U.S. ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF INSPECTOR GENERAL

Catalyst for Improving the Environment

Evaluation Report

EPA's Safety Determination for Delatte Metals Superfund Site Was Unsupported

Report No. 09-P-0029

November 19, 2008

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Abbreviations

Delatte	Delatte Metals Superfund Site
DQO	Data Quality Objective
EPA	U.S. Environmental Protection Agency
LDEQ	Louisiana Department of Environmental Quality
O&M	Operation and Maintenance
OIG	Office of Inspector General
ORD	Office of Research and Development
PRB	Permeable Reactive Barrier
QAPP	Quality Assurance Project Plan
RAO	Remedial Action Objective
Review	Five-Year Review
ROD	Record of Decision
SDMS	Superfund Document Management System
Site	Delatte Metals Superfund Site

Cover photo: New housing development built adjacent to the Delatte Metals Superfund Site, Ponchatoula, Louisiana. (EPA OIG photo)

U.S. Environmental Protection Agency
Office of Inspector General

09 -P-0029
November 19, 2008

At a Glance

Catalyst for Improving the Environment

Why We Did This Review

The Office of Inspector General (OIG) is testing long-term monitoring results at Superfund sites the U.S. Environmental Protection Agency (EPA) has deleted from the National Priorities List to ensure that EPA has valid, reliable, and accurate data on the conditions at these sites. Delatte Metals Superfund Site (Delatte), Ponchatoula, Louisiana, is one of eight sites that we are evaluating.

Background

Soil and water at Delatte were contaminated with metals from battery recycling and smelting operations. EPA deleted Delatte from the National Priorities List in 2005, signifying clean-up goals were achieved through remedial action. In November 2007, EPA Region 6 completed a required review (Five-Year Review) of the Site to determine if it still protected humans and the environment from unacceptable risks.

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

To view the full report, click on the following link:
www.epa.gov/oig/reports/2009/20081119-09-P-0029.pdf

EPA's Safety Determination for Delatte Metals Superfund Site Was Unsupported

What We Found

EPA's protection determination for the Delatte Metals Superfund Site was not supported by its data. Despite evidence of potential remedy failure, EPA Region 6 determined in November 2007 that conditions at Delatte protect humans and the environment in the short-term. Our review showed:

- The permeable reactive barrier (PRB) was not treating all of the shallow contaminated groundwater before it discharges to surface water and migration of metal contaminants was uncontrolled.
- Metal concentrations in surface water greatly exceeded site clean-up standards.
- Site access was uncontrolled and public warning that the Site is restricted to industrial use was limited.
- Region 6 did not perform sufficient testing of the groundwater and surface water to determine whether contaminants were controlled.
- Region 6 did not perform the required inspection of the PRB.

EPA research scientists also raised concerns about the effectiveness of the PRB in controlling the migration of all metals and recommended that Region 6 conduct additional testing. The data available to Region 6 when it conducted its November 2007 Five-Year Review, combined with the OIG's results, show that the Site's safety cannot be determined until the effectiveness of the PRB and the risk posed by the migration of metals are assessed.

What We Recommend

We made eight final recommendations to Region 6. The Region agreed with seven OIG recommendations to ensure that the Delatte clean-up remedy is performing as intended and is protective to human health and the environment. Region 6 disagreed with our recommendation to amend its 2007 Five-Year Review determination to state that the protectiveness of the Delatte remedy cannot be determined without further information and analysis. We believe this action is needed. The recommendation is open and unresolved.

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

OFFICE OF
INSPECTOR GENERAL

November 19, 2008

MEMORANDUM

SUBJECT: EPA's Safety Determination for Delatte Metals Superfund Site Was Unsupported
Report No. 09-P-0029

FROM: Wade Najjum
Assistant Inspector General
Office of Program Evaluation

TO: Richard Greene
Region 6 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 6's draft report comments by making changes to the report and providing responses to EPA Region 6, 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 $398,750.

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. For the recommendation over which we disagree, please reconsider your position in your response to this final report. 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 Carolyn Copper, Director for Program Evaluation, Hazardous Waste Issues, at (202) 566-0829, or copper.carolyn@epa.gov; or Patrick Milligan, Project Manager, at (215) 814-2326, or milligan.patrick@epa.gov.

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Chapter 1
Introduction

Purpose

The Office of Inspector General (OIG) of the U.S. Environmental Protection Agency (EPA) is evaluating long-term monitoring at Superfund sites deleted from the National Priorities List. This is being done to ensure that EPA has valid, reliable, and accurate data on the conditions of these sites. The Delatte Metals Superfund Site (Delatte, or the Site), located in Ponchatoula, Louisiana, is one of eight sites that we are evaluating. This report presents OIG findings related to EPA's Five-Year Review determination, or "protectiveness determination," that the remedy at Delatte is protective of human health and the environment.[1] We collected groundwater and surface water samples and conducted a site inspection. We compared our results to past results reported by EPA and the Louisiana Department of Environmental Quality (LDEQ).

Background

Delatte was added to EPA's Superfund National Priorities List in 1999. The Site covers about 19 acres, although remedial activities extended beyond the Site boundaries and encompassed a total of about 57 acres. Selsers Creek flows past the northwest corner of the Site. Two tributaries to the creek drain the Site.

Soil, sediment, surface water, and shallow groundwater were contaminated with lead, arsenic, cadmium and other metals from battery recycling and smelting operations conducted at Delatte. Remedial action objectives identified in the record of decision (ROD) included:

- Minimize or eliminate contaminant migration to the groundwater and surface waters to levels that ensure beneficial reuse of these resources,
- Treat or remove the principal threat wastes at the site, and
- Reduce or eliminate the direct contact threats associated with contaminated soil.

Remedial action included construction of a permeable reactive barrier (PRB) to treat contaminated shallow groundwater. The PRB at Delatte (Figure 1-1) extends 9 to 15 feet below ground and laterally about 720 feet across the direction of groundwater flow to intercept the shallow groundwater. The PRB is composed

[1] This report uses the terms "protective" and "safe" interchangeably. Our intent in using the word "safe," or "safety," is to clarify a technical EPA term. An EPA publication used to communicate the purpose of Superfund Five-Year Reviews also uses the words "protective" and "safe" interchangeably.

of limestone and cow manure to neutralize the acidity (raise the pH level) of the groundwater that flows through it. The rise in pH immobilizes some metals in the groundwater and limits the migration of metals off the Site. Remedial action also included removing or stabilizing on- and off-site contaminated soil. Remedial action was completed by Region 6 (Region) in 2003.

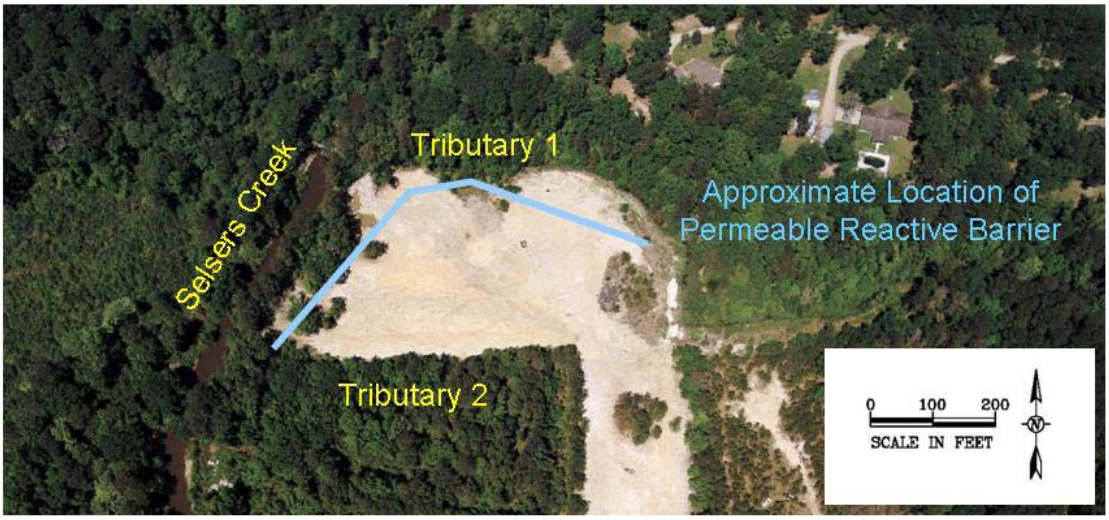


Figure 1-1: Aerial photograph of the northern portion of the Delatte Site, showing location of the PRB and surface water features. This photograph was taken before houses (shown in cover photograph) were constructed northwest of Selsers Creek. (Source: EPA, with labels added by OIG)

In 2004 LDEQ initiated the required ongoing Operation and Maintenance (O&M) phase that includes quarterly groundwater monitoring. In addition, research scientists from EPA's Office of Research and Development (ORD) periodically collected groundwater samples in the vicinity of the PRB.

EPA deleted the Site from the National Priorities List on August 8, 2005. Deletion signifies an EPA decision that all response actions were successful and no further Superfund response is required to protect human health and the environment. The State of Louisiana concurred with this decision. Although the Site is deleted, some waste remains, limiting the Site to industrial uses. Therefore, reviews are required by law at least every 5 years to ensure that the remedy continues to protect human health and the environment. Region 6 released its first Five-Year Review (Review) of the site on November 19, 2007, which was 5 years after remedial construction began. The Region concluded that the remedy protects in the short-term, but improvements were needed to ensure long-term safety. The Region did not define what it meant by short-term protection.

Noteworthy Achievements

The Region conducted remedial action during 2002 and 2003 to stabilize metals in soil or remove the contaminated soil. Over 85,000 tons of contaminated soil were excavated on- and off-site, treated, and disposed of at an off-site landfill. About 20,000 tons of off-site soils meeting on-site industrial clean-up standards were placed in the on-site excavations. Lime was applied to unexcavated areas to reduce the soil's acidity. Because treated wastes were left on-site, an institutional control in the form of conveyance notices were placed on the Site's property deeds limiting the Site to industrial uses and excluding access to groundwater under the Site for drinking water purposes.

Scope and Methodology

We conducted our work from May 2007 to August 2008 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 acquired a qualified contractor to take groundwater and surface water samples, and conduct a site inspection at the Site during the week of February 4, 2008. On or near the site, the contractor collected samples from 22 groundwater wells and 3 surface water locations. OIG staff members were present to ensure that proper sampling and site inspection quality assurance protocols were followed. The samples were analyzed at qualified laboratories.

We interviewed the EPA Remedial Project Manager, the Project Manager for LDEQ, and others. We reviewed relevant site and guidance documents. On March 6, 2008, we sent the Region information alerting it of potential issues we identified at Delatte, along with a list of questions regarding those issues. The Region provided this information to the EPA research scientists studying the effectiveness of the PRB. On March 24, 2008, the Region, along with the EPA research scientists, responded in writing. In May 2008, we followed up with the Remedial Project Manager and the LDEQ Project Manager to determine whether they implemented or planned corrective actions to address the issues we identified.

A draft of this report was sent to the Region 6 Administrator on August 7, 2008. We received comments from Region 6 on September 12, 2008, and met with Region officials on October 9, 2008 to discuss their review of a draft of this report. On October 15, 2008, the Region provided additional comments to their September response. We reviewed and considered the Region's comments, and made revisions to the report where appropriate.

Additional details on our Scope and Methodology are in Appendix A. A list of relevant documents we reviewed is in Appendix B. OIG sampling results that relate to issues discussed in this report are in Appendix C. Region 6's written comments and the OIG's evaluation of those comments are in Appendix D.

Chapter 2
OIG Sampling and Site Inspection Identified Site Safety Concerns

Results from our sampling and site inspection raise doubts about the safety of the Delatte Site and the level of protection provided by EPA's clean-up actions. Region 6 did not support its protectiveness determination based on data in its November 2007 Five-Year Review. In particular, we question the effectiveness of the PRB in preventing metals in the shallow groundwater from leaving the site. We believe that groundwater is being re-contaminated after passing through the PRB. In addition, the PRB does not extend far enough laterally to intercept all of the contaminated groundwater. This resulted in some contaminated groundwater bypassing the PRB and flowing from the Site untreated. Our site inspection and sampling showed that high metal concentrations were:

- in the groundwater that had passed through the PRB,
- in the groundwater that bypassed the PRB, and
- in the surface water we sampled.

Similar information gathered by the Region and LDEQ confirm our groundwater results and reinforce our doubts about the Region's determination that the remedy protects in the short-term. We concur with EPA research scientists in questioning the effectiveness of some characteristics of the PRB and recommending that further study is needed. Also, physical access to the Site was not controlled. Region 6 needs to conduct additional testing of groundwater and surface water and determine the effectiveness of the PRB as a remedy before it can determine whether the remedy protects human health and the environment.

OIG Sampling Results Identified High Metal Concentrations

Our results show high metal concentrations in parts of the shallow groundwater and in surface water where concentrations should be low if the PRB is effectively limiting the migration of metals off the Site. Discussion of these results follows.

High Metal Concentrations in Groundwater Beyond the PRB

Concentrations of some metals are reduced as the groundwater passes through some sections of the PRB. However, the PRB is not preventing metals in the groundwater from traveling beyond the PRB. Three monitoring wells tap groundwater that has already traveled through the PRB (wells BA-09, DW-01, and MW-01; see Figure 2-1 on page 7). We found high concentrations of metals in these monitoring wells located beyond the PRB (see Table 2-1 on page 6).

Also, the groundwater pH values at these wells were low, which means that acidity was high and metals were still mobile in this groundwater. The low pH values and elevated concentrations of metals are evidence that the PRB was not neutralizing the groundwater nor limiting the migration of all dissolved metals off the Site. Therefore, we concluded that the PRB was not meeting its designed remedial purpose.

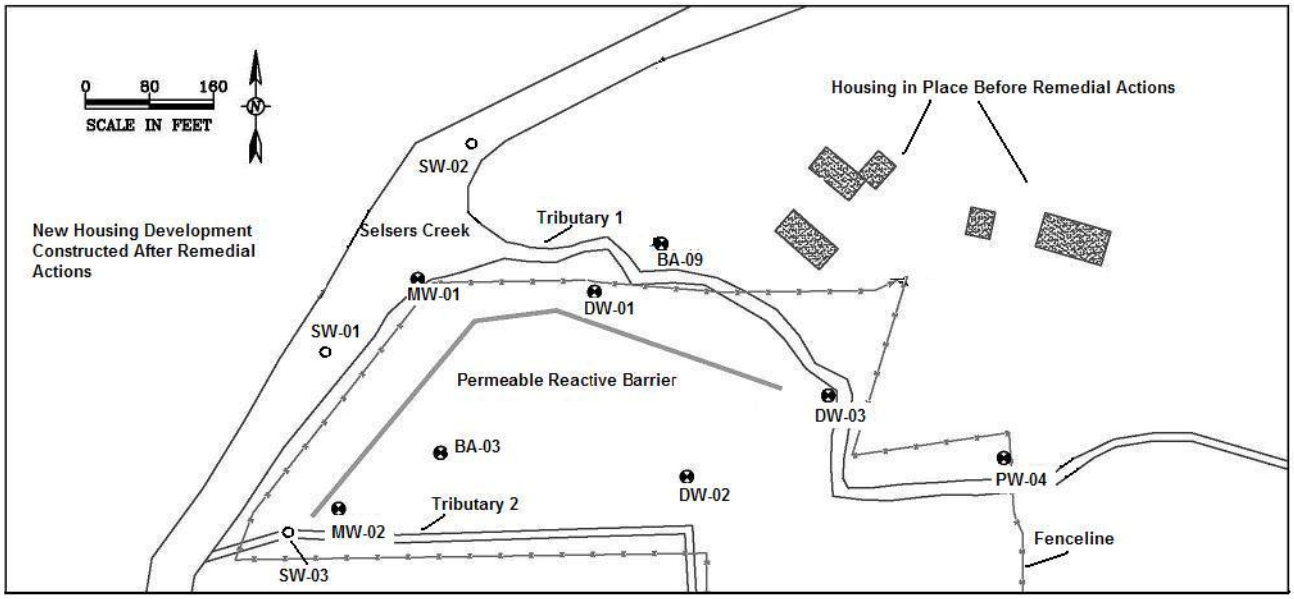
Table 2-1: Selected OIG Groundwater and Surface Water Results

		Sampling Location	Total Metal Concentration (milligrams per liter)					Field pH (standard units)
			Arsenic	Cadmium	Lead	Nickel	Zinc	
Groundwater Sampling	Beyond PRB	BA-09	0.019	**0.018**	**0.012**	**0.15**	**0.25**	**3.2**
		DW-01	**0.29**	**0.054**	**0.016**	0.028	**0.16**	**4.7**
		MW-01	0.11	**0.055**	<0.05	**0.34**	<0.5	**3.3**
	Next to PRB	DW-03	<0.01	**0.17**	**0.41**	0.033	**0.12**	**3.7**
Surface Water Sampling		SW-03	<0.01	**0.10**	**0.53**	0.024	**0.24**	**4.5**
Standards								
Federal Drinking Water *			0.01	0.005	0.015	--	5	6.5 - 8.5
LDEQ Ecological **			**0.15**	**0.0005**	**0.0007**	**0.061**	**0.041**	**6.5 - 9**
ROD, Residential Groundwater			--	--	0.015	--	--	--
ROD, Ecological ***			--	0.0009	0.0006	--	0.038	--

Source: EPA OIG

Metal concentrations in **BOLD** exceed the LDEQ ecological standard. pH values in **BOLD** are outside the federal ecological standard range. The standards are also presented in **BOLD**.
< The sample concentration is below the method reporting limit. Therefore, the sample concentration could not be measured. The value following the "<" sign is the method reporting limit for that analysis.
-- Federal drinking water standard has not been set or clean-up standard was not specified in the ROD and its appendices.
* Drinking water standards for pH and zinc are secondary standards. The drinking water standard for lead is an action level above which acidity control is required.
** The ecological standards for chronic exposure to cadmium, lead, nickel, and zinc are dependent on the hardness of the water. The standards given here are based on the median hardness of water in Selsers Creek at the LDEQ monitoring site downstream of the Delatte Site. The pH range is a federal ecological standard.
*** The ROD reports the clean-up standard for lead. Standards for cadmium and zinc are recommended in an appendix to the ROD.

Figure 2-1: Map of Northern Portion of Delatte Metals Superfund Site



Source: EPA Region 6, with labels added by OIG.

Many of our results from these three wells exceeded ecological standards (Table 2-1). These high metal concentrations raise concerns about the quality of the surface water on and near the Site, because the shallow groundwater in the vicinity of these wells is thought to discharge to Selsers Creek and a tributary (Tributary 1 in Figure 2-1). However, Region 6 has not investigated groundwater discharge to these surface waters nor required LDEQ to sample Selsers Creek and its tributaries as part of the quarterly O&M monitoring at the Site.

Results from three wells located beyond the PRB also show that concentrations of lead cannot be used as the Region's sole measure of remedial success at the Site. We found elevated arsenic, cadmium, nickel, and zinc concentrations in areas where lead concentrations were low. This contradicts the Region's assumption in the ROD that the clean-up of lead will effectively clean up the other metals as well.

High Metal Concentrations in Groundwater Bypassing the PRB

Not all of the shallow groundwater with high metal concentrations at the Site flows through the PRB. Some groundwater flows to the east of the PRB, possibly discharging into Tributary 1 or Selsers Creek. The highest lead concentration we found in groundwater was in a well next to the PRB (well DW-03). Several other metal concentrations also were elevated and the pH of this water was low. These sample results further support our conclusion that the PRB was not meeting its

designed remedial purpose, in this case because the PRB was not laterally extensive enough to treat all of the contaminated water.

High Metal Concentrations in Surface Water

The PRB was not preventing cadmium, lead, nickel, and zinc from migrating to the surface water. The highest lead concentration we measured was in a surface water sample (see SW-03 in Table 2-1) taken from the tributary that feeds into Selsers Creek near the western end of the PRB (Tributary 2 in Figure 2-1). The concentration is about 800 times the ecological clean-up level for lead in surface water specified in the ROD. As with the groundwater beyond and bypassing the PRB, we again found low pH levels.

One of the residents living adjacent to the Site informed us that children play in Selsers Creek. During our February 2008 site inspection, we also observed pets of the nearby residents in the creek and its tributaries. In evaluating the safety of the Site, Region 6 needs to assess how prevalent metals are in the creek and its tributaries, and determine possible human and ecological exposures.

One of the Region's recommendations in the Five-Year Review is to add surface water sampling to the O&M monitoring. LDEQ, in responding to a draft of the Five-Year Review, recommended in October 2007 that surface water sampling occur in an area of the creek near the PRB and also downstream of the PRB. However, the recommended action in the Review is limited to sampling in Selsers Creek in the vicinity of one of the monitoring wells (MW-01) located beyond the PRB. We concluded from our results that surface water sampling should be more extensive and include areas of the surface water possibly receiving groundwater that bypassed the PRB.

EPA Should Have Been Aware of Site Safety Concerns

Site information similar to our results was available to Region 6 when it conducted its November 2007 Five-Year Review. However, the Region did not raise concerns about uncontrolled migration of metals in the shallow groundwater, even though it had the data to suggest the PRB was not treating all of the contaminated groundwater. For example, sampling data collected by LDEQ and EPA research scientists showed that arsenic concentrations in groundwater in and beyond the PRB were as high as nine times the ecological standard.

LDEQ's O&M sampling also showed lead concentrations rising at well DW-03 located to the east of the PRB. This is the well in which we measured the highest groundwater concentration of lead. In its 2007 Review, Region 6 misidentified this well as being located ahead of rather than next to the PRB. As a result, EPA did not recognize that groundwater with high metal concentrations bypassed the PRB.

Region 6 had groundwater flow maps and analyses of contaminant transport that were gathered for the 1999-2000 remedial investigation before the PRB was designed. From this information, we concluded that the PRB does not extend far enough laterally to intercept all of the contaminated groundwater, some of which appears to discharge to the creek and its tributaries. We believe that the Region should have made these same conclusions and evaluated the magnitude of the migration of metals that would bypass the PRB and the potential risks to human health and the environment posed by that bypass.

Another source of information was LDEQ's sampling results when it tested the water quality of the creek downstream of the Site. LDEQ sampled the creek four times in 2007. All four water samples had lead concentrations that exceeded the ROD's clean-up standard for lead in surface water.

Access to Site Was Not Controlled

The Site is currently restricted to industrial use because wastes were left on-site at concentrations not appropriate for residential or ecological uses. During our site inspection in February 2008, we observed access to the site was not controlled:

- the perimeter fence was damaged in two locations by fallen trees;
- the fence had been cut and rolled back, providing access to one monitoring well;
- a chain on an access gate through the fence had been cut but was left to appear that the gate was still locked; and
- no signs were posted with warnings about the Site being limited to industrial use or with contact information.

Poor fence maintenance gives the perception that the Site is not maintained and allows unauthorized Site access. A resident whose property borders the site expressed concern about the damaged fence. The Region's Site manager stated that the fence belongs to the site owners and is not necessary to protect human health and the environment. In addition, the Region stated that a combination of existing land use controls on the Site and quarterly LDEQ inspections ensures that unauthorized activities are not occurring at the Site. However, quarterly inspections cannot prevent unauthorized access year-round. The Region stated in its response to the draft of this report that access to the Site will be controlled and signs posted. LDEQ told us it plans to repair and maintain the fence as part of its O&M responsibilities.

Although land use classification has not changed, residential density surrounding the site has changed. This change further emphasizes the need to review site access controls. Since the completion of remedial activities, subdivision housing has been constructed northwest of the Site (see cover photograph); another subdivision is planned next to the eastern fence. The growth in the population surrounding the Site increases the likelihood of trespassers entering through the

damaged perimeter fence. During the remedial investigation, risk assessments for on-site trespassers were not performed. EPA's Five-Year Review guidance specifically identifies changes in land use as a factor to consider in evaluating the protection provided by the remedy. We consider the increase in the housing density to be a change in land use. The Region stated that the residents in the new developments were protected because they were served by public water. However, this explanation does not account for the clean-up level of the soil. The soil on the Site was cleaned to an industrial-use standard, not to the more protective residential or ecological standards. As a result, the Site has restrictions and unauthorized people are not permitted. An evaluation of the risk to on-site trespassers, particularly in the absence of a secure perimeter fence, should have been conducted during the Five-Year Review.

The uncontrolled access may also result in damage to the remedy or the monitoring network in and around the PRB. The monitoring wells in this network were installed by the EPA research scientists without tamper-resistant casings that are standard and are installed on the wells in the O&M monitoring network at this Site. Instead, the plastic casings of the PRB monitoring wells are exposed above ground. These casings provide an unsecured route for tampering with the subsurface PRB, whether intentional or unintentional. The plastic casings above ground also could be easily damaged. While at the Site, we observed that several of the casings were already damaged.

Protection Level of Remedy Was Not Supported

EPA's determination in its November 2007 Five-Year Review that the remedy protects human health and the environment in the short-term was not supported by the information the Region included in the Review. The Region did not completely evaluate the performance of the PRB in meeting the remedial goal of controlling the migration of metals in the shallow groundwater. In addition, the Region did not comply with all ROD requirements, nor did it consider all human and ecological exposure pathways and their resulting risks. The Region needs to revise its protectiveness statement to indicate protectiveness cannot be determined until further information is obtained.

EPA guidance for conducting a Five-Year Review calls for a technical assessment that answers three questions:

- Is the remedy functioning as intended by the decision documents?
- Are the exposure assumptions, toxicity data, clean-up levels, and remedial action objectives used at the time of remedy selection still valid?
- Has any other information come to light that could call into question the protectiveness of the remedy?

How the Region answers these questions establishes whether EPA determines that the site remedy protects human health and the environment. In making its

determination, we found that the Region did not collect enough relevant information to answer these questions. Also, the Region did not use all of the available data or assess whether its assumptions were still valid. The Region cited monitoring results that indicated the remedy was functioning effectively. However, the Region also had data that indicated the remedy was not functioning as intended, and had received recommendations that further testing and investigation were needed. Region 6 did not cite these problematic results when determining the protection level. As a result, Region 6 did not identify all contaminant exposure pathways or assess the risks to human health and the environment in the Five-Year Review.

Incomplete Evaluation of Remedy

The Region did not conduct a full evaluation of the PRB, which is the remedy intended to treat the shallow contaminated groundwater to prevent the metal contaminants from leaving the Site and entering the surface water. The Region had evidence that the PRB was not fully preventing the migration of metals when it conducted the Site's Five-Year Review in 2007. The Review stated that with the exception of total lead, metal concentrations tended to be significantly higher in groundwater beyond the PRB than before it. This evidence should have prompted the Region to question the PRB's ability to limit the migration of all metals.

The Review stated that due to excessive vegetative growth, the Region and LDEQ were unable to inspect the area above the PRB in June 2007 when they inspected the Site as part of the Five-Year Review process. Inspecting the area above the PRB for irregularities at land surface (i.e., subsidence, cracks, and erosion) that might indicate problems below ground with the PRB is part of the quarterly O&M site inspection. The Region, through its oversight authority, could have requested that the area above the PRB be mowed so that a proper inspection could occur for the Five-Year Review, but did not take this step. Rather, it concluded that the ground showed no evidence of gross subsidence even though the area above the PRB had not been inspected. The Region did recommend in the Review that within 1 year LDEQ remove trees and mow routinely to facilitate inspection of the PRB. We found in our February 2008 site inspection evidence of the ground sinking over the PRB.

EPA research scientists are studying whether the PRB at Delatte operates as designed to increase the pH and decrease the concentration of metals in the groundwater that passes through the PRB. The scientists sent to the Region in February 2007 an evaluation of the PRB[2] based on 3 years of monitoring results. The scientists found high arsenic concentrations in groundwater that had passed through the PRB. They concluded that the groundwater may have become re-contaminated after it passed through the PRB. This groundwater is thought to

[2] In February 2007, EPA's ORD provided Region 6 its evaluation of the PRB performance. Region 6 included this evaluation as an attachment to its November 2007 Five-Year Review.

discharge into Selsers Creek and the tributary flowing to the north of the PRB. The PRB was installed across an area that had been used for many years to hold acid wastes in an unlined pond. High concentrations of arsenic and other metals were detected in the soils in this area during the Region's remedial investigation conducted in 1999-2000. However, we found no evidence in the 2007 Review that the Region considered the implications of high arsenic concentrations in groundwater beyond the PRB or other issues with the PRB raised by the scientists when determining whether the remedy protects human health and the environment.

In response to issues we raised in March 2008, the EPA research scientists provided an update to their 2007 PRB evaluation. They restated that groundwater is picking up arsenic after it passes through the PRB. Moreover, the scientists acknowledged that the PRB is not functioning completely as designed and some groundwater is flowing around the PRB. The scientists recommended investigating the source of the arsenic and possibly extending the PRB to intercept more contaminated groundwater. In responding to the same March 2008 OIG request, the Region did not account for the scientists' findings and instead responded that the PRB is functioning as designed.

The Region further responded in March 2008 that it had stated in the Review that the remedy is protective to human health and the environment in the short-term and it had recommended actions that needed to be taken for the remedy to be protective in the long-term. The Region's recommended actions do not focus on improved control of metals migrating in the shallow groundwater. The Region recommended improving evaluation of groundwater data and implementing surface water monitoring. Depending on the results of these efforts, the Region may need to then focus on improving control of metals migrating in the shallow groundwater.

In February 2008, LDEQ's consultant recommended in review of the December 2007 O&M monitoring results that additional remediation alternatives be considered in the shallow groundwater.

Region 6 Did Not Follow All ROD Requirements

Site deletion proceeded based on the assumption that the Site's clean-up actions were adequate for meeting the human health and environment clean-up standards specified in the ROD. However, no surface water samples were collected as part of the O&M monitoring and the Region did not account for the problematic groundwater data it had in assessing the effectiveness of the PRB. In addition, ROD conditions incorrectly state that clean-up of lead would also address other metals of concern.

The mobile lead in the shallowest groundwater at the Site was identified in the ROD as a "principal threat waste." The PRB was intended to treat this principal threat waste by neutralizing the acidity of the shallow groundwater and limiting

the migration of the dissolved metals that would otherwise discharge to the surface water. However, no surface water samples were taken at the Site to confirm that the ROD clean-up standard in surface water was being met. The Region stated in its March 2008 response to the OIG that the ROD does not include groundwater or surface water clean-up goals. However, the ROD identifies specific clean-up standards for all appropriate media for lead, including groundwater and surface water. We concluded that the Region has misinterpreted the clean-up requirements in the ROD.

The conditions of the ROD incorrectly state that the clean-up of lead would also address other metals of concern, such as cadmium, nickel, and zinc. This assumption was not supported by our sampling results and those from LDEQ and the EPA research scientists. These results show that while the concentrations of lead have been effectively reduced in the shallow groundwater beyond the PRB, the concentrations of other metals remain high. Region 6 cannot continue to assume that if lead concentrations are low other metals also are low. The concentrations of other metals in addition to lead should be evaluated and considered in decisions regarding the effectiveness of the PRB and the protection level provided by the remedy.

Region 6 Did Not Consider All Exposures and Risks

The Region did not consider all human and ecological exposures and risks when conducting the Five-Year Review. The Review identifies air, soil and groundwater as the media for potential contamination exposure to humans. Not recognizing problematic results and the potential migration of dissolved metals to the surface water prevents the Region from assessing exposure assumptions and identifying other potential exposure media, such as surface water. EPA has not evaluated human health risks to surface water for lead. In addition, unacceptable ecological risks may still exist at Selsers Creek and its tributaries because clean-up assumptions were contingent upon the remedy controlling metal migration in the groundwater.

Protection Determination Should Be Revised

The Region determined in November 2007 that the Delatte remedy was protective *in the short-term*. The Region added the emphasis to "*in the short-term*" in its March 2008 response to OIG questions. The response explained that the Region recognized that the groundwater data set was not robust due to issues related to detection limit variability and therefore made this short-term protectiveness determination. The Region recommended in its 2007 Review several actions that needed to be taken for the remedy to be protective in the long-term. These included adding surface water sampling, reviewing the adequacy of the groundwater monitoring program, and improving Site maintenance. However, none of these actions address PRB effectiveness or the possible risk to human health or the environment posed by uncontrolled migration of metals.

Based on information the Region disclosed in its Five-Year Review, along with the results of the recent OIG sampling and site inspection, an appropriate statement at this time would be that "protectiveness cannot be determined until further information is obtained." Such a statement would reflect an understanding by the Region of:

- limitations in its monitoring and site inspection data,
- potential problems raised by some of the data,
- doubts as to the effectiveness of the PRB remedy to control the migration of some metals in the shallow groundwater, and
- EPA's responsibility to protect human health and the environment.

EPA guidance on conducting a Five-Year Review establishes the determination "protectiveness cannot be determined until further information is obtained" as an option among the types of protectiveness determinations that can be made. Another EPA region recently released a Five-Year Review for one of its deleted Superfund sites where that Region concluded it could not make a protectiveness determination because site monitoring had been inadequate and new potential issues had been observed.[3]

Conclusions

Our review disclosed that the Region could not support its November 2007 Five-Year Review determination that the Delatte remedy protects human health and the environment in the short-term. From results of our work, we concluded that the PRB remedy at Delatte was not fully meeting its purpose of limiting the off-site migration of metals in the shallow groundwater, which may give rise to additional exposures and risks. A similar conclusion can be drawn from information available to the Region in 2007 when it conducted its Five-Year Review and made its protection determination. Accurate and balanced communication to the public on this Site should state that the Site's protectiveness cannot be determined until further information is obtained.

Recommendations

We recommend that the Region 6 Administrator:

2-1 Amend the Region's November 2007 Five-Year Review to state that protectiveness of the Site remedy in both the short- and long-term cannot be determined without further analysis of the effectiveness of the remedy and the risk posed by the migration of metals.

[3] See http://www.epa.gov/superfund/sites/fiveyear/f2007030001720.pdf, page vi.

2-2 Publish EPA's milestones for obtaining the information required to make an accurate determination on the effectiveness of the Site's remedy and on the risk associated with continued metal migration.

2-3 Investigate, quantify, and publicly report on the discharge of metals from shallow groundwater at the Site to Selsers Creek and its tributaries and implement an appropriate response.

2-4 Implement a comprehensive evaluation of the effectiveness of the PRB to minimize the migration of metals in groundwater off the Site and implement an appropriate response. Also, evaluate the impact of groundwater bypassing the PRB.

2-5 Examine the source and mobility of arsenic in shallow groundwater in the vicinity of the PRB and implement an appropriate response.

2-6 Require LDEQ to modify quarterly water quality sampling to include analyses for all metals of concern, including arsenic, cadmium, lead, nickel, and zinc.

2-7 Require LDEQ to control and restrict Site access by repairing and maintaining the fence and gates, and posting clearly visible signs describing Site use restrictions and hazards.

2-8 Conduct a new analysis of Site safety that properly considers information on metal concentrations in groundwater and surface water, and other evidence of whether the remedy is functioning.

EPA Region 6 Responses and OIG Evaluation

The OIG reviewed and considered two sets of Region 6 comments, and made revisions to the report where appropriate. Region 6's comments and the OIG's evaluation of those comments are in Appendix D. Region 6 did not agree with Recommendations 2-1 and 2-9 in the draft report, but did agree with Recommendations 2-2 through 2-8 and provided proposed corrective actions. The corrective actions for Recommendations 2-2, 2-6, and 2-7 meet the intent of our recommendations. However, Region 6's response and proposed corrective actions for Recommendations 2-3, 2-4, 2-5, and 2-8 do not fully address the recommendations.

In its response to Recommendation 2-1, the Region stated that it continues to believe that the Delatte remedy remains protective in the short-term. The Region added that no new information that would affect short-term protectiveness has come to light since the ROD was signed in September 2000, including the information provided in the OIG report. We do not agree. The OIG's recommendation is not contingent on presenting "new" information. Region 6's evaluation of the Delatte remedy was incomplete when it made its protectiveness

determination. OIG's work confirmed several of the results that EPA has seen at this site but did not act on. Additionally, the OIG was the first to sample surface water at this site during the O&M period. More information is needed to determine whether the Delatte remedy is protective to human health and the environment.

Regarding Recommendation 2-3, Region 6 has agreed to conduct surface water monitoring to better understand the groundwater to surface water migration pathway to guide the future direction of the site. However, the Region further stated that it did not find an unacceptable risk to human health from direct contact or ingestion of contaminated surface water during the remedial investigation. We found that the 2004 human health risk assessment report stated, "potential exposure to contaminated shallow groundwater may be possible if contamination were to discharge to surface water . . . ." This statement implies that there was limited information in 2004 to assess potential risk from exposure to contaminated groundwater discharging to surface water. As a result, Region 6 needs to use the data it collects to assess the risks to human health and the environment. In its response to the final report, the Region will need to describe actions taken or planned to ensure sufficient risk assessments are performed at the site.

Regarding Recommendation 2-4, Region 6 responded that EPA's ORD is currently conducting an independent evaluation of the PRB. Region 6 said it will consider the results of that evaluation and take appropriate action to improve the performance of the PRB if warranted. We agree that Region 6 needs to continue to work with ORD to evaluate the effectiveness of the existing PRB. However the Region also needs to determine whether the existing PRB is sufficient to ensure the site is protective of human health and the environment. For example, Region 6 needs to determine whether the PRB is of adequate length to ensure that the remedy is effective. In its response to the final report, the Region will need to describe actions taken or planned to ensure the PRB is protective of human health and the environment.

Regarding Recommendation 2-5, the Region responded that it will continue to monitor for arsenic in the groundwater, and that if unacceptable exposures occur, the Region will take whatever action is needed to address that exposure. We believe that monitoring alone is not sufficient because arsenic in the groundwater is a new condition. As such, this condition has not been included in the analyses conducted to date of potential exposure and risk. In its response to the final report, the Region will need to describe actions taken or planned to conduct an investigation to understand the magnitude and extent of the source of the mobile arsenic.

Regarding Recommendation 2-8, Region 6 responded that EPA and LDEQ will continue to collect data to evaluate the performance of the remedy, but that it continues to conclude that the remedy is protective in the short term. We believe that the protectiveness determination is unsupported.

In its response to the draft report's Recommendation 2-9, Region 6 responded that protectiveness determinations are made following the Five-Year Review Guidance. The Region added that the OIG's report does not support the need for implementing a quality assurance process to ensure that protectiveness determinations are made in accordance with Five-Year Review Guidance. The Region concluded that additional procedures would be redundant and unwarranted. We do not agree that the Region made the protectiveness determination in accordance with the Five-Year Review Guidance. The Region did not collect relevant information in answering the three technical questions that define protectiveness. The Region has not provided any additional information in its current response to address the problems identified by the OIG. This includes the fact that no surface water samples were taken at the Site and that the Region did not account for the problematic groundwater data it had in assessing the effectiveness of the remedy. The Region did not do a complete evaluation of the remedy during the Five-Year Review process. We concluded that the Region does not have adequate management controls to assure that EPA guidance on conducting Five-Year Reviews is followed. Consequently, the Region cannot provide a reasonable assurance that resulting protectiveness determinations are properly supported by the available data and analyses.

In December 2006, the OIG had issued a report titled, "EPA Has Improved Five-Year Review Process for Superfund Remedies, But Further Steps Needed." Recommendations were made to expand the scope of quality assurance reviews of Five-Year Review reports and revise guidance to more clearly define short- and long-term protectiveness determinations. OIG plans to address issues that pertain to Recommendation 2-9 in a follow-up review of this earlier report; therefore, Recommendation 2-9 has been removed from this report.

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
2-1	14	Amend the Region's November 2007 Five-Year Review to state that protectiveness of the Site remedy in both the short- and long-term cannot be determined without further analysis of the effectiveness of the remedy and the risk posed by the migration of metals.	U	Region 6 Administrator			
2-2	15	Publish EPA's milestones for obtaining the information required to make an accurate determination on the effectiveness of the Site's remedy and on the risk associated with continued metal migration.	O	Region 6 Administrator			
2-3	15	Investigate, quantify, and publicly report on the discharge of metals from shallow groundwater at the Site to Selsers Creek and its tributaries and implement an appropriate response.	U	Region 6 Administrator			
2-4	15	Implement a comprehensive evaluation of the effectiveness of the PRB to minimize the migration of metals in groundwater off the Site and implement an appropriate response. Also, evaluate the impact of groundwater bypassing the PRB.	U	Region 6 Administrator			
2-5	15	Examine the source and mobility of arsenic in shallow groundwater in the vicinity of the PRB and implement an appropriate response.	U	Region 6 Administrator			
2-6	15	Require LDEQ to modify quarterly water quality sampling to include analyses for all metals of concern, including arsenic, cadmium, lead, nickel, and zinc.	O	Region 6 Administrator			
2-7	15	Require LDEQ to control and restrict Site access by repairing and maintaining the fence and gates, and posting clearly visible signs describing Site use restrictions and hazards.	O	Region 6 Administrator			
2-8	15	Conduct a new analysis of Site safety that properly considers information on metal concentrations in groundwater and surface water, and other evidence of whether the remedy is functioning.	U	Region 6 Administrator			

[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

Appendix A

Details on Scope and Methodology

We initially visited the Delatte Metals Superfund Site in October 2007 to plan our sampling and conduct a preliminary inspection. We acquired a qualified contractor from the list of General Services Administration contractors to take groundwater and surface water samples, and conduct a site inspection. The contractor collected water samples during the week of February 4, 2008, to verify the results obtained in the quarterly O&M sampling. The OIG evaluation team was present to ensure that proper protocols were followed as part of the quality assurance program established for our sampling. Our sampling included, but was not limited to, eight monitoring wells screened within the shallow groundwater and three surface water samples – two in Selsers Creek and one in a tributary to the creek.

The contractor sampled groundwater using the protocol in the 2004 Site O&M manual. The contractor collected samples from the monitoring wells with peristaltic pumps using low-stress sampling techniques. Dedicated tubing already installed in the monitoring wells was used. The contractor monitored basic water quality parameters with calibrated electrodes in a flow-through cell (pH, conductivity, temperature, oxidation-reduction potential, and dissolved oxygen) or with grab samples measured on site (turbidity). The contractor monitored the water level in the monitoring well periodically during purging. The contractor collected groundwater samples after the parameters had stabilized. The flow-through cell was disconnected prior to collecting the samples.

Because Region 6 had not been collecting surface water samples, we had no site specific protocol to use. We used generally accepted surface water sampling methods appropriate for initial screening of site conditions. This included taking pH measurements along the stream by submerging a calibrated pH electrode. Samples were taken by a dip method at the location of the lowest pH measured along the creek or tributary and at a location upstream of the most northern groundwater monitoring well (see Figure 2-1).

Both unfiltered and filtered samples were collected for analysis of total and dissolved metals at all locations in clean, plastic bottles containing enough nitric acid to lower the pH of the sample to 2. These bottles were supplied by the analytical laboratories. Filtering of groundwater samples was done inline using disposable, 0.45 micron filters. For the surface water samples, water from the collection vessel was filtered using a hand-filtering unit.

Duplicate samples were taken at all locations, except for one surface-water location (SW-03). The duplicate samples were sent to separate laboratories for independent analyses.

All sample bottles were checked to make sure the sampling location designation matched the bottle labels, unfiltered samples were put in bottles labeled unfiltered, and filtered samples were put in bottles labeled filtered. All metal and cyanide bottles were checked for evidence of proper preservation by observing that the correct chemical was listed on the label and that liquid was in the bottles received from the laboratories.

Our sample collection was more extensive than that usually done during the O&M sampling. Typically only field pH, turbidity and concentrations of arsenic, lead, manganese, nickel, and thallium are analyzed. Filtered samples for analysis of dissolved metal concentrations are generally collected under the Site's O&M plan only when the turbidity exceeds 10 Nephelometric Turbidity Units. However, we collected filtered and unfiltered samples at all locations regardless of the turbidity measurement.

Samples were kept chilled and sent overnight to the laboratory. Chain of custody was maintained. Samples were analyzed by approved methods (EPA 105.1, pH; EPA 200.7/200.8, metals; EPA 245.1, mercury; EPA 355.4 or SM4500-CN C,E, cyanide) at two laboratories licensed by the National Environmental Laboratory Accreditation Conference and the Arizona Department of Health Services.

The resulting field and laboratory data were validated internally by performing the following:

- The laboratory reporting packages were checked to determine whether all samples, raw data, calibration curves, continuing calibration verification standards, interference checks and other batch quality control measures were present.
- All calibration and batch quality control measures were reviewed to determine if they were within the acceptance parameters specified in the method or contract statement of work and, if not, were flagged. The flagged data were determined as not impacting the data quality.
- Laboratory holding times were checked to determine whether they were analyzed within method-required holding times.
- Method, field, and rinse blanks were checked to make sure they were clean or had no impact if a compound was detected.
- A transcription check from raw data to final laboratory report was performed on approximately 25 percent of the groundwater data. All surface water samples (SW-01, SW-02, and SW-03) were checked because there was limited historical data for the surface water samples and they were the basis for many of our concerns.
- A sensibility check across the analyses was performed.
- Data were reviewed to determine whether the two sets of laboratory data matched, within the expected scientific variation of approximately 25 percent, except for low levels where greater variance is expected.

Appendix B

Relevant Documents Reviewed

Year	Site-Specific Documents (EPA except where noted otherwise)
1993	Hazard Ranking System, Delatte Metals, Ponchatoula, Louisiana, Superfund Document Management System (SDMS) 914705
1999	Community Involvement Plan, Delatte Metals, Ponchatoula, Louisiana, July 1999, SDMS 136511
1999	Remedial Investigation and Feasibility Study for Delatte Metals, Ponchatoula, Louisiana, Field Sampling Plan, SDMS 105307
2000	Delatte Metals Remedial Investigation Report, Ponchatoula, Louisiana, January 2000, SDMS 138215
2000	Delatte Metals Remedial Investigation and Feasibility Study for Delatte Metals, Ponchatoula, Louisiana, Baseline Ecological Risk Assessment, March 2000, SDMS 136507
2000	Delatte Metals Human Health Risk Assessment, March 2000 SDMS 136506
2000	Delatte Metals Feasibility Study Report, Ponchatoula, Louisiana, May 2000, SDMS 136509
2000	Superfund Record of Decision: Delatte Metals, EPA ID: LAD052510344, OU 01, Ponchatoula, LA, September 2000
2001	Delatte Metals Final Design Report, Ponchatoula, Louisiana, January 2001, SDMS 903141
2004	Final Close Out Report, Delatte Metals Superfund Site, Ponchatoula, Louisiana, March 2004, SDMS 183879
2004	Remedial Action Report, Delatte Metals Superfund Site, Ponchatoula, Louisiana, September 2004, SDMS 175105
2004	Explanation of Significant Differences: Delatte Metals Superfund Site, Ponchatoula, Louisiana, December 2004, SDMS 179805
2004	Public Health Assessment for Delatte Metals, prepared by Louisiana Office of Public Health, SDMS 207457
2004-2007	Quarterly Monitoring Reports, various, LDEQ
2005	Direct Final Notice of Deletion: Delatte Metals Superfund Site, Tangipahoa Parish, Louisiana, May 2005, SDMS 188689
2007	PRB performance evaluation update for the Delatte Metals site, Ponchatoula, Louisiana, memo from Ludwig and others, EPA's Ground Water and Ecosystems Restoration Division, National Risk Management Research Laboratory, Office of Research and Development, Ada, OK, to Region 6, February 2007, attachment 10 to the First Five-Year Review Report
2007	First Five-Year Review Report for the Delatte Metals Superfund Site, Ponchatoula, Tangipahoa Parish, Louisiana, November 2007
2008	EPA Region 6 and EPA research scientist responses to OIG questions
Year	**Guidance Documents (EPA)**
2000	Close Out Procedures for National Priorities List Sites, Office of Solid Waste and Emergency Response Directive 9320.2-09A-P, EPA 540-R-98-016
2001	Comprehensive Five-Year Review Guidance, Office of Solid Waste and Emergency Response Directive 9355.7-03B-P, EPA 540-R-01-007

Appendix C

Results of OIG Sampling

Table C-1.a: Shallow groundwater results, Delatte Metals Superfund Site, February, 2008 (Wells BA-03, BA-09, DW-01, and DW-02).

Analyte Identifier		BA-03		BA-09		DW-01		DW-02	
Sampling Date		6-Feb-08		5-Feb-08		7-Feb-08		6-Feb-08	
Laboratory		1	2	1	2	1	2	1	2
Total	**Aluminum**	44.5	48	172	180	7.21	7.4	667 MHA	640
Dissolved	**Aluminum**	47.1	48	129	200	5.50	5.2	677 MHA	650
Total	**Antimony**	<0.01	< 0.025	<0.01	< 0.025	<0.01	< 0.0200	<0.01 M2	< 0.025
Dissolved	**Antimony**	<0.01	< 0.025	<0.01	< 0.025	<0.01	< 0.0200	0.0100 M2	< 0.025
Total	**Arsenic**	<0.01	< 0.010	0.0193	0.020	0.289	0.261	0.0327 M2	0.054
Dissolved	**Arsenic**	<0.01	< 0.010	0.0169	0.024	0.128	0.0908	0.0252	0.044
Total	**Barium**	0.0224	0.025	0.0157	0.017	0.0276	0.029	0.0115 M2	0.014
Dissolved	**Barium**	0.0240	0.025	0.0143	0.022	0.0293	0.029	0.0127	0.016
Total	**Beryllium**	0.00570	0.0064	0.0178	0.020	<0.004	< 0.0050	0.0344 M2	0.051
Dissolved	**Beryllium**	0.00640	0.0062	0.0167	0.024 B7	0.00450	0.0059	0.0356	0.051
Total	**Cadmium**	0.239	0.27	0.0177	< 0.0030	0.0540	0.0507	0.0558 M2	0.025
Dissolved	**Cadmium**	0.254	0.26	0.0113	< 0.0030	0.0559	0.0493	0.0563 M2	0.028
Total	**Calcium**	59.9	67	59.7	68	45.4	46	133	200
Dissolved	**Calcium**	62.0	66	56.5	81	47.3	46	131	200
Total	**Chromium**	0.0165	0.019	0.0427	0.067	<0.005	< 0.0500	0.0900 M2	0.21
Dissolved	**Chromium**	0.0179	0.020	0.0362	0.078	<0.005	< 0.0500	0.0957 M2	0.21
Total	**Cobalt**	0.0820	0.092	0.112	0.12	0.0945	0.094	0.383 M2	0.56
Dissolved	**Cobalt**	0.0874	0.092	0.103	0.14	0.0981	0.096	0.385	0.56
Total	**Copper**	0.160	0.17	<0.01	< 0.010	0.126	0.124	<0.01 M2	< 0.010
Dissolved	**Copper**	0.169	0.17	<0.01	< 0.010	0.106	0.0934	<0.01 M2	< 0.010
Total	**Iron**	3.17	3.4	108	120	1.96	1.8	339 MHA	320
Dissolved	**Iron**	3.26	3.3	95.7	140	2.28	1.8	326 MHA	320
Total	**Lead**	0.360	0.36	0.0115	< 0.010	0.0161	< 0.0200	0.0270 M2	< 0.010
Dissolved	**Lead**	0.366	0.35	<0.005	< 0.010	0.0151	< 0.0200	0.0294	< 0.010
Total	**Magnesium**	30.4	34	58.3	67	8.00	7.9	111	180
Dissolved	**Magnesium**	32.2	34	52.3	80	8.93	8.4	113	180
Total	**Manganese**	2.66	3.0	2.52	2.6	7.31	7.7	16.9 MHA	16
Dissolved	**Manganese**	2.78	3.1	2.19	3.1	7.38	7.7	16.4 MHA	16
Total	**Nickel**	0.0968	0.12	0.152	0.16	0.0282	< 0.0500	0.458 M2	0.73
Dissolved	**Nickel**	0.104	0.12	0.137	0.20	0.0317	< 0.0500	0.480 M2	0.74
Total	**Potassium**	6.21	6.2	7.44	7.4	1.92	< 2.0	6.88	8.2
Dissolved	**Potassium**	6.31	6.1	5.89	9.0	2.34	2.3 B1	6.75	8.4
Total	**Selenium**	<0.01	< 0.025	<0.01	< 0.025	<0.01	< 0.0200	<0.01	< 0.025
Dissolved	**Selenium**	<0.01	< 0.025	<0.01	< 0.025	<0.01	< 0.0200	<0.01	< 0.025
Total	**Silver**	<0.005	< 0.0050	<0.005	< 0.0050	<0.005	< 0.0100	<0.005 M2	< 0.0050
Dissolved	**Silver**	<0.005	< 0.0050	<0.005	< 0.0050	<0.005	< 0.0100	<0.005 M2	< 0.0050
Total	**Sodium**	201	210	382	370	75.8	65	674	560
Dissolved	**Sodium**	213	200	360	430	82.9	65	655	520
Total	**Thallium**	<0.01	< 0.0500	<0.01	< 0.0500	<0.01	< 0.0050	<0.01 M2	< 0.0500
Dissolved	**Thallium**	<0.01	< 0.0500	<0.01	< 0.0500	<0.01	< 0.0050	<0.01 M2	< 0.0500
Total	**Vanadium**	<0.02	< 0.010	0.0658	0.076	<0.02	< 0.010	0.197 M2	0.29
Dissolved	**Vanadium**	<0.02	< 0.010	0.0659	0.093	<0.02	< 0.010	0.204 M2	0.30
Total	**Zinc**	0.616	0.70	0.254	0.27	0.160	0.16	1.53 M2	2.2
Dissolved	**Zinc**	0.645	0.69	0.216	0.32	0.164	0.16	1.55	2.3
Total	**Mercury**	<0.0002	< 0.0002	<0.0002	< 0.0002	<0.0002	< 0.0002	<0.0002	< 0.0002
Dissolved	**Mercury**	<0.0002	< 0.0002	<0.0002	< 0.0002	<0.0002	< 0.0002	<0.0002	< 0.0002
Total	**Cyanide**	<0.005	< 0.010	<0.005 A	< 0.010	<0.005	< 0.010	<0.005	< 0.010
Laboratory Measured pH		4.60 H	4.2 H	3.70 H	3.5 H	5.30 H	4.8 H	3.10 H	3.0 H
Field Measured pH		4.37		3.24		4.72		2.50	
Groundwater Level		8.47		2.01		3.49		10.27	

Table C-1.b: Shallow groundwater results, Delatte Metals Superfund Site, February, 2008 (Wells DW-03, MW-01, MW-02, and PW-04).

Analyte Identifier		DW-03		MW-01		MW-02		PW-04	
Sampling Date		7-Feb-08		6-Feb-08		7-Feb-08		6-Feb-08	
Laboratory		1	2	1	2	1	2	1	2
Total	**Aluminum**	23.7	23	331	340	22.3	22	13.8	14
Dissolved	**Aluminum**	25.6	27	363	350	23.9	24	14.3	14
Total	**Antimony**	0.0310	0.0305	<0.100	< 0.025	<0.01	< 0.0200	<0.01	< 0.025
Dissolved	**Antimony**	0.0310	0.0312	<0.100	< 0.025	<0.01	< 0.0200	<0.01	< 0.025
Total	**Arsenic**	<0.01	< 0.0300	0.108	0.093	<0.01	< 0.0300	<0.01	< 0.010
Dissolved	**Arsenic**	<0.01	< 0.0300	<0.10	0.077	<0.01	< 0.0300	<0.01	< 0.010
Total	**Barium**	0.0909	0.097	<0.100	0.017	0.0137	0.015	0.0199	0.022
Dissolved	**Barium**	0.0995	0.099	<0.100	0.017	0.0148	0.014	0.0207	0.021
Total	**Beryllium**	<0.004	< 0.0050	0.0460	0.049	0.0117	0.0123	0.0130	0.014
Dissolved	**Beryllium**	0.00410	0.0060	0.0490	0.050	0.0125	0.0137	0.0138	0.014
Total	**Cadmium**	0.174	0.161	0.0550	0.0071	0.126	0.116	0.00730	< 0.0030
Dissolved	**Cadmium**	0.194	0.193	0.0550	0.0041	0.137	0.128	0.00740	< 0.0030
Total	**Calcium**	22.7	23	144	140	15.5	16	74.9	80
Dissolved	**Calcium**	23.5	25	150	140	16.1	16	76.9	78
Total	**Chromium**	<0.005	< 0.0500	<0.0500	0.12	<0.005	< 0.0500	0.0444	0.058
Dissolved	**Chromium**	<0.005	< 0.0500	<0.0500	0.12	<0.005	< 0.0500	0.0456	0.057
Total	**Cobalt**	<0.02	0.021	0.307	0.32	0.0906	0.091	0.0430	0.045
Dissolved	**Cobalt**	0.0213	0.023	0.341	0.32	0.0932	0.085	0.0454	0.046
Total	**Copper**	0.169	0.159	<0.100	< 0.010	0.0107	< 0.0200	<0.01	< 0.010
Dissolved	**Copper**	0.188	0.177	<0.100	< 0.010	0.0122	< 0.0200	<0.01	< 0.010
Total	**Iron**	16.9	16	418	430	24.3	25	40.2	43
Dissolved	**Iron**	18.8	21	446	430	24.7	25	41.5	42
Total	**Lead**	0.406	0.406	<0.0500	< 0.010	<0.005	< 0.0200	<0.005	< 0.010
Dissolved	**Lead**	0.427	0.432	<0.0500	< 0.010	0.00501	< 0.0200	<0.005	< 0.010
Total	**Magnesium**	10.1	10	153	160	30.6	32	37.8	40
Dissolved	**Magnesium**	10.8	11	166	160	31.1	30	39.2	39
Total	**Manganese**	0.515	0.53	8.71	9.0	1.16	1.2	2.05	2.2
Dissolved	**Manganese**	0.541	0.59	9.23	9.1	1.20	1.3	2.11	2.2
Total	**Nickel**	0.0326	< 0.0500	0.344	0.40	0.120	0.111	0.0548	0.061
Dissolved	**Nickel**	0.0374	< 0.0500	0.387	0.41	0.128	0.106	0.0593	0.061
Total	**Potassium**	2.92	3.0	17.6	23	5.45	5.1	3.23	3.4
Dissolved	**Potassium**	3.13	3.2 B1	19.8	23	5.68	5.1 B1	3.24	3.2
Total	**Selenium**	<0.01	< 0.0200	<0.100	< 0.025	<0.01	< 0.0200	<0.01	< 0.025
Dissolved	**Selenium**	<0.01	< 0.0200	<0.100	< 0.025	<0.01	< 0.0200	<0.01	< 0.025
Total	**Silver**	<0.005	< 0.0100	<0.0500	< 0.0050	<0.005	< 0.0100	<0.005	< 0.0050
Dissolved	**Silver**	<0.005	< 0.0100	<0.0500	< 0.0050	<0.005	< 0.0100	<0.005	< 0.0050
Total	**Sodium**	21.9	22	835	710	164	170	120	120
Dissolved	**Sodium**	23.4	23	926	720	162	160	120	120
Total	**Thallium**	<0.01	< 0.0050	<0.100	< 0.100	<0.01	< 0.0050	<0.01	< 0.0500
Dissolved	**Thallium**	<0.01	< 0.0050	<0.100	< 0.100	<0.01	< 0.0050	<0.01	< 0.0500
Total	**Vanadium**	<0.02	< 0.010	0.212	0.22	<0.02	< 0.010	0.0806	0.082
Dissolved	**Vanadium**	<0.02	< 0.010	0.240	0.22	<0.02	< 0.010	0.0821	0.080
Total	**Zinc**	0.116	0.13	<0.50	0.45	0.416	0.43	0.147	0.16
Dissolved	**Zinc**	0.124	0.13	0.414	0.44	0.434	0.43	0.152	0.16
Total	**Mercury**	<0.0002	< 0.0002	<0.0002	< 0.0002	<0.0002	< 0.0002	<0.0002	< 0.0002
Dissolved	**Mercury**	<0.0002	< 0.0002	<0.0002	< 0.0002	<0.0002	< 0.0002	<0.0002	< 0.0002
Total	**Cyanide**	<0.005	< 0.010	<0.005	< 0.010	<0.005	< 0.010	<0.005	< 0.010
Laboratory Measured pH		3.30 H	3.7 H	3.80 H	3.4 H	3.30 H	3.2 H	4.50 H	4.1 H
Field Measured pH		3.73		3.33		3.06		3.92	
Groundwater Level		6.50		1.97		7.61		7.83	

All concentrations are reported in milligrams per liter.
pH is reported in standard pH units.
Groundwater level, as measured on February 5, 2008, is reported in feet above the National Geodetic Vertical Datum.

Note: These tables present results of OIG sampling conducted at the Delatte Metals Superfund Site in February 2008. Only results from the shallowest groundwater are given in line with the focus of this report.

Code	Explanation
<	Analyte not detected at method reporting limit, the value that follows the less than sign.
A	Sample pH was less than or equal to 12 upon receipt. pH was adjusted in the lab to greater than 12 prior to analysis.
B1	Target analyte detected in method blank at or above the method reporting limit.
B7	Target analyte detected in method blank at or above method reporting limit. Concentration in sample was 10 times above the concentration found in the method blank.
H	This test is specified to be performed in the field within 15 minutes of sampling; sample was received and analyzed past the regulatory holding time.
M2	The matrix spike (and/or matrix spike duplicate) was below the acceptance limits due to sample matrix interference.
MHA	Due to high levels of analyte in the sample, the matrix spike calculation does not provide useful spike recovery information.

Source: OIG

Table C-2: Surface water results, Delatte Metals Superfund Site, February, 2008.

Analyte Identifier		SW-01		SW-02		SW-03
Sampling Date		4-Feb-08		4-Feb-08		7-Feb-08
Laboratory		1	2	1	2	1
Total	**Aluminum**	1.54	2.2	1.62	2.2	7.05
Dissolved	**Aluminum**	0.193	0.18	0.266	0.27	7.26
Total	**Antimony**	<0.01	< 0.0020	<0.01	< 0.0020	<0.01
Dissolved	**Antimony**	<0.01	< 0.0020	<0.01	< 0.0020	<0.01
Total	**Arsenic**	<0.01	< 0.0030	<0.01	< 0.0030	<0.01
Dissolved	**Arsenic**	<0.01	< 0.0030	<0.01	< 0.0030	<0.01
Total	**Barium**	0.0550	0.057	0.0534	0.054	0.0528
Dissolved	**Barium**	0.0446	0.038	0.0402	0.039	0.0581
Total	**Beryllium**	<0.004	< 0.0005	<0.004	< 0.0005	<0.004
Dissolved	**Beryllium**	<0.004	< 0.0005	<0.004	< 0.0005	<0.004
Total	**Cadmium**	<0.001	< 0.0020	<0.001	< 0.0020	0.101
Dissolved	**Cadmium**	<0.001	< 0.0020	<0.001	< 0.0020	0.108
Total	**Calcium**	6.29	6.0	6.02	5.7	40.5
Dissolved	**Calcium**	5.40	5.2	5.75	5.2	41.5
Total	**Chromium**	<0.005	< 0.0050	<0.005	< 0.0050	<0.005
Dissolved	**Chromium**	<0.005	< 0.0050	<0.005	< 0.0050	<0.005
Total	**Cobalt**	<0.02	< 0.010	<0.02	< 0.010	0.0275
Dissolved	**Cobalt**	<0.02	< 0.010	<0.02	< 0.010	0.0312
Total	**Copper**	<0.01	0.0046	<0.01	0.0042	0.0114
Dissolved	**Copper**	<0.01	0.0032	<0.01	0.0033	0.0119
Total	**Iron**	1.78	1.8	1.88	1.8	1.68
Dissolved	**Iron**	0.413	0.38	0.459	0.67	1.61
Total	**Lead**	<0.005	0.0036	0.00846	0.0080	0.532
Dissolved	**Lead**	<0.005	< 0.0020	<0.005	0.0023	0.552
Total	**Magnesium**	1.60	1.6	1.70	1.7	11.2
Dissolved	**Magnesium**	1.45	1.4	1.56	1.5	11.8
Total	**Manganese**	0.111	0.10	0.143	0.13	1.18
Dissolved	**Manganese**	0.0996	0.090	0.124	0.12	1.20
Total	**Nickel**	<0.01	< 0.0050	<0.01	< 0.0050	0.0241
Dissolved	**Nickel**	<0.01	< 0.0050	<0.01	< 0.0050	0.0292
Total	**Potassium**	1.78	2.1	1.70	< 2.0	2.98
Dissolved	**Potassium**	1.96	2.1	1.68	< 2.0	3.21
Total	**Selenium**	<0.01	< 0.0020	<0.01	< 0.0020	<0.01
Dissolved	**Selenium**	<0.01	< 0.0020	<0.01	< 0.0020	<0.01
Total	**Silver**	<0.005	< 0.0010	<0.005	< 0.0010	<0.005
Dissolved	**Silver**	<0.005	< 0.0010	<0.005	< 0.0010	<0.005
Total	**Sodium**	13.9	14	15.7	15	41.2
Dissolved	**Sodium**	13.9	13	15.3	15	43.4
Total	**Thallium**	<0.01	< 0.0005	<0.01	< 0.0005	<0.01
Dissolved	**Thallium**	<0.01	< 0.0005	<0.01	< 0.0005	<0.01
Total	**Vanadium**	<0.02	< 0.010	<0.02	< 0.010	<0.02
Dissolved	**Vanadium**	<0.02	< 0.010	<0.02	< 0.010	<0.02
Total	**Zinc**	<0.05	0.11	<0.05	< 0.050	0.239
Dissolved	**Zinc**	<0.05	< 0.050	<0.05	< 0.050	0.247
Total	**Mercury**	<0.0002	< 0.0002	<0.0002	< 0.0002	<0.0002
Dissolved	**Mercury**	<0.0002	< 0.0002	<0.0002	< 0.0002	<0.0002
Total	**Cyanide**	<0.005	< 0.010	<0.005	< 0.010	NA
Laboratory Measured pH		6.40 H	6.9 H	7.80 H	6.8 H	NA
Field Measured pH		6.26		5.82		4.48

All concentrations are reported in milligrams per liter.
pH is reported in standard pH units.

Note: This table presents results of OIG sampling conducted at the Delatte Metals Superfund Site in February 2008. All laboratory results from surface water samples collected are included.

Code	Explanation
<	Analyte not detected at method reporting limit, the value that follows the less than sign.
H	This test is specified to be performed in the field within 15 minutes of sampling; sample was received and analyzed past the regulatory holding time.
NA	Not applicable

Source: OIG

Appendix D

EPA Region 6 Responses and OIG Evaluation

September 12, 2008

MEMORANDUM

TO: Carolyn Cooper
Director for Program Evaluation
Hazardous Waste Issues

FROM: Richard E. Greene */s/ Richard E. Greene*
Regional Administrator

SUBJECT: Draft Evaluation Report: Delatte Metals Superfund Site

On August 7, 2008, you provided me with a summary of concerns which led you to conclude that the Environmental Protection Agency (EPA) could not support its recent determination regarding the protectiveness of the remedy in place at the Delatte Metals Superfund site in Ponchatoula, Louisiana.

Attached is the Region 6 response to your draft evaluation report. I believe that that the overall conclusion of your report is misleading and does not present an accurate evaluation of EPA's past and future activities at the site. EPA made the determination that the remedy is currently protective based on several years of monitoring and observation at the site. Your evaluation suggests that the remedy in place at the site had no impact on human health and the environment and that exposure to contaminants is occurring. The determination of "protective in the short term" is based on the facts that there are no known exposures to ground water contamination, there are institutional controls in place to restrict land use and ground water use, any trespasser access will not result in an immediate health risk, and no cancer or non-cancer excess lifetime risk was identified for surface water that exceeded the EPA risk ranges.

I look forward to your assistance in resolving any concerns regarding the review that EPA conducted at the site in making its determination of protectiveness.

Attachments

OIG Response 1

The OIG's conclusion correctly conveys Region 6's past and future activities at the site. The OIG has not been misleading, and has fairly and transparently evaluated and communicated the conditions and activities at the Delatte Site. Region 6 continues to conclude that the Delatte Site is safe, or protective, in the short-term. The OIG's data, as well as several years of Region 6 and LDEQ sampling data at the Site, show that the PRB was not treating all of the shallow contaminated groundwater before it discharges to surface water, and migration of metals was uncontrolled. Our review concluded that more information is needed to determine whether the remedy is protective to human health and the environment.

As stated in our report and reiterated in EPA's current response, EPA guidance for conducting a Five-Year Review calls for a technical assessment that answers three questions:

A. Is the remedy functioning as intended by the decision documents?
B. Are the exposure assumptions, toxicity data, clean-up levels, and remedial action objectives used at the time of remedy selection still valid?
C. Has any other information come to light that could call into question the protectiveness of the remedy?

The answers to these questions are part of the basis for EPA's determination that the site remedy is protective of human health and the environment. In making its determination, we found that the Region did collect enough relevant information to answer these questions. Also, the Region did not use all available data. The Region cited monitoring results that indicated the remedy was functioning effectively. However, the Region also had data that indicated the remedy was not functioning as intended and had been advised that further testing and investigation were needed. Region 6 did not cite these problematic results when making its determination. The Region has not provided any additional information in its current response to address the issues raised in our report. The Region still has not collected surface water samples to confirm that the clean-up standard in the decision document (i.e., ROD) for surface water was being met. The Region did not account for the problematic groundwater data it had in assessing the effectiveness of the PRB. In addition, Region 6's data, as well as OIG data, show that the decision document had an incorrect assumption that clean-up of lead would also address other metals of concern. These conditions raise serious concerns regarding the Region's safety determination for the Site. Specifically, we found that the PRB is not functioning sufficiently to control the migration of metals in the shallow groundwater. EPA guidance for answering the question on remedy function (Question A) states that when conducting a Five-Year Review, the region should "investigate and identify problems that could lead to the remedy being not protective."

The Region's belief that there are no known exposures to groundwater contamination does not serve as evidence of no exposure. However, the Region has not investigated all exposures resulting from contaminated groundwater discharging to surface water. The risk imposed by this discharge depends on the magnitude and location of the discharge. Region 6 has not investigated this discharge or determined whether human and environmental exposures are occurring. Therefore, it is inappropriate for the Region to conclude that there are no exposures.

Region 6 Response to the Office of Inspector General's (OIG) Draft Report on the Protectiveness Determination in the Delatte Metals Superfund Site
Five Year Review

This document transmits the Region 6 response and comments on the OIG's draft evaluation report on the protectiveness determinations made in the November 2007 Five Year Review for the Delatte Metals Superfund Site in Ponchatoula, Louisiana. Our comments are limited to the findings regarding the protectiveness determination and the recommendations in the evaluation directed at Region 6.

In the November 2007 Five Year Review, EPA made recommendations to address site maintenance issues and to revise future sampling plans to evaluate the migration of contamination through a ground water to surface water pathway.

OIG Response 2

It has been nearly a year since Region 6 made these recommendations. The Region has not yet evaluated the migration of contaminants through a groundwater to surface water pathway. The Region recently addressed certain Site maintenance issues.

The OIG evaluation raises several concerns regarding the ability of the remedy at Delatte Metals to provide long-term protectiveness to human health and the environment. These concerns are similar to those identified in the Five Year Review. As part of the Five Year Review process, Region 6 is working with the Louisiana Department of Environmental Quality LDEQ) to include additional sampling in future site monitoring and tko procure a contractor to repair the damaged fences and gates and post informational signs at the site.

OIG Response 3

The OIG report addresses the protectiveness of the remedy. The Five-Year Review discusses surface-water sampling in the vicinity of well MW-01 to better understand the effectiveness of the PRB in limiting migration of metals. We believe that the surface water sampling should be more extensive to better understand the migration of metals that bypass the PRB. In the past, the Region did not support repairs to the damaged fence because it believed it was not necessary for safety. The Region recently agreed to address the damaged fence.

Region 6 would like to offer comments on a few specific issues that you raised in your evaluation.

Region 6 Response

Report Title: EPA's Safety Determination for Delatte Metals Superfund Site Was Unsupported

Narrative Response: The title of the evaluation is very misleading, including the use of the term "safety". The title of the OIG report is misleading and should be revised. The title suggests that EPA has done no remediation at the site, does not monitor the site, and that human exposure to contaminants is occurring. The determination of "protective in the short term" is based on the following facts: 1) there are no known exposures to ground water contamination, 2) there are institutional controls (IC) in place to restrict land use and ground water use, 3) any trespasser access will not result in an immediate health risk, and 4) no cancer or non-cancer excess lifetime risk was identified for surface water that exceeded the EPA risk ranges. LDEQ will continue to monitor the ground water quarterly as well as enforce the ICs, and EPA will continue to evaluate the site every five years. Data are reviewed continuously, and should monitoring data indicate the potential for exposure, EPA and/or LDEQ will take whatever action is needed to address that exposure. In addition, for the remedy to remain protective in the long-term, follow-up actions were identified in the five-year review and include continued site maintenance, continued ground water sampling, and the addition of surface water sampling. Long term monitoring and maintenance activities and continued five-year reviews of the effectiveness of the remedy will provide the information necessary for EPA to ensure protectiveness in the long-term.

The conclusions drawn in the Five Year Review were based on several years of monitoring data and site observations, whereas the conclusions drawn in your evaluation are based on one field investigation conducted in February 2008. The data requirements for monitoring the operation of the remedy are defined in the site Operation and Maintenance Plan.

CERCLA §121(c) requires reviews no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being "protected" by the remedial action being implemented. The NCP also discusses the five-year review in terms of evaluating whether the remedy continues to provide adequate "protection" of human health and the environment. Further, EPA's guidance specifically uses the terms "protectiveness determination" and "protectiveness statement." Your use of the term "safety" implies imminent risk and endangerment to the surrounding community.

Proposed Revision: The title of the evaluation should be re-written. "EPA's Short-Term Protectiveness Determination for the Delatte Metals Superfund Site is Appropriate."

OIG Response 4

The current title accurately captures OIG's conclusion that Region 6 did not support its recent protectiveness determination with data and analyses. The OIG conclusion is not based on one field investigation, but instead is based on the entire body of data available for the site.

The Region proposed a title revision, stating that the OIG's report title is misleading because it implies that "EPA has done no remediation at the site, does not monitor the site, and that human exposure to contaminants is occurring." The OIG's report includes discussion of the clean-up actions EPA and others have taken at Delatte (see Noteworthy Achievements). We also include discussion of the actions that EPA and others have taken to monitor the Site. As stated in its current response, Region 6 does not currently know whether adverse human and environmental exposures are occurring because the Region has not yet evaluated the migration of groundwater contaminants to surface water.

OIG Finding: High Metals Concentrations in Ground Water Beyond the Permeable Reactive Barrier (PRB), Page 4, Paragraph 1

Narrative Response: In the second sentence, you refer to the shallow ground water contaminated with metals as a principal threat waste. EPA does not generally consider contaminated ground water to be a principal threat (A Guide to Principal Threat and Low Level Wastes, November 1991, Attachment A).

Proposed Revision: "In particular, we question the effectiveness of the PRB in treating the shallow ground water contaminated with metals."

OIG Response 5

Regardless of whether EPA generally considers contaminated groundwater not to be a principal threat waste, in the ROD for Delatte (p. 32), Region 6 identified the "mobile lead source contaminants" in the shallow groundwater as a principal threat waste. The ROD stated that these contaminants "must be resolved by treatment and permanent solutions to the maximum extent practicable."

OIG Finding: High Metals Concentrations in Ground Water Beyond the PRB, Page 4, Paragraph 4

Narrative Response: The sentence, "The PRB is not preventing metals in the ground water from traveling beyond the PRB," suggests that the Permeable Reactive Barrier is not removing any contamination from the shallow ground water at the site. The PRB was designed to minimize the migration of contamination from the site by reducing the concentrations of metals as ground water passed through the PRB. Based on the data collected from monitoring wells upgradient and downgradient of the PRB by EPA and its Office of Research and Development (ORD) and provided to you on March 28, 2008, Region 6 concluded that the migration of metals is being controlled, although not eliminated by the PRB at the site. These data indicated that lead, cadmium, and arsenic contamination was reduced and that pH values were raised in ground

water passing through the PRB. From these data, EPA concludes that the PRB is working as intended (Attachment B, Page 3, General Comment 4).

OIG Response 6

EPA ORD's evaluation of the PRB (Attachment B, Page 3, General Comment 4) states, "With the exception of TEPA-8, Figures 5, 6, and 7 indicate lead, cadmium, and nickel are very effectively removed by the PRB." TEPA-8 is the line of six monitoring wells that crosses the eastern flank of the PRB. As such, the quoted statement implies that the eastern flank of the PRB does not effectively remove lead, cadmium, and nickel. In addition, ORD's results show that arsenic concentrations are elevated beyond the PRB in each line of monitoring wells. Therefore, we do not agree with the Region's conclusion that the PRB is working as intended. The PRB is intended to raise the pH and immobilize metals in the shallow groundwater.

The concentrations of metals found in the ground water samples collected during your evaluation do not affect the short term protectiveness determination made by EPA because the shallow ground water is not used as a drinking water supply and EPA has no evidence of exposure to ground water contamination.

The shallow ground water is not considered suitable for drinking water due to the high concentrations of Total Dissolved Solids (TDS). In EPA's ground water classification system ground water with greater than 10,000 micrograms per liter (ug/l) TDS is not considered suitable for drinking water (Attachment C, Page iv). EPA does not expect any impact to human health from exposure to the ground water. Also, EPA's risk assessment, conducted as part of the remedial investigation for the site, indicated that exposure to surface water from site contaminants would not pose an unacceptable risk to human health.

OIG Response 7

The Region stated that the remedy (PRB) is functioning as designed because it has no current evidence of exposures to contaminated groundwater, and previous investigations did not reveal unacceptable health risks from exposure to "surface water from site contaminants." We believe Region 6 has misinterpreted, or ignored the procedures that form the basis for making a decision about remedy functioning. Our data and EPA's data show that the PRB is not treating the shallow groundwater contaminated with metals. The mobile lead in this groundwater was identified in the ROD as a principal threat waste to be treated to the maximum extent practicable. Our site inspection and sampling showed that high metal concentrations were in the groundwater that had passed through the PRB, in the groundwater that bypassed the PRB, and in the surface water we sampled. Similar groundwater information was gathered by EPA and LDEQ and confirms OIG results. Even EPA's own research scientists questioned the effectiveness of some characteristics of the PRB and recommended that further study is needed.

Proposed Revision: "Although the PRB is not preventing metals in the ground water from traveling beyond the PRB, data indicates the PRB is reducing the metals concentrations and raising the pH of the shallow ground water at the site."

OIG Response 8

We do not agree with the proposed revision. The Region's declarations of PRB success focus on the western flank of the PRB, where most of ORD's monitoring wells are located. However, one transect of wells across the eastern flank (TEPA-8) has consistently yielded data that points to problems in that area of the PRB. As ORD research scientists have reported, the elevated arsenic levels may be resulting from a residual source located downgradient of the PRB. The Five-Year Review, based on an analysis of the Site's long-term monitoring data, noted that most recently (2005-2006) lead concentrations show a decreasing trend. However, the Review also stated that over the entire monitoring period (2004-2006) "none of the tested constituents exhibited a significant decrease in concentration downgradient of the PRB" (page 29). If these conditions exist, then the PRB does not limit the migration of all metals of concern.

OIG Finding: High Metals in Ground Water Bypassing the PRB, Page 6, Paragraph 3

Narrative Response: As noted in our March 28, 2008, response to you, EPA does believe that some ground water may be flowing around the western end of the PRB (Attachment B, Page 1, General Comment 1), but had no data to suggest that ground water was flowing around the eastern end of the PRB. We agree that additional data is needed to assess the potential for ground water bypassing the east end of the PRB. We note that you collected ground water and surface water data near the west end of the PRB and that you concluded that ground water discharges may be affecting the tributary at the west end of the PRB. The OIG cited the results of a sample that was collected from a tributary near the western end of the PRB, which had a lead concentration of 530 ug/l, and a shallow ground water sample you collected in the immediate vicinity of the surface water sample that had a lead concentration of less than 5 ug/l. These data suggests that ground water discharging into the tributary is not likely having a significant impact on surface water quality in this area of the site.

OIG Response 9

The Region's response concludes that groundwater discharging into the tributary is not likely having a significant impact on surface water quality in this area. Based on historical information on the variability of concentrations in groundwater, we do not accept this conclusion. The 2000 Feasibility Study report includes a map that shows a variable distribution of lead in the shallow groundwater. As part of the report, modelers projected the direction of transport from three "hot spots" of high lead concentrations. One of the flow arrows points directly to the location where we found high lead concentrations in the surface water. The varied distribution of lead in the groundwater may explain why we obtained low concentrations in the groundwater near where we obtained high concentrations in the surface water. The Region should conduct additional sampling to fully understand conditions at the site and the source of the high metals in the tributary.

EPA will work with the LDEQ to revise the existing site Operation and Maintenance Plan to assess the impact of ground water flowing around the ends of the PRB and discharging into the tributaries to Selser's Creek. The need for additional monitoring to assess the ground water to surface water migration pathway was identified in the November 2007 Five Year Review.

OIG Response 10

The Five-Year Review implies that monitoring to assess the groundwater to surface water migration pathway will be in the vicinity of well MW-01. OIG findings show that monitoring needs to be more extensive than sampling in the vicinity of MW-01. Well MW-01 is the area identified by the EPA research scientists as being downgradient of the part of the PRB that is working the best. Monitoring needs to include areas where problems have been identified.

OIG Finding: High Metals Concentrations in Surface Water, Page 7, Paragraph 1

Narrative Response: The sentence, "The PRB was not preventing cadmium, lead, nickel, and zinc from migrating to the surface water" does not consider that the Remedial Action Objective in the Record of Decision (Attachment D, Page 20) was written to "minimize or prevent contaminant migration." In the Five Year Review, EPA recognized the need to increase surface water sampling to ensure satisfaction with the Remedial Action Objectives and ensure the long term protectiveness of the remedy. EPA will work with the LDEQ to revise the existing site Operation and Maintenance Plan to assess the prevalence of metals in the surface water at the site.

This conclusion appears to be based on one round of sampling and the collection of three surface water samples, two of which are located within Selsers Creek and one from a drainage ditch that runs along the western boundary on the adjacent property. A single sampling event must be used in conjunction with other Site data and should be based on sound scientific data collected from multiple samples under a site-specific plan and evaluated relative to site-specific circumstances over a specified period of time to assist in understanding the site. These data should be collected in accordance with an established QAPP to address the site-specific data quality objectives. As no QAPP or DQOs were proved for EPA's review, the validity of the surface water data cannot be determined. In addition, the two samples collected from Selsers Creek are consistent with data collected during the RI and are consistent with upstream concentrations; therefore, these conclusions appear to be based on one sample taken from a drainage ditch located just west of the site.

OIG Response 11

We agree that a Quality Assurance Project Plan (QAPP) and Data Quality Objectives (DQOs) need to be established for the long-term monitoring at this site. Our sampling protocol was to use the Region's QAPP and DQOs, as we did with our groundwater sampling. However, because Region 6 and LDEQ have not conducted surface water sampling as part of the quarterly monitoring at Delatte, there were no QAPP and DQOs that we could use to guide our sampling. See Appendix A, Details on Scope and Methodology, for further information on our methods. Screening samples, such as the ones that we collected in February 2008, provide valuable information to the team tasked with establishing a QAPP and DQOs for the site. Region 6 should collect more screening samples to fully inform decisions needed for the design and quality of the surface water monitoring program, including finalizing a QAPP and DQOs.

OIG Finding: Access to the Site Was Not Controlled, Page 8, Paragraph 2

Narrative Response: The LDEQ is taking steps to address site access issues raised in this evaluation. The LDEQ is in the process of procuring a contractor repair the damaged fences and gates and post informational signs at the site. It should be noted that these findings were in EPA's November 2007 Five Year Review.

OIG Response 12

We had been informed of the Region's plans to discuss site access issues with LDEQ, as well as LDEQ's plans to repair and maintain the fence as part of its O&M responsibilities. We included this on page 8 of the draft report. We had not been told until this current response that informational signs would be posted.

The finding that the perimeter fence was damaged in several places is included in the Region's November 2007 Five-Year Review. However, the Review states that the ownership of the fence was turned over to the property owners. Region 6 did not recommend repair and maintenance of the perimeter fence in the November 2007 Five-Year Review. It was not until the OIG issued findings in this area that the Region committed to action.

OIG Finding: Protectiveness Determination Was Not Supported, Page 9, Paragraph 2

Narrative Response: EPA's protectiveness was made following guidelines published in EPA's "Comprehensive Five-Year Review Guidance," June 2001. Examples of protectiveness determinations are provided in Exhibit 4-5 (Attachment E) of this guidance. The guidance indicates that protectiveness is generally defined by the risk range and hazard index (HI) and information obtained through answers to Questions A, B, and C should be considered to determine possible impacts to the protectiveness of the remedy. The determination of "protective in the short term" is based on the facts that there are no known exposures to ground water contamination, there are institutional controls in place to restrict land and ground water use, and any trespasser access due to site security issues will not result in an immediate health risk. The remedial action addressed all soil contaminated with metals above concentrations that would allow for future industrial use. This level of clean-up also addresses the risk of direct contact with the soil by a trespasser.

EPA recognizes, as identified in the November 2007 Five Year Review, that additional actions need to be taken to ensure that the remedy is protective in the long term and recommend that ground water continue to be monitored and that surface water monitoring be included to ensure that the Remedial Action Objectives for the remedy are met.

OIG Response 13

The OIG's data, as well as several years of EPA and LDEQ sampling data at the site, confirm that more information is needed to determine whether the remedy is protective to human health and the environment. We remain concerned that the Region does not account for the uncertainties regarding the Site's current safety. See **OIG Response 1** for further information on our concerns.

The risk imposed by metals continuing to discharge to surface water depends on the magnitude and location of the discharge, as well as other factors. While the Five-Year Review recommends that surface water sampling be added to the quarterly monitoring "to evaluate the groundwater to surface water migration pathway in the vicinity of MW-01," we discuss in our report the need for more extensive surface water sampling. In addition, we conclude that the ecological standard for total lead (the freshwater chronic continuous criteria) reported in the Five-Year Review is incorrect for the surface waters found on and near the Site. The appropriate standard is about three times lower, as shown in Table 2-1 of our report.

Recommendations, Pages 12 and 13

2-1. Amend the November 2008 Five-Year Review to state that the safety of the site in both the short- and long-term cannot be determined without further analysis of the remedy and the risk posed by migration of the metals.

Narrative Response: As discussed above, EPA continues to believe that the Delatte Metals remedy remains protective in the short term. No new information that would affect short-term protectiveness has come to light since the ROD was signed in September 2000, including the information provided in the OIG report.

OIG Response 14

The OIG's recommendation is not contingent on new information. The OIG demonstrated that Region 6 did not act on the problematic information it had when it made its safety determination. Region 6's evaluation of the Delatte remedy was incomplete when it made its determination. OIG's work confirmed several of the results that Region 6 has seen at this site but did not act on. Information on hand, at best, supports a determination that more information is needed before making a safety decision.

The OIG was the first to sample surface water at this Site during the O&M period. We report those results here. Our limited results, showing high metal concentrations in one of the tributaries to the creek, are evidence that more information is needed to determine whether the Delatte remedy is protective to human health and the environment. See **OIG Response 1** for further information on our concerns regarding the protectiveness determination.

EPA recognized in the November 2007 Five Year Review that additional actions need to be taken to ensure that the remedy provides long-term protectiveness. Additional sampling to assess potential impacts from ground water bypassing the east end and, possibly, the west end of the PRB is needed. Additional monitoring is also needed to better understand the ground water

to surface water migration pathway and ensure that surface water quality criteria for the site are achieved. Work to improve site security and minimize site access, to maintain warning signs with contact information about the site, and to clear and grub the site and address settling in the area of the PRB needs to be completed.

EPA will work with the LDEQ to ensure that monitoring beginning in Spring 2009 will provide the data necessary to address issues raised in your evaluation. The data collected in future monitoring will be evaluated in accordance with statistical procedures outlined in the existing Operation and Maintenance Plan for the site (Attachment F).

2-2. Publish EPA's milestones for obtaining the information required to make an accurate determination on the effectiveness of the site's remedy and on the risk associated with continued metal migration.

Narrative Response: EPA will continue to collect data to evaluate the effectiveness of the PRB. As noted in this response, EPA will work with the LDEQ over the next several months to develop a plan for collecting the additional data needed to monitor the potential impacts from ground water bypassing the PRB, to understand the overall ground water to surface water migration pathway, and to ensure that exposure to surface water does not present a long term threat.

Once a plan is developed, EPA and/or the LDEQ will provide public availability of the plan, including facts sheets and be available to discuss the plan and site progress.

2-3. Investigate, quantify, and publicly report on the discharge of metals from shallow ground water at the site to Selser's Creek and its tributaries and implement an appropriate response.

Narrative Response: As identified in the Five Year Review, EPA recommended that more ground water and surface water monitoring is needed to ensure that the Remedial Action Objectives for the remedy are satisfied. EPA will use the data collected to better understand the ground water to surface water migration pathway to guide the future direction of the site. EPA will continue to make these data available to the public. As discussed in this response, EPA did not find an unacceptable risk to human health from direct contact or ingestion of contaminated surface water during the remedial investigation conducted for this site. Based on this finding, EPA did not select a component of the remedy to specifically address metals in surface water.

These activities will be carried out in concert with the responses to number 2-2 above.

OIG Response 15

The State human health risk assessment report for Delatte stated in 2004 (page 2) "potential exposure to contaminated shallow groundwater may be possible if contamination were to discharge to surface water . . . ." From this statement we conclude that the potential exposure pathway and the risk to human health from exposure to contaminated groundwater discharging to surface water had not been investigated. In addition, the ecological exposure pathways are numerous as mobile metals in ground water are discharging to surface water. The ecological risk assessment conducted for the remedial investigation noted low species diversity and abundance in the creek and tributaries and hypothesized that this observed poor ecological health could have resulted from a number of factors, including the discharge of low pH waters and the contaminants of concern.

2-4. Implement an independent evaluation of the effectiveness of the PRB to minimize migration of metals in ground water off the site and implement an appropriate response. Also, evaluate the impact of ground water bypassing the PRB.

Narrative Response: The EPA Office of Research and Development is currently conducting an independent evaluation of the PRB. EPA will consider the results of this evaluation and take appropriate action to improve the performance of the PRB, if warranted. As part of EPA's effort to conduct additional ground water and surface water monitoring, the resulting data will be used to evaluate the impact of ground water bypassing the east end of the PRB.

OIG Response 16

We agree that the Region can evaluate the effectiveness of the existing PRB by continuing to work with ORD research scientists. However, this evaluation needs to be extensive enough to determine whether the PRB is sufficiently controlling the migration of metals to ensure the Site is protective of human health and the environment. For example, the Region needs to determine whether the PRB is of adequate length to ensure that the remedy is effective.

2-5. Examine the source and mobility of arsenic in the shallow ground water in the vicinity of the PRB and implement an appropriate response.

Narrative Response: As EPA and LDEQ continue to monitor the site, data will be collected to ensure that unacceptable exposures to arsenic from the ground water do not occur. Should future monitoring data indicate the potential for exposure to arsenic in ground water to occur, EPA will take whatever action is needed to address that exposure.

OIG Response 17

Monitoring alone is not sufficient. An elevated concentration of arsenic in the groundwater is a new condition. As such, this condition has not been included in the analyses conducted to date of potential exposure and risk. Region 6 needs to conduct an investigation to understand the magnitude and extent of the source of the mobile arsenic, as this source was not identified in the remedial investigation.

Narrative Response: EPA recognized in the November 2007 Five Year Review the need for additional monitoring data. EPA will work with the LDEQ to include the analyses for all metals of concern in future sampling at the site.

2-7. Require LDEQ to control and restrict site access by repairing and maintaining the fences and gates and posting clearly visible signs describing site use restrictions and hazards.

Narrative Response: The LDEQ is currently in the process of acquiring a contractor to address these site security and information issues.

2-8. Conduct a new analysis of Site safety that properly considers information on metals concentrations in ground water and surface water, evidence of remedy functioning, and changes in land use around the site.

Narrative Response: EPA and LDEQ will continue to collect data to evaluate the performance of the remedy at the site. Based on all of the information available for the site, EPA continues to conclude that the remedy is protective in the short term and that some followup activities need to be undertaken by EPA and the LDEQ.

OIG Response 18

No new information is provided in Region 6's response to support its current protectiveness determination. Evidence shows that metal migration in the shallow groundwater is not controlled. Region 6 has not quantified the amount of this migration.

Land use around the site has not changed since the ROD was signed in September 2000. Land use in the area surrounding the site was identified in the ROD as residential; land use on the site was identified as industrial. The remedy for the site was selected considering the possibility that residential use around the site may increase over time. Also, EPA is not aware of any changes in the use of the shallow ground water for drinking water at the site.

OIG Response 19

Land use density has changed even though the land use classification has not. As a result, increased population density leads to a higher probability of increased trespasser activity, particularly if site access is not controlled. We have seen no indication in the site records in SDMS that an increase in the residential density around the site was considered when the risk assessments were conducted.

As new data becomes available, EPA and LDEQ will continue to evaluate the effectiveness of the remedy at the site and determine if any adjustments to the operation of the remedy need to be considered. EPA will also continue to conduct five year reviews of the remedy at the Delatte Metals site, as required under Superfund law.

OIG Response 20

We concluded that the evaluation of the effectiveness of the remedy conducted for the November 2007 Five-Year Review was incomplete. Not all of the available data was accounted for and the Region was missing other needed data. Region 6 did not have groundwater data for all of the contaminants of concern. Region 6 also did not collect any surface water samples to verify that the clean-up level for lead in surface water had been achieved. Finally, the evaluation did not fully incorporate the results reported by ORD scientists.

2-9. Implement a quality assurance process to ensure that safety determinations for future Five Year Reviews within the Region are conducted and supported with EPA guidance.

Narrative Response: The current Five Year Reviews are conducted in accordance with EPA's Five Year Review Guidance and protectiveness determinations are made following this guidance. Draft Five Year Review documents are reviewed by a site team in the Region. This team includes the Remedial Project Manager, the site attorney, the site risk assessor, an independent technical reviewer, Regional Superfund program management, staff from EPA Headquarters, and the State project manager. There are no supporting facts in the report that justify this recommendation. Our comments demonstrate that additional monitoring is also needed to better understand the ground water to surface water migration pathway and ensure that surface water quality criteria for the site are achieved, and that LDEQ is currently in the process of acquiring a contractor to address these site security issues. These issues were identified as part of the Five Year Review process. Additional procedures would be redundant and unwarranted.

OIG Response 21

EPA guidance for conducting a Five-Year Review calls for a technical assessment that answers three questions (see **OIG Response 1)**. How Region 6 answers these questions establishes whether the Region can determine the site remedy to be protective of human health and the environment. We conclude that the Region did not completely evaluate the remedy during the Five-Year review process at Delatte.

The OIG issued a report titled, "EPA Has Improved Five-Year Review Process for Superfund Remedies, But Further Steps Needed," in December 2006. Recommendations were made to expand the scope of quality assurance reviews of five-year review reports and revise guidance to more clearly define short- and long-term protectiveness determinations. OIG plans to address issues that pertain to Recommendation 2-9 in a follow-up review of this earlier report; therefore, Recommendation 2-9 has been removed from this report.

ATTACHMENT A
A Guide to Principal Threat and Low level Threat Wastes
Superfund Publication 9380.3-06FS
November 1991

ATTACHMENT B
EPA Office of Research and Development Response to OIG Comments/Questions Regarding PRB Performance at the Delatte Metals Site
Ponchatoula, Louisiana
March 20, 2008

ATTACHMENT C
Guidelines for Ground Water Classification under the EPA Ground Water Strategy
November 1986

ATTACHMENT D
Delatte Metals Superfund Site Record of Decision
September 2000

ATTACHMENT E
Comprehensive Five Year Review Guidance, June 2001

ATTACHMENT F
Operation and Maintenance Manual
Delatte Metals Superfund Site
Ponchatoula, Tangipahoa Parish, Louisiana
February 2004

OIG Response 22

The Region attached six documents to its response memorandum. The titles are listed here, but the documents are too large to include in this report. Five of these documents are public EPA documents. The sixth, Attachment B, is available on request.

OIG Response 23

We received comments from Region 6 on September 12, 2008, and met with Region officials on October 9, 2008, to discuss their review of a draft of the final report. We provided Region officials draft responses to their comments ahead of this meeting. On October 15, 2008, the Region sent a second set of comments. We reviewed and considered both sets of Region 6 comments, and made revisions to the report where appropriate. Below is the second set of comments, much of which has been previously presented by Region 6 and responded to by the OIG. Therefore, we only responded to new information presented by Region 6.

DELATTE METALS OIG REPORT
REGION 6 COMMENT CLARIFICATIONS
PRESENTED
DURING THE VIDEO CONFERENCE
ON
9 OCTOBER 2008

During the video conference, Region 6 and ORD presented several explanations and clarifications to explain why Region 6 could not and should not agree with the Recommendation 2-1 of the Draft OIG Report concerning the Delatte Metals Five Year Review. My staff compiled the reference materials from the ROD and the Five Year Review. As you can see from this information, the ROD anticipated that some contaminants and potentially some minor exposure could continue to exist at the site. Both the human health and ecological risk assessments dealt with these scenarios in the establishment of remedial action objectives and in the remedial action that was achieved.

OIG Response 24

One remedial action objective (RAO) of the ROD requires the remedy to "minimize or eliminate contaminant migration to the ground water and surface water to levels that ensure beneficial reuse of these resources." The ROD explicitly defines how the RAO will be achieved – by maintaining or attaining specific numerical clean-up levels in the soil, sediment, groundwater, and surface water. The OIG recognizes that some minor exposure may exist at the site, but EPA cannot claim that the site remedy is protective, either in the short-term or long-term, if it has never sampled the surface water to ensure that the RAO has been achieved.

The Five Year Review did reveal some issues that needed to be addressed in the "short term." The definition of "short term" was a topic of discussion during our call on October 9. In its Annual Report to Congress, EPA defined short term protectiveness as follows: "This statement is generally used when the remedy is protective but requires further actions or institutional controls to remain protective in the long term."

OIG Response 25

The OIG continues to believe that the Region's protectiveness determination was unsupported. The Region indicates, in reference to the definition it cites, that determining that a site remedy is protective in the short-term is the same as determining that the remedy is protective. According to the Region, the only difference between determining that a remedy is protective in the short- or long-term is the addition of a time-frame. Both indicate that the remedy protects human health and the environment from unacceptable risk at the time the determination is made. Our work has demonstrated that the Region did not have enough information at the time it made its November 2007 determination to state that the site remedy was protective – either in the short- or long-term. In addition, information that the Region did have indicated that problems existed with the overall effectiveness of the remedy in meeting the RAOs.

The Five Year Review included a milestone date of 1 year after report submittal in Table 14. In other words, Region 6 anticipated that a number of additional measures including the additional monitoring would be in place before November 2008. Region 6 recognizes that the actual implementation has been delayed by the ongoing responses to Hurricanes Gustav and Ike. Efforts to assure timely implementation are underway. Currently, the plan is to begin the additional monitoring before the end of December 2008. Our position remains that, based on the ROD, the decision to consider the short term protectiveness continues to be sound.

OIG Response 26

On May 20, 2008, more than 3 months before either Hurricane Gustav or Ike, the Site manager updated the OIG on the progress Region 6 made in implementing the additional measures at the Site. We were informed that no action had been taken because the Site manager had other priorities.

We recognize that Region 6 has competing responsibilities and priorities, including potentially significant responsibilities during hurricane season. However, the Region should then modify its current determination if the Region is aware that its competing responsibilities have caused it to delay the "short-term" period for which it has designated that the site remedy is protective (i.e., up through November 2008). The Region should factor the likely impact that unexpected events and competing priorities will have on its ability to address issues it designates as necessary in the "short-term" to ensure the protectiveness of Superfund sites. If the Region, or other involved parties have demonstrated an inability to fulfill their commitments according to the timelines they established, the Region should be conservative in its decisions about site remedy protectiveness.

"Evidence of current land use suggests that the future land use of the DMI [Delatte Metals, Inc.] Site will consist of the continuation of industrial/commercial activities in the facility area with off-facility residential and ecological use. The RAOs [Remedial Action Objectives] presented in this ROD [Record of Decision] have been developed for protection of activity within

these facility (industrial) and off-facility (residential and ecological) areas" (ROD, page 17).

See **OIG Response 27** (below)

"Three distinct and local water-bearing zones are beneath the DM [Delatte Metals] Site. According to the Louisiana Risk Evaluation/Corrective Action Program analysis of hydrology and water quality, the uppermost water-bearing zone is considered Class 3B (a source of a moderate quantity of water, with total dissolved solids concentration greater than 10,000 mg/1[milligrams per liter]); the middle is Class 2C (a source that could potentially supply drinking water in sufficient quantity for a domestic water supply, but since it has a total dissolved solids concentration between 1,000 mg/1 and 10,000 mg/1, it is not of sufficient drinking water quality); and the lowest is Class 1B (a source that could potentially or currently does supply drinking water to a domestic water supply and has less than 1000 mg/1 total dissolved solids)" (ROD, page 15). "For purposes of this ROD and ground water protection, the third identified water bearing zone at the DM Site is equivalent to the Shallow Aquifer" (ROD, page 16).

See **OIG Response 28** (below)

"… a HHRA [Human Health Risk Assessment] and ERA [Ecological Risk Assessment] [were] also performed to determine the current and future effects of contaminants on human health and the environment" (ROD, page 18). "In conclusion, for both the on-site and off-site child scenarios, the IEUBK [Integrated Exposure Uptake Biokinetic] Model estimated blood lead levels to be greater than 10 µg/dL [micrograms per deciliter] for all children between 0.5 years and 7 years of age." (HHRA, C-7). "The Adult Lead Model was used to predict soil screening levels for lead for non-residential exposure Pathways" and "…produced a screening level of 1,697 µg/g or mg/kg,.." (HHRA, page 49) which was adjusted to 1700 mg/kg (ROD, page 21 and Appendix C). "The conclusions of the Adult Lead Model and the IEUBK Model indicate that there will be unacceptable health risks and blood lead concentrations to both an adult worker in the facility areas of the DM Site and the child in the residential off-facility areas. Therefore,
cleanup of these areas designated for industrial and residential use will have to be addressed" (ROD, pages 19-20).

All other noncancer and cancer risks for the resident child related to exposure to offsite soil and for the industrial worker related to exposure to onsite soil were below the benchmark of 1 and were within or below the acceptable risk range (1E-04 to 1E-06), respectively. In addition, the Human Health Risk Assessment, evaluated the trespasser/visitor scenario for an adult and child exposed to surface water and sediment in Selsers Creek. The cancer and noncancer risks were

below the benchmark of 1 and the cancer risks were within or below the acceptable risk range (1E-04 to 1E-06) (HHRA, Section 5, Tables 7.5 – 7.6; 7.9 – 7.14; 7.15 – 7.16; 7.23 – 7.24; 8.5 – 8.6; 8.9 – 8.14; 8.15 – 8.16; and 8.23 – 8.24).

See **OIG Response 29** (below)

According to the ecological risk assessment, risks were evaluated for site soil, sediment and surface water. Soil "Risk to plants was based on the exceedance of soil toxicological benchmarks and on evidence of plant uptake" (ERA, page 132). "Terrestrial invertebrates are at risk from multiple COCs [contaminants of concern] in soil, surface water, and ground water" (ERA, page 132). "By every measure, the ditch habitat was more contaminated than the creek habitat" (ERA, page 133). "None of the creek samples were toxic to this species [Hyallela]. In the ditches, three samples were extremely toxic, and one moderately toxic, to Hyallela" (ERA, page 116). "Sediment HQs in the ditch for cadmium and lead are considered to indicate significant risk to benthic invertebrates, including crayfish" and "Surface water HQs for lead exceeded 500" (ERA, page 133). "Fish and amphibians contained levels of aluminum, cadmium, and lead indicating adverse effects on survival and growth. Levels were highest in the ditches, but of concern in creek populations also" (ERA, page 133). "The surface water and sediment in the area ditches and ground water that discharges to Selsers Creek are the prime candidates for remedial action. If these existing sources of contaminants are removed or reduced, concentrations of COCs in sediment and surface water in Selsers Creek will likely be diluted and redistributed by seasonal flooding, making active remediation of the creek unnecessary" (ERA, page 137-138).

"EPA has identified lead as the one COC that poses the greatest potential risk to human health at this Site" (ROD, page 18) and "…. is the most abundant and widespread COC at the DM Site. Since lead has been detected (co-located) at the points where the few other identified heavy metals have been detected, lead will be used as the basis for measuring numerical cleanup goals" (ROD, page 20). "…the cleanup of lead will address the other few metal contaminants (aluminum, antimony, cadmium, manganese, selenium, and zinc) because these contaminants have been found at the same sampling points where lead was found" (ROD, page 19). "Because of seasonal variations and the presence of sediment and soil mixed together in many pails of the off-facility areas, whenever this ROD addresses soil, it is with the understanding that it includes both soil and sediment (when present). It is anticipated that the cleanup of soil thus will of necessity include the cleanup of sediment" (ROD, page 19).

See **OIG Response 30** (below)

"The numerical cleanup goals were developed from the Adult Lead Model, the IEUBK Model, and the Ecological Risk Model. These models form the basis for

determination of cleanup levels that will ensure protection of human health and the environment in both facility (industrial) and off-facility (residential and ecological) areas" (ROD, page 20). "…since the source of the contamination is mainly in surficial and subsurface soils, the selected remedy was designed to primarily address the soil contamination. It is expected that when the soil cleanup levels are achieved, the other forms of cleanup measurements (such as Sediment: Ecological; 100 mg/kg lead; Ground Water; Residential: 15 ug/1 lead; and. Surface Water: Ecological: 0.6 ug/1 lead) will also be achieved (ROD, page 21). Therefore, the measurement of success at accomplishing the RAOs will be based on the media-specific numerical cleanup goals to be achieved in the various designated areas of soil contamination. These are:
1. Industrial (Adult Lead Model basis): 1,700 mg/kg lead in soil;
2. Residential (IEUBK Model basis): 500 mg/kg lead in soil; and,
3. Ecological: (Ecological Risk Model basis): 80 mg/kg lead in soil."

"The remedy at the DM Site will protect human health and the environment by:

- ***Immobilization to address the principal threat wastes within the soil (thus eliminating the source of contamination for sediment, surface water, ground water);***
- ***Off-site disposal to transport immobilized wastes to a disposal facility;***
- ***Permeable treatment walls to neutralize the acidity of the shallow ground water and limit the migration of dissolved metals;***
- ***Institutional controls in the form of deed notices to inform the public of Site conditions; and,***
- ***Ground water monitoring to ensure the effectiveness of the cleanup remedy.***

More specifically, the implementation of the selected remedy will achieve the DM Site RAOs, as determined by numerical cleanup goals formulated from the basis of the Adult Lead Model, IEUBK Model, and the Ecological Risk Model" (ROD, page 35).

"Excavation of soils and waste pits began in December 2002 and was completed in July 2003. Following soil excavation, surface restoration activities were conducted for on-site and off-site areas. Installation of the PRB began in February 2003 and was completed in June 2003. On September 22, 2004, LDEQ filed two institutional controls for three on-facility properties. The third institutional control was filed by one of the property owners" (Five Year Review, page 10).

Based on these actions, the site was determined to be protective in the short-term.

1. "Based on the risk models, a total of 44,000 cubic yards of contaminated soil would have to be addressed at the DM Site. Included in this total are areas where lead contaminants were found well above acceptable risk levels even for industrial workers (the approximately 25,000 cubic yards of highly mobile lead

source materials, also referred to in this ROD as the principal threat wastes)" (ROD, page 19 and 32). "On- and off-facility contaminated soil exceeding the industrial criteria were addressed by removal, solidification/stabilization (S/S), and off-site disposal; Off-facility soil exceeding the residential or ecological criteria were excavated and consolidated on the facility; and, Sediment exceeding the ecological criteria was also excavated and consolidated on the facility" (Five Year Review, page 9). "Approximately 41,000 cubic yards (cy) of on-facility and 1,400 cy of off-facility soil were excavated, treated, and disposed of at an off-site landfill. The total weight of soil disposed of at the landfill was 85,444 tons. Approximately 10,000 cy of off-facility soil meeting on-facility cleanup levels were placed in the on-facility excavations" (Five Year Review, Page 10). "Confirmation sampling was completed to verify sufficient excavation and soil treatment" (Five Year Review, page 9).

Five Year Review Recommendation and milestone date for follow-up actions supporting long-term protectiveness (page 42 and Table 14): "The ROD states that the "...the measurement of success at accomplishing the RAOs will be based on the media-specific numerical cleanup goals to be achieved in the various designated areas of soil contamination…" because "...it is expected that when soil cleanup levels are achieved,…" that the AWQ criteria and Groundwater criteria for lead will be met" (ROD, page 21 and Five Year Review, page 43). The remedy called for "Immobilization to address the principal threat wastes within the soil (thus eliminating the source of contamination for sediment, surface water, ground water)" (ROD, page 35).

See **OIG Response 31** (below)

"Groundwater monitoring is currently conducted; however, surface water sampling is not. According to the trend analysis, there is no identifiable increasing or decreasing trend for any of the COCs [regarding MW-01]; however, these values exceed the current 2.5 µg/L freshwater chronic continuous criteria for lead. "…to evaluate the groundwater to surface water migration pathway in the vicinity of MW-01 surface water samples should be collected to ensure satisfaction of the RAO" Five Year Review, page 43).

2. "There have been no changes in land use that bear on the protectiveness of the selected remedy. There have been no changes [in exposure pathways] that bear on the protectiveness of the selected remedy. There have been no new contaminants or contaminant sources identified at the Site. No new laws or regulations have been promulgated or enacted that would call into question the effectiveness of the remedy at the Site to protect human health and the environment" (Five Year Review, page 38).

3. "Since there is no evidence of drinking water use from the first two identified water-bearing zones (Class 3B and 2C), permeable treatment walls will be installed in the first water-bearing zone to aid in the overall immobilization

treatment process of the contaminated soils in order to prevent any migration of lead contaminants to the usable third water-bearing zone/Shallow Aquifer (Class 1B)" (ROD, page 17). "A Permeable Reactive Barrier (PRB) was installed to raise the pH of the groundwater as it migrates north and west toward Selsers Creek and its tributaries" (Five Year Review, page 9). "In general, the PRB is performing well in reducing the lead concentrations and treating the low pH impacted groundwater in the shallow WBZ" (Five Year Review, page 31 and Attachment 10).

4. "Ground water monitoring to ensure the effectiveness of the remedy is also a component of each alternative, except the "no action" alternative. This ground water component of Alternatives 2 through 6, requires the monitoring of ground water to ensure that contaminants have not migrated into the third water-bearing zone/Shallow Aquifer" (ROD, page 22).

Five Year Review Recommendation and milestone date for follow-up actions supporting long-term protectiveness (page 37 and 42 and Table 14): "Generally, metals concentrations in the third WBZ are not increasing. Although all of the third WBZ [water bearing zone] and water wells had metals concentrations which exceeded comparison criteria (e.g., MCLs), only three of these monitoring wells were located outside the area under institutional controls (in the form of conveyance notices). Based on the most recent data available (i.e., December 2006), the data show that monitoring wells maintain drinking water integrity and no detected constituents are above comparison criteria" (Five Year Review, page 37). "The groundwater dataset was not robust enough to form definitive conclusions about the functionality or efficacy of the PRB. Although, year 2006 concentrations remain below MCLs or EPA Region 6 MSSLs [medium-specific screening levels], trend analyses for wells located in the third WBZ show significant increasing trends: two for lead and two for nickel. Based on these findings, groundwater monitoring as outlined in the O&M Manual should continue using low-level reporting limits. In addition, the need for institutional controls restricting groundwater use of the third WBZ should be evaluated. The groundwater monitoring programs should be reviewed to ensure adequate data are collected which may include altering sampling frequency, altering sampling parameters, and plugging and/or installing wells" (Five Year Review, page 42).

5. "Institutional controls (in the form of conveyance notices) were placed on affected properties" Five Year Review, page 10). "The notice provided the following requirements: (1) That the property has been the subject of a CERCLA response; (2) That hazardous substances remain at specified locations on the property above levels that allow for unrestricted exposure; limit site use to industrial/commercial use; and prohibit the use of groundwater within the first and second WBZs; (3) That disturbing or moving soil in these locations may pose a threat to human health or the environment, and may subject the property owner and the party causing the disturbance to liability under CERCLA or other laws; (4) That structures including permeable treatment walls and monitoring

wells, and any other feature necessary for protectiveness of the remedy or for its successful operation and maintenance, remain on the property at specified locations; (5) That disturbing or moving these features of the remedy may pose a threat to human health or the environment, and my subject the property owner and the party causing the disturbance to liability under CERCLA or other laws; and, (6) That the property may be subject to restrictions under LAC 33.V. Chapter 35 (Five Year Review, page 40). "No future land uses have been established or are anticipated for the Site that would require an adjustment to the institutional controls currently being implemented" (Five Year Review, page 41).

Five Year Review actions supporting long-term protectiveness (page 46): The remedy will remain protective of human health and the environment in the long-term provided recommendations for improvement are made, O&M activities continue, and the institutional controls restricting the Site to commercial/industrial use remain in place.

5. "A review of the latest O&M Quarterly Report from the June 2006 groundwater monitoring event (McDonald Construction 2006) and groundwater monitoring data through December 2006 indicates that the O&M Manual (Tetra Tech 2004a) is being followed and the Remedial Action Objectives are generally being met" (Five Year Review, page 16).

Five Year Review actions supporting long-term protectiveness (page 46): The remedy will remain protective of human health and the environment in the long-term provided recommendations for improvement are made, O&M activities continue, and the institutional controls restricting the Site to commercial/industrial use remain in place.

See **OIG Response 32** (below)

As you can see from the Record of Decision, the future land use of the Site was evaluated and it was determined that the site would continue to be used for industrial/commercial activities in the facility area with off-facility residential and ecological use. The remedial action objectives presented were developed for protection of activity within the facility (industrial) and off-facility (residential and ecological) areas.

OIG Response 27

OIG has not raised an issue with the soil clean-up levels at Delatte, which were within the numerical clean-up levels established in the ROD. However, as shown in our report and previous responses, metal contaminants may be migrating off-site through the uncontrolled groundwater, and may be entering surface water. The ROD states that to meet the RAO to "minimize or eliminate contaminant migration to the ground water and surface water to levels that ensure beneficial reuse of these resources," numerical clean-up levels must be maintained in surface water. This is how the ROD defines protection of activity in off-facility (residential and ecological) areas. EPA has not collected surface water data to show that the RAO has been achieved prior to making its statement of protection.

Likewise, the ground water use was investigated. The Louisiana Risk Evaluation/Corrective Action Program analysis of hydrology and water quality, identifies the first water-bearing zone as Class 3B [(a source of a moderate quantity of water, with total dissolved solids concentration greater than 10,000 milligrams per liter (mg/1)], the second water-bearing zone as Class 2C (a source that could potentially supply drinking water in sufficient quantity for a domestic water supply, but since it has a total dissolved solids concentration between 1,000 mg/l and 10,000 mg/l, it is not of sufficient drinking water quality, and the third water-bearing zone as Class 1B (a source that could potentially or currently does supply drinking water to a domestic water supply and has less than 1,000 mg/l total dissolved solids).

OIG Response 28

The OIG is aware that the first water-bearing zone (Class 3B) is not intended to supply drinking water, and as such, human ingestion of groundwater from the first water-bearing zone is not an anticipated exposure pathway. However, groundwater from the contaminated first water-bearing zone discharges to the surface water of the nearby Selsers Creek and tributaries. EPA has not explored the impacts of this discharge, which may potentially re-contaminate the underlying sediment, and result in potential human and ecological exposure of metal contaminants. The OIG does not believe EPA can make a statement of protectiveness, either in the short-term or long-term, without further analysis on the risks posed by the migration of metals.

Based on these uses, site exposures were evaluated through a human health risk assessment and an ecological risk assessment. According to the Human Health Risk Assessment, unacceptable risks related to lead exposure were found to exist for the child resident and the industrial worker. Exposure to lead presented a potential for adverse health effects in children currently living near the Site and any children living on or near the site in the future and presented a potential for adverse health effects in the developing fetus of an adult woman. All other noncancer and cancer risks for the resident child related to exposure to offsite soil and for the industrial worker related to exposure to onsite soil were below the benchmark of 1 and were within or below the acceptable cancer risk range for Superfund sites (1E-04 to 1E-06), respectively. In addition, the Human Health Risk Assessment evaluated the trespasser/visitor scenario for an adult and child exposed to surface water and sediment in Selsers Creek. The

noncancer risks were below the benchmark of 1 and the cancer risks were within or below the acceptable risk range (1E-04 to 1E-06).

OIG Response 29

The OIG is not focusing on potential contaminant exposure from soil. Therefore, we are not addressing the cancer and non-cancer soil exposure risks for the off-site resident child or the on-site industrial worker. However, because metal contaminants in the groundwater are not controlled and the contaminated groundwater discharges to surface water, there may be risks associated with surface water exposure to trespassers and visitors.

Trespassers and visitors are defined in the Human Health Risk Assessment as any adult or child with limited exposure, whether that exposure is through hunting, fishing, hiking, or swimming in areas surrounding the site. During the remedial investigation, lead was found in the surface water and sediments in tributaries to Selsers Creek off-site at concentrations a couple of orders of magnitude greater than the ecological clean-up levels specified in the ROD. The reason for lead not being identified as non-cancer or cancer risks in the Human Health Risk Assessment was because toxicity values were not available for lead for the calculations to be performed. Instead, lead risk was calculated in the models for soil only. As a result, EPA never characterized the risk of lead for surface water and sediment exposure.

Region 6 has not recognized all contaminant exposure pathways, particularly human and ecological exposure to the surface water and sediments. As a result, EPA has not fully evaluated the effectiveness of the remedy to conclude that the remedy is protective of human health and the environment.

According to the ecological risk assessment, risks were evaluated for site soil, sediment and surface water. Risks related to exposure for all three media were found to exist, and the primary contaminants were identified as lead and cadmium. As presented in the ROD and supported by the risk assessments, lead has been identified as the most abundant and widespread contaminant based on concentration and associated risks for both human health and the environment. This contaminant of concern was also identified as being co-located with other metals. Therefore, addressing source material and lead concentrations in the soil and sediment will also address other detected metals.

OIG Response 30

The Ecological Risk Assessment assumes that sediment and surface water contamination will resolve itself once the source of the contamination (i.e., groundwater) has been controlled. The ROD assumes that (1) groundwater contamination would be controlled when soil clean-up levels are achieved, and (2) the clean-up of lead will address the other metal contaminants. As demonstrated in our report, both of the ROD's assumptions have been proven incorrect by EPA, LDEQ, and OIG data. Migration of metals in groundwater has not been controlled. Therefore, concentrations of lead and other metals may exceed ecological standards. Continued contamination may be adversely affecting benthic invertebrates, fish, and amphibians. The OIG believes that EPA cannot make its statement of protectiveness until it assesses whether the current discharge of metals to surface water poses an acceptable level of risk to the environment.

In order to be protective, remedial action objectives and cleanup levels were set for the soil, sediment, and ground water to address the human health (industrial onsite and residential offsite) and ecological risks (sediment and surface water). During remedial action, soil and sediment exceeding the cleanup levels were excavated and disposed offsite. This removed the risks associated with the soil to an acceptable level for industrial use onsite and residential use offsite. This also removed the ecological risks associated with the sediments to an acceptable level and removed the source of contamination for the surface water.

OIG Response 31

The ROD states, "... in order to achieve these RAOs, certain numerical cleanup levels would have to be maintained or attained in the various environmental media.… It is expected that when the soil cleanup levels are achieved, the other forms of cleanup measurements (such as Sediment: Ecological: 100 mg/kg lead; Ground Water: Residential: 15 ug/l lead; and, Surface Water: Ecological: 0.6 ug/l lead) will also be achieved. Therefore, the measurement of success at accomplishing the RAOs will be based on the media-specific numerical cleanup goals to be achieved in the various designated areas of soil contamination." As discussed in the report, post-remedial action data from EPA, LDEQ, and OIG has shown that migration of metals in groundwater has not been controlled even though the contaminated soil has been removed. Therefore, the ROD assumption that the clean-up of contaminated soil will resolve the other contaminated media is incorrect. Because groundwater contamination is not controlled, the ecological risks associated with the contaminated sediments and surface water cannot be assumed to have been alleviated to acceptable levels. The OIG recognizes the considerable efforts by EPA in removing and treating the contaminated soil during remedial action. However, the measurement of remedy success cannot be based on achieving the soil clean-up goals alone. EPA needs to ensure that numerical clean-up levels have been maintained in sediment, groundwater, surface water, and soil prior to concluding that the remedy is protective, either in the short-term or long-term.

The first two identified water-bearing zones (Class 3B and 2C) were identified as non-drinking water sources and no current use was identified. Therefore, permeable treatment walls were installed in the first water-bearing zone to aid in the overall immobilization treatment process of the contaminated soils in order to prevent any migration of lead contaminants to the usable third water-bearing zone/Shallow Aquifer (Class 1B). For continued protection of the permeable

reactive walls and from ground water exposure, an institutional control was placed on the property to restrict land use and ground water use.

OIG Response 32

The OIG is not addressing the second or third water-bearing zones in this report, nor is it questioning the adequacy of the institutional controls. The intended purpose of the PRB, as stated in the ROD, is "to neutralize the acidity of the shallow ground water and limit the migration of dissolved metals," whether it is to the potable third water-bearing zone or to the surface water nearby. The installation of the PRB serves to meet the RAO to "minimize or eliminate contaminant migration to the ground water and surface waters to levels that ensure beneficial reuse of these resources."

An additional item of concern includes the one surface water sample taken from the drainage ditch southwest of the site. During the site visit, three surface water samples were collected by the IG, two of which are located within Selsers Creek and one from a drainage ditch that runs along the western boundary, on the adjacent property, eventually discharging into Selters Creek. A single sampling event must be used in conjunction with other Site data and should be based on sound scientific data collected from multiple samples under a site-specific plan and evaluated relative to site-specific circumstances over a specified period of time to assist in the understanding the site. These data should also be collected in accordance with an established Quality Assurance Project Plan (QAPP) to address the site-specific data quality objectives. As no QAPP or Data Quality Objectives were approved for review, the validity of the surface water data cannot be determined.

OIG Response 33

See OIG Response 11 to address comment on the QAPP and DQOs. LDEQ had collected groundwater data over multiple sampling events in accordance with the QAPP. These data were available to Region 6 for its Five-Year Review. As demonstrated in our report, Region 6's data raises questions regarding the effectiveness of the remedy in minimizing contaminated groundwater discharge to Selsers Creek and its tributaries. In addition, our surface water samples were not taken to satisfy Region 6's responsibility to confirm that the RAOs have been met. Our surface water samples support our analysis of historic data.

We note that you collected ground water in the vicinity of the surface water sample location near the west end of the PRB and that you concluded that ground water discharges may be affecting the tributary at the west end of the PRB. You cited the result of the surface water sample as having a lead concentration of 530 µg/l and the shallow ground water sample as having a lead concentration less than 5 µg/l. These data suggests that ground water discharging into the tributary is not likely having a significant impact on surface water quality in this area of the site. As noted above, under Bullet 1, the Five Year Review noted the ground water concentrations as they relate to the surface water criteria needs additional review.
Based on these actions, the site was determined to be protective in the short-term:

1. All principal threat wastes, soil, and sediment exceeding the cleanup levels have been excavated, treated and disposed offsite. All soil and sediment cleanup levels have been met and the site is available for industrial use. No residential development was identified on the site, and portions of the site are being used for industrial use only. No unacceptable risks were identified.

2. The PRB has been installed in the first-water bearing zone and data gathered by EPA/ORD show the PRB is functioning as intended by neutralizing the ground water and reducing metals concentrations. Therefore, the removal of the source material and the PRB are minimizing contaminant migration to the surface water.

3. Ground water data, though not robust enough for definitive conclusions regarding the PRB influence on upgradient verses downgradient concentrations, were significant enough to allow for statistical evaluations within individual wells. Many wells show significant decreasing trends for metals evaluated while others show increasing trends. For many, no significant trend was identified. Although concentrations appear to be 'stable', this water bearing zone is not a drinking water zone, and there are no receptors exposed to concentrations in the ground water. Ground water flow in the first-water bearing zone continues to flow towards and through the PRB.

4. Current ground water data do not indicate that the third-water bearing zone exceeds drinking water criteria; therefore, the removal of the source material and the PRB are minimizing contaminant migration to the ground water.

OIG Response 34

The OIG currently does not anticipate contamination of the third-water bearing zone, nor does it anticipate an adverse direct human exposure to groundwater. However, as demonstrated in this report and the OIG responses, removal of large amounts of source material (i.e., contaminated soil) and the installation of the PRB have not controlled metal migration in the shallow groundwater.

5. The source of contamination for the ground water and surface water has been removed.

6. Institutional Controls have been placed on the property to restrict land use to industrial, prohibit activities that could affect long-term monitoring, and prohibit the use of the first-and second-water bearing zones.

7. O&M activities and ground water monitoring is conducted quarterly by LDEQ to ensure the IC are enforced, and site activities are restricted.

8. The assumptions used to evaluate the site and human and ecological risks were unchanged during the time of the Five-Year Review.

Appendix E

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