FACILITY MANAGEMENT PLAN

Tailings Management Areas
Verpol Plant
Florence, Vermont

Prepared for
Omya Inc.

Prepared by
Sanborn, Head & Associates, Inc.

File 2461.01
August 2005
Revised June 2006

******REVISED IN RESPONSE TO VTDEC COMMENTS DATED APRIL 18, 2006******

TABLE OF CONTENTS

******REVISED IN RESPONSE TO VTDEC COMMENTS DATED APRIL 18, 2006******

1.0 INTRODUCTION

This Facility Management Plan (FMP) was prepared for the tailings management areas (TMAs) at the Omya Inc. (Omya) Verpol plant located in Florence, Vermont. This Plan is a component of the Interim Certification Application for the TMAs, and was prepared in accordance with the requirements of Subchapter 6 (i.e., Design Standards), Section (§) 6-601 (i.e., General) and §6-602 (i.e., Submittals) of the Vermont Solid Waste Management Rules (VSWMRs). In addition, this FMP provides the additional information required by Subchapter 3 (i.e., Applicability and Administration), §6-306 (i.e., Interim Certification), Paragraph (b) and 10 V.S.A. §6605b (i.e., Interim Certification), Paragraph (b).

This FMP was prepared under the direction of Mr. Eric S. Steinhauser, P.E., a professional engineer licensed in the State of Vermont (Vermont PE No. 8576).

The remainder of this FMP is organized as follows:

- General site information is presented in Section 2.0;
- Site characterization information is addressed in Section 3.0;
- The design of the facility is addressed in Section 4.0; and
- The operation of the facility is address in Section 5.0.

2.0 GENERAL SITE INFORMATION

The Omya Verpol plant is located in Florence, Town of Pittsford, Rutland County, Vermont on approximately 385 acres. Calcium carbonate (an amendment to products such as paint, paper. and plastics) is produced at the Verpol plant from which a tailings product is generated. Initially the tailings product is in a slurry form comprised of approximately 99.6 percent crushed rock that, based on grain size analyses, may be described as sandy silt, and 0.4 percent chemical compounds utilized in the production process, most notably a flotation reagent. TMAs are located in former quarry areas on the same property as the production facility that generates the tailings product. The quarry areas are identified as: (i) the Dolomite (aka Hard Rock) Quarry; (ii) the Kane & Drake Quarry; and (iii) the Loveland (aka Dog Leg) Quarry. The locations of the quarries are shown on Sheet 1 of the Engineering Drawings (see Part D-2 to the Interim Certification Application).

The tailings product slurry is initially dewatered in settling cells located east of the former Loveland Quarry. Periodically the tailings product in the settling cells is excavated and transported to the Kane & Drake and Dolomite TMAs. Therefore, Omya controls the handling and management of the tailings product and keeps the material separate from wastes generated at the Verpol plant. Furthermore, only on-site roads are used to transport the tailings product to the TMAs.

For purposes of this application, only the Dolomite Quarry and the Kane & Drake Quarries, together with the settling cells utilized to dewater the tailings product, are proposed for use during the term of the Interim Certification to meet the operating needs and requirements of the Verpol plant.

Sheet 1 presents the grading in the TMAs as of July 7, 2005. As shown on Sheet 1, placement of the tailings product in the TMAs has been performed with the objective of approximating the elevation of the immediately surrounding areas. The outer slopes of the TMAs are currently inclined no steeper than about 2.5 horizontal to 1 vertical (2.5H:1V).

It has been Omya's intention to retain control over the tailings product, with the goal to recover the significant calcium carbonate content as technology permits, to find alternative uses for the tailings product, or to use the tailings product to reclaim depleted quarry operations on site. Approval for the approach was obtained in initial, and subsequent amendments, to the Act 250 permit for the development of the Verpol plant.

Tailings product initially was placed in the Kane & Drake Quarry starting in 1979. Prior to placing tailings product in the Kane and Drake TMA, Omya constructed a retaining embankment along the open (east) side of the quarry using shot rock. The retaining embankment also allows for vehicular access around the TMA perimeter. The retaining embankment averages between 20 and 30 feet tall, is about 20 feet wide at the top, and was constructed with exterior and interior sideslopes inclined at 2H:1V.

The Dolomite Quarry has been used as a TMA since 2000. With the exception of an area formerly used as an access way for trucks, the Dolomite Quarry TMA is bounded by rock walls developed during quarry operations. The truck access way was replaced with an engineered retaining structure also approved by the state.

The Loveland Quarry has received tailings product since 1979. The Loveland TMA currently contains the least amount of tailings product, deposited primarily as part of the dewatering process.

Visual observations indicate that the existing slopes of the TMAs, constructed of compacted tailings product, are stable (i.e., no sloughing) and are capable of sustaining vegetation. The portions of the TMA slopes that have been vegetated (using a soil conservation seed mix) do not show signs of significant erosion or other distress.

For the purposes of the Interim Certification application, only the Kane & Drake and Dolomite TMAs are proposed. Omya reserves the right to apply for additional TMA capacity in the Loveland TMA and other areas in the future.

The proposed development and closure of the Kane & Drake, Dolomite, and Loveland TMAs, as well as the settling basins, is addressed in the Engineering Report, the Engineering Drawings, and the Closure/Post Closure Plan, which are provided as Parts D-1, D-2, and D-4 to the Interim Certification Application, respectively.

3.0 SITE CHARACTERIZATION

3.1 Introduction

The following summarizes the hydrogeologic exploration, groundwater quality studies, and tailings product studies that Heindel & Noyes ("H&N") has performed at the Verpol plant since 2000. The information presented herein is taken from the Site Characterization Report (see Part C of the Interim Certification Application), which was prepared in accordance with the requirements of Subchapter 5 (i.e., Siting) and Subchapter 6 (i.e., Design Standards) §6-603 (i.e., Site Characterization). In summary, H&N performed site characterization studies, tested groundwater and surface water on and off the Omya property, including public and private wells and springs, and sampled and tested the tailings product. H&N's investigation has produced no data to indicate that the tailings product in the TMAs creates an unreasonable risk to the public health or is unreasonably destructive the environment.

3.2 Geologic and Hydrologic Site Characterization

H&N used several methods to evaluate the hydrogeology of the Verpol plant and to select groundwater monitoring well locations. These methods included: (i) fracture trace analysis; (ii) review of geologic mapping; (iii) field mapping of bedrock outcrops; (iv) borehole logging with a down-well video camera; (iv) water elevation contouring; and (v) field reconnaissance using very-low frequency (VLF) radio and geomagnetics. The fracture trace analysis, measurements of outcrop strike, and mapped geologic contacts all indicated a predominant south-southeast to north-northwest structural alignment in the bedrock at the site, with some weaker transverse fracture trace lineations. H&N concluded that it is the predominantly south-southeast to north-northwest structural alignment that influences the direction of local groundwater flow in bedrock.

Groundwater quality at the Verpol plant has been evaluated via a network of groundwater monitoring wells as well as eight surface water-sampling locations. Currently, there are 14 on-site bedrock wells and four on-site surface water sampling stations, as well as seven off-site groundwater monitoring locations that include private and public water wells (founded in bedrock and gravel), springs, and five off-site surface water locations along the "Post Office Swale".

The on-site monitoring network includes four wells installed prior to H&N's involvement, ten wells sited by H&N based on a review of geologic conditions, and natural groundwater discharge locations (seeps and springs). The locations of wells were sited to provide background

groundwater information as well as information on groundwater that passes under the TMAs. In fact, some wells were drilled directly through TMAs, while others were drilled downgradient of the tailings (based on the measured groundwater flow direction). The fracture trace analysis and geophysical testing were considered so that the on-site monitoring wells were located along mapped or inferred bedrock fracture zones that would be in the predominant area of groundwater flow in bedrock.

To evaluate groundwater flow direction, groundwater contour mapping was developed by H&N using groundwater elevations obtained from the network of 14 surveyed bedrock-monitoring wells at the site. The contour mapping shows a north-northwest flow direction in the bedrock groundwater from the TMAs, which is consistent with the fracture trace analysis, geologic mapping, and outcrop measurements. Based on the historical water level data, H&N reported that the groundwater flow pattern is consistent through seasonal hydrologic conditions (e.g., spring recharge and summer drought). H&N has noted that a small portion of the bedrock groundwater discharges at the "Hendee Spring" near monitoring well A, and flows eastward through a swale that crosses Creek Road near the Post Office (the "Post Office Swale").

Hydraulic properties of the bedrock aquifer were measured from pumping tests performed on the well network. In conjunction with measurements of gradient and vertical thickness, these properties were used by H&N to estimate groundwater flow rates in the vicinity.

3.3 Water Quality Monitoring

To date there have been 154 sampling events for the on-site bedrock wells and 14 sampling events for the four on-site surface water locations. In addition, 22 sampling events have been performed for the seven off-site wells and springs, and seven sampling events have been performed for the four off-site surface water locations to date.

Groundwater and surface water samples have been tested for compounds associated with the tailings product, as well as other compounds typically associated with mineral processing and industrial emissions in general. The list of tests, which was developed based on the inventory of chemicals used at the Verpol plant and on analyses of the tailings, is presented below.

- Volatile Organic Compounds (VOCs) by method 8260B
- Semi-Volatile Organic Compounds (SVOCs) by method 8270C
- acrylamide monomer (SW 8032)
- free chlorine (SM 4500 CI-G)
- isopropanol (8260 B screen)
- methyl isothiocyanate (8260 B screen)
- monomethyl amine (SW 8015)
- Ortho phenylphenol (OPP) (8270C Screen)

- Petroleum products (8270C Screen)
- Stearic Acid (8270C Screen)
- Tall Oil Imidazoline Based Reagent (OMYA AG 24)
- pH

The groundwater analytical data were analyzed in accordance with Vermont's Groundwater Protection Rule and Strategy (2005), which allowed the statistical calculation of the 95 percent confidence level ("95% CL") for groundwater results. The 95% CL's were compared to the applicable standard, if one exists. For compounds that are unregulated, the 95% CL's were compared to concentrations considered safe for drinking water as determined by a qualified toxicologist. For the tailings product constituents, the tested concentrations in groundwater were below the levels considered safe for drinking water, which indicates that the tailings product does not pose a risk to health or the environment. A summary of the test data is presented in Table 1.

Table 1: Groundwater Testing Summary

Target Compound	Standard (ppm)	# of on-site samples	Highest 95% CL from any on-site well (ppm)	# of off-site samples	# detections from all off-site wells	Conclusion
Acetone	0.700 (a)	80	0.166 (well B)	16	0	Within standards
Acrylamide	0.0005 (b)	21	all non-detect	11	0	None detected
Free Cl	4.0 (c)	18	all non-detect	11	0	None detected
THMs**	0.080 (c)	70	0.023 (96-1)	20	0	Within standards
IPA	NS	80	all non-detect	16	0	None detected
Methyl-amine	NS	21	all non-detect	11	0	None detected
MITC	NS	21	all non-detect	11	0	None detected
OPP	0.018 (d)	91	0.048 (well 2*)	21	0	None detected post remediation
Stearic Acid	NS	91	all non-detect	20	0	None detected
TOHI	0.126 (d)	139	0.058 (well B)	20	0	Within standards
Toluene	1.000 (a,c)	80	0.009 (96-1)	20	1 (e)	Within standards

(a) Groundwater Enforcement Standard
(b) USEPA drinking water standard
(c) Vermont Drinking Water Standard
(d) Vermont Health Advisory level
(e) Only one off-site detection - 0.0016 ppm from the Chrusciel Spring, which is not a drinking water source

NS = No Standard

* *OPP in well #2 has been remediated and no OPP has been found in groundwater on site since July 2001 (ND <0.002 ppm).*

** *THMs = Trihalomethanes, which are by-products of chlorination that are tested by the 8260 and 8260B methods.*

As noted above, the results of the groundwater and surface water tests from the Verpol plant indicate that the water quality is in compliance with applicable Groundwater Enforcement Standards, Drinking Water Standards, and Water Quality Standards, respectively. In addition, tailings-related contaminants have not been detected in samples collected from the off-site wells and surface water locations.

3.4. Tailings Product

Characterization of the tailings product was performed by H&N to evaluate the potential risk that the tailings product may pose to the environment. The results of those studies indicate that the constituents that make up tailings product (i.e., the mineral matter and the flotation reagent) are not hazardous and the tailings product itself is not considered a hazardous waste. Furthermore, the studies indicated that the tailings product does not pose a public health risk with respect to skin contact, ingestion, inhalation, and consumption of groundwater.

According to the H&N reports, and toxicological evaluations reported therein, TCLP-type extraction testing was performed on the tailings product. Results of this testing indicated that about 300 parts per billion of the flotation agent were detected in the extract. It is noted that the TCLP-type extraction testing performed is aggressive by design, and is not typical or representative of the management scenario and the tailings product management conditions historically employed by Omya or the proposed tailings product management scenario addressed under this Interim Certification Application. Consequently, this test should be considered a "special or extreme circumstance" in the context of the regulatory definition.

Additional evaluation of the flotation reagent was performed by Golder, and is included as Part C-1 to the Interim Certification Application. The Golder report reviews the composition of the flotation reagent and addresses its fate and transport in the environment. According to Golder, the flotation agent (Custamine 51D) is a stable and non-reactive compound that does not display chemical activity or undergo significant physical, chemical, or biological transformation. Rather, the flotation reagent is biodegradable and not toxic as are the constituents that comprise the flotation reagent (which may be found in common household products). The fate and transport evaluation performed by Golder indicates that the flotation reagent quickly breaks down into naturally occurring, ubiquitous compounds. This is confirmed by the results of the various water quality evaluations performed by H&N (see Section 3.3 of this FMP and Part C-1 of the Interim Certification Application), which indicate that the tailings product have not adversely affected groundwater or surface water quality.

3.5 Conclusions

In summary, the results of groundwater and surface water sampling and testing at the Verpol plant has shown that the tailings product, which has been in-place for over 25 years, has not adversely affected groundwater or surface water quality. Specifically, the on-site and off-site groundwater and surface water quality is in compliance with Vermont Groundwater Enforcement Standards, Water Quality Standards, and Drinking Water Standards. For compounds associated with Omya's production process that do not have standards, concentrations in the on-site groundwater and surface water are below levels that have been determined to be safe for drinking water. Furthermore, no substances have been detected in off-site groundwater or surface water that are the result of Omya's operation.

These results indicate that the TMAs have not and in the future would not unduly harm the public health and will have the least possible reasonable impact on the environment.

4.0 FACILITY DESIGN

4.1 General

The design of the TMAs is addressed in the Engineering Report, which is provided as Part D-1 to the Interim Certification Application. The Engineering Report was prepared in accordance with §6-601 (i.e., General) and §6-606 (i.e., Disposal Facilities), Paragraph (b)(2) (i.e., Standards for Specific Facilities – Discrete Disposal Facilities).

There are certain unique issues related to the design of the Verpol plant TMAs. One is that the TMAs already exist and are located on the same property as the production facility that generates the tailings product. Therefore, only on-site roads are used to transport the tailings product from the plant to the TMAs. With respect to §6-503(b) of the VSWMRs, no highway access is required.

As previously noted, the TMAs do not have liner or leachate collection systems. However, as noted in this Interim Certification Application, the tailings product is not the source of leachate harmful to public health and safety or the environment or the creation of nuisance conditions. The information is provided in the Site Characterization Report (Part C-1 of the Interim Certification Application and the December 22, 2005 Numerical Groundwater Fate and Transport Modeling Report prepared by Sanborn, Head & Associates, Inc.).

Because of the insignificant amount of organic matter in the tailings product, the TMAs are not anticipated to generate decomposition gases that would necessitate a control and treatment system required by §6-606(b)(2)(I). H&N performed a study in 2004 that, among other criteria, evaluated the presence of oxygen, carbon dioxide, methane, and hydrogen sulfide[1] gases in the Dolomite TMA. The results of the H&N study indicate that oxygen predominates in the Dolomite TMA, 0.3 percent or less of carbon dioxide, 0.15 percent or less of methane, and no hydrogen sulfide. As such, a gas control or extraction system is not needed, and hence will not be installed in the TMAs. Furthermore, because the TMAs are not expected to be sources of air emissions, air quality monitoring of the TMAs also is not needed.

Based on the above, the design of the TMAs consists of the following three components: (i) final grading; (ii) erosion and sediment control/stormwater management; and (iii) final cover system and re-vegetation. The design of each of these components is described below.

[1] Carbon Dioxide, methane, and hydrogen sulfide gases generated from decomposing organic matter.

4.2 Final Grading

The proposed final grading plan for the TMAs is presented on Sheet 2 of the Engineering Drawings, which are provided as Part D-2 to the Interim Certification Application. The proposed final grading shown on Sheet 2 assumes that Facility Certification is obtained in the future and that future placement of the tailings product occurs within the Dolomite, Kane & Drake, and Loveland Quarries. As shown on Sheet 2, the maximum elevation of the TMAs will be generally consistent with the elevation of the immediate surrounding areas. The final TMA grades in areas where additional tailings product will be placed, where possible, will provide a maximum slope of 3H:1V and minimum slope of 5 percent per §6-606(b)(2)(N) of the VSWMRs. In some areas the existing slopes are inclined as steep as about 2.5H:1V. Disturbing the existing in-place tailings product, which currently is well vegetated and stable, will be minimized so as not to increase the potential for erosion. An evaluation of the stability of the TMAs is addressed in the Engineering Report (Part D-1 of the Interim Certification Application) and slope stability calculations are provided in Part D-3 of the Interim Certification Application.

4.3 Erosion and Sedimentation Control / Stormwater Management

Operation of the TMAs requires the incorporation of appropriate erosion and sedimentation controls and stormwater management features. As part of the Engineering Report, an evaluation of the features necessary to comply with state requirements and the associated Construction General Permit was performed and the selected features are shown on Sheets 11 and 12 of the Engineering Drawings. These features were designed in accordance with the guidance obtained from the Vermont Handbook for Erosion Prevention and Sediment Control, released 2003. Furthermore, these features were designed to comply with §6-606(b)(2)(J) of the VSWMRs and the VTDEC Solid Waste Management Procedure entitled "Procedure Addressing Requirements for Run-on/Run-off Control Systems for Municipal Solid Waste Landfills," dated May 27, 1994. As shown on Sheet 2, stormwater runoff from the TMAs will flow to the existing stormwater management system of the Verpol plant. Calculations related to the design of the proposed stormwater management features are provided in Part D-3 of the Interim Certification Application.

4.4 Final Cover System and Re-Vegetation

The design of the final cover system is presented in the Closure/Post-Closure Plan (Part D-4 of the Interim Certification Application). As noted in the Closure/Post-Closure Plan, it is anticipated that the tailings product can be used as the earthen material component of the final cover system in accordance with the requirements of §6-306(b)(2)(M) of the VSWMRs.

5.0 FACILITY OPERATIONS

Operation of the TMAs is addressed in the Operations Plan, which is provided as Attachment E to the Interim Certification Application. The Operations Plan was prepared in accordance with the applicable requirements of Subchapter 7 (i.e., Operation Standards). Accordingly, the Operations Plan is organized as follows:

- Operations:
  - Operating Hours;
  - Dewatering;
  - Transportation;
  - Placement;
  - Filling Sequence;
  - Monitoring
  - Training; and
  - Nuisance Control;
- Reporting; and
- Record Keeping.