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KA 261-91-01

February 24, 1992

Mr. C. H. Fancy
Division of Air Resources Management
Florida Department of
Environmental Regulation
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, FL 32399-2400

Subject: Agrico Chemical Company
Polk County, Florida
Modification of No. 10 and No. 11
Sulfuric Acid Plants
FDER File No. AC53-199112 and PSD-FL-179

Dear Mr. Fancy:

Following several telephone conversations with Mr. John Vimont of the National Park Service, Mr. Lou Nagler of EPA Region IV and Mr. Tom Rogers of your staff, we have completed several model runs with the MESOPUFF air quality model documenting the impact of the proposed Agrico project on the Chassahowitzka Class I PSD area. Specifically, we have made the MESOPUFF model runs to assess the impact of sulfur dioxide emission increases resulting from increasing the sulfuric acid production capacity of Agrico's No. 10 and 11 sulfuric acid plants to 2700 tons per day, each plant.

The modeling addresses the impact of all PSD increment consuming sources that have been identified in west central Florida, including the increase in emissions resulting from the proposed Agrico project. The emission inventory is one that has been reviewed by your staff, the National Park Service and is an inventory that has been approved for the modeling exercise reported herein.

The telephone discussions with John Vimont, Lou Nagler and Tom Rogers were related to the use of the technical options included in the MESOPUFF model. The model has the option of incorporating algorithms to account for the dry deposition of a pollutant, the chemical transformation of a pollutant and the wet removal of a pollutant through wet deposition and rainfall scavenging. Additionally, the model can be run with either two vertical layers or three vertical layers. With the two layer model, dry deposition is assumed to deplete a pollutant throughout the mixing layer. With the three layer model, dry deposition is assumed to deplete the

pollutant concentration in a 10 meter surface layer. The model further assumes a transfer of the pollutant from the mixing layer (the middle layer of the three layer model) into the surface layer.

Another option included in the model is a choice of algorithms for vertical dispersion of a pollutant. One algorithm uses the classical Gaussian dispersion algorithm which, through reflection at the ground surface and the top of the mixing layer, approaches a uniform vertical pollutant distribution at great distances from the source. The second vertical dispersion option of the model assumes a uniform vertical dispersion distribution at all distances from a source.

From my telephone conversations with John Vimont, it is my understanding that he has no objection to using the various technical options in the MESOPUFF model. Likewise, it is my understanding that Tom Rogers of your staff has no objection to using the technical options available in the model. From my conversations with Lou Nagler, it is my understanding that EPA has developed a protocol for long range transport models which discourages the use of the various technical options available in the MESOPUFF model at this time. Mr. Nagler did state, however, that EPA was primarily concerned with source-to-receptor distances of 100 kilometers or less for air quality impact analyses. As Agrico is approximately 120 kilometers from the Class I area, it falls well outside of EPA's zone of influence.

MESOPUFF model runs were made using five combinations of the technical model options as summarized in the attached table. The meteorology used with the model was for calendar year 1986 and represented surface stations at Tampa, Orlando and Gainesville, Florida. Upper air data from Tampa and West Palm Beach were also input to the model. Initially, we intended to utilize upper air data from Waycross, Georgia, to represent the northerly extent of our meteorological grid; however, we discovered an inordinate amount of missing data in this file. The exclusion of an upper air station for the northerly extent of the meteorological grid is not expected to have a significant effect on the model considering the fact that the majority of the measured PSD increment consuming sources included in the inventory are in the west central Florida area and the fact that the receptor grid is closer to the Tampa and Orlando surface stations than to the Gainesville station.

The receptors used in the model were selected to define the boundary of the Chassahowitzka Wilderness Area. A more detailed description of the receptors and other protocol used with the MESOPUFF model will be provided to your office under separate cover.

Four of the five MESOPUFF model runs that were made indicated that the 24-hour Class I PSD increment for sulfur dioxide of 5.0 microgram per cubic meter was exceeded at several receptors at the boundary of the

Chassahowitzka area under a single 24-hour set of meteorological data (Julian Day 329, 1986). The model further showed that with meteorology from Julian Day 329, 1986, the impact of the increased sulfur dioxide emissions from the proposed Agrico project was less than 0.07 micrograms per cubic meter, 24-hour average; the guideline significant impact level defined by the National Park Service. These modeling results are summarized in the attached table.

The fifth model run showed a maximum impact of all PSD increment consuming sources in the Class I area to be 3.1 micrograms per cubic meter, 24-hour average for sulfur dioxide. This impact is less than the 5.0 micrograms per cubic meter, 24-hour average sulfur dioxide increment for Class I areas.

On behalf of Agrico and in accordance with discussions in our meeting with you on February 13, 1992, I would appreciate your expeditious review of these modeling results. If there are any questions regarding these results, I would appreciate it if you will contact me by telephone to expedite our response. Your cooperation on this matter is and has been appreciated.

Very truly yours,

KOOGLER & ASSOCIATES

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

JBK:wa
Enc.

c: Mr. John Vimont, National Park Service w/modeling results
Mr. Tom Rogers, FDER, w/modeling results
Mr. Cleve Holiday, FDER
Mr. Selwyn Presnell, Agrico
B. Thomas, SW Dist
G. Harper, EPA
C. Shaver, NPS
W. Hanks

SUMMARY OF MESOPUFF AIR QUALITY MODELING ANALYSES

AGRICO CHEMICAL COMPANY, POLK COUNTY, FLORIDA
FILE NO. AC53-199112 AND PSD-FL-179

Option(1)	Impact of All Increment Consuming Sources(2)			Impact of Emissions from Proposed Agrico Project	
	24-Hr Periods with Impact >5 μg/m3 (Julian Day, 1986)	Max 24-hour Impact (μg/m3)	Number of Class I Receptors with impact >5 μg/m3	24-hour Period (Julian Day, 1986)	Max 24-hour Impact at any Class I Receptor on Julian Day (μg/m3)
Gaussian Vertical Dispersion Algorithm					
1	329	6.50	5	329	0.069
2	329	6.42	5	329	0.068
3	329	6.42	5	329	0.068
4	329	6.39	5	329	0.068
Uniform Vertical Mixing Algorithm					
5	None	3.12	None	-	-

(1) Gaussian Dispersion Algorithm used for Vertical Dispersion

Option	Technical Model Options Employed
1	Dry Deposition
2	Dry Deposition + Chemical Transformation
3	Dry Deposition + Chem Trans + Wet Removal
4	Dry Deposition + Chem Trans + Wet Removal + Three-Level Model

Uniform Mixing Algorithm used for Vertical Dispersion

Option	Technical Model Options Employed
5	Dry Deposition + Chem Trans + Wet Removal + Three-Level Model

(2) 24-Hour SO_2 Impact of all PSD increment consuming sources on Chassahowitzka Class I Area.

MESOPUFF II SOURCE INVENTORY

X (m)	Y (m)	HT (m)	DIAM (m)	VEL (m/s)	TEMP (K)	EMIS (g/s)	SOURCE DESCRIPTION
9.03	7.89	15.2	4.21	56.21	820	466.40	FPC DEBARY PROP TURBINES
8.62	7.72	15.2	4.21	56.21	820	310.90	FPC INT. CITY PROP TURBINES
8.62	7.72	15.2	7.04	32.07	881	276.10	FPC INT. CITY PROP TURBINES
6.95	7.80	97.6	4.88	23.23	442	98.40	FLORIDA CRUSHED STONE CPL
7.49	7.69	60.3	2.44	16.40	353	-50.40	CF IND. BASELINE C
7.49	7.69	60.3	2.44	17.77	353	54.60	CF IND. PROPOSED C
7.49	7.69	60.3	2.44	16.40	353	-50.40	CF IND. BASELINE D
7.49	7.69	60.3	2.44	17.77	353	54.60	CF IND. PROPOSED D
6.88	7.82	27.4	4.88	7.48	470	1.45	FLORIDA MINING & MATERIALS
6.99	7.59	149.4	7.32	19.81	342	654.70	TECO BIG BEND-UNIT 4
6.99	7.59	149.4	7.32	28.65	422	-2436.00	TECO BIG BEND-UNITS 1&2
6.99	7.59	149.4	7.32	14.33	418	-1218.00	TECO BIG BEND-UNIT 3
6.70	7.75	83.8	3.05	15.70	394	14.10	PASCO COUNTY RRF
7.40	7.74	12.3	0.40	9.20	466	0.20	EVANS PACKING
6.98	7.82	8.5	1.08	10.95	357	2.25	ASPHALT PAVERS NO. 4
6.95	7.80	12.2	1.37	10.58	377	2.25	ASPHALT PAVERS NO. 3
7.90	7.66	30.5	5.79	28.22	783	29.11	LAKELAND UTILITIES CT
7.66	7.60	61.0	2.60	14.28	350	-170.10	IMC SAP #1,2,3 BASELINE
7.66	7.60	61.0	2.60	15.31	350	182.85	IMC SAP #1,2,3 PROJECTED
7.66	7.60	60.7	2.60	15.31	350	121.90	IMC SAP #4,5 PROJECTED
7.66	7.60	36.6	1.83	20.15	319	5.54	IMC DAP
7.45	7.75	30.5	3.35	17.13	384	5.04	PROPOSED PASCO CO. COGEN.
8.38	7.89	30.5	3.35	17.13	384	5.04	PROPOSED LAKE CO. COGEN.
7.38	7.81	9.1	0.61	4.57	478	2.99	FDOC BOILER #3
7.47	7.79	10.7	1.83	8.99	327	0.82	E.R. JAHNA (LIME DRYER)
6.95	7.81	7.6	1.83	6.29	347	2.09	OMAN CONST. (ASPHALT)
6.58	7.70	12.2	3.05	6.47	339	0.23	DRIS PAVING (ASPHALT)
6.87	7.76	9.1	1.30	16.00	408	3.67	OVERSTREET PAV. (ASPHALT)
6.40	7.71	11.0	0.31	3.88	544	0.06	NEW PORT RICHEY HOSP BLR #1
6.40	7.71	11.0	0.31	3.88	544	0.03	NEW PORT RICHEY HOSP BLR #2
6.44	7.75	11.0	0.31	4.00	533	0.08	HOSP CORP OF AM BOILER #1
6.44	7.75	11.0	0.31	4.00	533	0.08	HOSP CORP OF AM BOILER #2
6.58	7.70	9.1	1.40	22.30	436	7.25	COUCH CONST-ODESSA (ASPHALT)
7.54	7.72	6.1	1.38	21.00	422	3.54	COUCH CONST-ZEPHYRHILLS (ASPHALT)
7.87	7.58	45.7	1.60	39.06	350	113.50	AGRICO PROPOSED
7.87	7.58	45.7	1.60	26.40	350	-75.60	AGRICO BASELINE
9.30	7.77	167.6	5.80	21.60	326	105.40	OUC STANTON
9.30	7.77	167.6	5.80	23.50	324	242.40	OUC STANTON