STATE OF MAINE

DEPARTMENT OF ENVIRONMENTAL PROTECTION

ANGUS S. KING, JR.
GOVERNOR

EDWARD O. SULLIVAN
COMMISSIONER

CHAMPION INTERNATIONAL CORPORATION HANCOCK COUNTY BUCKSPORT, MAINE A-22-71-K-A	))))	DEPARTMENTAL FINDINGS OF FACT AND ORDER AIR EMISSION LICENSE AMENDMENT #5

After review of the air emission license amendment application, staff investigation reports, and other documents in the applicant's file in the Bureau of Air Quality Control, pursuant to 38 M.R.S.A., Section 344 and Section 590, the Department finds the following facts:

I. REGISTRATION

A. Champion International Corporation (Champion) was issued Air Emission License A-22-71-C-R on October 28, 1987. The license was subsequently amended on November 7, 1990 (A-22-71-D-M) on February 10, 1994 (A-22-71-H-M), and on October 24, 1994 (A-22-71-I-M) and on January 17, 1996 (A-22-71-J-A).

B. Champion submitted an application and a subsequent update to the application which were received and accepted by the Department on April 22, 1994 and April 28, 1995 respectively. The application requested an air emission license amendment to address Reasonably Available Control Technology (RACT) for Volatile Organic Compounds (VOC), as required by Chapter 134 of the Maine Air Regulations.

C. Application Classification
The application for Champion is considered to be an amendment to incorporate the VOC RACT requirements as required by Chapter 134, of the Maine Air Regulations.

II. BEST PRACTICAL TREATMENT

A. Introduction
Champion is in an attainment area for all U.S. EPA designated criteria air pollutants, except for ozone which is designated as marginal nonattainment. Chapter 134 of the Maine Air Regulations requires that every source which has the potential to emit quantities of VOC equal to or greater than 40 tons per year apply RACT to their applicable VOC emissions.

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B. RACT for VOC Emissions

Champion produces pulp by groundwood and thermomechanical processes. Champion then blends these mechanical pulps with purchased kraft pulp to produce light weight publication papers on their four paper machines. There are numerous sources of VOC throughout the pulp and paper mill.

A number of these are exempt from VOC RACT requirements pursuant to Chapter 134, including Champion's boilers, wood handling and storage activities and paper machine areas, including the finishing and converting areas. Based on information and data submitted into the record during rulemaking on Chapter 134, the Department determined that it is not economically and/or technically feasible to control the VOCs from such equipment. Further, the Department is not aware of any mill which controls VOCs from these types of sources. Champion's aqueous-based coating operations are also exempt as the coating used by Champion are below the limits which established in Chapter 123, the DEP's paper coating regulation from paper coating. The VOCs from Champion's waste water treatment system are deemed to meet RACT pursuant to Chapter 134, Section 3(A)(4)(b), provided Champion continues to operate in accordance with its National Pollution Discharge Elimination System (NPDES) permit. The remaining VOC emitting units at the mill are insignificant. The Department has determined that it is not economically and/or technically feasible to control the VOCs from the reject refiners and the other insignificant sources of low concentration, high volume VOCs at the mill.

The Department determined that the following sources should be addressed by Champion in an alternative VOC RACT analysis:

1. grinder vents of groundwood pulping operations (Champion has 2 grinder vents), and
2. primary and secondary refiner vent of thermomechanical pulping (TMP) operations (Champion has 1 TMP vent).

Phase I Cost Analysis

Champion performed a Phase I cost analysis for VOC RACT utilizing emission data generated from other facilities.

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Based on VOC testing that has been performed at other similar facilities around the country, the various species of VOCs emitted from mechanical pulping operations include mostly terpenes, with small amounts of methanol, ethanol, and propanol. Champion has estimated VOC emissions based on the information available from the groundwood and TMP processes to be approximately 0.576 lbs/ADTP (air dried ton of pulp), which equates to 37 and 18 tons per year, respectively based on average pulp production rates of 350 and 175 ADTP/day, respectively for 365 days/year.

Champion determined that the incineration of the VOCs within Champion's existing boilers would be very costly and very impractical, if not infeasible. This determination was based on the fact that the moisture in the exhaust streams from the groundwood and TMP operations would have to be removed by a condenser (which would double the mill's use of water); the gases would have to be ducted several hundred feet to the boilers and then reheated; the boilers would have to be modified with appropriate fans and blowers; there would have to a primary and backup incineration system; the air contaminants and oxygen supply would have to be carefully controlled to avoid explosive conditions; and the destruction efficiency of the system would be unknown.

Therefore, the following VOC control technologies were evaluated by Champion in the RACT analysis: incineration, condensation, adsorption, and a combination of concentration and incineration. Other control technologies were determined to be not technologically feasible based on the low concentration, high volume sources. Since the VOCs emitted from the 3 vents are a natural component of wood, there are no reasonably available pollution prevention options to reduce VOC emissions from these sources.

VOC RACT regulations require that compliance with the RACT determination be achieved by May 31, 1995. In addition, Champion shall be subject to meet the Maximum Achievable Control Technology (MACT) requirements three or four years after RACT, which could potentially require the replacement of the RACT controls by an alternate control strategy system. Therefore the RACT analysis which is based on a cost per ton of pollutant removed, shall be performed using a four year control equipment life in addition to the evaluation of the RACT analysis on a 10 year basis.

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1. Incineration

Incineration is an effective control technology for most VOCs, however most of the exhaust streams at the Champion mill are wet and would therefore require moisture removal through condensation prior to entering an incineration system. The two most common types of incineration are thermal incineration and catalytic incineration. Both incineration methods require the burning of a supplemental fuel to sustain temperatures necessary to oxidize the VOCs in the gas streams and additional electrical needs to operate the associated fans and pumps. The additional fuel firing by the incinerator would thereby result in an increase of air pollutants. It has been proposed by Champion that the two methods of incineration are technically feasible, although there would be significant energy and environmental impacts (e.g. increased NOx). The economic impacts of the two incineration methods were evaluated by Champion and found to be the following:

a. Single Thermal Incineration System for all three vents:
   10 year analysis - $7,116/ ton 4 year analysis - $11,594/ ton
b. One Thermal Incineration System for 2 groundwood vents
   10 year analysis - $5,067/ ton 4 year analysis - $7,296/ ton
   One Thermal Incineration System for 1 TMP vent
   10 year analysis - $5,157/ ton 4 year analysis - $7,783/ ton
c. One Catalytic Incineration System for 2 groundwood vents
   10 year analysis - $3,763/ ton 4 year analysis - $5,121/ ton
   One Catalytic Incineration System for for 1 TMP vent
   10 year analysis - $5,342/ ton 4 year analysis - $7,339/ ton

In addition, because NOx is the ozone precursor of most concern in Maine, the Department has determined that the environmental impacts from incineration are unacceptable; increasing NOx emissions through VOC control is not a reasonable ozone control strategy in Maine.

2. Condensation

Condensation is the process of converting a gas or vapor to a liquid, by lowering its temperature and/or increasing its pressure. The most common approach is to reduce the temperature of the gas stream, since increasing the pressure of a gas is very costly. Condensers are typically not capable of reaching low temperatures (below 70^{o}F) and high removal efficiencies are not obtained unless the vapors condense at high temperatures (above 100^{o}F). Condensers are typically used as pretreatment devices ahead of incinerators or adsorbers to reduce the total gas volume to be treated.

Currently, Champion operates a condenser (commonly referred to as a heat exchanger) to extract useful heat from the gas stream of the primary and secondary refiners in the TMP process. Although available information at this time is limited Champion does not believe that a condenser by itself would achieve 85% control effectiveness. Therefore, pursuant to Chapter 134, Section 3(A)(3), condensers are rejected as RACT for VOC emissions from the 3 identified vents.

3. Adsorption
Adsorption is a mass transfer process in which gas molecules are removed from an air stream by adhering to the solid surface of an adsorbent bed. The adsorbent bed must then be either disposed and replaced, or the VOC vapors must be desorbed before the adsorbent bed can be reused. The most common adsorbents used industrially include activated carbon, silica gel, activated alumina, and zeolites or molecular sieves. The VOC vapors that are desorbed must then be controlled either by passing them through a condenser or an incineration system.

Champion has proposed that since this type of control equipment cannot control VOC emissions as a stand alone unit, it was further evaluated in conjunction with another type of control. As stated above, the control effectiveness of the condenser is insufficient for RACT therefore, Champion evaluated the adsorption system followed by an incineration system.

Champion has proposed that the method of adsorption followed by incineration is feasible, although there would be similar energy and environmental impacts as described above for incineration alone. The economic impacts of adsorption followed by incineration was evaluated by Champion and found to be the following:

Combined Adsorption and Incineration System for all three vents (Re-Gensorb) 10 year analysis - $6,919/ ton
4 year analysis - $11,114/ ton

Phase II Cost Analysis
After obtaining more information from actual test data generated from the Champion facility, a Phase II cost analysis was performed. The analysis only evaluated the scenario of one Incineration System for the 2 groundwood vents and a separate Incineration System for the 1 TMP vent, since this scenario overall was determined to be the least costly of all options, and the most effective, it was the only scenario analyzed.

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Champion has proposed that the cost of the Incineration System is closely related to the flow rate of the gas stream being treated. The Phase I cost analysis was based on a low estimated flow rate of 15,000 scfm. Test results indicated that VOC emissions could be as high as 192 TPY with a flow rate of approximately 60,000 scfm. Based on the estimated maximum VOC emissions from the Champion facility based on test data and the cost of incineration technologies that have been identified by similar facilities, the economic impact was determined to be the following:

One Catalytic Incineration System for 2 groundwood vents:
10 year analysis - $5,076-8,932/ ton4 year analysis - $8,192-12,568/ ton
One Thermal Incineration System for 1 TMP vent:
10 year analysis - $4,621-6,801/ ton4 year analysis - $6,967-9,805/ ton

The above costs are based on the range of flowrates from 10,000 to 40,000 scfm and additional annual operating costs that were not considered in the Phase I cost analysis.

VOC RACT Conclusion

The VOC emissions generated from the mechanical pulping of wood are a natural component of the wood. Champion has indicated that the estimates used in the analysis were conservatively high. Based on the above analysis for energy, economic, and environmental impacts, additional VOC control of the identified 3 vent sources is not economically feasible. These sources are currently receiving RACT.

Based on the above, the Bureau of Air Quality Control finds that all sources including the 2 groundwood pulping grinder vents and the 1 primary and secondary refiner TMP vent at the Champion facility are meeting RACT for VOC emissions.

ORDER

Based on the above Findings and subject to conditions listed below the Department concludes that the emissions from this source:

- will receive Best Practical Treatment,
- will not violate applicable emission standards,
- will not violate applicable ambient air quality standards in conjunction with emissions from other sources.

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The Department hereby grants Air Emission License Amendment A-22-71-K-A, subject to the conditions found in Air Emission License A-22-71-C-R, in the amendments:

A-22-71-D-M, A-22-71-H-M, A-22-71-I-M, A-22-71-J-A, and in the following conditions:

(mm) Champion shall comply with the terms and conditions of their NPDES permit as a VOC RACT requirement.

(nn) This amendment shall expire concurrently with Air Emission License A-22-71-C-R.

DONE AND DATED IN AUGUSTA, MAINE THIS 18th DAY OF January 1996.

DEPARTMENT OF ENVIRONMENTAL PROTECTION

BY: James P. Brooks for
EDWARD O. SULLIVAN, COMMISSIONER

PLEASE NOTE THE ATTACHED SHEET FOR GUIDANCE ON APPEAL PROCEDURES

Date of initial receipt of application April 22, 1994
Date of application acceptance April 28, 1995

Date filed with the Board of Environmental Protection

FILED
JAN 19 1996
BOARD OF ENVIRONMENTAL PROT.
STATE OF MAINE

This Order prepared by Kim Hibbard, Bureau of Air Quality Control