/7/2006	FF-62 3/8/2006	GG-61 3/8/2006	HH-48 3/8/2006	HH-77 3/8/2006
acetone	mg/L	--	0.7	<0.005	<0.005	<0.005	<0.005	<0.005	<0.015
benzene	mg/L	0.005	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.003
2-butanone	mg/L	--	4.20	<0.005	<0.005	<0.005	<0.005	<0.005	<0.015
carbon disulfide	mg/L	--	0.7	<0.001	<0.001	<0.001	<0.001	<0.001	<0.003
chlorobenzene	mg/L	0.1	0.05	<0.001	<0.001	<0.001	<0.001	<0.001	<0.003
cis-1,2-dichloroethene	mg/L	0.07	0.07	<0.001	<0.001	<0.001	<0.001	<0.001	<0.003
ethylbenzene	mg/L	0.7	0.550	<0.001	<0.001	<0.001	<0.001	<0.001	<0.003
methylene chloride	mg/L	0.005	0.005	**0.0021**	**0.0018**	**0.002**	**0.0021**	**0.002**	**0.0031**
tetrachloroethene	mg/L	0.005	0.0007	<0.001	<0.001	<0.001	<0.001	<0.001	<0.003
toluene	mg/L	1.0	1.0	<0.001	<0.001	<0.001	<0.001	<0.001	<0.003
trichloroethene	mg/L	0.005	0.0028	<0.001	<0.001	<0.001	<0.001	**0.0954**	**0.402**
xylenes	mg/L	10	0.53	<0.002	<0.002	<0.002	<0.002	<0.002	<0.006
total organic carbon	mg/L	--	--	NA	NA	NA	NA	NA	NA

NA - Not Analyzed
mg/L - milligrams per Liter
Note: Detections are bolded.

Table 4
CNA Holdings Inc. / Ticona Shelby Facility
PEW Related Analytical Summary
Earth Tech Project No. 79750

Parameter	Unit	EPA Drinking Water Standard	North Carolina 2L Standard	F-55 3/8/2006	F-55 Dup 3/8/2006	PEW-1 3/7/2006	PEW-1 Dup 3/7/2006	PEW-3 3/7/2006	PEW-4 3/8/2006
Volatile Organics									
acetone	mg/L	--	0.7	**1.28**	**1.31**	<0.005	<0.005	**0.007**	<0.005
benzene	mg/L	0.005	0.001	**0.0502**	**0.0522**	<0.001	<0.001	<0.001	**0.0014**
chloroform	mg/L	0.08	0.00019	<0.003	<0.003	**0.0012**	**0.0013**	<0.001	**0.0011**
cis-1,2-dichloroethene	mg/L	0.07	0.07	<0.003	<0.003	**0.0012**	**0.0011**	<0.001	**0.0026**
methylene chloride	mg/L	0.005	0.005	**0.004**	**0.0039**	<0.001	<0.001	<0.001	**0.002**
toluene	mg/L	1.0	1.0	**0.0062**	**0.0063**	<0.001	<0.001	<0.001	<0.001
trichloroethene	mg/L	0.005	0.0028	<0.003	<0.003	**0.0047**	**0.0047**	<0.001	**0.0292**
Semivolatile Organics									
1,1-biphenyl	mg/L	--	0.35	**17**	**17.4**	<0.01	<0.01	**0.0447**	<0.01
biphenyl ether	mg/L	--	--	**50.8**	**51.7**	<0.01	<0.01	**0.143**	**0.022**
dibenzofuran	mg/L	--	--	**0.014**	**0.0145**	<0.01	<0.01	<0.01	<0.01
naphthalene	mg/L	--	0.021	**0.0174**	**0.0203**	<0.01	<0.01	<0.01	<0.01

mg/L - milligrams per Liter
Notes: Detections are bolded.

Table 5
CNA Holdings Inc. / Ticona Shelby Facility
Quarter 2 2006
Groundwater Analytical Summary
Earth Tech Project No. 79750

Parameter	Unit	K-28 6/7/2006	V-23 6/8/2006
total organic carbon	mg/L	**2,480**	**8,640**

mg/L - milligrams per Liter
Note: Detections are bolded.

Table 6
Summary of Chemical Data
MNA Quarterly Sampling June 2006
CNA Holdings, Inc./Ticona, Shelby, NC
Earth Tech Project No. 79750

Analyte	Unit	CC-33 6/8/2006	F-55 6/8/2006	IT-1 6/6/2006	IT-2 6/6/2006	IT-3 6/6/2006	IT-4 6/6/2006	IT-5 6/6/2006	IT-6 6/6/2006	IT-7 6/6/2006	IT-8R 6/7/2006	IT-9 6/7/2006
Semivolatile Organics												
ethylene glycol	mg/L	<7	6330	<7	<7	<7	<7	<7	514	<7	171	<7
Inorganics												
iron	mg/L	45.6	729	107	59.8	96.8	75.9	47.5	1290	116	1330	50.5
manganese	mg/L	2.9	221	1.9	13.7	0.37	0.86	4.8	704	21.8	230	47.3
Wet Chemistry												
alkalinity	mg/L	55.5	1390	88.8	150	144	85.5	1270	1360	555	1910	161
methane	mg/L	0.47	1.2	11	15	19	14	13	7.7	12	8.4	18
nitrate nitrogen	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.12	<0.1	<0.1	<0.1
sulfate	mg/L	7.7	2.9	<0.5	<0.5	<0.5	<0.5	<0.5	10.6	<0.5	3.5	<0.5
total organic carbon	mg/L	1.5	5130	4.7	3.1	6	5.9	25.2	4350	48	2330	14.8
Field Indicators												
dissolved oxygen	mg/L	0.49	2.7	0.65	0.24	0.43	0.08	0.67	0.19	0.17	0.09	0.1
ferrous iron	mg/L	4.5	2.8	5.5	3	4.6	1.5	2.5	1.5	3.8	6.3	4
ORP	mV	-80.6	52.3	-64	-22.8	-183	-213	-125	26.9	-101	-26	-85
pH	su	6.19	5.19	6.35	6.24	6.78	6.93	6.68	4.98	6.28	5.46	6.28
specific conductance	umhos/cm	319	3600	500	600	513	372	2100	4900	1100	4060	540
temperature	degrees C	19.7	23.8	21.7	17.9	18.3	20	19.6	21.1	20.1	19.9	20.2
turbidity	NTU	3	37.2	9.8	0	15.2	28	10.9	14.5	13.2	38.5	5.3

degrees C - degrees Celsius
feet MSL - feet above mean sea level
mV - millivolt
mg/L - milligram per liter
NTU - nephelometric turbidity unit
ORP - oxidation-reduction potential
su - standard unit
umhos/cm - micromhos per centimeter

Table 6
Summary of Chemical Data
MNA Quarterly Sampling June 2006
CNA Holdings, Inc./Ticona, Shelby, NC
Earth Tech Project No. 79750

Analyte	Unit	J-29 6/8/2006	K-28 6/7/2006	N-29 6/7/2006	O-25 6/7/2006	Q-33 6/7/2006	TI-1 6/8/2006	U-38 6/8/2006	V-23 6/8/2006	V-65 6/7/2006	W-23 6/7/2006
Semivolatile Organics											
ethylene glycol	mg/L	<7	55.1	<7	<7	<7	<7	<7	6740	<7	<7
Inorganics											
iron	mg/L	<0.1	1960	0.55	49.1	0.42	1.9	<0.1	1750	27.8	<0.1
manganese	mg/L	0.16	36.7	0.22	0.36	0.1	0.077	0.068	724	1.3	0.98
Wet Chemistry											
alkalinity	mg/L	579	2240	3.3	71.6	73.3	35	4.4	2260	276	114
methane	mg/L	0.016	11	0.5	0.68	0.041	0.14	0.0064	15	25	0.045
nitrate nitrogen	mg/L	1	<0.1	0.83	<0.1	<0.1	2.6	1.1	<0.2	<0.1	0.18
sulfate	mg/L	26.3	2.2	5	178	74.8	0.5	0.9	38.4	<0.5	70.9
total organic carbon	mg/L	<1	2480	<1	24.4	1.9	<1	<1	8640	2	4.9
Field Indicators											
dissolved oxygen	mg/L	0.32	0.62	0.22	0.5	0.43	3	2.32	0.25	0.12	0.87
ferrous iron	mg/L	0	4.5	0	4	0	0	0	1.5	2.6	0
ORP	mV	128	-80.4	584	-141	101.5	262	195.7	43.1	-107	179
pH	su	6.96	5.96	4.93	6.44	5.85	5.55	4.86	4.92	6.41	5.7
specific conductance	umhos/cm	999	4200	63	812	715	99	54	3255	501	198
temperature	degrees C	18.3	21	18.7	18.8	20.7	20	19.5	17.8	20.7	19.6
turbidity	NTU	3.3	16.4	2.8	10.6	6.6	19.8	0.8	0.6	7.2	3.6

degrees C - degrees Celsius
feet MSL - feet above mean sea level
mV - millivolt
mg/L - milligram per liter
NTU - nephelometric turbidity unit
ORP - oxidation-reduction potential
su - standard unit
umhos/cm - micromhos per centimeter

Table 7
Summary of Site Chemicals of Concern
CNA Holdings/Ticona Facility - Shelby, North Carolina
Earth Tech Project No. 79750

Parameter	GW 2L Standards (May 2006)	Detection Limit	Maximum Historic Detected Concentration	Location and Date for Maximum Detection	Detection Frequency for Most Recent Data by Location	Maxium Result in Most Recent Data by Location	Retain on COC List in ROD Amendment?
INDICATOR CHEMICALS							
benzene	0.001	0.001	0.19	TD-3 10/20/98	14 / 70	0.11	YES
bis(2-ethylhexyl)phthalate	0.0025	0 01	0.79	V-23 08/05/94	1 / 34	0.002	NO
chromium	0.05	0.005	0.62	FF-34 06/01/92	0 / 25	--	NO
lead	0.015	0.003	0.14	ITCI 08/09/94	6 / 24	0.14	NO
trichloroethene	0.0028	0.001	1.2	TD-3 10/20/98	14 / 70	0.567	NO
SUBSTANCES DETECTED ABOVE 2L STANDARDS							
1,1-dichloroethane	0.07	0.001	0.0057	O-25 09/24/01	3 / 70	0.0057	NO
1,1-dichloroethene	0.007	0.001	0.003	K-28 05/05/93	1 / 70	0.0014	NO
trans-1,2-dichloroethene	1	0.001	No Detections	No Detections	0 / 68	--	NO
barium	2	0.01	5.08	V-23 08/07/92	20 / 24	0.747	NO
carbon tetrachloride	0.000269	0.001	0.038	V-23 05/05/92	0 / 70	--	NO
chlordane	0.0001	0.005	No Detections	No Detections	0 / 24	--	NO
chlorobenzene	0.05	0.001	0.0495	ITCI 01/22/97	5 / 70	0.022	NO
chloromethane	0.0026	0.001	0.005	FF-34 11/01/93	0 / 70	--	NO
chloroform	0.07	0.005	0.57	Y-38 09/20/01	9 / 82	0.57	NO
iron	0.3	0.1	4270	K-28 08/08/90	27 / 43	1960	NO
manganese	0.05	0.01	1160	V-23 08/06/93	52 / 56	724	NO
methylene chloride	0.0046	0.01	0.0343	HH-48 08/23/95	12 / 70	0.004	NO
nickel	0.1	0.015	6.98	V-23 08/24/95	6 / 24	6.98	NO
phenols	0.3	0.01	0.26	F-55 02/18/05	2 / 34	0.1	NO
selenium	0.05	0.005	0.0047	K-28 08/09/94	0 / 24	--	NO
tetrachloroethene	0.0007	0.001	0.15	HH-48 02/05/90	2 / 70	0.0033	NO
vinyl chloride	1.50E-05	0.001	0.0017	ITCI 09/12/01	0 / 70	--	NO
POTENTIAL NEW CONTAMINANTS OF CONCERN (Five Year Review)							
1,1-biphenyl	0.35	0.01	101	F-55 07/19/00	5 / 25	17	TO BE CONSIDERED
Diethylene Oxide	0.007	0.01	2.9	V-23 6/19/02 & 07/28/05	62 / 99	2.4	TO BE CONSIDERED
Acetone	0.7	0.005	2.6	K-28 02/06/91	5 / 70	1.28	TO BE CONSIDERED
Ethylene glycol	14	7	25.000	IT-1 09/24/01	7 / 39	6,740	TO BE CONSIDERED
OTHER SUBSTANCES INCLUDED IN THE MNA DEMONSTRATION PROJECT WORK PLAN FOR MNA POTENTIAL EVALUATION							
1,1,1-Trichloroethane	0.2	0.001	0.061	V-23 05/05/92	0 / 70	--	NO
1,2-Dichlorobenzene	0.024	0.01	0.006	CC-33 08/08/91	0 / 34	--	NO
1,2-Dichloroethane	0.00038	0.001	0.049	WALKER 02/03/92	3 / 70	0.0032	NO
cis-1,2-Dichloroethene	0.07	0.001	0.067	TD-3 10/20/98	8 / 68	0.0605	NO
1,4-Dichlorobenzene	0.0014	0.01	0.002	CC-33 08/08/91	0 / 34	--	NO
2-Butanone (MEK)	4.2	0.005	15.6	F-55 07/27/05	3 / 70	0.398	NO
2-Hexanone	--	0.005	0.343	V-23 07/11/96	0 / 70	--	NO
2-Methylnaphthalene	0.014	0.01	1.6	F-55 01/22/98	1 / 34	0 0106	NO
4-Chlorophenyl phenyl ether	--	0.01	0.0226	PEW-3 06/19/96	0 / 34	--	NO
4,4'-DDT	0.0001	0.0001	0.01	V-23 08/24/95	1 / 24	0.01	NO
p-Cresol	0.0035	0.01	0.97	F-55 07/22/97	1 / 34	0.087	NO
delta-BHC	--	0.0001	0.01	AA-54 08/23/95	1 / 24	0.01	NO
Dibenzofuran	0.028(IMAC)	0.01	0.34	F-55 07/19/00	1 / 34	0.014	NO
Diphenyl ether	--	0.01	292	F-55 07/19/00	4 / 25	50.8	NO
Ethyl benzene	0.55	0.001	0.052	V-23 05/05/92	1 / 70	0.0031	NO
Naphthalene	0.021	0.01	0.71	F-55 07/19/00	1 / 34	0.0174	NO
Toluene	1	0.001	0.059	V-23 05/05/92	4 / 70	0.0099	NO
Xylenes, Total	0.53	0.002	0.054	V-23 05/05/92	2 / 70	0.0127	NO

All data in mg/L.

Table 8
Summary of Selected Natural Attenuation Indicator Parameters
MNA Quarterly Sampling June 2006
CNA Holdings, Inc./Ticona, Shelby, NC
Earth Tech Project No. 79750

Parameter	*Background*		*Plume Area*		*Downgradient*	
	TI-1	**U-38**	**V-23**	**K-28**	**O-25**	**W-23**
Ethylene Glycol	<7	<7	6,740	55.1	<7	<7
Nitrate	2.6	1.1	<0.2	<0.1	<0.1	0.18
Manganese	0.077	0.068	724	36.7	0.36	0.98
Ferrous Iron	0	0	1.5	4.5	0	0
Sulfate	0.5	0.9	38.4	2.2	178	70.9
Methane	0.14	0.0064	15.0	11.0	0.68	0.045
Alkalinity	35.0	4.4	2,260	2,240	71.6	114

Notes:
Concentration Unit: mg/L

Table 3
CNA Holdings Inc. / Ticona Shelby Facility
Quarter 3 2006
Groundwater Analytical Summary
Earth Tech Project No. 79750

Parameter	Unit	EPA Drinking Water Standard	North Carolina 2L Standard	C-49 8/16/2006	K-28 8/16/2006	P-58 8/17/2006	T-35 8/18/2006	V-23 8/17/2006	AA-54 8/15/2006	CC-33 8/17/2006	EE-58 8/15/2006
acetone	mg/L	--	0.7	<0.005	**1.1**	**0.0048 J**	**0.0048 J**	<0.005	**0.008**	**0.0039 J**	**0.0101**
benzene	mg/L	0.005	0.001	<0.001	**0.0108**	<0.001	<0.001	**0.0214**	<0.001	**0.0022**	<0.001
2-butanone	mg/L	--	4.20	<0.005	**0.587**	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
carbon disulfide	mg/L	--	0.7	<0.001	<0.001	<0.001	<0.001	**0.0107**	<0.001	<0.001	<0.001
carbon tetrachloride	mg/L	0.005	0.000269	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
chlorobenzene	mg/L	0.1	0.05	<0.001	<0.001	<0.001	**0.0006 J**	<0.001	<0.001	**0.0024**	<0.001
chloroform	mg/L	0.08	0.07	<0.001	<0.001	<0.001	<0.001	<0.001	**0.00053 J**	<0.001	**0.00054 J**
cis-1,2-dichloroethene	mg/L	0.07	0.07	<0.001	<0.001	<0.001	**0.00076 J**	**0.0019**	<0.001	**0.0067**	<0.001
diethylene oxide	mg/L	--	0.007	NA	**0.0062 J**	**0.294**	**0.0947**	**2.9**	**0.576 J**	**0.166 J**	NA
ethylbenzene	mg/L	0.7	0.550	<0.001	**0.00062 J**	<0.001	<0.001	**0.0031**	<0.001	<0.001	<0.001
tetrachloroethene	mg/L	0.005	0.0007	<0.001	<0.001	<0.001	**0.0014**	<0.001	<0.001	<0.001	<0.001
toluene	mg/L	1.0	1.0	**0.00067 J**	**0.0024**	**0.00071 J**	<0.001	**0.0115**	<0.001	**0.00077 J**	<0.001
trichloroethene	mg/L	0.005	0.0028	<0.001	<0.001	<0.001	**0.0017**	<0.001	<0.001	**0.0018**	<0.001
xylenes	mg/L	10	0.53	<0.002	**0.00074 J**	**0.00057 J**	<0.002	**0.013**	<0.002	**0.00052 J**	<0.002
total organic carbon	mg/L	--	--	NA	**3300**	NA	**NA**	**9110**	NA	**1.3**	NA

NA - Not Analyzed
mg/L - milligrams per Liter
Note: Detections are bolded.
J - estimated value

Table 3
CNA Holdings Inc. / Ticona Shelby Facility
Quarter 3 2006
Groundwater Analytical Summary
Earth Tech Project No. 79750

Parameter	Unit	EPA Drinking Water Standard	North Carolina 2L Standard	FF-34 8/15/2006	FF-62 8/15/2006	GG-61 8/15/2006	HH-48 8/15/2006	HH-77 8/15/2006	TD-3 11/9/2006	TD-3 11/30/2006	TD-4 11/9/2006
acetone	mg/L	--	0.7	<0.005	<0.005	<0.005	**0.0041 J**	**0.0108 J**	<0.005	<0.005	<0.005
benzene	mg/L	0.005	0.001	<0.001	<0.001	<0.001	<0.001	<0.003	<0.001	<0.001	**0.0047**
2-butanone	mg/L	--	4.20	<0.005	<0.005	<0.005	<0.005	<0.015	<0.005	<0.005	<0.005
carbon disulfide	mg/L	--	0.7	<0.001	<0.001	<0.001	<0.001	<0.003	<0.001	<0.001	<0.001
carbon tetrachloride	mg/L	0.005	0.000269	<0.001	<0.001	<0.001	<0.001	<0.003	<0.001	<0.001	**0.0037**
chlorobenzene	mg/L	0.1	0.05	<0.001	<0.001	<0.001	<0.001	<0.003	<0.001	<0.001	<0.001
chloroform	mg/L	0.08	0.07	<0.001	<0.001	<0.001	**0.00074 J**	**0.0021 J**	**0.0026**	**0.002**	**0.0075**
cis-1,2-dichloroethene	mg/L	0.07	0.07	<0.001	<0.001	<0.001	<0.001	<0.003	**0.0111**	**0.0088**	**0.0031**
diethylene oxide	mg/L	--	0.007	**0.0101 J**	**0.011 J**	**0.0287 J**	NA	NA	NA	NA	NA
ethylbenzene	mg/L	0.7	0.550	<0.001	<0.001	<0.001	<0.001	<0.003	<0.001	<0.001	<0.001
tetrachloroethene	mg/L	0.005	0.0007	<0.001	<0.001	<0.001	<0.001	<0.003	<0.001	<0.001	<0.001
toluene	mg/L	1.0	1.0	**0.00082 J**	**0.0017**	**0.0013**	<0.001	<0.003	<0.001	<0.001	<0.001
trichloroethene	mg/L	0.005	0.0028	<0.001	<0.001	<0.001	**0.118**	**0.395**	**0.202**	**0.199**	**2.63**
xylenes	mg/L	10	0.53	**0.00052 J**	**0.00087 J**	**0.00068 J**	<0.002	<0.006	<0.002	<0.002	<0.002
total organic carbon	mg/L	--	--	NA	NA	NA	NA	NA	NA	**2.1**	NA

NA - Not Analyzed
mg/L - milligrams per Liter
Note: Detections are bolded.
J - estimated value

Table 3
CNA Holdings Inc. / Ticona Shelby Facility
Quarter 3 2006
Groundwater Analytical Summary
Earth Tech Project No. 79750

Parameter	Unit	EPA Drinking Water Standard	North Carolina 2L Standard	TD-4 11/30/2006
acetone	mg/L	--	0.7	<0.005
benzene	mg/L	0.005	0.001	**0.0032**
2-butanone	mg/L	--	4.20	<0.005
carbon disulfide	mg/L	--	0.7	<0.001
carbon tetrachloride	mg/L	0.005	0.000269	**0.0028**
chlorobenzene	mg/L	0.1	0.05	<0.001
chloroform	mg/L	0.08	0.07	**0.0058**
cis-1,2-dichloroethene	mg/L	0.07	0.07	**0.003**
diethylene oxide	mg/L	--	0.007	NA
ethylbenzene	mg/L	0.7	0.550	<0.001
tetrachloroethene	mg/L	0.005	0.0007	<0.001
toluene	mg/L	1.0	1.0	<0.001
trichloroethene	mg/L	0.005	0.0028	**2.74**
xylenes	mg/L	10	0.53	<0.002
total organic carbon	mg/L	--	--	**0.99 J**

NA - Not Analyzed
mg/L - milligrams per Liter
Note: Detections are bolded.
J - estimated value

Table 4
CNA Holdings Inc. / Ticona Shelby Facility
PEW Related Analytical Summary
Earth Tech Project No. 79750

Parameter	Unit	EPA Drinking Water Standard	North Carolina 2L Standard	F-55 8/16/2006	PEW-1 8/15/2006	PEW-3 8/15/2006	PEW-3 Dup 8/15/2006	PEW-4 8/15/2006
Volatile Organics								
acetone	mg/L	--	0.7	**0.934**	<0.006	<0.005	<0.005	<0.0053
benzene	mg/L	0.005	0.001	**0.0543**	<0.001	<0.001	<0.001	**0.0024**
chloroform	mg/L	0.08	0.00019	**0.001 J**	<0.0018	<0.001	<0.001	<0.001
cis-1,2-dichloroethene	mg/L	0.07	0.07	<0.003	**0.0019**	<0.001	<0.001	**0.0029**
2-hexanone	mg/L			**0.0074 J**	<0.005	<0.005	<0.005	<0.005
toluene	mg/L	1.0	1.0	**0.0079**	<0.001	<0.001	<0.001	<0.001
trichloroethene	mg/L	0.005	0.0028	<0.003	**0.008**	<0.001	<0.001	**0.0163**
Semivolatile Organics								
1,1-biphenyl	mg/L	--	0.35	**22**	<0.01	**0.0023 J**	**0.0054 J**	**0.0058 J**
biphenyl ether	mg/L	--	--	**71.2**	<0.01	**0.0013 J**	**0.0096 J**	**0.0295**
dibenzofuran	mg/L	--	--	**0.0264 J**	<0.01	<0.01	<0.01	<0.01
naphthalene	mg/L	--	0.021	**0.0381 J**	<0.01	<0.01	<0.01	<0.01

mg/L - milligrams per Liter
Notes: Detections are bolded.
J - estimated value

Table 5
CNA Holdings Inc. / Ticona Shelby Facility
Quarter 4 2006
Groundwater Analytical Summary
Earth Tech Project No. 79750

Parameter	Unit	K-28 11/8/2006	V-23 11/8/2006
total organic carbon	mg/L	**4,050**	**9,580**

mg/L - milligrams per Liter
Note: Detections are bolded.

Table 6
CNA Holdings Inc. / Ticona Shelby Facility
September & November 2006
Diethylene Oxide Analytical Summary
Earth Tech Project No. 79750

A-39	9/13/2006	<0.002
B-34	9/12/2006	0.0348
C-49	9/12/2006	<0.002
D-35	9/13/2006	<0.002
D-88	9/14/2006	<0.002
F-55	9/20/2006	0.152
F-55	11/10/2006	0.337
G-50	9/20/2006	0.15
G-50 Dup	9/20/2006	0.168
G-50	11/9/2006	1.09
G-88	11/9/2006	0.0119
H-59	9/20/2006	0.0057
I-57	9/19/2006	0.103
I-57	11/9/2006	0.2
IT-6	9/12/2006	3.04
IT-9	9/12/2006	0.9
J-29	9/12/2006	0.0058
J-59	9/12/2006	0.019
K-28	11/30/2006	0.274
K-58	9/12/2006	0.969
M-28	9/19/2006	0.0737
M-44	9/19/2006	0.144
N-29	9/13/2006	0.0329
N-53	9/13/2006	<0.002
O-25	9/13/2006	0.0086
O-59	9/13/2006	0.0214
S-1	11/9/2006	<0.002
S-50	9/13/2006	<0.002
T-58	9/13/2006	0.141
V-65	9/13/2006	0.968
BB-18	9/12/2006	0.0126
CC-64	9/12/2006	0.381
DD-58R	9/20/2006	0.0387
II-40	9/14/2006	0.0667 J
II-65	9/15/2006	0.361
JJ-40	9/14/2006	<0.002
JJ-65	9/15/2006	<0.002
KK-27	9/14/2006	0.006
KK-55	9/14/2006	0.192
LL-110	9/13/2006	0.016 J
LL-175	9/21/2006	0.0191
LL-295	9/15/2006	0.0942 J
MM-128	9/12/2006	0.0128 J
MM-280	9/13/2006	0.0231 J
NN-105	9/14/2006	0.168 J
NN-240	9/20/2006	0.0291
NN-280	9/15/2006	0.006 J
OO-95	9/19/2006	<0.002
OO-218	9/20/2006	<0.002
OT-5	11/9/2006	0.01
OT-10	9/20/2006	<0.002
PZ-12	9/15/2006	0.309
TD-4	9/20/2006	<0.002
TI-1	11/8/2006	0.0028
TI-2	9/20/2006	<0.002
TI-2	11/9/2006	0.0025
PEW-4	11/9/2006	0.0685
SLUDGE POND A	9/20/2006	0.0054
SLUDGE POND B	9/20/2006	<0.002
SW-1	9/18/2006	0.0025
SW-2	9/18/2006	0.0675
SW-3	9/18/2006	0.0108
SW-4	9/18/2006	0.0386
SW-5	9/18/2006	0.005
SW-6	9/18/2006	<0.002
SW-7	9/18/2006	0.0098

All Results in mg/L
J - estimated value

Table 7
Summary of Chemical Data
MNA Quarterly Sampling Q3 2006
CNA Holdings, Inc./Ticona, Shelby, NC
Earth Tech Project No. 79750

Parameter	Unit	CC-33 8/17/2006	F-55 8/16/2006	IT-1 8/16/2006	IT-2 8/16/2006	IT-3 8/16-17/2006	IT-4 8/16/2006	IT-5 8/16/2006	IT-6 8/16/2006	IT-7 8/16/2006	IT-8R 8/16/2006	IT-9 8/16/2006
Semivolatile Organics												
ethylene glycol*	mg/L	<7	5110	1930	<7	<7	<7	<7	3970	<7	<7	<7
Inorganics												
iron	mg/L	47.3	632	0.013 J	51.3	79.4	57 5	77.8	846	176	247	41.8
manganese	mg/L	2.7	209	0.03	10.5	0.36	1.2	15	506	69.3	24.5	32.9
Wet Chemistry												
alkalinity	mg/L	51.8	1110	525	127	118	68.1	916	1050	480	432	113
methane	mg/L	0.59	2.5	9	16	20	10	22	12	7.5	16	18
nitrate nitrogen	mg/L	0.024	0.081	0.037	0.043	0.05	0.095	0.047	0.037	0.034	0.041	0.07
sulfate	mg/L	7.1	1.3	3.2	0.53	0.46 J	0.48 J	<0.5	11.6	<0.5	1.1	1.1
total organic carbon	mg/L	1.3	3970	800	6.9	3.8	6.2	127	3230	272	215	13.7
Field Indicators												
dissolved oxygen	mg/L	0.3	1.8	0.26	0.32	0.16	0.05	0.14	0.2	0.18	0.13	0.34
ferrous iron	mg/L	3.2	5.8	4	3.3	3	3	6	2		6	4.3
ORP	mV	-99	-157.9	-48.9	-57.1	-159.7	-150.1	-142	-20.6	-83	-129	-66.5
pH	su	6.39	5.22	5.97	6.04	6.63	6.76	6.75	4.77	6.15	6.35	6.38
specific conductance	umhos/cm	0.095	0.866	0.703	0.172	0.131	0.313	1.935	3.842	1.273	1.314	0.145
temperature	degrees C	20.1	22.1	23.4	22.97	23.91	20.44	20.66	21.49	21.79	20.42	20.7
turbidity	NTU	9.8	78.3	46.7	18.4	35.4	45	15.3	48	18	60	14.3

degrees C - degrees Celsius
feet MSL - feet above mean sea level
mV - millivolt
mg/L - milligram per liter
NTU - nephelometric turbidity unit
ORP - oxidation-reduction potential
su - standard unit
umhos/cm - micromhos per centimeter
* - Ethylene Glycol data was collected September 13, 19, and 20.
J - estimated value
NA - Not Analyzed

Table 7
Summary of Chemical Data
MNA Quarterly Sampling Q3 2006
CNA Holdings, Inc./Ticona, Shelby, NC
Earth Tech Project No. 79750

Parameter	Unit	J-29 8/16/2006	K-28 8/16/2006	N-29 8/16 - 17/2006	O-25 8/16 - 17/2006	Q-33 8/16/2006	TI-1 8/15/2006	U-38 8/17/2006	V-23 8/17/2006	V-65 8/18/2006	W-23 8/18/2006	X-32 8/17/2006
Semivolatile Organics												
ethylene glycol*	mg/L	<7	80.1 J	<7	12.9	<7	<7	<7	6630	<7	<7	<7
Inorganics												
iron	mg/L	<0.1	3000	0.13	49.4	0.072 J	490	0.26	1740	37.2	0.13	0.5
manganese	mg/L	0.24	64.4	0.2	0.33	0.09	9.8	0.069	749	1.6	1.2	NA
Wet Chemistry												
alkalinity	mg/L	514	3400	3.8	62.7	81.2	20.2	2.7	2410	373	158	NA
methane	mg/L	0.0004	9.4	0.45	0.5	0.064	0.18	0.038	15	24	0.067	NA
nitrate nitrogen	mg/L	1.4	0.046	0.72	0.058	0.022	3.4	1.8	0.038	0.03	0.1	NA
sulfate	mg/L	26.4	6.1	1.6	183	69.9	0.58	1.7	43.2	1.1	63.5	NA
total organic carbon	mg/L	<1	3300	<1	20.8	2.3	<1	<1	9110	43.9	5.4	NA
Field Indicators												
dissolved oxygen	mg/L	0.37	0.12	0.31	0.23	0.19	2.3	3.36	0.19	0.38	0.3	4.43
ferrous iron	mg/L	0	8	0	5	NA	<0.2	<0.2	4.6	3.5	0	0.5
ORP	mV	60.2	-111	589	-126	107.7	177.3	318.3	66.6	-115.6	168	177.6
pH	su	7.03	5.95	4.89	6.59	5.92	5.63	4.67	5.03	6.69	5.95	5.32
specific conductance	umhos/cm	0.293	2.103	0.018	0.263	0.215	0.03	0.021	1.856	0.257	0.234	0.04
temperature	degrees C	20.3	20.32	19.9	21.8	20.51	20.16	23.19	25.26	20.39	18 6	23.76
turbidity	NTU	2.8	38.8	3.7	70.2	2.3	3.4	13.1	1.71	12.4	4.8	5.93

degrees C - degrees Celsius
feet MSL - feet above mean sea le
mV - millivolt
mg/L - milligram per liter
NTU - nephelometric turbidity unit
ORP - oxidation-reduction potentia
su - standard unit
umhos/cm - micromhos per centim
* - Ethylene Glycol data was collec
J - estimated value
NA - Not Analyzed

Table 8
Summary of Chemical Data
MNA Quarterly Sampling Q4 2006
CNA Holdings, Inc./Ticona, Shelby, NC
Earth Tech Project No. 79750

Parameter	Unit	C-49 11/9/2006	CC-33 11/8/2006	F-55 11/10/2006	F-55 11/30/2006	FF-34 11/9/2006	G-50 11/9/2006	G-88 11/9/2006	I-57 11/9/2006	IT-1 11/7/2006	IT-2 11/7/2006	IT-3 11/7/2006	IT-4 11/7/2006
Semivolatile Organics													
ethylene glycol	mg/L	<7	<7	8880	11500	<7	<7	<7	<7	<7	<7	<7	<7
ethyl alcohol	mg/L	<5	<5	699	NA	<5	<5	<5	<5	<5	<5	<5	<5
Acetate													
acetate	mg/L	<25	<25	2690	NA	<25	<25	<25	<25	124	<25	<25	<25
Inorganics													
iron	mg/L	0.56	48.5	573	NA	0.13	21.8	1.7	0.16	382	60.5	63.4	64.4
manganese	mg/L	0.015	3.1	199	NA	0.0087 J	17.3	0.026	0.021	4.9	12.5	0.43	2
Wet Chemistry													
alkalinity	mg/L	1.6	32.9	1380	NA	17	43.8	22.4	10.4	403	107	83.2	71.2
methane	mg/L	0.00036	0.64	1.9	NA	0.00054	0.63	0.0034	0.00025	11	15	16	11
nitrate nitrogen	mg/L	0.73	<0.1	0.035	NA	0.41	<0.1	0.44	0.86	<0.1	<0.1	<0.1	<0.1
sulfate	mg/L	<0.5	8.9	2.9	NA	1.1	2.8	0.53	<0.5	1.4	<0.5	1.1	0.42 J
total organic carbon	mg/L	0.89 J	2	5390	NA	1.3	2.9	0.77 J	0.97 J	127	8.9	4.7	6.6
Field Indicators													
dissolved oxygen	mg/L	2.36	0.58	NA	3.12	3.65	1.79	2.71	3.48	1.34	0.85	0.63	0.29
ferrous iron	mg/L	0	4	NA	4	0	3.8	0	NM	6	2	2	3
ORP	mV	256.3	-108	NA	-29	184.4	-33.1	112.5	246	-119	-80	-119	-154
pH	su	5.37	6.45	NA	5.42	5.77	5.9	6.34	5.1	6.57	6.23	6.68	6.85
specific conductance	mS/cm	0.113	0.323	NA	2.66	0.614	4.33	0.593	0.036	1.23	0.627	0.373	0.327
temperature	degrees C	18.33	17.7	NA	21.9	17.82	22.66	21.4	18.59	15.6	16.68	15	15.5
turbidity	NTU	2.44	9.1	NA	40.3	4.01	6.33	66	2.2	56	5.2	11.3	45

degrees C - degrees Celsius
feet MSL - feet above mean sea level
mV - millivolt
mg/L - milligram per liter
NTU - nephelometric turbidity unit
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su - standard unit
umhos/cm - micromhos per centimeter
NA - Not analyed
J - estimated value

Table 8
Summary of Chemical Data
MNA Quarterly Sampling Q4 2006
CNA Holdings, Inc./Ticona, Shelby, NC
Earth Tech Project No. 79750

Parameter	Unit	IT-5 11/7/2006	IT-6 11/7/2006	IT-6 Dup 11/7/2006	IT-7 11/7/2006	IT-8R 11/7/2006	IT-9 11/7/2006	J-29 11/9/2006	K-28 11/8/2006	K-28 Dup 11/8/2006	K-28 11/30/2006	N-29 11/8/2006	O-25 11/8/2006
Semivolatile Organics													
ethylene glycol	mg/L	<7	2650	2730	<7	121	<7	NA	1410	1300 J	<140	<7	<7
ethyl alcohol	mg/L	<5	2540	2430	33.8	17.6	<5	NA	<5	<5	NA	<5	<5
Acetate													
acetate	mg/L	142	8040	8300	279	863	<25	<25	6360	7330	NA	<25	<25
Inorganics													
iron	mg/L	73.6	1680	1600	177	397	43 1	0.017 J	3450	3440	NA	0.15	43.3
manganese	mg/L	14	997	935	75.6	50.9	28.9	0.24	68.4	71.4	NA	0.21	0.31
Wet Chemistry													
alkalinity	mg/L	1040	2100	2150	574	569	92	512	3940	4010	NA	6.6	46
methane	mg/L	21	12	12	12	16	15	0.00084	15	10	NA	0.23	0.53
nitrate nitrogen	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	1.2	<0.1	<0.1	NA	0.57	<0.1
sulfate	mg/L	<0.5	86.2	87.8	<0.5	2.3	<0.5	28.5	<3	<3	NA	1.3	149
total organic carbon	mg/L	116	7530	6870	291	541	7.2	2	4050	4020	NA	1.2	12.9
Field Indicators													
dissolved oxygen	mg/L	0.49	0.57	NA	0.43	0.39	0.4	0.31	0.93	0.93	0.93	0.6	0.45
ferrous iron	mg/L	2.9	3.6	NA	3	4.9	3.6	0	6	6	6	0	4
ORP	mV	-132.5	47.6	NA	-74.2	-111	-140	168	-115	-115	-115	300	-153
pH	su	6.79	4.77	NA	6.21	6.2	6.41	6.98	6.02	6.02	6.02	5.07	6.61
specific conductance	mS/cm	19.52	57.44	NA	14.59	1.258	0.422	0.96	7380	7380	7.38	0.06	0.929
temperature	degrees C	14.57	15.92	NA	15.73	16.8	14.8	19.95	17.21	17.21	17.21	17.65	19.92
turbidity	NTU	15.4	15.6	NA	19.2	34	8.6	0.98	11.4	11.4	11.4	1.98	2.54

degrees C - degrees Celsius
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Table 8
Summary of Chemical Data
MNA Quarterly Sampling Q4 2006
CNA Holdings, Inc./Ticona, Shelby, NC
Earth Tech Project No. 79750

Parameter	Unit	PEW-4 11/9/2006	Q-33 11/8/2006	S-1 11/9/2006	TI-1 11/8/2006	TI-2 11/9/2006	U-38 11/8/2006	V-23 11/8/2006	V-65 11/8/2006	W-23 11/8/2006	X-32 11/8/2006
Semivolatile Organics											
ethylene glycol	mg/L	<7	<7	<7	<7	<7	<7	7020	<7	<7	<7
ethyl alcohol	mg/L	<5	<5	<5	<5	<5	<5	3810	<5	<5	<5
Acetate											
acetate	mg/L	<25	<25	<25	<25	<25	<25	7570	59.9	<25	<25
Inorganics											
iron	mg/L	5.3	0.11	NA	0.34	2.1	0.21	1910	39.6	0.18	0.51
manganese	mg/L	0.97	0.093	NA	0.047	0.098	0.068	813	1.7	1.2	0.023
Wet Chemistry											
alkalinity	mg/L	30.7	78.8	NA	16.4	16.4	3.8	2670	355	113	6
methane	mg/L	0.14	0.057	NA	0.052	0.00086	0.0013	11	22	0.09	0.0021
nitrate nitrogen	mg/L	<0.1	<0.1	NA	2.5	0.86	1.6	<0.1	<0.1	0.26	1.2
sulfate	mg/L	<0.5	69.3	NA	0.36 J	0.43 J	0.62	34.1	1.5	77.8	7.8
total organic carbon	mg/L	1.9	2.9	1.1	1.1	0.72 J	0.83 J	9580	51.2	5.9	<1
Field Indicators											
dissolved oxygen	mg/L	1.01	0.4	3.98	1.61	5.16	3.9	0.94	0.35	0.5	5.75
ferrous iron	mg/L	3.6	0	0	0	0	0	8	3.1	0	0
ORP	mV	48.4	127.1	304	214	192	312	55.3	-150.1	180.1	188
pH	su	5.44	5.87	4.85	5.34	6.06	4.8	4.87	6.63	5.77	5.33
specific conductance	mS/cm	0.758	6.888	0.18	0.086	0.049	0.067	58.76	7.82	6.631	0.138
temperature	degrees C	25.1	18.31	19.5	18.1	18.65	19.2	19.07	19.33	18.56	18
turbidity	NTU	3.47	6.75	5	5	26.2	3	3.37	7.8	1.1	4

degrees C - degrees Celsius
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Table 9
MNA Demonstration Data Summary
MNA Quarterly Sampling Q3 and Q4 2006
CNA Holdings, Inc./Ticona, Shelby, NC
Earth Tech Project No. 79750

Sampling Month-Yr	Ethylene glycol		Total Organic Carbon		Nitrate-		Sulfate		Iron	e	Alkalinity	Methane	ORP	DO	pH	Ferrous Iron	
CC-33																	
May-04	<	7	<	1	<	0.1		5.5	52.8	3.3	34	0.63					
Aug-04	<	7		1.2	<	0.1		5.9	51.7	3.1	44.5	0.55					
Nov-04	<	7		2.8		0.023		6.1	50.7	2.9	52.3	0.35					
Feb-05	<	7		1.2	<	0.1		6	49.5	2.9	61.6	0.43					
May-05	<	7	<	1	<	0.1		6.5	46.7	2.8	71.8	0.39					
Jul-05	<	7		1	<	0.1		11.8	47.5	2.9	70.4	0.32					
Oct-05	<	7		2.1	<	0.1		9.5	49.1	3.0	61	0.43	-43	0.09	6.27	>	40
Mar-06	<	7	<	1	<	0.1		5.8	50.1	3.0	36.9	0.23	-90	0	6.82		6
Jun-06	<	7	<	1.5	<	0.1		7.7	45.6	2.9	55.5	0.47	-80.6	0	6.19		4.5
Aug-06	<	7		1.3		0.024		7.1	47.3	2.7	51.8	0.59	-99	0.3	6.39		3.2
Nov-06	<	7		2	<	0.1		8.9	48.5	3.1	32.9	0.64	-108	0.58	6.45		4
F-55																	
May-04		1990		3590	<	0.05	<	2.5	583	215	1100	2.6					
Aug-04		3790		4260	<	0.02		3.8	580	204	1170	2.6					
Nov-04		5300		4810		0.045		5.1	579	205	1020	4					
Feb-05		5500		4770	<	0.5		1.2	594	208	1200	2.8					
May-05		5780		4290	<	0.1		13.1	631	217	1120	2.7					
Jul-05		6860		4890		0.11		6	564	201	1200	2.2					
Oct-05		6840		4330		0.18		4	572	200	1230	2.8	-69.6	0.92	5.43	>	40
Mar-06		5740		5470	<	0.1		0.79	573	211	929	1.3	23	1.8	5.35		2.4
Jun-06		6330		5130	<	0.1		2.9	729	221	1390	1.2	52.3	2.7	5.19		2.8
Aug-06		5110		3970		0.081		1.3	632	209	1110	2.5	-157.9	1.8	5.22		5.8
Nov-06		8880		5390		0.035		2.9	573	199	1380	1.9	-29	3.12	5.42		4
IT-1																	
May-04		16.8		678	<	0.1		6	444	5.6	628	18					
Aug-04		31.2		329		0.13		3.8	611	8.9	1000	11					
Nov-04	<	7		2.8		0.042	<	2.5	279	2.8	357	17					
Feb-05	<	7		7.8	<	0.1	<	0.5	156	2.1	167	23					
May-05		9.1		4.4	<	0.1	<	0.5	95.5	1.8	98.3	22					
Jul-05	<	7		6.1	<	0.02		3.5	155	2.3	113	14					
Oct-05	<	7		5.9	<	0.1		15.3	60.6	0.76	133	15	-86.3	0.11	6.57	>	40
Mar-06	<	7		5.4	<	0.1	<	0.5	117	1.9	54.5	16	-109	0.33	6.34		3
Jun-06	<	7		4.7	<	0.1	<	0.5	107	1.9	88.8	11	-64	0.65	6.35		5.5
Aug-06		1930		800		0.037		3.2	0.013 J	0.03	525	9	-48.9	0.26	5.97		4
Nov-06	<	7		127	<	0.1		1.4	382	4.9	403	11	-119	1.34	6.57		6
IT-2																	
May-04	<	7		408	<	0.1		3.4	395	5.2	1590	13					
Aug-04	<	7		76.4		0.058	<	2.5	203	4.1	1210	5.9					
Nov-04	<	7		3.1	<	0.02		0.78	128	4	704	6.4					
Feb-05	<	7		7.3	<	0.1	<	3	64	7.4	301	9.3					
May-05		7		3.7	<	0.1	<	0.5	66.9	12.1	159	18					
Jul-05	<	7		8	<	0.02		1.1	67.7	9.1	351	13					
Oct-05	<	7		8.2	<	0.1		3.6	71.6	7.7	440	8.8	-75.8	0.23	6.24	>	40
Mar-06	<	7		9.9	<	0.1		1.8	71	14	57.6	14	-62	0.31	6.04		5.5
Jun-06	<	7		3.1	<	0.1	<	0.5	59.8	13.7	150	15	-22.8	0.24	6.24		3
Aug-06	<	7		6.9		0.043		0.53	51.3	10.5	127	16	-57.1	0.32	6.04		3.3
Nov-06	<	7		8.9	<	0.1	<	0.5	60.5	12.5	107	15	-80	0.85	6.23		2

Table 9
MNA Demonstration Data Summary
MNA Quarterly Sampling Q3 and Q4 2006
CNA Holdings, Inc./Ticona, Shelby, NC
Earth Tech Project No. 79750

Sampling Month-Yr	Ethylene glycol		Total Organic Carbon	Nitrate-		Sulfate		Iron	e	Alkalinity	Methane	ORP	DO	pH	Ferrous Iron	
IT-3																
May-04	<	7	28.3	<	0.1		4	178	1.6	200	18					
Aug-04	<	7	8.5	<	0.1	<	0.5	106	1.1	187	14					
Nov-04	<	7	10	<	0.02		18.6	41.5	0.62	216	9.4					
Feb-05	<	7	4.5	<	0.1	<	3	54.8	0.79	207	21					
May-05	<	7	4.3	<	0.1	<	0.5	60.1	0.67	168	23					
Jul-05	<	7	5.5	<	0.02	<	0.5	87.9	0.57	183	19					
Oct-05	<	7	6.6	<	0.1		10	44.2	0.48	96	18	-139.7	0.09	6.91	>	40
Mar-06	<	7	7	<	0.1		0.5	109	0.62	123	18	-207	0.4	6.87		2
Jun-06	<	7	6	<	0.1	<	0.5	96.8	0.37	144	19	-183	0.43	6.78		4.6
Aug-06	<	7	3.8		0.05		0.46 J	79.4	0.36	118	20	-159.7	0.16	6.63		3
Nov-06	<	7	4.7	<	0.1		1.1	63.4	0.43	83.2	16	-119	0.63	6.68		2
IT-4																
May-04	<	7	12.8	<	0.1		3.6	118	1.1	189	15					
Aug-04	<	7	8.6	<	0.1	<	0.5	56.3	1.3	118	19					
Nov-04	<	7	7.9	<	0.02		1.8	46.2	0.6	65.7	8.5					
Feb-05	<	7	6.7	<	0.1	<	2.5	70.3	1.2	110	13					
May-05		7.7	4	<	0.1	<	0.5	49.8	3.2	95.9	13					
Jul-05	<	7	7.7	<	0.02		1.4	71.2	1.1	90.7	12					
Oct-05	<	7	6.1	<	0.1		9.6	45.6	0.78	56	9.6	-163.8	0.01	6.86	>	40
Mar-06	<	7	8.8	<	0.1	<	0.5	98.1	1.1	84.8	14	-183	0.36	6.8		2.7
Jun-06	<	7	5.9	<	0.1	<	0.5	75.9	0.86	85.5	14	-213	0.08	6.93		1.5
Aug-06	<	7	6.2		0.095		0.48 J	57.5	1.2	68.1	10	-150.1	0.05	6.76		3
Nov-06	<	7	6.6	<	0.1		0.42 J	64.4	2	71.2	11	-154	0.29	6.85		3
IT-5																
May-04	<	7	200	<	0.1		3.5	127	7.8	772	17					
Aug-04	<	7	12.6		0.12	<	0.5	85.7	3.6	620	13					
Nov-04	<	7	17.4		0.09		0.67	74.8	2.9	618	18					
Feb-05	<	7	17.4	<	0.1	<	0.5	74.6	3.6	709	17					
May-05		27.6	17.9	<	0.1	<	0.5	68.5	4	752	18					
Jul-05	<	7	69.4	<	0.02	<	0.5	118	15.7	946	14					
Oct-05	<	7	22.3	<	0.1		4.7	73.4	6.9	560	15	-100.7	0.08	6.39	>	40
Mar-06	<	7	67.1	<	0.1	<	0.5	86.2	11.2	972	14	-145	0	6.98		2.8
Jun-06	<	7	25.2	<	0.1	<	0.5	47.5	4.8	1270	13	-125	0.67	6.68		2.5
Aug-06	<	7	127		0.047	<	0.5	77.8	15	916	22	-142	0.14	6.75		6
Nov-06	<	7	116	<	0.1	<	0.5	73.6	14	1040	21	-132.5	0.49	6.79		2.9
IT-6																
May-04	<	70	5240		0.11		5.4	1820	699	2190	8.8					
Aug-04	<	140	4740	<	0.2	<	3	1630	624	2110	9					
Nov-04	<	35	3920		0.1		20.5	1420	553	1660	9.1					
Feb-05	<	7	2760	<	0.5		12.9	1000	452	1720	8.9					
May-05		461	2750		0.17		17.4	1010	447	1550	10					
Jul-05		359	3100		0.034		5.9	978	468	1690	7.7					
Oct-05		115	3090	<	0.5		17.7	1090	528	1510	9.6	30	0.11	4.81	>	40
Mar-06		55.4	5770	<	0.5		10.6	1240	652	1760	9	24	0.9	5		
Jun-06		514	4350		0.12		10.6	1290	704	1360	7.7	26.9	0.19	4.98		1.5
Aug-06		3970	3230		0.037		11.6	846	506	1050	12	-20.6	0.2	4.77		2
Nov-06		2650	7530	<	0.1		86.2	1680	997	2100	12	47.6	0.57	4.77		3.6

Table 9
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MNA Quarterly Sampling Q3 and Q4 2006
CNA Holdings, Inc./Ticona, Shelby, NC
Earth Tech Project No. 79750

Sampling Month-Yr	Ethylene glycol		Total Organic Carbon	Nitrate-		Sulfate		Iron		e	Alkalinity	Methane	ORP	DO	pH	Ferrous Iron	
IT-7																	
May-04	<	28		1980	<	0.05		3.2		422	389	930	9.3					
Aug-04	<	35		2170		0.025	<	3		432	373	1190	7.9					
Nov-04	<	35		808		0.035	<	2.5		475	292	1330	15					
Feb-05	<	7		37.2	<	0.1		5.3		122	25.7	650	14					
May-05		15.1		29	<	0.1	<	0.5		132	27.3	516	17					
Jul-05	<	7		66.8	<	0.02	<	0.5		125	29.4	500	13					
Oct-05	<	7		28.4	<	0.1		3.3		77.6	23.8	532	14	-60.2	0.15	6.53	>	40
Mar-06	<	7		233	<	0.1	<	0.5		166	40.2	402	7	-92	0	6.23		2.4
Jun-06	<	7		48	<	0.1	<	0.5		116	21.8	555	12	-101	0.17	6.28		3.8
Aug-06	<	7		272		0.034	<	0.5		176	69.3	480	7.5	-83	0.18	6.15		
Nov-06	<	7		291	<	0.1	<	0.5		177	75.6	574	12	-74.2	0.43	6.21		3
IT-8R																		
May-04	<	7		883	<	0.1	<	2.5		801	51	1060	11					
Aug-04	<	7		583	<	0.1		19.6		616	43.9	900	13					
Nov-04	<	7		210		0.034	<	2.5		328	31.5	492	17					
Feb-05		42		413	<	0.1		6.4		404	46.6	762	16					
May-05		264		932	<	0.1		0.96		667	110	907	15					
Jul-05	<	7		1240	<	0.02		1.1		827	116	1320	12					
Oct-05	<	7		116	<	0.1		3.3		197	20.7	416	19	-93.4	0.06	6.65	>	40
Mar-06	<	70		2760	<	0.5		2.9		1420	284	1770	12	27	0	5.01		2.9
Jun-06		171		2330	<	0.1		3.5		1330	230	1910	8.4	-26	0.09	5.46		6.3
Aug-06	<	7		215		0.041		1.1		247	24.5	432	16	-129	0.13	6.35		6
Nov-06		121		541	<	0.1		2.3		397	50.9	569	16	-111	0.39	6.2		4.9
IT-9																		
May-04	<	7		49.7	<	0.1	<	0.5		195	77.3	564	11					
Aug-04	<	7		84	<	0.1	<	0.5		141	91.6	580	16					
Nov-04	<	7		30.5		0.034	<	2.5		94.1	65.3	399	23					
Feb-05	<	7		31.3	<	0.1	<	3		74.9	60.2	364	20					
May-05		8		57.9	<	0.1	<	0.5		70.4	62.7	308	21					
Jul-05		7.6		26.3	<	0.02	<	0.5		56.9	38.3	261	18					
Oct-05	<	7		31.6	<	0.1		3.7		45.7	58.7	250	20	-46.5	0.1	6.48	>	40
Mar-06	<	7		30.5	<	0.1	<	0.5		44.7	35.8	93.9	18	-85	0	7.28		7
Jun-06	<	7		14.8	<	0.1	<	0.5		50.5	47.3	161	18	-85	0.1	6.28		4
Aug-06	<	7		13.7		0.07		1.1		41.8	32.9	113	18	-66.5	0.34	6.38		4.3
Nov-06	<	7		7.2	<	0.1	<	0.5		43.1	28.9	92	15	-140	0.4	6.41		3.6
J-29																		
Feb-05	<	7		1.6		19.2		40.7	<	0.1	0.3	957	0.0089					
May-05	<	7		2		9		36.7	<	0.1	0.3	843	0.013					
Jul-05	<	7		1.9		8.6		42.1	<	0.1	0.63	806	0.0083					
Oct-05	<	7		2.1		2.5		28.3	<	0.1	0.36	626	0.011	-110.4	0.18	6.96	<	0.1
Mar-06	<	7		1.3		1.5		27.3	<	0.1	0.43	566	0.034	47	0	6.67		2.4
Jun-06	<	7	<	1		1		26.3	<	0.1	0.16	579	0.016	128	0.32	6.96		0
Aug-06	<	7	<	1		1.4		26.4	<	0.1	0.24	514	0.0004	60.2	0.37	7.03		0
Nov-06				2		1.2		28.5		0.017 J	0.24	512	0.00084	168	0.31	6.98		0

Table 9
MNA Demonstration Data Summary
MNA Quarterly Sampling Q3 and Q4 2006
CNA Holdings, Inc./Ticona, Shelby, NC
Earth Tech Project No. 79750

Sampling Month-Yr	Ethylene glycol		Total Organic Carbon		Nitrate-		Sulfate		Iron	e	Alkalinity	Methane	ORP	DO	pH	Ferrous Iron	
K-28																	
May-04	<	35		1230	<	0.1		1.7	1090	17.8	1220	13					
Aug-04	<	35		2110	<	0.5		5.8	1810	32.3	2100	12					
Nov-04		227		2710		0.27	<	2.5	2160	41.3	2110	19					
Feb-05		244		60.4	<	0.1	<	2.5	613	10.5	770	16					
May-05		238		52.7	<	0.1		0.53	191	1.8	197	17					
Jul-05		296		2030	<	0.1		2.1	1730	36.5	1760	10					
Oct-05		66.2		2750	<	0.5		3.7	2360	52.6	3360	11	-71.9	0.08	5.82	>	40
Mar-06		12.5		1020	<	0.1		0.83	783	12.1	944	13	-146	1.92	6.79		4
Jun-06		55.1		2480	<	0.1		2.2	1960	36.7	2240	11	-80.4	0.62	5.96		4.5
Aug-06		80.1 J		3300		0.046		6.1	3000	64.4	3400	9.4	-111	0.12	5.95		8
Nov-06	<	1410 J		4050	<	0.1	<	3	3450	68.4	3940	15	-115	0.93	6.02		6
N-29																	
May-04	<	7	<	1.0		0.62		1.2	< 0.1	0.21	3.5	0.66					
Aug-04	<	7	<	1.0		0.69		1.2	< 0.1	0.2	4	0.47					
Nov-04	<	7		1.6		0.79		1	< 0.1	0.2	3.5	1.5					
Feb-05	<	7	<	1.0		0.51		0.91	< 0.1	0.2	4.3	0.95					
May-05	<	7	<	1.0		0.41		1.2	< 0.1	0.23	3.8	2.7					
Jul-05	<	7	<	1.0		0.59		2.9	< 0.1	0.21	2.4	0.7					
Oct-05	<	7	<	1.0		0.63		3	< 0.1	0.21	3.5	0.42	588.1	0.26	4.73	<	0.1
Mar-06	<	7	<	1.0		0.67		1.2	< 0.1	0.23	6.1	0.45	532	3.22	5.04		2
Jun-06	<	7	<	1		0.83		5	0.55	0.22	3.3	0.5	584	0.22	4.93		0
Aug-06	<	7	<	1		0.72		1.6	0.13	0.2	3.8	0.45	589	0.31	4.89		0
Nov-06	<	7		1.2		0.57		1.3	0.15	0.21	6.6	0.23	300	0.6	5.07		0
O-25																	
May-04	<	7		21.4	<	0.1		173	57.5	0.46	43	1.2					
Aug-04	<	7		22	<	0.1		179	54.8	0.44	40	1.1					
Nov-04	<	7		27		0.07		181	54.7	0.44	53.9	1.3					
Feb-05	<	7		21.3	<	0.1		217	51.4	0.42	70.2	0.76					
May-05		21.6		26.3	<	0.1		191	54.7	0.43	82.2	0.41					
Jul-05		16.2		22.6	<	0.1		268	52.6	0.4	61.8	0.75					
Oct-05		16		21.6	<	0.1		203	58.2	0.45	63	1	-103.2	0.29	6.67	>	40
Mar-06		12.5		24	<	0.1		171	56.3	0.45	62.6	0.96	-155	0	6.78		7
Jun-06	<	7		24.4	<	0.1		178	49.1	0.36	71.6	0.68	-141	0.5	6.44		4
Aug-06		12.9		20.8		0.058		183	49.4	0.33	62.7	0.5	-126	0.23	6.59		5
Nov-06	<	7		12.9	<	0.1		149	43.3	0.31	46	0.53	-153	0.45	6.61		4
Q-33																	
May-04	<	7		1.5	<	0.1		84.2	< 0.1	0.1	93	0.0037					
Aug-04	<	7		2.7	<	0.1		88.5	0.1	0.095	88	0.0014					
Nov-04	<	7		4.8	<	0.1		86.1	< 0.1	0.09	98.5	0.036					
Feb-05	<	7		1.9	<	0.1		91.6	< 0.1	0.091	98.6	0.048					
May-05	<	7		1.8	<	0.1		80.7	< 0.1	0.088	88.8	0.06					
Jul-05	<	7		2	<	0.1		85.5	< 0.1	0.085	91.7	0.041					
Oct-05	<	7		1.8	<	0.1		78.4	< 0.1	0.096	87.5	0.073	82.5	0.19	6	<	0.1
Mar-06	<	7		2.6	<	0.1		71.9	< 0.1	0.087	90.9	0.048	109	1.24	6.08		0
Jun-06	<	7		1.9	<	0.1		74.8	0.42	0.1	73.3	0.041	101.5	0.43	5.85		0
Aug-06	<	7		2.3		0.022		69.9	0.072 J	0.09	81.2	0.064	107.7	0.19	5.92		
Nov-06	<	7		2.9	<	0.1		69.3	0.11	0.093	78.8	0.057	127.1	0.4	5.87		0

Table 9
MNA Demonstration Data Summary
MNA Quarterly Sampling Q3 and Q4 2006
CNA Holdings, Inc./Ticona, Shelby, NC
Earth Tech Project No. 79750

Sampling Month-Yr	Ethylene glycol		Total Organic Carbon		Nitrate-		Sulfate		Iron		e	Alkalinity	Methane	ORP	DO	pH	Ferrous Iron	
TI-1																		
May-04	<	7	<	1		2.3		1.1		0.35	0.026	17	0.0066					
Aug-04	<	7	<	1		2.2		0.82		3.6	0.088	27	0.011					
Nov-04	<	7		2.6		2.5		0.83		4.2	0.12	27.1	0.026					
Feb-05	<	7	<	1		2.3		1.5		3.4	0.069	22.8	0.11					
May-05	<	7	<	1		2.5		1.1		0.64	0.042	26	0.11					
Jul-05	<	7	<	1		2.3		0.73		2.8	0.084	23.2	0.056					
Oct-05	<	7		1.1		2.4		0.74		1.4	0.062	20.5	0.033	-6.5	1.3	5.48	<	0.1
Mar-06	<	7	<	1		2.2	<	0.5	<	0.1	0.036	25.8	0.11	231	0	5.01		0
Jun-06	<	7	<	1		2.6		0.5		1.9	0.077	35	0.14	262	3	5.55		0
Aug-06	<	7	<	1		3.4		0.58		490	9.8	20.2	0.18	177.3	2.3	5.63	<	0.2
Nov-06	<	7		1.1		2.5		0.36 J		0.34	0.047	16.4	0.052	214	1.61	5.34		0
U-38																		
May-04	<	7	<	1		1.1		0.75	<	0.1	0.055	7.5	0.0012					
Aug-04	<	7	<	1		1.1		0.83	<	0.1	0.058	4	0.00049					
Nov-04	<	7		1.4		1.3		0.6	<	0.1	0.058	3	0.021					
Feb-05	<	7	<	1		0.91	<	2.5	<	0.1	0.054	1.9	0.0026					
May-05	<	7	<	1		0.91		1.7	<	0.1	0.054	2.4	0.021					
Jul-05	<	7	<	1		1		3.3	<	0.1	0.051	2.9	0.0028					
Oct-05	<	7		4		1.1		2	<	0.1	0.065	4.5	0.023	156	0.91	4.85	<	0.1
Mar-06	<	7	<	1		0.79		0.8		0.66	0.18	6.1	0.005	190	0.22	5.7		1
Jun-06	<	7	<	1		1.1		0.9	<	0.1	0.068	4.4	0.0064	195.7	2.32	4.86		0
Aug-06	<	7	<	1		1.8		1.7		0.26	0.069	2.7	0.038	318.3	3.36	4.67	<	0.2
Nov-06	<	7		0.83 J		1.6		0.62		0.21	0.068	3.8	0.0013	312	3.9	4.8		0
V-23																		
May-04		7230		11200		0.1		35.5		2020	963	2640	11					
Aug-04		8200		9840		0.43		36.5		2050	933	3130	12					
Nov-04		6460		12700		0.076		102		1950	884	2510	13					
Feb-05		6740		10700	<	0.5		75.1		1740	772	2800	16					
May-05		3740		8900	<	0.5		141		1780	757	2510	15					
Jul-05		7960		9900		0.12		41.9		1810	761	3030	13					
Oct-05		6770		9260	<	0.5		38.5		1890	776	2800	15	14.2	0.13	4.98	>	40
Mar-06		5140		9860	<	0.5		37.1		1730	774	2190	15	36	0.36	5		3.2
Jun-06		6740		8640	<	0.2		38.4		1750	724	2260	15	43.1	0.25	4.92		1.5
Aug-06		6630		9110		0.038		43.2		1740	749	2410	15	66.6	0.19	5.03		4.6
Nov-06		7020		9580	<	0.1		34.1		1910	813	2670	11	55.3	0.94	4.87		8
V-65																		
May-04	<	7		1.5	<	0.1		3.2		18.6	1.1	260	15					
Aug-04	<	7		1.8	<	0.1		2.8		20.4	0.96	250	18					
Nov-04	<	7		4.4	<	0.02		2.3		20.6	0.84	218	19					
Feb-05	<	7		1.1	<	0.1		1.1		23.4	1.2	250	22					
May-05	<	7	<	1	<	0.1		1.3		24.2	0.99	198	15					
Jul-05	<	7		9		0.037	<	0.5		21.2	1.1	210	12					
Oct-05	<	7		6	<	0.1	<	0.5		23.9	1	240	15	-86	0.31	6.39		24
Mar-06	<	7		4.3	<	0.1	<	0.5		32.5	1.4	248	21	-105	0.32	6.51		4
Jun-06	<	7		2	<	0.1	<	0.5		27.8	1.3	276	25	-107	0.12	6.41		2.6
Aug-06	<	7		43.9		0.03		1.1		37.2	1.6	373	24	-115.6	0.38	6.69		4.3
Nov-06	<	7		51.2	<	0.1		1.5		39.6	1.7	355	22	-150.1	0.35	6.63		3.1

Table 9
MNA Demonstration Data Summary
MNA Quarterly Sampling Q3 and Q4 2006
CNA Holdings, Inc./Ticona, Shelby, NC
Earth Tech Project No. 79750

Sampling Month-Yr	Ethylene glycol		Total Organic Carbon		Nitrate-		Sulfate	Iron		e	Alkalinity	Methane	ORP	DO	pH	Ferrous Iron	
								W-23									
May-04	<	7		2.3		1.2	64.3	<	0.1	1.5	29.5	0.0081					
Aug-04	<	7		1.3		1.9	63.8	<	0.1	1.9	10.4	0.0069					
Nov-04	<	7		3		1.4	60.4	<	0.1	2.1	9	0.62					
Feb-05	<	7		3.6		0.41	62.2	<	0.1	1.9	88.2	0.03					
May-05		9.2		4.1		0.92	60.4	<	0.1	1.8	92.6	0.036					
Jul-05	<	7		4		0.81	63.1	<	0.1	1.7	89.7	0.044					
Oct-05	<	7		5.4		0.31	65.6	<	0.1	1.7	113	0.045	-32.2	0.59	5.83	<	0.1
Mar-06	<	7	<	1		0.76	64.5		0.91	2.7	10.6	0.005	210	5.71	5.17		0
Jun-06	<	7		4.9		0.18	70.9	<	0.1	0.98	114	0.045	179	0.87	5.7		0
Aug-06	<	7		5.4		0.1	63.5		0.13	1.2	158	0.067	168	0.3	5.2		0
Nov-06	<	7		5.9		0.26	77.8		0.18	1.2	113	0.09	180.1	0.5	5.77		0

J- estimated value

Table 10
November 2006 PLFA Results
MNA Quarterly Sampling Q3 and Q4 2006
CNA Holdings, Inc./Ticona, Shelby, NC
Earth Tech Project No. 79750

Sample Name		C-49	F-55	PEW-4	TI-1	V-23	IT-6	K-28	O-25	CC-33	FF-34
		Upgradient/Background	F-55 Area			Inner Tier Area					Downgradient Site Perimeter
Sample Date		11/9/2006	11/10/2006	11/9/2006	11/8/2006	11/8/2006	11/7/2006	11/8/2006	11/8/2006	11/8/2006	11/9/2006
Cells	cells/mL	1.76E+04	5.64E+05	3.62E+04	8.23E+04	1.75E+05	1.29E+06	4.72E+05	5.88E+04	1.49E+04	3.80E+04
Firmicutes (TerBrSats)	%	2.09	17.7	7.46	2.76	51.4	53.23	4.34	15.09	12.87	1.46
Proteobacteria (Monos)	%	52.54	39.36	54.16	80.65	21.76	20.86	79.5	61.26	56.8	64.57
Anaerobic metal reducers (BrMonos)	%	7.38	15.06	0.76	0.39	2.48	4.01	1.27	2.04	0.4	2.05
SRB/Actinomycetes (MidBrSats)	%	1.54	0.5	10.98	2.47	6.94	5.55	1.03	3.22	1.92	0
General (Nsats)	%	35.28	26.35	26.31	12.95	17.43	15.41	10.58	16.19	24.68	28.47
Eukaryotes (polyenoics)	%	1.16	1.02	0.33	0.79	0	0.94	3.29	2.21	3.37	3.45
Slowed Growth	ratio cy/cis	0.87	1.51	0.15	0.30	3.80	1.15	0.09	0.20	0.49	0.08
Decreased Permeability	ratio trans/cis	0.19	0.35	0.13	0.28	0.00	0.37	0.33	0.27	0.22	0.02

Table 11
Summary of Selected Natural Attenuation Indicator Parameters
MNA Quarterly Sampling Q3 and Q4 2006
CNA Holdings, Inc./Ticona, Shelby, NC
Earth Tech Project No. 79750

Q3 2006

Parameter	*Background*		*Plume Area*		*Downgradient*	
	TI-1	U-38	V-23	K-28	O-25	W-23
Ethylene Glycol	<7	<7	6,630	80.1	12.9	<7
Nitrate	3.4	1.8	0.04	0.046	0.058	0.10
Manganese	9.8	0.068	749	64.4	0.33	1.2
Ferrous Iron	0	0	4.6	8	5	0
Sulfate	0.58	1.7	43.2	6.1	183	63.5
Methane	0.18	0.038	15.0	9.4	0.5	0.067
Alkalinity	20.2	2.7	2,410	3,400	62.7	158

Q4 2006

Parameter	*Background*		*Plume Area*		*Downgradient*	
	TI-1	U-38	V-23	K-28	O-25	W-23
Ethylene Glycol	<7	<7	7,020	<140	<7	<7
Nitrate	2.5	1.6	<0.1	<0.1	<0.1	0.26
Manganese	0.047	0.068	813	68.4	0.31	1.2
Ferrous Iron	0	0	8	6	4	0
Sulfate	0.36	0.6	34.1	<3	149	77.8
Methane	0.052	0.0013	11.0	15.0	0.53	0.090
Alkalinity	16.4	3.8	2,670	3,940	46	113

Notes:
Concentration Unit: mg/L

Table 3
CNA Holdings Inc. / Ticona Shelby Facility
Quarter 1 2007
Groundwater Analytical Summary
Earth Tech Project No. 79750

Parameter	Unit	EPA Drinking Water Standard	North Carolina 2L Standard	C-49 1/24/2007	J-29 1/23/2007	K-28 1/23/2007	P-58 1/25/2007	T-35 1/24/2007	V-23 1/25/2007	AA-54 1/24/2007	CC-33 1/25/2007
acetone	mg/L	--	0.7	< 0.005	< 0.005	**0.76**	< 0.005	< 0.005	**0.287 J**	< 0.005	< 0.005
benzene	mg/L	0.005	0.001	< 0.001	< 0.001	**0.0109**	< 0.001	< 0.001	**0.0145**	< 0.001	**0.0018**
2-butanone	mg/L	--	4.2	< 0.005	< 0.005	**0.316**	< 0.005	< 0.005	**0.131 J**	< 0.005	< 0.005
carbon disulfide	mg/L	--	0.7	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	**0.0037**	< 0.001	< 0.001
carbon tetrachloride	mg/L	0.005	0.000269	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
chlorobenzene	mg/L	0.1	0.05	< 0.001	< 0.001	< 0.001	< 0.001	**0.00058 J**	< 0.001	< 0.001	**0.002**
chloroform	mg/L	0.08	0.07	**0.00059 J**	**0.0031**	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
1,1-dichloroethane	mg/L	--	0.07	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
cis-1,2-dichloroethene	mg/L	0.07	0.07	< 0.001	< 0.001	< 0.001	< 0.001	**0.00093 J**	**0.0019**	< 0.001	**0.0079**
diethylene oxide	mg/L	--	0.007	NA	NA	NA	NA	NA	NA	NA	NA
ethylbenzene	mg/L	0.7	0.55	< 0.001	< 0.001	**0.00053 J**	< 0.001	< 0.001	**0.0024**	< 0.001	< 0.001
styrene	mg/L	0.1	0.1	< 0.001	< 0.001	**0.00058 J**	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
tetrachloroethene	mg/L	0.005	0.0007	< 0.001	< 0.001	< 0.001	< 0.001	**0.0015**	< 0.001	< 0.001	< 0.001
toluene	mg/L	1	1	< 0.001	< 0.001	**0.0022**	< 0.001	< 0.001	**0.0071**	< 0.001	< 0.001
trichloroethene	mg/L	0.005	0.0028	< 0.001	< 0.001	< 0.001	< 0.001	**0.0019**	< 0.001	< 0.001	**0.0026**
xylenes	mg/L	10	0.53	< 0.002	< 0.002	**0.00059 J**	< 0.002	< 0.002	**0.0059**	< 0.002	< 0.002
total organic carbon	mg/L	--	--	NA	NA	**2010**	NA	NA	**5700**	NA	NA

J - estimated value
mg/L - milligrams per liter
NA - not analyzed
Bolded values indicate detections.

Table 3
CNA Holdings Inc. / Ticona Shelby Facility
Quarter 1 2007
Groundwater Analytical Summary
Earth Tech Project No. 79750

Parameter	Unit	EPA Drinking Water Standard	North Carolina 2L Standard	EE-58 1/24/2007	FF-34 1/25/2007	FF-62 1/25/2007	GG-61 1/26/2007	HH-48 1/24/2007	HH-77 1/24/2007	TD-3 1/24/2007	TD-4 1/24/2007
acetone	mg/L	--	0.7	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
benzene	mg/L	0.005	0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	**0.00054 J**	**0.0028**
2-butanone	mg/L	--	4.2	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
carbon disulfide	mg/L	--	0.7	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
carbon tetrachloride	mg/L	0.005	0.000269	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	**0.0032**
chlorobenzene	mg/L	0.1	0.05	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
chloroform	mg/L	0.08	0.07	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	**0.0022**	**0.0067**
1,1-dichloroethane	mg/L	--	0.07	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	**0.00084 J**	< 0.001
cis-1,2-dichloroethene	mg/L	0.07	0.07	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	**0.0043**	**0.0091**	**0.0026**
diethylene oxide	mg/L	--	0.007	NA	NA	NA	NA	NA	NA	<0.002	<0.002
ethylbenzene	mg/L	0.7	0.55	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
styrene	mg/L	0.1	0.1	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
tetrachloroethene	mg/L	0.005	0.0007	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
toluene	mg/L	1	1	**0.00079 J**	< 0.001	< 0.001	< 0.001	**0.00064 J**	< 0.001	**0.00059 J**	**0.00096 J**
trichloroethene	mg/L	0.005	0.0028	< 0.001	< 0.001	< 0.001	< 0.001	**0.0824**	**0.17**	**0.178**	**2.53 J**
xylenes	mg/L	10	0.53	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	**0.00078 J**
total organic carbon	mg/L	--	--	NA	NA	NA	NA	NA	NA	NA	NA

J - estimated value
mg/L - milligrams per liter
NA - not analyzed
Bolded values indicate detections.

Table 4
CNA Holdings Inc. / Ticona Shelby Facility
PEW Related Analytical Summary
Earth Tech Project No. 79750

Parameter	Unit	EPA Drinking Water Standard	North Carolina 2L Standard	F-55 1/25/2007	F-55 4/20/2007	PEW-1 1/26/2007	PEW-1 4/18/2007	PEW-3 1/26/2007	PEW-3 4/18/2007	PEW-4 1/26/2007	PEW-4 4/18/2007
Volatile Organics											
acetone	mg/L	--	0.7	**0.991**	NA	< 0.005	NA	**0.0232**	NA	< 0.005	NA
benzene	mg/L	0.005	0.001	**0.0574**	NA	< 0.001	NA	< 0.001	NA	**0.0016**	NA
2-butanone	mg/L	--	4.2	**0.853**	NA	< 0.005	NA	< 0.005	NA	< 0.005	NA
carbon disulfide	mg/L	--	0.7	**0.0016 J**	NA	< 0.001	NA	< 0.001	NA	< 0.001	NA
chloroform	mg/L	0.08	0.07	< 0.005	NA	**0.0011**	NA	< 0.001	NA	**0.00088 J**	NA
cis-1,2-dichloroethene	mg/L	0.07	0.07	< 0.005	NA	**0.002**	NA	< 0.001	NA	**0.0017**	NA
toluene	mg/L	1	1	**0.0079**	NA	< 0.001	NA	< 0.001	NA	< 0.001	NA
trichloroethene	mg/L	0.005	0.0028	< 0.005	NA	**0.0078**	NA	< 0.001	NA	**0.0227 J**	NA
Semivolatile Organics											
1,1-biphenyl	mg/L	--	0.35	NA	**5.16**	NA	< 0.01	NA	**0.0185**	NA	**0.0044 J**
biphenyl ether	mg/L	--	--	NA	**15.8**	NA	< 0.01	NA	**0.0538**	NA	**0.0341**
dibenzofuran	mg/L	--	--	**0.118**	NA	< 0.01	NA	< 0.01	NA	< 0.01	NA
2-methylnaphthalene	mg/L	--	0.014	**0.504**	NA	< 0.01	NA	< 0.01	NA	< 0.01	NA
naphthalene	mg/L	--	0.021	**0.28**	NA	< 0.01	NA	< 0.01	NA	< 0.01	NA
phenol	mg/L	--	0.3	**0.299**	NA	< 0.01	NA	< 0.01	NA	< 0.01	NA

J - estimated value
mg/L - milligrams per liter
NA - not analyzed
Bolded values indicate detections.

Table 5
CNA Holdings Inc. / Ticona Shelby Facility
Quarter 2 2007
Groundwater Analytical Summary
Earth Tech Project No. 79750

Parameter	Unit	EPA Drinking Water Standard	North Carolina 2L Standard	HH-48 4/20/2007	HH-77 4/20/2007	II-65 4/20/2007	OT-2R 4/19/2007	K-28 4/18/2007	V-23 4/18/2007	TD-3 4/18/2007	TD-4 4/18/2007
benzene	mg/L	0.005	0.001	NA	NA	NA	NA	NA	NA	< 0.001	**0.0035**
carbon tetrachloride	mg/L	0.005	0.000269	NA	NA	NA	NA	NA	NA	< 0.001	**0.0034**
chloroform	mg/L	0.08	0.07	NA	NA	NA	NA	NA	NA	**0.002**	**0.0065**
1,1-dichloroethane	mg/L	--	0.07	NA	NA	NA	NA	NA	NA	**0.00069 J**	< 0.001
cis-1,2-dichloroethene	mg/L	0.07	0.07	NA	NA	NA	NA	NA	NA	**0.0084**	**0.0028**
diethylene oxide	mg/L	--	0.007	<0.002	<0.002	0.228	0.165	NA	NA	NA	NA
tetrachloroethene	mg/L	0.005	0.0007	NA	NA	NA	NA	NA	NA	**0.00056 J**	**0.00068 J**
toluene	mg/L	1	1	NA	NA	NA	NA	NA	NA	< 0.001	< 0.001
trichloroethene	mg/L	0.005	0.0028	NA	NA	NA	NA	NA	NA	**0.18**	**2.7**
total organic carbon	mg/L	--	--	NA	NA	NA	NA	**951**	**10000**	NA	NA

J - estimated value
mg/L - milligrams per liter
NA - not analyzed
Bolded values indicate detections.

Table 6
CNA Holdings, Inc./Ticona Shelby Facility
Summary of Chemical Data
MNA Quarterly Sampling Q1 2007
Earth Tech Project No. 79750

Parameter	Unit	CC-33 1/25/2007	F-55 1/25/2007	G-50 1/24/2007	G-88 1/24/2007	IT-1 1/23/2007	IT-2 1/23/2007	IT-3 1/23/2007	IT-4 1/23/2007	IT-5 1/23/2007
Semivolatile Organics										
ethylene glycol	mg/L	< 7	**8440**	< 7	< 7	**17**	< 7	< 7	< 7	< 7
Inorganics										
iron	mg/L	**43.9**	**748**	**28.3**	**31.4**	**391**	**60.7**	**46.7**	**41.8**	**76.7**
manganese	mg/L	**3.2**	**244**	**19.8**	**0.39**	**3.4**	**11.6**	**0.62**	**1.2**	**12.9**
Wet Chemistry										
acetate	mg/L	< 25	**2400**	< 25	< 25	**133**	< 25	< 25	< 25	**107**
alkalinity	mg/L	**39**	**1160**	**43.6**	**23.1**	**513**	**150**	**157**	**68.2**	**918**
ethyl alcohol	mg/L	< 5	**800**	< 5	< 5	**16.1**	< 5	< 5	< 5	< 5
methane	mg/L	**0.68**	**2.1**	**0.8**	**0.03**	**11**	**17**	**21**	**9.8**	**26**
nitrate nitrogen	mg/L	< 0.1	< 0.1	< 0.1	**0.44**	< 0.1	< 0.1	**0.016 J**	**0.025**	< 0.1
sulfate	mg/L	**7.6**	**4.9 J**	**2.4**	**0.8**	**0.76**	**0.69**	**4.3**	**0.64**	**1.7**
total organic carbon	mg/L	**1.2**	**4680**	**3.7**	< 1	**131**	**6.6**	**4.3**	**3.8**	**81.6**
Field Indicators										
dissolved oxygen	mg/L	0.6	1.9	0.9	3	0.6	0.65	0.93	0.8	2.3
ferrous iron	mg/L	2.4	5.2	3	0.2	3.4	2.4	2.4	2.3	2.5
ORP	mV	-133	-33	-56	77	-126	-60	-154	-166	-170
pH	su	6.32	5.22	5.95	6.3	6.58	6.25	6.84	6.98	6.86
specific conductance	umhos/cm	304	3770	427	54	1310	674	430	259	1810
temperature	degrees C	14.7	18.2	15.6	15.3	14.1	14.7	15	11	13.5
turbidity	NTU	1	333	51.8	416	43.3	0	23.2	13.8	53.3

ORP - oxidation-reduction potential
mg/L - milligrams per liter
mV - millivolt
su - standard unit
umhos/cm - micromhos per centimeter
degrees C - degrees Celsius
NTU - nephelometric turbidity unit
J - estimated value
NA - not analyzed
Bolded values indicate detections.

Table 6
CNA Holdings, Inc./Ticona Shelby Facility
Summary of Chemical Data
MNA Quarterly Sampling Q1 2007
Earth Tech Project No. 79750

Parameter	Unit	IT-6 1/23/2007	IT-7 1/23/2007	IT-8R 1/23/2007	IT-9 1/23/2007	J-29 1/23/2007	K-28 1/23/2007	N-29 1/23/2007	O-25 1/24/2007	Q-33 1/24/2007
Semivolatile Organics										
ethylene glycol	mg/L	**2370**	**56.5**	< 7	< 7	< 7	< 140	< 7	< 7	< 7
Inorganics										
iron	mg/L	**1630**	**191**	**1750**	**38.1**	**0.14**	**1720**	**0.043 J**	**45.6**	**0.14**
manganese	mg/L	**1060**	**75**	**426**	**25.5**	**0.089**	**39.2**	**0.22**	**0.37**	**0.097**
Wet Chemistry										
acetate	mg/L	**8190**	**431**	**5720**	< 25	< 25	**3460**	< 25	< 25	< 25
alkalinity	mg/L	**1880**	**574**	**1670**	**74.8**	**529**	**1790**	**6.2**	**50.2**	**75.3**
ethyl alcohol	mg/L	**2250**	**49.2**	**37.3**	< 5	< 5	< 5	< 5	< 5	< 5
methane	mg/L	**20**	**17**	**17**	**19**	**0.0083**	**22**	**0.23**	**0.9**	**0.063**
nitrate nitrogen	mg/L	< 0.1	**0.032**	< 0.1	**0.011 J**	**1.9**	< 0.1	**0.78**	< 0.1	< 0.1
sulfate	mg/L	**14.5**	**1.6**	**8.6**	**0.91**	**31.4**	**2.3**	**2.2**	**157**	**65**
total organic carbon	mg/L	**6810**	**317**	**3210**	**6.2**	**2.7**	**2010**	**1.2**	**19.1**	**1.8**
Field Indicators										
dissolved oxygen	mg/L	1.3	2.4	0.57	1.45	1.5	1.52	0.65	0.63	1.01
ferrous iron	mg/L	5	3.2	3.2	2.7	0	6.4	0	2.2	2
ORP	mV	13	-94	39	-139	20	-130	489	-123	126
pH	su	4.87	6.25	5.11	6.53	7.05	6.08	5.09	6.69	6.09
specific conductance	umhos/cm	6010	1570	5180	355	803	4760	61	875	676
temperature	degrees C	14.5	13.1	15.4	14.8	13	14.5	13.9	16.1	13.4
turbidity	NTU	12.9	18.2	38.6	12	9	8	1	0.7	1.3

ORP - oxidation-reduction potential
mg/L - milligrams per liter
mV - millivolt
su - standard unit
umhos/cm - micromhos per centimeter
degrees C - degrees Celsius
NTU - nephelometric turbidity unit
J - estimated value
NA - not analyzed
Bolded values indicate detections.

Table 6
CNA Holdings, Inc./Ticona Shelby Facility
Summary of Chemical Data
MNA Quarterly Sampling Q1 2007
Earth Tech Project No. 79750

Parameter	Unit	S-1 1/25/2007	TI-1 1/25/2007	TI-2 1/25/2007	U-38 1/25/2007	V-23 1/25/2007	V-65 1/25/2007	W-23 1/25/2007	X-32 1/26/2007
Semivolatile Organics									
ethylene glycol	mg/L	< 7	< 7	< 7	< 7	**2180**	< 7	< 7	< 7
Inorganics									
iron	mg/L	NA	**0.23**	**3.3**	**0.17**	**1360**	**34.3**	**0.054 J**	NA
manganese	mg/L	NA	**0.038**	**0.18**	**0.075**	**622**	**1.7**	**0.95**	NA
Wet Chemistry									
acetate	mg/L	< 25	< 25	< 25	< 25	**4380**	**37.8**	< 25	< 25
alkalinity	mg/L	NA	**17.4**	**15.9**	**4.1**	**1590**	**369**	**83.5**	NA
ethyl alcohol	mg/L	< 5	< 5	< 5	< 5	**2070**	< 5	< 5	< 5
methane	mg/L	NA	**0.15**	**0.0011**	**0.00032**	**21**	**30**	**0.028**	NA
nitrate nitrogen	mg/L	NA	**3.1**	**0.99**	**1.8**	< 0.1	< 0.1	**0.38**	NA
sulfate	mg/L	NA	**2.2**	**0.99**	**5.6**	**94.5**	**1.1**	**75.7**	NA
total organic carbon	mg/L	< 1	< 1	**0.85 J**	< 1	**5700**	**27.7**	**3.6**	NA
Field Indicators									
dissolved oxygen	mg/L	4.75	1.9	7.8	5.19	0.53	0.77	1.69	6.29
ferrous iron	mg/L	0	0	0	4	2.4	3.4	0	3.2
ORP	mV	306	175	173	363	52	-125	212	198
pH	su	4.73	5.55	5.83	4.53	5.03	6.53	5.9	5.46
specific conductance	umhos/cm	178	76	47	68	4400	780	506	131
temperature	degrees C	14.3	12.7	16.4	14.3	16.3	12.3	15.9	12.6
turbidity	NTU	1	22	220	0.8	22.4	53.9	0	4.7

ORP - oxidation-reduction potential
mg/L - milligrams per liter
mV - millivolt
su - standard unit
umhos/cm - micromhos per centimeter
degrees C - degrees Celsius
NTU - nephelometric turbidity unit
J - estimated value
NA - not analyzed
Bolded values indicate detections.

Table 7
CNA Holdings, Inc./Ticona Shelby Facility
Summary of Chemical Data
MNA Quarterly Sampling Q2 2007
Earth Tech Project No. 79750

Parameter	Unit	CC-33 4/19/2007	F-55 4/20/2007	IT-1 4/17/2007	IT-2 4/17/2007	IT-3 4/17/2007	IT-4 4/17/2007	IT-5 4/17/2007	IT-6 4/17/2007
Semivolatile Organics									
ethylene glycol	mg/L	< 7	**4750**	< 7	< 7	< 7	< 7	< 7	**845**
Inorganics									
iron	mg/L	**45.6**	**787**	**151**	**62.6**	**52.4**	**31.4**	**107**	**1650**
manganese	mg/L	**3.3**	**213**	**1.9**	**15**	**0.47**	**1.4**	**27**	**936**
Wet Chemistry									
acetate	mg/L	< 25	**3330**	**36.1**	< 25	< 25	< 25	**372**	**8270**
alkalinity	mg/L	**69.9**	**1380**	**201**	**82.8**	**132**	**68.8**	**1030**	**2340**
ethyl alcohol	mg/L	**3.4 J**	**864**	**18.1**	< 5	< 5	< 5	**9.7**	**2540**
methane	mg/L	**0.48**	**2.3**	**19**	**17**	**17**	**9.6**	**18**	**13**
nitrate nitrogen	mg/L	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.04
sulfate	mg/L	**21.5**	**2.8**	**0.31 J**	**0.65**	< 0.5	< 0.5	**0.39 J**	**32.4**
total organic carbon	mg/L	**2.2**	**4520**	**54.4**	**5.7**	**3.7**	**3.5**	**240**	**6580**
Field Indicators									
dissolved oxygen	mg/L	1.59	2.16	7.37	6.64	6.2	0.02	0	0
ferrous iron	mg/L	3	5	3.6	2.8	3	6	5	5.5
ORP	mV	-62	0	-106	-92	-188	-109	-170	-6
pH	su	6.24	5.44	6.34	6.08	6.6	6.45	6.93	4.77
specific conductance	umhos/cm	297	3600	610	595	385	3730	2120	6000
temperature	degrees C	17.8	20.7	16.44	20.7	20.4	19	20	20.3
turbidity	NTU	7	111	28	8	44	32	12	9.5

ORP - oxidation-reduction potential
mg/L - milligrams per liter
mV - millivolt
su - standard unit
umhos/cm - micromhos per centimeter
degrees C - degrees Celsius
NTU - nephelometric turbidity unit
J - estimated value
NA - not analyzed
Bolded values indicate detections.

Table 7
CNA Holdings, Inc./Ticona Shelby Facility
Summary of Chemical Data
MNA Quarterly Sampling Q2 2007
Earth Tech Project No. 79750

Parameter	Unit	IT-7 4/18/2007	IT-8R 4/18/2007	IT-9 4/17/2007	J-29 4/18/2007	K-28 4/18/2007	N-29 4/17/2007	O-25 4/18/2007	Q-33 4/17/2007
Semivolatile Organics									
ethylene glycol	mg/L	< 7	< 7	< 7	< 7	< 7	< 7	< 7	< 7
Inorganics									
iron	mg/L	**198**	**1150**	**38.7**	< 0.1	**676**	NA	**47.8**	**0.12**
manganese	mg/L	**74.7**	**223**	**31.4**	**0.14**	**11.8**	NA	**0.36**	**0.098**
Wet Chemistry									
acetate	mg/L	**487**	**3490**	**33.8**	< 25	**1500**	< 25	< 25	< 25
alkalinity	mg/L	**646**	**1450**	**104**	**468**	**766**	NA	**72.5**	**70**
ethyl alcohol	mg/L	**65.7**	**15.6**	< 5	< 5	< 5	< 5	< 5	< 5
methane	mg/L	**12**	**14**	**15**	**0.00054**	**19**	NA	**0.52**	**0.045**
nitrate nitrogen	mg/L	< 0.1	< 0.02	< 0.1	**1**	< 0.1	NA	**0.04 J**	< 0.1
sulfate	mg/L	**0.44 J**	**5.8**	**1.6**	**28.1**	**0.79**	NA	**179**	**66.5**
total organic carbon	mg/L	**376**	**2390**	**18.2**	**1.9**	**951**	< 1	**26.9**	**2.3**
Field Indicators									
dissolved oxygen	mg/L	2.5	2.76	0.67	0	6.4	7.8	0	0.3
ferrous iron	mg/L	2.8	5.8	3.6	0.6	4	0.2	4	3
ORP	mV	-76	3	-111	204	-147	545	-99	31
pH	su	6.05	5.14	6.25	6.81	6.27	4.44	6.55	5.71
specific conductance	umhos/cm	1610	3840	446	920	2600	64	880	900
temperature	degrees C	21.7	21	19.5	18.61	18	19.2	16.22	18.85
turbidity	NTU	12.76	27.5	4.3	1	9	1	13	2

ORP - oxidation-reduction potential
mg/L - milligrams per liter
mV - millivolt
su - standard unit
umhos/cm - micromhos per centimeter
degrees C - degrees Celsius
NTU - nephelometric turbidity unit
J - estimated value
NA - not analyzed
Bolded values indicate detections.

Table 7
CNA Holdings, Inc./Ticona Shelby Facility
Summary of Chemical Data
MNA Quarterly Sampling Q2 2007
Earth Tech Project No. 79750

Parameter	Unit	TI-1 4/18/2007	TI-2 4/18/2007	U-38 4/18/2007	V-23 4/18/2007	V-65 4/18/2007	W-23 4/17/2007	X-32 4/18/2007
Semivolatile Organics								
ethylene glycol	mg/L	< 7	< 7	< 7	**6210**	< 7	< 7	< 7
Inorganics								
iron	mg/L	**0.14**	**3.6**	**0.15**	**1810**	**40.4**	**0.021 J**	**0.41**
manganese	mg/L	**0.035**	**0.22**	**0.055**	**726**	**1.6**	**0.53**	**0.023**
Wet Chemistry								
acetate	mg/L	< 25	< 25	< 25	**7550**	**87**	< 25	< 25
alkalinity	mg/L	**15**	**14**	**2.1**	**2370**	**395**	**94.2**	**6.2**
ethyl alcohol	mg/L	< 5	< 5	< 5	**4030**	**3.6 J**	< 5	< 5
methane	mg/L	**0.03**	**0.0053**	**0.00048**	**17**	**29**	**0.061**	**0.038**
nitrate nitrogen	mg/L	**1.9**	**0.9**	**1.1**	< 0.1	< 0.1	**0.25**	**1.5**
sulfate	mg/L	**0.44 J**	**0.56**	**0.52**	**30.6 J**	**0.84**	**82.5**	**3.5**
total organic carbon	mg/L	< 1	**0.73 J**	**0.73 J**	**10000**	**59.7**	**4.7**	**0.95 J**
Field Indicators								
dissolved oxygen	mg/L	1.76	5.88	2.1	2.3	1.6	1.2	10.2
ferrous iron	mg/L	0		0.2	4.4	3.4	0	0.3
ORP	mV	222	203	333	34	-120	534	247
pH	su	5.35	5.89	4.79	5.1	6.68	5.77	5.24
specific conductance	umhos/cm	87	50	830	6110	950	542	131
temperature	degrees C	21.6	20.6	18.76	19	18.5	18.6	18.6
turbidity	NTU	1.1	227	5	7.1	7	3.7	13

ORP - oxidation-reduction potential
mg/L - milligrams per liter
mV - millivolt
su - standard unit
umhos/cm - micromhos per centimeter
degrees C - degrees Celsius
NTU - nephelometric turbidity unit
J - estimated value
NA - not analyzed
Bolded values indicate detections.

Table 8
CNA Holdings, Inc./Ticona Shelby Facility
MNA Demonstration Data Summary
MNA Quarterly Sampling Q1 and Q2 2007
Earth Tech Project No. 79750

Sampling Month-Yr	Ethylene Glycol	Iron	Manganese	Alkalinity	Methane	Nitrate-Nitrogen	Sulfate	Total Organic Carbon	DO	Ferrous Iron	ORP	pH
CC-33												
May-04	< 7	52.8	3.3	34	0.63	< 0.1	5.5	< 1				
Aug-04	< 7	51.7	3.1	44.5	0.55	< 0.1	5.9	1.2				
Nov-04	< 7	50.7	2.9	52.3	0.35	0.023	6.1	2.8				
Feb-05	< 7	49.5	2.9	61.6	0.43	< 0.1	6	1.2				
May-05	< 7	46.7	2.8	71.8	0.39	< 0.1	6.5	< 1				
Jul-05	< 7	47.5	2.9	70.4	0.32	< 0.1	11.8	1				
Oct-05	< 7	49.1	3.0	61	0.43	< 0.1	9.5	2.1	0.09	> 40	-43	6.27
Mar-06	< 7	50.1	3.0	36.9	0.23	< 0.1	5.8	< 1	0	6	-90	6.82
Jun-06	< 7	45.6	2.9	55.5	0.47	< 0.1	7.7	< 1.5	0	4.5	-80.6	6.19
Aug-06	< 7	47.3	2.7	51.8	0.59	0.024	7.1	1.3	0.3	3.2	-99	6.39
Nov-06	< 7	48.5	3.1	32.9	0.64	< 0.1	8.9	2	0.58	4	-108	6.45
Jan-07	< 7	43.9	3.2	39	0.68	< 0.1	7.6	1.2	0.6	2.4	-133	6.32
Apr-07	< 7	45.6	3.3	69.9	0.48	< 0.1	21.5	2.2	1.59	3	-62	6.24
F-55												
May-04	1990	583	215	1100	2.6	< 0.05	< 2.5	3590				
Aug-04	3790	580	204	1170	2.6	< 0.02	3.8	4260				
Nov-04	5300	579	205	1020	4	0.045	5.1	4810				
Feb-05	5500	594	208	1200	2.8	< 0.5	1.2	4770				
May-05	5780	631	217	1120	2.7	< 0.1	13.1	4290				
Jul-05	6860	564	201	1200	2.2	0.11	6	4890				
Oct-05	6840	572	200	1230	2.8	0.18	4	4330	0.92	> 40	-69.6	5.43
Mar-06	5740	573	211	929	1.3	< 0.1	0.79	5470	1.8	2.4	23	5.35
Jun-06	6330	729	221	1390	1.2	< 0.1	2.9	5130	2.7	2.8	52.3	5.19
Aug-06	5110	632	209	1110	2.5	0.081	1.3	3970	1.8	5.8	-157.9	5.22
Nov-06	8880	573	199	1380	1.9	0.035	2.9	5390	3.12	4	-29	5.42
Jan-07	8440	748	244	1160	2.1	< 0.1	4.9 J	4680	1.9	5.2	-33	5.22
Apr-07	4750	787	213	1380	2.3	< 0.1	2.8	4520	2.16	5	0	5.44
G-50												
Jan-07	< 7	28.3	19.8	43.6	0.8	< 0.1	2.4	3.7	0.9	3	-56	5.95
G-88												
Jan-07	< 7	31.4	0.39	23.1	0.03	0.44	0.8	< 1	3	0.2	77	6.3
IT-1												
May-04	16.8	444	5.6	628	18	< 0.1	6	678				
Aug-04	31.2	611	8.9	1000	11	0.13	3.8	329				
Nov-04	< 7	279	2.8	357	17	0.042	< 2.5	2.8				
Feb-05	< 7	156	2.1	167	23	< 0.1	< 0.5	7.8				
May-05	9.1	95.5	1.8	98.3	22	< 0.1	< 0.5	4.4				
Jul-05	< 7	155	2.3	113	14	< 0.02	3.5	6.1				
Oct-05	< 7	60.6	0.76	133	15	< 0.1	15.3	5.9	0.11	> 40	-86.3	6.57
Mar-06	< 7	117	1.9	54.5	16	< 0.1	< 0.5	5.4	0.33	3	-109	6.34
Jun-06	< 7	107	1.9	88.8	11	< 0.1	< 0.5	4.7	0.65	5.5	-64	6.35
Aug-06	1930	0.013 J	0.03	525	9	0.037	3.2	800	0.26	4	-48.9	5.97
Nov-06	< 7	382	4.9	403	11	< 0.1	1.4	127	1.34	6	-119	6.57
Jan-07	17	391	3.4	513	11	< 0.1	0.76	131	0.6	3.4	-126	6.58
Apr-07	< 7	151	1.9	201	19	< 0.1	0.31 J	54.4	7.37	3.6	-106	6.34

Table 6
CNA Holdings, Inc./Ticona Shelby Facility
MNA Demonstration Data Summary
MNA Quarterly Sampling Q1 and Q2 2007
Earth Tech Project No. 79750

Sampling Month-Yr	Ethylene Glycol	Iron	Manganese	Alkalinity	Methane	Nitrate-Nitrogen	Sulfate	Total Organic Carbon	DO	Ferrous Iron	ORP	pH
					IT-2							
May-04	< 7	395	5.2	1590	13	< 0.1	3.4	408				
Aug-04	< 7	203	4.1	1210	5.9	0.058	< 2.5	76.4				
Nov-04	< 7	128	4	704	6.4	< 0.02	0.78	3.1				
Feb-05	< 7	64	7.4	301	9.3	< 0.1	< 3	7.3				
May-05	7	66.9	12.1	159	18	< 0.1	< 0.5	3.7				
Jul-05	< 7	67.7	9.1	351	13	< 0.02	1.1	8				
Oct-05	< 7	71.6	7.7	440	8.8	< 0.1	3.6	8.2	0.23	> 40	-75.8	6.24
Mar-06	< 7	71	14	57.6	14	< 0.1	1.8	9.9	0.31	5.5	-62	6.04
Jun-06	< 7	59.8	13.7	150	15	< 0.1	< 0.5	3.1	0.24	3	-22.8	6.24
Aug-06	< 7	51.3	10.5	127	16	0.043	0.53	6.9	0.32	3.3	-57.1	6.04
Nov-06	< 7	60.5	12.5	107	15	< 0.1	< 0.5	8.9	0.85	2	-80	6.23
Jan-07	< 7	60.7	11.6	150	17	< 0.1	0.69	6.6	0.65	2.4	-60	6.25
Apr-07	< 7	62.6	15	82.8	17	< 0.1	0.65	5.7	6.64	2.8	-92	6.08
					IT-3							
May-04	< 7	178	1.6	200	18	< 0.1	4	28.3				
Aug-04	< 7	106	1.1	187	14	< 0.1	< 0.5	8.5				
Nov-04	< 7	41.5	0.62	216	9.4	< 0.02	18.6	10				
Feb-05	< 7	54.8	0.79	207	21	< 0.1	< 3	4.5				
May-05	< 7	60.1	0.67	168	23	< 0.1	< 0.5	4.3				
Jul-05	< 7	87.9	0.57	183	19	< 0.02	< 0.5	5.5				
Oct-05	< 7	44.2	0.48	96	18	< 0.1	10	6.6	0.09	> 40	-139.7	6.91
Mar-06	< 7	109	0.62	123	18	< 0.1	0.5	7	0.4	2	-207	6.87
Jun-06	< 7	96.8	0.37	144	19	< 0.1	< 0.5	6	0.43	4.6	-183	6.78
Aug-06	< 7	79.4	0.36	118	20	0.05	0.46 J	3.8	0.16	3	-159.7	6.63
Nov-06	< 7	63.4	0.43	83.2	16	< 0.1	1.1	4.7	0.63	2	-119	6.68
Jan-07	< 7	46.7	0.62	157	21	0.016 J	4.3	4.3	0.93	2.4	-154	6.84
Apr-07	< 7	52.4	0.47	132	17	< 0.1	< 0.5	3.7	6.2	3	-188	6.6
					IT-4							
May-04	< 7	118	1.1	189	15	< 0.1	3.6	12.8				
Aug-04	< 7	56.3	1.3	118	19	< 0.1	< 0.5	8.6				
Nov-04	< 7	46.2	0.6	65.7	8.5	< 0.02	1.8	7.9				
Feb-05	< 7	70.3	1.2	110	13	< 0.1	< 2.5	6.7				
May-05	7.7	49.8	3.2	95.9	13	< 0.1	< 0.5	4				
Jul-05	< 7	71.2	1.1	90.7	12	< 0.02	1.4	7.7				
Oct-05	< 7	45.6	0.78	56	9.6	< 0.1	9.6	6.1	0.01	> 40	-163.8	6.86
Mar-06	< 7	98.1	1.1	84.8	14	< 0.1	< 0.5	8.8	0.36	2.7	-183	6.8
Jun-06	< 7	75.9	0.86	85.5	14	< 0.1	< 0.5	5.9	0.08	1.5	-213	6.93
Aug-06	< 7	57.5	1.2	68.1	10	0.095	0.48 J	6.2	0.05	3	-150.1	6.76
Nov-06	< 7	64.4	2	71.2	11	< 0.1	0.42 J	6.6	0.29	3	-154	6.85
Jan-07	< 7	41.8	1.2	68.2	9.8	0.025	0.64	3.8	0.8	2.3	-166	6.98
Apr-07	< 7	31.4	1.4	68.8	9.6	< 0.1	< 0.5	3.5	0.02	6	-109	6.45

Table 8
CNA Holdings, Inc./Ticona Shelby Facility
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MNA Quarterly Sampling Q1 and Q2 2007
Earth Tech Project No. 79750

Sampling Month-Yr	Ethylene Glycol	Iron	Manganese	Alkalinity	Methane	Nitrate-Nitrogen	Sulfate	Total Organic Carbon	DO	Ferrous Iron	ORP	pH
					IT-5							
May-04	< 7	127	7.8	772	17	< 0.1	3.5	200				
Aug-04	< 7	85.7	3.6	620	13	0.12	< 0.5	12.6				
Nov-04	< 7	74.8	2.9	618	18	0.09	0.67	17.4				
Feb-05	< 7	74.6	3.6	709	17	< 0.1	< 0.5	17.4				
May-05	27.6	68.5	4	752	18	< 0.1	< 0.5	17.9				
Jul-05	< 7	118	15.7	946	14	< 0.02	< 0.5	69.4				
Oct-05	< 7	73.4	6.9	560	15	< 0.1	4.7	22.3	0.08	> 40	-100.7	6.39
Mar-06	< 7	86.2	11.2	972	14	< 0.1	< 0.5	67.1	0	2.8	-145	6.98
Jun-06	< 7	47.5	4.8	1270	13	< 0.1	< 0.5	25.2	0.67	2.5	-125	6.68
Aug-06	< 7	77.8	15	916	22	0.047	< 0.5	127	0.14	6	-142	6.75
Nov-06	< 7	73.6	14	1040	21	< 0.1	< 0.5	116	0.49	2.9	-132.5	6.79
Jan-07	< 7	76.7	12.9	918	26	< 0.1	1.7	81.6	2.3	2.5	-170	6.86
Apr-07	< 7	107	27	1030	18	< 0.1	0.39 J	240	0	5	-170	6.93
					IT-6							
May-04	< 70	1820	699	2190	8.8	0.11	5.4	5240				
Aug-04	< 140	1630	624	2110	9	< 0.2	< 3	4740				
Nov-04	< 35	1420	553	1660	9.1	0.1	20.5	3920				
Feb-05	< 7	1000	452	1720	8.9	< 0.5	12.9	2760				
May-05	461	1010	447	1550	10	0.17	17.4	2750				
Jul-05	359	978	468	1690	7.7	0.034	5.9	3100				
Oct-05	115	1090	528	1510	9.6	< 0.5	17.7	3090	0.11	> 40	30	4.81
Mar-06	55.4	1240	652	1760	9	< 0.5	10.6	5770	0.9		24	5
Jun-06	514	1290	704	1360	7.7	0.12	10.6	4350	0.19	1.5	26.9	4.98
Aug-06	3970	846	506	1050	12	0.037	11.6	3230	0.2	2	-20.6	4.77
Nov-06	2650	1680	997	2100	12	< 0.1	86.2	7530	0.57	3.6	47.6	4.77
Jan-07	2370	1630	1060	1880	20	< 0.1	14.5	6810	1.3	5	13	4.87
Apr-07	845	1650	936	2340	13	< 0.04	32.4	6580	0	5.5	-6	4.77
					IT-7							
May-04	< 28	422	389	930	9.3	< 0.05	3.2	1980				
Aug-04	< 35	432	373	1190	7.9	0.025	< 3	2170				
Nov-04	< 35	475	292	1330	15	0.035	< 2.5	808				
Feb-05	< 7	122	25.7	650	14	< 0.1	5.3	37.2				
May-05	15.1	132	27.3	516	17	< 0.1	< 0.5	29				
Jul-05	< 7	125	29.4	500	13	< 0.02	< 0.5	66.8				
Oct-05	< 7	77.6	23.8	532	14	< 0.1	3.3	28.4	0.15	> 40	-60.2	6.53
Mar-06	< 7	166	40.2	402	7	< 0.1	< 0.5	233	0	2.4	-92	6.23
Jun-06	< 7	116	21.8	555	12	< 0.1	< 0.5	48	0.17	3.8	-101	6.28
Aug-06	< 7	176	69.3	480	7.5	0.034	< 0.5	272	0.18		-83	6.15
Nov-06	< 7	177	75.6	574	12	< 0.1	< 0.5	291	0.43	3	-74.2	6.21
Jan-07	56.5	191	75	574	17	0.032	1.6	317	2.4	3.2	-94	6.25
Apr-07	< 7	198	74.7	646	12	< 0.1	0.44 J	376	2.5	2.8	-76	6.05

Table 3
CNA Holdings, Inc./Ticona Shelby Facility
MNA Demonstration Data Summary
MNA Quarterly Sampling Q1 and Q2 2007
Earth Tech Project No. 79750

Sampling Month-Yr	Ethylene Glycol	Iron	Manganese	Alkalinity	Methane	Nitrate-Nitrogen	Sulfate	Total Organic Carbon	DO	Ferrous Iron	ORP	pH
					IT-8R							
May-04	< 7	801	51	1060	11	< 0.1	< 2.5	883				
Aug-04	< 7	616	43.9	900	13	< 0.1	19.6	583				
Nov-04	< 7	328	31.5	492	17	0.034	< 2.5	210				
Feb-05	42	404	46.6	762	16	< 0.1	6.4	413				
May-05	264	667	110	907	15	< 0.1	0.96	932				
Jul-05	< 7	827	116	1320	12	< 0.02	1.1	1240				
Oct-05	< 7	197	20.7	416	19	< 0.1	3.3	116	0.06	> 40	-93.4	6.65
Mar-06	< 70	1420	284	1770	12	< 0.5	2.9	2760	0	2.9	27	5.01
Jun-06	171	1330	230	1910	8.4	< 0.1	3.5	2330	0.09	6.3	-26	5.46
Aug-06	< 7	247	24.5	432	16	0.041	1.1	215	0.13	6	-129	6.35
Nov-06	121	397	50.9	569	16	< 0.1	2.3	541	0.39	4.9	-111	6.2
Jan-07	< 7	1750	426	1670	17	< 0.1	8.6	3210	0.57	3.2	39	5.11
Apr-07	< 7	1150	223	1450	14	< 0.02	5.8	2390	2.76	5.8	3	5.14
					IT-9							
May-04	< 7	195	77.3	564	11	< 0.1	< 0.5	49.7				
Aug-04	< 7	141	91.6	580	16	< 0.1	< 0.5	84				
Nov-04	< 7	94.1	65.3	399	23	0.034	< 2.5	30.5				
Feb-05	< 7	74.9	60.2	364	20	< 0.1	< 3	31.3				
May-05	8	70.4	62.7	308	21	< 0.1	< 0.5	57.9				
Jul-05	7.6	56.9	38.3	261	18	< 0.02	< 0.5	26.3				
Oct-05	< 7	45.7	58.7	250	20	< 0.1	3.7	31.6	0.1	> 40	-46.5	6.48
Mar-06	< 7	44.7	35.8	93.9	18	< 0.1	< 0.5	30.5	0	7	-85	7.28
Jun-06	< 7	50.5	47.3	161	18	< 0.1	< 0.5	14.8	0.1	4	-85	6.28
Aug-06	< 7	41.8	32.9	113	18	0.07	1.1	13.7	0.34	4.3	-66.5	6.38
Nov-06	< 7	43.1	28.9	92	15	< 0.1	< 0.5	7.2	0.4	3.6	-140	6.41
Jan-07	< 7	38.1	25.5	74.8	19	0.011 J	0.91	6.2	1.45	2.7	-139	6.53
Apr-07	< 7	38.7	31.4	104	15	< 0.1	1.6	18.2	0.67	3.6	-111	6.25
					J-29							
May-04	< 7	< 0.1	0.83	1030	0.002	75.8	59.5	96.9				
Aug-04	< 7	< 0.1	0.69	1230	< 0.0028	76.7	63.3	5.3				
Nov-04	< 7	< 0.1	0.33	926	< 0.0071	34.3	38.8	11.6				
Feb-05	< 7	< 0.1	0.30	957	0.0089	19.2	40.7	1.6				
May-05	< 7	< 0.1	0.30	843	0.013	9	36.7	2				
Jul-05	< 7	< 0.1	0.63	806	0.0083	8.6	42.1	1.9				
Oct-05	< 7	< 0.1	0.36	626	0.011	2.5	28.3	2.1	0.18	< 0.1	-110.4	6.96
Mar-06	< 7	< 0.1	0.43	566	0.034	1.5	27.3	1.3	0	2.4	47	6.67
Jun-06	< 7	< 0.1	0.16	579	0.016	< 1	26.3	< 1	0.32	0	128	6.96
Aug-06	< 7	< 0.1	0.24	514	0.0004	1.4	26.4	< 1	0.37	0	60.2	7.03
Nov-06		0.017 J	0.24	512	0.00084	1.2	28.5	2	0.31	0	168	6.98
Jan-07	< 7	0.14	0.089	529	0.0083	1.9	31.4	2.7	1.5	0	20	7.05
Apr-07	< 7	< 0.1	0.14	468	0.00054	1	28.1	1.9	0	0.6	204	6.81

Table 8
CNA Holdings, Inc./Ticona Shelby Facility
MNA Demonstration Data Summary
MNA Quarterly Sampling Q1 and Q2 2007
Earth Tech Project No. 79750

Sampling Month-Yr	Ethylene Glycol	Iron	Manganese	Alkalinity	Methane	Nitrate-Nitrogen	Sulfate	Total Organic Carbon	DO	Ferrous Iron	ORP	pH
K-28												
May-04	< 35	1090	17.8	1220	13	< 0.1	1.7	1230				
Aug-04	< 35	1810	32.3	2100	12	< 0.5	5.8	2110				
Nov-04	227	2160	41.3	2110	19	0.27	< 2.5	2710				
Feb-05	244	613	10.5	770	16	< 0.1	< 2.5	60.4				
May-05	238	191	1.8	197	17	< 0.1	0.53	52.7				
Jul-05	296	1730	36.5	1760	10	< 0.1	2.1	2030				
Oct-05	66.2	2360	52.6	3360	11	< 0.5	3.7	2750	0.08	> 40	-71.9	5.82
Mar-06	12.5	783	12.1	944	13	< 0.1	0.83	1020	1.92	4	-146	6.79
Jun-06	55.1	1960	36.7	2240	11	< 0.1	2.2	2480	0.62	4.5	-80.4	5.96
Aug-06	80.1 J	3000	64.4	3400	9.4	0.046	6.1	3300	0.12	8	-111	5.95
Nov-06	1410 J	3450	68.4	3940	15	< 0.1	< 3	4050	0.93	6	-115	6.02
Jan-07	< 140	1720	39.2	1790	22	< 0.1	2.3	2010	1.52	6.4	-130	6.08
Apr-07	< 7	676	11.8	766	19	< 0.1	0.79	951	6.4	4	-147	6.27
N-29												
May-04	< 7	< 0.1	0.21	3.5	0.66	0.62	1.2	< 1				
Aug-04	< 7	< 0.1	0.2	4	0.47	0.69	1.2	< 1				
Nov-04	< 7	< 0.1	0.2	3.5	1.5	0.79	1	1.6				
Feb-05	< 7	< 0.1	0.2	4.3	0.95	0.51	0.91	< 1				
May-05	< 7	< 0.1	0.23	3.8	2.7	0.41	1.2	< 1				
Jul-05	< 7	< 0.1	0.21	2.4	0.7	0.59	2.9	< 1				
Oct-05	< 7	< 0.1	0.21	3.5	0.42	0.63	3	< 1	0.26	< 0.1	588.1	4.73
Mar-06	< 7	< 0.1	0.23	6.1	0.45	0.67	1.2	< 1	3.22	2	532	5.04
Jun-06	< 7	0.55	0.22	3.3	0.5	0.83	5	< 1	0.22	0	584	4.93
Aug-06	< 7	0.13	0.2	3.8	0.45	0.72	1.6	< 1	0.31	0	589	4.89
Nov-06	< 7	0.15	0.21	6.6	0.23	0.57	1.3	1.2	0.6	0	300	5.07
Jan-07	< 7	0.043 J	0.22	6.2	0.23	0.78	2.2	1.2	0.65	0	489	5.09
Apr-07	< 7							< 1	7.8	0.2	545	4.44
O-25												
May-04	< 7	57.5	0.46	43	1.2	< 0.1	173	21.4				
Aug-04	< 7	54.8	0.44	40	1.1	< 0.1	179	22				
Nov-04	< 7	54.7	0.44	53.9	1.3	0.07	181	27				
Feb-05	< 7	51.4	0.42	70.2	0.76	< 0.1	217	21.3				
May-05	21.6	54.7	0.43	82.2	0.41	< 0.1	191	26.3				
Jul-05	16.2	52.6	0.4	61.8	0.75	< 0.1	268	22.6				
Oct-05	16	58.2	0.45	63	1	< 0.1	203	21.6	0.29	> 40	-103.2	6.67
Mar-06	12.5	56.3	0.45	62.6	0.96	< 0.1	171	24	0	7	-155	6.78
Jun-06	< 7	49.1	0.36	71.6	0.68	< 0.1	178	24.4	0.5	4	-141	6.44
Aug-06	12.9	49.4	0.33	62.7	0.5	0.058	183	20.8	0.23	5	-126	6.59
Nov-06	< 7	43.3	0.31	46	0.53	< 0.1	149	12.9	0.45	4	-153	6.61
Jan-07	< 7	45.6	0.37	50.2	0.9	< 0.1	157	19.1	0.63	2.2	-123	6.69
Apr-07	< 7	47.8	0.36	72.5	0.52	0.04 J	179	26.9	0	4	-99	6.55

Table 8
CNA Holdings, Inc./Ticona Shelby Facility
MNA Demonstration Data Summary
MNA Quarterly Sampling Q1 and Q2 2007
Earth Tech Project No. 79750

Sampling Month-Yr	Ethylene Glycol	Iron	Manganese	Alkalinity	Methane	Nitrate-Nitrogen	Sulfate	Total Organic Carbon	DO	Ferrous Iron	ORP	pH
Q-33												
May-04	< 7	< 0.1	0.1	93	0.0037	< 0.1	84.2	1.5				
Aug-04	< 7	0.1	0.095	88	0.0014	< 0.1	88.5	2.7				
Nov-04	< 7	< 0.1	0.09	98.5	0.036	< 0.1	86.1	4.8				
Feb-05	< 7	< 0.1	0.091	98.6	0.048	< 0.1	91.6	1.9				
May-05	< 7	< 0.1	0.088	88.8	0.06	< 0.1	80.7	1.8				
Jul-05	< 7	< 0.1	0.085	91.7	0.041	< 0.1	85.5	2				
Oct-05	< 7	< 0.1	0.096	87.5	0.073	< 0.1	78.4	1.8	0.19	< 0.1	82.5	6
Mar-06	< 7	< 0.1	0.087	90.9	0.048	< 0.1	71.9	2.6	1.24	0	109	6.08
Jun-06	< 7	0.42	0.1	73.3	0.041	< 0.1	74.8	1.9	0.43	0	101.5	5.85
Aug-06	< 7	0.072 J	0.09	81.2	0.064	0.022	69.9	2.3	0.19		107.7	5.92
Nov-06	< 7	0.11	0.093	78.8	0.057	< 0.1	69.3	2.9	0.4	0	127.1	5.87
Jan-07	< 7	0.14	0.097	75.3	0.063	< 0.1	65	1.8	1.01	2	126	6.09
Apr-07	< 7	0.12	0.098	70	0.045	< 0.1	66.5	2.3	0.3	3	31	5.71
S-1												
Jan-07	< 7							< 1	4.75	0	306	4.73
TI-1												
May-04	< 7	0.35	0.026	17	0.0066	2.3	1.1	< 1				
Aug-04	< 7	3.6	0.088	27	0.011	2.2	0.82	< 1				
Nov-04	< 7	4.2	0.12	27.1	0.026	2.5	0.83	2.6				
Feb-05	< 7	3.4	0.069	22.8	0.11	2.3	1.5	< 1				
May-05	< 7	0.64	0.042	26	0.11	2.5	1.1	< 1				
Jul-05	< 7	2.8	0.084	23.2	0.056	2.3	0.73	< 1				
Oct-05	< 7	1.4	0.062	20.5	0.033	2.4	0.74	1.1	1.3	< 0.1	-6.5	5.48
Mar-06	< 7	< 0.1	0.036	25.8	0.11	2.2	< 0.5	< 1	0	0	231	5.01
Jun-06	< 7	1.9	0.077	35	0.14	2.6	0.5	< 1	3	0	262	5.55
Aug-06	< 7	490	9.8	20.2	0.18	3.4	0.58	< 1	2.3	< 0.2	177.3	5.63
Nov-06	< 7	0.34	0.047	16.4	0.052	2.5	0.36 J	1.1	1.61	0	214	5.34
Jan-07	< 7	0.23	0.038	17.4	0.15	3.1	2.2	< 1	1.9	0	175	5.55
Apr-07	< 7	0.14	0.035	15	0.03	1.9	0.44 J	< 1	1.76	0	222	5.35
TI-2												
Jan-07	< 7	3.3	0.18	15.9	0.0011	0.99	0.99	0.85 J	7.8	0	173	5.83
Apr-07	< 7	3.6	0.22	14	0.0053	0.9	0.56	0.73 J	5.88		203	5.89
U-38												
May-04	< 7	< 0.1	0.055	7.5	0.0012	1.1	0.75	< 1				
Aug-04	< 7	< 0.1	0.058	4	0.00049	1.1	0.83	< 1				
Nov-04	< 7	< 0.1	0.058	3	0.021	1.3	0.6	1.4				
Feb-05	< 7	< 0.1	0.054	1.9	0.0026	0.91	< 2.5	< 1				
May-05	< 7	< 0.1	0.054	2.4	0.021	0.91	1.7	< 1				
Jul-05	< 7	< 0.1	0.051	2.9	0.0028	1	3.3	< 1				
Oct-05	< 7	< 0.1	0.065	4.5	0.023	1.1	2	4	0.91	< 0.1	156	4.85
Mar-06	< 7	0.66	0.18	6.1	0.005	0.79	0.8	< 1	0.22	1	190	5.7
Jun-06	< 7	< 0.1	0.068	4.4	0.0064	1.1	0.9	< 1	2.32	0	195.7	4.86
Aug-06	< 7	0.26	0.069	2.7	0.038	1.8	1.7	< 1	3.36	< 0.2	318.3	4.67
Nov-06	< 7	0.21	0.068	3.8	0.0013	1.6	0.62	0.83 J	3.9	0	312	4.8
Jan-07	< 7	0.17	0.075	4.1	0.00032	1.8	5.6	< 1	5.19	4	363	4.53
Apr-07	< 7	0.15	0.055	2.1	0.00048	1.1	0.52	0.73 J	2.1	0.2	333	4.79

Table 8
CNA Holdings, Inc./Ticona Shelby Facility
MNA Demonstration Data Summary
MNA Quarterly Sampling Q1 and Q2 2007
Earth Tech Project No. 79750

Sampling Month-Yr	Ethylene Glycol	Iron	Manganese	Alkalinity	Methane	Nitrate-Nitrogen	Sulfate	Total Organic Carbon	DO	Ferrous Iron	ORP	pH
V-23												
May-04	7230	2020	963	2640	11	0.1	35.5	11200				
Aug-04	8200	2050	933	3130	12	0.43	36.5	9840				
Nov-04	6460	1950	884	2510	13	0.076	102	12700				
Feb-05	6740	1740	772	2800	16	< 0.5	75.1	10700				
May-05	3740	1780	757	2510	15	< 0.5	141	8900				
Jul-05	7960	1810	761	3030	13	0.12	41.9	9900				
Oct-05	6770	1890	776	2800	15	< 0.5	38.5	9260	0.13	> 40	14.2	4.98
Mar-06	5140	1730	774	2190	15	< 0.5	37.1	9860	0.36	3.2	36	5
Jun-06	6740	1750	724	2260	15	< 0.2	38.4	8640	0.25	1.5	43.1	4.92
Aug-06	6630	1740	749	2410	15	0.038	43.2	9110	0.19	4.6	66.6	5.03
Nov-06	7020	1910	813	2670	11	< 0.1	34.1	9580	0.94	8	55.3	4.87
Jan-07	2180	1360	622	1590	21	< 0.1	94.5	5700	0.53	2.4	52	5.03
Apr-07	6210	1810	726	2370	17	< 0.1	30.6 J	10000	2.3	4.4	34	5.1
V-65												
May-04	< 7	18.6	1.1	260	15	< 0.1	3.2	1.5				
Aug-04	< 7	20.4	0.96	250	18	< 0.1	2.8	1.8				
Nov-04	< 7	20.6	0.84	218	19	< 0.02	2.3	4.4				
Feb-05	< 7	23.4	1.2	250	22	< 0.1	1.1	1.1				
May-05	< 7	24.2	0.99	198	15	< 0.1	1.3	< 1				
Jul-05	< 7	21.2	1.1	210	12	0.037	< 0.5	9				
Oct-05	< 7	23.9	1	240	15	< 0.1	< 0.5	6	0.31	24	-86	6.39
Mar-06	< 7	32.5	1.4	248	21	< 0.1	< 0.5	4.3	0.32	4	-105	6.51
Jun-06	< 7	27.8	1.3	276	25	< 0.1	< 0.5	2	0.12	2.6	-107	6.41
Aug-06	< 7	37.2	1.6	373	24	0.03	1.1	43.9	0.38	4.3	-115.6	6.69
Nov-06	< 7	39.6	1.7	355	22	< 0.1	1.5	51.2	0.35	3.1	-150.1	6.63
Jan-07	< 7	34.3	1.7	369	30	< 0.1	1.1	27.7	0.77	3.4	-125	6.53
Apr-07	< 7	40.4	1.6	395	29	< 0.1	0.84	59.7	1.6	3.4	-120	6.68
W-23												
May-04	< 7	< 0.1	1.5	29.5	0.0081	1.2	64.3	2.3				
Aug-04	< 7	< 0.1	1.9	10.4	0.0069	1.9	63.8	1.3				
Nov-04	< 7	< 0.1	2.1	9	0.62	1.4	60.4	3				
Feb-05	< 7	< 0.1	1.9	88.2	0.03	0.41	62.2	3.6				
May-05	9.2	< 0.1	1.8	92.6	0.036	0.92	60.4	4.1				
Jul-05	< 7	< 0.1	1.7	89.7	0.044	0.81	63.1	4				
Oct-05	< 7	< 0.1	1.7	113	0.045	0.31	65.6	5.4	0.59	< 0.1	-32.2	5.83
Mar-06	< 7	0.91	2.7	10.6	0.005	0.76	64.5	< 1	5.71	0	210	5.17
Jun-06	< 7	< 0.1	0.98	114	0.045	0.18	70.9	4.9	0.87	0	179	5.7
Aug-06	< 7	0.13	1.2	158	0.067	0.1	63.5	5.4	0.3	0	168	5.2
Nov-06	< 7	0.18	1.2	113	0.09	0.26	77.8	5.9	0.5	0	180.1	5.77
Jan-07	< 7	0.054 J	0.95	83.5	0.028	0.38	75.7	3.6	1.69	0	212	5.9
Apr-07	< 7	0.021 J	0.53	94.2	0.061	0.25	82.5	4.7	1.2	0	534	5.77
X-32												
Jan-07	< 7								6.29	3.2	198	5.46
Apr-07	< 7	0.41	0.023	6.2	0.038	1.5	3.5	0.95 J	10.2	0.3	247	5.24

J - estimated value
Blank spaces indicate parameter not analyzed.

Table 9
CNA Holdings, Inc./Ticona Shelby Facility
Summary of Selected Natural Attenuation Indicator Parameters
MNA Quarterly Sampling Q1 and Q2 2007
Earth Tech Project No. 79750

Q1 2007

Parameter	Unit	Background		Plume Area		Downgradient	
		TI-1	U-38	V-23	K-28	O-25	W-23
ethylene glycol	mg/L	< 7	< 7	**2180**	< 140	< 7	< 7
manganese	mg/L	**0.038**	**0.075**	**622**	**39.2**	**0.37**	**0.95**
alkalinity	mg/L	**17.4**	**4.1**	**1590**	**1790**	**50.2**	**83.5**
methane	mg/L	**0.15**	**0.00032**	**21**	**22**	**0.9**	**0.028**
nitrate nitrogen	mg/L	**3.1**	**1.8**	< 0.1	< 0.1	< 0.1	**0.38**
sulfate	mg/L	**2.2**	**5.6**	**94.5**	**2.3**	**157**	**75.7**
ferrous iron	mg/L	0	4	2.4	6.4	2.2	0

Q2 2007

Parameter	Unit	Background		Plume Area		Downgradient	
		TI-1	U-38	V-23	K-28	O-25	W-23
ethylene glycol	mg/L	< 7	< 7	**6210**	< 7	< 7	< 7
manganese	mg/L	**0.035**	**0.055**	**726**	**11.8**	**0.36**	**0.53**
alkalinity	mg/L	**15**	**2.1**	**2370**	**766**	**72.5**	**94.2**
methane	mg/L	**0.03**	**0.00048**	**17**	**19**	**0.52**	**0.061**
nitrate nitrogen	mg/L	**1.9**	**1.1**	< 0.1	< 0.1	**0.04 J**	**0.25**
sulfate	mg/L	**0.44 J**	**0.52**	**30.6 J**	**0.79**	**179**	**82.5**
ferrous iron	mg/L	0	0.2	4.4	4	4	0

J - estimated value
mg/L - milligrams per liter
Bolded values indicate detections.

Table 3
CNA Holdings Inc. / Ticona Shelby Facility
Quarter 3 2007
Groundwater Analytical Summary
Earth Tech Project No. 79750

Parameter	Unit	EPA Drinking Water Standard	North Carolina 2L Standard	C-49 7/17/2007	K-28 7/18/2007	K-28 Dup 7/18/2007	P-58 7/17/2007	T-35 7/17/2007	V-23 7/18/2007	AA-54 7/17/2007	CC-33 7/19/2007	EE-58 7/17/2007
acetone	mg/L	--	0.7	<0.005	**1.19**	**1.1**	<0.0037	<0.004	<0.005	<0.0059	<0.004	<0.0044
benzene	mg/L	0.005	0.001	<0.001	**0.01**	**0.0101**	<0.001	<0.001	**0.0188**	<0.001	**0.0017**	<0.001
2-butanone	mg/L	--	4.2	<0.005	**0.569**	**0.585**	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
bromodichloromethane	mg/L	0.08	0.00056	<0.001	**0.0016 J**	**0.0014 J**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
chlorobenzene	mg/L	0.1	0.05	<0.001	<0.01	<0.01	<0.001	<0.001	<0.001	<0.001	**0.0019**	<0.001
chloroform	mg/L	0.08	0.07	**0.00059 J**	<0.01	<0.01	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,1-dichloroethane	mg/L	--	0.07	<0.001	<0.01	<0.01	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
cis-1,2-dichloroethene	mg/L	0.07	0.07	<0.001	<0.01	<0.01	<0.001	**0.00063**	<0.001	<0.001	**0.0089**	<0.001
ethylbenzene	mg/L	0.7	0.55	<0.001	<0.01	<0.01	<0.001	<0.001	**0.0031**	<0.001	<0.001	<0.001
tetrachloroethene	mg/L	0.005	0.0007	<0.001	<0.01	<0.01	<0.001	**0.0012**	<0.001	<0.001	<0.001	<0.001
toluene	mg/L	1	1	<0.001	**0.0025 J**	**0.0026 J**	<0.001	<0.001	**0.0104**	<0.001	<0.001	<0.001
trans-1,2-dichloroethene	mg/L	0.1	0.1	<0.001	<0.01	<0.01	<0.001	<0.001	<0.001	<0.001	**0.00053 J**	<0.001
trichloroethene	mg/L	0.005	0.0028	<0.001	<0.01	<0.01	<0.001	**0.0015**	<0.001	<0.001	**0.0038**	<0.001
xylenes	mg/L	10	0.53	<0.002	<0.02	<0.02	<0.002	<0.002	**0.0128**	<0.002	<0.002	<0.002
total organic carbon	mg/L	--	--	NA	**3610**	**3680**	NA	NA	**9310**	NA	**1.3**	NA

mg/L - milligrams per liter
NA - not analyzed
Bolded values indicate detections.

Table 3
CNA Holdings Inc. / Ticona Shelby Facility
Quarter 3 2007
Groundwater Analytical Summary
Earth Tech Project No. 79750

Parameter	Unit	EPA Drinking Water Standard	North Carolina 2L Standard	FF-34 7/18/2007	FF-62 7/18/2007	GG-61 7/17/2007	HH-48 7/18/2007	HH-77 7/18/2007	TD-3 7/17/2007	TD-4 7/17/2007
acetone	mg/L	--	0.7	<0.0049	<0.0069	<0.0036	<0.0053	<0.0064	<0.0055	**0.0569 J**
benzene	mg/L	0.005	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	**0.00062 J**	<0.02
2-butanone	mg/L	--	4.2	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1
bromodichloromethane	mg/L	0.08	0.00056	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	**0.0036 J**
chlorobenzene	mg/L	0.1	0.05	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.02
chloroform	mg/L	0.08	0.07	<0.001	<0.001	<0.001	<0.001	**0.00067 J**	**0.0022**	**0.0135 J**
1,1-dichloroethane	mg/L	--	0.07	<0.001	<0.001	<0.001	<0.001	<0.001	**0.00066 J**	<0.02
cis-1,2-dichloroethene	mg/L	0.07	0.07	<0.001	<0.001	<0.001	<0.001	**0.00056 J**	**0.0072**	<0.02
ethylbenzene	mg/L	0.7	0.55	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.02
tetrachloroethene	mg/L	0.005	0.0007	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.02
toluene	mg/L	1	1	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.02
trans-1,2-dichloroethene	mg/L	0.1	0.1	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.02
trichloroethene	mg/L	0.005	0.0028	<0.001	<0.001	<0.001	**0.0859**	**0.36**	**0.416**	**2.28**
xylenes	mg/L	10	0.53	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.04
total organic carbon	mg/L	--	--	NA	NA	NA	NA	NA	NA	NA

mg/L - milligrams per liter
NA - not analyzed
Bolded values indicate detections.

Table 4
CNA Holdings Inc. / Ticona Shelby Facility
PEW Related Analytical Summary
Earth Tech Project No. 79750

Parameter	Unit	EPA Drinking Water Standard	North Carolina 2L Standard	F-55 7/19/2007	PEW-3 7/19/2007	PEW-4 7/19/2007
Volatile Organics						
acetone	mg/L	--	0.7	**0.804**	<0.0034	<0.005
benzene	mg/L	0.005	0.001	**0.0504**	<0.001	**0.0016**
chloroform	mg/L	0.08	0.07	**0.002 J**	<0.001	<0.001
cis-1,2-dichloroethene	mg/L	0.07	0.07	<0.005	<0.001	**0.0021**
toluene	mg/L	1	1	**0.0119**	<0.001	<0.001
trichloroethene	mg/L	0.005	0.0028	**0.0016 J**	<0.001	**0.0157**
Semivolatile Organics						
1,1-biphenyl	mg/L	--	0.35	**3.75**	<0.01	**0.0042 J**
biphenyl ether	mg/L	--	--	**11**	<0.01	**0.0224**

Table 5
CNA Holdings Inc. / Ticona Shelby Facility
Quarter 4 2007
Groundwater Analytical Summary
Earth Tech Project No. 79750

Parameter	Unit	K-28 10/31/2007	K-28 Dup 10/31/2007	V-23 11/1/2007	V-23 Dup 11/1/2007
total organic carbon	mg/L	3880	3820	9650	9180

mg/L - milligrams per liter

Table 6
CNA Holdings, Inc./Ticona Shelby Facility
MNA Data Q3 2007
Earth Tech Project No. 79750

Parameter	Unit	CC-33 7/19/2007	F-55 7/19/2007	IT-1 7/17/2007	IT-2 7/17/2007	IT-3 7/17/2007	IT-4 7/17/2007	IT-5 7/17/2007	IT-6 7/17/2007	IT-6 Dup 7/17/2007
Semivolatile Organics										
ethylene glycol	mg/L	<7	**6680**	<7	<7	<7	<7	<7	**1040**	**983**
Inorganics										
iron	mg/L	**47.1**	**720**	**161**	**60.3**	**74.9**	**40.6**	**162**	**1410**	**1410**
manganese	mg/L	**2.9**	**196**	**2.3**	**15.1**	**0.42**	**1.8**	**45.2**	**855**	**851**
Wet Chemistry										
acetate	mg/L	<10	**2720**	**133**	<10	<10	**4.8 J**	**851**	**8230**	**8560**
alkalinity	mg/L	**46.4**	**1190**	**206**	**57.7**	**111**	**70**	**1250**	**2020**	**1980**
ethyl alcohol	mg/L	<5	**785**	**44.2**	<5	<5	<5	**6.4**	**2300**	**2300**
methane	mg/L	**0.58**	**2**	**18**	**20**	**18**	**7.9**	**18**	**9.5**	**10**
nitrate nitrogen	mg/L	<0.1	**0.38**	<0.1	<0.1	<0.1	<0.1	<0.1	**0.25**	**0.15**
sulfate	mg/L	**7**	**3.4**	**0.74**	**0.65**	**0.4 J**	**0.49 J**	<0.5	**17.4**	**17.4**
total organic carbon	mg/L	**1.3**	**4440**	**132**	**5**	**3.7**	**3.1**	**430**	**6140**	**6280**
Field Indicators										
dissolved oxygen	mg/L	**0.63**	**1.7**	**2.1**	**1.93**	0	**0.97**	**2.25**	**1.77**	**1.77**
ferrous iron	mg/L	**3.8**	NA	**6**	**3.4**	**3.6**	**6**	**2.9**	**4.4**	**4.4**
ORP	mV	**-71**	**-56**	**-135**	**-101**	**-165**	**-140**	**-153**	**33**	**33**
pH	su	**6.29**	**5.38**	**5.89**	**5.74**	**6.31**	**6.58**	**6.57**	**4.81**	**4.81**
specific conductance	umhos/cm	**318**	**3190**	**844**	**589**	**440**	**1300**	**2680**	**5810**	**5810**
temperature	degrees C	**19.6**	**24.6**	**23.3**	**23.7**	**20.2**	**22.27**	**24.3**	**27.4**	**27.4**
turbidity	NTU	**41.9**	**37**	**36**	**13**	**71.5**	**29.2**	**31**	**9**	**9**

ORP - oxidation-reduction potential
mg/L - milligrams per liter
mV - millivolt
su - standard unit
umhos/cm - micromhos per centimeter
degrees C - degrees Celsius
NTU - nephelometric turbidity unit
J - estimated value
NA - not analyzed
Bolded values indicate detections.

Table 6
CNA Holdings, Inc./Ticona Shelby Facility
MNA Data Q3 2007
Earth Tech Project No. 79750

Parameter	Unit	IT-7 7/17/2007	IT-8R 7/17/2007	IT-9 7/18/2007	J-29 7/18/2007	K-28 7/18/2007	K-28 Dup 7/18/2007	N-29 7/18/2007	O-25 7/18/2007	Q-33 7/18/2007
Semivolatile Organics										
ethylene glycol	mg/L	<7	<7	<7	<7	<7	<7	<7	<7	<7
Inorganics										
iron	mg/L	**198**	**694**	**34.3**	**0.025 J**	**2520**	**2500**	**0.048**	**39.5**	**0.1**
manganese	mg/L	**71.9**	**105**	**24.2**	**0.2**	**50.6**	**50.4**	**0.22**	**0.28**	**0.093**
Wet Chemistry										
acetate	mg/L	**462**	**1720**	<10	<10	**5530**	**5280**	<10	<10	<10
alkalinity	mg/L	**499**	**968**	**95.4**	**449**	**2760**	**3040**	**3.6**	**52.5**	**72.1**
ethyl alcohol	mg/L	**68.2**	**2.6 J**	<5	<5	<5	<5	<5	<5	<5
methane	mg/L	**12**	**15**	**19**	**0.025**	**18**	**16**	**0.36**	**0.43**	**0.048**
nitrate nitrogen	mg/L	<0.1	<0.1	**0.32**	**0.98**	**0.052 J**	**0.11**	**0.69**	<0.1	<0.1
sulfate	mg/L	**4.8**	**5.5**	**0.43 J**	**25.5**	**3.3**	**3.5**	**1.8**	**158**	**62**
total organic carbon	mg/L	**368**	**1050**	**4.4**	**1.1**	**3610**	**3680**	<1	**18.8**	**1.8**
Field Indicators										
dissolved oxygen	mg/L	0	0	**0.72**	**1.4**	**1.8**	**1.8**	**1.1**	**0.5**	**2.1**
ferrous iron	mg/L	**3**	**3.4**	**2.8**	0	**5**	**5**	0	**2.8**	0
ORP	mV	**-97**	**-46**	**-88**	**2**	**-171**	**-171**	**454**	**-132**	**185**
pH	su	**6.16**	**5.49**	**6.37**	**6.8**	**5.86**	**5.86**	**4.64**	**6.48**	**5.27**
specific conductance	umhos/cm	**1530**	**2600**	**424**	**935**	**6380**	**6380**	**73**	**891**	**688**
temperature	degrees C	**23.1**	**20.6**	**22.1**	**23.2**	**22.5**	**22.5**	**22.9**	**21.82**	**20.4**
turbidity	NTU	**34.7**	**25.8**	**7.1**	**1.8**	**21**	**21**	**1**	**2.75**	**17**

ORP - oxidation-reduction potential
mg/L - milligrams per liter
mV - millivolt
su - standard unit
umhos/cm - micromhos per centimeter
degrees C - degrees Celsius
NTU - nephelometric turbidity unit
J - estimated value
NA - not analyzed
Bolded values indicate detections.

Table 6
CNA Holdings, Inc./Ticona Shelby Facility
MNA Data Q3 2007
Earth Tech Project No. 79750

Parameter	Unit	S-1 7/18/2007	TI-1 7/19/2007	TI-2 7/19/2007	U-38 7/18/2007	V-23 7/18/2007	V-65 7/18/2007	W-23 7/18/2007	X-32 7/18/2007
Semivolatile Organics									
ethylene glycol	mg/L	<7	<7	<7	<7	**8280**	<7	<7	<7
Inorganics									
iron	mg/L	NA	**5.1**	**6.7**	**0.23**	**1920**	**35.2**	**10.5**	NA
manganese	mg/L	NA	**0.095**	**0.21**	**0.069**	**727**	**1.3**	**1.1**	NA
Wet Chemistry									
acetate	mg/L	<10	<10	<10	<10	**7120**	**27.9**	<10	<10
alkalinity	mg/L	NA	**21.6**	**13.9**	**5.2**	**2360**	**359**	**156**	NA
ethyl alcohol	mg/L	<5	<5	<5	<5	**3760**	<5	<5	<5
methane	mg/L	NA	**0.1**	**0.0043**	**0.0024**	**17**	**20**	**0.072**	NA
nitrate nitrogen	mg/L	NA	**2.6**	**0.86**	**1.6**		<0.1	**0.05 J**	NA
sulfate	mg/L	NA	**0.49 J**	**0.56**	**0.79**	**96.6**	**0.6**	**60.8**	NA
total organic carbon	mg/L	<1	<1	<1	<1	**9310**	**23.9**	**4.9**	NA
Field Indicators									
dissolved oxygen	mg/L	**4.3**	**1.86**	**5.95**	**4.41**	**1.13**	**1.05**	**1.1**	**7.4**
ferrous iron	mg/L	**0.4**	0	0	0	**3**	**1**	0	0
ORP	mV	**375**	**184**	**211**	**381**	**32**	**-147**	**110**	**402**
pH	su	**4.37**	**5.71**	**5.14**	**4.12**	**5.11**	**6.76**	**6.15**	**4.84**
specific conductance	umhos/cm	**256**	**118**	**70**	**99**	**5920**	**2770**	**2820**	**146**
temperature	degrees C	**24.2**	**27**	**23.28**	**22.1**	**21.2**	**23.57**	**29.96**	**21.1**
turbidity	NTU	**1.2**	**46.4**	**98.6**	**13.2**	**13.8**	**7.5**	**3.8**	**12**

ORP - oxidation-reduction potential
mg/L - milligrams per liter
mV - millivolt
su - standard unit
umhos/cm - micromhos per centimeter
degrees C - degrees Celsius
NTU - nephelometric turbidity unit
J - estimated value
NA - not analyzed
Bolded values indicate detections.

Table 7
CNA Holdings, Inc./Ticona Shelby Facility
MNA Data Q4 2007
Earth Tech Project No. 79750

Parameter	Unit	CC-33 11/1/2007	F-55 11/1/2007	G-50 10/31/2007	IT-1 10/30/2007	IT-2 10/30/2007	IT-3 10/30/2007	IT-4 10/30/2007	IT-5 10/30/2007	IT-6 10/30/2007	IT-7 10/30/2007
Semivolatile Organics											
ethylene glycol	mg/L	<7	**7080**	<7	<7	<7	<7	<7	<7	**954**	<7
Inorganics											
iron	mg/L	**47.3**	**653**	**18.8**	**318**	**56**	**73.9**	**43.3**	**106**	**1630**	**156**
manganese	mg/L	**3**	**199**	**16.8**	**3.2**	**14.4**	**0.3**	**1.8**	**26.2**	**1020**	**89.4**
Wet Chemistry											
acetate	mg/L	<10	**2490**	<10	**116**	<10	<10	<10	**399**	**8530**	**482**
alkalinity	mg/L	**34.2**	**932**	**51.2**	**418**	**100**	**84.9**	**64.2**	**1230**	**1840**	**642**
ethyl alcohol	mg/L	<5	**788**	<5	**12.3**	<5	<5	<5	<5	**1940**	**36**
methane	mg/L	**0.7**	**2.6**	**0.89**	**9.1**	**12**	**17**	**2.5**	**21**	**13**	**11**
nitrate nitrogen	mg/L	**0.1**	**0.54**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	**0.33**	**3.7**
sulfate	mg/L	**6.5**	<60	**1.6**	**0.69**	**0.39 J**	**0.54**	**0.75**	**0.33 J**	**15.4**	**0.45 J**
total organic carbon	mg/L	**1.9**	**3880**	**3.7**	**83.7**	**5.6**	**4.4**	**3.1**	**220**	**5560**	**335**
Field Indicators											
dissolved oxygen	mg/L	**0.35**	**2.83**	**1.11**	**1.48**	**1.22**	**0.04**	**0.06**	**0.06**	**0.6**	**1.4**
ferrous iron	mg/L	**3.2**	**3.8**	**2.2**	**5.5**	**4.9**	**2.6**	**2.9**	**3**	**5.2**	**3**
ORP	mV	**-134**	**-108**	**-41**	**-161**	**-103**	**-186**	**-188**	**-177**	**40**	**-62**
pH	su	**6.54**	**5.11**	**6.01**	**6.1**	**5.7**	**6.92**	**7**	**6.83**	**4.84**	**6.25**
specific conductance	umhos/cm	**290**	**3100**	**412**	**1170**	**6470**	**390**	**277**	**2360**	**5730**	**1700**
temperature	degrees C	**19.3**	**21.3**	**19.7**	**19**	**19**	**19.5**	**20**	**19.1**	**18**	**18.3**
turbidity	NTU	**8.8**	**333**	**6**	**23**	**14**	**14**	**29**	**8.7**	**15**	**11**

ORP - oxidation-reduction potential
mg/L - milligrams per liter
mV - millivolt
su - standard unit
umhos/cm - micromhos per centimeter
degrees C - degrees Celsius
NTU - nephelometric turbidity unit
J - estimated value
NA - not analyzed
Bolded values indicate detections.

Table 7
CNA Holdings, Inc./Ticona Shelby Facility
MNA Data Q4 2007
Earth Tech Project No. 79750

Parameter	Unit	IT-8R 10/30/2007	IT-9 10/31/2007	J-29 10/30/2007	K-28 10/31/2007	K-28 Dup 10/31/2007	N-29 10/31/2007	O-25 10/31/2007	Q-33 10/31/2007	TI-1 10/31/2007	TI-2 10/31/2007
Semivolatile Organics											
ethylene glycol	mg/L	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7
Inorganics											
iron	mg/L	**119**	**35.8**	<0.05	**3300**	**3260**	NA	**29.8**	**0.072**	**0.2**	**11.6**
manganese	mg/L	**7.9**	**20.6**	**0.26**	**72**	**71**	NA	**0.27**	**0.098**	**0.031**	**0.29**
Wet Chemistry											
acetate	mg/L	**79.1**	<10	<10	**5950**	**5800**	<10	<10	<10	<10	<10
alkalinity	mg/L	**168**	**77.6**	**513**	**3730**	**3660**	NA	**51.8**	**63.1**	**12.9**	**15**
ethyl alcohol	mg/L	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
methane	mg/L	**16**	**15**	**0.0016**	**9**	**11**	NA	**0.28**	**0.031**	**0.11**	**0.0055**
nitrate nitrogen	mg/L	<0.1	<0.1	**1.6**	**0.95**	**0.82**	NA	<0.1	<0.1	**2.5**	**0.87**
sulfate	mg/L	**1.3**	**0.41 J**	**29.1**	**3**	**4.5**	NA	**111**	**61**	**0.4 J**	**0.56**
total organic carbon	mg/L	**75.8**	**8.8**	**1.5**	**3880**	**3820**	**0.8 J**	**9.8**	**1.8**	**0.69 J**	**0.81 J**
Field Indicators											
dissolved oxygen	mg/L	**0.03**	**0.04**	**1.66**	**1.33**	**1.33**	**0.97**	**0.9**	**1.17**	**1.6**	**4**
ferrous iron	mg/L	**3.8**	**2.1**	**0.02**	**5.8**	**5.8**	**0.2**	**6.1**	**0**	**0**	**0.2**
ORP	mV	**-154**	**-134**	**283**	**-133**	**-133**	**449**	**-151**	**146**	**182**	**155**
pH	su	**6.56**	**6.68**	**6.6**	**6.13**	**6.13**	**4.7**	**6.4**	**5.6**	**5.67**	**6.26**
specific conductance	umhos/cm	**663**	**382**	**1000**	**6710**	**6710**	**169**	**1790**	**145**	**81**	**44**
temperature	degrees C	**19.1**	**16.7**	**18**	**20.9**	**20.9**	**17**	**18**	**19**	**22.3**	**21.1**
turbidity	NTU	**27.2**	**9**	**0.5**	**37.6**	**37.6**	**1**	**4**	**2**	**7**	**110**

ORP - oxidation-reduction potential
mg/L - milligrams per liter
mV - millivolt
su - standard unit
umhos/cm - micromhos per centimeter
degrees C - degrees Celsius
NTU - nephelometric turbidity unit
J - estimated value
NA - not analyzed
Bolded values indicate detections.

Table 7
CNA Holdings, Inc./Ticona Shelby Facility
MNA Data Q4 2007
Earth Tech Project No. 79750

Parameter	Unit	U-38 10/31/2007	V-23 11/1/2007	V-23 Dup 11/1/2007	V-65 11/1/2007	W-23 11/1/2007	X-32 11/1/2007
Semivolatile Organics							
ethylene glycol	mg/L	<7	**9640**	**9370**	<7	<7	<7
Inorganics							
iron	mg/L	**0.44**	**1970**	**1960**	**34.7**	**0.21**	**0.12**
manganese	mg/L	**0.07**	**767**	**764**	**1.2**	**3.7**	**0.018**
Wet Chemistry							
acetate	mg/L	<10	**146**	**139**	**53.6**	<10	<10
alkalinity	mg/L	**1.6**	**2500**	**2420**	**294**	**165**	**5.2**
ethyl alcohol	mg/L	<5	**4030**	**3850**	<5	<5	**2.6 J**
methane	mg/L	**0.00038**	**14**	**13**	**21**	**0.037**	**0.0015**
nitrate nitrogen	mg/L	**1.7**	**0.5**	**0.54**	<0.1	**0.13**	**1.4**
sulfate	mg/L	**1.2**	**192**	**203**	**0.86**	**52.9**	**5.8**
total organic carbon	mg/L	**0.84 J**	**9650**	**9180**	**36.2**	**4.9**	**1.3**
Field Indicators							
dissolved oxygen	mg/L	**3.98**	**5.07**	**5.07**	**2**	**0.19**	**5.68**
ferrous iron	mg/L	**0**	**3**	**3**	**3**	**0**	**0**
ORP	mV	**299**	**11**	**11**	**-168**	**122**	**273**
pH	su	**4.95**	**4.81**	**4.81**	**6.39**	**5.98**	**5.34**
specific conductance	umhos/cm	**74**	**5880**	**5880**	**784**	**677**	**197**
temperature	degrees C	**19.4**	**20.7**	**20.7**	**19.9**	**20.7**	**18.3**
turbidity	NTU	**7.2**	**1**	**1**	**25**	**5.1**	**8.2**

ORP - oxidation-reduction potential
mg/L - milligrams per liter
mV - millivolt
su - standard unit
umhos/cm - micromhos per centimeter
degrees C - degrees Celsius
NTU - nephelometric turbidity unit
J - estimated value
NA - not analyzed
Bolded values indicate detections.

Table 3
CNA Holdings Inc./Ticona Shelby Facility
Quarter 1 2008
Groundwater Analytical Summary
Earth Tech AECOM Project No. 79750

Parameter	Unit	EPA Drinking Water Standard	North Carolina 2L Standard	C-49 1/22/2008	K-28 1/23/2008	K-28 Dup 1/23/2008	P-58 1/22/2008	T-35 1/22/2008	V-23 1/23/2008	AA-54 1/22/2008	CC-33 1/24/2008	EE-58 1/22/2008
acetone	mg/L	--	0.7	<0.005	**1.37**	**1.29**	<0.0041	**0.0046 J**	<0.005	**0.0221**	**0.004 J**	**0.0056**
benzene	mg/L	0.005	0.001	<0.001	**0.0083 J**	**0.0078 J**	<0.001	<0.001	**0.0177**	<0.001	**0.0014**	<0.001
2-butanone	mg/L	--	4.2	<0.005	**0.57**	**0.563**	**0.0021 J**	<0.005	<0.005	**0.0022 J**	<0.005	<0.005
carbon disulfide	mg/L	--	0.7	<0.001	<0.01	<0.01	<0.001	<0.001	**0.0052**	<0.001	<0.001	<0.001
carbon tetrachloride	mg/L	0.005	0.00027	<0.001	<0.01	<0.01	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
chlorobenzene	mg/L	0.1	0.05	<0.001	<0.01	<0.01	<0.001	<0.001	<0.001	<0.001	**0.0015**	<0.001
chloroform	mg/L	0.08	0.07	**0.00059 J**	<0.01	<0.01	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
chloromethane	mg/L	--	0.0026	<0.001	**0.007 J**	**0.007 J**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,1-dichloroethane	mg/L	--	0.07	<0.001	<0.01	<0.01	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
cis-1,2-dichloroethene	mg/L	0.07	0.07	<0.001	<0.01	<0.01	<0.001	**0.00072 J**	<0.001	<0.001	**0.0119**	<0.001
trans-1,2-dichloroethene	mg/L	0.1	0.1	<0.001	<0.01	<0.01	<0.001	<0.001	<0.001	<0.001	**0.00076 J**	<0.001
ethylbenzene	mg/L	0.7	0.55	<0.001	**0.0052 J**	**0.0052 J**	<0.001	<0.001	**0.0027**	<0.001	<0.001	<0.001
methylene chloride	mg/L	0.005	0.0046	<0.001	<0.01	**0.0068 J**	<0.00086	<0.001	<0.0024	**0.0024**	**0.0021**	**0.0017**
styrene	mg/L	0.1	0.1	<0.001	**0.0084 J**	**0.0085 J**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
tetrachloroethene	mg/L	0.005	0.0007	<0.001	<0.01	<0.01	<0.001	**0.0014**	<0.001	<0.001	<0.001	<0.001
toluene	mg/L	1	1	<0.001	**0.0115**	**0.0119**	<0.001	<0.001	**0.0095**	<0.001	<0.001	<0.001
trichloroethene	mg/L	0.005	0.0028	<0.001	<0.01	<0.01	<0.001	**0.0017**	<0.001	<0.001	**0.0076**	<0.001
vinyl chloride	mg/L	0.002	0.000015	<0.001	<0.01	<0.01	<0.001	<0.001	<0.001	<0.001	**0.00071 J**	<0.001
xylenes	mg/L	10	0.53	<0.002	<0.02	<0.02	<0.002	<0.002	**0.0098**	<0.002	<0.002	<0.002
total organic carbon	mg/L	--	--	NA	**4300**	**3820**	NA	NA	**9140**	NA	**1.2**	NA

mg/L - milligrams per liter
NA - not analyzed
Bolded values indicate detections.

Table 3
CNA Holdings Inc./Ticona Shelby Facility
Quarter 1 2008
Groundwater Analytical Summary
Earth Tech AECOM Project No. 79750

Parameter	Unit	EPA Drinking Water Standard	North Carolina 2L Standard	FF-34 1/23/2008	FF-62 1/23/2008	GG-61 1/22/2008	HH-48 1/23/2008	HH-77 1/23/2008	TD-3 1/22/2008
acetone	mg/L	--	0.7	<0.0051	<0.0054	**0.0028 J**	**0.004 J**	**0.0313**	**0.0205**
benzene	mg/L	0.005	0.001	<0.001	<0.001	<0.001	<0.001	<0.004	<0.003
2-butanone	mg/L	--	4.2	<0.005	<0.005	<0.005	**0.0044 J**	<0.02	<0.015
carbon disulfide	mg/L	--	0.7	<0.001	<0.001	<0.001	<0.001	**0.00072 J**	**0.00063 J**
carbon tetrachloride	mg/L	0.005	0.00027	<0.001	<0.001	<0.001	<0.001	<0.004	<0.003
chlorobenzene	mg/L	0.1	0.05	<0.001	<0.001	<0.001	<0.001	<0.004	<0.003
chloroform	mg/L	0.08	0.07	<0.001	<0.001	<0.001	<0.001	<0.004	**0.002 J**
chloromethane	mg/L	--	0.0026	<0.001	<0.001	<0.001	<0.001	**0.0039 J**	<0.003
1,1-dichloroethane	mg/L	--	0.07	<0.001	<0.001	<0.001	<0.001	<0.004	**0.0006 J**
cis-1,2-dichloroethene	mg/L	0.07	0.07	<0.001	<0.001	<0.001	<0.001	**0.0032 J**	**0.0071**
trans-1,2-dichloroethene	mg/L	0.1	0.1	<0.001	<0.001	<0.001	<0.001	<0.004	<0.003
ethylbenzene	mg/L	0.7	0.55	<0.001	<0.001	<0.001	<0.001	<0.004	**0.0022 J**
methylene chloride	mg/L	0.005	0.0046	<0.0012	<0.0017	<0.00085	**0.0039**	**0.0028 J**	<0.003
styrene	mg/L	0.1	0.1	<0.001	<0.001	<0.001	<0.001	<0.004	**0.0037**
tetrachloroethene	mg/L	0.005	0.0007	<0.001	<0.001	<0.001	<0.001	<0.004	**0.00061 J**
toluene	mg/L	1	1	<0.001	<0.001	<0.001	<0.001	<0.004	**0.0051**
trichloroethene	mg/L	0.005	0.0028	<0.001	<0.001	<0.001	<0.001	**0.242**	**0.149**
vinyl chloride	mg/L	0.002	0.000015	<0.001	<0.001	<0.001	<0.001	<0.004	<0.003
xylenes	mg/L	10	0.53	<0.002	<0.002	<0.002	<0.002	<0.008	<0.006
total organic carbon	mg/L	--	--	NA	NA	NA	NA	NA	NA

mg/L - milligrams per liter
NA - not analyzed
Bolded values indicate detections.

Table 4
CNA Holdings Inc./Ticona Shelby Facility
PEW Related Analytical Summary
Earth Tech AECOM Project No. 79750

Parameter	Unit	EPA Drinking Water Standard	North Carolina 2L Standard	F-55 1/24/2008	F-55 1/30/2008	F-55 5/14/2008	F-55 Dup 5/14/2008	PEW-1 5/14/2008	PEW-3 1/24/2008	PEW-3 4/17/2008	PEW-4 1/24/2008	PEW-4 4/17/2008
Volatile Organics												
acetone	mg/L	--	0.7	<0.025	NA	NA	NA	NA	**0.0095**	NA	**0.0051**	NA
2-butanone	mg/L	--	4.2	<0.025	NA	NA	NA	NA	**0.0038 J**	NA	<0.005	NA
benzene	mg/L	0.005	0.001	**0.0392**	NA	NA	NA	NA	<0.001	NA	**0.001**	NA
chlorobenzene	mg/L	0.1	0.05	**0.00088 J**	NA	NA	NA	NA	<0.001	NA	<0.001	NA
chloroform	mg/L	0.08	0.07	<0.005	NA	NA	NA	NA	<0.001	NA	**0.0011**	NA
chloromethane	mg/L	--	0.0026	**0.0042 J**	NA	NA	NA	NA	<0.001	NA	<0.001	NA
cis-1,2-dichloroethene	mg/L	0.07	0.07	<0.005	NA	NA	NA	NA	<0.001	NA	**0.0012**	NA
methylene chloride	mg/L	0.005	0.0046	**0.0089**	NA	NA	NA	NA	**0.0017**	NA	**0.0011**	NA
toluene	mg/L	1	1	**0.0063**	NA	NA	NA	NA	<0.001	NA	<0.001	NA
trichloroethene	mg/L	0.005	0.0028	<0.005	NA	NA	NA	NA	<0.001	NA	**0.0315**	NA
Semivolatile Organics												
1,1-biphenyl	mg/L	--	0.35	NA	**56.8**	**8.94 J**	**19.8 J**	<0.01	**0.0522**	<0.01 UJ	<0.01	**0.0015 J**
biphenyl ether	mg/L	--	--	NA	**168**	**28.2 J**	**54.5 J**	<0.01	**0.174**	<0.01 UJ	**0.0146**	**0.0222 J**

J - estimated value
Bolded values indicate detections.

Table 5
CNA Holdings Inc./Ticona Shelby Facility
Quarter 2 2008
Groundwater Analytical Summary
Earth Tech AECOM Project No. 79750

Parameter	Unit	K-28 4/15/2008	K-28 Dup 4/15/2008	V-23 4/16/2008	TD-3 4/17/2008	TD-4 4/17/2008
1,1-dichloroethane	mg/L	NA	NA	NA	**0.00062 J**	<0.001
2-butanone	mg/L	NA	NA	NA	**0.0027 J**	**0.0048 J**
acetone	mg/L	NA	NA	NA	<0.005	**0.0033 J**
benzene	mg/L	NA	NA	NA	<0.001	**0.0039**
carbon disulfide	mg/L	NA	NA	NA	**0.00058 J**	**0.00083 J**
carbon tetrachloride	mg/L	NA	NA	NA	<0.001	**0.0028**
chloroform	mg/L	NA	NA	NA	**0.0019**	**0.0078**
cis-1,2-dichloroethene	mg/L	NA	NA	NA	**0.0066**	**0.0042**
trichloroethene	mg/L	NA	NA	NA	**0.14**	**2.07**
total organic carbon	mg/L	**2270**	**2260**	**7240**	NA	NA

mg/L - milligrams per liter
J - estimated value
NA - Not Analyzed

Table 6
CNA Holdings, Inc./Ticona Shelby Facility
MNA Data Quarter 1 2008
Earth Tech AECOM Project No. 79750

Parameter	Unit	CC-33 1/24/2008	F-55 1/24/2008	IT-1 1/22/2008	IT-2 1/23/2008	IT-3 1/22/2008	IT-4 1/23/2008	IT-5 1/22/2008	IT-6 1/22/2008	IT-6 Dup 1/22/2008
Semivolatile Organics										
ethylene glycol	mg/L	<7	**5970**	<7	<7	<7	<7	<7	**1740**	**1660**
Inorganics										
iron	mg/L	**48.2**	**586**	**414**	**59.5**	**12**	**39.3**	**89.2**	**1500**	**1440**
manganese	mg/L	**2.8**	**195**	**2.9**	**11.4**	**0.22**	**1.9**	**20.4**	**1030**	**965**
Wet Chemistry										
acetate	mg/L	<10	**2290**	**415**	<10	<10	<10	**221**	**9020**	**8590**
alkalinity	mg/L	**32.2**	**1080**	**312**	**201**	**111**	**73.8**	**1220**	**2120**	**2140**
ethyl alcohol	mg/L	<5	**611**	**53.6**	<5	<5	<5	**2.6 J**	**1890**	**1880**
methane	mg/L	**0.37**	**1.2**	**6.8**	**17**	**12**	**5.8**	**18**	**11**	**11**
nitrate nitrogen	mg/L	**0.04 J**	**0.14**	<0.1	<0.1	<0.1	**0.03 J**	<0.1	<0.1	<0.1
sulfate	mg/L	**2.6**	**3.7**	**0.99**	<0.5	**32.7**	**0.73**	<0.5	**13.5**	**13.2**
total organic carbon	mg/L	**1.2**	**3800**	**272**	**9.9**	**4.1**	**3.3**	**174**	**6500**	**6320**
Field Indicators										
dissolved oxygen	mg/L	**0.11**	**7.2**	**12.9**	**0.1**	**0.1**	**0.52**	**6.76**	**6.32**	**6.32**
ferrous iron	mg/L	**4.5**	**2.6**	**2.2**	NA	**5.5**	**3**	**3.6**	**4.8**	**4.8**
ORP	mV	**-110**	**-60**	**-36**	**-57**	**-134**	**-63**	**-191**	**3**	**3**
pH	su	**6.25**	**4.9**	**6.12**	**6.06**	**6.67**	**6.32**	**6.75**	**4.73**	**4.73**
specific conductance	umhos/cm	**393**	**2062**	**1147**	**742**	**447**	**350**	**2320**	**5900**	**5900**
temperature	degrees C	**14**	**15.8**	**9.4**	**8**	**15.3**	**15.8**	**12.5**	**12.7**	**12.7**
turbidity	NTU	0	**135**	**36**	**68**	**7.6**	**15.3**	**6.4**	**12**	**12**

ORP - oxidation-reduction potential
mg/L - milligrams per liter
mV - millivolt
su - standard unit
umhos/cm - micromhos per centimeter
degrees C - degrees Celsius
NTU - nephelometric turbidity unit
J - estimated value
NA - not analyzed
Bolded values indicate detections.

Table 6
CNA Holdings, Inc./Ticona Shelby Facility
MNA Data Quarter 1 2008
Earth Tech AECOM Project No. 79750

Parameter	Unit	IT-7 1/22/2008	IT-8R 1/22/2008	IT-9 1/22/2008	J-29 1/23/2008	K-28 1/23/2008	K-28 Dup 1/23/2008	N-29 1/23/2008	O-25 1/23/2008	Q-33 1/23/2008
Semivolatile Organics										
ethylene glycol	mg/L	<7	<7	<7	<7	<7	<7	<7	<7	<7
Inorganics										
iron	mg/L	**163**	**212**	**38.9**	**0.15**	**3440**	**3360**	**0.038 J**	**35.3**	**0.12**
manganese	mg/L	**93.9**	**22.6**	**22.8**	**0.37**	**71.9**	**67.6**	**0.21**	**0.26**	**0.098**
Wet Chemistry										
acetate	mg/L	**553**	**117**	<10	<10	**6710**	**6300**	**8.6 J**	**8.5 J**	<10
alkalinity	mg/L	**666**	**339**	**72.8**	**648**	**4010**	**4010**	**5.2**	**58.2**	**65.5**
ethyl alcohol	mg/L	**43.9**	<5	<5	<5	<5	<5	<5	<5	<5
methane	mg/L	**12**	**18**	**17**	**0.0016**	**12**	**9.4**	**0.25**	**0.35**	**0.051**
nitrate nitrogen	mg/L	<0.1	<0.1	<0.1	**3.7**	<0.1	<0.1	**0.63**	<0.1	<0.1
sulfate	mg/L	**0.41 J**	**0.24 J**	**0.23 J**	**41.8**	**2**	**1.6**	**1.4**	**123**	**62.7**
total organic carbon	mg/L	**410**	**94.7**	**3.8**	**2.2**	**4300**	**3820**	<1	**8.5**	**1.9**
Field Indicators										
dissolved oxygen	mg/L	**0.1**	**0.1**	**0.1**	**2.03**	**0.1**	**0.1**	**0.2**	**0.3**	**0.2**
ferrous iron	mg/L	**1.8**	**4**	**2.2**	0	**3.8**	**3.8**	0	NA	0
ORP	mV	**-66**	**-136**	**-95**	**295**	**-115**	**-115**	**489**	**-122**	**122**
pH	su	**6.17**	**6.24**	**6.13**	**6.73**	**5.86**	**5.86**	**5**	**6.61**	**4**
specific conductance	umhos/cm	**1540**	**1070**	**323**	**1220**	**7740**	**7740**	**187**	**960**	**557**
temperature	degrees C	**11.15**	**14.39**	**11**	**13.1**	**13.1**	**13.1**	**15.3**	**13.8**	**15.79**
turbidity	NTU	**17**	**29**	**6**	**9**	**18**	**18**	**2.3**	**4**	**4**

ORP - oxidation-reduction potential
mg/L - milligrams per liter
mV - millivolt
su - standard unit
umhos/cm - micromhos per centimeter
degrees C - degrees Celsius
NTU - nephelometric turbidity unit
J - estimated value
NA - not analyzed
Bolded values indicate detections.

Table 6
CNA Holdings, Inc./Ticona Shelby Facility
MNA Data Quarter 1 2008
Earth Tech AECOM Project No. 79750

Parameter	Unit	U-38 1/23/2008	V-23 1/22-23/2008	V-65 1/23/2008	W-23 1/23/2008	X-32 1/23/2008
Semivolatile Organics						
ethylene glycol	mg/L	<7	**7140**	<7	<7	<7
Inorganics						
iron	mg/L	**0.047 J**	**1800**	**31**	**0.052**	NA
manganese	mg/L	**0.066**	**746**	**1**	**0.95**	NA
Wet Chemistry						
acetate	mg/L	**8.4 J**	**7870**	<10	<10	<10
alkalinity	mg/L	**3.6**	**2450**	**374**	**84.2**	NA
ethyl alcohol	mg/L	<5	**3480**	<5	<5	<5
methane	mg/L	**0.0037**	**10**	**25**	**0.022**	NA
nitrate nitrogen	mg/L	**1.7**	<0.1	<0.1	**0.36**	NA
sulfate	mg/L	**0.93**	**42.4**	<0.5	**71.7**	NA
total organic carbon	mg/L	<1	**9140**	**7.4**	**3.9**	NA
Field Indicators						
dissolved oxygen	mg/L	**4.35**	**6.73**	**7.47**	**6.61**	**8.57**
ferrous iron	mg/L	0	**4.4**	**4.8**	0	0
ORP	mV	**368**	**19**	**-256**	**-208**	**-78**
pH	su	**4.35**	**4.84**	**6.52**	**5.71**	**5.14**
specific conductance	umhos/cm	**89**	**5970**	**751**	**563**	**183**
temperature	degrees C	**16.2**	**12.75**	**11.69**	**16.08**	**15.01**
turbidity	NTU	**8.8**	**7**	**21**	**1**	**1**

ORP - oxidation-reduction potential
mg/L - milligrams per liter
mV - millivolt
su - standard unit
umhos/cm - micromhos per centimeter
degrees C - degrees Celsius
NTU - nephelometric turbidity unit
J - estimated value
NA - not analyzed
Bolded values indicate detections.

Table 7
CNA Holdings, Inc./Ticona Shelby Facility
MNA Data Quarter 2 2008
Earth Tech AECOM Project No. 79750

Parameter	Unit	CC-33 4/16/2008	F-55 5/14/2008	F-55 Dup 5/14/2008	IT-1 4/15/2008	IT-2 4/15/2008	IT-3 4/15/2008	IT-4 4/15/2008	IT-5 4/15/2008	IT-6 4/15/2008	IT-7 4/15/2008
Semivolatile Organics											
ethylene glycol	mg/L	<7	**4390**	**4140**	**84.6**	<7	<7	<7	<7	**1300**	<7
Inorganics											
iron	mg/L	**46.4**	**543**	NA	**330**	**54.6**	**12.1**	**25.9**	**105**	**1410**	**157**
manganese	mg/L	**2.6**	**172**	NA	**2.6**	**8.9**	**0.27**	**1.6**	**22.3**	**1010**	**80**
Wet Chemistry											
acetate	mg/L	<10	**2740**	**3060**	**467**	<10	<10	<10	**225**	**8650**	**461**
alkalinity	mg/L	**27**	**1060**	NA	**492**	**210**	**172**	**79**	**960**	**2080**	**692**
ethyl alcohol	mg/L	<5	**592**	**609**	**118**	<5	<5	<5	**4.5 J**	**2590**	**35.4**
methane	mg/L	**0.67**	NA	NA	**8.3**	**10**	**16**	**5.2**	**20**	**15**	**15**
nitrate nitrogen	mg/L	<0.1	**0.05 J**	NA	<0.1	<0.02	**0.04 J**	<0.1	<0.1	<0.1	<0.1
sulfate	mg/L	**7.6**	**3.3**	NA	**0.8**	**0.77**	**19.5**	**1.2**	**2.2**	**13.2**	<0.5
total organic carbon	mg/L	**1.3**	**3160**	NA	**348**	**9.4**	**4.7**	**3.6**	**291**	**6520**	**353**
Field Indicators											
dissolved oxygen	mg/L	**2.9**	**1.5**	**1.5**	**4.62**	**5.1**	**4.8**	**5.25**	**5.2**	**4.09**	**3.8**
ferrous iron	mg/L	**2.6**	**3**	**3**	**4.6**	**3**	**2.2**	**2**	**3.8**	**7**	**4.2**
ORP	mV	**-90**	**-52**	**-52**	**-145**	**-143**	**-186**	**-159**	**-148**	**57**	**-96**
pH	su	**6.03**	**5.23**	**5.23**	**6.05**	**6.11**	**6.83**	**6.52**	**6.65**	**4.82**	**6.22**
specific conductance	umhos/cm	**0.257**	**2.47**	**2.47**	**1.33**	**0.823**	**437**	**269**	**2.01**	**6.34**	**1.68**
temperature	degrees C	**18**	**17.4**	**17.4**	**16.5**	**16.66**	**18.1**	**16.2**	**15.2**	**17.7**	**18.05**
turbidity	NTU	**10.3**	**79**	**79**	**28**	**8**	**6**	**37**	**11.7**	**4.1**	**11.97**

ORP - oxidation-reduction potential
mg/L - milligrams per liter
mV - millivolt
su - standard unit
umhos/cm - micromhos per centimeter
degrees C - degrees Celsius
NTU - nephelometric turbidity unit
J - estimated value
NA - not analyzed
Bolded values indicate detections.

Table 7
CNA Holdings, Inc./Ticona Shelby Facility
MNA Data Quarter 2 2008
Earth Tech AECOM Project No. 79750

Parameter	Unit	IT-8R 4/15/2008	IT-9 4/15/2008	J-29 4/15/2008	K-28 4/15/2008	K-28 Dup 4/15/2008	N-29 4/15/2008	O-25 4/16/2008	Q-33 4/16/2008	TI-1 4/16/2008	TI-2 4/16/2008
Semivolatile Organics											
ethylene glycol	mg/L	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7
Inorganics											
iron	mg/L	**1150**	**34.9**	<0.05	**1820**	**1840**	NA	**39.4**	**0.084**	**0.66**	**4.2**
manganese	mg/L	**270**	**19.5**	**0.009 J**	**46.5**	**47.2**	NA	**0.29**	**0.096**	**0.033**	**0.29**
Wet Chemistry											
acetate	mg/L	**3750**	**13**	<10	**4240**	**4420**	**9.8 J**	<10	<10	<10	<10
alkalinity	mg/L	**1550**	**50**	**428**	**1920**	**1980**	NA	**52**	**70**	**7.5**	**14.5**
ethyl alcohol	mg/L	**105**	<5	<5	<5	<5	<5	<5	<5	<5	<5
methane	mg/L	**14**	**15**	**0.0018**	**19**	**23**	NA	**0.75**	**0.071**	**0.11**	**0.0053**
nitrate nitrogen	mg/L	<0.1	<0.1	**0.87**	<0.1	<0.1	NA	**0.03 J**	<0.1	**2.9**	**0.82**
sulfate	mg/L	**2.3**	**0.82**	**28.1**	**1**	**0.83**	NA	**132**	**55**	<0.5	**0.69**
total organic carbon	mg/L	**2320**	**5.3**	**1.1**	**2270**	**2260**	**0.77 J**	**13.8**	**1.4**	<1	<1
Field Indicators											
dissolved oxygen	mg/L	**1**	0	**6.4**	**0.9**	**0.9**	**0.2**	**0.2**	**2.1**	**1.56**	**5.57**
ferrous iron	mg/L	**7**	**3.2**	0	**4.4**	**4.4**	0	**2.4**	0	0	0
ORP	mV	**-49**	**-139**	**371**	**-143**	**-143**	**544**	**-152**	**129**	**215**	**150**
pH	su	**5.5**	**6.47**	**6.8**	**6.31**	**6.31**	**4.7**	**6.61**	**5.58**	**5.25**	**5.78**
specific conductance	umhos/cm	**4.13**	**0.334**	**0.91**	**5.84**	**5.84**	**0.054**	**0.95**	**0.556**	**0.07**	**0.048**
temperature	degrees C	**16.4**	**15.8**	**14.31**	**18.2**	**18.2**	**17.3**	**17.64**	**19.3**	**18.74**	**20.27**
turbidity	NTU	**9.7**	**6.4**	**4.37**	**10.9**	**10.9**	**1.3**	**5**	**1.7**	**3**	**200**

ORP - oxidation-reduction potential
mg/L - milligrams per liter
mV - millivolt
su - standard unit
umhos/cm - micromhos per centimeter
degrees C - degrees Celsius
NTU - nephelometric turbidity unit
J - estimated value
NA - not analyzed
Bolded values indicate detections.

Table 7
CNA Holdings, Inc./Ticona Shelby Facility
MNA Data Quarter 2 2008
Earth Tech AECOM Project No. 79750

Parameter	Unit	U-38 4/16/2008	V-23 4/16/2008	V-65 4/16/2008	W-23 4/16/2008	X-32 4/16/2008
Semivolatile Organics						
ethylene glycol	mg/L	<7	**6100**	<7	<7	<7
Inorganics						
iron	mg/L	**0.076**	**1490**	**33.9**	**0.088**	**0.4**
manganese	mg/L	**0.06**	**642**	**1.3**	**0.31**	**0.033**
Wet Chemistry						
acetate	mg/L	<10	**6480**	**37.9**	<10	**8.3 J**
alkalinity	mg/L	**2.5**	**2080**	**368**	**66**	**6**
ethyl alcohol	mg/L	<5	**3400**	<5	<5	<5
methane	mg/L	**0.0031**	**15**	**25**	**0.014**	**0.00073**
nitrate nitrogen	mg/L	**1.2**	<0.1	<0.1	**0.42**	**1.2**
sulfate	mg/L	**0.89**	**48.2**	**0.71**	**66.7**	**4.8**
total organic carbon	mg/L	**0.55 J**	**7240**	**37**	**3.5**	**2.2**
Field Indicators						
dissolved oxygen	mg/L	**4.78**	**4.79**	**3.8**	**3.67**	**5.5**
ferrous iron	mg/L	0	**6.2**	**3**	0	0
ORP	mV	**304**	**45**	**-149**	**287**	**287**
pH	su	**4.65**	**4.92**	**6.67**	**5.6**	**4.91**
specific conductance	umhos/cm	**0.068**	**5.66**	**0.833**	**0.406**	**0.179**
temperature	degrees C	**18.88**	**17.59**	**19.3**	**19.73**	**17.2**
turbidity	NTU	**3.24**	**2.07**	**3.23**	**5.23**	**8.3**

ORP - oxidation-reduction potential
mg/L - milligrams per liter
mV - millivolt
su - standard unit
umhos/cm - micromhos per centimeter
degrees C - degrees Celsius
NTU - nephelometric turbidity unit
J - estimated value
NA - not analyzed
Bolded values indicate detections.

Table 1
CNA Holdings Inc. / Ticona Shelby Facility
Quarter 3 2008
Groundwater Analytical Summary
AECOM Project No. 79750

Parameter	Unit	C-49 7/22/2008	F-55 7/24/2008	G-50 7/24/2008	G-50 Dup 7/24/2008	G-88 7/24/2008	J-29 7/23/2008	K-28 7/23/2008	K-28 Dup 7/23/2008	N-29 7/23/2008	O-25 7/24/2008	P-58 7/22/2008	Q-33 7/23/2008	T-35 7/22/2008	U-38 7/23/2008	V-23 7/23/2008
acetone	mg/L	<0.005	0.836	NA	NA	NA	NA	1.15	1.15	NA	NA	<0.005	NA	<0.005	NA	<0.005
benzene	mg/L	<0.001	0.0594	NA	NA	NA	NA	0.0074 J	0.0076 J	NA	NA	<0.001	NA	<0.001	NA	0.0202
2-butanone	mg/L	<0.005	<0.025	NA	NA	NA	NA	<0.05	0.484	NA	NA	<0.005	NA	<0.005	NA	<0.005
carbon disulfide	mg/L	0.00078 J	0.0022 J	NA	NA	NA	NA	<0.01	<0.01	NA	NA	<0.001	NA	<0.001	NA	0.007
chlorobenzene	mg/L	<0.001	0.001 J	NA	NA	NA	NA	<0.01	<0.01	NA	NA	<0.001	NA	<0.001	NA	<0.001
chloroform	mg/L	0.00054 J	<0.005	NA	NA	NA	NA	<0.01	<0.01	NA	NA	<0.001	NA	<0.001	NA	<0.001
1,2-dichloroethane	mg/L	<0.001	0.0017 J	NA	NA	NA	NA	<0.01	<0.01	NA	NA	<0.001	NA	<0.001	NA	<0.001
cis-1,2-dichloroethene	mg/L	<0.001	<0.005	NA	NA	NA	NA	<0.01	<0.01	NA	NA	<0.001	NA	0.00055 J	NA	<0.001
trans-1,2-dichloroethene	mg/L	<0.001	<0.005	NA	NA	NA	NA	<0.01	<0.01	NA	NA	<0.001	NA	<0.001	NA	<0.001
ethylbenzene	mg/L	<0.001	<0.005	NA	NA	NA	NA	<0.01	<0.01	NA	NA	<0.001	NA	<0.001	NA	0.0034
2-hexanone	mg/L	<0.005	0.0026 J	NA	NA	NA	NA	<0.05	<0.05	NA	NA	<0.005	NA	<0.005	NA	<0.005
methylene chloride	mg/L	<0.0012	<0.005	NA	NA	NA	NA	<0.0107	<0.015	NA	NA	<0.0013	NA	<0.0013	NA	<0.0015
toluene	mg/L	0.00051 J	0.012	NA	NA	NA	NA	0.0018 J	<0.01	NA	NA	0.00068 J	NA	<0.001	NA	0.0112
trichloroethene	mg/L	<0.001	0.0028 J	NA	NA	NA	NA	<0.01	<0.01	NA	NA	<0.001	NA	0.0015	NA	<0.001
vinyl chloride	mg/L	<0.001	<0.005	NA	NA	NA	NA	<0.01	<0.01	NA	NA	<0.001	NA	<0.001	NA	<0.001
xylenes	mg/L	<0.002	<0.01	NA	NA	NA	NA	<0.02	<0.02	NA	NA	<0.002	NA	<0.002	NA	0.0135
1,1-biphenyl	mg/L	NA	8.04	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
biphenyl ether	mg/L	NA	24	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ethylene glycol	mg/L	NA	3010	<7	<7	<7	<7	<7	<7	<7	<7	NA	<7	NA	<7	6040
iron	mg/L	NA	548	18.3	18.3	3.1	0.093	2270	2330	0.018 J	34.1	NA	0.25	NA	0.25	1820
manganese	mg/L	NA	182	15	14.8	0.053	0.062	53.3	55.1	0.21	0.26	NA	0.11	NA	0.079	707
acetate	mg/L	NA	2950	<10	<10	<10	<10	7130	6990	<10	<10	NA	<10	NA	<10	11300
alkalinity	mg/L	NA	1020	48.5	51	35.4	505	2460	2810	5.1	40.4	NA	67.7	NA	2.5	2160
dissolved oxygen	mg/L	8.22	4.2	0.61	NA	2.22	5.2	3.85	NA	2.7	0	3.5	0	4	3.96	0.84
ethyl alcohol	mg/L	NA	471	<5	<5	<5	<5	<5	<5	<5	<5	NA	<5	NA	<5	3100
ferrous iron	mg/L	0	5.6	4	NA	2.2	0	8.6	NA	0	0	3.8	0.4	0.6	0	8
methane	mg/L	NA	0.029	0.85	0.9	0.011	0.0031	12	10	0.28	2.3	NA	0.11	NA	0.0023	14
nitrate nitrogen	mg/L	NA	0.04 J	<0.1	0.02 J	0.54	0.9	0.59	0.61	0.69	<0.1	NA	<0.1	NA	1.5	0.52
ORP	mV	293	-65	-72	NA	183	151	-202	NA	552	-182	-206	124	164	356	-11
pH	su	4.77	5.1	5.73	NA	6.15	5.67	5.97	NA	4.76	6.46	6.17	5.49	5.15	4.42	4.97
specific conductance	umhos/cm	22	2640	442	NA	88	665	6260	NA	51	759	744	900	4950	111	5960
sulfate	mg/L	NA	<0.5	1.4	1.7	0.19 J	28.2	1	0.6	1.5	140	NA	58.6	NA	0.55	66.5
temperature	degrees C	28.1	22.6	24.65	NA	25.32	20.7	23.57	NA	19.9	18.42	32.1	22.5	22.1	24.7	21.49
total organic carbon	mg/L	NA	3410	2.5	2.4	0.81 J	1.4	2270	2470	0.91 J	13.2	NA	1.7	NA	0.63 J	7700
turbidity	NTU	4.5	31	4.1	NA	23	6	17.4	NA	1	151	0.2	6.5	14	5.5	115

ORP - oxidation-reduction potential
mg/L - milligrams per liter
mV - millivolt
su - standard unit
umhos/cm - micromhos per centimeter
degrees C - degrees Celsius
NTU - nephelometric turbidity unit
J - estimated value
NA - not analyzed

Table 1
CNA Holdings Inc. / Ticona Shelby Facility
Quarter 3 2008
Groundwater Analytical Summary
AECOM Project No. 79750

Parameter	Unit	V-65 7/23/2008	W-23 7/24/2008	X-32 7/24/2008	AA-54 7/22/2008	CC-33 7/23/2008	EE-58 7/22/2008	FF-34 7/23/2008	FF-62 7/23/2008	GG-61 7/22/2008	HH-48 7/23/2008	HH-77 7/23/2008	IT-1 7/22/2008	IT-2 7/22/2008	IT-3 7/23/2008
acetone	mg/L	NA	NA	NA	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.02	NA	NA	NA
benzene	mg/L	NA	NA	NA	<0.001	0.0012	<0.001	<0.001	<0.001	<0.001	<0.001	<0.004	NA	NA	NA
2-butanone	mg/L	NA	NA	NA	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.00057 J	<0.02	NA	NA	NA
carbon disulfide	mg/L	NA	NA	NA	<0.001	<0.001	<0.001	<0.001	0.002	<0.001	0.00098 J	0.006	NA	NA	NA
chlorobenzene	mg/L	NA	NA	NA	<0.001	0.00099 J	<0.001	<0.001	<0.001	<0.001	<0.001	<0.004	NA	NA	NA
chloroform	mg/L	NA	NA	NA	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.00083 J	NA	NA	NA
1,2-dichloroethane	mg/L	NA	NA	NA	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.004	NA	NA	NA
cis-1,2-dichloroethene	mg/L	NA	NA	NA	<0.001	0.0156	<0.001	<0.001	<0.001	<0.001	<0.001	0.00078 J	NA	NA	NA
trans-1,2-dichloroethene	mg/L	NA	NA	NA	<0.001	0.0011	<0.001	<0.001	<0.001	<0.001	<0.001	<0.004	NA	NA	NA
ethylbenzene	mg/L	NA	NA	NA	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.004	NA	NA	NA
2-hexanone	mg/L	NA	NA	NA	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.02	NA	NA	NA
methylene chloride	mg/L	NA	NA	NA	<0.0012	<0.0012	<0.0013	<0.0018	<0.0051	<0.0016	<0.0052	<0.0059	NA	NA	NA
toluene	mg/L	NA	NA	NA	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.004	NA	NA	NA
trichloroethene	mg/L	NA	NA	NA	<0.001	0.0115	<0.001	<0.001	<0.001	<0.001	0.0655	0.32	NA	NA	NA
vinyl chloride	mg/L	NA	NA	NA	<0.001	0.00079 J	<0.001	<0.001	<0.001	<0.001	<0.001	<0.004	NA	NA	NA
xylenes	mg/L	NA	NA	NA	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.008	NA	NA	NA
1,1-biphenyl	mg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
biphenyl ether	mg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ethylene glycol	mg/L	<7	<7	<7	NA	<7	NA	NA	NA	NA	NA	NA	25.8	<7	<7
iron	mg/L	30.9	0.042 J	NA	NA	43.3	NA	NA	NA	NA	NA	NA	195	47.6	31.6
manganese	mg/L	1	0.33	NA	NA	2.9	NA	NA	NA	NA	NA	NA	1.7	9.9	0.33
acetate	mg/L	<10	<10	<10	NA	<10	NA	NA	NA	NA	NA	NA	141	<10	<10
alkalinity	mg/L	350	128	NA	NA	35.9	NA	NA	NA	NA	NA	NA	218	212	152
dissolved oxygen	mg/L	0.2	0.51	4.82	0.78	2.71	0.34	5.4	4.2	1.17	9.44	5.11	3.5	3.3	0
ethyl alcohol	mg/L	<5	<5	<5	NA	<5	NA	NA	NA	NA	NA	NA	24.7	<5	<5
ferrous iron	mg/L	7	0	0	NA	3	NA	0	0	0	0	0	3.2	2	4
methane	mg/L	22	0.4	NA	NA	0.57	NA	NA	NA	NA	NA	NA	10	8.4	19
nitrate nitrogen	mg/L	0.03 J	0.23	NA	NA	0.09 J	NA	NA	NA	NA	NA	NA	<0.1	<0.1	<0.1
ORP	mV	-174	179	222	88	-66	1	295	133	125	224	117	-114	-77	-220
pH	su	6.5	5.92	5.14	4.86	5.61	6.69	5.21	5.91	6.16	5.11	5.92	6.3	6.2	6.8
specific conductance	umhos/cm	654	610	300	273	274	78	61	91	179	76	98	707	747	362
sulfate	mg/L	0.25 J	61.9	NA	NA	4.1	NA	NA	NA	NA	NA	NA	0.52	0.45 J	0.81
temperature	degrees C	19.85	22.5	21.21	20.52	20.5	26.28	19.4	22	22.71	21.21	19.31	23.4	26.1	21.86
total organic carbon	mg/L	5.9	3.8	NA	NA	1.4	NA	NA	NA	NA	NA	NA	98.6	7.6	3.6
turbidity	NTU	56	100	49.1	40	3.7	48	1.2	1.8	2.6	30	22	19	6	38

ORP - oxidation-reduction potential
mg/L - milligrams per liter
mV - millivolt
su - standard unit
umhos/cm - micromhos per centimeter
degrees C - degrees Celsius
NTU - nephelometric turbidity unit
J - estimated value
NA - not analyzed

Table 1
CNA Holdings Inc. / Ticona Shelby Facility
Quarter 3 2008
Groundwater Analytical Summary
AECOM Project No. 79750

Parameter	Unit	IT-4 7/23/2008	IT-5 7/22/2008	IT-6 7/22/2008	IT-7 7/22/2008	IT-8R 7/22/2008	IT-9 7/22/2008	PEW-1 7/24/2008	PEW-3 7/24/2008	PEW-4 7/24/2008	S-1 7/22/2008	TD-3 7/24/2008	TD-4 7/24/2008	TI-1 7/23/2008	TI-1 Dup 7/23/2008	TI-2 7/23/2008
acetone	mg/L	NA	NA	NA	NA	NA	NA	<0.005	<0.0056	<0.005	NA	<0.005	<0.1	NA	NA	NA
benzene	mg/L	NA	NA	NA	NA	NA	NA	0.00064 J	<0.001	0.00077 J	NA	<0.001	<0.02	NA	NA	NA
2-butanone	mg/L	NA	NA	NA	NA	NA	NA	0.0037 J	<0.005	<0.005	NA	0.0012 J	<0.1	NA	NA	NA
carbon disulfide	mg/L	NA	NA	NA	NA	NA	NA	0.0065	0.0023	<0.001	NA	0.00053 J	0.0034 J	NA	NA	NA
chlorobenzene	mg/L	NA	NA	NA	NA	NA	NA	<0.001	<0.001	<0.001	NA	<0.001	<0.02	NA	NA	NA
chloroform	mg/L	NA	NA	NA	NA	NA	NA	0.00099 J	<0.001	0.0015	NA	0.0016	0.0079 J	NA	NA	NA
1,2-dichloroethane	mg/L	NA	NA	NA	NA	NA	NA	<0.001	<0.001	<0.001	NA	<0.001	<0.02	NA	NA	NA
cis-1,2-dichloroethene	mg/L	NA	NA	NA	NA	NA	NA	0.0031	<0.001	0.0013	NA	0.0052	<0.02	NA	NA	NA
trans-1,2-dichloroethene	mg/L	NA	NA	NA	NA	NA	NA	<0.001	<0.001	<0.001	NA	<0.001	<0.02	NA	NA	NA
ethylbenzene	mg/L	NA	NA	NA	NA	NA	NA	<0.001	<0.001	<0.001	NA	<0.001	<0.02	NA	NA	NA
2-hexanone	mg/L	NA	NA	NA	NA	NA	NA	<0.005	<0.005	<0.005	NA	<0.005	<0.1	NA	NA	NA
methylene chloride	mg/L	NA	NA	NA	NA	NA	NA	<0.003	<0.0033	<0.0033	NA	0.0053	0.0359	NA	NA	NA
toluene	mg/L	NA	NA	NA	NA	NA	NA	<0.001	<0.001	<0.001	NA	<0.001	<0.02	NA	NA	NA
trichloroethene	mg/L	NA	NA	NA	NA	NA	NA	0.0109	<0.001	0.0469	NA	0.0974	2.95	NA	NA	NA
vinyl chloride	mg/L	NA	NA	NA	NA	NA	NA	<0.001	<0.001	<0.001	NA	<0.001	<0.02	NA	NA	NA
xylenes	mg/L	NA	NA	NA	NA	NA	NA	<0.002	<0.002	<0.002	NA	<0.002	<0.04	NA	NA	NA
1,1-biphenyl	mg/L	NA	NA	NA	NA	NA	NA	<0.01	0.0291	0.0026 J	NA	NA	NA	NA	NA	NA
biphenyl ether	mg/L	NA	NA	NA	NA	NA	NA	<0.01	0.0885	0.017	NA	NA	NA	NA	NA	NA
ethylene glycol	mg/L	<7	<7	794	<7	<7	<7	NA	NA	NA	<7	NA	NA	<7	<7	<7
iron	mg/L	34.7	275	1450	227	601	36.8	NA	NA	NA	NA	NA	NA	0.16	0.17	0.95
manganese	mg/L	2.2	72.8	970	128	76.2	15.4	NA	NA	NA	NA	NA	NA	0.025	0.025	0.026
acetate	mg/L	<10	1310	13700	957	2020	<10	NA	NA	NA	<10	NA	NA	<10	<10	<10
alkalinity	mg/L	69.7	1520	1860	642	719	42.4	NA	NA	NA	NA	NA	NA	10.1	9.6	15.2
dissolved oxygen	mg/L	0	1.39	2.19	3.33	3.29	3.27	3.13	5.61	5.5	3.36	3.62	0.32	0.47	NA	6.32
ethyl alcohol	mg/L	<5	<5	1380	88.3	10.8	<5	NA	NA	NA	<5	NA	NA	<5	<5	<5
ferrous iron	mg/L	4	5.2	5.2	7	5.4	1.7	0.2	0.2	2	0	0	0	0	NA	0
methane	mg/L	6.2	14	8	5.7	15	8.9	NA	NA	NA	NA	NA	NA	0.14	0.14	0.0014
nitrate nitrogen	mg/L	<0.1	0.04 J	0.15	<0.1	<0.1	<0.1	NA	NA	NA	NA	NA	NA	3.3	3.2	0.91
ORP	mV	-191	-194	21	-180	-193	-176	171	122	138	371	266	85	127	NA	185
pH	su	6.64	6.37	4.57	5.78	5.77	5.77	5.08	7.02	4.97	4.47	4.75	6.16	5.1	NA	5.48
specific conductance	umhos/cm	250	3250	6270	1940	2180	361	88	85	69	187	222	58	80	NA	58
sulfate	mg/L	0.22 J	0.51	16.2	2.9	1.4	0.51	NA	NA	NA	NA	NA	NA	0.95	<0.5	0.44 J
temperature	degrees C	22.8	25.66	27	30.3	25.6	26.1	23.5	21.9	21.4	29.64	21.49	22 15	25.35	NA	24.46
total organic carbon	mg/L	2.6	577	4880	547	739	7.6	NA	NA	NA	1.1	NA	NA	0.63 J	<1	1
turbidity	NTU	76.2	19	11	23.4	33.5	29	0.2	8.4	1.1	6.3	12	17	3.1	NA	12

ORP - oxidation-reduction potential
mg/L - milligrams per liter
mV - millivolt
su - standard unit
umhos/cm - micromhos per centimeter
degreas C - degrees Celsius
NTU - nephelometric turbidity unit
J - estimated value
NA - not analyzed

Table 2
CNA Holdings Inc. / Ticona Shelby Facility
Quarter 4 2008
Groundwater Analytical Summary
AECOM Project No. 79750

Parameter	Unit	F-55 10/16/2008	J-29 10/15/2008	J-29 Dup 10/15/2008	K-28 10/15/2008	N-29 10/15/2008	O-25 10/15/2008	Q-33 10/15/2008	U-38 10/16/2008	V-23 10/16/2008	V-65 10/16/2008	W-23 10/16/2008	X-32 10/16/2008	CC-33 10/16/2008
acetone	mg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
benzene	mg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
carbon tetrachloride	mg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
chloroform	mg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
cis-1,2-dichloroethene	mg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
trichloroethene	mg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1-biphenyl	mg/L	68.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
biphenyl ether	mg/L	165	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ethylene glycol	mg/L	3140	<7	<7	<7	<7	<7	NA	<7	6770	<7	<7	<7	NA
iron	mg/L	728	<0.05	<0.05	3270	NA	33.8	NA	0.27	1910	34.3	0.039	0.11	NA
manganese	mg/L	205	0.009	0.006	82.1	NA	0.24	NA	0.073	714	1.2	0.42	0.043	NA
acetate	mg/L	3650	<10	<10	9060	NA	<10	NA	<10	13500	62.7	<10	<10	NA
alkalinity	mg/L	1190	581	580	3370	NA	43.8	NA	2.1	2060	402	105	3.1	NA
dissolved oxygen	mg/L	6.35	4.56	NA	1.1	1.46	5.2	7.47	6.82	0	4	0.64	7	0
ethyl alcohol	mg/L	751	<5	<5	<5	NA	<5	NA	<5	4250	<5	<5	<5	NA
ferrous iron	mg/L	4.2	0	NA	6	0	2	0	0	8	2.8	0	0.2	3
methane	mg/L	1.9	0.00029	0.00021	10	NA	0.54	NA	0.0032	15	25	0.026	0.00025	NA
nitrate nitrogen	mg/L	1.9	1.6	1.5	0.14	NA	<0.1	NA	1.7	0.22	<0.1	0.18	1	NA
ORP	mV	-9	178	NA	-140	551	-121	85	306	45	-116	249	285	-85
pH	su	4.9	6.75	NA	5.86	4.9	6.56	5.79	4.61	4.62	6.51	5.41	4.96	5.82
specific conductance	umhos/cm	2920	1200	NA	7240	69	803	658	82	6160	744	916	246	451
sulfate	mg/L	2.6	31.6	32.1	1.1	NA	162	NA	0.8	46.1	2.1	71.6	5	NA
temperature	degrees C	22.79	21.79	NA	22.53	19.32	20.4	19.7	20.3	18.64	18.6	20.23	20.5	21.49
total organic carbon	mg/L	2890	3.4	2.9	3810	1.1	11.8	NA	0.97	8610	34.6	4.2	0.88	NA
turbidity	NTU	281	65	NA	36	2.3	3.8	0.8	14	4.3	19	2.52	1.7	2

ORP - oxidation-reduction potential
mg/L - milligrams per liter
mV - millivolt
su - standard unit
umhos/cm - micromhos per centimeter
degrees C - degrees Celsius
NTU - nephelometric turbidity unit
J - estimated value
NA - not analyzed

Table 2
CNA Holdings Inc. / Ticona Shelby Facility
Quarter 4 2008
Groundwater Analytical Summary
AECOM Project No. 79750

Parameter	Unit	IT-1 10/15/2008	IT-2 10/15/2008	IT-3 10/15/2008	IT-3 Dup 10/15/2008	IT-4 10/15/2008	IT-5 10/15/2008	IT-6 10/15/2008	IT-7 10/15/2008	IT-8R 10/15/2008	IT-9 10/15/2008	PEW-1 10/15/2008	PEW-3 10/15/2008	PEW-4 10/15/2008
acetone	mg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
benzene	mg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
carbon tetrachloride	mg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
chloroform	mg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
cis-1,2-dichloroethene	mg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
trichloroethene	mg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1-biphenyl	mg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.01	0.01	0.0045
biphenyl ether	mg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.01	0.026	0.0242
ethylene glycol	mg/L	11.7	<7	<7	<7	<7	<7	514	<7	<7	<7	NA	NA	NA
iron	mg/L	734	52.4	18.1	18.2	34.6	107	1620	157	325	35.4	NA	NA	NA
manganese	mg/L	6.3	9	0.26	0.25	1.9	23.6	1100	97	31.7	17	NA	NA	NA
acetate	mg/L	1500	<10	<10	<10	<10	377	14900	642	365	<10	NA	NA	NA
alkalinity	mg/L	762	317	151	150	63.5	1140	1990	714	518	43.5	NA	NA	NA
dissolved oxygen	mg/L	5.5	0	0	NA	0	5.54	5.8	6.63	5.48	1.29	4.24	9.99	6.57
ethyl alcohol	mg/L	198	<5	<5	<5	<5	2.7	2410	43	<5	<5	NA	NA	NA
ferrous iron	mg/L	6.5	1.6	1.6	NA	2	2.8	5.1	3.1	4.2	2	0	0	0
methane	mg/L	6.6	6.4	14	11	4.9	21	12	12	18	11	NA	NA	NA
nitrate nitrogen	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.21	<0.1	<0.1	<0.1	NA	NA	NA
ORP	mV	-71	-60	-113	NA	-101	-144	51	-81	-144	-155	160	150	141
pH	su	5.71	5.05	5.13	NA	5.31	6.63	4.48	5.81	6.01	6.08	5.48	6.31	5.16
specific conductance	umhos/cm	2480	1030	580	NA	390	2480	6580	1760	1360	365	76	58	69
sulfate	mg/L	0.89	1.1	12.1	12.5	0.79	1.7	13	0.22	0.44	0.88	NA	NA	NA
temperature	degrees C	20.5	21.6	21.1	NA	19.8	18.73	20.73	22.71	20.6	19.01	21.2	21.4	22
total organic carbon	mg/L	833	7.1	4.3	4.1	3	234	5830	357	185	3.5	NA	NA	NA
turbidity	NTU	42	10	30	NA	56	22.3	8.7	11.22	21	24	0.29	6.4	1

ORP - oxidation-reduction potential
mg/L - milligrams per liter
mV - millivolt
su - standard unit
umhos/cm - micromhos per centimeter
degrees C - degrees Celsius
NTU - nephelometric turbidity unit
J - estimated value
NA - not analyzed

Table 2
CNA Holdings Inc. / Ticona Shelby Facility
Quarter 4 2008
Groundwater Analytical Summary
AECOM Project No. 79750

Parameter	Unit	TD-3 10/16/2008	TD-4 10/16/2008	TI-1 10/16/2008	TI-2 10/16/2008
acetone	mg/L	0.0069	0.0096	NA	NA
benzene	mg/L	<0.001	0.0036	NA	NA
carbon tetrachloride	mg/L	<0.001	0.0025	NA	NA
chloroform	mg/L	0.0016	0.0071	NA	NA
cis-1,2-dichloroethene	mg/L	0.005	0.0045	NA	NA
trichloroethene	mg/L	0.202	2.76	NA	NA
1,1-biphenyl	mg/L	NA	NA	NA	NA
biphenyl ether	mg/L	NA	NA	NA	NA
ethylene glycol	mg/L	NA	NA	<7	<7
iron	mg/L	NA	NA	1.4	0.18
manganese	mg/L	NA	NA	0.052	0.008
acetate	mg/L	NA	NA	<10	<10
alkalinity	mg/L	NA	NA	15.5	14
dissolved oxygen	mg/L	8.11	7.08	5.31	6.49
ethyl alcohol	mg/L	NA	NA	<5	<5
ferrous iron	mg/L	0.2	0	0	0
methane	mg/L	NA	NA	0.033	0.0054
nitrate nitrogen	mg/L	NA	NA	3	0.84
ORP	mV	319	148	290	191
pH	su	4.45	5.95	5.04	5.55
specific conductance	umhos/cm	252	47	76	53
sulfate	mg/L	NA	NA	0.47	0.56
temperature	degrees C	20.64	20.32	20.78	23.51
total organic carbon	mg/L	NA	NA	0.8	<1
turbidity	NTU	7.3	10	28.4	21

ORP - oxidation-reduction potential
mg/L - milligrams per liter
mV - millivolt
su - standard unit
umhos/cm - micromhos per centimeter
degrees C - degrees Celsius
NTU - nephelometric turbidity unit
J - estimated value
NA - not analyzed

Table 1
CNA Holdings Inc. / Ticona Shelby Facility
First Half 2009
Analytical Summary
AECOM Project No. 79750

Parameter	Unit	C-49 3/17/2009	F-55 3/20/2009	G-50 3/17/2009	I-57 3/18/2009	K-28 3/24/2009	T-35 3/17/2009	V-23 3/24/2009	V-65 3/24/2009	AA-54 3/18/2009	CC-33 3/18/2009	CC-33 Dup 3/18/2009	DD-58R 3/20/2009	GG-61 3/17/2009	II-65 3/20/2009	KK-55 3/19/2009
acetone	mg/L	<0.005	0.9	<0.005	<0.005	0.343	<0.005	<0.005	<0.0263	<0.005	<0.005	<0.0067	<0.0072	<0.005	<0.005	<0.005
benzene	mg/L	<0.001	0.0568	<0.001	<0.001	0.0089	<0.001	0.0131	0.0021	<0.001	<0.002	<0.0021	<0.001	<0.001	<0.001	<0.001
2-butanone	mg/L	<0.005	<0.025	<0.005	<0.005	0.148	<0.005	<0.005	0.017	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
carbon disulfide	mg/L	<0.001	<0.005	<0.001	<0.0023	<0.005	<0.001	0.0026	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
carbon tetrachloride	mg/L	<0.001	<0.005	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
chlorobenzene	mg/L	<0.001	<0.005	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.002	<0.0021	<0.001	<0.001	<0.001	<0.001
chloroform	mg/L	<0.001	<0.005	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,1-dichloroethene	mg/L	<0.001	<0.005	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
cis-1,2-dichloroethene	mg/L	<0.001	<0.005	<0.001	<0.001	<0.005	<0.001	0.0011	<0.001	<0.001	0.0106	0.0104	<0.0012	<0.001	<0.001	<0.001
diethylene dioxide	mg/L	<0.002	0.276	0.73	0.359	0.25	0.0417	1.03	0.322	0.226	0.08	0.0826	0.115	0.0492	0.27	0.142
ethylbenzene	mg/L	<0.001	<0.005	<0.001	<0.001	<0.005	<0.001	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
methylene chloride	mg/L	<0.001	0.0219	<0.001	<0.001	0.0083	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0034	<0.001	<0.0026	<0.001
tetrachloroethene	mg/L	<0.001	<0.005	<0.001	<0.001	<0.005	<0.0014	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
toluene	mg/L	<0.001	0.0121	<0.001	<0.001	<0.005	<0.001	0.0055	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
trichloroethene	mg/L	<0.001	<0.005	<0.001	<0.001	0.0126	<0.0015	<0.001	<0.001	<0.001	<0.0047	<0.0045	<0.001	<0.001	<0.001	<0.001
xylenes	mg/L	<0.002	<0.01	<0.002	<0.002	<0.01	<0.002	0.0073	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
1,1-biphenyl	mg/L	NA	38.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
biphenyl ether	mg/L	NA	119	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
phenol	mg/L	NA	2.13	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ethylene glycol	mg/L	NA	4250	<7	<7	<7	NA	653	<7	<7	NA	NA	<7	NA	<7	NA
ferrous iron	mg/L	<0.2	6.4	1.6	<0.2	3.4	0.6	3.1	<0.2	<0.2	1	1	1	<0.2	<0.2	0.8
ORP	mV	202	-27.4	-10.5	826	-326	76	109.5	-59.6	165	-69	-69	-126	156	90	-13.5
dissolved oxygen	mg/L	5.6	0.65	1	3.5	0.4	0.9	0.3	1.1	0.96	1.2	1.2	1.3	2.6	2.7	0.47
pH	su	5.3	6.7	6.1	5.1	6.1	5.6	5	6.6	5.1	6.4	6.4	7.2	6.1	6	6.4
specific conductance	mS/cm	0.018	2.7	0.37	0.032	2.2	0.51	3	0.92	0.3	0.28	0.28	0.57	0.18	0.14	0.49
temperature	degrees C	18.2	20.6	21.4	19.3	15.2	17	16.7	16.9	18.6	16.7	16.7	19.1	16	16.4	15.2
turbidity	NTU	3	54	14	5	20	9	13.1	3.1	5	1.3	1.3	41	<1	59	5

ORP - oxidation-reduction potential
mg/L - milligrams per liter
mV - millivolt
su - standard unit
umhos/cm - micromhos per centimeter
degrees C - degrees Celsius
NTU - nephelometric turbidity unit
J - estimated value
NA - not analyzed

Table 1
CNA Holdings Inc. / Ticona Shelby Facility
First Half 2009
Analytical Summary
AECOM Project No. 79750

Parameter	Unit	KK-55 3/30/2009	IT-5 3/24/2009	IT-6 3/24/2009	IT-7 3/24/2009	OT-2R 3/17/2009	PEW-1 3/19/2009	PEW-3 3/19/2009	PEW-4 3/19/2009	TD-2 3/19/2009	TD-3 3/20/2009	TD-4 3/20/2009	TI-2 3/19/2009	TI-2 Dup 3/19/2009	SW-4 3/19/2009	SW-7 3/19/2009
acetone	mg/L	NA	<0.0312	<0.005	0.122	<0.005	<0.007	<0.005	<0.0089	<0.005	<0.009	<0.005	<0.0065	<0.0081	<0.005	<0.005
benzene	mg/L	NA	0.0038	0.0168	0.0576	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.0054	<0.001	<0.001	<0.001	<0.001
2-butanone	mg/L	NA	0.0219	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
carbon disulfide	mg/L	NA	<0.001	0.0064	<0.001	<0.001	<0.001	<0.001	<0.0022	<0.001	<0.001	<0.001	<0.0012	<0.001	<0.001	<0.001
carbon tetrachloride	mg/L	NA	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.004	<0.001	<0.001	<0.001	<0.001
chlorobenzene	mg/L	NA	<0.001	0.0011	0.0464	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
chloroform	mg/L	NA	<0.001	<0.001	<0.001	<0.001	<0.0011	<0.001	<0.0016	<0.001	0.0019	0.0093	<0.0046	<0.0046	<0.001	<0.001
1,1-dichloroethene	mg/L	NA	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.0011	<0.001	<0.001	<0.001	<0.001
cis-1,2-dichloroethene	mg/L	NA	<0.001	0.0013	<0.001	<0.001	<0.0041	<0.001	<0.0019	<0.001	0.0055	0.0062	<0.001	<0.001	<0.001	<0.001
diethylene dioxide	mg/L	NA	0.453	2.45	0.366	0.09	0.028	<0.002	0.0655	<0.002	<0.002	<0.002	<0.002	<0.002	0.0097	0.0044
ethylbenzene	mg/L	NA	<0.001	0.0013	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
methylene chloride	mg/L	NA	<0.001	0.0011	<0.001	<0.001	<0.001	<0.0024	<0.0021	<0.001	<0.001	<0.001	<0.0023	<0.0023	<0.001	<0.001
tetrachloroethene	mg/L	NA	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.0055	0.0056	<0.001	<0.001
toluene	mg/L	NA	0.0013	0.0053	0.0163	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
trichloroethene	mg/L	NA	<0.001	<0.001	<0.001	<0.001	0.0128	<0.001	0.0524	<0.001	0.208	3.74	0.0072	0.0073	<0.001	<0.001
xylenes	mg/L	NA	<0.002	0.0047	0.0036	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
1,1-biphenyl	mg/L	NA	NA	NA	NA	NA	<0.01	0.0352	<0.01	NA	NA	NA	NA	NA	NA	NA
biphenyl ether	mg/L	NA	NA	NA	NA	NA	<0.01	0.08	0.0109	NA	NA	NA	NA	NA	NA	NA
phenol	mg/L	NA	NA	NA	NA	NA	<0.01	<0.01	<0.01	NA	NA	NA	NA	NA	NA	NA
ethylene glycol	mg/L	<7	<7	1830	<7	<7	NA	NA	NA	NA	NA	NA	<7	<7	NA	NA
ferrous iron	mg/L	0.6	1.2	5	2.4	1.6	<0.2	<0.2	0.8	<0.2	<0.2	<0.2	0.8	0.8	<0.2	<0.2
ORP	mV	-16	-85.2	79	10.7	-71	94	116	87	137	201	146	103	103	138	81
dissolved oxygen	mg/L	0.51	0.3	0.3	0.3	0.6	0.3	3.2	0.5	3.5	5.6	0.55	5	5	6.9	8.3
pH	su	6.5	6.5	4.9	6.3	6.7	5.9	6.9	5.4	5	6.7	6.9	5.9	5.9	7.1	7.2
specific conductance	mS/cm	0.48	1.5	6.2	1.8	0.55	0.099	0.066	0.069	0.1	0.23	0.042	0.046	0.046	0.15	0.11
temperature	degrees C	15.4	14	15.8	16.3	16	20	21	21	19	19.7	19.4	19.3	19.3	16.2	17
turbidity	NTU	5	22	20	17	6	<1	1	1	11	12	32	68	68	31	37

ORP - oxidation-reduction potential
mg/L - milligrams per liter
mV - millivolt
su - standard unit
umhos/cm - micromhos per centimeter
degrees C - degrees Celsius
NTU - nephelometric turbidity unit
J - estimated value
NA - not analyzed

Table 1
CNA Holdings Inc. / Ticona Shelby Facility
Second Half 2009
Analytical Summary
AECOM Project No. 60135442

Parameter	Unit	C-49 11/03/2009	F-55 11/05/2009	G-50 11/05/2009	I-57 11/05/2009	K-28 11/04/2009	T-35 11/03/2009	V-23 11/04/2009	V-65 11/04/2009	AA-54 11/04/2009	CC-33 11/03/2009	DD-58R 11/05/2009	GG-61 11/03/2009	II-65 11/04/2009	II-112 11/04/2009
acetone	mg/L	<0.005	1.020	<0.005	<0.005	0.883	<0.005	<0.005	0.00685	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
benzene	mg/L	<0.001	0.0535	<0.001	<0.001	0.00930	<0.001	0.0174	0.00216	<0.001	0.00193	<0.001	<0.001	<0.001	<0.001
2-butanone	mg/L	<0.005	<0.0250	<0.005	<0.005	0.728	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.00762
carbon disulfide	mg/L	0.00104	<0.005	<0.001	<0.001	<0.005	<0.001	0.00193	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
carbon tetrachloride	mg/L	<0.001	<0.005	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
chlorobenzene	mg/L	<0.001	<0.005	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	0.00284	0.00102	<0.001	<0.001	<0.001
chloroform	mg/L	<0.001	<0.005	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
cis-1,2-dichloroethene	mg/L	<0.001	<0.005	<0.001	<0.001	<0.005	<0.001	0.00124	<0.001	<0.001	0.00496	<0.001	<0.001	<0.001	<0.001
1,2-dichloroethane	mg/L	<0.001	<0.005	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
diethylene dioxide	mg/L	0.00365	0.313	0.562	0.360	0.738	0.0452	2.940	0.470	0.199	0.128	0.0789	0.0377	0.235	0.00633
ethylbenzene	mg/L	<0.001	<0.005	<0.001	<0.001	<0.005	<0.001	0.00271	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
tetrachloroethene	mg/L	<0.001	<0.005	<0.001	<0.001	<0.005	0.00113	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
toluene	mg/L	<0.001	0.0173	<0.001	<0.001	<0.005	<0.001	0.00929	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
trichlorethene	mg/L	<0.001	<0.005	<0.001	<0.001	<0.005	0.00151	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
xylenes	mg/L	<0.002	<0.01	<0.002	<0.002	<0.01	<0.002	0.0101	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
1,1-biphenyl	mg/L	NA	6.880	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
biphenyl ether	mg/L	NA	35.000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ethylene glycol	mg/L	NA	3010	<7	<7	<7	NA	3850	<7	<7	NA	<7	NA	<7	<7
ferrous iron	mg/L	<0.200	6.00	2.00	0.200	7.00	0.500	3.50	6.00	0.200	0.500	1.20	0.200	0.200	1.20
ORP	mV	289	-91	41	217	-119	136	55	-105	228	-32.6	33	175	276	-44
dissolved oxygen	mg/L	5.86	1.73	1.60	2.90	0.29	0.30	0.42	0.36	0.50	0.82	2.81	0.93	2.70	1.40
pH	su	5.28	5.26	5.87	4.62	6.10	5.58	5.02	6.80	5.04	6.24	6.59	6.33	5.93	7.13
specific conductance	mS/cm	0.0190	3.10	0.419	0.0260	5.93	0.547	6.06	0.842	0.352	0.288	0.545	0.162	0.180	0.151
temperature	degrees C	18.9	20.3	21.0	19.7	18.9	19.2	18.6	17.1	17.0	17.9	17.3	16.5	16.0	16.0
turbidity	NTU	2.80	128	16.0	7.00	4.78	8.00	3.10	3.00	6.00	5.10	463	1.00	34.0	1.00

ORP - oxidation-reduction potential
mg/L - milligrams per liter
mV - millivolt
su - standard unit
mS/cm - millisiemens per centimeter
degrees C - degrees Celsius
NTU - nephelometric turbidity unit
NA - not analyzed
J - estimated value

Table 1
CNA Holdings Inc. / Ticona Shelby Facility
Second Half 2009
Analytical Summary
AECOM Project No. 60135442

Parameter	Unit	KK-55 11/05/2009	IT-5 11/03/2009	IT-5 Dup 11/03/2009	IT-6 11/03/2009	IT-7 11/03/2009	OT-2R 11/03/2009	PEW-1 11/05/2009	PEW-3 11/05/2009	PEW-4 11/05/2009	TD-2 11/04/2009	TD-3 11/05/2009	TD-4 11/05/2009	TI-2 11/04/2009
acetone	mg/L	<0.005	0.0777 J	0.0564 J	<0.005	0.0767	<0.005	0.00649	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
benzene	mg/L	<0.001	0.00506	0.00484	0.0154	0.0454	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.00470	<0.001
2-butanone	mg/L	<0.005	0.127 J	0.0906 J	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
carbon disulfide	mg/L	<0.001	<0.001	<0.001	0.00282	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
carbon tetrachloride	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.00363	<0.001
chlorobenzene	mg/L	<0.001	<0.001	<0.001	<0.001	0.0471	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
chloroform	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.00105	<0.001	0.00115	0.00864	0.00529
cis-1,2-dichloroethene	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.00378	<0.001	<0.001	<0.001	0.00245	0.00540	<0.001
1,2-dichloroethane	mg/L	<0.001	<0.001	<0.001	<0.001	0.00139	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
diethylene dioxide	mg/L	0.104	0.809	0.856	2.460	0.429	0.0872	0.0216	<0.002	0.0426	<0.002	<0.002	<0.002	0.00478
ethylbenzene	mg/L	<0.001	<0.001	<0.001	0.00118	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
tetrachloroethene	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.00619
toluene	mg/L	<0.001	0.00141	0.00138	0.00519	0.0175	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
trichlorethene	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.0129	<0.001	0.0379	<0.001	0.0688	3.840	0.00817
xylenes	mg/L	<0.002	<0.002	<0.002	0.00472	0.00294	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
1,1-biphenyl	mg/L	NA	NA	NA	NA	NA	NA	<0.01	0.0422	<0.01	NA	NA	NA	NA
biphenyl ether	mg/L	NA	NA	NA	NA	NA	NA	<0.01	0.251	0.0173 J	NA	NA	NA	NA
ethylene glycol	mg/L	<7	<7	8.36	948	<7	<7	NA	NA	NA	NA	NA	NA	<7
ferrous iron	mg/L	3.00	1.40	1.40	6.00	4.00	1.40	0.200	0.500	1.50	0.200	0.200	0.200	0.200
ORP	mV	-50	-87	-89	1	-62	-65	138	227	122	220	275	187	156
dissolved oxygen	mg/L	0.85	0.50	0.50	0.70	0.60	0.60	0.85	4.86	1.32	2.40	4.70	1.20	3.40
pH	su	6.39	6.71	6.71	4.85	6.19	6.93	5.92	6.70	5.45	4.95	5.23	6.38	5.99
specific conductance	mS/cm	0.484	1.45	1.45	2.03	0.788	0.473	0.154	0.0600	0.0710	0.0950	0.251	0.0440	0.0480
temperature	degrees C	16.1	17.5	17.5	19.0	19.0	18.0	19.4	21.1	21.5	18.0	19.0	18.0	21.2
turbidity	NTU	1.00	26.0	26.0	5.00	20.0	14.0	1.10	1.00	1.00	31.0	4.00	77.0	33.0

ORP - oxidation-reduction potential
mg/L - milligrams per liter
mV - millivolt
su - standard unit
mS/cm - millisiemens per centimeter
degrees C - degrees Celsius
NTU - nephelometric turbidity unit
NA - not analyzed
J - estimated value

Table 2
CNA Holdings Inc. / Ticona Shelby Facilty
Second Half 2009
Analytical Surface Water Summary
AECOM Project No. 60135442

Parameter	Unit	SW1 11/04/2009	SW2 11/04/2009	SW3 11/04/2009	SW4 11/05/2009	SW4 DUP 11/05/2009	SW5 11/04/2009	SW6 11/03/2009	SW7 11/04/2009	SW8 11/04/2009	SW9 11/03/2009	SW10 11/03/2009	SW11 11/03/2009	SW12 11/03/2009
acetone	mg/L	NA	NA	NA	<0.005	<0.005	NA	NA	0.00560	NA	NA	NA	NA	NA
diethylene dioxide	mg/L	0.0117	0.0340	0.00410	0.0141	0.0168	0.00357	<0.002	0.00418	<0.002	0.00551	0.00372	0.00821	0.00770
ferrous iron	mg/L	0.200	0.200	0.200	1.10	1.10	0.200	0.300	0.200	0.200	0.200	0.200	0.300	0.200
ORP	mV	128	125	163	82	82	123	88.5	134	125	105.2	88.3	-103.5	120
dissolved oxygen	mg/L	6.40	6.60	8.00	5.90	5.90	3.70	4.20	8.00	6.10	6.50	5.80	6.60	6.60
pH	su	7.03	6.79	6.04	6.77	6.77	6.82	6.83	6.67	6.95	7.48	7.67	7.03	6.50
specific conductance	mS/cm	0.179	0.445	0.126	0.203	0.203	0.315	0.0850	0.120	0.0610	0.111	0.102	0.157	0.164
temperature	degrees C	12.3	15.4	11.0	15.7	15.7	13.4	17.6	12.3	14.7	16.8	16.2	15.0	14.0
turbidity	NTU	1.10	1.00	1.80	1.70	1.70	1.70	5.00	1.30	2.69	1.70	1.89	18.1	2.80

ORP - oxidation-reduction potential
mg/L - milligrams per liter
mV - millivolt
su - standard unit
mS/cm - millisiemens per centimeter
degrees C - degrees Celsius
NTU - nephelometric turbidity unit
NA - not analyzed

Table 1
CNA Holdings Inc. / Ticona Shelby Facility
First Half 2010
Analytical Summary
AECOM Project No. 60135442

Parameter	Unit	C-49 3/16/2010	F-55 3/17/2010	G-50 3/17/2010	I-57 3/17/2010	K-28 3/17/2010	T-35 3/17/2010	V-23 3/17/2010	V-65 3/17/2010	AA-54 3/16/2010	CC-33 3/16/2010	DD-58R 3/17-18/2010	GG-61 3/18/2010	II-65 3/18/2010	II-112 3/18/2010
acetone	mg/L	<0.005	<0.1	0.00715	<0.005	0.476	<0.005	<0.005	0.0071	<0.0109	0.00832	0.0117	<0.005	<0.00685	<0.005
benzene	mg/L	<0.005	<0.1	<0.005	<0.005	0.252	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
2-butanone	mg/L	<0.001	0.0424	<0.001	<0.001	0.00796	<0.001	0.0178	0.00239	<0.001	0.00147	<0.001	<0.001	<0.001	<0.001
carbon disulfide	mg/L	<0.001	<0.02	0.00673	<0.001	<0.005	<0.001	0.0053	<0.001	<0.001	<0.001	<0.001	0.00274	0.00142	<0.001
carbon tetrachloride	mg/L	<0.001	<0.02	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
chlorobenzene	mg/L	<0.001	<0.02	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	0.0025	<0.001	<0.001	<0.001	<0.001
chloroform	mg/L	<0.001	<0.02	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
cis-1,2-dichloroethene	mg/L	<0.001	<0.02	<0.001	<0.001	<0.005	<0.001	0.00131	<0.001	<0.001	0.00323	<0.001	<0.001	<0.001	<0.001
1,2-dichloroethane	mg/L	<0.001	<0.02	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
diethylene dioxide	mg/L	<0.002	0.319	0.573	0.509	0.41	0.0493	2.5	0.396	0.21	0.0894	0.0852	0.0416	0.301	0.00504
ethylbenzene	mg/L	<0.001	<0.02	<0.001	<0.001	<0.005	<0.001	0.00304	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
methylene chloride	mg/L	<0.001	0.0355	<0.001	<0.001	0.00732	<0.001	<0.001	<0.00107	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
tetrachloroethene	mg/L	<0.001	<0.02	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
toluene	mg/L	<0.001	0.0226	<0.001	<0.001	<0.005	<0.001	0.0107	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
trichlorethene	mg/L	<0.001	<0.02	0.00155	<0.001	<0.005	0.00156	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
xylenes	mg/L	<0.002	<0.04	<0.002	<0.002	<0.01	<0.002	0.0107	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
1,1-biphenyl	mg/L	NA	1.73	NA	NA	NA	NA	NA	NA	NA	NA	<0.01	NA	NA	NA
biphenyl ether	mg/L	NA	4.68	NA	NA	NA	NA	NA	NA	NA	NA	0.0641	NA	NA	NA
ethylene glycol	mg/L	NA	3550	< 7	< 7.00	< 7.00	NA	4560	< 7.00	< 7.00	NA	< 7.00	NA	< 7.00	< 7.00
total organic carbon	mg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	6.93	NA	NA	NA
ferrous iron	mg/L	0.200	6.30	2.30	0.200	3.50	0.500	5.00	5.00	0.200	2.00	2.40	0.200	0.200	0.600
ORP	mV	379.0	-107	-46	216.0	-88	163.0	45.6	-143	239.0	-71	86.0	132.0	196.0	48.0
dissolved oxygen	mg/L	5.81	1.64	0.60	4.00	0.48	0.90	0.41	0.42	0.32	1.70	2.98	3.00	2.60	1.30
pH	SU	4.70	5.18	5.83	5.04	6.45	5.62	5.07	6.70	5.01	6.04	6.98	6.55	5.81	6.83
specific conductance	mS/cm	0.0220	3.47	0.360	0.0330	1.76	0.556	5.96	0.878	0.345	0.295	0.603	0.170	0.172	0.130
temperature	Deg C	15.1	20.3	20.5	19.0	15.1	14.9	14.0	15.5	17.8	15.9	15.6	14.3	15.4	16.0
turbidity	NTU	1.00	133	17.0	6.00	4.12	5.62	4.10	5.83	2.99	8.00	17.0	1.00	1.00	2.00

ORP - oxidation-reduction potential
mg/L - milligrams per liter
mV - millivolt
su - standard unit
mS/cm - millisiemens per centimeter
degrees C - degrees Celsius
NTU - nephelometric turbidity unit
NA - not analyzed
J - estimated value

Table 1
CNA Holdings Inc. / Ticona Shelby Facility
First Half 2010
Analytical Summary
AECOM Project No. 60135442

Parameter	Unit	KK-55 3/17/2010	IT-5 3/16/2010	IT-6 3/16/2010	IT-7 3/16/2010	OT-2R 3/16/2010	PEW-1 3/17/2010	PEW-3 3/16/2010	PEW-4 3/16/2010	TD-2 3/18/2010	TD-3 3/17/2010	TD-4 3/17/2010	TI-2 3/18/2010
acetone	mg/L	<0.005	0.201	<0.005	0.11	<0.00712	<0.005	<0.005	0.0288	<0.00968	<0.005	<0.005	<0.005
benzene	mg/L	<0.005	0.182	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
2-butanone	mg/L	<0.001	0.00543	0.0148	0.0705	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.00507	<0.001
carbon disulfide	mg/L	0.001	<0.002	0.00369	<0.001	<0.001	<0.001	0.00105	<0.001	<0.001	0.0011	<0.001	0.0017
carbon tetrachloride	mg/L	<0.001	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.00333	<0.001
chlorobenzene	mg/L	<0.001	<0.002	<0.001	0.0484	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
chloroform	mg/L	<0.001	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001	0.00138	<0.001	0.00147	0.00936	0.00587
cis-1,2-dichloroethene	mg/L	<0.001	<0.002	<0.001	<0.001	<0.001	0.00464	<0.001	<0.001	<0.001	0.00252	0.00646	<0.001
1,2-dichloroethane	mg/L	<0.001	<0.002	<0.001	0.00236	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
diethylene dioxide	mg/L	0.121	0.907	2.43	0.452	0.101	0.0344	<0.002	0.0569	0.0022	<0.002	<0.002	0.00285
ethylbenzene	mg/L	<0.001	<0.002	0.0011	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
methylene chloride	mg/L	<0.001	<0.00275	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.00202	<0.001	<0.001	0.00245
tetrachloroethene	mg/L	<0.001	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.00579
toluene	mg/L	<0.001	0.00357	0.00511	0.0272	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
trichlorethene	mg/L	<0.001	<0.002	<0.001	<0.001	<0.001	0.0142	<0.001	0.0429	<0.001	0.375	3.56	0.0083
xylenes	mg/L	<0.002	<0.004	0.00399	0.00295	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
1,1-biphenyl	mg/L	NA	NA	NA	NA	NA	<0.01	<0.01	<0.01	NA	NA	NA	NA
biphenyl ether	mg/L	NA	NA	NA	NA	NA	<0.01	<0.01	0.0117	NA	NA	NA	NA
ethylene glycol	mg/L	< 7.00	< 7.00	1370	< 7.00	< 7.00	NA	NA	NA	NA	NA	NA	< 7.00
total organic carbon	mg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ferrous iron	mg/L	2.00	3.00	7.00	3.00	0.200	0.200	0.200	1.00	0.200	0.200	0.200	0.200
ORP	mV	-7	-104	-84	-43	80.0	114.0	355.0	153.0	251.0	170	121.0	200
dissolved oxygen	mg/L	0.20	0.71	0.80	0.70	0.54	0.50	4.10	0.80	2.94	3.90	1.30	5.00
pH	SU	6.36	6.41	4.93	6.04	6.93	6.09	6.24	5.30	5.31	5.00	5.82	5.94
specific conductance	mS/cm	0.468	2.73	6.13	1.77	0.592	0.209	0.0570	0.0680	0.105	0.216	0.0380	0.0470
temperature	Deg C	16.9	15.1	14.0	15.2	14.7	18.1	21.0	21.5	19.4	17.8	17.8	20.2
turbidity	NTU	8.00	15.1	22.4	19.0	3.01	3.10	1.00	1.00	19.3	6.00	57.0	35.0

ORP - oxidation-reduction potential
mg/L - milligrams per liter
mV - millivolt
su - standard unit
mS/cm - millisiemens per centimeter
degrees C - degrees Celsius
NTU - nephelometric turbidity unit
NA - not analyzed
J - estimated value

Table 2
Surface Water Analytical Summary
CNA Holdings Inc. / Ticona Shelby Facility
First Half 2010
Analytical Summary
AECOM Project No. 60135442

Parameter	Unit	SW-4 3/16/2010	SW-7 3/16/2010
acetone	mg/L	0.0281	0.0261
diethylene dioxide	mg/L	0.0127	0.00374
methylene chloride	mg/L	0.00144	0.0015
ferrous iron	mg/L	0.600	0.200
ORP	mV	171.0	129.0
dissolved oxygen	mg/L	8.10	9.60
pH	SU	6.13	7.30
specific conductance	mS/cm	0.152	0.0930
temperature	Deg C	13.4	139
turbidity	NTU	7.10	6.70

ORP - oxidation-reduction potential
mg/L - milligrams per liter
mV - millivolt
su - standard unit
mS/cm - millisiemens per centimeter
degrees C - degrees Celsius
NTU - nephelometric turbidity unit
NA - not analyzed
J - estimated value

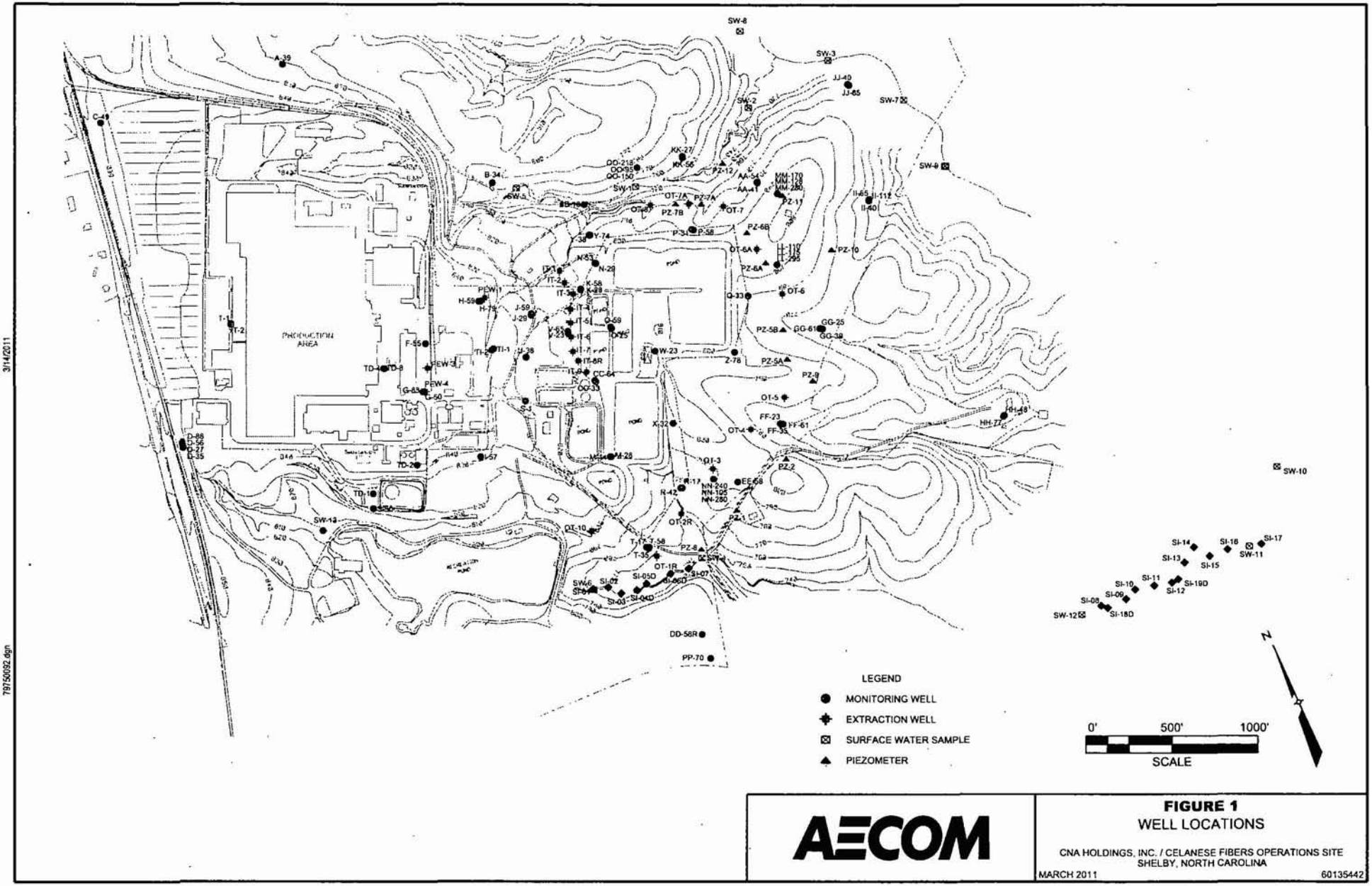

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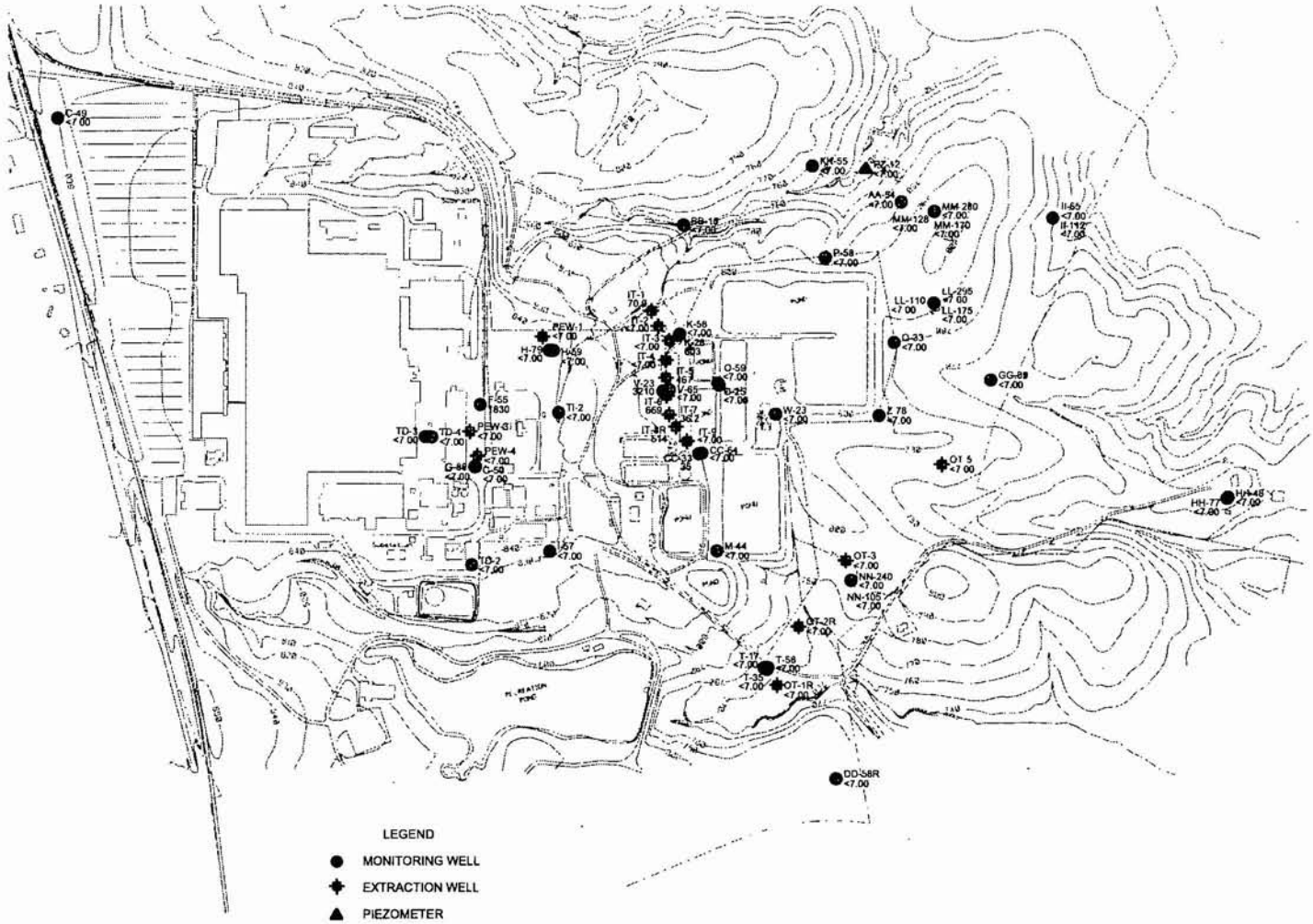
FIGURE 1
WELL LOCATIONS

CNA HOLDINGS, INC. / CELANESE FIBERS OPERATIONS SITE
SHELBY, NORTH CAROLINA

MARCH 2011 60135442



3/14/2011

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AECOM

FIGURE 2
ETHYLENE GLYCOL
SEPTEMBER 2010
CNA HOLDINGS, INC. / CELANESE FIBERS OPERATIONS SITE
SHELBY, NORTH CAROLINA
MARCH 2011 60135442

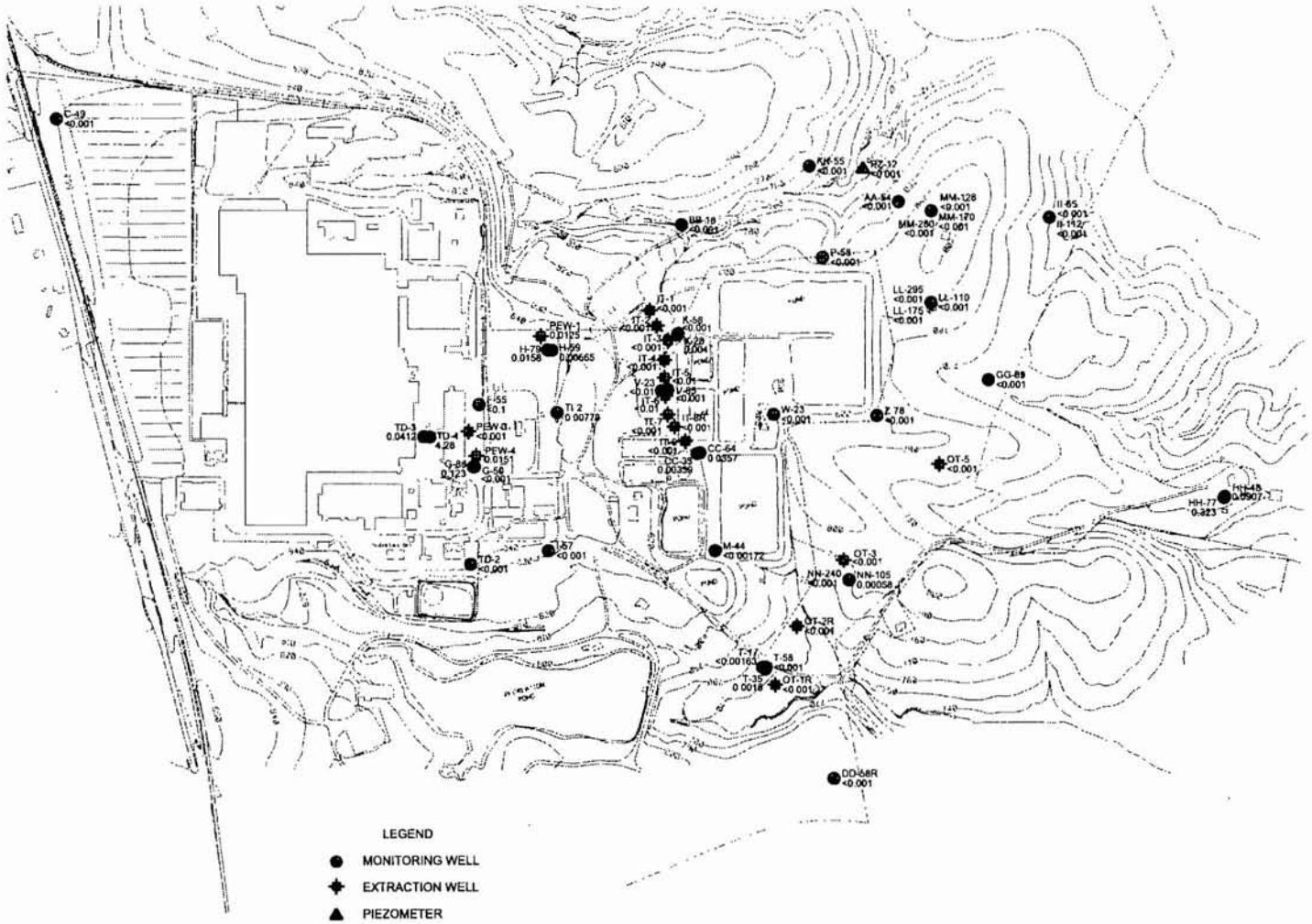

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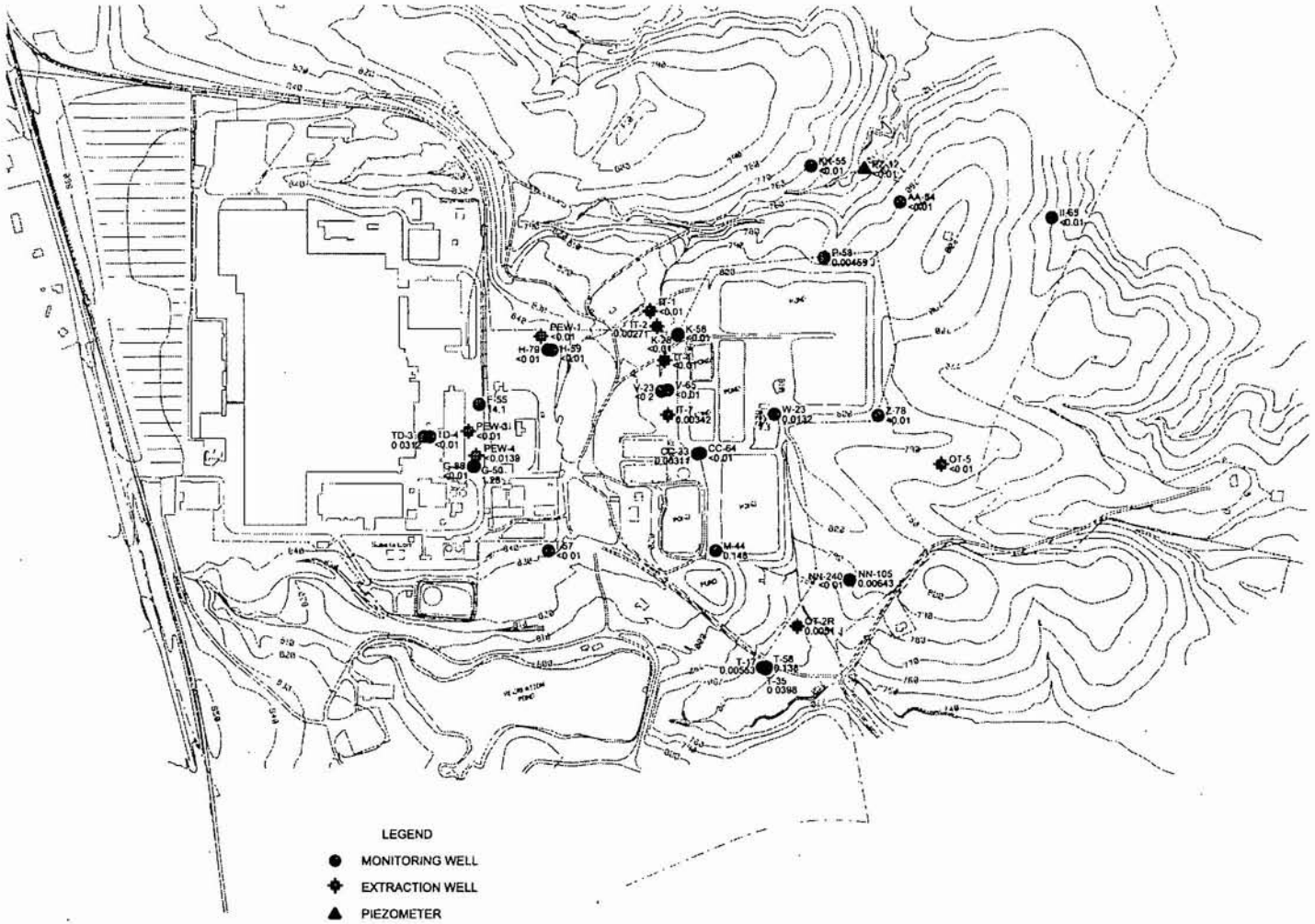
FIGURE 3
TCE
SEPTEMBER 2010
CNA HOLDINGS, INC. / CELANESE FIBERS OPERATIONS SITE
SHELBY, NORTH CAROLINA
MARCH 2011
60135442



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AECOM

FIGURE 4
BIPHENYL ETHER
SEPTEMBER 2010

CNA HOLDINGS, INC. / CELANESE FIBERS OPERATIONS SITE
SHELBY, NORTH CAROLINA

MARCH 2011

60135442

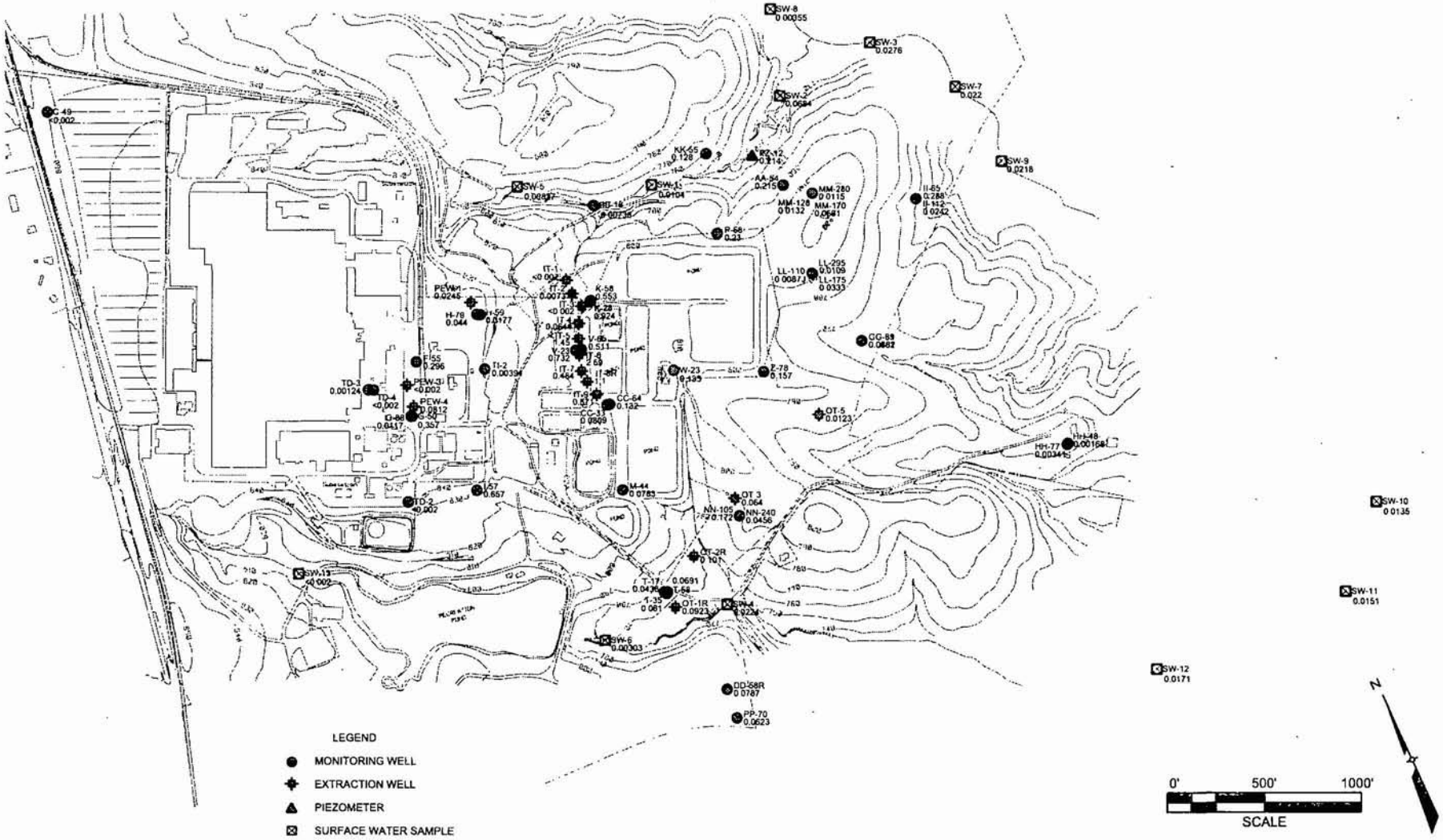

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FIGURE 5
DIETHYLENE DIOXIDE
SEPTEMBER 2010
CNA HOLDINGS, INC. / CELANESE FIBERS OPERATIONS SITE
SHELBY, NORTH CAROLINA
MARCH 2011 60135442

Appendix G: Stream Inflow Technical Memorandum

AECOM
One Midtown Plaza
1360 Peachtree St., N.E.
Suite 500
Atlanta, GA 30309

404.965.9600 tel
404.965.9605 fax

October 5, 2010

Ms. Beth Walden
Remedial Project Manager
US Environmental Protection Agency, Region 4
Atlanta Federal Center
61 Forsyth Street
Atlanta, Georgia 30303-3104

Subject: Stream Inflow Technical Memorandum
Celanese Fibers Operations Site
Shelby, North Carolina
Document Control 026SB-297
AECOM Project 60135442

Dear Ms. Walden,

Diethylene dioxide (DEDO) has been identified as a parameter of interest at the Shelby site. This parameter exists at the site because it is a by-product of plant processes. The primary source of DEDO at the site is believed to the former GRUB disposal area.

DEDO is both mobile and recalcitrant in the subsurface and detections are noted further away from the former disposal area than other chemicals associated with the site. A study was developed to evaluate whether shallow groundwater discharges to the boundary streams as suggested by the slope aquifer model proposed by Harry LeGrand. If the boundary streams are shown to capture discharge of DEDO then these results will support the conclusion that the surface water provides a hydraulic boundary on the DEDO plume.

The objectives of the stream investigation as stated in the *Work Plan and Field Sampling Plan for Supplemental Investigation and Long-Term Groundwater Monitoring*, June 2010 were to:

- collect samples that are representative of the groundwater beneath the stream bed,
- collect surface water samples from the stream, and
- confirm groundwater discharges to the stream as suggested by the slope aquifer model.

The work described below meets these objectives and the sampling and analysis demonstrate discharge to and capture by the perennial surface streams.

Field Work

The field effort was completed as described in the work plan. The general work area is presented in Figure 1.

A pilot study was initially completed to establish this effectiveness of the methodology. The results of this pilot study were presented in a Technical Memo submitted to EPA on May 12, 2009. The conclusion of the pilot study was that the methodology could be easily implemented and was capable of collecting samples which were representative of shallow groundwater (*Technical Memorandum, Stream Investigation Pilot Test, Fibers Operations Site, Shelby, NC*, AECOM, May 2009).

The full scale study was completed between September 22 and September 24, 2009. Surface water and groundwater samples were collected from twenty-one locations in Stream C and one location in Stream A slightly upstream of the confluence of Stream C. As described in the work plan, samples were collected from locations along Stream C extending from the recreation pond to the Celanese property boundary and through the property owned by George Camp. The sample locations along these two sections of the creek are presented in Figure 2.

Results

The results of manometer readings from the twenty-two locations are presented in Table 1. For the majority of locations a significant upward gradient was not noted. The one significant gradient was noted at the SI-17 location. This location is on Stream A slightly upstream of the confluence of Stream C.

The results of DEDO analyses are presented in Table 2, and the field data are summarized in Table 3.

Groundwater samples collected along the creek within Celanese property demonstrate the discharge of groundwater and DEDO into surface water. The first three locations nearest the recreation pond did not detect DEDO at a reporting level of 0.002 milligrams per liter (mg/L) in either the groundwater or surface water samples. However, the DEDO plume intersects with groundwater beneath the creek at some point between location SI-3D[1] and location SI-4D. The sample from groundwater at location SI-4D contained 0.0809 mg/L DEDO. The surface water at this location also had detected levels of DEDO, with a reported concentration of 0.0268 mg/L. Because the stream water upgradient of this location did not contain DEDO, the presence starting at this point indicates that discharge has occurred and DEDO is being captured by the surface water drainage feature. The lower concentration in surface water is the result of groundwater mixing with upgradient surface water which does not contain detectable levels of DEDO.

Because location SI-4D is the first location with detectable DEDO, a simple mass balance indicates that the flux of groundwater into the stream contributes roughly one third of the flow in this

---

[1] The locations were selected to generally represent approximate 100-foot long reaches of the stream. Locations that are at or near an adjacent surface drainage feature are identified with the suffix "D" after the location number.

immediate area. However, this is only an approximation and further data would be needed to refine the estimate.

Locations between the SI-4D location and the property boundary were generally consistent with the results of SI-4D. The groundwater concentration in the sample collected at location SI-6D was lower (0.0432 mg/L). Surface water concentrations varied between approximately <0.002 mg/L and 0.023 mg/L. However, the data consistently indicated relatively higher concentrations of DEDO in groundwater becoming diluted into lower concentration surface water flows, and the concentrations were within a consistent range. The lowest concentrations reported downstream after DEDO was first measured in the stream were as location SW-4D near the downstream property line.

Samples collected downstream on the Camp property, indicated that the surface water concentrations were stabilized and generally within the range of 0.010 mg/L to 0.015 mg/L. Shallow groundwater samples collected in this area were similar, though almost always slightly lower than the related surface water result. Groundwater concentrations ranged from <0.002 mg/L to 0.0161 mg/L. Figure 3 presents concentration profiles of the data for the reaches of the stream evaluated.

Conclusions

The data indicate that DEDO from the site is migrating to Stream C. The hydraulic gradients observed at most locations only identified minimal or no upward gradient. However, the data, particularly nearest to the recreation pond, clearly shows a direct relationship between DEDO in shallow groundwater and concentrations in the stream surface water.

Locations closer to the former source, as expected, were found to have higher concentrations of DEDO in groundwater and provide the primary contributions of DEDO mass noted in the surface water. As the surface water flows down stream it travels further from the former GRUB disposal area and groundwater concentrations encountered are lower.

The mass of DEDO in the downstream surface water in the streams is comprised of a combination of mass which has flowed along the stream and lower additional mass which enters the stream, though at lower flux rates as the plume migrates further from the former source. If discharge along the length of the stream was not occurring, the surface water concentration would be continually declining as DEDO-free water was discharged to the stream and increasing the stream baseflow.

The data show that the streams act as discharge locations for the DEDO plume. While DEDO is relatively recalcitrant in the subsurface, once it is exposed to sunlight via the surface water, degradation can be fairly rapid. Under ideal circumstances the half life can be on the order of hours. However, it is expected that in shallow surface streams with moderate to heavy canopy, the rate of degradation is slowed. The downstream concentrations measured during this study are the combined result of flow from upstream, continued influx of groundwater with DEDO at lower concentrations, and degradation of DEDO in surface water. The data show that these factors result in concentrations that decline and stabilize along the stream.

If you have questions about the data or the completed work activity, please contact us at (404) 965-9600.

Yours sincerely,

Jeff Peterman
Project Geologist

Bryon Dahlgren
Project Engineer

Everett W. Glover, Jr. PE
Project Manger

Tables

Table 1
Summary of Manometer Readings
Stream Inflow Investigation
CFO Site - Shelby, North Carolina
AECOM Project 60135442

Sample ID	Date	Manometer Reading feet	Stream Depth feet	MP to Stream Surface feet	Stream Elevation feet msl
SI-1D-GW	09/22/09				
SI-1D-SW	09/22/09	0.11	0.22	1.67	764.67
SI-2D-GW	09/22/09				
SI-2D-SW	09/22/09	0	0.08	0.82	763.46
SI-3-GW	09/22/09				
SI-3-SW	09/22/09	-0.02	0.12	0.82	762.27
SI-4D-GW	09/22/09				
SI-4D-SW	09/22/09	0	0.04	0.63	760.29
SI-5D-GW	09/22/09				
SI-5D-SW	09/22/09	0.01	0.50	1.42	758.87
SI-6D-GW	09/22/09				
SI-6D-SW	09/22/09	0	0.15	1.42	756.25
SI-7-GW	09/23/09				
SI-7-SW	09/23/09	0	0.56	1.47	755.94
SW-4D-GW	09/23/09				
SW-4D-SW	09/23/09	0.02	0.26	1.72	754.35
SW-12-GW	09/23/09				
SW-12-SW	09/23/09	0	0.10	1.28	689.24
SI-8-GW	09/23/09				
SI-8-SW	09/23/09	0.01	0.30	1.06	682.53
SI-18D-GW	09/24/09				
SI-18D-SW	09/24/09	-0.02	0.21	2.02	681.26
SI-9-GW	09/23/09				
SI-9-SW	09/23/09	-0.02	0.10	0.87	679.14
SI-10-GW	09/23/09				
SI-10-SW	09/23/09	0.08	0.07	0.16	677.37
SI-11-GW	09/23/09				
SI-11-SW	09/23/09	0	0.06	2.42	676.59
SI-12-GW	09/23/09				
SI-12-SW	09/23/09	0	0.06	3.59	672.42
SI-19D-GW	09/24/09				
SI-19D-SW	09/24/09	-0.01	0.02	2.10	671.60
SI-13-GW	09/24/09				
SI-13-SW	09/24/09	0.01	0.07	0.53	669.52
SI-14D-GW	09/24/09				
SI-14D-SW	09/24/09	0	0.08	2.44	668.08
SI-15-GW	09/24/09				
SI-15-SW	09/24/09	0	0.10	2.41	667.49
SI-16-GW	09/24/09				
SI-16-SW	09/24/09	0	0.08	1.68	662.47
SW-11-GW	09/24/09				
SW-11-SW	09/24/09	0	0.08	1.40	658.14
SI-17-GW	09/24/09				
SI-17-SW	09/24/09	0.75	0.20	1.40	657.28

"D" in Sample ID indicates sample location near drainage feature

Table 2
Summary of Diethylene Dioxide
Stream Inflow Investigation
CFO Site - Shelby, North Carolina
AECOM Project 60135442

Groundwater		Surface Water		
	mg/L		mg/L	
SI-1D-GW	<0.002	SD-1D	<0.002	
SI-2D-GW	<0.002	SI-2D	<0.002	
SI-3-GW	<0.002	SI-3	<0.002	
SI-4D-GW	0.0809	SI-4D	0.0268	
SI-5D-GW	0.086	SI-5D	0.0045	
SI-6D-GW	0.0432	SI-6D	0.015	
SI-7-GW	0.0857	SI-7	0.0226	
SW-4D-GW	0.00402	SW-4D	<0.002	Celanese Property
SW-12-GW	0.011	SW-12	0.00729	Camp Property
SI-8-GW	0.00473	SI-8	0.0167	
SI-18D-GW	0.0161	SI-18D	0.0164	
SI-9-GW	0.0112	SI-9	0.0158	
SI-10-GW	0.0119	SI-10	0.0143	
SI-11-GW	0.0112	SI-11	0.00853	
SI-12-GW	0.0115	SI-12	0.0152	
SI-19D-GW	0.011	SI-19D	0.0163	
SI-13-GW	0.00633	SI-13	0.0151	
SI-14D-GW	<0.002	SI-14D	0.0157	
SI-15-GW	0.0128	SI-15	0.0137	
SI-16-GW	0.012	SI-16	0.0137	
SW-11-GW	0.0105	SW-11	0.014	
SI-17-GW	0.00782	SI-17	0.00796	

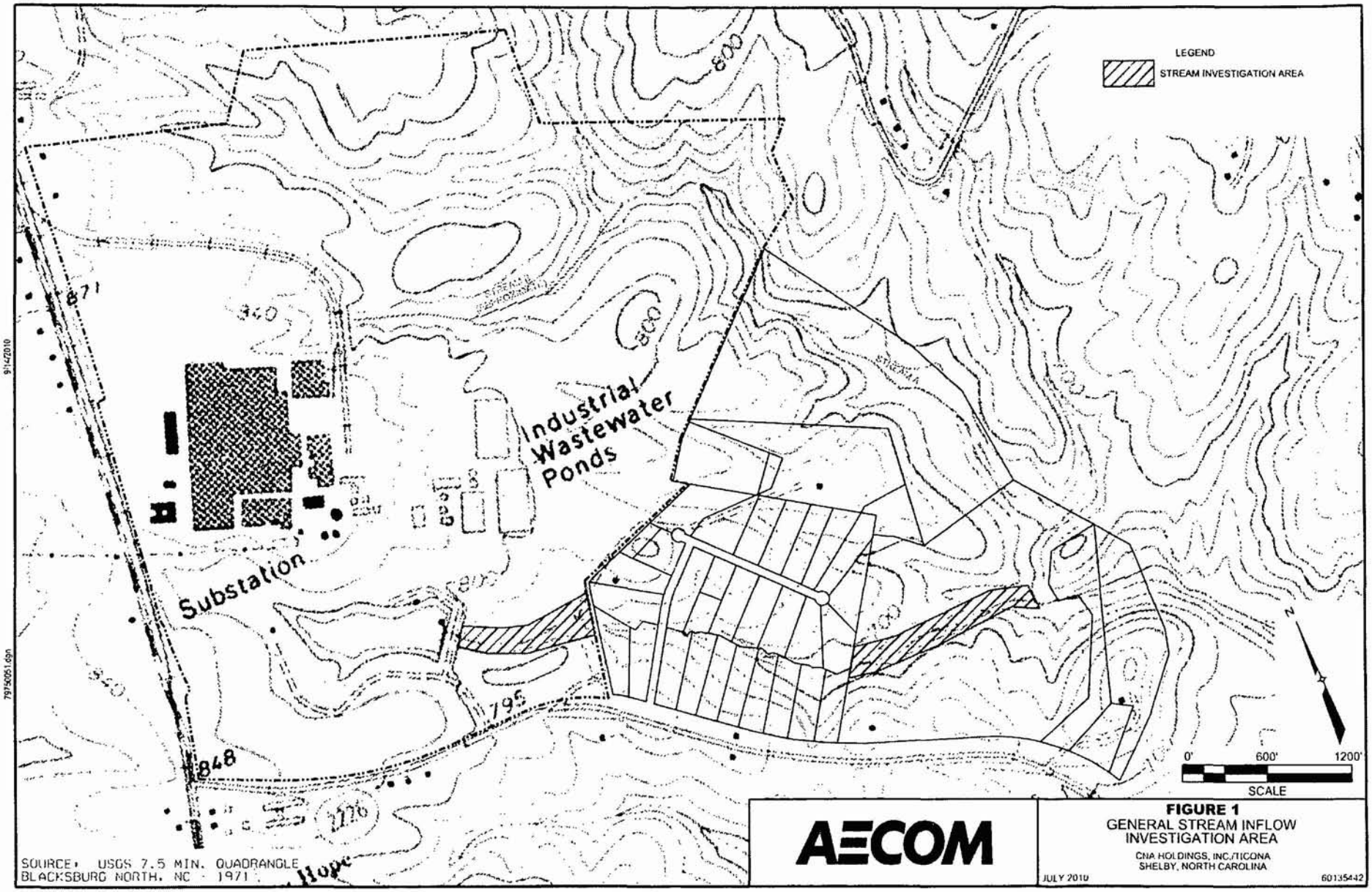
"D" in Sample ID indicates sample location near drainage feature
mg/L - milligrams/liter

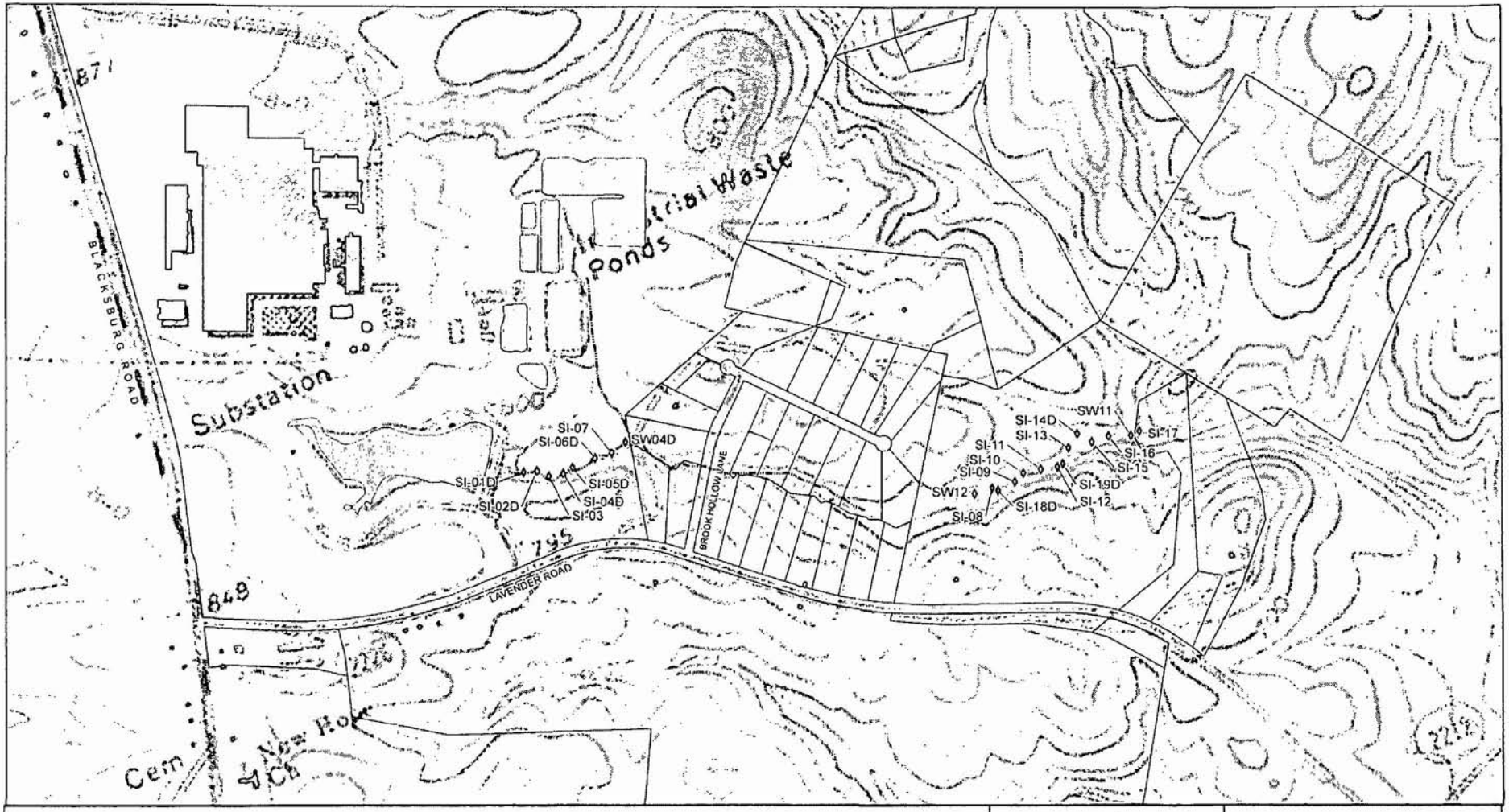
Table 3
Summary of Field Data
Stream Inflow Investigation
CFO Site - Shelby, North Carolina
AECOM Project 60135442

Sample ID	Date	GW pH SU	SW pH SU	GW Cond mS/cm	SW Cond mS/cm	GW DO mg/L	SW DO mg/L	GW Temp °C	SW Temp °C	GW ORP mV	SW ORP mV	GW Turb NTU	SW Turb NTU	GW Fe^{2+} mg/L	SW Fe^{2+} mg/L
SI-1D	09/22/09	5.41	6.41	0.058	0.082	2.7	6.4	21.0	20.4	17.8	154	12	7	NA	NA
SI-2D	09/22/09	5.80	6.48	0.058	0.076	4.5	5.1	19.6	20.6	162	153	8.6	7	<0.2	<0.2
SI-3	09/22/09	5.92	6.46	0.089	0.075	1.2	5.6	19 8	20 3	164	146	9.3	8.7	<0.2	<0.2
SI-4D	09/22/09	6.03	6.39	0.099	0.087	1.7	5.1	20.1	20.5	158	149	4.7	5.8	<0.2	<0.2
SI-5D	09/22/09	5.27	6.26	0.407	0.099	0.7	5.9	20.8	20.6	193	151	7.2	4.5	<0.2	<0.2
SI-6D	09/22/09	5.44	6.08	0.408	0.158	1.1	5.5	20.2	20.2	171	138	3.6	3.8	1.4	1.0
SI-7	09/23/09	5.39	6.12	0.531	0.207	0.8	4.9	20.9	21.1	187	169	3.1	2.9	1.2	0.8
SW-4D	09/23/09	6.42	6.29	0.492	0.229	0.7	5.9	20.3	20.5	-32	146	7	13.8	2.4	1.4
SW-12	09/23/09	6.38	7.19	0.15	0.194	1.5	5.9	22.2	22.7	44	231	9.2	6.9	4.0	<0.2
SI-8	09/23/09	6.89	7.33	0.313	0.195	0.7	6.3	21.7	22.3	-111	212	4.2	19	3.8	<0.2
SI-18D	09/24/09	6.82	7.24	0.194	0.197	3.7	6.4	22.4	22.6	180	267	7.2	8.7	<0.2	<0.2
SI-9	09/23/09	6.81	7.25	0.238	0.195	0.7	5.9	22.7	22.5	-104	180	3.6	7.8	3.4	<0.2
SI-10	09/23/09	6.82	7.26	0.226	0.196	0.4	5.8	23.9	23.2	-106	203	36	7.4	3.0	<0.2
SI-11	09/23/09	6.70	7.42	0.186	0.197	2.4	6.5	22,5	22.5	292	299	4.6	3.8	<0.2	<0.2
SI-12	09/23/09	6.78	7.50	0.197	0.197	1.0	6.6	21.9	22.4	-29	258	3.5	6.3	3.0	<0.2
SI-19D	09/24/09	6.61	7.55	0.176	0.196	1.4	7.0	23.5	23.4	168	216	9.6	8.4	<0.2	<0.2
SI-13	09/24/09	5.91	7.13	0.134	0.192	1.6	7.0	20.5	20.9	237	225	2.7	2.7	<0.2	<0.2
SI-14D	09/24/09	5.99	7.10	0.078	0.189	2.7	6.7	20.0	21.2	285	250	3.1	10.5	<0.2	<0.2
SI-15	09/24/09	6.61	7.16	0.188	0.187	1.6	6.3	21 9	22.0	13	134	3.2	8.6	1.6	0.4
SI-16	09/24/09	6.83	7.25	0.191	0.187	1.1	6.5	21.8	22.6	-60	15	3.3	10.8	2.4	4.0
SW-11	09/24/09	6.67	7.37	0.181	0.186	1.9	7.0	21.7	22.7	234	144	4.5	16.1	<0.2	<0.2
SI-17	09/24/09	6.95	7.40	0.137	0.141	4.7	6.7	22.5	22.8	277	283	7.7	3.2	<0.2	<0.2

"D" in Sample ID indicates sample location near drainage feature
GW - groundwater
SW - surface water
Cond - specific conductance
DO - dissolved oxygen
Temp - temperature
ORP - oxidation-reduction potential
Turb - turbidity
Fe^{2+} - ferrous iron
SU - standard units
mS/cm - millisiemens/centimetr
mg/L - milligrams/liter
°C - degrees Centigrade
mV - millivolts
NTU - Nephelometric Turbidity Units

Figures


LEGEND
STREAM INVESTIGATION AREA
Industrial Wastewater Ponds
Substation
600
840
871
795
848
Hope
N
0'
600'
1200'
SCALE
SOURCE: USGS 7.5 MIN. QUADRANGLE
BLACKSBURG NORTH, NC - 1971
AECOM
FIGURE 1
GENERAL STREAM INFLOW
INVESTIGATION AREA
CNA HOLDINGS, INC./TICONA
SHELBY, NORTH CAROLINA
JULY 2010
60135442
9/14/2010
79750051.dgn



Legend

- Stream Investigation Samples
- Stream

Note: "D" indicates Stream Investigation Sample location near a surface drainage feature.

Map Projection: NC Feet
Datum: NAD North American 1983

Source: USGS, Blacksburg North

0 300 600 1,200 Feet

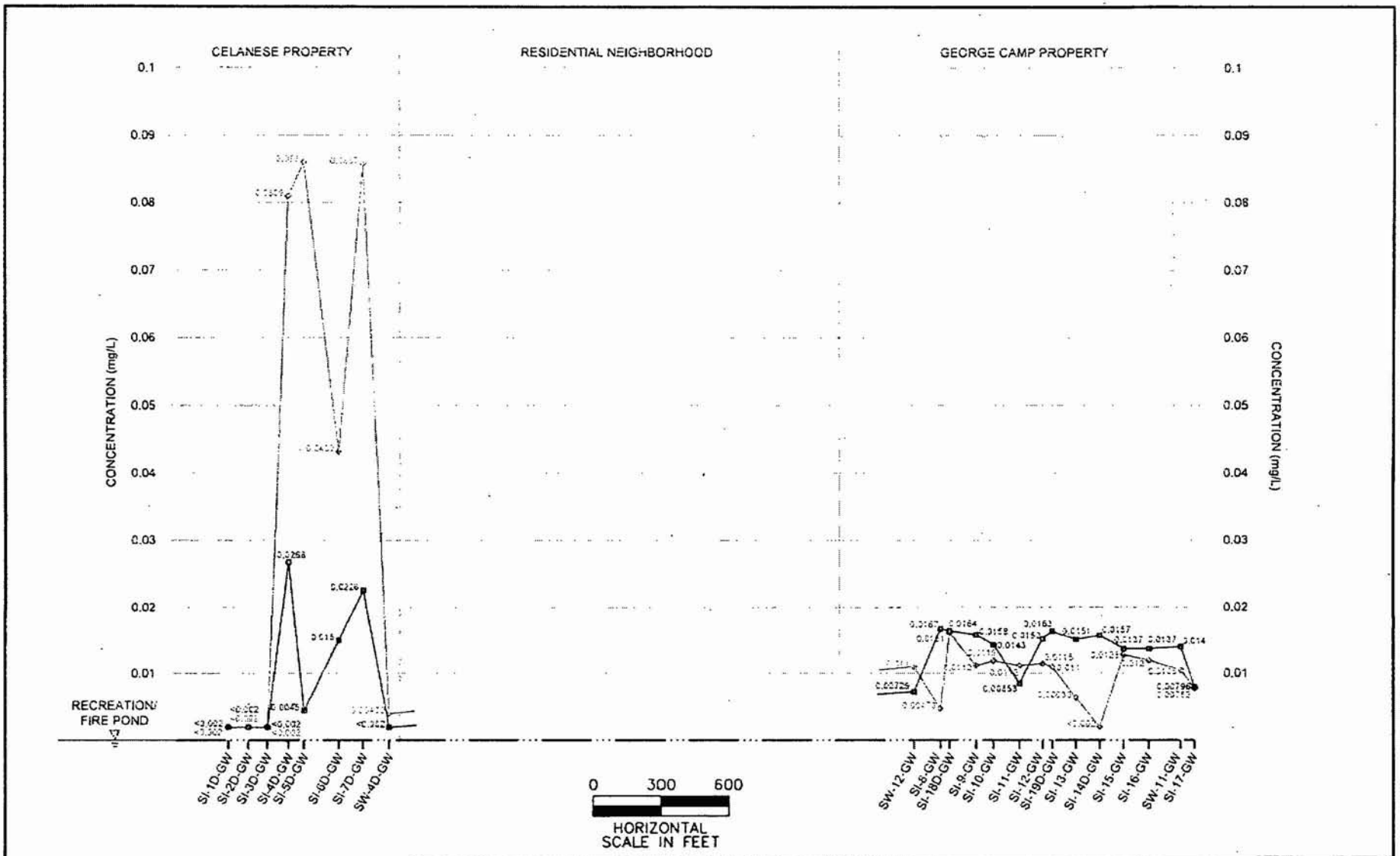
Figure 2
Stream Inflow Locations

CNA Holdings, Inc./Ticona
Shelby, North Carolina

AECOM

May 2010	60135442

Shelby_Stream Inflow Locations.mxd



AECOM

FIGURE 3
SHELBY STREAM INVESTIGATION DATA
SEPTEMBER 2009

CNA HOLDINGS, INC./TICONA
SHELBY, NORTH CAROLINA

JULY 2010

60135442

Appendix H: Examples of Water Supply Agreements

RECORDING FEE $ 10.00 BK1170PG0994

STATE OF NORTH CAROLINA

COUNTY OF CLEVELAND

WATER SUPPLY AGREEMENT

THIS AGREEMENT made, this the 31st day of August, 1995, by and between **FLEET FINANCE AND MORTGAGE, INC.** (herein "FLEET"), and **HOECHST CELANESE CORPORATION** (herein "HCC");

WITNESSETH:

WHEREAS, FLEET is the record owner of Tracts 15, 16, 19, and 24, (herein "lots"), Phase II, of **WILDWOOD MEADOWS SUBDIVISION** as shown in Book of Plats 16, Page 111 in the Office of the Register of Deeds for Cleveland County, and

WHEREAS, the lots are subject to land sales contracts with various individuals, and

WHEREAS, the parties hereto desire that this agreement relating to the water supply for the foregoing lots be reduced to writing;

NOW THEREFORE, for and in consideration of the mutual promises herein made and other good and valuable consideration, receipt of which is hereby acknowledged, the parties agree as follows:

1. HCC will pay all expenses and fees necessary to extend the Upper Cleveland Water System line and install a tap for each of the lots

2. HCC will indemnify and hold harmless FLEET, its officers, agents, employees, successors, and assigns from any and all claims, liability, damage, and loss that it may suffer by reason of its consent to this water supply agreement.

3. FLEET agrees that a perpetual restriction be imposed on the lots which prohibits the drilling of any new wells, or the tampering of any existing wells on the property, so long as a source of public water supply is available.

4. FLEET acknowledges that HCC has entered into certain expense reimbursement agreements with the various purchasers under the land sales contracts and FLEET agrees that all reimbursements may be paid directly to the purchaser and that no further consideration is payable to FLEET.

5. FLEET ratifies agreements by the contract purchasers for the permanent capping and sealing of any wells located on the lots.

IN WITNESS WHEREOF, FLEET FINANCE AND MORTGAGE, INC. has caused this instrument to be signed in its corporate name by its duly authorized officers and its seal be hereunto affixed by authority of its Board of Directors, the day and year first above written.

FLEET FINANCE AND MORTGAGE, INC.

BY: _____ (SEAL)
Therese G. Franzen, Sr. Vice President

ATTEST:

_____
Sheri L. Williams
Secretary (Corporate Seal)

BK1170PG0995

STATE OF GEORGIA

COUNTY OF DEKALB

I, a Notary Public of the County and State aforesaid, certify that Sheri L. Mullane personally appeared before me this day and acknowledged that He/she is Assistant Secretary of FLEET FINANCE AND MORTGAGE, INC., a Georgia corporation, and that by authority duly given and as the act of the corporation, the foregoing instrument was signed in its name by its Therese G. Franzen, Senior Vice President, sealed with its corporate seal and attested by Sheri L. Mullane as its Assistant Secretary.

Witness my hand and official stamp or seal, this 31st day of August, 1995.

My Commission Expires:
Notary Public, State of Georgia
DeKalb County, Georgia
My Commission Expires Aug. 31, 1998

Notary Public: Betty G. Yohpe

NORTH CAROLINA CLEVELAND COUNTY

The Foregoing (or annexed) certificate of Betty G. Yohpe a Notary Public, is certified to be correct. This 22 day of Nov A.D. 19 95

Bonnie E. Reece By: Barbara H. Davis
Assistant

The foregoing registration certificate of 22 day of Nov A.D. 19 95 at 1:32 o'clock P.M. and recorded in the office of Register of Deeds, Cleveland County, NC in Book 1122 Page 994

Bonnie E. Reece By: Barbara H. Davis
Assistant

CLEV. CO., NC
FILED
95 NOV 22 PM 1:32
BONNIE E. REECE
REGISTER OF DEEDS

20.00

BOOK 1168 PAGE 1104
CLEV. CO., NC

★ John Schweppe

Hoechst Celanese

FEE $ 20.00

August 16, 1995

95 OCT 10 AM 11:12

DORIS E. LEE
REGISTER OF DEEDS

1866

Textile Fibers
Hoechst Celanese Corporation
PO Box 87
Shelby, NC 28151-0087
704 48[illegible]411

[redacted]

Re: Water Supply Agreement: Property owned by [redacted] and [redacted] - Being that 11.5 acre tract described in Deed from [redacted], dated February 22, 1968 recorded Book 12-H, Page 263, and that 2.5 acre tract described in Deed from [redacted] dated October 25, 1968 recorded Book 12-V, Page 135, and that 7 acre tract described in Deed from [redacted] dated September 15, 1970 recorded Book 13-N, Page 9, all of the Cleveland County Registry (See Attachment "A")

Dear [redacted]

As you know, we regularly monitor ground water near our plant site, and presently are unaware of any problem with the quality of your well water. From previous meetings, you also know of our proposal to make mutually satisfactory arrangements to provide you with assurances that there will be no future disruption of your water supply due to ground water quality concerns.

We believe the best way to accomplish this goal is for our company to pay all costs and fees necessary to connect the dwellings located on your property described above to the county water system and reimburse you $1020.00, which we have mutually agreed will compensate you for all costs and fees incurred by you when you connected the workshop located on your property described above to the county water system. We will also reimburse you $4500.00, which we have mutually agreed represents the value of your existing well systems. To honor your request that you assume personal responsibility for connecting the dwellings to the county water system and to thereafter permanently seal the bored well located on your property, we will reimburse you the sum of $5620.00, which we have mutually agreed will compensate you for the labor and materials necessary to extend the water lines from the county taps to your dwellings and to permanently seal the bored well on your property. Additionally, we will reimburse you in advance $7500.00, which we have mutually agreed will compensate you fairly for five years county water service.

Your signatures below acknowledge receipt of a duplicate original of this letter and your agreement to the following.

Hoechst

(1) Your cooperation in our arrangements to extend the county water system to your property.

(2) Your acknowledgment that the workshop located on your property is [illegible].

(3) Your agreement to assume personal liability and accept personal responsibility for the connection of the dwellings to the county water system and permanent sealing of the bored well located on your property. Your further agreement that all such work will be in compliance with county and state regulations and that you will provide us with copies of any applications or reports filed by you and inspection/approval reports issued by regulatory agencies.

(4) Your acknowledgment of your ownership of this property and except for any mortgage holder, no other person holds any interest in the property which would limit your authority in this agreement.

(5) Your acknowledgment that you have elected to receive all advance water cost reimbursements and that we will make no additional payments to tenants residing on your property.

(6) Your agreement that when dwellings are connected to county water, we are authorized to permanently seal all existing wells located on this property with the exception of the one bored well which you have assumed personal responsibility for permanently sealing.

(7) Your agreement to a property restriction which prohibits the drilling of any new wells, or the reopening of any existing wells on the property, so long as a source of public water supply is available.

This agreement is binding on our company, its successors, and assigns and on you, your heirs, successors, and assigns. With your signatures, we will immediately proceed to secure the extension of county water lines to your property. We will notify you when the county water taps are in place and upon completion of the residential connections to the county water system and permanent closure of all wells on your property, we will immediately deliver your reimbursement check.

Thank you for your cooperation with this matter.

Appendix I: Vapor Intrusion Assessment Memorandum

United States Environmental Protection Agency
Region 4
Atlanta Federal Center
61 Forsyth St. SW, Atlanta, Georgia 30303-8960

May 20, 2011

4SSD-TSS

MEMORANDUM

SUBJECT: Limited Vapor Intrusion Assessment for the Celanese Five Year Review.

FROM: Ben Bentkowski, P. G., Hydrologist,
Technical Services Section
Superfund Division

THROUGH: Glenn Adams, Chief
Technical Services Section
Superfund Division

TO: Luis Flores
Remedial Project Manager
Superfund Division

This memorandum discusses the calculation of vapor intrusion risk associated with the TCE concentrations detected in monitoring well HH-48. This well is adjacent to a house and both are approximately 1,700 feet east of the Celanese facility fence line. There is currently a Five Review document undergoing review at EPA and the RPM has asked for a limited vapor intrusion assessment. I was provided a map of the area, basic data about the wells in the area, and specific concentration data for TCE and water levels for monitoring well HH-48.

There are a number of ways to estimate or calculate the vapor intrusion risk. I prefer to use the GW-ADV-Feb04 Excel spreadsheet J&E model. This allows the use of as much site specific data as available, easily adjust for assumed values when specific data is not available, and rely upon the numerous default values that the model includes. Certainly there are more rigorous and formal procedures but I find this gives a good quality quick look at the vapor intrusion risk.

From the provided TCE data, it appears that the most recent value of TCE in MW HH-48 is 99 ug/L and had recently been as high as 200 ug/L (2005). Water elevations were provided and a depth to water was calculated. Allowing for the house to be 2' -3' feet above the ground level of the well, a recent depth to water is approximated to be 45'. In 2005 depth to water level was 39'. As this is a piedmont setting and the shallower wells were probably set in saprolite; the soil type is assumed to be silt. The groundwater temperature is assumed to be 65°F or 18° C. The Cal EPA Unit Risk Factor of 2E-6 was used. The risk is shown in the table below.

MW-HH-48	TCE Conc ug/L	Depth to Water	Risk	TCE MCL
2005	200 ug/L	39'	5.1 E-7	5 ug/L
Recent	99 ug/L	45'	2.5 E-7	5 ug/L

The modeled results indicate that the calculated risk via potential vapor intrusion at this house would be below EPA's acceptable risk range and certainly below the 1.0 E-4 risk level that would trigger prompt remedial action. Unless new data is provided or additional data from other wells near other homes in the area is provided, I would recommend no further vapor intrusion evaluation for MW-HH-48 is needed.

If you have any questions, please contact me.

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