



December 2012 Plan Summaries

Toxic Reduction Plan Summaries

Clarabelle Mill and Water Treatment Plants Joint Facility

Arsenic
Cadmium
Chromium
Cobalt
Copper
Lead
Manganese
Mercury
Selenium
Sulphuric Acid
Thallium (added May 2016)
Vanadium
Zinc

Toxic Substance Reduction Plan Summaries for Toxic Substances at Clarabelle Mill

1. Facility information

NPRI identification number: 1465
NAICS identification number: 21-22-32
NAICS Canada code: 21

Legal and trade name of company:
Vale Canada Limited

Facility Street Address:
Clarabelle Mill,
1701 Elm Street, Unit 1,
Copper Cliff, Ontario
P0M 1N0

Facility Mailing Address:
Clarabelle Mill,
18 Rink Street,
Copper Cliff, Ontario
P0M 1N0

Number of full time employee equivalents (2011): 109

UTM x: 495695
UTM y: 5148049

Public Contact:
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18 Rink Street,
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Prepared Plan:
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Highest ranking official:
Duncan Ross,

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Clarabelle Mill,
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Copper Cliff, Ontario,
P0M 1N0

Toxic Reduction Planner and certifier:
Mary Dubel
Licence number: TSRP0118

Company information:
Vale Canada Limited
Business Number: 102475084
DUNS number: 200429306
Street Address:
200 Bay Street,
Suite 200, South Tower, P.O. Box 70
Toronto, Ontario
M5J 2K2

Parent Company:
Companhia Vale Do Rio Doce (Vale)
Business Number: 102475084
DUNS Number: 200429306
26 Graça Aranha Avenue,
Rio de Janeiro, Brazil

2. List of Toxic Substances used at Clarabelle Mill and CAS # of Substance

Arsenic and its compounds NA - 02
Cadmium and its compounds NA-03
Chromium and its compounds NA-04
Cobalt and its compounds NA-05
Copper and its compounds NA-06
Lead and its compounds NA-08
Manganese and its compounds NA-09
Mercury and its compounds NA-10
Nickel and its compounds NA-11
Selenium and its compounds NA-12
Sulphuric Acid 7664-93-9
Thallium 7440-28-0 (added May 2016 to Summary Plans)
Vanadium and its compounds 7440-62-2
Zinc and its compounds NA-14

3. Toxic Reduction Policy Statement of Intent

At Vale's Sudbury Operations, we are committed to sustainable development – meeting the needs of the present without compromising the ability of future generations to meet their own needs. Vale believes in zero harm, to our people, to our workplaces, to the communities in which we operate and to the natural environment. Vale Canada Sudbury Operation's is committed to playing a leadership role in protecting the environment. While, for milling, smelting and refining, this primarily means reducing toxic substances end-of-pipe emissions, wherever feasible, Vale will adopt safer alternatives and technologies to reduce the use and release of toxic substances. Toxic substance reduction will be a continuing effort in our company and new technologically and economically feasible reduction options will be considered if opportunities become available in the future and are in compliance with all federal and provincial regulations.

4. Objectives

4.1. Arsenic and Lead

At this time, Vale's Sudbury Operations does not intend to reduce the use of arsenic and lead at the Clarabelle Mill. Several reduction options were identified, however, at this time all options were not technically or economically feasible for the facility. Vale will continue its efforts to reduce the release of arsenic and lead into the environment and reduce the loss of any feed material during processing.

4.2. Cadmium, Chromium, Manganese, Mercury, Thallium, Vanadium and Zinc

At this time, Vale's Sudbury Operations does not intend to reduce the use of cadmium, chromium, manganese, mercury, vanadium and zinc at the Clarabelle Mill. A reduction option was identified, however, at this time the option was not technically feasible for the facility. Vale will continue its efforts to reduce the release of cadmium, chromium, manganese, mercury, thallium, vanadium and zinc into the environment and reduce the loss of any feed material during processing.

4.3. Cobalt, Copper, Nickel and Selenium

Vale's Sudbury Operations does not intend to reduce the use (input) of cobalt, copper, nickel and selenium at the Clarabelle Mill. Vale Canada Limited is in the business of supplying Canada and the world market with high quality cobalt, copper, nickel and selenium products; as such, reducing input of these substances into the milling process is not economically feasible. Vale will continue its efforts to reduce the release of cobalt, copper, nickel and selenium into the environment and reduce the loss of any feed material during processing.

4.4. Sulphuric Acid

At this time, Vale's Sudbury Operations does not intend to reduce the use of sulphuric acid at the Copper Cliff Waste Water Treatment Plant. A reduction option was identified, however, the option was not technically feasible for the operation. Technological advancements will be monitored for future reduction options.

5. Description of Substances

5.1. Arsenic, Cadmium, Chromium, Lead, Manganese, Mercury, Thallium, Vanadium and Zinc

Arsenic, cadmium, chromium, lead, manganese, mercury, thallium, vanadium and zinc are not 'used' at Clarabelle Mill. These substances are incidentally present in the ore that is processed to produce concentrate products. The ore essentially contains the periodic table of elements, with many elements chemically bound to base metals of value. It is the goal of the milling, smelting and refining process to remove the unwanted components from the ore to produce a valuable base metal product, in the case of Vale's Sudbury Operations, primarily nickel, copper, cobalt and precious metals.

5.2. Cobalt, Copper, Nickel and Selenium

Cobalt, copper, nickel and selenium enter Clarabelle Mill from the mined ore. It is the goal of the milling, smelting and refining process to remove the unwanted material from the ore to produce a valuable base metal product, in the case of Vale's Sudbury Operations, primarily nickel, copper, cobalt and precious metals.

Product streams at Clarabelle Mill containing copper are eventually processed at the Copper Cliff Smelter and Electrowinning facility to create a pure copper product for sale on the market. A copper concentrate product is also produced at the mill and sold to third party facilities. All product streams containing nickel are processed at the Copper Cliff Smelter and Copper Cliff Nickel Refinery to create a pure nickel product for sale on the market. Electrolytic cobalt is produced at Vale's Port Colborne Refinery located in Port Colborne, Ontario. Cobalt containing material that originated at the Sudbury mines and Clarabelle Mill is processed at this facility. Product streams containing selenium are further processed at the Copper Cliff Smelter and Copper Cliff Nickel Refinery. TOL slurry, containing selenium, is produced at the Electrowinning plant and sent to Vale's Port Colborne Metals Refinery (PMR). During the precious metal refining process selenium is recovered into a cake product and is sold to market.

5.3. Sulphuric Acid

Sulphuric acid is used as a reagent at the Copper Cliff Waste Water Treatment Plant, which is part of the Clarabelle Mill reporting Complex. Sulphuric acid is used to adjust the pH of process water before leaving the treatment facility, entering the natural environment. Sulphuric acid is a common reagent used in the waste water treatment plants.

6. Rationale as to Why No Reduction Options Were Selected

6.1. Arsenic and Lead

Even though several reduction options were identified for arsenic and lead, at this time, these options were not selected for implementation. The options presented in the plan did not meet the technical and economic feasibility criteria established by the facility.

6.2. Cadmium, Chromium, Lead, Manganese, Mercury, Thallium, Vanadium and Zinc

Even though a reduction option was identified for cadmium, chromium, lead, manganese, mercury, thallium, vanadium and zinc use, at this time, this option was not selected for implementation. The option presented in the plan did not meet the technical feasibility criteria established by the facility.

6.3. Cobalt, Copper, Nickel and Selenium

Vale Canada Limited is in the business of producing and supplying the world market with high quality cobalt, copper and nickel products. Options to reduce the amount of cobalt, copper and nickel processed and extracted at Clarabelle Mill will not be considered as these are our products.

6.4. Sulphuric acid

Even though a reduction option was identified for sulphuric acid, at this time, this option was not selected for implementation. The option presented in the plan did not meet the technical feasibility criteria established by the facility.

7. Additional Information

Vale has incorporated the concept of sustainability into the mining, milling, smelting and refining practices in Ontario, endeavoring to achieve zero harm to our people, to our workplaces and to the natural environment. For the Base Metals Industry, this is primarily accomplished through pollution control of end-of-pipe emissions. For the Sudbury Operations, past pollution control projects have reduced property source fugitive air emissions and reduced process air emissions, which included the construction of new storage handling facilities for feed material, re-vegetation of property boundary areas, and the installation of new baghouses and electrostatic precipitators to capture dust emissions.

The new CORE (Challenging Ore Recovery) project at the Mill is expected to result in increased metals extractions, while removing impurities, from the concentrate product. This will have a positive effect on downstream facilities in Sudbury with less impurities being carried through the process. Vale is undertaking its Clean AER (Atmospheric Emissions Reduction) project to reduce sulphur dioxide emissions by a further 70%, to significantly reduce particulate and metal emissions and improve local air quality. These projects will ensure Vale's Sudbury Operations will continue to contribute decades of employment, economic growth and community support.

8. Plan Summary Statement

This plan summary is an accurate synopsis of the content of the toxic substance reduction plan for arsenic, cadmium, chromium, cobalt, copper, lead, manganese, mercury, nickel, selenium, sulphuric acid, thallium, vanadium and zinc use at Clarabelle Mill and the Copper Cliff Waste Water Treatment Plant, Sudbury Operations, prepared for Vale Canada Limited, dated November 2012, amended May 2016. The content of the summary is up to date and reflects the current version of the toxic substance reduction plan.