

Drinking-Water Systems Regulation O. Reg. 170/03

Part III Form 2

Section 11. ANNUAL REPORT.

Drinking-Water System Number:	WW No. 240000075
Drinking-Water System Name:	Vermilion Water Treatment Plant
Drinking-Water System Owner:	VALE
Drinking-Water System Category:	Municipal and Private Water Works
Period being reported:	January 1st, 2022 to December 31st 2022

Complete if your Category is Large Municipal Residential or Small Municipal Residential

Does your Drinking-Water System serve more than 10,000 people? Yes [☒] No [☐]

Is your annual report available to the public at no charge on a web site on the Internet?

Yes [☒] No [☐]

Location where Summary Report required under O. Reg. 170/03 Schedule 22 will be available for inspection.

Hardcopy Address:

VALE
18 Rink Street
c/o Water Plants
Copper Cliff, Ontario, P0M 1N0

Web Address:

www.greatersudbury.ca

Complete for all other Categories.

Number of Designated Facilities served:

0

Did you provide a copy of your annual report to all Designated Facilities you serve?

Yes [☐] No [☒]

Number of Interested Authorities you report to:

0

Did you provide a copy of your annual report to all Interested Authorities you report to for each Designated Facility?

Yes [☐] No [☒]

Note: For the following tables below, additional rows or columns may be added or an appendix may be attached to the report

The Vermilion Water Treatment Plant also supplies water to the plumbing works system that is owned and operated by VALE for use by its employees and its process. The Vermilion Water Treatment Plant as owned and operated by Vale has developed a comprehensive Drinking Water Quality Management System as required by legislation. QMS Policy Statement: "Vale is committed to providing safe drinking water to the City of Greater Sudbury municipal drinking water Vermilion distribution system, in accordance with all applicable legislative and regulatory requirements, as well as to the maintenance and continual improvement of a Quality Management System".

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List all Drinking-Water Systems (if any), which receive all their drinking water from your system:

Drinking Water System Name	Drinking Water System Number
Vermilion Distribution system	260006789

Did you provide a copy of your annual report to all Drinking-Water System owners that are connected to you and to whom you provide all its drinking water?

Yes [☒] No [☐]

Indicate how you notified system users that your annual report is available and is free of charge.

☒ Public access/notice via the web

www.greatersudbury.ca

☒ Public access/notice via a newspaper

☐ Public access/notice via Public Request

☐ Public access/notice via a Public Library

☒ Public access/notice via other method

VALE – Copper Cliff Supervisor's office – by appointment call (705) 682-6153

Describe your Drinking-Water System

In 1972, INCO Limited constructed the INCO Vermilion Water Treatment Plant, in order to produce process water for the INCO mining operations as well as potable drinking water for INCO staff and the surrounding communities. In 2007, INCO became CVRD INCO and a name change to Vale Inco was completed late in the year. As of 2010, now named VALE, VALE's Vermilion Water Treatment Plant is designed for a total production capacity of 81,800 m³/day (21.7M USGPD) and is supplied with surface water from the Vermilion River.

All process equipment is installed inside a heated and ventilated building, except for the caustic and alum storage tanks that are installed outside. The water treatment plant consists of the following main elements:

- One rapid mix tank;
- One hydraulic retention time tank;
- One PULSATUBE sludge blanket type clarifier;
- Five AQUAZUR V gravity sand filters;
- One clear-well located below the filters;
- Treated and backwash water vertical turbine pumping station;
- Air scouring blower and air instrument compressor room;
- Chemical storage and dosing system;
- External heat traced caustic and alum storage tanks;
- Liquefied Chlorine (tonners) stored and used in Chlorination room;
- Plant control room and laboratory room.

Process Flow Description

1. Raw water is pumped from the Vermilion River to the VALE Vermilion WTP.
2. Raw water flow control is achieved with a by-pass pipe and control valve. The by-pass control valve automatically adjusts based on the water level in the clarifier. When the level in the clarifier rises, the by-pass flow control valve opens to decrease the flow to the plant. The by-pass is connected to the U-drain of the WTP.

List all water treatment chemicals used over this reporting period

- Aluminum Sulfate
- Sodium Hydroxide
- Liquefied Chlorine
- Hydro-fluosilicic Acid
- Polyfloc CP1160 35%
- Polyphosphate (Flogard POT6102)

Were any significant expenses incurred to?

Vale has also complied with the requirement for DWQMS and has received full scope accreditation from SAI- Global on behalf of the MECP. Vale has completed all internal and external audit cycles with action taken on findings accordingly.

- ☒ [X] Install required equipment
- ☒ [X] Repair required equipment
- ☒ [X] Replace required equipment

Please provide a brief description and breakdown of monetary expenses incurred

- Chlorine Scrubber update
- HFS system updates. Two new bulk tank and Day Tank
- New HVAC system for the chlorine tonner room
- Repaired broken air release on raw water line
- Rebuilt 4 chlorinators
- Replace one air vacuum pump
- Caustic Tank inspection and repairs
- NDE on all chemical tanks
- Clearwell inspection
- Wall hydrant valve repair
- Added WIFI connectivity and cell booster stations through the plant
- Engineering study for 5 MG tank
- Engineering study for switchroom upgrades
- Engineering study for Raw Water Line upgrades
- Engineering study for new compressors
- Engineering study for DCS replacement (Foxboro)

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Provide details on the notices submitted in accordance with subsection 18(1) of the Safe Drinking-Water Act or section 16-4 of Schedule 16 of O.Reg.170/03 and reported to Spills Action Centre:

Incident Date	Parameter	Result	Unit of Measure	Corrective Action	Corrective Action Date
No Notices / No Reports in 2022					

Microbiological testing done under the Schedule 10, 11 or 12 of Regulation 170/03, during this reporting period.

	Number of Samples	Range of E.Coli or Fecal Results (min #)-(max #)	Range of Total Coliform Results (min #)-(max #)	Number of HPC Samples	Range of HPC Results (min #)-(max #)
Raw	52	1- (NDOGT)	10 - (NDOGT)	N/A	N/A
Treated	52	0	0	52	<10 - 210
Plumbing Works	104	0	0	104	<10 - 20
N/A=Not Applicable			NDOGT= Overgrowth		

Operational testing done under Schedule 7, 8 or 9 of Regulation 170/03 during the period covered by this Annual Report.

FINISHED WATER ANALYSIS				
OPERATOR BENCH ANALYSIS			CONTINUOUS MONITORS	
	Number of Grab Samples	Range of Results (min #)-(max #)	Number of Samples As Per Note Below	Range of Results (min #)-(max #)
Turbidity	727	(0.010)-(0.900) NTU	8760	(0.00) NTU - (1.02) NTU
Chlorine	2061	(1.79)-(2.58) mg/L Free	8760	(0.00) - (3.27) mg/L Free
Fluoride (If the DWS provides fluoridation)	349	(0.10)-(0.86) mg/L	8760	(0.00) – (2.00) mg/L
			NOTE: For continuous monitors use 8760 as the number of samples. **Ranges min & max due to calibrations and equipment servicing captured on trending**	

NOTE: Record the unit of measure if it is *not* milligrams per litre

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Summary of additional testing and sampling carried out in accordance with the requirement of an approval, order or other legal instrument.

Date of legal instrument issued	Parameter	2022 Date Sampled	Result	Unit of Measure
Municipal Drinking Water License # 191-101 Issue # 3 Schedule C, Section 1.5 & 5.0, issued February 23, 2021	TSS Raw Water Grab Sample U-Drain flow to Environment	Jan 4	1.00	Raw Water Grab mg/L
		Feb 1	<0.67	Raw Water Grab mg/L
		Mar 1	1.00	Raw Water Grab mg/L
		Apr 4	2.70	Raw Water Grab mg/L
		May 3	<0.67	Raw Water Grab mg/L
		June 21	2.70	Raw Water Grab mg/L
		July 5	1.30	Raw Water Grab mg/L
		Aug 2	<0.67	Raw Water Grab mg/L
		Sept 9	1.70	Raw Water Grab mg/L
		Oct 4	<0.67	Raw Water Grab mg/L
		Nov 1	<0.67	Raw Water Grab mg/L
		Dec 6	<0.67	Raw Water Grab mg/L
	TSS Composite Sample U-Drain flow to Environment	Jan 5	4.30	Comp U-Drain mg/L
		Apr 4	<0.67	Comp U-Drain mg/L
		July 5	1.30	Comp U-Drain mg/L
		Oct 4	1.00	Comp U-Drain mg/L
	Total Chlorine Residual U-Drain flow to Environment	Jan 4	0.03	U-Drain Total Chlorine mg/L
		Feb 1	0.00	U-Drain Total Chlorine mg/L
		Mar 1	0.03	U-Drain Total Chlorine mg/L
		Apr 4	0.02	U-Drain Total Chlorine mg/L
		May 3	0.02	U-Drain Total Chlorine mg/L
		June 7	0.04	U-Drain Total Chlorine mg/L
		July 5	0.05	U-Drain Total Chlorine mg/L
		Aug 2	0.04	U-Drain Total Chlorine mg/L
		Sept 6	0.01	U-Drain Total Chlorine mg/L
		Oct 4	0.04	U-Drain Total Chlorine mg/L
		Nov 1	0.01	U-Drain Total Chlorine mg/L
		Dec 6	0.07	U-Drain Total Chlorine mg/L

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Summary of Inorganic parameters tested during this reporting period or the most recent sample results

Parameter	Unit of Measure	MDL Method Detection Limit	Result Value Year 2022		Exceedance
Antimony	ug/L	0.5	<0.05 <MDL	January 6	<i>Nil</i>
Arsenic	ug/L	1.0	<1.0 <MDL	January 6	<i>Nil</i>
Barium	ug/L	1.0	11.0	January 6	<i>Nil</i>
Boron	ug/L	2.0	3.0	January 6	<i>Nil</i>
Cadmium	ug/L	0.10	<0.1 <MDL	January 6	<i>Nil</i>
Chromium	ug/L	1.0	< 1.0 <MDL	January 6	<i>Nil</i>
Mercury	ug/L	0.1	<0.1 <MDL	January 6	<i>Nil</i>
Selenium	ug/L	0.2	0.3	January 6	<i>Nil</i>
Uranium	ug/L	1.0	< 1.0 <MDL	January 6	<i>Nil</i>
Fluoride	mg/L	0.05	0.37	January 6	<i>Nil</i>
Lead	ug/L	0.1	< 0.1 <MDL	January 6	<i>Nil</i>
Sodium	mg/L	0.10	15.5	January 24, 2020	<i>Nil</i>

Parameter	Unit of Measure	Result Value Year 2022				Exceedance
		Jan 6	Apr 5	Jul 5	Oct 4	
Nitrate	mg/L	0.15	0.20	0.15	<0.05	<i>Nil</i>
Nitrite	mg/L	<0.05	<0.05	<0.05	<0.05	<i>Nil</i>
THM	ug/L	31.4	33.2	95.1	45.5	Latest annual average 51.1 <i>½ mac</i>
Haloacetic Acids	ug/L	48	22	71	51	Latest annual average 48 <i>½ mac</i>

Summary of Organic parameters sampled during this reporting period or the most recent sample results

Parameter	Result Value	Unit of Measure	Exceedance
	Jan 6, 2022		
Alachlor	<0.238 <MDL	ug/L	Nil
Atrazine + N-dealkylated metabolites	<0.238 <MDL	ug/L	Nil
Azinphos-methyl	<0.179 <MDL	ug/L	Nil
Benzene	<0.1 <MDL	ug/L	Nil
Benzo(a)pyrene	<0.009 <MDL	ug/L	Nil
Bromoxynil	<0.102 <MDL	ug/L	Nil
Carbaryl	<3.0 <MDL	ug/L	Nil
Carbofuran	<5.0 <MDL	ug/L	Nil
Carbon Tetrachloride	<0.20 <MDL	ug/L	Nil
Chlorpyrifos	<0.179 <MDL	ug/L	Nil
Diazinon	<0.179 <MDL	ug/L	Nil
Dicamba	<0.0891 <MDL	ug/L	Nil
1,2-Dichlorobenzene	<0.30 <MDL	ug/L	Nil
1,4-Dichlorobenzene	<0.30 <MDL	ug/L	Nil
1,2-Dichloroethane	<0.30 <MDL	ug/L	Nil
1,1-Dichloroethylene (vinylidene chloride)	<0.3 <MDL	ug/L	Nil
Dichloromethane	<1.0 <MDL	ug/L	Nil
2,4-Dichlorophenol	<0.2 <MDL	ug/L	Nil
2,4-Dichlorophenoxy acetic acid (2,4-D)	<0.382 <MDL	ug/L	Nil
Diclofop-methyl	<0.127 <MDL	ug/L	Nil
Dimethoate	<0.179 <MDL	ug/L	Nil
Diquat	<0.2 <MDL	ug/L	Nil
Diuron	<10.0 <MDL	ug/L	Nil
Glyphosate	<20.0 <MDL	ug/L	Nil
Malathion	<0.179 <MDL	ug/L	Nil
2-Methyl-4-chlorophenoxyacetic acid	<6.36 <MDL	ug/L	Nil
Metolachlor	<0.119 <MDL	ug/L	Nil
Metribuzin	<0.119 <MDL	ug/L	Nil
Monochlorobenzene	<0.5 <MDL	ug/L	Nil
Paraquat	<0.10 <MDL	ug/L	Nil
Pentachlorophenol	<0.3 <MDL	ug/L	Nil
Phorate	<0.119 <MDL	ug/L	Nil
Picloram	<0.0891 <MDL	ug/L	Nil
Polychlorinated Biphenyls(PCB)	<0.06 <MDL	mg/L	Nil
Prometryne	<0.0596 <MDL	ug/L	Nil
Simazine	<0.179 <MDL	ug/L	Nil
Terbufos	<0.119 <MDL	ug/L	Nil
Tetrachloroethylene	<0.30 <MDL	ug/L	Nil
2,3,4,6-Tetrachlorophenol	<0.30 <MDL	ug/L	Nil
Triallate	<0.119 <MDL	ug/L	Nil
Trichloroethylene	<0.20 <MDL	ug/L	Nil
2,4,6-Trichlorophenol	<0.20 <MDL	ug/L	Nil
Trifluralin	<0.119 <MDL	ug/L	Nil
Vinyl Chloride	<0.10 <MDL	ug/L	Nil

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MDL = *Method Detection Limit*

List any Inorganic or Organic parameter(s) that exceeded half the standard prescribed in Schedule 2 of Ontario Drinking Water Quality Standards.

Parameter	Result Value	Unit of Measure	Date of Sample
THM Annual Average	51.1	ug/L	Annual Average
Haloacetic Acids Annual Average	48	ug/L	Annual Average

(Only if DWS category is large municipal residential, small municipal residential, large municipal non-residential, non-municipal year round residential, large non municipal non residential)