PM RM: R 241-474-016
3-23-87
Tampa, FL

GARDINIER INC.

Post Office Box 3269 • Tampa, Florida 33601 • Telephone 813 – 677 - 9111 • TWX 810 – 876 - 0648 • Telex - 52666 • Cable - Gardinphos

March 20, 1987

Mr. Clair H. Fancy, P. E.
Florida Department of Environmental
Regulation
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Fl 32301

SUBJECT: Gardinier Inc. No. 8 Sulfuric Acid Plant
File No. AC29-130371

Dear Mr. Fancy:

Please find attached responses to comments in your letter dated February 27, 1987 regarding increasing the capacity of the No. 8 Sulfuric Acid Plant and installation of electric power cogeneration. I believe this should resolve all issues regarding this project.

In addition, please find enclosed a copy of the computer printouts for the extra modeling analysis.

As we have indicated before, the cogeneration project is on a very fast track. If you require any additional information, please call.

Sincerely,

E. O. Morris
Manager
Environmental & Development

DER
MAR 25 1987
BAQM

:gf
Attachment

cc: B. Thomas, DER/Tampa/No printout attachment
J. Campbell, HCEPC "
R. Fernandez "
R. Nettles "
H. Mathot "

No. 8 Constructuion Permit Application
Responses to Comments from DER

RESPONSE TO COMMENT 1

The technical and economical feasibility evaluations of electrical cogeneration facilities with the production of sulfuric acid at Gardinier have indicated that major changes and modifications will be needed at the No. 8 sulfuric acid plant. The feasibility of the project is dependent on the increase in the production of the No. 8 plant for the increase in efficiency of steam production for electrical cogeneration. Additional annual sulfuric acid production is not needed.

Gardinier's sulfuric acid demand is mainly dependent on their need to produce phosphoric acid. Phosphoric acid production is limited by the two existing phos acid plants. Gardinier presently has no plans, nor does the market demand, additional phosphoric acid production. There is also a very poor market for sulfuric acid.

As we indicated in the subject application, expansion of the allowable production of the No. 8 sulfuric acid plant to 2500 TPD will allow for the increased efficiency of steam production to support electrical cogeneration facilities. However, total annual production of sulfuric acid at the facility is not expected to increase.

RESPONSE TO COMMENT 5

Comment 5 requests that further modeling analysis be done to reveal possible masking of critical days by the combining of Tampa Electric Company (TEC) Big Bend into a single source for the screening analysis. As a selection criteria, the FDER proposed that for each averaging period, the meteorological periods producing the following concentrations for each of the five years of meteorology be modeled in the refined mode: (1) the highest concentration; (2) the highest, second-highest concentration; (3) the second-highest concentration at the location of the highest concentration; and (4) the highest concentration at the location of the highest, second-highest concentration. It was also suggested that the screening model output be scanned for additional days when sources other than TEC Big Bend might have interacted with Gardinier to produce higher concentrations than those produced with TEC Big Bend and Gardinier in the refined modeling analysis. The periods recommended to be modeled included the following Julian days:

	Averaging Period	
Year	3-Hour	24-Hour
1974	33, 210	40, 96
1975	210	19, 189
1978	71, 214	-
1979	248	-
1981	-	150, 171

KBN's review of the initial modeling analyses results revealed that criteria 2 and 4 of the FDER selection criteria have already been addressed in the application submitted to FDER, and therefore no additional analysis is required. To satisfy criteria 1 and 3, the screening model output was reviewed and all second-highest concentrations exceeding approximately 85% of the 3- and 24- hour AAQS and occurring within Gardinier's maximum impact area were identified. The meteorological periods associated with these concentrations are presented in Table 1. As an additional check, the year 1979 was rerun in the screening mode with TEC Big Bend sources separated. The year 1979 was rerun because this year reflected the highest concentrations for both the original analysis and the additional analysis. No new critical periods were identified from the year 1979 run.

The critical periods were then remodeled in a screening mode, i.e., combining of major sources into a single stack and use of a coarse receptor grid, except that TEC Big Bend's sources were separated into individual stacks. The results of this analysis are presented in Table 2 under "Additional Analysis". The concentrations shown in Table 2 are due to the point sources modeled, and do not include a background SO_2 concentration.

A comparison of the previous screening modeling analysis and the additional screening analysis is also presented in Table 2. The "Additional Analysis" results reflect the maximum impacts obtained for each year by analyzing only the critical periods identified in Table 1. The "Previous Analysis" results reflect the screening analysis results presented in the original permit application.

Based upon the additional modeling results, the maximum 3-hour concentration predicted from the additional screening analysis was further refined (Day 129, Period 5, 1979). The resulting maximum 3-hour SO_2 concentration was 1031 ug/m^3, which is higher than the 870 ug/m^3 maximum impact obtained from the previous analysis, but still well below the AAQS of 1300 ug/m^3. Similarly, the highest 24-hour impact from the additional screening analysis was also further refined (Day 211, 1979), since this day produced impacts significantly above the other days evaluated. The resulting maximum 24-hour impact was 235 ug/m^3, which is above the results obtained from the previous modeling analysis, but still below the 24-hour AAQS of 260 ug/m^3.

These results do not include a 'background' SO_2 concentration (i.e., background assumed to be 0 ug/m^3). In the original analysis, it was conservatively estimated that a background concentration of 15 ug/m^3 existed in conjunction with the worst case point source impacts. However, because 99.9 percent of all point source emissions of SO_2 were accounted for in the refined modeling analysis, it is reasonable to assume a 0 ug/m^3 background level.

This additional analysis substantiates the results from the original modeling, which demonstrated compliance with all AAQS.

Table 1. Critical Periods and Radials Considered in the Additional Modeling Analysis.

Averaging Period	Year	Period (Julian Day)	Radial (°)
3-Hour	1974	33, 210	240, 250, 260, 270, 280, 290
	1975	82, 210	10
		66, 82	160
		18, 82	360
	1978	71, 73, 212	250, 260, 270, 280
		71, 73, 212, 214	310, 320, 330
	1979	129, 248	310
		100, 129, 248	360
	1981	60, 323, 341	160, 170, 180
		158, 201	300, 310
24-Hour	1974	40, 96	140, 150, 160, 170
		84, 212	350
	1975	66, 82	20
		19, 66, 105	140, 150, 160
	1978	102, 128	20
		155, 354	310
	1979	100, 248	20
		73, 211, 212	90
		129, 248	310
		100, 129, 248	360
	1981	150, 171, 196	90
		141, 342	140, 150

Table 2. Comparison of Maximum Concentrations Predicted in Previous Screening Modeling Analyses and Additional Analysis.[+]

Averaging Period	Year	Previous Analysis*					Additional Analysis**				
		Concentration (ug/m^3)	Receptor Location		Period		Concentration (ug/m^3)	Receptor Location		Period	
			Direction (°)	Distance (km)	Julian Day	Hour Ending		Direction (°)	Distance (km)	Julian Day	Hour Ending
					Screening						
3-Hour	1974	780	10	0.8	98	15	355	250	1.6	210	12
	1975	776	10	0.8	66	12	722	360	0.8	18	15
	1978	1083	240	1.6	212	12	655	360	1.1	71	12
	1979	1070	10	0.8	100	12	902	360	0.8	129	15
	1981	870	10	0.8	220	12	527	310	0.2	60	12
24-Hour	1974	183	10	1.1	98	24	165	150	1.6	96	24
	1975	210	80	0.8	66	24	171	90	1.1	66	24
	1978	217	10	0.8	128	24	191	20	0.8	128	24
	1979	224	10	0.8	248	24	219	90	0.8	211	24
	1981	205	10	1.6	38	24	201	140	1.1	342	24
					Refined						
3-Hour	1979	-	-	-	-	-	1301	6	0.9	129	15
	1981	870[++]	10	0.7	220	12	-	-	-	-	-
24-Hour	1979	226[++]	12	0.6	248	-	235	92	0.8	73	-

[+] Results reflect a background concentration of 0 ug/m^3, unless otherwise noted.
* Results of screening analysis presented in original permit application.
** Maximum impacts from analysis of the critical periods identified in Table 1.
[++] Includes background concentration of 15 ug/m^3.

RESPONSE TO COMMENT 6

This comment pertains to the potential for building downwash effects at the Gardinier facility. In order to investigate the potential for building downwash at the facility, building heights and locations in relation to stacks were reviewed. This review showed that no potential exists for downwash from the H_2SO_4 plants. The stacks for these plants are 150 feet in height, and associated structures are no greater than 60 feet high. Thus, the H_2SO_4 plant stacks are at least 2.5 times the height of nearby structures. As shown in the plot plan attached, other significant buildings located at the facility are located at such distance as to not influence the H_2SO_4 plant stacks.

The other SO_2 sources at Gardinier will have the potential to produce building downwash effects. Presented in Table 3 are the most significant structures associated with these sources, building dimensions, the projected crosswind width, and the length and width input to the ISCST model. The projected crosswind widths were selected as the maximum crosswind width for the structure, regardless of wind direction, in order to be conservative in the analysis. For the DM 1,2,3,4 and 5 sources, the manufacturing areas for each process are the most influencing structures. The manufacturing areas are located at the east end of the respective storage buildings.

The ISCST model was executed in the refined mode for the critical meteorological periods, using the building downwash option for the Gardinier sources. The meteorological period for the 3-hour averaging time is based upon the highest, second-highest concentration from the five years of meteorology , i.e., Day 129, Period 5, 1979 (see Response to Comment 5 and Table 2). Because the 3-hour maximum impacts were well below the 3-hour AAQS of 1300 ug/m^3, no other 3-hour periods were evaluated. The resulting refined 3-hour maximum concentration was 1031 ug/m^3. Because this 3-hour maximum impact was well below the 3-hour AAQS of 1300 ug/m^3, no other 3-hour periods were evaluated. (Note: Impacts during this 3-hour period were due to Gardinier's H_2SO_4 plants and TEC Big Bend. The other sources at

Gardinier did not contribute during this period, and therefore the downwash and non-downwash results are identical.)

For the 24-hour averaging time, all of the critical periods and directions identified in Table 1, as well as the critical periods and directions identified from the original modeling analysis, were executed with the ISCST, with the downwash option used for Gardinier sources. The results from this modeling analysis showed that second-highest SO_2 concentrations greater than the 260 ug/m^3 AAQS occurred at only one receptor location (310° @ 800 m from the Gardinier H_2SO_4 plants). Based upon the plot plan attached and Figure 1-2 of the Prevention of Significant Deterioration Analysis submitted with the permit application, this receptor is located well within Gardinier plant property boundaries. Maximum concentrations at all other receptors produced from the downwash modeling were below the 260 ug/m^3 AAQS. As discussed in regard to Response to Comment 5, it is reasonable to assume a 0 ug/m^3 background SO_2 concentration for the analysis.

The downwash modeling analysis demonstrates that the AAQS will be met in the vicinity of the Gardinier plant, even under the conservative downwash assumption.

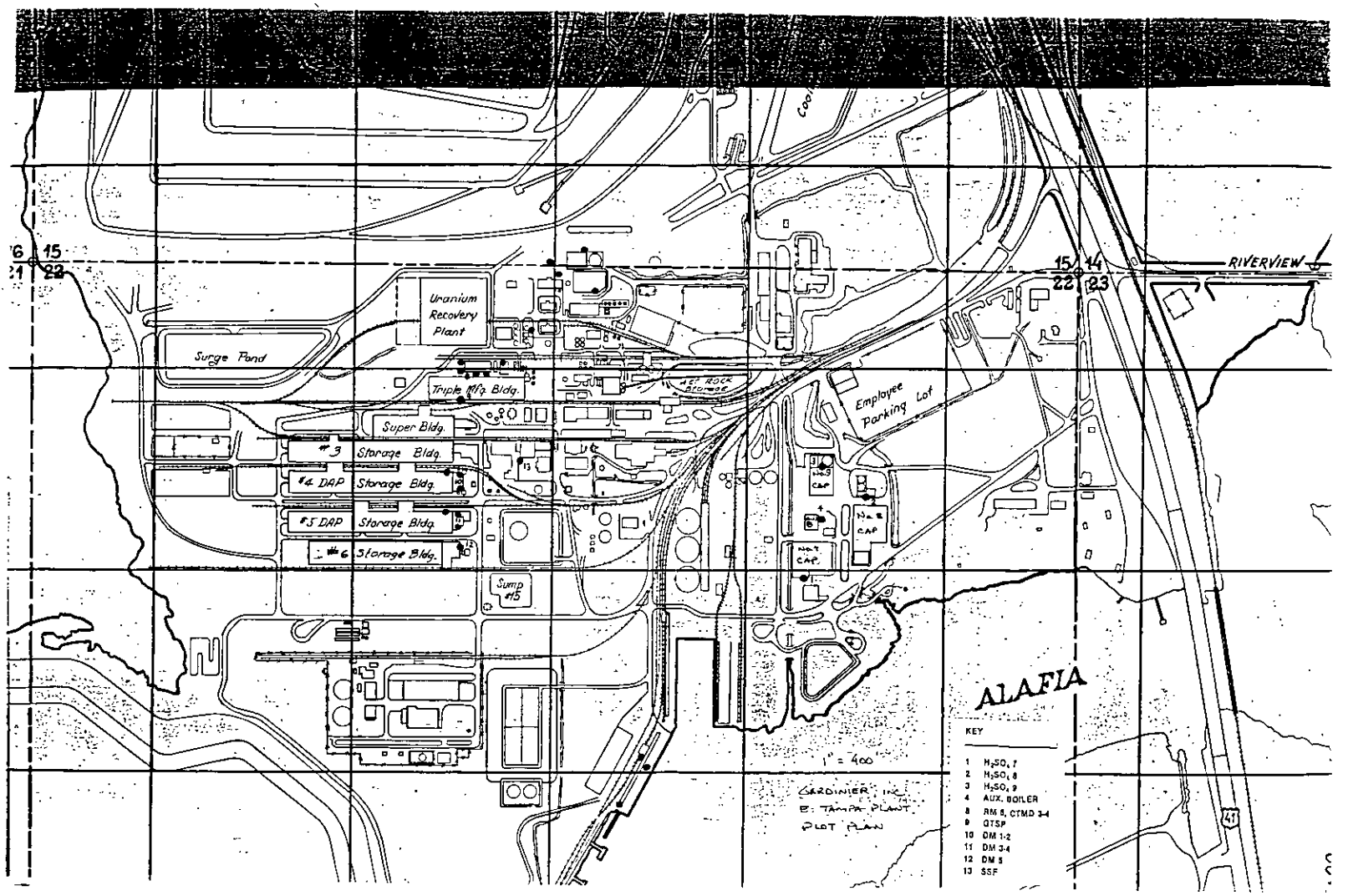
RESPONSE TO COMMENT 7

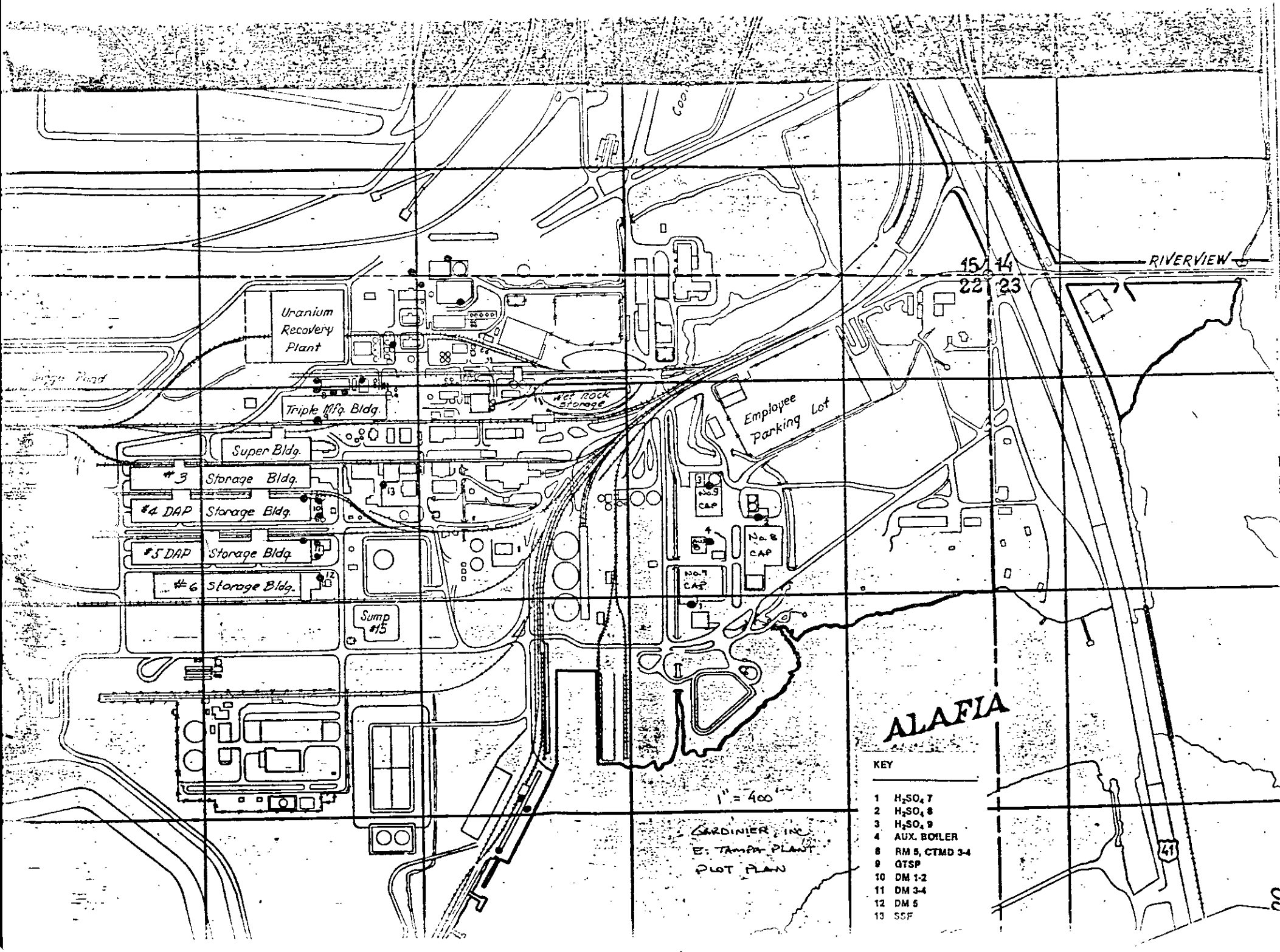
One copy of supportive computer model printouts for the additional modeling performed is included with this submittal.

Table 3. Building Dimensions Associated With Gardinier SO_2 Sources

Stack #	Source	Associated Building	Height (ft)	Length (ft)	Width (ft)	Projected Crosswind Width (ft)	Length & Width Input to Model (ft)*
8	RM5, CTMD 3,4	Triple Manuf. Bldg.	75	100	480	500	443
9	GTSP	Triple Manuf. Bldg.	75	100	480	500	443
10	DM 1,2	DM 1,2 Manuf. Bldg.	85	100	60	60	53
11	DM 3,4	DM 3,4 Manuf. Bldg.	100	100	60	60	53
12	DM5	DM5 Manuf. Bldg.	117	130	90	90	80
13	SSF	Triple Manuf. Bldg.	75	100	480	500	443

*Calculated to result in model simulation of projected crosswind width.


Uranium Recovery Plant
Surge Pond
Triple Mfg. Bldg.
Super Bldg.
#3 Storage Bldg.
#4 DAP Storage Bldg.
#5 DAP Storage Bldg.
#6 Storage Bldg.
Sump #15
Employee Parking Lot
RIVERVIEW
ALAFIA
KEY
1 H2SO4 7
2 H2SO4 8
3 H2SO4 9
4 AUX. BOILER
8 RM 8, GTMD 3-4
9 GTSP
10 DM 1-2
11 DM 3-4
12 DM 5
13 SSF
1" = 400'
GARDINIER INC.
E. TAMPA PLANT
PLOT PLAN


Uranium Recovery Plant
Triple Mfg. Bldg.
Wet Rock Storage
Super Bldg.
#3 Storage Bldg.
#4 DAP Storage Bldg.
#5 DAP Storage Bldg.
#6 Storage Bldg.
Sump #15
Employee Parking Lot
No. 9 CAP
No. 8 CAP
No. 7 CAP
RIVERVIEW
15 14
22 23
ALAFIA
41
KEY
1 H_2SO_4 7
2 H_2SO_4 8
3 H_2SO_4 9
4 AUX. BOILER
8 RM 5, CTMD 3-4
9 GTSP
10 DM 1-2
11 DM 3-4
12 DM 5
13 SSF
1" = 400'
GARDINIER, INC.
E. TAMPA PLANT
PLOT PLAN

P 408 531 169

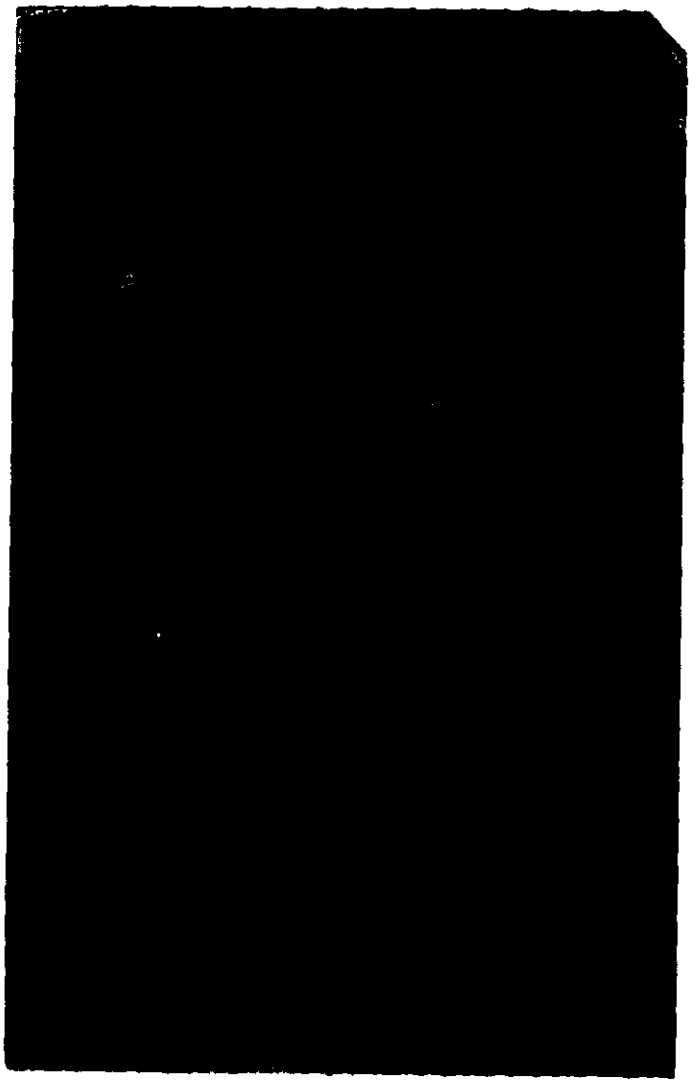
RECEIPT FOR CERTIFIED MAIL

NO INSURANCE COVERAGE PROVIDED—
NOT FOR INTERNATIONAL MAIL

(See Reverse)

Sent to Mr. E. O. Morris	
Street and No.	
P.O., State and ZIP Code	
Postage	$
Certified Fee	
Special Delivery Fee	
Restricted Delivery Fee	
Return Receipt Showing to whom and Date Delivered	
Return Receipt Showing to whom, Date, and Address of Delivery	
TOTAL Postage and Fees	$
Postmark or Date 3/2/87	

PS Form 3800, Feb. 1982



File Copy

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

TWIN TOWERS OFFICE BUILDING
2600 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32399-2400

BOB MARTINEZ
GOVERNOR

DALE TWACHTMANN
SECRETARY

February 27, 1987

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Mr. E. O. Morris
Manager, Environmental & Development
Gardiner, Inc.
Tampa, Florida 33601

Dear Mr. Morris:

Re: No. 8 Sulfuric Acid Plant (File No. AC 29-130371)

The department has made a preliminary review of your application for a permit to modify Gardinier's No. 8 sulfur acid plant to produce 2500 tons per day of sulfuric acid and install electric power co-generation. Before this application can be processed, the department will need the following information.

1. Please explain your need for increasing the sulfuric acid capacity of your No. 8 acid plant without requiring an increase in annual acid production.

2. With reference to your letter of October 15, 1984, subject: No. 8 sulfuric acid plant modification, what modifications were required and what was the approximate cost?

3. Reference, Page 6-2, Table 6-1 of your application. You exceed your permitted production rate by 6.73 tons/hour during the June 14, 1985, No. 8 H_2SO_4 Plant Source Emission Tests. How often and of what duration does this occur?

4. Can you maintain the required permitted standards without additional modifications?

5. The department is concerned that the screening modeling completed may not have adequately represented conditions for selecting all the critical days to be used in the refined modeling. In particular, the combining of the TECO Big Bend sources in the screening modeling seems to have caused much higher ground-level concentrations than when these sources are separated. This overwhelming of the TECO Big Bend facility may have masked-out high concentrations occurring due to other sources, given that only the two highest concentrations are determined at each receptor.

The department does not feel that complete remodeling of the screening runs is necessary; however, several additional individual days need to be modeled. As a selection criteria we propose that for each averaging period, the day having: (1) the highest concentration; (2) the highest, second-highest; (3) the highest, second-highest at the location of the highest; and, (4) the highest at the location of the highest, second-highest be modeled in the refined mode for each of the five years. These days are often duplicative for a given year.

The following additional days need to be modeled:

Year	3-hour	24-hour
1974	33, 210	40, 96
1975	210	19, 189
1978	71, 214	--
1979	248	--
1981	--	150, 171

In addition, since the screening modeling may not have flagged some critical days, please scan the output for additional days when other sources (not TECO Big Bend) may have interacted with Gardinier to produce higher concentrations than TECO Big Bend produces with Gardinier in its refined mode.

6. The possibility of building wake downwash at the Gardinier facility was not addressed. Please determine the "calculated GEP" stack height for the Gardinier sources. The department does not feel that a complete rerunning of the screening modeling is necessary. However, an estimate of the potentially increased ground-level concentrations due to downwash should be made using the ISCST model in a screening mode (similar to PTPLU). The maximum increase should be added to the refined modeling results.

7. Please submit a copy of the additional modeling to be completed.

If you have questions on the information needed to complete your application, please write to me or call Bob Daugherty on questions 1-4 and Tom Rogers on questions 5-7 at (904)488-1344.

We will resume processing your application when the information requested above is submitted.

Sincerely,

for C. H. Fancy, P.E.
Deputy Chief
Bureau of Air Quality
Management

CHF/BD/s

cc: B. Thomas, SW District
J. Campbell, HCEPC