

**Omya Inc., Florence, VT
Odor Study Work Plan
Phase 3: Air Testing and Health Risk Assessment
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TRC Project No. 45532

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1.0 Background

In the summer of 2004, the Environmental and Natural Resources Law Clinic of the Vermont Law School prepared an odor complaint on behalf of Residents Concerned about Omya (RCO), a residents group in Florence, that was presented to the State of Vermont, Agency of Natural Resources, Department of Environmental Conservation (DEC), Air Pollution Control Division. This complaint raised concerns about odorous emissions from Omya's Florence facility and potential health impacts associated with airborne chemicals that were causing the odors. As a result of the complaint, DEC met with Omya and requested that an odor study be conducted.

In responding to the DEC request, Omya contracted with TRC Environmental Corporation (TRC) to develop and implement a work plan, which consisted of three phases: (1) Primary Study; (2) Odor Testing and Dispersion Modeling, and (3) Air Testing and Health Risk Assessment. In April 2005, TRC conducted the Primary Study and concluded that the originally suspected sources, i.e. the emissions from the #4 and #5 Flash Dryer stacks at the East Plant, are the sources of the odor episodes in the neighboring community. Subsequently, in the fall of 2005, TRC performed the second phase of the Study: Odor Testing and Dispersion Modeling. The odor impacts of the odorous emission sources and potential odor abatement methodologies were considered preliminarily. TRC also recommends that the Phase 3 of the original work plan be carried out.

The purpose of the Phase 3: Air Testing and Health Risk Assessment is to determine the air contaminant concentrations and mass emission rates of the

process emissions, and to confirm that there are no corresponding exceedances of any applicable Vermont Air Pollution Control Regulation Hazardous Ambient Air Standards (HAAS) at locations beyond the Omya property line. The following sections outline the testing and assessment procedures. This Work Plan will be submitted to DEC for review and comment prior to the actual testing and assessment.

2.0 Air Sampling and Testing

The #4 and #5 Flash Dryer processes involve the mixing/coating of stearic acid with/onto calcium carbonate powder in a hot air stream resulting directly from the external combustion of #2 fuel oil. Some of the air components in the emissions are the pyrolytic (formed by heat) products of stearic acid. The stearic acid is applied to and coats the surface of the ground calcium carbonate, and is of vegetable (typically palm oil) origin. Some of the identified compounds also likely result from the combustion of the #2 fuel oil in the dryers. Aldehydes, ketones, and short chain hydrocarbons are the expected air contaminants in the emission.

An EPA procedure, Compendium Method TO-15 "Determination of Volatile Organic Compounds (VOCs) in Air Collected in Specially Prepared Canister and Analyzed by Gas Chromatography/Mass Spectrometry (GC/MS)" will be followed to collect and analyze the air samples taken from the dryer exhaust streams. Due to the high moisture content and hot temperature of the stack exhausts, a cooling trap will be inserted in the probe prior to the canister. A cryogenic procedure may be used during the analysis to improve (make lower) the limits of detection.

Since some of the expected compounds in the exhaust are low molecular weight aldehydes and ketones that are not stable in the canister, a second procedure, Compendium Method TO-5 "Determination of Aldehydes and Ketones in Ambient Air Using High Performance Liquid Chromatography (HPLC)" will be adapted. The method uses a trap that contains 2,4 di-nitro phenyl hydrazine (DPNH)/iso-octane mixture to collect the aldehydes and ketones, to yield stable forms of DPNH derivatives. The concentrations of the derivatives will be measured.

Sampling will be conducted under two process conditions. One will be the normal production condition, and the other will be baseline condition. During the baseline condition sampling, no raw materials will be introduced in the process, and only hot combustion air will be in the flash dryers. The purpose of sampling this baseline condition is to determine what air contaminants are introduced into the system from combustion, so that they can be accounted for in the normal production condition.

Under each condition, triplet samples will be collected for each of the two flash dryer stacks. During the sampling, air flow rate, temperature, and moisture

content will be also measured using respective EPA source measurement procedures.

3.0 Modeling and Health Risk Assessment

Section 5-261 of the Vermont Air Pollution Control Regulations, “Control of Hazardous Air Contaminants”, contains both regulatory ‘trigger’ levels (“Action Levels”) and HAAS ambient concentration limits for hundreds of hazardous air contaminants (HAC). The HAASs, where applicable, will be the basis of health risk assessment.

Air contaminants identified in the above-described air testing (Section 2.0) and attributable to the production condition (less any contributions from the baseline condition) will be compared to Section 5-261’s HAC lists. If listed, the air contaminant’s emission rate will be calculated, based on the air contaminant’s concentration quantified and the stack air flow rate. If the combined emission rate from the two stacks exceeds the respective Action Level, that air contaminant’s ambient impacts at downwind locations will be estimated using dispersion modeling techniques as described below.

The air contaminant emission rates, and dispersion-related characteristics of the sources (i.e., stack height, stack diameter, stack temperature, and surrounding building heights), will be input into Industrial Source Complex Short Term (ISCST3) dispersion model. ISCST3 was developed by the EPA to quantitatively estimate air quality impacts at downwind locations.

Other sub-programs and assumptions that will be used in the modeling calculations are:

- Screening meteorological data (yields worst-case results)
- Receptors will be placed at 10 degree intervals and oriented in all directions (360 degrees or 36 wind directions). In each direction, receptors will be placed from the facility’s property fenceline and outward.
- Receptors will be defined at a 100-meter spacing out to 500 meters (0.3 miles) and at a 500-meter spacing out to 3000 meters (just under 2 miles),
- USGS 7.5 minutes series Digital Elevation Model (DEM) data will be used to obtain receptor elevations
- EPA-approved Building Profile Input Program (BPIP) will be used to calculate building downwash parameters used by ISCST3
- Co-location of the two stacks, which is a conservative assumption.

The estimated ambient concentrations of the air contaminants will be compared against the HAAS limits to determine whether health risks may exist.

4.0 Report Preparation

A report will be prepared summarizing the procedures used, findings and conclusions.