UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
RESEARCH TRIANGLE PARK, NC 27711

OFFICE OF
AIR QUALITY PLANNING
AND STANDARDS

DEC 06 1996

MEMORANDUM

SUBJECT: Hess Oil Virgin Islands Corporation Intermittent Control System (ICS): Section 325 Waiver Request

FROM: Dennis Doll, Model Clearinghouse Coordinator
Air Quality Modeling Group, EMAD (MD-14)

TO: Annamaria Colecchia, Environmental Scientist
Region II (2APB-SIP)

THRU: Joseph A. Tikvart, Group Leader
Air Quality Modeling Group, EMAD (MD-14)

In response to your request, the Model Clearinghouse has reviewed your position with respect to the technical supportability of the proposed HOVIC ICS. Subject to the caveats below we agree that the proposed ICS will be protective of the NAAQS.

First, since we do not have access to the meteorological data , we defer to your technical judgment that the analysis of that data and modeling analysis is supportive of the 6-hour and 12-hour criteria described in your memorandum.

Second, as you are aware, our ability to accurately predict future air quality based on modeling with a historical year of meteorological data is an inexact science. Thus, as you have recognized, intermittent control systems need to have some "safety factors" built in.[1] For example, you indicate that the modeling data really indicated that no violations occurred until the wind was into the critical sector for at least 18 hours, yet the criteria for fuel switching is based on 6-hour and 12-hour winds into that sector. This is sort of a safety factor, presumably to account for unknowns and variability. On the other hand, apparently the critical wind sector is very precisely defined based on one past year of modeling and limited exactly to those directions for which exceedances were modeled. For that uncertainty you indicate that the Company has offered to install 3 monitors whose real time readings could be used to trigger and override the prediction system in the event that concentrations were getting "too high." Other factors which might cause a failure of the system to predict when exceedances might occur include the modeling based on a temporally limited (one year) meteorological data base and the lag between the time that the decision is made to switch fuels and the time that concentrations on the terrain downwind are actually reduced. Again, we leave it to your judgment that the safety factors you indicate and

the yet to be specified monitor threshold value are adequate to protect air quality in the event of a failure of the designed prediction system.

We understand that the 6-hour and 12-hour criteria are based on hourly average wind directions and not some shorter period average or instantaneous values. We also understand that the data from the SO_2 monitors will be telemetered to some kind of control room where they are continuously watched for exceedances of some critical short term or accumulated value. We also understand that when critical meteorological or ambient criteria are exceeded there will be an immediate fuel switching to low sulfur oil.

One of the critical factors in any ICS is enforceability.[2] The ICS plan should be in an enforceable document, and not just a guideline that the Company uses or perhaps chooses not to use in any given situation. In principle, we should not think in this case that the Company would be impelled to violate the plan for economic reasons since the frequency of the required fuel switching would be low. However, based on past guidance and on recent experience with ICS in Guam, it would be wise to have an enforceable plan.

Another factor in the continued successful practice of ICS at a plant is to have an "upgrade" provision[3] in place. This means that after some period of time, say a year, the newly acquired meteorological data are fed into the model and perhaps otherwise analyzed, and the monitored data are compared to model estimates to see if modifications need to be made to the ICS to accommodate previously unforeseen critical conditions.

Finally, it should be noted that in spite of careful design and inclusion of safety factors, the vagaries of the meteorology can cause a failure of an ICS, and thus there is always some risk of exceedances of the NAAQS. In accepting an ICS the control agency has to be willing to accept such risk.

In summary, given the information we have and subject to the assumptions/caveats we have stated above, we agree with you that the designed system should provide reasonable assurance that the NAAQS will not be violated.

If you have any questions, please contact Dean Wilson or me.

cc: D. deRoeck
R. Kelly (2APB-SIP)
S. Riva (2APB-PS)
J. Siegel (2ORC)
M. Stanco (2APB-PS)
D. Wilson

References:

1. Guidelines for Evaluating Supplementary Control Systems. EPA-450/2-76-003.

2. Guidelines for Enforcement and Surveillance of Supplementary Control Systems, Volumes I & II. EPA-450/2-75-008.

3. Technique for Supplementary Control System Reliability Analysis and Upgrading. EPA-450/2-76-015.

FY-97 MODEL CLEARINGHOUSE MEMORANDA

Date	Region	Subject
12/05	II	Hess Oil Virgin Islands Corporation Intermittent Control System (ICS): Section 325 Waiver Request

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION II

DATE: NOV 18 1996

SUBJECT: Hess Oil Virgin Islands Corporation Intermittent Control Strategy and Request for a Section 325 waiver

FROM: Annamaria Colecchia
Environmental Scientist

TO: Dennis Doll
Model Clearinghouse Coordinator

Thru: Steven C. Riva, Chief
Permitting Section

The purpose of this memorandum is to request Model Clearinghouse concurrence on the Region II position with respect to the technical aspects of the approvability of a proposed Intermittent Control Strategy (ICS) at the Hess Oil Virgin Islands Corporation (HOVIC) refinery in St. Croix.

As you know, the use of an ICS is explicitly prohibited by the Clean Air Act under section 123 where it is defined as a dispersion technique. However, the Clean Air Act also contains a provision under section 325 which allows the government of some of the U.S. territories (i.e., U.S. Virgin Islands, Guam, and American Samoa) to petition the EPA Administrator for an exemption of some Clean Air Act requirements. This petition may be granted in cases where the requirement is deemed "unreasonable or infeasible" due to special local geographic, meteorological or economic constraints at the islands. However, under no circumstance may the waiver be granted if there is a threat to the attainment or maintenance of the air quality standards.

HOVIC proposed to employ an ICS in order to mitigate modeled exceedances of the 24 hour SO_2 NAAQS. These exceedances were found as a result of modeling performed in support for a request to modify their PSD permit. The facility is located in a coastal area in the south of St. Croix with terrain to the north. The analysis used the ISC3 model with one year of on-site meteorological data. The results indicated 4 exceedances of the SO_2 24 hour NAAQS occurring over different times of the year. Each exceedance occurred under a southerly wind flow regime which impacted terrain approximately 2 kilometers to the north. HOVIC alleges that the 325 waiver should be granted based on the fact that they are subject to "unique meteorological conditions" (i.e., predominate easterly trade winds) and that it would be "unreasonable" for EPA to require the lower sulfur fuel year round when the problem occurs only a small percent of the year which can be corrected with the ICS.

In order to mitigate the exceedances, HOVIC proposed to employ an intermittent control strategy which would require them to switch to a lower sulfur fuel (from 1.0% to 0.5%) during the southerly wind conditions. Specifically, the ICS would be implemented under of the following scenarios:

1.) the winds blow from 143 to 187 degrees for either at least 6 consecutive hours or any 12 non-consecutive hours during a 24 hour period.

The switch back to the 1.0% sulfur fuel would occur when the winds blow outside the sector for at least 3 consecutive hours. **Or**,

2.) One of three ambient monitors placed inside the area of concern measures a critical threshold level (to be determined)

The 45 degree sector was selected by HOVIC after examination of the wind direction during each hour which contributed to one of the 4 exceedances (see contribution table attached). Originally, the Region was concerned that the sector was too limited and did not allow for <u>any</u> variability in wind direction in future years. The sector exactly encompasses the hourly wind directions to the nearest degree which contributed to one of the 4 modeled exceedances in that one year. Further, there was a concern regarding the uncertainty of implementing an ICS based solely on wind direction since wind direction is not the only atmospheric parameter which could be conducive to an exceedance (i.e., low wind speed, stable conditions).

In order to decrease the uncertainties, HOVIC proposed to install 3 ambient monitors in the area of concern which would also trigger the ICS. This would serve to account for the situations which also could lead to elevated concentrations for reasons other than the southerly wind directions and account for potential future elevated concentrations when the winds blow slightly outside the sector. The monitors also serve as a check for situations where the model may not have performed well in predicting an exceedance. The Region believes this is an acceptable alternative to simply increasing the sector.

Originally, the Region was also concerned that the 6 consecutive hour time period may not be adequate since the exceedance may occur after a shorter time period. The Region agrees that the 6 consecutive hour time frame is arbitrary. However, it was determined by HOVIC as a fraction of the actual persistence time that lead to the 4 modeled exceedances. Based on the one year of on-site meteorological data, the modeled exceedances occurred when the winds blew into the sector for at least 18 hours. Given that the modeled exceedances in this case occurred after 18 hours of persistence and the fact that the ambient monitor threshold could trigger the fuel switching at any time, the Region now believes the 6 consecutive hour persistence factor is acceptable.

In order to alleviate the EPA concern that the winds could meander in and out of the sector but on average blow into the sector often enough to cause a 24 hour average exceedance, HOVIC proposed an additional time criteria. That is, to also switch fuel after any 12 non-consecutive hours of winds blowing into the sector.

Region II believes that the ICS proposed by HOVIC will be protective of the 24-hour SO2 NAAQS. We request Clearinghouse review of this position.

Attachment

cc: S. Riva, 2APB-PS
M. Stanco, 2APB-PS
R. Kelly, 2APB-SIP
J. Siegel, 2ORC
D. DeRoeck, OAQPS-NSR

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12/05	II	Hess Oil Virgin Islands Corporation Intermittent Control System (ICS): Section 325 Waiver Request