Westinghouse Non-Proprietary Class 3

Proposed Plan - Operable Unit 1
Buried Waste, Impacted Soils, and Sediment

Westinghouse Electric Company LLC
Former Fuel Cycle Facility, Hematite, Missouri

EO-08-002

Rev. 0

June 25, 2008

Westinghouse

3300 State Road P, Festus, MO 63028

WESTINGHOUSE ANNOUNCES PROPOSED PLAN

This Proposed Plan identifies the preferred alternative for remediating buried waste, impacted soil, and impacted sediment at the Westinghouse Electric Company LLC Hematite Former Fuel Cycle Facility (Site) and provides the rationale for this preference. This action, identified as "Operable Unit 1," is one of two steps for remediating the Hematite Site. Operable Unit 2 will address impacted groundwater that remains after implementing Operable Unit 1.

In addition to describing the preferred alternative, this Plan also identifies other alternatives that were considered for Operable Unit 1. After reviewing and considering the information received during the 30-day public comment period, Westinghouse, in consultation with the Missouri Department of Natural Resources (MDNR) will select the Operable Unit 1 remedy for the Site. Westinghouse, in consultation with MDNR, may modify the preferred alternative or select another alternative presented in this Plan based on public comments received. These steps will be coordinated with the decommissioning process that Westinghouse is following in connection with its license with the U.S. Nuclear Regulatory Commission (NRC).

With MDNR's approval, Westinghouse is issuing this Proposed Plan as part of its public participation activities under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). This Proposed Plan summarizes information that is presented in detail in the Remedial Investigation (RI) and Feasibility Study (FS) reports and other documents contained in the Administrative Record for this Site. The public is encouraged to review these documents to gain a more thorough understanding of the Site and the response activities conducted to date.

PUBLIC COMMENT PERIOD:
JUNE 26,– JULY 26, 2008
Written comments on the Proposed Plan will be accepted during the public comment period.

Comments should be submitted to:
Westinghouse Electric Company
3300 State Route P
Festus, MO 63028

PUBLIC MEETING
JULY 10, 2008
A public meeting will be held to explain the Proposed Plan and the alternatives presented in the Feasibility Study. Oral and written comments will also be accepted at the meeting. The meeting will be held at
National Guard Armory
2740 State Road P
Festus, Missouri 63028
From : 7:00 – 9:00

For more information, see the Administrative Record at the following location:
Festus Public Library
300 N. Mill Street
Festus, Missouri 63028
636-937-2017

CERCLA PROCESS

Several CERCLA studies and investigations have preceded this Proposed Plan. Beginning in 2004, Westinghouse, with oversight by MDNR, prepared an RI, a Human Health Risk Assessment (HHRA),

and a Screening-Level Ecological Risk Assessment (SLERA):

- The RI characterizes the nature and extent of contamination associated with the Site.
- The HHRA describes the potential risks to human health posed by radiological and chemical constituents, and
- The SLERA evaluates the potential risks to the environment.

MDNR approved these reports as they relate to Operable Unit 1 on July 19, 2007.

Westinghouse used the results from the RI, HHRA, and SLERA to prepare an FS for Operable Unit 1. The FS identifies, develops, and evaluates alternative remedial actions to achieve a final remedy for buried waste, impacted soils, and impacted sediment using the evaluation process set forth in CERCLA and the NCP. MDNR approved the FS on December 21, 2007. This Proposed Plan has been developed from the approved FS and will serve as the basis for selecting a Site remedy for Operable Unit 1 in a Record of Decision to be issued following the current public comment period.

Throughout the CERCLA process, Westinghouse has sought and received public input, particularly in the form of questions and comments raised at various public meetings hosted by Westinghouse and MDNR. These public comments, as well as input from regulatory reviews, were used in preparing the FS and this Proposed Plan. MDNR has provided oversight of this CERCLA process, which in turn has been coordinated with the license termination process being conducted under NRC's jurisdiction.

NRC DECOMMISSIONING PROCESS

The NRC decommissioning process consists of a series of integrated activities outlined the NRC document NUREG 1757, Volume I. The steps in general are as follows:

- Notify NRC of decision to change from active to decommissioning status;
- Determine the location and concentration of remaining radiological contamination;
- Develop a Decommissioning Plan (DP), which includes the current status of the site, the proposed radiological release criteria, activities necessary to complete the remediation, procedures to protect the workers, cost estimates, final status survey methods, and schedule for completion;
- Submit a nuclear materials license amendment and DP to NRC for review and approval;
- Receive NRC approval;
- Remediate and decommission the site;
- Conduct final status surveys to show that remaining radiation levels comply with limits; and
- Request termination of the site license.

The NRC reviews the radiological release criteria established in the DP to verify that appropriate levels have been developed. These criteria are based on the calculated residual dose from all exposure pathways on the average member of the critical group (e.g., residential farmer), and are referred to as the derived concentration guideline levels (DCGLs). The DCGLs are specific limits for each radiological contaminant that are determined to be protective of human health and the environment. A final status survey and dose assessment of the site are performed to ensure that the DCGLs have been achieved.

SITE HISTORY

Nuclear-related operations at the Hematite Facility began in 1956 after the purchase of the property, by Mallinckrodt Chemical Works. In addition to Mallinckrodt, various entities owned and operated the Hematite Facility over the years before Westinghouse acquired the Facility in 2000.

Throughout its history, the primary activity at the Facility was producing uranium metal and compounds from enriched uranium. The uranium metals and compounds were used to produce nuclear reactor fuel. Secondary activities included uranium scrap recovery and limited work with thorium compounds. Prior to 1974, most of the Facility operations were related to nuclear fuel manufacturing for the U.S. Government. After 1974, Facility operations focused on commercial fuel production.

In 2001, Westinghouse ceased fuel production at the Hematite Facility and requested from the NRC an amendment of its nuclear materials license to change the scope of licensed activities to those focused on decommissioning. NRC issued the requested license amendment in 2002.

SITE CHARACTERISTICS

The Hematite Facility is located at 3300 Missouri Route P in Jefferson County, Missouri, near the unincorporated village of Hematite. The Westinghouse property consists of 228 acres. Facility operations were conducted primarily within a 10- to 12-acre portion of the property (Figure 1).

Geology

The Hematite Facility lies along the northwest edge of the floodplain of Joachim Creek, a tributary of the Mississippi River. The creek is incised into bedrock, forming a valley that trends east northeastward. The valley floor is about 200 feet lower in elevation than the uplands to the north and south.

Soils at the Hematite Site are both terrace deposits and floodplain alluvium. Shallow soils are silts and clay, which overlie deeper sand and gravel. The overall thickness of the terrace deposits and alluvium varies from about 20 to 35 feet.

In the Site vicinity, bedrock units are, in descending stratigraphic order, the Cotter Dolomite, the Jefferson City Dolomite, and the Roubidoux Formations. The Cotter Dolomite underlies the uplands, while the Jefferson City Dolomite is exposed in the valley walls of the tributaries to Joachim Creek. The nearest outcropping of the Roubidoux Formation is about six miles to the southwest of the Hematite Site.

Hydrogeology

In the unconsolidated terrace and alluvial floodplain sediments at the Site, rainwater infiltration seeps downward to the sand and gravel, and groundwater flows in this coarse-grain unit to the southeast toward Joachim Creek. Groundwater in the upper Jefferson City-Cotter Dolomite flows radially from the Hematite Facility toward the northeast along bedding planes and toward the southeast in a more-permeable zone in the rock. In the deeper Roubidoux Formation, groundwater flows to the northeast.

Between the deeper sediments and the Jefferson City-Cotter Dolomite, hydraulic gradients are downward near the Hematite Facility but are generally upward near Joachim Creek where shallow groundwater discharges. Vertical gradients also tend to be upward between the Jefferson City-Cotter

Dolomite and the Roubidoux Formation. Until 2004, however, this gradient was reversed (i.e., downward) as a result of lowered hydraulic heads in the Roubidoux Formation, possibly caused by the pumping of groundwater from the Roubidoux Formation by the City of Festus water supply wells.

NATURE AND EXTENT OF CONTAMINATION

The primary constituents of potential concern (COPCs) from past Facility operations are radiological contaminants and volatile organic compounds (VOCs). Radiological contaminants include uranium isotopes from fuel production and technetium-99 (that entered the Hematite Facility as a contaminant in incoming raw materials used in fuel production). The VOCs, including trichloroethylene (TCE) and tetrachloroethylene (PCE), were used in manufacturing and other Facility processes.

Both the radiological constituents and the VOCs primarily are associated with specific "areas of concern" at the Site, including the Burial Pit Area, the Evaporation Ponds, the former septic system leach field, soils under the buildings, outdoor areas adjacent to buildings, and the Site Pond. Figure 2 is a Site map that shows these areas of concern.

Other constituents related to past Site activity include metals (e.g., arsenic) and polycyclic aromatic hydrocarbons (PAHs). These chemicals contribute to potential human health or ecological risks only within very limited areas of surface soils or sediments. These chemicals are co-located with the primary COPCs and will be addressed concurrently with the primary COPCs during Site remediation.

PRIOR REMOVAL ACTIONS

Westinghouse has taken a number of other steps over the last several years in response to environmental conditions at and around the Site. Removal actions from 2002 through 2005 were implemented to address off-site groundwater impacts (i.e., provision of alternative water supplies), removal of uranium-impacted soils from an on-site area known as Deul's Mountain, and the removal of radiologically contaminated and other equipment from the property. Each of these actions was conducted in accordance with the NCP, including provisions for documentation and public comment, and was approved by MDNR.

SUMMARY OF SITE RISKS

As required under the CERCLA process, Westinghouse assessed potential risks to human health and to ecological receptors under baseline (unremediated) Site conditions. In these risk assessments, the actual contents of the Burial Pits were not evaluated as an exposure medium because of the difficulty of obtaining representative data of the heterogeneous material contained in them. Therefore, with respect to the Burial Pits, consistent with the NCP (40 CFR 300.430(d)(4)), the risk assessments characterized the current and potential future threats to human health and the environment that may be posed by constituents that may migrate from these buried materials to potential points of exposure, including groundwater. Exposure to the wastes contained in the Burial Pits or to the soils immediately adjacent to these wastes would be expected to result in risks greater than those quantified in the baseline risk assessments.

Potential human health risks modeled in the HHRA include cancer (carcinogenic) and toxic (non-carcinogenic) effects. Cancer

risk estimates were compared to the U.S. Environmental Protection Agency (EPA) risk range outlined in the NCP, whereby acceptable exposure levels are those that represent an excess upper-bound lifetime cancer risk to an individual in the range of one in a million (10^{-6}) to one in ten thousand (10^{-4}). The potential for non-carcinogenic effects was evaluated by adding for each chemical the ratio of potential intake to a published chronic reference dose. These ratios were then summed to obtain a hazard index (HI). An HI greater than 1.0 indicates a potential for adverse non-carcinogenic health effects.

Ecological risk screening was conducted by comparing the maximum concentrations of COPCs at the Site to ecological benchmarks. The ecological evaluation also considered the rarity, diversity, and importance of habitats at the Site.

Human Health Risks

The baseline HHRA followed EPA guidance in evaluating potential risks to current and potential future human receptors from exposure to various constituents identified at the Hematite Site. Receptors included potential future residents, Site workers, and other Site users/visitors. As noted above, MDNR approved the HHRA as it relates to Operable Unit 1 on July 19, 2007.

Risk Characterization for Chemical Constituents

Table 1 summarizes the total potential incremental lifetime cancer and non-cancer risk from chemical exposure to constituents through various pathways. As shown in Table 1, using the conservative assumptions inherent to the EPA risk assessment procedure, the potential carcinogenic Site-related risk attributable to unremediated conditions exceeds 10^{-4} for hypothetical future on-site residents, commercial/ industrial workers, and agricultural workers. Nearly all of the calculated risk results from exposures related to the assumed use of bedrock groundwater for drinking water and similar uses. The 10^{-4} incremental lifetime cancer risk value is used by EPA as a basis for action, indicating that remedial action is warranted.

Similarly, as shown in Table 1 under non-cancer risks expressed as HI, calculated HI values exceed 1.0 for potential future Site residents and construction workers based on unremediated conditions. EPA and MDNR use an HI greater than 1.0 as indicative of the need to address non-carcinogenic human health risks. The exposure routes contributing significantly to non-carcinogenic risks are the same as those contributing to carcinogenic risks.

Risk Characterization for Radiological Constituents

The baseline HHRA specifically addressed the total dose and total excess lifetime cancer risks associated with potential radiation exposure under current and future land-use scenarios. The total dose is expressed as the annual Total Effective Dose Equivalent (TEDE), which is the sum of the dose from all sources both internal and external averaged over the exposure period and expressed in units of millirem per year (mrem/yr). The dose from potential exposure was used to estimate risk.

The TEDE and risk estimates based on conservative exposure factors are included in Table 1. Table 1 shows that the calculated incremental lifetime cancer risk from exposure to radiological constituents is on the order of 10^{-7} to 10^{-5} for the various receptor populations. These risks are at the lower (less risk) end of the 10^{-6} to 10^{-4} acceptable risk range. As previously noted,

however, these calculated risks do not address radiological data for the buried waste or adjacent soils at the Burial Pits.

Ecological Risk

The SLERA concluded that no further ecological risk evaluation was needed for the Hematite Site because of the low probability of significant ecological effects on local populations and the lack of unique, rare, and critical habitat at the Hematite Site. The ecological risk evaluation concluded that remediation of the Site was not required to protect ecological receptors, with the exception of sediments within the Site Pond. Based on these findings, the Site Pond sediment will be addressed in remediation. As noted above, MDNR approved the SLERA as it relates to Operable Unit 1 on July 19, 2007.

Risk Summary

It is Westinghouse's and MDNR's current judgment that the preferred alternative identified in this Proposed Plan (or one of the other active measures considered in the FS), is necessary to protect public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment.

APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

CERCLA requires the selection of a remedial action that is protective of human health and the environment and complies with "applicable or relevant and appropriate requirements (ARARs)". ARARs consist of two distinct categories of environmental laws and regulations that affect what remediation may be required and how that remediation is executed: Applicable requirements and Relevant and Appropriate requirements. The NCP (40 CFR 300.5) and EPA guidance define these concepts as follows:

> "Applicable requirements means those clean-up standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under Federal environmental or state environmental or facility siting laws that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance found at a CERCLA site. Only those state standards that are identified by a state in a timely manner and that are more stringent than Federal requirements may be applicable.
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> "Relevant and Appropriate requirements means those clean-up standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under Federal environmental or state environmental or facility siting laws that, while not applicable to a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site, address problems or situations sufficiently similar to those encountered at the CERCLA site that their use is well-suited to the particular site. Only those state standards that are identified in a timely manner and are more stringent than Federal requirements may be relevant and appropriate."

If a particular requirement is found not to be Applicable, it may be found Relevant and Appropriate. 40 CFR 300.400(g) lists factors to be examined for relevance and appropriateness to determine whether a requirement addresses problems or situations sufficiently similar to circumstances of the release or remedial action contemplated and whether the requirement is well suited to the site. The

determination that a requirement is relevant and appropriate is a two-step process: (1) determination if a requirement is relevant; and (2) determination if a requirement is appropriate. A requirement may be relevant, but not appropriate given the circumstances of a particular site.

The NCP and EPA guidance further define three specific types of ARARs:

- Chemical specific;
- Location-specific; and
- Action specific.

Chemical-specific ARARs include those requirements that regulate the amounts or concentrations of hazardous substances that may be found in or discharged to the environment. Chemical-specific ARARs are important in determining whether soil, groundwater, surface water, and sediment at a site are impacted and in determining the residual levels of constituents allowable after site remediation. For Operable Unit 1 at the Hematite Site, the most significant chemical-specific ARARs are the NRC requirements that establish soil cleanup standards for removing radiological constituents in buried waste, soils, and sediment.

Location-specific ARARs apply to the area in which a site is located. Regulations that are potential ARARs may require actions to preserve or protect aspects of the environment or cultural resources that may be threatened by the site or by the remedial actions to be undertaken. While there are several environmental considerations that are potential location-specific ARARs for the Hematite Site, these do not define remediation requirements for this Site.

Action-specific ARARs are regulations that apply to specific actions or technologies to be used in site remediation. For Operable Unit 1 at the Hematite Site, significant action-specific ARARs include the NRC regulations for decommissioning and terminating nuclear materials licenses and the regulations promulgated under the Resource Conservation and Recovery Act (RCRA) that establish national standards for managing both non-hazardous and hazardous waste. Under the Federal regulations, Missouri has been delegated RCRA authority and the Missouri solid and hazardous waste regulations generally mirror the Federal requirements.

Table 2 summarizes key potential ARARs for Operable Unit 1 at the Hematite Site. A complete listing and discussion of ARARs for Operable Unit 1 can be found in the FS.

REMEDIAL ACTION OBJECTIVES AND REMEDIAL GOALS

Remedial Action Objectives

To determine the preferred remedial action, the NCP sets forth a procedure by which remedial action objectives (RAOs) are first established, based on the nature and extent of contamination, threatened resources, the potential for human and environmental exposure, and reasonably anticipated land uses. At the Hematite Site, Westinghouse established the following RAOs for Operable Unit 1:

- Eliminate potentially unacceptable human health or environmental risks that could result from contact with the buried waste and impacted soils and sediment, including contact via direct exposure, ingestion, dermal contact, and inhalation of particulates or VOCs in soil gas;
- Eliminate potential ecological risks associated with impacted sediments in the Site Pond;
- Address the waste contained in the Burial Pits as a principal source of

contamination through active remediation;
- Comply with ARARs and, to the extent practicable, other pertinent regulatory agency guidance; and
- Reduce the potential for buried waste and impacted soils to serve as a source of future groundwater contamination.

Chemical Preliminary Remedial Goals

Preliminary Remediation Goals (PRGs) are derived from the RAOs but are more-specific statements of the desired endpoint concentrations or risk levels established to protect human health and the environment. EPA guidance provides that, to the extent possible, applicable chemical-specific ARARs should be used to define PRGs. In the absence of chemical-specific ARARs, EPA guidance states that, for chemicals which pose carcinogenic risks, PRGs should generally be established at concentrations that achieve a 10^{-6} excess lifetime cancer risk as the "point of departure" for remedial planning. For individual chemicals that pose non-carcinogenic risks, PRGs should generally be established at concentrations that achieve an HI of 1.0.

When determining site specific PRGs, Westinghouse evaluated various guidance sources that provide default cleanup levels in soil and that can be used for remedial planning, including the Missouri Risk Based Corrective Action (MRBCA) technical guidance, EPA Soil Screening Levels, EPA Region III Risk-Based Concentrations, and EPA Region IX PRGs.

The chemical specific PRGs selected for Operable Unit 1 at the Hematite Site were derived from the MDNR risk-based corrective action process is set forth in the "Departmental Missouri Risk-Based Corrective Action Technical Guidance (MRBCA)." The MRBCA program covers all environmental media (i.e., surface water, groundwater, and soil) and provides default target levels to be used for remediation decisions. The program also considers institutional controls and activity and use limitations to ensure long-term stewardship. The MRBCA program are used instead of the Cleanup Levels for Missouri (CALM) Guidance as it contains the most recent information and is considered the to be the current program for risk-based remediation. The chemical PRGs derived for Operable Unit 1 at the Hematite Site are those shown in Table 3. These chemical PRGs are based on future residential use of the Hematite Site.

Radiological Derived Concentration Guideline Limit (DCGLs)

NRC regulations establish requirements for protection against ionizing radiation resulting from activities conducted under licenses issued by the NRC. These regulations define soil and groundwater remediation requirements for radiological contaminants either for unrestricted release or for restricted release of a site.

A site is considered acceptable for unrestricted use if the residual radioactivity above background radiation results in a TEDE to an average member of the receptor population of 25 mrem/yr or less. For unrestricted release, the residual radioactivity must also be reduced to levels that are as low as reasonably achievable (ALARA).

The criteria for restricted release can be used only if a licensee can demonstrate that further reductions in residual radioactivity necessary to achieve unrestricted release would result in more public or environmental harm or were not being made because the residual levels associated with restricted release are ALARA. Restricted

release also requires the use of legally enforceable institutional controls to reasonably assure th at the TE DE from residual radioactivity above background will not exceed 25 m rem/yr. The NRC regulations require that the dose contribution from all sources, including any rem aining on-site disposal areas , be accounted for at the time of license termination.

Pursuant to these NRC requirem ents, Westinghouse is developing DCGLs for soil, groundwater, and building surfaces. These DCGLs will be specified in the DP that will undergo NRC review and approval prior to commencing remediation. The DCGLs for the Hematite Site will be based on unrestricted release.

SUMMARY OF REMEDIAL ALTERNATIVES

In the FS, Westinghouse evaluated a wide variety of potential remedial technologies and processes with the potential to achieve the RAOs and meet the Site-specific cleanup levels given as the PRGs and DCGLs. These technologies were screened to identify the more technically ef fective, implementable, and co st-effective remedial methods. The technologies that passed screening were then assembled into four remedial action alternatives for further evaluation. In addition, in accordan ce with NCP and CERCLA guidance, a "no action" alternative was evaluate d and serv es as th e baseline against which other rem edial alternatives are compared.

The remedial alternatives for Operable Unit 1 at the He matite Site are pre sented below and numbered to correspond with the numbers in the FS Rep ort. For the reason s discussed below, the Preferred Alternative is Alternative 4.

Alternative 1: No Action

Estimated Capital Cost: $0
Estimated Annual Operation and Maintenance (O&M) Cost: $0
Estimated Present Worth Cost: $0
Estimated Construction Timeframe: None

Alternative 1 involves no further rem edial action for the buried w aste, impacted soils, and impacted sediment at the Hem atite Site. The no action altern ative for Oper able Unit 1 would allow buried waste and impacted soils to remain on-s ite and allow future Site users to potentially be exposed to these materials. Im pacted sediment in the Site Pond and associated potential ecological risks would likewise not be addressed.

Alternative 1 does not comply with ARARs. Residual contamination in buried waste, impacted soil and im pacted sediment would remain onsite at levels that would exceed guidelines. No reduction of the potential risks would be realized under this Alternative.

Alternative 2: In-Situ Containment with Access Control as Interim Remedial Action to Defer Final Remediation

Estimated Capital Cost: $7,185,300
Estimated Annual O&M Cost: $1,312,500
Estimated Present Worth Cost: $38,930,500
Estimated Construction Timeframe: 12 months

Alternative 2 provides containm ent of the identified areas of con cern to red uce the potential for direc t-contact exposure to impacted materials and to reduce the potential for VOCs and radiological constituents to leach from subsurface soils or waste and disperse into groundwater. Containment would be effected by installing a soil-bentonite slurry cutoff wall around the perimeter of the impacted areas and

constructing a multi-component low-permeability capping system over this area.

Site preparation activities would include relocating the Site fence as needed to maintain access restrictions but allow for consolidation of waste and soils and installing stormwater and erosion controls. Once these preliminary tasks were completed, impacted soil and waste from outside the perimeter would be consolidated within the area to be capped. Such materials include buried waste and impacted soils from the Red Room Roof Burial Area and Site Pond sediments. After waste, soil, and sediment removal and final status surveys to confirm the completeness of removal, the Red Room Roof Burial Area excavation would be backfilled, regraded to promote surface water drainage, and revegetated.

After wastes and soils from the remote areas were consolidated, a slurry wall would be constructed around the perimeter of the remaining waste management unit (10± acres) by trenching and filling the trench with bentonite clay or similar low-permeability material. The slurry wall would be keyed as deep as practicable into the upper weathered bedrock. Pumping wells would be used to lower the groundwater table inside the containment area and reduce the potential for releases of impacted groundwater to bedrock. The groundwater removed by these wells would be treated at an on-site treatment system and discharged to surface water. Management of migration of constituents in groundwater issues outside the containment area would be addressed under Operable Unit 2.

Once the slurry wall was in place, a multi-component low-permeability capping system would be placed over the containment area.

Once the cap was in place, the surrounding area would be regraded and vegetated to divert any surface run off away from the cover. Monitoring wells would then be installed immediately adjacent to the containment area to monitor for any lateral migration of contamination.

The containment area would be maintained and monitored to ensure its integrity, and physical access restrictions (i.e., fencing, warning signs) would provide security. Although institutional controls such as deed restrictions and restrictive covenants might also be employed, the active maintenance and monitoring are viewed as the primary means for protecting the integrity of the containment system.

Approval for the Alternative 2 in-place containment of waste would be obtained through the NRC license termination process and State approvals for chemical constituents. The justification for in-place containment of the waste would require a dose assessment to demonstrate compliance with the applicable NRC radiological release criteria and that residual on-site risks are ALARA. Because of the heterogeneity of the waste materials contained in buried waste, particularly the Burial Pits, the level of effort needed to generate the required information for an adequate dose assessment that is approvable by NRC may be prohibitive, and it is not clear that, even with enhanced information relative to in-place containment, this dose assessment would show a sufficiently low potential dose to allow the NRC to approve an in-place containment approach. Accordingly, the demonstration that Alternative 2 achieves chemical-specific ARARs is not assured and would need to be confirmed through additional investigation and dose assessment.

Furthermore, in-situ containment would not comply with siting and design requirements for radioactive and hazardous waste land disposal facilities that comprise location- and action-specific ARARs and may not prove effective in adequately controlling VOC releases to groundwater where concentrated organics are present in the subsurface.

For these reasons, this alternative does not meet the threshold criteria with regard to meeting ARARs. Accordingly, Alternative 2 is considered only as a limited, temporary action undertaken to defer final remediation. In the detailed evaluation of Alternative 2, it is assumed that an ultimate, permanent remedy would be implemented after a 30-year period. The ultimate remedy is assumed to involve removal and off-site disposal of impacted solid wastes and soils.

Alternative 3: Removal, Treatment of VOC Waste, and Disposal of LLRW and Non-Hazardous Treatment Residues in an On-Site Facility

Estimated Capital Cost: $21,130,900
Estimated Annual O&M Cost: $586,300
Estimated Present Worth Cost: $30,143,800
Estimated Construction Timeframe: 36 months

Alternative 3 involves the removal of the waste and impacted soils from each of the areas of concern, including the Burial Pits, and placing the exhumed materials in a newly constructed on-site disposal facility. Approval for an on-site disposal facility would be obtained through the NRC license termination process. As part of the approval, a dose assessment would be conducted to determine the dose contribution from the LLRW placed in the facility to demonstrate compliance with the radiological release criterion of 25 mrem/yr.

Site preparation activities performed before starting waste or contaminated soil removal would include relocating the Site fence as needed to restrict access restrictions while allowing for on-site facility construction and exhumation of waste and contaminated soil. Engineering controls would be installed for stormwater management and erosion control. A water treatment system would also be installed to collect and treat water from precipitation, infiltration, and runoff. Other preparatory work (e.g., sheetpiling around planned Evaporation Pond excavation) would also be completed at this time.

The on-site landfill would be constructed in a selected portion of the property above the floodplain. Clean soil would be imported to raise the elevation of the cell area by approximately five feet to ensure adequate separation between the landfill liner system and the groundwater table. The multi-component landfill liner would be installed in accordance with regulatory requirements.

Removing the waste and impacted soils from each of the areas of concern would entail excavation, materials handling, and construction dewatering. Sediment removal would involve re-routing the inflows to and decanting the surface water from the Site Pond, and dewatering the sediments either by air drying or mechanical means (i.e., filter press).

After waste and contaminated soil were removed, and final status surveys completed to confirm the completeness of removal, the excavations would be backfilled with clean fill, regraded to promote surface water drainage, and revegetated. The exception would be the Site Pond, where after sediment removal, the inflow diversion would be disconnected and the site dam removed to allow natural drainage patterns to be re-established.

Excavated materials would be sorted to identify and segregate wastes not amenable to direct on-site disposal, including wastes exhibiting VOC or other constituent concentrations above Land Disposal Restrictions (LDRs) or materials considered anomalous due to size or radiological contamination levels. After appropriate treatment, processing, and stabilization, materials amenable to on-site disposal, including those treated to meet LDRs, would be placed in the newly constructed landfill. Materials not suitable for on-site disposal would be sent off-site for further processing and disposal.

After the disposal facility was filled, the final capping system would be constructed. This cap would be comprised of the same components as those employed for the containment area cap under Alternative 2.

The on-site land disposal facility would be maintained and monitored to ensure its long-term integrity. Physical access restrictions would include fencing and the maintenance of security service. Long-term institutional controls would be required to identify the existence of the on-site disposal facility and control Site land uses to be compatible with the on-site facility.

Alternative 4: Removal, Treatment of VOC Waste, and Off-Site Disposal of LLRW and Non-Hazardous Treatment Residues

Estimated Capital Cost: $47,765,400
Estimated Annual O&M Cost: $0
Estimated Present Worth Cost: $47,765,400
Estimated Construction Timeframe: 24 months

Alternative 4, which is the preferred Alternative for Operable Unit 1, involves exhuming buried waste, impacted soil and sediment, and disposing of these materials in licensed and permitted off-site facilities. To the extent practicable, Alternative 4 relies on the on-site sorting, segregation, and treatment of exhumed materials to reduce the quantities of materials requiring off-site disposal and to maximize the quantity of material deemed suitable for reuse as on-site backfill. Sorting and segregation procedures are designed to properly classify the exhumed solid wastes and soils according to the material type, degree of radiologic impacts, and the degree of VOC impacts:

- Radiologically impacted wastes and impacted soils would be packaged and sent off-site for disposal as LLRW.
- VOC-containing wastes and soils that are not radiologically impacted above regulatory levels would be treated on-site. If the treated soils meet PRGs and backfill requirements after treatment, they would be used as backfill. The wastes and any treated soils that did not meet PRGs would be disposed of off-site.
- VOC-containing waste and soils that are also radiologically impacted above regulatory levels (i.e., LLMW) would be treated on-site prior to shipping them off-site for disposal.

The primary treatment method for VOC wastes and soils would be by ex-situ vapor extraction. The use of in situ (before excavation) methods to treat some materials to complement the ex-situ treatment may be evaluated as part of the remedial design of the remedial action.

<u>Preparation and Controls</u>

Site preparation activities would include relocating the Site fence to restrict access while allowing for exhumation of waste and contaminated soil. Engineering controls would be installed for stormwater management and erosion control. A water

treatment system would also be installed to collect and treat water from precipitation, infiltration, and run-off.

Exhumation

Removing the buried waste and contaminated soil would entail excavation, materials handling, and construction dewatering. After waste removal and final status surveys to confirm the completeness of removal, the excavations would be backfilled with clean fill (including treated soils that meet regulatory criteria), regraded to promote surface water drainage, and revegetated. The Site Pond is expected to be remediated using conventional earthmoving equipment. Sediment removal would involve re-routing the inflows to and decanting the surface water from the Site Pond, and dewatering the sediments. The wet sediment would be dewatered on-site and disposed of off-site. Following sediment removal at the Site Pond, the inflow diversion would be disconnected and the site dam removed to allow natural drainage patterns to be re-established.

The buried waste and contaminated soil would be exhumed and screened by field instruments for VOCs, radiological levels, and, as needed, other contaminants (e.g., metals). Oversized or anomalous objects would be segregated at the point of exhumation and relocated away from the active exhumation for further evaluation and processing.

The field screening data would be used as the basis for initial sorting and segregating the remaining soil and waste. Controls would be established in the area where field screening is performed to prohibit surface water runoff from the area, so that liquids from within the area can be collected and treated as wastewater. If necessary, a designated area away from the active excavation area will be used for field screening, the waste or soil would be transported to the area and spread to facilitate screening. Excavations would be performed in accordance with applicable safe trenching and shoring requirements. Worker health and safety protection would be provided through administrative and engineering controls and the use of personal protective equipment (PPE). Environmental monitoring would be performed to demonstrate that off-site emissions do not present an adverse risk to nearby residents.

Treatment

Analysis would be conducted on representative samples of the various categories of materials as needed to guide further handling requirements and off-site disposal decisions. Wastes containing VOC concentrations above regulatory levels would be treated in on-site tanks using ex-situ soil vapor extraction to remove VOCs to render this material non-hazardous and reduce VOC concentrations to below LDRs prior to off-site disposal.

Soils containing VOC would be similarly treated either to render them non-hazardous (if they contain elevated radiological levels and are being sent off-site for disposal) or to meet PRGs if they are not radiologically impacted above DCGLs and usable as on-site backfill.

Figure 3 shows a detail of how these tanks may be constructed. Following demolition of the Site buildings, the tanks will be installed atop the remaining concrete building slabs. Concrete barriers will be used to form the sidewalls, and impermeable polyethylene liner will be used to line and cover the materials placed in the cell. Provisions will be made to detect any leakage from below the liner, and Site procedures will require daily inspections to

ensure the integrity of the cover is maintained. A network of perforated pipes will be places inside the tank and connected to a blower that will induce air flow. The air flow will volatilize and extract the VOCs from the material. Emissions from the blower exhaust will be treated through high-efficiency particulate filters and activated carbon to remove potential airborne contaminants.

Although the configuration of these units will not be what is typically thought of as a "tank," the treatment units will be designed and operated to meet regulatory definition of a tank and provide for the needed double-containment, leak detection, and air emissions controls.

Packaging and Disposal

For materials that contained VOCs, post-treatment samples would be taken to confirm the effectiveness of treatment. Waste analysis frequency and parameters would be determined in conjunction with development of a waste profile for the selected off-site disposal facility.

In the event that other hazardous characteristics (non-VOC) are identified in of laboratory analyses, and these contaminants cannot be treated on-site, the material would be sent to an appropriate off-site disposal facility.

Other preparations for off-site disposal would involve volumetric surveys of bulk waste materials. All off-site disposal will be at approved disposal facilities.

Site Restoration

Soil samples would be collected from the base and walls of any excavation and analyzed to demonstrate that chemical and radiological clean-up criteria have been met. The excavation would not be backfilled until radiological and chemical results are available and regulatory approval is obtained to close the excavation. Until that approval is granted, water that collects in the area would be removed for treatment and discharge. Upon regulatory approval, remediated areas would be backfilled as needed and graded to promote surface water drainage. Any backfill soils that originated from outside the Westinghouse property would be sampled and tested to verify that it meets specified radiological, chemical, and geotechnical criteria. Low permeability soil may be used in certain areas based on the presence of VOCs in underlying groundwater.

The disturbed area would be seeded to establish vegetation.

Treated soils not exhibiting contamination above regulatory levels are anticipated to be used on-site as backfill, but would be subject to sampling and analysis to demonstrate that they meet NRC approved DCGLs for radiological constituents and MRBCA Tier I levels for chemical constituents.

Following sediment removal at the Site Pond, the inflow diversion would be disconnected and the site dam removed to allow natural drainage patterns to be re-established.

Alternative 5: Removal and Off-Site Disposal

Estimated Capital Cost: $61,353,600
Estimated Annual O&M Cost: $0
Estimated Present Worth Cost: $61,353,600
Estimated Construction Timeframe: 18 months

Like Alternative 4, Alternative 5 involves removing the buried waste and contaminated soil and disposing of removed materials in

licensed and permitted off-site facilities. The difference between these two alternatives is that, in Alternative 5, because the treatment of excavated materials on-site will be limited, the handling of exhumed waste materials and impacted soils is minimized.

On-site treatment is limited to the following:

- Initial segregation/sorting to separate waste containers and other large discrete objects not amenable to shredding or blending;
- Elimination of free liquids in the waste, as needed, by solidification; and
- Shredding/blending needed to facilitate packaging for off-site shipments.

Alternative 5 focuses on utilizing off-site disposal facilities for the various waste streams, including wastes that will require treatment prior to disposal. LLMW would be treated either at the disposal facility or at an alternate off-site facility to meet land disposal requirements before disposal.

Removal of the buried waste and contaminated soil would entail excavation, materials handling, and construction dewatering. Removal of sediment from the Site Pond would involve re-routing the inflows, decanting the surface water, and dewatering the sediments.

After waste removal and final status surveys to confirm the completeness of removal, the excavations would be backfilled with clean imported fill, as needed, and regraded to promote surface water drainage. The disturbed area would then be revegetated. The exception would be the Site Pond. Following sediment removal at the Site Pond, the inflow diversion would be disconnected and the site dam removed to allow natural drainage patterns to be re-established.

Off-site disposal would involve radiological and chemical characterization to ensure the materials comply with the disposal or processing facilities waste acceptance criteria prior to transport.

EVALUATION OF ALTERNATIVES

In the MDNR approved FS, Westinghouse evaluated the remedial alternatives using the CERCLA criteria established in the NCP to determine the preferred alternative for the Operable Unit 1 remediation at the Hematite Site. Table 4 provides a summary comparison of the evaluated alternatives using these criteria.

CERCLA EVALUATION CRITERIA

The NCP requires that the following criteria be applied when evaluating remedial alternatives:

Threshold Criteria (must be met)

- *Overall Protection of Human Health and the Environment* – Addresses whether an alternative provides adequate protection and describes how potential exposures to COPCs are eliminated, reduced, or controlled through treatment, engineered controls, or institutional controls.

- *Compliance with Applicable or Relevant and Appropriate Requirements* – Addresses whether a remedy would meet the Site ARARs.

Primary Balancing Criteria (identifies major trade-offs among alternatives)

- *Long-Term Effectiveness and Permanence* – Addresses the residual risk and the ability of an alternative to protect human health and the environment over time once cleanup goals have been met.

- *Reduction in Toxicity, Mobility, or Volume through Treatment* – Addresses the expected performance of treatment that permanently and significantly reduces the toxicity, mobility, or volume of the contamination.

- *Short-Term Effectiveness and Environmental Impacts* – Addresses the impacts to the community and Site workers during cleanup including the amount of time required for completing the action.

- *Implementability* – Addresses the technical and administrative feasibility of an alternative, including the availability of materials and services required for cleanup.

- *Cost* – Compares the differences in cost, including capital, O&M, and overall life-cycle costs.

Modifying Criteria (formally evaluated after the comment period)

- *State Acceptance* – Evaluates whether the State agrees with, opposes, or has no comment on the preferred alternative. This criterion is evaluated formally when comments on the Proposed Plan are reviewed.

- *Community Acceptance* – Addresses the issues and concerns the public may have regarding each of the alternatives. This criterion is evaluated formally when comments on this Proposed Plan are reviewed.

Threshold Criteria

Under the NCP, remedial action alternatives must achieve the threshold factors of overall protection of human health and the environment and compliance with ARARs.

Overall Protection of Human Health and the Environment

Alternatives 2 through 5 (the action alternatives) for Operable Unit 1 would protect human health and the environment. All are designed to address the potentially unacceptable risks identified in the HHRA by preventing human contact with radiologically and chemically impacted materials and reducing the effects of these materials as sources of groundwater contamination. In all cases, implementation of Operable Unit 2 (contaminated groundwater) will be necessary to fully address risks associated with groundwater. All of the action alternatives also address the potential ecological risks associated with the impacted sediments in the Site Pond. Alternative 1 ("no action alternative") does not address the risks identified in the HHRA or the ecological risks related to the Site Pond sediments.

Compliance with ARARs

Alternatives 4 and 5 satisfy the threshold criterion of meeting chemical-specific ARARs. Alternative 2 is not likely to satisfy the NRC ARARs. The uncertainty regarding the ability to comply with radiological release criteria precludes selection of Alternative 2 as a final remedy. Therefore, the in situ containment approach is considered a limited, temporary action alternative designed to defer final remediation. NRC may view Alternative 2 as merely a delay of final decommissioning, an approach that is generally not consistent with NRC regulations. Neither Alternative 2 nor Alternative 3 would achieve free release of the Site under the NRC license termination process, and it is not assured that such on-site closure alternatives could be demonstrated to achieve residual radiological risks that are ALARA.

Alternative 1 would not achieve chemical-specific ARARs for Operable Unit 1.

Except for the no action alternative (Alternative l), all of the alternatives could be implemented to achieve location-specific ARARs. For those alternatives that involve removal of materials from environmentally sensitive areas (e.g., wetlands, floodplain) such removal would need to be conducted in a manner that minimizes long-term impacts. For alternatives that involve containment of contaminated materials on-site (i.e., Alternatives 2 and 3), the containment area would need to be situated and designed to avoid or minimize impacts to environmentally sensitive areas.

Balancing Criteria

On the basis that all of the action alternatives meet or have a reasonable expectation of meeting the NCP threshold criteria discussed above, the detailed analysis and comparison of alternatives focuses on the five balancing criteria identified in the NCP.

Long-term Effectiveness and Permanence

Alternatives 4 and 5 best achieve the balancing criterion of long-term effectiveness and permanence. Under these alternatives, radiologically and chemically impacted wastes, soil, and sediments would be disposed of in licensed off-site facilities. VOC-containing wastes would be treated either on-site (Alternative 4) or off-site (Alternative 5), with any impacted residuals also disposed of off-site.

The long-term effectiveness and permanence criterion is not achieved by Alternatives 2 or 3. In both cases, the isolation of impacted materials on-site relies on maintaining institutional and Site controls, the durability of which cannot be assured over the timeframes associated with the long-lived radionuclides found at the Hematite Site.

Alternative 1, No Action, does not meet the criterion of long-term effectiveness and permanence.

Reduction of Toxicity, Mobility, or Volume of Contaminants through Treatment

Alternatives 3 and 4 maximize the treatment of waste materials, and therefore, best satisfy this criterion. For Alternative 3, such on-site treatment focuses on minimizing the toxicity, mobility, and volume of wastes to be placed in the on-site landfill. For Alternative 4, treatment focuses primarily on reducing the volume of waste to be sent off-site for disposal and secondarily on the toxicity of the VOC wastes.

Alternative 2 relies on in situ containment to address waste and impacted soils and sediment at the Hematite Site, and this alternative does not provide for waste treatment. The extent to which the containment provided under Alternative 2 is protective of bedrock groundwater depends on active hydraulic controls. In the long term, such containment is not effective for radiological constituents, and Alternative 2 would not appreciably reduce the mobility of these constituents in the long-term.

The criterion of reduction of toxicity, mobility, or volume through treatment is the principal discriminator between Alternatives 4 and 5. Alternative 4 reduces waste toxicity and minimizes off-site disposal by increased treatment. In contrast, Alternative 5 provides only for sorting and segregation of wastes and provides for waste treatment only to the extent needed to achieve waste acceptance criteria and land disposal regulations.

Alternative 1, No Action, does not meets the criterion of reduction of toxicity, mobility, or volume through treatment.

Short-Term Effectiveness

By minimizing on-site waste handling and largely relying on in situ containment, Alternative 2 presents the lowest levels of short-term risks to workers and the community. Implementation of Alternative 2 postpones the off-site transportation of wastes, thereby minimizing, in the short-term, the potential for project-related transportation and handling accidents.

While Alternative 3 also eliminates the off-site transportation of wastes, this alternative involves a substantial on-site construction project for new landfill construction and substantial truck traffic would be required for hauling lining and capping materials. Alternative 3 also relies on significant on-site waste treatment. By minimizing off-site transportation risks but maximizing the magnitude of the on-site construction and waste handling project, Alternative 3 is viewed as being a mid-range alternative with respect to short-term effectiveness and risks.

Alternative 4 presents somewhat higher potential short-term risks than Alternatives 2 and 3. This alternative involves a higher level of on-site waste handling, sorting, and treatment and off-site transportation of waste materials. Alternative 5 involves significantly less on-site waste handling, but, because off-site disposal options could be more limited and overall off-site transportation volumes increased, Alternative 5 could result in greater off-site transportation risks.

All of the action alternatives involve short-term environmental impacts associated with the removal of sediment from the Site Pond. These short-term impacts would be mitigated through pond restoration, and longer-term effects are not anticipated.

Under Alternative 1, No Action, short-term risks to human receptors are those defined under current land use conditions. The no action alternative does not address the current ecological risks associated with sediments in the Site Pond.

Implementability

Alternatives 4 and 5 are both technically and institutionally implementable. These alternatives employ well-proven and established methods and are designed to achieve NRC license termination through unrestricted release of the Site.

The institutional implementability of Alternative 2, even as an interim measure, is not assured. NRC policy favors decommissioning as quickly as possible and finality in such plans; therefore, Alternative 2 likely would be viewed as inconsistent with NRC regulations and precedents. Implementation of Alternative 2 would still require that an active license be maintained. Moreover, given that this alternative does not represent final decommissioning, the licensee would remain subject to any new or different requirements for decommissioning promulgated in the interim period.

The institutional implementability of Alternative 3 is also not assured, and this approach would only provide for a restricted release of the Hematite Site. Alternative 3 would also be technically and procedurally challenging given NRC regulations that allow restricted release only in limited instances. If this alternative were proposed, it would require significant additional NRC review of the design and construction of the containment cell. Continuing financial assurance requirements, additional input from affected parties regarding the proposed

restricted release, and the high probability that an environmental impact statement would be prepared by the NRC would be additional review considerations for restricted release.

For the Hematite Site, Alternative 1, No Action, is not implementable. NRC licensing requirements mandate that radiologically impacted buried waste and environmental media be addressed in decommissioning, and "no action" is not an acceptable alternative.

Cost

The No Action Alternative (Alternative 1) involves no positive actions and results in no cost irrespective of affected material volumes and characteristics. The capital cost of the containment alternative (Alternative 2) depends to some degree on the volume of affected materials, but the costs of these types of alternatives are much less sensitive to volume changes than alternatives involving removal and either on-site or off-site waste management (Alternatives 3 through 5). The costs of alternatives that rely on removal and off-site disposal (Alternatives 4 and 5) are proportional to the quantity of affected material that requires remediation.

Containment (Alternative 2) and on-site disposal (Alternative 3) both require active controls (e.g., security, monitoring, and maintenance) to ensure the continued integrity and effectiveness of the remedy. For Alternative 2, the period of active controls is assumed to be 30 years, at which time a permanent remedy would be implemented. Because Alternative 2 is a temporary remedy, the total life-cycle cost of this alternative includes the cost of this eventual permanent remedy. For Alternative 3, the total life-cycle cost depends on the timeframe required for active controls (e.g., security, monitoring, and maintenance) needed to ensure the continued integrity of the containment system. Although a 30-year timeframe is used as the base case, for radiological contaminants remaining on site above regulatory levels, this period of institutional control could extends for a much longer period of time (e.g., 1,000 years).

The estimated life-cycle costs in 2007 dollars for each Alternative are shown in Table 5.

MODIFYING CRITERIA

Westinghouse considered past input from the State and community in preparing the FS and Proposed Plan and will further evaluate State, NRC, and community acceptance following review of comments received during the public comment period. To date, the State and community have expressed opposition to leaving buried waste materials behind or restricting future land use.

State/Support Agency Acceptance

MDNR has evaluated the alternatives as presented in the FS by applying the CERCLA criteria as discussed above. MDNR's priority for site cleanup and restoration is to excavate all waste, dispose of the waste off site, and restore any and all impacted areas to unrestricted use. Upon review of the foregoing criteria, site constraints, and Westinghouse's preferred alternative, MDNR supports the Proposed Plan as described in this document.

Community Acceptance

Community acceptance of the preferred alternative will be evaluated after the public comment period ends and will be addressed in the Operable Unit 1 ROD.

SUMMARY OF THE PREFERRED ALTERNATIVE

The Preferred Alternative for remediation of the buried waste, impacted soil, and sediment at the Hematite Site is Alternative 4: Removal, Treatment of VOC Waste, and Off-Site Disposal of LLRW and Non-Hazardous Treatment Residues.

The Preferred Alternative was selected over other alternatives because it is expected to achieve substantial and long-term risk reduction through treatment and disposal; meets State and Federal statutory and regulatory requirements; and is expected to allow the property to be used for the most restrictive reasonably anticipated future land use, which is residential farmer.

Based on the information available at this time, Westinghouse believes that the Preferred Alternative would be protective of human health and the environment, would comply with ARARs, would be cost effective, and would utilize permanent solutions and alternative treatment technologies to the maximum extent practicable. Because it would treat the source materials constituting a principal threat, the remedy also would meet the CERCLA statutory preference for the selection of a remedy that involves treatment as a principal element.

COMMUNITY PARTICIPATION

Westinghouse and MDNR provide information regarding the cleanup of the Hematite Site to the public through public meetings and the Administrative Record file for the Site. The public is encouraged to gain a more comprehensive understanding of the Site and the activities that have been conducted at the Site.

The dates for the public comment period, the date, location, and time of the public meeting and the location of the Administrative Record files are provided on the first page of this Proposed Plan.

For further information on the Hematite Site, please contact

Don Ridenhower
Westinghouse Electric Company LLC
3300 State Road P
Festus, Missouri 63028
ridenhdd@westinghouse.com
636-937-6191

Table 1. Summary of Calculated Site Risks Not Including Risk Associated with Burial Pit Wastes

Incremental Lifetime Cancer Risk from Chemical Exposure						
Receptor	**Resident**	**Commercial/ Industrial Worker**	**Construction Worker**	**Recreational**	**Visitor/ Trespasser**	**Agricultural Worker**
Child	6.65E-01	--	--	6.48E-06	--	--
Adult	6.83E-01	6.52E-03	7.39E-05	6.94E-06	1.94E-06	1.01E-04
Lifelong Resident	1.35E+00	--	--	1.34E-05	--	--
Incremental Lifetime Cancer Risk from Radiological Exposure						
Receptor	**Resident**	**Commercial/ Industrial Worker**	**Construction Worker**	**Recreational**	**Visitor/ Trespasser**	**Agricultural Worker**
Child	4.95E-05	--	--	2.74E-06	--	--
Adult	9.58E-06	9.58E-06	8.37E-07	2.86E-06	--	--
Lifelong Resident	5.90E-05	--	--	5.60E-06	2.01E-07	9.30E-06
Non-Cancer Risk Expressed as HI						
Receptor	**Resident**	**Commercial/ Industrial Worker**	**Construction Worker**	**Recreational**	**Visitor/ Trespasser**	**Agricultural Worker**
Child	4.18E+03	--	--	1.99E-01	--	--
Adult	1.17E+03	8.62E+01	8.91E+00	5.70E-02	2.87E-02	3.79E-01

Table 2. Potential Key ARARs for Operable Unit 1

Topic	Authority	Law or Regulation
Soil and Sediment Cleanup Standards	Federal	NRC Standards for Protection Against Radiation (10 CFR 20, Subpart E)
	State	Missouri Hazardous Waste Management Law (RSMo 260) and Regulations 10 CSR 25-7.268
Surface Water Quality Standards and Protection	Federal	Clean Water Act, National Pollutant Discharge Elimination System (40 CFR 122-125)
	State	Missouri Clean Water Law and Regulations (10 CSR 20)
		Missouri Clean Water Law, Water Quality Standards (10 CSR 20-7)
Air Quality Standards and Protection	Federal	Clean Air Act, National Primary and Secondary Ambient Air Quality Standards (40 CFR 50)
		Clean Air Act, National Emission Standards for Hazardous Air Pollutants (40 CFR 61 and 63)
	State	Missouri Air Conservation Law (RSMo 643) and Regulations (10 CSR 10 Chapters 5 and 6)
Groundwater Protection	State	Missouri Clean Water Law (RSMo 644.051)
Well Drilling	State	Missouri Well Drilling Regulations (RSMo 256.600-670 and 10 CSR 23)
Wetlands and Waterways Protection	Federal	Clean Water Act Section 404 (40 CFR 230 and 33 CFR 320)
	State	Missouri Clean Water Law, Water Quality Certification (RSMo 644.037 and 644.041)
Fish and Wildlife Protection	Federal	Fish and Wildlife Coordination Act (16 USC 661 *et seq*., 40 CFR 6.302)
		Migratory Bird Treaty Act (16 USC 703 *et seq.*)
Licensed Facility Decommissioning	Federal	NRC Requirement to Decommission (10 CFR 70.25 and 70.38)
Radiation Protection	Federal	NRC Standards for Protection Against Radiation (10 CFR 20)
Radioactive Waste Shipment	Federal	NRC Packaging and Transportation of Radioactive Materials (10 CFR 71)
Radioactive and Hazardous Waste Shipment	Federal	Hazardous Materials Transportation Regulations (49 CFR 173, Subpart I)
Solid Waste Management	Federal	RCRA Criteria for Municipal Solid Waste Landfills (40 CFR 258)
	State	Missouri Solid Waste Management Law (RSMo 260.200 to 260.245) and Regulations (10 CSR 80)
Hazardous Waste Management	Federal	RCRA Hazardous Waste Management Regulations (40 CFR 260 to 268)
	State	Missouri Hazardous Waste Management Law (RSMo 260 and Regulations (10 CSR 25)
Worker Health and Safety	Federal	Occupational Safety & Health Administration Regulations (29 CFR 1900)

Table 3
Summary of Site-Specific PRGs[1]

Constituent	Surface Soil	Subsurface Soil	Sediment
Arsenic	9.6	--	--
Benzo(a)Anthracene	0.88	--	--
Benzo(a)Pyrene	0.62	--	--
Benzo(b)Fluoranthene	6.19	--	--
Indeno(1,2,3-cd)Pyrene	3.77	--	--
Total PAHs[2]	--	--	2.0
cis-1,2 dichloroethylene	0.521	0.521	--
trans-1,2 dichloroethylene	1.10	1.10	--
TCE	0.141	0.141	--
PCE	0.141	0.141	--
Vinyl chloride	0.0192	0.0192	--

[1] All concentrations in units of milligram per kilogram (mg/kg) or parts per million (ppm).

[2] Total PAHs is the sum of the concentrations of the 13 specific compounds.

Table 4 – Summary Evaluation of Alternatives

Criterion	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Overall Protection					
Human Health	0	3	4	4	4
Environment	0	3	4	4	4
Compliance with ARARS					
Chemical-specific	0	2	3	4	4
Location-Specific	0	3	4	4	4
Action-specific	0	2	3	4	4
Long-Term Effectiveness and Permanence					
Management of Residual Risk	0	2	2	4	4
Adequacy and Reliability of Controls	0	2	2	4	4
Permanence	0	1	2	4	4
Reduction in Toxicity, Mobility, or Volume through Treatment					
Reduction of TMV through Treatment	0	1	4	4	3
Short-Term Effectiveness					
Community Protection (Risk during implementation)	NA	3	3	2	2
Worker Protection (Risk during implementation)	NA	4	3	3	3
Environmental Impacts (Risk during implementation)	NA	3	3	3	3
Time Until Action is Complete	NA	3	1	2	2
Implementability					
Technical	4	4	3	4	4
Administrative	0	1	2	4	4
Cost					
Capital Cost	4	4	3	2	1
Life-Cycle Cost	4	3	4	2	1

Scoring Legend:

Scoring of alternatives for each evaluation factor is on a scale of 0 to 4. All scores are relative.

4 - Most favorable

3 - Favorable

2 - Less Favorable

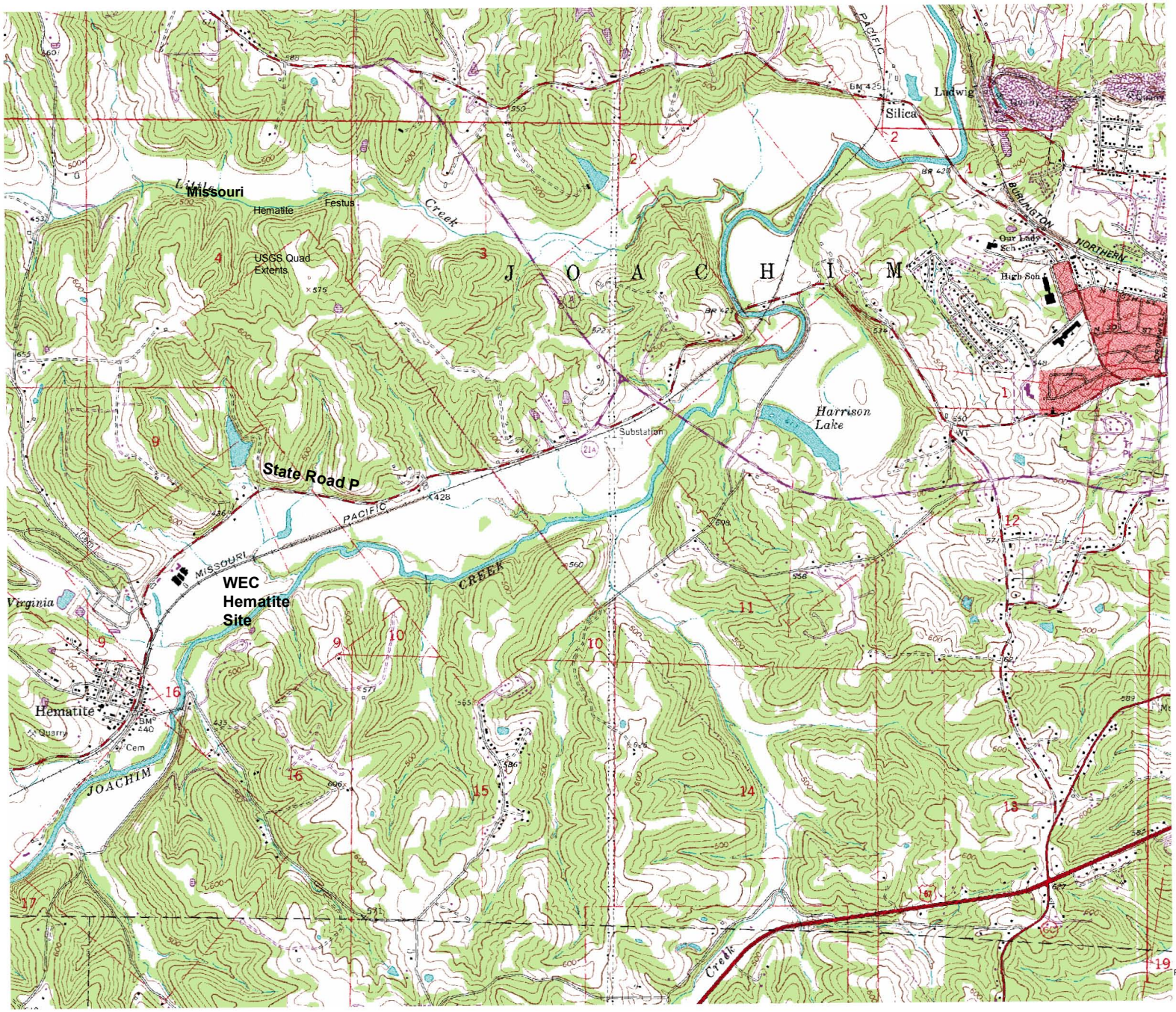
1 - Unfavorable

0 - Most unfavorable

Not all evaluation criteria carry equal weight, so simple summing of scores for each alternative is not meaningful.

Table 5
Estimated Life-cycle Costs
Net Present Value in 2007 Dollars
Including O&M Costs for the 30-Year Evaluation Period

Alternative	Cost (Million $)
Alternative 1, No-Action	0
Alternative 2, In-situ Containment with Access Controls as Interim Remedial Action to Defer Final Remediation	38.9
Alternative 3, Removal, Treatment of VOC Waste, and Disposal of LLRW and Non-Hazardous Treatment Residues in On-Site Facility	30.1
Alternative 4, Removal, Treatment of VOC Waste, and Off-Site Disposal of LLRW and Non-Hazardous Treatment Residues	47.8
Alternative 5, Removal and Off-Site Disposal	61.4



NAD 83, East
Missouri State Plane

0 1,400 2,800 Feet

Hematite Decommissioning Project
Jefferson County
Hematite, MO

Westinghouse

Prepared By:	Rev:	Date:
JAL	0	02-07-08

Figure 1.

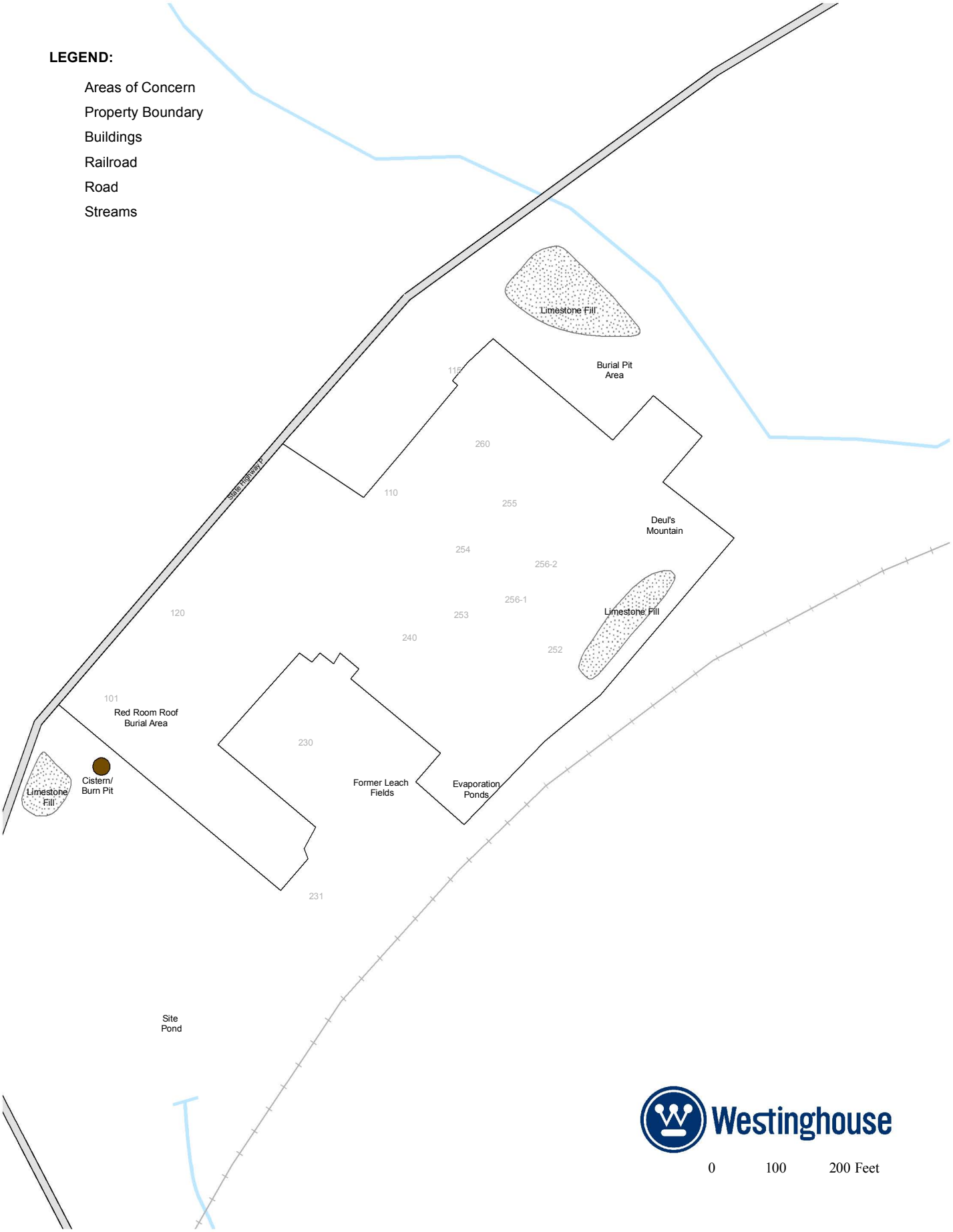
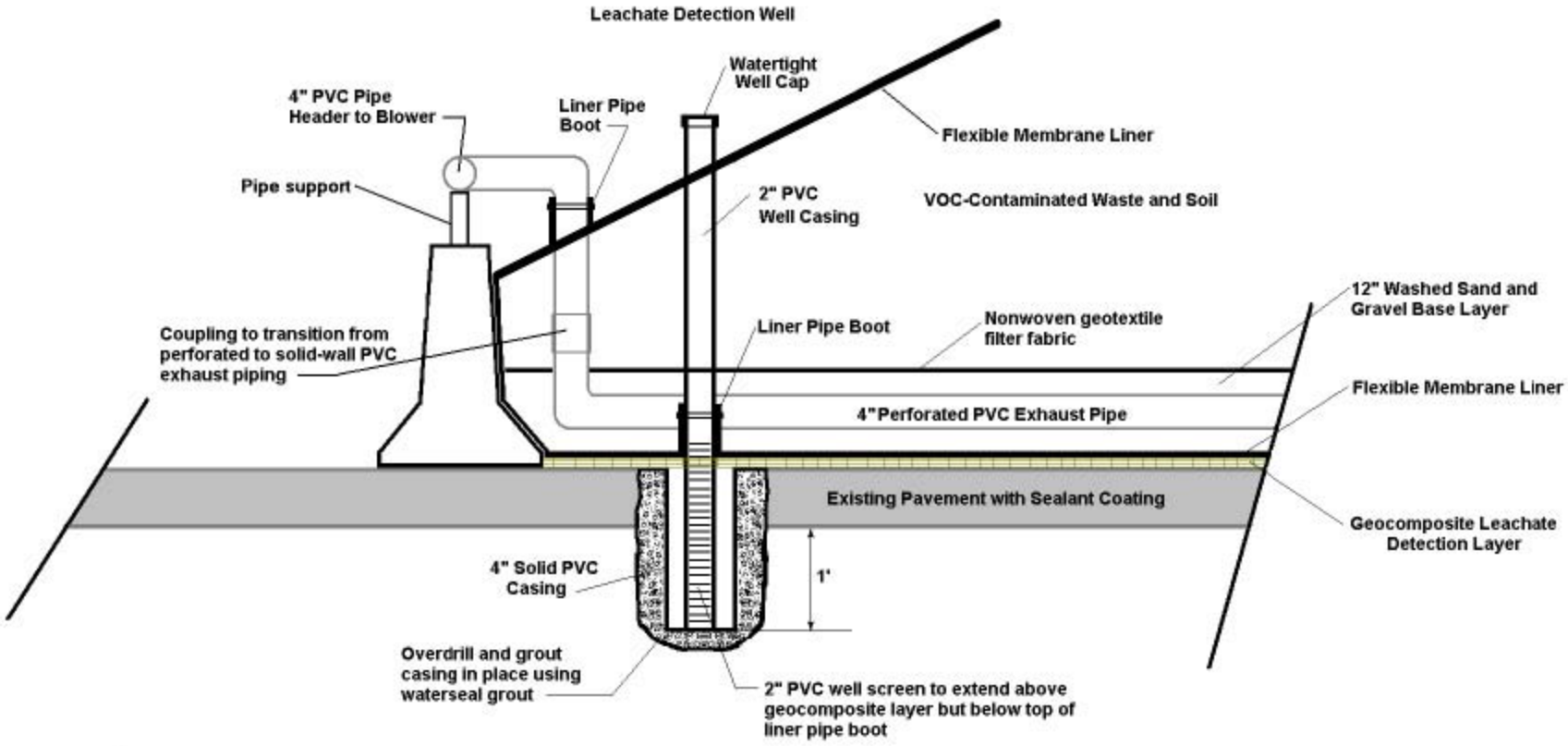

LEGEND:
Areas of Concern
Property Boundary
Buildings
Railroad
Road
Streams
Limestone Fill
Burial Pit Area
115
260
110
255
Deul's Mountain
254
256-2
256-1
120
253
Limestone Fill
240
252
101
Red Room Roof Burial Area
230
Limestone Fill
Cistern/ Burn Pit
Former Leach Fields
Evaporation Ponds
231
Site Pond
State Highway 22
Westinghouse
0
100
200 Feet

Figure 2.



VOC Treatment Tank Detail

(N.T.S.)

Figure 3

STATE OF MISSOURI
Matt Blunt, Governor • Doyle Childers, Director
DEPARTMENT OF NATURAL RESOURCES
www.dnr.mo.gov

JUN 18 2008

Mr. E. Kurt Hackmann
Hematite Director, Decommissioning
Westinghouse Electric Company LLC
3300 State Road P
Festus, MO 63028

RE: Proposed Plan, Operable Unit 1 - Westinghouse Electric Company, LLC - Former Fuel Cycle Facility, Hematite, Missouri

Dear Mr. Hackmann:

The Missouri Department of Natural Resources has reviewed the above referenced plan. In summary, we concur with the proposal detailing the remedy for chemically impacted soils and sediments, designated operable unit 1 (OU-1), and support presenting it to the public for consideration. Upon receipt of all public comments, further evaluation will be made of the proposal and whether or not it is appropriate to proceed with developing a Record of Decision (ROD), or if further revision of the alternatives is necessary.

The proposal set forth in the Proposed Plan (PP) closely matches that of Alternative 4, as provided within the Feasibility Study (FS). This remedy would require exhumation and disposal of buried wastes, excavation of soils contaminated by volatile organic compounds and then conducting on-site treatment rendering the soils suitable for off-site disposal or on-site reuse, if all health-based and land disposal restriction levels are met. Additionally, the decision for off-site disposal and on-site reuse would also depend upon other contaminants (radiological) remaining within the soil and decisions yet to be made on the decommissioning plan submittal by the Nuclear Regulatory Commission. Soils to be reused on-site will be assessed for non-radiological contaminants using the state land disposal restriction regulations and the Missouri Risk Based Corrective Action document as a guide for unrestricted re-use of the property. Following contaminated soil removal and backfilling, we anticipate that a low permeability backfill material will be graded across the excavation areas, specifically over locations of high concentrations of groundwater contamination. Further details regarding the OU-1 remedy are shown within the proposal. The contaminated groundwater, designated operable unit-2 (OU-2), will be addressed separately following completion of the OU-1 ROD implementation. Additionally, more detailed information will be forthcoming in future work plans if this OU-1 remedy is selected.

Our concurrence with this document is based strongly on our findings from the previous review of your FS and on-going technical briefings and discussions. During the review of the FS, the department conducted an evaluative comparison of the document to EPA guidance and found it consistent. The department also examined each of the alternatives in the FS for compliance with the nine specific criteria contained within the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA) and the National Contingency Plan (NCP). The department determined, based on that review, that it could accept the alternative proposed.

Specifically, the department, in our December 21, 2007, letter to Westinghouse, concluded the following:

> "Alternatives 4 and 5 each contemplate excavation and off-site disposal of waste materials, the significant technical difference being that Alternative 4 proposes on-site treatment of VOC contaminated wastes prior to shipping off-site for disposal. Either alternative can be implemented in a manner that would be protective of human health and the environment and, when completed, should result in a remedy that is effective and permanent. Alternative 4 would be somewhat more difficult to implement from a technical perspective as additional on-site activities (e.g. treatment, handling, confirmatory sampling) would be required before wastes could be shipped. We also expect that on-site treatment would result in a remedy that will take more time to complete. Considering these factors, we expect the community would accept Alternative 5 and the state would generally agree. However, Alternative 5 has a net present value ($61,353,600) that is significantly greater than alternative 4 ($47,765,400), and this cost differential will be given careful consideration during development of the Proposed Remedial Action Plan for the HRS.
>
> For purpose of final review, this letter hereby communicates the department's final assessment and acceptance of Westinghouse's evaluation of remedial alternatives detailed in the FS. Additional and more in-depth details of a specific selected remedy will be identified as we proceed toward development of a Proposed Plan for the HRS OU1."

While we support this proposal and its presentation to the public, paths taken for further development of the ROD and subsequent work plans will be strongly dependent upon comments received from the public. We acknowledge that Westinghouse has worked hard to prepare the PP and keep it focused on contaminants to which it is applicable. However, as you are aware, since contaminants being addressed in this proposal and the decommissioning plan are at times commingled, the ultimate decision of remedy selection will be dependent on both processes (this proposal and the decommissioning plan). It is important to the department that this proposal, subsequent documents, and related remedial actions do not conflict with the expectations of the Nuclear Regulatory Commission's review of your decommissioning plan.

Also, as the ROD and in-depth work plans are developed, the department will continue to provide additional input. This includes, but is not limited to: on-going assessment of air pollution control regulatory requirements for the proposed on-site treatment of soils; compliance with waste water treatment and storm water management standards associated with this project; and compliance with the department's Solid Waste regulations.

In conclusion, the department supports the proposal and strongly encourages the continued in-depth communication efforts with the public on this Site. As set forth in the plan, Westinghouse will be hosting a public meeting to detail the contents of the Proposed Plan. The department offers its assistance on this upcoming public meeting and requests that we coordinate in the development of the public notice and press release/advertisement. Ramona Huckstep remains the department's contact for public involvement on this site and can be contacted at (573) 522-1540.

If you have questions, or require clarification on any issue, please contact Robert Geller or Aaron Schmidt of my staff at (573) 751-2747. Please direct all written correspondence to their attention at the Hazardous Waste Program, P.O. Box 176 Jefferson City, MO 65102-0176.

Sincerely,

DIVISION OF ENVIRONMENTAL QUALITY

Daniel R. Schuette
Director

DS:asd

c: Mr. Chuck Banks, Jefferson County Commission
Mr. Gale Carlson, Department of Health and Senior Services
Mr. Dennis Deihl, Jefferson County Health Department
Mr. Mark Mertens, Jefferson County Commission
Mr. Pat Lamping, Jefferson County Commission
Mr. John Hayes, U.S. Nuclear Regulatory Commission
Ms. Rebecca Tadesse, U.S. Nuclear Regulatory Commission
Ms. Shelley Woods, Attorney Generals Office
Mr. Jim Hull, SWMP
Mr. Refaat Mefrakis, WPP
Mr. Peter Price, DGLS
Mr. Jim Kavanaugh, APCP
Mr. Mike Struckhoff, SLRO