NUCLEAR REGULATORY COMMISSION

[Docket No. 40-3392, NRC-2011-0143]

Environmental Assessment and

Finding of No Significant Impact for

Source Material License SUB-526

Amendment Request from Honeywell for

Decommissioning of

Ponds B, C, D, and E, at

Honeywell Metropolis Works,

Metropolis, Illinois

Office of Nuclear Material Safety and Safeguards

Division of Fuel Cycle Safety and Safeguards

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INTRODUCTION

The U.S. Nuclear Regulatory Commission (NRC) is considering the amendment of source material license SUB-526, held by Honeywell International, Inc. (Honeywell), to approve Honeywell's proposed Decommissioning Plan for Ponds B, C, D, and E at Honeywell's Metropolis Works (MTW) plant in Metropolis, Illinois.

By letter dated December 2, 2010, (Agencywide Document Access Management System [ADAMS] Accession No. ML103400456) Honeywell submitted a request to amend Source Material License, SUB-526, for the MTW uranium hexafluoride (UF_6) facility to approve the Decommissioning Plan for Ponds B, C, D, and E. At the MTW facility, uranium conversion services have been performed for the commercial nuclear power industry since the facility was originally licensed by the NRC's predecessor agency, the U.S. Atomic Energy Commission, in 1958. The current license was renewed by the NRC on May 11, 2007, for a 10-year period (ML062140705). The Environmental Assessment (EA) in support of the license renewal resulted in a Finding of No Significant Impact (FONSI) (ML061780260), and was published in the Federal Register (FR) on August 10, 2006 (71 FR 45862).

The National Environmental Policy Act of 1969, as amended (NEPA), 42 USC 4321 et.seq., requires Federal agencies, as part of their decision-making process, to consider the environmental impacts of actions under their jurisdiction. NRC has promulgated regulations to implement NEPA requirements; these regulations are contained in 10 CFR Part 51,

"Environmental Protection Regulations for Domestic Licensing and Related Regulatory Programs." Because amendment of Honeywell's license as Honeywell requested is not an action categorically excluded from further environmental review under 10 CFR 51.22, NRC has prepared this Environmental Assessment (EA) in accordance with 10 CFR 51.21, "Criteria for and identification of licensing and regulatory actions requiring environmental assessments."

This EA was initiated as a result of Honeywell's application for amendment of SUB-526 to approve a decommissioning plan for Ponds B, C, D, and E. The NRC staff has prepared this EA pursuant to 10 CFR Part 51 and applicable guidance from NUREG-1748, "Environmental Review Guidance for Licensing Actions Associated with NMSS Programs," Final Report, August 31, 2003 (ML032450279). The purpose of this EA is to assess the radiological and non-radiological environmental impacts of the proposed license amendment for this facility.

Documents used in preparing this EA include the following:

1. Honeywell Surface Impoundment Decommissioning Plan (ML103400456), including the 2-volume License Amendment Request (LAR) Report and Environmental Report (ML103420434).
2. Additional information provided by Honeywell, February 13, 2012 (ML12060A115).
3. Responses to Additional NRC Requests Regarding the Honeywell Metropolis Works LAR Report Volume 2: Closure Plan for Surface Impoundments B, C, D,&E, September 7, 2012 (ML12255A043).
4. EA for Renewal of NRC License No. SUB-526 for the Honeywell Specialty Materials Metropolis Works Facility, Docket No. 40-3392, June 2006, (ML061780260).
5. Illinois Emergency Management Agency letter to Mary Adams from Adnan Khayyat, May 10, 2013 (ML13142A276).

6. Illinois Environmental Protection Agency letter to Patricia Silva from Stephen F. Nightingale, May 16, 2013 (ML13142A275).
7. Illinois Historic Preservation Agency letter to Mary Adams from Anne E. Haaker, April 23, 2013 (ML13141A231).
8. U.S. Environmental Protection Agency - Region 5, letter to Mary T. Adams from Kenneth A. Westlake, May 30, 2013 (ML13155A488).
9. Supplemental Information for Pond Closure License Amendment Request, July 2, 2013 (ML13189A199).

ENVIRONMENTAL ASSESSMENT

Section 51.30(a) of Title 10 of the Code of Federal Regulations requires that an environmental assessment for proposed actions identify the proposed action and include a brief discussion of the need for the proposed action; alternatives to the proposed action; and the environmental impacts of the proposed action and alternatives; and a list of agencies and persons consulted and the identification of sources used.

Description of the Proposed Action

Honeywell is seeking a partial site unrestricted release and license termination for the 4 pond areas. The proposed federal action is to amend Honeywell's license SUB-526 to authorize Honeywell to perform the necessary decommissioning activities. NRC will release the former pond area from Honeywell's NRC license upon successful completion of the approved decommissioning activities. The license release will be effectuated in accordance with 10 CFR 40.42(k) through an administrative amendment to the license. The intent of the decommissioning plan is to meet the radiological criteria for license termination in 10 CFR 20.1402, radiological criteria for unrestricted use.

10 CFR 20.1402 states that, "[a] site will be considered acceptable for unrestricted use if the residual radioactivity that is distinguishable from background radiation results in a TEDE to an average member of the critical group that does not exceed 25 mrem (0.25 mSv) per year, including that from groundwater sources of drinking water, and the residual radioactivity has been reduced to levels that are as low as reasonably achievable (ALARA). Determination of the levels which are ALARA must take into account consideration of any detriments, such as deaths from transportation accidents, expected to potentially result from decontamination and waste disposal." SUB-526, License Condition 18 would be revised to include the following references to the amendment request:

- Amendment Request, dated December 2, 2010, as supplemented by letters on February 13 and September 7, 2012, regarding partial site release of the former Pond Area.

The ponds contain calcium fluoride (CaF_2), which was generated from treatment of hydrofluoric acid off-gas from the hydrofluorination process. In addition to the CaF_2, which is not subject to the NRC's jurisdiction, the ponds also contain low concentrations of uranium and thorium and their decay products, which are source material, as defined in 10 CFR 40.4, and to which this licensing action pertains.

The ponds are also Resource Conservation and Recovery Act (RCRA), Subtitle C facilities because, historically, the materials sent to the ponds had high pH and were characteristically hazardous for corrosivity in accordance with 40 CFR 261.22. Determining the conformance of the proposed ponds closure action with RCRA regulations is beyond the NRC's statutory authority. Other Federal and State agencies are authorized to issue permits and enforce the provisions of RCRA as they apply to the proposed action. These reviews and issuances of appropriate permits must be completed before Honeywell can close the ponds as proposed. The NRC's review of and action on Honeywell's proposed Decommissioning Plan

pertaining to the radiological constituents in the ponds does not excuse Honeywell from complying with other applicable Federal or State laws and regulations regarding the ponds.

MTW plans to close the retention ponds by stabilizing the contents of the ponds and constructing an engineered cover system that meets RCRA Subtitle C design criteria and NRC dose criteria for unrestricted release. The ponds' contents will be stabilized in place using a Portland cement or similar pozzolanic material. Bench studies on the viability of this method concluded that the stabilization would achieve three design objectives:

- Eliminating free liquids through removal or solidification;
- Stabilizing the pond material to achieve a bearing capacity sufficient to support the final cover; and
- Allowing construction of an engineered cover system that achieves the following:
  - Long-term minimization of the migration of liquids through the closed impoundment.
  - Minimal or no maintenance.
  - Proper surface water drainage and erosion protection of the final cover.

Following stabilization of the pond contents, an engineered cover will be constructed on each pond. The cover system design is described in detail in the LAR Report Volume 2 of 2, (Engineering Report, Appendix V) and in the Request for Additional Information (RAI) replies dated February 13 and September 7, 2012. In summary, cover construction will begin by placing soil fill material directly on top of the stabilized material to bring the pond content area up to grade with the existing berm. It is expected that the fill material will be obtained from both onsite and offsite borrow sources and will consist primarily of clayey silt/silty clay, which is prevalent in near surface layers throughout the site. The thickness of the fill will vary from pond to pond. A multi-layer engineered cover system will then be placed directly on the fill material. It is expected that the cover system above the borrow soil will include the following layers from top to bottom:

1. Vegetated topsoil and support soil: 2 feet thick;
2. Granular filter/drainage layer (sand and gravel): 1 foot thick;
3. Composite drainage net: <0.5 inch thick;
4. HDPE textured geomembrane: 0.06 inch thick;
5. Geosynthetic clay liner: <0.5 inch thick; and
6. Common fill soil on top the stabilized pond material to provide a subgrade for the cover system at or above the existing pond berm crest.

The minimum thickness of the engineered cover system is approximately 3 feet. The engineered cover system is designed to protect and contain the contents of the pond. The cover system design will minimize erosion by directing water flow off the relatively flat (4 percent slope) top cover to the designed riprap-protected berm side slopes and perimeter drainage ditches, and will prevent vegetative intrusion into the contaminated zone. The cover system soils consist of topsoil, vegetation support layer (clay and silt), and filter layer (sand with gravel). Due to the coarse-grained composition of the filter layer, it does not provide habitat for ecological receptors of concern (small burrowing mammals). Further, the coarse grained material will provide a measure of resistance to deeper root penetration. The geosynthetics (composite drainage net, geomembrane liner, and goesynthetic clay liner) all provide additional barriers to prevent mammals from burrowing into the impounded materials and from root penetration into the stabilized material. Stabilization of the pond contents will minimize the risk of damage due to seismic events. Although the cover system design does not specifically include a radon barrier or a frost/freeze barrier, the proposed cover system design will act as an effective frost freeze barrier given the frost depth and erosion rate in the geographic region and the amount of material that will remain after 1,000 years. Similarly, the materials used for the cover system are comparable to those used for cover systems designed specifically as radon

barriers at Uranium Mill Tailings Radiation Control Act (UMTRCA) sites. Consequently, the cover system will act as an effective radon barrier.

Consistent with NRC guidance in NUREG-1757, "Consolidated Decommissioning Guidance," only the passive performance of the cover system to mitigate radiological impacts may be credited in the dose assessment to demonstrate compliance with the License Termination Rule dose criteria. In addition, the assessment of performance of the cover system considers the reasonableness of a breach and the potential degradation of the barriers over time because monitoring and maintenance are assumed to not be active. Other reasonably foreseeable disruptive conditions from humans or natural events and processes were evaluated, and uncertainty in projecting the passive performance of the barriers was considered.

NRC assessed this pond closure approach for compliance with 10 CFR 20.1402 unrestricted release closure criteria. Engineering design details and an industrial worker scenario associated with pond closure were considered in the selection of appropriate input parameters for a dose modeling evaluation using Residual Radiation (RESRAD). The results of this assessment are detailed in the LAR report; NRC's evaluation of the assessment will be presented in the Safety Evaluation Report (SER) that will accompany the license amendment.

Need for the Pond Closures

Under the Atomic Energy Act of 1954, as amended (AEA), the NRC has the statutory authority to protect public health and safety and the environment related to the use of source, byproduct, and special nuclear material. One aspect of the responsibility is to ensure safe and timely decommissioning of the nuclear facilities that it licenses. Once licensed activities have ceased, licensees are required by NRC regulations in 10 CFR 40.42 to decommission their facilities and have their licenses terminated. The criteria for allowing the release of sites for unrestricted use are codified in 10 CFR Part 20, Subpart E, "Radiological Criteria for License Termination." Section 20.1402, "Radiological criteria for unrestricted use," states, in part, that a

site will be considered acceptable for unrestricted use following decommissioning if the residual radioactivity that is distinguishable from background radiation results in a total effective dose equivalent (TEDE) to an average member of the critical group that is less than 25 mrem (0.25 mSv) per year and the residual radioactivity has been reduced to levels that are ALARA. These criteria require that, through the decommissioning process, the residual radioactivity in buildings, equipment, soil, ground water, and surface water at the facility and its environs be reduced to such levels that the TEDE limits are satisfied.

In addition to NRC regulations described above, other Federal and State laws and regulations apply to the MTW. For example, the four ponds at MTW are regulated by the Illinois Environmental Protection Agency (IEPA) under a RCRA permit. One provision of the RCRA permit is related to a waiver from double-liner requirements of 40 CFR 264 (the RCRA waiver) granted in 1987 (ML13116A028) by U.S. Environmental Protection Agency (U.S. EPA). This waiver requires MTW to close the surface impoundments, by removing all waste, by December 31, 2020. Honeywell has requested a modification to the waiver that would allow the Ponds to be closed in place. Neither IEPA or U.S. EPA has made a decision on the waiver modification request.

Alternatives to the Proposed Action

The proposed action is the release of Ponds B through E from source materials license SUB-526. Six alternatives are associated with this action. The NRC evaluated these options regarding ultimate disposition of the pond area and their contents. The options identified are:

(1) No action;

(2) Removal and disposal of the pond contents followed by closure of Ponds B through E;

(3) Removal and recycling of the pond contents followed by closure of Ponds B through E;

(4) In-situ closure of Ponds B through E leaving the contents in the current condition;

(5) In-situ stabilization followed by closure of Ponds B through E; and

(6) Ex-situ stabilization followed by on-site placement in a newly-constructed cell.

Each alternative is discussed below.

(1) No Action

Under the no action alternative, MTW would not initiate decommissioning activities at the ponds. MTW would be required to maintain current radiological controls, site security, all applicable licenses and permits, and utilities. The no-action alternative requires MTW apply for and obtain an extension to the current IEPA permits and reach an agreement with IEPA as to the status of the retention ponds. The no-action alternative would be non-compliant with 10 CFR 40.42, “Expiration and termination of licenses and decommissioning of sites and separate buildings or outdoor areas, which includes requirements for timely decommissioning” (the timeliness rule). The purpose of the timeliness rule is to reduce potential risk to the public and the environment. Moreover, the ponds will require decommissioning eventually. Thus, the no-action alternative merely delays, rather than avoids, the impacts associated with the action alternatives.

This no-action alternative, as well as alternatives (4) and (5) listed above, would not comply with the 1987 RCRA waiver. As discussed above, Honeywell has requested a modification to the 1987 RCRA waiver, but as of the date of this EA, neither IEPA nor U.S. EPA has made a decision on the waiver modification request.

(2) Removal and Disposal of the Pond Contents

Under this alternative, radiologically-contaminated materials would be removed from the facility and disposed of at a facility licensed to accept the materials. On-site radioactive contamination would be reduced to levels considered acceptable for release for unrestricted use. The radiologically-contaminated materials would be transported from the facility via railcar. Construction/rehabilitation of roadways to support truck traffic between the ponds and the

railroad staging area would also be required. This alternative would result in increased noise and air emissions levels during the construction period. Because use of the pond area would be unrestricted following removal of the radiologically-impacted materials, the area could be redeveloped for additional industrial use. The long-term ecological value and aesthetic value of the area after release for unrestricted use are difficult to define, as the site will continue in operation as an industrial facility after release of the ponds from the license. The off-site disposal alternative is estimated to cost significantly more than the proposed action (section 6.5 of the Decommissioning Plan [ML130400456]). The potential for accidents during transport and high disposal cost significantly outweigh the minimal benefit to the plant from possible re-use of the pond areas. The potential impacts associated with this alternative are discussed below.

IEPA believes that removal of the Ponds contents is the only action available to Honeywell based on the existing minimum technology waiver and RCRA Part B permit. IEPA believes that removal of the Ponds contents removes any source of future groundwater contamination. NRC staff has determined that the proposed action complies with NRC regulations and provides adequate production of public health and the environment.

(3) Removal and Recycling of the Pond Contents

This action requires removal and transportation of the pond contents to a recycling facility or construction of a recycling facility at MTW. Recycling would then be followed by closure of Ponds B through E. Engineering evaluations for pond closure found that recycling was not technically feasible. As a result, this option is not a reasonable alternative to the proposed action.

(4) In-place Closure of Ponds B through E

This action requires construction of an engineered cover system while leaving the pond contents in their current condition. Physical property tests show that the pond contents without stabilization may not be able to remain cohesive in certain extreme seismic events. As a result, this option is less desirable than the proposed action.

This option would also not comply with the 1987 RCRA waiver. As discussed above, Honeywell has requested a modification to the 1987 RCRA waiver, but as of the date of this EA, neither IEPA nor U.S. EPA has made a decision on the waiver modification request.

(5) Stabilization and In-place Closure of Ponds B through E

This proposed action requires stabilization of the pond contents with Portland cement or similar pozzolanic material. Following stabilization of the pond contents, an engineered cover system will be constructed on each pond. This proposed action is estimated to cost approximately $30.4 million (Volume 2 of 2, Section 6.2, of the Decommissioning Plan [ML103400458]). Technical and engineering details of the stabilization process and the cover system design are provided in the LAR Report volumes 1 and 2 and in the RAI responses.

This approach meets regulatory requirements by:

- Eliminating free liquids through adding pozzolanic materials.
- Stabilizing the pond material to achieve a bearing capacity sufficient to support an engineered cover that provides:
    - Long-term minimization of the infiltration of water,
    - No maintenance to meet NRC closure requirements for unrestricted release,
    - Proper surface water drainage and erosion protection of the engineered cover.

This option would also not comply with the 1987 RCRA waiver. As discussed above, Honeywell has requested a modification to the 1987 RCRA waiver, but as of the date of this EA, neither IEPA nor U.S. EPA has made a decision on the waiver modification request.

(6) Ex-situ stabilization followed by on-site placement in a newly-constructed cell

Under this alternative, calcium fluoride pond materials would be stabilized through the addition of Portland cement or similar pozzolanic material, and placed in a newly-constructed onsite cell with an engineered RCRA cover and liner system. Honeywell would seek and select a site on the MTW property that is suitable for a new cell. The site would need to meet state

and local land use regulations. Honeywell would design a new cell of adequate capacity for the solidified ponds contents, the ponds liner systems, and any contaminated soils that might exist around or under the ponds. The new cell would meet state RCRA cell design requirements, including liner and cover system requirements, and Honeywell would apply for and receive a permit from Illinois EPA to construct the new cell.

After the new cell is permitted by IEPA and the new liner system constructed, Honeywell would mix the calcium fluoride pond materials with pozzolan before placing in the new cell. Pond materials could be solidified by using a barge-mounted high solids pump to transfer materials from the existing ponds to a rapid mix pug mill for pozzolan addition and pumping as a flowable fill into the new cell. Alternatively, the calcium fluoride pond materials could be solidified in-situ (within existing Ponds B, C, D, and E) using auger mixers followed by removal using backhoes or other excavating equipment to load trucks for transfer of solidified materials to the new cell. After the calcium fluoride pond materials are removed from Ponds B. C, D, and E, Honeywell would remove the ponds liners, leak detection and leachate collection systems, and lysimeters, and transport these materials to the new onsite cell. Honeywell would survey the ponds area to identify the presence of any residual radioactivity in soils around or under the ponds and would remove any identified residual radioactivity for disposal in the new cell, then would re-survey the ponds area to confirm that residual radioactivity has been removed to a level acceptable to NRC and to IEPA. When the final survey confirms that residual radioactivity has been removed to an acceptable level, NRC would release the ponds area from SUB-526 for unrestricted use. Honeywell would construct the final cover system on the new cell, in accordance with the IEPA permit. The environmental impacts of the ex-situ stabilization on-site disposal alternative are discussed below in the “Environmental Impacts of the Alternatives” section.

Environmental Impacts of the Proposed Action and Alternatives

Description of the Affected Environment

a. Land Use

The MTW facility is located in Massac County at the southeastern tip of Illinois, along the north bank of the Ohio River. The city of Metropolis is located approximately 1.6 kilometer (1 mile) southeast of the site. The site perimeter is formed by U.S. Highway 45 to the north, the Ohio River to the south, an industrial coal blending plant to the west, and privately-owned, developed land to the east.

The plant site occupies approximately 1,000 acres of land on the gently rolling hills that are typical of southern Illinois. Plant operations are conducted in a fenced restricted area covering approximately 59 acres in the north-central portion of the site. The primary facilities located in the operations area are the Feed Materials Building, Sampling and Storage Facility, Pretreatment Facility, Ore Calcining Facility, Storage Pads, Cylinder Wash Facility, and Waste Dryer. Additional facilities which are involved in the UF_6 manufacturing process, but which do not involve the handling of any significant quantities of source material, include a fluorine manufacturing building, a calcium fluoride (CaF_2) recovery plant to recycle synthetic CaF_2, a power plant, an incinerator, two small settling ponds, and a former fluoride waste treatment facility with the four large settling Ponds B, C, D, and E**.**

The site is situated on an alluvial terrace some 18 meters (60 feet) above the floodplain of the Ohio River. The terrace surface is generally level except for surface water drainage channels, which flow south to the Ohio River. The site elevation is between 300 and 380 feet above mean sea level. Ponds B thorough E are located in the southwest corner of the plant footprint within the existing controlled area (ER, Section 7.7.1). Detailed descriptions and drawings of the ponds and their liner systems are provided in Attachment T to the Decommissioning Plan and in Attachment C to the additional information provided by Honeywell on February 13, 2012.

The flood plain within the MTW site, between the restricted area and the Ohio River was cultivated in the past, but it is no longer farmed and is returning to a more natural vegetation state. Today, most of the MTW land outside the exclusion area is forested. Onsite cropland is limited to approximately 41 hectares (100 acres) north of Route 45. An electrical transmission line crosses the Honeywell property about half-way between the Ohio River and the southeastern border of the fenced area. The transmission line corridor is maintained in grasses and low-growing shrubs. A natural gas transmission line, crossing the property about 150 meters (500 feet) north of the administration building, provides gas to the site and continues east to provide natural gas to the City of Metropolis.

Major facilities in the 22-hectare (54-acre) restricted area include the administration building, the laboratory, the fluorine production facility, the feed materials building, the waste water ponds and treatment plant, and a UF_6 cylinder storage area. Security fences surround the facilities. Only the six-story feed materials building and the administration building are prominently visible from U.S. Highway 45 northeast of the plant structures.

The plant is located in a predominantly agricultural area. About 65 percent of the land in Massac County is used for agricultural purposes, with corn and soybeans as the principal cash crops and cattle and hogs as principal livestock (Soil Survey of Massac County, Illinois, http://soildatamart.nrcs.usda.gov, March 2013). The remaining lands are occupied by woodlands, idle farms, or urban areas. The nearest pastureland is located approximately 2 kilometers (1.5 miles) northeast of the plant and is used to graze beef cattle. The nearest dairy cattle are grazed approximately 13 kilometers (8 miles) east of the plant. Much of the Ohio River floodplain in the vicinity of the plant is cultivated.

Major nearby industrial developments include the TVA Shawnee Fossil Plant and the USEC Paducah Gaseous Diffusion Plant (a uranium enrichment facility) located across the Ohio River from the MTW facility. The American Electric Power Company coal blending plant is

located immediately northwest of the MTW site, and a coal-fired power plant operated by Electrical Energy, Inc. is located about 9.5 kilometers (6 miles) to the northwest.

There are two state-maintained natural areas within an 8-kilometer (5-mile) radius of the site. The Mermet Lake Conservation Area, which contains the Mermet Swamp Nature Preserve, is about 5.5 kilometers (3.5 miles) to the northwest. This conservation area is under the jurisdiction of the Illinois Department of Conservation. The West Kentucky Wildlife Management Area is across the river, 3.2 kilometers (2 miles) southwest of the site and adjacent to the Paducah Gaseous Diffusion Plant.

b. Transportation

The MTW facility is approximately 1.6 km [1 mile] northwest of Metropolis, Illinois. U.S. Highway 45 and Burlington North Railroad border the facility to the north, and the Ohio River bounds the MTW facility to the south. Interstate 24 is located approximately 7.2 km [4.5 miles] east of the facility and provides access across the Ohio River to Paducah, Kentucky.

All UF_6 product from MTW operations is shipped from the MTW facility by truck. From 2000 to 2004, there were about 570 UF_6 product shipments per year. During this same period, there were no reported traffic accidents involving UF_6 shipments from the MTW facility.

c. Geology, Soils, Seismology

The site is located at the northern end of the Mississippi Embayment, a depositional basin filled in with sediments 40 to 100 million years old that overlie older (300 to 600 million year old) bedrock. Surface soils at the Metropolis facility consist of silty loam and silty clay loam which have low permeability and poor drainage. The underlying unconsolidated surface deposits are approximately 24 to 27 meters (80 to 90 feet) thick and consist of sediments from three types of depositional environments.

Alluvial deposits consisting of sand, silt or clay and localized sandy gravel deposits are found along the Ohio River. Locally, the MTW site and much of the surrounding region overlies approximately a few meters of Quaternary loess. Recent Surface Geology Maps developed by the Illinois State Geological Survey (ISGS) exclude this loess veneer and show the area of the site to overlie the Metropolis Formation, consisting of clay-rich silty sand and sandy silt, ranging in thickness from 6 to 17 meters (20 to 50 feet). The deeply weathered, poorly sorted, and burrowed alluvial sediments of the Metropolis Formation is interpreted as fluvial sediments that occupied an undercut valley ancestral to the modern Ohio. The Metropolis Formation underlies the Mounds Gravel, comprised of gravel and sand 11 to 20 meters (35 to 65 feet) thick. The Mounds Gravel is interpreted as deposits of large, braided rivers that were in part ancestral to the modern Tennessee River. Groundwater monitoring wells at the MTW site are completed in the Mounds Gravel.

Bedrock underlying the unconsolidated Mounds Gravel surface deposits consists of Tertiary Porter's Creek Clay, Cretaceous McNairy Formation sandstones and shales, and Mississippian limestones and sandstones. The McNairy Formation sands, silt and clay are approximately of 40 to 49 meters (130 to 160 feet) thick. The Mississippian St. Louis Limestone is approximately 24 meters (80 feet) thick and occurs at an approximate depth of 152 meters (500 feet). Three onsite water supply wells of good quality water are completed in the St. Louis Limestone.

Mineral resources in the area include sand and fluorspar. Sand dredging on the Ohio River occurs about 11 kilometers (7 miles) upstream of the plant, and fluorspar mining occurs about 64 kilometers (40 miles) northeast of the plant.

The site is located near major fault zones. The New Madrid and St. Genevieve fault zones are approximately 24 and 8 kilometers (15 and 5 miles) from the site, respectively. A large number of earthquakes have occurred in northeastern Arkansas and southeastern Missouri in association with the New Madrid fault zone. The major historic earthquakes felt in

this area were from the 1811-1812 New Madrid earthquakes whose epicenter was approximately 97 kilometers (60 miles) southwest of the MTW facility. The strongest of these earthquakes is estimated to have produced a Modified Mercalli Intensity IX earthquake (i.e., a seismic event capable of causing considerable damage to well-built buildings, breaking some underground pipes, and causing serious damage to reservoirs) at MTW. The silt loam soils surrounding the MTW site may exhibit a viscous or visco-elastic response to earthquake loading and may be susceptible to ground wave motion from distance; however, severe ground motion tends to be reduced due to the soil structure present.

The 2008 U.S. Geological Survey (www.earthquake.usgs.gov, September 2012) National Seismic Hazard Maps display earthquake ground motions for various probability levels across the United States, including the New Madrid Seismic Zone (NMSZ), in which the MTW is located. The 2008 update of the maps incorporates new findings on earthquake ground shaking, faults, seismicity, and geodesy. The resulting maps are derived from seismic hazard curves calculated on a grid of sites across the U.S. that describe the frequency of exceeding a set of ground motions. The NMSZ was revised to include updated fault geometry and earthquake information. In addition, the model was adjusted to include the possibility of several large earthquakes taking place within a few years or less, similar to the earthquake sequence of 1811–1812. The new National Seismic Hazard Maps for the NMSZ show that the 1-hertz spectral acceleration 2%/50-year probability of exceedance is approximately 0.5 g, and the 5-hertz spectral acceleration 2%/50-year probability of exceedance is approximately 1.5 g. Both of the new probabilistic ground motion maps predict lower ground motion compared with the 2002 edition of the National Seismic Hazard maps for the MTW site.

d. Hydrology

Wetlands that have been mapped on the plant site include freshwater forested shrub areas that are temporarily flooded, located near the Ohio River

(www.fws.gov/wetlands/wetlands-mapper.html, February 15, 2013). No wetland communities have been identified within the restricted fence line.

The MTW site is bounded on the south by the Ohio River in the vicinity of River Mile 946. There are four creeks that drain the Honeywell property to the Ohio River. Outfall 002, which is used to discharge the plant's treated sanitary and process waste waters, is located on one of these drainages about 610 meters (2,000 feet) from the Ohio River. The plant's liquid effluent discharge rate averages about 0.015 cubic meters per second (m^3/s) (5.26 ft^3/s), which is trivial compared to the average discharge rate of 292,070 ft^3/s for the Ohio River (USGS, National Water Information System, Station 03611500 at Metropolis, IL). There are no downstream receptors for the intermittent drainage channel that receives plant effluent. This water body has no downstream uses for potable water, fishing, recreation, or irrigation prior to discharge to the Ohio River.

The Ohio River at the plant site is about 910 meters (3,000 feet) wide with a normal pool elevation of 88 meters (290 feet) above mean sea level. Ohio River discharge records have been maintained since 1928. The maximum recorded discharge on the Ohio River, 50,410 m^3/s (1,780,000 ft^3/s), occurred on February 1, 1937. Although flooding is an annual event, the plant site has reportedly never been reached by flood waters. The elevation of the site, 114 meters (375 feet), is considerably above the most extreme projected flood level. The probable elevation of the 100-year flood is 103 meters (337 feet). As a comparison, the 1937 flood reached an elevation of 104 meters (342 feet). Numerous flood control dams that regulate the flow of the Ohio River have reduced the threat of flooding. The nearest flood control structure is Lock and Dam No. 52 at Brookport, Illinois, about 11 kilometers (7 miles) upstream from the site. The nearest downstream public drinking water intake is located in Cairo, Illinois, about 51 kilometers (32 miles) away.

The water table at the site occurs within the sandy deposits of the Quaternary Henry Formation. The water table slopes from northeast to southwest and flows at an average rate of 0.0094 to 0.19 meters per day (0.031 to 0.62 feet per day) towards the Ohio River. Temporary flow reversals occur within the water table aquifer on a periodic basis in association with flooding on the Ohio River. The duration of reversal events is approximately 10 to 34 days; however, a series of multiple events may extend the flow reversal for up to 58 days.

The first unconfined aquifer is encountered in the mixed gravel, sand and clay of the Pliocene series (the Mounds Gravel Formation). The Mounds Gravel hydrogeologic unit is used as a drinking water source upgradient of the plant, but the productivity is not high enough to support large industrial or municipal withdrawals. The underlying McNairy Formation may yield enough water for domestic use, but the high iron content and fine-grained matrix make the groundwater quality generally unattractive.

Three deep aquifers underlie the MTW facility. Two aquifers are in the Cretaceous sandstones and the third is within the St. Louis Limestone. The principal source of groundwater for industrial, utility, and municipal water use is the highly fractured and cavernous St. Louis Limestone that underlies the Metropolis facility at depths of approximately 150 meters (500 feet) below the surface. The St. Louis Limestone is the groundwater source for the three industrial water supply wells and the one sanitary water well located at the MTW facility.

In April 2001, in response to elevated contaminant levels identified in groundwater from the on-site monitoring wells, IEPA issued a violation notice to Honeywell. In response, Honeywell prompted an investigation of the source of the groundwater contaminants. Honeywell's on-going efforts to investigate the groundwater contaminant source are being conducted as part of an IEPA-accepted Compliance Commitment Agreement. IEPA continues to monitor Honeywell's investigative activities in accordance with the approved Groundwater Workplan.

e. Ecological Resources

The natural vegetation in the vicinity of the MTW site is characteristic of oak-hickory and southern mixed hardwood forests. Tree species associated with these areas include oak (*Quercus* spp.), hickory (*Carya* spp.), persimmon (*Doispyros virginiana*), sassafras (*Sassafras albidum*), and black locust (*Robinia pseudoacacia*). Tree species such as cottonwood (*Populus deltoides*) and a variety of willows (*Salix* spp.) occur along the river in areas that are periodically flooded. Dryer areas along the river support tree species such as box elder (*Acer negundo*), American beech (*Fagus grandifolia*), sweet gum (*Liquidambar styraciflua*), and sycamore (*Plantanus occidentalus*). Vegetation along the transmission line corridor on the site is artificially maintained and supports only grasses and low-growing shrubs. Characteristic species include brome grass (*Bromus tectorum*), broom sedge (*Andropogon virginicus*), bluegrass (*Poa pratensis*), goldenrod (*Solidago* spp.), sumac (*Rhus* spp.) and blackberry (*Rubus allegheniensis*).

Animal species occurring on the MTW site are typical of old field and second-growth forests in Illinois. Birds and mammals associated with open habitat, such as the transmission line corridor and the cultivated fields, include bobwhite quail (*Colinus virginianus*), mourning dove (*Zenaidura macroura*), horned lark (*Eremophila alpestris*), groundhog (*Marmota monax*), deer mouse (*Peromyscus maniculatus*), and the eastern cottontail rabbit (*Sylvilagus floridanus*). Birds and mammals that could occur on forested land include the cardinal (*Richmondena cardinalis*), titmice and chickadees (*Parus* spp.), woodpeckers, eastern gray squirrel (*Sciurus carolinensis*), white-footed mouse (*Peromyscus leucopus*), opossum (*Didelphis marsupialis*), and white-tailed deer (*Odocoileus virginianus*). Animals associated with the banks of the Ohio River include muskrats (*Ondatra zibethica*), raccoon (*Procyon lotor*), and a variety of species of turtles, water snakes, salamanders, and frogs.

Other important species in the area of the MTW site include recreational game animals (i.e., small game, resident game birds, woodland game, migratory game birds, and furbearers) and regulated sport fish. More detailed identification of important species and habitats was provided by Honeywell in Appendix D of its RAI response dated February 13, 2012 (ML12060A115).

The aquatic biota of the Ohio River include algal plankton communities comprised of yellow-green (diatoms), green, and blue-green algae. Zooplankton communities consist primarily of rotifers.

Benthic communities in the Ohio River are characterized by species adapted to both flowing and restricted circulation conditions. Crustaceans are found in greater abundance in pooled areas behind dams than in the open river. Benthic invertebrate communities are not well developed in the Ohio River, possibly because of the lack of suitable substrates, high turbidity, or unfavorable chemical environment. Chironomid larvae and turbificids often dominate the community in terms of numbers, and the asiatic clam (*Corbicula manilensis*) occurs in large quantities. Other common organisms include snails and leeches.

Forage fish that feed largely on detritus, plant material, and bottom-dwelling invertebrates are abundant. These include the emerald shiner, the gizzard shad, and carp. Although commercial fishing has largely been abandoned on the Ohio River, sport fishing is still fairly popular. Commonly caught species include channel catfish, white bass, and bluegill.

f. Threatened and Endangered Species

According to the U.S. Fish and Wildlife Service Environmental Conservation Online System (http://ecos.fws.gov, October 2012) List of Threatened and Endangered Species, there are 17 animal species and 9 plant species listed in Illinois and that occur in Illinois. Six animal species classified by both the Federal and State governments as threatened or endangered exist in Massac County, Illinois. The U.S. Fish and Wildlife Service did not identify any listed

plant species occurring in Massac County. The following table provides the list of Federal-listed animal species that are known to occur in Massac County, Illinois or in the Ohio River bordering Massac County.

Plant and Animal Species listed in Illinois that Occur in Illinois Source http://ecos.fws.gov, October 2012	
Animal Species (17)	Plant Species (9)
Illinois cave amphipod (*Gammarus acherondytes*)	Decurrent false aster (*Boltonia decurrens*)
Gray bat (*Myotis grisescens*)	Prairie bush-clover (*Lespedeza leptostachya*)
Indiana bat* (*Myotis sodalist*)	Lakeside daisy (*Hymenoxys herbacea*)
Karner blue butterfly (*Lycaeides Melissa samuelis*)	Mead's milkweed (*Asclepias meadii*)
Clubshell (*Pleurobema clava*)	Eastern prairie fringed orchid (*Platanthera leucophaea*)
Hine's emerald dragonfly (*Somatochlora hineana*)	Small whorled pogonia (*Isotria medeoloides*)
Fanshell (*Cyprogenia stegaria*)	Prices' potato-bean (*Apios priceana*)
Higgins eye pearlymussel (*Lampsilis higginsii*)	Leafy prairie-clover (*Dalea foliosa*)
Pink mucket pearlymussel* (*Lampsilis abrupta*)	Pitcher's thistle (*Cirsium pitcheri*)
Snuffbox mussel (*Epioblasma triquetra*)	Running buffalo clover (*Trifolium stoloniferum*)
Orangefoot pimpleback pearlymussel* (*Plethobasus cooperianus*)	
Piping plover (*Charadrius melodus*)	
Fat pocketbook* (*Potamilus capax*)	
Iowa Pleisotcene snail (*Discus macclintocki*)	
Spectaclecase mussel* (*Cumberlandia monodonta*)	

Pallid sturgeon (*Scaphirhynchus albus*)	
Least tern* (*Sterna antillarum*)	
*Also occur in Massac County, IL	

g. Air Quality, Meteorology, and Climatology

The climate of the area is characteristic of the humid continental zone, where the primary source of heat and moisture for western Kentucky and southern Illinois is the Gulf of Mexico. However, because of the site's proximity to the Ohio River the climate is more typical of western Kentucky than southern Illinois. The region has two predominant weather patterns that define the winter and summer circulation regimes. Winter is characterized by evenly distributed precipitation events and moderate diurnal changes in temperature. During the summer, frontal and pressure systems generally pass north of the region, resulting in a more tranquil weather pattern over the area.

The average annual temperature is 14.4°C (57.9°F), with monthly average temperatures ranging from 26.3°C (79.3°F) during July to 1.3°C (34.5°F) during January. The maximum temperature at the Paducah, Kentucky, National Weather Service Office was 41.1°C (106.0°F) recorded in 1952 and the minimum temperature of -24.4°C (-12.0°F) was recorded in 1951. National Weather Service (NWS) data from the 1997 - 2004 timeframe indicated the Paducah area had approximately 42 days annually where the high temperature exceeded 32.2°C (90.0°F) and about 12 days where the daily high temperature did not exceed the freezing level. Precipitation in the region is fairly uniform throughout the year. The mean annual precipitation for the Paducah Weather Station Office is 117.8 centimeters (46.38 inches), with more rainfall typically occurring between March and July than the remainder of the year. Additionally, the region experiences approximately 70 thunderstorm days annually. The maximum monthly rainfall (45.0 centimeters [17.73 inches]) occurred during March 1966 and the greatest daily

rainfall (20.3 centimeters [8.00 inches]) occurred on March 4, 1964. Annual snowfall is generally light (22.1 centimeters [8.7 inches]), and usually occurs during January, February, and March. However, measurable snowfall has occurred as early as November and as late as April. The maximum monthly snowfall (57.4 centimeters [22.6 inches]) occurred during January 1978.

The predominant wind direction is from the southwest quadrant with a secondary maxima from the north-northwest. Analysis of the annual records for all eight individual years indicate that the mode (most common angle) of the wind direction ranged from 200° to 230° measured clockwise from North, including five years during which the mode was 210°. The average wind speed was 5.5 knots, with individual year averages ranging from 5.3 to 5.8 knots. The maximum hourly-average wind speed was 30 knots and the maximum gust recorded was 61 knots in 2001.

In general, this region is not directly influenced by tropical cyclone activity. However, because of the region's proximity to the Gulf of Mexico, it occasionally experiences increased rainfall from northward-moving tropical systems from the central and western Gulf Coast.

Major tornados are infrequent in Massac County, occurring only twice in the period 1950-2010. The May 6, 2003, F4 tornado began approximately 20 miles west-northwest of Metropolis, and traveled six miles into Massac County. The September 23, 2006, F3 tornado occurred about 4 miles west of MTW (www.isws.illinois.edu/atmos/statecli/tornado/NewMaps/Tornadoes-Massac-County-Illinois.png, March 2013).

Air quality is primarily measured against the National Ambient Air Quality Standards (NAAQS) established by the EPA to protect human health and welfare (primary standards) and to protect against damage to the environment and property (secondary standards). The pollutants regulated under the NAAQS are total suspended particulates (inhalable particulate matter with aerodynamic diameters less than 10 microns [referred to as PM_{10}], and less than 2.5 microns [referred to as $PM_{2.5}$]), ozone (O_3), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), carbon

monoxide (CO), and lead (Pb). Illinois has adopted air quality standards that are comparable to the EPA, with the exceptions of the $PM_{2.5}$ and 8-hour ozone standards, which have not been adopted by the State at this time. The National and Illinois air quality standards are summarized in Table 1.

Table 1: Summary of National and Illinois Ambient Air Quality Standards
Illinois Annual Air quality Report 2010 December 2011

Pollutant	Averaging Time	Primary Standard	Secondary Standard
Standard units are micrograms per cubic meter (mg/m3) and parts per million (ppm)			
Particulate matter 10 micrometers (PM10)	24-hour	150/mg/m3	Same as primary
Particulate matter 2.5 micrometers (PM2.5)	Annual arithmetic mean 24-hour	15.0 mg/m3 35 ug/mg	Same as primary Same as primary
Sulfur dioxide	1 hour* 3-hour	75 ppb none	None 0.5 ppm
Carbon monoxide	1-hour 8-hour	35 ppm 9 ppm	None None
Ozone	1-hour 8-hour	0.12 ppm 0.075 ppm	Same as Primary Same as Primary
Nitrogen dioxide	Annual arithmetic mean 1-hour*	53 ppb 100 ppb	Same as Primary None
Lead	Rolling 3-month mean	0.15 ug/m3	Same as Primary
The PM2.5 standards are referenced to local conditions of temperature and pressure rather than standard conditions (760 mm and 25 deg C)			
Note: The State of Illinois has not adopted the PM2.5 or 8-hour ozone standards at this time.			
*New standard established starting 2010			

Massac County, Illinois and McCracken County, Kentucky (across the Ohio River) are presently in attainment, i.e., it meets or has pollutant levels below the national ambient air quality standards, with regard to the six criteria pollutants monitored by the States of Illinois and Kentucky (www.epa.gov/oaqps001/greenbk/ancl.html, Currently Designated Nonattainment Areas for All Criteria Pollutants).

h. Noise

Illinois Administrative Code (IAC) Title 35: Environmental Protection; Subtitle H: Noise; Chapter I: Pollution Control Board; Section 901 contains sound emission standards and limitations for property line-noise-sources. Section 901.101 classifies land according to its use, based on the Land-Based Classification Standards of the American Planning Association. (www.planning.org/LBCS). The MTW facility is Class C land, LBCS Code 3110, Primarily plant or factory-type activities. Residential land including transient living (hotels) and institutional living are LCBS code 1100, 1200, and 1300, called Class A land uses. In accordance with IAC 901.102, daytime noise from Class C land to Class A land cannot exceed 75 dB at low frequencies (31.5 hertz) to 40 dB at high frequencies (8000 Hz). Nighttime limits are 69 dB at low frequencies and 32 dB at high frequencies. These limits apply at any point within the receiving land.

Honeywell has not performed any noise surveys at the boundary of the exclusion area and no ambient noise survey data has been taken for the area around the MTW site. There are no noise-sensitive receptors (e.g., residences, schools, hospitals) in close proximity to the exclusion area; the nearest residence is greater than 550 meters (1,800 feet) north-northeast of the MTW facility. The distance from the buildings to the site boundary helps mitigate any offsite noise impacts from the facility operations.

i. Historic and Cultural Resources

Four National-registered historic sites, and no State-registered historic sites, are located in the immediate vicinity of the Honeywell Metropolis Plant (NRIS, 2012, State Listings, Illinois, Massac County, www.NationalRegisterofHistoricPlaces.com/il/Massac/state.html). The Elijah P. Curtis House is located in Metropolis about 1.6 kilometer (1 mile) southeast of the plant, Fort Massac is about 6.5 kilometers (4 miles) upriver, in Fort Massac State Park on the banks of the Ohio River, and the Kincaid Mounds site containing 19 prehistoric mounds that rise about 9 meters (30 feet) above the river bottom along Avery Lake, are near Brookport, Illinois, about

12.1 kilometers (7.5 miles) southeast of the MTW facility (www.illinoishistory.gov). The R.W. McCartney Music Hall, also known as Old Masonic Temple, is located on Fourth St. in Metropolis. No registered National or State archaeological sites were identified within the boundaries of the site.

The area of potential effects of the pond closures is the geographical area within which the pond closure activities may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist within the area. No historic or cultural sites exist within the area of potential effects of the pond closure activities.

j. Visual and Scenic Resources

The MTW site lies in a rural region of extreme southern Illinois adjacent to the Ohio River. Generally, southern Illinois is an area of swampy, forested bottomlands and low clay and gravel hills. Away from well-traveled roadways, the area affords pastoral viewsheds where rural residences and undeveloped agricultural land and deciduous forests are the dominant visual features.

U.S. Highway 45 and a Burlington Northern railroad right-of-way border MTW to the northeast. Viewed from the air, MTW has the typical appearance of an industrial complex with interconnected industrial-looking buildings, storage of material, exhaust stacks with pollution control equipment, parking lots, railroad spurs, and other operational support areas. Cleared ground on the property is minimal. The plant buildings and operational areas are surrounded by two nine-foot high chain-link and barbed wire security fences approximately 50 feet apart. The majority of the site buildings are visible from U.S. Highway 45 northeast of the plant structures. While Massac County is mainly rural, the area in the immediate vicinity of the MTW site contains other substantial industrial and urban development on both sides of the Ohio River.

Impacts due to the proposed closure action will be limited to the appearance of the engineered RCRA cover system within the confines of the MTW owned and controlled land. The impacts will not significantly alter the current visual/scenic resource.

k. Demography and Socioeconomics

The plant site is located in a predominantly undeveloped, rural region of low-average population density with widely scattered villages and small cities in Massac County, Illinois, and across the Ohio River from McCracken County, Kentucky. Massac County has a population of 15,429 with 6,537 residing in the town of Metropolis, approximately 1.6 kilometers (1 mile) southeast of the site (U.S. Census, 2010). McCracken County, KY, has about 65,565 residents with 25,024 residing in the city of Paducah, approximately 16 kilometers (10 miles) southeast of the site. The population of the Paducah KY-IL Micropolitan Statistical Area is reported as 98,762.

There are two permanent residences and three mobile homes within 610 meters (2,000 ft.) of the feed materials building. The two permanent residences are nearest to the site and are located about 564 meters (1,850 ft.) north northeast from the feed materials building. The nearest school is 2.9 km (9850 ft.); the nearest hospital is 1.5 km (5020 ft.); and the nearest nursing home is 2.8 km (9180 ft.) from the MTW facility. Nearby industrial facilities include the United States Enrichment Corporation (USEC) Gaseous Diffusion Plant west of Paducah, and the Tennessee Valley Authority (TVA) and Electrical Energy, Inc. electrical generating plants situated on the Ohio River.

The MTW facility employs a labor force of 332 people. Plant employment is not a significant fraction of the employment in Massac or McCracken Counties. The unemployment rate in the Paducah KY-IL Micropolitan Statistical Area in May 2012 was 8.6%, which is the same as the State-wide unemployment rate for Illinois. The State-wide unemployment rate for

Kentucky was 8.2%. (U. S. Bureau of Labor Statistics, www.bls.gov/lau, Local Area Unemployment Statistics, Unemployment Rates for States, May 2012).

The median household income in 2010 in Massac County was $41,077. The median household income for the city of Metropolis, Il, was $32,715. The median household income for the Paducah, KY-IL Micropolitan Statistical Area was $41,288. (U.S. Census, 2010)

I. Public Health

External background radiation levels in the vicinity of Metropolis, Illinois, are mainly from natural sources of cosmic and terrestrial origin. The total-body dose rate from cosmic rays is about 41 nano Gray per hour (http://pubs.usgs.gov/of/2005/1413/fullcosmic .htm, April 2013), while terrestrial sources contribute about 4.5 micro R per hour (http://energy.cr.usgs.gov/radon/usagamma.gif, April 2013).

The background uranium concentrations in the soil and vegetation as determined by preoperational sampling were 0.6 parts per million (ppm) and 0.28 ppm, respectively. The USGS map of Uranium Concentrations indicates a concentration of 2.5 ppm elemental uranium (http://pubs.usgs.gov/of/2005/1413/umapfull.htm, April 2013). The uranium concentration in the Ohio River was less than 0.005 milligrams per liter in calendar years 2008-2010 (U.S. Department of Energy, 2011 Paducah Site Annual Site Environmental Report, PAD-REG-1012).

The risks to public health and safety from current MTW operations are exposure to chemical contaminants, radiation and radioactive materials as a result of liquid and airborne plant effluents. Members of the public in the immediate plant vicinity may be exposed to chemicals used in the plant as a result of routine controlled effluents and non-routine releases due to unplanned events. Fluoride (as hydrogen fluoride [HF]) is the primary non-radiological gaseous contaminant released through stacks on the feed materials building. The environmental air monitoring program requires periodic collection of air samples at on-site and off-site sample points. Cumulative samples are analyzed for uranium and fluoride.

Radioactive materials released from MTW facility may migrate into the environment through a variety of transport pathways, contributing to public exposures from both internal and external pathways. For atmospheric releases, internal exposures may occur through inhaling radioactive material dispersed in the air or ingesting crops and animal products that come in contact with radioactive material deposited from the air. External exposures may occur through direct radiation from an airborne plume or from particulates deposited on the ground from the plume. For liquid releases, internal exposures from ingesting water or irrigated crops may occur. External exposures from recreational activities, including swimming and boating may occur.

The MTW operations release small amounts of radioactive material to the atmosphere from 52 monitored release points. Gaseous effluent streams containing nonradioactive pollutants are discharged in accordance with operating permits issued by the IEPA. Releases attributable to the MTW facility are primarily uranium, although relatively small amounts of thorium-230 and radium-226 are also released from the facility. Liquid wastes are discharged to the Ohio River via one monitored release point, NPDES Outfall 002. Liquid waste streams generated at the MTW facility are categorized as low-level radioactive and non-radioactive waste streams. Prior to discharge into the Ohio River, radioactive and non-radioactive waste from MTW operations is processed through the Environmental Protection Facility to meet 10 CFR Part 20 radiological effluent limits and non-radiological effluent limits specified in the facility's NPDES permit.

The Illinois EPA believes that the Pond liners have leaked and there is a potential for Pond contaminants to have migrated to and beyond vadose zone monitoring points (lysimeters). NRC modeled the future performance of the Ponds using a highly conservative assumption that the liner system is not present, and concluded that radioactive materials migrating from the Ponds will not result in a public dose that exceeds regulatory criteria for unrestricted release of the Ponds.

m. Waste Management

Current MTW operations produce low-level radioactive, non-radioactive hazardous, mixed, and nonradioactive solid wastes. The facility uses a combination of recycling, compaction, and offsite disposal in management of these wastes.

Environmental Impacts of the Proposed Action and Alternatives

Description of Impacts to the Environment for Proposed Action

The following sections describe specific areas of the environment that may be affected as a result of the proposed activities and discuss the significance of the effects. Impact significance determination involves considering the context and intensity of the impacts. Context means that consideration should be given to what the impacts are, where they will occur, how long they will last, who is affected, and the carrying capacity of the affected environment. Each environmental impact is assigned one of the following three significance levels:

- Small: The environmental effects are not detectable or are so minor that they will neither destabilize nor noticeably alter any important attribute of the resource.
- Moderate: The environmental effects are sufficient to alter noticeably, but not to destabilize, important attributes of the resource.
- Large: The environmental effects are clearly noticeable and are sufficient to destabilize important attributes of the resource.

a. Land Use

Ponds B through E are located at the southwest corner of the plant footprint within the existing controlled area. The existing plant footprint is in the central portion of the land owned and controlled by MTW. Construction activities associated with the pond closure will be limited

to on-site actions. Therefore, no adverse impacts on neighboring land use, including residential or agricultural land uses, would result.

Dust and noise impacts associated with this alternative are not expected to significantly impact off-site land use. On-site land use impacts during decommissioning would be minimal, as current industrial activities in construction area would not be affected. Off-site activities associated with decommissioning would include the identification of suitable sources of engineered barrier materials and the transport of those materials to the MTW facility. It is expected that commercial local sources of soil borrow materials would be identified. Similarly, the source of the rock cover materials is a commercial quarry. Therefore, off-site land use impacts associated with the acquisition, removal and transport of engineered barrier materials from their respective source areas to the MTW facility would likely be minimal.

The only land use impacted by the decommissioning activities under the proposed action would be the future use of the closed ponds within the MTW facility. IEPA requires institutional controls related to future use of the area in which the engineered cover system is constructed regardless of its radiological status. Long-term land use impacts are difficult to predict, as future land use needs are dependent upon many factors. Isolation of the pond contents in place provides a greater degree of environmental protection than the existing conditions at the MTW facility and therefore is in keeping with the protection of the environment. The institutional controls that would limit future use of the restricted area would be in keeping with current industrial use. Therefore, the implementation of future use restrictions in the engineered barrier area would not significantly impact future development of currently undeveloped areas of the facility. Similarly, no adverse indirect off-site land use impacts would be expected following completion of decommissioning activities. Land use impacts are SMALL.

b. Transportation

The MTW facility is located approximately one mile west of Metropolis. U.S. Highway 45 and Burlington North Railroad border the facility to the north, and Ohio River bounds the MTW facility to the south. Interstate 24 is located approximately 4.5 miles east of the facility and provides access from Paducah, KY, across the Ohio River into Metropolis, IL. The proposed action would involve minimal on-site transportation impacts. An on-site roadway system to the ponds currently exists that could support the onsite truck traffic. A minor short-term increase in traffic to and from the facility would occur due to the transport of engineered cover system materials to the site but would require no modification of the local transportation system. To bring the estimated 80,000 cubic yards of engineered cover system materials and pozzolanic additives on-site, approximately 4,000 dump truck loads of soil, rock, and pozzolanic material (based on standard-sized 15-cubic meter [20-cubic yard] trucks) will be transported to the ponds from a combination of on-site borrow and offsite borrow sources. Assuming that these materials are transported to the facility over period of 18 months, the average round trip traffic to/from the facility would be approximately 10 trucks per day. This transportation impact is temporary and SMALL.

c. Geology and Soils

The MTW Site is located near the northern end of the Mississippian Embayment, an extension of the Gulf Coastal Plain and a depositional basin filled in with weakly lithified Cretaceous, Tertiary, and Quaternary elastic sediments, which overlap Paleozoic bedrock. Under this alternative, materials would be stabilized within the area in which they are currently located. Impacts to the geology and soils due to the proposed action would be limited to the immediate area within the footprint of Ponds B through E. Therefore, the impacts of the proposed action on existing geologic and soil features of the facility would be minimal. The greatest potential impact would be construction of an engineered barrier designed to provide

protection against erosion, even under intense meteorological conditions. Other baseline geologic and soil features (underlying soil compaction, disruption of natural drainage patterns, etc.) are not expected to be significantly impacted, due to the presence of the existing ponds. Also, the existing ponds have demonstrated long-term stability. The engineered cover will exhibit even greater stability. The stability of the engineered barrier design under both static and seismic loadings is demonstrated by the stability analysis conducted as part of the engineering design of the engineered barrier (LAR Report Volume 2, Appendix V). The maximum slopes of the cover system are also consistent with the design standard in the waste disposal industry and have been demonstrated to be protective against slope failures for highly-variable waste materials. Therefore, the potential for slope failures of the engineering barriers is not a major concern. Geology and soils impacts are SMALL.

d. Hydrology

The MTW Site is bound on the south by the Ohio River in the vicinity of River Mile 946 (www.tva.com, March 2013). The Ohio River at the plant site is about 910 meters (3,000 feet) wide with a normal pool elevation of 88 meters (290 feet) above mean sea level. The Ohio River drains 204,000 square miles (www.epa.gov/r5water/wshednps/watersheds.html, March 2013). The site is located along the Ohio River at a point approximately 35 miles upstream from its confluence with the Mississippi River.

Implementation of the proposed action will not require the use of water (other than potentially for dust control or equipment decontamination purposes), so there will be no significant project-related withdrawals of surface water or ground water. Similarly, no direct discharges to surface water will be associated with the implementation of this alternative. The only potential indirect discharges would be discharges to surface water via stormwater flow and infiltration of precipitation, with subsequent discharge to the ground water. All construction activities will comply with stormwater discharge requirements applicable to construction

projects. Run-on and run-off controls will be used in construction areas to minimize the impact of construction activities on stormwater quality. Existing impacts to ground water associated with the presence of the ponds are not significant. Localized drainage controls would be placed to direct surface water flow from the engineered barriers to the desired points for control prior to off-site discharge. In addition, the berms will be protected with riprap, so even if there is localized flooding, adverse impacts to the cover system would not be expected. Once the engineered cover system is in place, direct contact between the consolidated pond contents and stormwater will no longer occur, preventing any associated stormwater impacts. The features of the engineered cover system will inhibit the potential infiltration of precipitation through the engineered cover system. These features, combined with the low leachability of the stockpiled materials, will inhibit any potential future impacts to ground water quality. Impacts on surface or ground water quality are SMALL.

e. Ecological Resources

In developing the existing plant, all natural vegetation was cleared from the site to allow construction of buildings, ponds, and other plant-related facilities. The plant site occupies only about 5% of applicant's property that has otherwise remained mostly undeveloped through the years. Review of topographic maps suggests that the plant site was historically devoid of aquatic features of interest, including ephemeral streams. Accordingly, like terrestrial habitats and biota, the plant has had little or no effect on the area's aquatic biotic resources. Potential ecological resource impacts from pond closure include impacts that could result from on-site construction activities. However, construction activities within the ponds area will, for the most part, occur in an area that is already relatively clear of existing vegetation and that has no significant ecological value. Over the long-term, ecological resources could be impacted by a change in the long-term habitat value of the areas affected by the cover system. There are no anticipated impacts to the ecological resources due to the proposed pond closure action.

Regular maintenance and inspections of the cover systems will be performed during the IEPA-required 30-year post-closure period. This will include removal of woody vegetation such as trees and brush when observed. As long as these active maintenance and inspection requirements are periodically performed, no reforestation will occur. The "permanent pasture" condition was considered representative of the type of land management that would occur in an industrial setting. Under this setting, site areas would be managed to prevent uncontrolled vegetation. Therefore, even after the IEPA-required post-closure period, natural succession vegetation (i.e., reforestation) is not likely to develop. (February 2012 RAI reply) Impacts on ecological resources are SMALL.

f. Threatened and Endangered Species

Threatened and endangered species occurring near the MTW site are listed in the description of the affected environment above. Because the proposed action of stabilizing the ponds contents and placing the cover system will not impact land areas outside the existing industrial facility, there will be no impacts on threatened or endangered species or their habitats.

g. Air Quality, Meteorology and Climatology

The meteorology and climate of the area is summarized in the description of the affected environment above. There are no anticipated impacts to the meteorology and climatology due to the proposed pond closure action.

Construction activities associated with the proposed action could impact air quality through dust and emissions from construction equipment. Although dust from the pond contents would not occur due to the moisture content, dust from the surrounding soils and from installation of the cover system could be generated. Should this occur, dust suppression measures will be implemented, as necessary, during construction. Emissions from plant equipment during closure are expected to be minor and of limited duration. Overall, pond

closure is not expected to alter the existing air quality and would comply with the National Ambient Air Quality Standards (NAAQS). Impacts on air quality are temporary and SMALL.

h. Noise

There are no ambient noise survey data available for the area around the MTW site nor has Honeywell performed any noise surveys at the boundary of the exclusion area. There are no known noise-sensitive receptors in close proximity to the site with the exception of Class B rural residences. The potential noise impacts associated with the proposed action would be short-term impacts associated with construction activities. However, these impacts are not expected to be significant in light of the current noise levels at the site, which are typical of an industrial facility. Thus, there are no anticipated impacts to the noise conditions due to the proposed pond closure action beyond short-term general constructions noises typical of any operational industrial area. Following completion of the proposed action, no additional noise-generating activities would occur, with the possible exception of infrequent maintenance activities. Noise impacts are temporary and SMALL.

i. Historic and Cultural Resources

The ponds closure activities belong to a type of activity that has the potential to affect historic properties in that it is an NRC licensing action that is not solely administrative or procedural. The area of potential effects of the ponds closure activities is the geographical area within which pond closures may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist within the area (NUREG-1748, Appendix D). As discussed above in Section D, “Description of the Affected Environment,” no registered Federal or State archaeological sites were identified within the boundaries of the site. There are no anticipated impacts to historical and cultural resources due to the proposed pond closure action, because no historic or cultural sites exist within the area of potential effects. As documented in their letter dated April 23, 2013 (ML13141A231), the Illinois Historic Preservation Agency

reviewed the project documentation and has no objection to the undertaking proceeding as planned.

j. Visual and Scenic Resources

Impacts due to the proposed closure action will be limited to the appearance of the engineered RCRA cover system within the confines of the MTW owned and controlled land. The impact will not significantly alter the current visual/scenic resource. Visual impacts are SMALL.

k. Demography and Socioeconomics

The plant site is located in a predominantly agricultural area of low average population density with widely scattered villages and small cities in Massac County, Illinois, and across the Ohio River in McCracken County, Kentucky. The workforce required to implement the proposed action would be limited in size. Some of the work will require special qualifications and may therefore require the temporary importation of qualified workers from other areas. Workers that do not require special qualifications should be available locally. Overall, the potential individual and cumulative impacts on local population, housing, and health, social, and educational services are expected to be minimal. The presence of the construction workers will result in slight increases in the amount of income taxes collected. Purchase of materials of construction (e.g., soil) could potentially provide a positive local economic benefit during the construction period provided suitable materials are available locally.

The presence of the engineered barrier and associated institutional controls would prevent future development of the pond areas for commercial or industrial purposes. However, it is likely that land use across the facility will be limited to non-residential uses given the existing industrial facilities present.

Therefore, restrictions on future development of the pond areas will have a limited impact on the potential development of the rest of the facility. Thus, it is not expected that the

implementation of the proposed action will have adverse socioeconomic impacts on the area. Demographic and socioeconomic impacts are SMALL.

I. Public Health

External background radiation levels in the vicinity of Metropolis, Illinois, are primarily from natural sources of cosmic and terrestrial origin. The total effective dose equivalent from cosmic rays is about 0.43 mSv (43 mrem) per year, while terrestrial sources contribute about 0.46 mSv (46 mrem) per year. Radon progeny doses are highly variable, with an average effective dose equivalent of 2.0 mSv (200 mrem) per year (U.S. National Council on Radiation Protection and Measurements). The impacts to the public and occupational radiological dose are discussed in detail in the dose modeling discussion of the License Amendment Request Report Volume 1, Appendices A through S, and in the February 2012 RAI reply.

No liquid discharges are expected to be associated with this proposed action. Storm water management features associated with the design of the engineered barrier would contain the 100-year storm and would withstand temporary inundation during larger storm events without damage. Releases to the air associated with the construction of the engineered barrier would consist of the generation of air and particulate emissions. Exposures to on-site workers during the limited construction would mainly consist of exposures to fugitive dust and direct radiation associated with material stabilization activities.

The NRC's regulations at 10 CFR 20.1402, "Radiological criteria for unrestricted use," states that a site will be considered acceptable for unrestricted use if the residual radioactivity that is distinguishable from background radiation results in a TEDE to an average member of the critical group that does not exceed 25 mrem (0.25 mSv) per year, including that from groundwater sources of drinking water, and the residual radioactivity has been reduced to levels that are ALARA. Honeywell provided a detailed pond characterization report in Appendix T to the LAR, and provided a dose modeling analysis and RESRAD calculations including sensitivity

analysis to demonstrate that the proposed action would meet the 10 CFR 20.1402 radiological criteria for unrestricted use. Honeywell proposed using an industrial worker post-closure scenario, rather than a more-conservative resident farmer scenario, because the reasonably foreseeable future land use at the MTW site is industrial use. NRC performed a detailed review of the characterization report, and performed independent RESRAD calculations to confirm that the proposed action would meet the radiological criteria for unrestricted release. NRC's evaluation of the ponds characterization and independent analysis will be contained in the SER that will support the license amendment approving the closure plan. As will be documented in the SER, NRC has concluded that Honeywell's ALARA evaluation, including typical ALARA good practices and the quantitative ALARA analysis, demonstrate with reasonable assurance that the proposed decommissioning action will result in residual radioactivity levels that are ALARA as required by 10 CFR 20.1402.

Cumulatively, onsite workers would be subject to the combined impacts of air emissions, direct radiation and noise. These impacts could be mitigated through the use of appropriate personal protection equipment and dust suppression materials.

Off-site cumulative impacts would mainly consist of air emissions and noise. These impacts would be short-term impacts incurred during the construction period. Risks associated with transportation activities are limited to the risks involved in the shipment of cover materials to the MTW facility. Dose to members of the public would be non-existent because the pond area will remain within the proprietor owned area and under the control of MTW. Due to the absence of projected impacts of the alternative on ground water quality, potable water use and use of ground water for irrigation purposes would not be impacted by this alternative. Even though no impacts on ground water quality are expected, this alternative would provide a greater degree of protection than the existing conditions because the engineered barrier will isolate the underlying materials from the infiltration of precipitation in the future.

Based on the NRC's evaluation of compliance with 10 CFR 20.1402, as will be documented in greater detail in the SER supporting the license amendment, NRC concludes that the radiological impacts on public health of the proposed action will be SMALL.

m. Waste Management

The proposed action is not expected to result in the generation of significant amounts of waste requiring off-site management. By stabilizing the pond contents beneath an engineered barrier on-site, there will be minimal, if any, impact on off-site waste management systems. Additional waste materials potentially generated under this alternative include personal protection equipment wastes (e.g., disposable protective clothing), which would be minimal. Waste generated during the closure process will be monitored as necessary for radiological contamination and dispositioned accordingly. Waste management impacts are temporary and SMALL.

n. Impact Mitigation

Environmental impact measures under the proposed action include:

- The development and implementation of effective health and safety measures to maintain a safe environment during construction.
- The implementation of a Quality Assurance/Quality Control Construction Plan to assure that decommissioning activities are performed in a manner consistent with the decommissioning plan, regulatory requirements and license conditions.
- The development and implementation of an environmental monitoring and control program to reduce exposures to radioactive materials and direct radiation. Such a program will include the following:
    a. Sediment control measures, including run-off control measures as defined in the engineered cover system design.

b. Dust suppression measures, such as water spray, calcium chloride, or other dust suppression materials, to minimize the release of airborne materials from material excavation, transport and consolidation activities.

c. Air monitoring to monitor dust generation in the work area.

- The development and implementation of a long-term maintenance, monitoring and institutional control program, as required by IEPA, that will ensure the engineered cover system is adequately maintained following construction and to ensure that institutional controls limiting future site use are enforced. Such a program will include the following:

  a. Inspection program to ensure the integrity of the engineered barrier, associated surface water management systems and site security;

  b. Maintenance of the engineered barrier, surface water management systems, and site security measures;

  c. Implementation of deed restrictions and maintenance of associated land use restrictions as required by IEPA.

o. Cumulative Impacts

Cumulative impact is defined in the Council on Environmental Quality regulations (40 CFR 1508.7) as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonable foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time."

A reasonably foreseeable future action that could exert a cumulative impact on the environment is the ultimate decommissioning of the remainder of the Honeywell MTW fluoride plant. At that future time, Honeywell will be required to decommission the facility to meet the

NRC's then existing decommissioning criteria. If Honeywell proposes to decommission the facility for unrestricted use, and if the radiological criteria for unrestricted use are unchanged from the current 25 mrem/year TEDE to the average member of the critical group, then Honeywell will need to consider the dose contribution from the closed ponds area in the development of decommissioning criteria for the entire plant. The cumulative impacts of the ponds' closures and the plant closure will not exceed the dose which NRC has determined provides sufficient and ample margin for protection of public health and safety.

Description of Impacts to the Environment for Alternate Disposal Options

The following sections describe specific areas of the environment that may be affected as a result of off-site alternatives (2) and (3), and the ex-situ stabilization, on-site disposal alternative (6). Although alternative 6 is placement in a new cell on the Honeywell site, it is discussed in this section because many of the impacts are similar to those associated with off-site disposal.

a. Land Use

Ponds B through E are located at the southwest comer of the plant footprint within the existing controlled area. The existing plant footprint is in the central portion of the land owned and controlled by MTW. The off-site disposal alternative would result in the area remaining available for industrial uses. Dust and noise impacts associated with this alternative are not expected to significantly impact off-site land use. On-site land use impacts during decommissioning would be moderate, as current industrial activities in the construction area would be limited by increased activities specifically associated with the removal and disposal of the pond contents. Off-site activities associated with this alternative would include transport of construction equipment to and from the facility; construction/rehabilitation of roadways to support truck traffic from the ponds to the railroad staging area; and actual transport of the

waste materials to the railroad staging area. It is expected that off-site land use impacts associated with the removal and transport of waste materials from the ponds to the disposal facility would be MODERATE.

The local land use impacted by the activities under the alternate off-site disposal action would be the future use of the pond area within the MTW facility and the road system to the railroad staging area. In addition, potential land impacts at the site receiving the excavated pond materials would be minimal, as the disposal site will be licensed to receive these types of material. This alternative would also have minimal indirect land use impacts.

With respect to the alternative of ex-situ stabilization followed by on-site disposal, the on-site land use impacts during decommissioning would exceed those associated with the off-site disposal option. Space would be needed to construct and operate the ex-situ stabilization facility. Additional land on the larger MTW site, presumably an amount at least as large as the existing ponds area, would be needed for the new on-site cell. The land use impact of the ex-situ stabilization, on-site disposal alternative would be moderate.

b. Transportation

The alternate off-site disposal action would involve on-site and off-site transportation impacts. An on-site roadway system to the ponds currently exists that could support the on-site truck traffic. An increase in traffic to and from the facility would occur due to the transport of waste materials from the site to the railroad staging area and may also require modification/rehabilitation of the local transportation system.

Transport of the materials off-site would require an estimated 4,410 dump truck loads material (based on standard-sized 15-cubic meter [20-cubic yard] trucks) to be transported to the railroad staging facility. Assuming that these materials are transported over period of 24 months, the average round trip traffic to/from the facility would be approximately 9 trucks per day. In addition, following the removal of the radioactive materials for off-site disposal, the

excavation areas would be covered with clean topsoil. This would result in additional truck traffic. The truck transportation impacts of the ex-situ stabilization, on-site disposal alternative would be similar. There would be no railroad transportation impacts. Transportation impacts are temporary and SMALL.

c. Geology and Soils

Under this alternative, materials would be removed from the area in which they are currently located. Impacts to the geology and soils due to the alternate off-site disposal action could extend to the road system between MTW and the railroad staging area. Therefore, there may be minor impacts of the alternate off-site disposal on existing geologic and soil features of the facility roads. Other baseline geologic and soil features (underlying soil compaction, disruption of natural drainage patterns, etc.) are not expected to be significantly impacted, due to the presence of the existing ponds. The disposal site that would receive the materials would be required to go through a rigorous geologic evaluation during the permitting process, and the disposal facility permit would be issued based on demonstrated protectiveness of geology and soil conditions.

The impacts of the ex-situ stabilization, on-site disposal alternative on geology and soils would depend upon the area of the MTW site that is selected for on-site disposal of the stabilized materials. This on-site location would be subjected to the same rigorous geologic evaluation during its permitting process as is any off-site disposal facility. The new cell liner system would require additional soil and rock materials that would be obtained from quarries and borrow areas near the site. If the newly-constructed cell meets all the requirements for a RCRA disposal facility, the impact on the geology and soils is expected to be SMALL.

d. Hydrology

Implementation of the alternate off-site disposal action will not require the use of water (other than potentially for dust control or equipment decontamination purposes), so there will be

no significant project-related withdrawals of surface water or ground water. Similarly, no direct discharges to surface water will be associated with the implementation of this alternative. The only potential indirect discharges would be discharges to surface water via stormwater flow and infiltration of precipitation, with subsequent discharge to the ground water. All construction activities will comply with stormwater discharge requirements applicable to construction projects. Run-on and run-off controls will be used in construction areas to minimize the impact of construction activities on stormwater quality. Existing impacts to ground water associated with the presence of the ponds are not significant. Localized drainage controls would be placed to direct surface water flow from the construction area to the desired points for control prior to off-site discharge. The ex-situ stabilization on-site cell alternative would result in changes to drainage pathways due to the contours of the cover system. These surface water drainage changes would be considered in the design and review of the cell cover system, with an objective of minimizing adverse impacts on site hydrology. Therefore, none of the alternatives are expected to have significant impacts on local surface or ground water quality.

Transport of the materials via railcar to an off-site disposal facility would occur in covered railcars, therefore, potential impacts on surface and ground water quality during the transport process would be minimal, unless an unexpected accident were to occur. Even then, the nature of the materials would not present a significant risk to surface water or ground water quality. The containment features of the ultimate disposal facility, whether off-site or on-site, would be constructed in accordance with applicable regulations and would be expected to be protective of surface and ground water quality. Hydrology impacts are SMALL.

e. Ecological Resources

Potential ecological resource impacts from the alternate off-site disposal action would include impacts resulting from on-site construction activities and off-site transportation of waste materials. However, construction activities within the ponds area will, for the most part, occur in

an area that is already relatively barren of existing vegetation and that has no ecological value. Over the long-term, ecological resources could be impacted by a change in the long-term habitat value of the areas affected by the demolition of the pond surface impoundments. Ecological resource impacts for the off-site disposal alternative are temporary and SMALL.

Ecological resource impacts from the ex-situ stabilization, on-site disposal alternative would be greater than those for the off-site disposal alternative in that the new disposal facility would most likely be constructed on MTW land that is not already industrial. It would occupy an area of land, presumably at least as large as the existing ponds area, that is now forest or farm land. Although this impact will still be SMALL, it is greater than the off-site disposal alternative.

f. Threatened and Endangered Species

Threatened and endangered species occurring near the MTW site are listed in the description of the affected environment above. Because the off-site disposal alternative will not impact land areas outside the existing industrial facility, there will be no impacts on threatened or endangered species or their habitats.

The ex-situ stabilization, on-site disposal alternative impacts on threatened and endangered species is unknown at this time. The description of the affected environments above indicates that six threated and endangered animal species do exist in Massac County. It is possible that one or more of them could be impacted by construction of a new disposal facility on land that is now forested or farmed.

g. Air Quality, Meteorology and Climatology

There are no anticipated impacts to the meteorology and climatology due to the alternate off-site disposal action or the alternate ex-situ stabilization, on-site disposal action. Construction activities associated with either alternate disposal action could impact air quality through dust and emissions from excavation and construction equipment. Releases to the air associated with the demolition of the pond surface impoundments would consist of the generation of air and

particulate emissions. Exposures to on-site workers during the limited construction would mainly consist of exposures to fugitive dust associated with material removal activities and possibly dust from the pond contents (though significant dust would not be expected due to the moisture content of the materials). Dust suppression measures will be implemented, as necessary, during waste excavation. Emissions from plant equipment during closure are expected to be minor and of limited duration. Dust emissions associated with the ex-situ stabilization, on-site disposal action would be greater than those form the off-site disposal option because they would include dust emissions from new disposal site excavation, liner system construction, stabilized material placement, and cover system construction. Dust suppression measures would be implemented during these activities. Overall, operations associated with the alternate off-site disposal action or on-site disposal action are not expected to alter the existing air quality and would comply with the National and Illinois Ambient Air Quality Standards. Air quality impacts are temporary and SMALL.

h. Noise

The potential noise impacts associated with the alternate off-site disposal action would be short-term impacts associated with construction activities. Potential noise impacts associated with the ex-situ stabilization, on-site disposal action would be greater than those associated with the off-site disposal action, because construction would occur at two locations instead of just one. These impacts are not expected to be significant in light of the current noise levels at the site, which are typical of an industrial facility. Thus, there are no anticipated impacts to the noise conditions due to the alternate off-site disposal action or the alternate ex-situ stabilization on-site disposal action beyond short-term general construction noises typical of any operational industrial area. Following completion of either of these alternate off-site disposal actions, no additional noise-generating activities would occur. Noise impacts are temporary and SMALL.

i. Historic and Cultural Resources

There are no anticipated impacts to historical and cultural resources due to the alternate off-site disposal action, because no historic or cultural sites exist within the area of potential effects.

Impacts to historical and cultural resources associated with the ex-situ stabilization, on-site disposal alternative are unknown. Although no known historical or cultural sites exist within the area of potential effects of the proposed action, a new disposal facility located elsewhere on the Honeywell property could potentially encounter and impact a currently-unknown historic or cultural site.

j. Visual and Scenic Resources

Impacts due to the alternate off-site disposal action will be limited to the change in scenery associated with the demolition and removal of the pond surface impoundments within the confines of the MTW owned and controlled land. The impact will not significantly alter the current off-site visual/scenic resource. Visual impacts are SMALL.

Impacts to visual and scenic resources due to the ex-situ stabilization, on-site disposal alternative are unknown because no potential disposal site on the Honeywell property has been identified or selected. It is envisioned that the new disposal facility cover system would be gently sloped and planted with a vegetated cover that would blend in with the forested and farmed land in the area.

k. Demography and Socioeconomics

The socioeconomic impacts associated with the off-site disposal alternative would be comparable to the proposed alternative. The workforce required to implement the alternate off-site disposal action would be limited in size. Some of the work will require special qualifications and may therefore require the temporary importation of qualified workers from other areas. Workers that do not require special qualifications should be available locally. Overall, the

potential individual and cumulative impacts on local population, housing, and health, social, and educational services are expected to be minimal. The presence of the construction workers will result in slight increases in the amount of income taxes collected. Purchase of materials for construction (e.g., soil) could potentially provide a positive local economic benefit during the construction period provided suitable materials are available locally.

The removal of the pond surface impoundments would potentially allow for future development of the pond areas for commercial or industrial purposes. However, it is likely that land use across the facility will be limited to non-residential uses given the existing industrial facilities present. Therefore, the availability of the pond area for future development will have a limited impact on the potential development of the rest of the facility. Therefore, it is not expected that the implementation of the alternate off-site disposal action will have adverse socioeconomic impacts on the area. Demographic and socioeconomic impacts for the off-site disposal alternative, for the ex-situ stabilization, and on-site disposal alternative are temporary and SMALL.

Socio economic impacts associated with the ex-situ stabilization, on-site disposal alternative would be slightly greater than for the off-site disposal alternative, because of the additional labor required to construct the new on-site disposal facility. The new on-site disposal facility would also remove an area, presumably as large as the existing ponds area, from availability for future development. This alternative would also require a small level of effort for long-term maintenance of the cover system and for monitoring of the liner and groundwater monitoring systems.

I. Public Health

The impacts to the public and occupational radiological dose associated with the alternate off-site disposal action would be a result of the removal and transport of the waste materials. Given the low radioactivity of the material, exposure rates of the waste material

would be minimal, and therefore of little significance when compared to background radiation exposure levels.

No liquid discharges are expected to be associated with this alternative. Releases to the air associated with the demolition of the pond surface impoundments would consist of the generation of air and particulate emissions. Exposures to on-site workers during the limited construction would mainly consist of exposures to fugitive dust and direct radiation associated with material removal activities.

Cumulatively, onsite workers would be subject to the combined impacts of air emissions, direct radiation and noise. These impacts could be mitigated through the use of appropriate personal protection equipment and dust suppression materials.

Off-site cumulative impacts would mainly consist of air emissions, noise, direct radiation, and risks associated with the transport of the waste materials to the disposal facility and shipment of clean over fill to MTW. These impacts would be short-term impacts incurred during the construction period.

Even though no impacts on ground water quality are expected, this alternative would provide a greater degree of protection than the existing conditions because the removal of the pond contents will eliminate the underlying materials from the infiltration of precipitation in the future. Public health impacts of the off-site disposal alternative are SMALL.

Public health impacts of the ex-situ stabilization, on-site disposal alternative would be similar to those of the off-site disposal option. Additional impacts of the stabilization and on-site disposal processes would be offset by much smaller transportation impacts, because the stabilized CaF_2 material will not be loaded onto railcars for transportation to an off-site disposal facility. The long-term public health impacts of the ex-situ stabilization, on-site disposal alternative would be minimal because the on-site disposal facility would be constructed with an engineered RCRA cover and liner system that would be protective of public health. Public health impacts of the ex-situ stabilization, on-site disposal alternative are also SMALL.

m. Waste Management

The alternate off-site disposal action is expected to result in the generation of significant amounts of waste requiring off-site management. Under this alternative, the pond contents will be transported to a licensed facility for final disposal. The disposal facility will have sufficient capacity to receive the described waste materials. This option consumes limited licensed waste disposal capacity. Additional waste materials potentially generated under this alternative include personal protection equipment wastes (e.g., disposable protective clothing), which would be minimal. The ex-situ stabilization, on-site disposal option would also generate significant amounts of waste requiring on-site disposal. The stabilization process would increase the volume of the CaF_2 material to a volume approximately equal to that expected for the proposed in-situ stabilization action.

The cost of off-site disposal of the ponds contents (LAR Section 6.5) was estimated at $61,300,000, compared to the estimated $32,000,000 cost of in-place closure. The cost of the ex-situ stabilization, on-site disposal alternative is expected to be less than the off-site disposal alternative, because it requires less transportation. It is expected to be significantly greater than the proposed in-situ stabilization action, because of the cost to construct a new disposal facility on-site. Waste management impacts are MODERATE.

n. Impact Mitigation

Environmental mitigation measures under the off-site disposal and the ex-situ stabilization, on-site disposal alternatives would include:

- The development and implementation of effective health and safety measures to maintain a safe environment during construction.
- The development and implementation of a Quality Assurance program to assure that decommissioning activities are performed in a manner consistent with regulatory requirements and license conditions.

- The development and implementation of environmental monitoring and control programs to reduce exposures to radioactive materials and direct radiation during decommissioning. Such a program would include the following:
    a. Sediment control measures, including run-on and run-off control measures utilizing perimeter drainage swales, silt fences, hay bales and other stormwater and erosion control features, as necessary, and stormwater collection and treatment in the staging area.
    b. Dust suppression measures, such as water spray, calcium chloride, or other dust suppression materials, to minimize the release of airborne materials from material excavation, transport and material management (railcar loading) activities.
    c. Air monitoring to monitor dust generation in the work area.
- The development and implementation of a transportation and contingency program, to ensure that the waste hauler is knowledgeable of the materials being carried, and the associated health and safety/spill prevention and control issues and actions to be taken in the event of a transportation accident during shipment of the pond materials to the off-site or on-site disposal facility.

FINDING OF NO SIGNIFICANT IMPACT

The NRC staff concludes that the proposed amendment of license SUB-526 involving the decommissioning of Ponds B, C, D, and E at the Honeywell MTW site in Metropolis, Illinois, will not result in a significant impact to the environment. The NRC staff concludes that the proposed action is not likely to adversely affect Federally listed species or federally designated critical habitat because the ponds are already present, no expansion of the ponds area is planned, and the pond contents stabilization and cover system construction will be performed

within the existing ponds footprint. The NRC staff finds that no historic properties will be affected by the proposed action.

Airborne effluents from the pond stabilization activities and liquid effluents released to the Ohio River will remain below regulatory limits for radiological contaminants. Occupational doses will also be controlled to well below regulatory limits.

The long-term closure of Ponds B, C, D, and E will result in less than 25 millirem/year to a member of the public, considering the industrial worker scenario without the cover system, in accordance with 10 CFR Part 20, Subpart E. The NRC has determined that this annual dose to a member of the public meets the NRC criteria for unrestricted use of the ponds area and is not a significant environmental impact, because a limit of 25 millirem/year provides a sufficient and ample margin for protection of public health and safety.

The environmental impacts of the proposed action have been evaluated in accordance with the requirements in 10 CFR Part 51. The NRC staff has determined that the amendment of license SUB-526 to allow decommissioning of Ponds B, C, D, and E at the MTW facility will not have a significant impact to the human environment. No environmental impact statement is required, and a finding of no significant impact is appropriate in accordance with 10 CFR 51.31.

ENVIRONMENTAL IMPACTS SUMMARY

Impacts to the resource areas of the proposed action and the off-site disposal alternative are summarized in the table below:

COMPARISON OF IMPACTS OF THE PROPOSED ACTION AND ALTERNATIVES		
RESOURCE AREA	**IMPACTS OF THE PROPOSED ACTION**	**IMPACTS OF THE OFF-SITE DISPOSAL ALTERNATIVE AND THE EX-SITU, ON-SITE DISPOSAL ALTERNATIVE ACTION**
Land Use	No adverse impact on off-site land use. On-site future land use limited by cover system.	No adverse impact on off-site land use. No limit on future land use in ponds area. Limit on future land use in new disposal facility area.
Transportation	Minor temporary increase in traffic due to transportation of cover materials to site.	Increase in traffic due to transportation of waste materials to rail staging area and off-site disposal. Increased potential for accidents during transport of pond contents to disposal facility. Minor temporary increase in traffic due to transportation of stabilized

COMPARISON OF IMPACTS OF THE PROPOSED ACTION AND ALTERNATIVES		
RESOURCE AREA	**IMPACTS OF THE PROPOSED ACTION**	**IMPACTS OF THE OFF-SITE DISPOSAL ALTERNATIVE AND THE EX-SITU, ON-SITE DISPOSAL ALTERNATIVE ACTION**
		materials to new on-site disposal facility.
Geology, Soils, Seismology	Minor positive impact due to stabilization and drainage improvements.	Minor impacts on on-site road system and railroad staging area. Minor impacts at new on-site disposal facility.
Hydrology	No significant impacts to surface or ground water. Discharge from the ponds to Outfall 002 would stop.	Positive impact to ground water because source is removed. Discharge from the ponds to Outfall 002 would stop.
Ecological Resources	No impacts because site is industrial.	No impacts because site is industrial. Unknown impacts at a new on-site disposal facility.
Air Quality, Meteorology, Climatology	Small impacts on air quality from stabilization and cover system construction, dust control actions will be	Impacts on air quality because of pond contents removal and packaging, dust control actions will be implemented.

COMPARISON OF IMPACTS OF THE PROPOSED ACTION AND ALTERNATIVES		
RESOURCE AREA	**IMPACTS OF THE PROPOSED ACTION**	**IMPACTS OF THE OFF-SITE DISPOSAL ALTERNATIVE AND THE EX-SITU, ON-SITE DISPOSAL ALTERNATIVE ACTION**
	implemented.	
Noise	No off-site impacts, due to distance from receptors.	Temporary noise increase due to construction activities at the ponds location and transportation to rail staging area or to new on-site disposal facility.
Historic and Cultural Resources	No impacts because no resources are present.	For off-site disposal option, no impacts because no resources are present. Unknown for ex-situ stabilization on-site disposal alternative.
Visual and Scenic Resources	Change in appearance of the ponds due to cover system.	Change in appearance of the ponds due to ponds removal. Change in appearance of site selected for new on-site disposal facility.
Demography and	Small positive impact from	Small positive impact from

COMPARISON OF IMPACTS OF THE PROPOSED ACTION AND ALTERNATIVES		
RESOURCE AREA	**IMPACTS OF THE PROPOSED ACTION**	**IMPACTS OF THE OFF-SITE DISPOSAL ALTERNATIVE AND THE EX-SITU, ON-SITE DISPOSAL ALTERNATIVE ACTION**
Socioeconomics	construction workers and local purchase of cover system materials.	construction workers and local purchase of site re-vegetation materials. Significant impact to Honeywell due to high disposal costs.
Public Health	Small impacts to construction workers, mitigated by radiation protection program. Closure standard of 25 mrem/year provides sufficient and ample margin for protection of public health and safety. ALARA demonstration adequate.	Small impacts to construction workers, mitigated by radiation protection program. Positive impact to potential ground water quality because source is removed.
Waste Management	Small impacts of waste generated during stabilization.	More waste is generated by excavation of pond contents, takes up capacity at disposal

COMPARISON OF IMPACTS OF THE PROPOSED ACTION AND ALTERNATIVES		
RESOURCE AREA	**IMPACTS OF THE PROPOSED ACTION**	**IMPACTS OF THE OFF-SITE DISPOSAL ALTERNATIVE AND THE EX-SITU, ON-SITE DISPOSAL ALTERNATIVE ACTION**
		facility. High cost to construct new on-site disposal facility. High off-site disposal cost.

LIST OF AGENCIES CONSULTED

1. U.S. Department of Agriculture Natural Resources Conversation Service
2. U.S. Geological Survey
3. U.S. Fish and Wildlife Service
4. Illinois State Water Survey
5. U.S. Environmental Protection Agency
6. American Planning Association
7. U.S. Census
8. U.S. Bureau of Labor Statistics
9. Tennessee Valley Authority
10. National Council of Radiation Protection
11. Illinois Emergency Management Agency
12. Illinois Environmental Protection Agency
13. Illinois Historic Preservation Agency

REFERENCES

1. Honeywell Surface Impoundment Decommissioning Plan (ML103400456), including the 2-volume License Amendment Request (LAR) Report and Environmental Report (ML103420434).
2. Additional information provided by Honeywell, February 13, 2012 (ML12060A115).
3. Responses to Additional NRC Requests Regarding the Honeywell Metropolis Works LAR Report Volume 2: Closure Plan for Surface Impoundments B, C, D,&E, September 7, 2012 (ML12255A043).
4. EA for Renewal of NRC License No. SUB-526 for the Honeywell Specialty Materials Metropolis Works Facility, Docket No. 40-3392, June 2006, (ML061780260).
5. Illinois Emergency Management Agency letter to Mary Adams from Adnan Khayyat, May 10, 2013 (ML13142A276).
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