

140-306-V01-130

SL-1247

**HAZELWOOD INTERIM STORAGE SITE  
ENVIRONMENTAL SURVEILLANCE PLAN**

## A1.0 HAZELWOOD INTERIM STORAGE SITE ST. LOUIS, MISSOURI

### A1.1 SITE LOCATION AND DESCRIPTION

HISS occupies the eastern half of the property located at 9150 to 9200 Latty Avenue in northern St. Louis County, within the city limits of Hazelwood, Missouri. The western half of the property is occupied by Futura Coatings, a private industry. Hazelwood is approximately 25 km northwest of downtown St. Louis, and 1.6 km north of the Lambert-St. Louis International Airport (Figure A1-1). HISS is situated on approximately 2.2 ha and currently includes access roads, two interim storage piles, a utility building, a vehicle decontamination facility, and three office trailers (DOE 1987). In addition, in October 1995 a mobile laboratory began operation at the site. The mobile laboratory consists of a sample preparation trailer and laboratory trailer and is used for performing gamma and alpha spectroscopic analysis of samples, facilitating FUSRAP characterization and remedial action being conducted in the St. Louis area.

The site is adjacent to predominantly industrial and commercial properties. The nearest residential properties are approximately 0.5 km (0.3 mi) to the east in Hazelwood (population 12,800) and 0.8 km (0.5 mi) to the south in Berkeley (population 20,300). The total population of the area within an 80-km (50-mi) radius is approximately 2.6 million (1990 Census).

### A1.2 SITE HISTORY

From 1942 to 1957, uranium ore residues and uranium- and radium-bearing process wastes were generated at a St. Louis facility (FUSRAP's St. Louis Downtown Site) under contract with the AEC and its predecessor, MED. The wastes consisted of barium sulfate cake, pitchblende raffinate residues, Colorado raffinate residues, and contaminated scrap. The wastes were stored on another FUSRAP site (SLAPS) north of Lambert-St. Louis International Airport until 1966. In 1966 and 1967, most of the stored wastes were sold, removed from the site, and/or transported to the HISS property.

The main storage pile was formed in 1977 when the property owner prepared the western half of the property for commercial use. Approximately  $9,900 \text{ m}^3$  ( $13,000 \text{ yd}^3$ ) of contaminated material were generated during these activities and were placed in the main storage pile (Figure 2). In addition to this material,  $10,700 \text{ m}^3$  ( $14,000 \text{ yd}^3$ ) of contaminated soil, generated during a cleanup of the north end of HISS and the western end of Latty Ave. in 1985, were incorporated into this pile (BN1 1991).

The secondary pile at HISS was created in 1986 as a result of an offsite drainage improvement project conducted by the city of Berkeley. Approximately 3,500 m<sup>3</sup> of radioactively contaminated soils were excavated during this project and placed at HISS, north of the main storage pile (Figure 2) (DOE 1994).

### A1.3 GEOLOGY/HYDROGEOLOGY/HYDROLOGY

The site is situated within the Florissant basin, a subsurface, shallow, oval-shaped depression (Ford, Bacon & Davis Utah 1978). During glacial recession and associated drainage, the basin was blocked and a lake was formed. Within this lake, over 30 m (100 ft) of silts, clays, and fine sands were deposited. After the deposition of these lacustrine sediments, glacially derived wind-blown loess was deposited. The loess was subsequently covered, in places, by a thin veneer of alluvium deposited by Coldwater Creek and its tributaries (BNI 1994).

Today, the overburden at HISS consists of topsoil and fill material generally less than 1.8 m (6 ft) thick. The topsoil and fill overlie the loess material, which consists of yellowish-brown silty clay and clayey silt and extends to a depth of approximately 6.1 m to 7.6 m (20 to 25 ft) across the site. Greenish to olive-gray clayey silt and silty clay lacustrine deposits underlie the loess material (BNI 1994).

Groundwater occurs at approximately 1.8 m (6 ft) below ground surface. Hydraulic conductivity tests conducted in monitoring wells installed by BNI in 1992 indicate that the average hydraulic conductivity of the upper zone [extending from approximately 1.8 to 7.6 m (6 to 20 ft) below ground surface] is  $4.85 \times 10^{-4}$  cm/s (502 ft/yr) (BNI 1994).

Because topography at the site is relatively flat, precipitation often ponds onsite but eventually infiltrates into the ground or drains offsite by way of overland flow or drainage ditches. The overland flow is directed offsite to a drainage/storm ditch located to the north and to a stream located to the south, both of which ultimately drain into Coldwater Creek (Figure A1-3).

### A1.4 REGULATORY COMPLIANCE

The primary regulatory guidelines that affect activities at HISS and vicinity properties are found in DOE Orders, federal statutes, and federal regulations, as defined in the FUSRAP S/RID, and state and local regulations. S/RID requirements are generally applicable to all FUSRAP sites, while the applicability of other regulations varies from site to site.

### *Clean Air Act*

Section 112 of the Clean Air Act authorized EPA to promulgate NESHAPs. NESHAPs Subparts H and Q are applicable to HISS. Radon-flux rates are measured to ensure compliance with Subpart Q. A waiver from compliance with the radon emission standard for all short-term remedial activities at HISS has been granted by EPA Region VII.

Compliance with the non-radon radionuclide standards (Subpart H) is verified by applying the EPA-approved CAP88-PC model.

No air pollution permits are required at HISS.

### *Clean Water Act*

An NPDES permit issued by the Missouri Department of Natural Resources requires monthly effluent monitoring and quarterly reporting of the results. Drainage ditches have been constructed to direct stormwater flow into concrete flumes where a flowmeter and data logger are installed to record runoff flow rates. Water quality parameters are measured on the stormwater runoff as it exits the flumes.

### *Resource Conservation and Recovery Act*

There are no RCRA-regulated wastes at HISS.

### *Toxic Substances Control Act*

There are no Toxic Substances Control Act (TSCA) regulated wastes at HISS.

### *Comprehensive Environmental Response, Compensation, and Liability Act*

CERCLA and the National Oil and Hazardous Substances Contingency Plan (NCP) are the primary sources of federal regulatory authority for remedial action at HISS. Remediation of the site is being managed by DOE under Executive Order 12580.

Because HISS is on the National Priorities List (NPL), a Federal Facilities Agreement (FFA) is required for site remedial action; EPA and DOE signed the FFA on June 26, 1990. The FFA

integrates the provisions of CERCLA with other applicable and relevant laws. Specifically, the parties to the FFA concurred that activities covered by the agreement will achieve compliance with CERCLA and will meet or exceed ARARs.

#### *National Environmental Policy Act*

Remedial action at HISS will be conducted under CERCLA authority. CERCLA documents will incorporate NEPA values. An environmental assessment (EA) was prepared and incorporated in the engineering evaluation/cost analysis (EE/CA) to produce an EE/CA-EA, that supports a proposed plan to store contaminated soil removed from the vicinity properties near HISS. The EE/CA-EA was approved by DOE Headquarters in May 1991 (DOE 1991) and was issued subsequently for public review. In fiscal year 1994, the responsiveness summary was issued before work began in the field.

In addition to the EE/CA-EA, a remedial investigation/feasibility study (RI/FS) was initiated to comply with NEPA. The RI was completed in 1994 and the feasibility study is scheduled for completion in fiscal year 1997.

#### *Other Major Environmental Statutes and Executive Orders*

The following major environmental statutes and executive orders were also reviewed.

- Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA): There are no FIFRA-regulated substances at HISS.
- Endangered Species Act: There are no endangered species at HISS.
- Maximum contaminant levels (MCLs) and goals (MCLGs) established under SDWA are potential remediation goals for groundwater at FUSRAP sites and may be identified as ARARs for CERCLA actions. The Missouri Department of Natural Resources (MDNR) has incorporated the federal standards into the Missouri state regulations. MCLs and MCLGs may be identified as ARARs for the CERCLA action at HISS.
- The National Historic Preservation Act (NHPA) is the primary source of statutory authority related to the preservation of cultural and historic resources. The Missouri State Historic Office has concurred with the determination that activities at HISS will not detrimentally affect any historic properties.

- Executive Order 11988 (Floodplain Management) requires federal agencies to provide protection to floodplains by reducing the risk of flood loss; minimizing the impact of floods on human safety, health, and welfare; and restoring and preserving the natural and beneficial values served by floodplains. No DOE actions have affected floodplains located at HISS. Any proposed action will be evaluated to determine whether it will occur in a floodplain.
- Executive Order 11990 (Protection of Wetlands) requires federal agencies to minimize the destruction, loss, or degradation of wetlands and to preserve and enhance the natural and beneficial value of wetlands. No DOE actions have affected wetlands at HISS. Proposed action, if any, will be evaluated to determine whether it will affect any delineated wetlands at the site.

#### A1.5 SAMPLING RATIONALE

The overall goals of the environmental surveillance program at HISS are to provide a historical perspective of contaminant levels in various media, to provide a timely indication of contaminant release or migration, and to provide an indication of the magnitude and extent of contamination should a release or migration occur. Environmental surveillance activities are necessary at HISS to ensure that onsite waste and contamination do not pose a threat to human health and the environment through inadvertent or unanticipated release or migration. These monitoring activities include the surveillance of all credible transport pathways; the selection of suitable surveillance locations; and the application of appropriate sampling methods, techniques, and analyses. To achieve this goal, the program has been designed to meet the applicable requirements of DOE Orders 5400.1 and 5400.5, the *Environmental Regulatory Guidance for Radiological Effluent Monitoring and Environmental Surveillance*, and other applicable federal, state, and local regulations.

Contamination at HISS is present in two interim storage piles at the site and in some subsurface soils. Potential exposure to this contamination is most likely to occur through the air, groundwater, surface water, and/or streambed sediments. The environmental surveillance program at HISS has been developed to provide direct surveillance of these exposure routes through periodic sampling and analysis of radioactive and chemical constituents. Figures A1-2 and A1-3 illustrate the environmental surveillance program that has been implemented at HISS and indicate sampling locations and media. Tables A1-1 through A1-5 detail the sampling locations, media, analytes, QC samples, and frequency.

The contamination at HISS originated in the wastes that were transferred from SLAPS. These wastes derived primarily from the processing of uranium from pitchblende ores at SLDS. The processing of uranium generates wastes and residues containing elevated levels of radioactive constituents such as uranium (in natural isotopic abundance), radium, and thorium (DOE 1994). The environmental surveillance program at HISS requires analysis and measurement of these radioactive constituents at selected locations in the air, groundwater, surface water, and streambed sediments.

Atmospheric monitoring and measurement include analysis for radon-222 and radon-220 and external gamma radiation at fence line locations surrounding HISS, along the HISS/Futura Coatings property boundary, and around known areas of radioactive contamination or emissions to assess potential exposure levels to the public and site workers. Measurement of radon flux rates is conducted annually at discrete grid intersections on top of the interim waste storage piles.

Groundwater monitoring wells have been selected to assess upgradient and downgradient groundwater quality conditions. Groundwater monitoring includes analysis for radioactive constituents.

Surface water and streambed sediment sampling locations are located to assess upstream and downstream contamination. Surface water and streambed sediment sampling includes analysis for radioactive constituents.

Stormwater outfall sampling locations are located in northern and southern portions of the site to capture surface runoff from the site during storm events. Stormwater discharge sampling includes analysis for radioactive constituents, total organic carbon, total organic halides, and settleable solids.

## A1.6 BIBLIOGRAPHY

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Ford, Bacon, and Davis, 1978. *Engineering Evaluation of the Latty Avenue Site, Hazelwood, Missouri*, Salt Lake City, UT, (January).



**FIGURES FOR APPENDIX A1**

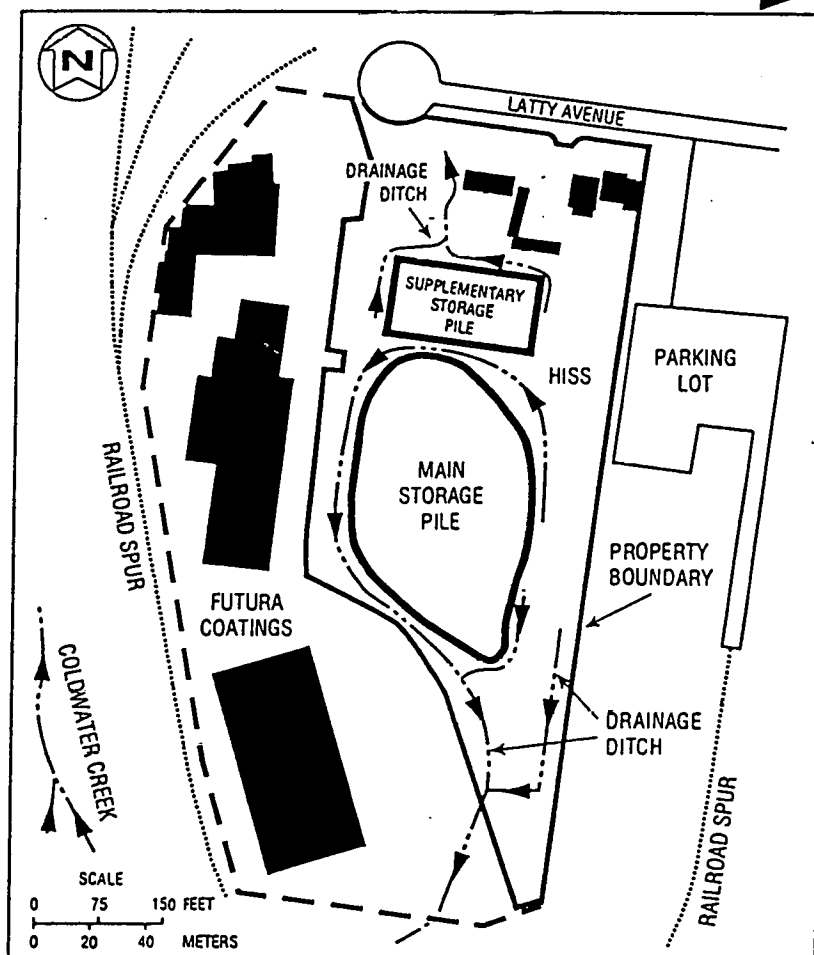
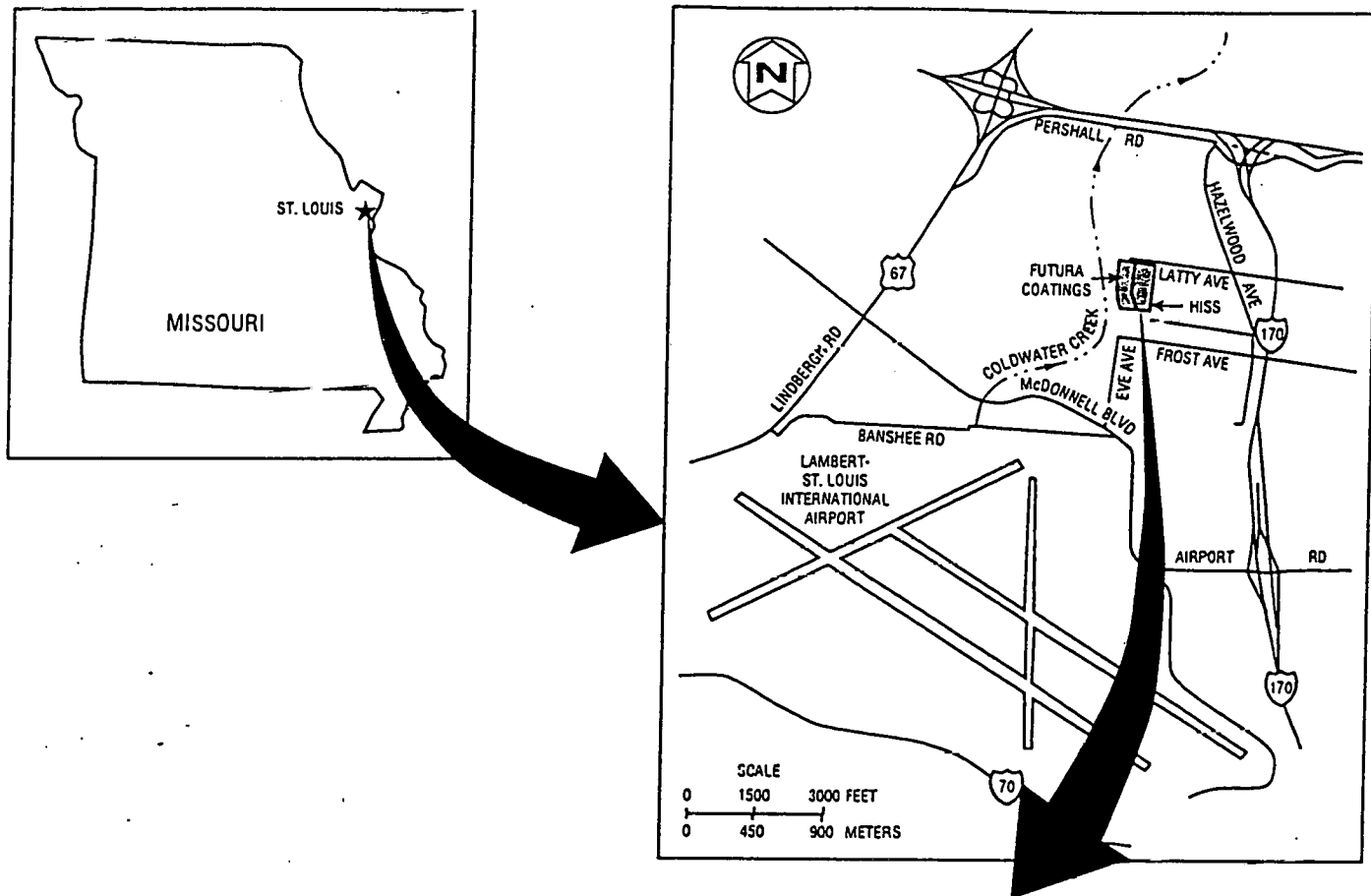
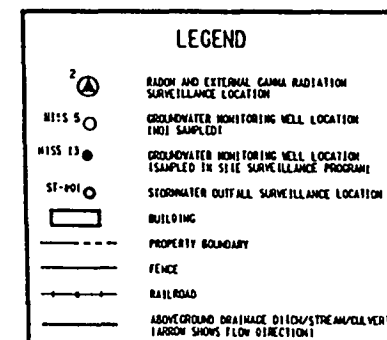
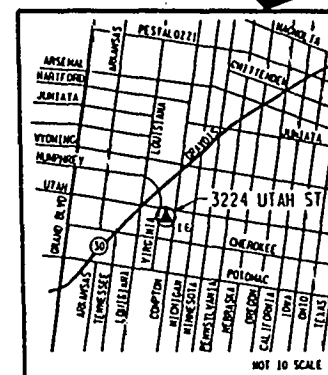
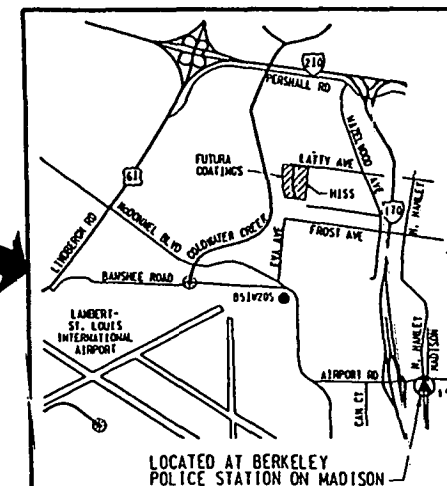
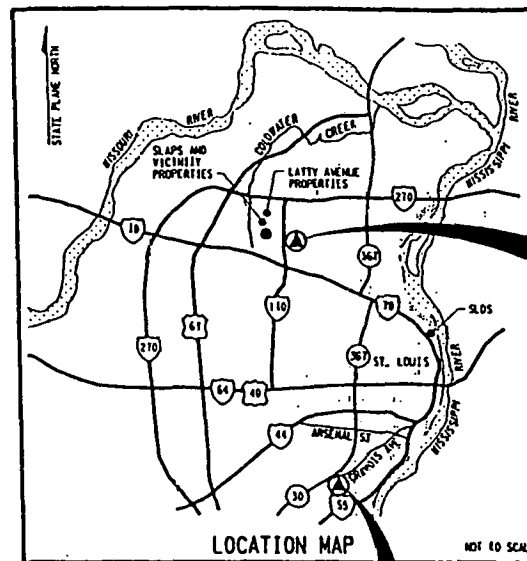
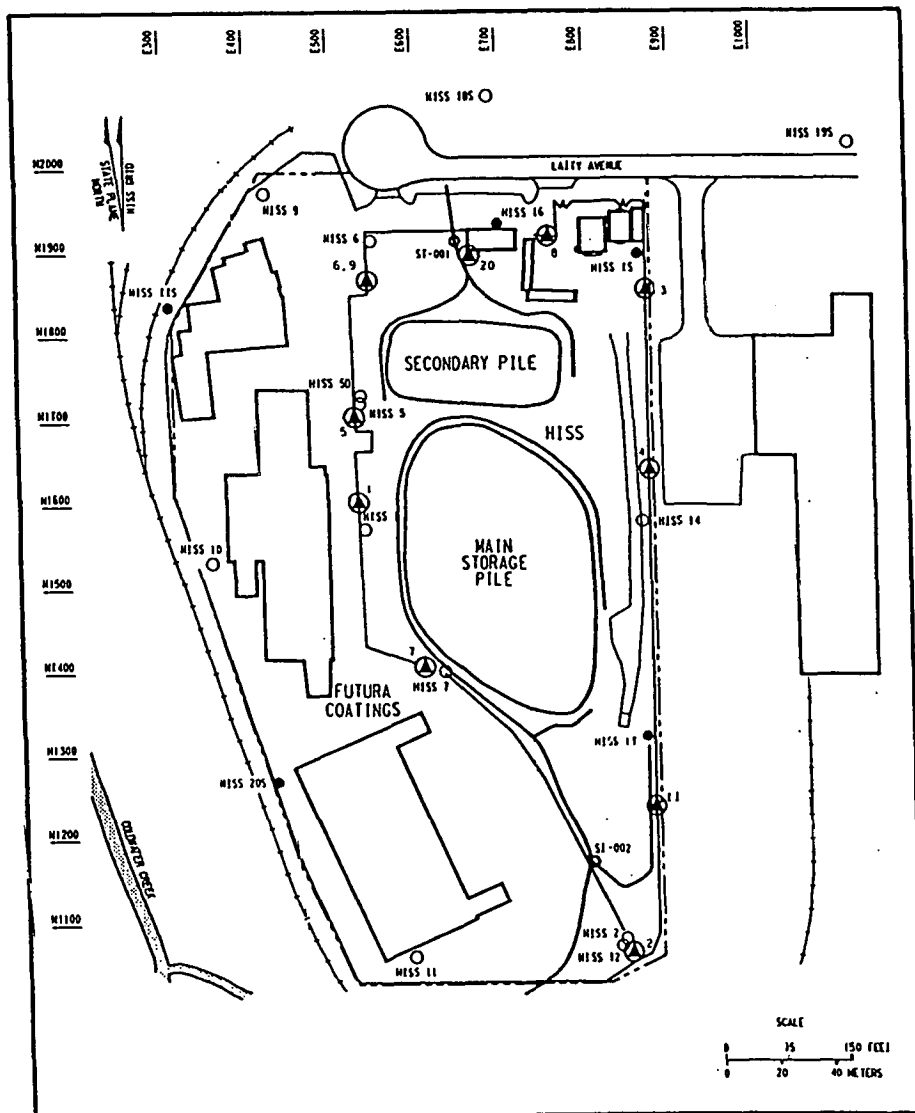
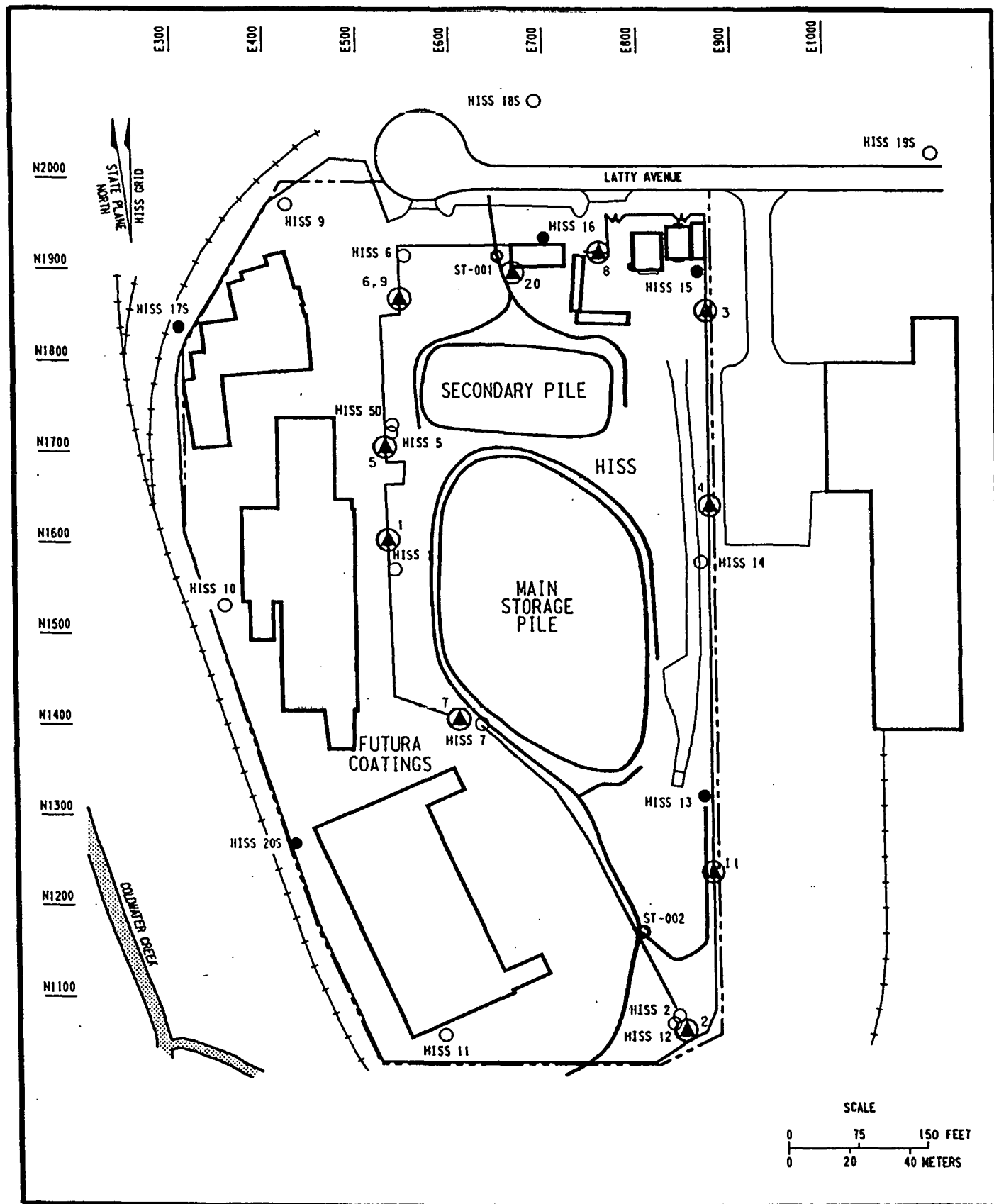


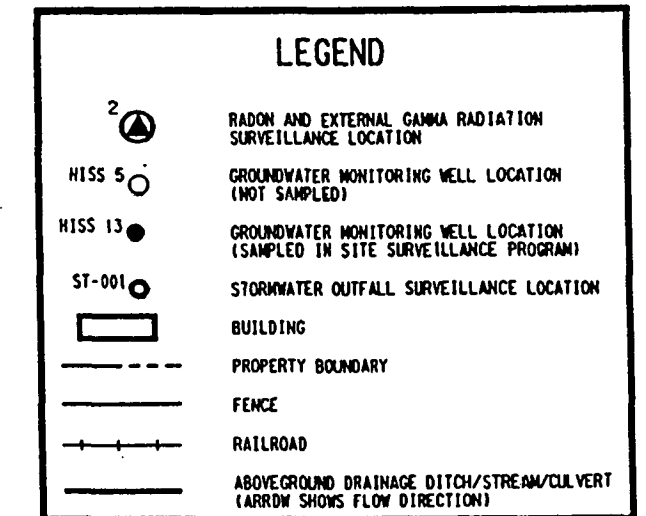
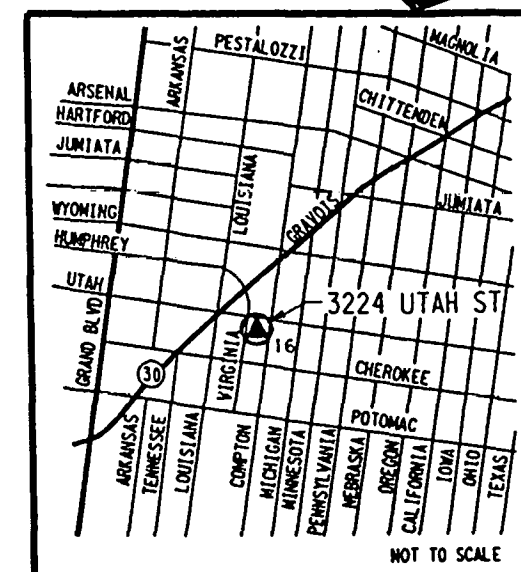
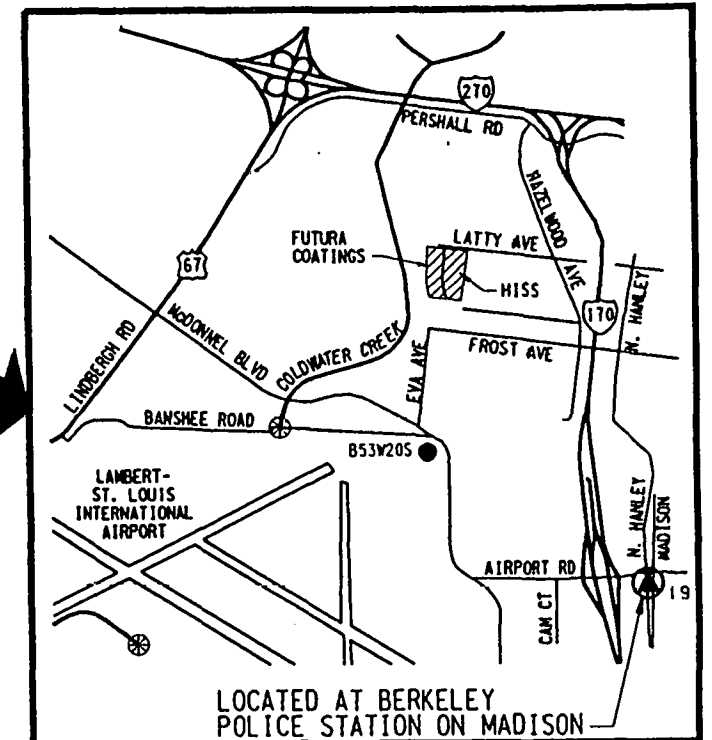
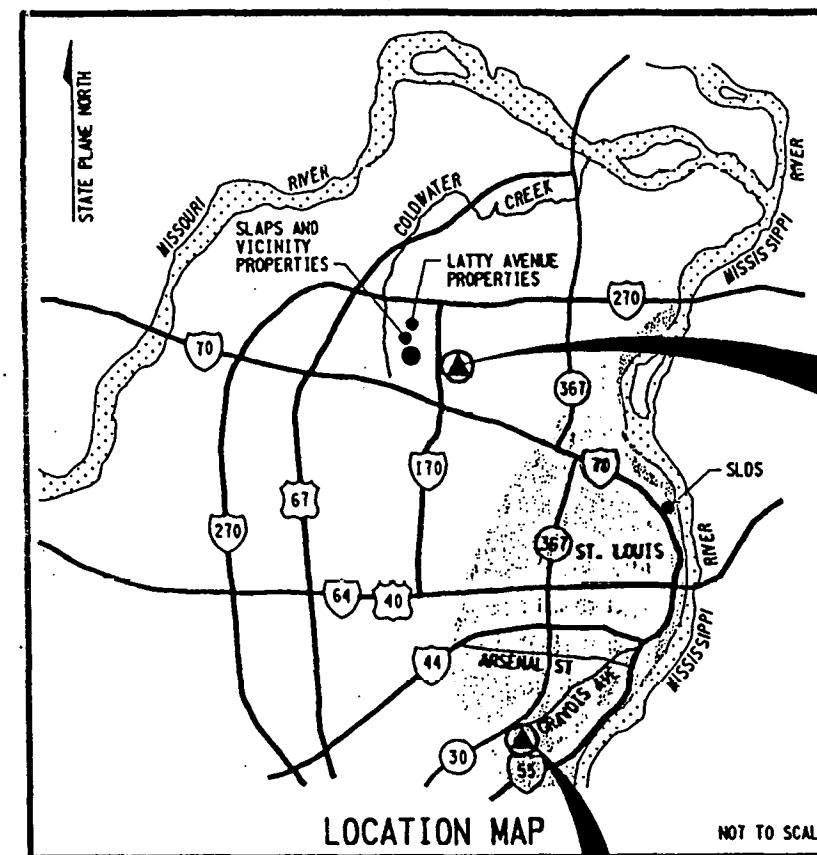
Figure A1-1  
Hazelwood Interim Storage Site, Site Location and Site Map



**Figure A1-2**  
**Hazelwood Interim Storage Site Environmental Surveillance Locations:**  
**External Gamma Radiation, Radon-222/Radon-220, Groundwater, and Stormwater**

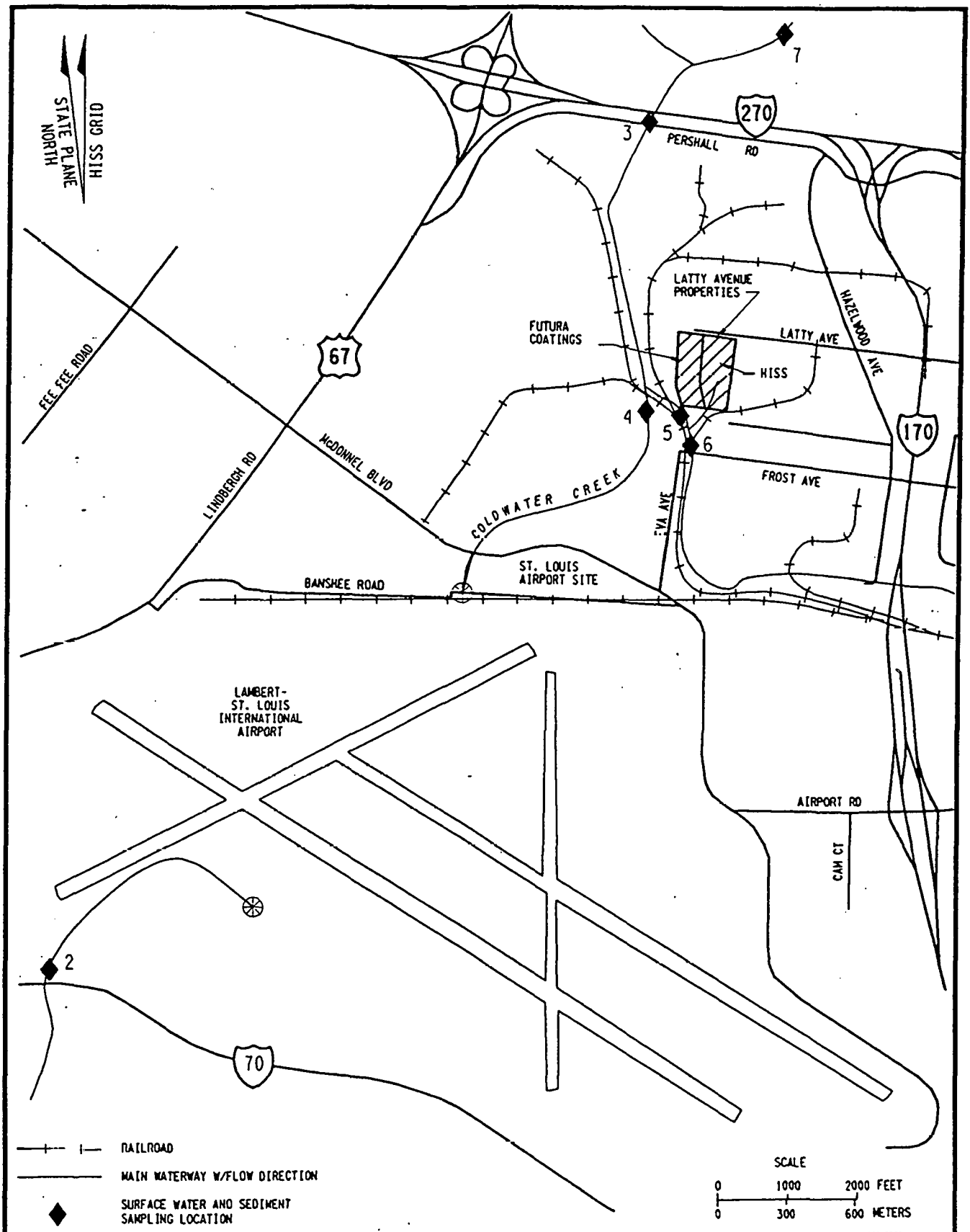


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NOTE:  
1. WATER LEVEL MEASUREMENTS ARE OBTAINED FROM 18 MONITORING WELLS (TABLE A1.6).

Figure A1-2  
Hazelwood Interim Storage Site Environmental Surveillance Locations:  
External Gamma Radiation, Radon-222/Radon-220, Groundwater, and Stormwater



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**Figure A1-3**  
Surface Water and Sediment Sampling Locations  
in the Vicinity of Hazelwood Interim Storage Site

## TABLES FOR APPENDIX A1

**TABLE A1 - 1: Analytes, Detection Limits, and Media**  
**Hazelwood Interim Storage Site (Latty Ave.)**

Analytes	Media and Target Detection Limits				
	Atmospheric	Groundwater	Surface Water	Sediment	Stormwater
<b>RADIONUCLIDES</b>					
Radium-226	--	0.5 pCi / L	0.5 pCi / L	0.5 pCi / g	0.5 pCi / L
Radium-228	--	0.5 pCi / L	0.5 pCi / L	0.5 pCi / g	0.5 pCi / L
Total uranium	--	0.03 µg / L	0.03 µg / L	0.1 µg / g	0.03 µg / L
Thorium-230	--	0.5 pCi / L	0.5 pCi / L	0.5 pCi / g	0.5 pCi / L
Thorium-232	--	0.5 pCi / L	0.5 pCi / L	0.5 pCi / g	0.5 pCi / L
Thorium-228	--	0.5 pCi / L	0.5 pCi / L	0.5 pCi / g	0.5 pCi / L
External gamma radiation	10 mrem / 6 months	--	--	--	--
Radon-222 / Radon-220	0.3 pCi / L	--	--	--	--
Radon flux	0.01 pCi / m <sup>2</sup> / s	--	--	--	--
Lead-210	--	--	--	--	0.5 pCi / L
Gross alpha	--	--	--	--	0.5 pCi / L
Gross beta	--	--	--	--	0.5 pCi / L
<b>ORGANICS</b>					
Total organic carbon	--	--	--	--	1 mg / L
Total organic halides	--	--	--	--	5 µg / L
<b>MISCELLANEOUS</b>					
Settleable Solids	--	--	--	--	0.5mL/L/h

Note: -- indicates no analyses

a. As specified by permit #MO-0111252, additional organic analyses may be initiated if a positive result is reported for TOX (a positive result has been determined to be 2 times the detection limit).

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[illegible]



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[illegible]

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[illegible]

- a. The Missouri State Operating Permit at HISS requires stormwater sample collection in March, June, September, and December. Adequate rainfall is required for the quarterly stormwater sampling. If adequate rainfall does not occur during the specified months, no stormwater samples are collected.
- b. Settleable solids

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[illegible]

**TABLE A1 - 3: Environmental Surveillance Summary**  
**External Gamma Radiation and Radon-222 / Radon-220**  
**Hazelwood Interim Storage Site (Latty Ave.)**

Measured Parameter	Station Identification	Number of Analyses or Measurements																												Total Analyses per Year
		No. of Sample Locations				Sample Duplicate				Ship Blank				Contingency Sample				Matrix Spike				Matrix Spike Duplicate								
		CY Quarter				CY Quarter				CY Quarter				CY Quarter				CY Quarter				CY Quarter								
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4					
LABORATORY MEASUREMENTS																														
External gamma radiation (TETLDs) <sup>a</sup>	1, 2, 3, 4, 5, 6, 7,	11		11					1		1		12		12														48	
Radon-222 / Radon-220	8, 11, 16, 19, 20 <sup>b</sup>	12		12		1		1																					26	
Radon-222 flux				88																									88	

a. TETLD = Tissue equivalent thermoluminescent dosimeter

b. Location 20 measures radon-222 / radon-220 only

**TABLE A1 - 3: Environmental Surveillance Summary**  
**Groundwater**  
**Hazelwood Interim Storage Site (Latty Ave.)**

Measured Parameter	Station Identification	Number of Analyses or Measurements																												Total Analyses per Year
		No. of Sample Locations				Rinsate Blank <sup>c</sup>				Trip Blank <sup>c</sup>				Sample Duplicate				Matrix Spike				Matrix Spike Duplicate								
		CY Quarter				CY Quarter				CY Quarter				CY Quarter				CY Quarter				CY Quarter								
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4					
FIELD MEASUREMENTS																														
Dissolved oxygen	HISS13		6																											6
Eh	HISS15		6																											6
Turbidity	HISS16		6																											6
Temperature	HISS17S		6																											6
Specific conductivity	HISS20S		6																											6
pH	B53W20S		6																											6
LABORATORY MEASUREMENTS																														
Radiological																														
Total uranium	HISS13		6				2								1															9
Thorium-232	HISS15		6				2								1															9
Thorium-230	HISS16		6				2								1															9
Thorium-228	HISS17S		6				2								1															9
Radium-226	HISS20S		6				2								1															9
Radium-228	B53W20S		6				2								1															9

c. Estimated number

**TABLE A1 - 3: Environmental Surveillance Summary**  
**Stormwater**  
**Hazelwood Interim Storage Site (Latty Ave.)**

Measured Parameter	Station Identification	Number of Analyses or Measurements																												Total Analyses per Year
		No. of Sample Locations				Rinsate Blank <sup>d</sup>				Trip Blank				Sample Duplicate <sup>e</sup>				Matrix Spike <sup>f</sup>				Matrix Spike Duplicate								
		CY Quarter				CY Quarter				CY Quarter				CY Quarter				CY Quarter				CY Quarter								
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4					
FIELD MEASUREMENTS																														
Specific conductivity	STW001, STW002	2	2	2	2																						8			
pH		2	2	2	2																						8			
Continuous flow		2	2	2	2																						N/A			
LABORATORY MEASUREMENTS																														
Radiological <sup>g</sup>																														
Total uranium	STW001, STW002	2	2	2	2																						8			
Thorium-230		2	2	2	2																						8			
Thorium-232		2	2	2	2																						8			
Thorium-228		2	2	2	2																						8			
Radium-226		2	2	2	2																						8			
Radium-228		2	2	2	2																						8			
Lead-210		2	2	2	2																						8			
Gross alpha		2	2	2	2																						8			
Gross beta		2	2	2	2																						8			
Chemical <sup>h</sup>																														
Total organic carbon	STW001, STW002	2	2	2	2																						8			
Total organic halides <sup>h</sup>		2	2	2	2																						8			
Settleable solids (monthly)		2	2	2	2																						24			

d. Estimated number

e. True field duplicates can not be obtained from composite samples, therefore, the laboratory replicate will present quality issues.

f. Additional volume for matrix spike analyses will not be collected. The matrix spike sample will be obtained from original volume shipped to the laboratory.

g. As per NPDES permit # MO-0111252, all stormwater samples will be flow-weighted composite samples.

h. As per NPDES permit # MO-0111252, if a positive result (a positive result has been identified as 2 times the detection limit) is reported for TOX, the permittee shall identify the specific compound.

**TABLE A1 - 3: Environmental Surveillance Summary**  
**Surface Water and Sediment**  
**Hazelwood Interim Storage Site (Latty Ave.)**

Measured Parameter	Station Identification	Number of Analyses or Measurements																								Total Analyses per Year
		No. of Sample Locations				Rinsate Blank <sup>i</sup>				Trip Blank <sup>i</sup>				Sample Duplicate				Matrix Spike				Matrix Spike Duplicate				
		CY Quarter				CY Quarter				CY Quarter				CY Quarter				CY Quarter				CY Quarter				
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	
FIELD MEASUREMENTS																										
Dissolved oxygen	SWSD002		6		6																					12
Eh	SWSD003		6		6																					12
Turbidity	SWSD004		6		6																					12
Temperature	SWSD005		6		6																					12
Specific conductivity	SWSD006		6		6																					12
pH	SWSD007		6		6																					12
LABORATORY MEASUREMENTS																										
Surface Water																										
Total uranium	SWSD002		6		6									1		1										14
Thorium-232			6		6									1		1										14
Thorium-230			6		6									1		1										14
Thorium-228			6		6									1		1										14
Radium-226		SWSD003		6		6								1		1										14
Radium-228		SWSD004		6		6								1		1										14
Sediment		SWSD005																								
Total uranium	SWSD006		6		6		1		1					1		1									16	
Thorium-232	SWSD007		6		6		1		1					1		1									16	
Thorium-230			6		6		1		1					1		1								16		
Thorium-228			6		6		1		1					1		1								16		
Radium-226			6		6		1		1					1		1								16		
Radium-228			6		6		1		1					1		1								16		

i. Estimated number

**TABLE A1 - 4: Deliverables Required for Environmental Surveillance Program  
Hazelwood Interim Storage Site (Latty Ave.)**

<b>Deliverable</b>	<b>Regulatory Driver</b>	<b>Frequency</b>	<b>Completion Goal</b>
Environmental Surveillance Technical Memorandum	DOE	Annually	June
NESHAPs Report	40 CFR Part 61, Subpart H	Annually	June
Radon Flux	40 CFR Part 61, Subpart Q	Annually	Within 30 days of receipt of results
Stormwater Report to the Missouri Department of Natural Resources	National Pollutant Discharge Elimination System	Quarterly	Apr. 28, Jul. 28, Oct. 28, Jan. 28



**TABLE A1 - 5: Groundwater Level Measurement  
Locations and Frequency  
Hazelwood Interim Storage Site (Latty Ave.)**

<b>Well ID <sup>a</sup></b>	<b>Well Completion</b>	<b>Manual Measurement <sup>b</sup> Frequency</b>
HISS1	Overburden	Quarterly
HISS2	Overburden	Quarterly
HISS5	Overburden	Quarterly
HISS5D	Bedrock	Quarterly
HISS6	Overburden	Quarterly
HISS7	Overburden	Quarterly
HISS9	Overburden	Quarterly
HISS10	Overburden	Quarterly
HISS11	Overburden	Quarterly
HISS12	Overburden	Quarterly
HISS13	Overburden	Quarterly
HISS14	Overburden	Quarterly
HISS15	Overburden	Quarterly
HISS16	Overburden	Quarterly
HISS17S	Overburden	Quarterly
HISS18S	Overburden	Quarterly
HISS19S	Overburden	Quarterly
HISS20S	Overburden	Quarterly

a. Well locations are shown on Figure A1 - 2.

b. Manual water level readings are taken in accordance with 191-IG-007.

SL-1247

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Formerly Utilized Sites Remedial Action Program (FUSRAP)

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# ADMINISTRATIVE RECORD

for the St. Louis Site, Missouri

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