



# MEMORANDUM

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Re: Highway 24 Mill - Streamlined Risk Evaluation

Date: December 18, 2024

## Purpose and Background:

This document is a streamlined risk evaluation on the Highway 24 Mill site located in Colorado Springs (Site). The Site consists of a mobile home park constructed adjacent to a former tailings pile associated with the Golden Cycle Mill and Gold Hill Tailings Site. The evaluation was conducted using the latest EPA guidance on risk assessment.

In 2022, the Superfund Technical Assessment and Response Team (START) collected samples from the mobile home park to assess the levels of metals in soil. Soil from 93 lots within the mobile home park (including 77 mobile homes, 1 office, 14 common areas, and one vacant lot) were collected at two depths: the top 0 to 1 inches and 1 to 6 inches below ground surface. Samples were analyzed for 23 Target Analyte List metals including mercury (Tetra Tech 2024).

In 2023, the START team conducted additional sampling to assess whether historical contamination from the former Golden Cycle Mill smokestack emissions and associated tailings pile extend beyond the mobile home park and to identify background levels of metals for the site. Sampling activities were conducted at 32 locations within 3 miles of the former Golden Cycle Mill. Samples were taken at 31 public properties (such as parks, open spaces, and recreational areas) and one commercial property. Soil samples were collected at two depth intervals: the top 0 to 1 inches and 1 to 6 inches below ground surface. Samples were analyzed for total recoverable metals (TRM) and mercury (Tetra Tech 2024).

## What we did:

TEEO assessed the reasonable maximum exposure to residents of the mobile home park based on the measured concentrations in soil. We identified contaminants of potential concern (COPC) based on a hazard quotient of 0.1 and cancer risk level of  $1E-06$  or 1 excess cancer case per million people exposed. We identified 12 contaminants of potential concern based on the maximum measured concentration of each metal throughout the Site (Table 1). We identified arsenic, lead, cadmium, and manganese as the primary contaminants of concern.



# MEMORANDUM

We then calculated non-cancer and cancer risks based on default residential assumptions<sup>1,2</sup>, maximum measured concentrations for each COPC at each site, a blood lead concentration of 3.5 micrograms per deciliter (ug/dL) or 5 ug/dL, and a site-wide relative bioavailability of 15.5% (lead) and 14.3% (arsenic) (CDPHE 2024). Table 2 shows the number of lots impacted by contaminant and Table 3 displays results by site.

## Conclusions:

- We identified 68 lots where 5% or more of children were predicted to have blood lead levels of 3.5 ug/dL or higher based on the measured lead concentrations in soil. We identified 20 lots where more than 5% of children would have predicted blood lead levels of 5 ug/dL or higher.
- We identified one parcel (GS-06B) with a total hazard quotient greater than three for cadmium.
- We identified six lots for arsenic, five lots for cadmium, and four lots for manganese that exceed a hazard quotient of one.
- The excess risk of developing cancer exceeded 1E-6 at all 93 lots but did not exceed 1E-4 at any lot.

Table 1. COPC selection

Metal	Max Measured Concentration (mg/kg)	Screening Level (mg/kg, THQ=0.1, CR=1E-6)	COPC?
Aluminum	11000	7700	YES
Antimony	2.6	3.1	no
Arsenic	140	0.68	YES
Barium	330	1500	no
Beryllium	1.8	16	no
Cadmium	23	0.71	YES
Calcium	32000	NE	no
Chromium(VI)	48	0.3	YES
Cobalt	15	2.3	YES
Copper	240	310	no
Iron	46000	5500	YES
Lead	700	100	YES
Magnesium	8900	NE	no
Manganese	4800	180	YES
Mercury	0.66	1.1	no
Nickel	140	140	YES
Potassium	4600	NE	no
Selenium	4.6	39	no
Silver	4.5	39	no
Sodium	1000	NE	no
Thallium	0.62	0.078	YES
Vanadium	49	39	YES
Zinc	5500	2300	YES

Note: mg/kg = milligram per kilogram, THQ = total hazard quotient based on EPA regional screening levels, CR = cancer risk, COPC = contaminant of potential concern, NE = not evaluated/no screening level available

<sup>1</sup> EPA RSL: <https://www.epa.gov/risk/regional-screening-levels-rsls-equations>

<sup>2</sup> EPA IEUBK: <https://www.epa.gov/superfund/lead-superfund-sites-software-and-users-manuals>



# MEMORANDUM

**Table 2. Summary of hazard characterization by contaminant**

Metal	# lots > THQ=1	# lots > THQ=3	# lots > CR=1E-6	# lots > 5% above 3.5 ug/dL cutoff	# lots > 5% above 5 ug/dL cutoff
Aluminum	0	-	-	-	-
Arsenic	6	-	93	-	-
Cadmium	5	1	0	-	-
Chromium(III)	0	-	-	-	-
Cobalt	0	-	0	-	-
Iron	0	-	-	-	-
Lead	-	-	-	68	20
Manganese	4	-	-	-	-
Nickel	0	-	0	-	-
Thallium	0	-	-	-	-
Vanadium	0	-	-	-	-
Zinc	0	-	-	-	-

Note: Due to lack of evidence that sources of hexavalent chromium exist at this site, hazard characterization for chromium was based on trivalent chromium. THQ = total hazard quotient, CR = cancer risk, - = not applicable, blood lead cutoff = 3.5 micrograms per deciliter

**Table 3. Hazard characterization by lot**

Lot	Arsenic THQ	Arsenic CR	Cadmium HQ	Percent of Population exceeding Blood Lead Level of 3.5 ug/dL	Percent of Population exceeding Blood Lead Level of 5 ug/dL	Manganese HQ
GS-01A	0.2	1.4E-05	0.2	3.6	0.5	0.3
GS-01B	0.4	2.3E-05	0.2	10.5	2.2	0.3
GS-01E	0.5	2.7E-05	0.3	7.2	1.3	0.5
GS-02A	0.2	1.3E-05	0.2	3.6	0.5	0.4
GS-02B	0.4	2.1E-05	0.2	4.5	0.7	0.5
GS-02E	0.7	3.9E-05	0.4	14.3	3.4	0.6
GS-03A	0.4	2.0E-05	0.2	4.1	0.6	0.4
GS-03B	0.5	2.8E-05	0.4	11.2	2.4	0.6
GS-03E	0.4	2.4E-05	0.4	13.5	3.1	0.5
GS-04A	0.3	1.5E-05	0.4	3.2	0.5	0.4
GS-04B	0.7	3.7E-05	1.4	11.9	2.6	1.7
GS-04E	0.4	2.3E-05	0.3	7.8	1.5	0.5
GS-05A	0.3	1.5E-05	0.2	4.1	0.6	0.3
GS-05B	0.5	2.7E-05	2.2	7.8	1.5	2.6
GS-06A	0.2	9.4E-06	0.1	1.9	0.2	0.3
GS-06B	0.5	2.8E-05	3.2	9.8	2	2.2
GS-06E	0.6	3.4E-05	0.4	12.7	2.9	0.6



# MEMORANDUM

Lot	Arsenic THQ	Arsenic CR	Cadmium HQ	Percent of Population exceeding Blood Lead Level of 3.5 ug/dL	Percent of Population exceeding Blood Lead Level of 5 ug/dL	Manganese HQ
GS-07A	0.2	1.1E-05	0.1	2.5	0.3	0.3
GS-07A1	0.2	1.1E-05	0.1	2.8	0.4	0.2
GS-07B	0.6	3.0E-05	2.2	11.9	2.6	2.0
GS-07E	1.0	5.4E-05	0.4	27.6	8.8	0.7
GS-08A	0.2	1.2E-05	0.2	3.2	0.5	0.3
GS-08B	0.9	4.8E-05	1.0	30.4	10.2	1.0
GS-08E	0.6	3.4E-05	0.4	11.2	2.4	0.5
GS-09B	0.9	4.9E-05	0.8	30.4	10.2	0.8
GS-09E	0.7	3.9E-05	0.6	23.0	6.7	0.7
GS-10B	1.0	5.4E-05	0.9	41.4	16.5	0.8
GS-11B	1.1	5.9E-05	0.7	44.1	18.2	0.6
GS-11D	0.3	1.6E-05	0.2	5.5	0.9	0.3
GS-12B	0.8	4.5E-05	0.5	40.5	15.9	0.5
GS-12D	0.4	2.1E-05	0.6	11.2	2.4	0.5
GS-13B	0.7	3.5E-05	0.4	33.2	11.6	0.5
GS-13D	0.6	3.0E-05	0.3	15.1	3.7	0.4
GS-14B	0.7	3.6E-05	0.4	30.4	10.2	0.4
GS-14D	0.4	2.1E-05	0.2	8.4	1.6	0.4
GS-15B	0.5	2.8E-05	0.6	9.8	2.0	0.8
GS-16B	0.6	3.2E-05	0.3	11.9	2.6	0.5
GS-16B1	0.3	1.7E-05	0.2	2.9	0.4	0.3
GS-16D	0.3	1.8E-05	0.3	7.2	1.3	0.3
GS-17B	0.4	2.3E-05	0.2	6.0	1.0	0.4
GS-17D	0.5	2.7E-05	0.4	9.1	1.8	0.6
GS-18B	0.3	1.8E-05	0.2	4.1	0.6	0.4
GS-18D	0.4	2.1E-05	0.3	6.6	1.2	0.4
GS-19B	0.5	2.4E-05	0.3	7.8	1.5	0.4
GS-20B	0.3	1.6E-05	0.3	4.5	0.7	0.4
GS-20D	0.4	2.4E-05	0.4	8.4	1.6	0.5
GS-21D	1.3	6.9E-05	0.4	46.6	20.0	0.6
GS-22D	0.5	2.4E-05	0.3	7.2	1.3	0.5
GS-23D	0.5	2.9E-05	0.4	12.7	2.9	0.6
GS-24D	0.4	2.4E-05	0.3	7.2	1.3	0.5
GS-25D	0.5	2.9E-05	0.4	11.2	2.4	0.5
GS-26D	0.4	2.3E-05	0.3	8.4	1.6	0.5
GS-27D	0.3	1.6E-05	0.2	4.5	0.7	0.4
GS-28D	0.5	2.9E-05	0.4	8.4	1.6	0.5
GS-29A4	0.9	4.9E-05	0.3	44.1	18.2	0.3



# MEMORANDUM

Lot	Arsenic THQ	Arsenic CR	Cadmium HQ	Percent of Population exceeding Blood Lead Level of 3.5 ug/dL	Percent of Population exceeding Blood Lead Level of 5 ug/dL	Manganese HQ
GS-29A5	1.0	5.4E-05	0.4	51.6	23.6	0.4
GS-29D	0.7	3.9E-05	0.6	22.1	6.3	0.7
GS-30A	1.0	5.4E-05	0.3	47.5	20.6	0.4
GS-31A	0.9	4.9E-05	0.4	47.5	20.6	0.4
GS-32A	0.9	4.7E-05	0.3	40.5	15.9	0.4
GS-33A	0.9	4.7E-05	0.4	29.5	9.7	0.5
GS-34A	0.8	4.4E-05	0.5	29.5	9.7	0.4
GS-35A	0.7	3.7E-05	0.4	22.1	6.3	0.5
GS-36A	0.9	4.7E-05	0.4	20.3	5.6	0.5
GS-37A	0.6	3.2E-05	0.5	13.5	3.1	0.7
GS-38A	0.6	3.1E-05	0.8	11.2	2.4	0.6
GS-39A	0.8	4.1E-05	1.1	13.5	3.1	0.7
GS-40A	0.6	3.2E-05	0.7	8.4	1.6	0.7
GS-40A1	0.4	2.1E-05	0.2	3.6	0.5	0.4
GS-40A2	0.3	1.7E-05	0.2	2.2	0.3	0.4
GS-41A	0.3	1.7E-05	0.2	2.4	0.3	0.4
GS-42A	0.3	1.4E-05	0.2	1.9	0.2	0.4
GS-43A	0.3	1.4E-05	0.2	1.7	0.2	0.4
GS-44A	0.2	1.0E-05	0.1	1.6	0.2	0.3
GS-45A	0.3	1.6E-05	0.2	2.7	0.4	0.4
GS-46A	0.3	1.6E-05	0.2	2.7	0.4	0.4
GS-47A	0.3	1.3E-05	0.2	3.0	0.4	0.3
GS-CA01	0.6	3.2E-05	0.3	15.1	3.7	0.4
GS-CA02	0.5	2.5E-05	0.2	6.0	1.0	0.5
GS-CA03	0.6	3.1E-05	0.3	10.5	2.2	0.5
GS-CA04	0.8	4.1E-05	0.4	16.8	4.2	0.5
GS-CA05	0.6	3.4E-05	0.3	10.5	2.2	0.5
GS-CA06	0.6	3.4E-05	0.3	7.8	1.5	0.5
GS-CA07	0.2	1.1E-05	0.1	2.3	0.3	0.3
GS-CA08	0.4	2.2E-05	0.3	7.8	1.5	0.5
GS-CA09	0.5	2.5E-05	0.3	6.6	1.2	0.6
GS-CA10	0.5	2.4E-05	0.3	9.1	1.8	0.5
GS-CA11	0.6	3.4E-05	0.3	15.9	4.0	0.6
GS-CA12	0.6	3.4E-05	0.3	9.1	1.8	0.5
GS-CA13	0.6	3.4E-05	0.3	7.8	1.5	0.5
GS-CA14	0.5	2.9E-05	0.1	2.6	0.4	0.3
GS-HOUSE	0.5	2.6E-05	0.3	9.1	1.8	0.5
GS-VACANT	0.6	3.0E-05	0.3	9.1	1.8	0.5



## MEMORANDUM

Note: THQ = total hazard quotient, CR = cancer risk, - = not applicable, lead results display predicted percentage of a population expected to have a blood lead level greater than either 3.5 or 5 micrograms per deciliter (ug/dL)



# MEMORANDUM

## References

Colorado Department of Public Health and Environment (CDPHE). 2024. Highway 24 Mill Preliminary Remediation Goals. December.

Tetra Tech 2024. Site Inspection Report, Highway 24 Mill Site, Colorado Springs, El Paso County, Colorado. U.S. EPA ID NO. CON000821192. June.