



GOVERNMENT OF
NEWFOUNDLAND AND LABRADOR
Department of Environment and Conservation

CERTIFICATE OF APPROVAL

Pursuant to the Environmental Protection Act, SNL 2002 c E-14.2 Section 83

Issue Date: *December 31, 2013*

Approval No. AA13-125585A

Amendment Date: *July 4, 2016*

Expiration: *December 31, 2018*

File No. 731.550

Proponent: **Vale Newfoundland & Labrador Limited**
Suite 700, Baine Johnston Centre
10 Fort William Place
St. John's, NL Canada A1C 1K4

Attention: **Mr. Perry Blanchard : Manager – Safety Health and Environment**

Re: **Voisey's Bay Mine/Mill Project Site**

Approval is hereby given for the operation of: an open pit mine; ore crusher; concentrator; effluent treatment system; tailings management facility; explosives manufacturing plant; and port unloading, storage and reclaim facilities and the construction of the following components of the Voisey's Bay Mine Expansion Project: temporary accommodation facilities, temporary construction warehouse, temporary construction and mining laydown areas, temporary underground mine maintenance shop, mine access portals, sewage treatment plant, potable water plant, and associated clearing and grubbing of the project areas including the incinerator area, stockpiling of organic and overburden material, construction of drainage structures, service roads, and surface-run and buried utilities and power lines to connect to existing services as required at the Voisey's Bay Project Site in Labrador.

This Certificate of Approval does not release the proponent from the obligation to obtain appropriate approvals from other concerned provincial, federal and municipal agencies. Nothing in this Certificate of Approval negates any regulatory requirement placed on the proponent. Where there is a conflict between conditions in this Certificate of Approval and a regulation, the condition in the regulation shall take precedence. Approval from the Department of Environment and Conservation shall be obtained prior to any significant change in the design, construction, installation, or operation of the Voisey's Bay Project Site, including any future expansion of the Voisey's Bay Mine/Mill. This Certificate of Approval shall not be sold, assigned, transferred, leased, mortgaged, sublet or otherwise alienated by the proponent without obtaining prior approval from the Minister.

This Certificate of Approval is subject to the terms and conditions as contained therein, as may be revised from time to time by the Department. Failure to comply with any of the terms and conditions may render this Certificate of Approval null and void, may require the proponent to cease all activities associated with this Certificate of Approval, may place the proponent and its agent(s) in violation of the *Environmental Protection Act*, and will make the proponent responsible for taking such remedial measures as may be prescribed by the Department. The Department reserves the right to add, delete or modify conditions to correct errors in the Certificate of Approval or to address significant environmental or health concerns.

For


MINISTER

TERMS AND CONDITIONS FOR APPROVAL No. AA13-125585A

July 4, 2016

General

1. This Certificate of Approval is for the operation of: an open pit mine; ore crusher; concentrator; effluent treatment system; tailings management facility; explosives manufacturing plant; and port unloading, storage and reclaim facilities and the construction of the following components related to the Voisey's Bay Mine Expansion: temporary accommodation facilities, temporary construction warehouse, temporary construction and mining laydown areas, temporary underground mine maintenance shop, mine access portals, sewage treatment plant, potable water plant, and associated clearing and grubbing of the project areas including the incinerator area, stockpiling of organic and overburden material, construction of drainage structures, service roads, and surface-run and buried utilities and power lines to connect to existing services as required at the Voisey's Bay Project Site as per plans and specifications supplied by Vale Newfoundland & Labrador Limited for this Certificate of Approval. Extensive future expansion or change of activities will require a separate Certificate of Approval.
2. This Approval does not include other components of the Voisey's Bay Mine Expansion including: construction of the concrete/shotcrete batch plant, paste backfill plant, surface ventilation facilities, concentrator facility modifications, new incinerator, power house and boiler room expansion, or mine service water treatment plant.
3. Certificate of Approval AA13-125585 is revoked and replaced by this Certificate of Approval.
4. Any inquiries concerning this approval shall be directed to the St. John's office of the Pollution Prevention Division (telephone: (709) 729-2556; or facsimile: (709) 729-6969).
5. In this Certificate of Approval:
 - **accredited** means the formal recognition of the competence of a laboratory to carry out specific functions;
 - **acutely lethal** means that the effluent at 100% concentration kills more than 50% of the rainbow trout subjected to it during a 96-hour period, when tested in accordance with the ALT;
 - **air contaminant** means any discharge, release, or other propagation into the air and includes, but is not limited to, dust, fumes, mist, smoke, particulate matter, vapours, gases, odours, odorous substances, acids, soot, grime or any combination of them;

- **ALT (acute lethality test)** means a test conducted as per Environment Canada's Environmental Protection Service reference method EPS/1/RM-13 Section 5 or 6;
- **composite sample** means a quantity of undiluted effluent collected continually at an equal rate or at a rate proportionate to flow over a designated sampling period;
- **Department** means the Department of Environment and Conservation and its successors;
- **Director** means the Director of the Pollution Prevention Division of the Department;
- **discharge criteria** means the maximum allowable levels for the parameters listed in *Table 3*;
- **grab sample** means a quantity of undiluted sample collected at any given time;
- **hazardous waste** means a product, substance or organism that is intended for disposal or recycling, including storage prior to disposal or recycling, and that:
 - (a) is listed in Schedule III of the *Export and Import of Hazardous Waste Regulations under the Canadian Environmental Protection Act, 1999*;
 - (b) is included in any of Classes 2 to 6, and 8 and 9 of the *Transportation of Dangerous Goods Regulations under the Transportation of Dangerous Goods Act, 1992*; or
 - (c) exhibits a hazard classification of a gas, a flammable liquid, an oxidizer, or a substance that is dangerously reactive, toxic, infectious, corrosive or environmentally hazardous;
- **licensed** means has a Certificate of Approval issued by the Minister to conduct an activity;
- **malfunction** means any sudden, infrequent and not reasonably preventable failure of air pollution control equipment, effluent treatment equipment, process equipment, or a process to operate in a normal or usual manner. Failures caused in part by poor maintenance or careless operation are not malfunctions;
- **Minister** means the Minister of the Department;
- **NO_x** means oxides of nitrogen;
- **PM_{2.5}** means particulate matter with a diameter of 2.5 µm or less;
- **proficiency testing** means the use of inter-laboratory comparisons to determine the performance of individual laboratories for specific tests or measurements;

- **QA/QC** means Quality Assurance/Quality Control;
- **rainbow trout test** means a test conducted as per Environment Canada's Environmental Protection Service reference method EPS/1/RM-13 Section 5 or 6;
- **register(ed)**, in the context of storage tanks, means that information regarding the storage tank system has been submitted to a Service NL office and a registration number has been assigned to the storage tank system. In the context of dispersion modelling, registered means submitted to and approved by the Department in accordance with departmental policy and guidelines;
- **regulated substance** means a substance subject to discharge limit(s) under the *Environmental Control Water and Sewage Regulations, 2003*;
- **SOP** means Standard Operating Procedure;
- **spill or spillage** means a loss of gasoline or associated product in excess of 70 litres from a storage tank system, pipeline, tank vessel or vehicle, or an uncontrolled release of any volume of a regulated substance onto or into soil or a body of water;
- **stack** means a chimney, flue, conduit or duct arranged to conduct an air contaminant into the environment;
- **storage tank system** means a tank and all vent, fill and withdrawal piping associated with it installed in a fixed location and includes a temporary arrangement;
- **TDS** means total dissolved solids;
- **toxic pass** means a fish mortality rate of no more than 50% during the acute lethality test (ALT);
- **TPH** means total petroleum hydrocarbons, as measured by the Atlantic PIRI method;
- **TPM** means total means total particulate matter;
- **TSS** means total suspended solids;
- **used lubricating oil** means lubricating oil that as a result of its use, storage or handling, is altered so that it is no longer suitable for its intended purpose but is suitable for refining or other permitted uses;
- **used oil** means a used lubricating oil or waste oil;
- **Vale** means Vale Newfoundland & Labrador Limited; and
- **waste oil** means an oil that as a result of contamination by any means or by its use, is altered so that it is no longer suitable for its intended purpose.

6. All necessary measures shall be taken to ensure compliance with all applicable acts, regulations, policies and guidelines, including the following, or their successors:
- *Environmental Protection Act;*
 - *Water Resources Act;*
 - *Air Pollution Control Regulations, 2004;*
 - *Environmental Control Water and Sewage Regulations, 2003;*
 - *Halocarbon Regulations;*
 - *Storage and Handling of Gasoline and Associated Products Regulations, 2003;*
 - *Used Oil Control Regulations;*
 - *Heating Oil Storage Tank System Regulations, 2003;*
 - *Voisey's Bay Nickel Company Limited Mine and Mill Undertaking Order;*
 - *Ambient Air Monitoring Guidance Document;*
 - *Sampling of Water and Wastewater - Industrial Effluent Applications Guidance Document;*
 - *Accredited Laboratory Policy;*
 - *Compliance Determination Guidance Document;*
 - *Stack Emission Testing Guidance Document;*
 - *Plume Dispersion Modelling Guidance Document;*
 - *Precipitation Drainage of Dyke Areas Guidance Document;* and
 - *Environmental Guidelines for Controlling Emissions of Volatile Organic Compounds from Above Ground Storage Tanks.*

This Approval provides terms and conditions to satisfy various requirements of the above listed acts, regulations, Departmental policies and guidelines. If it appears that all of the pertinent requirements of these acts, regulations, policies and guidelines are not being met, then a further review of the works shall be conducted, and suitable pollution control measures may be required by the Minister.

7. All reasonable efforts shall be taken to minimize the impact of the operation on the environment. Such efforts include minimizing the area disturbed by the operation, minimizing air or water pollution, finding alternative uses, acceptable to the Director, for waste or rejected materials, removing equipment or structures when they no longer have further use, and considering the requirement for the eventual rehabilitation of disturbed areas when planning the development of any area on the facility property.
8. Vale shall provide to the Department, within a reasonable time, any information, records, reports or access to data requested or specified by the Department.
9. Vale shall keep all records or other documents required by this Approval at the Voisey's Bay Project Site location for a period of not less than three (3) years, beginning the day they were made. These records shall be made available for review by officials of the Department or Service NL when requested.

10. Should Vale wish to deviate in any way from the terms and conditions of this Certificate of Approval, a written request detailing the proposed deviation shall be made to the Minister. Vale shall comply with the most current terms and conditions until the Minister has authorized otherwise. In the case of meeting a deadline requirement, the request shall be made at least 60 days ahead of the applicable date as specified in this Approval or elsewhere by the Department.

Construction

11. Any work that must be performed in a body of water below the high water mark shall be carried out during a period of low water levels, unless otherwise permitted in writing by the Department.
12. All construction operations shall be carried out in a manner that minimizes damage to land, vegetation, and watercourses, and which prevents pollution of bodies of water in excess of applicable regulatory limits.
13. The use of heavy equipment shall be confined to dry stable areas and shall not be carried out in streams or bodies of water, unless otherwise permitted in writing by the Department.
14. All vehicles and equipment shall be in good repair, and shall be free of leaks of oil or other harmful substances that could impair water quality.
15. During the construction of concrete components, formwork shall be properly constructed to prevent any fresh concrete from entering a body of water. Dumping of concrete or washing of tools and equipment in any body of water is prohibited.
16. Waste hardened concrete shall not be disposed as unsuitable material at the project site. Waste hardened concrete shall be put to beneficial use on site as fill material, or it shall be sent to an approved waste disposal site.
17. All areas affected by this project shall be restored to a state that resembles local natural conditions. Further remedial measures to mitigate environmental impacts on water resources can and will be specified, if necessary in the opinion of this Department.
18. Prior written permission is required from the Department for all work that takes place in a body of water, including but not limited to bridges, culverts, fording, stream modifications, infilling and dredging.

Environmental Protection Plan

19. Vale shall implement the most recent version of the Voisey's Bay Environmental Protection Plan. This plan shall be reviewed annually and revised as necessary, accounting for expanding or alteration of activities. All proposed revisions shall be submitted to the Director for review. The Department will acknowledge receipt of the Plan and/or revisions, and shall provide any review comments within a reasonable time frame.

Waste Management Plan

20. Vale shall implement the most recent version of the Voisey's Bay Waste Management Plan. Every year the Plan shall be reviewed and revised as necessary, accounting for expansion or alteration of activities. All proposed revisions shall be submitted to the Director for review. The Department will acknowledge receipt of the Plan and/or revisions, and shall provide any review comments within a reasonable time frame.

Emergency Response Plan

21. Vale shall implement the most recent version of the Voisey's Bay Emergency Response Plan. This Plan describes the actions to be taken in the event of a spill of a toxic or hazardous material. Copies of the plan shall be placed in convenient areas throughout the facility so that employees can easily refer to it when needed. Vale shall ensure that all employees are aware of the plan and understand the procedures and the reporting protocol to be followed in the event of an emergency. An annual response exercise is recommended for response personnel. Every year, as a minimum, the plan shall be reviewed and revised as necessary. Any proposed significant revisions shall be submitted to the Director for review. Changes which are not considered significant include minor variations in equipment or personnel characteristics which do not effect implementation of the plan.
22. Every time Vale implements the plan, information shall be recorded for future reference. This will assist in reviewing and updating the plan. The record is to consist of all incidents with environmental implications, and include such details as: date; time of day; type of incident (i.e. liquid spill, gas leak, granular chemical spill, equipment malfunction, etc.); actions taken; problems encountered; and other relevant information that would aid in later review of the plan performance. Each incident report shall be submitted to the Director as per the **Reporting** section.

Rehabilitation and Closure Plan

23. The Voisey's Bay Rehabilitation and Closure Plan shall be reviewed annually by Vale and revised as necessary. All proposed revisions to the plan shall be submitted to the Director for review.

Noise

24. Efforts shall be made to minimize and control noise resulting from the Voisey's Bay Project Site's operations and maintenance activities. All vehicles hauling materials within the facility shall have exhaust and muffling devices in good working order.

Open Burning

25. Materials listed in **Table 1** shall not be burned in open fires.
26. Materials not listed in **Table 1** may be burned on site only with the approval of the Department.

Table 1 – Material Not Approved for Open Burning	
tires	manure
plastics	rubber
treated lumber	tar paper
asphalt and asphalt products	railway ties
drywall	paint and paint products
demolition waste	fuel and lubricant containers
hazardous waste	used oil
biomedical waste	animal cadavers
domestic waste	hazardous substances
trash, garbage, or other waste from commercial, industrial or municipal operations	materials disposed of as part of the removal or decontamination of equipment, buildings or other structures

Dust Suppression

27. Vale shall control dusting resulting from construction and operational activities at the site. Use of dust suppressants other than water or calcium chloride shall require approval of the Director. Vale is encouraged to use best management practices when applying calcium chloride or any other approved dust suppressant.

Pollution Control Equipment

28. All pollution control equipment shall be maintained and operated as per the manufacturer’s specifications for best performance.
29. All oil/water separators shall be checked routinely to ensure that they are working properly. A log of these checks shall be maintained.

Spill Prevention and Containment

30. All on site storage of petroleum shall comply with the *Storage and Handling of Gasoline and Associated Products Regulations, 2003*, or its successor. Storage tank systems shall be registered with Service NL. All aboveground storage tanks shall be clearly and visibly labelled with their GAP registration numbers.
31. Areas in which chemicals are used or stored shall have impermeable floors and dykes or curbs and shall not have a floor drain system, nor shall it discharge to the environment. Areas inside the dykes or curbs shall have an effective secondary containment capacity of at least **110%** of the chemical storage tank capacity, in the case of a single storage container. If there is more than one storage container, the

dyked area shall be able to retain no less than **110% of the capacity of the largest container or 100 % of the capacity of the largest container plus 10% of the aggregate capacity of all additional containers, whichever is greater**. These dyked areas shall be kept clear of material that may compromise the capacity of the dyke system. Once a year, the dykes shall be visually inspected for their liquid containing integrity, and repairs shall be made when required. Once every ten years, the dykes shall be inspected, by a means other than visual inspection, for their liquid containing integrity, and repairs shall be made when required.

32. Where applicable, all tanks and fuel delivery systems shall be inspected to appropriate American Petroleum Institute or Underwriters' Laboratories of Canada standards, or any other standards acceptable to this Department. The required frequency of inspections may be changed at the discretion of the Director.
33. Vale shall maintain an inventory of all petroleum and chemical storage tanks. This inventory shall include a plan showing location, registration number (where applicable), identification number, material stored, capacity, annual throughput, tank material, tank type, tank diameter, tank height, tank colour, roof type, year of manufacture, date of installation, date of last inspection, failure history, maintenance history, dyke capacity and date of next planned inspection. Every two (2) years, an update of any significant changes to the inventory shall be submitted to the Director.
34. Refuelling and maintenance of vehicles and equipment shall, whenever possible, be undertaken on a prepared impermeable surface with an oil containment or collection system. When this is not possible, due care shall be taken to prevent spillage on the ground and to the surrounding environment, particularly streams and other water bodies. The *Emergency Response Plan* shall detail the specific response actions in the event of a spill from refuelling or maintenance activities.

Ore and Concentrate Storage, Handling and Transport

35. Spills of ore and concentrate shall be promptly cleaned up. Spilled ore and concentrate shall be returned to an operationally acceptable stage of the process.
36. All concentrate haul trucks shall have concentrate loads fully enclosed while transferring concentrate from the concentrator loadout facility at the Mine/Mill to the concentrate receiving station at the Port Unloading, Storage and Reclaim Facility.
37. Concentrate deposits on the exterior surfaces of the concentrate carrier trucks and dedicated concentrate handling equipment shall be removed before the equipment leaves the concentrate load-out area. Concentrate carrier wash water shall report to the truck wash settling pit and recycle to the truck wash module following settling and filtration.
38. Concentrate-contaminated equipment at the Port Unloading, Storage and Reclaim Facility shall be cleaned in the washdown annex before leaving the concentrate storage facility. All wash water used at the washdown annex shall be collected and retained within the washdown annex with no discharge permitted to the environment.
39. Concentrate deposits on exterior surfaces of mobile equipment used in ship loading shall be removed before the equipment is hoisted from the ship.

40. Collected sediment from the truck wash and the washdown annex systems shall be removed from the settling chambers as necessary and returned to the process or discharged to the tailings management area.
41. Run of mine ore shall not be permitted to be stored on the ROM ore storage pad area west of the primary crusher unless the ROM pad liner is extended eastward to the foundation of the primary crusher building, or replaced with a new liner that reaches the foundation of the primary crusher building.
42. The primary crusher shall not be operated without the primary crusher dust collector being operational. Limited periods of dust collector downtime associated with routine dust collector maintenance activities are acceptable. Collected dust shall report to the crushed ore stockpile conveyor.
43. Storage of crushed ore shall be limited to the coarse ore storage building. However, in order to allow the mill to sustain ore feed when the gyratory crusher is unavailable the use of a temporary ore transfer pad is acceptable. Implementation of the temporary ore transfer pad shall adhere to the terms and conditions as specified in the *Labrador Operations Alternative Ore Supply to the Coarse Ore Storage Facility Procedure* (SOP-M31, February 16, 2016) (i.e. notification of the Department prior to its use, maximum tonnage of ore to be stored and restoration of the ore pad area after its use).
44. The port unloading, storage and reclaim facilities shall be used to store and load copper and nickel concentrates that are to be transported from site. Concentrate shall be conveyed from the concentrate storage building via the conveyors to the ship loader. Vale shall employ and maintain measures (i.e. filters, mechanical dust collector, collection stacks, fully enclosed shiploader) to contain fugitive dust emissions and concentrate spillage during loading and unloading operations.

Used Oil

45. Used oil shall be retained in an approved tank or closed container, and disposed of by a company licensed for handling and disposal of used oil products.

Site Water Management

46. Mine inflows to the Open Pit from direct precipitation, pit wall runoff, groundwater seepage, and surface runoff from the mine access portals shall be collected in the pit sump and pumped to the mill, from where they shall be sent to Headwater Pond.
47. The Plant Site Sedimentation Pond shall collect surface runoff from the plant site area. Cell A shall provide storage and sediment control for surface runoff from the south side of the plant site including the northern part of the temporary accommodations construction area. Cell B shall provide storage and sediment control for surface runoff from the northern portion of the plant site including the new sewage treatment plant construction area. Runoff collected shall be pumped to the mill and sent to Headwater Pond.

48. The North Sedimentation Pond provides storage and sediment control for surface runoff from the Clean Rock Dump drainage area, the temporary underground mine maintenance shop area and the new temporary construction laydown area. Runoff accumulated in the North Sedimentation Pond shall be pumped to the Plant Site Sedimentation Ponds.
49. The South Sedimentation Pond shall be utilized to temporarily store runoff from the overburden and topsoil stockpile areas. Runoff collected shall be sent to the North Sedimentation Pond or directly to the mill.
50. The Port Site Sedimentation Pond shall be utilized to provide storage and sedimentation control for runoff and snowmelt from the port site prior to discharge into Anaktalak Bay.
51. The Mine Water Surge Pond shall be utilized for surge capacity by providing storage of inflows from other single lined or unlined site sedimentation ponds. The Mine Water Surge Pond shall not be used to collect mine inflows without prior written approval from the Director.
52. The geomembrane liner systems associated with Mine Water Surge Pond, Plant Site Sedimentation Pond, North Sedimentation Pond and Port Site Sedimentation Pond shall be periodically evaluated for leakage using methodology acceptable to and approved by the Director. The results of the leak detection survey shall be recorded and kept on file for review upon request by officials of the Department of Environment and Conservation or Service NL. The occurrence of any adverse event that impacts the integrity of the liners shall require immediate repair and testing of any damaged or leaking areas of the liner. Vale shall immediately notify the Department of any issues.
53. All external berms for the Mine Water Surge Pond, Plant Site Sedimentation Pond, North Sedimentation Pond, South Sedimentation Pond and Port Site Sedimentation Pond shall be visually inspected for signs of leakage or erosion that might affect the integrity of the structures. The visual inspections shall be conducted at least *monthly*, and the date and results of each inspection shall be recorded and kept on file for review upon request by officials of the Department of Environment and Conservation or Service NL.
54. Once per day the flow conditions at the discharge of the Port Site Sedimentation Pond shall be assessed and, if there is flow from the overflow pipe, the flow rate shall be estimated and recorded. During periods when there is no flow across the discharge weir the flow shall be noted as zero. Monthly total flow volume shall be submitted as per the *Reporting* section.

Tailings and Effluent Management

55. Headwater Pond is a tailings impoundment area for storage of tailings generated from the milling of Voisey's Bay ore. Headwater Pond shall also be utilized to provide surge capacity and retention time for site water management and act as a source of process water for the mill. Excess water from Headwater Pond shall be treated in the effluent treatment plant prior to discharge. Treated effluent shall be discharged into Edward's Cove via the treated effluent line and submarine diffuser.

56. All tailings shall be placed under water in Headwater Pond. The maximum elevation of placed tailings shall be maintained a minimum of 0.5 metres below the water surface at all times. Concentrator effluent treatment plant sludge shall be co-disposed with tailings at Headwater Pond. Sediment from sedimentation ponds shall be collected as required and disposed of in Headwater Pond or as otherwise approved by the Department.
57. Operation of the tailings, effluent and reclaim water pipelines shall be governed by the *Labrador Operations Pipeline Leak Detection and Response Procedure* (SOP ML-10, March 14, 2016).
58. All potentially acid generating waste rock, once removed from the confines of the open pit, shall be disposed of in Headwater Pond. With the exception of the top safe working surface of the PAG rock infill area, all potentially acid generating waste rock shall be fully immersed in the water.
59. Drainage from the treated effluent line may be discharged to the environment from the low point drains to perform extended periods of routine maintenance and to prevent freezing during periods when the line is not active. Prior to discharge, the effluent remaining in the line shall be tested to ensure it meets the discharge criteria as listed in **Table 3**. ALT is not required when discharging to land. Drainage activities shall be conducted in a manner that does not disturb the ground surface or create suspended sediment flows.
60. Surface water seepage from Tailings Dams H1 and H2 shall be returned to Headwater Pond or otherwise treated. If seepage water quality meets the discharge criteria specified in **Table 3** it may be discharged to the environment.

Effluent Discharge Monitoring

61. Vale shall perform an Effluent Monitoring Program as per **Table 2**. Vale shall ensure that effluent discharge is compliant with the maximum authorized parameter concentrations as specified in **Table 3**. Analytical results shall be submitted as per the **Reporting** section.

Table 2 – Effluent Monitoring Program		
Description/Location	Parameters	Frequency
Effluent Treatment System Discharge E 555 623 m N 6 444 220 m	Arsenic, Copper, Lead, Nickel, Zinc, Total Suspended Solids, Radium 226, pH, TPH	Weekly if outflow (at least 24 hours apart)
Port Site Sedimentation Pond Discharge E 558 316 m N 6 253 368 m	ALT	Monthly (at least 15 days apart)
Tailings Dam H1 Seepage Water Tailings Dam H2 Seepage Water	Flow Rate	Continuous/ Estimate During Sample Collection

Table 3 – Discharge Criteria			
Parameter	Maximum Authorized Monthly Mean Concentration	Maximum Authorized Concentration in a Composite Sample	Maximum Authorized Concentration in a Grab Sample
Arsenic	0.50 mg/L	0.75 mg/L	1.00 mg/L
Copper	0.30 mg/L	0.45 mg/L	0.60 mg/L
Lead	0.20 mg/L	0.30 mg/L	0.40 mg/L
Nickel	0.50 mg/L	0.75 mg/L	1.00 mg/L
Zinc	0.50 mg/L	0.75 mg/L	1.00 mg/L
TSS	15.00 mg/L	22.50 mg/L	30.00 mg/L
Radium 226	0.37 Bq/L	0.74 Bq/L	1.11 Bq/L
pH	Allowable Range 5.5 – 9.0 units		
ALT	Toxic pass		

62. Vale may reduce the frequency of testing for a parameter that is set out in **Table 3** with the exception of pH, TSS, ALT and Radium 226 to not less than once in each calendar quarter if that parameter's monthly mean concentration in the effluent is less than 10 percent of the maximum authorized monthly mean concentration for the 12 consecutive months immediately preceding the most recent test. Vale shall notify the Director in writing, at least 30 days in advance of a reduction in the frequency of testing.
63. Vale may reduce the frequency of testing for Radium 226 to not less than once in each calendar quarter if that substance's concentration in the effluent is less than 0.037 Bq/L in 10 consecutive tests. Vale shall notify the Director in writing, at least 30 days in advance of a reduction in the frequency of testing.

64. Vale shall increase the frequency of testing to the originally prescribed frequency for a parameter that is set out in **Table 3** with the exception of pH, TSS and ALT, if the parameter's monthly mean concentration is equal to or greater than 10 percent of the maximum authorized monthly mean concentration.
65. Vale may reduce the frequency of conducting ALT's to once in each calendar quarter if the effluent is determined not to be acutely lethal over a period of 12 consecutive months. Vale shall notify the Director in writing, at least 30 days in advance of a reduction in the frequency of testing.
66. If a sample is determined to be acutely lethal, an aliquot of the failing sample shall be analyzed for the parameters outlined in **Table 4** without delay.
67. If a sample is determined to be acutely lethal, Vale shall collect a grab sample from the final discharge point of the failing site and conduct an ALT in accordance with Section 6 of the Reference Method. Samples shall be collected twice per month, not less than 7 days apart, and an ALT shall be conducted on each sample, until it is determined that the effluent is not acutely lethal for three consecutive tests. Following the third consecutive non-acutely lethal test, Vale shall conduct ALT's as per the original prescribed frequency outlined in **Table 2**.
68. Vale shall continue to implement SOPs established to respond to ALT failures or to prevent the occurrence of such events.
69. Reports submitted under the section 31 of Metal Mining Effluent Regulations as a result of a deposit out of the normal course of events shall be provided to the Department.

Water Chemistry Analysis Program

70. Vale shall perform a Water Quality Analysis Program as per **Table 4**. All results shall be submitted to the Director as per the **Reporting** Section.
71. Vale shall perform a Water Chemistry Analysis Program four times per calendar year, not less than one month apart, unless otherwise noted, as per Table 4.
72. Four times (4) per calendar year and not less than one (1) month apart, Vale shall collect grab samples from surface water locations and groundwater monitoring wells as specified in **Table 4**. Samples shall be analyzed for the parameters as listed in **Table 4**. TSS analysis is not a requirement for groundwater samples.

Table 4 – Water Quality Monitoring

Sample Site #/Location	Parameters	Frequency
<ol style="list-style-type: none"> 1. Effluent Treatment System Discharge 2. Port Site Sedimentation Pond Discharge 3. Discharge End of Cutoff Ditch M1 4. Unnamed Stream – North Sedimentation Pond Area 5. ROM Pad Monitoring Well 1 (MW06-11) 6. ROM Pad Monitoring Well 2 (MW06-12) 7. South Sedimentation Pond Monitoring Well 1 (BH-8) 8. South Sedimentation Pond Monitoring Well 2 (BH-10) 9. North Sedimentation Pond – Wet Well 10. Plant Site Sedimentation Pond A – Wet Well 11. Plant Site Sedimentation Pond B - Wet Well 12. Headwater Pond Reclaim Barge 13. Tailings Dam H1 Seepage 14. Tailings Dam H2 Seepage 15. Tailings DamH1 Monitoring Well 1 (MW05-4) 16. Tailings DamH1 Monitoring Well 2 (MW05-5) 17. Tailings DamH2 Monitoring Well 1 (MW05-1A) 18. Tailings DamH2 Monitoring Well 2 (MW05-1B) 19. Tailings DamH2 Monitoring Well 3 (MW05-2A) 20. Tailings DamH2 Monitoring Well 4 (MW05-2B) 21. Tailings DamH2 Monitoring Well 5 (MW05-3A) 22. Tailings DamH2 Monitoring Well 6 (MW05-3B) 23. Explosives Plant Monitoring Well 1 (MW06-03) 24. Explosives Plant Monitoring Well 2 (MW06-04) 31. Camp Pond Brook Monitoring Well (MW06-01) 32. Camp Pond Brook Monitoring Well (MW06-02) 33. Camp Pond - Near the temporary underground maintenance shop) (C1) 34. Reid Brook - Near western construction area for Reid Brook) (C2) 35. Eastern Deeps Portal (C3) 36. Reid Brook Portal (C4) 37. Otter Pond 	<p>General Parameters - must include the following: nitrate + nitrite, nitrate, nitrite, ammonia, pH, TSS, colour, sodium, potassium, calcium, sulphide, magnesium, alkalinity, sulfate, chloride, turbidity, reactive silica, orthophosphate, phosphorous, DOC, conductance, TDS (calculated), phenolics, carbonate (CaCO₃), hardness (CaCO₃), bicarbonate (CaCO₃)</p> <p>Metals Scan - must include the following: aluminium, antimony, arsenic, barium, beryllium, bismuth, boron, cadmium, chromium, cobalt, copper, iron, lead, manganese, molybdenum, mercury, nickel, selenium, silver, strontium, thallium, tin, titanium, uranium, vanadium, zinc</p>	<p>Four (4) times per year (not less than one month apart)</p>

Table 4 – Water Quality Monitoring		
25. ROM Pad Drainage Pipe	pH, copper, nickel	Monthly Grab
26. Mine Water Surge Pond Wet Well 27. Mine Water Surge Pond – Leak Detection Sump 28. Mine Water Surge Pond Underdrain	arsenic, cobalt, copper, lead, nickel, zinc, TSS	Monthly Grab
10. North Sedimentation Pond – Wet Well	arsenic, cobalt, copper, lead, nickel, zinc, ammonia	Monthly Grab
29. Diffuser Water Quality Site 1 – ‘A’ Bay 30. Reference Water Quality Site 2 – ‘A’ Bay	As per federal Metal Mining and Effluent Regulations requirements aluminum, arsenic, cadmium, copper, iron, lead, mercury, molybdenum, nickel, zinc, radium-226, ammonia, nitrate, alkalinity, hardness (CaCO ₃), pH, electrical conductivity, salinity, dissolved oxygen, TSS	Four (4) times per year (not less than one month apart)

Environmental Effects Monitoring

73. The Metal Mining Effluent Regulations require that Vale conduct Environmental Effects Monitoring (EEM) as part of the mine’s authority to deposit effluent under the Fisheries Act. Copies of all EEM study designs and reports shall be submitted to the Department.

Ambient Air

74. Vale shall operate an ambient air monitoring program as per the conditions in this Approval and its amendments. Approval shall be obtained from the Director prior to purchase or installation of any monitoring equipment.
75. Parameters to be monitored are outlined in **Table 5**.

Table 5 – Ambient Air Monitoring Program			
Number of Monitors	Parameter	Location	UTM Co-ordinate
1	NO _x	Primary Crusher	E 555 250 N 6 243 800
1	NO _x	Accommodations	E 555 820 N 6 244 219
1	PM _{2.5}	Accommodations	E 555 820 N 6 244 219
1	TPM	Port Site	E 558 316 N 6 253 238
UTM Coordinates referenced to Zone 20 NAD83.			

76. Ambient air monitoring shall be done in accordance with the *Ambient Air Monitoring Guidance Document (GD-PPD-065)*, or its successors.
77. Vale shall operate and maintain a meteorological station in accordance with the guidelines specified in the United States EPA document “Quality Assurance Handbook for Air Pollution Measurement Systems - Volume IV: Meteorological Measurements Version 2.0 (Final),” EPA- 454/B-08-002, March 2008, or its successors. Parameters to be measured and recorded shall include: wind speed, wind direction, ambient air temperature, relative humidity, barometric pressure and precipitation. All results from this station shall be submitted in an acceptable digital format annually or as otherwise specified by the Department, as per the *Reporting* section.
78. Information regarding calibrations, site visits and maintenance for all continuous ambient air monitors shall be recorded into the DR DAS electronic logbook.
79. The ambient air quality standards specified in Schedule A of the *Air Pollution Control Regulations, 2004* shall apply to all points outside of the project site administrative boundary. The administrative boundary is defined as the area encompassed by the coordinates contained in Appendix ‘A’ and specifically refers to the area covered by the surface lease minus the area encompassed by the accommodations complex. All coordinates are referenced to NAD83 UTM Zone 20.

Fuel Assay and Consumption

80. Vale shall, on a monthly basis, submit fuel assay and consumption reports as per the *Reporting* section. Reports shall include; date of fuel deliveries; quantity of fuel received; assays for received fuel, fuel consumption by boiler and generators.

Stack Emissions Testing and Dispersion Modelling

81. Stack emissions testing shall be done in accordance with the *Stack Emission Testing Guidance Document (GD-PPD-016.1)*. The selection of the number of stacks along with specific stacks to be tested shall be at the discretion of the Director. Dispersion Modelling shall be done in accordance with the *Plume Dispersion Modelling Guidance Document (GD-PPD-019.2)*. Determination of frequency of stack emissions testing and dispersion modelling shall be done in accordance with the *Compliance Determination Guidance Document (GD-PPD-009.4)*.
82. Vale shall be required to complete stack emissions testing once every four years if it has been shown, via a registered dispersion model, that the operation is in compliance with section 3(2) and Schedule A of the *Air Pollution Control Regulations, 2004*. If it has been shown, via a registered dispersion model, that the operation is not in compliance with section 3(2) and Schedule A of the *Air Pollution Control Regulations, 2004*, then the facility shall complete stack emissions testing every two years.
83. Plume dispersion modelling results shall be submitted to the Department within *120 days* of acceptance of the stack emissions testing results by the Department.

84. If the results from the plume dispersion modelling indicate that Vale is not in compliance with section 3(2) and Schedule A of the *Air Pollution Control Regulations, 2004*, then Vale shall submit to the Director, *within 6 months* from the date of submission of plume dispersion modelling results, an Action Plan to bring emissions of the parameters of concern into compliance. In addition to this, the Plan shall include information detailing the improvements to be implemented to the equipment and instruments, and a time frame for the improvements. By *December 31* of each year, a report shall be submitted to the Director outlining the progress made to date towards accomplishing the goals of the Plan.

Analysis and QA/QC

85. Unless otherwise stated herein, all solids and liquids analysis performed pursuant to this Approval shall be done by either a contracted commercial laboratory or an in-house laboratory. Contracted commercial laboratories shall have a recognized form of accreditation. In-house laboratories have the option of either obtaining accreditation or submitting to an annual inspection by a representative of the Department, for which Vale shall be billed for each laboratory inspection in accordance with Schedule 1 of the *Accredited Laboratory Policy (PD:PP2001-01.02)*. Recommendations of the Director stemming from the annual inspections shall be addressed within 6 months, otherwise further analytical results shall not be accepted by the Director.
86. If Vale wishes to perform in-house laboratory testing and submit to an annual inspection by the Department then a recognized form of proficiency testing recognition shall be obtained for compliance parameters for which this recognition exists. The compliance parameters are listed in the *Effluent and Monitoring* section. If using a commercial laboratory, Vale shall contact that commercial laboratory to determine and to implement the sampling and transportation QA/QC requirements for those activities.
87. The exact location of each sampling point shall remain consistent over the life of the monitoring programs, unless otherwise approved by the Director. Using a GPS or similar device, the northing and easting of each sampling location shall be recorded and submitted to the Director.
88. Vale shall bear all expenses incurred in carrying out the environmental monitoring and analysis required under conditions of this Approval.

Monitoring Alteration

89. The Director has the authority to alter monitoring programs or require additional testing at any time when:
- pollutants might be released to the surrounding environment without being detected;
 - an adverse environmental effect may occur; or
 - it is no longer necessary to maintain the current frequency of sampling and/or the monitoring of parameters.

90. Vale may, at any time, request that monitoring program or requirements of this Approval be altered by:
- requesting the change in writing to the Director; and
 - providing sufficient justification, as determined by the Director.

The requirements of this Approval shall remain in effect until altered, in writing, by the Director.

Reporting

91. Monthly reports containing the environmental compliance monitoring and sampling information required in this Approval shall be received by the Director, in digital format (e-mail or CD), within 30 calendar days of the reporting month. All related laboratory reports shall be submitted with the monthly report, in spreadsheet format (Microsoft Excel or a format easily transferable to Excel), and either Adobe Portable Document Format (PDF) or hardcopy format. Digital report submissions, if e-mailed, shall be sent to the following address: statenv@gov.nl.ca

92. All incidents of:

- *Emergency Response Plan* implementation; or
- non-conformance of any condition within this approval; or
- spillage or leakage of a regulated substance; or
- whenever discharge criteria is, or is suspected to be, exceeded; or
- verbal/written complaints of an environmental nature from the public received by Vale related to the Voisey's Bay Project Site, whether or not they are received anonymously;

shall be immediately reported, within one working day, as follows:

- contact this Department (St. John's Office) by phoning (709) 729-2556, *and*
- contact Service NL (Goose Bay) by phoning (709) 896-5473, faxing (709) 896-4340, or emailing krussell@gov.nl.ca.

A written report including a detailed description of the incident, summary of contributing factors, and an Action Plan to prevent future incidents of a similar nature, shall be submitted to the Director. The Action Plan shall include a description of actions already taken and future actions to be implemented, and shall be submitted within thirty days of the date of the initial incident. The address for written report submission is:

Director, Pollution Prevention Division
Department of Environment and Conservation
P.O. Box 8700
St. John's, NL
A1B 4J6

93. Any spillage or leakage of gasoline or associated product shall be reported immediately through the Canadian Coast Guard at 1-(709)-772-2083.

Expiration

94. This Certificate of Approval expires *December 31, 2018*.
95. Should Vale wish to continue to operate the Voisey's Bay Mine-Mill Project Site beyond this expiry date, a written request shall be submitted to the Director for the renewal of this approval. Such request shall be made prior to *June 30, 2018*.

APPENDIX A

Vale Voisey's Bay Site - Administrative Boundary Coordinates

Surface Lease

558797.941	6253298.000
557500.004	6252193.505
557500.004	6246500.004
563999.997	6243500.004
563999.997	6241000.003
554500.001	6241000.003
554495.878	6242888.499
553014.001	6242888.499
553014.001	6243678.998
554500.001	6243678.998
554500.001	6247500.000
556006.434	6248520.002
556002.559	6251801.505
556609.626	6252718.998
557270.934	6252700.502
558411.747	6253715.505
558797.941	6253298.000

Accommodations Complex

555741.18	6244203
555749.51	6244188.56
555724.02	6244173.84
555725.94	6244170.52
555751.43	6244185.23
555761.4	6244167.97
555791.15	6244185.15
555789.63	6244187.79
555800.18	6244193.88
555791.65	6244208.66
555799.57	6244213.24
555793.91	6244223.03
555801.74	6244227.55
555838.87	6244163.25
555844.91	6244166.74
555847.47	6244172.37
555820.47	6244219.13
555821.28	6244222.17

555876.79	6244207.3
555878.59	6244214.04
555876.41	6244219.83
555824.39	6244233.77
555825.2	6244236.8
555871.97	6244263.8
555872.57	6244269.96
555869.08	6244276
555809.85	6244241.8
555812.36	6244237.45
555789.64	6244224.33
555786.77	6244229.31
555741.18	6244203

cc: Ms. Maria Dober - Head
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