APPENDIX A-A

NSDEL APPLICATION FOR APPROVAL – REFERENCE GUIDE

NOVA SCOTIA
Department of the Environment

NSDOE APPLICATION FOR APPROVAL REFERENCE GUIDE

For a complete list of activities which require an approval from the Nova Scotia Department of the Environment, please refer to Section 66 of Chapter 1 of the Statutes of Nova Scotia, 1994-95, The Environment Act.

1. Obtain the appropriate Application for Approval from an Environment office (see the list of offices on the reverse side of these instructions). If you are uncertain which application is required, please refer to the "Reference List - Activities Designation" which is available at all Environment offices.

2. Print or type the information required.
   a. **Section 1 – Owner**
      Provide the requested information for the Owner of the Activity.
   b. **Section 2 – Application Contact**
      If the Department of the Environment is to deal with anyone *other than the Owner* regarding *routine issues* during the processing of the application, provide the requested information for this contact person.
   c. **Section 3 – Site/Location of Proposed Activities**
      Provide the requested information for the site/location of the proposed activity.
   d. **Section 4 – Activity**
      Check all the proposed activities that apply to this application. Note the Sections and Subsections to be completed listed next to each activity.
   e. **Section 5 – Activity Details**
      Complete *only* the subsections that apply to the appropriate activities for this application. Complete Section 5 to the best of your knowledge as not all information may be available at the time the application is submitted. If necessary, missing/additional information may be requested during the processing of the application. Be sure to provide all measurements in the metric units requested.
   f. **Section 6 – Supporting Documentation to Attach**
      Attach the documentation requested for the appropriate activities only.
   g. **Section 7 – Declaration**
      Every application must be signed by the Owner (identified in Section 1) or the Application Contact (identified in Section 2). If the Owner is authorizing the Application Contact to act on their behalf (legal decisions, disbursement of funds, etc), a Letter of Authorization from the Owner is required.

3. Submit the completed form (and requested attachments) to a Nova Scotia Department of the Environment Regional or District office. ***If information submitted is incomplete, or if supporting documentation is of poor quality (plans, maps, etc.), the application may be delayed, returned or rejected.***

NOVA SCOTIA

Department of the Environment

REFERENCE LIST - ACTIVITIES DESIGNATION

For a more detailed description of activities proposed, please refer to current Regulations, Policies, Procedures & Guidelines under the Environment Act. Some exemptions may apply.

FORM NAME (Division)	ACTIVITY (Part)	ACTIVITY SUBSET (Keyword)
DIVISION 1 WATER	Bridge	
	Causeway	
	Culvert	
	Dam	
	Dredging	
	Erosion Protection	
	Fishing Equipment	
	Ford	
	Instream Structure	
	Other Alteration	
	Pipeline	
	Pond	
	Removal of Material	
	Storage of Water	
	Water Withdrawal/Diversion	
	Watercourse Diversion	
	Wetland	
	Wharf	
DIVISION 2 PESTICIDE	Application of Pesticide	Aircraft, Forested Land, Road/Street or Highway, Soil Sterilization, Surface Watercourse, Utility Corridor
	Pesticide Storage Facility	
DIVISION 3 MUNICIPAL WASTE	Septage Works	Treatment and Disposal
	Sewage Works	Collection and Pumping Application, Collection & Pumping Notification, Outfalls, Storage, Treatment
	Solid Waste	Composting Facility, Construction & Demolition Debris Disposal Site, Energy from Waste Facility, Front End Mixed Waste Processing Facility, Household Hazardous Waste Depot, Manufacturing Facility, Mixed Waste Material Recovery Facility, Municipal Solid Waste Ashfill, Municipal Solid Waste Landfill, Waste Storage Facility, Waste Transfer Station
	Storm Drainage Works	Collection and Pumping Application, Collection and Pumping Notification, Outfalls, Storage, Treatment
	Water Works	Water Distribution Application, Water Distribution Notification, Water Supply, Water Treatment

NOVA SCOTIA
Department of the Environment

APPLICATION FOR APPROVAL

OFFICE USE ONLY		Application #
Date Rec'd (yyyy/mm/dd)	Ext. Ref. #	NSCOE File #
Total Fees Due	Fees Paid	Paid in Full Yes ☐ No ☐
Receipt #	Water Adm. # (Div. Only)	

PLEASE PRINT OR TYPE. Complete Sections 1, 2, 3, 4 and 7 for ALL Applications. Complete areas of Sections 5 and 6 that are applicable to the specific activities of this application only.

Type of Application:

New Application ☐ Renewal ☐ Amendment ☐ Transfer ☐

If applicable, provide the previous Approval # _____

SECTION 1 - OWNER

If there is more than one owner, please indicate who will be the primary applicant for this project and attach a complete list of owners.

Company/Organization/Municipality			
Business Number (BN) *if applicable*			
Mr ☐ Ms. ☐ Mrs. ☐ Other:		Professional Designation	
First Name	Middle Initial	Family Name	
Phone Home ( )	Business ( ) Ext.	Other ( )	Ext.
Fax ( )	E-mail		
Civic/Street Address			
Mailing Address (if different than Civic)			
County		City/Town	
Province	Postal Code	Country	

SECTION 2 - APPLICATION CONTACT

Is the Application Contact the same as Section 1 - Owner? Yes ☐ No ☐ If yes, please skip to Section 3.

Company/Organization/Municipality			
Business Number (BN) *if applicable*			
Mr. ☐ Ms. ☐ Mrs. ☐ Other:		Professional Designation	
First Name	Middle Initial	Family Name	
Phone Home ( )	Business ( ) Ext.	Other ( )	Ext.
Fax ( )	E-mail		
Civic/Street Address			
Mailing Address (if different than Civic)			
County		City/Town	
Province	Postal Code	Country	

SECTION 3 - SITE/LOCATION OF PROPOSED ACTIVITIES

Property Identification numbers (PID) are available at the Nova Scotia Department of Housing & Municipal Affairs.
1:50,000 Topo Maps (identifying Easting and Northing) are available at Nova Scotia Department of the Environment Regional Offices.

Watercourse Name	
Tributary to	
Site Name	
Civic/Street Address	
County	Community
Property Identification # (PID)	1:50,000 Topo Map #
Grid Reference Easting (5)	Northing (7)

SECTION 4 - ACTIVITY

Proposed Activities - Please check (✓) all that apply.

Activity		Complete Sections	Activity		Complete Sections
Bridge	☐	4, 6A, 7	Other Alteration	☐	4, 5D, 6A, 7
Causeway	☐	4, 6A, 7	Pipeline	☐	4, 6A, 7
Culvert	☐	4, 5A, 6A, 7	Pond	☐	4, 6A, 7
Dam	☐	4, 6A, 7	Removal of Material	☐	4, 6A, 7
Dredging	☐	4, 6A, 7	Storage of Water	☐	4, 5B, 6A, 7
Erosion Protection	☐	4, 6A, 7	Watercourse Diversion	☐	4, 6A, 7
Fishing Equipment	☐	4, 6A, 7	Water Withdrawal/Diversion	☐	4, 5C, 6A, 6B, 7
Ford	☐	4, 6A, 7	Wetland	☐	4, 6A, 7
Instream Structure	☐	4, 6A, 7	Wharf	☐	4, 6A, 7

Will this Activity employ a new technology? Yes ☐ No ☐

If yes, please specify.

Proposed Project Dates, if applicable (yyyy/mm/dd)

Start Construction Date | Start Operations | End/Closure Date

SECTION 5 - ACTIVITY DETAILS

Complete Section 5 to the best of your knowledge. Please provide measurements in the metric units indicated.

5A - Complete only for *Culvert*

An Application for Approval is required if installed Oct. 1 - May 31. Notification only is required BEFORE an installation takes place between June 1 - Sept. 30 if the culvert measures 1.8 m (1800 mm) or 6 feet or less in diameter and is less than 18 metres (60 feet) in length. All installations must proceed in accordance with relevant Watercourse Alteration Specifications. *Structure sizing is the responsibility of the applicant.*

Diameter (mm) _____ Length (metres) _____ Date of Installation (yyyy/mm/dd) _____

Culvert Application ☐ OR Culvert Notification ☐

5B - Complete only for *Storage of Water*

Total Volume (metres³)

5C - Complete only for *Water Withdrawal/Diversion*

Withdrawal Rate (litres/day)	Well Log # (6)

Usage	Agriculture	☐	Industry	☐	Aquaculture	☐
	Municipal	☐	Fire Prevention	☐	Other	☐

If other, please specify.

5D - Complete only for *Other Alteration*
Please describe the proposed activity in detail.

SECTION 6 - SUPPORTING DOCUMENTATION TO ATTACH

All supporting documentation is to be submitted in accordance with the "Approvals Procedures Regulations." If applicable, the following documents must be submitted with this Application. However, additional information may be requested.

Note - A legend must be supplied for all mapping describing symbols used, scale and north orientation.

6A - Attach for *ALL* Applications	
	Specific details of proposed structures (bridge span/height, dam dimensions, storage volume, etc.) and/or proposed activities and measures to protect the watercourse. ***Structure sizing is the responsibility of the applicant.***
	Sketch of proposed work and watercourse location
	Plans, Drawings and Specifications

6B - Attach only for *Water Withdrawal/Diversion*	
	Well Log and Pump Test Information and Qualified Person's Assessment Report.

If information submitted is incomplete, or if supporting documentation is of poor quality (plans, maps, etc.), the application may be delayed, returned or rejected.

SECTION 7 - DECLARATION

Correspondence is to be returned to: Owner ☐ OR Application Contact ☐

Information in this application package which the applicant considers to be confidential business information should be clearly identified. Are you making this request? Yes ☐ No ☐

If yes, please indicate which information in the Supporting Documentation is considered confidential.

Owner's Signature _____ Date (yyyy/mm/dd) _____

Name (Please print or type) _____

OR

Owner's Authorization (Letter of Authorization attached)

If you are acting on behalf of the owner, you must:

1. Attach a letter of authorization from the *Owner* identified on Page 1, Section 1, of this application.
2. Identify yourself as the ***Application Contact*** on Page 1, Section 2, of this application.
3. Sign the declaration below.

I certify that I am acting with the owner's full consent.

Signature _____ Date (yyyy/mm/dd) _____

Name (Please print or type) _____

APPENDIX A-B

TOWN OF SHELBURNE TRUCKING SURVEY

Michael Edmund
ASSOCIATES

RR#1
Lockeport, NS
B0T 1L0, Canada

voice: (902) 656-3131
Email: mea@ns.sympatico.ca

Town of Shelburne Trucking Survey, December 17, 18, 19 and 20, 2001.

Executive Summary:

This Truck Survey has been completed by Michael Appelboom of Michael Edmund Associates on behalf of Black Bull Resources Inc. to review the volume of truck traffic within the Town of Shelburne

Location: The truck counts were completed at the corners of King and Water Street, downtown Shelburne and at the Irving Mainway at Falls Lane. The strategic locations of both entry points should give an accurate indication of the number of trucks traversing the town of Shelburne.

Time: Both locations were surveyed from 8 AM to NOON and NOON to 4 PM, on four consecutive days.

Truck Types: The greatest number of trucks encountered were delivery type vehicles supplying the area's retail stores. Other vehicles comprised of school busses, fuel delivery trucks, dump trucks, cement trucks and a few container trucks.

Time	Location	Single Axle	Tractor Trailer	Trailer + Pup	Total
Mon Dec 17, 8 AM - 12 PM	King/ Water	70	21		91
Tues Dec 18, 12 PM - 4 PM	Irving Mainway	63	12	2	77
Wed Dec 19, 8 AM - 12 PM	Irving Mainway	45	22		67
Thurs Dec 20, 12 PM - 4 PM	King/ Water	57	13		70

Conclusion:

The average number of commercial trucks indicate 152 vehicles per day. This traffic is between the hours of 8:00 AM and 4:00 PM (...it does not include night deliveries). Also note there were no major container shipments or fish transports during the four days surveyed. Delivery schedules of Kimskip and Clearwater, both located at the Town's Government Wharf could greatly increase the number of vehicles found in this survey

APPENDIX A-C

MICHAEL EDMOND & ASSOCIATES
– LETTER REGARDING PORT OF SHELBURNE TRAFFIC

Michael Edmund
ASSOCIATES

RR#1
Lockeport, NS
B0T 1L0, Canada

voice: (902) 656-3131
Email: mea@ns.sympatico.ca

January 15, 2002

Mr. Peter Oram P.Geo.
MGI Limited
31 Gloster Court
Dartmouth, NS
B3B 1X9

Dear Mr. Oram:

Re: Eimskip and Clearwater Truck Traffic, Shelburne Nova Scotia -- addendum to Black Bull Resources Inc. Shelburne Truck review.

Upon consultation with Donnie Acker, Port Manager on behalf of Transport Canada for the Port of Shelburne, I would like to forward the following additional truck counts. As mentioned in my December 2001 review, the survey did not include any truck traffic generated by Eimskip and Clearwater.

According to Mr. Acker's daily logs, in 2001, Eimskip brought 86 container ship loads into Shelburne Harbour. Each ship averaged 30 trucks to unload (2580 trucks)

In addition to Eimskip's truck traffic, approximately 136 trucks are required monthly to unload and resupply other vessels owned by Green Reefer, Clearwater and the Canadian Coast Guard All of these companies have indicated that they intend to increase their business.

For more information regarding the Port of Shelburne, please contact Mr. Donnie Acker at (902) 875-3316. I trust this information will assist in providing an accurate overview of the amount of truck traffic experienced by the Town of Shelburne.

Yours sincerely,

Michael Appelboom,
Michael Edmund Associates.

APPENDIX A-D

SURFACE WATER CHEMISTRY MONITORING DATA

SW-1

General Chemistry -Analytical Results

Parameters	Units	23-Apr-00	28-May-00	28-Aug-00	25-Apr-01	#######	28-Jun-01	26-Jul-01	28-Aug-01	12-Sep-01	11-Oct-01	12-Nov-01	12-Dec-01	CCME Guidelines 2001
Sodium	mg/L	3.2	3.1	7.3	3	3.2	3.9	4.5	5.3	4.7	5.1	4.9	3.9	
Potassium	mg/L	0.2	0.2	0.1	0.2	nd	0.4	0.2	0.3	0.4	0.4	0.3	0.2	
Calcium	mg/L	2.4	0.3	0.5	0.3	0.2	0.5	0.5	0.4	0.3	0.5	0.7	0.3	
Magnesium	mg/L	0.32	0.29	0.37	0.2	0.2	0.3	0.3	0.4	0.3	0.4	0.5	0.4	
Alkalinity (as CaCO3)	mg/L	3.2	nd	3	nd	nd	nd	nd	nd	nd	nd	nd	nd	
Sulfate	mg/L	3.8	2.2	nd	nd	nd	nd	6	nd	25	3	nd	27	
Chloride	mg/L	6.1	6.1	5.8	4.9	5.6	6	7.8	8.8	8.5	7.9	6.9	5.3	
Reactive Silica (as SiO2)	mg/L	2.8	1.9	4.3	1	2	1.3	1.5	2.2	1.4	1	5.9	4.1	
Phosphorus	mg/L	na	na	na	nd	nd	nd	nd	nd	0.1	nd	nd	nd	
Ortho Phosphate (as P)	mg/L	nd	nd	nd	0.1	nd	0.1	nd	nd	nd	nd	nd	nd	
Nitrite	mg/L	na	na	na	nd	0.01	nd	nd	nd	0.01	nd	nd	nd	0.06
Nitrate + Nitrite (as N)	mg/L	nd	0.45	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	
Nitrate (as N)	mg/L	na	na	na	nd	nd	nd	nd	nd	nd	nd	nd	nd	
Ammonia (as N)	mg/L	nd	nd	0.04	nd	nd	nd	nd	nd	nd	nd	nd	nd	
Dissolved Organic Carbon	mg/L	10.2	13.7	30.8	8.8	14.9	15	9	19.8	16.8	17.1	24.2	17.3	
Color	TCU	154	186	334	89	110	100	180	220	100	100	130	120	
Turbidity	NTU	2.5	2.6	0.5	0.4	0.4	1.1	0.6	0.3	0.4	0.8	0.4	0.5	
Total Suspended Solids	mg/L	na	5	1	nd	nd	5	nd	0.5	nd	nd	nd	nd	
Conductance (RCAp)	uS/cm	na	na	50.7	38	43	33	41	47	40	50	65	51	
pH	Units	6.3	4.2	4.2	4.7	4.8	4.8	4.4	4.4	4.8	4.5	4	4.1	>6.5;<9.0
Hardness (as CaCO3)	mg/L	7.4	1.9	2.8	1.6	1.3	2.5	2.5	2.6	2	2.9	3.8	2.4	
Bicarbonate (as CaCO3)	mg/L	3.2	0.4	3	nd	nd	nd	nd	nd	nd	nd	nd	nd	
Carbonate (as CaCO3)	mg/L	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	
TDS (Calculated)	mg/L	20.8	14.8	21.2	12	14	16	22	20	44	19	22	44	
Cation Sum	meq/L	na	na	na	0.19	0.19	0.26	0.29	0.33	0.27	0.33	0.4	0.31	
Anion Sum	meq/L	na	na	na	0.2	0.22	0.25	0.37	0.31	0.86	0.31	0.26	0.81	
Ion Balance	%	na	na	na	3.24	8.64	2.85	11.2	3.27	51.8	2.01	21.3	45.4	
Langlier Index @ 4C		na	na	na	-7.11	-7.01	-7.01	-7.41	-7.41	-6.32	-7.31	-7.81	-7.02	
Langlier Index @ 20C		na	na	na	-6.71	-6.61	-6.61	-7.01	-7.01	-5.92	-6.91	-7.41	-6.62	
Saturation pH @ 4C	Units	na	na	na	11.8	11.8	11.8	11.8	11.8	11.1	11.8	11.8	11.1	
Saturation pH @ 20C	Units	na	na	na	11.4	11.4	11.4	11.4	11.4	10.7	11.4	11.4	10.7	

***** varies with hardness **na** not analyzed

nd non-detect **ns** not sampled

SW-1
Metals -Analytical results

Parameters	Units	23-Apr-00	28-May-00	28-Aug-00	25-Apr-01	01-Jun-01	28-Jun-01	26-Jul-01	28-Aug-01	12-Sep-01	11-Oct-01	12-Nov-01	12-Dec-01	CCME Guidelines 2001
Aluminum	mg/L	na	na	0.4	0.23	0.39	0.51	0.39	0.41	0.36	0.39	0.57	0.39	
Antimony	mg/L	na	na	0.0005	nd	nd	nd	nd	nd	nd	nd	nd	nd	
Arsenic	mg/L	na	na	0.0009	nd	nd	nd	nd	nd	nd	nd	nd	nd	0.005
Barium	mg/L	na	na	0.0112	nd	nd	nd	nd	nd	nd	0.065	nd	nd	
Beryllium	mg/L	na	na	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	
Bismuth	mg/L	na	na	na	nd	nd	nd	nd	nd	nd	nd	nd	nd	
Boron	mg/L	na	na	0.01	nd	0.007	0.006	0.01	0.007	0.006	0.2	nd	0.006	
Cadmium	mg/L	na	na	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	0.000017
Chromium	mg/L	na	na	0.0012	nd	nd	nd	nd	nd	nd	nd	nd	nd	0.0089
Cobalt	mg/L	na	na	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	
Copper	mg/L	nd	nd	0.0051	nd	nd	nd	nd	nd	nd	0.002	nd	nd	0.002-0.004[1]
Iron	mg/L	na	na	na	0.07	0.13	0.31	0.37	0.33	0.36	0.3	0.23	0.13	0.3
Lead	mg/L	na	na	0.001	0.0006	0.0014	0.0018	0.0009	0.0007	0.0009	0.0009	0.0011	0.0008	0.001-0.007[1]
Manganese	mg/L	na	na	na	0.008	0.008	0.01	0.009	0.009	0.007	0.013	0.01	0.007	
Molybdenum	mg/L	na	na	na	nd	nd	nd	nd	nd	nd	nd	nd	nd	
Nickel	mg/L	na	na	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	0.025-0.15[1]
Selenium	mg/L	na	na	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	0.001
Silver	mg/L	na	na	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	0.0001
Strontium	mg/L	na	na	0.0087	nd	nd	nd	nd	nd	nd	0.005	nd	nd	
Thallium	mg/L	na	na	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	0.0008
Tin	mg/L	na	na	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	
Titanium	mg/L	na	na	na	nd	0.002	0.003	0.06	0.002	0.003	0.007	0.002	nd	
Uranium	mg/L	na	na	0.0004	0.0004	0.0006	0.0008	0.0005	0.0005	0.0009	0.0007	0.0005	0.0004	
Vanadium	mg/L	na	na	0.0006	nd	nd	nd	nd	nd	nd	nd	nd	nd	
Zinc	mg/L	nd	0.0018	0.007	0.003	0.004	0.01	0.018	0.006	0.01	0.006	0.006	0.004	0.03

***** varies with hardi **na** not analyzed

nd non-detect **ns** not sampled

1 varies with hardness

SW-2

General Chemistry -Analytical Results

Parameters	Units	23-Apr-00	28-May-00	28-Aug-00	25-Apr-01	01-Jun-01	28-Jun-01	12-Nov-01	12-Dec-01	28-Aug-01	12-Sep-01	11-Oct-01	27-Nov-01	CCME Guidelines 2001
Sodium	mg/L	3.2	3.1	4.2	2.9	4.3	3.4	5.2	4	4.1	4.3	5.3	4.6	
Potassium	mg/L	0.3	0.3	0.5	0.1	1.2	0.3	0.5	0.2	0.3	0.3	0.5	0.2	
Calcium	mg/L	0.4	0.2	0.2	0.2	0.4	0.4	0.9	0.3	0.4	0.6	0.5	0.5	
Magnesium	mg/L	0.26	0.08	0.11	0.2	0.2	0.2	0.4	0.4	0.4	0.3	0.4	0.6	
Alkalinity (as CaCO3)	mg/L	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	
Sulfate	mg/L	3.1	2.2	nd	nd	nd	22	7	26	nd	19	4	nd	
Chloride	mg/L	3.8	5.6	4.6	4.9	6	5.8	8.8	4.8	6.2	7.3	7.9	6.8	
Reactive Silica (as SiO2)	mg/L	2.1	2.4	5.8	1.5	2.7	2.4	1.6	4.7	4.3	3	4.3	6.6	
Phosphorus	mg/L	na	na	na	nd	nd	nd	0.1	nd	nd	nd	nd	0.1	
Ortho Phosphate (as P)	mg/L	nd	nd	nd	0.1	nd	0.1	0.01	nd	nd	nd	nd	nd	
Nitrite	mg/L	na	na	na	nd	nd	nd	nd	nd	nd	nd	nd	nd	0.06
Nitrate + Nitrite (as N)	mg/L	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	
Nitrate (as N)	mg/L	na	na	na	nd	nd	nd	nd	nd	nd	nd	nd	nd	
Ammonia (as N)	mg/L	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	
Dissolved Organic Carbon	mg/L	10.3	13.9	13.7	8.6	14.5	14.9	9.6	15.9	16	12.3	13.6	24.6	
Color	TCU	13	17.6	152	100	100	96	150	110	140	69	83	120	
Turbidity	NTU	3.3	2.5	0.3	0.4	0.4	0.5	11.6	0.2	0.5	1.2	0.2	0.3	
Total Suspended Solids	mg/L	na	3	4	nd	nd	nd	11.9	nd	1	nd		nd	
Conductance (RCAp)	uS/cm	na	na	na	38	42	34	41	49	45	36	45	62	
pH	Units	4.4	4.1	4.5	4.4	4.4	4.5	4.6	4.1	4.4	4.7	4.6	4	>6.5;<9.0
Hardness (as CaCO3)	mg/L	2	1.5	1.8	1.3	1.8	1.8	3.9	2.4	2.6	2.7	2.9	3.7	
Bicarbonate (as CaCO3)	mg/L	0.4	0.4	0.4	nd	nd	nd	nd	nd	nd	nd	nd	nd	
Carbonate (as CaCO3)	mg/L	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	
TDS (Calculated)	mg/L	13.4	14.2	16.8	13	18	39	25	44	19	38	24	22	
Cation Sum	meq/L	na	na	na	0.2	0.3	0.24	0.35	0.31	0.28	0.27	0.33	0.38	
Anion Sum	meq/L	na	na	na	0.2	0.23	0.74	0.42	0.78	0.24	0.86	0.33	0.26	
Ion Balance	%	na	na	na	1.2	11.9	50.7	9.41	43.1	8.1	51.8	0.48	19.7	
Langlier Index @ 4C		na	na	na	-7.41	-7.41	-6.62	-7.22	-7.02	-7.41	-6.32	-7.21	-7.81	
Langlier Index @ 20C		na	na	na	-7.01	-7.01	-6.22	-6.82	-6.62	-7.01	-5.92	-6.81	-7.41	
Saturation pH @ 4C	Units	na	na	na	11.8	11.8	11.1	11.8	11.1	11.8	11.1	11.8	11.8	
Saturation pH @ 20C	Units	na	na	na	11.4	11.4	10.7	11.4	10.7	11.4	10.7	11.4	11.4	

***** varies with hardness **na** not analyzed

nd non-detect **ns** not sampled

SW-2

Parameters	Units	23-Apr-00	28-May-00	28-Aug-00	25-Apr-01	#######	28-Jun-01	26-Jul-01
Aluminum	mg/L	na	na	0.398	0.22	0.39	0.34	0.56
Antimony	mg/L	na	na	0.0005	nd	nd	nd	nd
Arsenic	mg/L	na	na	0.0009	nd	nd	nd	nd
Barium	mg/L	na	na	0.0112	nd	nd	nd	nd
Beryllium	mg/L	na	na	nd	nd	nd	nd	nd
Bismuth	mg/L	na	na	nd	nd	nd	nd	nd
Boron	mg/L	na	na	0.01	nd	0.02	0.006	0.013
Cadmium	mg/L	na	na	nd	nd	0.0018	nd	nd
Chromium	mg/L	na	na	0.0012	nd	nd	nd	nd
Cobalt	mg/L	na	na	nd	nd	nd	nd	nd
Copper	mg/L	nd	nd	0.0051	nd	0.006	nd	0.002
Iron	mg/L	0.07	0.08	0.11	0.17	0.17	0.18	0.92
Lead	mg/L	na	na	0.001	0.0006	0.0013	0.0011	0.003
Manganese	mg/L	nd	nd	nd	0.006	0.008	0.006	0.002
Molybdenum	mg/L	na	na	na	nd	nd	nd	nd
Nickel	mg/L	na	na	nd	nd	3	nd	nd
Selenium	mg/L	na	na	na	nd	nd	nd	nd
Silver	mg/L	na	na	na	nd	nd	nd	nd
Strontium	mg/L	na	na	0.0087	nd	nd	nd	nd
Thallium	mg/L	na	na	na	nd	nd	nd	nd
Tin	mg/L	na	na	na	nd	nd	nd	nd
Titanium	mg/L	na	na	na	nd	0.002	0.002	0.057
Uranium	mg/L	na	na	0.0004	0.0004	0.0006	0.0006	0.0008
Vanadium	mg/L	na	na	0.0006	nd	nd	nd	nd
Zinc	mg/L	nd	0.0018	0.007	0.056	0.028	0.007	0.033

***** varies with har **na** not analyzed

nd non-detect **ns** not sampled

1 varies with hardness

28-Aug-01	12-Sep-01	11-Oct-01	12-Nov-01	12-Dec-01	CCME Guidelines 2001
0.41	0.28	0.33	0.58	0.39	
nd	nd	nd	nd	nd	
nd	nd	nd	nd	nd	0.005
nd	nd	0.16	nd	nd	
nd	nd	nd	nd	nd	
nd	nd	nd	nd	nd	
0.008	0.006	0.26	nd	0.006	
nd	nd	nd	nd	nd	0.000017
nd	nd	nd	nd	nd	0.0089
nd	nd	nd	nd	nd	
nd	nd	0.003	nd	nd	0.002-0.004[1]
0.22	0.18	0.24	0.2	0.13	0.3
0.0008	0.0008	0.0009	0.0011	0.0008	0.001-0.007[1]
0.007	0.008	0.03	0.008	0.007	
nd	nd	nd	nd	nd	
nd	nd	nd	nd	nd	0.025-0.15[1]
nd	nd	nd	nd	nd	0.001
nd	nd	nd	nd	nd	0.0001
nd	nd	0.005	nd	nd	
nd	nd	nd	nd	nd	0.0008
nd	nd	nd	nd	nd	
0.002	nd	0.007	0.002	0.002	
0.0005	0.0004	0.0007	0.0005	0.0004	
nd	nd	nd	nd	nd	
0.005	0.008	0.006	0.005	0.005	0.03

SW-3

General Chemistry -Analytical Results

Parameters	Units	23-Apr-00	28-May-00	28-Aug-00	25-Apr-01	01-Jun-01	28-Jun-01	26-Jul-01	CCME Guidelines 2001
Sodium	mg/L	0.3	na	2.6	20.1	21.7	14.8	10.3	
Potassium	mg/L	0.2	na	0.1	1.6	0.2	0.4	0.5	
Calcium	mg/L	0.4	0.2	0.3	1	1.5	1.6	0.8	
Magnesium	mg/L	0.22	0.27	0.2	0.5	0.5	0.3	0.3	
Alkalinity (as CaCO3)	mg/L	nd	nd	nd	na	na	na	na	
Sulfate	mg/L	3.4	2.2	na	na	na	31	3	
Chloride	mg/L	3.4	5.6	1.6	29.7	36.4	20.5	14.4	
Reactive Silica (as SiO2)	mg/L	2.9	2.4	8.8	na	0.5	0.6	0.7	
Phosphorus	mg/L	na	na	na	0.02	na	na	0.4	
Ortho Phosphate (as P)	mg/L	nd	nd	nd	0.1	na	0.2	0.02	
Nitrite	mg/L	na	na	na	na	na	na	0.01	0.06
Nitrate + Nitrite (as N)	mg/L	nd	nd	nd	na	na	na	na	
Nitrate (as N)	mg/L	na	na	na	na	na	na	na	
Ammonia (as N)	mg/L	na	na	na	na	na	na	na	
Dissolved Organic Carbon	mg/L	11.1	13.9	10.9	13.8	14.6	21.8	15.6	
Color	TCU	137	176	113	110	77	160	95	
Turbidity	NTU	2.5	2.5	0.3	0.6	3.5	1.8	15.2	
Total Suspenaed Solids	mg/L	na	7	14	96	22.8	22.3	116	
Conauctance (RCAp)	uS/cm	nd	nd	nd	124	140	97	60	
pH	Units	4.5	4.1	4.7	4.2	4.6	5	4.7	>6.5;<9.0
Hardness (as CaCO3)	mg/L	1.9	1.5	1.5	4.6	5.8	5.2	3.2	
Bicarbonate (as CaCO3)	mg/L	0.4	0.4	3.8	na	na	na	na	
Carbonate (as CaCO3)	mg/L	na	na	na	na	na	na	na	
TDS (Calculated)	mg/L	13.2	14.2	16.8	56	64	74	31	
Cation Sum	meq/L	na	na	na	1.07	1.09	0.79	0.35	
Anion Sum	meq/L	na	na	na	0.9	1.09	1.34	0.42	
Ion Balance	%	na	na	na	8.62	0.1	26.1	9.41	
Langlier Inaex @ 4C		na	na	na	-7.63	-7.05	-5.93	-7.22	
Langlier Inaex @ 20C		na	na	na	-7.23	-6.65	-5.53	-6.82	
Saturation pH @ 4C	Units	na	na	na	11.8	11.7	10.9	11.8	
Saturation pH @ 20C	Units	na	na	na	11.4	11.3	10.5	11.4	

***** varies with hardness **na** not analyzed

nd non-detect **ns** not sampled

SW-3

Metals -Analytical results

Parameters	Units	23-Apr-00	28-May-00	28-Aug-00	25-Apr-01	01-Jun-01	28-Jun-01	26-Jul-01	CCME Guidelines 2001
Aluminum	mg/L	na	na	0.21	0.25	0.26	0.46	0.5	
Antimony	mg/L	na	na	0.0005	na	na	na	na	
Arsenic	mg/L	na	na	0.0008	na	na	na	0.002	0.005
Barium	mg/L	na	na	0.0003	na	na	0.008	0.005	
Beryllium	mg/L	na	na	nd	na	na	na	na	
Bismuth	mg/L	na	na	nd	na	na	na	na	
Boron	mg/L	na	na	0.01	0.03	0.014	0.007	0.008	
Cadmium	mg/L	na	na	nd	na	na	na	0.0004	0.000017
Chromium	mg/L	na	na	nd	na	na	na	na	0.0089
Cobalt	mg/L	na	na	nd	na	na	1	na	
Copper	mg/L	nd	nd	nd	na	na	0.003	0.002	0.002-0.004[1]
Iron	mg/L	0.04	0.08	0.02	0.24	0.72	1.7	1.1	0.3
Lead	mg/L	na	na	0.0004	0.0008	0.0008	0.0038	0.0012	0.001-0.007[1]
Manganese	mg/L	nd	nd	nd	0.022	0.052	0.039	0.029	
Molybdenum	mg/L	na	na	nd	na	na	na	na	
Nickel	mg/L	na	na	nd	na	na	na	0.002	0.025-0.15[1]
Selenium	mg/L	na	na	nd	na	na	na	na	0.001
Silver	mg/L	nd	nd	nd	na	na	na	na	0.0001
Strontium	mg/L	na	na	0.0028	0.006	0.008	0.007	0.005	
Thallium	mg/L	na	na	na	na	na	na	0.0001	0.0008
Tin	mg/L	na	na	na	na	na	na	na	
Titanium	mg/L	na	na	na	na	0.002	0.003	0.046	
Uranium	mg/L	na	na	0.0005	0.0001	0.0002	0.0002	0.0003	
Vanadium	mg/L	na	na	na	na	na	na	na	
Zinc	mg/L	nd	nd	0.007	0.021	0.013	0.016	0.021	0.03

***** varies with har **na** not analyzed

nd non-detect **ns** not sampled

1 varies with hardness

SW-4

General Chemistry -Analytical Results

Parameters	Units	23-Apr-00	28-May-00	28-Aug-00	25-Apr-01	########	28-Jun-01	26-Jul-01	28-Aug-01	12-Sep-01	11-Oct-01	12-Nov-01	12-Dec-01
Sodium	mg/L	2.8	3.6	3.7	4.5	3.9	3.3	4.1	4.9	5.1	4.6	5.5	5.2
Potassium	mg/L	0.3	0.3	0.2	0.3	0.1	0.2	0.6	0.3	0.4	0.4	0.2	0.4
Calcium	mg/L	0.3	0.3	0.3	0.3	0.6	0.6	0.3	0.4	0.4	0.3	0.4	0.3
Magnesium	mg/L	0.16	0.22	0.21	0.2	0.2	0.2	0.3	0.3	0.3	0.2	0.4	0.4
Alkalinity (as CaCO3)	mg/L	nd	nd	1	nd	nd	nd	nd	nd	nd	nd	nd	nd
Sulfate	mg/L	3.3	2.2	nd	nd	nd	28	5	nd	32	3	nd	29
Chloride	mg/L	3.2	5.7	5.4	7	6.4	5.3	6.3	7.3	7	6.2	8.2	6
Reactive Silica (as SiO2)	mg/L	3.3	4.5	8	3.3	4.8	6	7.2	6.8	7.9	9.1	7.4	6.9
Phosphorus	mg/L	na	na	na	0.01	nd	nd	nd	nd	nd	nd	nd	nd
Ortho Phosphate (as P)	mg/L	nd	nd	0.03	0.1	nd	nd	nd	0.01	nd	0.01	nd	nd
Nitrite	mg/L	na	na	na	nd	nd	nd	nd	nd	0.01	nd	nd	nd
Nitrate + Nitrite (as N)	mg/L	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Nitrate (as N)	mg/L	na	na	na	nd	nd	nd	nd	nd	nd	nd	nd	nd
Ammonia (as N)	mg/L	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Dissolved Organic Carbon	mg/L	10.3	15.2	11.4	11.5	16.4	20.7	22.3	25.4	25.5	19.6	24.4	20.3
Color	TCU	135	165	314	92	130	130	210	200	150	100	120	130
Turbidity	NTU	2.6	2	0.4	0.3	0.3	0.3	0.3	0.4	0.6	0.5	0.3	0.1
Total Suspended Solids	mg/L	na	4.1	5.3	6	nd	2	2.5	1.9	nd	nd	nd	nd
Conductance (RCAp)	uS/cm	na	na	na	43	44	35	37	49	40	42	66	58
pH	Units	4.4	4.1	5.3	4.4	4.4	4.4	4.4	4.3	4.5	4.5	4.1	4
Hardness (as CaCO3)	mg/L	1.4	1.3	1.4	1.6	2.3	2.3	2	2.2	2.2	1.6	2.6	2.4
Bicarbonate (as CaCO3)	mg/L	0.4	0.4	1	nd	nd	nd	nd	nd	nd	nd	nd	nd
Carbonate (as CaCO3)	mg/L	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
TDS (Calculated)	mg/L	13.3	17	19.4	18	19	48	25	23	56	25	25	51
Cation Sum	meq/L	na	na	na	0.28	0.26	0.25	0.28	0.32	0.31	0.28	0.38	0.39
Anion Sum	meq/L	na	na	na	0.26	0.25	0.85	0.31	0.27	0.97	0.26	0.3	0.88
Ion Balance	%	na	na	na	2.9	3.22	54.2	4.89	8.16	51.2	2.32	12.4	38.6
Langlier Index @ 4C		na	na	na	-7.41	-7.41	-6.73	-7.42	-7.51	-6.63	-7.32	-7.72	-7.13
Langlier Index @ 20C		na	na	na	-7.01	-7.01	-6.33	-7.42	-7.11	-6.23	-6.92	-7.32	-6.73
Saturation pH @ 4C	Units	na	na	na	11.8	11.8	11.1	11.8	11.8	11.1	11.8	11.8	11.1
Saturation pH @ 20C	Units	na	na	na	11.4	11.4	10.7	11.4	11.4	10.7	11.4	11.4	10.7

***** varies with hardness **na** not analyzed

nd non-detect **ns** not sampled

SW-4

Metals -Analytical results

CCME Guidelines 2001	Parameters	Units	23-Apr-00	28-May-00	28-Aug-00	25-Apr-01	01-Jun-01	28-Jun-01	26-Jul-01	28-Aug-01	12-Sep-01	11-Oct-01	12-Nov-01
	Aluminum	mg/L	na	na	0.192	0.27	0.45	0.51	0.48	0.54	0.54	0.4	0.55
	Antimony	mg/L	na	na	0.0006	nd	nd	nd	nd	nd	nd	nd	nd
	Arsenic	mg/L	na	na	0.0006	nd	nd	nd	nd	nd	nd	nd	nd
	Barium	mg/L	na	na	nd	nd	nd	nd	nd	nd	nd	0.056	nd
	Beryllium	mg/L	na	na	nd	nd	nd	nd	nd	nd	nd	nd	nd
	Bismuth	mg/L	na	na	na	nd	nd	nd	nd	nd	nd	nd	nd
	Boron	mg/L	na	na	nd	0.006	0.007	0.005	0.005	0.009	nd	0.19	nd
	Cadmium	mg/L	na	na	nd	nd	nd	nd	nd	nd	nd	nd	nd
	Chromium	mg/L	na	na	nd	nd	nd	nd	nd	nd	nd	nd	nd
	Cobalt	mg/L	na	na	nd	nd	nd	nd	nd	nd	nd	nd	nd
0.06	**Copper**	mg/L	nd	nd	0.0009	nd	nd	0.003	nd	nd	nd	0.002	nd
	Iron	mg/L	0.04	0.05	0.06	0.05	0.1	0.15	0.28	0.31	0.43	0.22	0.16
	Lead	mg/L	na	na	0.0004	0.0008	0.0008	0.0012	0.0008	0.0009	0.0012	0.0007	0.0007
	Manganese	mg/L	na	na	nd	0.002	0.003	0.003	0.003	0.003	0.004	0.004	0.003
	Molybdenum	mg/L	na	na	nd	nd	nd	nd	0.008	nd	nd	nd	ndnd
	Nickel	mg/L	na	na	nd	nd	nd	nd	nd	nd	nd	nd	nd
	Selenium	mg/L	na	na	nd	nd	nd	nd	nd	nd	nd	nd	nd
	Silver	mg/L	na	na	nd	nd	nd	nd	nd	nd	nd	nd	nd
	Strontium	mg/L	na	na	0.0021	nd	nd	nd	nd	nd	nd	nd	nd
>6.5;<9.0	**Thallium**	mg/L	na	na	nd	nd	nd	nd	nd	nd	nd	nd	nd
	Tin	mg/L	na	na	nd	nd	nd	nd	nd	nd	nd	nd	nd
	Titanium	mg/L	na	na	nd	nd	0.002	0.003	0.051	0.002	0.002	0.007	0.002
	Uranium	mg/L	na	na	0.0003	0.0004	0.0006	0.0008	0.0005	0.0004	0.0004	0.0004	0.0004
	Vanadium	mg/L	na	na	nd	nd	nd	nd	nd	nd	nd	nd	nd
	Zinc	mg/L	nd	0.0018	0.005	0.004	0.007	0.016	0.012	0.007	0.009	0.0004	0.006

***** varies with hardness **na** not analyzed

nd non-detect **ns** not sampled

1 varies with hardness

12-Dec-01	CCME Guidelines 2001
0.53	
nd	
nd	0.005
nd	
nd	
nd	
nd	
nd	0.000017
nd	0.0089
nd	
nd	0.002-0.004[1]
0.13	0.3
0.0012	0.001-0.007[1]
0.002	
nd	
nd	0.025-0.15[1]
nd	0.001
nd	0.0001
nd	
nd	0.0008
nd	
0.002	
0.0005	
nd	
0.005	0.03

SW-5

General Chemistry -Analytical Results

Parameters	Units	23-Apr-00	28-May-00	28-Aug-00	25-Apr-01	01-Jun-01	28-Jun-01	26-Jul-01	28-Aug-01	12-Sep-01	11-Oct-01	12-Nov-01	12-Dec-01
Sodium	mg/L	ns	ns	3.3	4.6	2.6	3.8	3.2	3.3	3.2	3.9	4.2	4.1
Potassium	mg/L	ns	ns	nd	0.3	0.2	0.5	0.2	0.4	0.4	0.5	nd	0.7
Calcium	mg/L	ns	ns	0.4	0.2	0.2	0.3	0.3	0.4	0.4	0.3	0.5	0.4
Magnesium	mg/L	ns	ns	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.5	0.4
Alkalinity (as CaCO3)	mg/L	ns	ns	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Sulfate	mg/L	ns	ns	nd	nd	nd	29	3	nd	2	4	nd	34
Chloride	mg/L	ns	ns	5.1	7.3	4.3	4.4	4.7	4.5	4.5	4.9	5.8	4.9
Reactive Silica (as SiO2)	mg/L	ns	ns	7.4	3.4	4.8	5.4	7.9	7.6	10.6	11.5	7.4	6.9
Phosphorus	mg/L	ns	ns	na	0.01	nd	0.05	nd	nd	0.1	nd	nd	nd
Ortho Phosphate (as P)	mg/L	ns	ns	nd	0.1	nd	0.1	0.01	nd	0.01	nd	nd	0.01
Nitrite	mg/L	ns	ns	na	nd	nd	nd	nd	nd	nd	nd	nd	nd
Nitrate + Nitrite (as N)	mg/L	ns	ns	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Nitrate (as N)	mg/L	ns	ns	na	nd	nd	nd	nd	nd	nd	nd	nd	nd
Ammonia (as N)	mg/L	ns	ns	nd	nd	nd	nd	nd	nd	nd	nd	nd	0.13
Dissolved Organic Carbon	mg/L	ns	ns	29.2	10.8	17.4	20	20	20.7	11.7	13.8	22.9	23.7
Color	TCU	ns	ns	267	130	140	130	120	200	69	64	130	170
Turbidity	NTU	ns	ns	0.3	0.3	1.3	0.2	0.2	0.7	7.4	1.5	0.2	10.7
Total Suspended Solids	mg/L	ns	ns	4	nd	nd	2	nd	13.5	17.4	6.6	nd	33.2
Conductance (RCAp)	uS/cm	ns	ns	na	48	37	34	31	32	25	31	62	55
pH	Units	ns	ns	4.3	4.4	4.3	4.4	4.4	4.4	4.8	4.8	4	4
Hardness (as CaCO3)	mg/L	ns	ns	2.2	1.3	1.3	1.6	1.6	1.8	1.8	1.6	3.3	2.6
Bicarbonate (as CaCO3)	mg/L	ns	ns	0.4	nd	nd	nd	nd	nd	nd	nd	nd	nd
Carbonate (as CaCO3)	mg/L	ns	ns	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
TDS (Calculated)	mg/L	ns	ns	17.8	19	15	48	20	19	22	26	21	55
Cation Sum	meq/L	ns	ns	na	0.28	0.2	0.27	0.22	0.23	0.21	0.23	0.36	0.36
Anion Sum	meq/L	ns	ns	na	0.27	0.19	0.85	0.22	0.19	0.19	0.25	0.23	0.95
Ion Balance	%	ns	ns	na	1.2	3.1	5.2	0.14	9.75	3.32	3.16	22	45.2
Langlier Index @ 4C		ns	ns	na	-7.41	-7.51	-6.73	-7.41	-7.41	-7.01	-7.02	-7.81	-7.13
Langlier Index @ 20C		ns	ns	na	-7.01	-7.11	-6.33	-7.01	-7.01	-6.61	-6.62	-7.41	-6.73
Saturation pH @ 4C	Units	ns	ns	na	11.8	11.8	11.1	11.8	11.8	11.8	11.8	11.8	11.1
Saturation pH @ 20C	Units	ns	ns	na	11.4	11.4	10.7	11.4	11.4	11.4	11.4	11.4	10.7

***** varies with hardness **na** not analyzed

nd non-detect **ns** not sampled

SW-5

Metals -Analytical results

CCME Guidelines 2001	Parameters	Units	23-Apr-00	28-May-00	28-Aug-00	25-Apr-01	01-Jun-01	28-Jun-01	26-Jul-01	28-Aug-01	12-Sep-01	11-Oct-01	12-Nov-01
	Aluminum	mg/L	ns	ns	0.347	0.27	0.42	0.49	0.38	0.45	0.32	0.32	0.6
	Antimony	mg/L	ns	ns	0.0005	nd	nd	nd	nd	nd	nd	nd	nd
	Arsenic	mg/L	ns	ns	0.0008	nd	nd	nd	nd	nd	nd	nd	nd
	Barium	mg/L	ns	ns	0.001	nd	nd	nd	nd	nd	nd	0.074	nd
	Beryllium	mg/L	ns	ns	nd	nd	nd	nd	nd	nd	nd	nd	nd
	Bismuth	mg/L	ns	ns	na	nd	nd	nd	nd	nd	nd	nd	nd
	Boron	mg/L	ns	ns	nd	0.007	0.026	0.005	0.005	0.009	nd	0.25	nd
	Cadmium	mg/L	ns	ns	nd	nd	nd	nd	nd	nd	nd	nd	nd
	Chromium	mg/L	ns	ns	nd	nd	nd	nd	nd	nd	nd	nd	nd
	Cobalt	mg/L	ns	ns	nd	nd	nd	nd	nd	nd	nd	nd	nd
0.06	**Copper**	mg/L	ns	ns	na	nd	nd	0.002	nd	nd	nd	0.002	nd
	Iron	mg/L	ns	ns	0.13	0.06	0.12	0.1	0.12	0.31	0.13	0.11	0.15
	Lead	mg/L	ns	ns	0.001	0.0063	0.0009	0.0012	0.0009	0.0009	0.0012	0.0005	0.0011
	Manganese	mg/L	ns	ns	nd	0.003	0.002	0.003	0.002	0.003	0.002	0.003	0.003
	Molybdenum	mg/L	ns	ns	nd	nd	nd	nd	nd	nd	nd	nd	nd
	Nickel	mg/L	ns	ns	nd	nd	nd	nd	nd	nd	nd	nd	nd
	Selenium	mg/L	ns	ns	nd	nd	nd	nd	nd	nd	nd	nd	nd
	Silver	mg/L	ns	ns	nd	nd	nd	nd	nd	nd	nd	nd	nd
	Strontium	mg/L	ns	ns	0.0029	nd	nd	nd	nd	nd	nd	nd	nd
>6.5;<9.0	**Thallium**	mg/L	ns	ns	nd	nd	nd	nd	nd	nd	nd	nd	nd
	Tin	mg/L	ns	ns	nd	nd	nd	nd	nd	nd	nd	nd	nd
	Titanium	mg/L	ns	ns	nd	nd	0.002	0.002	0.048	0.002	0.002	0.009	0.002
	Uranium	mg/L	ns	ns	0.0007	0.0004	0.0006	0.0008	0.0007	0.0006	0.0006	0.0005	0.0005
	Vanadium	mg/L	ns	ns	0.0005	nd	nd	nd	< 2	nd	nd	nd	nd
	Zinc	mg/l	ns	ns	0.005	0.004	0.007	0.01	0.012	0.007	0.01	0.004	0.005

***** varies with hardnes **na** not analyzed

nd non-detect **ns** not sampled

1 varies with hardness

12-Dec-01	CCME Guidelines 2001
0.51	
nd	
nd	0.005
nd	
nd	
nd	
0.005	
nd	0.000017
nd	0.0089
nd	
nd	0.002-0.004[1]
0.14	0.3
0.0016	0.001-0.007[1]
0.003	
nd	
nd	0.025-0.15[1]
nd	0.001
nd	0.0001
nd	
nd	0.0008
nd	
0.002	
0.0005	
nd	
0.01	0.03

SW-6

General Chemistry -Analytical Results

Parameters	Units	23-Apr-00	28-May-00	28-Aug-00	########	########	########	26-Jul-01	########	########	11-Oct-01	12-Nov-01	12-Dec-01	CCME Guidelines 2001
Sodium	mg/L	ns	ns	3.2	4.4	2.4	3.1	3.2	3.5	3.2	3.9	4.1	3.8	
Potassium	mg/L	ns	ns	0.1	0.1	nd	0.1	0.3	0.1	0.3	0.4	nd	0.3	
Calcium	mg/L	ns	ns	0.3	0.2	0.2	0.5	0.4	0.3	0.2	0.3	0.5	0.4	
Magnesium	mg/L	ns	ns	0.25	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.5	0.4	
Alkalinity (as CaCO3)	mg/L	ns	ns	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	
Sulfate	mg/L	ns	ns	nd	nd	nd	30	7	nd	nd	4	nd	33	
Chloride	mg/L	ns	ns	5.1	7.1	4.3	4.5	4.9	4.4	4.3	4.6	5.8	4.2	
Reactive Silica (as SiO2)	mg/L	ns	ns	7.8	3.3	4.9	5.5	7.9	8.5	10.3	11	7.3	7	
Phosphorus	mg/L	ns	ns	na	0.01	nd	0.06	nd	nd	0.1	nd	nd	nd	
Ortho Phosphate (as P)	mg/L	ns	ns	nd	nd	nd	nd	nd	nd	0.01	nd	nd	nd	
Nitrite	mg/L	ns	ns	na	nd	nd	nd	nd	nd	nd	nd	nd	nd	0.06
Nitrate + Nitrite (as N)	mg/L	ns	ns	nd	nd	nd	nd	0.05	nd	nd	nd	nd	nd	
Nitrate (as N)	mg/L	ns	ns	na	nd	nd	nd	0.05	nd	nd	nd	nd	nd	
Ammonia (as N)	mg/L	ns	ns	0.04	nd	nd	nd	nd	nd	nd	nd	nd	nd	
Dissolved Organic Carbon	mg/L	ns	ns	23	10.7	18	22.5	20.8	18.7	12.7	13.6	nd	22	
Color	TCU	ns	ns	130	120	140	130	130	150	75	64	140	170	
Turbidity	NTU	ns	ns	0.3	0.2	0.3	0.3	0.9	0.4	0.8	0.4	0.5	0.2	
Total Suspended Solids	mg/L	ns	ns	1	4.5	nd	nd	44	1	17.4	nd	nd	nd	
Conductance (RCAp)	uS/cm	ns	ns	na	47	38	34	31	32	26	30	62	54	
pH	Units	ns	ns	4.3	4.3	4.3	4.4	4.5	4.4	4.8	4.8	4	4	>6.5;<9.0
Hardness (as CaCO3)	mg/L	ns	ns	1.7	1.3	1.3	2.1	1.8	1.6	1.3	1.6	3.3	2.6	
Bicarbonate (as CaCO3)	mg/L	ns	ns	0.4	nd	nd	nd	nd	nd	nd	nd	nd	nd	
Carbonate (as CaCO3)	mg/L	ns	ns	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	
TDS (Calculated)	mg/L	ns	ns	18	18	15	48	25	20	24	26	21	52	
Cation Sum	meq/L	ns	ns	na	0.27	0.19	0.24	0.22	0.23	0.21	0.23	0.35	0.33	
Anion Sum	meq/L	ns	ns	na	0.27	0.19	0.87	0.31	0.19	0.19	0.24	0.23	0.91	
Ion Balance	%	ns	ns	na	1.61	0.18	57.2	16.9	9.64	3.32	1.98	21.4	46.8	
Langlier Index @ 4C		ns	ns	na	-7.51	-7.51	-6.73	-7.32	-7.41	-7.01	-7.02	-7.81	-7.13	
Langlier Index @ 20C		ns	ns	na	-7.11	-7.11	-6.33	-6.92	-7.01	-6.61	-6.62	-7.41	-6.73	
Saturation pH @ 4C	Units	ns	ns	na	11.8	11.8	11.1	11.8	11.8	11.8	11.8	11.8	11.1	
Saturation pH @ 20C	Units	ns	ns	na	11.4	11.4	10.7	11.4	11.4	11.4	11.4	11.4	10.7	

***** varies with hardness **na** not analyzed

nd non-detect **ns** not sampled

SW-6

Metals -Analytical results

Parameters	Units	########	28-May-00	28-Aug-00	########	########	########	26-Jul-01	########	12-Sep-01	11-Oct-01	12-Nov-01	12-Dec-01	CCME Guidelines 2001
Aluminum	mg/L	ns	ns	0.43	0.31	0.42	0.53	0.39	0.44	0.3	0.32	0.59	0.52	
Antimony	mg/L	ns	ns	0.0005	nd	nd	nd	nd	nd	nd	nd	nd	nd	
Arsenic	mg/L	ns	ns	0.0009	nd	nd	nd	nd	nd	nd	nd	nd	nd	0.005
Barium	mg/L	ns	ns	0.0005	nd	nd	nd	nd	nd	nd	0.062	nd	nd	
Beryllium	mg/L	ns	ns	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	
Bismuth	mg/L	ns	ns	na	nd	nd	nd	nd	nd	nd	nd	nd	nd	
Boron	mg/L	ns	ns	nd	nd	0.006	0.005	nd	0.006	0.005	0.21	nd	nd	
Cadmium	mg/L	ns	ns	0.00004	nd	nd	nd	nd	nd	nd	nd	nd	nd	0.000017
Chromium	mg/L	ns	ns	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	0.0089
Cobalt	mg/L	ns	ns	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	
Copper	mg/L	ns	ns	0.0013	nd	nd	0.002	nd	nd	nd	0.002	nd	nd	0.002-0.004[1]
Iron	mg/L	ns	ns	0.11	0.04	0.13	0.13	0.12	0.11	0.09	0.1	0.15	0.14	0.3
Lead	mg/L	ns	ns	0.0008	0.0006	0.0008	0.0012	0.0007	0.0007	0.0007	0.0006	0.8	0.0008	0.001-0.007[1]
Manganese	mg/L	ns	ns	nd	nd	0.003	0.002	0.002	nd	0.003	0.002	0.002	0.002	
Molybdenum	mg/L	ns	ns	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	
Nickel	mg/L	ns	ns	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	0.025-0.15[1]
Selenium	mg/L	ns	ns	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	0.001
Silver	mg/L	ns	ns	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	0.0001
Strontium	mg/L	ns	ns	0.0023	nd	nd	nd	nd	nd	nd	nd	nd	nd	
Thallium	mg/L	ns	ns	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	0.0008
Tin	mg/L	ns	ns	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	
Titanium	mg/L	ns	ns	nd	nd	0.002	0.003	0.048	0.002	nd	0.007	0.002	0.002	
Uranium	mg/L	ns	ns	0.0007	0.0004	0.0006	0.0009	0.0007	0.0007	0.0006	0.0005	0.0005	0.0005	
Vanadium	mg/L	ns	ns	0.005	nd	nd	nd	nd	nd	nd	nd	nd	nd	
Zinc	mg/L	ns	ns	0.006	0.003	0.004	0.006	0.01	0.004	0.005	0.004	0.005	0.004	0.03

***** varies with hardne **na** not analyzed

nd non-detect **ns** not sampled

1 varies with hardness

Pit Pond

General Chemistry -Analytical Results

Parameters	Units	25-Apr-01	01-Jun-01	28-Jun-01	26-Jul-01	28-Aug-01	12-Sep-01	11-Oct-01	12-Nov-01	12-Dec-01	CCME Guidelines 2001
Sodium	mg/L	2.1	1.8	2	2.1	1.7	1.7	1.9	1.4	1.8	
Potassium	mg/L	0.3	0.3	0.4	0.5	0.6	0.7	0.6	0.6	0.6	
Calcium	mg/L	0.5	0.5	0.6	0.6	0.5	0.5	0.6	0.5	0.5	
Magnesium	mg/L	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	
Alkalinity (as CaCO3)	mg/L	nd	nd	nd	nd	nd	nd	nd	1	nd	
Sulfate	mg/L	nd	6	5	nd	3	9	3	nd	7	
Chloride	mg/L	3.3	3	2.8	2.6	2.6	2.8	3.1	2.4	2	
Reactive Silica (as SiO2)	mg/L	nd	nd	nd	nd	0.5	0.6	nd	nd	nd	
Phosphorus	mg/L	nd	0.02	0.02	nd	nd	0.1	nd	nd	nd	
Ortho Phosphate (as P)	mg/L	0.1	nd	nd	nd	nd	0.04	0.02	nd	nd	
Nitrite	mg/L	nd	nd	nd	nd	nd	0.01	nd	nd	nd	0.06
Nitrate + Nitrite (as N)	mg/L	nd	nd	nd	nd	nd	nd	nd	nd	nd	
Nitrate (as N)	mg/L	nd	nd	nd	nd	nd	nd	nd	nd	nd	
Ammonia (as N)	mg/L	nd	nd	nd	nd	nd	nd	nd	nd	nd	
Dissolved Organic Carbon	mg/L	nd	nd	1.2	1.7	2.4	2.4	5.4	3.2	3.8	
Color	TCU	8	14	8	9	nd	22	23	13	14	
Turbidity	NTU	2.9	9.1	2.1	2.1	6.1	3.9	5.2	5.3	0.2	
Total Suspended Solids	mg/L	7	11.2	5	10.9	10.8	16.3	10.5	11.1	25.5	
Conductance (RCAp)	uS/cm	19	17	16	15	14	15	18	13	15	
pH	Units	5.8	6.1	5.8	5.8	5.5	6.6	6.1	5.7	5.7	>6.5;<9.0
Hardness (as CaCO3)	mg/L	2.5	2.1	2.3	2.3	2.1	2.1	2.3	2.1	2.1	
Bicarbonate (as CaCO3)	mg/L	nd	nd	nd	nd	nd	nd	nd	nd	nd	
Carbonate (as CaCO3)	mg/L	nd	nd	nd	nd	nd	nd	nd	nd	nd	
TDS (Calculated)	mg/L	9	15	14	9	10	19	11	8	15	
Cation Sum	meq/L	0.15	0.13	0.15	0.16	0.14	0.14	0.15	0.12	0.14	
Anion Sum	meq/L	0.16	0.31	0.29	0.14	0.16	0.37	0.18	0.13	0.31	
Ion Balance	%	1.41	40.7	31.6	5.85	7.36	45.9	8.65	3.75	37	
Langlier Index @ 4C		-6.01	-5.01	-5.31	-6.01	-6.31	-4.51	-5.71	-6.1	-5.41	
Langlier Index @ 20C		-5.61	-4.61	-4.91	-5.61	-5.91	-4.11	-5.31	-5.7	-5.01	
Saturation pH @ 4C	Units	11.8	11.1	11.1	11.8	11.8	11.1	11.8	11.8	11.1	
Saturation pH @ 20C	Units	11.4	10.7	10.7	11.4	11.4	10.7	11.4	11.4	10.7	

***** varies with hardness **na** not analyzed

nd non-detect **ns** not sampled

Pit Pond

Metals -Analytical results

Parameters	Units	25-Apr-01	01-Jun-01	28-Jun-01	26-Jul-01	28-Aug-01	12-Sep-01	11-Oct-01	12-Nov-01	12-Dec-01	CCME Guidelines 2001
Aluminum	mg/L	0.14	0.21	0.39	0.2	0.23	0.19	0.29	0.19	0.2	
Antimony	mg/L	nd	nd	nd	nd	nd	nd	nd	nd	nd	
Arsenic	mg/L	nd	nd	nd	nd	nd	nd	nd	nd	nd	0.005
Barium	mg/L	nd	nd	nd	nd	nd	nd	nd	nd	nd	
Beryllium	mg/L	nd	nd	nd	nd	nd	nd	nd	nd	nd	
Bismuth	mg/L	nd	nd	nd	nd	nd	nd	nd	nd	nd	
Boron	mg/L	0.006	0.005	0.009	0.006	0.006	0.007	0.012	nd	nd	
Cadmium	mg/L	nd	nd	nd	nd	nd	nd	nd	nd	nd	0.000017
Chromium	mg/L	nd	nd	nd	nd	nd	nd	nd	nd	nd	0.0089
Cobalt	mg/L	nd	nd	nd	nd	nd	nd	nd	nd	nd	
Copper	mg/L	nd	nd	nd	nd	nd	0.002	nd	nd	nd	0.002-0.004[1]
Iron	mg/L	0.04	0.06	0.07	0.06	0.07	0.11	0.07	0.07	0.15	0.3
Lead	mg/L	nd	nd	0.0005	nd	nd	0.0074	nd	nd	nd	0.001-0.007[1]
Manganese	mg/L	0.023	0.005	nd	0.007	0.01	0.008	0.006	0.006	0.007	
Molybdenum	mg/L	nd	nd	nd	nd	nd	nd	nd	nd	nd	
Nickel	mg/L	nd	nd	nd	nd	nd	nd	nd	nd	nd	0.025-0.15[1]
Selenium	mg/L	nd	nd	nd	nd	nd	nd	nd	nd	nd	0.001
Silver	mg/L	nd	nd	nd	nd	nd	nd	nd	nd	nd	0.0001
Strontium	mg/L	nd	nd	nd	nd	nd	nd	nd	nd	nd	
Thallium	mg/L	nd	nd	nd	nd	0.0001	nd	nd	nd	nd	0.0008
Tin	mg/L	nd	nd	nd	nd	nd	nd	nd	nd	nd	
Titanium	mg/L	nd	0.002	0.002	0.044	0.003	0.003	0.003	0.007	0.003	
Uranium	mg/L	0.0004	0.0006	0	0.007	0.0008	0.0009	0.0008	0.0008	0.0006	
Vanadium	mg/L	nd	nd	nd	nd	nd	nd	nd	nd	nd	
Zinc	mg/L	0.004	0.004	0.003	0.01	0.003	0.01	0.002	0.003	0.004	0.03

***** varies with h **na** not analyzed

nd non-detect **ns** not sampled

1 varies with hardness

Frog Pond

General Chemistry -Analytical Results

Parameters	Units	25-Apr-01	01-Jun-01	28-Jun-01	26-Jul-01	28-Aug-01	12-Sep-01	11-Oct-01	12-Nov-01	CCME Guidelines 2001
Sodium	mg/L	ns	2.7	3.1	ns	3.2	ns	4	3.7	
Potassium	mg/L	ns	0.1	0.2	ns	0.2	ns	0.6	0.1	
Calcium	mg/L	ns	0.3	0.5	ns	0.2	ns	0.3	0.5	
Magnesium	mg/L	ns	0.2	0.2	ns	0.2	ns	0.2	0.6	
Alkalinity (as CaCO3)	mg/L	ns	nd	nd	ns	nd	ns	nd	nd	
Sulfate	mg/L	ns	nd	25	ns	nd	ns	4	nd	
Chloride	mg/L	ns	4.3	5.1	ns	4.2	ns	4.5	8.7	
Reactive Silica (as SiO2)	mg/L	ns	7.4	8.6	ns	8.4	ns	10.7	4.5	
Phosphorus	mg/L	ns	nd	0.02	ns	nd	ns	nd	nd	
Ortho Phosphate (as P)	mg/L	ns	nd	nd	ns	nd	ns	nd	nd	
Nitrite	mg/L	ns	nd	nd	ns	nd	ns	nd	nd	0.06
Nitrate + Nitrite (as N)	mg/L	ns	nd	nd	ns	nd	ns	nd	nd	
Nitrate (as N)	mg/L	ns	nd	nd	ns	nd	ns	nd	nd	
Ammonia (as N)	mg/L	ns	nd	nd	ns	nd	ns	nd	nd	
Dissolved Organic Carbon	mg/L	ns	12.4	15.2	ns	10.9	ns	8.7	nd	
Color	TCU	ns	93	100	ns	73	ns	46	160	
Total Suspended Solids	mg/L	ns	0.2	1.1	ns	1.5	ns	nd	nd	
Turbidity	NTU	ns	nd	nd	ns	0.2	ns	0.1	0.1	
Conductance (RCAp)	uS/cm	ns	32	30	ns	25	ns	26	65	
pH	Units	ns	4.5	4.7	ns	4.8	ns	5	4	>6.5;<9.0
Hardness (as CaCO3)	mg/L	ns	1.6	2.1	ns	1.3	ns	1.6	3.7	
Bicarbonate (as CaCO3)	mg/L	ns	nd	nd	ns	nd	ns	nd	nd	
Carbonate (as CaCO3)	mg/L	ns	nd	nd	ns	nd	ns	nd	nd	
TDS (Calculated)	mg/L	ns	18	46	ns	19	ns	25	31	
Cation Sum	meq/L	ns	0.19	0.2	ns	0.19	ns	0.23	0.12	
Anion Sum	meq/L	ns	0.19	0.77	ns	0.18	ns	0.24	0.13	
Ion Balance	%	ns	0.05	57.9	ns	1.76	ns	0.61	3.75	
Langlier Index @ 4C		ns	-7.31	-6.42	ns	-7.01	ns	-6.82	-6.1	
Langlier Index @ 20C		ns	-6.91	-6.02	ns	-6.61	ns	-6.42	-5.7	
Saturation pH @ 4C	Units	ns	11.8	11.1	ns	11.8	ns	11.8	11.8	
Saturation pH @ 20C	Units	ns	11.4	10.7	ns	11.4	ns	11.4	11.4	

***** varies with hardness **na** not analyzed

nd non-detect

ns not sampled

Frog Pond

Metals -Analytical results

Parameters	Units	25-Apr-01	01-Jun-01	28-Jun-01	26-Jul-01	28-Aug-01	12-Sep-01	11-Oct-01	12-Nov-01	12-Dec-01	CCME Guidelines 2001
Aluminum	mg/L	ns	0.39	0.44	ns	0.34	ns	0.25	0.42	0.51	
Antimony	mg/L	ns	nd	nd	ns	nd	ns	nd	nd	nd	
Arsenic	mg/L	ns	nd	nd	ns	nd	ns	nd	nd	nd	0.005
Barium	mg/L	ns	nd	nd	ns	nd	ns	0.057	nd	nd	
Beryllium	mg/L	ns	nd	nd	ns	nd	ns	nd	nd	nd	
Bismuth	mg/L	ns	nd	nd	ns	nd	ns	nd	nd	nd	
Boron	mg/L	ns	0.009	0.005	ns	0.006	ns	0.25	nd	nd	
Cadmium	mg/L	ns	nd	nd	ns	nd	ns	nd	0.0004	nd	0.000017
Chromium	mg/L	ns	nd	nd	ns	nd	ns	nd	nd	nd	0.0089
Cobalt	mg/L	ns	nd	nd	ns	nd	ns	nd	nd	nd	
Copper	mg/L	ns	nd	nd	ns	nd	ns	0.002	nd	nd	0.002-0.004[1]
Iron	mg/L	ns	0.07	0.09	ns	0.08	ns	0.09	0.08	0.1	0.3
Lead	mg/L	ns	0.0005	0.0008	ns	0.0005	ns	0.0012	0.0009	0.0005	0.001-0.007[1]
Manganese	mg/L	ns	nd	nd	ns	nd	ns	0.003	nd	nd	
Molybdenum	mg/L	ns	nd	nd	ns	nd	ns	nd	nd	nd	
Nickel	mg/L	ns	nd	nd	ns	nd	ns	nd	nd	nd	0.025-0.15[1]
Selenium	mg/L	ns	nd	nd	ns	nd	ns	nd	nd	nd	0.001
Silver	mg/L	ns	nd	nd	ns	nd	ns	nd	nd	nd	0.0001
Strontium	mg/L	ns	nd	nd	ns	nd	ns	nd	0.005	nd	
Thallium	mg/L	ns	nd	nd	ns	nd	ns	nd		nd	0.0008
Tin	mg/L	ns	nd	nd	ns	nd	ns	nd	nnd	nd	
Titanium	mg/L	ns	0.002	0.002	ns	nd	ns	0.007	0.002	0.002	
Uranium	mg/L	ns	0.0008	0.0009	ns	0.0007	ns	0.0005	0.0004	0.0006	
Vanadium	mg/L	ns	nd	nd	ns	nd	ns	nd	nd	nd	
Zinc	mg/L	ns	0.003	0.006	ns	0.004	ns	0.006	0.004	0.003	0.03

***** varies with ha **na** not analyzed

nd non-detect **ns** not sampled

1 varies with hardness

SW-8

General Chemistry -Analytical Results

Parameters	Units	06-Jun-01	CCME Guidelines 2001
Sodium	mg/L	2.2	
Potassium	mg/L	nd	
Calcium	mg/L	0.3	
Magnesium	mg/L	0.2	
Alkalinity (as CaCO3)	mg/L	nd	
Sulfate	mg/L	nd	
Chloride	mg/L	3.2	
Reactive Silica (as SiO2)	mg/L	2.5	
Phosphorus	mg/L	nd	
Ortho Phosphate (as P)	mg/L	nd	
Nitrite	mg/L	nd	0.06
Nitrate + Nitrite (as N)	mg/L	nd	
Nitrate (as N)	mg/L	nd	
Ammonia (as N)	mg/L	nd	
Dissolved Organic Carbon	mg/L	19.7	
Color	TCU	130	
Total Suspended Solids	mg/L	nd	
Turbidity	NTU	0.4	
Conductance (RCAp)	uS/cm	29	
pH	Units	4.9	>6.5;<9.0
Hardness (as CaCO3)	mg/L	1.6	
Bicarbonate (as CaCO3)	mg/L	nd	
Carbonate (as CaCO3)	mg/L	nd	
TDS (Calculated)	mg/L	11	
Cation Sum	meq/L	0.15	
Anion Sum	meq/L	0.16	
Ion Balance	%	3.17	
Langlier Index @ 4C		-6.91	
Langlier Index @ 20C		-6.51	
Saturation pH @ 4C	Units	11.8	
Saturation pH @ 20C	Units	11.4	

***** varies with hardness **na** not analyzed

nd non-detect **ns** not sampled

SW-8

Metals -Analytical results

Parameters	Units	06-Jun-01	CCME Guidelines 2001
Aluminum	mg/L	0.5	
Antimony	mg/L	nd	
Arsenic	mg/L	nd	0.005
Barium	mg/L	nd	
Beryllium	mg/L	nd	
Bismuth	mg/L	nd	
Boron	mg/L	0.007	
Cadmium	mg/L	nd	0.000017
Chromium	mg/L	nd	0.0089
Cobalt	mg/L	nd	
Copper	mg/L	nd	0.002-0.004[1]
Iron	mg/L	0.1	0.3
Lead	mg/L	0.0009	0.001-0.007[1]
Manganese	mg/L	nd	
Molybdenum	mg/L	nd	
Nickel	mg/L	nd	0.025-0.15[1]
Selenium	mg/L	nd	0.001
Silver	mg/L	nd	0.0001
Strontium	mg/L	nd	
Thallium	mg/L	nd	0.0008
Tin	mg/L	nd	
Titanium	mg/L	0.002	
Uranium	mg/L	0.001	
Vanadium	mg/L	nd	
Zinc	mg/L	0.006	0.03

***** varies with hardnes **na** not analyzed

nd non-detect **ns** not sampled

1 varies with hardness

SW-9

General Chemistry -Analytical Results

Parameters	Units	06-Jun-01	CCME Guidelines 2001
Sodium	mg/L	2.6	
Potassium	mg/L	nd	
Calcium	mg/L	0.3	
Magnesium	mg/L	0.2	
Alkalinity (as CaCO3)	mg/L	nd	
Sulfate	mg/L	nd	
Chloride	mg/L	3.6	
Reactive Silica (as SiO2)	mg/L	3.1	
Phosphorus	mg/L	nd	
Ortho Phosphate (as P)	mg/L	0.01	
Nitrite	mg/L	nd	0.06
Nitrate + Nitrite (as N)	mg/L	nd	
Nitrate (as N)	mg/L	nd	
Ammonia (as N)	mg/L	nd	
Dissolved Organic Carbon	mg/L	20.8	
Color	TCU	140	
Total Suspended Solids	mg/L	nd	
Turbidity	NTU	0.3	
Conductance (RCAp)	uS/cm	33	
pH	Units	4.3	>6.5;<9.0
Hardness (as CaCO3)	mg/L	1.6	
Bicarbonate (as CaCO3)	mg/L	nd	
Carbonate (as CaCO3)	mg/L	nd	
TDS (Calculated)	mg/L	13	
Cation Sum	meq/L	0.2	
Anion Sum	meq/L	0.17	
Ion Balance	%	9.28	
Langlier Index @ 4C		-7.51	
Langlier Index @ 20C		-7.11	
Saturation pH @ 4C	Units	11.8	
Saturation pH @ 20C	Units	11.4	

***** varies with hardness **na** not analyzed

SW-9

Metals -Analytical results

Parameters	Units	06-Jun-01	CCME Guidelines 2001
Aluminum	mg/L	0.44	
Antimony	mg/L	nd	
Arsenic	mg/L	nd	0.005
Barium	mg/L	nd	
Beryllium	mg/L	nd	
Bismuth	mg/L	nd	
Boron	mg/L	0.005	
Cadmium	mg/L	nd	0.000017
Chromium	mg/L	nd	0.0089
Cobalt	mg/L	nd	
Copper	mg/L	0.002	0.002-0.004[1]
Iron	mg/L	0.11	0.3
Lead	mg/L	0.0013	0.001-0.007[1]
Manganese	mg/L	0.002	
Molybdenum	mg/L	nd	
Nickel	mg/L	nd	0.025-0.15[1]
Selenium	mg/L	nd	0.001
Silver	mg/L	nd	0.0001
Strontium	mg/L	nd	
Thallium	mg/L	nd	0.0008
Tin	mg/L	nd	
Titanium	mg/L	0.002	
Uranium	mg/L	0.0008	
Vanadium	mg/L	nd	
Zinc	mg/L	0.014	0.03

***** varies with hardr **na** not analyzed

nd non-detect **ns** not sampled

1 varies with hardness

nd non-detect

ns not sampled

APPENDIX A-E

SAMPLING PROTOCOLS – SURFACE WATER AND GROUNDWATER

Field Sampling Practice and Quality Assurance/Quality Control Procedures

During the execution of all field related tasks, a rigid protocol is followed.

In terms of water sample collection, a rigorous Quality Assurance/Quality Control (QA/QC) is followed.

In this regard we utilize a protocol for collecting and analysing water samples which is defensible in legal forums. This protocol meets the requirements outlined in the "Handbook of Analytical Methods of Environmental Samples" and "A Guide to the Collection and Submission of Samples for Laboratory Analysis." All personnel collecting samples in this study have been thoroughly trained and are experienced in the sampling, preservation and field analysis techniques detailed in our protocol.

All groundwater monitoring wells/piezometers are purged to ensure stabilization of specific conductance, prior to sampling. This ensures that samples are representative of formation waters. All purging and sampling is conducted using dedicated polyethylene tubing to prevent external contamination. All personnel purging or sampling wear new surgical gloves at each monitoring well/piezometer installation.

All sample sets are collected in as short a time period as possible. This precaution ensures that the samples collected are representative and comparable for data interpretation purposes. The samples collected are preserved as required and stored at 4°C during shipment to the laboratory. Chain of Custody documents are used to track samples as they are transported from the field sampler to the laboratory for analysis. One chain of custody document is produced for each laboratory identifying all of the samples shipped by the field sampler to that laboratory. The chain of custody documents are completed in triplicate and a photocopy is maintained in the project files. Upon receipt of the samples, the lab fills out the forms as well and returns one copy to MGI. This completed copy is also retained in the project files.

The above sampling protocols, labelling procedures and chain of custody tracking are QA/QC procedures in themselves as they ensure that representative samples are collected, identified and received at the laboratory.

GROUNDWATER

Upon arrival at each well location, the well and surrounding area is inspected for signs of damage or other conditions that could have an effect on the quality of the groundwater sample to be collected (e.g. compromise of surface seal, broken well casing, evidence of vandalism or other unauthorized tampering, etc). Static water levels and the total well depth are then measured in each monitoring well. The well depth is compared to the available well construction details as a measure of the overall integrity of the well. Following this procedure each well is thoroughly purged via the removal of a minimum three pore volumes of water prior to sample collection. The purging involves the removal of a minimum of three borehole volumes of groundwater from each monitor well. However, during this exercise, field parameters (i.e. conductivity, temperature, pH and/or dissolved oxygen) are measured on an on-going basis and samples are only collected following the stabilization of the measured parameter(s).

Groundwater samples are collected using dedicated Waterra™ tubing and footvalves installed in each well and the samples are collected directly into new, laboratory supplied bottles while ensuring that the tubing does not come into contact with the sample bottle. Samples collected for metal analysis are field filtered, using a new Waterra™ 0.45µm inline filter for each sample, and acidified prior to analysis. If required, any sample to be submitted for the analysis of volatile organic compounds (VOCs) would be collected using a new disposable bottom loading bailer to ensure that the potential for VOC off gassing is minimized.

Field personnel wear new disposable powderless latex gloves during throughout the sample collection and handling process. Any equipment that is used at more than one sample location (e.g. water level metre) is washed using a biodegradable soap and triple rinsed with distilled water prior to being reused at subsequent sample locations. Finally, where practical, the wells are sampled in the anticipated order of increasing concentrations of constituents of concern.

SURFACE WATER

Surface water samples are collected directly into new laboratory supplied bottles by dipping the bottles below the surface of the water while ensuring that bottom sediments are not disturbed to the maximum extent possible. The top of the sample bottle is also directed upstream to ensure that any material that may be disturbed will not be captured in the sample. In extreme low flow cases, it may be necessary to create a small depression in the streambed to ensure an adequate depth of water for sample collection. If this becomes necessary, a brief period of time is allowed to elapse prior to the actual collection of the sample to ensure that any disturbed sediments are flushed from the sample location prior to sample collection.

Surface water samples collected for metal analysis are field acidified, however they are not filtered due to the fact that the analytical data is typically interpreted with respect to the CCME Freshwater Aquatic Life Guidelines, which are based on total metal concentrations as opposed to dissolved concentrations.

APPENDIX A-F

GROUNDWATER CHEMISTRY MONITORING DATA

Groundwater Analytical Results - General Chemistry
January 11, 2002

Parameters	Units	MW99-20	MW01-40	MW01-41	CCME Guidelines 2001[1]
Sodium	mg/L	3.5	4.9	19.4	
Potassium	mg/L	0.8	nd	0.9	
Calcium	mg/L	1	0.2	1	
Magnesium	mg/L	0.3	0.1	0.3	
Alkalinity (as CaCO3)	mg/L	7	nd	16	
Sulfate	mg/L	2	7	30	
Chloride	mg/L	3.6	3.1	5.5	
Reactive Silica (as SiO2)	mg/L	8	4.1	11.1	
Phosphorus	mg/L	nd	nd	nd	
Ortho Phosphate (as P)	mg/L	nd	nd	nd	
Nitrite	mg/L	nd	nd	nd	0.06
Nitrate + Nitrite (as N)	mg/L	nd	nd	nd	
Nitrate (as N)	mg/L	nd	nd	nd	
Ammonia (as N)	mg/L	nd	nd	nd	
Total Organic Carbon	mg/L	1.4	5.8	5.5	
Color	TCU	nd	nd	36	
Turbidity	NTU	284	357	76.5	
Conductance (RCAp)	uS/cm	27	30	103	
pH	Units	6.1	5.4	6.3	>6.5;<9.0
Hardness (as CaCO3)	mg/L	3.7	0.9	3.7	
Bicarbonate (as CaCO3)	mg/L	7	nd	16	
Carbonate (as CaCO3)	mg/L	nd	nd	nd	
TDS (Calculated)	mg/L	24	23	78	
Cation Sum	meq/L	0.25	0.24	0.95	
Anion Sum	meq/L	0.29	0.34	1.1	
Ion Balance	%	6.5	16.5	7.67	
Langlier Index @ 4C		-4.87	-5.72	-4.33	
Langlier Index @ 20C		-4.47	-5.32	-3.93	
Saturation pH @ 4C	Units	11	11.1	10.6	
Saturation pH @ 20C	Units	10.6	10.7	10.2	

1 Canadian Water Quality Guidelines for the Protection of Aquatic Life (2001)

nd non-detect

Groundwater Analytical Results - Metals
January 11, 2002

Parameters	Units	MW99-20	MW01-40	MW01-41	CCME Guidelines 2001[1]
Aluminum	mg/L	0.08	0.39	0.46	
Antimony	mg/L	nd	0.006	0.004	
Arsenic	mg/L	nd	nd	nd	0.005
Barium	mg/L	nd	0.092	0.17	
Beryllium	mg/L	nd	nd	nd	
Bismuth	mg/L	nd	nd	nd	
Boron	mg/L	nd	0.19	0.29	
Cadmium	mg/L	nd	nd	0.0008	0.000017
Chromium	mg/L	nd	nd	nd	0.001
Cobalt	mg/L	nd	nd	0.001	
Copper	mg/L	0.002	0.006	0.028	0.002-0.004[2]
Iron	mg/L	0.14	0.1	1.1	0.3
Lead	mg/L	0.0007	nd	0.0015	0.001-0.007[2]
Manganese	mg/L	0.078	0.002	0.016	
Molybdenum	mg/L	nd	nd	0.051	
Nickel	mg/L	nd	0.004	0.01	0.025-0.15[2]
Selenium	mg/L	nd	nd	nd	0.001
Silver	mg/L	nd	nd	nd	0.0001
Strontium	mg/L	0.005	0.007	0.013	
Thallium	mg/L	nd	nd	nd	0.0008
Tin	mg/L	nd	nd	nd	
Titanium	mg/L	nd	0.003	0.004	
Uranium	mg/L	0.0002	0.0001	0.041	
Vanadium	mg/L	nd	nd	nd	
Zinc	mg/L	0.018	0.024	0.11	0.03

1 Canadian Water Quality Guidelines for the Protection of Aquatic Life (2001)
2 varies with hardness
nd non-detect

PSC Analytical Services Inc
Bedford, NS

Tel: (902)420-0203
(800)565-7227
Fax: (902)420-8612

YGI Limited
31 Gloster Court
Dartmouth NS B3B 1X9
ATTENTION: ORAM, PETER 0200466H

CC: CC FAX:

FAX NUMBER: 466-2207 DATE: 1/18/02	

Number of pages including cover page: 6

JC Williams

Confirmations of Receipt or Analytical Reports follow.

Original Analytical Reports mailed to your attention.

If you have any questions,
please call Suzanne Rogers at ext 222.

ANALYTICAL SERVICES

Inorganic Parameters page : 1

Client : MGI Limited ORAM, PETER
91 Gloster Court
Dartmouth
NS B3B 1X9 FAX # : 468-2207
PSC Project Number : 0200466B Printed : 2002/01/18
Client Project Number : 20232-B Reported : 2002/01/18

Matrix		Water	Water	Water
Philip ID		02-H001505	02-H001506	02-H001507
Client ID		MW99-20	MW01-40	MW01-41
Date Sampled (y/m/d)		02/01/10	02/01/10	02/01/10
Date Received (y/m/d)		02/01/11	02/01/11	02/01/11
Analyte	Units	EQL		
Sodium	mg/L	0.1	3.6	4.9	19.4
Potassium	mg/L	0.1	0.8	nd	0.9
Calcium	mg/L	0.1	1.0	0.2	1.0
Magnesium	mg/L	0.1	0.3	0.1	0.3
Alkalinity (as CaCO3)	mg/L	1.	7.	nd(5.)	16.
Sulfate	mg/L	2.	2.	7.	30.
Chloride	mg/L	1.0	3.6	3.1	5.5
Reactive Silica (as SiO2)	mg/L	0.5	8.0	4.1	11.1
Ortho Phosphate (as P)	mg/L	0.01	nd	nd	nd
Phosphorus	mg/L	0.1	nd	nd	nd
Nitrate + Nitrite (as N)	mg/L	0.05	nd	nd	nd
Nitrate (as N)	mg/L	0.05	nd	nd	nd
Nitrite	mg/L	0.01	nd	nd	nd
Ammonia (as N)	mg/L	0.05	nd	nd	nd
Color	TCU	5	nd	nd	36.
Total Org. Carbon (by UV)	mg/L	0.5	1.4	5.8	5.5
Turbidity	NTU	0.1	284.	357	76.5
Conductance (RCAp)	uS/cm	1.	27.	30.	103.
pH	Units		6.1	5.4	6.3
Hardness (as CaCO3)	mg/L	0.1	3.7	0.9	3.7
Bicarbonate (as CaCO3)	mg/L	1.	7.	nd(5.)	16.
Carbonate (as CaCO3)	mg/L	1.	nd	nd(5.)	nd
TDS (Calculated)	mg/L	1.	24.	23.	78.
Cation Sum	meq/L	0.10	0.25	0.24	0.95

Legend:

EQL = Estimated Quantitation Limit for routine analysis
nd = not detected above standard EQL
nd() = not detected at the elevated EQL specified due to matrix interferences or sample pre-dilution
- = Parameter not requested in Sample

Note : Soil results are expressed as air dry weight basis. Biota results are expressed on a wet weight basis unless otherwise stated.

page verified

Inorganic Parameters page : 2

PSC Analytical Services
200 Bluewater Road
Bedford, NS Canada B4B 1G9
Tel (902) 420-0203
Toll free (800) 565-7227
Fax (902) 420-8612

Client : MGI Limited
31 Gloster Court
Dartmouth
NS B3B 1X9
PSC Project Number : 0200466R
Client Project Number : 20232-B

ORAM, PETER
FAX # : 468-2207
Printed : 2002/01/18
Reported : 2002/01/18

Matrix			Water	Water	Water
Philip ID			02-H001505	02-H001506	02-H001507
Client ID			MW99-20	MW01-40	MW01-41
Date Sampled (y/m/d)			02/01/10	02/01/10	02/01/10
Date Received (y/m/d)			02/01/11	02/01/11	02/01/11
Analyte	Units	EQL	(Continued from previous page)		
Anion Sum	meq/L	0.10	0.29	0.34	1.10
Ion Balance	%	-	6.50	16.5	7.67
Langelier Index @ 4C		-	4.67	-5.72	-4.33
Langelier Index @ 20C		-	-4.47	-5.32	-3.93
Saturation pH @ 4C	Units	-	11.0	11.1	10.6
Saturation pH @ 20C	Units	-	10.6	10.7	10.2
Aluminum	ug/L	10	80	390	460
Antimony	ug/L	2.	nd	6.	4.
Arsenic	ug/L	2.	nd	nd	nd
Barium	ug/L	5.	nd	92.	170
Beryllium	ug/L	5.	nd	nd	nd
Bismuth	ug/L	2.	nd	nd	nd
Boron	ug/L	5.	nd	190	290
Cadmium	ug/L	0.3	nd	nd	0.8
Chromium	ug/L	2.	nd	nd	nd
Cobalt	ug/L	1.	nd	nd	1.
Copper	ug/L	2.	2.	6.	28.
Iron	ug/L	20	110	100	1100
Lead	ug/L	0.5	0.7	nd	1.5
Manganese	ug/L	2.	75	2.	16
Molybdenum	ug/L	2.	nd	nd	51.
Nickel	ug/L	2.	nd	4.	10.
Selenium	ug/L	2.	nd	nd	nd

Legend:
EQL = Estimated Quantitation Limit for routine analysis
nd = not detected above standard EQL
nd() = not detected at the elevated EQL specified due to matrix interferences or sample pre-dilution
- = Parameter not requested in Sample
Note : Soil results are expressed as air dry weight basis. Biota results are expressed on a wet weight basis unless otherwise stated.

page verified

Inorganic Parameters page : 3

PSC Analytical Services
206 Bluewater Road
Bedford, NS Canada B4B 1G9
Tel (902) 420-0203
Toll free (800) 565-7227
Fax (902) 420-8612

Client : NCI Limited
31 Gloster Court
Dartmouth
NS B3B 1X9

ORAM, PETER

PSC Project Number : 0200466H
Client Project Number : 20232-B

FAX # : 468-2207
Printed : 2002/01/18
Reported : 2002/01/18

Matrix			Water	Water	Water
Philip ID			02-H001505	02-H001506	02-H001507
Client ID			MW99-20	MW01-40	MW01-41
Date Sampled (y/m/d)			02/01/10	02/01/10	02/01/10
Date Received (y/m/d)			02/01/11	02/01/11	02/01/11
Analyte	Units	EQL	(Continued from previous page)		
Silver	ug/L	0.5	nd	nd	nd
Strontium	ug/L	5.	5	7.	13.
Thallium	ug/L	0.1	nd	nd	nd
Tin	ug/L	2.	nd	nd	nd
Titanium	ug/L	2.	nd	3.	4.
Uranium	ug/L	0.1	0.2	0.1	41.
Vanadium	ug/L	2.	nd	nd	nd
Zinc	ug/L	2.	18.	24.	110
Filtration			By Client	By Client	By Client

Legend:

EQL = Estimated Quantitation Limit for routine analysis
nd = not detected above standard EQL
nd(#) = not detected at the elevated EQL specified due to matrix interferences or sample pre-dilution
- = Parameter not requested in Sample

Note : Soil results are expressed as air dry weight basis. Biota results are expressed on a wet weight basis unless otherwise stated.

page verified

PSC Analytical Services
200 Bluewater Road
Bedford, NS Canada B4B 1G9
Tel (902) 420-0203
Toll free (800) 565-7227
Fax (902) 420-8612

Client : MGT Limited
31 Gloster Court
Dartmouth
NS B3B 1X9

PSC Project Number : 0200466H
Client Project Number : 20232-B

ORAM, PETER

FAX # : 468-2207
Printed : 2002/01/18
Reported : 2002/01/18

Certificate of Analysis

Method Summaries:

Alkalinity: Roche Cobas Fara/BMC Hitachi 911 Automated Colorimetric Analyser. Ref: USEPA Method #310.2

- Chloride: Roche Cobas Fara/BMC Hitachi 911 Automated Colorimetric Analyser. Ref: USEPA Method #325.1
- Colour: Roche Cobas Fara/BMC Hitachi 911 Automated Colorimetric Analyser. Ref: Standard Methods, 16th Edition, 1985
- Conductance (Auto): Electrometric @ 25 C, values >300 uS/cm diluted for validation purposes. Ref: Standard Methods 4500-H+, 19th Edition, 1995.
- Total Organic Carbon: UV Digestion/Technicon AAI Analyser. Ref: Standard Methods, 19th Edition, 1995
- NO2/NO3: Roche Cobas Fara/BMC Hitachi 911 Automated Colormetric Analyser. Ref. USEPA Method #353.1
- pH: Electrometric @ 25 C. Ref: USEPA Method #150.1
- Phosphorus: PE Optima 3000 ICP-OES. Ref: USEPA Method #200.7
- Reactive Silica. Roche Cobas Fara/BMC Hitachi 911 Automated Colorimetric Analyser. Ref: USEPA Method #370.1
- Sulfate: Roche Cobas Fara/BMC Hitachi 911 Automated Turbidimetric. Ref: USEPA Method #375.4
- Turbidity: Nephelometric. Ref: USEPA Method #180.1
- Ortho Phosphorus: Roche Cobas Fara/BMC Hitachi 911 Automated Colorimetric Analyser. Ref. USEPA Method #365.2
- Trace Metals in Aqueous Samples: Elan 6000 ICP-MS. Ref: USEPA Method #200.8
- Ammonia (NH3 plus NH4+): Roche Cobas Fara/BMC Hitachi 911 Automated Colorimetric Analyser. Ref: USEPA Method #350.1
- Nitrite. Roche Cobas/BMC Hitachi 911 Automated Colormetric Analyser. Ref: USEPA Method #354.1
- Major Metals in Aqueous Samples: PE Optima 3000 ICP-OES. Ref: USEPA Method #200.7
- Dissolved Metals in Water: Filtration/ICP-MS. Ref: USEPA 200.8

Inorganic Parameters page : 5

PSC Analytical Services
200 Bluewater Road
Bedford, NS Canada B4B 1G9
Tel (902) 420-0203
Toll free (800) 565-7227
Fax (902) 420-8612

Client : MGI Limited
31 Gloster Court
Dartmouth
NS B3B 1X9
PSC Project Number : 0200466H
Client Project Number : 20232-B

ORAM, PETER
FAX # : 468-2207
Printed : 2002/01/18
Reported : 2002/01/18

Certificate of Analysis

Conversions: 1 mg/L = 1000 ug/L = 1 part per million (ppm)
1 ug/L = 0.001 mg/L = 1 part per billion (ppb)

All work recorded herein has been done in accordance with normal professional standards using accepted testing technologies, quality assurance and quality control procedures except where otherwise agreed to by the client and testing company in writing. Liability for any and all use of these test results shall be limited to the actual cost of the pertinent analysis performed. There is no other warranty expressed or implied. Excess sample will be discarded upon expiry of hold time.

Approval of Inorganic Parameters:

Inorganics Manager : Jerry Arahovich

APPENDIX A-G

HYDRAULIC CONDUCTIVITY TESTING – SITE GROUNDWATER WELLS

Project and Piezometer ----> (This will form title for graph)

Bail Test Results
20232-B
Monitor Well No. MW99-20

Test Hole **MW99-20** **** All input parameters entered in metres**

Depth to water table before bail **5.160**

Depth to water table after bail **6.93**

Depth of test hole **14.40**

Radius of PVC **0.051**

Radius of Screen **0.051**

Length of Screen **14.40**

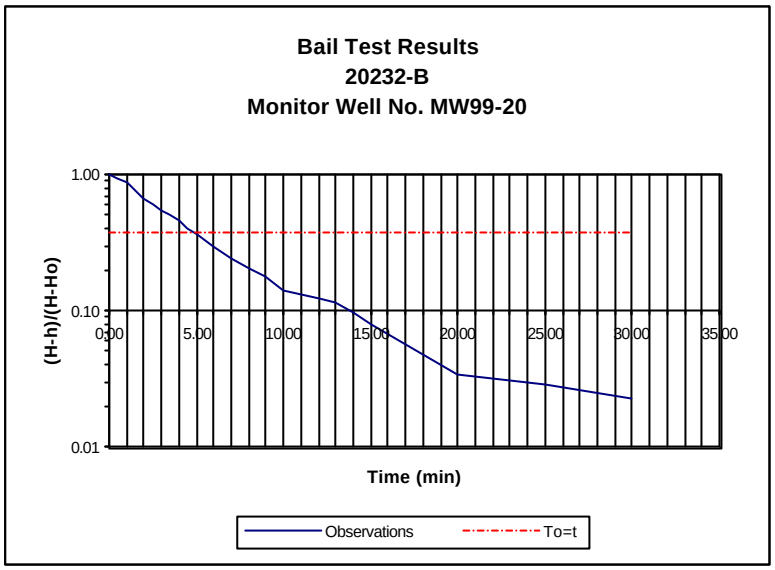
Length of Saturated Screen **9.24** (calculated)

Time (min)	Depth (metres)	Depth from datum	(H-h)/(H-Ho)	log(H-h)/(Ho-H)	Log=0.37
0.00	6.93	7.47	1.00	0.000	0.37
0.50	6.81	7.59	0.93	-0.030	0.37
1.00	6.69	7.71	0.86	-0.063	0.37
1.50	6.50	7.90	0.76	-0.121	0.37
2.00	6.33	8.07	0.66	-0.180	0.37
2.50	6.21	8.19	0.59	-0.227	0.37
3.00	6.12	8.28	0.54	-0.266	0.37
3.50	6.05	8.35	0.50	-0.299	0.37
4.00	5.96	8.44	0.45	-0.345	0.37
4.50	5.87	8.53	0.40	-0.397	0.37
5.00	5.80	8.60	0.36	-0.442	0.37
6.00	5.68	8.72	0.29	-0.532	0.37
7.00	5.59	8.81	0.24	-0.615	0.37
8.00	5.52	8.88	0.20	-0.692	0.37
9.00	5.47	8.93	0.18	-0.757	0.37
10.00	5.41	8.99	0.14	-0.850	0.37
11.00	5.39	9.01	0.13	-0.886	0.37
12.00	5.38	9.02	0.12	-0.906	0.37
13.00	5.36	9.04	0.11	-0.947	0.37
14.00	5.33	9.07	0.10	-1.018	0.37
15.00	5.30	9.10	0.08	-1.102	0.37
20.00	5.22	9.18	0.03	-1.470	0.37
25.00	5.21	9.19	0.03	-1.549	0.37
30.00	5.20	9.20	0.02	-1.646	0.37

To = **4.90**

Hydraulic Conductivity:

77.94 (metres/year)
1.48E-04 (metres/min)
2.47E-06 (metres/sec)
2.47E-04 (cm/sec)


Bail Test Results
20232-B
Monitor Well No. MW99-20
1.00
0.10
0.01
(H-h)/(H-Ho)
0.00
5.00
10.00
15.00
20.00
25.00
30.00
35.00
Time (min)
Observations
To=t

Project and Piezometer ----> (This will form title for graph)

Bail Test Results
20232-B
Monitor Well No. MW01-40

Test Hole **MW01-40** **** All input parameters entered in metres**

Depth to water table before bail **1.400**

Depth to water table after bail **2.10**

Depth of test hole **3.60**

Radius of PVC **0.051**

Radius of Screen **0.051**

Length of Screen **3.60**

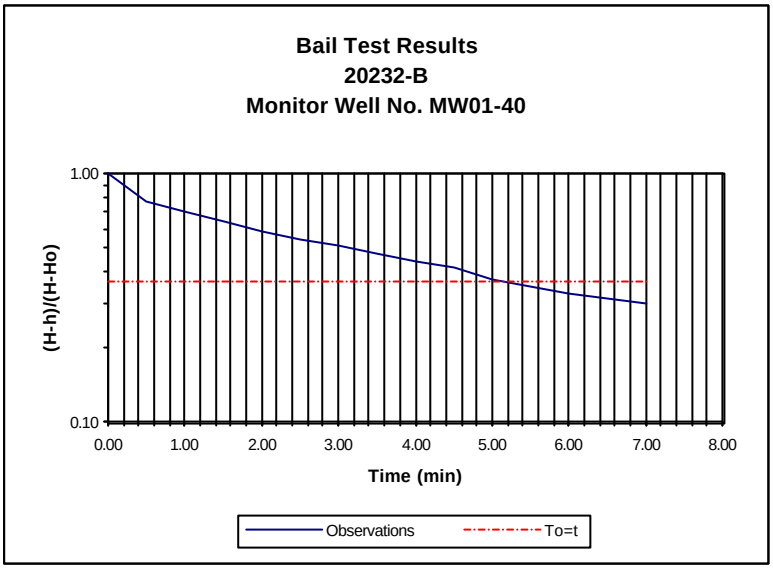
Length of Saturated Screen **2.20** (calculated)

Time (min)	Depth (metres)	Depth from datum	(H-h)/(H-Ho)	log(H-h)/(Ho-H)	Log=0.37
0.00	2.10	1.50	1.00	0.000	0.37
0.50	1.94	1.66	0.77	-0.113	0.37
1.00	1.89	1.71	0.70	-0.155	0.37
1.50	1.85	1.75	0.64	-0.192	0.37
2.00	1.81	1.79	0.59	-0.232	0.37
2.50	1.78	1.82	0.54	-0.265	0.37
3.00	1.76	1.84	0.51	-0.289	0.37
3.50	1.73	1.87	0.47	-0.327	0.37
4.00	1.71	1.89	0.44	-0.354	0.37
4.50	1.69	1.91	0.41	-0.383	0.37
5.00	1.66	1.94	0.37	-0.430	0.37
6.00	1.63	1.97	0.33	-0.483	0.37
7.00	1.61	1.99	0.30	-0.523	0.37

To = **5.00**

Hydraulic Conductivity:

232.33 (metres/year)
4.42E-04 (metres/min)
7.37E-06 (metres/sec)
7.37E-04 (cm/sec)


Bail Test Results
20232-B
Monitor Well No. MW01-40
1.00
0.10
(H-h)/(H-Ho)
0.00
1.00
2.00
3.00
4.00
5.00
6.00
7.00
8.00
Time (min)
Observations
To=t

Project and Piezometer ----> (This will form title for graph)

Bail Test Results
20232-B
Monitor Well No. MW01-41

Test Hole **MW01-41** **<u>** All input parameters entered in metres</u>**

Depth to water table before bail **4.600**

Depth to water table after bail **13.86**

Depth of test hole **25.00**

Radius of PVC **0.051**

Radius of Screen **0.051**

Length of Screen **3.00**

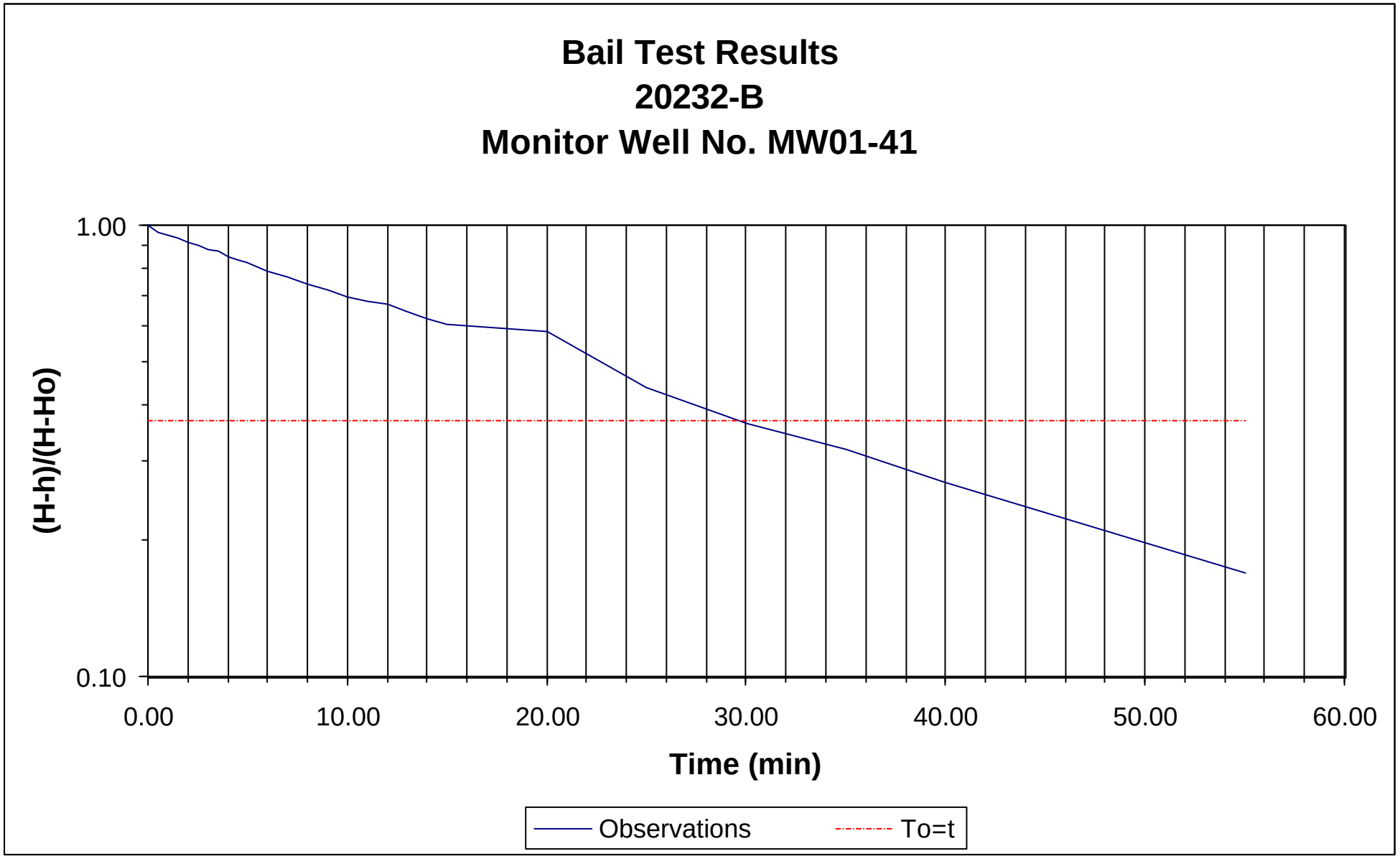
Length of Saturated Screen **3.00** (calculated)

Time (min)	Depth (metres)	Depth from datum	(H-h)/(H-Ho)	log(H-h)/(Ho-H)	Log=0.37
0.00	13.86	11.14	1.00	0.000	0.37
0.50	13.54	11.46	0.97	-0.015	0.37
1.00	13.38	11.62	0.95	-0.023	0.37
1.50	13.25	11.75	0.93	-0.030	0.37
2.00	13.11	11.89	0.92	-0.037	0.37
2.50	12.96	12.04	0.90	-0.044	0.37
3.00	12.80	12.20	0.89	-0.053	0.37
3.50	12.71	12.29	0.88	-0.058	0.37
4.00	12.50	12.50	0.85	-0.069	0.37
4.50	12.35	12.65	0.84	-0.077	0.37
5.00	12.25	12.75	0.83	-0.083	0.37
6.00	11.95	13.05	0.79	-0.100	0.37
7.00	11.70	13.30	0.77	-0.115	0.37
8.00	11.46	13.54	0.74	-0.130	0.37
9.00	11.24	13.76	0.72	-0.144	0.37
10.00	11.01	13.99	0.69	-0.160	0.37
11.00	10.89	14.11	0.68	-0.168	0.37
12.00	10.78	14.22	0.67	-0.176	0.37
13.00	10.58	14.42	0.65	-0.190	0.37
14.00	10.33	14.67	0.62	-0.208	0.37
15.00	10.20	14.80	0.60	-0.218	0.37
20.00	10.00	15.00	0.58	-0.234	0.37
25.00	8.65	16.35	0.44	-0.359	0.37
30.00	7.97	17.03	0.36	-0.439	0.37
35.00	7.56	17.44	0.32	-0.495	0.37
40.00	7.09	17.91	0.27	-0.570	0.37
55.00	6.17	18.83	0.17	-0.771	0.37

To = **28.00**

Hydraulic Conductivity:

32.93 (metres/year)
6.26E-05 (metres/min)
1.04E-06 (metres/sec)
1.04E-04 (cm/sec)


Bail Test Results
20232-B
Monitor Well No. MW01-41
1.00
0.10
(H-h)/(H-Ho)
0.00
10.00
20.00
30.00
40.00
50.00
60.00
Time (min)
Observations
To=t

APPENDIX A-H

LAND MANAGEMENT PLAN PROPOSAL

The Confederacy of Mainland Mi'kmaq

Member First Nation Bands
Afton • Annapolis Valley • Bear River • Horton • Millbrook • Pictou Landing

Main Office:
57 Martin Crescent, Millbrook Mi'kmaw Native Community
P.O. Box 1590 Truro, Nova Scotia Canada B2N 5V3
Tel (902) 895-6385 Fax (902) 893-1520

Sub-Offices: (Halifax)
Native Education Counselling Unit (902) 494-8863
Hospital Interpreters Liaison Program (902) 422-9120

Land Management Plan

Black Bull Resources Inc.

White Rock Mine

The Land Management Plan (LMP) for the White Rock Mine is being developed as part of the application for the surface lease and mining approvals granted by the Nova Scotia Department of Natural Resources. To satisfy this, the Confederacy of Mainland Mi'kmaq (CMM) proposes to develop the LMP and implement it in the coming months.

Further to our meeting on November 7, 2001, in which the conceptual plan and scope of the plan were discussed, it is CMM's understanding that because the proposed lease area has limited natural resources to manage that the LMP would focus on enhancing the existing environment and incorporate historical and other resources identified throughout various studies conducted for the preparation of the environmental registration document.

Specifically, CMM proposes to:

1. Enhance existing trails for walking and ATV use that are within the surface lease;
2. Decommission trails which are thought to be within the active mining area;
3. Construct/enhance footbridges for hiking and ATV use;
4. Focus on historical resources such as Aggie's and Porcupine Rock and other natural resources such as plant and animal species;
5. Prepare and install interpretive signage incorporating Mi'kmaq Knowledge, other stakeholder interests and Company initiatives;
6. Evaluate enhancement programs for plant species of significance identified by the management team and the public.

To accomplish this, CMM has developed the following action plan:

Phase I- Baseline Information Gathering. The LMP will focus on the existing trail system located within the lease area. To help identify candidate trials for enhancement, there is a requirement to locate the trials via GPS. Once all trails are identified and overlapped with the conceptual lease area, candidate trails can be identified for enhancement and decommissioning and also the need for and locations of new trail and stream crossings.

Phase II- Develop the LMP from the Phase I data;

Phase III- Implement the LMP.

Resources

Due to the fact that the development of the LMP is based on Phase I, it is difficult to determine the resource requirements to implement the LMP. The major issue is to determine if there is a need to create new trails and how many stream crossings will be required because this will affect budget requirements. At this initial stage, CMM suggests Phase I be completed so that a more accurate accounting of resources can be determined.

Michael Cox
Environmental Services

APPENDIX A-I

MUNICIPALITY OF ARGYLE – LETTER OF SUPPORT

[illegible]
[illegible]
[illegible]
[illegible]

January 8, 2002

Mr. John Keating
President & CEO
Black Bull Resources Inc.
548 Beatty Street
Vancouver, BC
V6B 2L3

COPY

Re: Council Support

Dear Mr. Keating:

In reference to our meeting with David Wood on December 17th, it is encouraging to know that your company is making progress with the development of the mining operation. Although there are mandatory permits and meetings to obtain approval of your project, the Council and residents of Argyle appreciate being kept informed of any developments. It is important to establish ongoing dialogue to ensure a good relationship between the community and your company.

Since your presentation to Council on March 13, 2001, we have continued to express an interest in your project. On behalf of Council, I would like to state that we fully support your mining operation and will assist your company to commence work in this new year.

Sincerely,

Aldric B. d'Entremont
Warden

Cc: Council

APPENDIX A-J

UPDATE LETTER – RR#1 RESIDENTS

BLACK BULL RESOURCES INC.

#303 Sun Tower
100 West Pender Street
Vancouver, British Columbia
Canada, V6B 1R8
Tel: 604-688-9500
Fax: 604-688-9550
E-mail: blackbullresources@telus.net

December 18, 2001

Residents of Rural Route #1
Shelburne, NS
Kemptville, NS

Dear Residents:

Re: Update on The Black Bull Resources White Rock Project

Over the past year and half, we have had the opportunity to meet with many of you. We thank you for your interest in our White Rock Quartz/Kaolin project. By way of this letter, we wanted to provide you with an update on the project.

In November 2001, the Minister of Environment and Labour advised Black Bull Resources that additional information was required to our earlier submitted environmental document. Black Bull is now obtaining the additional information, which includes data from water monitoring wells, and environmental effects on crown lands and the Tobeatic Wilderness Area. Logan Drilling Limited will drill holes in order to obtain some of the information. Drilling is expected to start mid-December 2001. The company anticipates that by mid January it will be able to provide all the additional information requested by the Minister of the Environment and Labour.

We would also like to invite you to an Open House to be held in Shelburne at the Fire Hall on January 10, 2002 from 2:00 pm until 8:00 pm. We welcome you to attend this meeting so we can learn of your views and suggestions. Please drop by at your convenience. For those of you that are unable to attend our Open House, we have enclosed a comment sheet for your convenience. We look forwared to hearing from you.

On a final note, we would like to take this opportunity to wish you and your families all the best during this Holiday Season and a safe and Happy New Year.

Yours truly,

BLACK BULL RESOURCES INC.

"David L. Wood"

David L. Wood
Director

APPENDIX A-K

NSDEL – MINISTER MORSE DECISION LETTER - NOVEMBER 2001

Department of
Environment & Labour
Office of the Minister

PO Box 697
Halifax, Nova Scotia
B3J 2T8

Our File Number
40100-50-07 (3700-40)

NOV 16 2001

Mr. John Keating, President
Back Bull Resources Inc
#303 Sun Tower, 100 West Pender St.,
Vancouver, British Columbia V6B 1R8

Dear Mr. Keating:

Re: Environmental Assessment - White Rock Mine

The environmental assessment of the proposed White Rock Mine near Flintstone Rock, Yarmouth County, Nova Scotia has been completed.

This letter is to advise that, pursuant to Section 13 (1)(a) of the *Environmental Assessment Regulations*, I have determined the registration information is insufficient to allow me to make a decision and that I require additional information.

Further information is required on any potential environmental effects to the Tobeatic Wilderness Areas, including but not limited to impacts from dust, noise, light, habitat alienation, water draw-down, and other edge-related effects and identify options and strategies to maximize impact avoidance, and where such impacts cannot be avoided, to identify appropriate mitigation and/or compensation. Further information is also required on activities at the proposed loading facilities and any potential environmental effects caused by the activities and proposed mitigation to address these effects.

This information shall be submitted by the Black Bull Resources Incorporated, at their convenience, as an addendum to the original registration information. Upon submission of this information, I will have up to 25 days to make a decision pursuant to Section 13(1) of the *Environmental Assessment Regulations*. Black Bull Resources Incorporated is also required to notify the public of the submitted addendum pursuant to Section 10 of the *Environmental Assessment Regulations*.

Black Bull Resources Incorporated shall not commence the undertaking or any part thereof until the undertaking has been approved under Part IV of the *Environment Act*.

If you have any questions, please contact the Manager, Environmental Review, Mr. Chris Daly at (902) 424-4936.

Yours truly,

David Morse

David Morse
Minister

Environmental Assessment for White Rock M[illegible] Extended
Environment and Labour
Nov. 16, 2001

Environment and Labour Minister David Morse announced today he requires more information on potential environmental impacts on the Tobeatic Wilderness Area, from the proposed White Rock Mine, before the assessment can be completed and a final decision made.

Black Bull Resources Inc. registered for an environmental assessment in October. The company is seeking approval to construct and operate a silica, kaolinite, and mica mine at Flintstone Rock, Yarmouth County.

Today's decision by Minister Morse means the company will have to submit an addendum to its original registration as part of the environmental assessment process. At the time of re-submission, the Minister will again have up to 25 days to make his decision. This time period includes an opportunity for the public to review the addendum and original registration, and to submit their comments on both. The documents will be available to the public online at www.gov.ns.ca/enla/esr/ea, and at the Shelburne Library, the Southwest Regional Development offices, the Ecology Action Centre office, the Glenn Nova Scotia office and the Yarmouth and Halifax offices of the Department of Environment and Labour.

The Minister is seeking information on the effects of dust, noise, water resource use and other potential impacts on the Tobeatic Wilderness Area. He also has requested further information on potential environmental effects caused by activities at the proposed port loading facilites for minerals.

There is no restriction on the time allowed for the company to submit the additional information.

FOR BROADCAST USE

Environment and Labour Minister David Morse announced today he requires more information on potential environmental impacts on the Tobeatic Wilderness Area, from the proposed White Rock Mine, before a final decision can be made.

Once the additional information is submitted by the company, the public will have an opportunity to review the information and submit comments. The company, Black Bull Resources Inc., is seeking approval to construct and operate a silica, kaolinite, and mica mine at Flintstone Rock, Yarmouth County.

-30-

Contact:
Valerie Bellefontaine
Environment and Labour
902-424-2575
bellefva@gov.ns.ca

APPENDIX A-L

DILLON CONSULTING
ERRATA SHEET FOR TERRESTRIAL AND AQUATIC HABITAT SURVEYS

January 21, 2002

DILLON CONSULTING

137
Chain Lake Drive
Suite 100
Halifax
Nova Scotia
Canada
B3S 1B3
Telephone
(902) 450-5002
Fax
(902) 450-2008

ISO 9001 Registered

MGI LIMITED
31 Gloster Court
Dartmouth, Nova Scotia
B3B 1X9

ATTENTION: Mr. Peter Oram, PGeo., Project Manager

Amendments to Biological Data Collection Report (Appendix E, In Environmental Registration Document White Rock Mine - October 2001)

Please note the following amendments:

Table 3 - The row for *Lasionycteris noctivagans*, should read:

Habitat column:	hibernation in trees in southern and central North America (furthest north is the southern New York state in the east). This species is known for Nova Scotia from a single report in Kejimkujik Park.
Potential in Study Area:	single record for Nova Scotia, low to no habitat potential

Appendix C: Electrofishing Spot Checks/Angling Summary Table, the row for E006 should read:

Captures column: Barclay Brook
- American eel (approximate total length 35 cm)
- 2 green frogs

Yours truly,

DILLON CONSULTING LIMITED

Karen L. March, M.Sc.
Project Manager

KLM:jep
Our File: 00-8392-0300

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