



Department of Energy
Savannah River Operations Office
P.O. Box A
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AUG 11 2025

Ms. Susan B. Fulmer, P. G., Manager
Federal Remediation Section
Division of Site Assessment, Remediation and Revitalization
Bureau of Land and Waste Management
South Carolina Department of Environmental Services
2600 Bull Street
Columbia, South Carolina 29201

Mr. Jon Richards
Savannah River Site Remedial Project Manager
Superfund and Emergency Management Division
U. S. Environmental Protection Agency, Region 4
61 Forsyth Street, SW
Atlanta, Georgia 30303

Dear Ms. Fulmer and Mr. Richards:

SUBJECT: Addendum to the Site Evaluation Report for the Spill on 2/1/57 of Unknown of Seepage Basin Pipe Leak from 904-44G (NBN) (WSRC-RP-2003-4049, Revision 0, June 2003) (U) (SRNS-RP-2023-00689, Revision 1, July 2025) (Redline Pages and Clean Copy) and Savannah River Site's Responses to the Regulatory Comments on the Revision 0 Document, SEMS Number: 61

In accordance with the terms of the Federal Facility Agreement (FFA), the U. S. Department of Energy (DOE) is submitting the subject document for your review. The *Addendum to the Site Evaluation Report for the Spill on 2/1/57 of Unknown of Seepage Basin Pipe Leak from 904-44G (NBN) (WSRC-RP-2003-4049, Revision 0, June 2003) (U) SRNS-RP-2023-00689, (Revision 0, January 2025)* was submitted to the South Carolina Department of Environmental Services (SCDES) and U.S. Environmental Protection Agency (EPA) for review on March 13, 2025. The EPA's comments and SCDES' approval on the Revision 0 report were received on June 4, 2025, and, June 10, 2025, respectively. The draft responses to the regulatory comments were submitted for review via email on July 15, 2025. The EPA and SCDES stated that the draft responses were acceptable via their respective emails dated July 15, 2025, and July 28, 2025, respectively. The final responses were incorporated into the Redline Revision 1 pages and Clean Copy.

Please review the enclosures and provide your response within thirty (30) days of receipt. The effort and time that the EPA and the SCDES have given on the subject operable unit are greatly appreciated.

AUG 11 2025

Ms. Susan Fulmer
Mr. Jon Richards

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Questions from you or your staff may be directed to me at (803) 952-6211, or Karen Morrow, Director, Remediation, Deactivation, and Decommissioning, at (803) 952-7556.

Sincerely,

**MATTHEW
BAKER**

Digitally signed by
MATTHEW BAKER
Date: 2025.08.11 08:24:37
-04'00'

Matthew R. Baker
Acting FFA Remedial Project Manager
DOE-Savannah River Operations Office
Remediation, Deactivation, and Decommissioning Division

RDDD-25-154

Enclosures:

1. SRS Responses to the U.S. Environmental Protection Agency's Comments on the Addendum to the Site Evaluation Report for the Spill on 2/1/57 of Unknown of Seepage Basin Pipe Leak from 904-44G (NBN) (WSRC-RP-2003-4049, Revision 0, June 2003) (U) (SRNS-RP-2023-00689, Revision 0, January 2025) SEMS Number: 61
2. Addendum to the Site Evaluation Report for the Spill on 2/1/57 of Unknown of Seepage Basin Pipe Leak from 904-44G (NBN) (WSRC-RP-2003-4049, Revision 0, June 2003) (U) (SRNS-RP-2023-00689, Revision 1, July 2025) (Redline Pages) SEMS Number: 61
3. Addendum to the Site Evaluation Report for the Spill on 2/1/57 of Unknown of Seepage Basin Pipe Leak from 904-44G (NBN) (WSRC-RP-2003-4049, Revision 0, June 2003) (U) (SRNS-RP-2023-00689, Revision 1, July 2025) (Clean Copy) SEMS Number: 61

**SRS Responses to U.S. Environmental Protection Agency
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Comments received: June 10, 2025

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GENERAL COMMENTS

1. It is uncertain why the cutoff date for the conduct of the streamlined human health risk assessment (HHRA) was September, 2023, and the Report is dated 2025. Several iterations of the EPA Regional Screening Levels (RSLs) have been issued since then, and it is EPA's policy to use the most recent RSLs for risk assessment screening purposes. *Please update the Report to use the most recent (i.e., November 2024) RSLs to screen for constituents of potential concern (COPCs) and calculate risks, or explain why September 2023 values have been used.*

Response: Clarification.

The 904-44G spill release area was investigated in 2002 under the Site Evaluation (SE) Program. As discussed in Section I, Introduction, of the Addendum to the 2003 Site Evaluation Report, the Core Team met in May 2023 to discuss the status of the 904-44G spill release area and to reached agreement on the administrative path forward. To support the 2023 Core Team discussions, an updated risk assessment of the 2002 data was conducted using the most current RSL and PRG values (i.e., May 2023). The risk assessment concluded that only cesium-137 was a problem warranting action in surface soil.

In August 2023, a second meeting was held and the Core Team agreed that the 2023 risk assessment supported removal of the cesium-137 hot spot at location HSB1-04 as a maintenance action (hot spot excavation) was appropriate. The Core Team agreed that formal documentation of the risk assessment presented at the August 2023 meeting was warranted for inclusion in an addendum to the 2003 Site Evaluation Report. Therefore, a reevaluation of the risk assessment using 2024 RSL/PRG thresholds was not necessary to proceed with the action.

No change to the document is proposed.

Responsible Party: Sadika O'Quinn, (803)952-6697, sadika.oquinn@srs.gov

2. The streamlined HHRA does not provide any discussion of how 95% upper confidence limits on the arithmetic mean (95UCLs) were calculated nor does it mention the software used to calculate the 95UCLs. *Please revise the Report to discuss how the 95UCLs were calculated and present the software output in an appendix.*

Response: Agree.

The output files for the 904-44G 2002 data are not included in the report due to the volume of files that are generated for each individual analyte. Rather the results from the ProUCL software will be summarized in Table 1, which is attached at the end of this document.

For clarity, the following text will be added as the last sentence in the 1st paragraph in Section 4.0, Supplemental Data Evaluation: **“The output from the ProUCL software (version 5.2) (USEPA 2022) for each analyte is summarized in Table 1 for the 0 to 0.3 (0 to 1 ft) interval.”**

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USEPA, 2022. *Statistical Software ProUCL v5.2 for Environmental Applications for Data Sets With and Without Nondetect Observations*, United States Environmental Protection Agency

Responsible Party: Sadika O'Quinn, (803)952-6697, sadika.oquinn@srs.gov

3. Because only constituent maximum detections are shown in the screening step presented on Table 4, Human Health COPC Screening for 904-44G Spill Release Area (0-1 ft), there is no indication of whether the detection limits are sensitive enough to screen the COPCs. Therefore, *please revise the Report to include screening of non-detected constituents against the RSLs/Preliminary Remediation Goals (PRGs) shown on Table 4 and include the detection limits for each constituent.*

Response: Clarification.

The data evaluated in the addendum was collected in 2002 and reported in the 2003 Site Evaluation Report (SER). Appendix H of the SER evaluates the usability of the 2002 data and is provided to demonstrate the adequacy, completeness, and quality of the data. Appendix H of the SER confirms that the data is of sufficient quality to support risk management decisions, and a reevaluation of data quality is not needed to support the Addendum to the SER. As agreed to by the Core Team during project scoping, an updated risk assessment using the 2002 data maximum concentrations would be documented in the addendum. Please refer to SER Appendix H for more detail on data quality.

No change to the document is proposed.

Responsible Party: Sadika O'Quinn, (803)952-6697, sadika.oquinn@srs.gov

4. EPA prefers the evaluation of residential soil exposure to be conducted on the whole soil column in the event that during site redevelopment, subsurface soils are brought to the surface; however, only exposure to surface soils has been considered in this streamlined HHRA. Although it is understood that the site will remain industrial, and that residential exposure was only used for screening purposes, the maximum detection used for screening should be derived from data spanning the full soil column. Therefore, *please revise the Report to screen residential exposure using both surface and subsurface data.*

Response: Clarification.

Standard exposure scenarios for SRS human receptors were agreed to by the Core Team as documented in the *EC&ACP Regulatory Document Handbook, Protocol HH-2, "Human Health Receptors and Scenarios."* The human health receptors (future resident and industrial worker) evaluated in SRS risk assessments are assessed for exposure to contaminated surface soils (0 to 0.3 m [0 to 1 ft]) soils or sediments. Exposure to the all-depth soil interval, which includes subsurface soils, is evaluated for the industrial worker in the PTSM evaluation according to *Protocol HH-7, "Evaluation of Principal Threat Source Material (PTSM) at SRS Waste Units."* The PTSM evaluation determines if there is an unacceptable human health risk to contaminated soils at all depths should exposure occur. A PTSM evaluation for all depths (i.e., surface and

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subsurface soil) was completed for the 904-44G spill release area as presented in Table 7 and discussed in Section 4.2.1 of the Addendum to the 2003 Site Evaluation Report.

No change to the document is proposed.

Responsible Party: Sadika O'Quinn, (803)952-6697, sadika.oquinn@srs.gov

5. Lead was not evaluated properly. First, EPA's Office of Land and Emergency Management (OLEM) published *Updated Residential Soil Lead Guidance for CERCLA Sites and RCRA Corrective Action Facilities* in January 2024 to reduce the residential RSL to 200 milligrams per kilogram; if updated RSLs from November 2024 are used, then this screening level should also be updated. Second, as per EPA risk assessment methodology, a hazard quotient (HQ) for lead is not calculated (or added to other HQs to derive a hazard index (HI)). Rather, lead exposure is modeled using either the Integrated Exposure Uptake Biokinetic (IEUBK) model for residential child receptors or the Adult Lead (Soil) Methodology (ALM) for adult workers and compared to a target blood lead level. Therefore, *please revise the Report by removing the lead HQ calculation/addition to the HI and use the appropriate model(s) to evaluate potential lead exposure hazard.*

As previously discussed, the screening values (May 2023) used in this evaluation were the most up to date values at the time to support the 2023 Core Team discussions. The updated risk assessment concluded that lead (maximum concentration = 67.8 mg/kg) was not a constituent of concern. However, the updated screening value of 200 ppm for lead was checked, and there are no substantive changes that would impact the conclusion of the risk assessment.

No change to the document is proposed.

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6. The range of background concentrations for each considered constituent in the refinement step (Section 4.1.5) is not presented. *Please either revise the text to include this for each constituent or add it to Table 4, Human Health COPC Screening for 904-44G Spill Release Area (0-1 ft).*

Response: Clarification.

In accordance with the *EC&ACP Regulatory Document Handbook, Human Health Constituents of Potential Concern* (Protocol HH-4), maximum concentration are compared to two times the average background concentration from the approved *Background Soils Statistical Summary Report for the Savannah River Site* (ERD-EN-2005-0223, Rev. 1, Appendix B-1) or unit-specific background. As documented in the Addendum, Table 4, Footnote 3, the background screening values were obtained from the background summary report. Please refer to the background summary report for the range of background concentrations.

No change to the document is proposed.

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7. The point of compliance (POC) wells that are required for groundwater monitoring (see Section 2.2, Point of Compliance Well Clusters) and shown on the site figures are identified in the figure legends as “GSA Stations;” however, the abbreviation GSA is not defined in the figure legends or in the List of Acronyms and Abbreviations. *Please revise the Report to provide the definition of GSA.*

Response: Agree.

GSA is the acronym for the General Separations Area. This acronym will be added to the Acronyms and Abbreviations.

Responsible Party: Sadika O’Quinn, (803)952-6697, sadika.oquinn@srs.gov

8. It should be noted in the Uncertainty Analysis that the evaluation of noncarcinogenic hazard relative to the RSL, as shown in Section 4.1.4, Risk/Hazard Calculation, PDF Page 15 of 49 is overly conservative. The noncarcinogenic RSL is based on child exposure and may overestimate risks to an adult receptor. Therefore, *please revise the Report to discuss the potential for overestimating noncarcinogenic hazards by comparing the exposure point concentration to the RSL.*

Response: Clarification.

SRS concurs that the evaluation of noncarcinogenic hazard relative to the RSL is overly conservative. With the conservative results for the noncarcinogenic hazard evaluation indicating that human health is not an issue for those constituents, the potential for overestimating noncarcinogenic hazards would not impact the conclusion of the risk assessment.

No change to the document is proposed.

Responsible Party: Sadika O’Quinn, (803)952-6697, sadika.oquinn@srs.gov

SPECIFIC COMMENTS

1. **Section 4.1.5, Refinement of Constituents of Concern, PDF Page 22 of 49:** *Please refer to the Excess Lifetime Cancer Risk (ELCR) range of 1E-04 to 1E-06 as the “risk management range” (not the “target risk range”), and revise the text accordingly.*

Response: Clarification.

In terms of CERCLA, the Target Risk Range (TRR), also known as the acceptable risk range, is used as a benchmark to determine if remedial action is necessary. The TRR terminology is used consistently in SRS documents as reflected in approved document templates.

No change to the document is proposed.

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2. Table 4, Human Health COPC Screening for 904-44G Spill Release Area, PDF Page 45 of 49:

It is uncertain why some of the human health screening values shown on the table are “0.1 x RSL” and others are “RSL.” There is no accompanying text discussing this and the selection of the constituents that are 0.1 x RSL vs. RSL appears to be arbitrary. *Please revise the table notes to explain why this was performed, and note that EPA prefers screening to target hazard quotient (THQ) = 0.1 for sites with multiple contaminants of concern.*

Response: Agree.

Per the *EC&ACP Regulatory Document Handbook*, Protocol HH-4, ‘Human Health Constituents of Potential Concern’, if a substance causes both cancer and noncancer (systemic) effects, the more stringent criteria shall take precedence. This screening methodology was applied to the constituents screened in Table 4.

For clarity, Table 4, footnote 2 will be revised as follows:

“2 – Nonradiological RSLs are default residential soil values from the EPA Regional Screening Levels Table (carcinogen RSL =1; noncarcinogen RSL HQ =0.1), dated May 2023. If a substance causes both cancer and noncancer effect, the more stringent criteria is used. Radiological PRGs are used....”

Responsible Party: Sadika O’Quinn, (803)952-6697, sadika.oquinn@srs.gov

3. Table 5, Residential Risk/Hazard Estimate for 904-44G Spill Release Area (0-1 ft), PDF Page 46 of 49:

There are three issues with this table. First, arsenic and chromium also have noncarcinogenic properties that are not included in the HI. Second, the units of the exposure point concentration (EPC) are assumed to be mg/kg but are not shown on the table. Third, the RSL = 1 is not identified in the table notes. *Please revise the table to include arsenic and chromium in the HI calculation, and add the units of the EPCs and the identification of the RSLs in the table notes.*

Response: Agree.

Arsenic and chromium will be included in the HI calculation for the resident (Table 5) and industrial worker (Table 6). Additionally, the units for the EPC will be added to Tables 5 and 6. The updated tables are included at the end of this document. The inclusion of arsenic and chromium in the hazard calculation did not change the conclusion of the risk assessment that there are no noncarcinogen COCs identified for the 904-44G spill area.

Tables 5 and 6 do not include the distinction of cancerous (RSL=1) or noncancerous (0.1xRSL) since the table designates whether the contaminant falls under the cancerous (RSL) or noncancerous (0.1xRSL) category. Please see the response to Specific Comment #2. This information is provided in Table 4.

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Table 1. Maximum Detected Concentrations at 904-44G Spill Release Area (0-1 ft interval)

Sample Location	Analyte	Analytical Method	Qualifer	95% UCL	DISTR. Code	UCL Method	Max Result	Result Units	Top Sample Interval (ft)	Bottom Sample Interval (ft)
HSB1-14	ALUMINUM	EPA6010B		1.85E+04	N	1	2.86E+04	mg/kg	0	1
HSB1-19	ANTIMONY	EPA6010B	J	1.03E+00	N	2	1.75E+00	mg/kg	0	1
HSB1-09	ARSENIC	EPA6010B		3.42E+00	N	2	5.41E+00	mg/kg	0	1
HSB1-04	BARIIUM	EPA6010B		3.06E+01	N	1	4.72E+01	mg/kg	0	1
HSB1-15	CALCIUM	EPA6010B		6.19E+02	G	3	1.41E+03	mg/kg	0	1
HSB1-09	CHROMIUM	EPA6010B	J	2.40E+01	N	1	3.59E+01	mg/kg	0	1
HSB1-18	COBALT	EPA6010B	J	1.00E+00	N	2	1.44E+00	mg/kg	0	1
HSB1-09	COPPER	EPA6010B	J	3.80E+00	N	2	7.48E+00	mg/kg	0	1
HSB1-09	IRON	EPA6010B		1.81E+04	N	1	2.91E+04	mg/kg	0	1
HSB1-25	LEAD	EPA6010B		2.02E+01	N	1	6.78E+01	mg/kg	0	1
HSB1-04	MAGNESIUM	EPA6010B		3.24E+02	N	1	7.98E+02	mg/kg	0	1
HSB1-04	MANGANESE	EPA6010B		1.08E+02	N	1	2.87E+02	mg/kg	0	1
HSB1-13	NICKEL	EPA6010B	J	4.12E+00	N	2	6.14E+00	mg/kg	0	1
HSB1-04	POTASSIUM	EPA6010B		2.06E+02	G	3	5.29E+02	mg/kg	0	1
HSB1-09	VANADIUM	EPA6010B		4.12E+01	N	1	6.87E+01	mg/kg	0	1
HSB1-09	ZINC	EPA6010B		2.15E+01	N	1	3.57E+01	mg/kg	0	1
HSB1-13	MERCURY	EPA7471A		6.07E-02	N	1	1.32E-01	mg/kg	0	1
HSB1-05	DDE	EPA8081A		2.83E-03	X	2	4.92E-03	mg/kg	0	1
HSB1-05	DDT	EPA8081A		2.84E-03	X	2	2.16E-03	mg/kg	0	1
HSB1-25	1,1-DICHLOROETHYLENE	EPA8260B		--	--	--	1.22E-03	mg/kg	0	1
HSB1-26	DICHLOROMETHANE (METHYLENE CHLORIDE)	EPA8260B	J	6.04E-04	N	2	1.09E-03	mg/kg	0	1
HSB1-16	STYRENE	EPA8260B	J	2.40E-04	X	2	8.29E-04	mg/kg	0	1
HSB1-04	TOLUENE	EPA8260B	J	4.97E-04	N	2	9.38E-04	mg/kg	0	1
HSB1-26	BIS(2-ETHYLHEXYL)PHTHALATE (DEHP)	EPA8270C		3.71E-01	N	2	1.22E+00	mg/kg	0	1
HSB1-04	STRONTIUM-90	RADA-004	J	--	--	--	1.70E+00	pCi/g	0	1
HSB1-04	URANIUM-233/234	RADA-011		--	--	--	9.22E-01	pCi/g	0	1
HSB1-04	URANIUM-238	RADA-011		6.28E-01	N	2	1.22E+00	pCi/g	0	1
HSB1-23	ACTINIUM-228	RADA-013		1.75E+00	N	1	3.73E+00	pCi/g	0	1
HSB1-04	BISMUTH-214	RADA-013		5.04E-01	N	2	9.77E-01	pCi/g	0	1
HSB1-04	CESIUM-137 ¹	RADA-013		6.96E-01	L	9	1.00E+01	pCi/g	0	1
HSB1-23	LEAD-212	RADA-013		1.49E+00	N	1	3.22E+00	pCi/g	0	1
HSB1-04	LEAD-214	RADA-013		6.28E-01	N	2	1.06E+00	pCi/g	0	1
HSB1-04	POTASSIUM-40	RADA-013		2.98E+00	G	3	9.52E+00	pCi/g	0	1
HSB1-23	THALLIUM-208	RADA-013		5.73E-01	N	1	1.24E+00	pCi/g	0	1

Distribution Code:	UCL Method Code: (as determined by ProUCL)
N - Normal Distribution G - Gamma Distribution	1) Student's t UCL 2) Kaplan-Meier (KM) t UCL
L - Lognormal Distribution X - Non-Parameric	3) Adjusted Gamma UCL 4) KM Approximate Gamma UCL
	5) Hall's Bootstrap UCL 6) Land's H-Statistic (H) UCL
	7) KM Adjusted Gamma UCL 8) 95% Approximate Gamma UCL
	9) 95% H-UCL (KM-log)

1 - Cs137 95% UCL EPC calculated using data that has been decay-adjusted to September 1, 2023 as shown in Table 3.

UCL = Upper Confidence Limit

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Table 5. Residential Risk/Hazard Estimate for 904-44G Spill Release Area (0-1 ft)

Analyte ¹	Exposure Point Concentration ²	Residential RSL/PRG ³	Residential Hazard Estimate (HQ) ⁴ (unitless)	Residential Risk Estimate ⁵ (unitless)	COC? ⁶
<i>Noncarcinogenic Hazard Estimate (mg/kg)</i>					
ALUMINUM	1.85E+04	7.7E+04	2.41E-01	--	NO
ARSENIC	3.42E+00	3.5E+01	9.77E-02	--	NO
CHROMIUM ⁷	2.40E+01	2.3E+02	1.04E-01	--	NO
IRON	1.81E+04	5.5E+04	3.28E-01	--	NO
LEAD	2.02E+01	4.0E+02	5.05E-02	--	NO
MANGANESE	1.08E+02	1.8E+03	5.99E-02	--	NO
VANADIUM	4.12E+01	3.9E+02	1.06E-01	--	NO
Total Media Hazard Index (HI) =			9.87E-01		
<i>Carcinogenic Risk Estimate (mg/kg)</i>					
ARSENIC	3.42E+00	6.8E-01	--	5.0E-06	YES
CHROMIUM ⁷	2.40E+01	3.0E-01	--	8.0E-05	YES
Total Chemical Risk =				8.5E-05	
CESIUM-137 ⁸	6.96E-01	6.1E-02	--	1.2E-05	YES
POTASSIUM-40	2.98E+00	1.4E-01	--	2.1E-05	YES
THORIUM-232 ⁹	1.75E+00	9.9E-03	--	1.8E-04	YES
URANIUM-238 ¹⁰	6.28E-01	1.3E-02	--	5.0E-05	YES
Total Radiological Risk =				2.6E-04	
Total Media Risk =				3.4E-04	

1 - Analytes that were identified as COPCs in Table 4.

2 - EPC = exposure point concentration: this preliminary calculation is the lesser of the 95%UCL and the maximum detected concentration.

3 - Nonradiological RSLs are default residential soil values from the *EPA Regional Screening Levels* table, dated May 2023. Radiological PRGs are site-specific soil values derived from the *EPA Preliminary Remediation Goals* calculator website (dated February 2023) and eliminating the fruit and vegetable consumption pathway.

4 - Residential Hazard Estimate (HQ) = EPC / RSL

5 - Residential Risk Estimate = (EPC / RSL or PRG) x 1E-06

6 - For noncarcinogens, no constituents are identified as COCs if the total media hazard index < 1. For carcinogens, constituents are identified as COCs if the individual cancer risk ≥ 1E-06.

7 - Chemical analysis for total chromium. A total chromium RSL is not available; hexavalent chromium RSL conservatively used to calculate risk.

8 - Cs137 95%UCL EPC calculated using data that has been decay-adjusted to September 1, 2023 as shown in Table 3.

9 - Th232 was not measured directly in the laboratory. Ac228, Pb212 and Tl208 are daughter products of Th232 and can be used to estimate its activity since these isotopes are in secular equilibrium. The highest detected activity in the entire decay chain was used in this calculation. The 95%UCL is calculated from the Ac228 analytical results. A separate risk calculation for daughter products is not provided since they are considered in the Th232 PRG for the entire chain.

10 - U238 was only measured in 1 sample and a 95%UCL could not be calculated. U234, Pb214 and Bi214 are daughter products of U238 and can be used to estimate its activity since these isotopes are in secular equilibrium. The highest detected activity in the entire decay chain was used in this calculation. The 95%UCL is calculated from the Pb214 analytical results. A separate risk calculation for daughter products is not provided since they are considered in the U238 PRG for the entire chain.

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Addendum to the Site Evaluation Report for the Spill on 2/1/57 of Unknown of Seepage Basin Pipe
Leak from 904-44G (NBN) (WSRC-RP-2003-4049, Revision 0, June 2003) (U)
SRNS-RP-2023-00689, Revision 0, January 2025

Comments received: June 10, 2025

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Table 6. Industrial Risk/Hazard Estimate for 904-44G Spill Release Area (0-1 ft)

Analyte ¹	Exposure Point Concentration ²	Industrial RSL/PRG ³	Industrial Hazard Estimate (HQ) ⁴ (unitless)	Industrial Risk Estimate ⁵ (unitless)	COC? ⁶
<i>Noncarcinogenic Hazard Estimate (mg/kg)</i>					
ALUMINUM	1.85E+04	1.1E+06	1.68E-02	--	NO
ARSENIC	3.42E+00	4.8E+02	7.13E-03	--	NO
CHROMIUM ⁷	2.40E+01	3.5E+03	6.85E-03	--	NO
IRON	1.81E+04	8.2E+05	2.20E-02	--	NO
LEAD	2.02E+01	8.0E+02	2.52E-02	--	NO
MANGANESE	1.08E+02	2.6E+04	4.15E-03	--	NO
VANADIUM	4.12E+01	5.8E+03	7.10E-03	--	NO
Total Media Hazard Index (HI) =			8.93E-02		
<i>Carcinogenic Risk Estimate (mg/kg)</i>					
ARSENIC	3.42E+00	3.0E+00	--	1.1E-06	YES
CHROMIUM ⁷	2.40E+01	6.3E+00	--	3.8E-06	YES
Total Chemical Risk =				4.9E-06	
CESIUM-137 ⁸	6.96E-01	9.1E-02	--	7.7E-06	YES
POTASSIUM-40	2.98E+00	2.2E-01	--	1.4E-05	YES
THORIUM-232 ⁹	1.75E+00	1.5E-02	--	1.1E-04	YES
URANIUM-238 ¹⁰	6.28E-01	2.0E-02	--	3.1E-05	YES
Total Radiological Risk =				1.7E-04	
Total Media Risk =				1.7E-04	

1 - Analytes that were identified as COPCs in Table 4.

2 - EPC = exposure point concentration is the lesser of the 95%UCL and the maximum detected concentration.

3 - Nonradiological RSLs are default industrial worker soil values from the *EPA Regional Screening Levels Table*, dated May 2023. Radiological PRGs are default industrial worker soil values from the *EPA Preliminary Remediation Goals Table*, dated February 2023.

4 - Industrial Hazard Estimate (HQ) = EPC / RSL

5 - Industrial Risk Estimate = (EPC / RSL or PRG) x 1E-06

6 - For noncarcinogens, no constituents are identified as COCs if the total media hazard index < 1. For carcinogens, constituents are identified as COCs if the individual cancer risk ≥ 1E-06.

7 - Chemical analysis for total chromium. A total chromium RSL is not available; hexavalent chromium RSL conservatively used to calculate risk.

8 - Cs137 95%UCL EPC calculated using data that has been decay-adjusted to September 1, 2023 as shown in Table 3.

9 - Th232 was not measured directly in the laboratory. Ac228, Pb212 and Tl208 are daughter products of Th232 and can be used to estimate its activity since these isotopes are in secular equilibrium. The highest detected activity in the entire decay chain was used in this calculation. The 95%UCL is calculated from the Ac228 analytical results. A separate risk calculation for daughter products is not provided since they are considered in the Th232 PRG for the entire decay chain.

10 - U238 was only measured in 1 sample and a 95%UCL could not be calculated. U234, Pb214 and Bi214 are daughter products of U238 and can be used to estimate its activity since these isotopes are in secular equilibrium. The highest detected activity in the entire decay chain was used in this calculation. The 95%UCL is calculated from the Pb214 analytical results. A separate risk calculation for daughter products is not provided since they are considered in the U238 PRG for the entire decay chain.