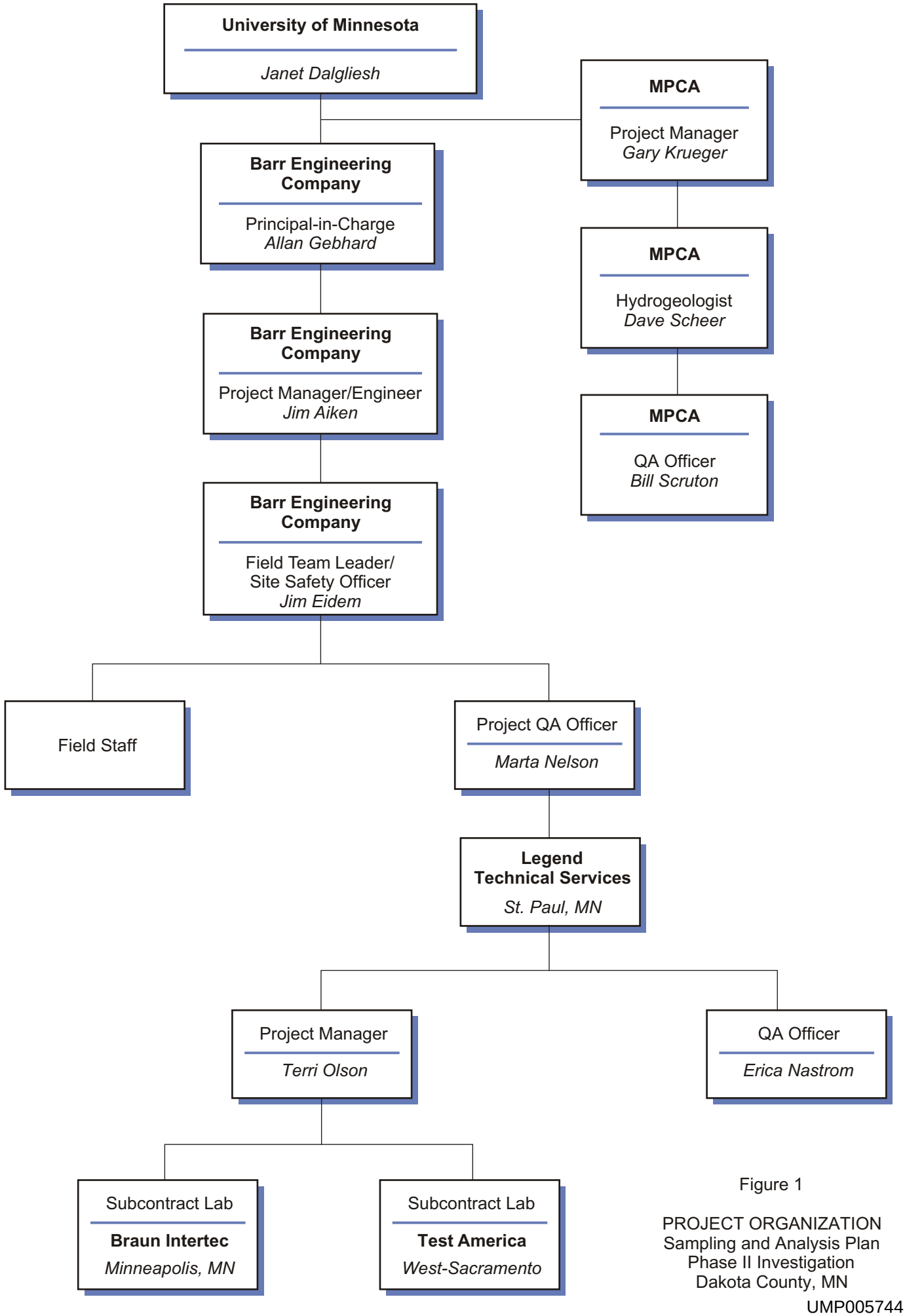
Figures

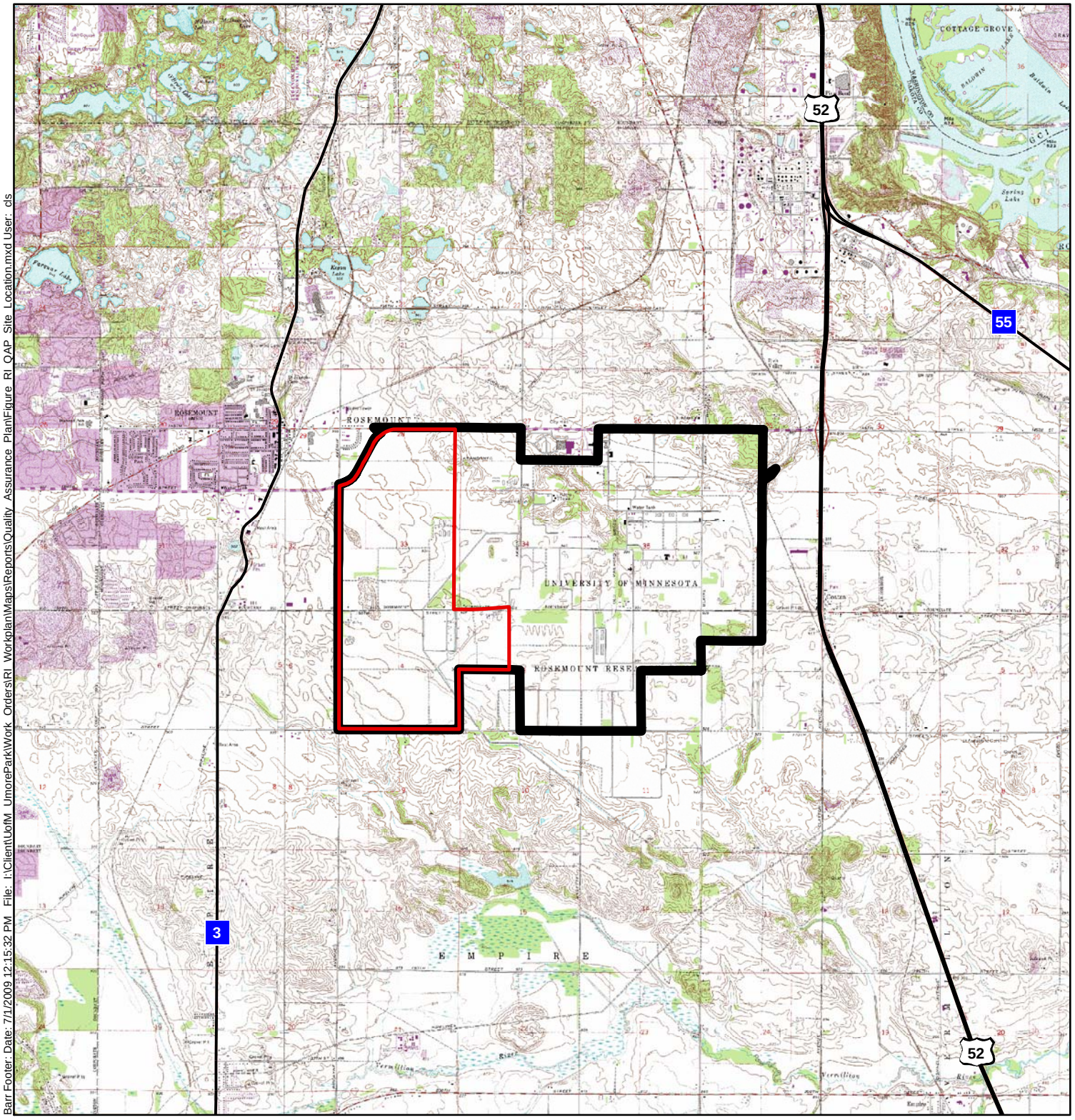


P:\Mpls\23 MN\19\23190B05\Workfiles\GW Assessment Invset WO#2 and WO#3\Figures_Graphics\Project Organization.CDR RLG 07-17-09

Figure 1

PROJECT ORGANIZATION
Sampling and Analysis Plan
Phase II Investigation
Dakota County, MN

UMP005744



Barr Footer: Date: 7/1/2009 12:15:32 PM File: I:\Client\UofM UmoreParkWork Orders\RI Workplan\Maps\Reports\Quality Assurance PlanFigure RI QAP Site Location.mxd User: cls

UMore Mining Area (UMA)

UMore Park Boundary

Figure 2

SITE LOCATION

Quality Assurance Project Plan
SSI/RI Workplan
SOCS 4 & 5
Dakota County, MN

N

Feet

6,000 0 6,000

Source: MnDOT, MN DNR, Dakota County, Barr, SEH, HKGi.
USGS topographic map background downloaded from the U.S.
Department of Agriculture, Natural Resources Conservation Service.

BARR

UMP005745

Chain of Custody

BARR
4700 West 77th Street
Minneapolis, MN 55435-4803
(952) 832-2600

Project Number ___/___—___

Project Name

Sample Identification	Collection Date	Collection Time	Matrix: Water	Matrix: Soil	Matrix:	Type: Grab	Type: Comp.	Type: QC	Number of Containers/Preservative — Water: Volatile Organics (Pres.) *1	Semivolatile Organics *2	Dissolved Metals (HNO_3)	Total Metals (HNO_3)	General (Unpreserved) *3	Cyanide (NaOH)	Nutrients (H_2SO_4) *4	Oil and Grease (H_2SO_4)	Sulfide (Zn Acetate)	Methane	Bacteria ($Na_2S_2O_3$)	DRO (HCl)				Soil: VOCs (2-oz tared MeOH) *1	GRO, BTEX (2-oz tared MeOH) *1	DRO (2-oz tared) - 25 grams	Metals (2-oz unpreserved)	SVOCs (2 or 4-oz unpres.) *2	% Moisture (plastic vial, unpres.)				Total No. Of Containers
1.																																
2.																																
3.																																
4.																																
5.																																
6.																																
7.																																
8.																																
9.																																
10.																																
11.																																
12.																																

COC _____ of _____

Project Manager: _____

Project Contact: _____

Sampled by: _____

Laboratory: _____

Remarks:

Common Parameter/Container - Preservation Key

**1* - *Volatile Organics = BTEX, GRO, TPH, Full List*
**2* - *Semivolatile Organics = PAHs, PCP, Dioxins, Full List, Herbicide/Pesticide/PCBs*
**3* - *General = pH, Chloride, Flouride, Alkalinity, TSS, TDS, TS, Sulfate*
**4* - *Nutrients = COD, TOC, Phenols, Ammonia Nitrogen, TKN*

Relinquished By:	On Ice? Y N	Date	Time	Received by:	Date	Time
Relinquished By:	On Ice? Y N	Date	Time	Received by:	Date	Time

Samples Shipped VIA: ☐ Air Freight ☐ Federal Express ☐ Sampler ☐ Other _____

Air Bill Number:

Distribution: White-Original Accompanies Shipment to Lab; Yellow - Field Copy; Pink - Lab Coordinator

Figure 3

CHAIN OF CUSTODY
Quality Assurance Project Plan
SSI/RI Work Plan, SOCs 4 and 5
UMore Mining Area
Dakota County, MN

Tables

Table 1
Analytical Parameters, Methods and Quantitation Limits
Quality Assurance Project Plan, SSI/RI, SOCs 4 and 5
UMore Mining Area
Dakota County, Minnesota

Parameter	CAS Number	Matrix	Method (EPA unless noted otherwise)	Method Detection Limit	Reporting Limit	Test Unit	MDH Health Risk Limits [3]	Minnesota Tier SLV [4]	Minnesota SRV [5]	Minnesota Tier II Industrial SRV [6]
Metals										
Antimony	7440-36-0	Soil/Solid	6010B	0.0055	0.50	mg/kg	--	2.7	12	100
Arsenic	7440-38-2	Soil/Solid	6010B	0.10	0.50	mg/kg	--	15.1	9	20
Beryllium	7440-41-7	Soil/Solid	6010B	0.011	0.25	mg/kg	--	1.4	55	230
Cadmium	7440-43-9	Soil/Solid	6010B	0.025	0.25	mg/kg	--	4.4	25	200
Chromium	7440-47-3	Soil/Solid	6010B	0.012	0.50	mg/kg	--	1000000 (8)	44000 (8)	100000 (8)
Copper	7440-50-8	Soil/Solid	6010B	0.070	1.0	mg/kg	--	400	100	9000
Lead	7439-92-1	Soil/Solid	6010B	0.034	1.0	mg/kg	--	525	300	700
Nickel	7440-02-0	Soil/Solid	6010B	0.014	0.25	mg/kg	--	88	560	2500
Selenium	7782-49-2	Soil/Solid	6010B	0.11	1.0	mg/kg	--	1.5	160	1300
Silver	7440-22-4	Soil/Solid	6010B	0.0090	0.25	mg/kg	--	3.9	160	1300
Thallium	7440-28-0	Soil/Solid	6010B	0.13	2.0	mg/kg	--	--	3	21
Zinc	7440-66-6	Soil/Solid	6010B	0.22	1.0	mg/kg	--	1500	8700	75000
Metals										
Antimony	7440-36-0	Water/Liquid	6020	0.046	0.500	ug/L	6	--	--	--
Arsenic	7440-38-2	Water/Liquid	6010B	2	10.000	ug/L	--	--	--	--
Beryllium	7440-41-7	Water/Liquid	6020	0.027	0.5000	ug/L	0.08	--	--	--
Cadmium	7440-43-9	Water/Liquid	6010B	0.099	1.0000	ug/L	4	--	--	--
Chromium	7440-47-3	Water/Liquid	6010B	0.24	10.000	ug/L	100 (5)	--	--	--
Copper	7440-50-8	Water/Liquid	6010B	1.4	20.000	ug/L	--	--	--	--
Lead	7439-92-1	Water/Liquid	6010B	0.68	3.0000	ug/L	--	--	--	--
Nickel	7440-02-0	Water/Liquid	6010B	0.28	5.0000	ug/L	100	--	--	--
Selenium	7782-49-2	Water/Liquid	6010B	2.2	20.000	ug/L	30	--	--	--
Silver	7440-22-4	Water/Liquid	6010B	0.18	5.0000	ug/L	30	--	--	--
Thallium	7440-28-0	Water/Liquid	6020	0.0081	0.500	ug/L	0.6	--	--	--
Zinc	7440-66-6	Water/Liquid	6010B	4.4	20.000	ug/L	2000	--	--	--
Mercury										
Mercury	7439-97-6	Soil/Solid	7471A	0.0031	0.10	mg/kg	--	1.6 C	0.5	1.5
Mercury	7439-97-6	Water/Liquid	7470A	0.000031	0.00020	mg/L	--	--	--	--
Nitrate+Nitrite Nitrogen as N (Braun)										
N+N Nitrogen as N	NA	Water/Liquid	SM4500-NO3-F	0.007	0.02	mg/L	10 (3)	--	--	--
Total Kjeldahl Nitrogen (Braun)										
TKN as N	NA	Water/Liquid	SM4500-NH3-C	0.17	0.5	mg/L	--	--	--	--
Perchlorate (TA)										
Perchlorate	NA	Water/Liquid	314	0.36	4	ug/L	--	--	--	--
Nitrocellulose (TA)										
Nitrocellulose	NA	Soil/Solid	353.2Mod	0.78	0.5	mg/kg	--	--	--	--
Nitrocellulose (TA)										
Nitrocellulose	NA	Water/Liquid	353.2Mod	0.124	0.5	mg/L	--	--	--	--
Organochlorine Pesticides										
4,4´-DDD	72-54-8	Soil/Solid	8081A	0.0015	0.040	mg/kg	--	--	56	125
4,4´-DDE	72-55-9	Soil/Solid	8081A	0.0014	0.040	mg/kg	--	--	40	80
4,4´-DDT	50-29-3	Soil/Solid	8081A	0.0020	0.040	mg/kg	--	--	15	88
a-Chlordane	5103-71-9	Soil/Solid	8081A	0.0015	0.040	mg/kg	--	--	--	--
Aldrin	309-00-2	Soil/Solid	8081A	0.0012	0.040	mg/kg	--	--	1	2
alpha-BHC	319-84-6	Soil/Solid	8081A	0.0011	0.040	mg/kg	--	--	2	3.5
beta-BHC	319-85-7	Soil/Solid	8081A	0.0015	0.040	mg/kg	--	--	7	15
delta-BHC	319-86-8	Soil/Solid	8081A	0.0015	0.040	mg/kg	--	--	--	--
Dieldrin	60-57-1	Soil/Solid	8081A	0.0014	0.040	mg/kg	--	--	0.8	2
Endosulfan I	959-98-8	Soil/Solid	8081A	0.0013	0.040	mg/kg	--	--	--	--
Endosulfan II	891-86-1	Soil/Solid	8081A	0.0016	0.040	mg/kg	--	--	--	--
Endosulfan sulfate	1031-07-8	Soil/Solid	8081A	0.0016	0.040	mg/kg	--	--	--	--
Endrin	72-20-8	Soil/Solid	8081A	0.0014	0.040	mg/kg	--	--	8	56
Endrin aldehyde	7421-93-4	Soil/Solid	8081A	0.0041	0.040	mg/kg	--	--	--	--
Endrin ketone	53494-70-5	Soil/Solid	8081A	0.0016	0.040	mg/kg	--	--	--	--
gamma-BHC (Lindane)	58-89-9	Soil/Solid	8081A	0.0012	0.040	mg/kg	--	--	9	15
gamma-Chlordane	5566-34-7	Soil/Solid	8081A	0.0017	0.040	mg/kg	--	--	--	--
Heptachlor	76-44-8	Soil/Solid	8081A	0.0014	0.040	mg/kg	--	--	2	3.5
Heptachlor epoxide	1024-57-3	Soil/Solid	8081A	0.0012	0.040	mg/kg	--	--	0.4	3
Methoxychlor	72-43-5	Soil/Solid	8081A	0.0019	0.040	mg/kg	--	--	11	50
Toxaphene	8001-35-2	Soil/Solid	8081A	0.015	0.080	mg/kg	--	--	13	28
Organochlorine Pesticides										
4,4´-DDD	72-54-8	Water/Liquid	8081A	0.026	0.40	ug/L	1	--	--	--
4,4´-DDE	72-55-9	Water/Liquid	8081A	0.037	0.40	ug/L	1	--	--	--
4,4´-DDT	50-29-3	Water/Liquid	8081A	0.031	0.40	ug/L	1	--	--	--
a-Chlordane	5103-71-9	Water/Liquid	8081A	0.030	0.40	ug/L	--	--	--	--
Aldrin	309-00-2	Water/Liquid	8081A	0.036	0.40	ug/L	--	--	--	--
alpha-BHC	319-84-6	Water/Liquid	8081A	0.028	0.40	ug/L	--	--	--	--
beta-BHC	319-85-7	Water/Liquid	8081A	0.026	0.40	ug/L	--	--	--	--
delta-BHC	319-86-8	Water/Liquid	8081A	0.023	0.40	ug/L	--	--	--	--
Dieldrin	60-57-1	Water/Liquid	8081A	0.031	0.40	ug/L	0.006 (4)	--	--	--

Table 1
Analytical Parameters, Methods and Quantitation Limits
Quality Assurance Project Plan, SSI/RI, SOCs 4 and 5
UMore Mining Area
Dakota County, Minnesota

Parameter	CAS Number	Matrix	Method (EPA unless noted otherwise)	Method Detection Limit	Reporting Limit	Test Unit	MDH Health Risk Limits [3]	Minnesota Tier SLV [4]	Minnesota SRV [5]	Minnesota Tier II Industrial SRV [6]
Endosulfan I	959-98-8	Water/Liquid	8081A	0.032	0.40	ug/L	--	--	--	--
Endosulfan II	891-86-1	Water/Liquid	8081A	0.035	0.40	ug/L	--	--	--	--
Endosulfan sulfate	1031-07-8	Water/Liquid	8081A	0.034	0.40	ug/L	--	--	--	--
Endrin	72-20-8	Water/Liquid	8081A	0.029	0.40	ug/L	--	--	--	--
Endrin aldehyde	7421-93-4	Water/Liquid	8081A	0.044	0.40	ug/L	--	--	--	--
Endrin ketone	53494-70-5	Water/Liquid	8081A	0.031	0.40	ug/L	--	--	--	--
gamma-BHC (Lindane)	58-89-9	Water/Liquid	8081A	0.024	0.40	ug/L	--	--	--	--
gamma-Chlordane	5566-34-7	Water/Liquid	8081A	0.030	0.40	ug/L	--	--	--	--
Heptachlor	76-44-8	Water/Liquid	8081A	0.028	0.40	ug/L	0.08	--	--	--
Heptachlor epoxide	1024-57-3	Water/Liquid	8081A	0.030	0.40	ug/L	0.04	--	--	--
Methoxychlor	72-43-5	Water/Liquid	8081A	0.032	0.40	ug/L	--	--	--	--
Toxaphene	8001-35-2	Water/Liquid	8081A	0.069	1.00	ug/L	0.3	--	--	--
MDA List 1 Pesticides (Braun)										
EPTC	759-94-4	Soil/Solid	8270C	0.0060	0.04	mg/kg	--	--	--	--
Propachlor	1918-16-7	Soil/Solid	8270C	0.0090	0.04	mg/kg	--	--	--	--
Ethalfluralin	55283-68-6	Soil/Solid	8270C	0.014	0.04	mg/kg	--	--	--	--
Deisopropylatrazine	1007-28-9	Soil/Solid	8270C	0.0080	0.04	mg/kg	--	--	--	--
Trifluralin	1582-09-8	Soil/Solid	8270C	0.014	0.04	mg/kg	--	--	--	--
Desethylatrazine	6190-65-4	Soil/Solid	8270C	0.011	0.04	mg/kg	--	--	--	--
Phorate	298-02-2	Soil/Solid	8270C	0.0060	0.04	mg/kg	--	--	--	--
Prometon	1610-18-0	Soil/Solid	8270C	0.0060	0.04	mg/kg	--	--	--	--
Simazine	122-34-9	Soil/Solid	8270C	0.0090	0.04	mg/kg	--	--	--	--
Atrazine	1912-24-9	Soil/Solid	8270C	0.0100	0.04	mg/kg	--	--	--	--
Propazine	139-40-2	Soil/Solid	8270C	0.0070	0.04	mg/kg	--	--	--	--
Terbufos	13071-79-9	Soil/Solid	8270C	0.0090	0.04	mg/kg	--	--	0.6	3.5
Fonofos	944-22-9	Soil/Solid	8270C	0.0040	0.04	mg/kg	--	--	--	--
Triallate	2303-17-5	Soil/Solid	8270C	0.0050	0.04	mg/kg	--	--	--	--
Metribuzin	21087-64-9	Soil/Solid	8270C	0.0090	0.04	mg/kg	--	--	--	--
Dimethenamid	87674-68-8	Soil/Solid	8270C	0.0060	0.04	mg/kg	--	--	--	--
Acetochlor	34256-82-1	Soil/Solid	8270C	0.010	0.04	mg/kg	--	--	--	--
Alachlor	15972-60-8	Soil/Solid	8270C	0.0070	0.04	mg/kg	--	--	--	--
Cyanazine	21725-46-2	Soil/Solid	8270C	0.0080	0.04	mg/kg	--	--	--	--
Metolachlor	51218-45-2	Soil/Solid	8270C	0.0030	0.04	mg/kg	--	--	435	3300
Chlorpyrifos	2921-88-2	Soil/Solid	8270C	0.0070	0.04	mg/kg	--	--	--	--
Pendimethalin	40487-42-1	Soil/Solid	8270C	0.016	0.04	mg/kg	--	--	--	--
MDA List 1 Pesticides (Braun)										
EPTC	759-94-4	Water/Liquid	8270C	0.22	0.50	ug/L	200	--	--	--
Propachlor	1918-16-7	Water/Liquid	8270C	0.14	0.50	ug/L	--	--	--	--
Ethalfluralin	55283-68-6	Water/Liquid	8270C	0.47	0.50	ug/L	300 (1)	--	--	--
Deisopropylatrazine	1007-28-9	Water/Liquid	8270C	0.26	0.50	ug/L	--	--	--	--
Trifluralin	1582-09-8	Water/Liquid	8270C	0.21	0.50	ug/L	5 (1)	--	--	--
Desethylatrazine	6190-65-4	Water/Liquid	8270C	0.29	0.50	ug/L	--	--	--	--
Phorate	298-02-2	Water/Liquid	8270C	0.58	1.00	ug/L	1 (1)	--	--	--
Prometon	1610-18-0	Water/Liquid	8270C	0.29	0.50	ug/L	100	--	--	--
Simazine	122-34-9	Water/Liquid	8270C	0.32	0.50	ug/L	4 (3)	--	--	--
Atrazine	1912-24-9	Water/Liquid	8270C	0.24	0.50	ug/L	3 (3)	--	--	--
Propazine	139-40-2	Water/Liquid	8270C	0.21	0.50	ug/L	10 (1)	--	--	--
Terbufos	13071-79-9	Water/Liquid	8270C	0.54	1.00	ug/L	0.2 (1)	--	--	--
Fonofos	944-22-9	Water/Liquid	8270C	0.30	0.50	ug/L	10 (1)	--	--	--
Triallate	2303-17-5	Water/Liquid	8270C	0.34	0.50	ug/L	9 (1)	--	--	--
Metribuzin	21087-64-9	Water/Liquid	8270C	0.35	0.50	ug/L	200	--	--	--
Dimethenamid	87674-68-8	Water/Liquid	8270C	0.24	0.50	ug/L	40 (1)	--	--	--
Acetochlor	34256-82-1	Water/Liquid	8270C	0.25	0.50	ug/L	9 (4)	--	--	--
Alachlor	15972-60-8	Water/Liquid	8270C	0.19	0.50	ug/L	5 (4)	--	--	--
Cyanazine	21725-46-2	Water/Liquid	8270C	0.48	0.50	ug/L	1	--	--	--
Metolachlor	51218-45-2	Water/Liquid	8270C	0.28	0.50	ug/L	300 (4)	--	--	--
Chlorpyrifos	2921-88-2	Water/Liquid	8270C	0.34	0.50	ug/L	20 (1)	--	--	--
Pendimethalin	40487-42-1	Water/Liquid	8270C	0.25	0.50	ug/L	--	--	--	--
MDA List 2 Pesticides (Braun)										
Dicamba	1918-00-9	Soil/Solid	8270C	0.008	0.50	mg/kg	--	--	--	--
MCPA	94-74-6	Soil/Solid	8270C	0.014	0.50	mg/kg	--	--	16	110
2,4-D	94-75-7	Soil/Solid	8270C	0.012	0.50	mg/kg	--	--	285	2200
Trichlopyr	55336-06-3	Soil/Solid	8270C	0.006	0.50	mg/kg	--	--	--	--
Pentachlorophenol	87-86-5	Soil/Solid	8270C	0.007	0.50	mg/kg	--	--	80	120
2,4,5-T.P.	93-72-1	Soil/Solid	8270C	0.007	0.50	mg/kg	--	--	--	--
2,4,5-T	93-76-5	Soil/Solid	8270C	0.009	0.50	mg/kg	--	--	290	2150
Dinoseb	88-85-7	Soil/Solid	8270C	0.005	0.50	mg/kg	--	--	--	--
2,4-D.B.	94-82-6	Soil/Solid	8270C	0.011	0.50	mg/kg	--	--	226	1750

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Dakota County, Minnesota

Parameter	CAS Number	Matrix	Method (EPA unless noted otherwise)	Method Detection Limit	Reporting Limit	Test Unit	MDH Health Risk Limits [3]	Minnesota Tier SLV [4]	Minnesota SRV [5]	Minnesota Tier II Industrial SRV [6]
Bentazone	25057-89-0	Soil/Solid	8270C	0.009	0.50	mg/kg	--	--	--	--
Picloram	1918-02-1	Soil/Solid	8270C	0.011	0.50	mg/kg	--	--	2000	15000
MDA List 2 Pesticides (Braun)										
Dicamba	1918-00-9	Water/Liquid	8270C	0.38	0.50	ug/L	200	--	--	--
MCPA	94-74-6	Water/Liquid	8270C	0.29	0.30	ug/L	--	--	--	--
2,4-D	94-75-7	Water/Liquid	8270C	0.26	0.50	ug/L	70	--	--	--
Trichlopyr	55336-06-3	Water/Liquid	8270C	0.41	0.50	ug/L	300 (1)	--	--	--
Pentachlorophenol	87-86-5	Water/Liquid	8270C	0.39	0.50	ug/L	1 (3)	--	--	--
2,4,5-T.P.	93-72-1	Water/Liquid	8270C	0.28	0.50	ug/L	50 (3)	--	--	--
2,4,5-T	93-76-5	Water/Liquid	8270C	0.31	0.50	ug/L	--	--	--	--
Dinoseb	88-85-7	Water/Liquid	8270C	0.34	0.50	ug/L	7 (1)	--	--	--
2,4-D.B.	94-82-6	Water/Liquid	8270C	0.15	0.50	ug/L	60 (1)	--	--	--
Bentazone	25057-89-0	Water/Liquid	8270C	0.22	0.50	ug/L	200 (1)	--	--	--
Picloram	1918-02-1	Water/Liquid	8270C	0.25	0.50	ug/L	500	--	--	--
PCBs -										
Aroclor 1016	12674-11-2	Soil/Solid	8082	0.017	0.20	mg/kg	--	--	--	--
Aroclor 1221	11104-28-2	Soil/Solid	8082	0.039	0.20	mg/kg	--	--	--	--
Aroclor 1232	11141-16-5	Soil/Solid	8082	0.010	0.20	mg/kg	--	--	--	--
Aroclor 1242	53469-21-9	Soil/Solid	8082	0.016	0.20	mg/kg	--	--	--	--
Aroclor 1248	12672-29-6	Soil/Solid	8082	0.0078	0.20	mg/kg	--	--	--	--
Aroclor 1254	11097-69-1	Soil/Solid	8082	0.0071	0.20	mg/kg	--	--	--	--
Aroclor 1260	11096-82-5	Soil/Solid	8082	0.015	0.20	mg/kg	--	--	--	--
PCBs -										
Aroclor 1016	12674-11-2	Water/Liquid	8082	0.41	2.0	ug/L	--	--	--	--
Aroclor 1221	11104-28-2	Water/Liquid	8082	0.36	2.0	ug/L	--	--	--	--
Aroclor 1232	11141-16-5	Water/Liquid	8082	0.25	2.0	ug/L	--	--	--	--
Aroclor 1242	53469-21-9	Water/Liquid	8082	0.58	2.0	ug/L	--	--	--	--
Aroclor 1248	12672-29-6	Water/Liquid	8082	0.25	2.0	ug/L	--	--	--	--
Aroclor 1254	11097-69-1	Water/Liquid	8082	0.25	2.0	ug/L	--	--	--	--
Aroclor 1260	11096-82-5	Water/Liquid	8082	0.32	2.0	ug/L	--	--	--	--
VOCs - Soil/Solid										
1,1,1,2-Tetrachloroethane	630-20-6	Soil/Solid	8260B	0.019	0.25	mg/kg	--	1.4	31	51
1,1,1-Trichloroethane	71-55-6	Soil/Solid	8260B	0.0098	0.25	mg/kg	--	3.5	140	472
1,1,2,2-Tetrachloroethane	79-34-5	Soil/Solid	8260B	0.012	0.25	mg/kg	--	0.005	3.5	6.5
1,1,2-Trichloroethane	79-00-5	Soil/Solid	8260B	0.022	0.25	mg/kg	--	0.010	9	14
1,1,2-Trichlorotrifluoroethane	76-13-1	Soil/Solid	8260B	0.052	0.25	mg/kg	--	2580	3745	5430
1,1-Dichloroethane	75-34-3	Soil/Solid	8260B	0.013	0.25	mg/kg	--	0.18	34	55
1,1-Dichloroethene	75-35-4	Soil/Solid	8260B	0.016	0.25	mg/kg	--	0.025	20	60
1,1-Dichloropropene	563-58-6	Soil/Solid	8260B	0.021	0.25	mg/kg	--	--	--	--
1,2,3-Trichlorobenzene	87-61-6	Soil/Solid	8260B	0.063	0.50	mg/kg	--	--	--	--
1,2,3-Trichloropropane	96-18-4	Soil/Solid	8260B	0.017	0.25	mg/kg	--	0.35	--	--
1,2,4-Trichlorobenzene	120-82-1	Soil/Solid	8260B	0.052	0.50	mg/kg	--	0.31	200	985
1,2,4-Trimethylbenzene	95-63-6	Soil/Solid	8260B	0.013	0.25	mg/kg	--	--	8	25
1,2-Dibromo-3-chloropropane	96-12-8	Soil/Solid	8260B	0.079	0.50	mg/kg	--	0.001	--	--
1,2-Dibromoethane (EDB)	106-93-4	Soil/Solid	8260B	0.0056	0.25	mg/kg	--	0.00001	0.3	0.5
1,2-Dichlorobenzene	95-50-1	Soil/Solid	8260B	0.0055	0.25	mg/kg	--	8.1	26	75
1,2-Dichloroethane	107-06-2	Soil/Solid	8260B	0.030	0.25	mg/kg	--	0.010	4	6
1,2-Dichloropropane	78-87-5	Soil/Solid	8260B	0.016	0.25	mg/kg	--	0.011	4	6
1,3,5-Trimethylbenzene	108-67-8	Soil/Solid	8260B	0.0077	0.25	mg/kg	--	--	3	10
1,3-Dichlorobenzene	541-73-1	Soil/Solid	8260B	0.015	0.25	mg/kg	--	4.2	26	200
1,3-Dichloropropane	142-28-9	Soil/Solid	8260B	0.017	0.25	mg/kg	--	--	--	--
1,4-Dichlorobenzene	106-46-7	Soil/Solid	8260B	0.017	0.25	mg/kg	--	0.13	30	50
2,2-Dichloropropane	594-20-7	Soil/Solid	8260B	0.034	0.50	mg/kg	--	--	--	--
2-Butanone	78-93-3	Soil/Solid	8260B	0.069	2.0	mg/kg	--	--	5500	19000
2-Chlorotoluene	95-49-8	Soil/Solid	8260B	0.015	0.25	mg/kg	--	--	436	436
4-Chlorotoluene	106-43-4	Soil/Solid	8260B	0.015	0.25	mg/kg	--	--	--	--
Acetone	67-64-1	Soil/Solid	8260B	0.16	2.0	mg/kg	--	0.7	340	1000
Allyl chloride	107-05-1	Soil/Solid	8260B	0.016	0.50	mg/kg	--	0.032	--	--
Benzene	71-43-2	Soil/Solid	8260B	0.0070	0.25	mg/kg	--	0.034	6	10
Bromobenzene	108-86-1	Soil/Solid	8260B	0.017	0.25	mg/kg	--	--	--	--
Bromochloromethane	74-97-5	Soil/Solid	8260B	0.021	0.25	mg/kg	--	0.15	--	--
Bromodichloromethane	75-27-4	Soil/Solid	8260B	0.020	0.25	mg/kg	--	0.013	10	17
Bromoform	75-25-2	Soil/Solid	8260B	0.015	0.50	mg/kg	--	0.14	370	650
Bromomethane	74-83-9	Soil/Solid	8260B	0.012	0.50	mg/kg	--	0.5	0.7	2
Carbon tetrachloride	56-23-5	Soil/Solid	8260B	0.018	0.25	mg/kg	--	0.023	0.3	0.9
Chlorobenzene	108-90-7	Soil/Solid	8260B	0.011	0.25	mg/kg	--	1.1	11	32
Chloroethane	75-00-3	Soil/Solid	8260B	0.045	0.25	mg/kg	--	--	1000	3000
Chloroform	67-66-3	Soil/Solid	8260B	0.017	0.25	mg/kg	--	0.17	2.5	4
Chloromethane	74-87-3	Soil/Solid	8260B	0.017	0.25	mg/kg	--	0.006	8	23
cis-1,2-Dichloroethene	156-59-2	Soil/Solid	8260B	0.016	0.25	mg/kg	--	0.14	8	22
cis-1,3-Dichloropropene	10061-01-5	Soil/Solid	8260B	0.0098	0.25	mg/kg	--	0.005 M	--	--
Dibromochloromethane	124-48-1	Soil/Solid	8260B	0.014	0.25	mg/kg	--	0.03	12	20
Dibromomethane	74-95-3	Soil/Solid	8260B	0.021	0.25	mg/kg	--	--	260	1860

Table 1
Analytical Parameters, Methods and Quantitation Limits
Quality Assurance Project Plan, SSI/RI, SOCs 4 and 5
UMore Mining Area
Dakota County, Minnesota

Parameter	CAS Number	Matrix	Method (EPA unless noted otherwise)	Method Detection Limit	Reporting Limit	Test Unit	MDH Health Risk Limits [3]	Minnesota Tier SLV [4]	Minnesota SRV [5]	Minnesota Tier II Industrial SRV [6]
Dichlorodifluoromethane	75-71-8	Soil/Solid	8260B	0.035	0.50	mg/kg	--	38	16	50
Dichlorofluoromethane	75-43-4	Soil/Solid	8260B	0.014	0.25	mg/kg	--	--	--	--
Ethyl ether	60-29-7	Soil/Solid	8260B	0.017	0.50	mg/kg	--	1.2	--	--
Ethylbenzene	100-41-4	Soil/Solid	8260B	0.011	0.25	mg/kg	--	4.7	200	200
Hexachlorobutadiene	87-68-3	Soil/Solid	8260B	0.11	1.0	mg/kg	--	25	6	37
Isopropylbenzene	98-82-8	Soil/Solid	8260B	0.019	0.25	mg/kg	--	18	30	87
m,p-Xylene	108-38-3/ 106-42-3	Soil/Solid	8260B	0.024	0.50	mg/kg	--	45 M	45 M	130 M
Methyl isobutyl ketone	108-10-1	Soil/Solid	8260B	0.031	0.50	mg/kg	--	0.42	1700	9000
Methyl tert-butyl ether	1634-04-4	Soil/Solid	8260B	0.018	0.25	mg/kg	--	0.027	--	--
Methylene chloride	75-09-2	Soil/Solid	8260B	0.043	1.0	mg/kg	--	0.068	97	158
Naphthalene	91-20-3	Soil/Solid	8260B	0.060	0.50	mg/kg	--	7.5	10	28
n-Butylbenzene	104-51-8	Soil/Solid	8260B	0.012	0.25	mg/kg	--	--	30	92
n-Propylbenzene	103-65-1	Soil/Solid	8260B	0.013	0.25	mg/kg	--	--	30	93
o-Xylene	95-47-6	Soil/Solid	8260B	0.015	0.25	mg/kg	--	45 M	45 M	130 M
p-Isopropyltoluene	99-87-6	Soil/Solid	8260B	0.014	0.25	mg/kg	--	--	--	--
sec-Butylbenzene	135-98-8	Soil/Solid	8260B	0.012	0.25	mg/kg	--	--	25	70
Styrene	100-42-5	Soil/Solid	8260B	0.012	0.25	mg/kg	--	1.9	210	600
tert-Butylbenzene	98-06-6	Soil/Solid	8260B	0.0073	0.25	mg/kg	--	--	30	90
Tetrachloroethene	127-18-4	Soil/Solid	8260B	0.016	0.25	mg/kg	--	0.068	72	131
Tetrahydrofuran	109-99-9	Soil/Solid	8260B	0.068	2.0	mg/kg	--	0.16	--	--
Toluene	108-88-3	Soil/Solid	8260B	0.0063	0.25	mg/kg	--	6.4	107	305
trans-1,2-Dichloroethene	156-60-5	Soil/Solid	8260B	0.016	0.25	mg/kg	--	0.27	11	33
trans-1,3-Dichloropropene	10061-02-6	Soil/Solid	8260B	0.013	0.25	mg/kg	--	0.005 M	--	--
Trichloroethene	79-01-6	Soil/Solid	8260B	0.013	0.25	mg/kg	--	0.14	29	46
Trichlorofluoromethane	75-69-4	Soil/Solid	8260B	0.035	0.25	mg/kg	--	22	67	195
Vinyl chloride	75-01-4	Soil/Solid	8260B	0.031	0.25	mg/kg	--	0.001	0.8	2.2
VOCs - Water/Liquid										
1,1,1,2-Tetrachloroethane	630-20-6	Water/Liquid	8260B	0.083	1.0	ug/L	70	--	--	--
1,1,1-Trichloroethane	71-55-6	Water/Liquid	8260B	0.098	1.0	ug/L	9000 (4)	--	--	--
1,1,2,2-Tetrachloroethane	79-34-5	Water/Liquid	8260B	0.084	1.0	ug/L	2	--	--	--
1,1,2-Trichloroethane	79-00-5	Water/Liquid	8260B	0.15	1.0	ug/L	3	--	--	--
1,1,2-Trichlorotrifluoroethane	76-13-1	Water/Liquid	8260B	0.10	1.0	ug/L	200000	--	--	--
1,1-Dichloroethane	75-34-3	Water/Liquid	8260B	0.094	1.0	ug/L	100 (7)	--	--	--
1,1-Dichloroethene	75-35-4	Water/Liquid	8260B	0.10	1.0	ug/L	200	--	--	--
1,1-Dichloropropene	563-58-6	Water/Liquid	8260B	0.099	1.0	ug/L	--	--	--	--
1,2,3-Trichlorobenzene	87-61-6	Water/Liquid	8260B	0.40	5.0	ug/L	--	--	--	--
1,2,3-Trichloropropane	96-18-4	Water/Liquid	8260B	0.13	2.5	ug/L	40	--	--	--
1,2,4-Trichlorobenzene	120-82-1	Water/Liquid	8260B	0.52	5.0	ug/L	--	--	--	--
1,2,4-Trimethylbenzene	95-63-6	Water/Liquid	8260B	0.052	1.0	ug/L	--	--	--	--
1,2-Dibromo-3-chloropropane	96-12-8	Water/Liquid	8260B	1.2	5.0	ug/L	--	--	--	--
1,2-Dibromoethane (EDB)	106-93-4	Water/Liquid	8260B	0.10	2.5	ug/L	0.004	--	--	--
1,2-Dichlorobenzene	95-50-1	Water/Liquid	8260B	0.12	1.0	ug/L	600	--	--	--
1,2-Dichloroethane	107-06-2	Water/Liquid	8260B	0.084	1.0	ug/L	4	--	--	--
1,2-Dichloropropane	78-87-5	Water/Liquid	8260B	0.13	1.0	ug/L	5	--	--	--
1,3,5-Trimethylbenzene	108-67-8	Water/Liquid	8260B	0.066	1.0	ug/L	100 (4) (6)	--	--	--
1,3-Dichlorobenzene	541-73-1	Water/Liquid	8260B	0.094	1.0	ug/L	--	--	--	--
1,3-Dichloropropane	142-28-9	Water/Liquid	8260B	0.074	1.0	ug/L	--	--	--	--
1,4-Dichlorobenzene	106-46-7	Water/Liquid	8260B	0.053	1.0	ug/L	10	--	--	--
2,2-Dichloropropane	594-20-7	Water/Liquid	8260B	0.23	5.0	ug/L	--	--	--	--
2-Butanone	78-93-3	Water/Liquid	8260B	0.58	20	ug/L	4000	--	--	--
2-Chlorotoluene	95-49-8	Water/Liquid	8260B	0.077	1.0	ug/L	--	--	--	--
4-Chlorotoluene	106-43-4	Water/Liquid	8260B	0.059	1.0	ug/L	--	--	--	--
Acetone	67-64-1	Water/Liquid	8260B	0.89	20	ug/L	700	--	--	--
Allyl chloride	107-05-1	Water/Liquid	8260B	0.28	5.0	ug/L	30	--	--	--
Benzene	71-43-2	Water/Liquid	8260B	0.047	1.0	ug/L	2 (4)	--	--	--
Bromobenzene	108-86-1	Water/Liquid	8260B	0.084	1.0	ug/L	--	--	--	--
Bromochloromethane	74-97-5	Water/Liquid	8260B	0.075	1.0	ug/L	--	--	--	--
Bromodichloromethane	75-27-4	Water/Liquid	8260B	0.13	1.0	ug/L	6	--	--	--
Bromoform	75-25-2	Water/Liquid	8260B	0.074	5.0	ug/L	40	--	--	--
Bromomethane	74-83-9	Water/Liquid	8260B	0.26	5.0	ug/L	10	--	--	--
Carbon tetrachloride	56-23-5	Water/Liquid	8260B	0.074	1.0	ug/L	3	--	--	--
Chlorobenzene	108-90-7	Water/Liquid	8260B	0.025	1.0	ug/L	100	--	--	--
Chloroethane	75-00-3	Water/Liquid	8260B	0.26	2.5	ug/L	--	--	--	--
Chloroform	67-66-3	Water/Liquid	8260B	0.098	1.0	ug/L	30 (4) (6)	--	--	--
Chloromethane	74-87-3	Water/Liquid	8260B	0.098	2.5	ug/L	--	--	--	--
cis-1,2-Dichloroethene	156-59-2	Water/Liquid	8260B	0.12	1.0	ug/L	50 (4)	--	--	--
cis-1,3-Dichloropropene	10061-01-5	Water/Liquid	8260B	0.11	1.0	ug/L	--	--	--	--
Dibromochloromethane	124-48-1	Water/Liquid	8260B	0.084	2.5	ug/L	10	--	--	--
Dibromomethane	74-95-3	Water/Liquid	8260B	0.14	2.5	ug/L	--	--	--	--
Dichlorodifluoromethane	75-71-8	Water/Liquid	8260B	0.39	5.0	ug/L	700 (4)	--	--	--
Dichlorofluoromethane	75-43-4	Water/Liquid	8260B	0.070	1.0	ug/L	--	--	--	--
Ethyl ether	60-29-7	Water/Liquid	8260B	0.10	5.0	ug/L	1000	--	--	--

Table 1
Analytical Parameters, Methods and Quantitation Limits
Quality Assurance Project Plan, SSI/RI, SOCs 4 and 5
UMore Mining Area
Dakota County, Minnesota

Parameter	CAS Number	Matrix	Method (EPA unless noted otherwise)	Method Detection Limit	Reporting Limit	Test Unit	MDH Health Risk Limits [3]	Minnesota Tier SLV [4]	Minnesota SRV [5]	Minnesota Tier II Industrial SRV [6]
Ethylbenzene	100-41-4	Water/Liquid	8260B	0.055	1.0	ug/L	700	--	--	--
Hexachlorobutadiene	87-68-3	Water/Liquid	8260B	0.58	10	ug/L	1	--	--	--
Isopropylbenzene	98-82-8	Water/Liquid	8260B	0.068	1.0	ug/L	300	--	--	--
m,p-Xylene	108-38-3 106-42 3	Water/Liquid	8260B	0.14	2.0	ug/L	10000 M	--	--	--
Methyl isobutyl ketone	108-10-1	Water/Liquid	8260B	0.13	5.0	ug/L	300	--	--	--
Methyl tert-butyl ether	1634-04-4	Water/Liquid	8260B	0.079	1.0	ug/L	--	--	--	--
Methylene chloride	75-09-2	Water/Liquid	8260B	0.29	5.0	ug/L	5 (3)	--	--	--
Naphthalene	91-20-3	Water/Liquid	8260B	0.38	5.0	ug/L	300	--	--	--
n-Butylbenzene	104-51-8	Water/Liquid	8260B	0.094	2.5	ug/L	--	--	--	--
n-Propylbenzene	103-65-1	Water/Liquid	8260B	0.079	1.0	ug/L	--	--	--	--
o-Xylene	95-47-6	Water/Liquid	8260B	0.074	1.0	ug/L	10000 M	--	--	--
p-Isopropyltoluene	99-87-6	Water/Liquid	8260B	0.087	2.5	ug/L	--	--	--	--
sec-Butylbenzene	135-98-8	Water/Liquid	8260B	0.030	1.0	ug/L	--	--	--	--
Styrene	100-42-5	Water/Liquid	8260B	0.072	1.0	ug/L	--	--	--	--
tert-Butylbenzene	98-06-6	Water/Liquid	8260B	0.046	1.0	ug/L	--	--	--	--
Tetrachloroethene	127-18-4	Water/Liquid	8260B	0.10	1.0	ug/L	5 (3)	--	--	--
Tetrahydrofuran	109-99-9	Water/Liquid	8260B	0.76	20	ug/L	--	--	--	--
Toluene	108-88-3	Water/Liquid	8260B	0.036	1.0	ug/L	1000	--	--	--
trans-1,2-Dichloroethene	156-60-5	Water/Liquid	8260B	0.14	1.0	ug/L	100	--	--	--
trans-1,3-Dichloropropene	10061-02-6	Water/Liquid	8260B	0.082	1.0	ug/L	--	--	--	--
Trichloroethene	79-01-6	Water/Liquid	8260B	0.097	1.0	ug/L	5 (3)	--	--	--
Trichlorofluoromethane	75-69-4	Water/Liquid	8260B	0.17	1.0	ug/L	2000	--	--	--
Vinyl chloride	75-01-4	Water/Liquid	8260B	0.10	1.0	ug/L	0.2 (4)	--	--	--
SemiVolatile Organics										
1,2,4-Trichlorobenzene	120-82-1	Soil/Solid	8270C	0.020	0.33	mg/kg	--	0.31	200	985
1,2-Dichlorobenzene	95-50-1	Soil/Solid	8270C	0.012	0.33	mg/kg	--	8.1	26	75
1,2-Diphenylhydrazine as Azobenzene	103-33-3	Soil/Solid	8270C	0.039	0.33	mg/kg	--	--	--	--
1,3-Dichlorobenzene	541-73-1	Soil/Solid	8270C	0.014	0.33	mg/kg	--	4.2	26	200
1,4-Dichlorobenzene	106-46-7	Soil/Solid	8270C	0.013	0.33	mg/kg	--	0.13	30	50
2,3,4,6-Tetrachlorophenol	58-90-2	Soil/Solid	8270C	0.072	0.67	mg/kg	--	--	636	3700
2,4,5-Trichlorophenol	95-95-4	Soil/Solid	8270C	0.039	0.67	mg/kg	--	--	1920	10600
2,4,6-Trichlorophenol	88-06-2	Soil/Solid	8270C	0.081	0.67	mg/kg	--	0.21	595	1060
2,4-Dichlorophenol	120-83-2	Soil/Solid	8270C	0.046	0.67	mg/kg	--	0.076	48	230
2,4-Dimethylphenol	105-67-9	Soil/Solid	8270C	0.079	0.67	mg/kg	--	0.34	390	1925
2,4-Dinitrophenol	51-28-5	Soil/Solid	8270C	0.064	0.67	mg/kg	--	0.014	--	--
2,4-Dinitrotoluene	121-14-2	Soil/Solid	8270C	0.044	0.33	mg/kg	--	0.001	50	355
2,6-Dichlorophenol	87-65-0	Soil/Solid	8270C	0.042	0.67	mg/kg	--	--	--	--
2,6-Dinitrotoluene	606-20-2	Soil/Solid	8270C	0.040	0.33	mg/kg	--	0.001	25	175
2-Chloronaphthalene	91-58-7	Soil/Solid	8270C	0.018	0.33	mg/kg	--	--	--	--
2-Chlorophenol	95-57-8	Soil/Solid	8270C	0.029	0.67	mg/kg	--	0.26	--	--
2-Methylnaphthalene	91-57-6	Soil/Solid	8270C	0.021	0.33	mg/kg	--	--	100	369
2-Methylphenol	95-48-7	Soil/Solid	8270C	0.019	0.67	mg/kg	--	0.064	75	352
2-Nitroaniline	88-74-4	Soil/Solid	8270C	0.041	0.33	mg/kg	--	--	--	--
2-Nitrophenol	88-75-5	Soil/Solid	8270C	0.040	0.67	mg/kg	--	0.60	--	--
3,3´-Dichlorobenzidine	91-94-1	Soil/Solid	8270C	0.21	1.6	mg/kg	--	0.36	25	50
3-Nitroaniline	99-09-2	Soil/Solid	8270C	0.041	0.33	mg/kg	--	--	--	--
4,6-Dinitro-2-methylphenol	534-52-1	Soil/Solid	8270C	0.097	0.67	mg/kg	--	--	--	--
4-Bromophenyl phenyl ether	101-55-3	Soil/Solid	8270C	0.044	0.33	mg/kg	--	--	--	--
4-Chloro-3-methylphenol	59-50-7	Soil/Solid	8270C	0.075	0.67	mg/kg	--	--	--	--
4-Chloroaniline	106-47-8	Soil/Solid	8270C	0.022	0.67	mg/kg	--	--	--	--
4-Chlorophenyl phenyl ether	7005-72-3	Soil/Solid	8270C	0.024	0.33	mg/kg	--	--	--	--
4-Methylphenol	106-44-5	Soil/Solid	8270C	0.017	0.67	mg/kg	--	0.033	10	59
4-Nitroaniline	100-01-6	Soil/Solid	8270C	0.044	0.33	mg/kg	--	--	--	--
4-Nitrophenol	100-02-7	Soil/Solid	8270C	0.081	0.67	mg/kg	--	--	--	--
Acenaphthene	83-32-9	Soil/Solid	8270C	0.020	0.33	mg/kg	--	50	1200	5260
Acenaphthylene	208-96-8	Soil/Solid	8270C	0.031	0.33	mg/kg	--	--	--	--
Aniline	62-53-3	Soil/Solid	8270C	0.034	0.67	mg/kg	--	--	--	--
Anthracene	120-12-7	Soil/Solid	8270C	0.043	0.33	mg/kg	--	942	7880	45400
Benzidine	92-87-5	Soil/Solid	8270C	0.71	2.5	mg/kg	--	--	--	--
Benzo (a) anthracene	56-55-3	Soil/Solid	8270C	0.045	0.33	mg/kg	--	10.2 T	2 T	3 T
Benzo (a) pyrene	50-32-8	Soil/Solid	8270C	0.049	0.33	mg/kg	--	10.2 T	2 T	3 T
Benzo (b) fluoranthene	205-99-2	Soil/Solid	8270C	0.048	0.33	mg/kg	--	10.2 T	2 T	3 T
Benzo (g,h,i) perylene	191-24-2	Soil/Solid	8270C	0.050	0.33	mg/kg	--	--	--	--
Benzo (k) fluoranthene	207-08-9	Soil/Solid	8270C	0.053	0.33	mg/kg	--	10.2 T	2 T	3 T
Benzoic acid	65-85-0	Soil/Solid	8270C	0.036	0.33	mg/kg	--	30	50000	100000
Benzyl alcohol	100-51-6	Soil/Solid	8270C	0.11	0.67	mg/kg	--	--	8700	56000

Table 1
Analytical Parameters, Methods and Quantitation Limits
Quality Assurance Project Plan, SSI/RI, SOCs 4 and 5
UMore Mining Area
Dakota County, Minnesota

Parameter	CAS Number	Matrix	Method (EPA unless noted otherwise)	Method Detection Limit	Reporting Limit	Test Unit	MDH Health Risk Limits [3]	Minnesota Tier SLV [4]	Minnesota SRV [5]	Minnesota Tier II Industrial SRV [6]
Bis(2-chloroethoxy)methane	111-91-1	Soil/Solid	8270C	0.021	0.33	mg/kg	--	--	--	--
Bis(2-chloroethyl)ether	111-44-4	Soil/Solid	8270C	0.013	0.33	mg/kg	--	0.001	2.5	5
Bis(2-chloroisopropyl)ether	39638-32-9	Soil/Solid	8270C	0.017	0.33	mg/kg	--	--	--	--
Bis(2-ethylhexyl)phthalate	117-81-7	Soil/Solid	8270C	0.046	0.33	mg/kg	--	40	570	2100
Butyl benzyl phthalate	85-68-7	Soil/Solid	8270C	0.047	0.33	mg/kg	--	28	580	3700
Carbazole	86-74-8	Soil/Solid	8270C	0.044	0.33	mg/kg	--	--	700	1310
Chrysene	218-01-9	Soil/Solid	8270C	0.049	0.33	mg/kg	--	10.2 T	2 T	3 T
Dibenz (a,h) anthracene	53-70-3	Soil/Solid	8270C	0.053	0.33	mg/kg	--	10.2 T	2 T	3 T
Dibenzofuran	132-64-9	Soil/Solid	8270C	0.022	0.33	mg/kg	--	--	104	810
Diethyl phthalate	84-66-2	Soil/Solid	8270C	0.045	0.33	mg/kg	--	18	--	--
Dimethyl phthalate	131-11-3	Soil/Solid	8270C	0.043	0.33	mg/kg	--	172	--	--
Di-n-butyl phthalate	84-74-2	Soil/Solid	8270C	0.054	0.33	mg/kg	--	23	2440	16300
Di-n-octyl phthalate	117-84-0	Soil/Solid	8270C	0.056	0.33	mg/kg	--	--	520	3700
Fluoranthene	206-44-0	Soil/Solid	8270C	0.047	0.33	mg/kg	--	295	1080	6800
Fluorene	86-73-7	Soil/Solid	8270C	0.011	0.33	mg/kg	--	47	850	4120
Hexachlorobenzene	118-74-1	Soil/Solid	8270C	0.041	0.33	mg/kg	--	0.32	5	9
Hexachlorobutadiene	87-68-3	Soil/Solid	8270C	0.035	0.33	mg/kg	--	25	6	37
Hexachlorocyclopentadiene	77-47-4	Soil/Solid	8270C	0.030	0.33	mg/kg	--	4.4	2	6
Hexachloroethane	67-72-1	Soil/Solid	8270C	0.018	0.33	mg/kg	--	0.050	--	--
Indeno (1,2,3-cd) pyrene	193-39-5	Soil/Solid	8270C	0.042	0.33	mg/kg	--	10.2 T	2 T	3 T
Isophorone	78-59-1	Soil/Solid	8270C	0.018	0.33	mg/kg	--	0.16	--	--
Naphthalene	91-20-3	Soil/Solid	8270C	0.015	0.33	mg/kg	--	7.5	10	28
Nitrobenzene	98-95-3	Soil/Solid	8270C	0.014	0.33	mg/kg	--	--	--	--
N-Nitrosodimethylamine	62-75-9	Soil/Solid	8270C	0.028	0.33	mg/kg	--	0.82	--	--
N-Nitrosodi-n-propylamine	621-64-7	Soil/Solid	8270C	0.014	0.33	mg/kg	--	--	0.7	1.2
N-Nitrosodiphenylamine ***	86-30-6	Soil/Solid	8270C	0.045	0.33	mg/kg	--	0.88	1950	3720
Diphenylamine ***	122-39-4	Soil/Solid	8270C	--	--	--	--	--	--	--
Pentachlorophenol	87-86-5	Soil/Solid	8270C	0.081	0.67	mg/kg	--	0.034	80	120
Phenanthrene	85-01-8	Soil/Solid	8270C	0.026	0.33	mg/kg	--	--	--	--
Phenol	108-95-2	Soil/Solid	8270C	0.027	0.67	mg/kg	--	7.8	1500	20203
Pyrene	129-00-0	Soil/Solid	8270C	0.046	0.33	mg/kg	--	272	890	5800
2,4-Dinitrotoluene (DNT)	121-14-2	Soil/Solid	8270C	0.063	3.0	mg/kg	--	0.001	50	355
2,6-Dinitrotoluene (DNT)	606-20-2	Soil/Solid	8270C	0.13	3.0	mg/kg	--	0.001	25	175
SemiVolatile Organics										
1,2,4-Trichlorobenzene	120-82-1	Water/Liquid	8270C	0.28	10	ug/L	--	--	--	--
1,2-Dichlorobenzene	95-50-1	Water/Liquid	8270C	0.21	10	ug/L	600	--	--	--
1,2-Diphenylhydrazine as Azobenzene	103-33-3	Water/Liquid	8270C	0.20	10	ug/L	--	--	--	--
1,3-Dichlorobenzene	541-73-1	Water/Liquid	8270C	0.21	10	ug/L	--	--	--	--
1,4-Dichlorobenzene	106-46-7	Water/Liquid	8270C	0.18	10	ug/L	10	--	--	--
2,3,4,6-Tetrachlorophenol	58-90-2	Water/Liquid	8270C	1.0	10	ug/L	--	--	--	--
2,4,5-Trichlorophenol	95-95-4	Water/Liquid	8270C	0.85	10	ug/L	--	--	--	--
2,4,6-Trichlorophenol	88-06-2	Water/Liquid	8270C	0.89	10	ug/L	30	--	--	--
2,4-Dichlorophenol	120-83-2	Water/Liquid	8270C	0.78	10	ug/L	20	--	--	--
2,4-Dimethylphenol	105-67-9	Water/Liquid	8270C	0.76	10	ug/L	100	--	--	--
2,4-Dinitrophenol	51-28-5	Water/Liquid	8270C	0.50	10	ug/L	10	--	--	--
2,4-Dinitrotoluene	121-14-2	Water/Liquid	8270C	0.49	10	ug/L	0.5 (2)	--	--	--
2,6-Dichlorophenol	87-65-0	Water/Liquid	8270C	0.78	10	ug/L	--	--	--	--
2,6-Dinitrotoluene	606-20-2	Water/Liquid	8270C	0.39	10	ug/L	0.5 (2)	--	--	--
2-Chloronaphthalene	91-58-7	Water/Liquid	8270C	0.20	10	ug/L	--	--	--	--
2-Chlorophenol	95-57-8	Water/Liquid	8270C	0.66	10	ug/L	30	--	--	--
2-Methylnaphthalene	91-57-6	Water/Liquid	8270C	0.32	10	ug/L	--	--	--	--
2-Methylphenol	95-48-7	Water/Liquid	8270C	0.77	10	ug/L	30	--	--	--
2-Nitroaniline	88-74-4	Water/Liquid	8270C	0.92	10	ug/L	--	--	--	--
2-Nitrophenol	88-75-5	Water/Liquid	8270C	1.0	10	ug/L	--	--	--	--
3,3´-Dichlorobenzidine	91-94-1	Water/Liquid	8270C	7.1	25	ug/L	0.8	--	--	--
3-Nitroaniline	99-09-2	Water/Liquid	8270C	0.95	10	ug/L	--	--	--	--
4,6-Dinitro-2-methylphenol	534-52-1	Water/Liquid	8270C	0.90	10	ug/L	--	--	--	--
4-Bromophenyl phenyl ether	101-55-3	Water/Liquid	8270C	0.19	10	ug/L	--	--	--	--
4-Chloro-3-methylphenol	59-50-7	Water/Liquid	8270C	0.79	10	ug/L	--	--	--	--
4-Chloroaniline	106-47-8	Water/Liquid	8270C	1.0	10	ug/L	--	--	--	--
4-Chlorophenol	106-48-9	Water/Liquid	8270C	NA	NA	ug/L	--	--	--	--
4-Chlorophenyl phenyl ether	7005-72-3	Water/Liquid	8270C	0.15	10	ug/L	--	--	--	--
4-Methylphenol	106-44-5	Water/Liquid	8270C	0.82	10	ug/L	3	--	--	--
4-Nitroaniline	100-01-6	Water/Liquid	8270C	0.83	10	ug/L	--	--	--	--
4-Nitrophenol	100-02-7	Water/Liquid	8270C	1.2	10	ug/L	--	--	--	--
Acenaphthene	83-32-9	Water/Liquid	8270C	0.15	10	ug/L	400	--	--	--
Acenaphthylene	208-96-8	Water/Liquid	8270C	0.17	10	ug/L	--	--	--	--

Table 1
Analytical Parameters, Methods and Quantitation Limits
Quality Assurance Project Plan, SSI/RI, SOCs 4 and 5
UMore Mining Area
Dakota County, Minnesota

Parameter	CAS Number	Matrix	Method (EPA unless noted otherwise)	Method Detection Limit	Reporting Limit	Test Unit	MDH Health Risk Limits [3]	Minnesota Tier SLV [4]	Minnesota SRV [5]	Minnesota Tier II Industrial SRV [6]
Aniline	62-53-3	Water/Liquid	8270C	0.97	10	ug/L	--	--	--	--
Anthracene	120-12-7	Water/Liquid	8270C	0.18	10	ug/L	2000	--	--	--
Benzidine	92-87-5	Water/Liquid	8270C	23	100	ug/L	--	--	--	--
Benzo (a) anthracene	56-55-3	Water/Liquid	8270C	0.18	10	ug/L	--	--	--	--
Benzo (a) pyrene	50-32-8	Water/Liquid	8270C	0.22	10	ug/L	--	--	--	--
Benzo (b) fluoranthene	205-99-2	Water/Liquid	8270C	0.18	10	ug/L	--	--	--	--
Benzo (g,h,i) perylene	191-24-2	Water/Liquid	8270C	0.24	10	ug/L	--	--	--	--
Benzo (k) fluoranthene	207-08-9	Water/Liquid	8270C	0.21	10	ug/L	--	--	--	--
Benzoic acid	65-85-0	Water/Liquid	8270C	0.75	10	ug/L	30000	--	--	--
Benzyl alcohol	100-51-6	Water/Liquid	8270C	0.66	10	ug/L	--	--	--	--
Bis(2-chloroethoxy)methane	111-91-1	Water/Liquid	8270C	0.21	10	ug/L	--	--	--	--
Bis(2-chloroethyl)ether	111-44-4	Water/Liquid	8270C	0.21	10	ug/L	0.3	--	--	--
Bis(2-chloroisopropyl)ether	39638-32-9	Water/Liquid	8270C	0.14	10	ug/L	--	--	--	--
Bis(2-ethylhexyl)phthalate	117-81-7	Water/Liquid	8270C	0.45	10	ug/L	20 (1)	--	--	--
Butyl benzyl phthalate	85-68-7	Water/Liquid	8270C	0.33	10	ug/L	100	--	--	--
Carbazole	86-74-8	Water/Liquid	8270C	0.24	10	ug/L	--	--	--	--
Chrysene	218-01-9	Water/Liquid	8270C	0.15	10	ug/L	--	--	--	--
Dibenz (a,h) anthracene	53-70-3	Water/Liquid	8270C	0.25	10	ug/L	--	--	--	--
Dibenzofuran	132-64-9	Water/Liquid	8270C	0.27	10	ug/L	--	--	--	--
Diethyl phthalate	84-66-2	Water/Liquid	8270C	0.32	10	ug/L	6000	--	--	--
Dimethyl phthalate	131-11-3	Water/Liquid	8270C	0.26	10	ug/L	70000	--	--	--
Di-n-butyl phthalate	84-74-2	Water/Liquid	8270C	0.33	10	ug/L	700	--	--	--
Di-n-octyl phthalate	117-84-0	Water/Liquid	8270C	0.42	10	ug/L	--	--	--	--
Fluoranthene	206-44-0	Water/Liquid	8270C	0.23	10	ug/L	300	--	--	--
Fluorene	86-73-7	Water/Liquid	8270C	0.16	10	ug/L	300	--	--	--
Hexachlorobenzene	118-74-1	Water/Liquid	8270C	0.15	10	ug/L	0.2	--	--	--
Hexachlorobutadiene	87-68-3	Water/Liquid	8270C	0.34	10	ug/L	1	--	--	--
Hexachlorocyclopentadiene	77-47-4	Water/Liquid	8270C	0.22	10	ug/L	--	--	--	--
Hexachloroethane	67-72-1	Water/Liquid	8270C	0.30	10	ug/L	--	--	--	--
Indeno (1,2,3-cd) pyrene	193-39-5	Water/Liquid	8270C	0.19	10	ug/L	--	--	--	--
Isophorone	78-59-1	Water/Liquid	8270C	0.23	10	ug/L	100	--	--	--
Naphthalene	91-20-3	Water/Liquid	8270C	0.19	10	ug/L	300	--	--	--
Nitrobenzene	98-95-3	Water/Liquid	8270C	0.26	10	ug/L	--	--	--	--
N-Nitrosodimethylamine	62-75-9	Water/Liquid	8270C	0.30	10	ug/L	--	--	--	--
N-Nitrosodi-n-propylamine	621-64-7	Water/Liquid	8270C	0.28	10	ug/L	--	--	--	--
N-Nitrosodiphenylamine ***	86-30-6	Water/Liquid	8270C	0.27	10	ug/L	70	--	--	--
Diphenylamine ***	122-39-4	Water/Liquid	8270C	--	--	--	--	--	--	--
Pentachlorophenol	87-86-5	Water/Liquid	8270C	0.99	10	ug/L	1 (3)	--	--	--
Phenanthrene	85-01-8	Water/Liquid	8270C	0.13	10	ug/L	--	--	--	--
Phenol	108-95-2	Water/Liquid	8270C	0.59	10	ug/L	4000	--	--	--
Pyrene	129-00-0	Water/Liquid	8270C	0.24	10	ug/L	200	--	--	--

Notes:

M - the values with this notation indicate the limit is for all combined isomers of this compound

T - the values with this notation represent the limit for the total carcinogenic PAHs as BaP

C - Mercury as mercuric chloride

(TA) - Legend Technical Services, Inc. will subcontract this analysis to Test America, West Sacramento, California.

(Braun) - Legend Technical Services, Inc. will subcontract this analysis to Braun Intertec, Minneapolis, MN.

(1) Not a HRL but a Health Based Value (HBV)

(2) (SRL)-Specific Risk Level (water concentration which corresponds to a riskof 1E-5.

(3) Not a HRL but an EPA Maximum Contaminant Level (MCL).

(4) Value is representative of the lowest exposure duration published in the 2008 Health Risk Limits.

(5) Value represents the criteria for Chromium, hexavalent.

(6) Set at short-term HRL.

(7) Not a HRL, but a Risk Assessment Advice (RAA).

(8) Value represents the criteria for Chromium, Trivalent.

[3] - Minnesota Department of Health, Health Risk Limit (HRL) unless noted otherwise.

[4] - Minnesota Pollution Control Agency's Risk-based guidance for Soil - Soil Leaching Value (SLV)

[5] - Minnesota Pollution Control Agency's Risk-based guidance for Soil - Soil Reference Value (SRV)

[6] - Minnesota Pollution Control Agency's Risk-based guidance for Soil - Tier II Industrial SRV.

Table 2

Data Quality Objectives
Quality Assurance Project Plan, SSI/RI Work Plan, SOCs 4 and 5
UMore Mining Area
Dakota County, MN

Step 1: Identify the Problem	Step 2: Identify the Decisions	Step 3: Identify Inputs to the Decisions	Step 4: Define the Study Boundaries	Step 5: Develop a Decision Rule	Step 6: Specify Limits on Decision Errors	Step 7: Optimize the Design for Obtaining Data
SOC 4 – OU1: Former DNT Loading Platform and Drainage Ditch: Characterization is needed to determine if hazardous substances have been released to the soil or groundwater.	**Study Question:** Are COCs present in soil and groundwater at concentrations above ARARs and TCBs? **Alternative actions:** - No further investigation - Additional investigation **Decision Statement:** Determine if COCs are present in soil and groundwater and at what concentrations.	1. New and existing validated measurements of COC concentrations in soil samples collected from SOC 4-OU1. 2. New and existing validated measurements of COC concentrations in groundwater samples collected from SOC 4-OU1.	The boundary of SOC 4-OU1 is included in the Work Plan (Barr, 2009).	If concentrations of COCs in soil and groundwater samples exceed ARARs and TCBs, further sampling and analysis will be conducted to determine magnitude and extent of the COC-impacted soils and groundwater.	Potential sampling errors include sampling design errors and measurement errors. Design errors are countered with an adequate number of sampling points and measurement errors are minimized through systematic uniform management of each of the steps of measurement using SOPs and by following the QAPP.	Samples of surface soil will be collected from three soil borings and one test trench and analyzed for COCs listed in the work plan. Surface and subsurface soils will be field screened for organic vapors. If elevated organic vapors are detected or other evidence of a release of hazardous substances are observed, additional samples for COCs will be collected from the interval demonstrating the most significant indications of the release. Groundwater samples will be collected from two soil borings and analyzed for COCs listed in the work plan. Subsurface soils will be field screened for organic vapors. If elevated organic vapors are detected or other evidence of a release of hazardous substances are observed, additional samples for COCs will be collected from the interval demonstrating the most significant indications of the release. Sampling locations, depths, and methods are discussed in the Work Plan and FSP.
SOC 4 – OU2: Settling Basin and Drainage Ditch South of SOC 5: Characterization is needed to determine if hazardous substances have been released to the soil or groundwater.	**Study Question:** Are COCs present in soil and groundwater at concentrations above ARARs and TCBs? **Alternative actions:** - No further investigation - Additional investigation **Decision Statement:** Determine if COCs are present in soil and groundwater and at what concentrations.	1. New and existing validated measurements of COC concentrations in soil samples collected from SOC 4-OU2. 2. New and existing validated measurements of COC concentrations in groundwater samples collected from SOC 4-OU2.	The boundary of SOC 4-OU2 is included in the Work Plan (Barr, 2009).	If concentrations of COCs in soil and groundwater samples exceed ARARs and TCBs, further sampling and analysis will be conducted to determine magnitude and extent of the COC-impacted soils and groundwater.	Potential sampling errors include sampling design errors and measurement errors. Design errors are countered with an adequate number of sampling points and measurement errors are minimized through systematic uniform management of each of the steps of measurement using SOPs and by following the QAPP.	Samples of surface soil will be collected from four soil borings and one test trench and analyzed for COCs listed in the work plan. Surface and subsurface soils will be field screened for organic vapors. If elevated organic vapors are detected or other evidence of a release of hazardous substances are observed, additional samples for COCs will be collected from the interval demonstrating the most significant indications of the release. Groundwater samples will be collected from one soil boring and analyzed for COCs listed in the work plan. Subsurface soils will be field screened for organic vapors. If elevated organic vapors are detected or other evidence of a release of hazardous substances are observed, additional samples for COCs will be collected from the interval demonstrating the most significant indications of the release. Sampling locations, depths, and methods are discussed in the Work Plan and FSP.
SOC 4 – OU3: Surficial Debris Area: Characterization is needed to determine if hazardous substances have been released to the soil.	**Study Question:** Are COCs present in soil beneath the surface debris at concentrations above ARARs and TCBs? **Alternative actions:** - No further investigation - Additional investigation **Decision Statement:** Determine if COCs are present in soil and at what concentrations.	1. New and existing validated measurements of COC concentrations in soil samples collected from SOC 4-OU3. 2. Description and field screening results of the debris encountered at the ground surface.	The boundary of SOC 4-OU3 is included in the Work Plan (Barr, 2009).	If concentrations of COCs in soil samples exceed ARARs and TCBs, further sampling and analysis will be conducted to determine magnitude and extent of the COC-impacted soils.	Potential sampling errors include sampling design errors and measurement errors. Design errors are countered with an adequate number of sampling points and measurement errors are minimized through systematic uniform management of each of the steps of measurement using SOPs and by following the QAPP.	Surface and subsurface soils in the vicinity and beneath the surficial debris will be field screened for organic vapors. If elevated organic vapors are detected or other evidence of a release of hazardous substances are observed, samples for COCs will be collected from the interval demonstrating the most significant indications of the release. Sampling locations and methods are discussed in the Work Plan and FSP.

Table 2

Data Quality Objectives
Quality Assurance Project Plan, SSI/RI Work Plan, SOCs 4 and 5
UMore Mining Area
Dakota County, MN

Step 1: Identify the Problem	Step 2: Identify the Decisions	Step 3: Identify Inputs to the Decisions	Step 4: Define the Study Boundaries	Step 5: Develop a Decision Rule	Step 6: Specify Limits on Decision Errors	Step 7: Optimize the Design for Obtaining Data
SOC 5 – OU1 a-h: DNT Storage Bunkers: Characterization is needed to determine if hazardous substances or petroleum products have been released to the soil or groundwater.	**Study Question:** Are COCs present in soil and groundwater at concentrations above ARARs and TCBs? **Alternative actions:** - No further investigation - Additional investigation **Decision Statement:** Determine if COCs are present in soil and groundwater and at what concentrations.	1. New and existing validated measurements of COC concentrations in subsurface soil samples collected from SOC 5-OU1 a-h. 2. New and existing validated measurements of COC concentrations in surface soil samples collected from SOC 5-OU1 a-h. 3. New and existing validated measurements of COC concentrations in groundwater samples collected from SOC 5-OU1 a-h.	The boundary of SOC 5-OU1 a-h is included in the Work Plan (Barr, 2009).	If concentrations of COCs in soil and groundwater samples exceed ARARs and TCBs, further sampling and analysis will be conducted to determine magnitude and extent of the COC-impacted soils and groundwater.	Potential sampling errors include sampling design errors and measurement errors. Design errors are countered with an adequate number of sampling points and measurement errors are minimized through systematic uniform management of each of the steps of measurement using SOPs and by following the QAPP.	Samples of subsurface soil will be collected from eight test trench and analyzed for COCs listed in the work plan. Surface and subsurface soils will be field screened for organic vapors. If elevated organic vapors are detected or other evidence of a release of hazardous substances are observed, additional samples for COCs will be collected from the interval demonstrating the most significant indications of the release. Surface soil samples will be collected from thirty-six locations and analyzed for COCs as detailed in the work plan. Groundwater samples will be collected from seven soil borings and analyzed for COCs listed in the work plan. Subsurface soils will be field screened for organic vapors. If elevated organic vapors are detected or other evidence of a release of hazardous substances are observed, additional samples for COCs will be collected from the interval demonstrating the most significant indications of the release. Sampling locations, depths, and methods are discussed in the Work Plan and FSP.
SOC 5 – OU2: Pesticide Release Area: Characterization is needed to determine if hazardous substances have been released to the soil or groundwater.	**Study Question:** Are COCs present in soil and groundwater at concentrations above ARARs and TCBs? **Alternative actions:** - No further investigation - Additional investigation **Decision Statement:** Determine if COCs are present in soil and groundwater and at what concentrations.	1. New and existing validated measurements of COC concentrations in surface and subsurface soil samples collected from SOC 5-OU2. 2. New and existing validated measurements of COC concentrations in groundwater samples collected from SOC 5-OU2.	The boundary of SOC 5-OU2 is included in the Work Plan (Barr, 2009).	If concentrations of COCs in soil and groundwater samples exceed ARARs and TCBs, further sampling and analysis will be conducted to determine magnitude and extent of the COC-impacted soils and groundwater.	Potential sampling errors include sampling design errors and measurement errors. Design errors are countered with an adequate number of sampling points and measurement errors are minimized through systematic uniform management of each of the steps of measurement using SOPs and by following the QAPP.	Soil samples will be collected from four composite soil sampling locations and analyzed for COCs listed in the work plan. Samples of subsurface soils will be collected from one test trench and analyzed for COCs listed in the work plan. Subsurface soils will be field screened for organic vapors. If elevated organic vapors are detected or other evidence of a release of hazardous substances are observed, additional samples for COCs will be collected from the interval demonstrating the most significant indications of the release. Groundwater samples will be collected from four soil borings downgradient of SOC 5-OU2 and analyzed for COCs listed in the work plan. Sampling locations, depths, and methods are discussed in the Work Plan and FSP.
SOC 5 – OU3: Petroleum Release Area: Characterization is needed to determine if petroleum products or hazardous substances have been released to the soil or groundwater.	**Study Question:** Are COCs present in soil and groundwater at concentrations above ARARs and TCBs? **Alternative actions:** - No further investigation - Additional investigation **Decision Statement:** Determine if COCs are present in soil and groundwater and at what concentrations.	1. New and existing validated measurements of COC concentrations in surface and subsurface soil samples collected from SOC 5-OU3. 2. New and existing validated measurements of COC concentrations in groundwater samples collected from SOC 5-OU3.	The boundary of SOC 5-OU3 is included in the Work Plan (Barr, 2009).	If concentrations of COCs in soil and groundwater samples exceed ARARs and TCBs, further sampling and analysis will be conducted to determine magnitude and extent of the COC-impacted soils and groundwater.	Potential sampling errors include sampling design errors and measurement errors. Design errors are countered with an adequate number of sampling points and measurement errors are minimized through systematic uniform management of each of the steps of measurement using SOPs and by following the QAPP.	Samples of surface and subsurface soils will be collected from four soil borings and analyzed for COCs listed in the work plan. Subsurface soils will be field screened for organic vapors are detected or other evidence of a release of hazardous substances are observed, additional samples for COCs will be collected from the interval demonstrating the most significant indications of the release. Groundwater samples will be collected from four soil borings downgradient of SOC 5-OU3 and analyzed for COCs listed in the work plan. Sampling locations, depths, and methods are discussed in the Work Plan and FSP.

Table 2

Data Quality Objectives
Quality Assurance Project Plan, SSI/RI Work Plan, SOCs 4 and 5
UMore Mining Area
Dakota County, MN

Step 1: Identify the Problem	Step 2: Identify the Decisions	Step 3: Identify Inputs to the Decisions	Step 4: Define the Study Boundaries	Step 5: Develop a Decision Rule	Step 6: Specify Limits on Decision Errors	Step 7: Optimize the Design for Obtaining Data
SOC 5 – Other - Green space:	**Study Question:** Are COCs present in surface soil at concentrations above ARARs and TCBs? **Alternative actions:** - No further investigation - Additional investigation **Decision Statement:** Determine if COCs are present in soil and at what concentrations.	1. New and existing validated measurements of COC concentrations in surface soil samples collected from green spaces in SOC 5.	The boundary of SOC 5 is included in the Work Plan (Barr, 2009).	If concentrations of COCs in soil samples exceed ARARs and TCBs, further sampling and analysis will be conducted to determine magnitude and extent of the COC-impacted soils.	Potential sampling errors include sampling design errors and measurement errors. Design errors are countered with an adequate number of sampling points and measurement errors are minimized through systematic uniform management of each of the steps of measurement using SOPs and by following the QAPP.	Samples of surface soils will be collected from eleven surface sampling locations and analyzed for COCs listed in the work plan. Sampling locations, depths, and methods are discussed in the Work Plan and FSP.
SOC 5 – Other - Roads:	**Study Question:** Are COCs present in the dirt road bed materials at concentrations above ARARs and TCBs? **Alternative actions:** - No further investigation - Additional investigation **Decision Statement:** Determine if COCs are present in dirt road bed and at what concentrations.	1. New and existing validated measurements of COC concentrations in samples collected from dirt road in SOC 5.	The boundary of SOC 5 is included in the Work Plan (Barr, 2009).	If concentrations of COCs in dirt road bed samples exceed ARARs and TCBs, further sampling and analysis will be conducted to determine magnitude and extent of the COC-impacted road bed materials and surrounding soils.	Potential sampling errors include sampling design errors and measurement errors. Design errors are countered with an adequate number of sampling points and measurement errors are minimized through systematic uniform management of each of the steps of measurement using SOPs and by following the QAPP.	Samples of surface soils will be collected from four sampling locations and analyzed for COCs listed in the work plan. Sampling locations, depths, and methods are discussed in the Work Plan and FSP.
SOC 5 – Other – Water Supply Wells:	**Study Question:** Are COCs present in nearby water supply wells at concentrations above ARARs and TCBs? **Alternative actions:** - No further investigation - Additional investigation **Decision Statement:** Determine if COCs are present in groundwater at nearby drinking water supply wells and at what concentrations.	2. New and existing validated measurements of COC concentrations in samples collected from water supply wells downgradient in SOC 5.	The boundaries of SOC 5- and nearby water supply wells are included in the Work Plan (Barr, 2009).	If concentrations of COCs in groundwater from the nearby water supply well samples exceed ARARs and TCBs, further sampling and analysis will be conducted to determine magnitude and extent of the COC-impacted groundwater in the bedrock aquifers beneath SOC 5.	Potential sampling errors include sampling design errors and measurement errors. Design errors are countered with an adequate number of sampling points and measurement errors are minimized through systematic uniform management of each of the steps of measurement using SOPs and by following the QAPP.	Samples of groundwater will be collected from four water supply wells and analyzed for COCs listed in the work plan. Sampling locations, depths, and methods are discussed in the Work Plan and FSP.

Table 3
Field Instrument Precision, Accuracy and Preventative Maintenance

Quality Assurance Project Plan, SSI/RI, SOCs 4 and 5
UMore Mining Area
Dakota County, Minnesota

Field Instrument	Precision Limits	Accuracy Limits	Preventive Maintenance
OVM-Thermo 580B	±35% RPD on duplicate soil samples	95-105%	If detected value is < or >10% of the true value submit for repair. Replace batteries as needed
MiniRAE 2000	±35% RPD on duplicate soil samples	95-105%	If detected value is < or >10% of the true value submit for repair. Replace batteries as needed
YSI Model 556 MPS	±25% RPD on duplicate water samples.	Calibrated daily	Change batteries when gauge is low. Replace sensors as needed. Replace/recharge batteries as needed
Ohaus Scout Pro Field Balance	50±3 g	Tare each time it is turned on.	Replace batteries as needed

Table 4
Frequency of Quality Assurance Samples

Quality Assurance Project Plan, SSI/RI, SOCs 4 and 5
UMore Mining Area
Dakota County, Minnesota

Parameter	Frequency	Comments
Field Blanks	1 collected every 20 samples	
Field Replicates	1 collected every 20 samples	Analyzed with field equipment only (i.e., replicate temp, pH or headspace readings to confirm instrument precision)
Field Duplicates	1 collected every 20 samples	Blind laboratory sample submittal
Trip Blanks – Soil (Methanol)	1 placed in every shipping container containing VOC soil samples.	Made up in the laboratoryLaboratory prepared, only analyzed with associated VOCs soil samples. (a soil trip blank)
Trip Blanks – Water (HCl)	1 placed in every shipping container containing VOC water samples.	Made up in the laboratory, only analyzed with associated VOCs water samples.
Matrix Spike, Matrix Spike Duplicates	1 collected every 20 samples to provide the laboratory with necessary QA/QC volume.	Batch MS/MSD samples are required for this project and will performed on each matrix sampled. Since these batches should be representative of each matrix, project specific MS/MSD samples are not required for this project. Extra volume will be provided to the laboratory so that project samples may be used as MS/MSD samples.

Table 5
Sample Containers, Preservation and Holding Times
Quality Assurance Project Plan, SSI/RI, SOCs 4 and 5
UMore Mining Area
Dakota County, Minnesota

Parameter	Preservative/Container Type & Volume	EPA Recommended Hold Time
Soil		
Metals	Cool to ≤ 6°C, plastic or glass (4-oz and additional volume for moisture analysis)	180 days Mercury = 28 days
SVOCs	Cool to ≤ 6°C, glass (4-oz and additional volume for moisture analysis)	14 days to extraction; 40 days to analysis
VOCs	Cool to ≤ 6°C, 1:1 ratio soil:methanol (MeOH), glass (10 g to 10 ml solvent and additional volume for moisture analysis) 40 ml vial	14 days
Pesticides (All lists)	Cool to ≤ 6°C, glass (one, 4oz container or two, 2-oz containers and additional volume for moisture analysis)	14 days to extraction; 40 days to analysis
Nitrocellulose	Cool to ≤ 6°C, glass (two, 4-oz containers)	28 days
PCBs	Cool to ≤ 6°C, glass (4-oz and additional volume for moisture analysis)	none
Water		
Metals	HNO_3 to pH<2; Cool to ≤ 6°C, plastic (250 ml)[1]	Six months Mercury = 28 days
SVOCs	Cool to ≤ 6°C, amber glass (1-liter)	7 days to extraction; 40 days to analysis
VOCs	Cool to ≤ 6°C, HCl to pH <2, glass (set of 3-40 ml vials)	14 days
Total Kjeldahl Nitrogen	H_2SO_4 to pH<2; Cool to ≤ 6°C, plastic (500 ml)	28 days
Nitrate + Nitrite as N	H_2SO_4 to pH<2; Cool to ≤ 6°C, plastic (500 ml)	28 days
Pesticides	Cool to ≤ 6°C, glass (1-liter)	7 days to extraction; 40 days to analysis
Nitrocellulose	Cool to ≤ 6°C, glass (250 mL)	28 days
Perchlorate	Cool to ≤ 6°C, plastic (250 mL)	28 days

1 All water samples collected for metals analysis from temporary wells or monitoring wells will be filtered in the field. All water samples collected for metals analysis from supply wells will not be filtered.