

FIFTH FIVE-YEAR REVIEW REPORT FOR
E. I. DU PONT DE NEMOURS & CO., INC., COUNTY ROAD X-23
SUPERFUND SITE
LEE COUNTY, IOWA



Prepared by

U.S. Environmental Protection Agency
Region 7
LENEXA, KANSAS

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Date

The following Table of Contents shows typical major divisions and subheadings for Five-Year Review reports. Subheadings may be included as needed.

- Note: If you choose to work from this document & keep the headings the same, the table of contents & page numbers have already been formatted. As a result, you may simply click on the Table of Contents & then click “Update Table” to update the page numbers in the Table of Contents for your FYR.
- If you decide to include optional appendices, please make sure to incorporate them in this Table of Contents as well.

Table of Contents

| | |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|
| LIST OF ABBREVIATIONS & ACRONYMS | 2 |
| I. INTRODUCTION | 3 |
| FIVE-YEAR REVIEW SUMMARY FORM | 4 |
| II. RESPONSE ACTION SUMMARY | 4 |
| Basis for Taking Action | 4 |
| Response Actions | 5 |
| Status of Implementation | 6 |
| IC Summary Table | Error! Bookmark not defined. |
| Systems Operations/Operation & Maintenance | Error! Bookmark not defined. |
| III. PROGRESS SINCE THE LAST REVIEW | 7 |
| IV. FIVE-YEAR REVIEW PROCESS | 7 |
| Community Notification, Involvement & Site Interviews | 7 |
| Data Review | 7 |
| Site Inspection | 8 |
| V. TECHNICAL ASSESSMENT | 8 |
| QUESTION A: Is the remedy functioning as intended by the decision documents? | 8 |
| QUESTION B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives (RAOs) used at the time of the remedy selection still valid? | 9 |
| QUESTION C: Has any other information come to light that could call into question the protectiveness of the remedy? | 12 |
| VI. ISSUES/RECOMMENDATIONS | 12 |
| OTHER FINDINGS | Error! Bookmark not defined. |
| VII. PROTECTIVENESS STATEMENT | 13 |
| VIII. NEXT REVIEW | 13 |
| APPENDIX A – REFERENCE LIST | 27 |

LIST OF ABBREVIATIONS & ACRONYMS

| | |
|----------|---------------------------------------------|
| bgs | Below ground surface |
| CFR | Code of Federal Regulations |
| Eco-SSLs | Ecological Soil Screening Levels |
| EPA | U.S. Environmental Protection Agency |
| IEUBK | Integrated Exposure Uptake Biokinetic model |
| MCL | Maximum Contaminant Level |
| mg/kg | Milligrams per kilogram |
| NPL | National Priorities List |
| OU | Operable unit |
| RAO | Remedial action objective |
| ROD | Record of Decision |
| RSL | Regional Screening Level |
| VOCs | Volatile organic compounds |
| µg/dL | Microgram per deciliter |
| µg/L | Microgram per liter |

I. INTRODUCTION

The purpose of a five-year review is to evaluate the implementation and performance of a remedy in order to determine if the remedy is and will continue to be protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in five-year review reports such as this one. In addition, five-year review reports identify issues found during the review, if any, and document recommendations to address them.

The U.S. Environmental Protection Agency (EPA) is preparing this five-year review pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act Section 121, consistent with the National Contingency Plan (40 CFR Section 300.430(f)(4)(ii)), and considering EPA policy.

This is the fifth five-year review for the E. I. DuPont de Nemours & Co., Inc., County Road X-23 Superfund site. The triggering action for this statutory review is the completion date of the previous five-year review. The five-year review has been prepared due to the fact that hazardous substances, pollutants, or contaminants remain at the site above levels that allow for unlimited use and unrestricted exposure.

The site consists of one operable unit (OU), OU01, which will be addressed in this five-year review. The site includes two separate parcels of property identified as the Baier and McCarl subsites.

The E. I. DuPont de Nemours & Co., Inc., County Road X-23 Superfund site Five-Year Review was led by Diana Engeman, Remedial Project Manager with the EPA. Participants included Dan Nicoski, EPA hydrogeologist; Todd Phillips, EPA human health risk assessor; Catherine Wooster-Brown, EPA ecological risk assessor; Pamela Houston, EPA community engagement specialist; David Hoefer, EPA attorney and Matt Culp, Iowa Department of Natural Resources. Jacob Larsen, the Remediation Project Director with DuPont, was notified of the initiation of the five-year review. The review began on June 27, 2016.

Site Background

Between April 1949 and November 1953, wastes generated at DuPont's paint manufacturing facility in Fort Madison, Iowa, were disposed of at the Baier and McCarl subsites. Limited information is available about the volume of waste that was generated but it was estimated that between 48,000 and 72,000 55-gallon drums of waste were disposed at the two subsites. In addition to drummed wastes, paint waste was placed in trenches and burned. An estimate of the volume of material burned indicated that between 4,500 and 7,000 tons of ash was present at the subsites. The Baier subsite was the primary disposal area; however, during inclement weather, when the Baier subsite was inaccessible, wastes were disposed at the McCarl subsite.

The site is located in rural Lee County, Iowa, approximately 3.5 miles south of the town of West Point. The two subsites are located about three-fourths of a mile apart, in Township 68 North and Range 5 West. The Baier subsite is located in the southwest quarter of Section 28, and the McCarl subsite is located in the southwest quarter of Section 22 (see Figure 1). The Baier subsite encompasses approximately 13 acres of which 3.5 acres are where the treated soil is located. The subsite is accessible by an easement through another property owner's farm ground that is off of County Road X-23. The McCarl subsite encompasses approximately 1.25 acres located in a largely undeveloped, wooded area.

Land use in the vicinity of the subsites was, and continues to be, agricultural with some scattered residences. The Baier subsite is surrounded by farm fields, pastures and forests. There are no residences near the Baier subsite. There is one residence on the property adjacent to the McCarl subsite. Land use in the vicinity of the subsites is not anticipated to change substantially in the future. DuPont owns the properties that comprise both subsites.

According to the 2016 Groundwater Sampling Report, the depth to water at the Baier subsite in the shallow water-bearing zone was approximately 25 to 49 feet below ground surface (bgs). A deeper groundwater zone is found at approximately 77 to 115 feet bgs. The upper and lower water-bearing zones are separated by a confining unit composed of unweathered glacial till. The shallow water-bearing unit does not provide enough water to serve as a source of drinking water. Monitoring wells at the McCarl subsite have been abandoned.

FIVE-YEAR REVIEW SUMMARY FORM

| SITE IDENTIFICATION | | |
|------------------------------------------------------------------------|----------------------------------------------------|-----------------------------|
| Site Name: E. I. Du Pont de Nemours & Co., Inc. (County Road X-23) | | |
| EPA ID: IAD980685804 | | |
| Region: 7 | State: IA | City/County: West Point/Lee |
| SITE STATUS | | |
| NPL Status: Deleted | | |
| Multiple OUs? No | Has the site achieved construction completion? Yes | |
| REVIEW STATUS | | |
| Lead agency: EPA | | |
| Author name (Federal or State Project Manager): Diana Engeman | | |
| Author affiliation: EPA-Region 7 | | |
| Review period: 6/27/2016 - Click here to enter a date | | |
| Date of site inspection: 3/6/2017 | | |
| Type of review: Statutory | | |
| Review number: 5 | | |
| Triggering action date: 6/26/2012 | | |
| Due date (<i>five years after triggering action date</i>): 6/26/2017 | | |

II. RESPONSE ACTION SUMMARY

Basis for Taking Action

A Baseline Risk Assessment to evaluate human health risks and an Ecological Risk Assessment were prepared and included as Appendices H and I, respectively, to the final Remedial Investigation Report.

The Baseline Risk Assessment evaluated the current exposure scenarios. A Supplemental Risk Assessment Report was prepared by the EPA to evaluate the potential future residential risks. It was determined that exposure to soil at both subsites presented significant human health risks associated with a future land use scenario involving residential exposures. Increased health risks were found to be due to the noncarcinogenic effects of exposure to cadmium, chromium, selenium and lead in soil. It was also determined in the Baseline Risk Assessment that no exposure to contaminated groundwater would occur due to the low groundwater yield from the contaminated shallow zone.

The contaminants of concern identified in soil at the Baier and McCarl subsites were:

| <u>Inorganic Contaminants</u> | <u>Volatile Organic Contaminants</u> | <u>Semi-volatile Contaminants</u> |
|-------------------------------|--------------------------------------|-----------------------------------|
| Arsenic | Ethylbenzene | Bis(2-ethylhexyl)phthalate |
| Barium* | 4-methyl-2-pentanone | 2-methyl naphthalene |
| Cadmium | Toluene | Naphthalene |
| Chromium | 1,1,1-trichloroethane** | |
| Copper* | Xylenes | |
| Lead | | |
| Manganese* | | |
| Selenium | | |
| Zinc | | |

* Contaminant found at the McCarl subsite only.
** Contaminant found at the Baier subsite only.

Response Actions

The EPA conducted investigations at the subsites from 1983 through 1986, during which volatile organic compounds (VOCs) and metals contamination were identified in soil and groundwater. The site was proposed for inclusion on the National Priorities List (NPL) in June 1988 and the listing became final in August 1990. Appendix A is a Chronology of Site Events.

In January 1991, DuPont completed Remedial Investigation and Feasibility Study Reports for the site. The Record of Decision (ROD) was signed on May 28, 1991. The following remedial action objectives (RAOs) were developed:

- Prevent or minimize the potential for human exposure to contaminated soil and groundwater so that health-based allowable exposure limits are not exceeded; and
- Prevent or minimize the potential for future off-site migration of contaminants.

The selected remedy for soil was stabilization and solidification of all soil contaminated above risk-based levels into a solid monolith such that contaminants of concern would be unable to leach into the groundwater. All surface waste materials not amenable to the selected technology, such as scrap metal, grinding balls, filters or drums, were removed and disposed at an off-site hazardous waste landfill prior to treatment of the soil. Following treatment, the treated soil was covered with a soil cap to protect the treated material and prevent direct contact with human or ecological receptors. The protective cover was required to be graded and planted with vegetation to reduce erosion. Covenants imposing restrictions on the future use of the site were implemented to ensure the integrity of the protective cover and underlying solidified soil mass and to prevent exposure to the treated soil.

The selected remedy for groundwater was “no action.” Groundwater monitoring was required for a minimum of five years.

An Explanation of Significant Difference was signed by the EPA on May 11, 1992. It modified the treatment technology as described in the ROD so that stabilization/solidification of contaminated soil could be conducted on-site and above ground instead of in situ. Contaminated soil from the McCarl and Baier subsites was consolidated at the Baier subsite, then mixed with stabilizing/solidifying reagents. The resulting monolith was then covered with impermeable clay, clean topsoil and a vegetative cover at the Baier subsite.

Soil cleanup levels established in the ROD were 350 milligrams per kilogram (mg/kg) for lead; 150 mg/kg for chromium; 10 mg/kg for selenium; and 20 mg/kg for cadmium. Cleanup levels for groundwater were not established in the ROD but groundwater samples have been compared to Maximum Contaminant Levels (MCLs) established in the Safe Drinking Water Act. MCLs set forth the permissible levels of contaminants in water that is delivered to any user of a public water system.

Status of Implementation

A total of 2,408 cubic yards of contaminated soil was excavated from the McCarl subsite and transported to the Baier subsite, where it was stockpiled within the area of contamination until it was treated. The McCarl subsite was then backfilled with clean soil and covered with six inches of topsoil. The site was graded, fertilized and seeded.

Excavation at the Baier subsite began with the construction of a disposal trench. Once completed, contaminated soil from the trench location and the McCarl subsite was placed in the trench. A total volume of 6,795 cubic yards of contaminated soil was excavated from the Baier subsite and placed in the trench.

Stabilization of the excavated soil was achieved by mixing the contaminated soil with water and approximately 20 percent Type 1 Portland cement within the disposal trench. After chemical and physical performance testing of the stabilized material, a three-foot thick layer of compacted clay followed by a one-foot thick layer of topsoil was placed over the treated material. After placement of the topsoil, the disposal trench area was graded, fertilized and seeded. Figure 2 shows a diagram of the Baier subsite with the locations of the remediation trench, extent of the cap and monitoring wells as indicated. Figure 3 is an areal view of the Baier subsite.

One year of quarterly groundwater sampling at the Baier subsite began in September 1993 and was then conducted annually through September 1996. Since the first five-year review in 1997, groundwater monitoring was conducted biennially and sampling for VOCs was discontinued. During the second five-year review, it was determined that it was no longer necessary to continue groundwater monitoring at the McCarl subsite since contaminated soil was removed from the subsite. In December 2011, groundwater at the Baier subsite was sampled for VOCs to confirm that the soil remediation continued to prevent those contaminants from leaching to groundwater. VOCs were not detected in any of the samples collected.

DuPont continues to conduct inspections of the Baier subsite semiannually. Any deficiencies in the condition of the monitoring wells, the cap and vegetation, and the site fencing are addressed. DuPont also inspects the McCarl subsite, although this is no longer required by the EPA.

On September 20, 2007, DuPont recorded an Environmental Covenant with the Lee County, Iowa Recorder of Deeds which superseded the prior Declaration of Covenants and Restrictions. This

Environmental Covenant prohibits residential, recreational or food chain agricultural uses of the property and the installation of water wells. It includes a requirement that the property be fenced. The Environmental Covenant also includes a requirement that DuPont submit verification to the EPA annually that the activity and use limitations remain in place and were complied with during the preceding year. This notice has been submitted each year since imposition of the Environmental Covenant, most recently in a letter dated January 16, 2017.

Through the filing of this Environmental Covenant, the restrictions on the property known as the McCarl subsite were released. It was determined in 2007 that these restrictions were no longer needed since contaminated soil and monitoring wells no longer exist on this property.

III. PROGRESS SINCE THE LAST REVIEW

There were no issues identified or recommendations made in the last five-year review and the sitewide protectiveness statement was as follows:

The remedy at the E.I. du Pont de Nemours & Co., Inc. County Road X-23 site is protective of human health and the environment.

IV. FIVE-YEAR REVIEW PROCESS

Community Notification and Involvement

A public notice was made available by a display ad in The Daily Democrat newspaper on August 19, 2016, and The Hawk Eye newspaper on August 21, 2016, stating that the EPA was conducting a five-year review and inviting the public to submit any comments to the EPA. There were no comments received. The results of the review and the report will be made available to the public.

Data Review

Site Inspection Reports were reviewed for site visits conducted each fall and spring since the last five-year review. These inspections were performed by the environmental staff from the DuPont Plant in Fort Madison. On each occasion, both the Baier and McCarl subsites were visually inspected regarding the condition of the soil caps and vegetative covers; development of areas of erosion; development of natural drainage channels; and the condition of monitoring wells, roadways to the subsite, and site fences and gates. There were only minor issues with fencing noted and they were immediately repaired. The EPA did not require inspection of the McCarl property during the past five years since all of the wastes and the monitoring wells have been removed from the property and there are no longer any use restrictions, but DuPont prefers to continue these inspections of this property. Appendix B is a list of documents reviewed during the five-year review.

Since the fourth five-year review, groundwater monitoring of the shallow and deeper water-bearing zones of the Baier subsite was conducted in October 2013 and September 2016. During each of the sampling events, water level measurements were taken in the monitoring wells to determine the direction of groundwater flow in both water-bearing zones. During the past five years groundwater in the shallow water-bearing zone flowed to the southwest and in the deep water-bearing zone, groundwater flowed to the south/southwest. These flow directions are consistent with historical data for both zones. Table 1 contains water levels in monitoring wells at the Baier subsite.

Although cleanup levels were not established for groundwater in the ROD since the exposure pathway for groundwater was determined to be incomplete, groundwater monitoring results have been compared to MCLs, as discussed previously. Table 2 contains groundwater monitoring results for the shallow wells at the Baier subsite. Table 3 contains groundwater monitoring results for the deep wells at the Baier subsite.

Selenium was the only contaminant of concern which exceeded the MCL during the past five years. The MCL for selenium is 50 micrograms per liter ($\mu\text{g/L}$). In the shallow water-bearing zone at the Baier subsite, selenium was found at levels exceeding the MCL at monitoring well BRA-1S (94.4 $\mu\text{g/L}$ in 2013 and 147 $\mu\text{g/L}$ in 2016) and in the deeper water-bearing zone at monitoring well BRA-2D (62.5 $\mu\text{g/L}$ in 2013). The concentrations of selenium in BRA-1S are consistent with what has been detected in this well in the past. Based on the direction of groundwater flow in this zone at the Baier subsite, this well is upgradient of the area of contamination so it is unlikely that the selenium would be coming from site wastes. The detection of selenium in BRA-2D is the first time this contaminant has been detected in the deep water-bearing zone at the Baier subsite at a level that exceeds the MCL. Based on the current and historical direction of groundwater flow in the deeper zone, this well is upgradient of the area of contamination. During the remedial investigation no connection between the two water-bearing zones was found to exist.

Site Inspection

The inspection of the site was conducted on March 6, 2017. In attendance were Diana Engeman, EPA Remedial Project Manager and Ramiro (Pep) Hernandez, Environmental Health and Safety Manager at the DuPont Fort Madison Plant. The purpose of the inspection was to assess the protectiveness of the remedy. Appendix C contains the Site Inspection Form.

There was nothing found at the Baier subsite that would appear to adversely impact current or future protectiveness of the remedy. The gate was locked and fencing appeared to be in good condition. The cap appeared to be in excellent condition with well established vegetation. Monitoring wells were in good condition with locked caps. It did appear that frost heave of the surface pads at wells BRA-3S and BRA-3D may have occurred. Mr. Hernandez had performed the most recent inspection of the site and said that this condition was not observed at that time. This should be investigated more thoroughly by DuPont staff and repaired, if needed.

The McCarl subsite no longer has any monitoring wells or covenants on the property. This subsite appears to be substantially the same as it was five years ago.

There were no changes in land use in the vicinity of either of the subsites and it does not appear that the situation is likely to change in the foreseeable future. Both subsites are in rural areas accessible only by gravel roads.

V. TECHNICAL ASSESSMENT

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

Question A Summary:

The selected remedy in the ROD included disposal of debris; excavation and solidification/stabilization of contaminated soil that exceeded cleanup levels; construction of a vegetated soil cover; groundwater monitoring; and implementation of institutional controls. Excavation, stabilization/solidification and

capping of contaminated soil has achieved the remedial action objectives of preventing or minimizing the potential for exposure to contaminated soil and groundwater and the potential for future off-site migration of contaminants. The effective implementation of an Environmental Covenant also prevents or minimizes exposure to contaminated soil and groundwater.

The relative stability of the groundwater monitoring results at the Baier subsite, throughout the implementation of the remedy, support the conclusion that the solidified/stabilized soil, covered with the clay cap, is stable. All of the contaminated soil from the McCarl subsite was excavated, treated and disposed of at the Baier subsite.

The Environmental Covenant that is in place on the Baier subsite prohibits residential, recreational or food chain agricultural uses of the property and the installation of water wells. It includes a requirement that the property be fenced. There were no activities observed that violate these requirements. At the time of the EPA's inspection of the Baier subsite, the capped area as well as the area surrounding it was undisturbed with a thick cover of vegetation, and no new uses of groundwater were observed. The Baier subsite remains fenced and secure. The Environmental Covenant includes a requirement that DuPont verify annually that the activity and use limitations continue in place and were complied with during the preceding year, which has been done annually.

QUESTION B: Are the exposure assumptions, toxicity data, cleanup levels, and RAOs used at the time of the remedy selection still valid?

Question B Summary:

The RAOs in the ROD remain valid. There have been numerous changes to toxicity values and human health risk assessment methodology since the ROD but none of these changes have adversely affected the protectiveness of the remedy. Although RAOs and cleanup levels to specifically address ecological receptors were not selected in the ROD, the remedy remains protective of these potential receptors. The vapor intrusion pathway does not appear to be a potential pathway of concern for this site.

Changes in Standards and To Be Considered

In the ROD, cleanup levels were established for soil, as it was determined in the Baseline Risk Assessment that no exposure to contaminated groundwater would occur due to the low groundwater yield from the contaminated zone. However, groundwater is monitored as a means to ensure that the stabilized/solidified soil is not releasing contaminants into the groundwater.

The chemical-specific soil cleanup levels established in the ROD were 350 mg/kg for lead; 150 mg/kg for chromium; 10 mg/kg for selenium; and 20 mg/kg for cadmium. Contaminated soil exceeding these levels at both subsites was excavated, treated and then capped at the Baier subsite. For contaminants except lead, the soil cleanup levels were compared to the most recent EPA Regional Screening Levels (RSLs) for residential soil, as the RSLs generally are derived using the latest toxicity values (<https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables-may-2016>). Currently, the RSLs are higher for selenium (390 mg/kg) and cadmium (71 mg/kg) than the soil cleanup values for this site, assuming residential use of the site. Chromium is present in two valence states: the less toxic trivalent chromium (Cr^{+3}) and the significantly more toxic hexavalent chromium (Cr^{+6}). The chromium associated with this site was predominantly present as lead chromate which is most likely comprised of Cr^{+6} . During preparation of the Baseline Risk Assessment for this site it was assumed that all of the chromium associated with the site was Cr^{+6} . Evaluations of the toxicity of Cr^{+6} continue but the most recent

toxological values used in developing the RSLs for Cr^{+6} result in a residential soil screening level of 0.30 mg/kg at the 1×10^{-6} cancer risk level, which is significantly lower than the cleanup level of 150 mg/kg in the ROD.

Contaminated soil was removed from the McCarl subsite and transported to the Baier subsite. Confirmation samples of the residual soil at the McCarl subsite were collected and they did not exceed the soil cleanup levels for selenium or cadmium. The residual levels of total chromium at the McCarl subsite ranged from a high of 13.06 mg/kg to below detection limits. Confirmation samples were also collected from the areas that were excavated at the Baier subsite. The two highest levels of residual total chromium at the Baier subsite were 64 mg/kg and 41.74 mg/kg, with the remaining samples from 28 mg/kg to below detection limits. While these levels of residual total chromium would exceed the most conservative Cr^{+6} screening levels, only two individual sample locations are outside the 1×10^{-4} acceptable carcinogenic risk range. These two elevated levels occur at the Baier subsite where an Environmental Covenant has been placed on the property preventing residential and food chain agricultural use. Therefore, it can be concluded that these two locations with elevated residual chromium do not adversely affect the protectiveness of the remedy.

Based on the December 22, 2016, EPA Office of Land and Emergency Management Directive 9200.2-167, the evaluation of lead has changed from the time the ROD was signed. The EPA's previous risk reduction goal was to limit exposures to soil lead levels such that a typical or hypothetical child or group of similarly exposed children would have an estimated risk of no more than a 5% probability of exceeding a 10 microgram per deciliter ($\mu\text{g}/\text{dL}$) blood lead level. However, the current scientific literature on lead toxicology and epidemiology provides evidence that adverse health effects are associated with blood lead levels less than 10 $\mu\text{g}/\text{dL}$.

Although the cleanup level for lead was based on a 5% probability of exceeding a 10 $\mu\text{g}/\text{dL}$ blood lead level, the remedy remains protective because no exposure to contaminated soil is occurring. The selected remedy for soil was stabilization and solidification of all soil contaminated above risk-based levels into a solid monolith. The treated soil was then covered with an impermeable clay, clean topsoil and a vegetative cover, preventing exposure to the treated soil. In addition, an Environmental Covenant on the Baier subsite prevents residential and food chain agricultural use of the property.

Confirmation sampling results for lead in soil at the McCarl subsite ranged from 17.9 mg/kg to 171 mg/kg, and from 13.3 mg/kg to 382 mg/kg at the Baier subsite. The sample containing 382 mg/kg was the only sample at the Baier subsite that exceeded 200 mg/kg. As a result, calculating a new cleanup level for lead using a lower blood lead level and updated Integrated Exposure Uptake Biokinetic (IEUBK) model input parameters is not necessary because no exposure is occurring and the average concentrations of residual lead at both subsites are well below 200 mg/kg, which would be the approximate residential cleanup level derived using a 5% probability of exceeding a 5 $\mu\text{g}/\text{dL}$ blood lead level and updated IEUBK model input parameters. Therefore, it can be concluded that residual lead does not adversely affect the protectiveness of the remedy.

Exposure assumptions, toxicity data, ecological cleanup levels and RAOs were not selected specifically for ecological receptors at the site. The soil cleanup level for cadmium exceeds the Ecological Soil Screening Levels (Eco-SSLs) for some avian and mammals, however there is a one to three foot cap over these soils and confirmation samples of the topsoil showed

concentrations of 8.0 mg/kg of lead; 11.1 mg/kg of chromium and non-detectable levels of cadmium and selenium. This level of lead in the topsoil is below the lowest EPA Eco-SSL of 11.0 mg/kg of lead in soil for avian receptors. There is no Eco-SSL for total chromium, but there are Eco-SSLs for trivalent chromium. They range from 26 mg/kg for the vermivorous woodcock and 78 mg/kg for the herbivorous dove, to 780 mg/kg for the carnivorous hawk. The highest levels of total chromium from the Baier subsite (64 mg/kg and 41.74 mg/kg) do exceed the trivalent chromium Eco-SSLs for the woodcock. However, trivalent chromium is only a portion of total chromium and is considered an essential dietary nutrient. Naturally occurring chromium levels from 2 to 25,000 mg/kg are found in Iowa native soils. Therefore, the EPA Region 7 ecological risk assessors do not find there is an unacceptable ecological risk to receptors due to metals in topsoil at the Baier site.

Changes in Toxicity and Other Contaminant Characteristics

Numerous toxicity values have changed since completion of the Baseline Risk Assessment and Supplemental Risk Assessment in 1991. Comparisons of the past and current toxicity values are shown in Table 4. However, since completion of the soil remediation activities, no exposure to contaminated soil is occurring.

For groundwater, the Baseline Risk Assessment indicated that no unacceptable exposure to contaminated groundwater would occur due to the low groundwater yield from the contaminated zone. Additionally, the Environmental Covenant prohibits installation of water wells at the Baier subsite.

As discussed previously, evaluations into the toxicity of Cr^{+6} continue but the most recent toxicological values used in the RSLs for Cr^{+6} result in a residential soil screening level of 0.30 mg/kg at the 1×10^{-6} cancer risk level, which is significantly lower than the cleanup level of 150 mg/kg in the ROD. Two confirmation samples taken from the Baier subsite would exceed the 1×10^{-4} carcinogenic risk range. Unacceptable exposures resulting from contamination on that property are further prevented by an Environmental Covenant restricting the property use. In the future the EPA may finalize toxicity factors for chromium.

Ecological toxicity values have also changed over time but they do not have an adverse effect on the protectiveness of this remedy.

Changes in Risk Assessment Methods

Some standardized risk assessment methodologies have changed since the Baseline Risk Assessment and Supplemental Risk Assessment were completed in 1991. Currently, dermal contact with contaminated water while showering and bathing would be quantified, and the EPA has more recent guidance on quantifying exposure for both the dermal and inhalation routes of exposure than those used in 1991. However, these changes do not affect the protectiveness of the remedy as indicated in the discussion on changes to toxicity values.

In 1998 the EPA Final Ecological Risk Assessment Guidance was published. However, it has been determined that the ecological risk assessment that was performed at the site was adequate and the changes do not adversely affect the protectiveness of the remedy.

Changes in Exposure Pathways

Land use has not changed at the site. DuPont owns the properties that comprise both the Baier and McCarl subsites and it is reasonably anticipated that future land use will remain the same. Further, the Baier subsite has an Environmental Covenant placed on the property that restricts uses that may result in unacceptable future exposures.

Expected Progress Towards Meeting RAOs

The RAOs have been met.

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

No.

VI. ISSUES/RECOMMENDATIONS

| Issues/Recommendations |
|--------------------------------------------------------------------------|
| OU(s) without Issues/Recommendations Identified in the Five-Year Review: |
| None |

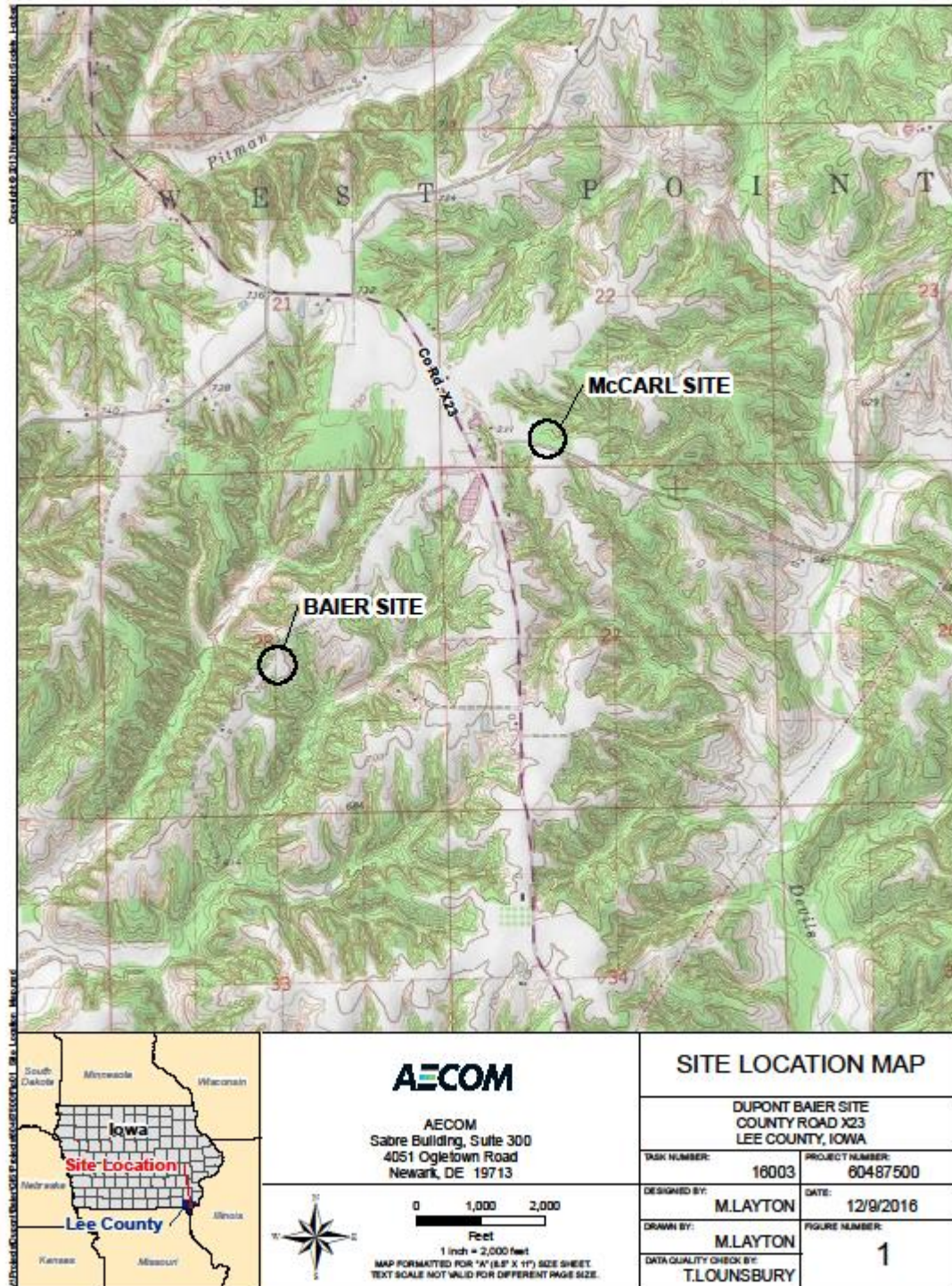
VII. PROTECTIVENESS STATEMENT

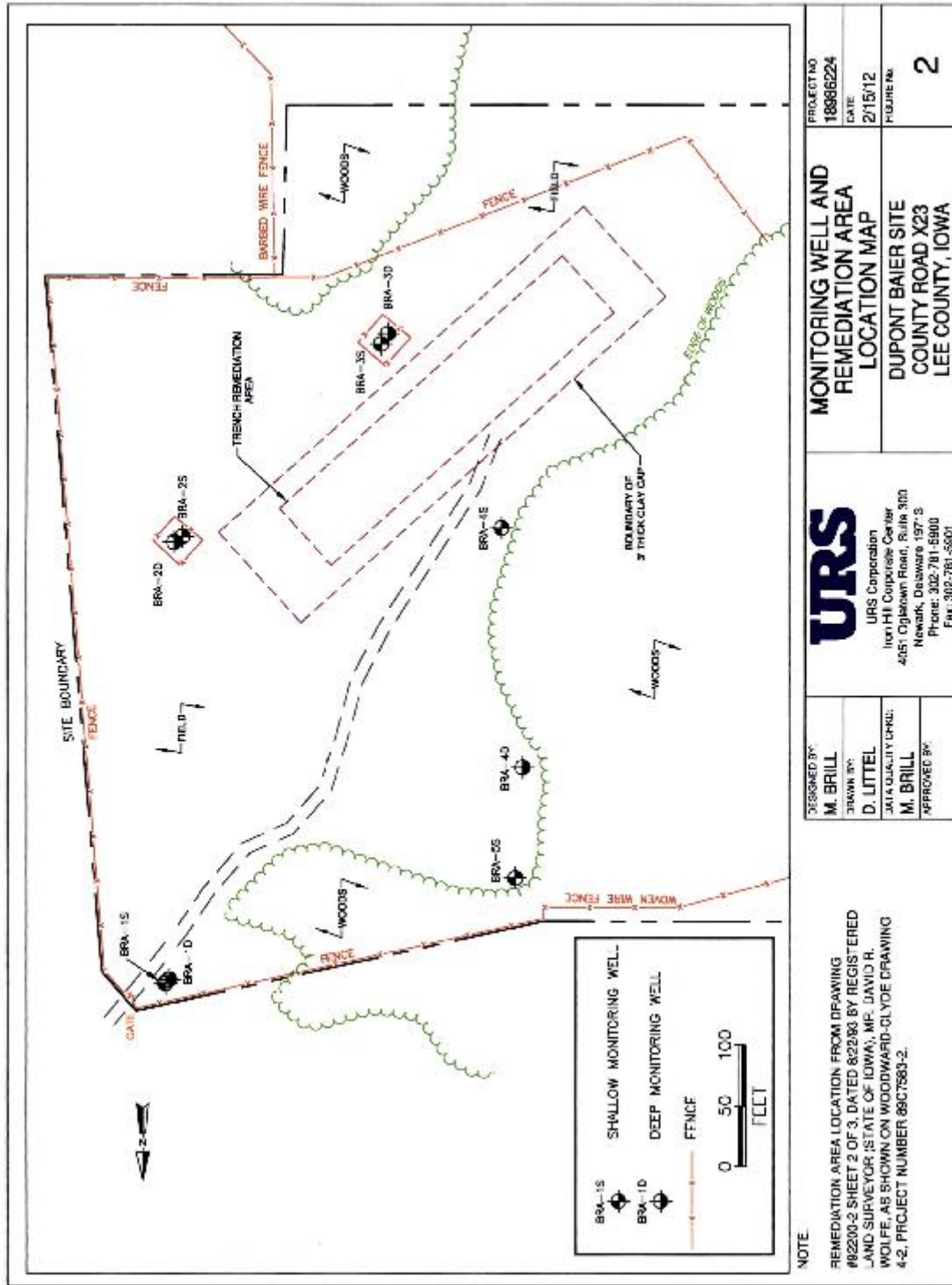
| Sitewide Protectiveness Statement | |
|--------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| <i>Protectiveness Determination:</i> | Protective |
| <i>Protectiveness Statement:</i> | The remedy for the E. I. DuPont de Nemours & Co., Inc., County Road X-23 Superfund Site is protective of human health and the environment. |

VIII. NEXT REVIEW

The next five-year review report for the E. I. DuPont de Nemours & Co., Inc., County Road X-23 Superfund site is required five years from the completion date of this review.

FIGURES

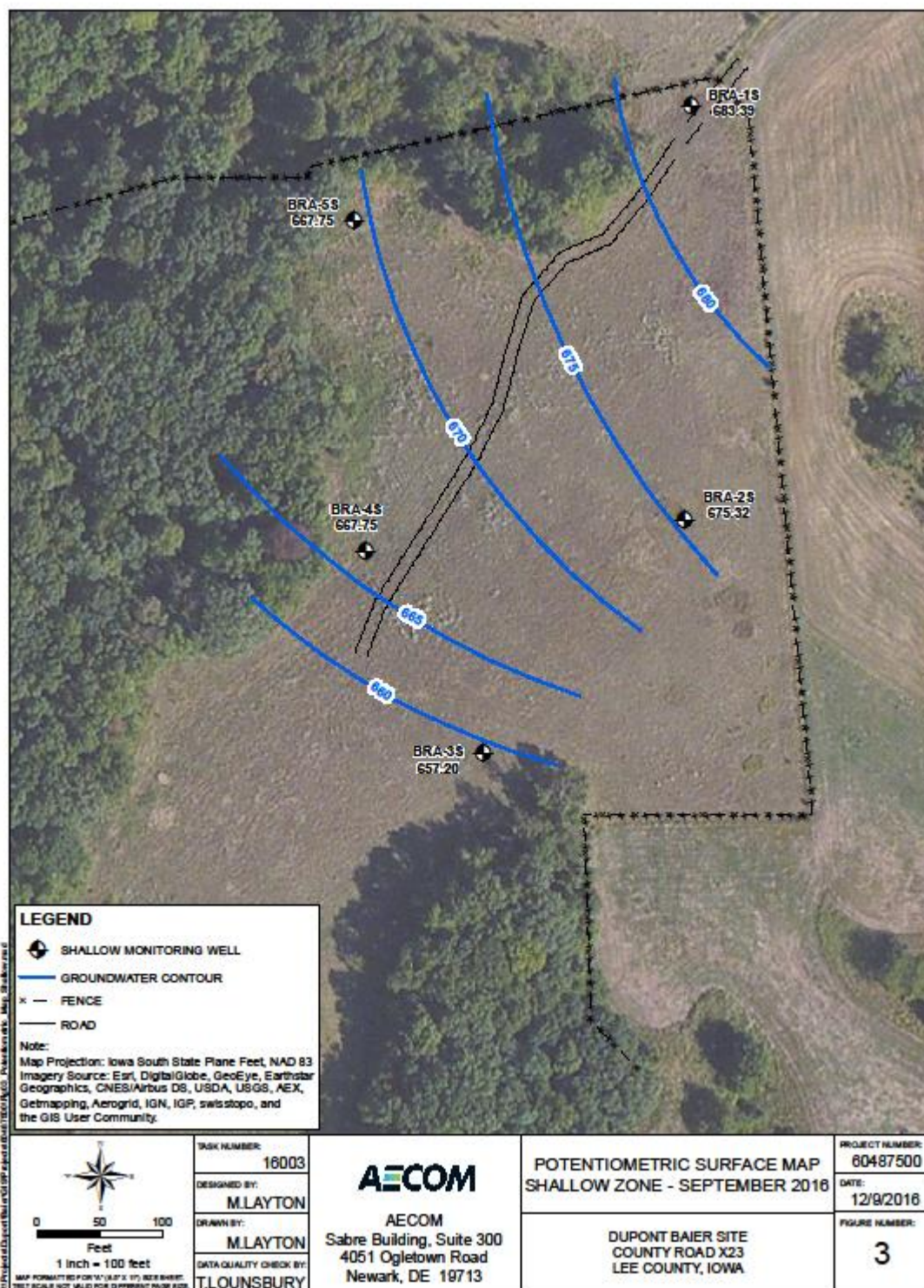




U:\Baier-Mitchell\landfill\CAD\15885967\Figure 2 MW Location Map.dwg, 2/21/2012 2:23:48 PM, DWG To PDF.plt

| | |
|--------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| DESIGNED BY: M. BRILL | PROJECT NO. 18886224 |
| DRAWN BY: D. LITTEL | DATE 2/15/12 |
| QA/QC CHECKED BY: M. BRILL | FIGURE NO. 2 |
| APPROVED BY: | MONITORING WELL AND REMEDATION AREA LOCATION MAP DUPONT BAIER SITE COUNTY ROAD X23 LEE COUNTY, IOWA |

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TABLES

Table 1
Water Levels (1993 to 2016)
Baier Site
County Road X23 Superfund Site
Lee County, Iowa

| DEEP ZONE | | | | | | |
|-----------|--------------------|-------|---------------------|----------------------|--------|--------------------|
| Well | Top of Casing (ft) | Date | Depth to Water (ft) | Water Elevation (ft) | Well | Top of Casing (ft) |
| BRA-3D | 705.85 | 9/93 | 94.75 | 613.15 | BRA-4D | 692.77 |
| | | 12/93 | 94.42 | 613.48 | | |
| | | 3/94 | 94.00 | 613.90 | | |
| | | 6/94 | 94.27 | 613.63 | | |
| | | 9/94 | 94.52 | 613.38 | | |
| | | 9/95 | 93.93 | 613.97 | | |
| | | 9/96 | 93.81 | 614.09 | | |
| | | 9/98 | 93.15 | 614.75 | | |
| | | 9/00 | 92.80 | 615.10 | | |
| | | 7/03 | 93.32 | 614.58 | | |
| | | 9/04 | 93.46 | 614.44 | | |
| | | 9/06 | 93.46 | 614.44 | | |
| | | 9/08 | 93.35 | 614.55 | | |
| | | 9/10 | 92.47 | 615.43 | | |
| | | 10/13 | 92.44 | 615.46 | | |
| | | 9/16 | 92.40 | 615.50 | | |
| BRA-2D | 708.20 | 9/93 | 97.93 | 610.27 | BRA-1D | 707.90 |
| | | 12/93 | 97.72 | 610.48 | | |
| | | 3/94 | 97.53 | 610.67 | | |
| | | 6/94 | 98.24 | 609.96 | | |
| | | 9/94 | 98.35 | 609.86 | | |
| | | 9/95 | 97.76 | 610.44 | | |
| | | 9/96 | 97.80 | 610.40 | | |
| | | 9/98 | 97.33 | 610.87 | | |
| | | 9/00 | 97.39 | 610.81 | | |
| | | 7/03 | 97.34 | 610.86 | | |
| | | 9/04 | 98.02 | 610.18 | | |
| | | 9/06 | 98.23 | 609.97 | | |
| | | 9/08 | 97.88 | 610.32 | | |
| | | 9/10 | 97.08 | 611.12 | | |
| | | 10/13 | 97.29 | 610.91 | | |
| | | 9/16 | 97.19 | 611.01 | | |
| BRA-3D | 705.85 | 9/93 | 114.13 | 591.72 | BRA-4D | 692.77 |
| | | 12/93 | 113.77 | 592.08 | | |
| | | 3/94 | 113.77 | 592.08 | | |
| | | 6/94 | 113.95 | 591.90 | | |
| | | 9/94 | 114.22 | 591.63 | | |
| | | 9/95 | 114.14 | 591.71 | | |
| | | 9/96 | 113.76 | 592.09 | | |
| | | 9/98 | 113.94 | 591.91 | | |
| | | 9/00 | 114.09 | 591.76 | | |
| | | 7/03 | 114.40 | 591.45 | | |
| | | 9/04 | 114.59 | 591.26 | | |
| | | 9/06 | 114.65 | 591.20 | | |
| | | 9/08 | 114.77 | 591.08 | | |
| | | 9/10 | 113.97 | 591.88 | | |
| | | 10/13 | 114.08 | 591.77 | | |
| | | 9/16 | 114.19 | 591.66 | | |
| BRA-2D | 692.77 | 9/93 | 77.10 | 615.67 | BRA-1D | 707.90 |
| | | 12/93 | 76.56 | 616.21 | | |
| | | 3/94 | 76.59 | 616.18 | | |
| | | 6/94 | 76.94 | 615.83 | | |
| | | 9/94 | 76.98 | 615.79 | | |
| | | 9/95 | 76.62 | 616.15 | | |
| | | 9/96 | 76.67 | 616.10 | | |
| | | 9/98 | 76.18 | 616.59 | | |
| | | 9/00 | 76.69 | 616.08 | | |
| | | 7/03 | 77.85 | 614.92 | | |
| | | 9/04 | 77.77 | 615.00 | | |
| | | 9/06 | 78.08 | 614.69 | | |
| | | 9/08 | 77.94 | 614.93 | | |
| | | 9/10 | 76.29 | 616.48 | | |
| | | 10/13 | 77.20 | 615.57 | | |
| | | 9/16 | 76.92 | 615.85 | | |

Table 1
Water Levels (1993 to 2016)
Baier Site
County Road X23 Superfund Site
Lee County, Iowa

| SHALLOW ZONE | | | | | | |
|--------------|--------------------|-------|---------------------|----------------------|--------|--------------------|
| Well | Top of Casing (ft) | Date | Depth to Water (ft) | Water Elevation (ft) | Well | Top of Casing (ft) |
| BRA-3S | 705.61 | 9/93 | 24.66 | 683.00 | BRA-4S | 705.20 |
| | | 12/93 | 25.56 | 682.10 | | |
| | | 3/94 | 25.71 | 681.95 | | |
| | | 6/94 | 25.75 | 681.91 | | |
| | | 9/94 | 27.38 | 680.28 | | |
| | | 9/95 | 25.50 | 682.16 | | |
| | | 9/96 | 26.09 | 681.57 | | |
| | | 9/98 | 23.62 | 684.04 | | |
| | | 9/00 | 27.18 | 680.48 | | |
| | | 7/03 | 27.11 | 680.55 | | |
| | | 9/04 | 27.02 | 680.64 | | |
| | | 9/06 | 28.85 | 678.81 | | |
| | | 9/08 | 25.52 | 682.14 | | |
| | | 9/10 | 19.20 | 688.46 | | |
| | | 10/13 | 24.67 | 682.99 | | |
| | | 9/16 | 24.27 | 683.39 | | |
| BRA-2S | 708.11 | 9/93 | 38.57 | 668.54 | BRA-4S | 705.20 |
| | | 12/93 | 38.97 | 668.14 | | |
| | | 3/94 | 38.19 | 668.92 | | |
| | | 6/94 | 38.22 | 668.89 | | |
| | | 9/94 | 39.62 | 668.49 | | |
| | | 9/95 | 34.48 | 673.63 | | |
| | | 9/96 | 38.68 | 669.43 | | |
| | | 9/98 | 37.72 | 670.39 | | |
| | | 9/00 | 38.32 | 669.79 | | |
| | | 7/03 | 38.36 | 668.75 | | |
| | | 9/04 | 38.34 | 668.77 | | |
| | | 9/06 | 39.00 | 668.11 | | |
| | | 9/08 | 39.92 | 668.19 | | |
| | | 9/10 | 33.02 | 675.09 | | |
| | | 10/13 | 33.05 | 675.06 | | |
| | | 9/16 | 32.79 | 675.32 | | |

Table 1
Water Levels (1993 to 2016)
Baier Site
County Road X23 Superfund Site
Lee County, Iowa

| SHALLOW ZONE (Cont.) | | | | | |
|----------------------|--------------------|-------|---------------------|----------------------|--|
| Well | Top of Casing (ft) | Date | Depth to Water (ft) | Water Elevation (ft) | |
| BRA-5S | 694.59 | 9/93 | 25.65 | 668.94 | |
| | | 12/93 | 25.87 | 668.72 | |
| | | 3/94 | 26.26 | 668.33 | |
| | | 6/94 | 26.20 | 668.39 | |
| | | 9/94 | 28.66 | 665.93 | |
| | | 9/95 | 27.20 | 667.39 | |
| | | 9/96 | 27.80 | 666.79 | |
| | | 9/98 | 26.81 | 667.78 | |
| | | 9/00 | 28.32 | 666.27 | |
| | | 7/03 | 28.58 | 666.01 | |
| | | 9/04 | 27.75 | 666.84 | |
| | | 9/06 | 29.30 | 665.29 | |
| | | 9/08 | 26.44 | 668.15 | |
| | | 9/10 | 21.82 | 672.77 | |
| | | 10/13 | 27.37 | 667.22 | |
| | | 9/16 | 26.84 | 667.75 | |

Table 2

AECOM

Groundwater Concentrations: 1993 to 2016
Shallow Wells
Baier Site
County Road X23 Superfund Site
Lee County, Iowa

| Well | BRA-1S | | | | | | | | | | | | | | | | Screening |
|----------|--------|--------|--------|-------|--------|----------|---------|---------|---------|----------|----------|----------|---------|----------|----------|----------|-----------|
| Date | 09/93 | 12/93 | 03/94 | 06/94 | 09/94 | 09/95 | 09/96 | 09/98 | 09/00 | 07/03 | 09/04 | 09/06 | 09/08 | 09/10 | 10/13 | 09/16 | Criteria |
| SELENIUM | 0.0935 | 0.173 | 0.141 | 0.137 | 0.179 | 0.179 | 0.124 | 0.152 | 0.148 | 0.163 J | 0.156 | 0.149 | 0.148 | 0.155 | 0.0944 | 0.147 | 0.05 |
| THALLIUM | <CRDL | <CRDL | <CRDL | <CRDL | <CRDL | 0.0027 B | <0.0011 | <0.0065 | <0.0035 | <0.0059 | <0.0086 | <0.0079 | <0.0069 | 0.006 B | <0.00015 | <0.00016 | 0.002 |
| Well | BRA-3S | | | | | | | | | | | | | | | | |
| SELENIUM | <CRDL | 0.0279 | 0.0453 | <CRDL | 0.0264 | 0.03 | 0.0139 | 0.0215 | 0.02 | 0.0235 J | 0.0168 J | 0.0082 J | <0.0075 | 0.0231 J | 0.0060J | 0.0141 | 0.05 |
| THALLIUM | <CRDL | <CRDL | <CRDL | <CRDL | <CRDL | <0.0014 | <0.0011 | <0.0065 | <0.0035 | <0.0059 | <0.0086 | <0.0079 | <0.0069 | 0.0064 B | <0.00015 | <0.00016 | 0.002 |
| Well | BRA-4S | | | | | | | | | | | | | | | | |
| SELENIUM | 0.0063 | <CRDL | <CRDL | <CRDL | <CRDL | 0.0016 B | <0.0007 | <0.004 | <0.0038 | 0.0021 J | <0.0034 | <0.0062 | <0.0075 | <0.0024 | 0.00081J | 0.0017J | 0.05 |
| THALLIUM | <CRDL | <CRDL | <CRDL | <CRDL | <CRDL | <0.0014 | <0.0011 | <0.0065 | <0.0035 | <0.0059 | <0.0086 | <0.0079 | <0.0069 | 0.0062 B | <0.00015 | <0.00016 | 0.002 |

All units are mg/L. B: Blank Contamination J: Estimated Concentration (1): Secondary Drinking Water Standard
Shade: Result > MCL CRDL: Contract Required Detection Limit (2): Action Level

Table 3

AECOM

Groundwater Concentrations: 1993 to 2016
[]
Baier Site
County Road X23 Superfund Site
Lee County, Iowa

| Well | BRA-2D | | | | | | | | | | | | | | | | Screening |
|----------|--------|-------|-------|-------|-------|----------|---------|---------|---------|---------|---------|---------|----------|----------|----------|----------|-----------|
| Date | 09/93 | 12/93 | 03/94 | 06/94 | 09/94 | 09/95 | 09/96 | 09/98 | 09/00 | 07/03 | 09/04 | 09/06 | 09/08 | 09/10 | 10/13 | 09/16 | Criteria |
| SELENIUM | <CRDL | <CRDL | <CRDL | <CRDL | <CRDL | <0.00068 | <0.0007 | <0.004 | <0.0038 | <0.002 | <0.0034 | <0.0062 | <0.0075 | <0.0024 | 0.0825 | <0.00044 | 0.05 |
| THALLIUM | <CRDL | <CRDL | <CRDL | <CRDL | <CRDL | 0.0018 B | <0.0011 | <0.0065 | <0.0035 | <0.0059 | <0.0086 | <0.0079 | 0.0076 J | 0.0072 B | <0.00015 | <0.00016 | 0.002 |
| Well | BRA-3D | | | | | | | | | | | | | | | | |
| SELENIUM | <CRDL | <CRDL | <CRDL | <CRDL | <CRDL | <0.00068 | <0.0007 | <0.004 | <0.0038 | <0.002 | <0.0034 | <0.0062 | <0.0075 | <0.0024 | <0.0005 | <0.00044 | 0.05 |
| THALLIUM | <CRDL | <CRDL | <CRDL | <CRDL | <CRDL | <0.0014 | <0.0011 | <0.0065 | <0.0035 | <0.0059 | <0.0086 | <0.0079 | <0.0069 | 0.0064 B | <0.00015 | <0.00016 | 0.002 |

All units are mg/L. B: Blank Contamination J: Estimated Concentration (1): Secondary Drinking Water Standard
 Shade: Result > MCL CRDL: Contract Required Detection Limit (2): Action Level
 Screening Criteria: Federal Maximum Contaminant Levels (MCLs) unless specified

Table 4
Comparison of Past and Current Toxicity Values

| Chemical | 1991 Risk Assessment Toxicity Values | | 2012 Toxicity Values (Fourth Five-Year Review) | | Current Toxicity Values | |
|---------------------|--------------------------------------|---------------------------------|------------------------------------------------|---------------------------------|-------------------------|---------------------------------|
| | SF _o | RfD _o (mg/kg-day) | SF _o | RfD _o (mg/kg-day) | SF _o | RfD _o (mg/kg-day) |
| Arsenic | 1.75 | 1.00e-03 | 1.5 | 3.00e-04 | 1.5 | 3.0e-04 |
| Barium | --- | 5.00e-02 | --- | 2.00e-01 | --- | 2.0e-01 |
| Cadmium | --- | 1.00e-03 | --- | 5.00e-04 | --- | 1.0e-03 |
| Hexavalent Chromium | --- | 5.00e-03 | 5.0e-01 | 3.00e-03 | 5.0e-01 | 3.0e-03 |
| Copper | --- | 1.30e+00 | --- | 4.00e-02 | --- | 4.0e-02 |
| Lead | NA | NA | NA | NA | NA | NA |
| Manganese | --- | 2.00e-01 | --- | 1.40e-01 | --- | 2.4e-02 |
| Selenium | --- | 3.00e-03 | --- | 5.00e-03 | --- | 5.0e-03 |
| Zinc | --- | 2.00e-01 | --- | 3.00e-01 | --- | 3.0e-01 |

SF_o – Oral Slope Factor

RfD_o – Oral Reference Dose

NA – Not Applicable

APPENDICES

APPENDIX A CHRONOLOGY OF SITE EVENTS

| EVENT | Date |
|-------------------------------------------------------------------------|-----------|
| Initial discovery of contamination | 11/1979 |
| Removal actions conducted | 1990-1992 |
| Final listing on National Priorities List | 8/30/1990 |
| Remedial Investigation/Feasibility Study completed | 1/1991 |
| Proposed Plan made available for public comment | 4/1991 |
| Record of Decision signed | 5/28/1991 |
| Consent Decree for Remedial Design/Remedial Action finalized | 4/23/1992 |
| Explanation of Significant Differences signed | 5/11/1992 |
| RD completed and RA construction began | 6/5/1992 |
| Preliminary Close-Out Report signed | 9/29/1993 |
| Final Close-Out Report signed | 8/1/1994 |
| Site deleted from the NPL | 9/25/1995 |
| First five-year review signed | 6/19/1997 |
| Second five-year review signed | 8/16/2002 |
| Third five-year review signed | 8/15/2007 |
| Environmental Covenant Recorded with Lee County, Iowa Recorder of Deeds | 9/30/2007 |
| Fourth five-year review signed | 6/26/2012 |

APPENDIX B REFERENCE LIST

2013 Groundwater Sampling Report, Baier Landfill, County Road X23 Superfund Site, Lee County, Iowa, March 2014

2016 Groundwater Sampling Report, Baier Site, County Road X23 Superfund Site, Lee County, Iowa, March 2017

Consent Decree, United States of America v. E. I. DuPont De Nemours & Company, May 21, 1992

Environmental Covenant, September 20, 2007

Environmental Covenant Compliance Notification letter, January 7, 2013

Environmental Covenant Compliance Notification letter, January 29, 2014

Environmental Covenant Compliance Notification letter, January 30, 2015

Environmental Covenant Compliance Notification letter, January 7, 2016

Environmental Covenant Compliance Notification letter, January 16, 2017

Explanation of Significant Differences for the DuPont County Road X23 Superfund Site, Lee County, Iowa, May 11, 1992

Fourth Five-Year Review DuPont County Road X-23 Site, Lee County, Iowa, June 26, 2012

Inspection and Maintenance Plan Report for E. I. du Pont de Nemours and Company, (DuPont Lee County X-23) Baier and McCarl Site, Lee County, Iowa, October 16, 2007

Inspection and Maintenance Plan Report for E. I. du Pont de Nemours and Company, (DuPont Lee County X-23) Baier and McCarl Site, Lee County, Iowa, April 3, 2008

Inspection and Maintenance Plan Report for E. I. du Pont de Nemours and Company, (DuPont Lee County X-23) Baier and McCarl Site, Lee County, Iowa, October 31, 2008

Inspection and Maintenance Plan Report for E. I. du Pont de Nemours and Company, (DuPont Lee County X-23) Baier and McCarl Site, Lee County, Iowa, March 30, 2009

Inspection and Maintenance Plan Report for E. I. du Pont de Nemours and Company, (DuPont Lee County X-23) Baier and McCarl Site, Lee County, Iowa, November 3, 2009

Remedial Design Report, Final Design Submittal Baier Site and McCarl Site, Lee County, Iowa, May 1992

Sampling and Analysis Plan, Baier Site, County Road X-23, Lee County, Iowa, April 2014

Site Inspection Report, Baier Site, October 26, 2012

Site Inspection Report, McCarl Site, October 26, 2012

Site Inspection Report, Baier Site, May 29, 2013

Site Inspection Report, McCarl Site, May 29, 2013

Site Inspection Report, Baier Site, November 19, 2013

Site Inspection Report, McCarl Site, November 19, 2013

Site Inspection Report, Baier Site, May 28, 2014

Site Inspection Report, McCarl Site, May 28, 2014

Site Inspection Report, Baier Site, November 10, 2014

Site Inspection Report, McCarl Site, November 10, 2014

Site Inspection Report, Baier Site, May 22, 2015

Site Inspection Report, McCarl Site, May 22, 2015

Site Inspection Report, Baier Site, November 2, 2015

Site Inspection Report, McCarl Site, November 2, 2015

Site Inspection Report, Baier Site, October 20, 2016

Site Inspection Report, McCarl Site, October 20, 2016

Superfund Record of Decision: E. I. du Pont de Nemours (County Rd X23), Iowa, May 1991

APPENDIX C SITE INSPECTION FORM

| I. SITE INFORMATION | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------|
| Site name: E.I. DuPont de Nemours & Co., County Road X-23 | Date of inspection: March 6, 2017 |
| Location: West Point, Lee County, Iowa | EPA ID: IAD980685804 |
| Agency, office, or company leading the five-year review: EPA-Region 7 | Weather/temperature: mid-60s, intermittent rain |
| Remedy Includes: (Check all that apply) <div style="display: flex; flex-wrap: wrap; justify-content: space-between; margin-top: 10px;"> <div style="width: 45%;"> <input checked="" type="checkbox"/> Landfill cover/containment <input checked="" type="checkbox"/> Access controls <input checked="" type="checkbox"/> Institutional controls <input type="checkbox"/> Groundwater pump and treatment <input type="checkbox"/> Surface water collection and treatment <input checked="" type="checkbox"/> Other <u>Soil stabilization/solidification</u> </div> <div style="width: 45%;"> <input type="checkbox"/> Monitored natural attenuation <input type="checkbox"/> Groundwater containment <input type="checkbox"/> Vertical barrier walls </div> </div> | |
| II. INTERVIEWS (Check all that apply) | |
| <div style="display: flex; justify-content: space-between; align-items: flex-end;"> <div> 1. O&M site manager <u>Pep Hernandez</u> <div style="text-align: center; width: 40%;">Name</div> </div> <div> Env. Health & Safety Mgr. <div style="text-align: center; width: 40%;">Title</div> </div> <div> <u>3/6/2017</u> <div style="text-align: center; width: 40%;">Date</div> </div> </div> <p style="margin-top: 10px;">Interviewed <input checked="" type="checkbox"/> at site <input type="checkbox"/> at office <input type="checkbox"/> by phone Phone no. _____</p> <p style="margin-top: 10px;">Problems, suggestions; <input type="checkbox"/> Report attached <u>Pointed out possible frost heaving of monitoring wells BRA-3S and BRA-3D to him. He said he had not observed that condition at last semiannual site inspection.</u></p> | |
| III. ACCESS AND INSTITUTIONAL CONTROLS <input checked="" type="checkbox"/> Applicable <input type="checkbox"/> N/A | |
| A. Fencing | |
| <div style="display: flex; justify-content: space-between; align-items: flex-end;"> <div> 1. Fencing damaged <input checked="" type="checkbox"/> Location shown on site map <input checked="" type="checkbox"/> Gates secured <input type="checkbox"/> N/A </div> </div> <p>Remarks <u>All fencing and gates appear to be well maintained and gate is locked.</u></p> | |
| B. Other Access Restrictions | |
| <div style="display: flex; justify-content: space-between; align-items: flex-end;"> <div> 1. Signs and other security measures <input type="checkbox"/> Location shown on site map <input checked="" type="checkbox"/> N/A </div> </div> <p>Remarks _____</p> | |

| | | | |
|-------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|----------------------------------------------------------------|---------------------------------------------------------------------------------|
| C. Institutional Controls (ICs) | | | |
| 1. | Implementation and enforcement | | |
| | Site conditions imply ICs properly implemented | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No <input type="checkbox"/> N/A |
| | Site conditions imply ICs being fully enforced | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No <input type="checkbox"/> N/A |
| | Type of monitoring (<i>e.g.</i> , self-reporting, drive by) <u>Self-reporting</u> | | |
| | Frequency <u>Annually</u> | | |
| | Responsible party/agency <u>DuPont</u> | | |
| | Contact <u>Mike Sherrier</u> | <u>Project Director</u> | <u>302-999-2533</u> |
| | Name | Title | Phone no. |
| | Reporting is up-to-date | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No <input type="checkbox"/> N/A |
| | Reports are verified by the lead agency | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No <input type="checkbox"/> N/A |
| | Specific requirements in deed or decision documents have been met | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No <input type="checkbox"/> N/A |
| | Violations have been reported | <input type="checkbox"/> Yes | <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A |
| 2. | Adequacy | <input checked="" type="checkbox"/> ICs are adequate | <input type="checkbox"/> ICs are inadequate <input type="checkbox"/> N/A |
| | Remarks _____ | | |
| D. General | | | |
| 1. | Vandalism/trespassing | <input type="checkbox"/> Location shown on site map | <input checked="" type="checkbox"/> No vandalism evident |
| | Remarks _____ | | |
| 2. | Land use changes on site | <input type="checkbox"/> N/A | |
| | Remarks <u>No changes</u> | | |
| 3. | Land use changes off site | <input type="checkbox"/> N/A | |
| | Remarks <u>No changes</u> | | |
| IV. GENERAL SITE CONDITIONS | | | |
| A. Roads <input checked="" type="checkbox"/> Applicable <input type="checkbox"/> N/A | | | |
| 1. | Roads damaged | <input checked="" type="checkbox"/> Location shown on site map | <input checked="" type="checkbox"/> Roads adequate <input type="checkbox"/> N/A |
| | Remarks _____ | | |
| B. Other Site Conditions | | | |
| | Remarks <u>None</u> | | |
| | _____ | | |
| V. LANDFILL COVERS <input checked="" type="checkbox"/> Applicable <input type="checkbox"/> N/A | | | |
| A. Landfill Surface | | | |
| 1. | Settlement (Low spots) | <input type="checkbox"/> Location shown on site map | <input checked="" type="checkbox"/> Settlement not evident |
| | Areal extent _____ | Depth _____ | |
| | Remarks _____ | | |
| | _____ | | |
| 2. | Cracks | <input type="checkbox"/> Location shown on site map | <input checked="" type="checkbox"/> Cracking not evident |
| | Lengths _____ | Widths _____ | Depths _____ |
| | Remarks _____ | | |
| | _____ | | |

| | | | |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------|---------------------------------------------------------|
| 3. | Erosion Areal extent _____ Remarks _____ | <input type="checkbox"/> Location shown on site map Depth _____ | <input checked="" type="checkbox"/> Erosion not evident |
| 4. | Holes Areal extent _____ Remarks _____ | <input type="checkbox"/> Location shown on site map Depth _____ | <input checked="" type="checkbox"/> Holes not evident |
| 5. | Vegetative Cover <input checked="" type="checkbox"/> Grass <input checked="" type="checkbox"/> Cover properly established <input checked="" type="checkbox"/> No signs of stress <input type="checkbox"/> Trees/Shrubs (indicate size and locations on a diagram) Remarks _____ | | |
| 6. | Alternative Cover (armored rock, concrete, etc.) <input checked="" type="checkbox"/> N/A Remarks _____ | | |
| 7. | Bulges Areal extent _____ Remarks _____ | <input type="checkbox"/> Location shown on site map Height _____ | <input checked="" type="checkbox"/> Bulges not evident |
| 8. | Wet Areas/Water Damage <input checked="" type="checkbox"/> Wet areas/water damage not evident <input type="checkbox"/> Wet areas <input type="checkbox"/> Location shown on site map Areal extent _____ <input type="checkbox"/> Ponding <input type="checkbox"/> Location shown on site map Areal extent _____ <input type="checkbox"/> Seeps <input type="checkbox"/> Location shown on site map Areal extent _____ <input type="checkbox"/> Soft subgrade <input type="checkbox"/> Location shown on site map Areal extent _____ Remarks _____ | | |
| 9. | Slope Instability <input type="checkbox"/> Slides <input type="checkbox"/> Location shown on site map <input checked="" type="checkbox"/> No evidence of slope instability Areal extent _____ Remarks _____ | | |
| B. Benches <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A (Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.) | | | |
| C. Letdown Channels <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A (Channel lined with erosion control mats, riprap, grout bags, or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.) | | | |
| D. Cover Penetrations <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A | | | |
| E. Gas Collection and Treatment <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A | | | |
| F. Cover Drainage Layer <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A | | | |
| G. Detention/Sedimentation Ponds <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A | | | |
| H. Retaining Walls <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A | | | |
| I. Perimeter Ditches/Off-Site Discharge <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A | | | |

| | |
|---------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| VI. GROUNDWATER/SURFACE WATER REMEDIES <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A | |
| VII. OVERALL OBSERVATIONS | |
| A. | Implementation of the Remedy |
| | <p>Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).</p> <p><u>Every element of the remedy appears to be functioning as designed. The cap over the treated soil is in excellent condition with no signs of erosion. The grass cover is well established and maintained in such a manner that trees and large, woody vegetation is not allowed to grow into the cap. The fence and gate are well maintained as serve as a deterrent to trespassing and keep livestock near the Baier subsite from entering the capped area.</u></p> <p>_____</p> <p>_____</p> <p>_____</p> |
| B. | Adequacy of O&M |
| | <p>Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.</p> <p><u>As stated above, O&M of the cap, vegetation, fence and gate are effective.</u></p> <p>_____</p> <p>_____</p> <p>_____</p> |
| C. | Early Indicators of Potential Remedy Problems |
| | <p>Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs that suggest that the protectiveness of the remedy may be compromised in the future.</p> <p><u>None</u></p> <p>_____</p> <p>_____</p> <p>_____</p> |
| D. | Opportunities for Optimization |
| | <p>Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.</p> <p><u>None identified.</u></p> <p>_____</p> <p>_____</p> <p>_____</p> |