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CITROSUCO NORTH AMERICA, INC.
VOC EMISSIONS SUMMARY

Prepared For:
Citrosuco North America, Inc.
Post Office Box 3950
Lake Wales, Florida 33859-3950

Prepared by:
Gulfcoast Engineering Inc.
2516 E. State Road 60
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May 21, 1998

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Florida Dept. of Environmental Protection
Air Program
Twin Towers Office Building/MS#5510
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

ATTN: A.A. Linero, P.E.
Administrator, New Source Review Section

RE: Citrosuco
North America

Gentlemen:

We wanted to thank you for meeting with us this past Tuesday. As we suggested we are proposing to limit VOC emissions to less than a 39 ton increase from actuals to potential. This will allow Citrosuco to avoid the BACT analysis for VOC which would unnecessarily delay the permitting. We have attached the emissions analysis report and the 1997 and 1998 VOC tests.

As also suggested we will be following up with additional information to help your staff develop a more thorough understanding of the citrus processing facility.

Should you have any further questions please contact me at my office at your earliest convenience.

Sincerely,



Wayne E. Griffin, P.E.
President

WEG:pg

cc: Citrosuco

General

The citrus processing facility is proposing to expand to 25,000,000 boxes/year from the existing 10,000,000 boxes/year. This will require installation of two (2) additional 1000 Hp boilers and replacement of the existing 40,000#/hr dryer with two (2) 60,000#/hr dryers.

As noted in the FCPA study the VOC emissions from a citrus processing facility are principally comprised of d'limonene based compounds. These d'limonene compounds are oils primarily found in the peel and to some extent in the juice. The VOC emissions are generally proportional to the oil content of the press cake entering the peel dryer. Reduction of those oil levels will result in a corresponding reduction in VOC emissions.

Basis of Emissions Estimates

Methodology

The basic premise is to compare the VOC emissions levels to those of facilities using similar techniques to improve oil recovery rates and thereby reduce VOC emissions. The emissions from each facility will be adjusted to a weighted average due to the variation in oil content during the processing season.

Facility A

The average VOC emissions rate from the FCPA study for facility A was 33.6#/hr. This facility processes approximately 12 million boxes/year with a 60,000#/hr dryer over approximately 4500 operating hours. The FCPA test at this facility was conducted on early-mid fruit which has a lower oil content than late season valencia fruit.

$$\text{Adjusted VOC Emission Rate} = 33.6\#/hr \times 3/2 = 50.4\#/hr$$

Facility B

The average VOC emissions rate from the FCPA study for facility B was 71.4#/hour. This facility processes approximately 8 million boxes/year with a 60,000#/hour dryer over approximately 3600 hours operating hours. The FCPA test at this facility was conducted on valencia fruit which has the highest oil content.

$$\text{Adjusted VOC Emission Rate} = 71.4\#/hr \times 2/3 = 47.6\#/hr$$

Citrosuco

Citrosuco will have twice the peel dryer processing capability of facilities A & B.

Estimated Emissions = 2 x 49#/hr x 4000 hours = 196 tons/year

Discussion

The Citrosuco facility emissions are currently approximately 418 tons/year based on the FCPA study testing and an additional test completed in 1998. When compared to facility A and B this leaves much room for improved oil recovery at Citrosuco. Facility A is slightly larger in processing capacity and facility B is slightly smaller in processing capacity than the Citrosuco facility. VOC emissions at those facilities, however, are roughly ¼ of those at Citrosuco.

Proposed Improvements

With the expansion Citrosuco will incorporate all of the oil recovery techniques being used at facilities A and B as well as some additional steps that should further enhance recoveries. Specific improvements include:

1. Improved cold press oil recovery with new generation equipment.
2. Pumped conveyance of peel.
3. Reaction tank for lime system.
4. Improved pressing of peel to remove oil.
5. Improved grinding of peel to reduce particle size.
6. Removal of solids from press liquor stream.
7. Improved combustion in the peel dryer thru use of PLC control system.
8. Reduction of return air gas temperatures in the peel dryer along with increased return air rate.
9. Improved scrubbing of the dryer exhaust.

Summary

The technology is available to significantly reduce the VOC emissions from the Citrosuco facility. Based on the data from facilities A & B which focus on improved oil recovery the VOC emissions can be easily reduced to levels that will represent minimal increases with the proposed expansion.