

**Appendix B**  
**Risk Assessment Information**

## **Summary of Post-Remediation Risk Status at the Weldon Spring Site**

Baseline risk assessments addressing both human health and ecological risks were performed as part of the remedial investigation phase of the remedial investigation/feasibility study processes conducted. A limited assessment was performed for the Quarry Bulk Waste Operable Unit (OU) consistent with the focused scope of the remedial investigation/feasibility study conducted.

These risk assessments are documented in the baseline risk assessment reports that have been prepared for the four operable units of the Weldon Spring Site (DOE 1990, 1992, 1997, 1998). The assessments provided information regarding actual and potential risks to human health and the environment posed by the site areas addressed in each of the operable units. The information was then used to determine whether a current or potential threat to human health or the environment exists that warranted consideration of a remedial action.

The risk assessment performed to support the removal action conducted at the Southeast Drainage is presented in the Engineering Evaluation/Cost Analysis report prepared for the drainage (DOE 1996). An assessment was also prepared for the contaminated culverts under County Highway D (Frog Pond culverts) (ANL 2000).

After remediation of the former Chemical Plant and vicinity properties, a post-cleanup risk assessment (DOE 2002) was performed to determine residual risk levels for the various soil areas remediated. A similar assessment was also performed after the removal action was completed for the Southeast Drainage (ANL 1999). Information from the post-remediation reports and from the baseline risk assessment reports (for areas that did not undergo remediation) was used to determine the need for and the nature of institutional controls to protect human health and the environment.

### **B1.0 Risk Assessment Methodology**

#### **B1.1 Human Health**

Potential risks posed by exposure to site-related radiation and chemicals were assessed using methods developed by EPA and other agencies (EPA 1989b). Although exposure to ionizing radiation can result in cancer, serious genetic effects, and other detrimental health effects, the predominant health concern associated with radioactive contaminants at the Weldon Spring Site (which are primarily alpha-emitting radionuclides) is the induction of cancer. The radiological health risks evaluated were limited to this concern. This approach is consistent with EPA guidance, which notes that, in general, the risk of cancer is limiting and may be used as the sole basis for assessing the radiation-related human health risks for a site contaminated with radionuclides (EPA 1989b). For exposure to site chemicals, cancer and noncancer endpoints were evaluated consistently with EPA guidance (EPA 1989b).

Potential human health risks were estimated with reference to current and likely foreseeable future land use. Risk assessments conducted for the Weldon Spring Site have been performed by DOE in consultation with EPA and the state of Missouri and conform to procedures recommended by both agencies.

The EPA risk assessment process as implemented at the Weldon Spring Site consists of four primary steps. Recognition and careful consideration of the uncertainties associated with each of the four steps presented below is an important component of the risk assessment process.

***Data Collection and Hazard Assessment***—Site-related hazards or contaminants of concern are identified.

***Exposure Assessment***—An estimate is made as to the nature and magnitude of potential exposures associated with the site. Exposure scenarios, exposure pathways, potential receptors, exposure concentrations, and intakes are postulated or estimated. An exposure pathway is considered complete only if all the following elements are present: presence of a contaminated medium (e.g., drinking water, soil), presence of a person or ecological receptor at the location where the contaminated medium exists, and opportunity for the person or ecological receptor to come in contact with the contaminated medium.

***Toxicity Assessment***—Toxicity of the contaminants of concern are evaluated, and appropriate toxicity values for quantifying the potential health effects of the contaminants of concern are identified; these values have been developed by EPA for conducting risk assessments at CERCLA sites.

***Risk Characterization***—Potential cancer and noncancer risks are quantified. For cancer risks, EPA has established an acceptable risk range of 1 in 1 million to 1 in 10,000 (EPA 1990). This means that contaminant concentrations at a site that could result in increasing a person's chances of developing cancer by 1 chance in 1 million to 1 chance in 10,000 (in addition to this person's chances of developing cancer from other causes) would be considered acceptable. The quantitative measure of noncarcinogenic health effects is the hazard index. EPA has defined a hazard index greater than 1 as indicating possible adverse noncarcinogenic health effects.

Table B-1 presents a summary of the exposure scenarios, scenario assumptions, and intake parameters used in the various risk assessments performed for the site.

## **B1.2 Ecological Risk Assessment**

The ecological assessments conducted for the Weldon Spring Site addressed both aquatic biota and terrestrial wildlife, as appropriate for the four operable units (EPA 1989a and 1989c). For aquatic biota, the risk assessment included consideration of both exposure and effects. Biotic surveys of fish and invertebrate communities were performed. This method provided direct information on the status of the aquatic community inhabiting a spring (e.g., Burgermeister Spring) or a site surface water area (e.g., Femme Osage Slough) and the habitat quality of these spring water or surface water areas. Acute and chronic toxicity tests were also performed. The risk assessment for terrestrial wildlife modeled uptake of contaminants through a drinking water pathway.

## B2.0 Baseline Risk Assessment Results

### B2.1 Human Health

The baseline risk assessment performed for the former Chemical Plant soils, structures, surface water, and sludges at the raffinate pits indicates that elevated concentrations of site-related contaminants (both radioactive and chemical) could pose an unacceptable risk and a hazard index greater than 1 for the future recreational visitor scenario evaluated (DOE 1992).

Risk estimates for contaminated groundwater in the shallow aquifer beneath the Chemical Plant area indicate that some contaminants could pose an unacceptable risk if ingested at frequencies and amounts similar to those of residential use (DOE 1997).

EPA Gen-7 Risk estimates for springs (including Burgermeister Spring) at the Chemical Plant indicate that site-related contaminant levels are within the acceptable risk range and below a hazard index of 1 for the current and future recreational visitor accessing the spring water (DOE 1997).

For the Southeast Drainage, risk estimates for a recreational visitor and hypothetical child resident scenario indicated that contaminant levels in spring water are within the acceptable risk range and below a hazard index of 1. However, radioactive contaminant levels in sediment at several locations posed a risk slightly greater than the acceptable range when evaluated using the hypothetical child resident scenario (DOE 1996). The hypothetical child resident was evaluated as the reasonably maximally exposed individual at the drainage. DOE consulted with EPA, the Missouri Department of Natural Resources, and the Missouri Department of Health in developing this scenario and its exposure assumptions for evaluating potential exposure to the contaminants in the drainage.

EPA Gen-7 For the quarry, residual soils at the quarry proper, including those in the fractures, indicated that contaminant levels are within the acceptable risk range and below a hazard index of 1 for the recreational visitor scenario. Surface water, sediment, and fish samples from Femme Osage Slough also indicate that contaminant levels are within the acceptable risk range and below a hazard index of 1 for the recreational visitor scenario (DOE 1998).

Uranium in groundwater north of Femme Osage Slough poses a risk greater than the acceptable risk range for a hypothetical resident scenario. Site-related contaminants have not been detected at monitor wells south of Femme Osage Slough (including those at the St. Charles County well field) (DOE 1998).

### B2.2 Ecological Risk

At the former Chemical Plant, the area of most ecological concern was the four raffinate pits, largely due to chemicals (generally metals) in the ponded water and raffinate pit sludges.

EPA Gen-7 Although the industrial portion of the former Chemical Plant did not present good habitat for wildlife, the undeveloped areas supported fauna similar to that in the surrounding wildlife areas. Tissue concentrations in fish collected in Lakes 34, 35, and 36 in the Busch Wildlife Area indicated uranium concentrations at levels for which no adverse effects have been observed. Overall, there were no obvious adverse ecological impacts to area biota, with the possible

exception of the biota at the raffinate pits. Remedial action at the former Chemical Plant and raffinate pits has significantly reduced ecological risks in the area (DOE 1992).

Results of the biotic surveys, media toxicity testing, and contaminant uptake modeling for terrestrial wildlife indicate that current contaminant levels in surface water and sediment at Burgermeister Spring pose little or no risk to the aquatic and terrestrial biota of the area (DOE 1997).

The quarry proper provides minimal suitable habitat for vegetation and wildlife and was not addressed in the ecological risk assessment. The media and areas of interest in terms of ecological risk are surface water and sediment in Femme Osage Slough and Little Femme Osage Creek. Results of the ecological risk assessment indicated that there are no risks to terrestrial wildlife receptors foraging in Femme Osage Slough or ingesting water from Little Femme Osage Creek. Biotic surveys indicated that the aquatic and terrestrial communities are typical of those expected to be in the area. Tissue analyses of small mammals and fish indicated uranium concentrations within the range for which no adverse effects have been observed. The levels of site-related contaminants in surface water and sediment in Femme Osage Slough and Little Femme Osage Creek present no risk to biota in the area (DOE 1998).

At the Southeast Drainage, surface water in the drainage does not pose risk to terrestrial biota drinking the water at the drainage. Surface water and sediment in the drainage pose minor risks to aquatic biota, and adverse effects would more likely result from the intermittent flow of surface water than from contamination in the drainage. Any ecological impacts would be localized within the drainage and would not have demonstrable effect on the ecological resources in the area. Removal of contaminated sediments has further reduced the low ecological risks that existed previously (DOE 1996).

### **B3.0 Residual Risk Summary**

Table B-2 presents a summary of the human health risk status based on current conditions at the areas that constitute the Weldon Spring Site. The table is a compilation of risk results presented in post-remediation reports for remediated areas (e.g., the post-remediation risk assessment prepared for the former Chemical Plant soils, structures, and raffinate pits [DOE 2002]) and those presented in the baseline risk assessment reports for areas that did not undergo remediation, such as Femme Osage Slough, Burgermeister Spring, and quarry groundwater. For the areas that were not remediated, DOE reviewed more recent data to determine whether risk results presented in the baseline risk assessments still reflect current conditions, and risk estimates were updated as needed.

The post-cleanup risk assessment performed for the Chemical Plant and vicinity properties (DOE 2002) incorporated all the soil data collected during the confirmation process. These data represent the levels of soil contaminants of concern that remain. The risk assessment considered each confirmation unit as separate one-half acre exposure units. The 95 percent upper confidence limit of the arithmetic mean of all samples collected for each confirmation unit was used as the exposure point concentration for calculating potential risk based on a hypothetical resident scenario. The ingestion, inhalation (including radon), and external gamma pathways were evaluated.

For the Southeast Drainage, confirmation data that were collected for the locations remediated were also evaluated to determine the residual risk and the risk reduction that was achieved. The removal action performed has resulted in reducing potential risk posed by the drainage (ANL 1999).

Finally, data evaluated in the baseline risk assessment (DOE 1998) for Femme Osage Slough and Little Femme Osage Creek were re-evaluated to estimate potential risk using a hypothetical resident scenario. The evaluation in the baseline risk assessment was based on a recreational visitor scenario and was consistent with current and reasonable future land use. Results indicate that contaminant levels in the sediment and surface water are also within the acceptable risk range for the hypothetical resident scenario (ANL 2003).

Table B-1. Exposure Scenarios and Scenario Assumptions Presented in Risk Assessments for the Weldon Spring, Missouri, Site

Occurrence	Exposure Scenario	Scenario Assumptions and Intake Parameters	Comment/Reference
Chemical Plant soil	Site worker at former Chemical Plant <sup>a</sup>	Assumed 10 years of exposure for 200 days/year at 8 hours per day. Evaluated the ingestion, inhalation, and external gamma pathways.	Baseline Assessment Report (DOE 1992).
	Site trespasser at former Chemical Plant <sup>a</sup>	Assumed 10 years of exposure for 5 times a year for 1 hour each time. Evaluated the ingestion, inhalation, and external gamma pathways.	(same as above)
	Current/future recreational visitor <sup>a</sup>	Assumed 30 years of exposure for 20 times or days per year for 4 hours each time. Evaluated the ingestion, inhalation, and external gamma pathways.	(same as above)
	Hypothetical resident <sup>b</sup>	Assumed 30 years of exposure for 350 days per year. Evaluated the ingestion, inhalation (including radon) and external gamma pathway.	Post-Remediation Risk Assessment Report (DOE 2002)
Chemical Plant groundwater and springs (including Burgermeister Spring)	Current/future recreational visitor (assumed ingestion of spring water only) <sup>a</sup>	Assumed ingestion for 30 years at 20 visits per year consuming a cupful (200 mL) each time.	Baseline Risk Assessment Report (DOE 1997).
	Hypothetical resident (assumed ingestion of groundwater) <sup>a</sup>	Assumed ingestion for 30 years, 350 days/year at 2 L per day.	
Quarry Bulk Waste	Hypothetical passerby <sup>a</sup>	Evaluated the inhalation to radon pathway for an adult passing by 500 to 700 times per year for 5 to 10 years.	These scenarios were postulated to assess potential exposure to the bulk waste present at the time when the quarry was fenced and closed to the public. Assessment presented in the Baseline Risk Evaluation Report (DOE 1990).
	Hypothetical trespasser <sup>a</sup>	Assumed to be 11 to 18 years old; trespassed 12 to 50 times a year for 2 to 4 hours each time for 5 to 10 years.	

Table B-1 (continued). Exposure Scenarios and Scenario Assumptions Presented in Risk Assessments for the Weldon Spring, Missouri, Site

Occurrence	Exposure Scenario	Scenario Assumptions and Intake Parameters	Comment/Reference
Residual Soil at Quarry Proper (soil that remained after bulk waste removal)	Recreational visitor <sup>a</sup>	Assumed ingestion, inhalation, external gamma pathways; 30 years of exposure, 20 visits per year.	Baseline Risk Assessment Report (DOE 1998).
Quarry Area soil	Recreational visitor <sup>a</sup>	Assumed ingestion, inhalation, external gamma pathways; 30 years of exposure, 20 visits per year.	(same as above)
Femme Osage Slough and Little Femme Osage Creek	Current/future recreational visitor <sup>a</sup>	Assumed ingestion of sediment, surface water, and fish.	(same as above)
	Hypothetical resident <sup>c</sup>	Assumed exposure to sediment and surface water via the ingestion and external gamma pathway.	Letter transmittal to DOE (ANL 2003).
Quarry groundwater	Hypothetical resident (assumed ingestion of groundwater) <sup>a</sup>	Assumed ingestion of groundwater for 30 years, 350 days/year at 2 L per day.	Baseline Risk Assessment Report (DOE 1998).
Southeast Drainage	Current/future recreational visitor/hunter <sup>a</sup>	Assumed 20 visits/year for 30 years; evaluated external gamma and ingestion pathways <sup>d</sup> .	Southeast Drainage Engineering Evaluation/Cost Analysis (DOE 1996).
	Hypothetical child resident <sup>a</sup>	Assumed 90 days/year visits for 10 years; evaluated for external gamma and ingestion pathways <sup>d</sup> .	
Frog Pond culverts	Utility construction worker <sup>a</sup>	Assumed exposure for 5 working days, 8 hours per day; evaluated external gamma, inhalation, and ingestion pathways.	Letter transmittal to DOE (ANL 2000).
	Recreational visitor <sup>a</sup>	Assumed exposure for 10 years, 10 days per year for 1 hour per day. Same pathways as that for construction worker.	

<sup>a</sup> Exposure scenario evaluated for the baseline risk assessment.

<sup>b</sup> Exposure scenario evaluated for the post-remediation risk assessment.

<sup>c</sup> Data from baseline risk assessment (DOE 1998) reevaluated for hypothetical resident scenario.

<sup>d</sup> For calculating the external gamma doses, it was assumed that only 25 percent of the exposure time was spent in areas with elevated radionuclide concentrations because a receptor would be likely to move around the drainage.

Key: mL = milliliter, L = liter

Table B-2. Summary of Residual Risk Status at the Weldon Spring, Missouri, Site

Site Area	Risk Status	Reference
Chemical Plant soil	Similar to background. <sup>a</sup>	DOE 2002
Vicinity property soil	Similar to background. <sup>a</sup>	DOE 2002
Chemical Plant groundwater	Greater than acceptable risk range and hazard index of 1 for a hypothetical resident scenario. <sup>b</sup>	DOE 1997
Burgermeister Spring	Within acceptable risk range for recreational visitor. <sup>b</sup>	DOE 1997
Quarry proper	Within acceptable risk range for recreational visitor. <sup>b</sup>	DOE 1998
Quarry area groundwater north of slough	Greater than acceptable risk range and hazard index of 1 due to uranium concentrations remaining. <sup>b</sup>	DOE 1998
Quarry area groundwater south of slough	Within acceptable risk range for resident scenario. <sup>b</sup>	DOE 1998
Femme Osage Slough and Little Femme Osage Creek	Within acceptable risk range for the recreational visitor <sup>b</sup> scenario. Within acceptable risk range for a hypothetical <sup>c</sup> resident scenario.	DOE 1998 ANL 2003
Southeast Drainage	Within acceptable risk range for recreational visitor and hypothetical child resident. <sup>b</sup>	DOE 1996
Frog Pond outlet/culverts	Within acceptable risk range for a utility construction worker and recreational visitor scenario. <sup>b</sup>	ANL 2000

<sup>a</sup>Risk status after remediation.

<sup>b</sup>Risk status at baseline risk assessment phase and still representative of current conditions.

<sup>c</sup>Data from baseline risk assessment (DOE 1998) reevaluated for hypothetical resident scenario.

## B4.0 References

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**Appendix C**  
**Disposal Cell Contents**

Table C-1 (continued). Contents of the Weldon Spring, Missouri, Disposal Cell

Work Zone Per WP437 and Material Description	Cell Placement Considerations	Occupied Cell Volume (cy)
<b>Raffinate Pits Work Zone</b>		
CSS Grout	Produced in CSS Plant and pumped to cell. Volume as determined at the plant.	188,443.00
Raffinate Pit 4 residual sludge	Stabilized in situ with grout then mixed with TSA aggregates. Conversion calculated assuming aggregates alone would not shrink and the mix ratio was 2.5 to 1.	2,530.00
Raffinate Pit 3 residual sludges	Mixed with > or = 3 parts contaminated soil. Conversion factor calculated assuming that soil alone will shrink with 0.965.	10,277.00
Raffinate Pit 3 soils	Conversion factor bank/fill for soils is 0.965.	52,365.73
Raffinate Pit 4 soils	Conversion for soils is 0.965.	65,649.92
Raffinate Pits 1 and 2 soils (some residual sludge mixed with the soils)	Conversion factor is 0.950.	58,197.95
Raffinate Pits metal debris	Mixed with soil in the cell. Conversion loose/fill for metal is 10 to 1.	21.00
Raffinate Pit 1 interceptor trench	North and east of Raffinate Pit 1. Estimated at 481 + 489 + 1894 = 3274 cy. Use 0.90 for conversion.	2,946.60
Trench for the 2 inch PVC line	Estimated at 133 cy. Use 0.900.	119.70
Entrance ramp in Raffinate Pits 1 and 2	Aggregate surface estimated at 100 cy. Use conversion of 1 to 1.	100.00
Raffinate Pit 3 overflow line and manhole	Estimated at 726 cy of soil. Use 0.900 conversion.	653.40
Intermediate dike in Raffinate Pit 4	Estimated at 8366 cy. Conversion is 0.965 to 1.	8,073.19
Interceptor trench east of Raffinate Pit 3	Estimated at 2198 cy. Conversion is 0.900 to 1.	1,978.20
Aggregate on SW corner of Raffinate Pit 4 dike	Estimated at 370 cy. Conversion is 0.900.	333.00
<b>TSA Work Zone</b>		
Soil stockpiles from quarry cleanup	Used alone or in various mixes. Conversion factor for soils is 0.965.	99,332.28
Nitro soil pile, quarry origin	Previously treated with cement/fly ash. Conversion factor for this mix is 1.00.	25,100.00
Soil pile NW of TSA	Created during excavations for SWTP basins and TSA construction (1992). Conversion factor is 0.965.	19,029.80
Rubble pile from quarry cleanup	Conversion factor loose/fill is 0.900.	16,290.00
Metal stockpiles	Resulted from site demolitions. Conversion for metals is 10 to 1.	220.00
HEPA filters	From site demolitions. Entombed in concrete and soil under the CSS monolith. Volume includes concrete and soil.	452.00
B-25 boxes	Unreleasable content. Grouted with clean grout on a grout pad and under the CSS monolith. 36 boxes @ 5 cy each.	180.00
Containers, 20-cy each	Boxes with process pipe from site demolitions. Grouted with clean grout on a clean grout base, then entombed under the CSS monolith. 117 containers @ (20cy + 5cy base) = 2925 cy.	2,925.00
Filter cake from SWTP in 4-cy boxes	Total volume is 800 cy.	800.00
TSA facility (construction gravel and sand, liners)	Mostly mixed with Raffinate Pit 4 stabilized soil. Conversion factor assuming aggregates were placed alone is 1.0.	37,700.00
TSA in situ soil excavations	Conversion factor for these soils is 0.965.	26,540.40
TSA concrete transfer station	Estimated at 162 cy. Use 1.67 for bulking at placement.	270.54
TSA transfer station metal debris	Estimated at 30 cy. Use 10 to 1 conversion.	3.00
TSA aggregates under transfer station	Estimated at 797 cy. Use 1 to 1 conversion.	797.00

Table C-1 (continued). Contents of the Weldon Spring, Missouri, Disposal Cell

Work Zone Per WP437 and Material Description	Cell Placement Considerations	Occupied Cell Volume (cy)
TSA transfer station underlying soils	Estimated at 142 cy. Use 0.965 conversion.	137.03
TSA decontamination station concrete	Estimated at 125 cy. Use 1.67 for bulking in cell.	208.75
TSA various liners (basin, decontamination station, etc)	All liners (HDPE, geotextile) generated from the TSA were shredded and entombed in soil. Total occupied volume is below 50 cy. Use 50 cy.	50.00
Brine tanks from SWTP	Mixed with soil. Est. conversion factor is 0.430.	25.80
Contaminated Jersey barriers	27 each at 0.5 cy.	13.50
TSA equalization basin sediment	estimated at 1800 cy mixed with soil in the cell. Conversion factor is 0.43.	774.00
PCB contaminated concrete	200 cy. Conversion is .900 to 1.	180.00
PCB contaminated aggregates	Estimated at 108 cy. Conversion 1 to 1.	108.00
TSA scrap metal, wood and debris	Estimated at 430 cy. Conversion is 1 to 10.	43.00
20-cy rolloffs	Emptied in cell then crushed. Misc. materials estimated to 180 cy. Conversion is 1 to 5.	36.00
PMC stored equipment	Estimated at 50 cy. Entombed in CSS or soil. Conversion is .66 to 1.	33.00
<b>Ash Pond Work Zone</b>		
Soil stockpiled from cell foundation, including Ash Pond capping	From WP420 excavations. Factor bank to fill is 0.965.	437,310.98
Soil stockpiled from Raffinate Pit 4 excavations	Conversion factor is 0.965.	47,478.00
Soil stockpiled from VP-9 cleanup	Conversion factor is 0.80 due to presence of vegetation and roots.	2,680.00
Wood piles from site	Mixed with 3 parts of soil. Volumetric conversion factor is 0.50.	910.00
Rubble	from site foundations removal. Conversion factor is 0.900.	65,419.20
In-situ soils	Conversion factor is 0.965.	108,461.18
Buried rubble	Conversion 0.9.	292.50
Sediments in sedimentation basins	Mixed with several soil parts for drying. Conversion factor is 0.2.	785.00
Soil under DHO equipment parking area	Conversion is 0.965.	11,469.03
Nitro-contaminated soils	Estimated at 370 cy. Conversion is 1 to 1.	370.00
Root balls from VP-9	Estimated at 300 cy. Conversion is 1 to 0.5 because were mostly placed in CSS grout.	150.00
Various debris (concrete, bricks, rocks, gravel)	Estimated at 8185 cy. Conversion is 0.8 to 1.	6,548.00
Contaminated soil under cell footprint	Estimated at 8000 cy. Conversion is 0.965.	7,720.00
<b>MSA Work Zone</b>		
Structural metal piles	Entombment in soil. Conversion is 5 to 1 between loose and fill cy.	3,260.00
Shreddable metal piles	Same as above.	6,860.00
Aluminum piles	Same as above.	336.00
Copper piles	Entombed in CSS grout. Conversion assumes 30% of voids filled, thus a factor of 0.7 applies.	634.90
Window frames	Entombed in soil. Conversion is 5 to 1.	55.00
ACM siding bundles	Placed directly in cell.	650.00
Intact metal objects	Big pieces placed in CSS. Some void filling and crushing is assumed. Conversion loose to fill is 0.5.	1,660.00
Drums	Placed intact and crushed. Assume 0.5 of volume is reduced.	351.50
Sling bags with cemented filter cake and brine from SWTP	Placed to block CSS flow. Bulking of 10% assumed due to uneven voids when placed.	715.00

Table C-1 (continued). Contents of the Weldon Spring, Missouri, Disposal Cell

Work Zone Per WP437 and Material Description	Cell Placement Considerations	Occupied Cell Volume (cy)
13 cy roll-off containers	Content emptied in the cell and grouted or covered with soil. Assume 50% voids filled with soil.	338.00
4-cy roll-off containers	Entombed in CSS grout. Add 1 cy per box for the clean grout base. 36 boxes @ 5cy = 180 cy.	180.00
20-cy roll-off containers	Contents placed in the cell. Assume 50% voids filled with soil or compacted.	1,670.00
PCB contaminated concrete	Placed near or within CSS monolith. Assume voids remain as in the stockpile.	500.00
MSA trash and rubble	Estimated at 700 cy. Conversion is 1 to 5.	140.00
Transite pipe	Crushed and entombed in soil. Assume reduction of 5 to 1.	166.00
MSA pad and facility	Assumed factor of 1.0 in-situ to placed in the cell.	14,800.00
MSA in situ soils	Conversion factor in-situ to placed in the cell is 0.965.	4,855.88
<b>Frog Pond Work Zone</b>		
Frog Pond in situ soils	Conversion is 0.965.	15,721.78
Sediments	Conversion after mixing with soil is 1 to 0.43.	2,290.61
Soil under the sediments	Conversion is 0.965.	2,068.00
Frog Pond outlet	Estimated at 473 cy. Conversion is 1 to 1.	473.00
<b>SWTP and 434 Work Zones</b>		
Soil excavated in this work zone	Conversion is 0.965.	7,047.40
Sediments	Conversion is 1 to 0.43.	206.40
Boxes	Content mixed with soil. Conversion is 1 to 0.43.	87.72
SWTP foundations	Estimated at 582 cy. Bulking factor of 1.67.	971.94
SWTP debris	Estimated at 220 cy. Use 0.2 conversion factor.	44.00
SWTP liners	Total of 175,000 sq.ft HDPE, 43,000 sq.ft geonet and 43,000 GCL. Shredded and entombed in soil. Estimated total volume is approximately 500 cy.	500.00
Building 434 foundations	Estimated at 635 cy concrete. Conversion factor for bulking is 1.67.	1,060.45
<b>CSS Plant Work Zone</b>		
CSS pilot plant concrete debris	Estimated at 222 cy Conversion is 1 to 1.	222.00
CSS pilot plant metal debris	Estimated at 100 loose cy. Conversion is 10:1.	10.00
Road at the CSS Pilot plant	Estimated at 500 cy aggregates. Conversion is 1 to 1.	500.00
CSS Plant metal debris	Estimated at 3700 cy. Due to size and volume, placement requirements are as for the MSA metal. Conversion loose to fill is 5 to 1.	740.00
CSS Plant concrete debris	Estimated at 676 cy. Conversion is 1 to 1.	676.00
Contaminated aggregate under the CSS Plant	Per estimates. Conversion is 1 to 1.	1,686.00
in situ contaminated soils in this area	Conversion is 0.965.	3,638.05
<b>Administration Area Work Zone</b>		
Concrete foundations (decontamination pad and others)	Estimated at 100 cy. Conversion 1.67 to 1.	167.00
Storm sewer removal, metal, concrete and soil	Estimated at approximately 200 cy. Factor of conversion 1 to 1.	200.00

Table C-1 (continued). Contents of the Weldon Spring, Missouri, Disposal Cell

Work Zone Per WP437 and Material Description	Cell Placement Considerations	Occupied Cell Volume (cy)
<b>ASA Work Zone</b>		
In situ soils	Conversion is 0.965.	2,080.54
Aggregate pad	Estimated at 3009 cy.	3,009.00
Sea-Land containers	Emptied, covered with soil and demolished. Conversion is 1 to 1.	3,987.00
<b>Misc. Contaminated Items</b>		
Access road aggregate from DHO equipment staging area to north decontamination pad	Estimated at 300 cy. Conversion is 1 to 1.	300.00
Aggregate surface at north decontamination pad and DHO shop	Estimated at 1,700 cy. Conversion factor is 1 to 1.	1,700.00
Sediments in the DHO recirculation pond (north decontamination pad)	Estimated at 350 cy. Conversion factor is 1 to 2.27.	150.50
Liners, pipelines, soil around pipes at north DHO decontamination pad	Estimated at 150 cy. Conversion 1 to 0.8.	3,320.00
Concrete foundations at DHO north decontamination pad and shop	Estimated at 294 cy. Bulking factor is 1.67.	490.98
Debris at north DHO decontamination pad	Estimated at 150 cy. Conversion factor is 1 to 5.	30.00
Contaminated soils around north DHO decontamination pad	Estimated at 150 cy. conversion is 0.965.	144.75
Resurfacing of contaminated haul roads	Estimated at 4,489 cy. Conversion is 1 to 1.	4,489.00
DHO equipment staging area	Estimated at 2,900 cy aggregates. Conversion is 1 to 1.	2,900.00
SWTP filter cake boxes directly to cell	129 4-cy boxes = 496 cy. Conversion is 1 to 0.43.	213.28
Sling bags	48 bags.	48.00
SWTP brine as grout pumped placed in the cell	3,697.5 cy. Conversion is 1 to 1.	3,698.00
General hot spots on chemical plant site	1,2098 cy. Conversion is 0.965.	11,674.57
Sediments from CMSA basin	4,617 cy. Conversion factor is 0.43.	1,985.31
<b>Clean Items Used In Cell Waste Containment Area</b>		
6-inch soil cushion on the upper 3:1 slope	Per design, 4,600 cy.	4,600.00
Rock on the CSS haul routes inside the cell	As built, 4,950 cy.	4,950.00
Pads for pumps between Phase 1 and 2	As built, 60 cy.	60.00
Erosion berms on the LCRS sand	As built, 30 cy.	30.00
Separation berm Phase 1 from Phase 2	As built, 3,160 cy.	3,160.00
North low-permeability berm	As built, 140 cy.	140.00
East rebuilt Penetration	As built, 50 cy.	50.00
Gravel on west entrance berm	As built, 1,200 cy.	1,200.00
Overbuilt within tolerances on the LCRS sand layer	As built, 2,600 cy.	2,600.00
Select soil waste built of clean common fill	1,020 cy. Used in covering the cell dimple = 1,150 cy.	2,270.00
Peat used for the geochemical barrier	Per purchase and 1/4 mix ratio with soil.	9,295.00
<b>Army Waste</b>		
Waste from army property	As received, 26,220 cy. Conversion is 0.9.	23,598.00
<b>Wastes in the Cell Dimple</b>		
Quarry geonet	Entombed in clean grout.	175.00
Quarry Water Treatment Plant tanks and metal debris	Entombed in clean grout.	570.00
Quarry HDPE liners	Entombed in clean grout.	30.00
Quarry soils, sediments, filter and media	Placed and compacted in the cell dimple.	1,875.00

Table C-1 (continued). Contents of the Weldon Spring, Missouri, Disposal Cell

Work Zone Per WP437 and Material Description	Cell Placement Considerations	Occupied Cell Volume (cy)
Quarry concrete debris	Placed and compacted in the cell dimple.	304.00
Quarry wood and railroad ties	Placed and compacted in the cell dimple.	20.00
Admin. Area asphalt and metal debris	Placed and compacted in the cell dimple.	310.00
Various trash generated on site	Placed and compacted in the cell dimple.	70.00
Admin. Area concrete debris	Placed and compacted in the cell dimple.	77.00
Waste from army property	Placed and compacted in the cell dimple.	50.00

Key:

- ACM = asbestos containing material
- ASA = asbestos storage area
- CMSA = construction material staging area
- CSS = chemical stabilization/solidification
- cy = cubic yard(s)
- DHO = direct hire organization
- GCL = geosynthetic clay liner
- HEPA = high-efficiency particulate air
- LCRS = leachate collection and removal system
- PCB = polychlorinated biphenyls
- MSA = material staging area
- PMC = Project Management Contractor
- SWTP = site water treatment plant
- TSA = temporary storage area
- WP = work package
- VP = vicinity property

Table C-2. Weldon Spring Site Disposal Cell Total Activity Final Estimate

Waste Stream <sup>a</sup>	Volume (cy)	Mass (g) <sup>c</sup>	Radiological Profile <sup>d</sup>	Nuclide Activity (Ci) <sup>e</sup>									Total Activity (Ci)	% of Total (if > 1%)
				U-238	U-234	U-235	Th-228	Th-230	Th-232	Ra-226	Ra-228	Rn-222 <sup>f</sup>		
<b>Raffinate Pits Work Zone</b>														
Raffinate processed through CSS Plant <sup>b</sup>	159990	1.49E+11	Raffinate	6.12E+01	6.12E+01	2.84E+00	8.95E+00	4.03E+03	4.78E+01	1.25E+02	9.10E+00	1.47E+02	4.49E+03	68.44%
Pit 4 residual sludge	2530	2.36E+09	Raffinate	9.68E-01	9.68E-01	4.48E-02	1.42E-01	6.37E+01	7.55E-01	1.98E+00	1.44E-01	2.33E+00	7.11E+01	1.08%
Pit 3 residual sludge	10277	9.59E+09	Raffinate	3.93E+00	3.93E+00	1.82E-01	5.75E-01	2.59E+02	3.07E+00	8.05E+00	5.85E-01	9.47E+00	2.89E+02	4.40%
Pit 3 soil	52366	6.74E+10	Raffinate pit soils	2.76E+00	2.76E+00	1.35E-01	4.04E-01	1.82E+02	2.16E+00	5.66E+00	4.11E-01	6.66E+00	2.03E+02	3.09%
Pit 4 soil	65650	8.45E+10	Raffinate pit soils	3.46E+00	3.46E+00	1.69E-01	5.07E-01	2.28E+02	2.70E+00	7.10E+00	5.15E-01	8.35E+00	2.54E+02	3.88%
Pits 1 & 2 soil	58198	7.49E+10	Raffinate pit soils	3.07E+00	3.07E+00	1.50E-01	4.49E-01	2.02E+02	2.40E+00	6.29E+00	4.57E-01	7.40E+00	2.26E+02	3.44%
Pit 1 Interceptor Trench	2947	3.79E+09	Site soils	3.94E-01	3.89E-01	2.20E-02	1.67E-02	4.13E-02	4.25E-02	1.86E-02	1.52E-02	1.86E-02	9.58E-01	
Pit 3 Overflow & Manhole	653	8.40E+08	Site soils	8.72E-02	8.62E-02	4.87E-03	3.70E-03	9.16E-03	9.41E-03	4.12E-03	3.36E-03	4.12E-03	2.12E-01	
Pit 4 Intermediate Dike	8073	1.04E+10	Site soils	1.08E+00	1.07E+00	6.03E-02	4.57E-02	1.13E-01	1.16E-01	5.09E-02	4.16E-02	5.09E-02	2.62E+00	
Interceptor Trench east of Pit 3	1978	2.55E+09	Site soils	2.64E-01	2.61E-01	1.48E-02	1.12E-02	2.77E-02	2.85E-02	1.25E-02	1.02E-02	1.25E-02	6.43E-01	
<b>TSA Work Zone</b>														
Quarry soils stockpiles	99332	1.28E+11	TSA bulk waste	2.53E+01	2.53E+01	1.16E+00	1.23E+01	4.19E+01	3.29E+00	1.39E+01	1.23E+01	1.39E+01	1.50E+02	2.28%
Nitro soils pile	25100	3.23E+10	TSA bulk waste	6.40E+00	6.40E+00	2.94E-01	3.11E+00	1.06E+01	8.30E-01	3.52E+00	3.11E+00	3.52E+00	3.78E+01	
B-25 boxes	180	2.32E+08	TSA non-filter cake	7.41E-01	7.41E-01	3.48E-02	2.23E-02	5.33E+00	1.99E+01	2.50E-02	2.23E-02	2.50E-02	2.69E+01	
20 cy rolloffs	2925	3.76E+09	TSA non-filter cake	1.20E+01	1.20E+01	5.65E-01	3.63E-01	8.66E+01	3.24E+02	4.07E-01	3.63E-01	4.07E-01	4.37E+02	6.65%
SWTP filter cake	800	7.65E+08	TSA filter cake	1.19E+00	1.19E+00	5.58E-02	6.12E-04	4.48E-02	8.72E-03	4.82E-03	4.05E-03	4.82E-12	2.50E+00	
TSA in-situ soil	26540	3.42E+10	Site soils	3.55E+00	3.50E+00	1.98E-01	1.50E-01	3.72E-01	3.83E-01	1.67E-01	1.37E-01	1.67E-01	8.63E+00	
TSA Transfer Station underlying soil	137	1.76E+08	Site soils	1.83E-02	1.81E-02	1.02E-03	7.76E-04	1.92E-03	1.97E-03	8.64E-04	7.05E-04	8.64E-04	4.45E-02	
TSA Equalization Basin sediment	774	9.96E+08	Site soils	1.03E-01	1.02E-01	5.78E-03	4.38E-03	1.09E-02	1.12E-02	4.88E-03	3.98E-03	4.88E-03	2.52E-01	
<b>Ash Pond Work Zone</b>														
Soil stockpile	426737	5.49E+11	Site soils	5.70E+01	5.64E+01	3.19E+00	2.42E+00	5.99E+00	6.15E+00	2.69E+00	2.20E+00	2.69E+00	1.39E+02	2.11%
Vicinity Properties	10575	1.36E+10	Site soils	1.41E+00	1.40E+00	7.89E-02	5.99E-02	1.48E-01	1.52E-01	6.67E-02	5.44E-02	6.67E-02	3.44E+00	
Soils stockpiled from Pit 4 excavations	47478	6.11E+10	Site soils	6.34E+00	6.27E+00	3.54E-01	2.69E-01	6.66E-01	6.84E-01	2.99E-01	2.44E-01	2.99E-01	1.54E+01	
Soils from VP 9 cleanup	2680	3.45E+09	Site soils	3.58E-01	3.54E-01	2.00E-02	1.52E-02	3.76E-02	3.86E-02	1.69E-02	1.38E-02	1.69E-02	8.71E-01	
In-situ soil	108461	1.40E+11	Site soils	1.45E+01	1.43E+01	8.10E-01	6.14E-01	1.52E+00	1.56E+00	6.84E-01	5.58E-01	6.84E-01	3.52E+01	
Sedimentation basin sediments	785	1.01E+09	Site soils	1.05E-01	1.04E-01	5.86E-03	4.45E-03	1.10E-02	1.13E-02	4.95E-03	4.04E-03	4.95E-03	2.55E-01	
Soil under DHO equip parking area	11469	1.48E+10	Site soils	1.53E+00	1.51E+00	8.56E-02	6.50E-02	1.61E-01	1.65E-01	7.23E-02	5.90E-02	7.23E-02	3.73E+00	
Nitro soils	370	4.76E+08	Site soils	4.94E-02	4.89E-02	2.76E-03	2.10E-03	5.19E-03	5.33E-03	2.33E-03	1.90E-03	2.33E-03	1.20E-01	
Soil under cell footprint	7720	9.94E+09	Site soils	1.03E+00	1.02E+00	5.76E-02	4.37E-02	1.08E-01	1.11E-01	4.87E-02	3.97E-02	4.87E-02	2.51E+00	
<b>MSA Work Zone</b>														
SWTP filter cake	715	6.83E+08	MSA filter cake	6.18E+01	6.18E+01	2.84E+00	2.88E-03	4.00E-02	7.79E-03	1.20E-01	4.44E-02	1.20E-01	1.27E+02	1.93%
13 cy rolloffs	338	4.35E+08	MSA containerized waste	2.28E+00	8.61E-02	5.66E-03	1.31E-03	6.96E-03	1.22E-02	1.31E-03	0	1.31E-03	2.39E+00	
4 cy rolloffs	180	2.32E+08	MSA containerized waste	1.21E+00	4.59E-02	3.01E-03	6.95E-04	3.71E-03	6.49E-03	6.95E-04	0	6.95E-04	1.28E+00	
20 cy rolloffs	1670	2.15E+09	MSA containerized waste	1.13E+01	4.26E-01	2.79E-02	6.45E-03	3.44E-02	6.02E-02	6.45E-03	0	6.45E-03	1.18E+01	
Drums	352	4.53E+08	MSA containerized waste	2.37E+00	8.97E-02	5.89E-03	1.36E-03	7.25E-03	1.27E-02	1.36E-03	0	1.36E-03	2.49E+00	
Waste Piles	13622	NA	MSA waste piles	6.16E-02	6.16E-02	2.89E-03	0	0	0	0	0	0	1.26E-01	
MSA in-situ soil	4856	6.25E+09		6.49E-01	6.41E-01	3.63E-02	2.75E-02	6.81E-02	7.00E-02	3.06E-02	2.50E-02	3.06E-02	1.58E+00	

Table C-2 (continued). Weldon Spring Site Disposal Cell Total Activity Final Estimate

**Frog Pond Work Zone**

In-situ soil	15722	2.02E+10	Site soils	2.10E+00	2.08E+00	1.17E-01	8.90E-02	2.21E-01	2.27E-01	9.92E-02	8.09E-02	9.92E-02	5.11E+00
Sediments	2291	2.95E+09	Site soils	3.06E-01	3.03E-01	1.71E-02	1.30E-02	3.21E-02	3.30E-02	1.44E-02	1.18E-02	1.44E-02	7.45E-01
Soil under sediments	2068	2.66E+09	Site soils	2.76E-01	2.73E-01	1.54E-02	1.17E-02	2.90E-02	2.98E-02	1.30E-02	1.06E-02	1.30E-02	6.72E-01
Frog Pond Outlet	473	6.09E+08	Site soils	6.32E-02	6.25E-02	3.53E-03	2.68E-03	6.64E-03	6.82E-03	2.98E-03	2.44E-03	2.98E-03	1.54E-01

**SWTP & Bldg 434 Work Zones**

Soil excavated from these zones	7047	9.07E+09	Site soils	9.41E-01	9.31E-01	5.26E-02	3.99E-02	9.89E-02	1.02E-01	4.44E-02	3.63E-02	4.44E-02	2.29E+00
Sediments - Train 1	155	1.99E+08	Site soils	2.07E-02	2.05E-02	1.16E-03	8.78E-04	2.17E-03	2.23E-03	9.78E-04	7.98E-04	9.78E-04	5.04E-02
Sediments - Train 2	52	6.69E+07	Site soils	6.95E-03	6.87E-03	3.88E-04	2.94E-04	7.30E-04	7.50E-04	3.28E-04	2.68E-04	3.28E-04	1.69E-02

**CSS Plant Work Zone**

In-situ soil	3638	4.68E+09	Site soils	4.86E-01	4.80E-01	2.72E-02	2.06E-02	5.10E-02	5.24E-02	2.29E-02	1.87E-02	2.29E-02	1.18E+00
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**ASA Work Zone**

In-situ soil	2081	2.68E+09	Site soils	2.78E-01	2.75E-01	1.55E-02	1.18E-02	2.92E-02	3.00E-02	1.31E-02	1.07E-02	1.31E-02	6.76E-01
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**Miscellaneous**

DHO decon pad recirculation pond	150	1.93E+08	Site soils	2.00E-02	1.98E-02	1.12E-03	8.49E-04	2.10E-03	2.16E-03	9.46E-04	7.72E-04	9.46E-04	4.87E-02
Soils around DHO decon pad	145	1.87E+08	Site soils	1.94E-02	1.91E-02	1.08E-03	8.21E-04	2.03E-03	2.09E-03	9.14E-04	7.47E-04	9.14E-04	4.71E-02
SWTP filter cake	213	2.74E+08	Site soils	2.85E-02	2.81E-02	1.59E-03	1.21E-03	2.99E-03	3.07E-03	1.34E-03	1.10E-03	1.34E-03	6.92E-02
Hot spots	11675	1.50E+10	Site soils	1.56E+00	1.54E+00	8.72E-02	6.61E-02	1.64E-01	1.68E-01	7.36E-02	6.01E-02	7.36E-02	3.79E+00
CMSA basin sediments	1985	2.55E+09	Site soils	2.65E-01	2.62E-01	1.48E-02	1.12E-02	2.78E-02	2.86E-02	1.25E-02	1.02E-02	1.25E-02	6.45E-01

**Cell Dimple Items**

Quarry soils, sediments, filter & media	1875	2.41E+09	Site soils	2.50E-01	2.48E-01	1.40E-02	1.06E-02	2.63E-02	2.70E-02	1.18E-02	9.65E-03	1.18E-02	6.09E-01
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<b>Totals</b>	1206028			2.95E+02	2.78E+02	1.38E+01	3.09E+01	5.12E+03	4.17E+02	1.77E+02	3.08E+01	2.04E+02	6.57E+03
% of Total				4.5%	4.2%	0.2%	0.5%	78.0%	6.4%	2.7%	0.5%	3.1%	

Summed for All Listed Nuclides = 6,57E+03 Ci

Notes:

<sup>a</sup>Waste streams with < 0.01 Ci not included.

<sup>b</sup>Source: *Chemical Plant Operable Unit Remedial Action Report* (DOE/OR/21548-909) Rev. A, September 2002, p. 13.

<sup>c</sup>mass (g) = volume (cy) x density (g/cy). See Density Calculations worksheet for raffinate, soil, and filter cake density calculations.

<sup>d</sup>See Radiological Profiles worksheet.

<sup>e</sup>Nuclide Activity (Ci) = mass (g) x Nuclide Activity Concentration (pCi/g) [from Radiological Profiles worksheet] x (1E-12 Ci/pCi).

<sup>f</sup>Rn-222 assumed to be in equilibrium with Ra-226 when Rn-222 concentration not reported in reference.

Table C-3. Contamination Profiles for the Various Waste Streams

Profile	Nuclide Activity Concentration (pCi/g)									Source
	U-238	U-234	U-235	Th-228	Th-230	Th-232	Ra-226	Ra-228	Rn-222 <sup>a</sup>	
Site soils	103.8	5.8	102.6	4.4	10.9	11.2	4.9	4	4.9	Table C-4
TSA bulk waste	198	198	9.1	96.4	328	25.7	109	96.4	109	Ref. 1 Tbl 2-2
Raffinate <sup>b,c</sup>	410	410	19	60	27000	320	840	61	988	Ref. 1 Tbl 2-10
Raffinate pit soils <sup>c,d</sup>	41	41	2	6	2700	32	84	6.1	98.8	Ref. 1 Tbl 2-2 footnote (e)
MSA waste piles <sup>c,e</sup>	Total surficial activity = 0.126 Ci									Ref. 1 Tbl 2-15
MSA containerized waste	5239	198	13	3	16	28	3	0	3	Ref. 1 Tbl 2-16
MSA WTP filter cake	90420	90420	4159	4.22	58.6	11.4	175	65	175	Ref. 1 Tbl 2-17
TSA filter cake <sup>2</sup>	1563	1563	73	0.8	58.6	11.4	6.3	5.3	6.3	Ref. 2 Tbl 3-3
TSA non-filter cake containerized waste <sup>2</sup>	3200	3200	150	96.4	23000	86000	108.8	96.4	108.8	Ref. 2 Tbl 3-5

References:

1. *Hazard Categorization for the Disposal Cell* (DOE/OR/21548-579) Rev. 2, September 1997
2. *Interim Facility Safety Documentation for the Temporary Storage Area* (DOE/OR/21548-513) Rev. 3, December 1997

Notes:

- <sup>a</sup>Rn-222 assumed to be in equilibrium with Ra-226 when Rn-222 concentration not reported in reference.
- <sup>b</sup>This is raffinate concentrations, not grout (i.e. first column of Table 2-10).
- <sup>c</sup>Reference provides either total U only, or U-238 only. Natural U ratios assumed to calculate isotopic i.e. U-238 = U-234 = total U/2.047, and U-235 = total U x (0.047/2.047).
- <sup>d</sup>Raffinate pit soils activity is assumed to be equivalent to 10% of raffinate activity.
- <sup>e</sup>MSA waste piles were building components surficially contaminated with uranium. Total (surficial) uranium activity is 0.126 Ci.

Table C-4. Site Soils Radiological Profile Calculation

Source <sup>a</sup>	Source Vol (cy)	Wtd Vol <sup>b</sup>	Activity Concentration (pCi/g)							
			U-238	U-235	U-234	Th-228	Th-230	Th-232	Ra-226	Ra-228
Imhoff Tank sludge Tbl 3-1	510	0.001972	843.0	35.9	831.1	5.6	26.0	5.2		
Weighted Activity (pCi/g) <sup>c</sup>			1.7	0.1	1.6	0.0	0.1	0.0		
Decon sump Tbl 3-2	56	0.000217	256.4	10.9	252.7					
Weighted Activity (pCi/g) <sup>c</sup>			0.1	0.0	0.1					
Bldg demo waste Tbl 3-3	73270	0.283327	250.0	15.0	246.0	2.7	25.7	28.0	3.4	
Weighted Activity (pCi/g) <sup>c</sup>			70.8	4.2	69.7	0.8	7.3	7.9	1.0	
Vicinity prop. soils Tbl 3-4	3640	0.014075	20.0	0.9	20.0	1.4	1.2	0.8	1.3	1.4
Weighted Activity (pCi/g) <sup>c</sup>			0.3	0.0	0.3	0.0	0.0	0.0	0.0	0.0
Bldg found. soils Tbl 3-5	170000	0.657371	42.3	2.0	42.3	5.5	5.4	5.0	6.0	6.0
Weighted Activity (pCi/g) <sup>c</sup>			27.8	1.3	27.8	3.6	3.5	3.3	3.9	3.9
Bldg found. conc. Tbl 3-6	11130	0.043038	73.3	3.4	73.3					
Weighted Activity (pCi/g) <sup>c</sup>			3.2	0.1	3.2					
Total waste volume (cy)	258606									
Sum of Weighted Activities			103.8	5.8	102.6	4.4	10.9	11.2	4.9	4.0

Notes:

<sup>a</sup>From *Interim Facility Safety Documentation for the Ash Pond Storage Area* (DOE/OR/21548-551) Rev. 1, December 1996

<sup>b</sup>Weighted volume = source volume / total waste volume

<sup>c</sup>Weighted Activity = weighted volume x activity concentration

Table C-5. Density Calculations

From *Hazard Categorization for the Chemical Stabilization and Solidification Facility* (DOE/OR/21548-570) Rev. 4, November 1997:

1. Section 2.1, p. 4: maximum sludge concentration (i.e. dry sludge solids in water) in raffinate pits before dredging = 27%
2. Section 2.1, p. 5: density of dry sludge solids = 1.8148 g/cu cm

$$\begin{aligned}\text{in-situ sludge density} &= [\text{fractional sludge concentration} \times \text{density of dry sludge solids}] + [\text{fractional water concentration} \times \text{density of water}] \\ &= [0.27 \times 1.8148] + [0.73 \times 1.00] \\ &= 1.22 \text{ g/cu cm} \\ &= 1.22 \text{ g/cu cm} \times [2.54 \text{ cm}/(1/12) \text{ ft}]^3 \times (27 \text{ cf/cy}) \\ &= 932754 \text{ g/cy} \\ &= 76 \text{ lb/cf}\end{aligned}$$

From e-mail from Serban Grozescu to David Fleming dated 9-9-02, subject "sludge":

$$\begin{aligned}\text{Soil density} &= 105 \text{ lb/cf} \\ &= 105 \text{ lb/cf} \times (454 \text{ g/lb}) \times (27 \text{ cf/cy}) \\ &= 1287090 \text{ g/cy}\end{aligned}$$

From *Interim Facility Safety Documentation for the Temporary Storage Area* (DOE/OR/21548-513) Rev. 3, December 1997, p. 10:

$$\begin{aligned}\text{Density of filter cake} &= 1.25 \text{ g/cu cm} \\ &= 1.25 \text{ g/cu cm} \times [2.54 \text{ cm}/(1/12) \text{ ft}]^3 \times (27 \text{ cf/cy}) \\ &= 955694 \text{ g/cy}\end{aligned}$$

**Appendix D**  
**Legal Description of DOE Property**

All of two parcels of land lying within St. Charles County, Missouri, comprising the Federal facility identified as the Weldon Spring Site Remedial Action Project, as shown on maps dated September 2002 prepared by St. Charles Engineering Surveying, Inc. and titled *Dept. of Energy, Weldon Spring Site Remedial Action Project, MO, Boundary Survey for WSSRAP Site*. The bearings and distances are based on the Missouri State Plane Coordinate System (NAD 83). Said parcels are more particularly described as follows:

**Parcel 1: Chemical Plant Site Proper**

Being a parcel of land lying within Section 31, Township 46 North, Range 3 East of the Fifth Principal Meridian in St. Charles County, Missouri. Beginning at a point identified by concrete Monument WS 1 set at Missouri State Plane Coordinates N=1,042,054.0867 and E=756,224.5074, said point also being located N 29°04'06" W for a distance of 1789.86 feet from the southeast corner of Section 31; thence along the following bearings and distances:

S 84°59'43" W for a distance of 511.53 feet to set Monument WS 2,  
S 77°59'16" W for a distance of 839.83 feet to set Monument WS 3,  
S 45°55'46" W for a distance of 894.25 feet to set Monument WS 4,  
S 89°59'22" W for a distance of 812.12 feet to set Monument WS 5,  
N 00°02'16" E for a distance of 749.79 feet to set Monument WS 6,  
N 70°25'08" W for a distance of 105.03 feet to set Monument WS 7,  
N 48°12'56" W for a distance of 618.60 feet to set Monument WS 8,  
N 04°34'10" W for a distance of 189.65 feet to set Monument WS 9,  
N 29°11'22" E for a distance of 384.67 feet to set Monument WS 10,  
N 05°22'06" W for a distance of 474.62 feet to a point that is offset 20 feet from set Monument WS 11,  
N 63°03'07" E for a distance of 485.67 feet to set Monument WS 12,  
N 00°04'28" W for a distance of 1355.33 feet to set Monument WS 13,  
S 81°55'03" E for a distance of 389.64 feet to set Monument WS 14,  
N 00°05'38" W for a distance of 109.85 feet to set Monument WS 15,  
N 89°54'31" E for a distance of 499.21 feet to set Monument WS 16,  
S 00°00'02" E for a distance of 93.62 feet to set Monument WS 17,  
N 86°28'56" E for a distance of 705.14 feet to set Monument WS 18,  
S 48°44'32" E for a distance of 828.97 feet to set Monument WS 19,

Thence along a curve to the right having a radius of 1,862.61 feet with a chord bearing and distance of S 36°47'33" E, 771.35 feet for an arc length of 776.97 feet, passing set Monument WS 20, to set Monument WS 21; thence,  
S 24°50'33" E for a distance of 1171.92 feet to set Monument WS 22,  
S 28°17'16" W for a distance of 801.90 feet to the point of beginning. Said parcel contains 219.50 acres, more or less.

## Parcel 2: Quarry Site

Being a parcel of land lying within Section 13, Township 45 North, Range 2 East of the Fifth Principal Meridian in St. Charles County, Missouri. Beginning at a point identified by concrete monument WQ 1 offset 5 feet from Missouri State Plane Coordinates N=1,029,029.9933 and E=747,488.7459, said point also being located S 39°59'07" W a distance of 14,950.05 feet from the northeast corner of Section 6; thence along the following bearings and distances:

S 83°48'22" E for a distance of 406.92 feet to an old iron pipe now designated as Monument WQ 2,  
S 88°30'22" E for a distance of 635.69 feet to an iron pipe at a point that is offset 5 feet from Monument WQ 3,  
S 15°08'38" W for a distance of 170.00 feet to an iron pipe at a point that is offset 5 feet from Monument WQ 4,  
S 39°49'38" W for a distance of 208.99 feet to set Monument WQ 5,  
S 72°20'38" W for a distance of 370.41 feet to set Monument WQ 6,  
S 70°27'38" W for a distance of 258.04 feet to set Monument WQ 7,  
N 27°15'22" W for a distance of 483.80 feet to Monument WQ 8 to be set,  
N 15°59'50" W for a distance of 159.83 feet to the point of beginning. Said parcel contains 8.66 acres, more or less.

The aggregate of the two parcels totals 228.16 acres, more or less.

EPA 50-59  
MDNR 25 & 50

## **Appendix E**

# **Institutional Control Documentation**

End of current text

## **E.1.0 Introduction**

Residual contamination and risks are described in Appendices A and B. Residual soil contamination at the Chemical Plant Area averages close to background levels. Cleanup confirmation results demonstrate that the As Low As Reasonably Achievable (ALARA) goals were met in 99.2% of the more than 52,000 samples which were analyzed. Exception areas are the Southeast Drainage and the Quarry, which were cleaned up to different standards based upon different exposure scenarios. The disposal cell itself contains the site contaminants. The Quarry has been back-filled with clean soil. Residual groundwater and spring water contamination at the Chemical Plant Area, the Southeast Drainage and the Quarry Area exceeds EPA's acceptable risk range based upon a residential exposure scenario.

Therefore, institutional controls (ICs) are needed to prevent residential use of shallow groundwater until the cleanup standards are met and to prevent residential development directly in the Southeast Drainage and on the DOE property at the Quarry and the Chemical Plant, where the institutional control must assure that the contents of the disposal cell are not disturbed. Primary institutional controls should be supplemented with additional controls to provide a layering affect.

The current land and groundwater use is protective of human health and the environment. Federal and state ownership of all the impacted properties has been in place since prior to the release of contaminants. Current federal and state missions on the impacted properties are not only compatible with the necessary restrictions, but provide additional protection. This additional protection derives from the recreational and light industrial missions and uses of the impacted state property and the remedial, recreational, educational and military training missions and uses of the federal properties. The ongoing remedial and educational missions of DOE include an on-site staff with physical field work (primarily groundwater monitoring and disposal cell maintenance). Light industrial use of the MoDOT property is also compatible with the needed restrictions. The two MDC residences along Highway D, which support their operations, are outside the groundwater institutional control boundary and they are connected to the public water supply. Impacted groundwater is not in use at all, except for monitoring purposes, and potable water is readily available and in use at all of the inhabited structures in the area.

Residential, commercial and industrial growth within St. Charles County make it more likely that the State-owned recreational lands will continue to experience increasing use and therefore increasing value as a recreational resource.

## **E.2.0 Types of Restrictions and Institutional Controls**

Institutional controls for the Weldon Spring Site are categorized as "necessary" or "additive." Necessary ICs are those which function as the primary means to restrict activities that have the potential to adversely impact the protectiveness of the remedies currently in place or to acquire the rights to conduct certain activities that maintain the protectiveness of the remedies. Additive ICs are those which function either as a secondary means of restriction or as a means to provide further protectiveness.

The necessary ICs address the following requirements:

- 1) A control to prevent any disturbance of the disposal cell, which encapsulates the waste, and the surrounding buffer zone which provides a vegetated area to prevent erosion that could threaten the integrity of the disposal cell.
- 2) A control to prevent the residential use of the contaminated shallow groundwater beneath the DOE property at the Chemical Plant Area until the groundwater meets unrestricted use standards.
- 3) A control to prevent residential development within the DOE Quarry due to the residual soil contamination within the cracks and fissures and the underlying contaminated shallow groundwater.
- 4) A control to prevent residential development within the Southeast Drainage due to the residual soil contamination and the underlying contaminated shallow groundwater.
- 5) A control to prevent the residential use of the contaminated shallow groundwater (including a 1000 foot hydraulic buffer zone) on Missouri Department of Conservation properties surrounding the DOE Chemical Plant until the groundwater meets unrestricted use standards.
- 6) A control to prevent the residential use of the contaminated shallow groundwater (including a 1000 foot hydraulic buffer zone) on Missouri Department of Transportation property adjacent to the DOE Chemical Plant until the groundwater meets unrestricted use standards.
- 7) A control to prevent the residential use of the contaminated shallow groundwater (including a 1000 foot hydraulic buffer zone) on U.S. Army property adjacent to the DOE Chemical Plant until the groundwater meets unrestricted use standards.
- 8) A control to prevent the residential use of the contaminated shallow groundwater (including a 1000 foot downgradient hydraulic buffer zone) on Missouri Department of Conservation property adjacent to the DOE Quarry until the groundwater meets unrestricted use standards.
- 9) A control to prevent disturbance of the area on Missouri Department of Conservation property south of the DOE Quarry and north of the slough, which is functioning as a groundwater reduction zone.
- 10) A requirement to solicit public involvement and provide opportunities for public education regarding the site cleanup and long term surveillance and maintenance activities.
- 11) A requirement to have access to Missouri Department of Conservation properties surrounding the DOE Chemical Plant and Quarry for the purposes of collecting groundwater and spring samples and drilling and/or abandoning groundwater monitoring wells.
- 12) A requirement to have access to U.S. Army property adjacent to the DOE Chemical Plant for the purposes of collecting groundwater samples and drilling and/or abandoning groundwater monitoring wells.

The additive ICs address the following enhancements:

- 1) An agreement with the Missouri Department of Natural Resources to allow vehicle access to the Katy Trail in order to increase DOE's efficiency in reaching several monitoring locations near the DOE Quarry and the Southeast Drainage.
- 2) An agreement with the Missouri Department of Conservation for maintenance of the Hamburg Trail section on DOE property.
- 3) An agreement with the U.S. Army allowing continued use and access to the DOE effluent discharge pipeline which runs from the DOE Chemical Plant to the Missouri River.
- 4) An agreement with the Missouri Department of Conservation allowing continued use and access to the DOE effluent discharge pipeline which runs from the DOE Chemical Plant to the Missouri River.
- 5) An agreement with the Missouri Department of Transportation providing for coordination with DOE regarding the repair or replacement of the culverts in the institutional control boundaries (Highway D twin culverts and Missouri State Route 94 culvert in the Southeast Drainage).
- 6) An agreement with a local entity providing use and maintenance of the DOE administrative building.

### **E.3.0 Necessary ICs**

Primary protection for human health and the environment, while residual contamination is above the standard for unrestricted use, is found in the Federal and State ownership of the affected properties. The cooperation between the Federal and State entities in placing appropriate controls and restrictions on their property is part of this plan and will be further documented in a Federal Facility Agreement.

Specifically;

Requirements 1, 2 and 3 are addressed via federal ownership of the DOE Chemical Plant and Quarry properties and a "Notation on Ownership Record" filed with the St. Charles County Recorder of Deeds.

Requirement 4 is addressed with an existing DOE easement granting rights in the Southeast Drainage. Although DOE's existing rights do not prevent residential development and use of groundwater, DOE's right to discharge from a process sewer line would legally have to be investigated by a future residential developer prior to construction and thus would provide DOE with the opportunity to enjoin construction activities.

Requirements 2 through 8 are addressed with the existing well drilling regulations in 10 CSR 23 of the Missouri code of regulations. These regulations require that well drillers case any well a minimum of 80 feet below the surface to assure well water does not draw on shallow groundwater, which is more likely to contain contaminants from a variety of sources. This protection also provides isolation from the DOE shallow groundwater contamination at the Chemical Plant Area and the Quarry.

Requirement 9, as well as all other requirements restricting State owned property, will be addressed by State participation in the Federal Facility Agreement which will include a commitment by the State to do its part in maintaining the protectiveness of the remedies.

Requirement 10 is currently addressed with the existing LTSM Plan, outlining opportunities for public involvement and the operation of the Interpretive Center.

Requirement 11 is addressed with the existing access agreement with MDC.

Requirement 12 is addressed with the existing Memorandum of Understanding with the U.S. Army.

It is, therefore, DOE's position that all necessary institutional controls are currently in place, with the exception of the Quarry reduction zone control and the control for the protection against access to Nitrates via a residential well drilled in the MDC property in the 1000 foot buffer zone. The Department expects that the formation of the Federal Facility Agreement between the parties will support these requirements effectively. However, DOE recognizes that in the case of institutional controls, it is prudent not to rely entirely on the one set of controls, but rather to layer controls as much as possible. Therefore, DOE is proposing to pursue additional institutional controls that will provide layers of protection.

### **E.4.0 Additive ICs**

Nitrate is one of the contaminants at the chemical plant area and is present in the shallow groundwater at concentrations which exceed the hazard index of one. Since this contaminant could have an immediate impact, primarily on infants, it is not prudent to rely solely on the Well Drillers Construction Code for adequate warning or protection against an illegally installed well. DOE will work with the State of Missouri to restrict the installation of residential wells within the 1000 foot buffer zone on MDC property using a recorded real estate easement as an additive institutional control. DOE will also work with MDC to provide additional layers of protection regarding restricting disturbance of the Quarry reduction zone, restricting residential development in the SED and providing notice regarding utility corridor disturbance at the Highway D and Missouri State Route 94 culvert locations.

DOE will also work to acquire real estate agreements with MoDOT to provide additional layers of protection regarding restricting shallow groundwater use and providing notice regarding utility corridor disturbance at the Highway D and Missouri State Route 94 culvert locations.

DOE will also work to acquire a real estate agreement with the Army to provide additional layers of protection regarding restricting shallow groundwater use. This restriction is likely to be doubly redundant due to groundwater restrictions the Army may self-impose as a component of its groundwater remedy.

### **E.5.0 Implementation Process**

The necessary institutional controls, Federal and State ownership, and the well drillers regulations, are already in place. These land owner commitments will be further enhanced

through inclusion in the new Federal Facility Agreement. The implementation strategy applies only to acquiring the additive ICs. DOE is implementing the following process to acquire real estate agreements with surrounding State and Federal land owners:

- 1) Initiate contact among real estate specialists within each agency.
- 2) Provide background information regarding the remedies and descriptions of the controls being sought.
- 3) Meet to discuss possible options regarding the imposition of the controls
- 4) Survey or otherwise develop legal descriptions of the areas sought for ICs.
- 5) Conduct appraisals if necessary.
- 6) Negotiate the specific terms of the real estate agreements.
- 7) Sign the agreements and file them with the St. Charles County Recorder as appropriate.

As of August 2004, DOE has completed the first four steps, however, additional meetings may be needed to complete step three. DOE is ready to complete the remaining steps pending the availability of State real estate officials. DOE is also negotiating the new Federal Facility Agreement language with EPA and MDNR and expects to have that document signed in very near future.

End of current text

**Appendix F**  
**Official Contact List**

## **Long-Term Stewardship Emergency Contact List**

### **Environmental Protection Agency**

Mr. Dan Wall  
Remedial Project Manager  
Superfund Division  
U.S. EPA Region 7  
901 North 5<sup>th</sup> Street  
Kansas City, Kansas 66101  
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### **Missouri Department of Natural Resources**

Mr. Robert Geller  
Chief, Federal Facilities Section  
Missouri Department of Natural Resources  
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### **St. Charles County**

Mr. Mike Duvall  
Director, Division of Environmental Services  
St. Charles County Government  
201 North Second Street, Suite 537  
St. Charles, MO 63301  
(636) 949-7583

### **Missouri Department of Health and Senior Services**

Mr. Gale Carlson  
Assessment Unit Chief  
Missouri Department of Health and Senior Services  
210 El Mercado  
Jefferson City, MO 65102  
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## *Long-Term Stewardship Emergency Notification List*

### **Weldon Spring Citizens Commission**

Helene Diller  
Administrative Assistant  
Weldon Spring Citizens Commission  
7295 Highway 94 South  
St. Charles, MO 63304  
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### **Francis Howell School District**

Mr. Chad Brady  
Chief Financial Officer  
Francis Howell School District  
4545 Central School Road  
St. Charles, MO 63304  
636-441-0088

### **Francis Howell High School**

Ms. Pam Sloan  
Principal  
Francis Howell High School  
7001 Highway 94 South  
St. Charles, MO 63304  
636-926-8773

### **Missouri Department of Conservation**

Mr. John Vogel  
August A. Busch Memorial Conservation Area  
2360 Highway D  
St. Charles, MO 63304  
636-300-1953 ext, 318

### **U.S. Department of Army**

Mr. Jerry Stubblefield, Facility Manager  
Weldon Spring Training Area  
7301 Highway 94 South  
St. Charles, Missouri 63304  
(636) 329-1200 x231

### **Missouri Department of Transportation**

Mr. Ed Warhol, Buildings and Grounds Specialist  
Missouri Department of Transportation  
1590 Woodlake Dr.  
Chesterfield, Missouri 63017  
(314) 340-4250

## *Institutional Control Annual Contact List*

### **Missouri Department of Conservation**

Mr. Joel Porath, Wildlife Regional Supervisor  
Missouri Department of Conservation  
August A. Busch Memorial Conservation Area  
2360 Highway D  
St. Charles, Missouri 63304  
(636) 441-4554

Mr. Don Schulteheinrich, Realty Specialist  
Missouri Department of Conservation  
P.O. Box 180  
Jefferson City, Missouri 65102  
(573) 751-4115

### **Missouri Department of Natural Resources**

Ms. Lori Huber, Parks Operation Officer  
Missouri Department of Natural Resources  
Division of State Parks  
P.O. Box 176  
Jefferson City, Missouri 65102  
(573) 751-5374

### **Missouri Department of Transportation**

Mr. Ed Warhol, Buildings and Grounds Specialist  
Missouri Department of Transportation  
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Mr. Don Wichern, Assistant District Engineer  
Missouri Department of Transportation  
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### **U.S. Department of Army**

Mr. Jerry Stubblefield, Facility Manager  
Weldon Spring Training Area  
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St. Charles, Missouri 63304  
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**Institutional Control Annual Contact List (continued)**

**St. Charles County**

Mr. Mike Duvall, Director  
Division of Environmental Services  
St. Charles County Government  
201 North Second Street, Suite 537  
St. Charles, Missouri 63301

**Appendix G**  
**Distribution List**

Except for individual stakeholders, this distribution list is composed of people representing organizations, which have expressed interest in site activities. When individual turnover occurs in these positions, DOE will revise the list to reflect the current holder of these positions. This type of revision is considered minor and not subject to review. All individuals on this list will receive notices of upcoming meetings or the availability of certain documents such as the annual site inspection report, the 5-Year Review and proposed revisions of this Long-Term Surveillance and Maintenance Plan. If a document is the subject of the notice, then those individuals without an asterisk will also receive the document with the notice.

## DISTRIBUTION LIST

### Stakeholders

Ms. Linda Covilli  
202 North Benton Avenue  
St. Charles, MO 63301

Mr. Karl Daubel  
15022 Willow Lake Court  
Chesterfield, MO 63017

Ms. Kay Drey  
515 West Point Avenue  
University City, MO 63130

Ms. Shannon Dougherty  
1 Strawgrass Court  
St. Charles, MO 63304

Ms. Clarissa Eaton  
3419 Kathleen Drive  
Festus, MO 63028

Dr. Michael Garvey  
208 Pitman Hill Road  
St. Charles, MO 63304

Dr. Dawn Garzon  
2748 Royal Valley Way  
O'Fallon, MO 63366

Ms. Mary Halliday  
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Defiance, MO 63341

### Stakeholders (continued)

Mr. John Hammerschmidt  
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P.O. Box 100  
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Mr. Brian Harcek  
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Ms. Cindy Hebenstreit  
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Mr. David Hosking\*  
4 Monet Court  
O'Fallon, MO 63366

Immaculate Conception Church of Dardenne  
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O'Fallon, MO 63366

Ms. Karen Johnson  
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Dr. Daniel W. McKeel, Jr.  
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## **Stakeholders** (continued)

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Lake St. Louis, MO 63367

John & Sharon Prokovich  
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Ms. Elsa Steward  
Great Rivers Environmental Law Center  
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St. Louis, MO 63103

Mr. Jack Strick  
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St. Charles, MO 63304

Ms. Rebecca Wright  
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## **Schools/Universities**

Mr. Chad Brady, Chief Financial Officer  
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4545 Central School Road  
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Dr. Daniel O'Donnell, Superintendent \*  
Francis Howell School District  
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7001 Highway 94 South  
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Julie Mueller, Chief Operations Officer  
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## **Media Contact List**

Mr. Shane Anthony  
St. Louis Post Dispatch  
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St. Charles, MO 63303-3255

Mr. Raymond Castile  
St. Charles Journal  
1529 Old Highway 94 South  
Suite 108  
St. Charles, MO 63303

Mr. Kevin Lavery  
KWMU  
8001 Natural Bridge Road  
St. Louis, MO 63121

Ms. Sara Shipley, Environmental Reporter  
St. Louis Post-Dispatch  
900 North Tucker Boulevard  
St. Louis, MO 63101

## **Municipalities**

The Honorable Paul Lambi, Mayor\*  
City of Wentzville  
310 W. Pearce Blvd.  
Wentzville, MO 63385

The Honorable Shawn Brown, Mayor\*  
City of St. Peters  
One St. Peters Centre Blvd.  
St. Peters, MO 63376

The Honorable Donald D. Lickliger,  
Mayor\*  
City of Weldon Spring  
711 Nancy Lane  
Weldon Spring, MO 63304

The Honorable Michael Potter, Mayor\*  
City of Lake St. Louis  
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Lake St. Louis, MO 63367

## **Municipalities** (continued)

The Honorable Robert Powers, Mayor\*  
City of Cottleville  
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The Honorable Paul F. Renaud, Mayor\*  
City of O'Fallon  
100 North Main Street  
O'Fallon, MO 63366

The Honorable Francis G. Slay, Mayor\*  
City of St. Louis  
City Hall, Room 200  
1200 Market Street  
St. Louis, MO 63103

The Honorable Patricia York, Mayor\*  
City of St. Charles  
St. Charles City Hall  
200 North Second Street  
St. Charles, MO 63301

The Honorable Joe Nolkemper, Mayor\*  
City of New Melle  
P.O. Box 114  
New Melle, MO 63365

Ms. Catherine Davis, Chairperson  
Weldon Spring Heights  
16 Weldon Spring Heights  
St. Charles, MO 63304

The Honorable Tom Diehl, Mayor\*  
City of Augusta  
P.O. Box 42  
Augusta, MO 63332

Ms. Virginia Dowden  
League of Chambers  
10 Hobie Cat Drive  
Defiance, MO 63341

## **St. Charles County Agencies/ Companies/Organizations**

The Honorable Joe Ortwerth, County  
Executive\*  
St. Charles County Courthouse  
100 North Third Street  
St. Charles, MO 63301

The Honorable Jeff Morrison, Councilman\*  
District #1, County Council  
St. Charles County Courthouse  
100 North Third Street  
St. Charles, MO 63301

The Honorable Joseph Brazil, Councilman\*  
District #2, County Council  
St. Charles County Courthouse  
100 North Third Street  
St. Charles, MO 63301

The Honorable Robert Schnur, Councilman\*  
District #3, County Council  
St. Charles County Courthouse  
100 North Third Street  
St. Charles, MO 63301

The Honorable Doug Funderburk,  
Councilman\*  
District #4, County Council  
St. Charles County Courthouse  
100 North Third Street  
St. Charles, MO 63301

The Honorable Sally A. Faith,  
Councilwoman \*  
District #5, County Council  
St. Charles County Courthouse  
100 North Third Street  
St. Charles, MO 63301

The Honorable Dan Foust, Councilman\*  
District #6, County Council  
St. Charles County Courthouse  
100 North Third Street  
St. Charles, MO 63301

**St. Charles County Agencies/  
Companies/Organizations** (continued)

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Mr. Gil Copley  
St. Charles County Department of Health  
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Mr. Barry Drucker, Environmental  
Sanitarian\*  
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St. Charles, MO 63301

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St. Charles County Parks and Recreation  
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Middendorf-Kredell Library  
Ms. Anna Sylvan, Documents Manager  
2750 Highway K  
O'Fallon, MO 63366

Mr. Steve Wilkins, Water Superintendent\*  
St. Charles County Water Department  
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Defiance, MO 63341

**St. Charles County Agencies/  
Companies/Organizations** (continued)

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Technical Consultant to Weldon Spring  
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Director\*  
University of Missouri-Cooperative  
Extension Service  
260 Brown Road  
St. Peters, MO 63376

Mr. Ron Molly, Manager\*  
Missouri American Water Company  
P.O. Box 355  
Cottleville, MO 63338-0355

Mr. Mike Dougherty\*  
Division Manager  
Alliance Water Resources  
410 East Elm St.  
O'Fallon, MO 63366

Tim Geraghty, P.E.  
Manager of Engineering and Operations  
Public Water Supply District #2  
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O'Fallon, MO 63366

**St. Louis County Agencies/  
Companies/Organizations** (continued)

The Honorable Charlie A. Dooley\*  
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St. Louis County  
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Clayton, MO 63105

Ms. Jacquelynn A. Meeks, Director\*  
Environmental Administration  
County Health Department  
111 South Meramec, 2nd Floor  
Clayton, MO 63105

Mr. Roland A. Biehl  
Environmental Associate Engineer  
Metropolitan St. Louis Sewer District  
10 East Grand Avenue  
St. Louis, MO 63147-2913

Director\*  
Environmental Engineering &  
Site Services Department  
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One Busch Place  
St. Louis, MO 63118

Mr. Chris Byrne\*  
Program Manager--Air, Land, and Water  
St. Louis County, Department of Health  
111 S. Meramec  
Clayton, MO 63105

Dr. Robert Nicolotti\*  
St. Louis County Health Department  
111 South Meremac  
Fifth Floor  
St. Louis, MO 63105

Mr. Frank Hartman\*  
Vice President for Production  
Missouri American Water Company  
535 North New Ballas Road  
St. Louis, MO 63141

**St. Louis County Agencies/  
Companies/Organizations** (continued)

Mr. Don Rea\*  
City of St. Louis Water Division  
Chain of Rocks Plant  
10450 Riverview Drive  
St. Louis, MO 63137

Mr. Gary Schmidt\*  
Hanson Professional Services  
4227 Earth City Expressway, Suite 130  
St. Louis, MO 63045

Mr. Curtis Skouby\*  
City of St. Louis Water Division  
Howard Bend Plant  
14769 Olive St.  
Chesterfield, MO 63017

Mr. Mike Zlatic\*  
St. Louis County Department of Health  
111 S. Meramec  
Clayton, MO 63105

Mr. Jack Fraenhoffer\*  
Director, Site Development & Community  
Relations  
Mallinckrodt Inc.  
P.O. Box 5439  
St. Louis, MO 63147

Dan Hoffman  
Pangea Group  
743 Spirit 40 Park Drive, Ste. 232  
Chesterfield, MO 63005

**State - Elected Officials**

The Honorable Bob Holden, Governor\*  
State of Missouri  
Missouri Capitol Building  
Room 216  
P.O. Box 720  
Jefferson City, MO 65102

## State - Elected Officials (continued)

The Honorable Jon Dolan  
D-2nd District  
Missouri State Senator  
State Capitol, Room 428  
201 West Capitol Avenue  
Jefferson City, MO 65101

The Honorable Charles Gross\*  
R-23rd District  
Missouri State Senator  
State Capitol, Room 227  
201 West Capitol Avenue  
Jefferson City, MO 65101

Ms. Vicky Huesemann\*  
Office of Senator Charles Gross  
415 N. 2<sup>nd</sup> Street  
St. Charles, MO 63301

The Honorable Sherman Parker\*  
R-12th District  
Missouri House of Representatives  
State Capitol, Room 130-DA  
201 West Capitol Avenue  
Jefferson City, MO 65101

The Honorable Scott T. Rupp\*  
R-13th District  
Missouri House of Representatives  
State Capitol, Room 304-B  
201 West Capitol Avenue  
Jefferson City, MO 65101

The Honorable Joe Smith\*  
R-14th District  
Missouri House of Representatives  
State Capitol, Room 413-B  
201 West Capitol Avenue  
Jefferson City, MO 65101

The Honorable Thomas S. Green\*  
D-15th District  
Missouri House of Representatives  
State Capitol, Room 102-BA  
201 West Capitol Avenue  
Jefferson City, MO 65101

## State - Elected Officials (continued)

The Honorable Carl L. Bearden\*  
R-16th District  
Missouri House of Representatives  
State Capitol, Room 306  
201 West Capitol Avenue  
Jefferson City, MO 65101

The Honorable Vicki Schneider\*  
R-17th District  
Missouri House of Representatives  
State Capitol, Room 406-B  
201 West Capitol Avenue  
Jefferson City, MO 65101

The Honorable Thomas D. Dempsey\*  
R-18th District  
State Capitol, Room 313-3  
201 West Capitol Avenue  
Jefferson City, MO 65101

The Honorable Kevin Threlkeld \*  
109th District  
Missouri House of Representatives  
State Capitol, Room 110B  
Jefferson City, MO 65101

## State Agencies

Mr. Steve Mahfood\*  
Director, Missouri Department of Natural Resources  
Post Office Box 176  
Jefferson City, MO 65102

Mr. Robert Geller  
Missouri Department of Natural Resources  
Post Office Box 176  
Jefferson City, MO 65102

Mr. Larry Erickson  
Missouri Department of Natural Resources  
Post Office Box 176  
Jefferson City, MO 65102

## State Agencies (continued)

Mr. Thomas Siegel  
Missouri Department of Natural Resources  
7545 S. Lindbergh Blvd., Suite 210  
St. Louis, MO 63125

Mr. Ben Moore  
Missouri Department of Natural Resources  
Post Office Box 176  
Jefferson City, MO 65102-0176

Ms. Mimi Garstang  
Director, Geological Survey and Resource  
Assessment Division  
Missouri Department of Natural Resources  
Post Office Box 250  
Rolla, MO 65402

Ms. Myrna Rueff  
Missouri Department of Natural Resources  
Division of Geological Land Services  
Post Office Box 250  
Rolla, MO 65402

Ms. Jennier Frazier, Real Estate Manager\*  
Missouri Department of Natural Resources  
Division of State Parks  
P.O. Box 176  
Jefferson City, Missouri 65102

Ms. Ramona Huckstep\*  
Community Relations Coordinator  
Missouri Department of Natural Resources  
P.O. Box 176  
Jefferson City, MO 65102

Ms. Lorna Domke  
Missouri Department of Conservation  
Post Office Box 180  
Jefferson City, MO 65102

Mr. John Hoskins  
Missouri Department of Natural Resources  
Post Office Box 176  
Jefferson City, MO 65102

## State Agencies (continued)

Mr. John Vogel  
August A. Busch Memorial Conservation  
Area  
2360 Highway D  
St. Charles, MO 63304

Mr. Marvin Boyer  
August A. Busch Memorial Conservation  
Area  
2360 Highway D  
St. Charles, MO 63304

Mr. Joel Porath\*  
August A. Busch Memorial Conservation  
Area  
2360 Highway D  
St. Charles, MO 63304

Ms. Denise Garnier, Asst. to the Director\*  
Missouri Department of Conservation  
Post Office Box 180  
Jefferson City, MO 65102-0180

Ms. Cynthia Green, Realty Specialist\*  
Missouri Department of Conservation  
P.O. Box 180  
Jefferson City, Missouri 65102

Mr. Lee Hughes\*  
Missouri Department of Conservation  
Post Office Box 180  
Jefferson City, MO 65102

Mr. Ed Warhol, Buildings and Grounds  
Specialist\*  
Missouri Department of Transportation  
1590 Woodlake Dr.  
Chesterfield, Missouri 63017

Mr. Don Wichern, Assistant District Engr.  
Missouri Department of Transportation  
1590 Woodlake Dr.  
Chesterfield, Missouri 63017

## **State Agencies** (continued)

Mr. Kevin Wideman  
Environmental Compliance Coordinator  
Missouri Department of Transportation  
Post Office Box 270  
Jefferson City, MO 65102

Mr. Gale Carlson  
Assessment Unit Chief  
Missouri Department of Health and Senior  
Services  
Post Office Box 570  
Jefferson City, MO 65102

Dr. Eduardo Simoes\*  
Epidemiology  
Missouri Department of Health and Senior  
Services  
P.O. Box 570  
Jefferson City, MO 65102

## **Federal - Elected Officials**

The Honorable Christopher S. Bond\*  
U.S. Senate  
274 Russell Office Building  
Washington, D.C. 20510

The Honorable James Talent\*  
U.S. Senate  
493 Russell Senate Office Building  
Washington, D.C. 20510

The Honorable Richard Gephardt\*  
U.S. House of Representatives  
1236 Longworth House Office Building  
Washington, D.C. 20515

Office of Congressman Richard Gephardt\*  
11140 South Towne Square, Room 201  
St. Louis, MO 63123

## **Federal - Elected Officials** (continued)

The Honorable Kenny Hulshof\*  
U.S. House of Representatives  
412 Cannon House Office Building  
Washington, D.C. 20515

Office of Congressman Kenny Hulshof\*  
516 Jefferson Street  
Washington, MO 63090

The Honorable W. Todd Akin\*  
U.S. House of Representatives  
117 Cannon House Office Building  
Washington, D.C. 20515

Mr. Jim Mitas  
Office of Congressman W. Todd Akin  
301 Sovereign Court, Suite 201  
Ballwin, MO 63011

The Honorable William L. Clay\*  
U.S. House of Representatives  
131 Cannon House Office Building  
Washington, D.C. 20515

Office of Congressman William L. Clay\*  
625 North Euclid St., Suite 200  
St. Louis, MO 63108

## **Federal Agencies**

Mr. James B. Gulliford\*  
Regional Administrator  
U.S. Environmental Protection Agency  
Region VII  
901 North 5th Street  
Kansas City, KS 66101

## **Federal Agencies** (continued)

Ms. Denise Jordan-Izaguire  
Sr. Regional Representative  
ATSDR c/o EPA Region VII  
500 State Avenue, Suite 182  
Kansas City, KS 66101

Mr. Dan Wall (2 copies)  
Superfund Division  
U.S. Environmental Protection Agency  
Region VII  
901 North 5th Street  
Kansas City, KS 66101

Mr. Bill McFarland  
Program and Project Management Division  
Attn: CENWK-PM-ES  
U.S. Army Corps of Engineers

Kansas City District  
601 East 12<sup>th</sup> Street  
Kansas City, MO 64106

Mr. Dave Nelson  
Program and Project Management Division  
Attn: CENWK-EC-ED  
U.S. Army Corps of Engineers  
Kansas City District  
601 East 12<sup>th</sup> Street  
Kansas City, MO 64106

Barry McFarland  
Regional Environmental Program  
Coordinator  
89th Regional Readiness Command  
3130 George Washington Blvd.  
Wichita, KS 67210-1598

Mr. Jerry Stubblefield  
89<sup>th</sup> Regional Readiness Command  
Facility Manager  
Weldon Spring Training Area  
7301 Highway 94 South  
St. Charles, MO 63304

## **Federal Agencies** (continued)

Mr. Adam Ross  
89<sup>th</sup> Regional Readiness Command  
7301 Highway 94 South  
St. Charles, MO 63304

Mr. Jeff Imes  
U.S. Geological Survey  
1400 Independence Road  
Mail Stop 200  
Rolla, MO 65402

Mr. Stephen McCracken, EM-90\*  
Assistant Manager for Environmental  
Management  
Oak Ridge Operations  
P.O. Box 2001  
Oak Ridge, TN 37831-8545

Mr. David Geiser, LM-40  
Office of Legacy Management  
U.S. Department of Energy  
1000 Independence Avenue S.W.  
Washington, D.C. 20585

Ms. Donna Bergman-Tabbert, LM-50  
Office of Legacy Management  
U.S. Department of Energy  
2597 B 3/4 Road  
Grand Junction, CO 81503

## **Internal**

Mr. Tom Pauling  
U.S. Department of Energy  
Weldon Spring Site  
7295 Highway 94 South  
St. Charles, MO 63304

Ms. Mary Picel  
EAD  
Argonne National Laboratory  
9700 South Cass Avenue, Building 900  
Argonne, IL 60439

Internal (continued)

Ms. Wendee Ryan  
S.M. Stoller, Inc.  
2597 B <sup>3</sup>/<sub>4</sub> Road  
Grand Junction, CO 81503

Administrative Record  
(1 Copy)

\*These individuals will only be sent notices of a meeting or the availability of a specific document. The document will be sent to them upon request.

**Appendix H**  
**Annual Inspection Checklist**

# Initial Annual Site Inspection Checklist

## Purpose of the Checklist

This checklist has been developed from the EPA guidance document *Comprehensive Five Year Review Guidance* dated June 2001 (OSWER No. 9355.7-03B-P) and from Section 2.3 of the *Long-Term Surveillance and Maintenance Plan for the Weldon Spring, Missouri, Site*. The checklist was modified to site-specific conditions as recommended by the guidance document. The checklist will be completed annually during the Weldon Spring Site annual surveillance and maintenance inspection. The checklist will also be used to assist in compiling information for the five-year review.

I. SITE INFORMATION	
<b>Site name:</b> DOE Weldon Spring Site	<b>Date(s) of inspection:</b>
<b>Location:</b> St. Charles, MO	<b>EPA ID:</b> MO6210022830
<b>Agencies accompanying DOE for portions of the annual inspection:</b> EPA, Region 7 MDNR Other (list) _____	<b>Weather:</b>
<b>Remedy Includes:</b> Disposal Cell Institutional controls Monitored Natural Attenuation Long Term Monitoring Other _____	
<b>Inspectors</b> _____	
<b>Participants</b> _____	
<b>Attachments:</b> Inspection team roster attached                      Site map attached	
II. INTERVIEWS (Check all that apply)	
<b>1. Local Site Manager</b> _____	
Name	Title
Date	
Interviewed    at site    at office    by phone    Phone no. _____	
Problems, suggestions;    Report attached _____	
_____	
<b>2. Environmental Data Manager</b> _____	
Name	Title
Date	
Interviewed    at site    at office    by phone    Phone no. _____	
Check to ensure that environmental data is reviewed and trended.	
Problems, suggestions;    Report attached _____	
_____	
<b>3. Other Staff (as applicable)</b> _____	
Name	Title
Date	
Interviewed    at site    at office    by phone    Phone no. _____	
Problems, suggestions;    Report attached _____	
_____	

4. **Local response agencies:** Contact to notify of annual inspection and to determine if there are any concerns or issues.

Agency: **St. Charles County Sheriff**

Contact \_\_\_\_\_ 636-949-3005  
Name Title Date Phone no.

Problems; suggestions; Report attached \_\_\_\_\_

Agency: **Cottleville Fire Department**

Contact \_\_\_\_\_ 636-447-6655  
Name Title Date Phone no.

Problems; suggestions; Report attached \_\_\_\_\_

Agency : **SimplexGrinnel (LCRS and Interpretive Center Alarm Company)**

Contact \_\_\_\_\_ 888-746-7539  
Name Title Date Phone no.

Problems; suggestions; Report attached \_\_\_\_\_

Agency **U.S. Geologic Survey National Earthquake Information Center**

Contact \_\_\_\_\_  
Name Title Date Phone no.

Problems; suggestions; Report attached \_\_\_\_\_

Agency \_\_\_\_\_

Contact \_\_\_\_\_  
Name Title Date Phone no.

Problems; suggestions; Report attached \_\_\_\_\_



2.	<b>Site-Specific Health and Safety Plan</b> Contingency plan/emergency response plan Remarks _____ _____	Readily available Readily available	Up to date Up to date	N/A N/A
3.	<b>Permits and Service Agreements</b> NPDES Permits MSD agreement and records Other permits _____ Remarks _____ _____	Readily available Readily available Readily available	Up to date Up to date Up to date	N/A N/A N/A
4.	<b>Groundwater Monitoring Records</b> Remarks _____ _____	Readily available	Up to date	N/A
5.	<b>Leachate Records</b> Remarks _____ _____	Readily available	Up to date	N/A
6.	<b>Interpretative Center Sign-In Logs</b> Remarks _____ _____	Readily available	Up to date	N/A
<b>IV. O&amp;M COSTS</b>				
1.	<b>Organization</b> DOE Other participants (list organizations) _____ _____	Contractor for DOE		
2.	<b>O&amp;M Cost Records</b> (This information may be reviewed and completed prior to the inspection)			
	Original O&M cost estimate _____		Breakdown attached	
	Total annual cost for prior federal fiscal year:			
	From _____	To _____	_____	Breakdown attached
	Date	Date	Total cost	
3.	<b>Unanticipated or Unusually High O&amp;M Costs During Review Period</b> Describe costs and reasons: _____ _____ _____ _____ _____			

**V. INSTITUTIONAL CONTROLS**

**Institutional Control (IC) Inspections**

**1. Land and Shallow Groundwater Use within the Chemical Plant Site and Quarry Property**

Inspect for indications of excavations into soil or bedrock and groundwater withdrawal or use in restricted areas. If any party has been granted use of portions of the Chemical Plant or Quarry area, inspect to ensure that land use is in compliance with the terms of the restrictions within the notation.

Note any observations: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**2. Groundwater Use in Areas Surrounding the Chemical Plant**

Groundwater use is restricted in areas. Inspect affected areas for evidence of groundwater or spring water use (Burgermeister Spring and Spring 6303). Inspect to ensure that land use continues to be in compliance with the terms of the license, easement, or permit and the restrictions contained therein.

Note any observations: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**3. Groundwater (Quarry)**

Groundwater use is restricted in areas. Inspect affected areas for evidence of groundwater withdrawal or use in the area of impact. Inspect to ensure that land use continues to be in compliance with the terms of the license and the restrictions contained therein.

Note any observations: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**4. Land Use in Quarry Area Reduction Zone**

A naturally occurring reduction zone exists in soil south of the Katy Trail and north of the Femme Osage Slough. Inspect for indications of excavations into soils and bedrock in the uranium reduction zone. Inspect to ensure that land use continues to be in compliance with the terms of the easement and the restrictions contained therein.

Note any observations: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**5. Southeast Drainage**

Check for indications of residential use or construction in the Southeast Drainage (200-foot-wide corridor), or other activity that would indicate nonrecreational use of the area. Check Springs 5303 and 5304 for residential, commercial, or agricultural use of spring water.

Note any observations: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

6. **Highway D Culvert**

Check for signs of disturbance of the affected region where the Frog Pong outlet culverts pass beneath Highway D and in the utility rights-of-way in the affected area.

Note any observations: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

7. **State Route 94 Culvert**

Check for signs of disturbance of the affected region where the culvert passes beneath State Route 94 and in the utility rights-of-way in the affected area.

Note any observations: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

8. **Pipeline from LCRS to Missouri River**

Inspect the entire length of the pipeline and outfall for any disturbances or maintenance needs.

Note any observations: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**C. Institutional Control Annual Contact Log**

In accordance with the LTS Plan, the following will be contacted to verify cognizance of institutional controls and real estate agreements. Fill in all that apply.

1. **Agency:** Missouri Department of Conservation **Contact Name:** Joel Porath, Wildlife Regional Supv.  
**Address:** August A. Busch Memorial Conservation Area, 2360 Highway D, St. Charles, MO 63304  
**Institutional Control and Real Estate Licenses to Verify:** Chemical Plant Groundwater Use Restriction, Quarry Area Groundwater Use Restriction, Quarry Reduction Zone Land Use Restriction, Southeast Drainage Residential Use Restriction, Missouri State Highway 94 Culvert, Hwy D Culverts, North Gate Access, Blanket Well Installation and Sampling Agreement, Effluent Discharge Pipeline, Hamburg Trail Use Agreement.

Contact Name Current    yes    no

Phone Number Current    yes    no    \_\_\_\_\_ (new phone no. if applicable)

Contact \_\_\_\_\_    \_\_\_\_\_    \_\_\_\_\_    636-441-4554  
Name (if different than above)    Title    Date    Phone no.

Problems; suggestions;    Report attached \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

2. **Agency:** Missouri Department of Conservation **Contact Name:** Don Schulteheinrich, Realty Spec.  
**Address:** P.O. Box 180, Jefferson City, MO 65102  
**Institutional Control and Real Estate Licenses to Verify:** See No. 1

Contact Name Current    yes    no

Phone Number Current    yes    no    \_\_\_\_\_ (new phone no. if applicable)

Contact \_\_\_\_\_    \_\_\_\_\_    \_\_\_\_\_    573-751-4115  
Name (if different than above)    Title    Date    Phone no.

Problems; suggestions;    Report attached \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

3. **Agency:** Missouri Department of Natural Resources **Contact Name:** Lori Huber, Parks Operation Off.  
**Address:** P.O. Box 176, Jefferson City, MO 65102  
**Institutional Controls and Real Estate Licenses to Verify:** Quarry Area Groundwater Use Restriction, Quarry Reduction Zone Land Use Restriction, Southeast Drainage Residential Use Restriction, Blanket Groundwater Well Sampling Access Agreement, Effluent Discharge Pipeline

Contact Name Current    yes    no

Phone Number Current    yes    no    \_\_\_\_\_ (new phone no. if applicable)

Contact \_\_\_\_\_    \_\_\_\_\_    \_\_\_\_\_    573-751-5374  
Name (if different than above)    Title    Date    Phone no.

Problems; suggestions;    Report attached \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

4. **Agency:** Missouri Department of Transportation **Contact Name:** Ed Warhol, Bldg and Grounds Spec.  
**Address:** 1590 Woodlake Dr., Chesterfield, MO 63017  
**Institutional Controls to and Real Estate Licenses to Verify:** Chemical Plant Groundwater Use Restriction, Missouri State Highway 94 Culvert, Highway D Culverts

Contact Name Current    yes    no

Phone Number Current    yes    no    \_\_\_\_\_ (new phone no. if applicable)

Contact \_\_\_\_\_    \_\_\_\_\_    \_\_\_\_\_    314-340-4250  
Name (if different than above)    Title    Date    Phone no.

Problems; suggestions;    Report attached \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



<b>General</b>		
1.	<b>Land Use Changes On Site</b> Remarks _____ _____ _____ _____	Yes      No
2.	<b>Land Use Changes Off Site</b> Remarks _____ _____ _____ _____	Yes      No
<b>VI. GENERAL SITE CONDITIONS</b>		
1.	<b>Roads</b> Location shown on site map Remarks _____ _____ _____ _____	Roads adequate
2.	<b>Vandalism</b> Location shown on site map Remarks _____ _____ _____ _____	No vandalism noted
3.	<b>Personal Injury Risks</b> Remarks _____ _____ _____	Housekeeping maintained
4.	<b>Site Markers (Four Information Plaques on Top of Cell, Historical Markers, and Other Information Markers)</b> Location shown on site map Remarks _____ _____ _____	Legible and Secure
5.	<b>Guard Rail Around Cell</b> Secure Remarks _____ _____ _____	Location shown on site map

6.	<b>Stairs to Top of Cell</b>	Location shown on site map	
	Stairs in good condition	Handrail stable and in good condition	
	Remarks _____		
	_____		
	_____		

7.	<b>Other Site Conditions:</b>		
	Remarks _____		
	_____		
	_____		
	_____		
	_____		

**VII. EROSION**

1.	<b>Chemical Plant Areas</b>	Location shown on site map	Erosion not evident
	Areal extent _____	Depth _____	
	Remarks _____		
	_____		
	_____		
	_____		

2.	<b>Quarry Area</b>	Location shown on site map	Erosion not evident
	Areal extent _____	Depth _____	
	Remarks _____		
	_____		
	_____		
	_____		



4.	<b>Wet Areas/Water Damage</b>	Wet areas/water damage not evident	
	Wet areas	Location shown on site map	Areal extent _____
	Ponding	Location shown on site map	Areal extent _____
	Seeps	Location shown on site map	Areal extent _____
	Remarks _____		
	_____		
	_____		
5.	<b>Toe/Apron Drains</b>	Proper drainage	Silting Evidence of erosion
	Remarks _____		
	_____		
	_____		
6.	<b>Slope Instability</b>	Slides	Location shown on site map No evidence of slope instability
	Areal extent _____		
	Remarks _____		
	_____		
7.	<b>Leachate Collection and Removal System</b>	Fence/Gates/Locks in good condition	
	Properly secured/locked	Functioning	Routinely sampled Good condition
	LCRS flow rates	Flow rate issues	Review data trending and Action Leakage Rate review
	<input type="checkbox"/> Sump Containment System (Burrito) flow rates		Burrito flow rate issues
	Alarm system functioning	Methane Detection System functioning	
	Compliance with MSD Agreement	Review shipping records	
	Check alarm records (note any issues)		
	Remarks _____		
	_____		
	_____		
	_____		
8.	<b>Condition of 300 Ft. Buffer Zone</b>	Evidence of erosion (shown on map)	
	Vegetative growth of woody species (show location)		
	Remarks _____		
	_____		
	_____		
9.	<b>Condition of Prairie</b>	Evidence of erosion (shown on map)	
	Vegetative growth of woody species (show location)		
	Remarks _____		
	_____		
	_____		
<b>IX. GROUNDWATER MONITORING</b>			
1.	<b>Disposal Cell Monitor Well Network</b>		
	Properly secured/locked	Functioning	Sampled in accordance with LTS&M Plan
	Good condition	Evidence of surface water infiltration at casing	Needs maintenance
	Proper ID on each well	Acceptable quality of data	
	Any issues with data trends (See Section II.2)		
	Remarks _____		
	_____		
	_____		
	_____		

2. **Chemical Plant Groundwater Monitor Well Network**  
 Properly secured/locked    Functioning    Sampled in accordance with LTS&M Plan  
 Good condition    Evidence of surface water infiltration at casing    Needs maintenance  
 Acceptable quality of data    Any issues with data trends (see Section II.2)  
 List wells checked by number (> 10% of wells) \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Remarks \_\_\_\_\_  
 \_\_\_\_\_

3. **Quarry Monitor Well Network**  
 Properly secured/locked    Functioning    Sampled in accordance with LTS&M Plan  
 Good condition    Evidence of surface water infiltration at casing    Needs maintenance  
 Acceptable quality of data    Any issues with data trends (see Section II.2)  
 List wells checked by number (> 10% of wells) \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Remarks \_\_\_\_\_  
 \_\_\_\_\_

**X. OVERALL OBSERVATIONS**

**A. Implementation of the Remedies**

Describe issues and observations relating to whether the remedies are effective and functioning as designed.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**B. Adequacy of O&M**

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedies.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**C. Early Indicators of Potential Remedy Problems**

Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs that suggest that the protectiveness of one or more of the remedies may be compromised in the future.

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**D. Opportunities for Optimization**

Describe possible opportunities for optimization in monitoring tasks or the operation of the remedies.

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ASA = Asbestos Storage Area  
CMSA = Construction Material Staging Area  
GCL = Geosynthetic Clay Liner  
MSA = Material Staging Area