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U.S. Department of Energy

Miamisburg Closure Project
500 Capstone Circle
Miamisburg, Ohio 45342

JUN 21 2004

Mr. Brian Nickel
OEPA
401 E. Fifth Street
Dayton, OH 45402

MCP-268-04

Dear Mr. Nickel:

Enclosed are two U.S. Department of Energy (DOE) reports, pertaining to studies initiated in 2002 in support of planning activities for the Department's Long Term Stewardship (LTS) mission at the Miamisburg Closure Project (MCP). Electronic copies of the enclosed reports were provided to you months ago. The reports are:

Mound Site Assessment of Post-Closure Data Needs (April 2002), and

Uncertainty Analysis of Land Use Controls at the Mound Plant (September 2003).

As you are already aware, both of the above reports were prepared by DOE, after consultation with the Mound 2000 Core Team, the Post-Closure Stewardship Working Group (a stakeholder group chartered and chaired by the Miamisburg Mound Community Improvement Corporation), and representatives from the City of Miamisburg. The enclosed final reports are being provided to you for information and inclusion with other LTS-related reports or documents previously transmitted to you by the DOE.

If you have any questions on either of the enclosed reports, or on LTS planning activities in general, please contact Ms. Sue Smiley of my staff at (937) 847-8350, ext. 318.

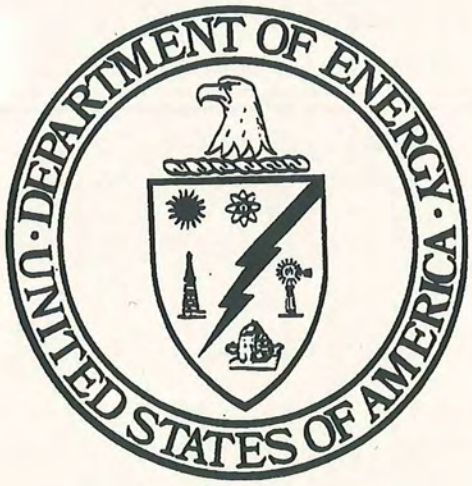
Sincerely,

Margaret Marks
Director

Enclosures

cc w/enc:
Paul Lucas, DOE-MCP
David Seely, USEPA
Celeste Lipp, ODH
Jane O'Dell, OEPA
Dave Geiser, DOE-LM
Monte Williams, CH2M HILL
Dann Bird, MMCIC
Beth Moore, City of Miamisburg
cc w/o enc:
Sue Smiley, DOE-MCP
Cliff Carpenter, DOE-LM
John Fulton, CH2M HILL
Kathy Gunckle, CH2M HILL

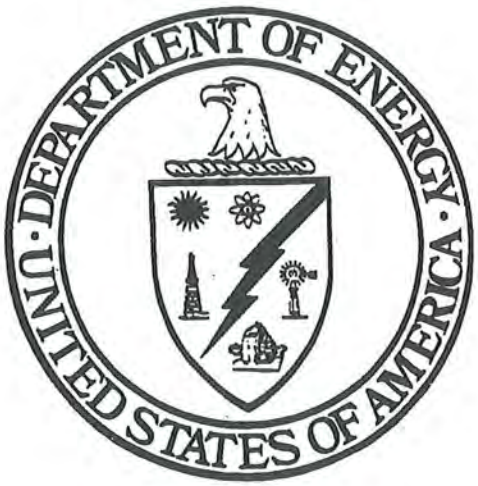
Uncertainty Analysis of Land Use Controls at the Mound Plant



prepared by the
U.S. Department of Energy
Miamisburg Closure Project

September 2003

Uncertainty Analysis of Land Use Controls at the Mound Plant



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September 2003

Uncertainty Analysis of Land Use Controls at the Mound Plant

I. Purpose

The DOE Mound Site is approaching closure milestones and preparing to transfer the site to the Miamisburg Mound Community Improvement Corporation (MMCIC) for economic redevelopment. A key concern of stakeholders, including the public, regulators, and DOE, identified during the *Mound Site Assessment of Post-Closure Data Needs (April 2002)* is how DOE will ensure continued protection of human health and the environment following transfer, particularly in terms of maintaining effectiveness of land use controls in the long term.[1] To address this concern, and to more effectively plan how to manage the potential impacts of the uncertainties associated with long-term controls at the Mound Plant, DOE-Mound Environmental Management Project (DOE-MCP) decided to conduct an uncertainty analysis, sponsored in part by LandTrek. The purpose of this report is to document the analysis that was conducted, the uncertainties that were identified, and the resulting prioritization of those uncertainties so that DOE-MCP may effectively plan how to manage the site in the long-term.

II. Approach

To conduct the uncertainty analysis, representative individuals from the agencies that are currently planning and that will ultimately implement Long-Term Stewardship (LTS) at the Mound Plant were consulted and interviewed. These individuals include employees of the Mound Site (i.e., Department of Energy and contractor employees), regulatory agencies, MMCIC, and employees of other local, city, or state organizations. (See Attachment A for a list of agencies involved.) Based on the information collected group meetings and individual interviews, a draft of priorities was developed. Finally, several core team meetings [i.e., a meeting between DOE-MCP; the U.S. Environmental Protection Agency, Region V (USEPA); the Ohio Environmental Protection Agency (OEPA); and the Ohio Department of Health (ODH)] were held to reach consensus on the rank of the priorities and to discuss uncertainty management planning.

The uncertainty analysis was conducted in five parts, each of which is described in detail in Section IV: Evaluation Process (See page 5):

1. Identification of uncertainties associated with land use controls.
2. Evaluation of probabilities and potential impacts.
3. Development of draft priorities.
4. Attainment of core team consensus on prioritization of scenarios.
5. Discussion of uncertainty management planning.

III. Findings

The detailed findings of the uncertainty analysis are documented in an uncertainty management matrix, included as Attachment B. An uncertainty management matrix is a tool to assist project

[1] Land use controls are the institutional controls, barriers, warnings or education/notification programs used to restrict use of land with residual contamination.

managers in assessing and managing uncertainties (also known as a risk matrix).[2] In this case, the uncertainty management matrix is focused only on post-closure uncertainties. For each risk scenario evaluated, the uncertainty management matrix summarizes seven components of the evaluation:

1. Expected condition: The assumed conditions of the site at the time of DOE closure, when the entire site is transferred for economic redevelopment.

2. Deviation (i.e., risk scenario): A potential deviation from the expected conditions based on uncertainties – i.e., possible site conditions that are different than assumed.

3. Probability of occurrence: The probability that each identified risk scenario may occur, based on professional judgment.

4. Impact: The impact of each scenario assuming it *did* occur. Impacts were assessed in terms of health, public perception, and response required by DOE, based on the expertise of the individual interviewed. The distinction among different types of impacts is important because the management approaches and contingency plans likely will be different based on the type of impact that may occur.

5. Monitoring/ Management approach: Actions that are planned or under consideration to monitor for these risk scenarios and to proactively manage uncertainties. This report is a living document and, as such, reflects DOE's current plans to monitor for certain risk scenarios and to proactively manage associated uncertainties. This report also identifies potential monitoring or management approaches that regulators or stakeholders have provided to DOE for consideration.

6. Time to respond: The time to respond if a risk scenario *did* occur.

7. Contingency plans: Actions that are planned or under consideration to address risk scenarios if they do occur. Note: contingency plans are implemented in reaction to an event, whereas management approaches are implemented to proactively manage uncertainties. This report is a living document and, as such, reflects DOE's current contingency plans to address certain risk scenarios, should those scenarios occur. This report also identifies contingency plan components that are still under development by DOE, in response to suggestions provided by regulators or stakeholders.

Based on risk presented by each risk scenario (i.e., the probability of occurrence multiplied by the impact of occurrence), the Mound core team prioritized uncertainties into four levels for management.[3] These priority levels are indicated in Table 1 and described below.

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[2] See Planning and Implementing RCRA/CERCLA Closure and Post-Closure Care when Wastes Remain Onsite, October 1999 (DOE/EH-413-9910).

[3] The Mound core team comprises decision-makers from the Department of Energy, the U.S. Environmental Protection Agency, and the Ohio Environmental Protection Agency.

Table 1. Priority Levels.[4]

		Impact		
		Low	Moderate	High
Probability	High	Level 3	Level 2	Level 1
	Moderate	Level 4	Level 3	Level 2
	Low	Level 4	Level 4	Level 3

Level 1: Top priority, due to high probability and high impact. Resources should first be spent on addressing these scenarios. These uncertainties should be addressed in the Long Term Stewardship (LTS) Plan and may require several layers of management.

Level 2: Second priority, due to either a high probability and a moderate impact or a moderate probability and a high impact rating. After Level 1 uncertainties are addressed, resources should be directed to managing these scenarios. In general, these uncertainties also should be included in the LTS Plan.

Level 3: Lesser priority with one of the following scorings: high probability and low impact, moderate probability and moderate impact, or low probability and high impact. These are uncertainties that should be considered; however, the core team feels that if management is necessary, low-cost approaches are most appropriate for uncertainties in this grouping.

Level 4: Lowest priority due to one of the following ratings: moderate or low probability and low impact or low probability and moderate impact. These uncertainties are generally inconsequential and may require little to no management. Note: in addition, the core team determined that some high probability/low impact uncertainties should be placed into the Level 4 grouping. These are scenarios that the core team feels will occur but will not have a health or perception impact. Uncertainties in this grouping are not included in the uncertainty management matrix.

The core team identified two risk scenarios as having the highest priority for management (i.e., Level 1 risks). These two risk scenarios, as well as the management approaches and contingency planning being considered, are described below.

1. <u>The risk that exposure may occur due to the presence of unknown contamination onsite.</u> The specific concern is that a site construction or utility maintenance worker may be exposed to unknown contamination while digging at the site. Although there is a high probability that a worker will be exposed to unknown contamination, the expectation is that the concentrations of contamination and duration of exposure will be consistent with the assumptions in the Residual Risk Evaluation (RRE). The RRE evaluates the health risk to workers from exposure to concentrations of residual contamination for a duration of time consistent with the activities expected to take place at the site. It is determined that there are no unacceptable risks to workers prior to transfer of land. In other words, the health impact has been evaluated quantitatively and has been estimated to be low.

[4] Colors in Table 1 have been added to assist the reader in distinguishing among the various priority levels and do not have any other significance.

There is a very low probability that an individual would be exposed to a sufficient volume of soil or to any volume of soil with a high contaminant concentration exceeding the exposure scenario in the RRE. Therefore, if this risk scenario were to occur, the health impacts should be low. However, the core team agreed that this scenario should be rated as a top-priority uncertainty because the impact could be high due to perception issues. The potential cost impact to DOE associated with addressing these perceptions issues could be high.

The agencies and organizations that are planning LTS have identified the following methods for managing this risk:

- Performing a RRE prior to transfer of the land to ensure that the parcel of land does not present an unacceptable risk.
- Implementing a "1-800- Call before you dig" program to provide information about the area before utility and construction workers dig.
- Implementing a city construction permit program to control construction at the site.
- Conducting reviews of site information per the O&M Plan (e.g., annual parcel walkover) and/or per CERCLA 5-year review to ensure that current assumptions continue to be correct.

Contingency plans (i.e., appropriate responses if this risk deviation occurs) are still to be determined, but the core team has identified some possible actions:

- Ensure prompt notification, if exposure occurs.
- Conduct education seminars (to address perception impact).
- Test soils to determine level of exposure.
- If contamination is discovered at concentrations that could cause health impacts, immediately stop work and test/treat workers.

2. The risk that soil is moved offsite without approval (for private use, for a facility for children under 18 years, to a landfill or to another industrial site or for recreational use). The specific concern is that a large volume of soil containing a hotspot would be removed from the site, potentially exposing a sector of population. The core team agreed that the probability of soil being removed at some point in the future was high; however, the probability removing a hotspot that would result in a health impact is low. For the hotspot to have a health impact, the volume and/or concentration of the hotspot would need to be sufficient to exceed the assumed exposure scenario in the RRE. In addition, the impact of the hotspot may be diluted at its final destination point if it mixes with other soils, causing the concentration of contaminant to be lower. Therefore, if this risk scenario were to occur, the health impacts should be low. The core team agreed that this scenario should be rated as a top-priority uncertainty because the impact could be high due to perception issues and the potential cost impact to DOE associated with addressing these perceptions.

   The agencies and organizations that are planning LTS have identified the following methods for managing this risk:

- Restricting movement of soil through deed restrictions (i.e., soil will not be moved offsite without approval).
- Incorporating language in individual leases that states that soil is not to be moved offsite; these leases must be signed by all businesses/organizations that maintain offices at the site.
- Establishing a Mound Museum for education purposes.
- Monitoring for soil removal in the Mound Plant O&M Plan.
- Granting Ohio the right of enforcement by quitclaim deed for each parcel.

Contingency plans (i.e., appropriate responses if this risk deviation occurs) are still to be determined, but the core team has identified some possible actions:

- Evaluating the risk associated with where soils were placed (may include soil sampling).
- Conducting a response action at the location that received Mound soils.
- Conducting education seminars/ holding community meetings to address perception issues.

Additional findings are included in the uncertainty management matrix (Attachment B), which is divided based on the priority level of each risk scenario. Priority levels are noted at the top of the matrix and also in the page numbering. Uncertainties ranked as last priority have not been evaluated in the uncertainty matrix; however, the rationale for their ranking is included in Attachment C.

IV. Evaluation Process

As mentioned above, the uncertainty analysis was conducted in five parts:

1. Identification of uncertainties associated with land use controls.
2. Evaluation of probabilities and potential impacts.
3. Development of draft priorities.
4. Attainment of core team consensus on prioritization of scenarios.
5. Discussion of uncertainty management planning.

Each component of the evaluation process is described below.

Identification of uncertainties associated with land use controls

In order to define uncertainties associated with land use controls at the Mound Plant, several brainstorming sessions were conducted. These brainstorming sessions were conducted in group meetings, and each uncertainty was defined in terms of a risk scenario that could occur.[5] In defining risk scenarios, the group assumed that a number of land use controls would be in place at the time of site transfer. (Attachment D defines the baseline scenario of land use controls assumed to be in place at the time of site transfer).

The group of individuals involved in the project decided to be thorough in identifying and documenting uncertainties. Based on this decision, the group did not limit their identification of

[5] Attachment A contains a list of the agencies, organizations, and companies involved in the brainstorming meetings.

uncertainties to only those risk scenarios that they believed were significant – i.e., they also identified uncertainties expected to present minimal risk or to be inconsequential. (Attachment E contains a list of all of the scenarios identified). Rather than narrow down this list initially, the group decided to continue the evaluation of uncertainties. Specifically, for each risk scenario, probability of occurrence and impact of occurrence were evaluated. Following this evaluation, the group concurred that it would be appropriate to prioritize the risk scenarios and focus their discussion of management approaches and contingency planning on only those scenarios that they believed were significant in some way.

Therefore, the purpose of the evaluation process was twofold:

1. To document the uncertainties associated with land use controls, regardless of the risk these uncertainties present; and
2. To prioritize uncertainties based on the risk so that the core team can effectively allocate resources to manage these uncertainties.

Evaluation of probabilities and potential impacts

Following the group meetings, individual interviews were conducted to assess the probability that each identified scenario may occur and the impact of each scenario assuming it ***did*** occur. Interviews were conducted with every individual involved in the brainstorming session, as well as various subject area experts. Each individual evaluated the probabilities and impacts qualitatively (i.e., high, moderate, low), based on professional judgment. A total of 20 interviews were conducted in March, April and October of 2002.[6]

Probabilities: It was recognized that the probability of occurrence often changes over time. Therefore, each probability was initially assessed in terms of three different timeframes:

1. The first five years following closure of the site and transfer for economic redevelopment.
2. Five to ten years following transfer of the site.
3. More than ten years following transfer of the site.

These timeframes could be an important consideration if the stewards of the site planned to implement a phased approach to uncertainty management (e.g., if the core team planned to implement additional management approaches in the future when risks increase). In the case of the Mound Plant, however, the core team plans to implement management approaches and develop contingency plans prior to site closure. Consequently, the core team later decided to eliminate the timeframe dimension from the evaluation. Instead, probabilities were rated based on the maximum risk the risk scenario could pose over time. In other words, if the probability of a risk scenario occurring was low during the first five years following site transfer, but increased to moderate after 15 years of stewardship, the probability of occurrence would be rated as "moderate."

[6] Note: Not every individual evaluated every risk scenario. In cases where individuals did not feel like they had the background to provide a probability or impact score, the individual did not rate that particular risk scenario. For example, the records management subject matter experts chose not to answer questions regarding soil and groundwater uncertainties.

Impact: As part of the interview, individuals were asked to evaluate the impacts of each risk scenario, assuming that it occurred. Impacts were assessed in terms of health, public perception, and response required by DOE, based on the expertise of the individual interviewed. The distinction among different types of impacts is important because the management approach likely will be different based on the type of impact that may occur. For example, DOE will likely manage perception impacts most effectively by establishing a community involvement process; potential human health impacts, on the other hand, must be managed by ensuring that pathways do not exist from contaminants that remain onsite to potential receptors.

Development of draft priorities

Draft priorities were developed based on an overall risk rating for each risk scenario. In order to develop the draft priorities, the following evaluations were conducted:

1. The development of an overall probability rating for each risk scenario, based on input received during individual interviews,
2. The development of an overall impact rating for each risk scenario, based on input received during individual interviews, and
3. The development of overall risk ratings, based on the overall probability and impact ratings.

The following describes the methodology for assigning these overall ratings:

- In cases where all individuals agreed on the probability or impact of a risk scenario, the overall rating was straightforward: it was the rating concurred upon by the group.
- For scenarios where ratings were nearly unanimous among all individuals interviewed (i.e., only one person differed in the rating given to a probability that a scenario would occur), the nearly unanimous rating was assigned.
- In cases where there was not concurrence in the evaluation of probabilities or impacts, an overall rating was determined based on professional judgment, since there were not enough interviews conducted to determine overall ratings statistically. When the interviewees provided a range of different probabilities or impacts, an overall probability or impact rating was determined by evaluating the range of scores, with the ratings provided by experts in that field given more weight than non-expert ratings (e.g., contract management experts scores were weighted more heavily in determining the probabilities associated with loss of records). In general, if ratings were divided evenly between two categories, the higher rating of the two was identified as the overall rating in order to be more conservative. For example, if half of the individuals rated a scenario with a "moderate" probability of occurrence in the first five years following closure, and the other half rated the probability as "high," the overall rating would be "high."

Risk is a combination of probability and impact. Therefore, the overall ratings for probability of occurrence and the impact (either health or financial/perception) were combined to provide an overall risk score. The overall risk-scoring table summarizes risk for each scenario evaluated (see Attachment F). This table was used as the basis for developing preliminary prioritization levels. Each risk scenarios was sorted into one of four preliminary priority levels based on their overall risk rating. (See the description of these priority levels in the Findings section on page 2.)

Attainment of core team consensus on prioritization of risk scenarios

Collectively, the interviews did not provide a consensus view on all of the probability and impact ratings; thus, the preliminary prioritization of the uncertainties was not consensus-based. Since DOE-MCP has limited funding to manage priorities and because DOE-MCP has been working collaboratively with regulators using a core team approach to reach consensus on a range of decisions for the site, DOE requested a core team meeting to jointly determine the priority that should be placed on managing identified uncertainties associated with land use controls.

The purpose of the core team meeting was to reach consensus on the priority rankings of the risk scenarios, primarily by reaching consensus on the probability and impact ratings. It is important to note that the priority ratings of each uncertainty scenario reflect the level of consideration and/or management that the core team believes should be required for each risk scenario. In a few cases, the priority rating is not equivalent to the overall risk rating (which is a combination of probability multiplied by impact). Specifically, the core team determined that some high probability/low impact uncertainties should be placed into the Level 4 grouping. These are scenarios that the core team feels will occur but will not have a health or perception impact.

During the evaluation process, the core team decided to remove from consideration some of the risk scenarios originally identified by the group. Some of the scenarios were removed because they were considered covered under other, broader scenarios; others were removed because they were considered repetitive due to the nature of the contingency plan used to address them. See Attachment G for a summary of the scenarios removed and the rational for removal.

Discussion of uncertainty management planning

Finally, the core team met to discuss uncertainty management planning, including approaches to manage the uncertainties proactively and appropriate contingency plans if the risk scenarios were to occur. Although uncertainty management planning is not complete, a number of management actions have been identified as part of the LTS planning efforts. The core team efforts thus far have focused on 1) ensuring that existing plans address risk scenarios of concern, and 2) identifying additional uncertainty management approaches to consider. Core team discussions regarding uncertainty management planning are summarized in the corresponding sections of the uncertainty management matrix (Attachment B).

V. Conclusions and Recommendations

Based on the uncertainty management analysis, there are four conclusions/recommendations:

1. DOE-Mound, along with the other agencies and organizations responsible for implementing LTS at the site, has made significant progress in preparing for management of uncertainties following closure of the site and transfer for re-use. In particular, DOE-Mound and its partners have identified a multi-layered approach to monitor for inappropriate uses of the site and to proactively managing identified uncertainties.

2. Further contingency planning is needed. Thus far, DOE and its partners have focused on planning proactive approaches to prevent risk scenarios from occurring; however, it will also be important to identify contingency plans in case the risk scenarios occur. By

agreeing ahead of time to the appropriate response actions, decision-makers allow for quick responses in case risk scenarios occur. In particular, DOE should focus on identifying contingency plans for Level 1 and Level 2 risk scenarios.

3. The two greatest risks identified in this analysis are ranked as such because they may result in high perception impacts. It is important to note that these risk scenarios are not expected to have any unacceptable health impacts. Therefore, it is imperative that DOE identify methods for addressing potentially negative public perceptions. Currently, DOE is planning to develop a community involvement process to ensure that public education about the site continues following site transfer. Such a process would also allow a forum for DOE to address public perceptions and misconceptions. It is recommended that DOE establish this community involvement process prior to final transfer of the site.

4. DOE should prioritize the management approaches and contingency planning identified in this analysis. This uncertainty management analysis identified management approaches and contingency planning that are additional to the requirements established in the site's RODs. DOE-Mound should evaluate which management approaches and contingency planning activities are most important and clearly document the prioritization of these efforts. In particular, DOE should consider the following in prioritizing their uncertainty management planning actions:

    a. The severity of the risk posed by an uncertainty
    b. Time to respond if a risk scenario occurs
    c. Type of impact that a risk scenario would have (e.g., human health, public perception)
    d. The number of uncertainties (or risk scenarios) that a management approach or contingency planning activity will address.

Attachment A: Organizations represented in the Analysis

1. CH2M Hill Mound, Inc.
2. City of Miamisburg
3. Miamisburg Mound Community Improvement Corp. (MMCIC)
4. Ohio Department of Health
5. Ohio Environmental Protection Agency
6. United States Environmental Protection Agency, Region V
7. United States Department of Energy – Miamisburg Closure Project

Attachment B: Mound Draft Uncertainty Management Matrix
Uncertainties associated with Land Use Controls and Long-Term Protectiveness at the Site

#	Expected Condition	Deviation (Risk Scenario)	Probability	Impact	Monitoring /Management Approach	Time to Respond (If deviation occurs)	Contingency Plan
Top Priority Scenarios (Level 1)							
1	Cleanup actions have addressed site contamination. No exposure to unexpected contamination occurs.	Exposure occurs due to presence of unknown contamination. Specifically, a site construction worker or utility maintenance worker is exposed to unknown contamination while digging.	High Rationale: There is a high probability that a worker will be exposed to unknown contamination; however, the expectation is that the concentrations of contamination and duration of exposure are expected to be consistent with the assumptions in the Residual Risk Evaluation (RRE). Note: There is a very low probability that an individual would be exposed to a sufficient volume of soil or to any volume of soil with a high contaminant concentration exceeding the exposure scenario in the RRE.	High: Perception [Health impacts are low] Rationale (Perception): The impact of this deviation occurring could be high due to perception issues. As a result, the cost to DOE of addressing perception issues could be high. Rationale (Health): The RRE evaluates the health risk to workers from exposure to concentrations of residual contamination for a duration of time consistent with the activities expected to take place at the site. It is determined that there are no unacceptable risks to workers prior to transfer of land. In other words, the health impact has been evaluated quantitatively and has been estimated to be low. Therefore, if the deviation were to occur, the health impacts should be low.	Currently planned: • 1-800- "Call before you dig" program • City construction permit program • Review per O&M Plan (e.g., annual parcel walkover) and/or per CERCLA 5-year review	Short, with notification ASAP[7] If the impact is a perception one, and not a health impact, DOE will likely have a moderate timeframe for addressing perception impacts through education, etc.[8]	Under Development Ideas for potential contingency plans: • Conduct education seminars (to address perception impact) • Notification, if exposure occurs • Test soils to determine level of exposure • If contamination is discovered at concentrations that could cause health impacts, immediately stop work and test/treat workers

[7] A short time to respond indicates that a response must be initiated within a month following occurrence of the scenario.
[8] A moderate time to respond indicates that a response is required within 6 months.

Legend: = Rating of High; = Rating of Moderate; = Rating of Low

#	Expected Condition	Deviation (Risk Scenario)	Probability	Impact	Monitoring /Management Approach	Time to Respond (If deviation occurs)	Contingency Plan
Section 1: Top Priority Scenarios (Level 1)							
2	No soil will be removed offsite without approval.	Soil is moved offsite without approval (for private use, for a facility for children under 18 years, to a landfill or to another industrial site or for recreational use).	High Rationale: There is a high probability of soil being removed from the site. Note, however, that the probability of a hotspot being removed is low.	High: Perception [Health impacts are low] Rationale (Health): For the hotspot to have a high health impact, the volume and/or concentration of the hotspot would need to be sufficient to meet the exposure scenario in the RRE. In addition, the effect of the hotspot may be diluted at its final destination point when it mixes with other soils, causing the concentration of the contaminant(s) to be lower. Rationale (Perception): The impact of this deviation occurring could be high due to perception issues. As a result, the cost to DOE of addressing these perception issues could be high.	Currently planned: • Deed restrictions • Property leases • Mound Museum for education • Mound Plant O&M Plan • Ohio right of enforcement granted by quitclaim deed for each parcel Under consideration: • Portal monitor to detect soil leaving the site • Neighborhood watch program • Defined post-closure community involvement process to address community concerns and perceptions	Immediate.[9] Need to locate soil to assess impacts and ensure that soil isn't moved to additional locations.	Under Development Ideas for potential contingency plans, depending on placement of soils: • Evaluate risk associated with where soils were placed (may include soil sampling) • Response action at location that received Mound soils • Conduct education seminar/ hold community meetings

[9] An immediate time to respond indicates that a response is required within a week (e.g., hours or days).

Legend: = Rating of High; = Rating of Moderate; = Rating of Low

#	Expected Condition	Deviation (Risk Scenario)	Probability	Impact	Monitoring /Management Approach	Time to Respond	Contingency Plan
Second Priority Scenarios (Level 2)							
1	Budget is maintained at levels high enough to conduct all long-term activities required by the ROD.	Budget cuts result in reducing activities required by the ROD (e.g., 5-year review and groundwater monitoring activities, annual report).	Moderate Rationale: The core team agreed that for the next ten years the probability of a budget cut is low; however, after that time period the probability increases to moderate due to loss of institutional memory or changes in national priorities.	High: Health & Perception Rationale (Health): Activities that are required by the ROD are necessary to ensure that there is no unacceptable human health risk. Therefore, reducing these activities could result in a high health impact. Rationale (Perception): If there is not federal support for maintaining site controls, there will likely be a high perception impact. This impact will be worse if there are also health impacts.	Currently planned: • DOE to fulfill budgeting and budget request responsibilities • Stakeholders to support congressmen who will support LTS • Cannot otherwise manage whether or not there is a budget cut. However, the land use will be maintained through a tiered approach to ICs, involving agencies other than DOE. (Other agencies are not likely to conduct ROD activities and will not be liable for implementing activities agreed to in the tiered approach.) Under consideration: • This is a nation-wide issue. DOE Mound may not be able to manage it alone; however, DOE could support national efforts (EM-51) for LTS funds (e.g., establish contingency fund)	Moderate. If budget cuts occur, DOE will likely have advance notice that funding will be cut. Once the budget is final, DOE will need to reduce long-term stewardship activities immediately.	Under Development Ideas for potential contingency plans: • Stakeholders to support lobbying campaign to Congress • Use contingency fund money (if available) • Prioritization plan for stewardship activities • Involve community in post-closure process • OEPA and/or USEPA take action against DOE based on a violation of the ROD

Legend: = Rating of High; = Rating of Moderate; = Rating of Low

#	Expected Condition	Deviation (Risk Scenario)	Probability	Impact	Monitoring /Management Approach	Time to Respond	Contingency Plan
Second Priority Scenarios (Level 2)							
2	Boundaries of the site are maintained	Boundaries of the site are lost over time. The concern is the possibility of encroachment toward the boundaries. Of most concern is the scenario where a neighbor plants a vegetable garden on site property and consumes the fruits/vegetables grown on the former Mound Plant.	Moderate Rationale: The probability of occurrence increases to moderate over time due to loss of institutional memory.	High: Health & Perception Rationale (Health): If the site is used in a manner not consistent with the RRE, there could be exposure to contamination, potentially causing a health impact. Rationale (Perception): The perception impact could be high if the site is used in a manner not consistent with deed restrictions.	Currently planned: • Review per O&M Plan (e.g., annual parcel walkover) and/or per CERCLA 5-year review • Coordinates documented in deed • Mound Museum for education Under consideration: • A GIS system to demonstrate the site boundaries as well as the land use allowed in each area of the site may reduce the risk of this uncertainty • Stone markers at areas of concern • Limited fencing • Ongoing community education (e.g., annual newspaper article)	Moderate. Minimizing duration of exposure directly reduces severity of impact.	Under Development Ideas for potential contingency plans, depending on location of encroachment and actual exposure type/duration: • Evaluate potential impact to health associated with exposure. Take action, if necessary • Research historical documents to re-define boundaries of site • Fence site boundaries

Legend: = Rating of High
= Rating of Moderate
= Rating of Low

#	Expected Condition	Deviation (Risk Scenario)	Probability	Impact	Monitoring /Management Approach	Time to Respond	Contingency Plan
Second Priority Scenarios (Level 2)							
3	Site is used consistent with the deed; all restrictions are observed.	Site is used for a land use that is not allowed under the deed, such as residential, a day care facility, a school, a community center, playground, or other recreational or religious facility for children.	Moderate Rationale: The probability of occurrence increases to moderate over time due to loss of institutional memory. For example, if the industrial park succeeds, there may be pressure in the future to have an onsite day-care facility. If the industrial park does not succeed, there may be pressure in the future to redevelop the land for one of the other uses.	High: Perception [Health impacts are moderate] Rationale (Health): Because recreational land uses are generally less restrictive than industrial land use, the core team does not believe this will have a high health impact. The core team rated this scenario as having a moderate health impact (rather than a low health impact) because it may include exposure to children less than 18 years of age. Note: Recreational land use was not evaluated in the RRE. Rationale (Perception): Perception impact could be high if the site is used in a manner not consistent with the deed restrictions.	Currently planned: • Deed restrictions • Property leases • Review per O&M Plan (e.g., annual parcel walkover) and/or per CERCLA 5-year review • Ohio right of enforcement • MRC Interim Land Use Policy • Mound Plant O&M Plan Under consideration: • Review of satellite imaging • Ongoing community education (e.g., annual newspaper article) • Require more than one physical inspection conducted by a federal entity each year, OR conduct random site inspections to ensure that land use is maintained • Neighborhood watch program	Moderate to long, depending on use.[10] For most of the land use changes there will be a period of construction prior to using the land in a manner inconsistent with the deed. This time period will allow DOE and other agencies to evaluate or stop the construction or prevent use of the facility.	Report violation to the Department of Justice (DOJ), so that they may take action Ideas for additional contingency plan components (Under Development): • Evaluate potential impact to health associated with exposure. Take appropriate action based on results • Conduct education seminar

[10] A long time to respond indicates that a response may be initiated 6 months or more following occurrence of the scenario.

Legend: = Rating of High; = Rating of Moderate; = Rating of Low

#	Expected Condition	Deviation (Risk Scenario)	Probability	Impact	Monitoring /Management Approach	Time to Respond	Contingency Plan
Second Priority Scenarios (Level 2)							
4	Site is used consistently with the intended land use designation.	Site is used for a land use that is not anticipated based on the industrial land use designation. Of specific concern is that the site is used for health-care related commercial activities (e.g., hospitals, eldercare), or non-health care related commercial activities (e.g., restaurants, stores).	Moderate Rationale: The probability of occurrence increases to moderate over time due to loss of institutional memory. If the industrial park does not succeed, there may be pressure in the future to expand the use associated with industrial to include one of these other uses.	High: Health & Perception Rationale (Health): The deed restrictions were put in place to ensure that an unacceptable risk to human health does not occur. If these restrictions are not observed, the impact to health could be high (depending on the actual exposure scenario). None of the exposure scenarios listed in the deviation section have been evaluated in the RRE. Rationale (Perception): Perception impact could be high if the site is used in a manner not consistent with the deed restrictions.	Currently planned: • Deed restrictions • Property leases • Review per O&M Plan (e.g., annual parcel walkover) and/or per CERCLA 5-year review • Ohio right of enforcement • MRC Interim Land Use Policy • Mound Plant O&M Plan • Mound Museum for education Under consideration: • Review of satellite imaging • Ongoing community education (e.g., annual newspaper article) • Revising deed to specifically exclude these land uses • Require more than one physical inspection conducted by a federal entity each year, OR conduct random site inspections to ensure that land use is maintained • Neighborhood watch program	Moderate to long, depending on use. For most of the land use changes there will be a period of construction prior to using the land in a manner inconsistent with the deed. This time period will allow DOE and other agencies to evaluate or stop the construction or prevent use of the facility.	Report violation to the DOJ, so that they may take action Ideas for additional contingency plan components: • Evaluate potential impact to health associated with exposure. Take action, if necessary • Conduct education seminar

Legend: = Rating of High; = Rating of Moderate; = Rating of Low

#	Expected Condition	Deviation (Risk Scenario)	Probability	Impact	Monitoring /Management Approach	Time to Respond	Contingency Plan
Second Priority Scenarios (Level 2)							
5	Onsite BVA Aquifer water is not used for human consumption without approval.	The onsite BVA Aquifer is used for drinking water without approval. This activity is specifically excluded by the deed. Note: Presently the onsite BVA is used to supply potable water to the site, including transferred parcels. The site's water supply is currently monitored per the Safe Drinking Water Act. This risk scenario applies once the entire site is transferred and the municipal water supply is hooked up and functioning. In order to assess the health impacts of this risk scenario, the assumption was made that future wells could be located in areas with groundwater contamination or that contamination could migrate to the groundwater in the long term.	Moderate Rationale: The probability of occurrence increases to moderate over time due to loss of institutional memory.	High: Health & Perception Rationale (Health): Based on the results of the RRE, there is a potential high health impact posed by consumption of water from the onsite BVA. Also, this risk scenario includes exposure (i.e., consumption) to receptors that were not evaluated in the RRE. Actual health impacts would depend on the location of the well, the concentrations of contaminants in the water, the quantity of water consumed, the duration of exposure, and the characteristics of the receptor. Rationale (Perception): The perception impact could be high if the site is used in a manner not consistent with deed restrictions. Perception problems will likely increase the longer the aquifer is used for drinking.	Currently planned: • City water supply • Deed restrictions • Review per O&M Plan (e.g., annual parcel walkover) and/or per CERCLA 5-year review • Regulator independent authority • Ohio right of enforcement • State/county well permit program • Mound O&M Plan Under consideration: • Neighborhood watch program • Geophone (acoustic monitoring) technology to detect well-drilling • Ongoing community education (e.g., annual newspaper article) • Defined post-closure community involvement process • Require more than one physical inspection per year OR conduct random site inspections to ensure that groundwater use restriction is maintained	Moderate. Minimizing duration of exposure directly reduces severity of impact. Also, perception problems will likely be worse the longer the aquifer is used for drinking.	Report violation to DOJ, so that they may take action Ideas for additional contingency plan components: • Evaluate potential impact to health associated with exposure (i.e. ingesting onsite BVA water). Take action, if necessary • Close / abandon groundwater wells • Conduct education seminar

Legend: = Rating of High; = Rating of Moderate; = Rating of Low

#	Expected Condition	Deviation (Risk Scenario)	Probability	Impact	Monitoring /Management Approach	Time to Respond	Contingency Plan
Second Priority Scenarios (Level 2)							
6	Post-closure worker does not get sick due to his/her work at Mound.	Post closure worker later gets sick and think it's due to work at Mound.	High Rationale: Other DOE sites have had to address potential health issues related to their workers. It is likely that if a post-closure worker later gets sick (e.g., cancer), he or she will assume that it is due to work at Mound.	Moderate: Cost & Perception Rationale (Cost): The cost impact could be significant if dose reconstructions are required to determine if the sickness is related to post-closure work at Mound. Rationale (Perception): Due to the historical secrecy of the DOE mission and historical environmental releases, DOE has faced perception issues with local communities and previous site workers. These perception issues may continue in the future and extend to employees that work at the site following closure.	• Maintain CERCLA administrative records as required. These records will provide documentation of the cleanup conducted and the residual concentrations of contaminants left at the site	Moderate. Because the impact is a perception one, and not a health impact, DOE will likely have a moderate timeframe for addressing perception impacts. However, the longer that DOE waits to address a perception issue, the worse the problem could become.	Under Development Ideas for potential contingency plans: • Reconstruct dose exposure for workers who believe they are sick • Implement education seminar

Legend: = Rating of High
= Rating of Moderate
= Rating of Low

#	Expected Condition	Deviation (Risk Scenario)	Probability	Impact	Monitoring /Management Approach	Time to Respond	Contingency Plan
Third Priority Scenarios (Level 3)							
1	Seeps will not be used for any purpose.	Children play in the seep area.	High (Offsite seeps) Rationale: Because some of the seeps are located offsite, and currently there are no access restrictions to these seep areas, there is a high probability that children could play in seeps. [Low: Onsite seeps] Note, however, that there is a low probability that children will play in the onsite seeps.	Low: Health & Perception (Offsite Seeps) Rationale (Health): Presently, the offsite seeps are accessible to the public. The health impacts of this risk scenario are expected to be low to none, due to the concentrations of residual contamination and the intermittent nature of the seeps (assuming MCLs are met and contaminants continue to decrease). An offsite risk evaluation is planned and this risk scenario will be included in that evaluation. *Note*: If children were to play in the onsite seeps, the health impacts should also be low, assuming the MCLs have been met. It is possible that the parcel could be transferred without the seeps meeting MCL standards. The core team is concerned that it may take some time for levels to drop below MCLs following source term removal. If so, a remedy will be placed in the ROD to address this situation. Rationale (Perception): No perception impacts are expected if children play in the offsite seeps due to the low concentrations of residual contamination and the intermittent nature of the seeps. *Note:* There may be a moderate to high perception impact if children play in the onsite seeps.	Currently planned: • Deed restrictions • City's I-2 zoning ordinance • Mound Museum for education • Mound O&M Plan Under consideration: • Ensure that the seeps meet MCLs before transfer to the MMCIC • If seeps are transferred prior to meeting MCLs, efficiently document the reasons why this does not represent a health impact • Fence onsite seep area (specifically Seep 601) • Post signs near the onsite seep • Video surveillance • Defined post-closure community involvement process • Ongoing community education (e.g., annual newspaper article) • Neighborhood watch program	Moderate.	Report violation to DOJ, so that they may take action Ideas for additional contingency plan components: • Evaluate potential impact to health associated with exposure (i.e., ingesting and contact with seep water • Conduct education seminar

Legend: = Rating of High; = Rating of Moderate; = Rating of Low

#	Expected Condition	Deviation (Risk Scenario)	Probability	Impact	Monitoring /Management Approach	Time to Respond	Contingency Plan
Third Priority Scenarios (Level 3)							
2	Records are maintained to ensure that they can be accessed if needed. May be accomplished by: 1) Maintaining paper files, 2) Continuing to use current imaging and retrieval technologies, or 3) Ensuring that records are compatible with new imaging and retrieval technologies.	Needed records/data (e.g., for litigation, public concern) are not readable or available resulting in either Federal liability or re-work (e.g., sampling). There are two specific concerns: 1) Rapid advances in records imaging and retrieval technology make previous records unreadable, and 2) Geographical data are not maintained	High Rationale: Other sites have already had to address this scenario with potentially large costs for re-creating information though additional sampling, etc. It is important to note, however, that this scenario only applies to electronic records.	Low: Health & Cost Rationale (Health): There is a low health impact because the readability of records does not influence potential exposure to residual contamination. Rationale (Cost): There is a low cost impact because DOE is planning to maintain at least one copy of each of its records in paper form, negating the risk scenario.	Currently planned: • DOE-Mound will maintain all of its CERCLA Administrative Record (AR) documents in paper form • Additional copies of the CERCLA AR will be kept (e.g., by USEPA and OEPA) • Convert old electronic files when new technology installed Also considering: • Include a review of imaging and retrieval technologies / readability of records in the annual or CERCLA 5-Year Review	Moderate. Records may not be immediately required and there will likely be a limited amount of time (e.g., months) to re-build systems or re-assemble information.	Under Development Ideas for potential contingency plans: • Retrieve duplicate paper record • Attempt to obtain previously used technology to read records and copy onto a current format (If possible) • Resample area(s) in question or, if possible, fill data gaps with long-term monitoring data

Legend: = Rating of High
= Rating of Moderate
= Rating of Low

#	Expected Condition	Deviation (Risk Scenario)	Probability	Impact	Monitoring /Management Approach	Time to Respond	Contingency Plan
Third Priority Scenarios (Level 3)							
3	Budget is maintained at levels high enough to conduct all planned activities, including those not required by the ROD.	Budget cuts result in reducing activities at the site; the activities that are eliminated are not ROD requirements (e.g., technologies to determine if truck leaves site with soil).	High Rationale: Long-term stewardship funding is a nation wide concern, for all post-closure activities. The core team agrees that for the next ten years the probability of a budget cut will be low; however, after that time period the probability increases to high due to loss of institutional memory or changes in national priorities.	Low: Health Rationale: This scenario is focused on budget cuts reducing activities not required by the ROD. The purpose of these activities is to provide additional management to ensure that the land use restrictions at Mound are maintained; however, they are not required to ensure protection of human health and the environment.	Currently planned: • DOE to fulfill budgeting and budget request responsibilities • Stakeholders to support congressmen who will support LTS • Can't otherwise manage whether or not there is a budget cut. But the land use will be maintained through a tiered approach to ICs, involving agencies other than DOE. (Other agencies aren't liable for implementing activities agreed to in the tiered approach.) Under consideration: • This is a nation-wide issue. DOE Mound may not be able to manage it alone; however, DOE could support national efforts (EM-51) for LTS funds • Prioritization plan for stewardship activities • Defined post-closure community involvement process	Moderate. If budget cuts occur, DOE will likely have advance notice that funding will be cut. Once the budget is final, DOE will need to reduce long-term stewardship activities immediately.	Under Development Ideas for potential contingency plans: • Support lobbying campaign to Congress • Use fund money (if available) • If possible, implement prioritization plan for stewardship activities and community process

Legend: = Rating of High
= Rating of Moderate
= Rating of Low

#	Expected Condition	Deviation (Risk Scenario)	Probability	Impact	Monitoring /Management Approach	Time to Respond	Contingency Plan
Third Priority Scenarios (Level 3)							
4	There will be some type of central oversight /onsite presence at the site (e.g., MMCIC)	No central oversight / onsite presence. The specific concern is that a lack of onsite oversight increases the probability that a deed restriction may be violated.	High <u>Rationale:</u> It is possible that eventually there will not be an entity onsite to provide oversight. For example, MMCIC will likely leave the site after it is fully developed as an industrial park.	Low: Health, Cost & Perception <u>Rationale (Health, Cost & Perception):</u> DOE will conduct yearly inspections as required by the ROD, regardless of whether there is an onsite presence. Accordingly, DOE is planning to report and address changes of land use and any other activities onsite on a yearly basis. The oversight that DOE will be providing in this manner should ensure that deed restrictions are not violated. Therefore, even if there is no onsite oversight, the health, cost & perception impacts should be minimal at most.	Currently planned: • Tiered approach to ICs, involving agencies other than DOE • City's I-2 zoning • Review per O&M Plan (e.g., annual parcel walkover) and/or per CERCLA 5-year review • Regulator independent authority • Ohio right of enforcement • MRC Interim Land Use Policy • Mound Plant O&M Plan (Yearly inspections; report and address potential problems on a yearly basis)	Moderate. The health, cost & perception impacts should be minimal regardless of an onsite presence, so there is a moderate time frame to determine the path forward.	Under Development Ideas for potential contingency plans: • Require more than one physical inspection conducted by a federal entity each year • Random site inspections to ensure that land use is maintained • DOE or another federal, state, or local agency takes on an on-site presence at the site (e.g., City of Miamisburg relocates offices onsite)

Legend: = Rating of High
= Rating of Moderate
= Rating of Low

#	Expected Condition	Deviation (Risk Scenario)	Probability	Impact	Monitoring /Management Approach	Time to Respond	Contingency Plan
Third Priority Scenarios (Level 3)							
5	The monitoring systems are regularly inspected and maintained to prevent any breakdowns.	System for monitoring breaks down at some point in the chain of events. This scenario includes all things required for monitoring – e.g., monitoring equipment, data transfer, data analysis.	High Rationale: Based on the site experience monitoring groundwater, it is highly probable that there will be a breakdown at some point in the chain of events.	Low: Health, Cost & Perception Rationale (Health, Cost & Perception): The assumption is that after the monitoring system breaks down, the problem will be caught and fixed within a few months timeframe. Potentially a quarter's worth of monitoring data could be lost; however, the loss of that amount of monitoring data should have a low health, cost and perception impact.	Currently planned: • Review per O&M Plan (e.g., annual parcel walkover) and/or per CERCLA 5-year review • Review of monitoring data by regulators Ideas for additional monitoring: • If there are any events that would require an immediate response, conduct backup/duplicate monitoring	Moderate. Monitoring will generally be used to demonstrate data trends, but could indicate new sources of contamination; therefore, it important to maintain the system to ensure that significant amounts of data are not lost.	Under Development Ideas for potential contingency plans: • Fix monitoring system as soon as breakdown is identified • Recollect data, if necessary
6	All workers at the site are adults (greater than 18 years of age).	A worker is employed (full-time or part-time) who is less than 18 years of age and as young as 14 years of age per Title 41, Ohio Revised Code, Chapter 4109. This scenario is of concern because it was not evaluated in the RRE.	High Rationale: There is a high possibility that at some point in the future, a firm associated with the site employs a minor (e.g., a landscaping firm).	Low: Health Rationale: The health impact to a minor working at the site should be low, because the exposure period before becoming an adult would be limited and the number of hours a minor can work are limited by law. Further, the exposure scenario in the RRE assumes a certain body weight of an 18-year old; the weight of minors that are old enough to get a work permit likely approximates this body weight. Note: Actual health impacts would depend on the specific type of work performed, the duration of exposure, and the characteristics of the receptor.	Currently planned: • Deed restrictions • MMCIC includes language in property leases that prohibits employing minors • Mound Museum for education Under consideration: • Ongoing community education (e.g., annual newspaper article) • Neighborhood watch program	Short. Minimizing duration of exposure directly reduces severity of impact. Also, perception impacts will likely be worse the longer that the minor is working at the site.	Under Development Ideas for potential contingency plans: • Upon discovery, immediately layoff/relocate all workers under 18 years of age • Evaluate potential impact to health. Take action, if necessary

Legend: = Rating of High; = Rating of Moderate; = Rating of Low

#	Expected Condition	Deviation (Risk Scenario)	Probability	Impact	Monitoring /Management Approach	Time to Respond	Contingency Plan
Third Priority Scenarios (Level 3)							
7	DOE provides all required reports promptly.	DOE does not provide required report (e.g., CERCLA 5-year report, required monitoring data). A failure to submit required reports would have the potential to lead to regulatory enforcement.	High Rationale: At some point in the future, it is probable that DOE will fail to provide a required report on time.	Low: Perception Rationale (Perception): The failure to provide a report may have some perception impacts that could potentially lead to lawsuits. The most likely impact is that USEPA and OEPA would coerce DOE into completing work.	Currently planned: • Prior to transfer, define documentation and activity expectations with regulators	Short. DOE will need to remedy the situation quickly to minimize negative perceptions about the effectiveness of long-term stewardship and comply with legal requirements.	Currently planned: • Regulator imposed fines/litigation Ideas for additional contingency plan components: • If DOE is aware that a report will be late, notify regulators ahead of time/request an extension
8	DOJ will take a sufficient level of action following a reported violation of deed restrictions/ ROD requirement.	OEPA believes that DOJ has taken insufficient level of action following violation of deed restrictions.	High Rationale: Because DOJ is a federal agency with national responsibilities, it is possible that the action DOJ chooses to take following a violation of a deed restriction will be considered insufficient by agencies with more of a local focus.	Low: Health Rationale: The level of action that DOJ determines is appropriate will not have a health impact. Note: The impacts evaluated here are simply those associated with believing that DOJ has taken insufficient action following a deed violation. The impacts of specific deed violations are evaluated as separate deviations in this risk management matrix.	Currently planned: • Tiered approach to ICs, involving agencies other than DOE, to prevent a violation of deed restrictions	Short to moderate depending on violation.	• OEPA may initiate legal proceedings against DOE • OEPA may use of the right to enforce deed restrictions granted by DOE through the deed

Legend: = Rating of High
= Rating of Moderate
= Rating of Low

#	Expected Condition	Deviation (Risk Scenario)	Probability	Impact	Monitoring /Management Approach	Time to Respond	Contingency Plan
Third Priority Scenarios (Level 3)							
9	The site will not be used for recreational off-roading.	Trespassing for the purpose of off-roading. The main concern is chronic exposure of children under 18 years of age.	Moderate to High <u>Rationale:</u> The probability of repeated trespassing for the use of off-roading is low if the industrial park succeeds. It might be possible for the site to be used for off-roading at some point in the future, especially if the industrial park fails.	Health: Low <u>Rationale:</u> Even if individuals were to trespass for the purpose of off-roading, any exposures incurred should be less than those estimated in the RRE under the construction worker scenario. It is also assumed that receptors would be similar in physical characteristics to those evaluated in the RRE.	Currently planned: • Tiered approach to ICs, involving agencies other than DOE • Deed restrictions • Property leases • Review per O&M Plan (e.g., annual parcel walkover) and/or per CERCLA 5-year review • Ohio right of enforcement • Development of industrial park • Mound Plant O&M Plan • Mound Museum for education Under consideration: • Ongoing community education (e.g., annual newspaper article)	Long.	Report violation to the DOJ, so that they may take action. Ideas for additional contingency plan **components** if trespassing for off-roading becomes a common occurrence: • Evaluate the potential impact to health associated with exposure. Take appropriate action based on the results • Fence the site • Post "No Trespassing" signs • Conduct education seminar

Legend: = Rating of High
= Rating of Moderate
= Rating of Low

#	Expected Condition	Deviation (Risk Scenario)	Probability	Impact	Monitoring /Management Approach	Time to Respond	Contingency Plan
Third Priority Scenarios (Level 3)							
10	The definition of industrial land use remains the same indefinitely. Only the uses specified in the deed are permitted.	Definition of industrial land use changes in future to include new scenarios that are not specifically excluded by the deed (e.g., the City of Miamisburg could potentially allow uses permitted under an I-2 zoning and not specifically excluded in the deed). This scenario implies land uses that are outside of the ROD.	Moderate Rationale: In the future, the probability of occurrence may increase to moderate due to the loss of institutional memory.	Moderate: Perception [Health impacts are low] Rationale (Perception): If there were to be an impact, it would likely be a perception one (e.g., worker concern about land use). Rationale (Health): The health impact is expected to be low because any uses allowed under an I-2 zoning would likely result in exposures that are similar to or less than those evaluated in the RRE (e.g., receptors should have similar physical characteristics and the duration of exposure should be similar).	Currently planned: • Deed restrictions (including prohibiting specific uses) • Property leases • Review per O&M Plan (e.g., annual parcel walkover) and/or per CERCLA 5-year review • Mound Reuse Committee's Interim Land Use Policy • Mound Museum to provide education • Mound Plant O&M Plan Under consideration: • Ongoing community education (e.g., annual newspaper article) • Require more than one physical inspection per year OR conduct random site inspections to ensure that land use restrictions are maintained	Long. If the accepted definition of "industrial" changes to include uses at other sites that are not acceptable for the Mound Plant, steps can be taken to ensure that these uses do not occur at Mound.	Report violation to the DOJ, so that they may take action. Ideas for additional contingency plan components: • Evaluate the ongoing activity per the RRE to determine the risk it poses. Take appropriate action based on results • Conduct education seminar

Legend: = Rating of High
= Rating of Moderate
= Rating of Low

#	Expected Condition	Deviation (Risk Scenario)	Probability	Impact	Monitoring /Management Approach	Time to Respond	Contingency Plan
Third Priority Scenarios (Level 3)							
11	The CERCLA AR remains complete.	Loss or loss of access to a portion of the CERCLA AR (e.g., due to lack of care, mold, rats, misplacement).	Moderate The core team assumes that the Administrative Record (AR) will be kept in a Federal Records Center, reducing the probability that records will be lost (or access to records will be lost). In addition, there will be duplicate sets of the AR available (e.g., USEPA will retain a copy). Therefore, the probability of losing access to a portion of the AR is moderate.	Moderate: Cost & Perception [Health impacts are low] Rationale (Cost & Perception): The impact would not be high because there are going to be duplicate copies of the AR. If some records are lost from the AR, they should be retrievable from another source (e.g., USEPA, OEPA). The biggest concern is the inability to access documents required for litigation or for understanding how to best manage the site. If records cannot be re-assembled, DOE may need to collect additional data at the site, thus incurring additional costs. Rationale (Health): Loss or loss of access to a portion of the CERCLA administrative record will not have a health impact.	Currently planned: • Currently preparing to meet CERCLA and FFA AR requirements, although the exact method is unknown • Place records in Federal Records Center • Provide copy of administrative record to Mound Museum • Duplicate sets of the AR available (e.g., USEPA will retain a copy) • Define records as "vital" so that an additional copy is stored	Moderate. Records may not be immediately required. There will likely be a limited amount of time to re-assemble or gather information.	Under Development Ideas for potential contingency plans: • Re-assemble the AR from the duplicate copies (if possible) • Compile other historical data that may be available to supplement or reconstruct remainder of AR • Resample area(s) in question or, if possible, fill data gaps with long-term monitoring data

Legend: = Rating of High
= Rating of Moderate
= Rating of Low

#	Expected Condition	Deviation (Risk Scenario)	Probability	Impact	Monitoring /Management Approach	Time to Respond	Contingency Plan
Third Priority Scenarios (Level 3)							
12	Monitoring data are interpreted correctly.	New monitoring data are not interpreted correctly. Particularly of concern is that the party responsible for monitoring data is not familiar with site-specific conditions. The result could be that new data are interpreted incorrectly to indicate that further action or additional data collection is warranted at the site (e.g., high concentrations of certain metals in the groundwater may be due to corrosion of the well casings).	Moderate [The probability of this scenario resulting in health impacts is low] Rationale: In the future, the probability that monitoring data will be misinterpreted increases to moderate due to loss of institutional memory (e.g., interpretation of data by someone unfamiliar with the site) or human error. Note: The probability of misinterpreted data resulting in health risks is extremely low.	Moderate: Cost, Perception & Health Rationale (Cost & Perception): The core team agreed that an error in interpreting new monitoring data could lead to costs for additional investigation or unnecessary action. The sooner the error is caught, the less costly the mistake will be. Rationale (Health): In an extreme case, misinterpreted data could lead to potential health risks.	Under consideration: • Maintain institutional knowledge (i.e., personnel with Mound-specific knowledge to review monitoring data) • Prior to transfer, document lessons learned from monitoring at the site (e.g., past inconsistencies with monitoring data and reasons why they exist) • Train new personnel in Mound-specifics that may cause confusion	Short to moderate. The core team expects that errors associated with monitoring data could be corrected quickly, thus reducing the level of impact. If data are interpreted incorrectly (i.e., wrongly indicating further action or further investigation is needed), that action will take time to plan. However, the sooner the error is caught, the less costly the mistake will be.	Under Development Ideas for potential contingency plans: • When data analysis indicates that additional action may be required, request that an expert in the field (preferably with experience at Mound) provide an independent interpretation of the data. This will improve public perception and provided additional weight to the corrected data

Legend: = Rating of High
= Rating of Moderate
= Rating of Low

#	Expected Condition	Deviation (Risk Scenario)	Probability	Impact	Monitoring /Management Approach	Time to Respond	Contingency Plan
Third Priority Scenarios (Level 3)							
13	Onsite BVA Aquifer water is not used for industrial processes without approval.	Use of onsite BVA aquifer without approval for industrial processes.	Moderate Rationale: The probability of occurrence increases to moderate over time due to the loss of institutional memory.	Moderate: Health & Perception Rationale (Health): Although this resource use is excluded in the deed, the core team did not believe it would have a high health impact since it does not include consumption as an exposure pathway. This risk scenario was not evaluated in the RRE. Rationale (Perception): Perception impacts could be high if the site is used in a manner not consistent with the deed restrictions. Perception impacts will likely increase the longer that the aquifer is used for industrial processes.	Currently planned: • Switch site to city water supply • Deed restrictions • Property leases • Review per O&M Plan (e.g., annual parcel walkover) and/or per CERCLA 5-year review • Regulator independent authority • Ohio right of enforcement • State/county well permit program • Mound Plant O&M Plan Under consideration: • Neighborhood watch program • Geophone (acoustic monitoring) technology to monitor for well-drilling (Pilot project phase) • Ongoing community education (e.g., annual newspaper article) • Require more than one physical inspection per year OR conduct random site inspections to ensure that groundwater use restriction is maintained	Moderate. Minimizing duration of exposure directly reduces severity of impact.	Report violation to DOJ, so that they may take action. Ideas for additional contingency plan components: • Stop use of onsite BVA aquifer and provide city water • Abandon well(s) • Evaluate the potential impact to health associated with exposure. Take appropriate action based on results • Conduct education seminar

Legend: = Rating of High; = Rating of Moderate; = Rating of Low

#	Expected Condition	Deviation (Risk Scenario)	Probability	Impact	Monitoring /Management Approach	Time to Respond	Contingency Plan
Third Priority Scenarios (Level 3)							
14	The records retrieval system works accurately and provides correct information.	Records retrieval system results in someone getting incorrect information.	Moderate Rationale: In the future, it is possible that the records retrieval system will not function correctly due to technological or human error.	Moderate: Perception & Cost Rationale (Cost & Perception): The public may believe that long-term stewardship is not being conducted effectively. In addition, an error in receiving information could lead to additional costs for additional investigation. However, errors associated with records retrieval and monitoring technologies could be corrected quickly, thus reducing the level of impact. Note: There are no expected health impacts associated with an error in records retrieval.	Currently planned: • Currently developing the Document Management System, which includes key words in its coding	Short to moderate DOE should respond quickly to minimize negative perceptions about the effectiveness of long-term stewardship.	Under Development Ideas for potential contingency plans: • Upon discovery of error, provide correct document • If error was a result of a retrieval system failure, correct problem • If it appears that additional action is required, re-evaluate to determine if there has been an error in records retrieval prior to planning action

Legend: = Rating of High
= Rating of Moderate
= Rating of Low

#	Expected Condition	Deviation (Risk Scenario)	Probability	Impact	Monitoring /Management Approach	Time to Respond	Contingency Plan
Third Priority Scenarios (Level 3)							
15	MMCIC/City succeeds in developing site for industrial use	MMCIC/City does not succeed in developing Site for industrial use. Lack of industrial park increases the probability that a deed restriction may be violated	Moderate Rationale: It is possible that MMCIC will not receive the funding support needed or the leasers necessary to succeed in developing the site for industrial use.	Moderate: Health & Perception Rationale (Health & Perception): If an industrial park is not in place, the land could be used inappropriately, potentially resulting in both health and perception impacts. Note: Depending upon the outcome and type of use of the property, the health and perception impacts could range from low to high. The impacts of various land uses, including specific deed violations, are evaluated as separate deviations in this risk management matrix.	Currently planned: • Tiered approach to ICs, involving agencies other than DOE • Review per O&M Plan (e.g., annual parcel walkover) and/or per CERCLA 5-year review • Regulator independent authority • Ohio right of enforcement • Mound Plant O&M Plan • Mound Museum for education Under consideration: • Neighborhood watch program • Ongoing community education (e.g., annual newspaper article)	Moderate. The health & perception impacts should be small during the time it would take to find another suitable use or landlord for the site.	Under Development Ideas for potential contingency plans: • DOE or another federal, state, or local agency takes on an on-site presence at the site (e.g., City of Miamisburg relocates offices onsite) • Fence site to ensure land use restrictions are maintained • Increase number of physical inspections required per year OR conduct random site inspections to ensure that land use is maintained

Legend: = Rating of High
= Rating of Moderate
= Rating of Low

#	Expected Condition	Deviation (Risk Scenario)	Probability	Impact	Monitoring /Management Approach	Time to Respond	Contingency Plan
Third Priority Scenarios (Level 3)							
16	DOJ will take a sufficient level of action following a violation of a deed restriction.	DOJ does not take any action following a violation of a deed restriction.	Moderate Rationale: Because DOJ is a Federal agency with national responsibilities, it is possible that DOJ may choose not to take any action following a violation of a deed restriction.	Moderate: Perception & Health Rationale (Perception & Health): If DOJ chooses not to take any action following a deed restriction, it could become increasingly difficult to enforce the land use restrictions, resulting in a moderate perception and health impact. It is important to note, however, that the planned, layered management approach will reduce the impacts that the lack of DOJ action could have. Note: The impacts evaluated here are simply those associated with DOJ choosing not to take action following a deed violation. The impacts of specific deed violations are evaluated as separate deviations in this risk management matrix.	Currently planned: • Tiered approach to ICs, involving agencies other than DOE	Short to moderate depending on violation.	• OEPA initiates legal proceedings using the right to enforce deed restrictions granted by DOE through the deed • OEPA and/or USEPA take action against • DOE based on a violation of the ROD Ideas for potential contingency plans: • DOE, USEPA or OEPA take additional action

Legend: = Rating of High
= Rating of Moderate
= Rating of Low

#	Expected Condition	Deviation (Risk Scenario)	Probability	Impact	Monitoring /Management Approach	Time to Respond	Contingency Plan
Third Priority Scenarios (Level 3)							
17	The CERCLA AR remains complete.	Catastrophic event (e.g., flood, fire) destroys DOE's entire CERCLA Administrative Record. Records not available if needed for litigation purposes or for understanding the actions taken at the Site and the rationale for these actions.	Low Rationale: The core team assumes that the administrative record will be kept in a Federal Records Center. In addition there will be a duplicate sets available (e.g., EPA will also retain a copy). Thus the probability of destroying the entire record becomes very small.	High: Cost & Perception Rationale (Cost & Perception): This scenario would eliminate all site records, leading either to additional costs for investigation or potential mismanagement of the site.	Currently planned: • Preparing to meet CERCLA and FFA requirements / retention schedules (i.e., NARA requirements) • Place records in Federal Records Center • Duplicate sets available (e.g., USEPA will also retain a copy) • Duplicate sets of the AR available (e.g., USEPA will retain a copy) Under consideration: • Define records as "vital" so that an additional copy is stored • Provide copy of administrative record to Mound Museum	Moderate. Records may not be immediately required and there will likely be a limited amount of time to re-assemble information.	Under Development Ideas for potential contingency plans: • Re-assemble the AR from the duplicate copies (if possible) • Compile other historical data that may be available to supplement or reconstruct remainder of AR • Resample area(s) in question or, if possible, fill data gaps with long-term monitoring data

Legend: = Rating of High
= Rating of Moderate
= Rating of Low

#	Expected Condition	Deviation (Risk Scenario)	Probability	Impact	Monitoring /Management Approach	Time to Respond	Contingency Plan
Third Priority Scenarios (Level 3)							
18	Current cleanup levels are and will continue to be considered protective in the future and monitoring technologies are able to demonstrate that contaminatio n is at or below cleanup levels.	Changes in cleanup levels result in: 1) the site no longer being considered protective in the future, and/or 2) in place monitoring technologies unable to demonstrate that contamination is at or below cleanup levels (e.g., due to detection limits).	Low Rationale: The core team agrees that cleanup criteria will change; however, It is extremely unlikely that a change in cleanup criteria will result in the site no longer being considered protective of human health and the environment. The core team believes that the remedy will continue to be protective, even if the cleanup levels change, because of the degree of conservatism used for determining the health impacts of the residual contamination at the site.	High: Health, Cost & Perception Rationale (Health, Cost & Perception): If cleanup levels change such that the site is no longer considered protective, there will be high cost and perception impacts, and potentially high health impacts.	Currently planned: • CERCLA 5-Year Review. DOE and regulators will determine if toxicological values (slope factors) have changed and evaluate the impact of these changes Under consideration: • Define evaluations that would be necessary to evaluate impact to site workers so that they can be conducted quickly • Define post-closure community involvement process	Short. In terms of implementing the new standard, DOE will likely have a long time to respond. However, DOE will have to move quickly to educate and respond to workers, the general public and the media. DOE will have to address the amount of change, the reasons for the change, and the impact of the change.	Under Development Ideas for potential contingency plans: • Re-evaluate protectiveness of the site given the new cleanup criteria • Replace monitoring technologies (if necessary) with ones that will detect to new standards protection • Conduct additional response actions, if necessary • Conduct education seminar

Legend: = Rating of High
= Rating of Moderate
= Rating of Low

#	Expected Condition	Deviation (Risk Scenario)	Probability	Impact	Monitoring /Management Approach	Time to Respond	Contingency Plan
Third Priority Scenarios (Level 3)							
19	Site is used for industrial land use only, as specified by the deed.	Site is used for farming activities. This scenario includes the possibility that the onsite BVA aquifer is used for irrigation.	Low Rationale: The core team agreed that the probability for farming to take place at some point in the future is very low. Land use in the Miamisburg area has increasingly become residential, commercial and industrial. Farming has continued to decrease.	High: Health, Cost & Perception Rationale (Health): If farming were to occur, there could be high health impacts because of consumption of the crops. The actual health impacts would depend upon the type of crop and its ability for contaminant uptake, as well as the characteristics of the receptor. This scenario was not evaluated in the RRE. Rationale (Cost & Perception): Perception impacts could be high if the site is used in a manner not consistent with the deed restrictions. If perception impacts are high, DOE will likely have high costs associated with addressing those perceptions. Cost and perception impacts will likely be worse the longer that the farming activities have occurred.	Currently planned: • Tiered approach to ICs, involving agencies other than DOE • Deed restrictions • Property leases • Review per O&M Plan (e.g., annual parcel walkover) and/or per CERCLA 5-year review • Regulator independent authority • Ohio right of enforcement • Mound Plant O&M Plan Under consideration: • Ongoing community education (e.g., annual newspaper article) • Require more than one physical inspection per year OR conduct random site inspections to ensure that land use restrictions are maintained	Moderate. Minimizing the duration of exposure directly reduces severity of impact.	Report violation to DOJ, so that they may take action. Ideas for additional contingency plan components: • Evaluate the potential impact to health associated with exposure. Take appropriate action based on results • Conduct education seminar

Legend: = Rating of High
= Rating of Moderate
= Rating of Low

#	Expected Condition	Deviation (Risk Scenario)	Probability	Impact	Monitoring /Management Approach	Time to Respond	Contingency Plan
Third Priority Scenarios (Level 3)							
20	Seeps will not be used for any purpose.	Water from the seeps is used for drinking.	Low Rationale: The seeps produce very little water; therefore, the probability of using the seeps for drinking water is incredibly low.	High: Health Rationale: Currently, the health impacts could be high because the seep water is above MCLs.	Currently planned: • Deed restrictions • City's I-2 zoning ordinance • Mound Plant O&M Plan • Mound Museum Under consideration: • Ongoing community education (e.g., annual newspaper article)	Short. Contamination concentrations may be above MCLs; however it is not clear if they are high enough for acute exposure risks.	Report violation to DOJ, so that they may take action. Ideas for additional contingency plan components: • Evaluate the potential impact to health associated with exposure. Take appropriate action based on results • Implement education seminar • Post signs • Fence-off seep area

Legend: = Rating of High
= Rating of Moderate
= Rating of Low

#	Expected Condition	Deviation (Risk Scenario)	Probability	Impact	Monitoring /Management Approach	Time to Respond	Contingency Plan
Third Priority Scenarios (Level 3)							
21	Onsite Bedrock Aquifer water is not used for human consumption without approval.	The onsite Bedrock Aquifer is used for drinking water without approval. This activity is specifically excluded by the deed.	Low. Rationale: Because the onsite bedrock aquifer produces such a small yield, the probability of using it for drinking water is very low.	High: Health The health impact could be high based on output from the risk model. (Actual health impacts would depend on the location of the well, the concentrations of contaminants in the water, the quantity of water consumed, the duration of exposure and characteristics of the receptor.) This scenario was not evaluated in the RRE.	Currently planned: • City water supply • Deed restrictions • Property leases • Review per O&M Plan (e.g., annual parcel walkover) and/or per CERCLA 5-year review • Regulator independent authority • Ohio right of enforcement • State/County well permit program • Mound O&M Plan Under consideration: • Neighborhood watch program • Geophone (acoustic monitoring) technology to monitor for well-drilling • Ongoing community education (e.g., annual newspaper article) • Require more than one physical inspection per yr OR conduct random site inspections to ensure that groundwater use restriction is maintained	Moderate. Minimizing duration of exposure directly reduces severity of impact. Also, perception problems will likely be worse the longer the aquifer is used for drinking.	Report violation to DOJ, so that they may take action Ideas for additional contingency plan components: • Evaluate potential impact to health associated with exposure. Take action, if necessary • Close/abandon groundwater wells • Conduct education seminar

Legend: = Rating of High; = Rating of Moderate; = Rating of Low

Attachment C: Risk Scenarios Rated as Fourth Priority

Fourth Priority (Level 4)				
#	Scenario	Probability	Impact	Comments
1	Mound museum located onsite	High	Low	Even though the core team agreed that this uncertainty should be rated as a high probability/low impact scenario, they rated it as fourth priority. The reason for this rating is that they believe the museum will be located onsite. Based on an assumed exposure associated with visiting the museum, there should be no health impact. (This scenario is an expected condition) This scenario was not evaluated in the RRE.
2	Jogging path/biking path located onsite	High	Low	Even though the core team agreed that this uncertainty should be rated as a high probability/low impact scenario, they rated it as fourth priority. The reason for this rating is that they believe a jogging/biking path will be located onsite. Based on the assumed exposure associated with using the jogging/biking path, there should be no health impact. (This scenario is an expected condition.) This scenario was not evaluated in the RRE.
3	Loss or loss of access to a portion of the CERCLA Information Repository	High	Low	Even though the core team agreed that this uncertainty should be rated as a high probability/low impact scenario, they rated it as fourth priority. The reason for this rating is that they believe that the probability of losing a portion of the Information Repository is high in the out years (i.e., more than 10 years following transfer of the site). The IR comprises those documents that provide back-up information to the Administrative Record. The Administrative Record will provide sufficient documentation of the restoration conducted at the site and the remaining contamination without the IR. Therefore, a loss of a portion of the IR will be inconsequential since several copies of the Administrative Record will be maintained.

Fourth Priority (Level 4)				
#	Scenario	Probability	Impact	Comments
4	Fish grow in pond and are consumed	Moderate	Low	Industrial use of the site should limit the possibility of occurrence; however, even if fish grow in the pond and are consumed, the core team does not believe there would be a health impact. This belief is based on current sampling results and the volume of fish that would need to be consumed over a long period of time. This scenario was not evaluated in the RRE.
5	Falling into pond	Moderate	Low	The core team agreed that falling into an onsite pond should not result in health risks due to current residual contamination levels in the ponds. This scenario was not evaluated in the RRE.
6	Playing/Swimming in pond	Moderate	Low	Industrial use of the site should limit the possibility of occurrence. The core team agreed that playing or swimming in an onsite pond should not result in health risks due to current residual contamination levels in the ponds and the amount of exposure time needed to result in an exposure. This scenario was not evaluated in the RRE.
7	A flood / heavy rains / erosion results in movement of large quantities of soil from the Mound Plant	Low	Moderate	The probability of a hotspot from one of these events is very low. For the hotspot to have a high health impact, the volume and/or concentration of the hotspot would need to be sufficient to meet the exposure scenario. In addition the effect of the hotspot may be diluted at its final destination point when it mixes with other soils, causing the concentration of contaminant to be lower. This scenario was not evaluated in the RRE.
8	Tornado results in movement of large quantities of soil from the Mound Plant	Low	Moderate	Such events have the probability of a hotspot being removed is very low. For the hotspot to have a high health impact, the volume and/or concentration of the hotspot would need to be sufficient to meet the exposure scenario. In addition the effect of the hotspot may be diluted at its final destination point when it mixes with other soils, causing the concentration of contaminant to be lower. This scenario was not evaluated in the RRE.

Fourth Priority (Level 4)				
#	Scenario	Probability	Impact	Comments
9	Onsite Bedrock Aquifer: Irrigation of plants that are not typically consumed by people.	Low	Low	This activity is specifically excluded by the deed. Because the bedrock aquifer produces such a small yield, the probability of using it for irrigation is very low. In addition, the Site will be hooked up to municipal water. Even if the aquifer were used for irrigation in this way, the health impact should be low based on the limited exposure pathway. This scenario was not evaluated in the RRE.
10	Use of the onsite BVA aquifer without approval for firefighting, construction, or irrigation of plants that are not typically consumed by people.	Low	Low	This activity is specifically excluded by the deed. The core team felt that the probability of this occurring would be low, especially because the Site will be hooked up to municipal water. However, even if the onsite BVA aquifer were used for these purposes, the health impact should be low based on the limited exposure pathway. Presently, the onsite BVA is used to supply water to the fire distribution system. Once the site has been transferred and the municipal water supply is hooked up and functioning, this scenario would then apply.
11	Catastrophic event (e.g., flood, fire) destroys entire CERCLA Information Repository	Low	Low	The IR comprises those documents that provide back-up information to the Administrative Record. The Administrative Record will provide sufficient documentation of the restoration conducted at the site and the remaining contamination without the IR. Therefore, a loss of a portion of the IR will be inconsequential since several copies of the Administrative Record will be maintained. Further, the core team believed there was a low probability that the entire IR would be destroyed.
12	Occupant uses facility in a manner different than expected in the RRE (e.g., works over a 40-hour workweek for periods of time approximating exposure scenarios in RRE)	Low	Low	The core team believed that the probability of an occupant using the facility in a manner different than expected in the RRE over a long period of time was low. Even if this scenario were to occur, the core team believes there should be a low health impact, due to the conservatism in the risk evaluation used for determining the health impacts of the remaining contamination at the site.

Fourth Priority (Level 4)				
#	Scenario	Probability	Impact	Comments
13	Burning of vegetation that has absorbed contamination through uptake, resulting in dispersion via suspension of contaminated particulate matter	Low	Low	The core team believes there is a low probability of burning vegetation dispersing contamination. However, even if this scenario were to occur, the core team concurs that it should have a low health impact based on the limited exposure pathway and time.
14	Another federal agency takes over, changing the management practices at the site	Low	Low	As long as a federal agency has responsibility for stewardship of the site, the core team believes that there would be low to no change in the health impact.

Attachment D: Baseline Scenario (ICs and Land Use Controls Assumed to be in Place at the Mound Plant at the Time of Transfer)

Land Use Restrictions/ICs

1. No movement of soil offsite without approval
2. No exposure to or use of groundwater without approval
3. Industrial land use

Systems to enhance ICs

1. Regulators maintain independent police power authority
2. State of Ohio exercises right, granted by the DOE, to enforce the covenants of the Quitclaim deed.
3. County well permit program
4. City construction permit program
5. City's I-2 zoning ordinance
6. Mound Reuse Committee's Interim Land Use Policy
7. Property leases
8. Requirements of City overlay zone
9. Site soil management plan (MMCIC)
10. CERCLA Five-Year Review
11. Mound Plant Operation and Maintenance Plan for Implementation of Institutional Controls
12. Groundwater monitoring system

Notification / Education systems

1. 1-800 "Call before you dig" program
2. City plat for former DOE-Mound Site
3. Mound Museum Association

Attachment E: Uncertainties / List of Scenarios of Potential Concern

I. Quit Claim Deed Restrictions

A. **Industrial Use:** Site will be used only for industrial use and there will be no activities that could result in the chronic exposure of children less than 18 yrs of age to soil or groundwater from the Premises.

Scenarios that cause restriction to be violated:

1. Site is used for farming activities
2. Single or multifamily dwellings or rental units are constructed on the site
3. A day care facility is constructed or operated on the site
4. A school or other educational facility for children under 18 yrs of age is constructed or operated at the site
5. A community center, playground or other recreational or religious facility for children under 18 years of age is constructed at the site.

Other scenarios of concern that were considered:

1. Site used for commercial activities that result in the chronic exposure of children under 18 (e.g., restaurant, hospitals, eldercare)
2. Worker (full-time or part-time) who is less than 18 years of age.
3. Site is used for recreational purposes
4. Trespassing for the purpose of off-roading
5. Boundaries of site are lost over time
6. Definition of "industrial" land use changes in future to include scenarios that are currently prohibited.
7. Changes in current cleanup levels result in the site no longer being considered protective in the future.
8. Occupant uses facility for non-industrial purposes
9. Company workers work over 40-hour workweek for extended period of time.

B. **Groundwater:** The groundwater underlying the premises is not consumed, exposed or used in any way without the prior written approval of the USEPA and OEPA.

Scenarios that may cause restriction to be violated:

Perched aquifer

1. Well placed into the perched aquifer
2. Onsite use of water for irrigation (non-consumption) without approval
3. Onsite use of water for drinking without approval

Onsite BVA aquifer

1. Well placed into the onsite BVA aquifer
2. Onsite use of water for irrigation (consumption) without approval
3. Onsite use of water for irrigation (non-consumption) w/out approval
4. Onsite use of water for industrial/commercial processes without approval
5. Onsite use of water for fighting fires without approval

6. Onsite use of water for drinking without approval
7. Onsite use of water for construction uses without approval

Seeps
1. Water from the seeps is used for drinking
2. Water from the seeps is used for irrigation (non-consumption)
3. Children play in the seep area

C. **Soils:** Soils will not be removed from the Mound Plant without approval from the ODH and the OEPA or their successor agencies.

Scenarios that may cause restriction to be violated:
1. Movement of soil offsite to a landfill without approval
2. Movement of soil offsite for private use without approval
3. Movement of soil offsite to another industrial site without approval
4. Movement of soil offsite for recreational use without approval
5. Movement of soil offsite for a facility for children under 18 years of age
6. A flood results in movement of large quantities of soil from the Mound Plant
7. Tornado results in movement of large quantities of soil from the Mound Plant

II. Required Management Practices

A. Records Management

Scenarios that may cause a risk to the management practice being maintained:
1. Catastrophic event (e.g., flood, fire) destroys DOE's entire CERCLA Administrative Record.
2. Catastrophic event (e.g., flood, fire) destroys entire CERCLA Information Repository.
3. Loss or loss of access to a portion of the CERCLA Administrative Record.
4. Loss or loss of access to a portion of the CERCLA Information Repository.
5. New monitoring data are not interpreted correctly.
6. Records retrieval system results in someone getting incorrect information
7. DOE does not provide required report (e.g., annual report, required monitoring data)

B. Stewardship Technologies

Scenarios that may cause a risk to the management practice being maintained:
1. Monitoring technologies do not function as intended
2. Insufficient funding to maintain or upgrade equipment /software as necessary
3. Rapid advances in records imaging and retrieval technology make previous records unreadable.
4. Cleanup standards will change and technology in place at the site will no longer meet need
5. System for monitoring (including the automated portions and the person at end that makes decision) breaks down at some point in the chain of events.

III. Exposure Scenarios of Potential Concern:

A. **Exposure to Surface Water**

Scenarios of concern that were considered:

1. Consumption of fish caught in onsite pond
2. Playing / swimming in pond
3. Accidentally falling into pond

B. **Fire at the Site**

Burning of vegetation that has absorbed contamination through uptake, resulting in dispersion via suspension of contaminated particulate matter

C. **Unknown Contamination**

Exposure occurs due to presence of unknown contamination

IV. Other scenarios that may present a risk to effective long-term stewardship:

A. No central oversight / presence (e.g., MMCIC).
B. The site becomes an "orphan" (i.e., DOE leaves, provides no funding)
C. Budget cuts restrict stewardship activities
D. DOE abolished and a new federal agency takes over, changing the management practices at the site
E. DOJ fails to take action following violation
F. OEPA or USEPA believes that DOJ has taken insufficient level of action following violation

Attachment F: Overall Risk Scoring Matrix

Probability of Occurrence		Impacts		
		Low	Moderate	High
	High	– Children play in the seep area – Needed records/data (e.g., for litigation, public concern) are not readable or available resulting in either Federal liability or re-work (e.g., sampling). – Budget cuts result in reducing activities; the activities are in addition to ROD requirements – No central oversight/onsite presence – System for monitory breaks down at some point in the chain of events – Worker who is less than 18 yrs of age is employed at the site – DOE does not provide a required report – OEPA believes that DOJ has taken insufficient level of action following violation – Trespassing for the purpose of off-roading. – Mound museum constructed onsite[11] – Jogging/biking path constructed onsite[12] – A portion of the Information Repository is lost[13]	– Post-closure workers later get sick and think it's due to work at Mound	– Exposure occurs due to presence of unknown contamination – Movement of soil offsite without approval
	Moderate	– Fish grow in pond and are consumed – Falling into pond – Playing/swimming pond	– Definition of industrial land use changes to include scenarios that are not specifically excluded by the deed. – Loss or loss of access to a portion of the CERCLA Administrative Record – New monitoring data are misinterpreted – Use of onsite BVA aquifer for industrial processes w/out approval – Records retrieval system results in someone getting incorrect information – MMCIC/City does not succeed in developing the site for industrial use – DOJ doesn't take action following a violation	– Budget cuts result in reducing activities required by the ROD – Boundaries of the site are lost over time – Site is used for a land use that is not allowed under the deed (residential, day care facility, school, community center, playground, health-care related commercial activities or non-health care related commercial activities) – Site is used for a land use that is not anticipated based on the industrial land use designation. – Onsite BVA aquifer is used for drinking water without approval

[11] Although the core team agreed that there was a high probability of occurrence and a low impact for this scenario, the core team also agreed that this uncertainty should be a fourth priority scenario. The rationale for this decision is included in Table 2.

[12] See Footnote 3.

[13] See Footnote 3.

	Low	– Onsite bedrock aquifer used for irrigation of non-consumable plants – Use of the onsite BVA aquifer without approval for firefighting, construction, or irrigation of plants that are not typically consumed by people – CERCLA Information Repository destroyed – Facility used differently than RRE – Burning vegetation results in dispersion of contamination – Another federal agency takes over changing the management practices at the site	– Flood/rains/erosion result in the movement of large quantities of soil from the Mound Plant. – Tornado results in movement of large quantities of soil from the Mound Plant.	– Entire CERCLA Administrative Record is destroyed – Changes in cleanup levels result in: 1) the site no longer being considered protective in the future, and/or 2) in place monitoring technologies unable to demonstrate that contamination is at or below cleanup levels – Site is used for farming – Water from the seeps is used for drinking – The onsite Bedrock Aquifer is used for drinking water without approval.

Attachment G: Scenarios Eliminated from Review

Several scenarios considered during the review were removed because the core team agreed that they were considered under other scenarios. Following is a list of scenarios and the reason for removal or why they were merged or separated

Scenario	Modifications & Comments
The site becomes an "orphan" (i.e., DOE leaves, provides no funding).	The core team considered that this scenario had been evaluated under the scenarios that address the impact of budget cuts on stewardship (i.e., this is basically the most extreme scenario associated with budget cuts). See Second Priority (Level 2) #1 and Third Priority (Level 3) #3.
Movement of soil offsite sub-scenarios.	The movement of soil offsite scenario was originally several separate scenarios based on the end use of the soil. The core team agreed that the end use of the soil was not the decisive factor in the management approach; rather, the important factor to focus on was the soil leaving the site. All the scenarios were merged into one. See Top Priority (Level 1) #2.
Industrial park fails	The core team considered that this scenario had been evaluated as part of the scenarios that involve land use changes not allowed by the deed. See Second Priority (Level 2) #3 & #4 and Third Priority (Level 3) #9, #10, #13 & #20
Budget cuts restrict stewardship activities	The core team agreed that the probability of a budget cut varied depending on whether the stewardship activity was necessary due to a legally binding document or was being conducted in addition to basic requirements. For this reason the core agreed to split this scenario into two different scenarios. The first scenario addresses stewardship activities required by the ROD and the second addresses stewardship activities that are conducted in addition to the ROD. See Second Priority (Level 2) # 1 and Third Priority (Level 3) #3.
Onsite BVA aquifer used for irrigation of consumable crops without approval	The core team agreed that this scenario was best evaluated under the risk scenario that the site was used for farming because the onsite BVA aquifer would not be used for irrigation of consumable crops onsite unless farming was conducted onsite. Therefore, this scenario was combined with Third Priority (Level 3) #19.

Scenario	Modifications & Comments
Onsite bedrock aquifer used for irrigation of consumable crops without approval	The core team agreed that this scenario did not need to be evaluated because the onsite bedrock aquifer does not produce enough water for irrigation. If onsite irrigation were to occur, the only feasible aquifer to provide water would be the onsite BVA aquifer. (See above)
Seeps used for irrigation of non-consumable crops	The core team agreed that this scenario should be eliminated from the evaluation because: 1) the seeps do not produce enough flow to use the water for irrigation, and 2) even if the seep water could be used for irrigation of non-consumable crops, the only exposures of concern are dermal and ingestion. These exposure scenarios are already being evaluated in Third Priority (level 3) #1 and #20.