



ADDENDUM

Purpose and Background:

The purpose of this addendum is to provide the remedial project managers with additional risk estimates and Preliminary Remediation Goals (PRG) to be considered in the removal action at the Highway 24 Mill Site (Site). On January 13, 2025, the EPA released an updated Toxicological Review for inorganic arsenic in the Integrated Risk Information System (IRIS) <https://iris.epa.gov/document/&deid=363892>. The IRIS program is a primary source of toxicity values that are used to evaluate the potential risks from environmental exposures.

The new toxicity values for arsenic were published after the Streamlined Risk Evaluation and PRG memorandums for the site were finalized in December 2024, but prior to any removal action occurring at the site. This addendum includes the estimated risk and PRGs based on use of the updated IRIS toxicity values for arsenic.

Why the change?

The EPA IRIS program conducts reviews of contaminants and their potential to cause health effects periodically as new information and science becomes available. The update to the arsenic toxicity values was a years-long process that went through multiple layers of review and public comment. The Streamlined Risk Evaluation and PRG memos were written for the site based on the previous toxicity values that were published in 1995. Additional research about the potential for arsenic to cause health effects has increased knowledge over the last 30 years, and the updated toxicity values reflect that increase. This process is not unique for arsenic. The IRIS program conducts these periodic toxicity reviews for several contaminants that people are exposed to in the environment as new science becomes available. To learn more about the IRIS program, please visit <https://www.epa.gov/iris/basic-information-about-integrated-risk-information-system>.

What changed?

Toxicity values can be derived for both cancer and non-cancer endpoints when the available information on a particular contaminant suggests that exposure can lead to cancer and non-cancer health effects. Arsenic is, and has been, considered a known carcinogen. In addition, arsenic has been known to cause non-cancer health effects, such as skin disorders. The updated Toxicological Review for arsenic changed both cancer and non-cancer values, indicating that arsenic is more toxic than previously thought. The net effect of this change is the PRGs will be lower than those that were previously calculated at the Site (approximately 21 times lower for cancer and five times lower for non-cancer health effects).



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What has not changed?

The updated risks and preliminary remediation goals included in this addendum were derived in the same way as described in the previously published memos. The concentrations of arsenic in all samples remains the same. The arsenic concentrations in soil ranged from 15 mg/kg to 140 mg/kg with an average concentration of 53.8 mg/kg. The bioaccessibility of arsenic from the site soil samples ranged from 7-18% with a mean in vitro bioaccessibility assay (IVBA) of 13%. This corresponds to a calculated relative bioavailability (RBA) of 8-17%. The 95% upper confidence level (UCL) on the mean IVBA results is 14.3% with a corresponding RBA of 14%. Due to the large variance in the IVBA results, the 95% UCL value of 14.3% RBA was selected for use in the PRG calculation for arsenic. It should also be noted that the change in arsenic toxicity values does not impact the PRGs that were calculated for lead.

Arsenic Preliminary Remediation Goals

The site wide RBA and updated toxicity values were entered into the Regional Screening Level calculator and the residential PRGs are shown in the table below. The estimated screening levels are based on the target cancer risk level of 1E-04, a non-cancer Hazard Quotient (HQ) of 1, and a non-cancer HQ of 3 (Table 1). Table 2 shows the comparison with the updated PRGs for each property.

Table 1. Updated Site Soil Screening Level Values for Arsenic (RBA set at 14.3%)

Arsenic Screening Level based on Non-cancer Child HQ = 1 (in mg/kg)	Arsenic Screening Level based on Non-cancer Child HQ = 3 (in mg/kg)	Arsenic Screening Level based on Cancer Risk at 1E-04 Theoretical Risk (in mg/kg)
22 (91)	66 (26)	9.6 (93)

NOTE: number in (**Bold**) indicates the number of lots with sample data exceeding the site screening level value for arsenic. RBA = Relative Bioavailability, HQ = Hazard Quotient, mg/kg = milligram per kilogram

How can this change impact the Site?

The PRGs based on the updated IRIS values indicate that removal action may be necessary at many more properties than previously calculated. Ninety-one properties exceed a target hazard quotient of one. Twenty-six properties exceed a HQ of three and all properties exceed a cancer risk level of 1 in 10,000.



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Final cleanup levels consider not only risk-based PRGs to assess protectiveness, but also the remaining eight criteria contained in the National Contingency Plan (40 CFR 300.430(e)(9)). Background concentrations of arsenic in soil, both geogenic and anthropogenic, may also impact achievable cleanup levels. Therefore, the final selected cleanup level may differ from the PRGs documented in this addendum.

Table 2. Decision Unit Comparison of Selected PRGs

Decision Unit	Concentration (mg/kg)	HQ = 1	HQ= 3	CR 1E-04
GS-01A-00-01	29	X		X
GS-01A-01-06	24	X		X
GS-01B-00-01	46	X		X
GS-01B-01-06	25	X		X
GS-01E-00-01	54	X		X
GS-01E-01-06	45	X		X
GS-02A-00-01	24	X		X
GS-02A-01-06	26	X		X
GS-02B-00-01	43	X		X
GS-02B-01-06	37	X		X
GS-02E-00-01	47	X		X
GS-02E-01-06	79	X	X	X
GS-03A-00-01	35	X		X
GS-03A-01-06	41	X		X
GS-03B-00-01	44	X		X
GS-03B-01-06	56	X		X
GS-03E-00-01	44	X		X
GS-03E-01-06	48	X		X
GS-04A-00-01	30	X		X
GS-04A-01-06	27	X		X
GS-04B-00-01	75	X	X	X
GS-04B-01-06	55	X		X
GS-04E-00-01	46	X		X
GS-04E-01-06	44	X		X
GS-05A-00-01	31	X		X
GS-05A-01-06	24	X		X
GS-05B-00-01	53	X		X
GS-05B-01-06	55	X		X
GS-06A-00-01	19			X
GS-06A-01-06	17			X
GS-06B-00-01	50	X		X
GS-06B-01-06	56	X		X
GS-06E-00-01	37	X		X
GS-06E-01-06	70	X	X	X
GS-07A-00-01	22	X		X
GS-07A-01-06	19			X
GS-07A1-00-01	22	X		X



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GS-07A1-01-06	18			X
GS-07B-00-01	56	X		X
GS-07B-01-06	60	X		X
GS-07E-00-01	54	X		X
GS-07E-01-06	110	X	X	X
GS-08A-00-01	25	X		X
GS-08A-01-06	15			X
GS-08B-00-01	79	X	X	X
GS-08B-01-06	97	X	X	X
GS-08E-00-01	48	X		X
GS-08E-01-06	68	X	X	X
GS-09B-00-01	79	X	X	X
GS-09B-01-06	99	X	X	X
GS-09E-00-01	53	X		X
GS-09E-01-06	79	X	X	X
GS-10B-00-01	99	X	X	X
GS-10B-01-06	110	X	X	X
GS-11B-00-01	96	X	X	X
GS-11B-01-06	120	X	X	X
GS-11D-00-01	25	X		X
GS-11D-01-06	33	X		X
GS-12B-00-01	63	X		X
GS-12B-01-06	92	X	X	X
GS-12D-00-01	37	X		X
GS-12D-01-06	43	X		X
GS-13B-00-01	60	X		X
GS-13B-01-06	72	X	X	X
GS-13D-00-01	61	X		X
GS-13D-01-06	52	X		X
GS-14B-00-01	72	X	X	X
GS-14B-01-06	73	X	X	X
GS-14D-00-01	42	X		X
GS-14D-01-06	42	X		X
GS-15B-00-01	44	X		X
GS-15B-01-06	56	X		X
GS-16B-00-01	46	X		X
GS-16B-01-06	65	X		X
GS-16B1-00-01	35	X		X
GS-16B1-01-06	24	X		X
GS-16D-00-01	35	X		X
GS-16D-01-06	37	X		X
GS-17B-00-01	47	X		X
GS-17B-01-06	42	X		X
GS-17D-00-01	44	X		X
GS-17D-01-06	55	X		X
GS-18B-00-01	32	X		X
GS-18B-01-06	36	X		X



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GS-18D-00-01	43	X		X
GS-18D-01-06	28	X		X
GS-19B-00-01	49	X		X
GS-19B-01-06	30	X		X
GS-20B-00-01	24	X		X
GS-20B-01-06	33	X		X
GS-20D-00-01	48	X		X
GS-20D-01-06	34	X		X
GS-21D-00-01	65	X		X
GS-21D-01-06	140	X	X	X
GS-22D-00-01	49	X		X
GS-22D-01-06	47	X		X
GS-23D-00-01	58	X		X
GS-23D-01-06	48	X		X
GS-24D-00-01	48	X		X
GS-24D-01-06	46	X		X
GS-25D-00-01	50	X		X
GS-25D-01-06	58	X		X
GS-26D-00-01	47	X		X
GS-26D-01-06	46	X		X
GS-27D-00-01	30	X		X
GS-27D-01-06	33	X		X
GS-28D-00-01	49	X		X
GS-28D-01-06	58	X		X
GS-29A4-00-01	94	X	X	X
GS-29A4-01-06	100	X	X	X
GS-29A5-00-01	95	X	X	X
GS-29A5-01-06	110	X	X	X
GS-29D-00-01	78	X	X	X
GS-29D-01-06	79	X	X	X
GS-30A-00-01	92	X	X	X
GS-30A-01-06	110	X	X	X
GS-31A-00-01	100	X	X	X
GS-31A-01-06	100	X	X	X
GS-32A-00-01	88	X	X	X
GS-32A-01-06	96	X	X	X
GS-33A-00-01	83	X	X	X
GS-33A-01-06	96	X	X	X
GS-34A-00-01	89	X	X	X
GS-34A-01-06	77	X	X	X
GS-35A-00-01	74	X	X	X
GS-35A-01-06	75	X	X	X
GS-36A-00-01	96	X	X	X
GS-36A-01-06	80	X	X	X
GS-37A-00-01	61	X		X
GS-37A-01-06	65	X		X
GS-38A-00-01	50	X		X



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GS-38A-01-06	63	X		X
GS-39A-00-01	84	X	X	X
GS-39A-01-06	84	X	X	X
GS-40A-00-01	64	X		X
GS-40A-01-06	58	X		X
GS-40A1-00-01	38	X		X
GS-40A1-01-06	43	X		X
GS-40A2-00-01	34	X		X
GS-40A2-01-06	29	X		X
GS-41A-00-01	35	X		X
GS-41A-01-06	32	X		X
GS-42A-00-01	29	X		X
GS-42A-01-06	29	X		X
GS-43A-00-01	29	X		X
GS-43A-01-06	28	X		X
GS-44A-00-01	21			X
GS-44A-01-06	20			X
GS-45A-00-01	32	X		X
GS-45A-01-06	23	X		X
GS-46A-00-01	31	X		X
GS-46A-01-06	29	X		X
GS-47A-00-01	27	X		X
GS-47A-01-06	26	X		X
GS-CA01-00-01	64	X		X
GS-CA01-01-06	60	X		X
GS-CA02-00-01	51	X		X
GS-CA02-01-06	39	X		X
GS-CA03-00-01	62	X		X
GS-CA03-01-06	52	X		X
GS-CA04-00-01	84	X	X	X
GS-CA04-01-06	63	X		X
GS-CA05-00-01	69	X	X	X
GS-CA05-01-06	67	X	X	X
GS-CA06-00-01	69	X	X	X
GS-CA06-01-06	60	X		X
GS-CA07-00-01	23	X		X
GS-CA07-01-06	21			X
GS-CA08-00-01	44	X		X
GS-CA08-01-06	42	X		X
GS-CA09-00-01	51	X		X
GS-CA09-01-06	47	X		X
GS-CA10-00-01	48	X		X
GS-CA10-01-06	49	X		X
GS-CA11-00-01	54	X		X
GS-CA11-01-06	68	X	X	X
GS-CA12-00-01	69	X	X	X
GS-CA12-01-06	57	X		X



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GS-CA13-00-01	70	X	X	X
GS-CA13-01-06	46	X		X
GS-CA14-00-01	59	X		X
GS-CA14-01-06	27	X		X
GS-HOUSE-00-01	49	X		X
GS-HOUSE-01-06	52	X		X
GS-VACANT-00-01	60	X		X
GS-VACANT-01-06	58	X		X

NOTE: For lots with duplicate or triplicate samples the maximum value is shown, lot nomenclature: GS=Garner Street, DU= decision unit, sample depth at intervals of 00-01 or 01-06 inches, mg/kg = milligram per kilogram, HQ = Hazard Quotient, CR = Cancer risk, 1E-04 = 1 excess cancer case per 10,000 people exposed