

Appendix A

Analytical Reports

BRAUN INTERTEC

Braun Intertec Corporation
11001 Hampshire Avenue S.
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Mr. Keith Pilgrim
Barr Engineering Company
4700 West 77th Street
Minneapolis, MN 55435-4803

November 14, 2012

Report #: 1206697

RE: Determine Toxicity Deicing Material 23621088

Dear Keith Pilgrim:

Braun Intertec Corporation received samples for the project identified above on October 31, 2012. Analytical results are summarized in the following report.

All routine quality assurance procedures were followed, unless otherwise noted.

Analytical results are reported on an "as received" basis unless otherwise noted. Where possible, the samples will be retained by the laboratory for 14 days following issuance of the initial final report. The samples will be disposed of or returned at that time. Arrangements can be made for extended storage by contacting me at this time.

We appreciate your decision to use Braun Intertec Corporation for this project. We are committed to being your vendor of choice to meet your analytical chemistry needs.

If you have any questions please contact me at the above phone number.

Sincerely,



Steven J. Albrecht
Project Manager

Barr Engineering Company
4700 West 77th Street
Minneapolis, MN 55435-4803

Client Ref: Determine Toxicity Deicing Material 23621088
Client Contact: Mr. Keith Pilgrim
PO Number:

Report #: 1206697
Project Mgr: Steven J. Albrecht
Account ID: B01058

Qualifiers and Abbreviations

ts	This analysis was performed by a subcontract laboratory.
sd	See case narrative section for further information.
R-01	The Method Reporting Limit for this analyte has been raised to account for matrix interference.
qn	The spike recovery is outside of laboratory control limits for the matrix spike (MS) and/or the matrix spike duplicate (MSD).
J	Detected but below the Method Reporting Limit; therefore, result is an estimated concentration (CLP J-Flag).
gg	The sample was received past the method specified holding time.
COC	Chain of Custody
dry	Sample results reported on a dry weight basis
MDL	Method Detection Limit
MRL	Method Reporting Limit
NA	Not Applicable
ND	Analyte NOT DETECTED above the MDL value
NR	Not Reported
%Rec	Percent Recovery
RPD	Relative Percent Difference
VOC	Volatile Organic Compound

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Case Narrative

The sample containers in Cooler 1 were received at 15.2 °C. This exceeds the regulatory requirement of 6 °C.

Samples were collected improperly for this analysis. Samples should be collected in an unpreserved amber glass container with minimal or no headspace. The color of the samples required dilutions that may not normally have been needed due to the colorimetric nature of the test for residual chlorine. This resulted in higher reporting limits on certain samples that in turn had results under those raised limits.

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Sample Summary

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
MgCl2 (FG)	1206697-01	Liquid	10/30/12 13:00	10/31/12 14:00
A1 NaCl	1206697-02	Liquid	10/30/12 13:00	10/31/12 14:00
Boost CaCl2	1206697-03	Liquid	10/30/12 13:00	10/31/12 14:00
K-Ac CF-7	1206697-04	Liquid	10/30/12 13:00	10/31/12 14:00
Beet SS	1206697-05	Liquid	10/30/12 13:00	10/31/12 14:00
Apogee	1206697-06	Liquid	10/30/12 13:00	10/31/12 14:00
CaCl2 RG+	1206697-07	Liquid	10/30/12 13:00	10/31/12 14:00
MgCl2 Apex	1206697-08	Liquid	10/30/12 13:00	10/31/12 14:00

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Conditions Upon Receipt

Cooler: Cooler 1

Temperature: 15.2 °C
Temperature Blank: No
Received on Ice: Yes
Preservation Confirmed: Yes

COC Included: Yes
COC Complete: Yes
COC & Labels Agree: Yes
Sufficient Sample Provided: Yes

Custody Seals Used: No
Custody Seals Intact: NA
Hand Delivered by Client: Yes
Headspace Present (VOC): No

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MgCl2 (FG)
1206697-01 (Liquid)
10/30/12 13:00

Classical Chemistry Parameters

Analyte	Result	MRL	MDL	Units	Dilution	Batch	Prepared	Analyzed	Analyst	Method	Notes
Orthophosphate as P	9.6	0.30	0.045	mg/L	50	B2K0004	11/1/12	11/1/12	JTake	EPA 365.1	
Phosphorus, Total as P	9.3	0.50	0.14	mg/L	10	B2K0116	11/6/12	11/7/12	JET	EPA 365.1	
Residual Chlorine	ND	1.2	0.35	mg/L	5	B2J0797	10/31/12	11/1/12	SRH	SM4500 Cl-G	gg, sd
Cyanide (total)	ND	0.010	0.0020	mg/L	1	B2K0025	11/2/12	11/2/12	SRH	SM 4500-CN-E	

Metals

Analyte	Result	MRL	MDL	Units	Dilution	Batch	Prepared	Analyzed	Analyst	Method	Notes
Aluminum	ND	800	32	ug/L	10	B2K0021	11/1/12	11/6/12	CJS	EPA 200.7	R-01
Arsenic	140 J	400	12	ug/L	10	B2K0021	11/1/12	11/9/12	DRM	EPA 200.7	R-01
Barium	ND	200	7.0	ug/L	10	B2K0021	11/1/12	11/6/12	CJS	EPA 200.7	R-01
Boron	30000	4000	240	ug/L	10	B2K0021	11/1/12	11/6/12	CJS	EPA 200.7	
Cadmium	ND	40	3.5	ug/L	10	B2K0021	11/1/12	11/6/12	CJS	EPA 200.7	R-01
Chromium	ND	100	7.4	ug/L	10	B2K0021	11/1/12	11/6/12	CJS	EPA 200.7	R-01
Cobalt	4.4 J	100	2.8	ug/L	10	B2K0021	11/1/12	11/6/12	CJS	EPA 200.7	R-01
Copper	ND	200	4.9	ug/L	10	B2K0021	11/1/12	11/6/12	CJS	EPA 200.7	R-01
Magnesium	4800000	1000	48	ug/L	10	B2K0021	11/1/12	11/6/12	CJS	EPA 200.7	
Nickel	ND	100	10	ug/L	10	B2K0021	11/1/12	11/6/12	CJS	EPA 200.7	R-01
Potassium	49000	4000	660	ug/L	10	B2K0021	11/1/12	11/6/12	CJS	EPA 200.7	
Sodium	79000	4000	86	ug/L	10	B2K0021	11/1/12	11/6/12	CJS	EPA 200.7	
Zinc	82 J	400	14	ug/L	10	B2K0021	11/1/12	11/6/12	CJS	EPA 200.7	R-01

Subcontracted to Instrumental Research, Inc. (MDH# 027-003-130)

Analyte	Result	MRL	MDL	Units	Dilution	Batch	Prepared	Analyzed	Analyst	Method	Notes
Biochemical Oxygen Demand	160	1.0	0.62	mg/L	1	B2K0211	11/1/12	11/1/12	---	SM 5210B	ts

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Watershed Cl ~~A1~~ NaCl

1206697-02 (Liquid)

10/30/12 13:00

Classical Chemistry Parameters

Analyte	Result	MRL	MDL	Units	Dilution	Batch	Prepared	Analyzed	Analyst	Method	Notes
Orthophosphate as P	0.057 J	0.060	0.0090	mg/L	10	B2K0004	11/1/12	11/1/12	JTake	EPA 365.1	
Phosphorus, Total as P	0.10	0.050	0.014	mg/L	1	B2K0116	11/6/12	11/7/12	JET	EPA 365.1	
Residual Chlorine	0.55 J	1.2	0.35	mg/L	5	B2J0797	10/31/12	11/1/12	SRH	SM4500 Cl-G	gg, sd
Cyanide (total)	0.0093 J	0.010	0.0020	mg/L	1	B2K0025	11/2/12	11/2/12	SRH	SM 4500-CN-E	

Metals

Analyte	Result	MRL	MDL	Units	Dilution	Batch	Prepared	Analyzed	Analyst	Method	Notes
Aluminum	ND	800	32	ug/L	10	B2K0021	11/1/12	11/6/12	CJS	EPA 200.7	R-01
Arsenic	32 J	400	12	ug/L	10	B2K0021	11/1/12	11/9/12	DRM	EPA 200.7	R-01
Barium	ND	200	7.0	ug/L	10	B2K0021	11/1/12	11/6/12	CJS	EPA 200.7	R-01
Boron	1300 J	4000	240	ug/L	10	B2K0021	11/1/12	11/6/12	CJS	EPA 200.7	R-01
Cadmium	ND	40	3.5	ug/L	10	B2K0021	11/1/12	11/6/12	CJS	EPA 200.7	R-01
Chromium	ND	100	7.4	ug/L	10	B2K0021	11/1/12	11/6/12	CJS	EPA 200.7	R-01
Cobalt	ND	100	2.8	ug/L	10	B2K0021	11/1/12	11/6/12	CJS	EPA 200.7	R-01
Copper	12 J	200	4.9	ug/L	10	B2K0021	11/1/12	11/6/12	CJS	EPA 200.7	R-01
Magnesium	2200	1000	48	ug/L	10	B2K0021	11/1/12	11/6/12	CJS	EPA 200.7	
Nickel	ND	100	10	ug/L	10	B2K0021	11/1/12	11/6/12	CJS	EPA 200.7	R-01
Potassium	12000	4000	660	ug/L	10	B2K0021	11/1/12	11/6/12	CJS	EPA 200.7	
Sodium	5600000	20000	430	ug/L	50	B2K0021	11/1/12	11/9/12	DRM	EPA 200.7	
Zinc	ND	400	14	ug/L	10	B2K0021	11/1/12	11/6/12	CJS	EPA 200.7	R-01

Subcontracted to Instrumental Research, Inc. (MDH# 027-003-130)

Analyte	Result	MRL	MDL	Units	Dilution	Batch	Prepared	Analyzed	Analyst	Method	Notes
Biochemical Oxygen Demand	170	1.0	0.62	mg/L	1	B2K0211	11/1/12	11/1/12	---	SM 5210B	ts

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Boost CaCl₂
1206697-03 (Liquid)
10/30/12 13:00

Classical Chemistry Parameters

Analyte	Result	MRL	MDL	Units	Dilution	Batch	Prepared	Analyzed	Analyst	Method	Notes
Orthophosphate as P	0.91	0.060	0.0090	mg/L	10	B2K0004	11/1/12	11/1/12	JTake	EPA 365.1	
Phosphorus, Total as P	3.9	0.10	0.028	mg/L	2	B2K0116	11/6/12	11/7/12	JET	EPA 365.1	
Residual Chlorine	340 J	500	140	mg/L	100	B2J0797	10/31/12	11/1/12	SRH	SM4500 Cl-G	gg, sd
Cyanide (total)	0.0058 J	0.010	0.0020	mg/L	1	B2K0025	11/2/12	11/2/12	SRH	SM 4500-CN-E	

Metals

Analyte	Result	MRL	MDL	Units	Dilution	Batch	Prepared	Analyzed	Analyst	Method	Notes
Aluminum	410 J	800	32	ug/L	10	B2K0021	11/1/12	11/6/12	CJS	EPA 200.7	R-01
Arsenic	25 J	400	12	ug/L	10	B2K0021	11/1/12	11/9/12	DRM	EPA 200.7	R-01
Barium	660	200	7.0	ug/L	10	B2K0021	11/1/12	11/6/12	CJS	EPA 200.7	
Boron	2400 J	4000	240	ug/L	10	B2K0021	11/1/12	11/6/12	CJS	EPA 200.7	R-01
Cadmium	ND	40	3.5	ug/L	10	B2K0021	11/1/12	11/6/12	CJS	EPA 200.7	R-01
Chromium	ND	100	7.4	ug/L	10	B2K0021	11/1/12	11/6/12	CJS	EPA 200.7	R-01
Cobalt	5.5 J	100	2.8	ug/L	10	B2K0021	11/1/12	11/6/12	CJS	EPA 200.7	R-01
Copper	32 J	200	4.9	ug/L	10	B2K0021	11/1/12	11/6/12	CJS	EPA 200.7	R-01
Magnesium	200000	1000	48	ug/L	10	B2K0021	11/1/12	11/6/12	CJS	EPA 200.7	
Nickel	ND	100	10	ug/L	10	B2K0021	11/1/12	11/6/12	CJS	EPA 200.7	R-01
Potassium	890000	4000	660	ug/L	10	B2K0021	11/1/12	11/6/12	CJS	EPA 200.7	
Sodium	280000	4000	86	ug/L	10	B2K0021	11/1/12	11/6/12	CJS	EPA 200.7	
Zinc	450	400	14	ug/L	10	B2K0021	11/1/12	11/6/12	CJS	EPA 200.7	

Subcontracted to Instrumental Research, Inc. (MDH# 027-003-130)

Analyte	Result	MRL	MDL	Units	Dilution	Batch	Prepared	Analyzed	Analyst	Method	Notes
Biochemical Oxygen Demand	1100	1.0	0.62	mg/L	1	B2K0211	11/1/12	11/1/12	---	SM 5210B	ts

Barr Engineering Company
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Client Ref: Determine Toxicity Deicing Material 23621088
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Project Mgr: Steven J. Albrecht
Account ID: B01058

K-Ac CF-7
1206697-04 (Liquid)
10/30/12 13:00

Classical Chemistry Parameters

Analyte	Result	MRL	MDL	Units	Dilution	Batch	Prepared	Analyzed	Analyst	Method	Notes
Orthophosphate as P	19	1.2	0.18	mg/L	200	B2K0004	11/1/12	11/1/12	JET	EPA 365.1	
Phosphorus, Total as P	22	1.0	0.28	mg/L	10	B2K0116	11/6/12	11/7/12	JET	EPA 365.1	
Residual Chlorine	ND	0.050	0.014	mg/L	1	B2J0797	10/31/12	11/1/12	SRH	SM4500 Cl-G	gg, sd
Cyanide (total)	ND	0.010	0.0020	mg/L	1	B2K0025	11/2/12	11/2/12	SRH	SM 4500-CN-E	

Metals

Analyte	Result	MRL	MDL	Units	Dilution	Batch	Prepared	Analyzed	Analyst	Method	Notes
Aluminum	ND	2000	79	ug/L	10	B2K0021	11/1/12	11/6/12	CJS	EPA 200.7	R-01
Arsenic	ND	1000	30	ug/L	10	B2K0021	11/1/12	11/9/12	DRM	EPA 200.7	R-01
Barium	ND	500	18	ug/L	10	B2K0021	11/1/12	11/6/12	CJS	EPA 200.7	R-01
Boron	2500 J	10000	610	ug/L	10	B2K0021	11/1/12	11/6/12	CJS	EPA 200.7	R-01
Cadmium	ND	100	8.8	ug/L	10	B2K0021	11/1/12	11/6/12	CJS	EPA 200.7	R-01
Chromium	ND	250	19	ug/L	10	B2K0021	11/1/12	11/6/12	CJS	EPA 200.7	R-01
Cobalt	ND	250	7.1	ug/L	10	B2K0021	11/1/12	11/6/12	CJS	EPA 200.7	R-01
Copper	32 J	500	12	ug/L	10	B2K0021	11/1/12	11/6/12	CJS	EPA 200.7	R-01
Magnesium	ND	2500	120	ug/L	10	B2K0021	11/1/12	11/6/12	CJS	EPA 200.7	R-01
Nickel	ND	250	25	ug/L	10	B2K0021	11/1/12	11/6/12	CJS	EPA 200.7	R-01
Potassium	11000000	50000	8200	ug/L	50	B2K0021	11/1/12	11/9/12	DRM	EPA 200.7	
Sodium	5600 J	10000	210	ug/L	10	B2K0021	11/1/12	11/6/12	CJS	EPA 200.7	R-01
Zinc	ND	1000	34	ug/L	10	B2K0021	11/1/12	11/6/12	CJS	EPA 200.7	R-01

Subcontracted to Instrumental Research, Inc. (MDH# 027-003-130)

Analyte	Result	MRL	MDL	Units	Dilution	Batch	Prepared	Analyzed	Analyst	Method	Notes
Biochemical Oxygen Demand	13000	1.0	0.62	mg/L	1	B2K0211	11/1/12	11/1/12	—	SM 5210B	ts

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Account ID: B01058

Apogee
1206697-06 (Liquid)
10/30/12 13:00

Classical Chemistry Parameters

Analyte	Result	MRL	MDL	Units	Dilution	Batch	Prepared	Analyzed	Analyst	Method	Notes
Orthophosphate as P	24	2.4	0.36	mg/L	400	B2K0004	11/1/12	11/1/12	JET	EPA 365.1	
Phosphorus, Total as P	32	1.0	0.28	mg/L	20	B2K0116	11/6/12	11/7/12	JET	EPA 365.1	
Residual Chlorine	0.018 J	0.050	0.014	mg/L	1	B2J0797	10/31/12	11/1/12	SRH	SM4500 Cl-G	gg, sd
Cyanide (total)	ND	0.010	0.0020	mg/L	1	B2K0025	11/2/12	11/2/12	SRH	SM 4500-CN-E	

Metals

Analyte	Result	MRL	MDL	Units	Dilution	Batch	Prepared	Analyzed	Analyst	Method	Notes
Aluminum	ND	800	32	ug/L	10	B2K0021	11/1/12	11/6/12	CJS	EPA 200.7	R-01
Arsenic	ND	400	12	ug/L	10	B2K0021	11/1/12	11/9/12	DRM	EPA 200.7	R-01
Barium	ND	200	7.0	ug/L	10	B2K0021	11/1/12	11/6/12	CJS	EPA 200.7	R-01
Boron	910 J	4000	240	ug/L	10	B2K0021	11/1/12	11/6/12	CJS	EPA 200.7	R-01
Cadmium	ND	40	3.5	ug/L	10	B2K0021	11/1/12	11/6/12	CJS	EPA 200.7	R-01
Chromium	ND	100	7.4	ug/L	10	B2K0021	11/1/12	11/6/12	CJS	EPA 200.7	R-01
Cobalt	ND	100	2.8	ug/L	10	B2K0021	11/1/12	11/6/12	CJS	EPA 200.7	R-01
Copper	12 J	200	4.9	ug/L	10	B2K0021	11/1/12	11/6/12	CJS	EPA 200.7	R-01
Magnesium	5600	1000	48	ug/L	10	B2K0021	11/1/12	11/6/12	CJS	EPA 200.7	
Nickel	ND	100	10	ug/L	10	B2K0021	11/1/12	11/6/12	CJS	EPA 200.7	R-01
Potassium	3000 J	4000	660	ug/L	10	B2K0021	11/1/12	11/6/12	CJS	EPA 200.7	R-01
Sodium	1400000	4000	86	ug/L	10	B2K0021	11/1/12	11/6/12	CJS	EPA 200.7	
Zinc	ND	400	14	ug/L	10	B2K0021	11/1/12	11/6/12	CJS	EPA 200.7	R-01

Subcontracted to Instrumental Research, Inc. (MDH# 027-003-130)

Analyte	Result	MRL	MDL	Units	Dilution	Batch	Prepared	Analyzed	Analyst	Method	Notes
Biochemical Oxygen Demand	26000	1.0	0.62	mg/L	1	B2K0211	11/1/12	11/1/12	---	SM 5210B	ts

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Project Mgr: Steven J. Albrecht
Account ID: B01058

CaCl2 RG+
1206697-07 (Liquid)
10/30/12 13:00

Classical Chemistry Parameters

Analyte	Result	MRL	MDL	Units	Dilution	Batch	Prepared	Analyzed	Analyst	Method	Notes
Orthophosphate as P	ND	0.060	0.0090	mg/L	10	B2K0005	11/1/12	11/1/12	JTake	EPA 365.1	
Phosphorus, Total as P	0.83	0.050	0.014	mg/L	1	B2K0116	11/6/12	11/7/12	JET	EPA 365.1	
Residual Chlorine	19 J	31	8.8	mg/L	25	B2J0797	10/31/12	11/1/12	SRH	SM4500 Cl-G	gg, sd
Cyanide (total)	0.0058 J	0.010	0.0020	mg/L	1	B2K0025	11/2/12	11/2/12	SRH	SM 4500-CN-E	

Metals

Analyte	Result	MRL	MDL	Units	Dilution	Batch	Prepared	Analyzed	Analyst	Method	Notes
Aluminum	41 J	800	32	ug/L	10	B2K0021	11/1/12	11/6/12	CJS	EPA 200.7	R-01
Arsenic	ND	400	12	ug/L	10	B2K0021	11/1/12	11/9/12	DRM	EPA 200.7	R-01
Barium	3200	200	7.0	ug/L	10	B2K0021	11/1/12	11/6/12	CJS	EPA 200.7	
Boron	3300 J	4000	240	ug/L	10	B2K0021	11/1/12	11/6/12	CJS	EPA 200.7	R-01
Cadmium	ND	40	3.5	ug/L	10	B2K0021	11/1/12	11/6/12	CJS	EPA 200.7	R-01
Chromium	ND	100	7.4	ug/L	10	B2K0021	11/1/12	11/6/12	CJS	EPA 200.7	R-01
Cobalt	2.9 J	100	2.8	ug/L	10	B2K0021	11/1/12	11/6/12	CJS	EPA 200.7	R-01
Copper	23 J	200	4.9	ug/L	10	B2K0021	11/1/12	11/6/12	CJS	EPA 200.7	R-01
Magnesium	570000	1000	48	ug/L	10	B2K0021	11/1/12	11/6/12	CJS	EPA 200.7	
Nickel	ND	100	10	ug/L	10	B2K0021	11/1/12	11/6/12	CJS	EPA 200.7	R-01
Potassium	530000	4000	660	ug/L	10	B2K0021	11/1/12	11/6/12	CJS	EPA 200.7	
Sodium	510000	4000	86	ug/L	10	B2K0021	11/1/12	11/6/12	CJS	EPA 200.7	
Zinc	89 J	400	14	ug/L	10	B2K0021	11/1/12	11/6/12	CJS	EPA 200.7	R-01

Subcontracted to Instrumental Research, Inc. (MDH# 027-003-130)

Analyte	Result	MRL	MDL	Units	Dilution	Batch	Prepared	Analyzed	Analyst	Method	Notes
Biochemical Oxygen Demand	1300	1.0	0.62	mg/L	1	B2K0211	11/1/12	11/1/12	---	SM 5210B	ts

Barr Engineering Company
4700 West 77th Street
Minneapolis, MN 55435-4803

Client Ref: Determine Toxicity Deicing Material 23621088
Client Contact: Mr. Keith Pilgrim
PO Number:

Report #: 1206697
Project Mgr: Steven J. Albrecht
Account ID: B01058

MgCl2 Apex
1206697-08 (Liquid)
10/30/12 13:00

Classical Chemistry Parameters

Analyte	Result	MRL	MDL	Units	Dilution	Batch	Prepared	Analyzed	Analyst	Method	Notes
Orthophosphate as P	ND	0.12	0.018	mg/L	20	B2K0005	11/1/12	11/1/12	JTake	EPA 365.1	qn
Phosphorus, Total as P	ND	0.050	0.014	mg/L	1	B2K0116	11/6/12	11/7/12	JET	EPA 365.1	
Residual Chlorine	ND	0.050	0.014	mg/L	1	B2J0797	10/31/12	11/1/12	SRH	SM4500 Cl-G	gg, sd
Cyanide (total)	ND	0.010	0.0020	mg/L	1	B2K0025	11/2/12	11/2/12	SRH	SM 4500-CN-E	

Metals

Analyte	Result	MRL	MDL	Units	Dilution	Batch	Prepared	Analyzed	Analyst	Method	Notes
Aluminum	ND	800	32	ug/L	10	B2K0021	11/1/12	11/6/12	CJS	EPA 200.7	R-01
Arsenic	40 J	400	12	ug/L	10	B2K0021	11/1/12	11/9/12	DRM	EPA 200.7	R-01
Barium	ND	200	7.0	ug/L	10	B2K0021	11/1/12	11/6/12	CJS	EPA 200.7	R-01
Boron	15000	4000	240	ug/L	10	B2K0021	11/1/12	11/6/12	CJS	EPA 200.7	
Cadmium	ND	40	3.5	ug/L	10	B2K0021	11/1/12	11/6/12	CJS	EPA 200.7	R-01
Chromium	ND	100	7.4	ug/L	10	B2K0021	11/1/12	11/6/12	CJS	EPA 200.7	R-01
Cobalt	ND	100	2.8	ug/L	10	B2K0021	11/1/12	11/6/12	CJS	EPA 200.7	R-01
Copper	ND	200	4.9	ug/L	10	B2K0021	11/1/12	11/6/12	CJS	EPA 200.7	R-01
Magnesium	5400000	1000	48	ug/L	10	B2K0021	11/1/12	11/6/12	CJS	EPA 200.7	
Nickel	ND	100	10	ug/L	10	B2K0021	11/1/12	11/6/12	CJS	EPA 200.7	R-01
Potassium	61000	4000	660	ug/L	10	B2K0021	11/1/12	11/6/12	CJS	EPA 200.7	
Sodium	120000	4000	86	ug/L	10	B2K0021	11/1/12	11/6/12	CJS	EPA 200.7	
Zinc	ND	400	14	ug/L	10	B2K0021	11/1/12	11/6/12	CJS	EPA 200.7	R-01

Subcontracted to Instrumental Research, Inc. (MDH# 027-003-130)

Analyte	Result	MRL	MDL	Units	Dilution	Batch	Prepared	Analyzed	Analyst	Method	Notes
Biochemical Oxygen Demand	72	1.0	0.62	mg/L	1	B2K0211	11/1/12	11/1/12	---	SM 5210B	ts

Barr Engineering Company
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Report #: 1206697
Project Mgr: Steven J. Albrecht
Account ID: B01058

Classical Chemistry Parameters - Quality Control

Batch B2J0797 - Method-specified preparation

Method Blank (B2J0797-BLK1)

Prepared: 10/31/12 Analyzed: 11/01/12

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Residual Chlorine	ND	0.050	0.014	mg/L	NA	NA	NA	NA	NA	NA	

Laboratory Control Sample (B2J0797-BS1)

Prepared: 10/31/12 Analyzed: 11/01/12

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Residual Chlorine	1.08	0.050	0.014	mg/L	1.00	NA	108	90-110	NA	NA	

Laboratory Control Sample Duplicate (B2J0797-BSD1)

Prepared: 10/31/12 Analyzed: 11/01/12

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Residual Chlorine	1.05	0.050	0.014	mg/L	1.00	NA	105	90-110	2.65	20	

Matrix Spike (B2J0797-MS1)

Source: 1206697-01

Prepared: 10/31/12 Analyzed: 11/01/12

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Residual Chlorine	5.39	0.25	0.070	mg/L	5.00	ND	108	75-125	NA	NA	

Matrix Spike Duplicate (B2J0797-MSD1)

Source: 1206697-01

Prepared: 10/31/12 Analyzed: 11/01/12

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Residual Chlorine	5.21	0.25	0.070	mg/L	5.00	ND	104	75-125	3.42	20	

Batch B2K0004 - EPA 365.1

Method Blank (B2K0004-BLK1)

Prepared & Analyzed: 11/01/12

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Orthophosphate as P	0.00232 J	0.0060	0.00090	mg/L	NA	NA	NA	NA	NA	NA	

Laboratory Control Sample (B2K0004-BS1)

Prepared & Analyzed: 11/01/12

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Orthophosphate as P	0.0977	0.0060	0.00090	mg/L	0.100	NA	97.7	90-110	NA	NA	

Laboratory Control Sample Duplicate (B2K0004-BSD1)

Prepared & Analyzed: 11/01/12

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Orthophosphate as P	0.0974	0.0060	0.00090	mg/L	0.100	NA	97.4	90-110	0.328	20	

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Project Mgr: Steven J. Albrecht
Account ID: B01058

Classical Chemistry Parameters - Quality Control

Batch B2K0004 - EPA 365.1

Matrix Spike (B2K0004-MS1)

Source: 1206655-01

Prepared & Analyzed: 11/01/12

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Orthophosphate as P	0.150	0.0060	0.00090	mg/L	0.100	0.0458	105	90-110	NA	NA	

Matrix Spike Duplicate (B2K0004-MSD1)

Source: 1206655-01

Prepared & Analyzed: 11/01/12

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Orthophosphate as P	0.150	0.0060	0.00090	mg/L	0.100	0.0458	105	90-110	0.00	20	

Batch B2K0005 - EPA 365.1

Method Blank (B2K0005-BLK2)

Prepared & Analyzed: 11/01/12

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Orthophosphate as P	0.00100 J	0.0060	0.00090	mg/L	NA	NA	NA	NA	NA	NA	

Laboratory Control Sample (B2K0005-BS2)

Prepared & Analyzed: 11/01/12

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Orthophosphate as P	0.0959	0.0060	0.00090	mg/L	0.100	NA	95.9	90-110	NA	NA	

Laboratory Control Sample Duplicate (B2K0005-BSD2)

Prepared & Analyzed: 11/01/12

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Orthophosphate as P	0.0985	0.0060	0.00090	mg/L	0.100	NA	98.5	90-110	2.70	20	

Matrix Spike (B2K0005-MS2)

Source: 1206697-08RE1

Prepared & Analyzed: 11/01/12

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Orthophosphate as P	0.106	0.0060	0.00090	mg/L	0.100	ND	106	90-110	NA	NA	

Matrix Spike Duplicate (B2K0005-MSD2)

Source: 1206697-08RE1

Prepared & Analyzed: 11/01/12

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Orthophosphate as P	0.118	0.0060	0.00090	mg/L	0.100	ND	118	90-110	10.9	20	qn

Batch B2K0025 - SM4500CNE

Method Blank (B2K0025-BLK1)

Prepared & Analyzed: 11/02/12

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Cyanide (total)	ND	0.010	0.0020	mg/L	NA	NA	NA	NA	NA	NA	

EPA Lab ID: MN00063

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Barr Engineering Company
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Client Ref: Determine Toxicity Deicing Material 23621088
Client Contact: Mr. Keith Pilgrim
PO Number:

Report #: 1206697
Project Mgr: Steven J. Albrecht
Account ID: B01058

Classical Chemistry Parameters - Quality Control

Batch B2K0025 - SM4500CNE

Method Blank (B2K0025-BLK1)

Prepared & Analyzed: 11/02/12

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Laboratory Control Sample (B2K0025-BS1)

Prepared & Analyzed: 11/02/12

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Cyanide (total)	0.120	0.010	0.0020	mg/L	0.125	NA	96.0	80-120	NA	NA	

Laboratory Control Sample Duplicate (B2K0025-BSD1)

Prepared & Analyzed: 11/02/12

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Cyanide (total)	0.119	0.010	0.0020	mg/L	0.125	NA	95.2	80-120	0.858	20	

Matrix Spike (B2K0025-MS1)

Source: 1206686-01

Prepared & Analyzed: 11/02/12

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Cyanide (total)	0.147	0.010	0.0020	mg/L	0.125	0.0315	92.1	75-125	NA	NA	

Matrix Spike Duplicate (B2K0025-MSD1)

Source: 1206686-01

Prepared & Analyzed: 11/02/12

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Cyanide (total)	0.150	0.010	0.0020	mg/L	0.125	0.0315	94.6	75-125	2.08	20	

Batch B2K0116 - EPA 365.1

Method Blank (B2K0116-BLK1)

Prepared: 11/06/12 Analyzed: 11/07/12

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Phosphorus, Total as P	ND	0.010	0.0028	mg/L	NA	NA	NA	NA	NA	NA	

Laboratory Control Sample (B2K0116-BS1)

Prepared: 11/06/12 Analyzed: 11/07/12

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Phosphorus, Total as P	0.103	0.010	0.0028	mg/L	0.100	NA	103	90-110	NA	NA	

Laboratory Control Sample Duplicate (B2K0116-BSD1)

Prepared: 11/06/12 Analyzed: 11/07/12

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Phosphorus, Total as P	0.100	0.010	0.0028	mg/L	0.100	NA	100	90-110	2.86	20	

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Report #: 1206697
Project Mgr: Steven J. Albrecht
Account ID: B01058

Classical Chemistry Parameters - Quality Control

Batch B2K0116 - EPA 365.1

Duplicate (B2K0116-DUP1)

Source: 1206821-01

Prepared: 11/06/12 Analyzed: 11/07/12

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Phosphorus, Total as P	0.950	0.050	0.014	mg/L	NA	0.969	NA	NA	1.93	20	

Matrix Spike (B2K0116-MS1)

Source: 1206697-08

Prepared: 11/06/12 Analyzed: 11/07/12

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Phosphorus, Total as P	0.508	0.050	0.014	mg/L	0.500	ND	102	90-110	NA	NA	

Matrix Spike Duplicate (B2K0116-MSD1)

Source: 1206697-08

Prepared: 11/06/12 Analyzed: 11/07/12

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Phosphorus, Total as P	0.515	0.050	0.014	mg/L	0.500	ND	103	90-110	1.37	20	

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Project Mgr: Steven J. Albrecht
Account ID: B01058

Metals - Quality Control

Batch B2K0021 - EPA 200.7

Method Blank (B2K0021-BLK1)

Prepared: 11/01/12 Analyzed: 11/06/12

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	12.5 J	40	1.6	ug/L	NA	NA	NA	NA	NA	NA	
Barium	ND	10	0.35	ug/L	NA	NA	NA	NA	NA	NA	
Boron	42.1 J	200	12	ug/L	NA	NA	NA	NA	NA	NA	
Cadmium	ND	2.0	0.18	ug/L	NA	NA	NA	NA	NA	NA	
Chromium	ND	5.0	0.37	ug/L	NA	NA	NA	NA	NA	NA	
Cobalt	ND	5.0	0.14	ug/L	NA	NA	NA	NA	NA	NA	
Copper	0.447 J	10	0.24	ug/L	NA	NA	NA	NA	NA	NA	
Magnesium	13.4 J	50	2.4	ug/L	NA	NA	NA	NA	NA	NA	
Nickel	ND	5.0	0.51	ug/L	NA	NA	NA	NA	NA	NA	
Potassium	ND	200	33	ug/L	NA	NA	NA	NA	NA	NA	
Sodium	4.77 J	200	4.3	ug/L	NA	NA	NA	NA	NA	NA	
Zinc	ND	20	0.68	ug/L	NA	NA	NA	NA	NA	NA	

Method Blank (B2K0021-BLK2)

Prepared: 11/01/12 Analyzed: 11/09/12

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Arsenic	ND	20	0.60	ug/L	NA	NA	NA	NA	NA	NA	

Laboratory Control Sample (B2K0021-BS1)

Prepared: 11/01/12 Analyzed: 11/06/12

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	3170	40	1.6	ug/L	3000	NA	106	85-115	NA	NA	
Barium	3140	10	0.35	ug/L	3000	NA	105	85-115	NA	NA	
Boron	3170	200	12	ug/L	3000	NA	106	85-115	NA	NA	
Cadmium	3060	2.0	0.18	ug/L	3000	NA	102	85-115	NA	NA	
Chromium	3120	5.0	0.37	ug/L	3000	NA	104	85-115	NA	NA	
Cobalt	3420	5.0	0.14	ug/L	3000	NA	114	85-115	NA	NA	
Copper	3130	10	0.24	ug/L	3000	NA	105	85-115	NA	NA	
Magnesium	40800	50	2.4	ug/L	40000	NA	102	85-115	NA	NA	
Nickel	2970	5.0	0.51	ug/L	3000	NA	99.1	85-115	NA	NA	
Potassium	39200	200	33	ug/L	40000	NA	97.9	85-115	NA	NA	
Sodium	42800	200	4.3	ug/L	40000	NA	107	85-115	NA	NA	

EPA Lab ID: MN00063

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Client Ref: Determine Toxicity Deicing Material 23621088
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Report #: 1206697
Project Mgr: Steven J. Albrecht
Account ID: B01058

Metals - Quality Control

Batch B2K0021 - EPA 200.7

Laboratory Control Sample (B2K0021-BS1)

Prepared: 11/01/12 Analyzed: 11/06/12

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Zinc	3090	20	0.68	ug/L	3000	NA	103	85-115	NA	NA	

Laboratory Control Sample (B2K0021-BS2)

Prepared: 11/01/12 Analyzed: 11/09/12

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Arsenic	3260	20	0.60	ug/L	3000	NA	109	85-115	NA	NA	

Laboratory Control Sample Duplicate (B2K0021-BSD1)

Prepared: 11/01/12 Analyzed: 11/06/12

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	3090	40	1.6	ug/L	3000	NA	103	85-115	2.72	25	
Barium	3060	10	0.35	ug/L	3000	NA	102	85-115	2.71	25	
Boron	3200	200	12	ug/L	3000	NA	107	85-115	1.07	25	
Cadmium	3000	2.0	0.18	ug/L	3000	NA	100	85-115	1.77	25	
Chromium	3050	5.0	0.37	ug/L	3000	NA	102	85-115	2.49	25	
Cobalt	3340	5.0	0.14	ug/L	3000	NA	112	85-115	2.33	25	
Copper	3040	10	0.24	ug/L	3000	NA	102	85-115	2.84	25	
Magnesium	40600	50	2.4	ug/L	40000	NA	101	85-115	0.655	25	
Nickel	2940	5.0	0.51	ug/L	3000	NA	98.3	85-115	0.867	25	
Potassium	39000	200	33	ug/L	40000	NA	97.3	85-115	0.592	25	
Sodium	42400	200	4.3	ug/L	40000	NA	106	85-115	0.853	25	
Zinc	3070	20	0.68	ug/L	3000	NA	103	85-115	0.596	25	

Laboratory Control Sample Duplicate (B2K0021-BSD2)

Prepared: 11/01/12 Analyzed: 11/09/12

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Arsenic	3080	20	0.60	ug/L	3000	NA	103	85-115	5.58	25	

Matrix Spike (B2K0021-MS1)

Source: 1206718-01

Prepared: 11/01/12 Analyzed: 11/06/12

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	3250	40	1.6	ug/L	3000	21.0	108	75-125	NA	NA	
Barium	3310	10	0.35	ug/L	3000	190	104	75-125	NA	NA	
Boron	3510	200	12	ug/L	3000	286	108	75-125	NA	NA	

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Project Mgr: Steven J. Albrecht
Account ID: B01058

Metals - Quality Control

Batch B2K0021 - EPA 200.7

Matrix Spike (B2K0021-MS1)

Source: 1206718-01

Prepared: 11/01/12 Analyzed: 11/06/12

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Cadmium	3060	2.0	0.18	ug/L	3000	ND	102	75-125	NA	NA	
Chromium	3040	5.0	0.37	ug/L	3000	1.35	102	75-125	NA	NA	
Cobalt	3300	5.0	0.14	ug/L	3000	ND	110	75-125	NA	NA	
Copper	3150	10	0.24	ug/L	3000	12.2	105	75-125	NA	NA	
Magnesium	148000	50	2.4	ug/L	40000	103000	112	75-125	NA	NA	
Nickel	2880	5.0	0.51	ug/L	3000	ND	96.2	75-125	NA	NA	
Potassium	64600	200	33	ug/L	40000	21300	108	75-125	NA	NA	
Sodium	125000	200	4.3	ug/L	40000	90300	86.4	75-125	NA	NA	
Zinc	3150	20	0.68	ug/L	3000	19.8	104	75-125	NA	NA	

Matrix Spike (B2K0021-MS2)

Source: 1206718-01RE1

Prepared: 11/01/12 Analyzed: 11/09/12

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Arsenic	3270	20	0.60	ug/L	3000	24.4	108	75-125	NA	NA	

Matrix Spike Duplicate (B2K0021-MSD1)

Source: 1206718-01

Prepared: 11/01/12 Analyzed: 11/06/12

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	3170	40	1.6	ug/L	3000	21.0	105	75-125	2.34	20	
Barium	3230	10	0.35	ug/L	3000	190	102	75-125	2.17	20	
Boron	3470	200	12	ug/L	3000	286	106	75-125	1.28	20	
Cadmium	2990	2.0	0.18	ug/L	3000	ND	99.8	75-125	2.23	20	
Chromium	2970	5.0	0.37	ug/L	3000	1.35	99.0	75-125	2.53	20	
Cobalt	3220	5.0	0.14	ug/L	3000	ND	107	75-125	2.42	20	
Copper	3070	10	0.24	ug/L	3000	12.2	102	75-125	2.54	20	
Magnesium	144000	50	2.4	ug/L	40000	103000	103	75-125	2.68	20	
Nickel	2820	5.0	0.51	ug/L	3000	ND	94.1	75-125	2.26	20	
Potassium	63200	200	33	ug/L	40000	21300	105	75-125	2.18	20	
Sodium	122000	200	4.3	ug/L	40000	90300	79.4	75-125	2.27	20	
Zinc	3080	20	0.68	ug/L	3000	19.8	102	75-125	2.28	20	

Barr Engineering Company
4700 West 77th Street
Minneapolis, MN 55435-4803

Client Ref: Determine Toxicity Deicing Material 23621088
Client Contact: Mr. Keith Pilgrim
PO Number:

Report #: 1206697
Project Mgr: Steven J. Albrecht
Account ID: B01058

Metals - Quality Control

Batch B2K0021 - EPA 200.7

Matrix Spike Duplicate (B2K0021-MSD2)

Source: 1206718-01RE1

Prepared: 11/01/12 Analyzed: 11/09/12

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Arsenic	3250	20	0.60	ug/L	3000	24.4	108	75-125	0.604	20	

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206697

Chain of Custody

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

Project Number: 23621088

Project Name: Determine Toxicity Deicing Material

Sample Origination State: (use two letter postal state abbreviation)

COC Number: NO 39247

Number of Containers/Preservative

Water					Soil						
VOCs (unpreserved) #2	Dissolved Metals (HNO ₃)	Total Metals (HNO ₃)	General (unpreserved) #3	Diesel Range Organics (HCl)	Nutrients (H ₂ SO ₄) #4	VOCs (tared MeOH) #1	GRO, BTEX (tared MeOH) #1	DRO (tared unpreserved)	Metals (unpreserved)	SVOCS (unpreserved) #2	% Solids (plastic vial, unpres.)

Total Number Of Containers

COC _____ of _____

Project Manager: KMP

Project QC Contact: _____

Sampled by: EUN

Laboratory: _____

Location	Start Depth	Stop Depth	Depth Unit (m./ft. or in.)	Collection Date (mm/dd/yyyy)	Collection Time (hh:mm)	Matrix		Type		VOCs (HCl) #1	Dissolved Metals (HNO ₃)	Total Metals (HNO ₃)	General (unpreserved) #3	Diesel Range Organics (HCl)	Nutrients (H ₂ SO ₄) #4	VOCs (tared MeOH) #1	GRO, BTEX (tared MeOH) #1	DRO (tared unpreserved)	Metals (unpreserved)	SVOCS (unpreserved) #2	% Solids (plastic vial, unpres.)	Total Number Of Containers	
						Water	Soil	Grab Comp.	OC														
1. <u>MgCl₂ (F6)</u>				<u>10/30/12</u>	<u>1300</u>	X					X	X	X	X	X								<u>Diluted 1:20</u>
2. <u>Al NaCl</u>						X					X	X	X	X	X								<u>Diluted 1:20</u>
3. <u>Boost CaCl₂</u>						X					X	X	X	X	X								<u>Diluted 1:20</u>
4. <u>K-Ac CF-7</u>						X					X	X	X	X	X								<u>Diluted 1:20</u>
5. <u>Beet SS</u>						X					X	X	X	X	X								<u>Diluted 1:20</u>
6. <u>Apogee</u>						X					X	X	X	X	X								<u>Diluted 1:20</u>
7. <u>CaCl₂ RG+</u>						X					X	X	X	X	X								<u>Diluted 1:20</u>
8. <u>MgCl₂ Apex</u>						X					X	X	X	X	X								<u>Diluted 1:20</u>
9.																							<u>Test For: Mg, Na, K, Al, As, Ba, Cd, Cr, Co, Cu, Ni, Zn</u>
10.																							

Common Parameter/Container - Preservation Key

#1 - Volatile Organics = BTEX, GRO, TPH, 8260 Full List

#2 - Semivolatile Organics = PAHs, PCP, Dioxins, 8270 Full List, Herbicide/Pesticide/PCBs

#3 - General = pH, Chloride, Fluoride, 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: _____

BRAUN INTERTEC

Braun Intertec Corporation
11001 Hampshire Avenue S.
Minneapolis, MN 55438

Phone: 952.995.2000
Fax: 952.995.2020
Web: braunintertec.com

Mr. Keith Pilgrim
Barr Engineering Company
4700 West 77th Street
Minneapolis, MN 55435-4803

December 07, 2012

Report #: 1207047
(Revised)

RE: Determine Toxicity Deicing Material 23621088

Dear Keith Pilgrim:

Braun Intertec Corporation received samples for the project identified above on November 16, 2012. Analytical results are summarized in the following report.

All routine quality assurance procedures were followed, unless otherwise noted.

Analytical results are reported on an "as received" basis unless otherwise noted. Where possible, the samples will be retained by the laboratory for 14 days following issuance of the initial final report. The samples will be disposed of or returned at that time. Arrangements can be made for extended storage by contacting me at this time.

We appreciate your decision to use Braun Intertec Corporation for this project. We are committed to being your vendor of choice to meet your analytical chemistry needs.

If you have any questions please contact me at the above phone number.

Sincerely,



Steven J. Albrecht
Project Manager

Barr Engineering Company
4700 West 77th Street
Minneapolis, MN 55435-4803

Client Ref: Determine Toxicity Deicing Material 23621088
Client Contact: Mr. Keith Pilgrim
PO Number:

Report #: 1207047
Project Mgr: Steven J. Albrecht
Account ID: B01058

Qualifiers and Abbreviations

ve	The method reporting limits (MRLs) are elevated due to adjustments of the sample preparation amounts. This was necessary because of the sample matrix.
R-05	The sample was diluted due to the presence of high levels of non-target analytes resulting in elevated reporting limits.
R-01	The Method Reporting Limit for this analyte has been raised to account for matrix interference.
qn	The spike recovery is outside of laboratory control limits for the matrix spike (MS) and/or the matrix spike duplicate (MSD).
J	Detected but below the Method Reporting Limit; therefore, result is an estimated concentration (CLP J-Flag).
gh	The sample was received past the 15-minute EPA specified holding time.
gg	The sample was received past the method specified holding time.
COC	Chain of Custody
dry	Sample results reported on a dry weight basis
MDL	Method Detection Limit
MRL	Method Reporting Limit
NA	Not Applicable
ND	Analyte NOT DETECTED above the MDL value
NR	Not Reported
%Rec	Percent Recovery
RPD	Relative Percent Difference
VOC	Volatile Organic Compound

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Case Narrative

In the analysis of 350.1NH3 in water, the Matrix Spike(MS)/Matrix Spike Duplicate(MSD) results from preparation batch B2K0396 are not reported due to high levels of target analyte in the source sample. The amount of spike used in the MS/MSD was overwhelmed by the level of analyte in the source sample, resulting in non-valid data for the MS/MSD.

In the analysis of 350.1NH3 in water, the Matrix Spike(MS)/Matrix Spike Duplicate(MSD) results from preparation batch B2K0397 are based on the results of a source sample from another project.

In the analysis of SM4500 NO32 in water, the Matrix Spike(MS)/Matrix Spike Duplicate(MSD) results from preparation batch B2K0485 are not reported due to high levels of target analyte in the source sample. The amount of spike used in the MS/MSD was overwhelmed by the level of analyte in the source sample, resulting in non-valid data for the MS/MSD.

In the analysis of 351.2 TKN in water, the Matrix Spike(MS)/Matrix Spike Duplicate(MSD) results from preparation batch B2K0468 are based on the results of a source sample from another project.

In the analysis of 351.2 TKN in water, the Matrix Spike(MS)/Matrix Spike Duplicate(MSD) results from preparation batch B2K0470 are based on the results of a source sample from another project.

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Client Ref: Determine Toxicity Deicing Material 23621088
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Project Mgr: Steven J. Albrecht
Account ID: B01058

Sample Summary

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
MgCl2 (FG)	1207047-01	Liquid	10/30/12 13:00	11/16/12 09:37
A1 NaCl	1207047-02	Liquid	10/30/12 13:00	11/16/12 09:37
Boost CaCl2	1207047-03	Liquid	10/30/12 13:00	11/16/12 09:37
K-Ac CF-7	1207047-04	Liquid	10/30/12 13:00	11/16/12 09:37
Beet SS	1207047-05	Liquid	10/30/12 13:00	11/16/12 09:37
Apogee	1207047-06	Liquid	10/30/12 13:00	11/16/12 09:37
CaCl2 RG+	1207047-07	Liquid	10/30/12 13:00	11/16/12 09:37
MgCl2 Apex	1207047-08	Liquid	10/30/12 13:00	11/16/12 09:37

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Conditions Upon Receipt

Cooler: Cooler 1

Temperature: 3.7 °C

Temperature Blank: No

Received on Ice: Yes

Preservation Confirmed: Yes

COC Included: Yes

COC Complete: Yes

COC & Labels Agree: Yes

Sufficient Sample Provided: Yes

Custody Seals Used: No

Custody Seals Intact: NA

Hand Delivered by Client: Yes

Headspace Present (VOC): No

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Account ID: B01058

MgCl2 (FG)

1207047-01 (Liquid)

10/30/12 13:00

Classical Chemistry Parameters

Analyte	Result	MRL	MDL	Units	Dilution	Batch	Prepared	Analyzed	Analyst	Method	Notes
Specific conductance	16000	10	1.7	umhos/cm	1	B2K0365	11/19/12	11/19/12	SRH	EPA 120.1	
Ammonia as N	1.5	0.10	0.036	mg/L	5	B2K0396	11/19/12	11/20/12	JET	EPA 350.1	
Total Kjeldahl Nitrogen	40	5.0	1.5	mg/L	1	B2K0468	11/26/12	11/27/12	JET	EPA 351.2	
Chemical Oxygen Demand	1500	80	33	mg/L	1	B2K0404	11/20/12	11/20/12	SRH	EPA 410.4	
Total Alkalinity as CaCO3	210	20	7.7	mg/L	1	B2K0363	11/19/12	11/19/12	SRH	SM 2320B	gg
Hardness as CaCO3	21000	18	0.48	mg/L	5	[CALC]	11/16/12	11/19/12	DRM	SM 2340B	
Chloride	15000	1000	110	mg/L	1000	B2K0369	11/19/12	11/19/12	JET	SM4500 CL-E	
pH	8.35			pH Units	1	B2K0361	11/19/12	11/19/12	SRH	SM4500 H+B	gh
Nitrate + Nitrite as N	0.49 J	0.80	0.30	mg/L	20	B2K0485	11/26/12	11/26/12	JET	SM4500 NO3F	R-01

Metals

Analyte	Result	MRL	MDL	Units	Dilution	Batch	Prepared	Analyzed	Analyst	Method	Notes
Calcium	38000	5000	94	ug/L	5	B2K0351	11/16/12	11/19/12	DRM	EPA 200.7	
Magnesium	5100000	1200	60	ug/L	5	B2K0351	11/16/12	11/19/12	DRM	EPA 200.7	

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Report #: 1207047
Project Mgr: Steven J. Albrecht
Account ID: B01058

Watershed Cl ~~A1~~ NaCl

1207047-02 (Liquid)

10/30/12 13:00

Classical Chemistry Parameters

Analyte	Result	MRL	MDL	Units	Dilution	Batch	Prepared	Analyzed	Analyst	Method	Notes
Specific conductance	18000	10	1.7	umhos/cm	1	B2K0365	11/19/12	11/19/12	SRH	EPA 120.1	
Ammonia as N	0.16	0.020	0.0072	mg/L	1	B2K0396	11/19/12	11/20/12	JET	EPA 350.1	
Total Kjeldahl Nitrogen	1.8 J	5.0	1.5	mg/L	1	B2K0468	11/26/12	11/27/12	JET	EPA 351.2	R-05
Chemical Oxygen Demand	800	80	33	mg/L	1	B2K0404	11/20/12	11/20/12	SRH	EPA 410.4	
Total Alkalinity as CaCO3	32	20	7.7	mg/L	1	B2K0363	11/19/12	11/19/12	SRH	SM 2320B	gg
Hardness as CaCO3	0.47 J	3.5	0.096	mg/L	1	[CALC]	11/16/12	11/19/12	DRM	SM 2340B	
Chloride	8800	1000	110	mg/L	1000	B2K0369	11/19/12	11/19/12	JET	SM4500 CL-E	
pH	6.41			pH Units	1	B2K0361	11/19/12	11/19/12	SRH	SM4500 H+B	gh
Nitrate + Nitrite as N	5.5	0.80	0.30	mg/L	20	B2K0485	11/26/12	11/26/12	JET	SM4500 NO3F	

Metals

Analyte	Result	MRL	MDL	Units	Dilution	Batch	Prepared	Analyzed	Analyst	Method	Notes
Calcium	140 J	1000	19	ug/L	1	B2K0351	11/16/12	11/19/12	DRM	EPA 200.7	ve
Magnesium	31 J	250	12	ug/L	1	B2K0351	11/16/12	11/19/12	DRM	EPA 200.7	ve

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Project Mgr: Steven J. Albrecht
Account ID: B01058

Boost CaCl₂
1207047-03 (Liquid)
10/30/12 13:00

Classical Chemistry Parameters

Analyte	Result	MRL	MDL	Units	Dilution	Batch	Prepared	Analyzed	Analyst	Method	Notes
Specific conductance	20000	10	1.7	umhos/cm	1	B2K0365	11/19/12	11/19/12	SRH	EPA 120.1	
Ammonia as N	230	10	3.6	mg/L	500	B2K0396	11/19/12	11/20/12	JET	EPA 350.1	
Total Kjeldahl Nitrogen	300	25	7.6	mg/L	5	B2K0468	11/26/12	11/27/12	JET	EPA 351.2	
Chemical Oxygen Demand	3400	80	33	mg/L	1	B2K0404	11/20/12	11/20/12	SRH	EPA 410.4	
Total Alkalinity as CaCO ₃	64	20	7.7	mg/L	1	B2K0363	11/19/12	11/19/12	SRH	SM 2320B	gg
Hardness as CaCO ₃	19000	18	0.48	mg/L	5	[CALC]	11/16/12	11/19/12	DRM	SM 2340B	
Chloride	13000	1000	110	mg/L	1000	B2K0369	11/19/12	11/19/12	JET	SM4500 CL-E	
pH	5.63			pH Units	1	B2K0361	11/19/12	11/19/12	SRH	SM4500 H+B	gh
Nitrate + Nitrite as N	3.4	0.80	0.30	mg/L	20	B2K0485	11/26/12	11/26/12	JET	SM4500 NO3F	

Metals

Analyte	Result	MRL	MDL	Units	Dilution	Batch	Prepared	Analyzed	Analyst	Method	Notes
Calcium	7400000	5000	94	ug/L	5	B2K0351	11/16/12	11/19/12	DRM	EPA 200.7	
Magnesium	200000	1200	60	ug/L	5	B2K0351	11/16/12	11/19/12	DRM	EPA 200.7	

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Account ID: B01058

K-Ac CF-7
1207047-04 (Liquid)
10/30/12 13:00

Classical Chemistry Parameters

Analyte	Result	MRL	MDL	Units	Dilution	Batch	Prepared	Analyzed	Analyst	Method	Notes
Specific conductance	24000	10	1.7	umhos/cm	1	B2K0365	11/19/12	11/19/12	SRH	EPA 120.1	
Ammonia as N	0.072	0.020	0.0072	mg/L	1	B2K0396	11/19/12	11/20/12	JET	EPA 350.1	
Total Kjeldahl Nitrogen	ND	5.0	1.5	mg/L	1	B2K0468	11/26/12	11/27/12	JET	EPA 351.2	R-05
Chemical Oxygen Demand	2000	80	33	mg/L	1	B2K0404	11/20/12	11/20/12	SRH	EPA 410.4	
Total Alkalinity as CaCO3	8700	20	7.7	mg/L	1	B2K0363	11/19/12	11/19/12	SRH	SM 2320B	gg
Hardness as CaCO3	0.17 J	3.5	0.096	mg/L	1	[CALC]	11/16/12	11/19/12	DRM	SM 2340B	
Chloride	43	1.0	0.11	mg/L	1	B2K0369	11/19/12	11/19/12	JET	SM4500 CL-E	
pH	8.82			pH Units	1	B2K0361	11/19/12	11/19/12	SRH	SM4500 H+B	gh
Nitrate + Nitrite as N	0.32 J	0.80	0.30	mg/L	20	B2K0485	11/26/12	11/26/12	JET	SM4500 NO3F	R-01

Metals

Analyte	Result	MRL	MDL	Units	Dilution	Batch	Prepared	Analyzed	Analyst	Method	Notes
Calcium	68 J	1000	19	ug/L	1	B2K0351	11/16/12	11/19/12	DRM	EPA 200.7	ve
Magnesium	ND	250	12	ug/L	1	B2K0351	11/16/12	11/19/12	DRM	EPA 200.7	ve

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Account ID: B01058

Apogee
1207047-06 (Liquid)
10/30/12 13:00

Classical Chemistry Parameters

Analyte	Result	MRL	MDL	Units	Dilution	Batch	Prepared	Analyzed	Analyst	Method	Notes
Specific conductance	5800	10	1.7	umhos/cm	1	B2K0365	11/19/12	11/19/12	SRH	EPA 120.1	
Ammonia as N	0.020	0.020	0.0072	mg/L	1	B2K0397	11/19/12	11/20/12	JET	EPA 350.1	
Total Kjeldahl Nitrogen	ND	5.0	1.5	mg/L	1	B2K0468	11/26/12	11/27/12	JET	EPA 351.2	R-05
Chemical Oxygen Demand	49000	4000	1700	mg/L	1	B2K0404	11/20/12	11/20/12	SRH	EPA 410.4	
Total Alkalinity as CaCO3	200	20	7.7	mg/L	1	B2K0363	11/19/12	11/19/12	SRH	SM 2320B	gg
Hardness as CaCO3	23	3.5	0.096	mg/L	1	[CALC]	11/16/12	11/19/12	DRM	SM 2340B	
Chloride	1500	20	2.3	mg/L	20	B2K0369	11/19/12	11/19/12	JET	SM4500 CL-E	
pH	6.69			pH Units	1	B2K0361	11/19/12	11/19/12	SRH	SM4500 H+B	gh
Nitrate + Nitrite as N	0.41 J	0.80	0.30	mg/L	20	B2K0485	11/26/12	11/26/12	JET	SM4500 NO3F	R-01

Metals

Analyte	Result	MRL	MDL	Units	Dilution	Batch	Prepared	Analyzed	Analyst	Method	Notes
Calcium	800 J	1000	19	ug/L	1	B2K0351	11/16/12	11/19/12	DRM	EPA 200.7	ve
Magnesium	5200	250	12	ug/L	1	B2K0351	11/16/12	11/19/12	DRM	EPA 200.7	

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CaCl2 RG+

1207047-07 (Liquid)

10/30/12 13:00

Classical Chemistry Parameters

Analyte	Result	MRL	MDL	Units	Dilution	Batch	Prepared	Analyzed	Analyst	Method	Notes
Specific conductance	18000	10	1.7	umhos/cm	1	B2K0365	11/19/12	11/19/12	SRH	EPA 120.1	
Ammonia as N	39	1.0	0.36	mg/L	50	B2K0397	11/19/12	11/20/12	JET	EPA 350.1	
Total Kjeldahl Nitrogen	190	25	7.6	mg/L	5	B2K0468	11/26/12	11/27/12	JET	EPA 351.2	
Chemical Oxygen Demand	5100	4000	1700	mg/L	1	B2K0404	11/20/12	11/20/12	SRH	EPA 410.4	
Total Alkalinity as CaCO3	120	20	7.7	mg/L	1	B2K0363	11/19/12	11/19/12	SRH	SM 2320B	gg
Hardness as CaCO3	17000	18	0.48	mg/L	5	[CALC]	11/16/12	11/19/12	DRM	SM 2340B	
Chloride	13000	1000	110	mg/L	1000	B2K0369	11/19/12	11/19/12	JET	SM4500 CL-E	
pH	8.19			pH Units	1	B2K0361	11/19/12	11/19/12	SRH	SM4500 H+B	gh
Nitrate + Nitrite as N	9.9	0.80	0.30	mg/L	20	B2K0485	11/26/12	11/26/12	JET	SM4500 NO3F	

Metals

Analyte	Result	MRL	MDL	Units	Dilution	Batch	Prepared	Analyzed	Analyst	Method	Notes
Calcium	6000000	5000	94	ug/L	5	B2K0351	11/16/12	11/19/12	DRM	EPA 200.7	
Magnesium	560000	1200	60	ug/L	5	B2K0351	11/16/12	11/19/12	DRM	EPA 200.7	

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Account ID: B01058

MgCl2 Apex
1207047-08 (Liquid)
10/30/12 13:00

Classical Chemistry Parameters

Analyte	Result	MRL	MDL	Units	Dilution	Batch	Prepared	Analyzed	Analyst	Method	Notes
Specific conductance	18000	10	1.7	umhos/cm	1	B2K0365	11/19/12	11/19/12	SRH	EPA 120.1	
Ammonia as N	1.3	0.020	0.0072	mg/L	1	B2K0397	11/19/12	11/20/12	JET	EPA 350.1	
Total Kjeldahl Nitrogen	18	5.0	1.5	mg/L	1	B2K0470	11/26/12	11/27/12	JET	EPA 351.2	
Chemical Oxygen Demand	1800	80	33	mg/L	1	B2K0404	11/20/12	11/20/12	SRH	EPA 410.4	
Total Alkalinity as CaCO3	92	20	7.7	mg/L	1	B2K0363	11/19/12	11/19/12	SRH	SM 2320B	gg
Hardness as CaCO3	22000	18	0.48	mg/L	5	[CALC]	11/16/12	11/19/12	DRM	SM 2340B	
Chloride	13000	1000	110	mg/L	1000	B2K0369	11/19/12	11/19/12	JET	SM4500 CL-E	
pH	8.11			pH Units	1	B2K0361	11/19/12	11/19/12	SRH	SM4500 H+B	gh
Nitrate + Nitrite as N	1.2	0.80	0.30	mg/L	20	B2K0485	11/26/12	11/26/12	JET	SM4500 NO3F	

Metals

Analyte	Result	MRL	MDL	Units	Dilution	Batch	Prepared	Analyzed	Analyst	Method	Notes
Calcium	54000	5000	94	ug/L	5	B2K0351	11/16/12	11/19/12	DRM	EPA 200.7	
Magnesium	5200000	1200	60	ug/L	5	B2K0351	11/16/12	11/19/12	DRM	EPA 200.7	

Barr Engineering Company
4700 West 77th Street
Minneapolis, MN 55435-4803

Client Ref: Determine Toxicity Deicing Material 23621088
Client Contact: Mr. Keith Pilgrim
PO Number:

Report #: 1207047
Project Mgr: Steven J. Albrecht
Account ID: B01058

Classical Chemistry Parameters - Quality Control

Batch B2K0361 - Method-specified preparation

Laboratory Control Sample (B2K0361-BS1)

Prepared & Analyzed: 11/19/12

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
pH	6.7			pH Units	6.85	NA	97.7	90-105	NA	NA	

Laboratory Control Sample Duplicate (B2K0361-BSD1)

Prepared & Analyzed: 11/19/12

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
pH	6.8			pH Units	6.85	NA	98.5	90-105	0.893	20	

Duplicate (B2K0361-DUP1)

Source: 1207077-01

Prepared & Analyzed: 11/19/12

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
pH	9.7			pH Units	NA	9.7	NA	NA	0.413	20	

Batch B2K0363 - Method-specified preparation

Laboratory Control Sample (B2K0363-BS1)

Prepared & Analyzed: 11/19/12

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Total Alkalinity as CaCO ₃	48.0			mg/L	48.0	NA	100	80-120	NA	NA	

Laboratory Control Sample Duplicate (B2K0363-BSD1)

Prepared & Analyzed: 11/19/12

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Total Alkalinity as CaCO ₃	48.0			mg/L	48.0	NA	100	80-120	0.00	20	

Matrix Spike (B2K0363-MS1)

Source: 1207047-02

Prepared & Analyzed: 11/19/12

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Total Alkalinity as CaCO ₃	260	20	7.7	mg/L	240	32.0	95.0	75-125	NA	NA	

Matrix Spike Duplicate (B2K0363-MSD1)

Source: 1207047-02

Prepared & Analyzed: 11/19/12

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Total Alkalinity as CaCO ₃	256	20	7.7	mg/L	240	32.0	93.3	75-125	1.55	20	

Batch B2K0365 - Method-specified preparation

Laboratory Control Sample (B2K0365-BS1)

Prepared & Analyzed: 11/19/12

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Specific conductance	318			umhos/cm	303	NA	105	80-120	NA	NA	

EPA Lab ID: MN00063

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Barr Engineering Company
4700 West 77th Street
Minneapolis, MN 55435-4803

Client Ref: Determine Toxicity Deicing Material 23621088
Client Contact: Mr. Keith Pilgrim
PO Number:

Report #: 1207047
Project Mgr: Steven J. Albrecht
Account ID: B01058

Classical Chemistry Parameters - Quality Control

Batch B2K0365 - Method-specified preparation

Laboratory Control Sample (B2K0365-BS1)

Prepared & Analyzed: 11/19/12

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Laboratory Control Sample Duplicate (B2K0365-BSD1)

Prepared & Analyzed: 11/19/12

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Specific conductance	312			umhos/cm	303	NA	103	80-120	1.90	20	

Duplicate (B2K0365-DUP1)

Source: 1207047-01

Prepared & Analyzed: 11/19/12

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Specific conductance	15700	10	1.7	umhos/cm	NA	15700	NA	NA	0.318	20	

Batch B2K0369 - Method-specified preparation

Method Blank (B2K0369-BLK1)

Prepared & Analyzed: 11/19/12

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Chloride	ND	1.0	0.11	mg/L	NA	NA	NA	NA	NA	NA	

Laboratory Control Sample (B2K0369-BS1)

Prepared & Analyzed: 11/19/12

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Chloride	40.1	1.0	0.11	mg/L	40.0	NA	100	80-120	NA	NA	

Laboratory Control Sample Duplicate (B2K0369-BSD1)

Prepared & Analyzed: 11/19/12

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Chloride	39.9	1.0	0.11	mg/L	40.0	NA	99.7	80-120	0.480	20	

Matrix Spike (B2K0369-MS1)

Source: 1207077-01

Prepared & Analyzed: 11/19/12

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Chloride	42.2	1.0	0.11	mg/L	40.0	2.56	99.0	75-125	NA	NA	

Matrix Spike Duplicate (B2K0369-MSD1)

Source: 1207077-01

Prepared & Analyzed: 11/19/12

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Chloride	42.6	1.0	0.11	mg/L	40.0	2.56	100	75-125	1.08	20	

Batch B2K0396 - Method-specified preparation

EPA Lab ID: MN00063

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Barr Engineering Company
4700 West 77th Street
Minneapolis, MN 55435-4803

Client Ref: Determine Toxicity Deicing Material 23621088
Client Contact: Mr. Keith Pilgrim
PO Number:

Report #: 1207047
Project Mgr: Steven J. Albrecht
Account ID: B01058

Classical Chemistry Parameters - Quality Control

Batch B2K0396 - Method-specified preparation

Method Blank (B2K0396-BLK1)

Prepared: 11/19/12 Analyzed: 11/20/12

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Ammonia as N	ND	0.020	0.0072	mg/L	NA	NA	NA	NA	NA	NA	

Laboratory Control Sample (B2K0396-BS1)

Prepared: 11/19/12 Analyzed: 11/20/12

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Ammonia as N	0.512	0.020	0.0072	mg/L	0.500	NA	102	90-110	NA	NA	

Laboratory Control Sample Duplicate (B2K0396-BSD1)

Prepared: 11/19/12 Analyzed: 11/20/12

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Ammonia as N	0.514	0.020	0.0072	mg/L	0.500	NA	103	90-110	0.331	20	

Batch B2K0397 - Method-specified preparation

Method Blank (B2K0397-BLK1)

Prepared: 11/19/12 Analyzed: 11/20/12

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Ammonia as N	ND	0.020	0.0072	mg/L	NA	NA	NA	NA	NA	NA	

Laboratory Control Sample (B2K0397-BS1)

Prepared: 11/19/12 Analyzed: 11/20/12

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Ammonia as N	0.515	0.020	0.0072	mg/L	0.500	NA	103	90-110	NA	NA	

Laboratory Control Sample Duplicate (B2K0397-BSD1)

Prepared: 11/19/12 Analyzed: 11/20/12

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Ammonia as N	0.513	0.020	0.0072	mg/L	0.500	NA	103	90-110	0.369	20	

Matrix Spike (B2K0397-MS1)

Source: 1207077-01

Prepared: 11/19/12 Analyzed: 11/20/12

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Ammonia as N	0.617	0.020	0.0072	mg/L	0.500	0.166	90.2	90-110	NA	NA	qn

Matrix Spike Duplicate (B2K0397-MSD1)

Source: 1207077-01

Prepared: 11/19/12 Analyzed: 11/20/12

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Ammonia as N	0.598	0.020	0.0072	mg/L	0.500	0.166	86.5	90-110	3.09	20	qn

Batch B2K0404 - Method-specified preparation

EPA Lab ID: MN00063

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Barr Engineering Company
4700 West 77th Street
Minneapolis, MN 55435-4803

Client Ref: Determine Toxicity Deicing Material 23621088
Client Contact: Mr. Keith Pilgrim
PO Number:

Report #: 1207047
Project Mgr: Steven J. Albrecht
Account ID: B01058

Classical Chemistry Parameters - Quality Control

Method Blank (B2K0404-BLK1)

Prepared & Analyzed: 11/20/12

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Chemical Oxygen Demand	ND	20	8.4	mg/L	NA	NA	NA	NA	NA	NA	

Laboratory Control Sample (B2K0404-BS1)

Prepared & Analyzed: 11/20/12

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Chemical Oxygen Demand	188			mg/L	200	NA	94.0	80-120	NA	NA	

Laboratory Control Sample Duplicate (B2K0404-BSD1)

Prepared & Analyzed: 11/20/12

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Chemical Oxygen Demand	191			mg/L	200	NA	95.4	80-120	1.48	20	

Matrix Spike (B2K0404-MS1)

Source: 1207043-01

Prepared & Analyzed: 11/20/12

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Chemical Oxygen Demand	459	20	8.4	mg/L	200	255	102	75-125	NA	NA	

Matrix Spike Duplicate (B2K0404-MSD1)

Source: 1207043-01

Prepared & Analyzed: 11/20/12

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Chemical Oxygen Demand	454	20	8.4	mg/L	200	255	99.3	75-125	1.23	20	

Batch B2K0468 - EPA 351.2

Method Blank (B2K0468-BLK1)

Prepared: 11/26/12 Analyzed: 11/27/12

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Total Kjeldahl Nitrogen	ND	0.50	0.15	mg/L	NA	NA	NA	NA	NA	NA	

Laboratory Control Sample (B2K0468-BS1)

Prepared: 11/26/12 Analyzed: 11/27/12

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Total Kjeldahl Nitrogen	2.38	0.50	0.15	mg/L	2.50	NA	95.3	90-110	NA	NA	

Laboratory Control Sample Duplicate (B2K0468-BSD1)

Prepared: 11/26/12 Analyzed: 11/27/12

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Total Kjeldahl Nitrogen	2.41	0.50	0.15	mg/L	2.50	NA	96.4	90-110	1.21	20	

Barr Engineering Company
4700 West 77th Street
Minneapolis, MN 55435-4803

Client Ref: Determine Toxicity Deicing Material 23621088
Client Contact: Mr. Keith Pilgrim
PO Number:

Report #: 1207047
Project Mgr: Steven J. Albrecht
Account ID: B01058

Classical Chemistry Parameters - Quality Control

Batch B2K0468 - EPA 351.2

Matrix Spike (B2K0468-MS1)

Source: 1206992-05

Prepared: 11/26/12 Analyzed: 11/27/12

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Total Kjeldahl Nitrogen	2.52	0.50	0.15	mg/L	2.50	0.501	80.6	90-110	NA	NA	qn

Matrix Spike Duplicate (B2K0468-MSD1)

Source: 1206992-05

Prepared: 11/26/12 Analyzed: 11/27/12

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Total Kjeldahl Nitrogen	2.46	0.50	0.15	mg/L	2.50	0.501	78.2	90-110	2.45	20	qn

Batch B2K0470 - EPA 351.2

Method Blank (B2K0470-BLK1)

Prepared: 11/26/12 Analyzed: 11/27/12

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Total Kjeldahl Nitrogen	ND	0.50	0.15	mg/L	NA	NA	NA	NA	NA	NA	

Laboratory Control Sample (B2K0470-BS1)

Prepared: 11/26/12 Analyzed: 11/27/12

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Total Kjeldahl Nitrogen	2.45	0.50	0.15	mg/L	2.50	NA	98.0	90-110	NA	NA	

Laboratory Control Sample Duplicate (B2K0470-BSD1)

Prepared: 11/26/12 Analyzed: 11/27/12

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Total Kjeldahl Nitrogen	2.73	0.50	0.15	mg/L	2.50	NA	109	90-110	10.8	20	

Matrix Spike (B2K0470-MS1)

Source: 1207077-01

Prepared: 11/26/12 Analyzed: 11/27/12

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Total Kjeldahl Nitrogen	6.58	0.50	0.15	mg/L	2.50	4.65	77.0	90-110	NA	NA	qn

Matrix Spike Duplicate (B2K0470-MSD1)

Source: 1207077-01

Prepared: 11/26/12 Analyzed: 11/27/12

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Total Kjeldahl Nitrogen	6.36	0.50	0.15	mg/L	2.50	4.65	68.2	90-110	3.40	20	qn

Batch B2K0485 - Method-specified preparation

Method Blank (B2K0485-BLK1)

Prepared & Analyzed: 11/26/12

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Nitrate + Nitrite as N	ND	0.020	0.015	mg/L	NA	NA	NA	NA	NA	NA	

EPA Lab ID: MN00063

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Barr Engineering Company
4700 West 77th Street
Minneapolis, MN 55435-4803

Client Ref: Determine Toxicity Deicing Material 23621088
Client Contact: Mr. Keith Pilgrim
PO Number:

Report #: 1207047
Project Mgr: Steven J. Albrecht
Account ID: B01058

Classical Chemistry Parameters - Quality Control

Batch B2K0485 - Method-specified preparation

Method Blank (B2K0485-BLK1)

Prepared & Analyzed: 11/26/12

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Laboratory Control Sample (B2K0485-BS1)

Prepared & Analyzed: 11/26/12

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Nitrate + Nitrite as N	0.524	0.020	0.015	mg/L	0.500	NA	105	90-110	NA	NA	

Laboratory Control Sample Duplicate (B2K0485-BSD1)

Prepared & Analyzed: 11/26/12

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Nitrate + Nitrite as N	0.527	0.020	0.015	mg/L	0.500	NA	105	90-110	0.666	20	

Barr Engineering Company
4700 West 77th Street
Minneapolis, MN 55435-4803

Client Ref: Determine Toxicity Deicing Material 23621088
Client Contact: Mr. Keith Pilgrim
PO Number:

Report #: 1207047
Project Mgr: Steven J. Albrecht
Account ID: B01058

Metals - Quality Control

Batch B2K0351 - EPA 200.7

Method Blank (B2K0351-BLK1)

Prepared: 11/16/12 Analyzed: 11/19/12

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calcium	13.3 J	200	3.8	ug/L	NA	NA	NA	NA	NA	NA	
Magnesium	ND	50	2.4	ug/L	NA	NA	NA	NA	NA	NA	

Laboratory Control Sample (B2K0351-BS1)

Prepared: 11/16/12 Analyzed: 11/19/12

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calcium	41600	200	3.8	ug/L	40000	NA	104	85-115	NA	NA	
Magnesium	40200	50	2.4	ug/L	40000	NA	100	85-115	NA	NA	

Laboratory Control Sample Duplicate (B2K0351-BSD1)

Prepared: 11/16/12 Analyzed: 11/19/12

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calcium	41700	200	3.8	ug/L	40000	NA	104	85-115	0.373	25	
Magnesium	40500	50	2.4	ug/L	40000	NA	101	85-115	0.659	25	

Matrix Spike (B2K0351-MS1)

Source: 1207032-01

Prepared: 11/16/12 Analyzed: 11/19/12

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calcium	120000	200	3.8	ug/L	40000	82300	94.9	75-125	NA	NA	
Magnesium	74300	50	2.4	ug/L	40000	32600	104	75-125	NA	NA	

Matrix Spike Duplicate (B2K0351-MSD1)

Source: 1207032-01

Prepared: 11/16/12 Analyzed: 11/19/12

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Calcium	121000	200	3.8	ug/L	40000	82300	96.6	75-125	0.579	20	
Magnesium	74800	50	2.4	ug/L	40000	32600	105	75-125	0.763	20	

Report #: 1207047
Project Mgr: Steven J. Albrecht
Account ID: B01058

[illegible]

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

15.20L (HD) + ICE

BRAUN INTERTEC

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Mr. Keith Pilgrim
Barr Engineering Company
4700 West 77th Street
Minneapolis, MN 55435-4803

May 17, 2013

Report #: 1301992
(Revised)

RE: Determine Toxicity Deicing Mat
23621088

Dear Keith Pilgrim:

Braun Intertec Corporation received samples for the project identified above on May 01, 2013.
Analytical results are summarized in the following report.

All routine quality assurance procedures were followed, unless otherwise noted.

Analytical results are reported on an "as received" basis unless otherwise noted. Where possible, the samples will be retained by the laboratory for 14 days following issuance of the initial final report. The samples will be disposed of or returned at that time. Arrangements can be made for extended storage by contacting me at this time.

We appreciate your decision to use Braun Intertec Corporation for this project. We are committed to being your vendor of choice to meet your analytical chemistry needs.

If you have any questions please contact me at the above phone number.

Sincerely,



Steven J. Albrecht
Project Manager

Certification/Accreditation Number

Minnesota Department of Health #027-053-117

Providing engineering and environmental solutions since 1957

Barr Engineering Company
4700 West 77th Street
Minneapolis, MN 55435-4803

Client Ref: Determine Toxicity Deicing Mat
Client Contact: Mr. Keith Pilgrim
PO Number: 23621088

Report #: 1301992
Project Mgr: Steven J. Albrecht
Account ID: B01058

Qualifiers and Abbreviations

ve	The method reporting limits (MRLs) are elevated due to adjustments of the sample preparation amounts. This was necessary because of the sample matrix.
ts	This analysis was performed by a subcontract laboratory.
sd	See case narrative section for further information.
R-05	The sample was diluted due to the presence of high levels of non-target analytes resulting in elevated reporting limits.
qn	The spike recovery is outside of laboratory control limits for the matrix spike (MS) and/or the matrix spike duplicate (MSD).
J	Detected but below the Method Reporting Limit; therefore, result is an estimated concentration (CLP J-Flag).
gi	The sample was not filtered within 15 minutes of sample collection as required by the EPA.
gh	The sample was received past the 15-minute EPA specified holding time.
gg	The sample was received past the method specified holding time.
ca	This field of testing is not certifiable by the Minnesota Department of Health.
COC	Chain of Custody
dry	Sample results reported on a dry weight basis
MDL	Method Detection Limit
MRL	Method Reporting Limit
NA	Not Applicable
ND	Analyte NOT DETECTED above the MDL value
NR	Not Reported
%Rec	Percent Recovery
RPD	Relative Percent Difference
VOC	Volatile Organic Compound

A field of testing is the combination of analyte, matrix, method, and regulatory program.

Barr Engineering Company
4700 West 77th Street
Minneapolis, MN 55435-4803

Client Ref: Determine Toxicity Deicing Mat
Client Contact: Mr. Keith Pilgrim
PO Number: 23621088

Report #: 1301992
Project Mgr: Steven J. Albrecht
Account ID: B01058

Case Narrative

In the analysis of Potassium and Sodium in Groundwater, the Matrix Spike (MS)/Matrix Spike Duplicate (MSD) results from preparation batch B3E0094 are not reported due to high levels of target analyte in the source sample. The amount of spike used in the MS/MSD was overwhelmed by the level of analyte in the source sample, resulting in non-valid data for the MS/MSD.

In the analysis of 351.2 TKN in water, the Matrix Spike(MS)/Matrix Spike Duplicate(MSD) results from preparation batch B3E0148 are based on the results of a source sample from another project.

The percent recoveries of the Matrix Spike (MS) and Matrix Spike Duplicate (MSD) from preparation batch B3E0094 are outside of laboratory acceptance limits for Boron in Groundwater. The MS or MSD recoveries were 50% and 52%. The acceptance limits are 75% - 125%. There may be a low bias of the Boron result in sample Beet-SS (1301992-01) due to interference from the sample matrix.

Barr Engineering Company
4700 West 77th Street
Minneapolis, MN 55435-4803

Client Ref: Determine Toxicity Deicing Mat
Client Contact: Mr. Keith Pilgrim
PO Number: 23621088

Report #: 1301992
Project Mgr: Steven J. Albrecht
Account ID: B01058

Sample Summary

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
Beet-SS	1301992-01	Water	05/01/13 08:30	05/01/13 09:15
K-acetate	1301992-02	Water	05/01/13 08:30	05/01/13 09:15

Barr Engineering Company
4700 West 77th Street
Minneapolis, MN 55435-4803

Client Ref: Determine Toxicity Deicing Mat
Client Contact: Mr. Keith Pilgrim
PO Number: 23621088

Report #: 1301992
Project Mgr: Steven J. Albrecht
Account ID: B01058

Conditions Upon Receipt

Cooler: Cooler 1

Temperature: 3.9 °C

Temperature Blank: Yes

Received on Ice: Yes

Preservation Confirmed: Yes

COC Included: Yes

COC Complete: Yes

COC & Labels Agree: Yes

Sufficient Sample Provided: Yes

Custody Seals Used: No

Custody Seals Intact: NA

Hand Delivered by Client: Yes

Headspace Present (VOC): No

Barr Engineering Company
4700 West 77th Street
Minneapolis, MN 55435-4803

Client Ref: Determine Toxicity Deicing Mat
Client Contact: Mr. Keith Pilgrim
PO Number: 23621088

Report #: 1301992
Project Mgr: Steven J. Albrecht
Account ID: B01058

Beet-SS
1301992-01 (Water)
5/1/13 8:30

Classical Chemistry Parameters

Analyte	Result	MRL	MDL	Units	Dilution	Batch	Prepared	Analyzed	Analyst	Method	Notes
Specific conductance	30000	10	1.7	umhos/cm	1	B3E0032	5/2/13	5/2/13	SRH	EPA 120.1	ca
Ammonia as N	3.1	2.0	0.72	mg/L	100	B3E0116	5/6/13	5/8/13	JET	EPA 350.1	ca
Total Kjeldahl Nitrogen	460	50	15	mg/L	10	B3E0148	5/7/13	5/8/13	JET	EPA 351.2	sd, ca
Orthophosphate as P	0.66	0.12	0.018	mg/L	20	B3E0022	5/1/13	5/1/13	JET	EPA 365.1	gi, ca
Phosphorus, Total as P	3.3	0.10	0.028	mg/L	1	B3E0140	5/7/13	5/9/13	JET	EPA 365.1	ca
Chemical Oxygen Demand	17000	400	170	mg/L	1	B3E0105	5/6/13	5/6/13	SRH	EPA 410.4	ca
Total Alkalinity as CaCO3	400	20	7.7	mg/L	1	B3E0034	5/2/13	5/2/13	SRH	SM 2320 B-97	ca
Hardness as CaCO3	40	3.5	0.096	mg/L	5	[CALC]	5/1/13	5/3/13	DRM	SM 2340B	
Residual Chlorine	ND	1.2	0.35	mg/L	1	B3E0103	5/6/13	5/6/13	SRH	SM4500 Cl-G	gg, ca
Cyanide (total)	ND	0.010	0.0020	mg/L	1	B3E0069	5/3/13	5/3/13	SRH	SM 4500-CN-E	ca
pH	6.13			pH Units	1	B3E0033	5/2/13	5/2/13	SRH	SM4500-H+ B-96	gh, ca
Nitrate + Nitrite as N	13	0.40	0.30	mg/L	20	B3E0077	5/3/13	5/3/13	JET	SM4500 NO3F	ca

Metals

Analyte	Result	MRL	MDL	Units	Dilution	Batch	Prepared	Analyzed	Analyst	Method	Notes
Aluminum	160 J	200	7.9	ug/L	1	B3E0094	5/4/13	5/7/13	DRM	EPA 6010C	ve
Arsenic	13 J	100	3.0	ug/L	1	B3E0094	5/4/13	5/7/13	DRM	EPA 6010C	ve
Barium	ND	50	1.8	ug/L	1	B3E0094	5/4/13	5/7/13	DRM	EPA 6010C	ve
Boron	1800 J	5000	300	ug/L	5	B3E0094	5/4/13	5/6/13	DRM	EPA 6010C	qn, R-05
Cadmium	3.6 J	10	0.88	ug/L	1	B3E0094	5/4/13	5/7/13	DRM	EPA 6010C	ve
Calcium	9300	5000	94	ug/L	5	B3E0094	5/4/13	5/6/13	DRM	EPA 6010C	
Chromium	7.2 J	25	1.9	ug/L	1	B3E0094	5/4/13	5/7/13	DRM	EPA 6010C	ve
Cobalt	24 J	25	0.71	ug/L	1	B3E0094	5/4/13	5/7/13	DRM	EPA 6010C	ve
Copper	13 J	50	1.2	ug/L	1	B3E0094	5/4/13	5/7/13	DRM	EPA 6010C	ve
Magnesium	5000	250	12	ug/L	1	B3E0094	5/4/13	5/7/13	DRM	EPA 6010C	
Nickel	88	25	2.5	ug/L	1	B3E0094	5/4/13	5/7/13	DRM	EPA 6010C	
Potassium	1700000	5000	820	ug/L	5	B3E0094	5/4/13	5/6/13	DRM	EPA 6010C	sd
Sodium	9400000	100000	2100	ug/L	100	B3E0094	5/4/13	5/6/13	DRM	EPA 6010C	sd
Zinc	350	100	3.4	ug/L	1	B3E0094	5/4/13	5/7/13	DRM	EPA 6010C	

Anions by Ion Chromatography

Analyte	Result	MRL	MDL	Units	Dilution	Batch	Prepared	Analyzed	Analyst	Method	Notes
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Barr Engineering Company
4700 West 77th Street
Minneapolis, MN 55435-4803

Client Ref: Determine Toxicity Deicing Mat
Client Contact: Mr. Keith Pilgrim
PO Number: 23621088

Report #: 1301992
Project Mgr: Steven J. Albrecht
Account ID: B01058

Beet-SS

1301992-01 (Water)

5/1/13 8:30

Anions by Ion Chromatography

Analyte	Result	MRL	MDL	Units	Dilution	Batch	Prepared	Analyzed	Analyst	Method	Notes
Bromide	0.92 J	10	0.90	mg/L	50	B3E0285	5/14/13	5/15/13	CAC	EPA 9056A	R-05
Chloride	13000	1000	280	mg/L	5000	B3E0285	5/14/13	5/15/13	CAC	EPA 9056A	

Subcontracted to Instrumental Research, Inc. (MDH# 027-003-130)

Analyte	Result	MRL	MDL	Units	Dilution	Batch	Prepared	Analyzed	Analyst	Method	Notes
Biochemical Oxygen Demand	6700	1.0	0.62	mg/L	1	B3E0250	5/2/13	5/2/13	---	SM 5210B	ts, ca

Barr Engineering Company
4700 West 77th Street
Minneapolis, MN 55435-4803

Client Ref: Determine Toxicity Deicing Mat
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PO Number: 23621088

Report #: 1301992
Project Mgr: Steven J. Albrecht
Account ID: B01058

K-acetate
1301992-02 (Water)
5/1/13 8:30

Classical Chemistry Parameters

Analyte	Result	MRL	MDL	Units	Dilution	Batch	Prepared	Analyzed	Analyst	Method	Notes
Chemical Oxygen Demand	8400	160	67	mg/L	1	B3E0105	5/6/13	5/6/13	SRH	EPA 410.4	ca

Subcontracted to Instrumental Research, Inc. (MDH# 027-003-130)

Analyte	Result	MRL	MDL	Units	Dilution	Batch	Prepared	Analyzed	Analyst	Method	Notes
Biochemical Oxygen Demand	ND	1.0	0.62	mg/L	1	B3E0250	5/2/13	5/2/13	---	SM 5210B	ts, ca

Barr Engineering Company
4700 West 77th Street
Minneapolis, MN 55435-4803

Client Ref: Determine Toxicity Deicing Mat
Client Contact: Mr. Keith Pilgrim
PO Number: 23621088

Report #: 1301992
Project Mgr: Steven J. Albrecht
Account ID: B01058

Classical Chemistry Parameters - Quality Control

Batch B3E0022 - EPA 365.1

Method Blank (B3E0022-BLK1)

Prepared & Analyzed: 05/01/13

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Orthophosphate as P	0.00104 J	0.0060	0.00090	mg/L	NA	NA	NA	NA	NA	NA	

Laboratory Control Sample (B3E0022-BS1)

Prepared & Analyzed: 05/01/13

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Orthophosphate as P	0.0999	0.0060	0.00090	mg/L	0.100	NA	99.9	90-110	NA	NA	

Laboratory Control Sample Duplicate (B3E0022-BSD1)

Prepared & Analyzed: 05/01/13

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Orthophosphate as P	0.0996	0.0060	0.00090	mg/L	0.100	NA	99.6	90-110	0.281	20	

Duplicate (B3E0022-DUP1)

Source: 1301992-01

Prepared & Analyzed: 05/01/13

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Orthophosphate as P	0.638	0.12	0.018	mg/L	NA	0.663	NA	NA	3.87	20	

Batch B3E0032 - Method-specified preparation

Laboratory Control Sample (B3E0032-BS1)

Prepared & Analyzed: 05/02/13

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Specific conductance	315			umhos/cm	303	NA	104	80-120	NA	NA	

Laboratory Control Sample Duplicate (B3E0032-BSD1)

Prepared & Analyzed: 05/02/13

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Specific conductance	310			umhos/cm	303	NA	102	80-120	1.60	20	

Duplicate (B3E0032-DUP1)

Source: 1301977-01

Prepared & Analyzed: 05/02/13

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Specific conductance	1620	10	1.7	umhos/cm	NA	1620	NA	NA	0.247	20	

Batch B3E0033 - Method-specified preparation

Laboratory Control Sample (B3E0033-BS1)

Prepared & Analyzed: 05/02/13

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
pH	6.5			pH Units	6.85	NA	95.0	90-105	NA	NA	

EPA Lab ID: MN00063

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Barr Engineering Company
4700 West 77th Street
Minneapolis, MN 55435-4803

Client Ref: Determine Toxicity Deicing Mat
Client Contact: Mr. Keith Pilgrim
PO Number: 23621088

Report #: 1301992
Project Mgr: Steven J. Albrecht
Account ID: B01058

Classical Chemistry Parameters - Quality Control

Batch B3E0033 - Method-specified preparation

Laboratory Control Sample (B3E0033-BS1)

Prepared & Analyzed: 05/02/13

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Laboratory Control Sample Duplicate (B3E0033-BSD1)

Prepared & Analyzed: 05/02/13

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
pH	6.6			pH Units	6.85	NA	95.6	90-105	0.613	20	

Duplicate (B3E0033-DUP1)

Source: 1301977-01

Prepared & Analyzed: 05/02/13

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
pH	6.9			pH Units	NA	6.8	NA	NA	1.75	20	

Batch B3E0034 - Method-specified preparation

Laboratory Control Sample (B3E0034-BS1)

Prepared & Analyzed: 05/02/13

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Total Alkalinity as CaCO3	48.0			mg/L	48.0	NA	100	80-120	NA	NA	

Laboratory Control Sample Duplicate (B3E0034-BSD1)

Prepared & Analyzed: 05/02/13

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Total Alkalinity as CaCO3	44.0			mg/L	48.0	NA	91.7	80-120	8.70	20	

Duplicate (B3E0034-DUP1)

Source: 1301977-01

Prepared & Analyzed: 05/02/13

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Total Alkalinity as CaCO3	160	20	7.7	mg/L	NA	168	NA	NA	4.88	20	

Matrix Spike (B3E0034-MS1)

Source: 1301977-01

Prepared & Analyzed: 05/02/13

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Total Alkalinity as CaCO3	392	20	7.7	mg/L	240	168	93.3	75-125	NA	NA	

Matrix Spike Duplicate (B3E0034-MSD1)

Source: 1301977-01

Prepared & Analyzed: 05/02/13

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Total Alkalinity as CaCO3	388	20	7.7	mg/L	240	168	91.7	75-125	1.03	20	

Batch B3E0069 - SM4500CNE

Barr Engineering Company
4700 West 77th Street
Minneapolis, MN 55435-4803

Client Ref: Determine Toxicity Deicing Mat
Client Contact: Mr. Keith Pilgrim
PO Number: 23621088

Report #: 1301992
Project Mgr: Steven J. Albrecht
Account ID: B01058

Classical Chemistry Parameters - Quality Control

Batch B3E0069 - SM4500CNE

Method Blank (B3E0069-BLK1)

Prepared & Analyzed: 05/03/13

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Cyanide (total)	ND	0.010	0.0020	mg/L	NA	NA	NA	NA	NA	NA	

Laboratory Control Sample (B3E0069-BS1)

Prepared & Analyzed: 05/03/13

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Cyanide (total)	0.112	0.010	0.0020	mg/L	0.125	NA	89.6	80-120	NA	NA	

Laboratory Control Sample Duplicate (B3E0069-BSD1)

Prepared & Analyzed: 05/03/13

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Cyanide (total)	0.111	0.010	0.0020	mg/L	0.125	NA	88.8	80-120	0.920	20	

Matrix Spike (B3E0069-MS1)

Source: 1301930-01

Prepared & Analyzed: 05/03/13

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Cyanide (total)	0.117	0.010	0.0020	mg/L	0.125	0.00220	91.7	75-125	NA	NA	

Matrix Spike Duplicate (B3E0069-MSD1)

Source: 1301930-01

Prepared & Analyzed: 05/03/13

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Cyanide (total)	0.115	0.010	0.0020	mg/L	0.125	0.00220	90.6	75-125	1.18	20	

Batch B3E0077 - Method-specified preparation

Method Blank (B3E0077-BLK1)

Prepared & Analyzed: 05/03/13

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Nitrate + Nitrite as N	ND	0.020	0.015	mg/L	NA	NA	NA	NA	NA	NA	

Laboratory Control Sample (B3E0077-BS1)

Prepared & Analyzed: 05/03/13

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Nitrate + Nitrite as N	0.481	0.020	0.015	mg/L	0.500	NA	96.2	90-110	NA	NA	

Laboratory Control Sample Duplicate (B3E0077-BSD1)

Prepared & Analyzed: 05/03/13

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Nitrate + Nitrite as N	0.475	0.020	0.015	mg/L	0.500	NA	95.1	90-110	1.23	20	

Barr Engineering Company
4700 West 77th Street
Minneapolis, MN 55435-4803

Client Ref: Determine Toxicity Deicing Mat
Client Contact: Mr. Keith Pilgrim
PO Number: 23621088

Report #: 1301992
Project Mgr: Steven J. Albrecht
Account ID: B01058

Classical Chemistry Parameters - Quality Control

Batch B3E0077 - Method-specified preparation

Matrix Spike (B3E0077-MS1)

Source: 1301914-01

Prepared & Analyzed: 05/03/13

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Nitrate + Nitrite as N	0.798	0.020	0.015	mg/L	0.500	0.330	93.7	80-120	NA	NA	

Matrix Spike Duplicate (B3E0077-MSD1)

Source: 1301914-01

Prepared & Analyzed: 05/03/13

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Nitrate + Nitrite as N	0.794	0.020	0.015	mg/L	0.500	0.330	92.8	80-120	0.528	20	

Batch B3E0103 - Method-specified preparation

Method Blank (B3E0103-BLK1)

Prepared & Analyzed: 05/06/13

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Residual Chlorine	ND	0.050	0.014	mg/L	NA	NA	NA	NA	NA	NA	

Laboratory Control Sample (B3E0103-BS1)

Prepared & Analyzed: 05/06/13

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Residual Chlorine	1.06	0.050	0.014	mg/L	1.00	NA	106	90-110	NA	NA	

Laboratory Control Sample Duplicate (B3E0103-BSD1)

Prepared & Analyzed: 05/06/13

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Residual Chlorine	1.05	0.050	0.014	mg/L	1.00	NA	105	90-110	1.13	20	

Matrix Spike (B3E0103-MS1)

Source: 1301789-03

Prepared & Analyzed: 05/06/13

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Residual Chlorine	1.83	0.050	0.014	mg/L	1.00	0.945	88.7	75-125	NA	NA	

Matrix Spike Duplicate (B3E0103-MSD1)

Source: 1301789-03

Prepared & Analyzed: 05/06/13

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Residual Chlorine	1.84	0.050	0.014	mg/L	1.00	0.945	89.5	75-125	0.431	20	

Batch B3E0105 - Method-specified preparation

Method Blank (B3E0105-BLK1)

Prepared & Analyzed: 05/06/13

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Chemical Oxygen Demand	ND	20	8.4	mg/L	NA	NA	NA	NA	NA	NA	

EPA Lab ID: MN00063

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Barr Engineering Company
4700 West 77th Street
Minneapolis, MN 55435-4803

Client Ref: Determine Toxicity Deicing Mat
Client Contact: Mr. Keith Pilgrim
PO Number: 23621088

Report #: 1301992
Project Mgr: Steven J. Albrecht
Account ID: B01058

Classical Chemistry Parameters - Quality Control

Batch B3E0105 - Method-specified preparation

Method Blank (B3E0105-BLK1)

Prepared & Analyzed: 05/06/13

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Laboratory Control Sample (B3E0105-BS1)

Prepared & Analyzed: 05/06/13

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Chemical Oxygen Demand	201			mg/L	200	NA	101	80-120	NA	NA	

Laboratory Control Sample Duplicate (B3E0105-BSD1)

Prepared & Analyzed: 05/06/13

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Chemical Oxygen Demand	195			mg/L	200	NA	97.5	80-120	3.18	20	

Matrix Spike (B3E0105-MS1)

Source: 1301999-01

Prepared & Analyzed: 05/06/13

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Chemical Oxygen Demand	298	20	8.4	mg/L	200	79.5	109	75-125	NA	NA	

Matrix Spike Duplicate (B3E0105-MSD1)

Source: 1301999-01

Prepared & Analyzed: 05/06/13

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Chemical Oxygen Demand	306	20	8.4	mg/L	200	79.5	113	75-125	2.78	20	

Batch B3E0116 - Method-specified preparation

Method Blank (B3E0116-BLK1)

Prepared: 05/06/13 Analyzed: 05/08/13

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Ammonia as N	ND	0.020	0.0072	mg/L	NA	NA	NA	NA	NA	NA	

Laboratory Control Sample (B3E0116-BS1)

Prepared: 05/06/13 Analyzed: 05/08/13

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Ammonia as N	0.502	0.020	0.0072	mg/L	0.500	NA	100	90-110	NA	NA	

Laboratory Control Sample Duplicate (B3E0116-BSD1)

Prepared: 05/06/13 Analyzed: 05/08/13

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Ammonia as N	0.495	0.020	0.0072	mg/L	0.500	NA	99.1	90-110	1.26	20	

Barr Engineering Company
4700 West 77th Street
Minneapolis, MN 55435-4803

Client Ref: Determine Toxicity Deicing Mat
Client Contact: Mr. Keith Pilgrim
PO Number: 23621088

Report #: 1301992
Project Mgr: Steven J. Albrecht
Account ID: B01058

Classical Chemistry Parameters - Quality Control

Batch B3E0116 - Method-specified preparation

Matrix Spike (B3E0116-MS1)

Source: 1302010-01

Prepared: 05/06/13 Analyzed: 05/08/13

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Ammonia as N	0.641	0.020	0.0072	mg/L	0.500	0.129	102	90-110	NA	NA	

Matrix Spike Duplicate (B3E0116-MSD1)

Source: 1302010-01

Prepared: 05/06/13 Analyzed: 05/08/13

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Ammonia as N	0.650	0.020	0.0072	mg/L	0.500	0.129	104	90-110	1.42	20	

Batch B3E0140 - EPA 365.1

Method Blank (B3E0140-BLK1)

Prepared: 05/07/13 Analyzed: 05/09/13

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Phosphorus, Total as P	ND	0.010	0.0028	mg/L	NA	NA	NA	NA	NA	NA	

Laboratory Control Sample (B3E0140-BS1)

Prepared: 05/07/13 Analyzed: 05/09/13

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Phosphorus, Total as P	0.102	0.010	0.0028	mg/L	0.100	NA	102	90-110	NA	NA	

Laboratory Control Sample Duplicate (B3E0140-BSD1)

Prepared: 05/07/13 Analyzed: 05/09/13

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Phosphorus, Total as P	0.0994	0.010	0.0028	mg/L	0.100	NA	99.4	90-110	2.19	20	

Matrix Spike (B3E0140-MS1)

Source: 1301939-01

Prepared: 05/07/13 Analyzed: 05/09/13

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Phosphorus, Total as P	0.170	0.010	0.0028	mg/L	0.100	0.0698	99.8	90-110	NA	NA	

Matrix Spike Duplicate (B3E0140-MSD1)

Source: 1301939-01

Prepared: 05/07/13 Analyzed: 05/09/13

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Phosphorus, Total as P	0.168	0.010	0.0028	mg/L	0.100	0.0698	97.8	90-110	1.19	20	

Batch B3E0148 - EPA 351.2

Method Blank (B3E0148-BLK1)

Prepared: 05/07/13 Analyzed: 05/08/13

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Total Kjeldahl Nitrogen	ND	0.50	0.15	mg/L	NA	NA	NA	NA	NA	NA	

EPA Lab ID: MN00063

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Barr Engineering Company
4700 West 77th Street
Minneapolis, MN 55435-4803

Client Ref: Determine Toxicity Deicing Mat
Client Contact: Mr. Keith Pilgrim
PO Number: 23621088

Report #: 1301992
Project Mgr: Steven J. Albrecht
Account ID: B01058

Classical Chemistry Parameters - Quality Control

Batch B3E0148 - EPA 351.2

Method Blank (B3E0148-BLK1)

Prepared: 05/07/13 Analyzed: 05/08/13

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Laboratory Control Sample (B3E0148-BS1)

Prepared: 05/07/13 Analyzed: 05/08/13

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Total Kjeldahl Nitrogen	2.27	0.50	0.15	mg/L	2.50	NA	90.6	90-110	NA	NA	

Laboratory Control Sample Duplicate (B3E0148-BSD1)

Prepared: 05/07/13 Analyzed: 05/08/13

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Total Kjeldahl Nitrogen	2.39	0.50	0.15	mg/L	2.50	NA	95.8	90-110	5.49	20	

Matrix Spike (B3E0148-MS1)

Source: 1301939-04

Prepared: 05/07/13 Analyzed: 05/08/13

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Total Kjeldahl Nitrogen	2.83	0.50	0.15	mg/L	2.50	1.07	70.4	90-110	NA	NA	qn

Matrix Spike Duplicate (B3E0148-MSD1)

Source: 1301939-04

Prepared: 05/07/13 Analyzed: 05/08/13

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Total Kjeldahl Nitrogen	2.86	0.50	0.15	mg/L	2.50	1.07	71.5	90-110	0.950	20	qn

Barr Engineering Company
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Client Ref: Determine Toxicity Deicing Mat
Client Contact: Mr. Keith Pilgrim
PO Number: 23621088

Report #: 1301992
Project Mgr: Steven J. Albrecht
Account ID: B01058

Metals - Quality Control

Batch B3E0094 - EPA 3005A

Method Blank (B3E0094-BLK1)

Prepared: 05/04/13 Analyzed: 05/06/13

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Boron	47.0 J	200	12	ug/L	NA	NA	NA	NA	NA	NA	
Calcium	ND	200	3.8	ug/L	NA	NA	NA	NA	NA	NA	

Method Blank (B3E0094-BLK3)

Prepared: 05/04/13 Analyzed: 05/06/13

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	4.78 J	40	1.6	ug/L	NA	NA	NA	NA	NA	NA	
Arsenic	ND	20	0.60	ug/L	NA	NA	NA	NA	NA	NA	
Barium	0.813 J	10	0.35	ug/L	NA	NA	NA	NA	NA	NA	
Cadmium	ND	2.0	0.18	ug/L	NA	NA	NA	NA	NA	NA	
Chromium	ND	5.0	0.37	ug/L	NA	NA	NA	NA	NA	NA	
Cobalt	ND	5.0	0.14	ug/L	NA	NA	NA	NA	NA	NA	
Copper	ND	10	0.24	ug/L	NA	NA	NA	NA	NA	NA	
Magnesium	15.0 J	50	2.4	ug/L	NA	NA	NA	NA	NA	NA	
Nickel	ND	5.0	0.51	ug/L	NA	NA	NA	NA	NA	NA	
Potassium	ND	200	33	ug/L	NA	NA	NA	NA	NA	NA	
Sodium	ND	200	4.3	ug/L	NA	NA	NA	NA	NA	NA	
Zinc	ND	20	0.68	ug/L	NA	NA	NA	NA	NA	NA	

Laboratory Control Sample (B3E0094-BS1)

Prepared: 05/04/13 Analyzed: 05/06/13

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Boron	3080	200	12	ug/L	3000	NA	103	85-115	NA	NA	
Calcium	40000	200	3.8	ug/L	40000	NA	100	85-115	NA	NA	

Laboratory Control Sample (B3E0094-BS2)

Prepared: 05/04/13 Analyzed: 05/06/13

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	2890	40	1.6	ug/L	3000	NA	96.4	85-115	NA	NA	
Arsenic	3020	20	0.60	ug/L	3000	NA	101	85-115	NA	NA	
Barium	2940	10	0.35	ug/L	3000	NA	98.1	85-115	NA	NA	
Cadmium	2780	2.0	0.18	ug/L	3000	NA	92.9	85-115	NA	NA	
Chromium	2880	5.0	0.37	ug/L	3000	NA	96.2	85-115	NA	NA	

Barr Engineering Company
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Minneapolis, MN 55435-4803

Client Ref: Determine Toxicity Deicing Mat
Client Contact: Mr. Keith Pilgrim
PO Number: 23621088

Report #: 1301992
Project Mgr: Steven J. Albrecht
Account ID: B01058

Metals - Quality Control

Batch B3E0094 - EPA 3005A

Laboratory Control Sample (B3E0094-BS2)

Prepared: 05/04/13 Analyzed: 05/06/13

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Cobalt	3070	5.0	0.14	ug/L	3000	NA	102	85-115	NA	NA	
Copper	3000	10	0.24	ug/L	3000	NA	100	85-115	NA	NA	
Magnesium	39300	50	2.4	ug/L	40000	NA	98.0	85-115	NA	NA	
Nickel	2980	5.0	0.51	ug/L	3000	NA	99.6	85-115	NA	NA	
Potassium	40200	200	33	ug/L	40000	NA	100	85-115	NA	NA	
Sodium	39700	200	4.3	ug/L	40000	NA	99.1	85-115	NA	NA	
Zinc	2970	20	0.68	ug/L	3000	NA	99.1	85-115	NA	NA	

Laboratory Control Sample Duplicate (B3E0094-BSD1)

Prepared: 05/04/13 Analyzed: 05/06/13

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Boron	3080	200	12	ug/L	3000	NA	103	85-115	0.121	20	
Calcium	39900	200	3.8	ug/L	40000	NA	99.6	85-115	0.338	20	

Laboratory Control Sample Duplicate (B3E0094-BSD2)

Prepared: 05/04/13 Analyzed: 05/06/13

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	2890	40	1.6	ug/L	3000	NA	96.3	85-115	0.0596	20	
Arsenic	3010	20	0.60	ug/L	3000	NA	100	85-115	0.267	20	
Barium	2940	10	0.35	ug/L	3000	NA	98.0	85-115	0.0769	20	
Cadmium	2780	2.0	0.18	ug/L	3000	NA	92.8	85-115	0.150	20	
Chromium	2880	5.0	0.37	ug/L	3000	NA	96.0	85-115	0.138	20	
Cobalt	3070	5.0	0.14	ug/L	3000	NA	102	85-115	0.151	20	
Copper	3000	10	0.24	ug/L	3000	NA	100	85-115	0.138	20	
Magnesium	39200	50	2.4	ug/L	40000	NA	97.9	85-115	0.151	20	
Nickel	2970	5.0	0.51	ug/L	3000	NA	99.3	85-115	0.308	20	
Potassium	40100	200	33	ug/L	40000	NA	100	85-115	0.0981	20	
Sodium	39600	200	4.3	ug/L	40000	NA	99.0	85-115	0.142	20	
Zinc	2960	20	0.68	ug/L	3000	NA	98.8	85-115	0.355	20	

Matrix Spike (B3E0094-MS3)

Source: 1301992-01

Prepared: 05/04/13 Analyzed: 05/06/13

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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EPA Lab ID: MN00063

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Barr Engineering Company
4700 West 77th Street
Minneapolis, MN 55435-4803

Client Ref: Determine Toxicity Deicing Mat
Client Contact: Mr. Keith Pilgrim
PO Number: 23621088

Report #: 1301992
Project Mgr: Steven J. Albrecht
Account ID: B01058

Metals - Quality Control

Batch B3E0094 - EPA 3005A

Matrix Spike (B3E0094-MS3)

Source: 1301992-01

Prepared: 05/04/13 Analyzed: 05/06/13

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	2960	200	7.9	ug/L	3000	183	92.5	75-125	NA	NA	
Arsenic	3120	100	3.0	ug/L	3000	ND	104	75-125	NA	NA	
Barium	2940	50	1.8	ug/L	3000	12.4	97.8	75-125	NA	NA	
Boron	3270	1000	61	ug/L	3000	1760	50.5	75-125	NA	NA	qn
Cadmium	2820	10	0.88	ug/L	3000	ND	94.2	75-125	NA	NA	
Calcium	42200	1000	19	ug/L	40000	9270	82.3	75-125	NA	NA	
Chromium	2920	25	1.9	ug/L	3000	14.0	96.8	75-125	NA	NA	
Cobalt	3050	25	0.71	ug/L	3000	32.3	101	75-125	NA	NA	
Copper	3060	50	1.2	ug/L	3000	22.0	101	75-125	NA	NA	
Magnesium	38900	250	12	ug/L	40000	5300	83.9	75-125	NA	NA	
Nickel	2990	25	2.5	ug/L	3000	96.6	96.5	75-125	NA	NA	
Zinc	3120	100	3.4	ug/L	3000	341	92.9	75-125	NA	NA	

Matrix Spike Duplicate (B3E0094-MSD3)

Source: 1301992-01

Prepared: 05/04/13 Analyzed: 05/06/13

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Aluminum	2980	200	7.9	ug/L	3000	183	93.2	75-125	0.704	20	
Arsenic	3180	100	3.0	ug/L	3000	ND	106	75-125	1.88	20	
Barium	2960	50	1.8	ug/L	3000	12.4	98.5	75-125	0.636	20	
Boron	3320	1000	61	ug/L	3000	1760	52.1	75-125	1.46	20	qn
Cadmium	2860	10	0.88	ug/L	3000	ND	95.6	75-125	1.44	20	
Calcium	42500	1000	19	ug/L	40000	9270	83.0	75-125	0.639	20	
Chromium	2960	25	1.9	ug/L	3000	14.0	98.4	75-125	1.61	20	
Cobalt	3100	25	0.71	ug/L	3000	32.3	102	75-125	1.53	20	
Copper	3090	50	1.2	ug/L	3000	22.0	103	75-125	1.06	20	
Magnesium	39500	250	12	ug/L	40000	5300	85.5	75-125	1.56	20	
Nickel	3040	25	2.5	ug/L	3000	96.6	98.2	75-125	1.64	20	
Zinc	3180	100	3.4	ug/L	3000	341	94.6	75-125	1.62	20	

Barr Engineering Company
4700 West 77th Street
Minneapolis, MN 55435-4803

Client Ref: Determine Toxicity Deicing Mat
Client Contact: Mr. Keith Pilgrim
PO Number: 23621088

Report #: 1301992
Project Mgr: Steven J. Albrecht
Account ID: B01058

Anions by Ion Chromatography - Quality Control

Batch B3E0285 - EPA 9056

Method Blank (B3E0285-BLK1)

Prepared & Analyzed: 05/14/13

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Bromide	ND	0.20	0.018	mg/L	NA	NA	NA	NA	NA	NA	
Chloride	ND	0.20	0.057	mg/L	NA	NA	NA	NA	NA	NA	

Laboratory Control Sample (B3E0285-BS1)

Prepared & Analyzed: 05/14/13

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Bromide	0.992	0.20	0.018	mg/L	1.00	NA	99.2	80-120	NA	NA	
Chloride	0.988	0.20	0.057	mg/L	1.00	NA	98.8	80-120	NA	NA	

Laboratory Control Sample Duplicate (B3E0285-BSD1)

Prepared & Analyzed: 05/14/13

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Bromide	0.977	0.20	0.018	mg/L	1.00	NA	97.7	80-120	1.59	20	
Chloride	0.968	0.20	0.057	mg/L	1.00	NA	96.8	80-120	1.97	20	

Matrix Spike (B3E0285-MS1)

Source: 1302254-01

Prepared: 05/14/13 Analyzed: 05/15/13

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Bromide	24.6	5.0	0.45	mg/L	25.0	ND	98.4	75-125	NA	NA	
Chloride	33.2	5.0	1.4	mg/L	25.0	8.62	98.4	75-125	NA	NA	

Matrix Spike Duplicate (B3E0285-MSD1)

Source: 1302254-01

Prepared: 05/14/13 Analyzed: 05/15/13

Analyte	Result	MRL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Bromide	25.0	5.0	0.45	mg/L	25.0	ND	100	75-125	1.59	20	
Chloride	33.6	5.0	1.4	mg/L	25.0	8.62	100	75-125	1.26	20	

Barr Engineering Company
4700 West 77th Street
Minneapolis, MN 55435-4803

Client Ref: Determine Toxicity Deicing Mat
Client Contact: Mr. Keith Pilgrim
PO Number: 23621088

Report #: 1301992
Project Mgr: Steven J. Albrecht
Account ID: B01058

1301992

Chain of Custody

BARR

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

Project Number: **23621088**

Project Name: **Determine toxicity Deicing Mat**

Sample Origination State: **__** (use two letter postal state abbreviation)

COC Number:

No 42235

Location	Start Depth	Stop Depth	Depth Unit (m./ft. or in.)	Collection Date (mm/dd/yyyy)	Collection Time (hh:mm)	Matrix		Type	VOCs (HCl)	SVOCs (unpreserved)	Dissolved	Total Metals (unpreserved)	General (unpreserved)	Diesel Range	Nutrients			VOCs (tared MeOH)	GRO, BTEX (tared MeOH)	DRO (tared unpreserved)	Metals (unpreserved)	SVOCs (unpreserved)	% Solids (plastic vial, unpreserved)	Total Number of Containers	Laboratory: _____	
						Water	Soil	Grab Comp.																		QC
1. Beet -SS				5/1/2013	8:30am	X																			Diluted 20:1	
2. K-acetate				5/1/2013	8:30am	X																			Diluted 20:1	
3.																										cap on
4.																										total-P, ortho-P, K; eluted nitrogen-N, nitrate-nitrite, BOD, COD, ammonia-N, alkalinity, chlorine residual, conductivity, total hardness, pH Cl ⁻ , Na ⁺ , K ⁺ , magnesium, cyanide, aluminum, arsenic, barium, bromide, cadmium, chromium, cobalt, copper, nickel, zinc.
5.																										
6.																										
7.																										
8.																										
9.																										
10.																										

Common Parameter/Container - Preservation Key

- #1 - Volatile Organics = BTEX, GRO, TPH, 8260 Full List
#2 - Semivolatile Organics = PAHs, PCB, Dioxins, 8270 Full List, Herbicide/Pesticide/PCBs
#3 - General = pH, Chloride, Fluoride, Alkalinity, TSS, TDS, TS, Sulfate
#4 - Nutrients = COD, TOC, Phenols, Ammonia Nitrogen, TKN

Relinquished By:	On Ice?	Date	Time	Received by:	Date	Time
	Y N					
Relinquished By:	On Ice?	Date	Time	Received by:	Date	Time
	Y N			<i>[Signature]</i>	5/1/13	9:15
Samples Shipped VIA: ☐ Air Freight ☐ Federal Express ☐ Sampler				Air Bill Number:		
☐ Other: _____				3.9°C + ice + TB (HD)		

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

HR/LS/STD/FORMS/Chain of Custody Form 2009 RLG Rev. 09/01/09