AN APPLICATION FOR A PSD CONSTRUCTION PERMIT REVIEW AIR QUALITY REVIEW

PREPARED FOR:

ROYSTER PHOSPHATES, INC.
MANATEE COUNTY
PALMETTO, FLORIDA

MARCH 8, 1990

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AIR QUALITY REVIEW

Royster Phosphates, Inc. is proposing to construct a Monsanto Enviro-Chem double absorption sulfuric acid plant and an co-generation facility which will use export steam from the sulfuric acid plant to generate electrical power. The new sulfuric acid plant will operate at a capacity of 2700 short tons per day of 100 percent sulfuric acid and will replace an existing double absorption sulfuric acid plant having a permitted capacity of 2000 short tons per day of 100 percent sulfuric acid. The co-generation facility will be rated at 20.8 megawatts, average annual export of electrical power.

The project will result in a significant increase in the emission rates of sulfur dioxide and sulfuric acid mist. The emission rate increase of nitrogen oxides will be less than significant. "Significant," as used in this context, is defined by Rule 17-2.500(2)(e)2,FAC. As a result, of the significance of the emission rate increases, the air quality review for the project must address both sulfur dioxide and sulfuric acid mist.

The air quality review for the project was designed to provide the Florida Department of Environmental Regulation (FDER) with the assurance that the proposed increases in sulfur dioxide and acid mist emission rates, together will all other applicable increases and decreases in emissions from any facility significantly impacting the project area, will not cause or contribute to a violation of any ambient air quality standard or to exceedances of the allowable incremental increases in pollutant levels.

Additionally, the modeling associated with the review provides criteria for determining if pre-construction ambient air quality monitoring will be required. Monitoring may be required if the net increase in emissions resulting from the proposed project are expected to have an impact on air quality that is greater on de minimis. The de minimis impacts are defined in Rule 17-2.500(3)(e)1,FAC. For sulfur dioxide, the de minimis impact level is defined as 13 micrograms per cubic meter, 24-hour average. No de minimis impact level is defined for sulfuric acid mist.

The air quality review reported in this section shows that the net increase in sulfur dioxide emissions resulting from the proposed Royster project will be significant for the three-hour and 24-hour averaging periods (greater than 25 micrograms per cubic meter, three-hour average, and greater than 5.0 micrograms per cubic meter, 24-hour average). The impact of the emission increase will not be significant however, for the annual averaging period (less than 1.0 micrograms per cubic meter, annual average) and the impact will be less than the de minimis impact level of 13.0 micrograms per cubic meter, 24-hour average. As a result of these findings, additional air quality modeling is required and has been conducted to define:

1. The areas of significant sulfur dioxide impacts,
2. PSD increment consumption, and
3. Compliance with ambient air quality standards.

The fact that the impact of the increased sulfur dioxide emissions is less than de minimis indicates that no pre-construction ambient air quality monitoring will be required.

EXISTING AIR QUALITY DATA

Existing ambient monitoring data collected by the Hillsborough County Environmental Protection Commission (HCEPC) were reviewed to establish a sulfur dioxide background level for the Royster site. Continuous sulfur dioxide monitoring data from the HCEPC Monitoring Site No. 116 at Apollo Beach and Site No. 54 at Big Bend Road were reviewed. The monitoring data from each site represented data from the most recent year of operation; 11/1986-10/1987 for Station No. 116 (the station was discontinued in November 1987) and 1989 for Station No. 54. For the one year of data from Station 116, the measured ambient sulfur dioxide concentration was zero (instrument baseline) during 2966 hours; or 36 percent of the time the station operated. At Station No. 54, the sulfur dioxide concentration was zero during 3870 hours; or 45 percent of the time the station operated. The locations of these sites is shown in Figure 7A-1.

Based upon the review of the HCEPC monitoring data and the fact that sulfur dioxide emissions from all major and minor sources impacting project site were accounted for in the air quality modeling, it is reasonable to assume that the sulfur dioxide background level at the Royster site will be zero.

EMISSION INVENTORIES

The air pollutants considered in the air quality review were sulfur dioxide and sulfuric acid mist. An emission inventory was developed for sulfur dioxide from data contained in FDER permit files, from the FDER Air Pollution Inventory System (APIS), and from studies previously conducted by Koogler & Associates and other consultants. For sulfuric acid mist, only the emissions of the existing and proposed sulfuric acid plants at the Royster site were considered as other sources of sulfuric acid mist are approximately 30 kilometers to the northeast of the Royster site.

The sulfur dioxide emitting sources included in the air quality review are tabulated in Table 7A-1 and the locations of the major sources are shown in Figure 7A-1. In developing this emission inventory, some screening was conducted using the "20 X D" Rule. This rule states that sources that should be considered in an air quality review are sources with annual emissions (reported in tons per year) greater than the product of 20 X D; or:

$$Q > 20 \times D$$

where Q = Annual emission rate (tons per year) of sources that should be included in the air quality review,

20 = a constant, and

D = the distance from the source to the project area under review (kilometers).

The "20 X D" Rule has been developed to limit the number of air pollutant sources that must be considered in an air quality review by eliminating sources that will obviously have no impact on the study area. Several small sources were eliminated from the initial sulfur dioxide emission inventory list by the "20 X D" Rule. These sources included facilities such as asphalt plants, small industrial sources and small fuel-burning sources.

The sources listed in the emission inventory (Table 7A-1) include both baseline sources and PSD increment consuming and expanding sources. The PSD increment consuming and expanding sources are identified in Table 7A-1 as Sources 1-460. This source group includes the existing Royster sulfuric acid plant and the proposed sulfuric acid plant. The existing Royster plant is a baseline source that will be shut down, thus expanding the PSD increment, while the new plant is an increment consuming source. The baseline sources are identified in Table 7A-1 as sources 470-1060.

The emission inventory for sulfuric acid mist was limited to emissions from the Royster facility. Included in the inventory were the emissions from the existing 2000 ton-per-day sulfuric acid plant, which will be shut down, and emissions from the proposed 2700 ton-per-day sulfuric acid plant. The other sources of sulfuric acid mist in the west central Florida area are other phosphate fertilizer complexes and possibly coal-burning electric utilities; all of which are 30 kilometers or more from the Royster site.

METEOROLOGICAL DATA

The EPA guideline for air quality modeling suggests that five years of meteorological data be used for air quality modeling. The possible sources of meteorological data for the Royster air quality review were Tampa, Florida, (38 kilometers north of the site) and Ft. Myers, Florida (145 kilometers south-southeast of the site). The meteorological data from Tampa was selected for the review because of the closer proximity of Tampa to the Royster site.

The hourly surface meteorological data from the National Weather Service station at the Tampa International Airport for calendar years 1973-1975, 1978 and 1979, and twice-daily upper air soundings from the National Weather Service station at Ruskin, Florida, were selected for the review.

The surface observations used for the air quality modeling include wind speed, wind direction, ambient temperature and a measure of the atmospheric stability. The stability was determined as a function of wind speed, cloud cover and cloud ceiling height. The upper air soundings were used to estimate the atmospheric mixing heights; i.e., the thickness of the atmospheric layer through which air pollutants will be dispersed.

RECEPTOR LOCATIONS

Preliminary air quality modeling demonstrated that the impact of the increased sulfur dioxide emissions from the Royster site would be

significant to a distance of approximately three kilometers from the plant. To cover the area of significant impact, a six-kilometer by six-kilometer receptor grid was established, with receptors spaced at 0.5 kilometers center-to-center. In addition to the rectangular grid, a series of discrete receptors were spaced at 0.1 kilometer intervals around the Royster property boundary. The layout of the grid system is shown in Figure 7A-2.

GOOD ENGINEERING PRACTICE STACK HEIGHT

As described in the original application, the height of the proposed sulfuric acid plant stack will be 200 feet above grade. This stack height is less than the 213-foot (65 meters) maximum stack height allowed by the Good Engineering Practice Stack Height Rule (17-2.270,FAC). The 200-foot height will place the top of the stack at least 2.5 times the height of a nearby structure; thus, minimizing the potential for plume downwash. The height of the stack on the existing sulfuric acid plant is also 200 feet above grade.

PLUME DOWNWASH

It is generally accepted that if the height of a stack is equal to the height of nearby structures plus 1.5 times the lesser of the height or width of the structure, the wake generated by the structure will not affect the dispersion of air pollutants emitted from the stack. In the

case of the existing and proposed sulfuric acid plants, the "nearby structures" are the absorption and drying towers of each plant. In both cases, the towers are 86 feet high and have a crosswind dimension of 70 feet. The height plus 1.5 times the width of the structures is approximately 191 feet; or less than the 200-foot high stacks on both plants. As a result, plume downwash is not expected to be a major consideration in the air quality review.

Even though downwash is not considered to be a major factor, the air quality modeling was done taking into consideration the possibility of plume downwash. The height (86 feet) and the width (70 feet) of the absorption and drying towers of both plants were inputs to the air quality modeling.

AIR QUALITY MODELING METHODOLOGY

The project proposed by Royster will result in significant emission rate increases in sulfur dioxide and sulfuric acid mist, but a less than significant increase in nitrogen oxides emissions. Hence, the air quality modeling required for the project permit application will address only sulfur dioxide and sulfuric acid mist emissions.

The impact of sulfur dioxide emissions was assessed with the Industrial Source Complex-Short Term (ISC-ST) air quality model. The modeling was conducted in accordance with guidelines established by EPA and published in the document, Guideline for Air Quality Modeling, (Revised), July 1986.

The sulfur dioxide emissions used in the impact analyses are summarized in Table 7A-1. The sulfur dioxide emission rate increases and decreases at the Royster site are documented in Section 3.0 of the original permit application and are summarized in Table 7A-2.

The air quality modeling that was reported in the original permit application demonstrated that the impact of the net change in sulfur dioxide emissions from the Royster complex would be significant for the three-hour and 24-hour periods, but not significant for the annual period. The distance to which the impacts are significant is approximately 3.0 kilometers. These data are graphically presented in Figures 7A-3, 7A-4 and 7A-5 for the three-hour, 24-hour and annual periods, respectively. Because the annual impact of sulfur dioxide emission increases at the Royster plant is not significant at any distance, no additional sulfur dioxide air quality modeling is required for the annual period.

The modeling for PSD increment consumption was conducted using only sulfur dioxide emitting sources whose emissions are considered to be increment expanding or consuming. These sources are identified as Sources 1-460 in Table 7A-1 and include the existing and proposed sulfuric acid plants at Royster.

The modeling for PSD increment consumption shows the maximum increment consumption for the three-hour period to be 91.2 micrograms per cubic meter, compared with a Class II PSD increment of 512 micrograms per cubic meter. The maximum 24-hour incremental consumption is 20.9 micrograms per

cubic meter, compared with a Class II PSD increment of 91 micrograms per cubic meter. These data are summarized in Figures 7A-6 and 7A-7 for the three-hour and 24-hour averaging periods, respectively.

The modeling of all existing and proposed sulfur dioxide sources for compliance with Ambient Air Quality Standards (AAQS) is summarized in Figures 7A-8 and 7A-9. The modeling to demonstrate compliance with the three-hour sulfur dioxide AAQS (Figure 7A-8) shows the maximum impact to be 484 micrograms per cubic meter and the modeling for the 24-hour averaging period (Figure 7A-9) shows a maximum impact of 182 micrograms per cubic meter. Both of these impacts are well below the ambient air quality standards for sulfur dioxide of 1300 micrograms per cubic meter for the three-hour period and 260 micrograms per cubic meter for the 24-hour period.

Results of the air quality modeling for sulfuric acid mist were presented in the original application. These results demonstrated that the maximum expected increase in ambient sulfuric acid mist levels would be approximately 0.4 micrograms per cubic meter, over a 24-hour period. Modeling also shows that the maximum expected sulfuric acid mist impact resulting from the operation of the proposed sulfuric acid plant would be approximately 1.4 micrograms per cubic meter, 24-hour average. These impacts compare with an ambient guideline concentration for sulfuric acid mist of 4.8 micrograms per cubic meter, 24-hour average.

TABLE 7A-1

INVENTORY OF SULFUR DIOXIDE EMITTING SOURCES
USED IN AIR QUALITY MODELING

ROYSTER PHOSPHATES, INC.
MANATEE COUNTY, FLORIDA

SOURCE NUMBER	SO2 EMISSIONS	LOCATION X	Y	STACK HEIGHT	STACK TEMP	STACK VEL	STACK DIAM	BLDG. HEIGHT	BLDG. LENGTH	BLDG. WIDTH	NAME
1	-35.38	348546	3057307	60.96	338	8.75	2.36	26.21	21.34	21.34	ROYSTER
2	56.70	348680	3057318	60.96	350	9.60	2.82	26.21	21.34	21.34	ROYSTER
10	462.65	404800	3057400	22.90	389	23.90	4.88	0	0	0	HARDEE POWER PLANT
20	-52.50	388076	3116011	18.75	316	18.75	1.52	0	0	0	CPI A H2SO4 EXIST
30	-52.50	388085	3115976	18.75	316	18.75	1.52	0	0	0	CPI B H2SO4 EXIST
40	35.83	388085	3115976	27.44	316	19.69	1.52	0	0	0	CPI A H2SO4 PROP
50	35.83	388085	3115976	27.44	316	19.69	1.52	0	0	0	CPI B H2SO4 PROP
60	-37.80	388155	3116034	60.52	352	13.00	2.44	0	0	0	CPI C H2SO4 EXIST
70	-37.80	388211	3116047	60.52	352	13.00	2.44	0	0	0	CPI D H2SO4 EXIST
80	50.40	388155	3116034	60.52	352	16.40	2.44	0	0	0	CPI C H2SO4 PROP
90	50.40	388211	3116047	60.52	352	16.40	2.44	0	0	0	CPI D H2SO4 PROP
100	7.36	407380	3071700	38.10	328	14.60	3.10	0	0	0	AGRICO DAP
110	-110.60	408500	3083000	30.50	350	14.60	1.68	0	0	0	CF BARTOW RE. H2SO4
120	4.30	408500	3083000	9.10	450	22.50	0.70	0	0	0	CF BARTOW DAP
130	52.90	408500	3083000	67.10	351	9.80	2.40	0	0	0	CF BARTOW #7 H2SO4
140	21.02	361800	3088300	30.00	375	20.00	0.61	0	0	0	CLM CHLORIDE METALS
150	-15.20	398400	3084200	30.50	308	18.90	1.80	0	0	0	CONSERVE
160	42.00	398400	3084200	45.70	352	10.30	2.30	0	0	0	CONSERVE NO. 1 H2SO4 PLT.
160	-54.56	409500	3079500	30.48	311	20.18	1.37	0	0	0	FARMLAND 1,2 H2SO4
180	67.16	409500	3079500	30.48	355	9.27	2.29	0	0	0	FARMLAND 3,4 H2SO4
190	41.96	409500	3079500	45.72	355	9.65	2.44	0	0	0	FARMLAND 5 H2SO4
200	-121.84	336500	3098300	16.80	727	61.00	4.60	0	0	0	FPC HIGGINS PEAK
210	588.46	336500	3098200	52.90	424	12.60	3.80	0	0	0	FPC HIGGINS 1-3
220	559.53	367200	3054100	152.10	425	23.47	7.99	0	0	0	FPL MANATEE
230	514.14	367200	3054100	152.10	425	23.77	7.92	0	0	0	FPL MANATEE
240	18.40	389550	3067930	38.10	339	10.13	2.90	0	0	0	IMC LONESOME MINE DRY. 1
250	21.17	389550	3067930	38.10	346	18.40	2.44	0	0	0	IMC LONESOME MINE DRY. 2
260	352.53	409200	3106200	45.72	419	23.77	2.74	0	0	0	LAKELAND CITY POWER PLANT
270	500.12	409200	3106200	76.20	350	32.61	4.88	0	0	0	LAKELAND CITY POWER PLANT
280	63.00	396560	3078640	60.70	350	15.55	2.60	0	0	0	NEW WALES #4 H2SO4
290	3.78	396750	3079350	52.40	322	13.00	2.40	0	0	0	NEW WALES AFI
300	5.36	396830	3079430	52.40	319	7.10	2.40	0	0	0	NEW WALES MULTIPHOS
310	5.54	396450	3079150	36.60	319	20.80	1.80	0	0	0	NEW WALES #2 DAP
320	63.00	396490	3078640	60.70	350	15.55	2.60	0	0	0	NEW WALES #5 H2SO4
330	-34.27	396680	3078860	21.04	347	18.56	2.13	0	0	0	NEW WALES ROCK DRYER
340	-146.00	396530	3078750	61.00	350	11.14	2.50	0	0	0	NEW WALES #1-3 H2SO4 EXIST
350	189.00	396530	3078750	61.00	350	16.71	2.50	0	0	0	NEW WALES #1-3 H2SO4 MOD
360	-257.60	406700	3085200	51.00	356	9.90	2.13	0	0	0	ROYSTER #1
370	35.70	406700	3085200	61.00	360	12.20	2.13	0	0	0	ROYSTER #2
380	-1764.00	361500	3075000	149.40	415	22.90	7.30	0	0	0	TECO BIG BEND 1-3 RED.
390	653.94	361900	3075000	149.35	342	17.98	7.32	0	0	0	TECO BIG BEND #4
400	63.00	416120	3068620	53.40	355	15.91	2.59	0	0	0	USSAC FT MEADE H2SO4 1
410	63.00	416120	3068620	53.40	355	15.91	2.59	0	0	0	USSAC FT MEADE H2SO4 2
420	-78.80	416210	3068740	29.00	314	6.77	3.02	0	0	0	USSAC FT MEADE H2SO4 X
430	-216.00	409700	3086000	45.70	352	16.50	1.40	0	0	0	WR GRACE RET. H2SO4
440	36.80	409700	3086000	61.00	346	7.30	2.80	0	0	0	WR GRACE 2 46 16
450	36.80	409700	3086000	61.00	346	7.30	2.80	0	0	0	WR GRACE 2 46 17
460	21.40	360300	3092300	50.00	491	18.30	1.80	0	0	0	HILLSCO RESOURCE RECOVERY
470	52.50	388085	3115976	18.75	316	18.75	1.52	0	0	0	CPI A H2SO4 B.L.
480	52.50	388085	3115976	18.75	316	18.75	1.52	0	0	0	CPI B H2SO4 B.L.
490	37.80	388155	3116034	60.52	352	13.00	2.44	0	0	0	CPI C H2SO4 B.L.
500	37.80	388211	3116047	60.52	352	13.00	2.44	0	0	0	CPI D H2SO4 B.L.
510	1.72	387858	3115904	28.66	322	7.20	3.05	0	0	0	CPI A DAP
520	3.13	387890	3115918	54.88	322	9.79	2.79	0	0	0	CPI Z DAP
530	15.63	387813	3116041	41.45	313	9.24	2.79	0	0	0	CPI X GTSP
540	15.63	387838	3116052	54.88	333	13.41	2.79	0	0	0	CPI Y GTSP
550	37.80	407570	3071240	45.72	350	11.21	2.74	0	0	0	AGRICO #11 H2SO4

(Continued)

TABLE 7A-1 (Continued)

560	37.80	407520	3071240	45.72	350	11.21	2.74	0	0	0	AGRICO #10 H2SO4
570	19.35	407520	3071520	42.67	315	12.46	2.74	0	0	0	AGRICO GTSP
580	110.60	408500	3083000	30.50	350	14.60	1.68	0	0	0	CF BARTOW RET. H2SO4
590	46.70	408500	3083000	34.50	319	20.00	1.30	0	0	0	CF BARTOW #3 H2SO4
600	56.70	408500	3083000	63.40	351	6.90	2.10	0	0	0	CF BARTOW #6 H2SO4
610	45.40	408500	3083000	34.50	319	14.20	1.30	0	0	0	CF BARTOW #4 H2SO4
620	56.70	408500	3083000	63.40	347	6.90	2.10	0	0	0	CF BARTOW #5 H2SO4
630	3.65	408100	3081800	38.60	341	11.00	2.19	0	0	0	CF BARTOW 3-DAP
640	15.20	398400	3084200	30.50	308	18.90	1.80	0	0	0	CONSERVE
650	17.20	398400	3084200	24.40	330	5.00	1.70	0	0	0	CONSERVE
660	3.34	398700	3084200	24.69	328	3.66	2.29	0	0	0	CONSERVE PHOS ROCK DRYER
670	0.32	398700	3084200	15.85	322	20.12	0.76	0	0	0	CONSERVE DAP COOLER
680	54.56	409500	3079500	30.48	311	20.18	1.37	0	0	0	FARMLAND 1,2 H2SO4
690	1007.45	342400	3082700	91.50	422	31.10	2.70	0	0	0	FPC BARTOW 1 & 2
700	710.00	342400	3082700	91.50	430	29.10	3.40	0	0	0	FPC BARTOW 3
710	154.42	342200	3083900	13.70	839	61.00	5.30	0	0	0	FPC BARTOW PEAK
720	149.22	338800	3071300	13.40	728	61.00	3.40	0	0	0	FPC BAYB
730	121.84	336500	3098300	16.80	727	61.00	4.60	0	0	0	FPC HIGGINS PEAK
740	46.20	363200	3082300	45.72	340	13.41	2.29	0	0	0	GARDINIER 7 H2SO4
750	93.66	363200	3082300	45.72	351	7.90	2.59	0	0	0	GARDENIER 8 H2SO4
760	58.84	363200	3082300	45.72	344	12.19	2.74	0	0	0	GARDENIER 9 H2SO4
770	41.50	360100	3087500	13.10	349	9.70	0.30	0	0	0	IMC TAMPA
780	115.47	409000	3106200	50.29	433	5.49	3.05	0	0	0	LAKELAND CITY POWER PLANT
790	2.40	398000	3085300	25.90	339	16.00	2.30	0	0	0	MOBIL
800	56.50	398000	3085300	30.50	350	11.00	2.00	0	0	0	MOBIL
810	146.00	396600	3078750	61.00	350	11.14	2.50	0	0	0	NEW WALES #1-3 H2SO4 EXIST
820	0.82	396540	3079030	36.60	319	15.60	2.10	0	0	0	NEW WALES #1 DAP
830	1.89	396550	3079150	36.60	325	20.40	1.80	0	0	0	NEW WALES GTSP
840	34.27	396680	3078860	21.04	347	18.56	2.13	0	0	0	NEW WALES ROCK DRYER
850	257.60	406700	3085200	51.00	356	9.90	2.13	0	0	0	ROYSTER #1
860	1.88	406800	3085200	31.10	322	8.26	2.67	0	0	0	ROYSTER DAP/GTSP
870	10039.82	361900	3075000	149.35	410	14.33	7.32	0	0	0	TECO BIG BEND
880	3650.20	360000	3087500	93.30	430	26.50	3.90	0	0	0	TECO GANNON (COMPOSITE)
890	388.90	358000	3091000	85.40	402	15.90	3.40	0	0	0	TECO HOOKERS PT. (COMP)
900	78.80	416210	3068740	29.00	314	6.77	3.02	0	0	0	USSAC FT. MEADE H2SO4
910	9.60	415920	3068890	28.40	314	9.33	1.45	0	0	0	USSAC FT. MEADE GTSP DRYER
920	34.80	415860	3068550	15.90	336	11.04	1.83	0	0	0	USSAC FT. MEADE ROCK DRYER
930	216.00	409700	3086000	45.70	352	16.50	1.40	0	0	0	WR GRACE RET. H2SO4 B.L.
940	57.70	409700	3086000	45.70	322	16.70	1.50	0	0	0	WR GRACE 3 46 15
950	91.80	409700	3086000	61.00	346	25.90	1.50	0	0	0	WR GRACE 3 46 14
960	47.20	363900	3093850	30.50	350	22.40	0.61	0	0	0	GULF COAST LEAD
1050	35.38	348546	3057307	60.96	338	8.75	2.36	26.21	21.34	21.34	ROYSTER B.L.
1060	7.36	348546	3057307	60.96	328	15.60	3.10	0	0	0	ROYSTER DAP

NOTES:

1. Sources 1-460 are PSD increment expanding (-) and consuming (+) sources.

2. Sources 470-1060 are baseline sources.

TABLE 7A-2

PLANT CHARACTERISTICS USED FOR AIR QUALITY MODELING

ROYSTER PHOSPHATES, INC.
MANATEE COUNTY, FLORIDA

PLANT	STACK		STACK GAS		EMISSION RATES (1)			
					SO2		Acid Mist	
	Ht (ft)	Dia (ft)	Vel (FPS)	Temp (F)	(lb/hr)	(TPY)	(lb/hr)	(TPY)
Existing H2SO4 #1 (2)	200	7.75	28.7	150	280.8	906	7.4	23.9
New H2SO4 #2 (3)	200	9.25	31.5	170	450.0	1971	16.9	74.0

(1) Annual emission rates are based on the following assumptions:

(a) Existing H2SO4 - An annual operating factor, based on production, of 0.737.
(b) New H2SO4 - Operating time will be 8760 hours/year.

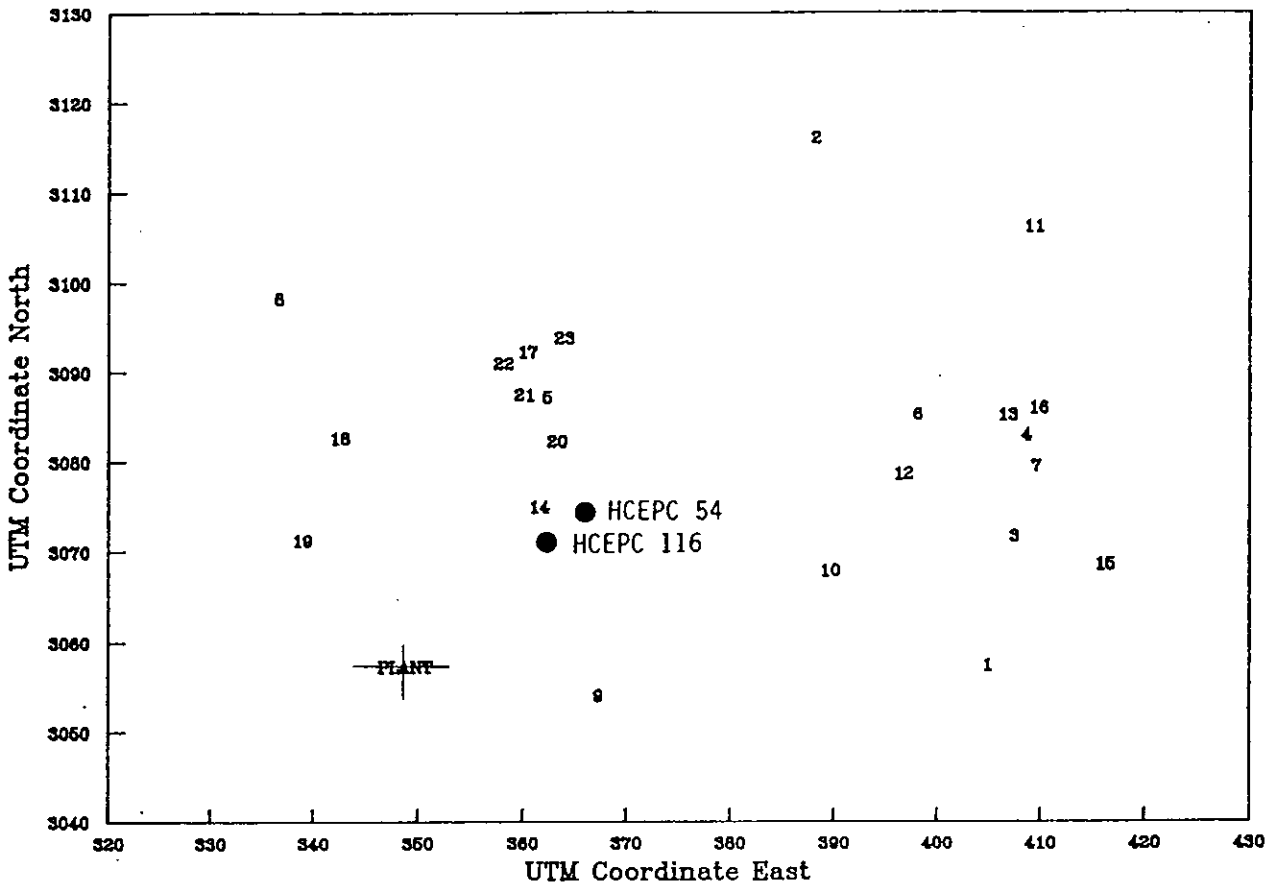
(2) Plant to be shut down. Emissions represent a decrease in sulfur dioxide emissions.

(3) New plant to replace existing plant. Emissions represent an increase in sulfur dioxide emissions.

FIGURE 7A-1

MAJOR SOURCES OF SULFUR DIOXIDE
WITHIN 100 KM OF ROYSTER PHOSPHATES

ROYSTER PHOSPHATES, INC.
MANATEE COUNTY, FLORIDA



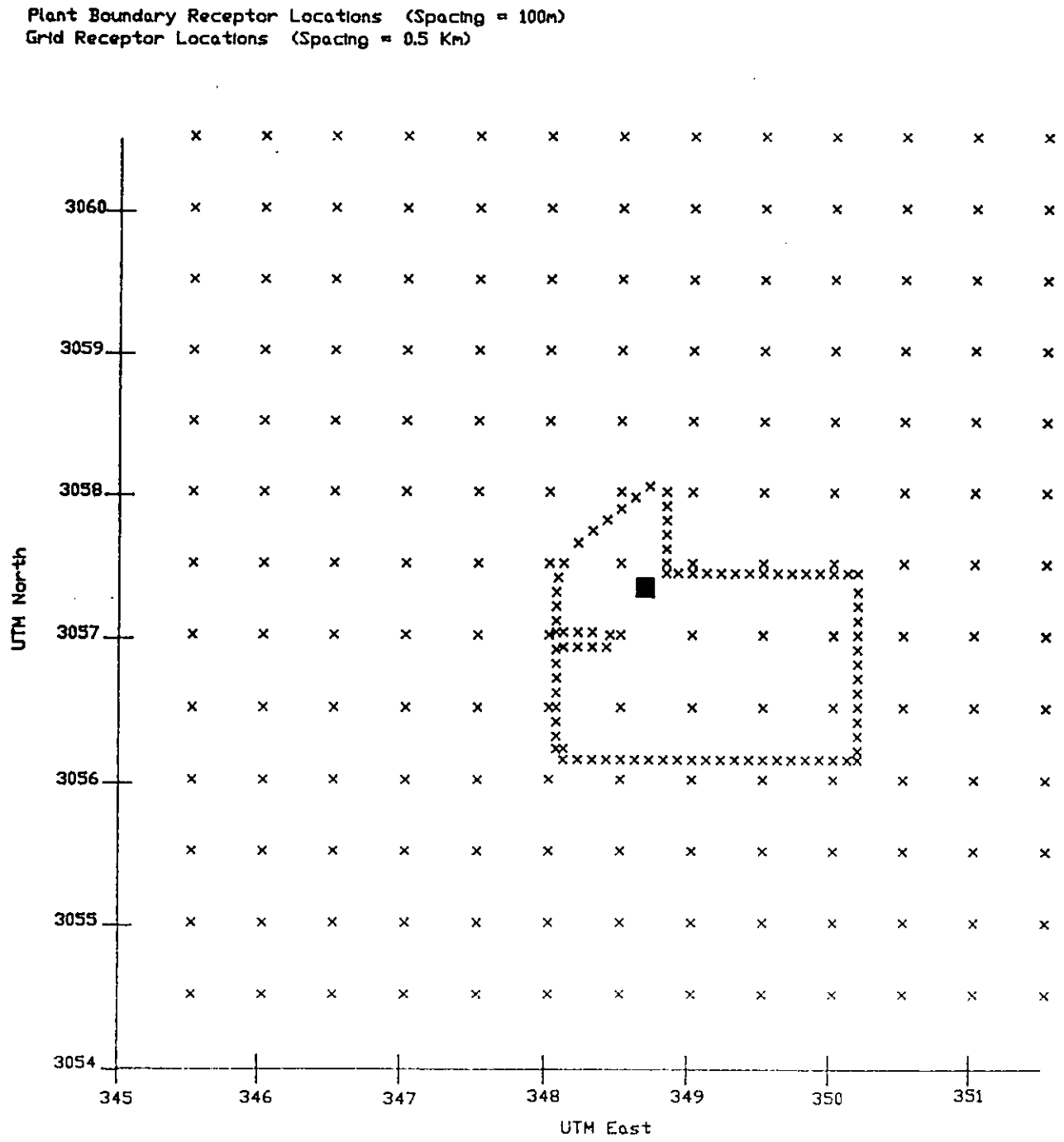
● AMBIENT MONITORING SITES

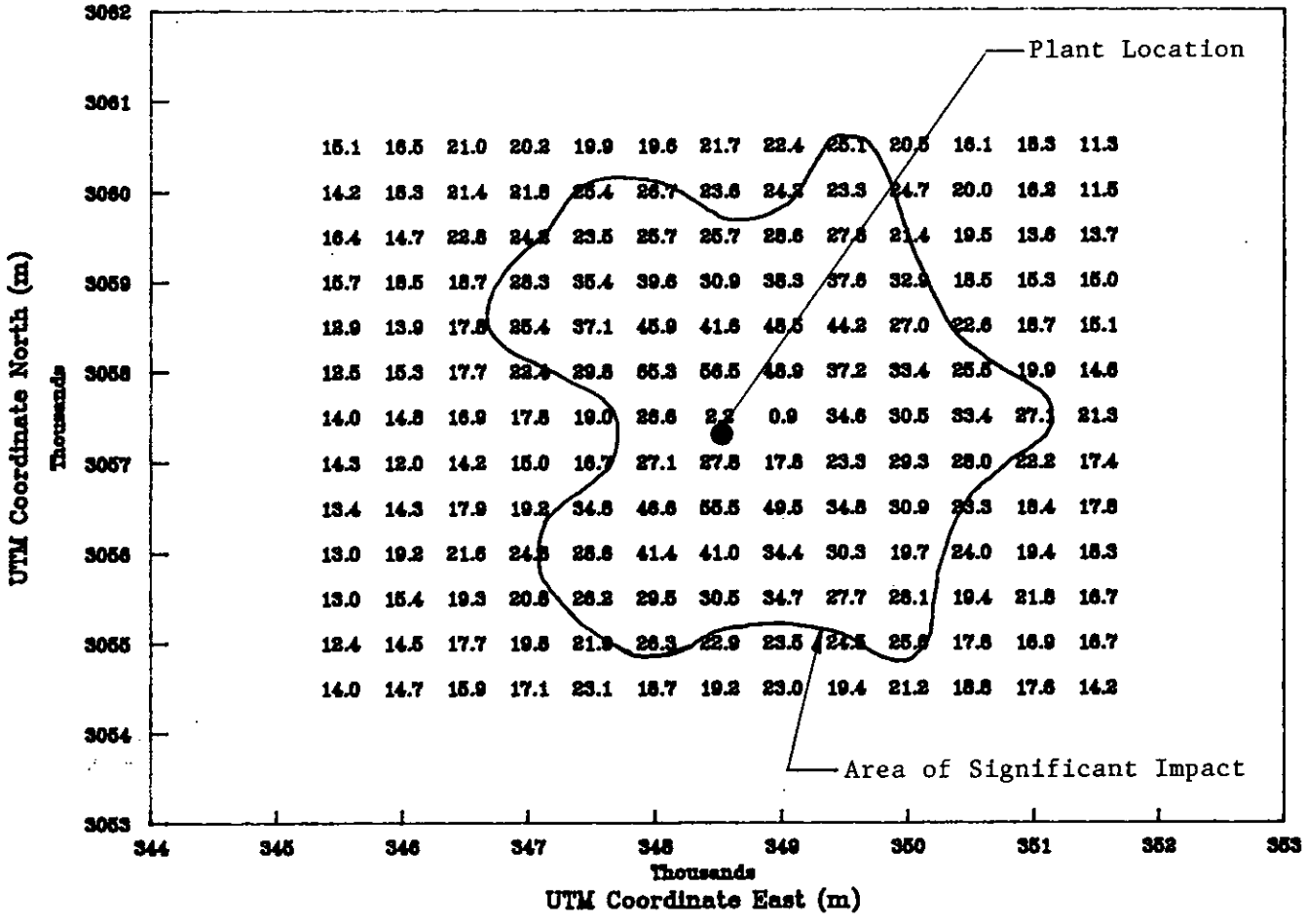
PLANT ROYSTER
1 HARDEE POWER PLANT
2 CPI
3 AGRICO
4 CF BARTOW
5 CLM CHLORIDE METALS
6 CONSERVE
MOBIL
7 FARMLAND
8 FPC HIGGINS PEAK
9 FPL MANATEE
10 IMC LONESOME MINE
11 LAKELAND CITY POWER PLANT.
12 NEW WALES
13 ROYSTER
14 TECO BIG BEND
15 USSAC FT MEADE
16 WR GRACE
17 HILLSCO RESOURCE RECOVERY
18 FPC BARTOW
19 FPC BAYB
20 GARDINIER
21 IMC TAMPA
TECO GANNON
22 TECO HOOKERS PT.
23 GULF COAST LEAD

FIGURE 7A-2

RECEPTOR LOCATIONS FOR AIR QUALITY MODELING

ROYSTER PHOSPHATES, INC.
MANATEE COUNTY, FLORIDA



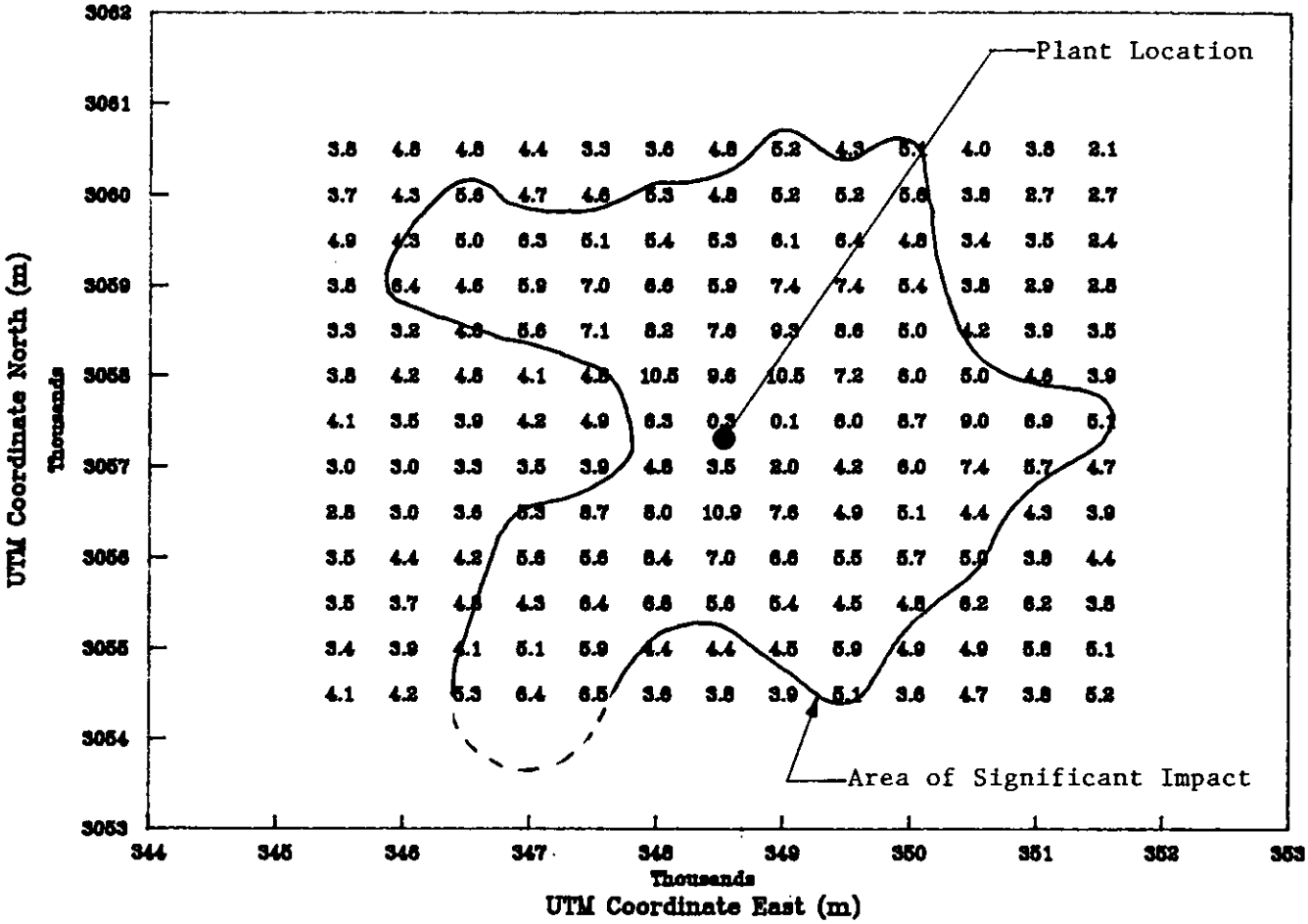


3-hour Significant Impact - 25 ug/m^3

FIGURE 7A-3

3-hour Average Impact of Contemporaneous
SO_2 Emission Changes at Royster
Maximum Impact at Each Receptor for 5-Year Period - 1973-75, 78, 79

Royster Phosphates, Inc.
Manatee County, Florida

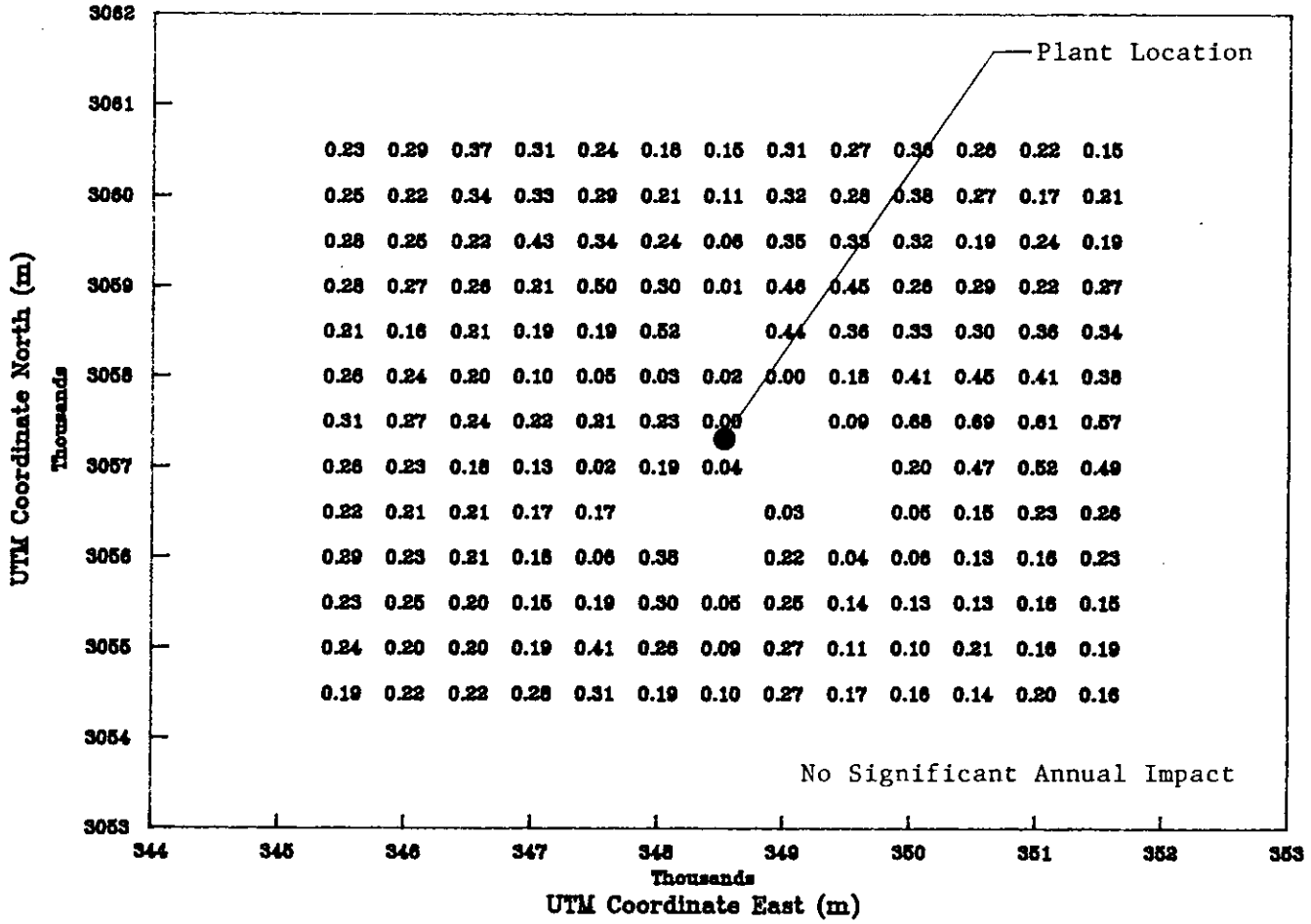


24-hour Significant Impact - 5 ug/m^3

FIGURE 7A-4

24-hour Average Impact of Contemporaneous
SO_2 Emission Changes at Royster
Maximum Impact at Each Receptor for 5-Year Period - 1973-75, 78, 79

Royster Phosphates, Inc.
Manatee County, Florida



Annual Significant Impact - 1.0 ug/m^3

FIGURE 7A-5

Annual Average Impact of Contemporaneous
SO_2 Emission Changes at Royster
Maximum Impact at Each Receptor for 5-Year Period - 1973-75, 78, 79

Royster Phosphates, Inc.
Manatee County, Florida

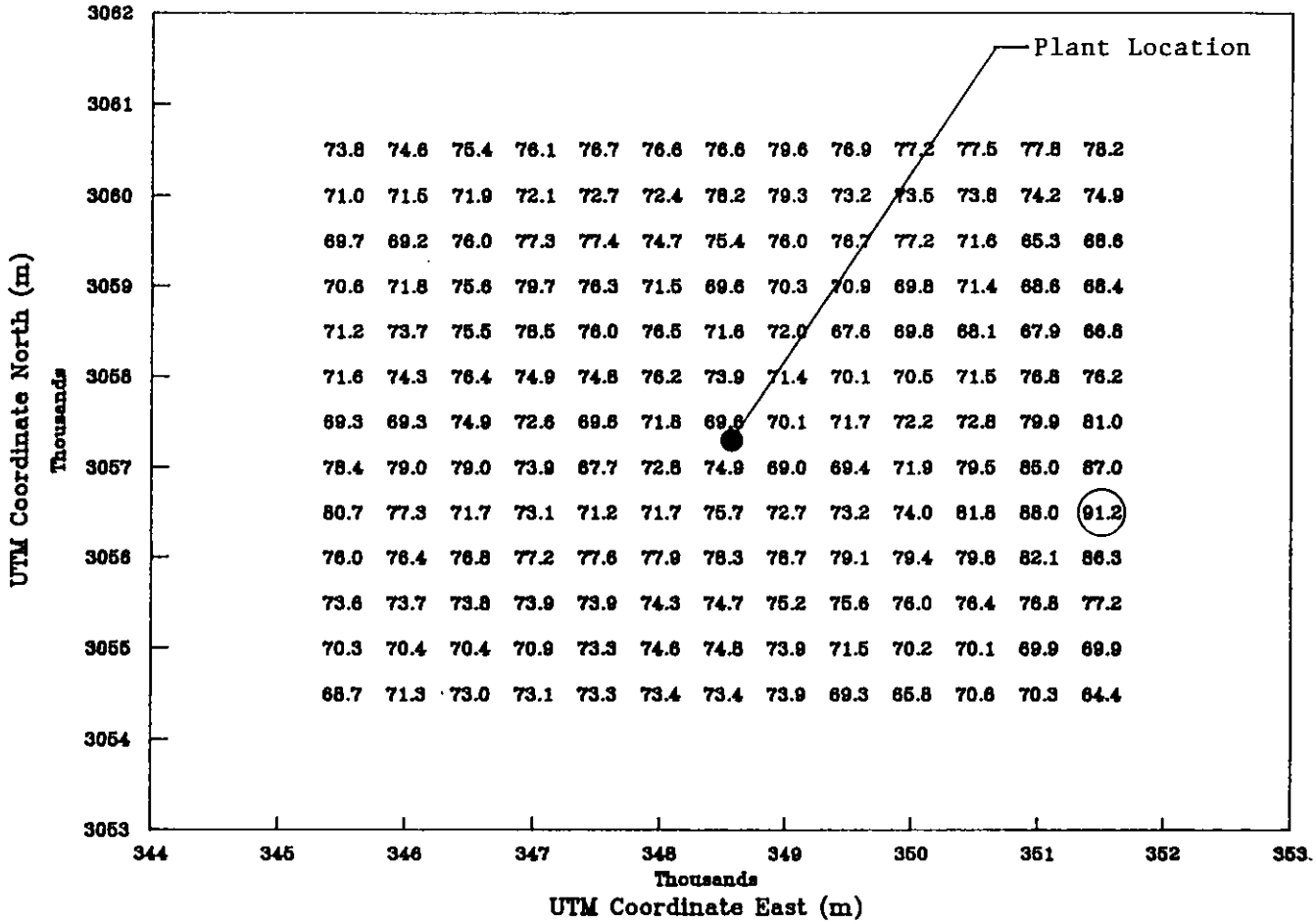
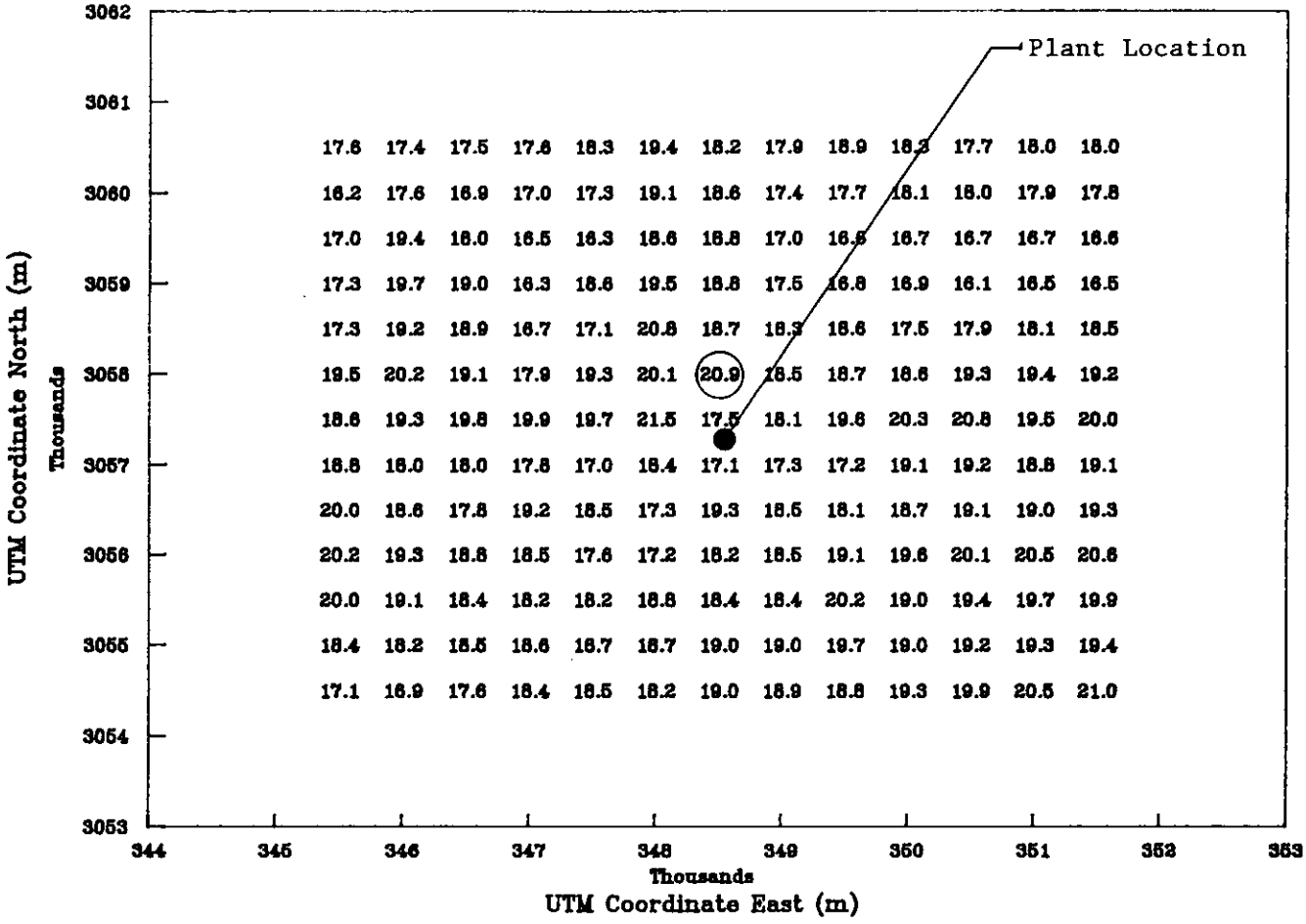


FIGURE 7A-6

3-hour Average Impact of All
SO_2 PSD Increment Consuming Sources (ug/m^3)
Maximum Impact at Each Receptor for 5-Year Period - 1973-75, 78, 79

Royster Phosphates, Inc.
Manatee County, Florida

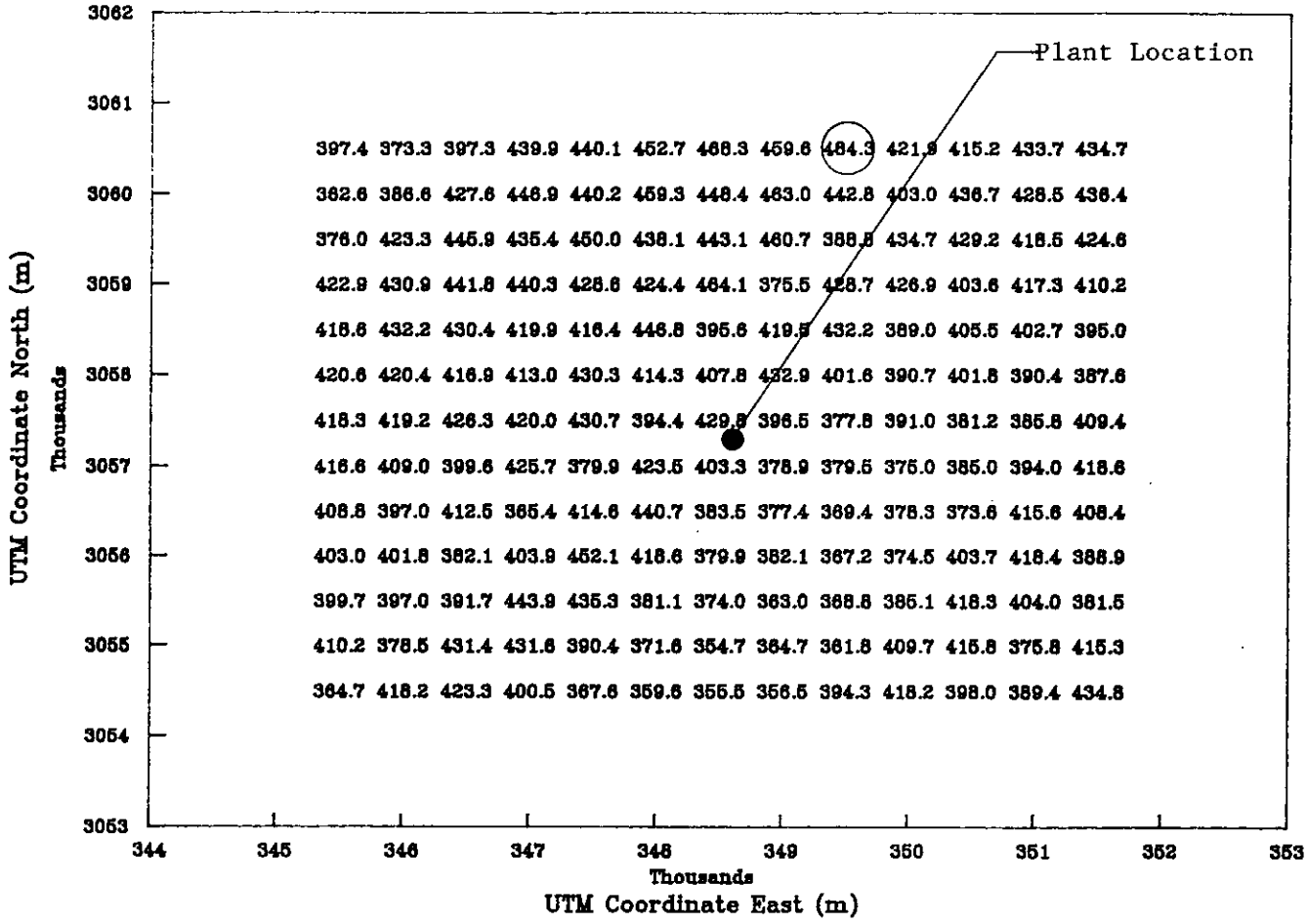


24-hour PSD Increment - 91 ug/m^3

FIGURE 7A-7

24-hour Average Impact of All
SO_2 PSD Increment Consuming Sources (ug/m^3)
Maximum Impact at Each Receptor for 5-Year Period - 1973-75, 78, 79

Royster Phosphates, Inc.
Manatee County, Florida

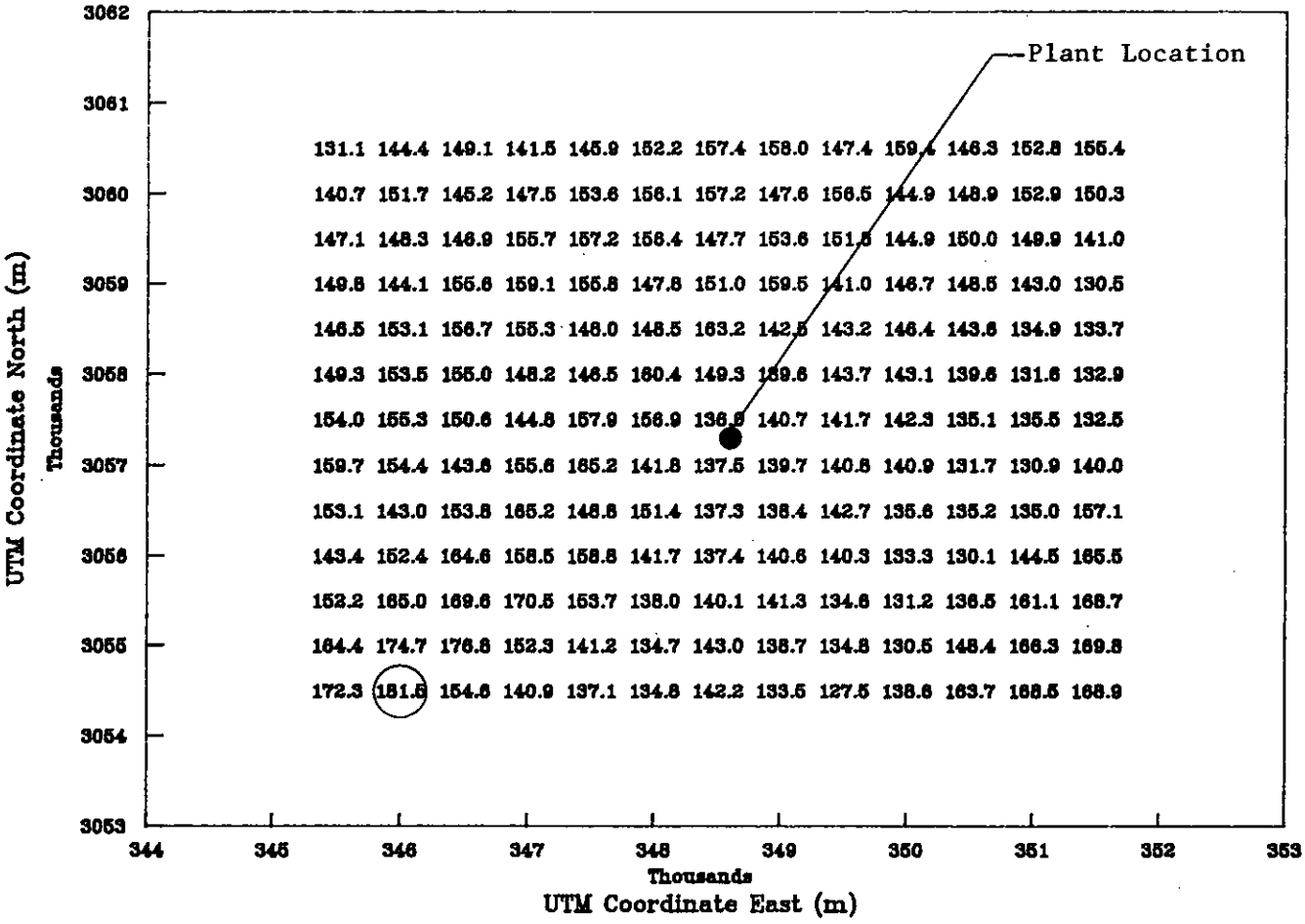


3-hr Air Quality Standard - 1300 ug/m^3

FIGURE 7A-8

3-hr. Average Impact of All Proposed
and Permitted SO_2 Emitting Sources (ug/m^3)
Maximum Impact at Each Receptor for 5-Year Period - 1973-75, 78, 79

Royster Phosphates, Inc.
Manatee County, Florida



24-hr Air Quality Standard - 260 ug/m³

FIGURE 7A-9

24-hr. Average Impact of All Proposed
and Permitted SO_2 Emitting Sources (ug/m³)
Maximum Impact at Each Receptor for 5-Year Period - 1973-75, 78, 79

Royster Phosphates, Inc.
Manatee County, Florida