



U.S. ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF INSPECTOR GENERAL

Catalyst for Improving the Environment

Hotline Report

EPA Activities Provide Limited Assurance of the Extent of Contamination and Risk at a North Carolina Hazardous Waste Site

Report No. 10-P-0130

May 17, 2010



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Abbreviations

CIC	Community Involvement Coordinator
CIP	Community Involvement Plan
EPA	U.S. Environmental Protection Agency
NPL	National Priorities List
OIG	Office of Inspector General
OSC	On-Scene Coordinator
PRP	Potentially responsible party
SVE	Soil vapor extraction
TCE	Trichloroethylene
µg/L	micrograms per liter
VOC	Volatile organic compound

Cover photo: Former CTS Corp. facility at the Mills Gap Site, Asheville, North Carolina.
(Photo courtesy EPA)



At a Glance

Catalyst for Improving the Environment

Why We Did This Review

In response to a congressional request, the U.S. Environmental Protection Agency (EPA) Office of Inspector General (OIG) opened a Hotline case to examine the quality of recent EPA water and air sampling at the Mills Gap Site (Site) located in Asheville, North Carolina. We also reviewed whether EPA clearly communicated sampling results to residents.

Background

The Site has been in the State of North Carolina's hazardous waste clean-up program since 1993. EPA Region 4 has carried out emergency response actions at the Site since 1999. These actions included providing an alternative drinking water source for residents with unsafe levels of the chemical trichloroethylene, or TCE, in their drinking water. EPA's current role is to ensure compliance with clean-up agreements and assess the extent of Site contamination.

For further information, contact our Office of Congressional, Public Affairs and Management at (202) 566-2391.

To view the full report, click on the following link:
www.epa.gov/oig/reports/2010/20100517-10-P-0130.pdf

EPA Activities Provide Limited Assurance of the Extent of Contamination and Risk at a North Carolina Hazardous Waste Site

What We Found

The water and air quality sampling conducted at the Mills Gap Site has provided limited assurance of the extent of water and air contamination and risk at the Site. Within the records OIG reviewed, Region 4 adhered to accepted standards and practices in conducting its drinking water sampling in 2008 and 2009. However, the limited scope of Region 4's past sampling activities and oversight kept the Region from detecting groundwater contamination in drinking water wells. Region 4 also adhered to accepted standards and practices in conducting its 2007-2008 air sampling. However, an ineffective response action has not addressed the potential air quality risk that remains.

Region 4's letters to affected residents communicating water and air sample results contained jargon and technical language, did not clearly communicate safety issues, and could have been misleading to some. Although there have been some improvements in communications, Region 4's drinking water letters did not disclose that water samples were only tested for site-related contaminants and the results do not indicate the overall safety of the water.

Region 4's Community Involvement Plan did not reflect all Site activities and did not include a communication strategy. Region 4 staff have not always documented conversations with residents or Site visits. These shortcomings impede Region 4's ability to effectively manage community concerns and relationships. This complex site is of great interest to the community and poses public health risks. Region 4 must take into account these issues as it completes its response work and transitions the Site to the State.

What We Recommend

We recommend that Region 4 develop a plan for Site transition to the State, clarify resident communications, update the Community Involvement Plan, and improve recordkeeping. Region 4 generally agreed with five of our six recommendations. The remaining recommendation is under further review by the Region. The Acting Regional Administrator said the Region "will do everything within our authority to ensure the safety of the residents in the Mills Gap area."



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

OFFICE OF
INSPECTOR GENERAL

May 17, 2010

MEMORANDUM

SUBJECT: EPA Activities Provide Limited Assurance of the Extent of Contamination and Risk at a North Carolina Hazardous Waste Site Report No. 10-P-0130

FROM: Wade T. Najjum
Assistant Inspector General
Office of Program Evaluation

A handwritten signature in black ink, appearing to read "Wade T. Najjum", is written over the typed name and title.

TO: A. Stanley Meiburg
Acting Region 4 Administrator

This is our report on the subject evaluation conducted by the Office of Inspector General (OIG) of the U.S. Environmental Protection Agency (EPA). This report contains findings that describe the problems the OIG has identified and corrective actions the OIG recommends. The OIG responded to EPA Region 4's draft report comments by making changes to the report and providing responses to EPA Region 4, as appropriate. This report represents the opinion of the OIG and does not necessarily represent the final EPA position. Final determinations on matters in this report will be made by EPA managers in accordance with established resolution procedures.

The estimated cost of this report – calculated by multiplying the project's staff days by the applicable daily full cost billing rates in effect at the time – is \$382,254.

Action Required

In accordance with EPA Manual 2750, you are required to provide a written response to this report within 90 calendar days. You should include a corrective action plan for agreed-upon actions, including milestone dates. We have no objections to the further release of this report to the public. This report will be available at <http://www.epa.gov/oig>.

If you or your staff have any questions regarding this report, please contact me at (202) 566-0827 or najjum.wade@epa.gov; or Carolyn Copper, Director for Program Evaluation, Hazardous Waste Issues, at (202) 566-0829 or copper.carolyn@epa.gov.

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Purpose

We performed this evaluation in response to a request from a Member of Congress. We addressed the following questions:

- Does Region 4's assessment of drinking water and air quality at the Mills Gap Site assure the safety of drinking water and air quality?
- Are results clearly communicated to affected residents?

Background

The Mills Gap Site (Site) centers on the former CTS Corp. electronics part manufacturing plant in Asheville, North Carolina. From 1959 to 1986, CTS conducted electroplating of metal parts. In 1987, Mills Gap Road Associates purchased the property from CTS and redeveloped 45 of the acres into residences. The remaining 9 acres include the manufacturing building within a perimeter fence (Figure 1).

CTS used the chemical trichloroethylene (TCE) to clean metal parts at the facility. Drinking or breathing large amounts of TCE may cause impaired heart function, unconsciousness, and death. Skin contact with TCE for short periods may cause skin rashes. Studies of animals exposed to TCE have reported increases in lung, liver, kidney, and testicular tumors, and lymphoma. The U.S. Environmental Protection Agency (EPA) is currently reassessing the cancer classification of TCE.

Figure 1: Entrance Gate to Former CTS Facility



Source: EPA OIG photo taken July 2009.

The North Carolina Department of Environment and Natural Resources (State) placed the Site on its list of Inactive Hazardous Sites in 1993. In 1999, the State asked EPA Region 4 to evaluate the Site for emergency removal action. The request followed the State's sampling of contaminated springs on property next to the former CTS facility and a drinking water well about ¼ mile away. These samples revealed chemical contamination up to 4,200 times greater than the level for safe drinking water. In response to these results, Region 4 provided bottled water to the affected residents pending connection to the local municipal water supply. Based on additional sampling, Region 4 concluded that the soil beneath the former CTS building was potentially the source of chemical contamination in the drinking water springs and well.

Under its Superfund removal authority, Region 4 has taken measures to evaluate threats posed to human health and minimize risks posed by the Site contaminants. These measures included installing systems to remove or destroy contaminants and investigating contaminants in the air in and around homes and near springs.

Under State authority, the State named CTS as a responsible party at the Site in 2007. CTS then initiated a clean-up investigation under State oversight. The State released results of this investigation in July 2009.

In December 2008, as part of its ongoing site assessment activities, Region 4 committed to quarterly sampling of drinking water wells in the area around the former CTS facility. This commitment was in response to concerns of residents regarding exposure to potentially contaminated groundwater. In 2009, Region 4, with assistance from local officials, conducted quarterly sampling of approximately 50 drinking water wells within 1 mile of the facility.

Since 1985, Region 4 or the State has assessed contamination at the Site four times. In 2006, the Site was evaluated for EPA's National Priority List (NPL). Currently, Region 4 is considering new information gathered since 2006 and reassessing the Site for NPL listing. If the Site again does not meet the criteria, Region 4 will transition its assessment activities to the State. The State will oversee future remedial activities through the State's clean-up program.

Noteworthy Achievements

In 2004, Region 4 negotiated an Administrative Order on Consent (2004 agreement) with the potentially responsible parties (PRPs), CTS and Mills Gap Road Associates. The 2004 agreement resulted in construction of a soil vapor extraction (SVE) system to reduce the quantity of volatile organic compounds (VOCs) leaching into the groundwater in a zone under and near the facility. We estimate that since operation began in 2006, the SVE system has removed over 6,000 pounds of VOCs from the subsurface (equal to nine 55-gallon drums of TCE). Region 4 oversees operation of the SVE system to ensure compliance with the 2004 agreement.

During the April 2009 sampling of drinking water wells, Region 4 enforcement and investigations staff conducted a formal review of adherence to sampling procedures by the Region's contractor, who had been tasked with conducting the sampling. The review resulted in on-the-scene correction of the problems found. These problems included purging wells too long and not checking the calibration of water quality meters at the end of each field day.

Scope and Methodology

We conducted this evaluation from June 2009 to February 2010 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the evaluation to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our evaluation objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our evaluation objectives. We limited our review to compliance with those management controls related to the issues evaluated in the congressional request.

To address our objectives, we interviewed past and present Region 4 site managers and staff involved with the Site. To obtain background information, we reviewed Region 4 documents and files. To evaluate the quality of Region 4's sampling, we examined records from about

21 percent (34) of the 160 drinking water samples collected in wells from September 2008 to April 2009 and 100 percent (32) of the air samples collected in December 2007 and August 2008. To determine the clarity of the Region's communication of sampling results, we reviewed the letters reporting sampling results that the Region sent to the residents. We examined the letters associated with the 21 percent of the drinking water samples we reviewed and with 100 percent of the air samples we reviewed. We also reviewed the Site Community Involvement Plan (CIP) and documents maintained by the Community Involvement Coordinator (CIC). In July 2009, we visited the Site to gain an understanding of the location, conditions, characteristics, and ongoing activities.

Appendix A provides further details on our scope and methodology.

Results of Review

Region 4's sampling of water and air quality at the Site provided limited assurance of the extent of water and air contamination at the Site. We concluded that the Region's assessment of drinking water and air quality showed that the Region's oversight and administration of drinking water sampling and assessment of air quality was limited. In addition, emergency response actions taken provided limited protection, and communication of sample results was not always clear. As a result, contaminated drinking water wells went undetected, Site risk remains, and the Region's communications may have misled and confused some residents.

We also found that the Region's recordkeeping practices did not satisfy EPA requirements, and the Site CIP did not address current site activities. As a result, the Region may have impeded its ability to effectively respond to and manage community concerns and relationships.

Region 4's Oversight and Administration of Drinking Water Sampling Was Limited

We reviewed Region 4's drinking water sampling performed from September 2008 through April 2009. Our review of 21 percent of the sampling records showed that Region 4 adhered to accepted standards and practices in conducting its drinking water sampling. However, from 1999 through 2009, Region 4 performed three separate emergency removal actions to eliminate threats to the public from contaminated drinking water. Removal actions recurred because Region 4's oversight of the PRPs' actions and its own actions were limited. As a result, contaminated groundwater went undetected. More oversight and sampling may have detected contaminated drinking water sooner.

After its emergency response action in 1999, the Region executed the 2004 agreement with the PRPs. The 2004 agreement required the PRPs to develop a sampling plan for drinking water wells that were determined to have a reasonable potential for impact by releases from the Site. At the time, Region 4's hydrogeologist, a member of the Region's technical support staff, recommended evaluation of drinking water wells within 1 mile of the facility. The hydrogeologist recommended 1 mile because of the ability of contaminants to move a considerable distance in groundwater through fractured rock.

In 2005, the contractor identified nine wells within approximately ½ mile of the facility with the potential for impact. Region 4 approved limiting sampling to these nine wells. In 2006, the PRPs' contractor sampled five of the nine wells. According to the PRPs' contractor, four wells were not sampled because two were not used for drinking water, one did not exist, and the owner of the fourth well declined to have the well sampled. We did not find evidence that Region 4 attempted to contact, or request that the PRPs contact, the well owner who declined access. This lack of attempt to contact the owner is significant because the access letter sent to the well owner did not disclose that contamination from the former CTS facility might affect the well. Consequently, the well owner may have been unaware that water from the well was potentially contaminated.

From late 2007 until April 2008, the State, with Region 4 support, expanded the sampling to include drinking water wells within approximately 1 mile of the facility. Of the wells sampled, one contained TCE at a concentration about 11 times the federal drinking water standard. Follow-up sampling by local officials also detected TCE in a nearby well. These wells were located in an area about ¾ of a mile from the facility. In response, Region 4 initially provided bottled water to the residents and later installed filter systems for use until the homes could be connected to the local municipal water supply.

In August 2009, Region 4 again discovered unsafe levels of contamination in a drinking water well that was within 1 mile of the facility – the well that the owner had reportedly declined access to in 2006. Neither the State nor Region 4 had included the well in their four subsequent sampling events. However, in August 2009, Region 4 sampled the well in conjunction with its site assessment activities. TCE contamination measured in the well water was about 160 times higher than the federal drinking water standard. Region 4 took emergency action and provided bottled water. Had Region 4 evaluated the completeness of its own well sampling, or conducted better oversight of the 2006 sampling done by the PRPs' contractor, the Region may have known the extent of drinking water contamination earlier.

Because of the August 2009 discovery, Region 4 completed a broader survey to identify drinking water wells missed in previous sampling events. This involved a door-to-door survey within 1 mile of the facility. As a result, the size of the Region's quarterly sampling doubled. Region 4 will continue the quarterly well sampling while site assessment activities are conducted. However, if the Site does not qualify for the NPL, Region 4 will no longer have the authority to continue quarterly well sampling. In this case, the Region stated it will discuss with the State the transfer of this sampling activity to the State's clean-up program.

Region 4's Assessment of Air Quality Identified a Need for Monitoring and Response Action at Contaminated Springs

Region 4 adhered to accepted standards and practices for indoor and outdoor air sampling conducted in December 2007 and August 2008. The Region's December 2007 air sampling results identified the need for additional sampling in the area around the springs on the east side of the former CTS facility. The results of the 2007 and 2008 sampling showed high TCE concentrations that exceeded the removal action level (action level) in the eastern springs and

showed the need for measures to address the TCE concentrations in the springs and in the air. Also, the Region identified a need to limit contact with the contaminated eastern springs.

The Region conducted initial air sampling near the springs on both sides of the former CTS facility in December 2007. Region 4 conducted the sampling to determine whether TCE found in springs caused TCE vapors in air. Because of high TCE concentrations in the air near the eastern springs, a fence and warning signs were installed to isolate the springs and limit direct contact with the contaminated water and air (Figure 2). The results also identified a need for additional sampling.

In 2008, Region 4 conducted additional air sampling at residences near the springs to further assess TCE vapors in the air. The results showed that while TCE concentrations in the immediate vicinity of the eastern springs exceeded action levels, data from all other locations were well below action levels. The Region concluded that TCE concentrations in the air decrease to below action levels at a fence line previously installed to limit exposure. Region 4 concluded that air conditions outside the fence were within an acceptable risk range.

Figure 2: Warning Sign for Contaminated Springs



Source: EPA OIG photo taken July 2009.

In addition to a fence and warning signs to limit exposures to TCE-contaminated springs, a pilot ozonation system was placed into operation in April 2009, to reduce levels of TCE in the springs. The system operated for 9 months. The data obtained over this period showed that the system did not reduce TCE concentrations to the degree that warranted the system's continued operation. Region 4 stated that the system was shutdown in January 2010.

Region 4 Is Completing Removal Action, But Site Risks Remain

According to Region 4, as it nears completion of its removal action, the Site will transition to the State for further action. Region 4 believes that remedial-type actions are necessary to address threats posed by the Site. Area residents will remain at risk from potential TCE exposure through coming into direct contact with contaminated springs and breathing nearby contaminated air. The Region plans to work with the State to implement a "seamless transition" from the Region's removal program and site assessment activities to the States' clean-up program. A seamless transition may help ensure that Site risks are appropriately communicated, documented, and addressed.

TCE Contamination in Eastern Springs

The PRPs operated a pilot ozonation system from April 2009 to January 2010 with the intent of reducing TCE concentrations in the eastern springs that formerly served as a drinking water source. However, during operation, three of the four springs showed concentrations that exceeded those measured in March 2009, 1 month before the system began operating. The PRPs also reported that the TCE level in a nearby groundwater monitoring well was significantly higher (53,000 micrograms per liter [$\mu\text{g/L}$]) than the highest level in the springs (36,000 $\mu\text{g/L}$) 1 month before operation. Because the source of water for the springs is groundwater, TCE in the eastern springs may increase due to the higher TCE level in groundwater.

TCE concentrations in nearby air could also increase if concentrations increase in the springs. However, the nature of this increase will depend on site-specific conditions. Results of air monitoring at and outside the fence around the eastern springs have not shown concentrations that exceed action levels. However, concentrations in the air have been measured only a few times and not at the same time as the water measurements. Simultaneous measurements in both surface water and air clarify the site-specific relationship between contaminant concentrations in the surface water and air. Increased concentrations in the springs above the concentrations discussed above may present the risk of exposure to contaminated air at and beyond the fence line.

TCE Contamination in Western Springs

A situation similar to the eastern springs occurs at the springs on the western side of the former CTS facility. A 2009 report prepared by the PRPs' contractor shows that TCE concentrations in groundwater on the western side of the facility are also high (up to 35,000 $\mu\text{g/L}$). Because of the high concentrations in groundwater, the concentration of TCE in the western springs fed by that groundwater could increase. Consequently, concentrations in nearby air may also increase. Exposure risk may occur because the western springs are not fenced, or otherwise marked, to keep people away from the contaminated water and air.

Sample Results Were Not Clearly Communicated

Region 4's letters to affected residents communicating water and air sample results contained jargon and technical language, did not clearly communicate safety issues, and could have been misleading to some. Although there have been improvements in the communications process, Region 4's drinking water letters did not disclose that the water samples were only tested for site-related contaminants and the results do not indicate the overall safety of the water. The Region has not implemented an effective quality review process for its communications and did not follow EPA's general guidelines for communications with the public. As a result, the Region may not have effectively managed community concerns and relationships.

Region 4 Letters Did Not Communicate Limitations in Testing of Drinking Water

The results in the letters we reviewed were accurate relative to the laboratory results. However, the letters did not disclose limitations in the laboratory testing that is needed to determine the

overall safety of the water. The information provided to the residents may have led them to conclude that their water was safe, although Region 4's limited testing did not provide enough information to make that determination. Since 2008, some aspects of Region 4's letters to the residents regarding drinking water results have improved.

The letters also did not disclose that Region 4 did not analyze for all chemicals recommended by EPA for safe drinking water. According to Region 4 staff, one of the objectives in monitoring the drinking water wells at the Site is to determine movement of contaminants from the Site. The Region did not conduct sampling that mirrors the routine testing required for public water systems or that EPA recommends for private well owners. The Region conducted the sampling to provide information to residents concerned about Site-related contaminants in their drinking water.

The letters also did not disclose that some testing was not sensitive enough to determine whether a compound was present at the health screening level established by EPA (e.g., a drinking water standard or a risk-based screening level). In some cases, we found that laboratory reporting limits were higher than federal drinking water standards. This occurred because the samples were analyzed using hazardous waste program methods, not drinking water methods. As a result, the laboratory reporting limits for some metals, VOCs, and semi-VOCs were above the federal drinking water standards. Consequently, the safety of the drinking water relative to all drinking water standards cannot be assessed.

Our review identified some improvements in recent letters, including:

- A well-designed table that included relevant results from all samplings.
- Health screening levels for compounds listed in the table of results.
- A clear designation in the table of results when a compound was not detected.
- Laboratory reports for the analyses conducted on the most recently collected samples.
- Information on whom to contact for further information.
- Notice of an upcoming session where Region 4, State, and local health department personnel would be available to answer well owners' questions about the results.

Region 4 Letters Did Not Clearly Communicate and Address Air Safety Concerns

Letters to residents communicating the results of its outdoor and indoor air were accurate relative to laboratory results. However, some letters communicating air sample results were not clear and did not address safety concerns at the Site. The letters were not consistent with the principles of EPA's public participation guidance. There was no quality review process in place to ensure that the letters were accurate, complete, clear, consistent, and readable for a general audience. As a result, EPA may be presenting sample results and associated risks in a way that is too technical, not understood by the residents, or could unnecessarily create or heighten resident safety concerns.

EPA's public participation guidance for On-Scene Coordinators (OSCs)¹ states that OSCs must maintain consistent, timely, and accurate communications with the community. In addition, because discussions of removal actions can sometimes be highly technical, the OSC must present information in clear and easy-to-understand terms. The resident letters we reviewed varied in format, did not consistently report the same contaminants or the same standards, and did not clearly address safety concerns and potential risks. For example, letters state that sample results exceed reporting limits but are within EPA's interim acceptable exposure limits and below Region 4's Emergency Response action levels. However, the letters did not always include these limits or action levels or explain what these values mean and why they are or are not important. These statements do not convey the safety of the air in generally understandable terms. In addition, the letters did not include all contaminants tested or detected, and the language used was technical, making the letters difficult to understand. If the residents shared or compared letters, the differences and inconsistencies in the letters could result in additional concern and confusion on the part of the residents.

The Region also did not conduct any independent quality review of the letters before sending them to the residents. We found one letter that referred to the wrong analytical report, one letter that included the wrong sample number, and one letter that was sent to the wrong address. Some letters referred to removal action levels while the referenced analytical report showed only reporting limits. Without adequate explanation of the limits and action levels, residents may not understand the purpose of, or the differences in, these standards of measurement.

Recordkeeping Practices Did Not Satisfy EPA Requirements

Region 4's CIC did not document phone calls with residents or interactions with the community during Site visits. The CIC was not aware of specific program guidance or policy that requires such documentation. In addition, Site managers did not consistently maintain documentation to support their calls to residents regarding drinking water and air sample results. Region 4 staff should document these activities according to EPA's records management policies and program requirements.

Under the authority of the Federal Records Act, EPA's Agency-wide Records Management Manual requires written documentation of meetings and site visits in certain circumstances. The Records Management Manual states that an information resource may be a record if it:

- (1) documents significant Agency decisions and commitments;
- (2) adds to proper understanding of the formulation or execution of Agency actions, operations, and responsibilities;
- (3) conveys information of value on important Agency activities;
- (4) facilitates action by Agency staff;
- (5) provides key substantive comments on a draft; and
- (6) makes possible a proper scrutiny by Congress or the Agency.

¹ U.S. Environmental Protection Agency, *Superfund Removal Procedures, Public Participation Guidance for On-Scene Coordinators: Community Relations and the Administrative Record*, July 1992.

Based on our interviews with the CIC and the Site managers, we believe that Site visits and phone discussions with the community often met several of the six definitions described above. EPA's Records Management Manual applies to all EPA programs and offices, and meeting its requirements would support improved Region 4 documentation of its Site-related discussions and interactions with the public. Documenting these types of public communications is also a good business practice.

Community Involvement Plan Does Not Address Current Site Activities

The CIP for the Site is limited to activities associated with Region 4's removal actions. EPA's guidance for *Early and Meaningful Community Involvement* provides that a CIP should be focused, current, and helpful. However, the existing CIP focuses only on the Region's removal actions, even though the Region was sampling and conducting other site assessment work when it released the CIP in 2008.

In addition, the CIP does not include a strategy for communicating current Site activities or conditions to the public. These missing components may impede the Region's ability to effectively respond and manage community concerns and relationships. A CIP that addresses all Site activities, including coordination among those conducting work at the Site, and includes a communications strategy, should enhance community understanding regarding the Site.

A communication strategy should be included in the CIP "when events or issues are complex or potentially sensitive," according to the "Communication Strategies" file contained in EPA's *Superfund Community Involvement Toolkit*. The communication strategy assists in avoiding "potential misunderstandings about difficult issues." Moreover, it "develops vehicles to deliver information." We identified several shortcomings in Region 4's communications with the community that the Region could address with a communication strategy. Specifically, Region 4 lacks:

- A fact sheet and Website specific to remedial activities, and general public information on the range and progress of activities, overall sample results, and issues at the Site.
- A complete and current mailing list for the community to facilitate notification regarding public meetings and other pertinent site information.
- A site-specific hotline for reporting community concerns and providing community updates.
- A system for announcing and holding periodic community meetings or availability sessions to discuss sampling results and ongoing and future site activities.

Conclusions

Over the last 10 years, Region 4 has taken multiple actions to address potential and actual public health threats from contaminated air and water at the Site. During this time, the Site has been under the jurisdiction of North Carolina's Inactive Hazardous Sites Program and Region 4's Emergency Removal Program. This complex site is of great interest to the community and poses public health risks. This Site does not have Superfund NPL status. We concluded that shortcomings in the Region's oversight of activities under its authority have been a factor in not

detecting some Site contamination until recently. In addition, the Region has not always communicated effectively with the community regarding the safety of drinking water and air around the Site. The Region's Community Involvement Plan is incomplete; it neither addresses all of the Region's activities at the Site, nor includes a communication strategy. The Region also had inconsistent recordkeeping practices. These shortcomings impede the Region's ability to effectively respond to and manage community concerns. Region 4's completion of its response work at the Site will neither remedy remaining Site contamination, nor mitigate potential future risks. The Region must be proactive in developing a clear plan to transition the Site to the State.

Recommendations

We recommend that the Region 4 Administrator:

1. Complete and document the Region's recent efforts to identify all drinking water wells within 1 mile of the former CTS facility.
2. Modify future letters that communicate results of drinking water sampling to:
 - a. Inform residents that the Region did not test drinking water wells for all compounds that EPA recommends for annual testing of private drinking water wells.
 - b. Provide residents with directions on where they can obtain further information on testing the quality of their well water.
 - c. Inform residents if testing cannot determine whether a compound was present in their well water at a drinking water standard or a risk-based screening level.
3. Develop procedures and guidelines to ensure letters to the residents containing scientific and technical information are accurate, complete, clear, consistent, and readable for a general audience. The procedures should describe a quality review process designed to maintain compliance with developed guidelines.
4. Develop a plan for the Site transition from Region 4 to the State. The plan should:
 - a. Document the Region's removal actions and site assessment activities previously undertaken.
 - b. Identify outstanding issues and information about remaining Site risks.
 - c. Be readable for a general audience, be made available to the public, and provide the public points of contact at the State.
5. Provide community involvement and Superfund program staff with written guidance or policy that defines their responsibilities for complying with EPA's records management policies when conversing with the public and conducting site visits.

6. Develop a new Community Involvement Plan that addresses all ongoing Site activities and the community's issues, needs, and concerns. The plan should identify specific activities, outreach products, or programs Region 4 will use to address the community's concerns, and include a communication strategy for disseminating information to the public.

EPA Region 4 Comments and OIG Evaluation

The OIG made changes to this final report based on the Region's draft report comments where appropriate. Specifically, we revised findings about the Region's air quality assessment and replaced three draft report recommendations with one final report recommendation.² The full text of the Region's comments and OIG evaluation are in Appendix B. The Region's response to OIG follow-up questions is in Appendix C.

Region 4 agreed with Recommendations 1, 2, 3, 5, and 6, but did not provide clear milestones for Recommendations 1, 2, and 5. Based on our follow-up, Region 4 provided estimated milestones of May 15, 2010, May 7, 2010, and April 30, 2010, for Recommendations 1, 2, and 5, respectively. Milestones provided for Recommendations 3 and 6 are October 1, 2010, and March 31, 2010, respectively. In response to Recommendation 6, Region 4 provided OIG with a CIP on April 27, 2010. OIG has not reviewed the CIP to determine whether it meets the intent of OIG's recommendation. Although the milestones for Recommendations 1, 2, and 5 have passed, Region 4 has not informed OIG that the corrective actions for these recommendations are completed or provided updated milestones. All recommendations will remain open with agreed-to actions pending. The Region's 90-day response to this final report should provide OIG an update on the completion of activities for Recommendations 1, 2, 3, 5, and 6, as appropriate.

Recommendation 4 replaces three recommendations in the draft report with which the Region did not agree. The OIG evaluation and information about the three removed recommendations are in Appendices B and C.

In the Region's general comments to the draft report, the Acting Regional Administrator said that Region 4 "will do everything within our authority to ensure the safety of the residents in the Mills Gap area." Region 4 believes the removal action at the Site will reach established goals in the near future, and at that point, the removal action will be complete. Region 4 is nearing completion of its site assessment effort and is preparing to make a decision on NPL listing. Region 4 says it will work with the State to implement a seamless transition if the Site does not obtain NPL status. Region 4 expects the State will implement interim actions to address the TCE contamination in the springs and conduct additional monitoring of the springs and groundwater. Region 4 says it will coordinate with the State to ensure that the Region can respond appropriately should a change in conditions warrant additional removal action.

² OIG's final report Recommendation 4 replaced Draft Report Recommendations 2, 3, and 4.

Status of Recommendations and Potential Monetary Benefits

RECOMMENDATIONS						POTENTIAL MONETARY BENEFITS (in \$000s)	
Rec. No.	Page No.	Subject	Status ¹	Action Official	Planned Completion Date	Claimed Amount	Agreed To Amount
1	10	Complete and document the Region's recent efforts to identify all drinking water wells within 1 mile of the former CTS facility.	O	Region 4 Administrator	5/15/2010*		
2	10	Modify future letters that communicate results of drinking water sampling to: <ol style="list-style-type: none"> a. Inform residents that the Region did not test drinking water wells for all compounds that EPA recommends for annual testing of private drinking water wells. b. Provide residents with directions on where they can obtain further information on testing the quality of their well water. c. Inform residents if testing cannot determine if a compound was present in their well water at a drinking water standard or a risk-based screening level. 	O	Region 4 Administrator	5/7/2010*		
3	10	Develop procedures and guidelines to ensure letters to the residents containing scientific and technical information are complete, clear, consistent, and readable for a general audience. The procedures should describe a quality review process designed to maintain compliance with developed guidelines.	O	Region 4 Administrator	10/1/2010		
4	10	Develop a plan for the Site transition from Region 4 to the State. The plan should: <ol style="list-style-type: none"> a. Document the Region's removal actions and site assessment activities previously undertaken. b. Identify outstanding issues and information about remaining Site risks. c. Be readable for a general audience, be made available to the public, and provide the public points of contact at the State. 	U	Region 4 Administrator			
5	10	Provide community involvement and Superfund program staff with written guidance or policy that defines the responsibilities for complying with EPA's records management policies when conversing with the public and conducting site visits.	O	Region 4 Administrator	4/30/2010*		
6	11	Develop a new Community Involvement Plan that addresses all ongoing Site activities and the community's issues, needs, and concerns. The plan should identify specific activities, outreach products, or programs Region 4 will use to address the community's concerns, and include a communication strategy for disseminating information to the public.	O	Region 4 Administrator	3/31/2010**		

¹ O = recommendation is open with agreed-to corrective actions pending

C = recommendation is closed with all agreed-to actions completed

U = recommendation is undecided with resolution efforts in progress

* Although the milestones for Recommendations 1, 2, and 5 have passed, Region 4 has not informed OIG that the corrective actions for these recommendations are completed or provided updated milestones.

** In response to Recommendation 6, Region 4 provided OIG with a CIP on April 27, 2010. OIG has not reviewed the CIP to determine whether it meets the intent of OIG's recommendation.

Appendix A***Detailed Scope and Methodology***

We conducted our evaluation from June 2009 through January 2010 in accordance with generally accepted government auditing standards. We limited our review to compliance with those management controls related to the issues we evaluated in the congressional request. We reviewed Region 4's drinking water sampling activities from September 2008 through April 2009. We also reviewed Region 4's air sampling activities in December 2007 and August 2008. To understand Region 4's role and specific Site activities, we interviewed past and present Site managers (On-Scene Coordinators and Site Assessment Managers) and other involved regional staff. We also reviewed program documents and records applicable to the Site.

To answer our two evaluation questions pertaining to the quality of Region 4's assessment of drinking water and communication of results, we examined records from about 21 percent (or 34) of the 160 samples collected from September 2008 to April 2009. We first randomly selected about 20 percent³ of wells sampled in April 2009. Because the letters to residents reporting these sampling results also included results from the previous two samplings, these results were included as part of the 20 percent selected for each of the earlier sampling events. Letters communicating earlier results only included the results of that particular sampling. We selected additional records from the earlier sampling events to complete the 20 percent review.

To assess the accuracy of the information sent to the residents, we compared drinking water results reported in the letters we reviewed to the laboratory reports. We also compared results to federal health screening levels to determine whether the Region properly identified possible problems with the groundwater. The health screening level for a particular tested compound was the federal drinking water standard, if a standard had been set. If no standard had been set, we used the risk-based screening level. We examined the laboratory reports to understand the accuracy of the laboratory methods relative to the health screening levels. We also examined field logbooks to determine whether the Region conducted the sampling using approved and standard procedures.

To evaluate the drinking water letters that Region 4 sent to residents, we reviewed EPA guidance related to risk communication to the public. This guidance included, but was not limited to, (1) EPA's *Superfund Community Involvement Handbook* (April 2005), and (2) EPA's *Risk Assessment Guidance for Superfund: Volume 1 – Human Health Evaluation Manual Supplement to Part A: Community Involvement in Superfund Risk Assessments* (March 1999). We used this guidance to review selected letters to determine whether the letters:

- summarized why the sampling was done;
- were easy to read and free of technical and legal jargon;
- were technically and legally accurate;

³ The selection goal was 20 percent for each of the three samplings. However, due to the discrete nature of the populations being sampled, the total for the results selected was about 21 percent.

- were complete, providing all the needed information, including the applicable health standards;
- summarized the results of the entire sampling effort and thus provided context for the individual results;
- included directions for obtaining additional information; and
- provided instructions on follow-up action, if needed.

To answer our first evaluation question, pertaining to the quality of Region 4's assessment of indoor and outdoor air quality, we reviewed key documents, including a work plan and a quality assurance project plan. We reviewed 82 air samples (including soil gas, subslab, indoor, and outdoor) collected by Region 4 in December 2007 and August 2008. Our primary focus was on the review of indoor and outdoor air samples. These samples represented 32 of the 82 reviewed. We reviewed soil gas and subslab samples to the extent needed to gain an understanding of how subsequent sample locations were determined. We compared sample results included in the letters to the residents to the analytical data reports to ensure accuracy of the data presented. We verified the screening limits or levels used in the letters to the residents with the applicable federal or State standard. We reviewed logbooks for the indoor and outdoor air sampling to determine whether the samples were collected as recommended in EPA's November 2002 draft guidance titled *OSWER Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (Subsurface Vapor Intrusion Guidance)*.

To answer our second evaluation question, pertaining to the accuracy and effectiveness of Region 4's written communication of indoor and outdoor air sample results, we reviewed all 24 individual letters to the residents. Similar to the review of drinking water letters, we identified and reviewed applicable EPA guidance related to risk communication to the public. Using this guidance, we reviewed the letters for accuracy, clarity, simplicity, consistency, and thoroughness, as we did with the drinking water letters.

Issues related to recordkeeping, the Community Involvement Plan, and Site security arose during our review. To complete work associated with these issues, we identified Superfund community involvement guidance; compared community involvement documents or suggested practices with Region 4's CIP and activities; and reviewed the CIC's Site files. We also reviewed Site security requirements contained in the 2004 agreement and the August 2005 Removal Action Plan. We toured the Site, took photographs, and made observations on Site security. We obtained and reviewed EPA records, news articles, and publicly available crime reports for the area to determine trespasser, vandalism, or criminal activity at the Site.

Appendix B

EPA Region 4 Comments to Draft Report and OIG Evaluation

March 5, 2010

MEMORANDUM

SUBJECT: Draft Office of Inspector General Report Titled *EPA Activities Provide Limited Assurance of the Extent of Contamination at a North Carolina Hazardous Waste Site*

FROM: A. Stanley Meiburg
Acting Regional Administrator

TO: Wade Najjum
Assistant Inspector General for Program Evaluation

Thank you for the opportunity to provide comments to the Office of Inspector General of the U.S. Environmental Protection Agency (OIG) on the findings and recommendations contained in the draft report titled *EPA Activities Provide Limited Assurance of the Extent of Contamination at a North Carolina Hazardous Waste Site*. EPA's mission to protect human health and the environment is our number one priority at the Mills Gap CTS Site and every other site at which we have oversight. We will do everything within our authority to ensure the safety of the residents in the Mills Gap area.

Attached you will find our comments organized by OIG recommendation, with a statement of Region 4 agreement or disagreement and proposed timelines for implementation of corrective actions.

If you have questions or need additional information, please contact me. Questions of a technical nature may be directed to Carolyn Callihan, callihan.carolyn@epa.gov, or (404) 562-8913; Stephen Ball, ball.stephen@epa.gov, or (404) 562-8528; or James Webster, webster.james@epa.gov, or 404-562-8769.

Again, thank you for the opportunity to comment on this report, and we appreciate the chance to work with you on behalf of the environment in Region 4.

Attachment

ATTACHMENT

**EPA Region 4 Responses to Office of Inspector General (OIG) Recommendations
in Draft Report Titled *EPA Activities Provide Limited Assurance of the
Extent of Contamination at a North Carolina Hazardous Waste Site***

March 3, 2010

EPA Region 4 believes that it is important to understand some of the broader context in which we are working at the Mills Gap Road Site (Site). The Superfund removal action began in 1999 when Region 4 Emergency Response and Removal Branch (ERRB) connected certain families to the public water supply system because of trichloroethylene (TCE) contamination in their spring. Since that time, ERRB has aggressively utilized our removal authority to accomplish as much risk reduction as possible. Measures taken under our removal authority have included: (1) installation of a soil vapor extraction (SVE) system to remove volatile organic compounds (VOC) from unsaturated soil on the former CTS property; (2) installation of an ozonation system to destroy VOCs emanating from the springs on the Rice property; (3) investigation of the vapor intrusion pathway in homes closest to the former CTS property; and (4) investigation of ambient air impacts near the springs. All of these efforts, with the exception of the ozonation system which has been ineffective, have contributed to either better understanding threats posed to human health and/or minimizing those risks.

As you know, Region 4 has used our site assessment process in an effort to determine whether this Site should be proposed to the National Priorities' List (NPL) so that remedial authorities could be utilized to address ground water contamination at the Site. However, to date, Region 4 has not documented a score of 28.5 or higher on the Hazard Ranking System for the Site's inclusion on the NPL. Region 4's evaluation efforts are continuing.

Given the current situation, Region 4 believes the removal action will reach goals set forth in the removal action work plan in the near future and at that point the removal action will be completed. The North Carolina Department of Environment and Natural Resources (NCDENR) has the authority to address this Site under their Inactive Sites Program and, in fact, a comprehensive ground water and soil investigation is currently being conducted by the CTS Corporation pursuant to NCDENR's authorities. Region 4 will work with the NCDENR to implement a seamless transition and expect they will implement interim actions to address the TCE contamination in the springs as well as bring the SVE system back online if site conditions warrant such an action. Additional monitoring of the springs and ground water will be conducted as part of this effort. We will coordinate with NCDENR through this effort so if conditions change that may warrant additional removal actions we can respond appropriately. In the meantime, Region 4 is nearing completion of the site evaluation effort and expects to be ready to make a decision on listing to the NPL by May of this year.

The following comments are offered in response to OIG recommendations contained in the draft report titled *EPA Activities Provide Limited Assurance of the Extent of Contamination at a North Carolina Hazardous Waste Site*.

Recommendation 1. Complete and document the Region’s recent efforts to identify all drinking water wells within 1 mile of the former CTS facility.

Region 4 Response: We agree. The effort has been completed, with the exception of a few property parcels, where Region 4 is still attempting to obtain verification of the residential drinking water supply. The documentation of that effort is in progress.

OIG Response 1: Based on additional information received from Region 4 on March 31, 2010 (Appendix C), OIG agrees with the planned corrective action and accepts the milestone of May 15, 2010. Although the milestone for Recommendation 1 has passed, Region 4 has not informed OIG that the corrective action for the recommendation is complete or provided an updated milestone. The recommendation is therefore considered open with agreed- to actions pending. In its 90-day response to this final report, Region 4 should update OIG on the status of planned corrective actions in response to Recommendation 1.

Recommendation 2. Conduct follow-up indoor air sampling at residences that were previously tested for chemical vapors originating from the surface water that is currently undergoing ozonation treatment.

Region 4 Response: While additional data is almost always helpful, Region 4 disagrees with OIG Recommendation 2 for the following two reasons:

- **EPA conducted both initial and follow-up rounds of air sampling. The results confirm that indoor and ambient air concentrations in areas where exposure may occur are below EPA Region 4 Removal Action Levels (RALs) for TCE.**

The OIG report inaccurately states that no follow-up indoor air sampling has been conducted since the initial testing, and incorrectly suggests that EPA’s two separate air sampling events are one event. This is incorrect. The initial sampling event was carried out in December 2007. A follow-up study was conducted in August 2008. The follow-up sampling event was conducted in the summer to explore seasonal variations, as well as evaluate the results of the earlier sampling event.

All sampling results were compared to the EPA Region 4 Removal Action Level (RAL) of TCE in air of 23 parts-per-billion by volume (ppbv). This RAL is based on protection for a residential indoor air exposure setting. EPA does not have an outdoor ambient air RAL; however the indoor air RAL was used to evaluate outdoor ambient air samples as a conservative approach. The highest airborne concentration identified during the initial and follow-up investigation was 3.78 ppbv, which was measured in a crawlspace beneath a home. The crawlspace results from the follow-up event ranged from non-detect to 1.38 ppbv – more than

an order of magnitude below the RAL of 23 ppbv. Per EPA's November 2002 *OSWER Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (Subsurface Vapor Intrusion Guidance)*, crawlspace air provides a direct measure of the potential for exposures from vapor intrusion.

As none of the indoor or crawlspace results for either the initial or follow-up sampling events approached the RAL, Region 4 believes that indoor air has been adequately evaluated and no further sampling is necessary.

- **EPA's Vapor Intrusion (VI) investigation, referred to in the OIG Report as indoor air sampling, was consistent with the national approach to VI investigations and was conducted in accordance with EPA guidance as appropriate relative to best professional judgment and years of practical experience conducting VI investigations.**

The VI investigation was conducted by the EPA Environmental Response Team (ERT) at the request of EPA Region 4. ERT is an EPA Special Team that provides technical and scientific planning and operational support to EPA Regions and is the national source for technical expertise in VI investigations. The investigation was planned and executed in accordance with the U.S. EPA's November 2002 *OSWER Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (Subsurface Vapor Intrusion Guidance)* to the extent practicable given field conditions and using best professional judgment based on experience gained in conducting VI investigations since development of the draft guidance document.

The OIG report faults EPA for not strictly adhering to the draft vapor intrusion guidance during the sampling events. Specifically, the draft guidance typically recommends that all appliances that may create a pressure gradient be turned off prior to and during sampling.

Region 4 recognizes that this portion of the guidance was not strictly adhered to. However, from a practical standpoint, residents could not be expected to turn off their heat in winter and air conditioning in summer during sampling events.

ERT suggests that leaving appliances such as heating and air conditioning systems running may create pressure gradients that can actually draw vapors into the structure, thus creating that worst case scenario referred to in the OIG report. This is a reason why VI sampling is recommended to be performed during the winter season.

The OIG report fails to recognize that EPA facilitated temporary shutdown of the SVE system on the Site prior to and during the sampling event, specifically in order to temporarily maximize the potential for migration of organic vapors from the Site and increase the worst case scenario potential.

Finally, and as indicated previously, indoor TCE concentrations measured during the first sampling event (December 2007) ranged from non-detect to 3.78 ppbv, with the highest indoor concentration encountered during the investigation being obtained from within the crawlspace of a home. Though OIG has not accepted crawlspace results as indoor samples, they are generally considered a worst case scenario per the draft OSWER guidance.

OIG Response 2: Based on Region 4's response and additional information received from Region 4 on March 31, 2010 (Appendix C), we agree that follow-up indoor sampling at residences previously tested is unwarranted at this time. OIG removed this recommendation from the final report. However, while OIG believes additional testing is unwarranted at this time, any significant increases in TCE concentrations in the nearby springs may trigger the need for future indoor and outdoor air monitoring to ensure the safety of the residents. Region 4 should address this potential situation as part of the Region's plan for transitioning the Site to the State upon completion of its removal action at the Site. This OIG concern is addressed in final report Recommendation 4.

Recommendation 3. Conduct outdoor air monitoring on the eastern side of the former CTS facility near the contaminated surface water that is currently undergoing ozonation treatment.

Region 4 Response: Again, while additional data is almost always helpful, Region 4 disagrees with OIG Recommendation 3 for the following factors:

- **EPA conducted two sampling events (2007 and 2008) to evaluate outdoor ambient air impacts from nearby TCE contaminated springs.** Though airborne TCE concentrations in the immediate vicinity of the springs east of the Site exceeded the RAL, these springs have been fenced to limit exposure potential, and data gathered in all other locations were well below RALs. The initial and follow-up investigations further demonstrate that ambient air intrusion is unlikely to result in indoor air concentrations above the RAL.
- **Data derived from the investigation represent the worst case.** Ambient air samples were collected in biased locations (i.e., purposely placed in areas believed to have the potential for higher airborne TCE impacts). Contrary to the OIG report, samples were taken both east and west of the fence line in both indoor and outdoor samples. Specific sample locations were selected through consultation between the OSC and technical staff.
- **During the 2007 sampling event, the range of outdoor ambient air TCE concentrations were consistently below the RAL.** Measured TCE concentrations in ambient air in locations other than immediately at the springs

themselves varied from 0.5 to 21 ppbv. The 21 ppbv value was obtained through an instantaneous sample that could never be duplicated in later sampling events. Follow-up sampling took place two days later at the location that yielded the higher (21 ppbv) detection and the result was 0.49 ppbv TCE. In 2008, two 24 hour Summa Canister samples were collected at this location. Both Summa Canister samples yielded results of non-detect for TCE. Region 4 also notes that all the TCE concentrations, including the 21 ppbv result, were below EPA Region 4's RAL of 23 ppbv.

- **During the second sampling event in 2008, similar sampling locations were chosen and results ranged from non-detect to 0.975 ppbv of TCE.** The results of the initial and follow-up rounds of sampling effectively demonstrate lack of air concentrations at levels of concern.
- **Airborne TCE concentrations immediately at the springs drop off rapidly to below RALs at the fence installed to limit exposure potential.** Off gassing of TCE at the springs has been noted to be a source of TCE in ambient air at the Site. To assess the magnitude of off gassing and the potential risk to nearby residents, EPA conducted air sampling at the springs themselves. A sample collected immediately adjacent to the springs yielded a TCE concentration of 277 ppbv, above the RAL of 23 ppbv (based on a residential exposure). The removal action included installation of a fence and warning signs to isolate and limit direct contact to the springs.

Air sampling around the springs demonstrated that TCE concentrations drop to below RALs at the fence perimeter. Two rounds of air monitoring around the perimeter of the fence have been conducted. The first sampling event took place during the 2008 sampling survey, and yielded an airborne TCE concentration of 1.60 ppbv. The follow-up round of sampling was conducted by CTS, at the direction of EPA, and consisted of four (4) ambient air samples along the perimeter of the fence. The results ranged from 2.38 ppbv to 7.23 ppbv, all below Region 4's RAL (based on a residential exposure). These multiple sampling results demonstrate ambient air conditions outside the fence are within acceptable risk range.

- **Given groundwater conditions, outdoor ambient air TCE data collected to date are believed to provide an accurate estimate of ambient air conditions over time.** Samples collected at the contaminated springs east of the Site consistently yield TCE concentrations in the 20,000 micrograms-per-liter (ug/l) range. Samples collected from the stream formed by the springs (at the perimeter of the containment fence) are consistently in the 2000 ug/l range. These data indicate a consistent source of TCE volatilization to ambient air. However, ambient air in this area, which has been measured over 3 sampling events, show airborne TCE concentrations are well below the TCE removal action level of 23 ppbv in all areas other than at the springs themselves. Given this uniformity in

source, Region 4 believes that TCE concentrations in ambient air will not change significantly over time.

OIG Response 3: Based on Region 4's response and additional information received from Region 4 on March 31, 2010 (Appendix C), we agree that outdoor sampling on the eastern side of the former CTS facility – outside the fenced springs area – is unwarranted at this time. OIG removed this recommendation from the final report. However, while OIG believes additional testing is unwarranted at this time, any significant increases in TCE concentrations in the nearby springs may trigger the need for future outdoor and indoor monitoring to ensure the safety of the residents. Region 4 should address this potential situation as part of the Region's plan for transitioning the Site to the State upon completion of its removal action at the Site. This OIG concern is addressed in final report Recommendation 4.

Recommendation 4. Conduct monitoring of surface water and nearby outdoor air on the western side of the former CTS facility to determine if there are unacceptable levels of contaminants in water and air. Assess for potential exposure and the need to mitigate.

Region 4 Response: The OIG report states that because of high concentrations of TCE in groundwater, the concentrations of TCE in the western springs fed by the groundwater may increase with time. Consequently, the concentration of chemical vapors in air may also increase. Region 4 disagrees with the conclusion and with Recommendation 4 for the following reasons:

- **Springs west of the Site are not potable water sources and TCE concentrations are significantly lower than in the springs east of the Site.** During the week of September 24, 2007, NCDENR Division of Waste Management sampled the stream along Mills Gap Road west of the site. The stream measured 247 ug/l of TCE and dissipated to 12.1 ug/l 220 feet further downstream. NCDENR again sampled the stream along Mills Gap Road west of the site in April of 2008 and results ranged from non-detect to 330 ug/l TCE.
- **TCE concentrations in ambient air west of the Site are consistently below the RAL.** EPA sampled ambient air near the stream west of the site in August 2008. Results ranged from 0.184 ppbv to 0.975 ppbv. EPA also sampled ambient air at SSV, the residential area west of the Site. This event is not noted in the OIG report. The results, obtained through Summa Canister sampling, were non-detect for TCE. These results were all more than an order of magnitude below EPA Region 4's RAL of 23 ppbv for TCE and demonstrate that ambient air near the stream west of the site is within EPA's risk range.
- **Given conditions and observations at the springs east of the Site, the western springs are an unlikely source of airborne TCE above the RAL.** Surface water samples at the springs to the east of the site near the Rice property are

historically high in concentrations of TCE. Samples in the springs and stream formed by the springs are consistently in the 20,000 and 2,000 ug/l range, respectively. However, ambient air in this area, which has been measured over 3 sampling events, consistently shows air samples well below the TCE removal action level of 23 ppbv with exception of the eastern spring itself. Applying these findings to the stream to the west of the site, where surface water samples show a concentration of TCE at a maximum concentration of 408 ug/l (sampling event November 27-29 and December 11, 2007), we do not expect that concentrations in ambient air would become elevated over time beyond the removal action level of 23 ppbv. In addition, the exposure pathways of inhalation or ingestion from this stream are incomplete based on the fact that the stream is not a potable water source, and ambient air samples are below the TCE removal action level of 23 ppbv.

OIG Response 4: Based on Region 4's response and additional information received from Region 4 on March 31, 2010 (Appendix C), we agree that monitoring of surface water and nearby outdoor air on the western side of the former CTS facility is unwarranted at this time. OIG removed this recommendation from the final report. However, while the OIG believes additional testing is unwarranted at this time, any significant increases in TCE concentrations in the groundwater and/or nearby springs may trigger the need for future surface water sampling and indoor and outdoor air monitoring to ensure the safety of the residents. Region 4 should address this potential situation as part of the Region's plan for transitioning the Site to the State upon completion of its removal action at the Site. This OIG concern is addressed in final report Recommendation 4.

Recommendation 5. Modify future letters that communicate results of drinking water sampling to:

- a. Inform residents that the Region did not test drinking water wells for all compounds that EPA recommends for annual testing of private drinking water wells.**

Region 4 Response: We agree. Region 4 will prepare and insert a disclaimer sheet with the results. We note that sample analyses cover over 90 additional metals and compounds that are not included as drinking water regulated constituents.

Proposed timeline: Disclaimer to be sent out with next round of results letters in coordination with proposed workgroup timeline (see response to 2.d. below).

- b. Provide residents with directions on where they can obtain further information on testing the quality of their well water.**

Region 4 Response: We agree. Region 4 has now provided all residents on the monitoring network with EPA's January 2002 Guidance entitled "Drinking Water from Household Wells," EPA 816-K-02-003. This document was sent to all well owners for the 49 wells added to the monitoring network in September and early October. All other residents previously on the monitoring network received the document in January 2010, along with their October 2009 results. This document addresses the owners' responsibility for their private wells, the need to have their wells tested periodically, and what organizations may be able to provide additional information or help with the testing, among other things.

Further, for the last two quarterly events, Region 4 has offered to hold a public availability session to go over results with residents at their request. To date, no community member or resident has requested such a session. Region 4 has received positive feedback from residents regarding the new format of the results letters.

c. Inform residents if testing cannot determine if a compound was present in their well water at a drinking water standard or a risk-based screening level.

Region 4 Response: We agree. Region 4 has taken measures to lower the detection limits of most of the constituents on the VOC, semi-volatile organic compound (SVOC) and metals analyte list to the designated maximum contaminant level for the upcoming monitoring event scheduled for the week of February 22, 2010. If there is a compound present on the analyte list of which a lower detection limit cannot be reached, residents will be informed of such on the disclaimer sheet discussed previously.

OIG Response 5: In the final report, this is Recommendation 2. Based on additional information received from Region 4 on March 31, 2010 (Appendix C), OIG agrees with the planned corrective action and accepts the milestone of May 7, 2010. Although the milestone for Recommendation 2 has passed, Region 4 has not informed OIG that the corrective action for the recommendation is complete or provided an updated milestone. The recommendation is therefore considered open with agreed-to actions pending. In its 90-day response to this final report, Region 4 should update OIG on the status of planned corrective actions in response to Recommendation 2.

Recommendation 6. Develop procedures and guidelines to ensure letters to the residents containing scientific and technical information are accurate, complete, clear, consistent, and readable for a general audience. The procedures should describe a quality review process designed to maintain compliance with developed guidelines.

Region 4 Response: We agree. The Superfund Division will convene a workgroup to formulate policy and procedures (methods to be used, detection limits, disclaimers to be communicated, review process to be performed, language to be conveyed, etc.) for conducting private well sampling/monitoring and communicating results to well owners. The panel will consist of management, Remedial Project Managers (RPM), On-Scene

Coordinators (OSC), Community Involvement Coordinators (CIC), sample control staff and human health risk assessor staff.

Timeline: October 1, 2010

OIG Response 6: In the final report, this is Recommendation 3. Based on additional information received from Region 4 on March 31, 2010 (Appendix C), OIG agrees with the planned corrective action and accepts the milestone of October 1, 2010. The recommendation is open with agreed-to actions pending. In its 90-day response to this final report, Region 4 should update OIG on the status of planned corrective actions in response to Recommendation 3.

Recommendation 7. Provide Community Involvement and Superfund program staff with written guidance or policy that defines the responsibilities for complying with EPA’s records management policies when conducting conversations with the public and conducting site visits.

Region 4 Response: We agree. The Agency’s Records Management Manual and the Superfund Community Involvement Handbook provide written guidance on the responsibilities for complying with EPA’s records management policies when conducting personal conversations with the public, either when on the phone or in person. Community Involvement and Superfund program staff is aware of these responsibilities. Regional managers will remind staff of these responsibilities at our upcoming All-Hands Meeting scheduled for March 11, 2010.

In particular, Superfund managers will ensure that all staff is aware of the requirement to document site-related discussions and interactions with the public. The Site Team will, as required by the Agency’s Records Management Manual, keep a transcript of the public meetings conducted during the comment periods and make transcripts available to the public as part of the administrative record and information repository. Staff will also be made aware that other substantive discussions, such as telephone calls or meetings with individuals, must also be documented.

CICs will be reminded that interviews are strictly confidential. Names, addresses, and phone numbers of private citizens should not appear in the Community Involvement Plan (CIP), and there should be no way to trace information or comments to any private citizens. However, local officials and representatives of Potentially Responsible Parties (PRP) interviewed in their official capacity should be identified in the list of contacts.

OIG Response 7: In the final report, this is Recommendation 5. Based on additional information received from Region 4 on March 31, 2010 (Appendix C), OIG agrees with the planned corrective action and accepts the milestone of April 30, 2010. Although the milestone for Recommendation 5 has passed, Region 4 has not informed OIG that the corrective action for the recommendation is complete or provided

an updated milestone. The recommendation is therefore considered open with agreed-to actions pending. In its 90-day response to this final report, Region 4 should update OIG on the status of planned corrective actions in response to Recommendation 5.

Recommendation 8. Develop a new Community Involvement Plan that addresses all ongoing Site activities and the community's issues, needs, and concerns. The plan should identify specific activities, outreach products, or programs Region 4 will use to address the community's concerns and include a communication strategy for disseminating information to the public.

Region 4 Response: We agree. The CIC for the Mills Gap Site is currently in the process of developing a new CIP. The CIC is in the process of conducting the community interviews and will provide a general description of who has been interviewed.

The new CIP will include a comprehensive community profile, including a site description, history, demographics, economy, community assets and unique needs. The CIP will describe what is known about environmental exposures, and identify key community needs, concerns, and expectations derived from community interviews. The CIP will provide citizens in this community with information and opportunities to participate as active partners in this assessment phase that affect the site in their community and to promote successful community participation throughout the process. The CIP will identify approaches to reach and engage the community, based on the uniqueness of the community. The CIP will discuss how Region 4 has been working and communicating with the citizens and will include a communication strategy that will design and enhance community involvement activities and how EPA plans to disseminate information to the public throughout the site investigation. The CIP will demonstrate that local citizens and EPA can work together effectively to protect human health and the environment. Finally, the Agency will make the CIP available to the public for comment before issuing a final CIP.

Timeline for completion: March 31, 2010.

OIG Response 8: In the final report, this is Recommendation 6. OIG agrees with the planned corrective action and accepts the milestone of March 31, 2010. In response to Recommendation 6, Region 4 provided OIG with a CIP on April 27, 2010. OIG has not reviewed the CIP to determine whether it meets the intent of OIG's recommendation. The recommendation is therefore considered open with actions pending. In its 90-day response to this final report, Region 4 should update OIG on the status of any additional planned corrective actions in response to Recommendation 6.

Appendix C

EPA Region 4 Response to OIG Follow-up Questions

March 31, 2010

MEMORANDUM

SUBJECT: Draft Office of Inspector General Report Titled *EPA Activities Provide Limited Assurance of the Extent of Contamination at a North Carolina Hazardous Waste Site*

FROM: A. Stanley Meiburg
Acting Regional Administrator

TO: Wade Najjum
Assistant Inspector General for Program Evaluation

Thank you for the opportunity to provide comments to the Office of Inspector General of the U.S. Environmental Protection Agency (OIG) on the findings and recommendations contained in the draft report titled *EPA Activities Provide Limited Assurance of the Extent of Contamination at a North Carolina Hazardous Waste Site*. The purpose of this memorandum is to address follow up questions submitted to Region 4 by the OIG on March 11, 2010. Attached you will find our comments organized by OIG question and recommendation.

If you have questions or need additional information, please contact me. Questions of a technical nature may be directed to James Webster at (404) 562-8769 or Webster.James@epa.gov, Carolyn Callihan at (404) 562-8913 or Callihan.Carolyn@epa.gov, or Stephen Ball at (404) 562-8528 or Ball.Stephen@epa.gov.

Again, thank you for the opportunity to comment on this report, and we appreciate the chance to work with you on behalf of the environment in Region 4.

Attachments

ATTACHMENT 1

EPA Region 4 Responses to Office of Inspector General (OIG) Follow up Questions Submitted on March 11, 2010, Relative to the Draft Report Titled *EPA Activities Provide Limited Assurance of the Extent of Contamination at a North Carolina Hazardous Waste Site*

OIG Question 1 - Ozonation System: Region 4's response to the OIG draft report states that the ozonation system "installed to destroy VOCs emanating from the springs on the Rice property" was ineffective. In our meeting on February 25, 2010, Region 4 staff stated that the ozonation system had been dismantled.

- a. On the basis of what information did Region 4 determine that the system was ineffective? Please provide the OIG with that information along with the Supplemental Removal Action Plan, August 2008, which does not appear to be in SDMS or on the Mills Gap OSC website.
- b. When was the ozonation system dismantled/taken 'off-line'?
- c. How and when will Region 4 communicate with the affected and interested public that the system has been dismantled?

Region 4 Response:

- a. The *August 20, 2008 Supplement to Removal Action Plan of February 4, 2005* is attached (*Attachment 2*). Performance of the pilot ozonation system was evaluated based on comparison of surface water quality data generated prior to and during the pilot study. The intended purpose of the ozonation system was to treat trichloroethylene (TCE) contaminated groundwater discharging at multiple springs located immediately east of the Mills Gap Groundwater Contamination Site (Site), located in Skyland, Buncombe County, North Carolina.

CTS, under order by EPA Region 4, collected 10 months of surface water sample data as part of the ozone pilot study. A baseline sample event took place on March 19, 2009. After the system came online in April 2009, nine additional monthly sample events took place to measure changes in TCE concentration in surface water resulting from ozone injection. During the months of operation of the pilot ozonation system, no change in TCE concentrations were observed relative to the baseline sampling event. It was thus concluded that the ozonation system was not having a measurable effect on TCE concentration at the springs.

The surface water data was collected at the four springs on the east of the Site and one stream sample at the fence boundary downstream from the springs. Spring 1 was only sampled seven months due to consistently low concentrations. Table 1 below contains a summary of data collected and shown in the *Draft Report of Removal Action Pilot Study (Attachment 3)*. Also shown is the mean and median of the collected data showing average conditions for Springs #3 and #4 of approximately 20,000 micrograms-per-liter (ug/l).

**Table 1
Concentration of TCE**

Sample Location	Range (ug/l)	Mean (ug/l)	Median (ug/l)
Spring 1	1.3 – 290	85.69	5.9
Spring 2	12,000 – 21,000	15,600	15,000
Spring 3	11,000 – 25,000	20,000	20,500
Spring 4	2,900 – 36,000	20,790	21,500
Surface Water 1	1,800 – 3,000	2,330	2,300

Additional information on performance of the pilot ozonation system, including data tables and a sample location figure, can be viewed in the *Draft Report of Removal Action Pilot Study* (Attachment 3).

- b. The pilot ozonation system was shutdown on January 14, 2010, and dismantled (removed from fenced springs area) on January 15, 2010. The injection points and small 'wellheads' are still at the Site, and may be removed upon final approval of the pilot study report.
- c. Region 4 communicated termination of the ozone system to select community representatives at the Mills Gap Congressional meeting on Friday, January 22, 2010. The community members in attendance were Barry Durand, Aaron Penland, Tate MacQueen, and Dave Ogren. At the meeting Mr. Durand indicated that he represented the Rice family. Once the *Draft Report of Removal Action Pilot Study* becomes final, a fact sheet will be distributed to the community to inform them of the event and outcome.

OIG Question 2 - SVE System: Region 4's response to the OIG draft report states that NCDENR may "bring the SVE system back online if site conditions warrant such action." This statement implies that operation of the SVE system has been discontinued. However, that is not stated in the Region's response.

- a. Was the SVE system stopped and when?
- b. On the basis of what information did Region 4 determine that the system was no longer needed? Please provide the OIG with that information.
- c. How and when will Region 4 communicate with the affected and interested public that the system has been/will be shut down?

Region 4 Response:

- a. The statement in the initial Region 4 response to the draft OIG report was poorly worded and therefore misleading. No, the SVE system has not been shutdown. It is still in operation at this time.

- b. As indicated, the SVE system is still in operation at the Site. However, evaluation of the effectiveness of the system and any eventual decision on its operation will be based on analysis of its performance at removing volatile organic compounds (VOCs) from the subsurface.

Removal action goals are discussed under Section 4.0 of the *Revised Removal Action Plan* (Attachment 4). Specifically, “to evaluate the constituent recovery rates and determine when they have reached an asymptote, at which time further operation of the SVE system will be unnecessary, a regression analysis will be performed on the data.”⁴ Air samples are collected from the SVE system once per month to estimate the mass of VOCs removed from the subsurface, unsaturated zone. At such time that a statistical analysis of the mass recovery rate demonstrates a slope that is indicative of an asymptote, the effectiveness of the SVE system may be considered exhausted and termination of its operation will be considered.

- c. Once the SVE system has attained the goals stated in the *Revised Removal Action Plan*, Region 4 will coordinate an availability session or a public meeting as appropriate to convey the results to the community.

OIG Question 3 - Removal Action Goals: Region 4's response to the OIG draft report states "given the current situation, Region 4 believes the removal action will reach goals set forth in the removal action work plan in the near future and at that point the removal action will be completed."

- a. What are the removal action goals?
- b. On the basis of what information will the Region determine that the goals have been met?
- c. How and when will Region 4 communicate with the affected and interested public that the removal action goals have been met?
- d. Is a public comment period required?

Region 4 Response:

- a. The approved *Revised Removal Action Plan* specifies in Section 4.0, “the removal action standard that is proposed for this project, and the method for determining when the standard is met, is based on reaching asymptotic recovery rates from the SVE recovery wells¹. To perform this evaluation, certain vapor samples will be collected and analyzed for USEPA Method 8260 VOCs. Concentration data will be plotted versus time to illustrate the changes in removal rates with the ongoing operation of the removal system. Typically, the removal of constituents from environmental media occurs in a logarithmic scale.”

⁴ A statistical analysis to fit a curve through the set of measurements (recovery rates over time). An asymptote in the case of the SVE system may be assumed when the rate of VOC removal from the subsurface is approaching zero along a trend into infinity (i.e., may get infinitely close but never actually reach zero).

- b. Evaluation of the effectiveness of the system and any eventual decision to discontinue its operation will be based on analysis of its performance at removing VOCs from the subsurface. See Region 4 response to OIG question 2.b., above, for additional details of evaluation of the SVE system.
- c. Once the SVE system has attained the goals stated in the *Revised Removal Action Plan*, Region 4 will coordinate an availability session or a public meeting as appropriate to convey the results to the community.
- d. No, a public comment period is not required relative to the determination that the goals of the removal action have been attained.

OIG Question 4 - Seamless Transition to NCDENR: Page 1 of your response states "...expect they will implement interim actions to address TCE contamination in the springs..."

- a. What is the basis for assuming interim actions, vs. long-term actions are needed?
- b. Has the Region had discussions with the NCDENR regarding what interim actions will be taken?
- c. What are the interim actions the Region envisions?
- d. What assurances does Region 4 have from NCDENR that they will implement interim actions to address the TCE contamination in the springs?
- e. What authority, if any, permits the Region to enforce or require NCDENR interim actions?
- f. If all interim actions are led by NCDENR, what is Region 4's oversight role at the site, in addition to completing its site assessment activities?

Region 4 Response:

- a. Region 4 believes remedial-type actions are necessary to address the threats posed by the site. Interim actions may be warranted during the site characterization process to collect and treat contaminated water emanating from springs which EPA has discussed with NCDENR. To address long-term actions, historically EPA has utilized several different technologies at similar contaminated ground water sites including, extraction and treatment, in-situ treatment, and monitoring of natural processes. Each of these alternatives requires considerable characterization and design which can take years to accomplish, followed by years of remedial action.
- b. Yes, the Region has discussed the potential interim actions with NCDENR.

- c. The Region has discussed two possible interim actions with NCDENR: (1) collection and treatment of contaminated water emanating from the springs; and (2) continuing to operate the SVE system.
- d. Region 4 has no assurances from NCDENR at this point, but we will continue to communicate with our counterparts at NCDENR.
- e. EPA has no authority to enforce or require actions by NCDENR under their Inactive Sites Program, however we work closely with NCDENR in every facet of the Superfund program and we will offer technical support at this site, and any site, should they request it.
- f. EPA does not have a formal oversight role on sites in NCDENR's Inactive Sites Program. As stated above in (e), EPA can provide technical support on sites in the NCDENR Inactive Sites Program when requested.

OIG Question 5 - Recommendation 1: Complete and document the Region's recent efforts to identify all drinking water wells within 1 mile of the former CTS facility.

- a. When do you expect that verification will be completed?
- b. How is the effort being documented?
- c. When do you expect documentation to be completed?
- d. Please provide an overall estimated milestone completion date for both of these efforts.

Region 4 Response:

- a. Verification should be completed by April 15, 2010.
- b. EPA has constructed a GIS-based parcel map of the 1-mile radius around the Site, which is based upon the Buncombe County Land Records parcel map. Each parcel is color-coded showing if the property is supplied by municipal water, a private well, or not supplied. The methodology behind this analysis was a process of documenting previously known information, elimination of parcels without structures and parcels served by municipal water, followed up with a ground survey (door-to-door survey). The GPS points from historical sampling events were identified and overlaid onto the GIS Buncombe County Land Records parcel map layer. Multiple GPS points for each parcel and from different sampling events identified known parcels on well water. This information was then cross-referenced against a database to identify which residents have wells currently being sampled. The City of Asheville provided data referencing of current property parcels currently supplied by city water. These parcels were removed from the parcels on well water within a 1-mile radius. Apparent vacant parcels were systematically removed by referencing each parcel against the Buncombe County Property Record Card to confirm if any structures were on the property. Lots were also viewed by *Google Maps* aerial images and *Image Connect* to verify if

structures were on the parcels. We are currently in the process of verifying the status of a remaining handful of parcels. Documentation will consist of the actual GIS-based map, the Scribe Database, notes from the door-to-door survey, access agreements and well information forms, telephone call logs, and notes. An Excel spreadsheet will accompany this information and will contain information on each parcel documented that contains a private well. Information will include, owner name, address, number of population on the well, contact name and number, and miscellaneous notes. Documentation should be completed within one month of completion of verification.

c. This action will be completed by May 15, 2010.

d. Both actions will be completed by May 15, 2010.

OIG Question 6 - Recommendation 2: Conduct follow-up indoor air sampling at residences that were previously tested for chemical vapors originating from the surface water that is currently undergoing ozonation treatment.

We understand Region 4's position that the sampling in December 2007 was the initial sampling and that the Region considers the sampling conducted in August 2008 to be the follow-up sampling. However, our discussion in the report pertains to the lack of follow-up sampling after startup of the ozonation system to determine its impact on indoor and outdoor air quality. As discussed in the report, the Region believed that the ozonation system would reduce TCE vapors in the residences. To our knowledge, no additional (or follow-up) sampling was conducted outside the fence line surrounding the system and stream to determine the impact of the ozonation system. We do not agree that the August 2008 sampling was "follow-up" sampling for purposes of testing the effectiveness of the ozonation system.

- a. Why does Region 4 think it unnecessary to conduct a second round of indoor breathing space sampling when EPA's Draft 2002 Vapor Intrusion Guidance states "Two or more sampling events at each location are desirable" (p. E-5). To our knowledge, the Dec 2007 sampling included "crawlspaces" and not "breathing zones"?
- b. Region 4 has concluded that TCE vapors within the house closest to the contaminated springs east of the former CTS facility is from ambient air and that the springs are the primary source for the TCE vapors in ambient air. Why did Region 4 not conduct an additional round of indoor breathing space sampling, even though the sampling conducted in August 2008 showed low ambient air concentrations relative to the higher concentrations in December 2007?

Region 4 Response:

Region 4 did not understand that the follow-up sampling referred to by the OIG was specific to the ozonation system. Thank you for that clarification. Region 4 acknowledges that no follow-up VI or ambient air sampling was conducted once the ozone system was brought online for the purposes of evaluating impacts the Ozone system may have had on ambient air. This was due to the finding that the ozonation system had no impact on TCE concentrations at the springs or in

surface water, and therefore there would be no expected change in concentrations of TCE in ambient air. See Region 4 response to OIG Question 1.a., above for a description of the evaluation of the ozonation system.

- a. Region 4 believes that a crawlspace air sample represents a worst case scenario of a breathing zone. First, because at this Site, ambient air is the believed source of indoor TCE, and the crawlspace in this case was believed to be representative of ambient air in close communication with the home. Also note that air sampling at the springs has shown that ambient air TCE concentrations are uniformly lower than the RAL for indoor air at the fence line surrounding the springs (i.e., no air sample taken outside the spring fenced area has ever exceeded the residential RAL). Secondly, crawlspace samples as a worst case estimate of indoor TCE concentrations is supported by the U.S. EPA's November 2002 *OSWER Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (Subsurface Vapor Intrusion Guidance)*, which states that crawlspace air provides a direct measure of the potential for exposures from vapor intrusion. Therefore one round of indoor air sampling and two rounds of crawlspace samples, none of which exceed the indoor air RAL of 23 parts-per-billion by volume (ppbv), are a sufficient measure of the potential exposure threat posed by ambient air migration into a home. The first round of sampling (Dec. 2007) included a crawlspace air sample from the house closest to the spring. The crawlspace was selected as the sample location based on discussions with the EPA Environmental Response Team (ERT) that the crawlspace would show the highest air concentration of TCE in the home. The sample result was 3.78 ppbv. This sample was significantly below the EPA Emergency Response and Removal Branch (ERRB) Removal Action Level (RAL) of 23 ppbv. However, since TCE was detected in air, and as a conservative measure, the home was resampled during the August 2008 sampling event (Attachment 5). During this event it was decided that both the crawlspace and the interior of the home would be sampled. The crawlspace sample was 1.38 ppbv and the indoor air sample result was 1.27 ppbv. The indoor air sample was lower than the crawlspace sample, which indicates that the crawlspace sample is representative of the worst case scenario. In addition, the August 2008 follow-up sampling event provided two more data points significantly below the RAL. Two sampling events consisting of two crawlspace samples and one interior sample, all of which are significantly lower than the RAL provided the ERRB with a reasonable basis for determination that additional sampling was unwarranted.
- b. As indicated under (a), all sample results from the subject house were well below the RAL, and as Region 4 believes, in this case, crawlspace air sample represents a worst case scenario estimate of a breathing zone. As crawlspace samples during both sample events were below the RAL, further follow-up sampling was not warranted.

OIG Question 7 - Recommendation 3: Conduct outdoor air monitoring on the eastern side of the former CTS facility near the contaminated surface water that is currently undergoing ozonation treatment.

OIG wrote draft recommendation 3 regarding air monitoring assuming that sampling of surface water (springs and stream) would continue.

- a. Now that the AOC respondents have dismantled the pilot ozonation system, what continued monitoring is Region 4 requiring them to carry out?
- b. Region 4 states that "airborne TCE concentrations immediately at the springs drop off rapidly to below RALs at the fence." Could Region 4 please provide us a map that shows the location of the fence relative to the spring, stream, outdoor air, crawl space and indoor air sampling locations?
- c. Region 4 states that the "data derived from the investigation represent the worst case." Why have concentrations in the springs not been measured at the same time as ambient air? Without these simultaneous measurements, how is Region 4 able to claim that it understands the contribution of TCE from the springs to ambient air and that the ambient air measurements represent the worst case?
- d. Table 7 of the 2009 Phase I Remedial Investigation Report presents the water quality data for the springs and streams. According to this table, spring locations 1 and 2 on the eastern side have been sampled six times since 1999 with measured concentrations ranging from 1,900 ug/l to 34,000 ug/l. Does Region 4 have additional data that supports its claim that "samples collected at the contaminated springs east of the Site consistently yield TCE concentrations in the 20,000 micrograms-per-liter (ug/l) range"? Please provide all the monitoring and location data that the Region used to make the various claims in its response to Draft Recommendation 3.

Region 4 Response:

- a. The Region 4 Emergency Response and Removal Branch (ERR) is not requiring the PRPs to monitor the springs or downgradient stream under the current AOC. Region 4 believes that 10 months of water quality data in the east springs are a sufficient measure of concentrations that will continue to be observed in the springs and stream. See Region 4 response to OIG question 1.a., above for information regarding monitoring of the springs and stream during evaluation of the ozonation system.
- b. A map showing the location of the springs and the outdoor ambient air samples collected by MacTec (a consultant to the PRPs) is attached (Attachment 6). Additional maps showing the various air sampling events and types of samples collected by EPA are also attached (Attachments 5 and 7). New maps are being generated to combine all sampling events onto one map. Those maps will also show the location of the fence around the springs. Those maps are expected to be completed by March 29, 2010, and can be made available to the OIG at that point; however this is a compilation of existing data and no new information will be presented on these maps.

- c. The springs have been sampled consistently over a 10 month period during the ozone pilot study. Sample results from the springs are consistent (See Table 1 under Response 1.a., above). Region 4 believes this amount of time gives an accurate representation of spring conditions over time and that further spring sampling concurrently with indoor air or crawlspace sampling is not necessary to draw the conclusion that air samples represent a worst case scenario. In addition, during the start-up of the ozone system an outdoor ambient air sampling event was conducted in conjunction with the baseline spring (surface water) sampling event in March of 2009. The data below shows perimeter fence line air monitoring as well as surface water concentrations at each of the four springs during the same month (Table 2). Note that at Spring 4, the TCE concentration in ambient air at the exclusion fence was well below the RAL (for indoor residential air) even at a TCE concentration in surface water at the spring of 36,000 ug/l.

Table 2
Concentrations of TCE

Air at Fence Line (March 31, 2009)	AA-01	AA-02	AA-03	AA-04
	2.93 ppbv	2.38 ppbv	7.23 ppbv	6.38 ppbv
Surface Water (March 19, 2009)	Spring 1	Spring 2	Spring 3	Spring 4
	1.3 ug/l	14,000 ug/l	11,000 ug/l	36,000 ug/l

Additionally, in December of 2007, NCDENR did conduct a surface water sampling event that coincides with EPA's initial crawlspace air sampling event. See the Table 3 below for data comparisons.

Table 3
Concentrations of TCE

EPA Crawlspace Air December 2007	MGSC01 (Southside Village, west springs)		MGSC25 (Rice home, east springs)	
	0.161 ppbv		3.78 ppbv	
NCDENR Surface Water December 2007	CTS-013-SW (west springs)	CTS-012-SW (west stream)	CTS-008-SW (east spring)	CTS-009-SW (east spring)
	408 ug/l	39.4 ug/l	18,000 ug/l	11,600 ug/l

These data further demonstrate that the worst case scenario can be determined as well as shows that concentrations of TCE in indoor and outdoor air emanating from the springs has not been and is not expected to be above EPA's RAL for indoor air of 23 ppbv. Please see Attachments 7 and 8 for more information on data distribution and correlation.

- d. Please refer to Region 4 response to OIG question 1.a. for a explanation of our basis for 20,000 ug/l as the estimation of average conditions in the eastern springs. Please refer to Region 4 response to (c), above, for a discussion of TCE concentrations in ambient air relative to TCE concentrations in springs.

OIG Question 8 - Recommendation 4: Conduct monitoring of surface water and nearby outdoor air on the western side of the former CTS facility to determine if there are unacceptable levels of contaminants in water and air. Assess for potential exposure and the need to mitigate.

Region 4's position is that the conditions are unchanging (in steady state) and that the limited sampling that has been conducted sufficiently establishes that levels of TCE in the western springs are not high enough to warrant concern. We do not accept these claims that conditions are steady and concentrations will not become high. As we have stated in our draft report, concentrations of TCE in groundwater on the western side are high, as shown in the 2009 Phase I Remedial Investigations Report. We expect that concentrations in the groundwater-fed springs on the western side will increase. No sampling of these springs has been conducted in 23 months. What information does Region 4 have to support its claim that conditions are unchanging?

Region 4 Response:

As indicated in our March 5, 2010, response, surface water west of the Site was sampled by NCDENR in September 2007, November/December 2007, and April 2008. On the first occasion, the highest TCE concentration found was 247 ug/l, which dissipated to 12.1 ug/l within approximately 200 feet downstream of the source (Attachment 9). During the second event, the highest TCE concentration observed was 408 ug/l (Attachment 8). During the third event, TCE concentrations ranged from non-detect to 330 ug/l TCE (Attachment 10). Ambient air sampling conducted near the stream on the west side of the Site conducted in August 2008 yielded airborne TCE concentrations of 0.184 ppbv to 0.975 ppbv. Ambient air sampling conducted in the residential area west of the Site yielded results of non-detect for TCE.

Given that the stream west of the Site is not a current source of potable water and that all air sampling results are well below the RAL of 23 ppbv, Region 4 believes that these areas have been adequately assessed with respect to the emergency response and removal program. Region 4 also notes that the Phase I report referenced by OIG above was produced by CTS under the direction and oversight of NCDENR, and, should NCDENR request, ERRB will review and act upon, as appropriate, any future data generated through any State oversight investigation of the Site.

Region 4 further based its initial response to OIG Recommendation #4 through comparison with conditions observed east of the Site where even though measured surface water concentrations are approximately two orders of magnitude higher than in the west, ambient air concentrations are well below RALs in all areas other than at the spring head itself (See Table 1 under Response 1.a., above).

OIG Question 9 - Recommendation 5: Modify future letters that communicate results of drinking water sampling to:

- a. Inform residents that the Region did not test drinking water wells for all compounds that EPA recommends for annual testing of private drinking water wells.**

Could Region 4 please clarify the proposed timeline for the actions proposed to address Recommendation 5a? For this timeline, the Region refers OIG to "see response to 2.d. below". However, there is no response 2d.

- b. Provide residents with directions on where they can obtain further information on testing the quality of their well water.**

The OIG accepts the proposed action and acknowledges that Region 4 has already completed the proposed action. That completion will be noted in the final report.

- c. Inform residents if testing cannot determine if a compound was present in their well water at a drinking water standard or a risk-based screening level.**

What is Region 4's proposed milestone date for sending out the letters to residents communicating the results of the sampling that was conducted in February 2010?

Region 4 Response:

- a.** We mistakenly referenced 2.d. The correct reference is 2.c. We expect to mail out the February well monitoring results by May 7, 2010. The Superfund Division work group (see Recommendation 6) to formulate policy and procedures for communicating multi-media results to residents should complete their work by October 1, 2010. Obviously, these two deadlines do not coincide. However, the work group will prioritize the work on formulating the disclaimer for the private well water samples, so that the disclaimer can be sent out with the February results, if possible.
- b.** Region 4 thanks the OIG for acceptance of the proposed action.
- c.** The time from sampling date until final letters are sent out to the residents takes on the average 8-10 weeks. We would expect that residents would be sent their results by May 7, 2010.

OIG Question 10 - Recommendation 6: Develop procedures and guidelines to ensure letters to the residents containing scientific and technical information are accurate, complete, clear, consistent, and readable for a general audience. The procedures should describe a quality review process designed to maintain compliance with developed guidelines.

In order to address this recommendation, the Region needs to include communication of other sampling, such as sampling ambient, indoor, subslab, and crawl space air, conducted on private residential property. We communicated this during our February 25, 2010, meeting. At that time, the Region agreed that the scope of their corrective action plan to address this recommendation would extend beyond drinking water letters. Region 4 seemed to understand that recommendation 6 applied to letters communicating results of **all** sampling conducted at private residences. OIG's final report will include direction to the Region about what specific actions OIG needs to see in the Region's 90-day response to the final OIG report. That response includes details on corrective action plans to address OIG recommendations and that haven't been provided prior to that time.

Region 4 Response:

Region 4 agrees that procedures and guidelines for clear communication of scientific and technical information should address all environment media and investigations. The workgroup referenced in our March 5, 2010, response to OIG Recommendation 6 will address multi-environmental media scientific and technical information.

OIG Question 11 - Recommendation 7: Provide Community Involvement and Superfund program staff with written guidance or policy that defines the responsibilities for complying with EPA's records management policies when conducting conversations with the public and conducting site visits.

In order to address this recommendation, the Region needs to develop a corrective action plan that provides Regional staff with **written** guidance or policy that defines responsibilities for complying with EPA's record management policies. The Region's draft response says it will provide "verbal communication" of the responsibilities. The Region can complete this recommendation by issuing a management memo/all-hands memo to all Regional staff outlining their responsibilities.

Region 4 Response:

Region 4 agrees with the OIG's recommendation. We will develop and distribute an all-hands memo to the Regional staff outlining roles and responsibilities for complying with EPA's record management policies. The timeline for completion of this action is within 30 days of the date of this memorandum.

OIG Question 12 - Recommendation 8: Develop a new Community Involvement Plan that addresses all ongoing Site activities and the community's issues, needs, and concerns. The plan should identify specific activities, outreach products, or programs Region 4 will use to address the community's concerns and include a communication strategy for disseminating information to the public.

The OIG finds the response and timeline for completion acceptable.

Region 4 Response:

Region 4 thanks OIG for acceptance of the proposed action.

Summary of Region 4 Actions or Deliverables

A summary of the actions and/or deliverables identified within the preceding Region 4 responses to OIG follow up questions is given in Table 4, below.

Table 4
Summary of Region 4 Actions and/or Deliverables Identified Within Attachment 1

Region 4 Response	Action or Deliverable	Completion Date or Comment
1.a.	Fact Sheet on <i>Report of Removal Action Pilot Study</i>	Upon finalization of <i>Draft Report of Removal Action Pilot Study</i>
2.c.	Availability session or public meeting to discuss SVE system goals and status	Upon SVE system having attained goals as stated in <i>Revised Removal Action Plan</i>
5.a.	Verification of drinking water wells within 1 mile of former CTS facility	April 15, 2010
5.c.	Documentation of drinking water wells within 1 mile of former CTS facility	May 15, 2010
5.d.	Milestone completion date for verification and documentation	April 15, 2010 for verification and May 15, 2010 for documentation
7.a.	New maps with compilation of past sampling events	March 29, 2010
9.a.	Mail out of analytical results of February 2010 monitoring results of residents	May 7, 2010
9.a.	Formulation of proposed policy and procedures for communicating multi-media monitoring results to residents	October 1, 2010
11	All hands memorandum outlining roles and responsibilities for compliance with EPA record management policies	Within 30 days of date of this memorandum

Appendix D

Distribution

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