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**OMYA – Verpol Plant**

Dear ,

October 15, 2002

Thank you for coming to the neighbor meeting on October 10. 1 appreciate the time that you are spending to better understand OMYA.

As I promised, here is a copy of the Heindel and Noyes report characterizing the tailings as well as the response from the Waste Management Division. I am taking the liberty of including the other correspondence related to this so that you may have the full picture.

Please let me know if you have questions or concerns. Again, it was nice to meet with you.

Sincerely

Tom Sawyer
Manager

P.S. When do you want to take that tour that we've been discussing? I firmly believe that it will help in further understanding OMYA's impact to the community.

Enclosure:
Heindel and Noyes Tailings Characterization Report dated August 9, 2002
Letter from James Surwilo dated September 6, 2002
Letter to James Surwilo dated September 13, 2002
Letter from Andrea Cohen dated September 30, 2002

Department of Fish and Wildlife
Department of Forests, Parks and Recreation
Department of Environmental Conservation
State Geologist
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State of Vermont

AGENCY OF NATURAL RESOURCES Department of Environmental Conservation

Waste Management Division 103 South Main Street Waterbury, Vermont 05671-0407

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September 6, 2002

Mr. Tom Sawyer,
EHS Manager Florence Road, P.O. Box 10
Florence, VT 05744

Dear Mr. Sawyer:

I have reviewed your August 6, 2002 request to exempt OMYA's Verpol Plant, Florence, Vermont, tailings disposal from the Vermont Solid Waste Management Rules as allowed by SWMR §6-30 1 (b)(2). Accompanying the request was the *Tailings Characterization Report,* prepared by Heindel & Noyes, dated August 9, 2002. During my August 23, 2002, site visit I was provided with three maps: *Tailings Management Plan,* dated 12/5/01; and OMYA - Dolomite *Quarry Site Tailings Stockpile Plan (Figures I and* 2), prepared by Geodesign Incorporated, dated 8/20/02.

. §6-301(b)(2) exempts from the Solid Waste Management Rules:

*Earth materials resulting from mining, extraction, or processing operations except where the Secretary determines that these materials may pose a threat to public health and safety, the environment, or cause a nuisance*.

When the Secretary has made this determination in similar circumstances, the Program has considered both the earth material itself as well as the methods for managing that material. We view these as intertwined, as virtually any material, no matter how inert, will be a threat or a nuisance if mismanaged. Generally, exemptions have been allowed if the earth material is benign, and is managed within some agreed upon framework. For that reason, in order to make the determination, I will require information on the disposal site itself, and information on the operation of the facility, as well as information on the chemical and physical nature of OMYA's tailings.

The August 23 site visit was enlightening. As you related, the proposed methods of tailings disposal in the Dolomite Quarry is consistent to the current methods of disposal in another nearby abandoned quarry. The dewatering, dredging, and the final disposal of the tailings is to occur as they have presently and in the past, the difference being merely the location of the disposal site. The Dolomite Quarry is several hundred feet east of the present tailings disposal site.

The current operation is relatively simple, as I understand it. Drier tailings in the disposal area are bermed into a roughly square shape. The dewatered, yet "sloppy", tailings are dredged from either the settling cells or Dogleg Quarry, placed in off-road dump trucks, and placed within the bermed cell. We observed that finished side slopes of the current disposal area are periodically hydroseeded, and that some of the seeds were germinating.

OMYA's plan is to augment and eventually replace the current tailing disposal area with the remaining below-original-ground capacity of the Dolomite Quarry then continue to mound tailings above original ground at this location. The disposal site will extend outward in all directions from the present Dolomite Quarry hole. Estimating from the maps provided, the present Dolomite Quarry "footprint" 'is approximately 8 acres, while the proposed footprint is 30-40 acres.

At the time of my site visit, I observed no dust, odors, or other nuisance conditions. Although steep according to the Rules, landfill sideslopes should not be steeper than 33% - the sideslopes appeared resistant to erosion, slumping, or instability. In short, I observed nothing problematic in the current management strategy of the disposal operation.

While the site visit raised no issues about the current practices, the exemption application lacks detail about OMYA's proposed disposal operation. Please provide a narrative and/or additional plan sheets on the day-to-day operation. Much of this information we discussed at the site visit, and likely will be part of the Act 250 amendment application, but it has to be a component of our review. Any exemption from the Rules will need to be conditioned on an approved management plan. Examples of the needed information are details of the construction of the individual tailings cells, erosion controls, closure plans, rate and sequence of fill, and ultimate capacity. For the record, the Rules require a minimum 50' buffer zone between a waste management facility and the adjacent property. As we noted during the site visit, OMYA's proposal is a 25' buffer to the parcel to the east, consistent with Town of Proctor zoning criteria.

In addition to understanding the disposal operation and site characteristics, the Program must conclude that the earth material not "pose a threat to public health and safety, the environment". Generally, this has been interpreted by the Program to mean that the material does not emit or discharge contaminants in concentrations above any applicable standards (e.g. groundwater, drinking water, surface water, or air quality).

The information included in the *Tailings Characterization Report* arc useful in understanding the nature of the tailings and the impact of past practices on the environment around the Verpol Plant. The report contains analytical data from analyses of in-plant process water, slurry destined for dewatering, sediment from settling cells, sediment from the current tailings disposal area, and groundwater from surficial and bedrock monitoring and water supply wells. Much of the data were formulated as a result of a site investigation precipitated by a spill of Ortho-phenylphenol (OPP) in November 2000. The report raises several questions and comments.

Semi-Volatile Organic Compound Analytical Results:

- I discussed the status of the OPP spill remediation with Michael Smith, project manager with the Division's Sites Management Section. As indicated in the Report, remediation is considered complete with the exception of long term monitoring. OPP is biogradeable, has a low solubility in water, and an affinity for carbon containing compounds. The likelihood of migration of OPP to any receptors is very slight.

- Tall oil is a component in the flotation agent used to process the ore. No standards exists for the chemical, and the literature suggests that there is little environmental or human health threat at concentrations such as detected in the sediments. Tall oil was found in the cells and quarries where the tailings are dewatered. Given its physical and chemical characteristics, tall oil is not expected to migrate from the disposed tailings.

- Stearic acid was detected in the tailings, but not in the pore water of the disposed tailings, nor in the groundwater. As described, stearic acid is a food additive, and there are no environmental standards for this waste. Stearic acid is added during the production of some products, after the benefication process is complete. In the past, occasionally off-specification product containing stearic acid would be disposed of with tailings. The Report relates that this practice was stopped in 2000, and no additional stearic acid containing waste will be disposed of with the tailings.

- Several other SVOCs were detected in various sampling locations, including groundwater. Can you offer an explanation for their presence, their environmental impact, and their presumed fate?

Volatile Organic Compound Analytical Results:

- Frankly, I find the VOC results difficult to interpret as identical sampling locations have different nomenclature, and it is not clear whether the sampling media is solid or liquid. On page 12, are "Tailings Settling Cell" or "Dolomite Quarry" or "Dogleg Quarry" results from pore water, or water from the surface of these locations, or water at all? Further, the acetone results from the "Tailings Settling Cell" range from <20 -192 ppb, yet I do not find a result of 192 ppb anywhere in Appendix 2. Again on page 12, what is the "Tailings Area - Tailings Solids" location? Where in Appendix 2 is the positive acetone results for this?

- That said, acetone was detected at low concentrations in a number of sampling locations, including the tailings themselves, tailings pore water, and groundwater. Several of the results - although not from groundwater itself - are above the Vermont Groundwater Enforcement Standard for acetone of 700ppb. While the VGES may not be applicable in this instance, it represents a good indicator of whether the waste is a "threat to public health and safety, the environment." The Report contends that acetone is an impurity in a dispersant used in the milling process, and that the washwater containing the dispersant will be redirected to hydrate the final product. The report is not clear whether this process change has been made or is pending. Can you clarify?

- Toluene is nearly ubiquitous at low levels in tailings and groundwater. It has been detected in bedrock wells #96-1 and Well #5, both located some distance from the quarries or the plant itself. In all instances the toluene results are well below regulatory standards. The origin of the toluene apparently is unknown. The Report indicates that no petroleum compounds are used in the milling process, and that toluene may be an artifact of past activities (mining or other).

- Please explain the VOC results for the "White Pigment Plant Site" sampling location in Appendix 2, page 8.

Metal Analytical Results:

- The analytical results for metals indicate no elevated concentrations in the tailings or groundwater.

In conclusion, the site visit revealed no obvious nuisance or environmentally threatening conditions from the current tailings disposal operation. The proposal site and management plan needs to be better detailed so that the Secretary may determine whether the operation, and not simply the waste, constitutes no threat to public health or the environment.

The analytical results provided are useful to understanding the process, past practices, and the state of the environment in and around the site. There are low levels of various contaminants in the tailings, associated pore water, surface water in the settling and dewatering areas, and in the groundwater beneath the site. Very few of the historic results are above a ground water, surface water, or risk-based standard. However, because of the recirculatory nature of the milling process, distinguishing prior waste characteristics from future characteristics is difficult. While several statements within the Report assert that the current site conditions meet Groundwater Enforcement Standards, that assertion is too broad for the finding that the Secretary needs to make. As I stated above, in order to be considered to meet the "no threat" criterion, the waste destined for the planned Dolomite Quarry disposal area must not leach or emit contaminants above any environmental standards. Please confirm that this is true, Supported by any additional data that you believe is necessary.

Sincerely,

James V. Surwilo
Technical Assistance Section

o Consulting Hydrogeologists
. Engineers
- Environmental Scientists

Heindel & Noyes _
PO. Box 64709 Burlington, Vermont 05406-4709
802-658-0820
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September 12, 2002

Mr. Tom Sawyer
OMYA Inc.
10 Florence Road
Florence, Vermont 05744

RE: James Surwilo Letter Concerning OMYA Tailings Operation

Dear Mr. Sawyer,

The purpose of this letter is to clarify Heindel & Noyes' "Tailings Characterization Report", dated August 9, 2002. In summary, the data presented in the report demonstrated that the proposed tailings operation would be in conformance with section 6-301 (b)(2) of the Vermont Solid Waste Management Rules, which exempts from the provisions of the rules earth materials resulting, from mining, extraction, or processing operations except where the Secretary determines that these materials may pose a threat to public health and safety, the environment, or cause a nuisance.

We have determined that the operation would not "cause a threat to public health, safety, or the environment", by examining the existing tailings operation at OMYA. This conclusion was, based upon testing of groundwater around and directly beneath the current tailings operation, surface water downstream from 'the operation, and numerous other sampling points as detailed in the report. The current tailings operation does not leach, emit, or discharge any contaminants above any environmental standards, to any groundwater, surface water, wetland, or other receptor.

Specifically, we have found that no detectable contaminants have been present in the surface water downstream from the tailings operation (see page 5 of appendix 2 for a data table). Groundwater data show that the operation does not leach or emit contaminants above any environmental standard, Bedrock well B drilled directly underneath the current tailings stockpile, shows that the operation does not leach contaminants into groundwater above the standards (see page 2 of appendix 2), Samples collected at a seep at the base of the tailings stockpile showed no detectable contaminants-, also indicating a lack of groundwater contamination,

We emphasize that the data pertinent to the determination are the groundwater and surface water test results. Those test locations represent the impact which

the proposed operation would have "to public health, safety, or the environment". Because the groundwater and surface water samples were taken from in-situ locations, under the influence of a tailings operation which has been in existence for many years, !hey indicate the actual effects to the environment of the proposed activity. Many other sampling locations, including settling basins, plant tailings discharge, thickener overflow, quarries, etc., do not represent the tailings operation's impact on the environment. Rather, they were evaluated in the report to illustrate the origin of the tailings, and the various treatment processes to which they are subjected.

In response to specific comments from Mr. Surwilo's letter to you dated September 6, 2002, we present the following information. His comments are summarized in bold type.

- Page 3, 4th paragraph: **Several other SVOCs were detected in various sampling locations, including groundwater. Can you offer an explanation for their presence, their environmental impact, and their presumed fate?**

- other than the SVOCs which were associated with the current tailings operation and evaluated in detail (OPP, Tall oil, and stearic acid -the OPP will not be associated With future, operations), several other compounds were detected, All of these "other" SVOCs were found in very low concentrations, and were only detected occasionally. Possible origins of those compounds include contamination at the analytical laboratory, breakdown products of the former OPP release, and historical uses of the site.

- Refer +a the summary table on, page 8 of the text- For example, bis(2ethyihexyl)phthalate was found In two samples at less than 6 ug/L. This compound 'is -used in the laboratory which tested the samples, and at these levels likely originated in the lab, "Alkylated cyclic hydrocarbons" were found in some locations This very general class of compounds, which includes petroleum constituents, may have originated from the former asphalt plant at the site, or from biodegradation of OPP. Another class of compounds, "carboxylic acids", were found in a few locations. Carboxylic acids include weak organic acids such -as acetic acid vinegar), stearic acid, and formic acid (which can be naturally formed). Those detections might represent stearic acid from failed product I batches, or naturally occurring substances. Still other compounds; such as phenol, are believed to be breakdown products of the OPP which was accidentally released in November 2000. Those compounds have not been detected recently, because they ultimately biodegraded to form carbon dioxide and water. and because that incident has been remediated.

- Concerning environmental fate and impact, these "other" SVOCs are present

in very low concentrations, and only so on occasion; and have no regulatory standards. Therefore, they have no known adverse impact, and rapidly dissipate or biodegrade.

- Page 3, 5th paragraph- **VOC results are difficult to interpret... on page 12, are "Tailing Settling Cell" or "Dolomite Quarry" or "Dogleg Quarry" results from pore water, or water from the surface of these locations, or water at all?**

  Water samples were analyzed at these three locations, although they contain suspended particles due to the nature of the locations tested. At the Dogleg Quarry and the East Settling Cell, solids samples were also analyzed separately. To consolidate and simplify the summary table on page 12, the solids and liquid results from these locations were combined. The data are broken down in appendix 2: page 3 shows the water sample data for the Dogleg Quarry and page 4 shows the solids data. The Johnson Company sample site "WCTC-5," (settling pond, pages 6-10) is a solids sample and the OMYA sample "West Settling Cell" (page 13) is a water sample.

- Page 3, 5th paragraph: ... **acetone results from the "Tailings Settling Cell range from <20 -192 ppb, yet I do not find a result of 192 ppb?**

  Mr. Surwilo discovered a typographical error. The table on page 12 should read " <20-92 ppb ", consistent with page 13 of appendix 2.

- Page 3, 5th paragraph: .. **Again on page 12, what is the "Tailings Area - Tailings Solids" location'?**

The "Tailings Area - Tailings Solids" row of the table presents the range of SVOCs found in the seven solids samples taken from the current tailings stockpile. This is the same stockpile which Mr. Surwilo observed on his August 23 site visit with you. The map on page I of appendix 1 shows the sample locations. Those seven sites include "WC-1 " through "WC-5" (see appendix 2, page -11 for all data), and "WCTC-1" and "WCTC-2" (from the Johnson Company work, -see appendix 2, pages 8-10). Similarly, the "Tailings Area - Pore Water" row presents the pore water results from those same locations.

The table on Page 12 summarizes and groups sample data, because very many samples were analyzed by different consultants, at different sites. We have used the same nomenclature and grouping on page 3 (SOC data) and page 15 (metals data).

- Page 3. 5th, paragraph: ... **Where in appendix 2 is the positive acetone results for this (tailings area -tailings solids location]?**

As appendix 2 shows, no acetone was detected in the "tailings area - tailings solids" samples. The table on page 12 concurs, showing that only toluene was found in those samples

- Page 4, 1st paragraph: **Several of the results - although not from the groundwater itself - are above the Vermont Groundwater Enforcement Standards for acetone of 700 ppb. While the VGES may not be applicable in this instance, it represents a good indicator of whether the waste is a "threat to public health and safety, the environment".**

The best indicator of the "threat to public health and safety, the environment" is the data collected from the environment itself - the surface water and groundwater samples, in this case. The other sampling locations to which this comment refers do not represent the tailings operation's impact on the environment. Rather, they were evaluated in the report to illustrate the origin of the tailings, and the various treatment processes to which they are subject. Because a tailings operation already has existed at OMYA for over twenty years, we could study the actual effects of that operation on the environment, using groundwater wells and surface water sampling. It is this groundwater and surface water data which best depicts the environmental impact of the proposed operation.

- Page 4, 1st paragraph: **The report is not clear whether the process change has been made or is pending. Can you clarify?**

You have informed us that OMYA will complete this change by the end of this week.

- Page 4, 3rd paragraph: **Please explain the VOC results for the "White Pigment Plant Site" sampling location in Appendix 2, page 8.**

The White Pigment Plant Site, also known as the East Plant, is not related to OMYA's current or proposed tailings operation. An extensive environmental investigation has been conducted at the White Pigment Plant Site following the discovery of these VOC results. Disposal practices of the former White Pigment Company from -the 1940's through the early 1980's - including the use of kerosene as part of a flotation technique that was discontinued in the early 1970's - resulted in the presence of the VOCs found at this site. These practices are not acceptable, and were discontinued decades ago.

8601014

Please call me or Jeff Noyes if you have any additional questions.

Sincerely,

Ammeda John Perry
Hydrogeologist

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OMYA – Verpol Plant

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Mr. James V. Surwilo, Technical Assistance Section
Waste Management Division
Vermont Agency of Natural Resources
103 South Main Street
Waterbury, VT 05671-0407

September 13, 2002
Re: OMYA Tailings Operation
Fax: (802) 241-3296 Page 1 of 7

Dear Mr. Surwilo,

This letter is in response to your request for more information in your September 6, 2002 letter. Each of your requests is outlined below and a response is provided.

- **Page 2,4th paragraph: Please provide a narrative and/or additional plan sheets on the day-to-day operation.**

The tailings management will proceed in phases. Initially, a two -foot thick, granular drainage blanket will be installed around the perimeter of the stockpile area prior to placement of the tailings product. An outer shell of compacted tailings placed in 6" - 12" lifts, sloped to provide drainage then will be placed above the drainage blanket. A drainage system will be installed around the perimeter of the stockpile area to capture both process water and rainwater from the stockpile area. A previously installed drain will be left in place, but the primary capture of water released from the stockpile area will be by the perimeter drain. The water captured in the perimeter drain will be recycled and reused in the Plant's production process. Standard erosion control practices will be utilized during all phases of the stockpiling operation on. These include the use of silt fences, hay bales and hydro seeding.

To ensure ease of handling and to minimize the amount of water transported to the stockpile area, the tailings product will be dewatered to a minimum of 30% solids. The dewatering of the tailings product will be completed by one of two methods; the use of settling cells, which is the current method used at the plant, or the possible future use of a new thickener. Dewatering by use of the settling cells occurs in three steps: First tailings product will be pumped from the flotation process into one of two primary settling cells located south of the Verpol Plant as shown on the plans. The two primary settling cells will be employed alternately. In the primary settling cells, the suspended solids settle and the water is decanted and returned to the Plant's production process. Once the initial settling cell is full of thickened solids, the tailings product from the flotation process will be placed in the other primary settling cell, and vice versa. The thickened tailings product in the first primary settling cell will be excavated with a backhoe and transported via dump truck to the stockpile area for secondary dewatering. There, the tailings product will be deposited into secondary settling cells, and allowed to dewater further through percolation and evaporation. Lastly, as secondary settling cells are filled, the dewatered tailings product will be excavated again and utilized to construct additional secondary settling cells for treatment of subsequent deliveries of tailings product. Over time, the construction, filling, and completion of the secondary settling cells will effect the construction of the "layers" of the stockpile. A similar type of construction with the tailings product presently is being performed on site in the area due south of the plant.

Use of a thickener to dewater the tailings would involve the installation of an approximate 100 feet diameter thickener at the north end of the proposed stockpile area. Tailings product would be pumped from the flotation process to the thickener where the tailings product will settle. Tailings product at a concentration of 60 to 75 % solids would be pumped to locations in the stockpile area where the 'thickened tailings will form mounds. As the

mounds are formed, the water would be collected in a perimeter drain around the stockpile. This water, along with the thickener overflow water, would be returned to the plant's production process. Once the mound reaches a given size, another location in the stockpile area would be selected for the formation of the next mound, and so on. At this point, the previously created mound will be graded with a bulldozer to form the grade of the stockpile. The perimeter will be compacted to ensure stability in the stockpile.

Once the capacity of the stockpile has been fully reached, the remaining open areas will be hydro seeded. (The sides of the stockpile are seeded during construction as part of the on-going erosion control plan.) Since the tailings work well as a cap material, additional cap material is not required. Water from the area will continue to be collected for plant use.

As noted, the proposed stockpile volume will satisfy the Plant's operation for approximately ten years. During that time, OMYA will continue to pursue the location of markets for the tailings product. One possible use being investigated is back filling abandoned quarries and other natural or man -made voids. This would allow for the reclamation of land that otherwise may not serve a useful purpose. In addition, it may be possible to utilize the tailings product for industrial applications, but those have not been proved or selected to-date.

As indicated in your letter, you have already received drawings of the tailings management plan as well as the Dolomite quarry site tailings stockpile plan.

- **Page 4, Ist paragraph: The report is not clear whether the process change has been made or is pending. Can you clarify?**

Changes to the plant wash water system are being finished this week to reclaim significant amounts of wash water to minimize the quantity of dispersant entering the Dogleg quarry. As of today, our engineers believe that that these changes will be operational by early next week.

All other requests for information are addressed in the attached letter from Heindel and Noyes.

Thank you for your time and effort in this matter. Please call me at 770-7608 or Neal Jordan at 770-7261 if you have questions or will require additional information.

Sincerely,

Tom Sawyer
EHS Manager

Enclosure:
Heindel and Noyes letter dated September 12, 2002

State of Vermont
Department of Fish and Wildlife
Department of Forests, Parks and Recreation
Department of Environmental Conservation
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September 30, 2002

Mr. Tom Sawyer, EHS Manager
OMYA Verpol Plant
Florence Road, P.O. Box 10
Florence, VT 05744

RE: OMYA Tailings Disposal - Exemption from the Solid Waste Management Rules

Dear Mr. Sawyer:

On August 12,2002, OMYA submitted to the Agency evidence to demonstrate that the tailings from the OMYA Verpol calcium carbonate plant in Florence, Vermont, should be formally exempted from the Solid Waste Management Rules (SWMR). The evidence was in the form of a cover letter and report by Heindel and Noyes, Consulting Hydrogeologists, entitled *OMYA, Inc., Verpol Plant -Tailings Characterization Report,* dated August 9, 2002. Subsequently, James Surwilo, ANR, visited the current and proposed tailings disposal areas, obtained several site plans, and requested from you additional information in support of the exemption request. That additional information was included in a September 13, 2002, letter, with an attachment from Amedda John Perry of Heindel and Noyes.

Section 6-301(b)(2) of the SWMR exempts:

> *Earth materials resulting from mining, extraction, or processing operations except where the Secretary determines that these materials may pose a threat to public health and safety, the environment, or cause a nuisance.*

When making such a determination, the Program considers both the earth material itself as well as the methods for managing that material. The Program views these two factors as intertwined, as virtually any material, no matter how inert, will be a threat or a nuisance if mismanaged. Generally, exemptions are confirmed if the Secretary finds that the material does not emit or discharge contaminants in concentrations above any applicable standards (e.g. groundwater, drinking water, surface water, or air quality) and is managed by means of some agreed upon strategy that in and of itself will not cause a nuisance or threat.

The **information provided by** Heindel and Noyes included a hydrogeologic site characterization, a description of the basic tailings generation and disposal processes, a physical characterization of the tailings, as well as comprehensive analytical results from testing of the tailings themselves, process water, tailings pore water, and ground- and surface water. The information provided by you included three plan sheets; *OMYA - Dolomite Quarry Site Tailings Stockpile Plan* (figures I and 2), dated August 20, 2002, and *Tailings Management Plan,* dated December 5, 2002, and a narrative on the operation of the disposal area.

The submitted information concludes that:

1. Seven substances of concern pertaining to the tailings have been detected in the various materials testing.

a. **Tall oil** is a component of the flotation agent used in the process to separate impurities from the finished calcium carbonate product. Tall oil is a refined byproduct of pulp wood processing. Tall oil is present in the tailings, but not in any discharge locations, and not in groundwater. Tall oil has an affinity for adsorbing onto carbon-rich media, such as the tailings, and thus is not expected to migrate off site. Tall oil is recognized for low toxicity, and no regulatory standards exist for tall oil.

b**.** **Ortho-phenylphenol** (OPP) is a biocide added to the finished calcium carbonate product just prior to shipping. A November 2000 accidental spill resulted in 4500 gallons of this chemical being released into OMYA's Dogleg Quarry. Because of the recirculatory nature of the milling process, OPP has been detected in the sediments and surface water of the other quarries used for tailing storage and disposal. In 2001, The spill was remediated and monitored to the satisfaction of the ANR's Sites Management Section.

c. **Stearic acid** was detected in one tailing solids sample. Stearic acid is a fatty acid added to some of OMYA's calcium carbonate products. In the past, off-specification batches of these products would be disposed of with the tailings. This approach was discontinued in 2000, and no additional stearic acid should be introduced into the system. Stearic acid is utilized as food additive and poses no known health or environmental risk at such concentrations.

d. **Toluene** has been detected in quarry surface water, pore water, solids, and in the groundwater around the site, including locations such as Well 96-2 that are quite some distance from the tailings disposal quarries. In theory, the detection of toluene in the tailings indicates that was introduced at some point in the production process, although not known how or when. Another possibility is that the toluene is an artifact of previous industrial activities on the OMYA property, although curiously few other petroleum hydrocarbons were detected. In any event, the toluene is ubiquitous but at extremely low levels, well below the Groundwater Enforcement Standard of 1000 micrograms/liter.

e. **Acetone** was detected in quarry water, solids, and groundwater. Acetone is a impurity in a dispersant used in the milling process to maintain the calcium carbonate in suspension, and thus would be present in the washwater that is recirculated through the tailings' settling and disposal processes. One July 2001 tentative result in Well B, within the current disposal area, identified acetone at concentration of 780 ppb, exceeding the Groundwater Enforcement Standard of 700 ppb. However, no detectable acetone has been identified in this location in ten subsequent samples, Several other results in the quarry water or process water approached or exceeded the ES, although this groundwater standard is not directly applicable to the recirculated process water.

As confirmed in your September 12 letter, OMYA has completed plant design changes that will redirect the washwater out of the milling process "loop," and instead into the final product slurry. By doing so, residual acetone and isopropyl alcohol in the tailings will be reduced.

f. **Isopropyl alcohol** is another component of the dispersant that has been detected, but only in plant process water, not in either the tailings themselves or the groundwater. The presumption is that the isopropyl alcohol present in the process water volatilizes in the tailings settling system.

g. **Metals** sampling was performed on the tailings, process water, ground- and surface waters. All of the test results were well below the applicable standard for the particular media. The results were consistent with naturally occurring concentrations.

2. Future tailings are proposed to be managed similarly to the present strategy. As described, the impurities in the production of calcium carbonate are floated out by the use of a floatation agent and air bubbles. The impurities are settled out of the solution in several settling cells. The tailings are further dewatered in stockpiles until such point as the material is dry enough to be excavated and transported via dump trucks to final deposition in the abandoned quarries. OMYA is proposing to augment and eventually replace the current tailing disposal area with the remaining below-original-ground capacity of the Dolomite Quarry then continue to mound tailings above original ground at this location. The disposal site will extend laterally in all directions from the present Dolomite Quarry hole. Estimating from the *OMYA - Dolomite Quarry Site Tailings Stockpile Plan* (figures 1), the present Dolomite Quarry "footprint" is approximately 8 acres, while the proposed footprint is 30-40 acres.

The Secretary has determined that the OMYA Verpol Plant tailings and associated management strategy as described do not pose a threat to public health and safety, the environment, or will cause a nuisance, and therefore are exempt from the Solid Waste Management Rules provided that:

A. The composition of the tailings is not appreciably altered from the description provided in the above referenced correspondence. Any change in the tailings generation process, change in chemical additives, or methods of dewatering shall be cause for the Secretary to reevaluate the Rule exemption.

B. The tailings are managed in accordance with the description provided in the above referenced correspondence and site plans, **with the exception that no tailings shall be disposed within 50' of the eastern and southern property boundaries.** (Revised site plans should be submitted to this office.)
Erosion control mechanisms shall be implemented as needed to maintain a stable tailings pile and to prevent sediment discharges to the waters of the state or to wetlands. Further details for the reclamation of the quarries maybe contained in OMYA's Act 250 permit(s).

This exemption is specific to the Verpol Plant tailings and disposal sites and does not allow for the disposal of tailings from other sources or in other locations. This exemption maybe altered or revoked at anytime based on the receipt of information that indicates that the tailings do pose a public health, safety, or environmental threat, or will cause a nuisance. **This exemption does not provide authorization of any activity in lieu of Act 250 or other state or local laws which may also govern.**

Please call me at 241-2368 or Buzz Surwilo at 241-3481 if you have any questions.

Sincerely,

Andrea Cohen
Solid Waste Program Manager

**OMYA – Verpol Plant**

Florence Road, P.O. Box 10
Florence, Vermont 05744
Tel. (802) 770-7608
Fax. (802) 770-7589

Andrea Cohen, Program Manager
Solid Waste Program
Waste Management Division
VT Agency of Natural Resources
West Office Building
103 South Main Street
Waterbury, VT 05671-0407

August 6, 2002

Dear Ms. Cohen:

The OMYA Verpol plant located in Florence, Vermont, has been managing its calcium carbonate process tailings on-site for over 20 years. This aspect of OMYA's operations has been reviewed previously by District Environmental Commission #1 and addressed in past Act 250 proceedings and permit amendments.

OMYA plans to modify its tailings management only slightly with respect to placement location on site, and will be seeking to amend its Act 250 permit accordingly. In order to demonstrate compliance with Act 250 Criterion 1 B, OMYA commissioned the consulting firm of Heindel and Noyes to fully analyze and characterize the potential public health, environmental, and nuisance aspects of the proposed modified tailings management operation. Their report is attached. Based on the analyses and conclusions presented therein, we believe OMYA's tailings remain exempt from the Vermont Solid Waste Management Rules pursuant to Section 6-301 (b)(2).

We anticipate that the District Environmental Commission will look to the Agency of Natural Resources for concurrence with OMYA's position on this historic exemption. Therefore, in advance of filing our Act 250 Permit amendment application, OMYA seeks a written determination from the Solid Waste Program to the effect that the earth material tailings resulting from OMYA's calcium carbonate processing operations, as proposed to be managed on site, are exempt from the Vermont Solid Waste Management Rules pursuant to Section 6-301 (b)(2) and will not pose a threat to public health and safety or the environment, or cause a nuisance.

Thank you in advance for your Program's time and effort. Please call me at 770-7608 or Neal Jordan at 770-7261 if you have questions or will require additional information.

Sincerely

Tom Sawyer
EHS Manager

# OMYA, Inc.
# Verpol Plant
## Florence, Vermont

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# TAILINGS CHARACTERIZATION REPORT

Prepared for.

OMYA, Incorporated

Prepared by.

Heindel and Noyes

August 9, 2002

# OMYA, Inc.
# Verpol Plant
## Florence, Vermont

# TAILINGS CHARACTERIZATION REPORT

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# OMYA, Inc.
# Verpol Plant
## Florence, Vermont

# TAILINGS CHARACTERIZATION REPORT

## EXECUTIVE SUMMARY

- The purpose of this evaluation was to perform an assessment of whether OMYA's proposed tailings product ("tailings") stockpiling operation will conform with section 6301(b)(2) of the Vermont Solid Waste Management Rules, and with 10 V.S.A. 6086(a)(1)(B), Criterion 1 (B) of Act 250.

- The Solid Waste Management Rules, section 6-301(b)(2) (1/15/1999), exempts from the provisions of the rules earth materials resulting from mining, extraction, or processing operations except where the Secretary determines that these materials may pose a threat to public health and safety, the environment, or cause a nuisance.

- The waste disposal criterion for Act 250 approval, 10 V.S.A. § 6086(a)(1)(B), requires that the project and disposal of wastes therefrom will not involve the injection of waste materials or any harmful or toxic substance into groundwater or wells.

- Tailings consist primarily of the natural mineral impurities from the calcium carbonate beneficiation process, along with a large portion of calcium carbonate lost via that process, and a much smaller portion of calcium carbonate from the rest of the production process. OMYA is seeking a market for the tailings and/or a cost-effective means of recovering the calcium carbonate portion. In the interim, OMYA is proposing to continue to utilize the tailings on-site to refill depleted quarries and to stockpile the excess.

- Testing has been conducted of the tailings material, plant process water, ground water, seepage water, and surface water in the vicinity of OMYA's tailings management area.

- Testing has identified six substances, which are related to the tailings, that pertain to the scope of this assessment: tall oil, OPP, stearic acid, toluene, acetone, and barium.

- Tall oil is used in the beneficiation process, and is a part of the tailings stream. It is not regulated, and has no known harmful effects. Tall oil will remain bound to the tailings solids and will not enter groundwater or wells.

- OPP is not typically associated with the tailings operation, but was found in tailings, groundwater, and surface water on site due to an accidental spill that occurred on November 18, 2000. Upgrades have been performed to the plant to prevent a recurrence of such a spill. The OPP has been removed from surface and groundwater through a remediation program, conducted under the oversight of the State of Vermont. No adverse effects to public health and the environment have occurred or will occur due to OPP at OMYA.

- Stearic acid is added at low levels (typically <1 %) to some OMYA products and has entered the current tailings stockpile area on occasions when product batches failed quality control tests and were deposited along with other tailings. Stearic acid is not regulated, is recognized as safe for food use, will be immobilized within the tailings, and will not enter the environment.

- Toluene is found in low levels in the tailings stream. Toluene levels are well below standards for groundwater, surface water, and drinking water, indicating no adverse effect. Toluene has not been detected in surface water discharging off-site.

- Acetone had been found in tailings, in groundwater directly beneath the current tailings stockpile area, and in the quarries used for tailings settling. Acetone levels (5% exceedance levels) are lower than Vermont Groundwater Enforcement Standards. It had not traveled, either in groundwater or in surface water, from the stockpile or settling quarries. OMYA has designed modifications to the milling and water circulation processes to minimize the content of acetone in the tailings. As a result, the tailings operation will not cause any violations of groundwater or surface water standards for acetone.

- Levels of Barium in and around the tailings are comparable to natural levels of this element, indicating no adverse effect. No barium was detected in surface water discharging off-site.

- The proposed tailings management operation will be in conformance with both 10 V.S.A. § 6086(a)(1)(B) and section 6-301(b)(2) of the Vermont Solid Waste Management Rules: no harmful or toxic substances will be injected to groundwater, and the operation will not cause any nuisances or threats to public health and safety, or the environment.

# OMYA, Inc.
# Verpol Plant
## Florence, Vermont

# TAILINGS CHARACTERIZATION REPORT

### 1. INTRODUCTION

### A. Project Overview

Heindel and Noyes was contracted by OMYA, Inc., to evaluate the environmental impacts of its tailings management practices. The purpose of this evaluation was to perform an assessment of whether OMYA's proposed tailings operation would conform with section 6-301(b)(2) of the Vermont Solid Waste Management Rules and with 10 V.S.A. § 6086(a)(1)(B) of Act 250. Conformance with these requirements involves verifying that the operation will not be a nuisance, and will cause no threats to public health and safety or the environment, and will not inject waste materials or any hazardous or toxic substance into groundwater. The tailings management operation will be in conformance with the identified statutes and regulations.

The OMYA, Inc. Verpol plant in Florence, Vermont produces fine ground calcium carbonate. Quarried marble ore is delivered to the plant by truck; it is coarsely ground processed to remove natural mineral impurities, and ground further to the desired final particle size. The finished product is shipped off-site in rail cars and trucks as a water-based slurry and as a dry powder.

Tailings consist primarily of the mineral impurities separated from the calcium carbonate via the beneficiation process, mixed with calcium carbonate lost due to the efficiency limits of the current technology. To a much lesser extent, tailings also may consist of calcium carbonate from the rest of the production process. In the beneficiation process, impurities are floated out of a mixture of water and coarsely ground ore by means of a flotation agent and air bubbles. The typical particle size of this portion of the tailings is 45 microns. Tailings are settled out from the mixture, and deposited on site in and over former quarries. Water from the production process is recirculated and reused

in the plant, or is shipped from the plant as part of the slurry product; excess water is discharged offsite rarely, when necessitated by very wet weather conditions,

Currently, OMYA places its tailings in two locations that are approaching capacity. Tailings from the flotation beneficiation process are conveyed either to the onsite Dolomite Quarry, where the solids are allowed to settle, or alternately to two settling cells, where the solids settle and from which they are dredged periodically. Tailings from the plant milling and washwater are settled in the onsite Dogleg Quarry, which is also periodically dredged. The dredged solids from the settling cells and Dogleg Quarry are deposited over an abandoned quarry due south of the Dogleg Quarry, referred to as the current tailings stockpile area. That abandoned Quarry is part of the historical Dogleg Quarry complex. (See map, page 1 of Appendix 1. The abandoned quarry is shown as the crosshatched "current tailings area".)

Because both the Dolomite Quarry and the current tailings stockpile area are nearly filled to capacity, OMYA proposes to commence a new tailings management plan. A new tailings stockpile area is proposed to be created on top of the filled Dolomite Quarry. Tailings would be dewatered, and water recovered from the dewatering process would run into the Pittsford Italian Quarry, already used as part of OMYA's water recirculation system. Tailings solids would be stockpiled temporarily, allowed to drain further (with water again entering the Pittsford Italian Quarry), and finally deposited on the new tailings stockpile area. Tailings from plant milling and washwater also would be deposited on the new tailings stockpile area, after being allowed to settle in the Dogleg Quarry, as is the case currently.

For this investigation, samples of water and tailings solids taken from locations throughout the process stream were analyzed chemically. Samples were obtained of tailings solids and pore water from the current tailings stockpile area, of tailings solids from settling cells, of groundwater in and around the current tailings stockpile area, of seepage water from below the current tailings stockpile area, of surface water in the quarries and offsite at permitted points of discharge, and of process water at various locations in the plant. Statistical analysis of sampling data was performed. The hydrogeology of the site was studied in detail in order to perform this investigation. OMYA's water and tailings management processes and chemical usage were evaluated.

## B. Tailings Operation Description

Tailings primarily are the mineral impurities removed during the process of producing the calcium carbonate products, but also contain a large percentage (up to 60%) of calcium carbonate, which cannot be recovered due to the efficiency limitations of current flotation technology. The mineral impurities consist primarily of micas, quartz, and feldspars. Those impurities are floated out of a mixture of water and coarsely ground ore, by means of a flotation agent and air bubbles. The typical particle size of this portion of the tailings is 45 microns. Water from the flotation process and plant wash water is conveyed through a series of settling cells and former quarries known as the Dogleg Quarry, the Dolomite Quarry, and the Pittsford-Italian Quarry (see map,

page 1 of appendix 1). Tailings settle out in these cells and quarries. The settled solids are dredged from the cells and Dogleg Quarry, and deposited in or over inactive quarries located on site. The other two quarries in the process water stream are allowed to fill in. Water from the settling cells and quarries is recirculated and reused throughout the plant.

A discharge permit allows discharges off-site, at two points of discharge, but only one discharge point typically is used. Off-site discharges have been made only when necessary because of heavy rain or snowmelt events. Water to be discharged is pumped from the on-site Pittsford-Italian Quarry, the downstream-most quarry, to a series of settling basins and swales. The discharge water is first conveyed to a settling pond north of the East Plant ("East Settling Pond"). A standpipe in the pond acts as the headwater of a small gully that drains to another on-site settling pond, which in turn empties to a grass lined swale leading under the Florence Road to Otter Creek. A second permitted discharge point exists downstream from a settling pond near the entrance to the West plant ("West Settling Pond"). However, rather than being discharged offsite, water that collects in that pond is recirculated to the Dogleg Quarry. The second point of discharge is maintained, in the event it ever may be needed.

## II. SITE DESCRIPTION

### A. Location and Topography

The OMYA plants are situated in the community of Florence, within the town of Pittsford, Vermont. The site is located in the foothills at the eastern margin of the Taconic Mountain Range. This region is considered the northern end of the Vermont Valley, which runs north to south between the Green Mountains and the Taconics. The Otter Creek, flowing north, is east of the site. The topography generally slopes east to the Creek, although due to the numerous hills and knolls, slope and topography are highly varied, The OMYA Verpol plant (also called the West plant) itself is located on a promontory of bedrock, surrounded on the west, north, and east by lowlands, swamps, and streams. The East plant, separated from the West Plant by a ridge of land and ledge, also is surrounded by similarly varied terrain. The East plant, used for product development and drying of certain product lines, is not a source of tailings. The Verpol plant is the main mineral processing facility and is the subject of this report.

### B. Geology

Surficial Geology

Surficial materials vary between the upper locations at the plant site, and the valleys on the west, north, and east. At the Verpol plant proper, thin layers of glacial till cover bedrock, and, at many locations, the bedrock surface is exposed. Drilling logs from water wells in the vicinity indicate till thicknesses from 1 to 3 feet on the higher terrain. In the valleys surrounding the plant site, gravel wells have been drilled into a confined aquifer that is covered by 60 to 70 feet of clay, peat, and silty clay. The confined gravel aquifers are underlain by glacial till.

The glacial till at the plant site and beneath the gravel aquifers was deposited during glaciation. Later, as glaciers began to melt, the gravel was deposited in the low areas, by the meltwater that flowed through the valleys. Next, as glacial lakes developed, the valleys were submerged, and the clays and silty clays settled out of the lakewater, accumulating on top of the gravel. The higher terrain at the plant site was above the level of the lakes and, therefore, did not receive any gravel, clay, and silt from the meltwater and glacial lakes.

Bedrock Geology

Carbonate bedrock with karst features underlies the site, and fractures run in a north-northwest to south-southeast orientation, nearly parallel with the valley.

Because of the use of the site for bedrock mining, the geology has been well studied. Bedrock consists of closely related carbonates: dolomite, limestone, and marble. According to reports by Geomapping Associates (1996), the carbonate rocks have solution voids (karst features) that have been filled with clay minerals and sediments. The solution voids are the result of erosion and dissolution of the rock material by groundwater.

## C. Potentially Affected Environment

A survey was performed of sensitive receptors within the vicinity of the plant and the tailings management areas. Bedrock groundwater and surface waters are the primary environmental receptors of potential waterborne discharges from the tailings materials.

Bedrock Aquifers

The quarries where the tailings settling process occurs are excavated into bedrock. Water may discharge from the quarries into the aquifers, depending upon the water management at the plant. The floor and sidewalls of the Dogleg and Dolomite quarries are effectively sealed by the deep layers of impermeable tailings which have settled. Water may seep out from these quarries only during the unusual event when water levels are elevated above the level of the tailings. The bedrock beneath the current tailings stockpile area also is in contact with the tailings. Testing of the bedrock aquifer was conducted by sampling at a network of 7 wells located in, upgradient, and downgradient from the tailings management areas. (See bedrock aquifer map, page 2 of Appendix 1.)

Confined Gravel Aquifers

The confined gravel aquifer is localized in the valley to the northwest of the plant and the tailings area. Groundwater flow from the site is to the north and northeast, and does not impact or recharge the gravel aquifer, which appears to obtain its recharge from the higher terrain to the west. Testing has determined that the gravel aquifer is not hydraulically connected to the bedrock aquifer in the vicinity of the current tailings area and quarries. A pumping test was performed to assess the connection between the confined gravel aquifer, where OMYA's two gravel wells are located, and the bedrock

aquifer at the plant site. This test was conducted between May 8 and May 10, 2001, with the gravel wells operating at the constant rate of 66 gallons per minute. This flow rate is equal to the normal production rate of the wells. Monitoring was conducted using automatic dataloggers in bedrock wells A, B, and C, which surround the tailings area and quarries.

Monitoring results from the pumping test show that the bedrock aquifer at the plant site is not connected to the gravel aquifer. The three bedrock wells did not respond to the pumping of the gravel wells. Well B, located within the current tailings stockpile area, displayed receding water levels in response to dry weather experienced during the test period. Well C, located adjacent to the Dolomite Quarry, also displayed a receding water level in response to the dry weather following the snowmelt. The recession rate was constant prior to, during, and after the pumping period, indicating no connection to the gravel wells. Well A, located in the center of the OMYA plant site, displayed a gradually rising water level before, during, and after the test. Water levels rose in well A because it is located downgradient from the other two wells, where the lag time in response to weather events is longer. Wells B and C already had begun receding following snowmelt while well A still was experiencing recharge. (See data, pages 3-4 of appendix 1).

The gravel aquifer is not hydraulically connected to the bedrock aquifer at the plant site, and has not been impacted by the tailings or by other plant operations. The aquifer is not considered a sensitive receptor due to its geologic isolation from the tailings operation.

Public Community Water System

The Pittsford-Florence Water System (WSID #5226) operates a pair of gravel wells near the Otter Creek, east of the plant. The main and emergency backup wells are located adjacent to each other. According to the water system operator, the wells produce up to 600,000 gallons on peak days. Average production is 200,000 gallons to 350,000 gallons per day. Demand depends significantly upon OMYA's contractual use of municipal water to supplement its own sources.

The wells are approximately 3,300 feet northeast from the Dogleg Quarry, 3,400 feet northeast from the Dolomite Quarry, and 2000 feet east from the Pittsford-Italian Quarry. The wellhead protection area (WHPA) extends to the ridgeline east of the Pittsford-Italian Quarry; none of the three quarries, nor the current and proposed tailings stockpile areas, nor the discharge points are within the WHPA.

Testing of the Public Community wells indicates that they obtain their recharge water primarily from the Otter Creek, are not hydraulically connected to the OMYA site, and are not impacted by any activities at the site. These wells are not considered sensitive receptors of the tailings operation due to their distant location and geologic isolation.

Surface waters

The Otter Creek and its tributary streams are present near the OMYA plant site. Those surface waters may receive discharge from the settling pond / quarry flow process or from groundwater discharge. Our evaluation has included testing of surface waters throughout the OMYA site, including at the point used for off-site discharge. No contamination has been found at the discharge point.

## III. TAILINGS EVALUATION

A comprehensive evaluation of the environmental effects of the tailings operations has been conducted. Tailings solids, plant process water, groundwater, and surface water were tested for metals, volatile organic compounds, semi-volatile compounds, pesticides, and the flotation agent used at the plant. The results of the testing indicate that nearly all hazardous materials and regulated chemicals are absent throughout the tailings stream. At localized areas within some quarries, in the current tailings stockpile area, and in the groundwater directly beneath it, flotation agent and volatile organics were present at concentrations below applicable regulatory standards.

### A. Methods

Samples have been collected at various times since November of 2000. Much of the data analyzed in this report was collected as part of several other investigations performed at the site by Heindel and Noyes and by the Johnson Company of Montpelier, VT. Data have been compiled and organized by location and type of chemical analysis.

In downstream flow order, samples have been collected of water from four locations within the plant (11,000 gallon tank, cyclone overflow, thickener overflow, and 500,000 gallon tank," OMYA); of slurry from a sample tap in the OMYA plant from where tailings material is sent to the settling cells ("WCG-1", Johnson Company), of slurry from the flotation tailings discharge point to the Dolomite Quarry (H&N, OMYA), of sediment from a primary tailings settling cell ("WCTC-5", Johnson Company and "west settling cell", OMYA), of sediment and water from the Dogleg Quarry (Heindel & Noyes, OMYA), of water from the Dolomite Quarry outflow (Heindel & Noyes, OMYA, Johnson Company), of water from the Pittsford-Italian Quarry (Heindel & Noyes, OMYA), of sediment and pore water from the current tailings stockpile area ("WCTC-1" and "WCTC-2", Johnson Company, and "WC1 - WC-5", Heindel & Noyes), and of groundwater from 9 wells located on and off site. Well samples include three onsite bedrock monitoring wells (A, B, and C, Heindel & Noyes, OMYA), three onsite abandoned bedrock wells (#2(s), 96-1, and 96-2, Heindel & Noyes, Johnson Company), and two in-use onsite wells (Gravel #1, Johnson Company; and the CDP well or well #5, by Heindel & Noyes and Johnson Company). Finally, surface water has been sampled at a seep downgradient from the current tailings stockpile area (seep 1, Heindel and Noyes), at a drainage Swale by the West plant ("WCSW-2", Johnson Company), and near the currently used permitted

offsite discharge point, at the outlet of the East settling pond ("WCSW-3", Johnson Company, and "East Settling Pond Outfall", Heindel & Noyes).

Samples were analyzed for RCRA metals, TCLP extraction for herbicides and pesticides, methods 8260 and 8260B for volatile organics, and methods 8270 and 8270C for semi-volatiles and flotation agents.

The sampling design has permitted a thorough assessment of the characteristics of the proposed tailings operation. The wide range of tests for metals, pesticides, volatile and semi-volatile organic compounds, and substances used at the Verpol Plant covered the full spectrum of possible environmental effects of the project. The testing of actual onsite bedrock wells is the most accurate measure of the impacts of tailings management on groundwater. Well B, located where tailings have been placed for 20+ years, enabled in-situ testing, which is far more representative of onsite conditions than the laboratory TCLP tests, which attempt to replicate the in-situ conditions. The wide area network of groundwater and surface water monitoring points ensured that all possible environmental receptors were evaluated. Testing of several locations within the plant's process water stream enabled the origin of certain substances to be determined, so that they could be mitigated from the tailings stream.

## B. Results

Results are grouped by the type of analysis and tested compounds. Results are summarized in appendix 2; laboratory reports are in appendix 3.

1 . Semi-Volatile Organic Compounds

Analysis for semi-volatile organic compounds (SOCs) was performed to investigate for the presence of pesticides, hydrocarbons, flotation agents, and breakdown products of chemicals that might be expected to be found in OMYA's process stream, and for priority compounds required by the Vermont Hazardous Waste Management Regulations.

Sampling indicates that the tailings management plan does not pose a risk of contaminating the environment with SOCs. Two SOCs were detected in the tailings and in the surrounding environment: Ortho-phenyl phenol (OPP) and Tail Oil. The Tall Oil is a normal part of the tailings stream, as it is the flotation agent that OMYA currently uses in its flotation process. The OPP is not a typical component of the tailings, but was present due to an accidental spill. A third SOC, stearic acid (octadecanoic and hexadecanoic acid), was detected in some tailings solids only, and not in any water. Stearic acid is added to some OMYA products at low levels (typically <1%), and has entered the tailings stream on infrequent occasions when product batches failed quality control tests and were deposited along with other tailings.

No other SOCs were found associated with the tailings operation. Other SOCs were sporadically detected in groundwater and surface water sampling points, but were not detected in the tailings themselves, so would have originated from other sources. The

table below summarizes all SOC detections. Complete data tables depicting individual sampling dates and results are in Appendix 2, pages 1-10; lab reports are in Appendix 3.

Table 1: SOC Summary

| Site | SOC Tests Performed | SOCs Detected | Concentration Range Detected | Regulatory Standard |
|---|---|---|---|---|
| Plant Tailings Tap | 8270, 8081A, 8151, 8150 | None | -- | -- |
| Flotation tailings discharge | 8270C | None | -- | -- |
| Tailings Settling Cell | 8270, 8081A, 8151, 8150 | Tall Oil | 51,700 ppb | NS |
| Tailings Area – Tailings solids | 8270C, 8081A, 8151, 8150 | Tall Oil<br>OPP<br>Octadecanoic Acid<br>Hexadecanoic Acid | 64,700 - 194,000 ppb<br><40.0 - 5,270 ppb<br>ND - 10,000* ppb<br>ND - 5,000* ppb | NS<br>NS<br>NS<br>NS |
| Tailings Area - Pore Water | 8270C | OPP | <10.0 - 189 ppb | UD[1] |
| Seep 1 | 8270C | None | -- | -- |
| Well #5 (CDP well) | 8270C | None | -- | -- |
| Well #96-1 | 8270C | Bis (2-ethylhexyl) phthalate<br>Alkylated cyclic hydrocarbons | 5.3 ppb<br>ND - 50* ppb | NS<br>NS |
| Well 96-2 | 8270C | Benzothiozoles<br>Alkylated cyclic hydrocarbons<br>Carboxylic acids | ND - 50* ppb<br>ND - 50* ppb<br>ND - 50* ppb | NS<br>NS<br>NS |
| Well #2 | 8270C | OPP<br>Tall Oil<br>Alkylated cyclic hydrocarbons<br>2-methyl-3-buten-2-ol<br>Dimethyl-1,4-dioxane | <1.0 - 98.2 ppb<br>ND - 2000* ppb<br>10 - 15* ppb<br>ND - 5* ppb<br>ND - 15* ppb | UD[1]<br>NS<br>NS<br>NS<br>NS |
| Well A | 8270C | Alkylamines<br>Alkylated cyclic hydrocarbons | ND - 5* ppb<br>ND - 10* ppb | NS<br>NS |
| Well B | 8270C | Carboxylic acids<br>Alkylated cyclic hydrocarbons | ND - 15* ppb<br>ND - 15*ppb | NS<br>NS |
| Well C | 8270C | Dimethyldioxane<br>Aliphatic/Alkylated cyclic hydrocarbons | ND - 10* ppb<br>ND - 10* ppb | NS<br>NS |
| Pittsford-Florence | 8270C | none | -- | -- |

| Site | SOC Tests Performed | SOCs Detected | Concentration Range Detected | Regulatory Standard |
|---|---|---|---|---|
| Well | | | | |
| Dogleg Quarry | 8270C | OPP | <2.0 - 950,000 ppb | UD[1] |
| | | Bis(2-ethylhexyl)phthalate | ND - 5.8 ppb | 1.8 ppb[2] / 5.9 ppb[3] |
| | | Tall Oil | ND - 500* ppb | NS |
| | | Aliphatic/Alkylated cyclic hydrocarbons | ND - 10* ppb | NS |
| Dolomite Quarry | 8270C | OPP | <2.0 - 5,360 ppb | UD[1] |
| | | Phenol | <5 - 5* ppb | 21,000 ppb |
| | | Tall Oil | 4,000* - 6,000* ppb | NS |
| | | 1-phenyl ethanone | ND - 1.0* ppb | NS |
| | | crotonic acid | ND - 2.0* ppb | NS |
| | | 2-heptanone | ND - 2.0* ppb | NS |
| | | 2-piperidinone | ND - 3.0* ppb | NS |
| | | 2-dibenzofuranol | ND - 2.0* ppb | NS |
| | | 3-amino phenol | ND - 5.0* ppb | NS |
| | | 2-butanone | ND - 3.3* ppb | NS |
| | | Alkylated cyclic hydrocarbons | ND - 10* ppb | NS |
| | | unknown | ND - 10* ppb | NS |
| Pittsford-Italian Quarry | 8270C | OPP | <2.0 - 2770 ppb | UD[1] |
| | | Aliphatic/Alkylated cyclic hydrocarbons | ND - 4* ppb | NS |
| | | Dibenzofuranol | ND - 10* ppb | NS |
| Surface Water Discharge off-site | 8270C | None | -- | -- |

ND = Not Detected; the detection limit is not defined for compounds identified as "unidentified peaks"
* Detected as an unidentified peak; quantification and identification are tentative
[1] UD = Standard is under development; The Vermont Department of Health proposed a Health Advisory of 18 ppb (2001); a risk assessment performed by Keller & Heckman recommends a 14,000 ppb standard. No groundwater enforcement standard currently exists.
[2] Vermont Water Quality Standard, Human Health/Consumption of Water
[3] Vermont Water Quality Standard, Human Health/Consumption of Organisms

0rtho-phenyl phenol (OPP) was found in some samples. The OPP was the result of an accidental spill in November 2000, and is not typical of the tailings chemistry. Normally, the OPP is added to the final slurry product, to preserve the product from microbial growth, as it is shipped from the plant. Because of an equipment failure, approximately 4,500 gallons of the preservative (20% solution) entered the Dogleg Quarry. During the ensuing investigation, the OPP was detected in quarry water, sediment, and on-site groundwater. OPP entered the tailings area by means of the dredging and deposition of contaminated tailings from the Dogleg Quarry. The OPP in the quarries and in

groundwater was remediated in 2001 as part of a state approved monitoring and remediation program. To reduce the chances that such an accident could occur again, numerous system changes designed to enhance environmental protection and safety have been completed. Because of its low solubility and high affinity for carbon-based materials, any OPP remaining from the accidental spill is expected to remain within the tailings and not to migrate.

The second SOC found, which can be attributed to the tailings operation, is tall oil. Tall oil is the primary ingredient in the Miramine brand of flotation agent that OMYA currently uses. Tall oil (CAS #8002-26-4) also is known as acintol c, liquid rosin, and tall oil rosin. It is produced as a byproduct of wood pulp processing: the "black liquor" from pine pulp used in the kraft paper manufacturing process is digested with sodium hydroxide, then acidified with sulfuric acid to form tall oil. Tall oil may be refined in numerous ways, and used for various purposes. For example, certain tall oil formulations are considered safe for use in cosmetics (J. Am. Coll. Toxicol, 1989), and other tall oil phytosterols are considered to be "Generally Recognized as Safe" (GRAS) food ingredients in the United States (Tracor-Jitco, 1973; Rulis, 2000). Experimentation with plants has shown that tall oil does not affect plant growth rates (Miller et al, 1980). Tall oil is not a regulated substance in Vermont. Therefore, the tall oil is not considered an environmentally harmful material.

As would be expected, tall oil has been found in the settling cells and in the Dogleg and Dolomite quarries where tailings settling occurs. Because it is poorly soluble in water, and binds to the tailings solids, it has not been detected in the more downstream Pittsford-Italian quarry or at the off-site discharge location. Tall oil has been absent from groundwater, except in well # 2 which is adjacent to the Dolomite quarry. The tall oil most likely would have entered this well because the well was pumped as part of the OPP remediation project. Normally, the well is not pumped and would not draw in the tall oil. After the pumping in well #2 was stopped in July 2001, no more tall oil was detected in the well. The tall oil found in the Dogleg and Dolomite Quarries and in well #2 was most likely adsorbed to suspended tailings particles in those waters.

Tall oil has low mobility in groundwater, and therefore is not likely to dissolve or migrate significantly from the tailings area. A measure of a substance's relative preference for dissolving in water versus partitioning to organic matter is the partitioning coefficient, or log Kow. Higher log Kow values correspond to materials which are very immobile, bond strongly to organic matter, and are poorly soluble. At the pH of 7.5 (similar to the pH of OMYA's process water stream), the log Kow of the various tall oil components ranges from 3.6 to 7.4, according to OMYA's supplier. That range of log Kow values is much higher than that of most commonly encountered environmental contaminants. For comparison, the log Kow of benzene is only 2.13, and the log Kow of Pyrene, one of the most insoluble of the common contaminants, is 5.32 (Fetter, 1999).

Due to its preference to adsorbing onto carbon-rich solids, such as tailings, rather than dissolving in water, the tall oil is expected to remain in the tailings stockpile, and will not enter either groundwater or the process waters drained from the tailings. Accordingly, no tall oil has been detected in well B, located in the middle of the current tailings stockpile area.

The third SOC, stearic acid, was found in one of seven samples of tailings solids. The laboratory reported a tentative (70% certainty) identification of octadecanoic and hexadecanoic acid as unidentified peaks in sample WC-1. Because stearic acid, a synonym for these acids, is used in the production of certain of OMYA's products, it is believed that both unidentified peaks represent the stearic acid. Stearic acid is not used in the flotation process; however, it is added at low levels (typically <1%) to some calcium carbonate products later in the process. Infrequently, product batches that failed OMYA's quality control tests were deposited in the tailings stockpile. This practice was discontinued in 2000 and will not be continued in the new tailings stockpile area. The distribution of the stearic acid in only one test site indicates its limited presence in the tailings.

Stearic acid does not pose an environmental risk. It has been affirmed as "Generally Recognized as Safe" (GRAS) for use in human food by the U.S. Food and Drug Administration and, because of its extremely high partitioning coefficient (koc=7.2x l05) , is immobile in soil (Toxnet, 2001). Accordingly, stearic acid was not present in the pore water within the tailings solids and has not been detected in groundwater.

In summary, SOCs associated with the tailings operation consist of tall oil, OPP, and stearic acid. The OPP was found in tailings, in quarry water and sediment, and in groundwater following a spill in November of 2000. The OPP has been remediated from the quarry water and groundwater, but still exists within the current tailings stockpile area. Any OPP possibly remaining in the current tailings area is not expected to migrate and does not pose a threat to public health and safety, the environment, or cause a nuisance. The tall oil is a normal component of the tailings stream, having been found in the tailings and quarry water. It is not environmentally harmful, and has not been discharged off-site. Similarly, the stearic acid is not environmentally harmful and is bound to the tailings solids.

The proposed tailings management process would not include the release of any SOCs to the environment. OPP and stearic acid will not be part of the tailings stream entering the proposed stockpile area. Tall oil will be bound to the tailings solids separated from water. Those solids, with the tall oil, will remain in the new tailings stockpile area. As currently is the case, no tall oil will enter groundwater or offsite surface water.

2. Volatile Organic Compounds

VOC sampling indicates the presence of acetone and toluene in the water carrying the tailings and toluene in the tailings materials themselves. Those chemicals have been found in groundwater beneath the current tailings stockpile area and in the water circulated through the onsite quarries. However, VOCs have not been detected off-site in groundwater or surface water, and are not migrating from the tailings area. The table below summarizes all VOC detections. Complete data tables depicting individual sampling dates and results are in Appendix 2, pages 1-10; lab reports are in Appendix 3.

Table 2. VOC Summary

| Site | VOC Tests Performed | VOCs Detected | Concentration Range Detected | Regulatory Standard |
|---|---|---|---|---|
| Plant Tailings Tap | SW1311/8260B | None | -- | -- |
| Tailings Settling Cell | SW1311/8260B | Acetone | <20 - 192 ppb | NS |
| Tailings Area - Tailings solids | 8260, 8260B | Toluene | <20.0 - 114 ppb | $1.6 \times 10^7$ ppb[1] |
| Tailings Area - Pore water | 8260, 8260B | Acetone<br>Toluene | <20.0 - 26.7 ppb<br><1.0 - 34.5 ppb | 700 ppb[4]<br>1,000 ppb[2] |
| Seep 1 | 8260B | None | -- | -- |
| Well #5 (CDP well) | 8260, 8260B | Toluene | <1.0 - 3.2 ppb | 1,000 ppb[2] |
| Well #96-1 | 8260, 8260B | Bromodichloromethane<br>Chloroform<br>Toluene | <1.0 - 2.8 ppb<br><1.0 - 26.8 ppb<br><1.0 - 9.2 ppb | 80 ppb[2]<br>80 ppb[2]<br>1,000 ppb[2] |
| Well 96-2 | 8260, 8260B | Toluene | 1.0 - 12.6 ppb | 1,000 ppb[2] |
| Well #2 | 8260, 8260B | Isopropylbenzene<br>Toluene<br>Xylenes | <1.0 - 1.8 ppb<br><1.0 - 1.7 ppb<br><2.0 - 15.3 ppb | NS<br>1,000 ppb[2]<br>10,000 ppb[2] |
| Well A | 8260, 8260B | None | -- | -- |
| Well B | 8260, 8260B | Acetone<br>Toluene | <20 - 780* ppb<br><1.0 - 10.7 ppb | 700 ppb[4]<br>1,000 ppb[2] |
| Well C | 8260, 8260B | Toluene | 1.2 - 3.3 ppb | 1,000 ppb[2] |
| Pittsford-Florence Well | 8260, 8260B | None | -- | -- |
| Dogleg Quarry | 8260, 8260B | Acetone<br>Isopropyl Alcohol<br>Toluene<br>Chloroform | <20 - 634 ppb<br><100 - 464 ppb<br><1.0 - 1.7 ppb<br><1.0 - 2.3 ppb | NS<br>NS<br>6,800 ppb[3]<br>5.7 ppb[3] |
| Dolomite Quarry | 8260, 8260B | Acetone<br>Toluene<br>Isopropyl Alcohol | <20 - 893 ppb<br><1.0 - 1.8 ppb<br><100 – 2740 ppb | NS<br>6,800 ppb[3]<br>NS |

| Site | VOC Tests Performed | VOCs Detected | Concentration Range Detected | Regulatory Standard |
|---|---|---|---|---|
| | | Chloroform | 1.4 - 1.9 ppb | 5.7 ppb[3] |
| Pittsford Italian Quarry: Inlet | 8260B | Acetone<br>Isopropyl Alcohol | <20 - 849 ppb<br><100 -917 ppb | NS<br>NS |
| Pittsford-Italian Quarry: Outlet | 8260, 8260B | Toluene<br>Acetone<br>Isopropyl Alcohol | <1.0 - 1.6 ppb<br><20 - 531 ppb<br><100 - 242 ppb | 6,800 ppb[3]<br>NS<br>NS |
| Discharge off-site | 8260B | none | -- | -- |
| Flotation Tailings Discharge | 8260B | Acetone<br>Isopropyl Alcohol | 41 - 698 ppb<br><100 - 1950 ppb | 700 ppb[4]<br>NS |
| 11,000 gallon tank | 8260B | Acetone | 37.8 - 197 ppb | NS |
| Cyclone overflow | 8260B | Acetone | 33.3 - 161 ppb | NS |
| Thickener overflow | 8260B | Acetone | 34.8 - 284 ppb | NS |
| 500,000 gallon tank | 8260B | Acetone | <20 - 192 ppb | NS |

* Detected as an unidentified peak; quantification and identification are tentative
[1] US EPA Region III Risk-based soil exposure guideline
[2] Drinking water standard
[3] Vermont Water Quality Standard, Human Health/Consumption of Water
[4] Vermont Groundwater Enforcement Standard

As shown in table 2 above, most VOC detections have been trace amounts. The VOCs detected in the tailings are Toluene and Acetone.

Acetone had been detected in the tailings pore water and in groundwater at the tailings area, indicating its origin in the tailings stream. Detections of acetone have been confirmed in well B, a bedrock well drilled in the current tailings stockpile area. Acetone levels in well B have been within the Vermont Groundwater Enforcement Standards (GES). Out of 13 samples analyzed between March 30, 2001 and June 6, 2002, the mean acetone level was 120 ppb. The 5% exceedance value ("5% EV") statistic, which is applied to groundwater enforcement standards in Vermont, was 542 ppb. Vermont's GES is 700 ppb. The only acetone detection from that well that exceeded the GES was a tentative laboratory quantification (unidentified peak). Acetone has not been detected in the well since July 2001. Ten samples collected subsequently all showed no detectable acetone.

No acetone has been found in seep 1, which is located downhill from the tailings area-, or in any other well, indicating that the acetone formerly found in well B has not traveled beyond the current tailings stockpile area. Acetone has been detected in the Dolomite quarry, which also is a site for settling of tailings solids. Acetone data are summarized

on pages 13-15 of appendix 2. Also see page 2 of appendix 2 for groundwater data, including acetone.

Because of the water recirculation system, acetone had been found at several locations in the plant, yet its origin initially was unknown. It has been determined that acetone originated in the dispersant chemical that OMYA uses to keep the calcium carbonate in aqueous suspension during its fine milling process. The acetone, which exists as an impurity in the dispersant, entered the Dogleg Quarry in the washwater stream from the mill. From there, it would enter the flotation system, as Dogleg Quarry water was reused for flotation. The acetone then would flow either to the Dolomite Quarry, or to the settling cells via the flotation tailings discharge. From the settling cells, it would enter the tailings area along with the dredged sediment. From the Dolomite Quarry, it would flow to the Pittsford Italian Quarry, and from there would be recirculated to the plant, flowing through the following sampled locations in order: 11,000 gallon tank, cyclone overflow, thickener overflow, 500,000 gallon tank, and then into the flotation system again.

To mitigate the acetone, OMYA has designed changes to the process water circulation system. Most of the washwater from the mill will be redirected so it will be used in the plant to make the final slurry product. This step significantly will reduce the acetone from entering the water circulation system in the quarries, which ultimately will keep the acetone out of the tailings, and mitigate its potential release to groundwater.

Isopropyl Alcohol, which is found in the dispersant and which can form acetone, was only found in plant process water. No isopropyl alcohol exists in tailings or groundwater. Most likely, the majority of the alcohol had volatilized prior to reaching the tailings area or groundwater. For example, the data shows that nearly none of the isopropyl alcohol entering the Pittsford Italian Quarry was present in water flowing out of that quarry.

Toluene also has been detected in tailings solids and in groundwater at the tailings stockpile area, also indicating its origin in the production of tailings. Toluene also has been found in very low levels in the Dogleg, Dolomite, and Pittsford-Italian Quarries, which suggests that it would have originated in tailings settled in the Dolomite Quarry and in the washwater managed in the Dogleg Quarry, and circulated to the Pittsford- Italian Quarry. In the other onsite bedrock wells, toluene has been detected sporadically, suggesting it is present in trace amounts around the site, probably due to the long history of industrial activity at the site, including a former asphalt plant. In the wells, low levels of toluene may indicate its presence in the well sampling equipment (inflatable packers) that were used at the request of the State of Vermont.

Acetone and toluene are the only VOCs that could be related to the tailings, because they are the only VOCs found in the tailings, the flotation tailings discharge, and in tailings water. Acetone has been found in localized concentrations in bedrock groundwater surrounding the current tailings stockpile area, and in the quarries used in the tailings management process. Changes to OMYA's process water system will mitigate the source of the acetone in groundwater, tailings, and quarry water. Toluene has been found in very low levels, sporadically around the site, most likely originating

from a variety of sources given the site's long history of industrial use, including preOMYA activities. The majority of the VOCs on site are found at low levels, and are not related to the tailings operation. No VOCs have been detected offsite.

The VOCs associated with the proposed tailings operation will not pose a threat to public health and safety, the environment, or cause a nuisance. Waste materials and toxic substances will not impact groundwater above regulatory standards, and any impacts will be confined to the immediate vicinity of the tailings stockpile area.

3. Metals

Metals sampling indicates that no part of the tailings stream constitutes a hazardous material, as defined by the Vermont Hazardous Waste Management Regulations (§7208). Samples of groundwater and surface water indicate no violations of standards. Most samples contained no detectable target metals. The table below summarizes all metals detections. See pages 10-12 of appendix 2 for complete metals data.

Table 3. Metals Summary

| Site | Metals Tested | Metals Detected | Concentration Range Detected | Regulatory Standard |
|---|---|---|---|---|
| Plant Tailings Tap | TCLP[1] | None | -- | -- |
| Tailings Settling cell | TCLP[1] | Barium | 0.108 ppm by TCLP | 100 ppm[2] |
| Tailings Area - Tailings solids | TCLP[1] | None | -- | -- |
| Well #5 | GES[3] | Barium<br>Zinc | 0.02 ppm<br>0.025 ppm | 1.0 ppm[3]<br>2.5 ppm[3] |
| Well #96-1 | GES[3] | Barium | 0.018 ppm | 1.0 ppm[3] |
| Well 96-2 | GES[3] | Barium | 0.05 ppm | 1.0 ppm[3] |
| Gravel #1 | GES[3] | Barium<br>Lead<br>Zinc | 0.04 ppm<br>0.004 ppm<br>0.285 ppm | 1.0 ppm[3]<br>0.015 ppm[3]<br>2.5 ppm[3] |
| Dolomite Quarry | GES[3] | Arsenic<br>Zinc | 0.014 ppm<br>0.053 | 0.36 ppm[4] / 0.00002 ppm[5]<br>0.18 ppm[4] |
| Drainage Swale at Plant | GES[3] | Barium<br>Cadmium<br>Copper<br>Zinc | 0.016 ppm<br>0.003 ppm<br>0.022 ppm<br>0.121 ppm | NS<br>0.007 ppm[4]<br>0.03 ppm[4]<br>0.18 ppm[4] |
| Discharge off-site | GES[3] | Arsenic<br>Zinc | 0.006 ppm<br>0.024 | 0.36 ppm[4] / 0.00002 ppm[5]<br>0.18 ppm[4] |

[1] Arsenic, Barium, Cadmium, Chromium, Lead, Mercury, Selenium, and Silver
[2] Hazardous Threshold, Vermont Hazardous Waste Management Regulations (§7-208)
[3] Metals from Groundwater Enforcement Standards list: Antimony, Arsenic, Barium, Beryllium, Cadmium, Chromium, Copper, Lead, Mercury, Nickel, Selenium, Silver, Thallium, and Zinc.
[4] Surface water quality standard for the protection of aquatic organisms.

[5] Surface water quality standard for the protection of human health.

Sampling of the plant tailings tap, the settling cell, and the tailings pile indicates that barium is the only metal detected in the tailings stream. Barium was found in low levels in the tailings stream, most likely due to its natural presence in the raw rock processed by OMYA. Barium often is found in bedrock groundwater, originating from minerals in the surrounding rock and soil. The barium levels in groundwater and surface water at the OMYA site are consistent with naturally occurring levels throughout the state, based on Heindel and Noyes' experience testing groundwater over the past two decades in Vermont.

Other metals found at the site were not detected in the tailings, and thus did not originate in the tailings. Very low levels of Arsenic, Cadmium, Copper, Lead, and Zinc were found in groundwater and surface water. These metals may have originated from natural sources and/or past industrial activities unrelated to the current tailings management operation.

## C. Summary and Conclusions

The proposed tailings management operation at the OMYA Verpol plant in Florence, Vermont poses no threat to public health and safety or to the environment, and will not cause a nuisance. Substances from the project will not impact groundwater or wells above Vermont Groundwater Enforcement Standards. Testing conducted on the tailings material, plant process water, groundwater, seepage water, and surface water in the vicinity has found that the tailings are not causing off site contamination.

Testing has identified six substances of interest to the management of the tailings. The tailings operation has not caused any undue environmental or health effect resulting from those substances. The six materials are tall oil, OPP, stearic acid, toluene, acetone, and barium. No other substances, including hazardous, toxic, or regulated substances, will be associated with the proposed tailings operation. The tailings themselves are inert, harmless solids consisting of earth materials, primarily calcium carbonate, mica and feldspar.

Tall oil originates from the flotation process, and is a part of the tailings stream. It is not regulated, and has no known harmful effects. It has not been detected in surface water discharging off-site. Tall oil will not enter groundwater or surface water from the proposed tailings operation. It will remain bound to the tailings solids.

OPP will not be associated with the proposed tailings operation, but was found in tailings, groundwater, and surface water as the result of an accidental spill. Upgrades have been performed to the plant to prevent a recurrence of such a spill. The OPP has been removed from surface and groundwater through a remediation program, conducted with the oversight of the State of Vermont. As a result of the remediation and the immobility of the OPP in the tailings, the previously released OPP poses no threat of adverse environmental impacts.

Stearic acid will not be associated with the proposed tailings operation. It had entered the current tailings stockpile area via occasional deposition of calcium carbonate product batches that failed quality control tests, and thus is present in the existing tailings stockpile area on a very limited basis. The practice of placing failed product will not be continued in the new tailings area. Stearic acid is not a regulated substance, is generally recognized as safe by the FDA for use in human food, and does not emanate from the tailings to the environment.

Toluene is found in low levels in the existing tailings stockpile area. Toluene levels are well below standards for groundwater, surface water, and drinking water, indicating no adverse effect. Toluene has not been observed at the point of discharge off-site. Very low levels of toluene may originate from the proposed tailings operation, which will cause no environmental harm.

Acetone had been found in groundwater directly beneath the current tailings stockpile area and in the quarries used for tailings management. Levels of acetone in the groundwater beneath the current tailings stockpile area have decreased, and have been below detection limits for the ten most recent sampling rounds. The 5% EV statistic, based on the long-term acetone data, is less than the GES. The acetone has not migrated, either in groundwater or in surface water, from the existing management areas. As part of the proposed project, changes to the milling and water circulation process in the plant will result in acetone levels being further reduced. No acetone will be released offsite.

Levels of barium in and around the existing tailings stockpile area are comparable to natural levels of the element, indicating no impact from the tailings management operation, Barium has not been observed at the point of discharge off-site.

In accordance with section 6-301(b)(2) of the Vermont Solid Waste Management Rules (1/15/1999), the tailings operation is exempt from the provisions of the rules because it involves an earth material resulting from the mining, extraction, and processing of rock, and will not cause a threat to public health and safety, the environment, or cause a nuisance. The former presence of acetone in groundwater is not considered a threat to public health and safety because it is confined to the groundwater below the current tailings stockpile area, which is not used or exposed to the public. It is not considered an environmental threat because levels are within Vermont Groundwater Standards, and will not migrate from the tailings stockpile area or reach off-site surface waters.

The tailings operation will conform to 10 V.S.A. § 6086(a)(1)(B), because it will not involve the injection of waste materials or any harmful or toxic substance into groundwater or wells.

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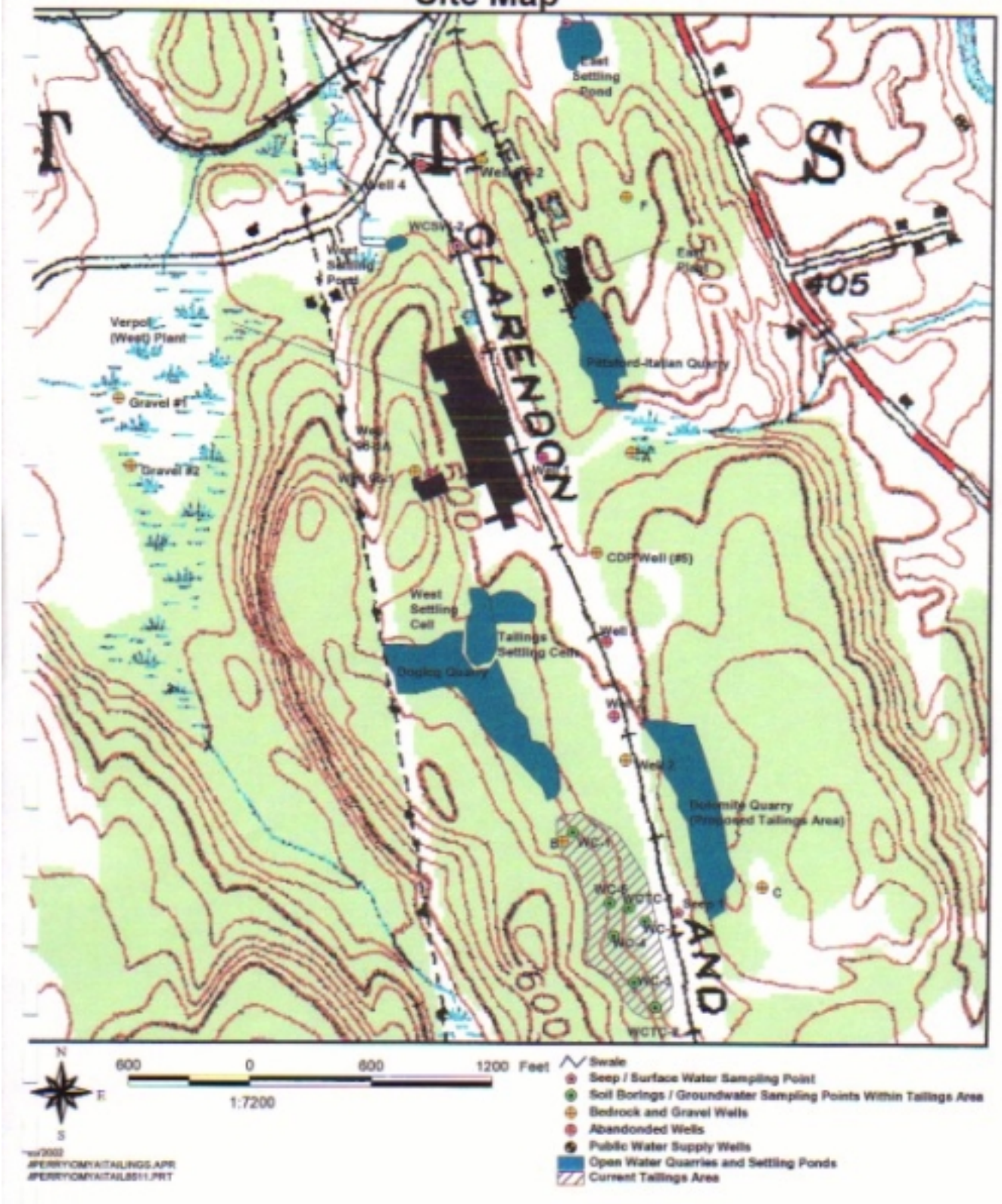
**Not Included in this file:**

**1 site map**

**60 pages of appendices containing test results referred to in the report**

# Site Map


T
T
S
CLARENDON
LAND
500
600
605
Verpol (West) Plant
Gravel #1
Gravel #2
Pittsford-Italian Quarry
CDP Well (#5)
West Settling Cell
Tailings Settling Cells
Dogleg Quarry
Dolomite Quarry (Proposed Tailings Area)
WC-1
WC-2
WC-3
WC-4
WC-5
WCTC-1
WCTC-4
N
S
600
0
600
1200 Feet
1:7200
Swale
Seep / Surface Water Sampling Point
Soil Borings / Groundwater Sampling Points Within Tailings Area
Bedrock and Gravel Wells
Abandonded Wells
Public Water Supply Wells
Open Water Quarries and Settling Ponds
Current Tailings Area