

# TECHNICAL MEMORANDUM

To:	Nevada Environmental Response Trust
Cc:	Nevada Division of Environmental Protection United States Environmental Protection Agency
From:	Chris Hayes
Date:	September 29, 2022
Subject:	Unit 4 Source Area In-Situ Bioremediation Treatability Study Monthly Progress Report

At the direction of the Nevada Environmental Response Trust (NERT or Trust), Tetra Tech, Inc. (Tetra Tech) has prepared this memorandum to summarize Tetra Tech's progress during August 2022 toward successfully implementing the Unit 4 Source Area In-Situ Bioremediation (ISB) Treatability Study.

#### Task Progress Update: August 2022

#### Task M21 - Unit 4 Source Area ISB Treatability Study

- Current Status
  - Phase 2 of the Unit 4 Source Area ISB Treatability Study is ongoing. A layout map and construction details of all injection, monitoring, and extraction wells are provided on **Figure 1** and **Table 1**. The following activities were completed during August 2022 as part of the design and implementation:
    - An automatic gate was installed to allow access to and from the Unit 4 Source Area ISB
      Treatability Study area and Process Tank T-201. The gate installation was completed on
      August 25, 2022.
    - The injection/extraction system initial startup and testing phase was completed in August 2022.
- Schedule and Progress Updates
  - The treatability study is ready to begin with extraction operations in Area 1 for initial total dissolved solids reduction and injection/extraction operations associated with implementation of ISB in Area 2.
     Startup is scheduled to begin in September 2022, although timing is dependent on the readiness status of the Chromium Treatment Subsystem.
- Health and Safety
  - There were no health and safety incidents related to Task M21 during August 2022.

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#### CERTIFICATION

#### Unit 4 Source Area In-Situ Bioremediation Treatability Study Monthly Progress Report

#### Nevada Environmental Response Trust Site (Former Tronox LLC Site) Henderson, Nevada

#### Nevada Environmental Response Trust (NERT) Representative Certification

I certify that this document and all attachments submitted to the Division were prepared at the request of, or under the direction or supervision of NERT. Based on my own involvement and/or my inquiry of the person or persons who manage the systems(s) or those directly responsible for gathering the information or preparing the document, or the immediate supervisor of such person(s), the information submitted and provided herein is, to the best of my knowledge and belief, true, accurate, and complete in all material respects.

Office of the Nevada Environmental Response Trust

Le Petomane XXVII, not individually, but solely in its representative capacity as the Nevada Environmental Response Trust Trustee

Signature: but solely in his representative capacity as President of  Name: Jay A. Steinberg, not individually, but solely in Environmental Response Trust Trustee		
Title: Solely as President and not individually		
Company: Le Petomane XXVII, Inc., not individually Environmental Response Trust Trustee	, but solely in its representative capac	ity as the Nevada
Date: 9/29/22		

#### **CERTIFICATION**

I hereby certify that I am responsible for the services described in this document and for the preparation of this document. The services described in this document have been prepared in a manner consistent with the current standards of the profession, and to the best of my knowledge, comply with all applicable federal, state, and local statutes, regulations, and ordinances. I hereby certify that all laboratory analytical data was generated by a laboratory certified by the NDEP for each constituent and media presented herein.

**Description of Services Provided:** Prepared Unit 4 Source Area In-Situ Bioremediation Treatability Study Monthly Progress Report.

David S. Wilson, CEM

Principal Engineer Tetra Tech, Inc.

Nevada CEM Certificate Number: 2385

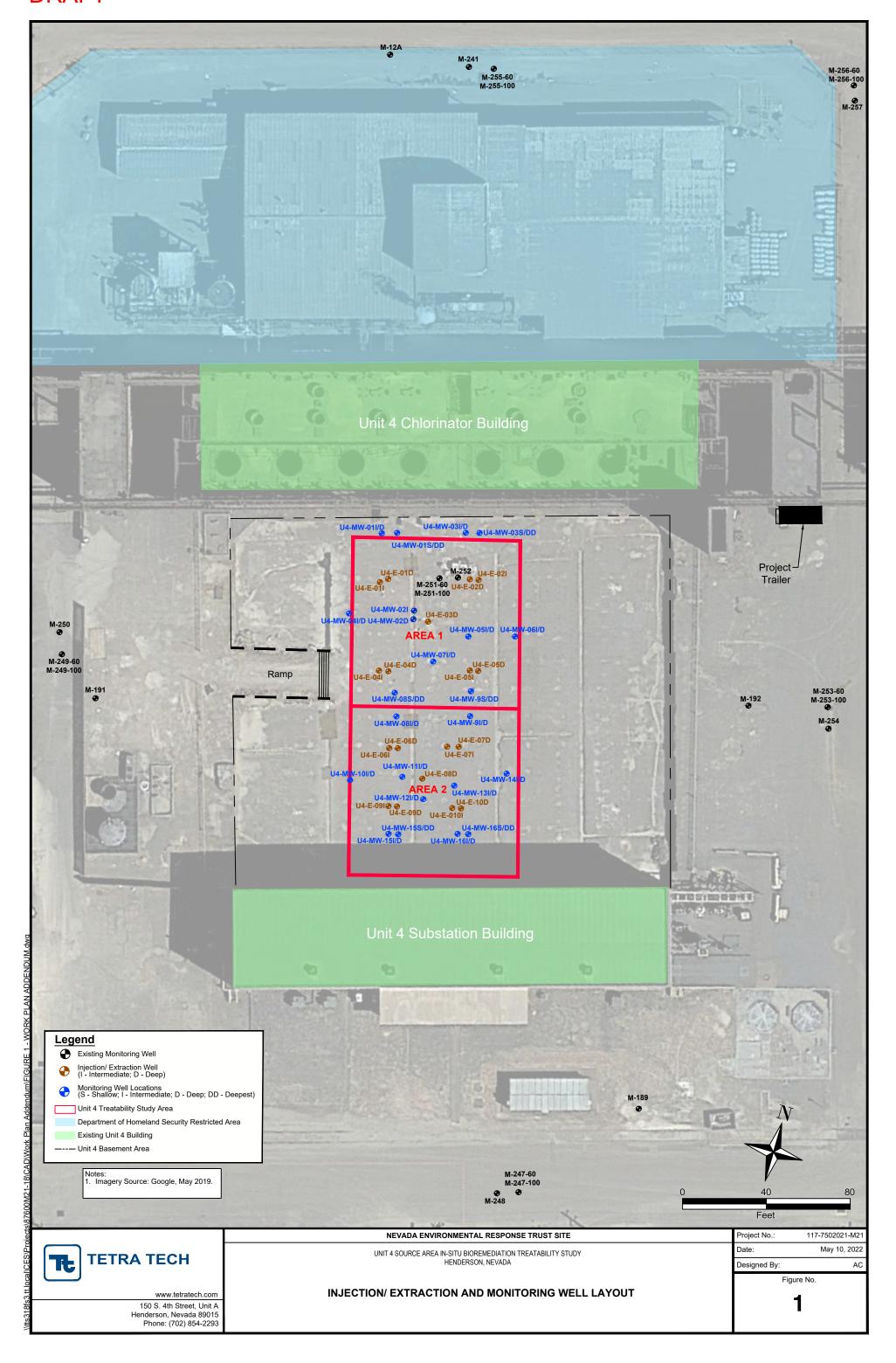
Nevada CEM Expiration Date: September 19, 2024

September 29, 2022

Date

## **Figures**

### **DRAFT**



### **Tables**



### Table 1 Phase 2 Well Construction Details

Unit 4 Source Area In-Situ Bioremediation Treatability Study

	0			Ground	Top of	0				Filter	Borehole	Borehole	Well	Nominal	Well	Bottom	Тор
Well ID	Screened Lithology	Northing	Easting	Surface Elevation <sup>1</sup>	Casing Elevation	Construction Type	Casing Material	Screen Material	Slot Size	Pack	Diameter	Total Depth	Diameter	Screen Length	Total Depth	of Screen	of Screen
	Limology			feet amsl	feet amsl	1,700			inches	Gradation	inches	feet bgs <sup>1</sup>	inches	feet	feet bgs <sup>1</sup>	feet bas <sup>1</sup>	feet bas <sup>1</sup>
U4-E-03D	UMCf	26717310.37	828241.13	1805.49	1804.94	Single	Schedule 80 PVC	Stainless Steel Wire-Wrap	0.010	#2/16	8	113.0	4	15	111.1	110.1	95.1
U4-E-06D	UMCf	26717253.44	828232.43	1805.44	1804.74	Single	Schedule 80 PVC	Stainless Steel Wire-Wrap	0.010	#2/16	8	112.0	4	15	111.1	110.1	95.1
U4-E-06I	UMCf	26717252.90	828228.29	1805.47	1805.04	Single	Schedule 80 PVC	Stainless Steel Wire-Wrap	0.010	#2/16	8	92.5	4	15	89.2	88.2	73.2
U4-E-07D	UMCf	26717258.48	828261.02	1805.62	1805.31	Single	Schedule 80 PVC	Stainless Steel Wire-Wrap	0.010	#2/16	8	111.5	4	15	110.6	109.6	94.6
U4-E-07I	UMCf	26717257.68	828255.56	1805.62	1805.16	Single	Schedule 80 PVC	Stainless Steel Wire-Wrap	0.010	#2/16	8	92.0	4	15	90.7	89.7	74.7
U4-E-08D	UMCf	26717240.82	828246.11	1805.45	1804.91	Single	Schedule 80 PVC	Stainless Steel Wire-Wrap	0.010	#2/16	8	120.0	4	15	110.6	109.6	94.6
U4-E-09D	UMCf	26717225.92	828236.22	1805.45	1804.91	Single	Schedule 80 PVC	Stainless Steel Wire-Wrap	0.010	#2/16	8	112.0	4	15	110.5	109.5	94.5
U4-E-09I	UMCf	26717225.46	828232.18	1805.47	1805.14	Single	Schedule 80 PVC	Stainless Steel Wire-Wrap	0.010	#2/16	8	93.3	4	15	90.9	89.9	74.9
U4-E-10D	UMCf	26717229.55	828266.50	1805.66	1805.28	Single	Schedule 80 PVC	Stainless Steel Wire-Wrap	0.010	#2/16	8	112.0	4	15	110.5	109.5	94.5
U4-E-10I	UMCf	26717229.15	828262.34	1805.71	1805.37	Single	Schedule 80 PVC	Stainless Steel Wire-Wrap	0.010	#2/16	8	92.0	4	15	90.2	89.2	74.2
U4-MW-01I	UMCf	26717353.59	828209.51	1805.57	1805.14	Dual-Nested	Schedule 80 PVC	Stainless Steel Wire-Wrap	0.010	#2/16	11	108.0	2	10	86.7	86.7	76.7
U4-MW-01D	UMCf	26717353.51	828209.25	1805.57	1805.10		Schedule 80 PVC	Stainless Steel Wire-Wrap	0.010	#2/16	11	108.0	2	10	106.7	106.7	96.7
U4-MW-01S	UMCf	26717354.83	828216.42	1805.57	1805.02		Schedule 80 PVC	Stainless Steel Wire-Wrap	0.010	#2/16	<b></b>		2	10	64.7	64.7	54.7
U4-MW-01DD	UMCf	26717354.86	828216.87	1805.57	1805.09	Dual-Nested	Schedule 80 PVC	Stainless Steel Wire-Wrap	0.010	#2/16	11	131.0	2	10	129.9	129.9	119.9
U4-MW-03I	UMCf	26717359.79	828248.76	1805.61	1805.17	Description of	Schedule 80 PVC	Stainless Steel Wire-Wrap	0.010	#2/16		400.0	2	10	86.6	86.6	76.6
U4-MW-03D	UMCf	26717360.01	828249.20	1805.61	1805.18	Dual-Nested	Schedule 80 PVC	Stainless Steel Wire-Wrap	0.010	#2/16	11	108.3	2	10	106.6	106.6	96.6
U4-MW-03S	UMCf	26717360.79	828255.35	1805.56	1805.19	5 111 1 1	Schedule 80 PVC	Stainless Steel Wire-Wrap	0.010	#2/16			2	10	64.5	64.5	54.5
U4-MW-03DD	UMCf	26717360.84	828255.62	1805.56	1805.20	Dual-Nested	Schedule 80 PVC	Stainless Steel Wire-Wrap	0.010	#2/16	11	131.3	2	10	129.7	129.7	119.7
U4-MW-04I	UMCf	26717313.50	828199.89	1805.49	1805.13		Schedule 80 PVC	Stainless Steel Wire-Wrap	0.010	#2/16			2	10	86.8	86.8	76.8
U4-MW-04D	UMCf	26717313.36	828199.55	1805.49	1805.15	Dual-Nested	Schedule 80 PVC	Stainless Steel Wire-Wrap	0.010	#2/16	11	108.5	2	10	107.0	107.0	97.0
U4-MW-05I	UMCf	26717311.18	828257.53	1805.52	1805.06		Schedule 80 PVC	Stainless Steel Wire-Wrap	0.010	#2/16			2	10	86.6	86.6	76.6
U4-MW-05D	UMCf	26717311.18	828257.89	1805.52	1805.05	Dual-Nested	Schedule 80 PVC	Stainless Steel Wire-Wrap	0.010	#2/16	11	108.0	2	10	108.2	108.2	98.2
U4-MW-06I	UMCf	26717314.46	828279.53	1805.52	1805.21		Schedule 80 PVC	Stainless Steel Wire-Wrap	0.010	#2/16			2	10	86.5	86.5	76.5
U4-MW-06D	UMCf	26717314.51	828279.82	1805.52	1805.20	Dual-Nested	Schedule 80 PVC	Stainless Steel Wire-Wrap	0.010	#2/16	11	108.3	2	10	107.1	107.1	97.1
U4-MW-07I	UMCf	26717296.98	828242.85	1805.36	1805.16		Schedule 80 PVC	Stainless Steel Wire-Wrap	0.010	#2/16		+	2	10	86.8	86.8	76.8
U4-MW-07D	UMCf	26717296.68	828242.80	1805.36	1805.01	Dual-Nested	Schedule 80 PVC	Stainless Steel Wire-Wrap	0.010	#2/16	11	109.2	2	10	106.5	106.5	96.5
U4-MW-08I	UMCf	26717268.25	828229.36	1805.45	1804.97		Schedule 80 PVC	Stainless Steel Wire-Wrap	0.010	#2/16		108.0	2	10	88.0	88.0	78.0
U4-MW-08D	UMCf	26717268.30	828229.62	1805.45	1804.99	Dual-Nested	Schedule 80 PVC	Stainless Steel Wire-Wrap	0.010	#2/16	11		2	10			
U4-MW-08S	UMCf	26717268.30	828226.78	1805.47	1804.99		Schedule 80 PVC	Stainless Steel Wire-Wrap	0.010	#2/16		+	2	10	108.6	108.6 64.9	98.6 54.9
U4-MW-08DD	UMCf	26717279.35	828227.22	1805.47	1804.95	Dual-Nested	Schedule 80 PVC	Stainless Steel Wire-Wrap	0.010	#2/16	11	131.2	2	10	64.9 129.8	129.8	119.8
U4-MW-09I	UMCf	26717279.33	828264.04	1805.62	1805.22		Schedule 80 PVC	Stainless Steel Wire-Wrap	0.010	#2/16		+	2	10			
						Dual-Nested					11	108.0	2	10	86.8	86.8	76.8
U4-MW-09D	UMCf	26717273.73	828264.40	1805.62	1805.20		Schedule 80 PVC	Stainless Steel Wire-Wrap	0.010	#2/16					106.9	106.9	96.9
U4-MW-09S	UMCf	26717285.44	828262.62	1805.55	1805.12	Dual-Nested -	Schedule 80 PVC	Stainless Steel Wire-Wrap	0.010	#2/16	11	132.0	2	10	65.3	65.3	55.3
U4-MW-09DD	UMCf	26717285.52	828263.00	1805.55	1805.12		Schedule 80 PVC	Stainless Steel Wire-Wrap	0.010	#2/16			2	10	129.8	129.8	119.8
U4-MW-10I	UMCf	26717234.83	828212.05	1805.55	1805.10		Schedule 80 PVC	Stainless Steel Wire-Wrap	0.010	#2/16	11	109.0	2	10	87.1	87.1	77.1
U4-MW-10D	UMCf	26717235.18	828212.26	1805.55	1805.07		Schedule 80 PVC	Stainless Steel Wire-Wrap	0.010	#2/16		-	2	10	106.9	106.9	96.9
U4-MW-11I	UMCf	26717240.19	828236.42	1805.41	1805.03	Dual-Nested	Schedule 80 PVC	Stainless Steel Wire-Wrap	0.010	#2/16	11	109.0	2	10	87.0	87.0	77.0
U4-MW-11D	UMCf	26717240.23	828236.77	1805.41	1804.96		Schedule 80 PVC	Stainless Steel Wire-Wrap	0.010	#2/16			2	10	107.4	107.4	97.4
U4-MW-12I	UMCf	26717231.25	828247.87	1805.47	1805.11	Dual-Nested	Schedule 80 PVC	Stainless Steel Wire-Wrap	0.010	#2/16	11	108.0	2	10	86.8	86.8	76.8
U4-MW-12D	UMCf	26717231.22	828248.29	1805.47	1805.12		Schedule 80 PVC	Stainless Steel Wire-Wrap	0.010	#2/16			2	10	107.1	107.1	97.1
U4-MW-13I	UMCf	26717242.66	828261.00	1805.64	1805.28	Dual-Nested	Schedule 80 PVC	Stainless Steel Wire-Wrap	0.010	#2/16	11	109.0	2	10	87.1	87.1	77.1
U4-MW-13D	UMCf	26717242.70	828261.37	1805.64	1805.35		Schedule 80 PVC	Stainless Steel Wire-Wrap	0.010	#2/16			2	10	108.2	108.2	98.2
U4-MW-14I	UMCf	26717249.26	828285.32	1805.43	1805.13	Dual-Nested	Schedule 80 PVC	Stainless Steel Wire-Wrap	0.010	#2/16	11	109.0	2	10	87.3	87.3	77.3
U4-MW-14D	UMCf	26717249.24	828285.84	1805.43	1805.05		Schedule 80 PVC	Stainless Steel Wire-Wrap	0.010	#2/16			2	10	107.3	107.3	97.3
U4-MW-15I	UMCf	26717212.34	828233.91	1805.48	1805.03	Dual-Nested	Schedule 80 PVC	Stainless Steel Wire-Wrap	0.010	#2/16	11	109.0	2	10	86.8	86.8	76.8
U4-MW-15D	UMCf	26717212.35	828234.41	1805.48	1804.97	2 aa. 1100100	Schedule 80 PVC	Stainless Steel Wire-Wrap	0.010	#2/16			2	10	106.0	106.0	96.0
U4-MW-15S	UMCf	26717212.89	828238.61	1805.44	1805.05	Dual-Nested	Schedule 80 PVC	Stainless Steel Wire-Wrap	0.010	#2/16	11	132.0	2	10	64.8	64.8	54.8
U4-MW-15DD	UMCf	26717212.87	828239.01	1805.44	1804.98	Duai 1100100	Schedule 80 PVC	Stainless Steel Wire-Wrap	0.010	#2/16			2	10	130.3	130.3	120.3
U4-MW-16I	UMCf	26717217.25	828266.62	1805.68	1805.36	Dual-Nested	Schedule 80 PVC	Stainless Steel Wire-Wrap	0.010	#2/16	11	108.5	2	10	87.0	87.0	77.0
U4-MW-16D	UMCf	26717217.40	828266.90	1805.68	1805.27	_ 30	Schedule 80 PVC	Stainless Steel Wire-Wrap	0.010	#2/16		100.5	2	10	106.8	106.8	96.8
U4-MW-16S	UMCf	26717217.87	828271.70	1805.59	1805.24	Dual-Nested	Schedule 80 PVC	Stainless Steel Wire-Wrap	0.010	#2/16	11	131.0	2	10	64.8	64.8	54.8
U4-MW-16DD	UMCf	26717218.04	828271.95	1805.59	1805.32	Juan Nesteu	Schedule 80 PVC	Stainless Steel Wire-Wrap	0.010	#2/16	-11	131.0	2	10	130.8	130.8	120.8

Notes

amsl - above mean sea level bgs - below ground surface bTOC - below top of casing PVC - polyvinyl chloride

UMCf - Upper Muddy Creek formation

<sup>1.</sup> Ground surface refers to the concrete floor of the Unit 4 basement, which is approximately 8 feet below the surrounding grade.

<sup>2.</sup> Well names including E indicate an extraction/injection well. Well names including MW indicate a monitoring well.