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Project Summary for a Construction Permit Application from Viscofan USA, Inc. for Modifications to Process Machine Casing Lines 7A & 8 at its Danville, Illinois Plant

Site Identification No.: 183804AAL
Application No.: 08110034
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I. INTRODUCTION

Viscofan has requested a permit to modify existing process machines 7A and 8 at its cellulose casing plant to operate at higher rates to increase production. The plant operates a number of machines which produce the cellulose casings used in the manufacture of hot dogs and other processed meats.

The Illinois EPA has reviewed the application and made a preliminary determination that this application meets applicable requirements. Accordingly, the Illinois EPA has prepared a draft of the air pollution control construction permit that it would propose to issue for this project. However, before issuing this permit, the Illinois EPA is holding a public comment period to receive written comments on the proposed issuance of this permit and the terms and conditions of the draft permit.

II. PROJECT DESCRIPTION

Viscofan USA, Inc. (Viscofan) operates a cellulose casing plant in Danville, in Vermilion County. The plant operates a number of machines which produce the cellulose casings used in the packaging of hot dogs and other processed meats. In the case of hot dogs these casing are removed from the hot dog in the manufacturing process following cooking. In the case of salami, bologna and other products, the casing stays with the product until it is prepared by the consumer.

Viscofan makes the casing from cellulose using the viscose process. In this process cellulose from wood pulp is reacted with various chemicals, including liquid carbon disulfide, to produce a “viscose” mixture which may be extruded and converted back into a continuous cellulose film of the desired thickness and configuration. The cellulose is extruded in the form of a cylinder with the diameter of the particular meat product.

The planned project will result in a significant increase in volatile organic materials (VOM) and reduced sulfur compounds (RSC) emissions as defined by the PSD rules. VOM emissions will be controlled by current historical optimized process control efforts (used to achieve the MACT standard) as the BACT control technology for VOM and RSC. The project will not be significant for total reduced sulfur compounds, i.e. hydrogen sulfide (H_2S). The control strategy that Viscofan is employing is the control of hydrogen sulfide emissions through the use of caustic (sodium hydroxide) scrubbers along with process changes.

Carbon Disulfide (CS_2) is commonly used in the manufacture of cellulose products because of its ability to react with cellulose to form a soluble derivative. CS_2 is physically hazardous since it is readily ignited, and is flammable in air at concentrations ranging from 1 to 44%. The mild odor of pure carbon disulfide, if detectable, is generally considered pleasant.

The majority of the carbon disulfide is emitted from the lines where the viscose mixture is converted back into cellulose. In order to minimize explosion and other risk from CS_2, the CS_2 is vented to the

atmosphere with a large volume of air. Small amount of carbon disulfide are also emitted from the handling of carbon disulfide and the production of the viscose mixture.

The manufacture of cellulose casing also emits Hydrogen Sulfide (H_2S). H_2S is a byproduct, as a significant fraction of the carbon disulfide is converted into hydrogen sulfide and released from the lines. While H_2S may be used as an industrial material, it is more commonly the byproduct of a chemical reaction. The reaction may be "natural," such as the decay of plant matter or sewage, or "man-made," such as the removal of sulfur from crude oil. H_2S has the characteristic and highly disagreeable odor associated with rotten eggs. Before being discharged to the ambient air, H_2S rich process exhausts are passed through a scrubber. In the scrubber, the H_2S reacts with caustic soda (sodium hydroxide) and is removed with the liquid scrubbing stream from the exhaust flow. The scrubber removes over 93% of the H_2S from the exhaust flow. The $_{CS2}$ in the exhaust flow is not affected by the scrubber.

The combination of CS_2 and H_2S, as well as a third compound, carbonyl sulfide (COS), are regulated in aggregate as the pollutant Reduced Sulfur Compounds (RSC).

III. PROJECT EMISSIONS

The potential or permitted annual emissions of this project, as would be allowed by the draft permit, are summarized below. Actual emissions will be less than the permitted emissions to the extent that the facility would operate at less than its maximum capacity and control equipment normally operates to achieve emission rates that are lower than the applicable standards and limitations.

Permitted Annual Emissions Increase of the Project (Tons/Year)

	CS_2	H_2S	VOM	RSC	PM_{10}[a]	NO_x[b]	SO_2[b]	CO[b]
Line 7A & 8	223.0	7.7	223.0	232.0	0.55	7.1	0.05	6.0
PSD de minimis Level	40.0	10.0	40.0	10.0	15.00	40.0	40.00	100.0

Notes:

a. Particulate matter less than 10 microns including condensable particulate as measured by USEPA Method 202.

b. Increase in emissions associated with increase natural gas usage at existing natural gas fired boilers.

IV. APPLICABLE EMISSION STANDARDS

The application shows that the proposed project will readily comply with applicable state and federal emission standards, including the emission standards and regulations of the State of Illinois (35 Ill. Adm. Code: Subtitle B) and applicable federal emission standards adopted by the United States EPA (40 CFR Part 52, 60 and 40 CFR Part 63

Subpart UUUU). Carbon disulfide is an organic material. The relevant state rule 35 IAC 215.301 would only limit emissions of Machine 7A and 8 if it was determined to cause odor nuisance.

V. PREVENTION OF SIGNIFICANT DETERIORATION (PSD)

The proposed project is considered a major project under the federal rules for Prevention of Significant Deterioration (PSD), 40 CFR 52.21, for emissions of volatile organic material (VOM) and reduced sulfur compounds (RSC). The Illinois EPA has been delegated authority by the United States EPA to administer the federal PSD program in Illinois. These rules are relevant for this pollutant because Viscofan's Danville complex is located in a region whose air quality is classified as attainment for particulate matter, ozone, sulfur dioxide, nitrogen dioxide, and carbon monoxide.

Because the existing Danville complex is already a major source of emissions, the criterion for whether the proposed project is considered major is whether the permitted emissions of the project for one or more pollutants regulated by PSD would qualify as significant, as defined by the PSD rules. The project meets this criterion for VOM and RSC with permitted annual emissions that are each greater than 40 tons and 10 tons, respectively. The project is therefore subject to the certain substantive requirements of the PSD rules for this pollutant. The potential annual emission increases of hydrogen sulfide, particulate matter, nitrogen oxides, sulfur dioxide and carbon monoxide associated with the project are less than 10, 15, 40, 40 and 100 tons, respectively. Therefore, this project is not subject to PSD review for these pollutants.

The substantive requirement of the PSD rules for a major project for a pollutant are: 1) A case-by-case determination of Best Available Control Technology (BACT), 2) An ambient air quality impact analysis to confirm that the project would not cause or contribute to a violation of the National Ambient Air Quality Standard(s) (NAAQS) or applicable PSD increment(s); and 3) An assessment of the impacts on soils, vegetation and visibility.

A. BEST AVAILABLE CONTROL TECHNOLOGY (BACT)

Viscofan submitted a "top-down" BACT demonstration in its application reflecting its judgment as to the emission control technologies and associated emission limits that should be considered BACT under the PSD rules for various units at the casing lines. This demonstration addressed the modified units in the plant that emit those pollutants for which the project is a major modification (i.e., VOM and RSC). The BACT requirement of the PSD rules does not apply to existing units that are not being modified.

The Illinois EPA has reviewed the material submitted by Viscofan and made its independent determination of BACT. In addition to the material submitted by Viscofan, the Illinois EPA's determination of BACT relies upon its general knowledge of the

types of operations at the proposed plant and specific information about existing plants with similar operations that are located in U.S. As explained below, the Illinois EPA concurred with Viscofan's selection of control technologies as it reflected technologies that are in common use at similar plants and effectively control emissions.

CS_2 is the sole constituent of VOM emissions increases, and the main RSC emissions component, have following available control technologies. The processing of cellulose casing product vent vapors from existing stacks.

Potentially applicable control technologies are for these sources are discussed below:

Carbon Adsorption: Carbon adsorption is a mature technology that has been used for the last 50 years to recover solvents from solvent-laden air streams. Activated carbon, which has a high surface-to-volume ratio and a preferential affinity for organics, can serve as a very effective adsorbent of low-solubility, high molecular weight VOM.

CS_2-contaminated air flow at Viscofan is very wet (80 – 100% relative humidity). Moisture limits the effectiveness of carbon adsorbents. Additionally, CS_2 has a low auto ignition temperature in air (~100°C), which raises concerns about its flammability when adsorbed on carbon in a heated adsorption bed. Common noncarbon adsorbents (zeolite, silica gel) would be poisoned by the water in the waste air stream. Other possible noncarbon adsorbents were found to be almost an order of magnitude less efficient at loading CS_2 than activated carbon.

Furthermore, this technology has seen very limited application at cellulose product manufacturing facilities and is unproven and very hazardous. For these reasons, carbon adsorption cannot be implemented at Viscofan.

Wet Scrubber: Wet scrubbers absorb VOMs such as CS_2 into an absorbing liquid such as water. Effective absorption requires large liquid surface areas to optimize mass transfer from the gas to liquid phase. Gas/liquid contact is enhanced through incorporating hydraulic sprays, trays, or packing to create a high liquid surface area while minimizing the liquid flow rate. McIntosh published a research paper on CS_2 removal and recovery, and has evaluated gas absorption as a possible technology to control Viscofan's CS_2 emissions. After a thorough review, a feasible absorbent for this application was not identified. For this reason, gas absorption as a stand-alone treatment technology for CS_2 is not technically feasible to control CS_2 emissions at Viscofan.

Oxidizer: Types of oxidizers include thermal, catalytic, and regenerative. In a thermal oxidizer, the volatile organic materials in a gas stream are subjected to high temperatures in the presence of oxygen. The VOM is converted to carbon dioxide,

water, and byproducts including, in the case of CS_2, sulfur dioxide (SO_2).

Oxidation of CS_2 has economic and environmental drawbacks. For example, sulfur dioxide (SO_2), which is very difficult and expensive to separate from air, would be produced in an oxidizer. Viscofan's proposed project will result in total CS_2 emissions from PM7A and PM8 of 635 tons/year. 13.7 tons/year of H_2S will also be emitted from these lines in the same process streams as the CS_2. If all of this CS_2 and the accompanying H_2S were incinerated, SO_2 emissions would be 1,095 tons/yr and Viscofan would become a major source for SO_2, necessitating the installation of control technology for this pollutant. An SO_2 scrubber, a likely control technology choice, would result in cross-media contamination and require the use of 3.9 lb of sodium sulfate per lb CS_2 incinerated or 2,480 tons per year in the case of the proposed modifications. The oxidizer would also emit 370 tons/year of carbon dioxide. Heating the CS_2-contaminated streams from 30°C (the temperature at which they exit the casing lines) to temperatures appropriate for oxidation would also be very energy intensive and generate more CO_2 emissions. Applying oxidation technology to treat CS_2 at Viscofan would therefore have significant environmental, energy, and economic impacts. Furthermore, no comparable facility employs this technology in the United States.

Condensation: In condensation, the VOM exhaust is forced into the liquid phase either by a temperature decrease, pressure increase, or both. Typically, temperature is reduced at a constant pressure. Condensers are most effective when the stream being treated is saturated or nearly saturated with condensable VOM. McIntosh's study included condensation as a means to recover CS_2 from adsorbents in an evaluation of an adsorption plant to treat and recover CS_2. He examined the conditions under which CS_2 could be separated from N_2, a potential adsorption bed purge gas. McIntosh found that condensation temperatures near the freezing temperature of water (32°F) and CS_2 concentrations near 500,000 ppm are required to achieve 80% CS_2 recovery. He estimated that the CS_2 concentration must exceed 175,000 ppm for condensation to be feasible. If condensation is being considered as the sole control technology for CS_2-contaminated streams these findings may apply. Although in this application we are considering separating CS_2 from air rather than pure nitrogen, we expect similar conditions would apply given that nitrogen is 79% of air. The concentration of CS_2 that is emitted from Viscofan is roughly 100 ppm, orders of magnitude below 175,000 ppm. CS_2-contaminated air streams are therefore not concentrated enough to make condensation technically feasible at Viscofan.

Biofiltration: A biological filter is a compost bed inoculated with aerobic microorganisms. VOM-laden gas passes through the compost bed and the contaminants are removed through adsorption, absorption, and chemical degradation. These contaminants are then metabolized by the microorganisms. Biofilters are best

suited for applications in which the feed to the biofilter is at constant temperature and contaminant concentration.

Biological reactors have been used to treat CS_2 emissions at cellulose products manufacturing facilities. In one design, the bioreactor system has three layers of media. The process water can be recycled and inorganic media enhances mass transfer. Sulfuric acid is formed and must be neutralized if it is not used on site. It would be technically possible to employ biofiltration at Viscofan.

An undesirable environmental effect of bioreactors is the production of sulfuric acid. It is infeasible to neutralize this acid because Viscofan must limit its sulfate emissions to the Danville Sanitary District by court order. As a result, Viscofan has had to incorporate a costly operation to isolate anhydrous sodium sulfate from its recycled acid streams to control its sulfate waste water emissions. If sulfate emissions to the Sanitary District exceed 15,000 lb/day Viscofan must pay surcharges. To mitigate the production of sulfuric acid, then, Viscofan would either need to treat it by evaporation, which is energy intensive, or convert it to gypsum, which sells at a loss. Neither of these two options is feasible. For these reasons, biofiltration cannot be applied at Viscofan.

Flares: Flaring is a VOM control process in which VOM are piped to a remote, usually elevated, location and burned in an unenclosed flame using a specially designed burner tip, auxiliary fuel, and steam or air to promote mixing for nearly complete VOM destruction. Complete combustion in a flare depends on flame temperature, residence time in the combustion zone, turbulent mixing of the gas stream components to complete the oxidation reaction, and available oxygen for free radical formation. Incomplete combustion results in some of the VOM being unaltered or converted to other organic compounds such as aldehydes or acids. SO_2 will form in a 2:1 molar ratio when CS_2 is combusted.

Flares have not been demonstrated in practice at cellulose products manufacturing plants in the United States and pose safety risks given carbon disulfide's low auto ignition temperature in air (~100°C). For these reasons, flaring systems are not technically feasible at Viscofan.

Membrane Separation: Membrane processes can be used to separate gaseous or liquid mixtures with semi permeable membranes. These membranes allow one or more constituents of the gas or liquid mixtures to pass through but are impermeable to other constituents of the mixture. Many materials can be used as membranes including porous glass, sintered metal, and a range of flexible films of synthetic polymers that are specifically engineered for a variety of applications.

McIntosh considered membrane separation technology to recover CS_2 from air at Viscofan. Through extensive phone interviews, he found no data or experience existed for CS_2 permeation and separation through ceramic-type membranes. Extremely limited,

experimental experience existed for polymer-type membranes. Since no appropriate membrane material exists, membrane separation is not technically feasible at Viscofan.

To summarize add-on control technology, including oxidation, adsorption, and biofiltration each have unacceptable energy, economic, and/or environmental impacts.

The above analysis revealed that no add-on control technology can be selected as BACT to treat VOM and RSC emissions, both of which are dominated by CS_2. This result is consistent with approaches to controlling CS_2 emissions at the few direct peers in the cellulose products manufacturing industry operating in the United States. Viskase Companies, Inc. uses a biofilter to comply with 40 CFR 63 Subpart UUUU (National Emission Standards for Hazardous Air Pollutants for Cellulose Products Manufacturing) at its Arkansas and Tennessee plants. It is unclear whether this technology achieves control beyond the MACT-required level (25%).

A review of EPA's RACT/BACT/LAER clearinghouse was completed to investigate CS_2 control techniques at facilities other than cellulose products manufacturing plants. This analysis revealed that many facilities do not control CS_2 emissions. For example, a Degussa carbon black manufacturing plant in Ohio without CS_2 control has a permit limit of 131 tons/yr of CS_2. (Recall that the increase of CS_2 emissions at Viscofan will be 218 tons/year.)

The controls proposed by Viscofan are the top ranked feasible technologies available for these processes. The analysis revealed that no technology can be selected as BACT to treat VOM and RSC emissions.

<u>Process Controls</u>: Process controls or pollution prevention measures can be an effective means of limiting VOM emissions.

In the past, Viscofan has reduced CS_2 emissions through process controls such as limiting the CS_2 charge per batch, stretching the casings so that less material is required per unit length of casing, and reducing the amount of viscose required per unit length of casing through adopting new formulations. Specific information on these process control efforts was provided to USEPA during the development of the Cellulose Manufacturing NESHAPS, and USEPA used the Viscofan data to set the MACT floor for Cellulose Food Casing facilities. Viscofan continues to use its process controls to maintain compliance with its permit requirements. At this time, however, no further opportunities have been identified to apply process controls to limit CS_2 emissions. Therefore, the use of further process controls is not currently a viable option for CS_2 control at Viscofan.

In conclusion, in the absence of a add-on control technology that can control CS_2 emissions without significant economic, energy, and environmental impacts, Viscofan has identified their current historical optimized process control

efforts (used to achieve the MACT standard) as the BACT control technology for VOM and RSC.

Limits are set on emissions that represent best available control technology as required by the PSD rules.

VI. AIR QUALITY ANALYSIS

A. Introduction

The previous discussion addressed emissions and emission standards. Emissions are the quantity of pollutants emitted by a source, as they are released to the atmosphere from a stack. Standards are set limiting the amount of these emissions primarily as a means to address the quality of air. The quality of air as we breathe it or as plants and animals experience it is known as ambient air quality. Ambient air quality considers the emissions from a particular source after they have dispersed following release from a stack, in combination with pollutant emitted from other nearby sources and background pollutant levels.

The concern for pollutants in ambient air is typically expressed in terms of the concentration of the pollutant in the air. One form of this expression is parts per million. A more common scientific form is microgram per cubic meter, millionth of a gram in a cube of air one meter on a side.

The United States EPA has established standards, which set limits on the level of pollution in the ambient air. These ambient air quality standards are based on a broad collection of scientific data to define levels of ambient air quality where adverse human health impacts and welfare impacts may occur. As part of the process of adopting air quality standards, the United States EPA compiles the various scientific information on impacts into a “criteria” document. Hence the pollutants for which legal air quality standards exist are known as criteria pollutants. Based upon the nature and effects of a pollutant, appropriate numerical limitation(s) and associated averaging times are set to protect against adverse impacts. For some pollutants several standards are set, for others only a single standard has been established.

Areas can be designated as attainment or nonattainment for criteria pollutants, based on the existing air quality. Areas in which the air quality standard is met for a pollutant are known as attainment. If the air quality standard is exceeded, the area is known as nonattainment. Given the geographic extent of areas designated as nonattainment and the USEPA’s process for redesignating an area to attainment, the air quality in some or all of an area designated as nonattainment may actually be in compliance with the relevant air quality standard.

In attainment areas one wishes to generally preserve the existing clean air resource and prevent increases in emissions, which would result in nonattainment. In a nonattainment area efforts

must be taken to reduce emissions to come into attainment. An area can be attainment for one pollutant and nonattainment for another.

Compliance with air quality standards is determined by two techniques, monitoring and modeling. In monitoring one actually samples the levels of pollutants in the air on a routine basis. This is particularly valuable as monitoring provides data on actual air quality, considering actual weather and source operation. The Illinois EPA operates a network of ambient monitoring stations across the state.

Monitoring is limited because one cannot operate monitors at all locations. One also cannot monitor to predict the effect of a future source, which has not yet been built, or to evaluate the effect of possible regulatory programs to reduce emissions. Modeling is used for these purposes: Modeling uses mathematical equations to predict ambient concentrations based on various factors, including the height of a stack, the velocity and temperature of exhaust gases, and weather data (speed, direction and atmospheric mixing).

Modeling is performed by computer, allowing detailed estimates to be made of air quality impacts over a range of weather data. Modeling techniques are well developed for essentially stable pollutants like particulate matter, NO_x, and CO, and can readily address the impact of individual sources. Modeling techniques for reactive pollutants, e.g., ozone, are more complex and have generally been developed for analysis of entire urban areas. They are not applicable to a single source with small amounts of emissions.

Air quality analysis is the process of predicting ambient concentrations in an area or as a result of a project and comparing the concentration to the air quality standard or other reference level. Air quality analysis uses a combination of monitoring data and modeling as appropriate.

B. Air Quality Analysis for volatile organic matter (VOM) and reduced sulfur compounds (RSC)

An ambient air quality analysis was conducted by a consulting firm, URS, on behalf of Viscofan to assess the impacts of the proposed plant on ambient air quality. Under the PSD rules, this analysis must demonstrate that the proposed project will not cause or contribute to a violation of any applicable air quality standard or PSD increment.

The starting point for determining the extent of the modeling necessary for this plant was evaluating whether the proposed project would have a “significant impact”. The PSD rules identify Significant Impact Levels, which represent thresholds triggering a need for more detailed modeling. These thresholds are specified for all criteria pollutants, except ozone and lead. The significant impact levels do not correlate with any health or

welfare thresholds for humans, nor do they correspond to a threshold for effects on flora or fauna. For pollutants for which impacts were above the significant impact level, modeling was done incorporating proposed new emissions units at proposed plant and significant stationary sources in surrounding area.

The permit application is requesting an increase in the current production and emissions for line 7A and a modification to line 8 to allow for an additional type of casing to be manufactured. Currently, processes and controls (caustic scrubbers) of this type are well established at the Danville plant. In addition, two lagoons located on plant property are included as part of fugitive emissions in this analysis.

This application considers the sum of carbon disulfide (CS_2) emissions and hydrogen sulfide (H_2S) as part of RSC. The increases in VOM emissions are equal to the sum of CS_2 emissions from the casing line process machines (223 tons/year), and VOM from the boilers, that is significant increase over 40 tons per year. The boiler contribution to VOM emissions is small at 0.39 tons/year.

The total potential RSC emissions increase from this facility is 232 tons/year and exceeds the significant emissions rate of 10 tons/year for this volatile organic material (VOM). Individual H_2S emissions are reported to increase by 7.7 tons/year which is below the 10 tons/year significant emission rate.

Emissions of CS_2 are also evaluated for odor impact, both acute and chronic exposure levels. URS performed the air quality dispersion modeling to assess these potential impacts.

Emissions of RSC from the proposed project were modeled for the five year period indicated above to determine if modeled RSC concentrations will exceed the 1-hour RSC monitoring de minimis threshold. The maximum predicted RSC off-site concentration results for both the URS modeling and the Illinois EPA modeling audit are provided below.

Table 1
Modeling Results: Comparison of Maximum Predicted RSC Concentration with Monitoring De minimis

Pollutant	Averaging Period	Maximum Concentration (ug/m^3)	Monitoring De minimis Concentration (ug/m^3)
RSC	1 Hour	666	10

The results show RSC concentrations well above the 1-hour monitoring de minimis level. There is no NAAQS for RSC.

An odor analysis of CS_2 was performed by URS using AERMOD. Off-site concentrations of CS_2 were initially determined for a 1-hour averaging period; however, assessment of odor impacts is properly done on the basis of maximum instantaneous concentrations. This coincides with a short-term averaging

period of 2 – 5 seconds. Due to short term impacts related to odor, longer averaging periods such as 1-hour will underestimate odor impacts. To address this issue, 1-hour concentrations were reduced using an industry accepted peak to mean ratio calculation for determining peak factors for odor emissions. This approach is based on the power law relationship (Wand and Skipka 1993). The maximum predicted 1-hour CS_2 average concentrations and the calculated 5-second average (short-term) concentrations for both the URS and Illinois EPA modeling audit are provided in Table 2 below.

Studies show CS_2 threshold values range from 24.3 ug/m^3 (odor low) to 23,100 ug/m^3 (odor high). These values reflect persons that are most sensitive to those that are least sensitive (Ruth 1986). Additional studies indicate that, on average, people can smell CS_2 at levels as low as 62.2 ug/m^3 to 311.2 ug/m^3 (ATSDR). In addition to a threshold comparison, it is recommended that an odor strength or dilution to threshold ratio be used to access the severity of the odor problem. Relatively speaking, the higher the D/T value, the stronger the odor. Higher D/T values have the potential to cause complaints. The D/T calculated values are listed as below.

Table 2
URS and IEPA Modeling Results
Comparison of Adjusted 5-second Predicted Air Toxic Concentrations of CS2 with Odor Thresholds

Pollutant	Averaging Period	Maximum Concentration 1-hour (ug/m^3)	Adjusted Concentration for 5 seconds (ug/m^3)	Max Threshold Detection (ug/m^3)	Dilution to Threshold (D/T)
CS_{2**}	1 Hour	4,925.02	18,360.1[a]	187**	98.18
CS_{2*}	1 Hour	5,335.21	19,846.9[a]	23,000*	0.86

* Illinois EPA determined threshold 0 based on the following reference: Ruth, Jon H. "Odor Thresholds and Irritation Levels of Several Chemical Substances: A Review." American Industrial Hygiene Association Journal 47 (March 1986): A-144.

** URS indicated threshold:

The odor threshold varies amongst established sources. The following source was used for the odor threshold included above: Carbon Disulfide - Agency for Toxic Substances and Disease Registry (ATSDR), Medical Management Guidelines for CS_2, 0.02 ppm to 0.1 ppm defined as threshold. The National Disaster Communication Response Team - Metropolitan Emergency Response & Logistical Information Network also listed an odor threshold of 0.11 ppm. A midpoint value of 0.06 ppm was chosen between the range of 0.02 to 0.1 ppm and converted to ug/m^3 based on 1 ppm = 3.11 mg/m^3 for CS_2.

[a] The adjusted instantaneous concentration is based on the power law equation for a 5 second period from a

1-hour model predicted concentration. Example Calculation: Adjusted Concentration = Maximum Predicted Concentration * (Modeled time period/Desired time period) ^ Power law exponent; or 18360.1 ug/m^3 = 4925 ug/m^3 * (3600 sec/5 sec) ^ 0.2

Results for CS_2 in Table 3 indicate the potential for odor complaints, as lower threshold values have a high D/T value.

An analysis was also performed to access the impact of CS_2 against acute and chronic exposure thresholds. Modeling was performed to determine whether CS_2 emissions from the facility, including the increase from the proposed project, could be expected to exceed acute and chronic thresholds. Table 3 outlines the results from modeling for multiple averaging periods in comparison to U.S.EPA Technology Transfer Network (TTN) air toxics thresholds (TTN, Table 1 & 2, 6/12/2007).

Table 3

URS and IEPA Modeling Results

Comparison of Maximum Predicted CS2 with Acute and Chronic Exposure Thresholds

Pollutant	Averaging Period	Maximum Concentration (ug/m^3)	Acute AEGL-1 (ug/m^3)[1]	Acute AEGL-2 (ug/m^3)[1]	Chronic Exposure Threshold (ug/m^3)
CS_2	1-hour	4,925.02	40000	500000	---
CS_2*	1-hour	5,335.21	40000	500000	---
CS_2	8-hour	2,806.40	21000	160000	---
CS_2*	8-hour	2,963.43	21000	160000	---
CS_2	24-Hour	1,532.90	---	---	---
CS_2 *	24-Hour	1,643.71	---	---	---
CS_2	Annual	144.00	---	---	700
CS_2*	Annual	140.58	---	---	700

* Illinois EPA audit results using new AERMAP and AERMET runs

[1] AEGL – Acute Exposure Guideline Levels; AEGL-1 – mild effects, AEGL-2 – moderate effects (1 and 8 hour exposures)

Modeling results for CS_2 indicate that under certain meteorological conditions, both acute and chronic thresholds will not be exceeded based on plant emissions.

c. Other Air Quality Related Impacts

Under PSD rules, Viscofan must also submit analysis that assesses the changes in air quality from growth in the area, and modification of the source itself. It must also evaluate the potential for visibility impairment and address the potential impacts on soil and vegetation.

Viscofan provided qualitative approach for growth analysis. The activities which will be performed within the building structure that house the equipment affected by the proposed changes are not anticipated to have any adverse affects on human health or welfare. Potential emissions of regulated air contaminants are anticipated to be negligible as no significant construction activities will take place. The increase in the production at the facility should not result in any noticeable residential growth in the area.

Viscofan's air quality consultant, URS, provided an additional analysis to evaluate potential impacts to vegetation and soils. Since the proposed project does not trigger PSD review for either NO2 or SO_2 impacts from the proposed expansion project are anticipated to be well below the ambient air quality standards, which are designed to protect public health and welfare from any known or adverse effects of air pollutants, including effects on vegetation.

Visibility analyses evaluate impacts from the proposed project within the modeled area of impact on areas such as state parks, wilderness area, and other unique sites. Estimated emissions of NOx, SO_2 or PM_{10} are less than the PSD significant emission rates. As such, visibility analysis for class II areas should not be required.

Ozone Air Quality Impact: Possible effects from ozone from proposed changes in VOM emissions (CS_2) were also evaluated as part of this analysis. US EPA has determined that the increase in CS_2 will have no measureable effect, if not no effect, on the endangered species with respect to ozone.

URS has performed the air quality analysis consistent with Illinois EPA guidelines and the results of the Illinois EPA's modeling audit provide reasonable confirmation of the applicant's results and are considered acceptable.

VII. PERMIT CONDITIONS

The conditions of the permit set forth the air pollution control requirements that the project must meet. These requirements include the applicable emission standards that apply to the project. They also include the measures that must be used and the emission limits that must be met as BACT for emissions of VOM and RSC from the modified facility.

The permit also establishes enforceable limitations on the amount of emissions for which the project is permitted. In addition to annual limitations on emissions, the permit includes short-term emission limitations and operational limitations, as needed to provide practical enforceability of the annual emission limitations. As previously noted, actual emissions associated with the project would be less than the permitted emissions to the extent that the facility operates at less than capacity and control equipment normally operates to achieve emission rates that are lower than the applicable standards and limitations.

The permit also establishes appropriate compliance procedures for the ongoing operation of the facility, including requirements for emission testing, required work practices, operational monitoring, recordkeeping, reporting and develop program to address odor complaints. These measures are imposed to assure that the operation and emissions of the facility are appropriately tracked to confirm compliance with the various limitations and requirements established for individual emission units.

VIII. REQUEST FOR COMMENTS

It is the Illinois EPA's preliminary determination that the proposed project meets applicable state and federal air pollution control requirements. The Illinois EPA is therefore proposing to issue a construction permit for the project.

Comments are requested on this proposed action by the Illinois EPA and the conditions of the draft permit.

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