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Verpol Plant Tailings: 2nd Addendum to Spring 2006 Monitoring Report

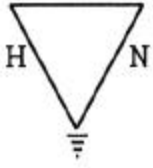
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Prepared for:

Omya Inc.

November 8, 2006



OMYA INC., FLORENCE, VT

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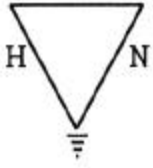
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OMYA INC., FLORENCE, VT

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I Introduction

Heindel & Noyes' (H&N) Spring 2006 monitoring report presented the results of the Spring 2006 semi-annual groundwater and surface water testing conducted in accordance with the Monitoring Plan (August 15, 2005, revised February 24, 2006) that was approved by the Vermont Department of Environmental Conservation on April 7, 2006. However, as noted in the report, the results from the AG-24 analysis performed by Endyne, Inc. were invalidated. This was detailed in a letter from H&N to Julie Hackbarth dated August 3, 2006. H&N subsequently performed three re-sampling events for analysis via method OMYA AG-24 by Endyne Laboratories, Inc. In addition, samples from the August 21st and September re-sampling events were submitted to Severn Trent Laboratories (STL) for supplementary analysis via LC/MS. Our findings are detailed in this report.

The Spring 2006 annual sampling event was conducted on April 24 – 25, 2006. Water samples were collected from eight off-site wells and springs, nine on-site wells, and one surface water station. H&N staff performed all field measurements and sample collection. As detailed in the August 3, 2006 letter to Julie Hackbarth, AG-24 results were invalidated and not presented in the Verpol Plant Tailings: Spring 2006 Monitoring Report due to contamination issues at the laboratory. Sufficient sample volume was not available for the laboratory to perform a reanalysis at that time.

Endyne determined an error occurred during the performance of the analytical procedure, causing the initial sample results to be invalidated. The laboratory identified insufficient cleaning and rinsing of the sample preparation equipment as a likely source of cross contamination of flotation reagent (FR) in all the samples including the equipment blank collected during the Spring 2006 groundwater sampling event. It also was determined that contamination by the reagent used in the extraction process may have occurred while transferring the sample from the extraction vessel to the sample analysis container.

On July 31st and August 1st, 2006, H&N staff resampled all locations that were sampled during the Spring sampling event. Wells with AG-24 detections during this first re-sampling round then were resampled for a second time on August 21st. Further detections were noted via Omya AG-24 during this second re-sampling round, and the VTDEC requested that a third re-sampling event occur, in which all onsite wells and surface water locations were resampled. The third re-sampling event occurred on September 20 – 22, and September 25, 2006.

During the third re-sampling round, several extra steps were taken that went above and beyond the normally approved sampling procedures. All samples also were submitted to STL in Sacramento, California, for analysis for the four components of FR via LC/MS technology. In addition, several samples from the August 21st re-sampling round also were submitted to STL for analysis. Additionally, the Geotech bladder pump that is normally used for the deepest wells onsite was not used during this round, as Endyne believes that Teflon, used in the bladder construction, may have an affinity for FR. Instead, a Grundfos Redi-Flo pump was used on all wells onsite, with modifications made to the method for the very deepest wells. Additionally, equipment blanks were collected prior to use of that pump and between taking samples from any consecutively pumped wells. Also, all five Post Office Swale surface water locations were sampled, while only one location is regularly sampled.

II Sampling Methods and Results - September

A summary of results from all three re-sampling events following the initial Spring 2006 sampling are shown in Table 1 below.

Sampling Location	July 31/August 1, 2006		August 21st, 2006			September 20 - 25, 2006		
	Endyne AG-24 result (µg/L)	Endyne Duplicate AG-24 result (µg/L)	Endyne AG-24 result	Endyne Duplicate AG-24 Results	*Severn Trent FR (ug/L)	Endyne AG-24 result (ug/L)	Endyne Duplicate AG-24 result (ug/L)	*Severn Trent FR (ug/L)
Well 2	ND <25					53.9		ND
Well 5	ND <25					ND <25		ND
Well 96-1	47.3		50.1	84.3	ND	51.9		ND
Well A	ND <25	ND <25				ND <25		ND
Well B	109	129	111	104	ND	95.2		7.16*
Well C-2	ND <25					ND <25		ND
Well G	ND <25	ND <25				25.5	43.5**	ND
Well H	ND <25					42.6		ND
Well I	ND <25					ND <25	76.7**	ND
East Plant MW-10						81.9		ND
Chapin Well	ND <25							
Crusciel Spring	392	448	248	232	ND	226		ND
Eugair Bedrock	37.3		ND <25	ND <25		61		ND

Sampling Location	July 31/August 1, 2006		August 21st, 2006			September 20 - 25, 2006		
	Endyne AG-24 result (µg/L)	Endyne Duplicate AG-24 result (µg/L)	Endyne AG-24 result	Endyne Duplicate AG-24 Results	*Severn Trent FR (ug/L)	Endyne AG-24 result (ug/L)	Endyne Duplicate AG-24 result (ug/L)	*Severn Trent FR (ug/L)
Eugair House	ND <25					ND <25		ND
Eugair Shallow Dug Well						80.9		ND
Orvis Spring	77.2	94.7	ND <25	ND <25	ND	ND <25		ND
Pittsford Florence Well	ND <25					ND <25	ND <25	ND
PO Swale #1						143		ND
PO Swale #2						61		ND
PO Swale #3						45.4		ND
PO Swale #4						90.9		ND
PO Swale #5	249	289	159	146	ND	115		ND
U Rosato Well	ND <25							
Sandillo Well	37.3	31.2	ND <25	ND <25		ND <25	ND <25	ND

Notes:

* Per STL's October 27, 2006 letter to Omya and submitted to the VTDEC (see Appendix 5), "STL developed calibration curves and performed Method Detection Limit (MDL) and Demonstration of Capability (DOC) studies that indicated there was sufficient instrument and method sensitivity to achieve a Practical Quantitation Limit (PQL) well below the Health Advisory (HA). Evaluations of instrument sensitivity and analyses of Continuing Calibration Verification (CCV) standards were performed to determine allowable instrument variability "drift" over time, beyond which corrective action must be performed. Based on all of the data, STL has established a PQL of 50ppb for each of the four analytes. However, low level calibration standards and sensitivity check standards are analyzed at levels 2-5 times below the PQL. The low level calibration and sensitivity check standards are evaluated for response and support reporting estimated results below the PQL. STL's evaluations of instrument sensitivity and analyses of CCV standards at or above the mid range of the quantitation range showed variability within +/-30%. The evaluations of instrument sensitivity and analyses of CCV standards at or below the PQL showed variability of greater than +/-30% but less than +/-50%. Therefore, CCV acceptance criteria have been set at +/- 50% for standards analyzed at or below the PQL and +/-30% for CCV standards analyzed at or above the mid range of the quantitation curve."

**sampled with a bailer, not pumped

Blank cell = not analyzed on date shown

Table 2 below illustrates details about the September re-sampling event only. Results from Endyne Laboratories for AG-24 are shown, along with STL's LC/MS analysis for tall oil, amidoamide (TAA), the major component of FR. Several samples were analyzed for all four components of FR.

Sample	Lab Code	Endyne AG-24 results (ppb)	Severn Trent TAA (ppb)	Severn Trent DT (ppb)	Severn Trent IM (ppb)	Severn Trent AEEA (ppb)
Trip Blank	1	ND				
Equip Blank prior to use	16	47.8	ND			
Well A Rediflo	31	ND	ND			
Well A Equip Blank	15	ND	ND			
Well B Rediflo	30	95.2	ND	ND	7.16	ND
Well C-2 Rediflo	14	ND	ND			
Well C-2 Equip Blank	29	ND	ND			
Well G Rediflo	12	25.5	ND			
Well G Equip Blank	13	ND	ND			
Well G Bailer	28	43.5	ND			
Well I Rediflo	35	ND	ND			
Well I Equip Blank	3	29.3	ND			
Well I Bailer	17	76.7	ND			
Well H Rediflo	27	42.6	ND			
Well H Equip Blank	11	50.6	ND			
Well 96-1 Rediflo	33	51.6	ND			
Well 96-1 Equip Blank	18	ND	ND			
Well 2 Rediflo	34	53.9	ND			
Well 2 Equip Blank	26	ND	ND			
Well 5 (CDP well)	4	ND	ND			
East Plant MW-10	25	81.9	ND	ND	ND	ND
PO Swale 1	24	143	ND	ND	ND	ND
PO Swale 2	10	61	ND			
PO Swale 3	19	45.4	ND			
PO Swale 4	23	90.9	ND			
PO Swale 5	5	115	ND	ND	ND	ND
Chrusciel Spring	20	226	ND	ND	ND	ND
Pittsford Florence	22	ND	ND			
Pittsford Florence Dup	32	ND	ND			
Orvis	21	ND	ND			
Sandillo	6	ND	ND			
Sandillo Dup	9	ND	ND			
Eugair Bedrock	8	61	ND	ND	ND	ND
Eugair House	7	ND	ND			
Eugair Shallow Dug Well	100	80.9	ND			
Endyne 261 ppb Standard	X		95.9			

Notes:

TAA = tall oil, amidoamine (TAA);

IM = tall oil hydroxyethyl imidazoline (TOHI – 91% by weight, hydrolyzes to TAA in water);

DT = amine acetate (DT, for the trade name Duomeen T – 7.5% by weight);

AEEA = aminoethylethanolamine (AEEA – 1.5% by weight).

II a – Pumped Samples

On September 20 – 22, 2006, the sampling team was comprised of David Wechsler, H&N Senior Scientist, and Dave Linari and Beth Erickson, H&N geologists.

As shown above, during the September sampling, a detection via AG-24 was reported in the equipment blank of the rental Grundfos Redi-Flo pump before its first use on September 20th. The equipment never had been used at Omya, and therefore could not be contaminated with FR. In addition, the pump was thoroughly decontaminated using a 50% methanol/water solution before its first use, and all equipment was decontaminated at the Field Environmental office before being sent out for rental. The equipment blank was non-detect for the TAA component of the FR by LC/MS.

Well H was sampled on September 20th from the water bearing fracture at 138' below top of pipe. The sample was reported at 42.6 ppb as analyzed by Endyne via OMYA AG-24. The equipment blank that was taken after decontaminating the pump was 50.6 ppb by the same analysis. Both samples were non-detect for the TAA component of FR via LC/MS analysis by STL.

Well 2 also was sampled on September 20th, from the water bearing fracture at 100' below top of pipe. This sample was reported at reported at 53.9 ppb as analyzed by Endyne via OMYA AG-24, and its associated equipment blank was non-detect (<25 ppb). Both samples were non-detect for FR by STL.

Well A was sampled on September 21st from the water bearing fracture at 188' below top of pipe using the Redi-flo pump. The sample from Well A was non-detect by both Endyne and STL, as was the equipment blank taken after decontaminating the pump following sampling. The cleanup and decontamination of this well were observed by Meddie Perry of Pioneer Environmental, Carey Hengstenberg of the ANR, and Michael Laurent of Omya Inc.

Well C-2 was sampled on September 21st from 204' below top of pipe, and both the sample and its associated equipment blank were non-detect by both laboratories. The set-up of this well was observed by Meddie Perry, Carey Hengstenberg, and Michael Laurent, who had not witnessed the set-up at Well A, and expressed a desire to see one full well pumped from start to finish.

Well G was sampled on September 21st from the maximum effective depth of the Grundfos Redi-Flo pump (280' bgs). In the past, this well was sampled using a Geotech bladder pump from the depth of the water-bearing fracture, 361' below top of pipe. As proposed in our monitoring plan for the September re-sampling event, the bladder pump was not used due to Endyne Laboratories' assertion that the Teflon bladder in the bladder pump may have an affinity for the FR. H&N pumped an additional 116 gallons of water from this well to assure that we were accessing a fresh sample from the fracture. To achieve this, the pump was run at a discharge rate of 1 gpm for 116 minutes. The sample was reported at 25.5 ppb by Endyne via OMYA AG-24, and non-

detect by STL for the TAA component of FR. The associated equipment blank was non-detect by both laboratories. As a check on this new sampling method, H&N also lowered a dual check valve bailer to the depth of the water-bearing fracture at 361' below top of pipe. This sample was reported at 43.5 ppb as analyzed by Endyne and non-detect by STL. Carey Hengstenberg of the State ANR arrived with Beth Erickson while the well was being pumped for 116 minutes, but departed before the sample was collected and the pump was decontaminated.

Well I was sampled using the same method as Well G, pumping an extra 116 gallons of water to access fresh water from the fracture, also at 361' below top of pipe. This well was sampled on September 22nd by Beth Erickson and Dave Linari. The sample was non-detect (<25 ppb) by Endyne, and its associated equipment blank was reported at 29.3 ppb. A sample taken from the fracture depth using a dual check valve bailer was reported at 76.7 ppb. All three samples were non-detect via LC/MS technology by STL for the TAA component of FR.

Well 96-1 was sampled from 269' below top of pipe on September 22nd by Beth Erickson and Dave Linari. The sample was reported at 51.6 ppb via OMYA AG-24 by Endyne laboratories, and its associated equipment blank was non-detect. Both of these samples were non-detect by STL for the TAA component of FR.

Well B was sampled from 152' below top of pipe on September 22nd by Beth Erickson and Dave Linari. This sample was reported at 95.2 ppb via OMYA AG-24 by Endyne. Results from STL indicate that, while the major TAA component of FR was non-detect for Well B, as were two of the other minor components, the IM component was identified at an estimated concentration. That is, while the compound has been identified as present, it can not be quantified precisely, but was estimated at 7.16 ppb.

Well 5, or the "CDP trailer well," has a permanent pump installed in the well, so it is essentially collected in the same manner as a tap sample. The sample was collected by Beth Erickson after purging the well to obtain a fresh sample. The sample was non-detect by both laboratories.

II b Surface Water grab samples

Six surface water locations were sampled by H&N scientist Beth Erickson.

Five of these surface water locations were along the Post Office Swale. In addition to the regularly-sampled Post Office Swale location (PO Swale #5), four additional samples were collected from this same swale (PO Swale # 1 – 4). Proper stream sampling methods were followed, working from the downstream-most location at PO Swale #1, to the uppermost location at PO Swale #5. All five Post Office Swale samples had reported detections via OMYA AG-24 by Endyne, ranging from 61 ppb to 143 ppb. None had any detections via LC/MS by STL.

The sixth surface water location sampled was the Chrusciel Spring, a small swampy pond area. This sample was reported at 226 ppb by OMYA AG-24, but non-detect for all four FR components by LC/MS.

II c Residential Tap Samples

In addition, several tap samples were collected by H&N scientist Beth Erickson on September 20th, with collection methods monitored by Carey Hengstenberg, Meddie Perry, and Michael Laurent. Taps were purged for 15 minutes to obtain a fresh sample, then samples were collected. The Pittsford-Florence water system was sampled, and a duplicate sample also was collected for statistical QA/QC purposes. These samples were non-detect by both Endyne and STL. The Orvis spring sample was non-detect by both laboratories, as was the Sandillo house sample and its duplicate (again collected for QA/QC purposes).

At the Eugair residence, two water sources are sampled. The first is the spring, which is sampled from the kitchen tap. This sample was non-detect by both laboratories. The second is the deep bedrock well, which is sampled from a tap in the barn, used in dairy production. This sample was reported at 61 ppb via OMYA AG-24 by Endyne, but non-detect for all four components of FR by STL. Because of that reported detection by Endyne, H&N returned to the site on September 25th to sample a third water source onsite, a shallow dug well, less than 20' in depth, that is located in the field behind the barn on the Eugair property, and is used as a backup water source for the barn. This sample was collected by Beth Erickson using a bailer directly from the well, with Michael Laurent, Mrs. Eugair, and her granddaughter observing. The sample was reported at 80.9 ppb via OMYA AG-24 by Endyne Laboratories, and non-detect for the TAA component of FR by STL.

III QA/QC

In addition to the equipment blanks and duplicate samples that were taken, two other samples were analyzed for QA/QC purposes. Endyne analyzed a trip blank that it had supplied to H&N on September 19th. That trip blank was non-detect by OMYA AG-24. Endyne also provided a 261 FR standard for analysis by STL, and it was analyzed as 95.90 ppb by LC/MS. Table 3 below shows the results, from both Endyne and STL, for equipment blank testing from all three re-sampling events.

Date of Sampling	7/31-8/1/06	8/21/2006		9/20-25/06	
Sampling Location	Endyne AG-24 result (µg/L)	Endyne AG-24 result	Severn Trent FR (ug/L)	Endyne AG-24 result (ug/L)	Severn Trent FR (ug/L)
Equipment blank prior to 1st use of pump				47.8	ND

Date of Sampling	7/31-8/1/06	8/21/2006		9/20-25/06	
Sampling Location	Endyne AG-24 result (µg/L)	Endyne AG-24 result	Severn Trent FR (ug/L)	Endyne AG-24 result (ug/L)	Severn Trent FR (ug/L)
Well 2 Equipment blank				ND <25	ND
Well 96-1 Equipment blank				ND <25	ND
Well A Equipment blank				ND <25	ND
Well B Equipment blank	ND <25	53	ND		
Well C-2 Equipment blank				ND <25	ND
Well G Equipment blank				ND <25	ND
Well H Equipment blank	ND <25			50.6	ND
Well I Equipment blank				29.3	ND

IV Severn Trent Results – August 21st

As shown in Table 1 above, several samples from the August 21st re-sampling round that previously had been analyzed by Endyne also were analyzed by STL. These were the samples from Well 96-1, Well B, Chrusciel Spring, Orvis Spring, PO Swale #5, and an equipment blank that was taken after sampling Well B. All samples were non-detect by LC/MS for the TAA component of the FR.

V Additional testing

In addition to the OMYA AG-24 analysis, Endyne ran all samples for EPA Method 8270 analysis to try to identify any possible causes of false-positive results. All EPA Method 8270 analyses were non-detect for all target compounds. Additionally, no unidentified peaks were detected via the 8270 analyses. The 8270 results are included in Appendix 2.

While the PO Swale locations had been geochemically characterized in the past to determine that they were derived from groundwater, the Chrusciel Spring location had not. Endyne analyzed the water from the Chrusciel Spring for various metals and other parameters that may indicate the source of the water at that location, to see whether it was derived from groundwater or precipitation. The results are included as in Appendix 2. Presently, the analysis is inconclusive pending gross alpha radioactivity results.

VI Discussion

Samples taken onsite and offsite and analyzed by Endyne by AG-24 have indicated the potential presence of FR in all three re-sampling events since the initial Spring 2006 results were invalidated due to laboratory error. Some of the highest reported detections via that method have been in offsite surface water grab samples, in much higher concentrations than those detected in onsite wells. In addition, method AG-24

has indicated the potential presence of FR in unexpected places, most notably in the Eugair property water sources. The Eugair property is located across a hydrogeologic divide (a branch or the tributary to Smith Pond) uphill and distant from the site, and the shallow dug well onsite is less than 20 feet deep, meaning it is extremely unlikely that this water source could be hydrologically connected to the Omya site.

As we have noted in past reports, AG-24 is a non-specific spectrophotometric method, and other compounds may be detected as was shown clearly during the August 21st re-sampling event, when a blank of Heindel & Noyes' tap water from the Champlain Water District yielded a positive detection. The most logical explanation for that result was that the chloramines used in the water disinfection had an affinity for the method, and yielded a false positive result. To assess what other compounds may give false-positive results or interferences with the method, Omya Inc requested that Endyne analyze other prepared standards to see whether they also could yield false-positive results. The following laboratory standards yielded false-positive results using the AG-24 method: tap water containing chloramines, 1 ppm method 8270 analytical standard, 1000 ppm NaCl as Cl, 1000 ppm Na Acetate as Na, estimated 1 ppm cationic surfactant, 0.1 ppm method 8270 analytical standard. These results are shown in Appendix 4. In addition, Endyne has hypothesized that turbidity may affect the method. That hypothesis is supported by the fact that the PO Swale #1 sample was taken from a very shallow and silty stream, and it was necessary to dig out a spot in the mud for water to collect so that a sampling jar could be lowered into the water column. PO Swale #1 is the farthest downstream location along the Post Office Swale, so it does not make sense that it should have the highest concentration of FR. H&N hypothesizes that other amines, such as biological proteins, may affect the method. We put forth this hypothesis based on the very high detections in the Chrusciel Spring, essentially a swampy pond teeming with life.

In the case of a non-specific spectrophotometric method, it is possible that there may be many false positives and interferences. That is not to say the method is not accurate; rather, that it accurately may detect other compounds and that not all detections are of the target compound. The method is suitable to use essentially as a screening method, so that, once some compound is detected, a more compound-specific method, such as LC/MS is necessary for precise identification. In this instance, because the specific compound (FR) is known, and a specific LC/MS method has been developed for it, the sample can be analyzed for that compound to determine whether it, indeed, is present.

We stress that a false-positive result by AG-24 does not invalidate past negative results, as false-positives and false-negatives are scientifically very different things. A false positive, or Type I, error is when a target analyte is found in a blank sample, when it is known to be absent. For example, this occurred when the H&N tap water sample from August 21st was reported as a detection via AG-24. This also occurred when Endyne sampled various laboratory solutions that had detections, yet were known to not contain FR, as shown in Appendix 4. Another example is the reported detection in the equipment blank prior to first use of the equipment, in which case it was not possible for

the equipment to be contaminated with FR. A false negative, or Type II error, occurs when a target analyte is not detected in a sample when it is known to be present, such as a standard with a known concentration. Since Endyne has passed its proficiency tests and regularly analyzes standards with known concentrations with excellent recovery, false negative errors are not occurring in Endyne's analytical procedures.

All offsite locations and surface water samples were non-detect for the TAA component of FR via LC/MS analysis by STL. This component makes up approximately 91.5% of the FR. All other samples tested by STL for the other compounds also yielded no detections offsite.

The identification of the IM component of FR in Well B is puzzling, because it completely hydrolyzes to TAA in water. Of the 34 onsite and offsite samples analyzed by Severn Trent, only Well B (located directly within one of the TMAs) yielded an estimated detection, which was well within the state Health Advisory of 126 ppb. The STL results indicate that FR is not present in groundwater or surface water above regulatory standards.

VII Recommendations

H&N recommends continuing the semiannual sampling schedule following the approved Monitoring Plan submitted on June 15, 2006 and as refined on September 19, 2006, which refinements were followed in the latest rounds of sampling. We recommend the use of the LC/MS method as a supplemental analysis for any specific future samples exhibiting positive AG24 results.

Data further reinforces AG-24 is a non-specific method and sample blank detections further supports the sensitivity of the AG-24 method for compounds other than the FR. Therefore, we recommend further analysis by Endyne in an effort to determine other possible common source false-positives and interferences to the AG-24 method, in addition to the ones tested. Because interferences were not an issue during past sampling rounds, it would be helpful to try to determine the causes of false-positive results.

Based upon the non-detect results from STL, H&N does not believe that it is necessary to take equipment blanks after every sample as was done for the September re-sampling round. That recommendation also is based on the detection via AG-24 in an equipment blank taken of a rented Grundfos Redi-Flo pump, which had never been used on the Omya site before, and could not possibly have been used on a site where FR would be a contaminant of concern.

H&N recommends the use of the Geotech bladder pump for deep wells as originally approved in the Monitoring Plan because it represents the best and most precise technology available for sampling from specific depths greater than 280' below ground surface.

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**OMYA, INC.
VERPOL PLANT TAILINGS
Florence, VT**

2nd Addendum to Spring 2006 Monitoring Report

November 8, 2006

HEINDEL AND NOYES

Consulting Hydrogeologists, Engineers and Environmental Scientists