

August 29, 2020

Mr. Patrick Euler, Contracting Officer
Mike McCrum, Contracting Officer's Representative
Bureau of Land Management (BLM), Alaska State Office
222 W. 7th Ave #13
Anchorage, AK 99513

[Via Email: peuler@blm.gov]

[Via Email: mmcrum@blm.gov]

**Subject: 2019 Groundwater and Surface Water Baseline Monitoring Work Plan - Red Devil Mine,
Alaska**

Dear Mr. Euler,

This memo serves as an addendum to the 2019 Groundwater and Surface Water Baseline Monitoring Work Plan for the Optional Year 2 scope of work. The Baseline monitoring Work Plan establishes procedures for baseline monitoring of groundwater and surface water at the Red Devil Mine site, including a Field Sampling Plan (FSP) and Quality Assurance Project Plan (QAPP). This Work Plan was developed to address baseline groundwater and surface water monitoring needs as the BLM understood them at the beginning of the base scope of work, as outlined in the 2018 Baseline Monitoring Statement of Work (SOW). E & E prepared this Work Plan on behalf of the BLM under BPA L14PA00149 and Delivery Order Number 140L6318F0016.

At the conclusion of the base scope of work, E&E prepared the 2019 Baseline Monitoring report, which includes a summary of spring and fall baseline surface water and groundwater monitoring data and recommendations for future monitoring events developed in coordination with BLM. Among these recommendations were changes to the list of groundwater monitoring wells to be sampled for the Optional Year 2 scope of work, based on correspondence with BLM COR Mike McCrum dated May 18, 2020.

Beginning with the Spring 2020 field event, the 2019 Baseline Monitoring Work Plan, as modified by this addendum, serves as the reference for the Optional Year 2 Scope of Work tasks. Surface water sampling is reduced to five stations, as listed in the SOW for Optional Year 2 and the attached Table 2-3. Groundwater monitoring well sampling is reduced to 24 wells, per the SOW, with the list of wells modified as requested by BLM in the attached Table 2-1. The attached versions of tables 2-1 and 2-3 replace the Tables 2-1 and 2-3 of the 2019 Baseline Monitoring FSP for the Optional Year 2 Scope of Work.

If you have any questions or concerns regarding this addendum, please contact me by email (cbillor@ene.com) or phone at 206-624-9537.

Sincerely,



Catherine Billor
Project Manager

Table 2-1 Spring & Fall 2020 Groundwater Sample Collection

Monitoring Well ID	General Geographic Area	Location Description	Sampling Method	Sample Analyses and Methods											
				Total TAL Metals	Total Low Level Hg	Dissolved Low Level Hg	Total Suspended Solids	Inorganic Ions	Carbonate Alkalinity as CaCO3	Nitrate Nitrite as N	SVOCs	BTEX (VOCs)	GRO	DRO	
				EPA 6010C/6020A	EPA 1631E	EPA 1631E	SM 2540D	MCAWW 300.0	SM 2320B	MCAWW 353.2	SW846 8021B /8270D	SW846 8260C	AK101	AK102	
MW01	Post-1955 Main Processing Area	Gravel Pad / Downgradient from Monofill #3	Bladder												
MW09		Downgradient of Monofill #2	Bladder												
MW10		Downgradient from Monofill #2 / Post-1955 Retort Building	Bladder	•	•	•	•	•	•	•					
MW16		Shallow/deep well pair / Tailings Area	Peristaltic	•	•	•	•	•	•	•					
MW17			Peristaltic	•	•	•	•	•	•	•					
MW22	Berm / Downgradient of Settling Pond #3	Peristaltic													
MW06	Pre-1955 Main Processing Area	Downgradient of Pre-1955 Retort Area	Peristaltic	•	•	•	•	•	•	•					
MW26		Pre-1955 Main Processing Area	Bladder												
MW27		Shallow/deep well pair near seep on bank of Red Devil Creek / Downgradient of former mine openings / Tailings Area	Bladder	•	•	•	•	•	•	•	•				
MW28			Bladder	•	•	•	•	•	•	•	•				
MW32	Red Devil Creek Downstream Alluvial Area and Delta	Peristaltic													
MW33		Peristaltic													
MW40	Upgradient from Pre-1955 Main Processing Area	Near 507 Crosscut and Dolly No. 7 / 1280 Crosscut. Well installed.	Bladder	•	•	•	•	•	•	•	•				
MW42		Near 325 Adit and 150 Level / 200 Level. Well installed.	Bladder	•	•	•	•	•	•	•	•				
MW43		Near 33 Level. Well installed.	Bladder	•	•	•	•	•	•	•	•				
MW29		Upgradient from Pre-1955 Main Processing Area	Bladder												
MW39	Surface Mined Area/Proposed Repository Footprint	Located along southern edge of repository footprint.	No Pump												
MW44		Downgradient of proposed repository footprint.	Bladder	•	•	•	•	•	•	•	•				
MW45		Eastern edge of proposed repository.	Bladder	•	•	•	•	•	•	•	•				
MW46		Eastern edge of proposed repository.	Bladder	•	•	•	•	•	•	•	•				
MW47		Northeastern corner of proposed repository.	Bladder	•	•	•	•	•	•	•	•				
MW48		Downgradient of proposed repository footprint.	Peristaltic	•	•	•	•	•	•	•	•				
MW49		Downgradient of proposed repository footprint.	Bladder												
MW50		Within proposed repository footprint.	Bladder	•	•	•	•	•	•	•	•				
MW51		Within proposed repository footprint.	Bladder	•	•	•	•	•	•	•	•				
MW52		Northern edge of proposed repository footprint.	Bladder	•	•	•	•	•	•	•	•				
MW53		Western edge of proposed repository footprint.	Bladder	•	•	•	•	•	•	•	•				
MW54		Western edge of proposed repository footprint.	Bladder	•	•	•	•	•	•	•	•				
MW55		Northwestern edge of proposed repository footprint.	Peristaltic	•	•	•	•	•	•	•	•				
MW56		Southern edge of proposed repository footprint.	Bladder	•	•	•	•	•	•	•	•				
MW57		Southwestern edge of proposed repository footprint.	Bladder	•	•	•	•	•	•	•	•				
MW58	Upland Area West of SMA and proposed repository footprint.	Bladder	•	•	•	•	•	•	•	•					
MW59	Replacement well for MW39. Located along southern edge of proposed repository footprint.	Bladder	•	•	•	•	•	•	•	•					
MW08	Upgradient of Post-1955 Main Processing Area	Upgradient of Post-1955 Main Processing Area	Peristaltic												
MW19		Upgradient of Settling Ponds #2 and #3	Peristaltic												
MW31	Upland Area West of Surface Mined Area	Upland Area West of Surface Mined Area	Bladder												

Key:
 BTEX = benzene, ethylbenzene, toluene, and xylenes
 CaCO3 = calcium carbonate
 DRO = diesel-range organics
 EPA = U.S. Environmental Protection Agency
 GRO = gasoline-range organics
 Hg = mercury
 SMA = Surface Mined Area
 SVOC = semivolatile organic compound
 TAL = Target Analyte List
 VOC = volatile organic compound

Table 2-3 Spring and Fall 2020 Surface Water Sample Collection

Sample Location ID	Location Description	Sample Analyses and Methods									
		Total TAL Metals	Dissolved TAL Metals	Total Low Level Hg	Dissolved Low Level Hg	Total Organic Carbon	Total Suspended Solids	Total Dissolved Solids	Inorganic Ions	Carbonate Alkalinity as CaCO3	Nitrate Nitrite as N
		EPA 6010C/6020A	EPA 6010C/6020A	EPA 1631E	EPA 1631E	SW846 9060	SM 2540D	SM 2540C	MCAWW 300.0	SM 2320B	MCAWW 353.2
RD10SW	Red Devil Creek, downstream of the reservoir, upstream of NTCRA.	•	•	•	•	•	•	•	•	•	•
RD15SW	Red Devil Creek, new station immediately downstream of the newly aligned section (post-NTCRA) of Red Devil Creek, near former baseline monitoring station RD13SW	•	•	•	•	•	•	•	•	•	•
RD05SW	Seep on left bank of Red Devil Creek	•	•	•	•	•	•	•	•	•	•
RD06SW	Red Devil Creek, near Settling Pond #3	•	•	•	•	•	•	•	•	•	•
RD08SW	Red Devil Creek, near confluence of Red Devil Creek and Kuskokwim River, downstream of sediment trap constructed during NTCRA	•	•	•	•	•	•	•	•	•	•

Key:

- CaCO3 = calcium carbonate
- EPA = Environmental Protection Agency
- Hg = Mercury
- MCAWW = Methods for Chemical Analysis of Water and Wastes
- NTCRA = non-time-critical removal action
- TAL = Target Analyte List