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KA 344-90-01

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Mr. Cleve Holladay
Florida Department of
Environmental Regulation
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, FL 32399-2400

Subject: Air Quality Impact Analysis
Molten Sulfur System
CF Industries, Inc.
Permit File No. AC29-187327

Dear Mr. Holladay:

This is in response to your request for an air quality impact analysis concerning the molten sulfur system at the existing CF Industries (CF) facility in Plant City, Hillsborough County, Florida.

In September 1990, CF applied to FDER for an increase in the molten sulfur throughput rate. Although the estimated air emissions from the sulfur system are fairly small, concerns were expressed by FDER about the ambient impacts associated with the sulfur dioxide emissions from the molten sulfur storage tank and the two truck receiving pits.

An ambient air quality impact analysis was conducted to evaluate the individual and collective sulfur dioxide impacts resulting from the molten sulfur system as well as the recent modifications of the C and D sulfuric acid plants.

Computer modeling was conducted using the EPA approved ISC-ST model, Version 90346. The meteorological data used for the modeling was for Tampa for the years 1982-1986 and was identical to that previously used for the modeling conducted for the C and D sulfuric acid plants.

Modeling Input

The total sulfur dioxide emissions from the molten sulfur system and the net sulfur dioxide emission increases for the C and D sulfuric acid plants were input to the model. The sulfur dioxide emissions from the molten sulfur system are 1.02 pounds per hour for the storage tank and 0.11 pound per hour for each of the truck pits. The total molten sulfur system

sulfur dioxide emissions of 1.24 pounds per hour (0.1564 grams per second) were modeled as being emitted from the storage tank (since the tank accounts for the bulk of the emissions). The sulfur dioxide emission rates for the C and D sulfuric acid plants used for the modeling were identical to those used in the previous modeling conducted for the acid plants. No distinction was made for the relative location of the sources because they are all in the same section of the plant, as shown in the CF facility plot plan submitted with the molten sulfur system permit application. The sources were modeled in three groups. Source Group 1 represented the molten sulfur system, Source Group 2 represented the C and D acid plant modification, and Source Group 3 represented the molten sulfur system and the acid plant modification.

Building wake effects were taken into consideration for only the molten sulfur system as wake effects are not applicable to the C and D acid plants (see previous modeling analysis for the C and D acid plant modification project). Building dimensions of 200 feet length, 200 feet width, and 60 feet height were used, conservatively, reflecting the plant structures surrounding the molten sulfur system on all sides.

The receptor locations chosen for the modeling reflect the approximate plant boundary represented by discrete receptors, and a polar receptor grid (same as the one used in the previous modeling) downwind of the discrete receptors (see Figure 1). The polar grid receptors were situated on radials from 10° - 360° at downwind distances of 1000, 2000 and 5000 meters. Receptors beyond 5000 meters were not included because the previous modeling predicted maximum ambient air impacts from the modifications of C and D plants within 2000 meters of the plants while the predicted maximum ambient air impacts from the molten sulfur system occurred at 500 meters from the plant and decreased downwind.

Modeling Results

The results of the air modeling, summarized in Table 1, show that the predicted maximum impact from the combined sources (Source Group 3) would be 0.46, 17.65 and 3.90 micrograms per cubic meter for the annual, 3-hour and 24-hour averaging periods, respectively. These impacts are less than the significant impact levels for sulfur dioxide of 1.0, 25.0 and 5.0 micrograms per cubic meter for the same respective averaging periods. As expected, the predicted maximum impacts occur within 2000 meters from the sources and decrease downwind (See Figure 2). A hard copy and diskette of the air modeling is included in the Appendix.

Based on the results of the modeling, it can be concluded that the sulfur dioxide emissions from the molten sulfur system are not significant and will not cause or contribute to a violation of any ambient air quality standards or allowable PSD increments.

It is anticipated that this information will satisfy the only remaining FDER requirement pertaining to the sulfur system permit application review.

If you have any questions, please do not hesitate to contact me.

Very truly yours,

KOOGLER & ASSOCIATES

John B. Koogler, Ph.D., P.E.

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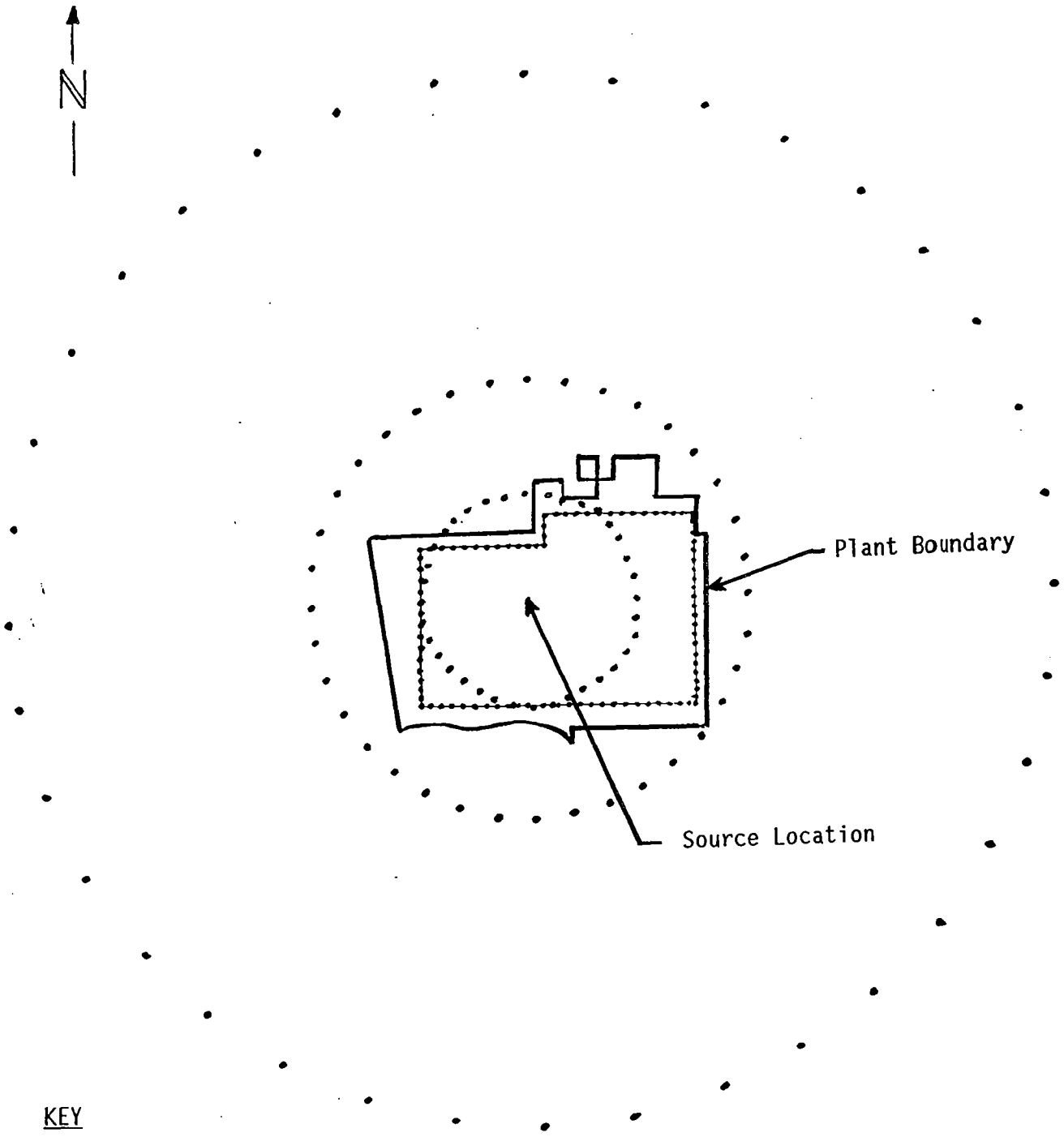
FIGURE 1

RECEPTOR LOCATIONS

SULFUR SYSTEM SULFUR DIOXIDE IMPACT ANALYSIS

CF INDUSTRIES, INC.
PLANT CITY, FLORIDA



KEY

Discrete Receptor

Grid Receptor

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TABLE 1

SUMMARY OF SULFUR DIOXIDE AMBIENT AIR IMPACT ANALYSIS
MOLTEN SULFUR SYSTEM

CF INDUSTRIES, INC.
PLANT CITY, FLORIDA

Meteorological Data	Sulfur Dioxide Impacts ($\mu g/m^3$)[1]		
	Annual	3-hour	24-hour
1982	0.38 (1000m, 240°)	17.65 (-400m, 500m)	3.10 (-500m, 500m)
1983	0.36 (1000m, 240°)	14.01 (-100m, 500m)	3.90 (-500m, 500m)
1984	0.46 (1000m, 250°)	14.16 (1000m, 250°)	3.50 (1000m, 250°)
1985	0.42 (1000m, 240°)	15.76 (200m, 500m)	3.24 (-300m, 500m)
1986	0.42 (1000m, 250°)	15.09 (-100m, 500m)	3.66 (-1000m, -200m)
Significant Impact (17-2.100(171)(a),FAC)	1.0	25.0	5.0

[1] The sulfur dioxide ambient air impacts reflect the maximum predicted impacts and their location resulting from the molten sulfur system and the C and D sulfuric acid plant modification.

FIGURE 2

MAXIMUM IMPACT LOCATIONS

SULFUR SYSTEM SULFUR DIOXIDE IMPACT ANALYSIS

CF INDUSTRIES, INC.
PLANT CITY, FLORIDA