Reading

STATE OF FLORIDA

# DEPARTMENT OF ENVIRONMENTAL REGULATION


.VIN TOWERS OFFICE BUILDING
.00 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32301

BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY


May 17, 1982

John Koogler, P.E., Ph.D.
Sholtes and Koogler, Environmental Consultants
1213 N.W. 6th Street
Gainesville, Florida 32601

Dear Dr. Koogler:

Re: Occidental Chemical Company: Impact on the Okefenokee Class I Area; Modeling.

Your recent correspondence dated April 26, 1982, contained additional modeling of the Occidental Chemical Company's impact on the Okefenokee Class I area. The modeling included all increment consuming emissions from the Swift Creek and the Suwannee River chemical complexes. Changes made from previous modeling included an increase in the sulfur dioxide half-life from eight to 12 hours, a reduction in the sulfur content of the fuel from 1.3 percent to 1.0 percent for the four boilers, and an increase in the sulfur content of the fuel for the No. 2 DAP plant from 1.3 percent to 1.5 percent.

A review of the submitted modeling has been completed. Further information is needed by the Department before a preliminary determination can be written. Please respond to the following questions and comments.

1. What were the input data to the FDER preprocessor program used to eliminate days (24-hour periods) in which the magnitude of the resultant wind vectors in the desired directions were not great enough to transport the pollutant to the receptor site?

2. What wind profile exponents were used in the preprocessor and CRSTER model runs?

3. The Department would like a copy of the program used to eliminate hours of calm winds from the CRSTER modeling--for verification purposes and to check for adherence to Department policy on the elimination of calms. An explanation of how the program works should be included.

4. In the output of the above program it is not clear whether the hierarchy of maximum concentrations are recomputed after the elimination of calm hours. That is, are the highest and highest, second-highest concentration tables recomputed?

5. It appears that the version of CRSTER you are using does not convert all hours of stability class 7 to stability class 6 for calculation of concentrations. This modification should be made to your program.

The purpose of the preceding questions is to verify that the "critical" days used in the more detailed model (ISCST) to determine the impact on the Class I area are in fact the worst-case days containing reasonable meteorology.

Finally, in the ISCST model runs the rural wind profile exponents used are not totally correct. The stability class 6 exponent should be 0.55 instead of 0.35. This error is believed to result in slightly more conservative concentrations.

Sincerely,

Thomas Rogers
Bureau of Air Quality Management

TR/jf

cc: Mr. W. W. Atwood

SHOLTES & KOOGLER, ENVIRONMENTAL CONSULTANTS
1213 N.W. 6th Street Gainesville, Florida 32601 (904) 377-5822

SKEC 102-81-08



April 26, 1982



Mr. Clair Fancy
Bureau of Air Quality Management
Department of Environemntal Regulation
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, FL 32301

Subject: Occidental Chemical Company
PSD-FL-082, Swift Creek Chemical Complex
PSD-FL-083, Suwannee River Chemical Complex

Dear Mr. Fancy:

In the original PSD applications that the Occidental Chemical Company submitted to FDER for modifying operations at both the Swift Creek and Suwannee River Chemical Complexes, the impact of sulfur dioxide emissions on the Okefonokee Class I PSD area were reviewed. In these reviews, a half-life for sulfur dioxide in the atmosphere of 12 hours was used. This half-life was adopted based on a conversation with Mr. Lou Nagler with EPA Region IV in Atlanta and upon information contained in the document Guideline on Air Quality Models, Proposed Revisions, U.S. Environmental Protection Agency, October 1980.

In your letter of November 24, 1981 to Mr. Wes Atwood of the Occidental Chemical Company, you state that the use of an 8 hour half-life is unacceptable to your agency without documentation of its accuracy. Subsequent conversations with Mr. Lou Nagler indicated that EPA has also changed its position on the use of an 8 hour half-life. Both your November 24th letter and telephone conversations with EPA indicate that a 12 hour half-life for sulfur dioxide will be acceptable without documentation.

At the Swift Creek and Suwannee River Chemical Complexes the Occidental Chemical Company has six sulfur dioxide emitting sources which are classified as "new sources" for purposes of PSD determinations. Three of these sources are at the Swift Creek Chemical Complex (SCCC); the "E" and "F" sulfuric acid plants and the "E Boiler". The remaining three sources are at the Suwannee River Chemical Complex (SRCC); the "B", "C" and "D" auxillary boilers. Also at the SRCC is the No. 2 DAP Plant (Z Train), an existing source, for which a sulfur dioxide emission increase is requested. All of these sources are also addressed in the two subject PSD applications. In the applications it was proposed to increase the permitted production rate of the "E" and "F" sulfuric acid plants from 2,000 tons of 100 percent sulfuric acid per day to 2500 tons of acid per day for each of the two plants. With the boilers, it was proposed to increased the sulfur content of the fuel oil used for firing the boilers from the presently permitted level of 0.8 percent to 1.3 percent. It was also proposed to increase the sulfur content of fuel oil used in the dryer of the No. 2 DAP Plant from 0.8 percent to 1.3 percent.

As the results of your November 24th letter, Occidental had two basic options. The first option would be to document an 8 hour half-life for sulfur dioxide and maintain the modifications proposed for the seven sources as outlined in the above paragraph. The second option would be to increase the half-life of sulfur dioxide to 12 hours and to decrease the sulfur dioxide emissions from the effected sources to a level which would not result in a significant impact on the Okefenokee National Wildlife Refuge.

In view of recent BACT determinations by your department, as they relate to controlling emissions from fossil fuel fired boilers, it was determined that it would be most expeditious to reduce the requested sulfur content of fuels for the four boilers to 1.0 percent, to maintain the same production rate increases requested for the "E" and "F" sulfuric acid plants and to request a sulfur dioxide emission rate from the No. 2 DAP Plant of 0.41 pounds of sulfur dioxide per ton $P_2O_5$ input to the plant (the use of 1.5 percent sulfur fuel oil).

These revisions to the modifications requested in the original PSD application will result in a net decrease in sulfur dioxide emissions over the increase requested in the orignial PSD applications of 51.2 pounds per hour (218.8 tons per year) for the Swift Creek Chemical Complex (SCCC) and 435.5 pounds per hour (1907.6 tons per year) for the Suwannee River Chemical Complex (SRCC). Since there is a decrease in the requested incremental increase in sulfur dioxide emissions all of the information contained in the original PSD applications and the supplemental information provided to your office on December 7, 1981 represents conditions much more severe that will actually exist. Because of this the only matter which will be addressed in this document is the impact of sulfur dioxide on the Okefenokee Class I PSD area.

The revised modified emissions from all of the effected sources are presented in Attachment 1. These emissions are based on a sulfur dioxide emission rate from the "E" and "F" sulfuric acid plant of 4.0 pounds of sulfur dioxide per ton of 100 percent acid produced and a 2500 ton per day production rate. The sulfur dioxide emission rates from the four boilers are based on the use of fuel oil with a 1.0 percent sulfur content and the sulfur dioxide emission rate from the No. 2 DAP Plant is based on the use of fuel oil with 1.5 percent sulfur content and an 80 percent absorption factor.

The emissions from the effected sources were modeled to evaluate the impact on the Okefenokee Class I PSD area using the CRSTER air quality model and the ISC-ST model. The meteorological data input to the CRSTER air quality model represented data from Valdosta, Georgia for the period 1972 through 1976. These data were preprocessed using a program developed by the FDER to eliminate all days except those which contained a vector which would result in the transport of the pollutant from the Occidental Chemical Company to the boundary of the Okefenokee National Wildlife Refuge. The CRSTER model was also modified to review the output tape from that model and exclude non-zero sulfur dioxide concentration contributions to a receptor which resulted from periods with calm winds. This modification is consisted with the EPA recommendation which states:

> "Generally, concentrations calculated for those hours with calm winds (e.g., wind speeds less than 1 mps) should be excluded from averages of 24 hours or less, if a concentration during an hour with calm winds contributes to the average concentration for the period. For example, if six hours in a 24-hour period contain calms, and the source contribution to the 24-hour average is non-zero for each of the six calm hours, the 24-hour average would be the sum of concentrations for the 18 non-calm hours divided by 18; the contribution for the hours with calms should be discarded. However, if only one of the six calm hours contributes a concentration and the other five calm hours have no contribution, the 24-hour concentration would be the sum of concentrations for 23 hours divided by 23; only the calm hour which could make a contribution to the 24-hour average would be discarded" (Guideline on Air Quality Models, Proposed Revisions U.S. Environmental Protection Agency, October, 1980).

The receptors defined by the CRSTER air quality model are defined by a direction and a downwind distance from the source to the receptor. The receptors used for defining the boundary of the Okefenokee National Wildlife Refuge closest to the Occidental Chemical Company are shown in Figure 1. The UTM coordinates of each of these receptors were also calculated for use in the ISC-ST air quality model. The Okefenokee National Wildlife Refuge is at a direction between 30° and 80°, from the north, from Occidental. The nearest boundaries, the west and south boundaries, are at distances ranging from 39.4 to 61.9 kilometers from Occidental.

The results of the air quality modeling designed to evaluate the impact of the effective sources on the Okefenokee National Wildlife Refuge are summarized in Tables 1, 2 and 3. The annual impacts are summarized in Table 1, the 24-hour impacts are summarized in Table 2, and the 3-hour impacts are summarized in Table 3.

The annual sulfur dioxide impacts on the Okefenokee National Wildlife Refuge were calculated with the CRSTER air quality model. As previously stated, the meteorological data input to the CRSTER model were preprocessed with an FDER program so that only days which contained a vector which would allow the pollutants to be transported to the Class I PSD area were included. In 1972 for example, there were 159 such days in the total year of 366 days. To account for the days which contributed no sulfur dioxide to the annual impact on the Class I area, the annual concentrations calculated by the CRSTER air quality model were multiplied by the number of days which contributed a sulfur dioxide impact and divided by the total number of days in the year. For 1972, for example, the maximum annual impact at the Okefenokee boundary was calculated with the CRSTER air quality model, with 159 days of meteorology, to be 1.9 micrograms per cubic meter. To correct this impact to a true annual impact the 1.9 micrograms per cubic meter was multiplied by the factor 159/366. The resulting maximum annual impact for calendar year 1972, using this approach, was determined to be 0.8 micrograms per cubic meter; or an impact less than the significant impact level defined by State and Federal PSD Regulations. The maximum annual impact for each of the five years analyzed are summarized in Table 1.

The 24-hour impacts of sulfur dioxide emissions are summarized in Table 2. In this table two types of impacts are presented. One is the second-high impact occurring for each of the years calculated using all hours in the 24-hour period; both calm and non-calm hours. The second type of impacts are the second-high impacts calculated for each year using only non-calm hours as suggested by EPA.

All of the 24-hour impacts calculated using non-calm hours were less than the associated impacts calculated using all hours. All of the second-high non-calm hour impacts were also greater than 5.0 micrograms per cubic meter; the significant impact level as defined by State and Federal PSD Regulations. Factors contributing to high calculated impacts include the co-location of all sources as required by the CRSTER air quality model and the assumption that sulfur dioxide is an inert non-reactive pollutant. To over come these assumptions which are inherent in the CRSTER air quality model, the ISC-ST model was use to further evaluate the higher impacts.

The ISC-ST model can incorporate a sulfur dioxide half-life (12 hours) and will allow for inputing the actual location of each source. The results of the ISC-ST modeling for selected 24-hour periods are also summarized in Table 2. These results show that all impacts are less than 5.0 micrograms per cubic meter; the significant impact level.

The 3-hour sulfur dioxide impacts are summarized in Table 3. As with the 24-hour impacts, 3-hour impacts were calculated using "all hours" and "non-calm hours". The second-high impacts calculated for the 3-hour period were all in excess of 25 micrograms per cubic meter; the significant impact level for a 3-hour period as defined by State and Federal PSD Regulations. Again, the ISC-ST model was used to further refine the impacts resulting from selected 3-hour meteorological conditions. These results, summarized in Table 3, show that the ISC-ST predicts all 3-hour impacts to be below the 25.0 micrograms significant impact level.

The computer print-outs from which all of the above referenced data were derived are attached hereto as Attachment 2.

Based on the modeling reported herein, it can be concluded that Occidental can increase the permitted production rate of the "E" and "F" sulfuric acid plants to 2500 tons of 100 percent sulfuric acid per day, each plant; that Occidental can increase the sulfur content of fuel oil fired to the "B", "C", "D" and "E" Boilers from 0.8 to 1.0 percent; and that Occidental can increase the sulfur content of fuel oil fired to the No. 2 DAP Plant dryer from 0.8 percent to 1.5 percent without the resulting emissions having a significant impact on the Okefenokee National Wildlife Refuge. Since the emission rates represented by these proposed conditions are less than emission rates of sulfur dioxide requested in the original PSD applications, and since the higher emission rates did not result in violations of air quality standards or PSD increments other than as readdressed herein, it is not necessary to futher modify the PSD applications or supplement information already submitted to your office.

According to our records the submittal of this information should provide your office with all of the information required to complete the federal review of the two subject PSD Applications. The only additional information which we need to submit to your office are the State Air Pollution Source Construction Permit Applications for the effected sources. These are presently being prepared and will be submitted to your office within a week. If there are any questions regarding the information contained herein please feel free to contact me.

Very truly yours,

SHOLTES & KOOGLER
ENVIRONMENTAL CONSULTANTS

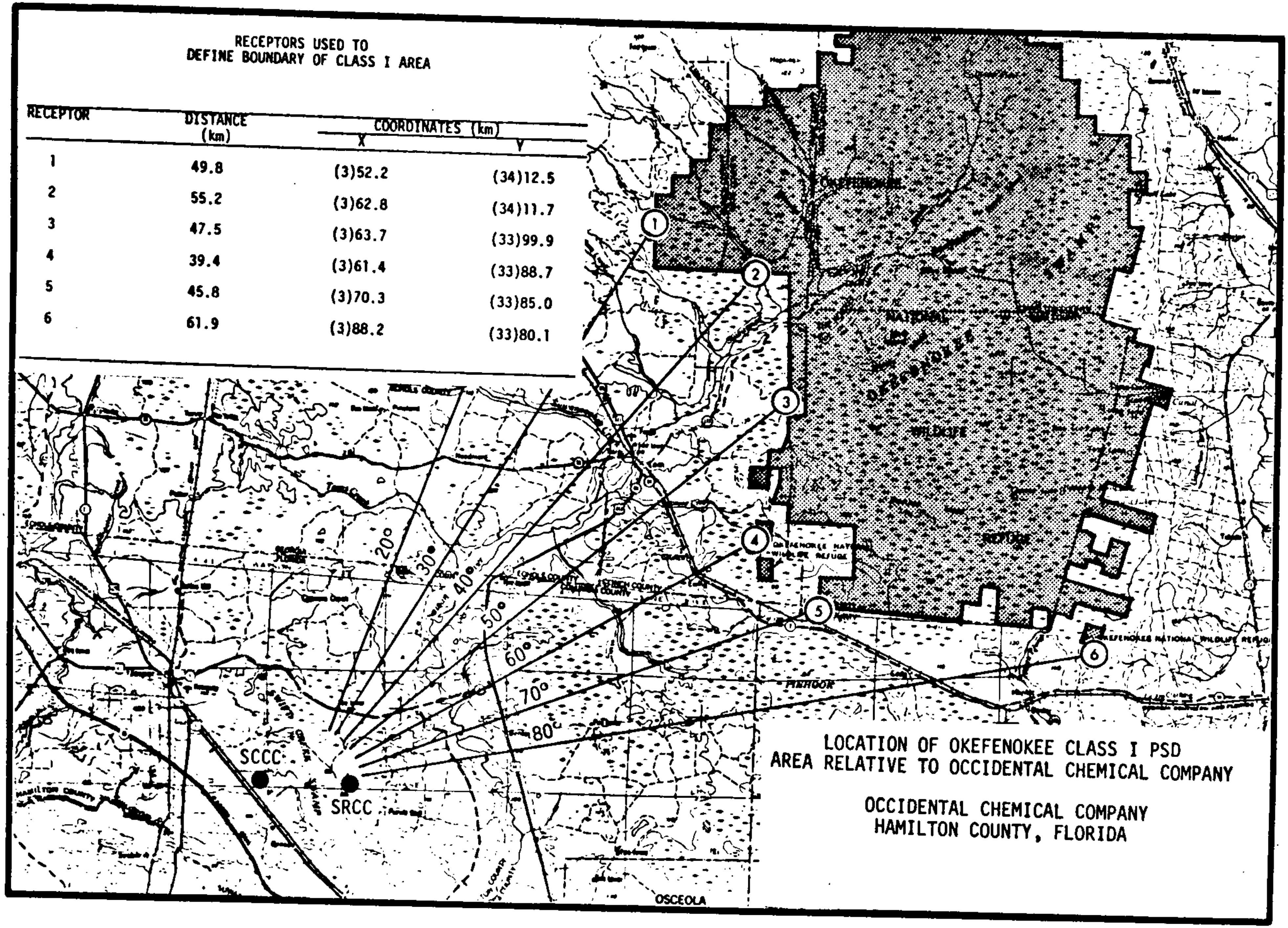
John B. Koogler, Ph.D., P.E.

JBK:ls
Attachments

cc: Mr. W. W. Atwood
Mr. T. Rogers
Mr. W. Hanks

RECEPTORS USED TO DEFINE BOUNDARY OF CLASS I AREA

| RECEPTOR | DISTANCE (km) | COORDINATES (km) X | COORDINATES (km) Y |
|---|---|---|---|
| 1 | 49.8 | (3)52.2 | (34)12.5 |
| 2 | 55.2 | (3)62.8 | (34)11.7 |
| 3 | 47.5 | (3)63.7 | (33)99.9 |
| 4 | 39.4 | (3)61.4 | (33)88.7 |
| 5 | 45.8 | (3)70.3 | (33)85.0 |
| 6 | 61.9 | (3)88.2 | (33)80.1 |




LOCATION OF OKEFENOKEE CLASS I PSD AREA RELATIVE TO OCCIDENTAL CHEMICAL COMPANY

OCCIDENTAL CHEMICAL COMPANY
HAMILTON COUNTY, FLORIDA

TABLE I

SUMMARY OF THE ANNUAL IMPACTS OF SULFUR DIOXIDE EMISSIONS FROM OCCIDENTAL CHEMICAL COMPANY NEW SOURCES ON OKEFENOKEE CLASS I PSD AREA

OCCIDENTAL CHEMICAL COMPANY
HAMILTON COUNTY, FLORIDA

| YEAR | ANNUAL IMPACT ($ug/m^3$) |
|---|---|
| 1972 | 0.8 |
| 1973 | 0.7 |
| 1974 | 0.8 |
| 1975 | 0.6 |
| 1976 | 0.7 |
| Significant Impact | 1.0 |

TABLE 2

SUMMARY OF THE 24-HOUR IMPACTS OF SULFUR DIOXIDE EMISSIONS FROM OCCIDENTAL CHEMICAL COMPANY NEW SOURCES ON OKEFENOKEE CLASS I PSD AREA

OCCIDENTAL CHEMICAL COMPANY
HAMILTON COUNTY, FLORIDA

| YEAR | 24-HOUR $SO_2$ IMPACT (ug/m$^3$) | | |
|---|---|---|---|
| | CRSTER | | ISC-ST |
| | All Hours | Non-Calm Hours | Non-Calm Hours |
| 1972 | 14.6/292/30°(1) | 9.8/292/30° | 4.5/292/30° |
| 1973 | 12.3/015/60° | 8.3/187/60° | -- |
| 1974 | 13.6/209/40° | 8.8/070/60° | 4.9/070/60° |
| 1975 | 14.2/160/60° | 9.1/070/50° | 4.7/070/50° |
| 1976 | 17.0/329/50° | 9.2/265/50° | 2.2/265/50° |

Significant Impact - 5.0 ug/m$^3$

(1)aa/bb/cc - aa - impact (ug/m$^3$)
bb - Julian day
cc - direction at which impact occurs

## TABLE 3

### SUMMARY OF THE 3-HOUR IMPACTS OF SULFUR DIOXIDE EMISSIONS FROM OCCIDENTAL CHEMICAL COMPANY NEW SOURCES ON OKEFENOKEE CLASS I PSD AREA

OCCIDENTAL CHEMICAL COMPANY
HAMILTON COUNTY, FLORIDA

| YEAR | 3-HOUR $SO_2$ IMPACT (ug/m$^3$) | | |
|---|---|---|---|
| | CRSTER | | ISC-ST |
| | All Hours | Non-Calm Hours | Non-Calm Hours |
| 1972 | 80.4/293(1)/60°[(1)] | 47.3/232(7)/60° | -- |
| 1973 | 74.2/306(7)/50° | 56.3/343(7)/60° | -- |
| 1974 | 86.9/197(1)/60° | 68.2/198(1)/60° | 24.9/198(1)/60° |
| 1975 | 63.5/349(8)/50° | 62.2/070(7)/50° | 15.0/070(7)/50° |
| 1976 | 92.4/259(7)/60° | 51.7/198(8)/60° | -- |

Significant Impact - 25.0 ug/m$^3$

[(1)] aa/bb(c)/dd - aa - impact (ug/m$^3$)
bb - Julian day
(c) - three hour period during Julian day
dd - direction at which impact occurs

ATTAHMENT 1

ATTACHMENT 1

# SULFUR DIOXIDE EMISSION RATE CALCULATIONS

## OCCIDENTAL CHEMICAL COMPANY
## HAMILTON COUNTY, FLORIDA

## SWIFT CREEK CHEMICAL COMPLEX

### SULFURIC ACID PLANT 'E' (NEW SOURCE)

Present Permitted Rate - 2000 ton/day

Proposed Rate - 2500 ton/day

$SO_2$ = 2500 ton/day × 1/24 day/hr × 4.0 lb $SO_2$/ton
= 416.7 lb $SO_2$/hr
= 52.5 g/sec

### SULFURIC ACID PLANT 'F' (NEW SOURCE)

Identical to 'E'

### BOILER 'E' (NEW SOURCE)

Present Permitted Fuel - No. 6 Oil w/ 0.8% S

Proposed Fuel - No 6 Oil w/ 1.0% S

$SO_2$ = 125,000 lb/hr steam × 1000 BTU/lb × 1/0.8 efficiency × 1/18300 lb oil/BTU × (0.01 × 2) lb $SO_2$/lb oil
= 170.8 lb $SO_2$/hr
= 21.5 g/sec

## SUWANNEE RIVER CHEMICAL COMPLEX

### BOILER 'B' (NEW SOURCE)

Present Permitted Fuel - No. 6 Oil w/ 0.8% S

Proposed Fuel - No 6 Oil w/ 1.0% S

$SO_2$ = $160 \times 10^6$ BTU/hr input × 1/18300 lb oil/BTU × (0.01 × 2) lb $SO_2$/lb oil
= 174.9 lb $SO_2$/hr

## Boiler 'C' (New Source)[1]

Present Permitted Fuel - No 6 Oil w/ 0.8% S

Proposed Fuel - No 6 Oil w/ 1.0% S

$SO_2$ = $120 \times 10^6$ BTU/hr input × 1/18300 lb/BTU × (0.01×2)
= 131.1 lb $SO_2$/hr
= 16.5 g/sec

## Boiler 'D' (New Source)[1]

Identical to Boiler "C"

## DAP No 2 - 'Z' Train (Existing Source)

Present Permitted $SO_2$ Emission Rate - 6.3 lb/hr

Present and Proposed $P_2O_5$ input - 697 tpd ; 29.0 tph

Proposed Fuel - No 6 Oil w/ 1.5% S

$SO_2$ = $36 \times 10^6$ BTU/hr × 1/18300 lb/BTU × (0.015×2)
× (1 - 0.8) absorption factor
= 11.8 lb/hr (0.41 lb $SO_2$/ton $P_2O_5$ input)

$SO_2$ increase = 11.8 - 6.3 lb/hr
= 5.5 lb/hr
= 0.69 g/sec

(1) Boilers "C" and "D" are vented thru a common stack

SHOLTES & KOOGLER, ENVIRONMENTAL CONSULTANTS
1213 N.W. 6th Street Gainesville, Florida 32601 (904) 377-5822

SKEC 102-81-08

December 7, 1981



Mr. Clair Fancy
Bureau of Air Quality Management
Florida Department of
Environmental Regulation
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, FL 32301

Subject: Occidental Chemical Company
PSD-FL-082, Swift Creek Chemical Complex
PSD-FL-083, Suwannee River Chemical Complex

Dear Mr. Fancy:

On July 24th, 1981, your office sent the Occidental Chemical Company a letter requesting additional information so that the processing of the two subject PSD applications could be completed. The attachments to this letter respond, using the same enumeration used in your July 24th letter, to the six issues addressed by your letter.

Items 1 and 2 are related to BACT for sulfur dioxide emissions from fuel burning sources. These items apply to both PSD applications PSD-FL-082 and PSD-FL-083. The Items 3A, 3B, and 3C reference PSD application PSD-FL-083; the Suwannee River Chemical Complex application. The Item identified as "A" refers to PSD application PSD-FL-082; the Swift Creek Chemical Complex application.

In addition to the material attached hereto, a response is being prepared to your letter dated November 24th, 1981 addressing the sulfur dioxide half-life used in the model runs evaluating the sulfur dioxide impact on the Okeefenokee National Wildlife Refuge. We are also preparing State Air Pollution Source Construction Permit Applications for the sources addressed in the two PSD applications. These should be in your office within two weeks.

If there are any questions regarding the material attached hereto, please feel free to contact me.

Very truly yours,

SHOLTES & KOOGLER
ENVIRONMENTAL CONSULTANTS

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

JBK:sc
Attachments

cc: Mr. W. W. Atwood

ITEMS 1 & 2

Occidental has requested the use of fuel oil with an increased sulfur content in one source covered by PSD application PSD-FL-082 (SCCC); and in four sources covered by PSD application PSD-FL-083 (SRCC). The SCCC source and three of the four sources at the SRCC are boilers. The fourth source at the SRCC is a DAP plant which uses fuel oil in a product dryer.

Best Available Control Technology for sulfur dioxide control in boilers of the size operated by Occidental (120-160 million Btu per hour heat input) involves varying the sulfur content of the boiler fuel. Varying the sulfur content of the fuel is more practical, particularly in the case at Occidental, than injecting an absorbent into the fire box of the boiler or adding a flue gas desulfurization system. The use of absorbents for sulfur dioxide control is effective on coal fired units which none of the Occidental boilers or the DAP plant are. The use of scrubbers for flue gas desulfurization would add completely new pieces of process equipment and would compound water treatment and disposal problems at Occidental.

The feasible alternative available to Occidental for controlling sulfur dioxide from the effected sources is through the control of the sulfur content of fuels used in the sources. At the SCCC the alternative fuels that Occidental could consider are coal, oil and a coal-oil mix (COM). At the SRCC the available alternative fuels include coal, oil, COM and natural gas.

Coal is not considered a feasible alternative by Occidental at either of the chemical complexes at the present time because of the problems encountered in storing and handling a solid fuel. At the SRCC in particular, space constraints are such that it would be virtually impossible to store a necessary stockpile of coal. In addition, the transfer of coal at the SRCC to the four individual sources which are the subject of PSD application PSD-FL-083 would be very cumbersome. At the SCCC coal storage and coal transfer would not be as severe a problem as at the SRCC; however, it would be severe enough to preclude the consideration of coal as a feasible alternative fuel.

The use of COM fuel would be feasible at both chemical complexes. Occidental recently had the operating permit for the "C" boiler at the SRCC (one of the sources addressed in PSD application PSD-FL-083) revised to permit the use of COM with a 0.8 percent sulfur content as an alternative fuel. After some operating experience has been gained with this fuel Occidental may very well request permit modifications for some or all fuel burning sources to allow the use of COM as an alternative fuel. Until operating experience is gained with this fuel; however, Occidental is hesitant to consider this fuel as an alternative for other sources.

At the SRCC natural gas is available and is used as an alternative fuel in most all fuel burning sources when it is available. Natural gas is presently the most ideal fuel available because of present pricing and because the combustion of the fuel results in practically no sulfur dioxide or particulate matter emissions. The problem with this fuel is the availability. Occidental, as with virtually all industrial users of natural gas, is on an interruptable service. This means the gas supply can be interrupted when gas is needed to provide energy for residential and other non-interruptable services. Occidental has experienced a greater frequency of interruptions in recent years because of the energy situation in this country.

The only fuel other than natural gas at the SRCC, that Occidental would consider at this particular time is No. 6 fuel oil. All of the subject sources are permitted to use this fuel with a 0.8 percent sulfur content or less. Occidental is requesting the use of a No. 6 fuel oil with a sulfur content of 1.3 percent. The request by Occidental is based on these factors; one being the existing cost differential between fuel oil with a 0.8 percent sulfur content and fuel oil with a 1.3 percent content; the second being the anticipated difficulty in obtaining low sulfur fuel oil at any reasonable price on the future market; and the third is the fact that Occidental owns or leases all property within several miles of both chemical complexes and has no sensitive sulfur dioxide receptors on the property.

Occidental obtained quotations for No. 6 fuel oil with varying sulfur contents in mid-August, 1981 and updated these price quotations by telephone conversation in early December, 1981. These price quotations are appended hereto as Attachment 1.

Based on quoted fuel oil prices and the heat input required by the four boilers and the DAP plant, annual fuel costs were calculated assuming the use of fuel oil with 0.8 percent sulfur (currently permitted conditions) and the use of fuel oil with 1.3 percent sulfur. The fuel costs, the fuel use by each source and the annual fuel costs are summarized in Attachment 2.

For the five sources involved, the annual fuel cost for No. 6 oil with 0.8 percent sulfur content ranges between $13.8 and $14.8 million per year depending upon the price quotation used. For a fuel oil with 1.3 percent sulfur content the annual fuel costs ranged between $12.4 million and $12.8 million; or an averaged annual cost differential over 0.8 percent sulfur fuel of $1,712,772 or 12.0 percent.

The maximum impacts on air quality resulting from the use of fuel oil with a 1.3 percent sulfur content over the impacts resulting from the use of 0.8 percent sulfur fuel oil are 74-84 micrograms per cubic meter, 3-hour average; 19-26 micrograms per cubic meter, 24-hour average; and 1.4-2.0 micrograms per cubic meter, annual average. The ranges stated take into account the impacts at both the SRCC and the SCCC.

Taking the average of these increased impacts and the annual costs associated with the fuels, the annual costs associated with increased sulfur dioxide levels were calculated. Burning fuel oil with a 0.8 percent sulfur rather than fuel oil with 1.3 percent sulfur is costing Occidental $10,900 per year for each microgram per cubic meter the <u>maximum</u> 3-hour sulfur dioxide level is decreased; $38,500 per year for each microgram per cubic meter the <u>maximum</u> 24-hour sulfur dioxide level is decreased; and $1,019,500 per year for each microgram per cubic meter the sulfur dioxide level is decreased on the average for each year.

Occidental's request to use a fuel oil with a higher sulfur content is based on the cost differential between 0.8 percent sulfur fuel oil and 1.3 percent sulfur fuel oil and on a potential availability factor. Regarding the cost, Occidental is of the opinion that $1.02 million per year to decrease the sulfur dioxide level one microgram per cubic meter on an annual average is excessive. This is particularly so when one considers the fact that Occidental owns or leases all of the property within several miles of both the Swift Creek and Suwannee River Chemical Complexes. Also, there are no sensitive receptors to sulfur dioxide on either the property controlled by Occidental or adjoining property owned or controlled by others.

Another matter to take into consideration when evaluating the Best Available Control Technology for sulfur dioxide is changes in the prices of fuel oils with various sulfur contents. These price changes are brought on in part by the availability of the various fuels and in part by the demand for the fuels. For example, if the prices quoted by Eastern Seaboard Petroleum Company, Inc. (See Attachment 1) are reviewed one finds that the cost of fuel oil with a 0.8 percent sulfur content increased by $4.17 per barrel (14 percent) between August, 1981 and December, 1981. During the same time period the cost of fuel oil with 1.3 percent sulfur content increased $2.37 per barrel or eight percent.

Translated to the fuel use of Occidental, the increase in cost of fuel oil with 0.8 percent sulfur content over the four month period from August, 1981 through December, 1981 calculates to an annual fuel cost increase of $1,922,782.00 to Occidental. During the same period the cost increase for fuel oil with a 1.3 percent sulfur content calculates to an annual fuel cost increase of $1,012,772.00. Just the differential in cost increases of 0.8 percent sulfur fuel over 1.3 percent sulfur fuel in a four month period translates to a $910,000.00 per year annual cost to Occidental.

The fact that the oil with 0.8 percent sulfur content increased in cost at a much greater rate (6 percent greater) during the period August-December, 1981, is undoubtedly related to the fact that there is a greater demand for the lower sulfur fuel oil. At present there appears to be a supply of the 0.8 percent sulfur content oil that will satisfy the demand of all users. Changes in world political situations; however, greatly influenced the availability of this grade fuel oil, as well as other fuel oils, as experienced a few years ago.

Anticipating possible supply shortages of 0.8 percent sulfur content oil in the future, considering the cost differential between the 0.8 percent sulfur fuel and the 1.3 percent sulfur fuel, and taking into consideration the fact that there are no sensitive sulfur dioxide receptors in the areas where the highest expected sulfur dioxide levels will occur, Occidental suggests that the use of fuel oil with a 1.3 percent sulfur content represents Best Available Control Technology for sulfur dioxide emissions from fuel burning sources at the Swift Creek and Suwannee River Chemical Complexes.

ITEM 3A

The original Occidental Suwannee River Chemical Complex was constructed in 1966. At this time the chemical complex consisted of the "A" and "B" sulfuric acid plants, auxiliary boiler "A", phosphoric acid plant "A" the "X" and "Y" trains (granular products plants), the No. 1 SPA plant and the East and West Suwannee River Mine dryers. In 1970-71 Occidental constructed an animal feed facility referred to as the Pollyphos plant. In 1974 FDER construction permits were obtained for the "B" and "C" phosphoric acid plants, the "C" and "D" sulfuric acid plants, the "Z" train (a DAP plant) and the Swift Creek Mine dryer. None of these sources were subject to PSD.

Following the adoption of Federal PSD Regulations in January, 1975, the "B" auxiliary boiler was permitted and installed (1975). On February 27, 1978 a final PSD approval was granted by EPA for the "C" and "D" boilers at the Suwannee River Chemical Complex, the "E" auxiliary boiler at the Swift Creek Chemical Complex and the "E" and "F" sulfuric acid plants at the Swift Creek Chemical Complex.

In January, 1981, Occidental received final PSD approval from EPA to increase the production capacity of the phosphoric acid and superphosphoric acid facilities at the Suwannee River Chemical Complex and to convert the "X" train to an animal feed production facility. The animal feed produced in the modified "X" train is referred to as Dical.

since the subject PSD application addresses only sulfur dioxide and particulate matter emitting sources, only those sources constructed or modified since January 6, 1975 are classified as PSD increment consuming for the purposes of the subject PSD application. The sources owned and operated by Occidental that are increment consuming are:

Auxiliary Boiler "B" (SRCC)
Auxiliary Boilers "C" & "D" (SRCC)
Auxiliary Boiler "E" (SCCC)
Sulfuric Acid Plants "E" & "F" (SCCC)

In addition to these sources, the sulfur dioxide and particulate matter increases expected, and addressed in the SCCC PSD application (PSD-FL-082) and the SRCC PSD application (PSD-FL-083) will also be increment consuming. In both referenced PSD applications these sources have been classified and treated as an increment consuming source.

ITEM 3B

The sulfur dioxide emission rates for the "A" and "B" pollyphos reactors are listed in Table 5-1 of both PSD applications (PSD-FL-082 and PSD-FL-083) as 13.1 grams per second (104 pounds per hour). This is also the emission rate listed in the current operating permit application for the two reactors.

The stated emission rate was based upon sulfur dioxide emission measurements conducted some time ago on the reactor stacks. Subsequent to that time, and prior to preparation of the PSD applications, SKEC conducted sulfur dioxide emission measurements on the two reactor stacks as described in the attached report (Attachment 3). With both reactors, the sulfur dioxide emission rate was measured to be less than five pounds per hour.

For purposes of the PSD air quality review; however, an emission rate of 0.63 grams per second (5.0 pounds per hour) was used. Occidental will amend the "A" and "B" pollyphos reactor air pollution source operating permit applications on file with FDER in Jacksonville to reflect this reduced emission rate.

ITEM 3C

The sulfur dioxide levels reported for some of the receptors in PSD application PSD-FL-083 were less than the maximum concentrations shown in the computer outputs as a result of oversights. This occurred for the 24-hour sulfur dioxide impact at receptor No. 4 (See Figure 6-2 of subject PSD application) and for the 3-hour sulfur dioxide impacts at Receptors 8 and 9. The corrected maximum impacts are shown on the revised Figure 6-2, appended hereto as Attachment 4.

The changes in the reported maximum sulfur dioxide levels do not change any of the conclusions stated in the original PSD application.

PSD-FL-082
Item A

The analysis of the 24-hour sulfur dioxide impact with meteorology from day 246, 1973 was omitted by oversight. Attached hereto is a revised Figure 6-5 of the subject PSD application (Attachment 5) and the PTMTPW computer print-out of this model run (Attachment 6).

The results of this model run show that the maximum 24-hour sulfur dioxide impact resulting from the meteorology of day 246, 1973 is 45 micrograms per cubic meter. This impact occurrs, as shown in revised

Figure 6-5, at the north edge of the Swift Creek Chemical Complex cooling water pond. This impact is well below the 24-hour sulfur dixoide standard of 260 micrograms per cubic meter and the new source impact of 43 micrograms per cubic meter is well below the 24-hour Class II sulfur dioxide PSD increment of 91 micrograms per cubic meter.

STATE OF FLORIDA

# DEPARTMENT OF ENVIRONMENTAL REGULATION

TWIN TOWERS OFFICE BUILDING
2600 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32301

BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

November 24, 1981

W. W. Atwood
Occidental Chemical Company
P. O. Box 300
White Springs, Florida 32096

Re: Permit Applications (PSD-FL-082) and (PSD-FL-083)

Dear Mr. Atwood:

An incompleteness letter concerning the subject permit applications was sent to your firm and your consultant on July 24, 1981. As of this date we have not received a response. The Bureau would appreciate an update on the status of the permit applications.

Also, as you may recall, we discussed briefly in your visit here in early July, the use of a half-life in the modeling for $SO_2$. In your model runs evaluating the impact on the Okeefenokee National Wildlife Refuse, you used a half-life of eight hours. The use of this half-life is unacceptable without documentation as to its accuracy. A 12-hour half-life has been accepted by the Bureau in the past and would also be accepted in this case without further documentation. I am enclosing a copy of an alternative method for determining $SO_2$ depletion that was used by Trinity Consultants for a project in South Carolina. This method was accepted by EPA and may also be useful for this project or future projects.

Sincerely,

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

CF/TR/bjm

cc: J. Koogler (w/enclosure)

*Protecting Florida and Your Quality of Life*

STATE OF FLORIDA

# DEPARTMENT OF ENVIRONMENTAL REGULATION

TWIN TOWERS OFFICE BUILDING
2600 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32301

BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

July 24, 1981

Mr. M.P. McArthur, V.P.
General Manager
Occidental Chemical Company
Post Office Box 300
White Springs, Florida 32096

Dear Mr. McArthur:

The Department of Environmental Regulation has received your federal PSD applications requesting a sulfuric acid plant production rate increase (PSD-FL-082) and use of higher sulfur content oil (PSD-FL-083). Based on the initial review of these applications, it has been determined that additional information is needed before they can be processed. The information required to complete the applications are listed below.

1. The $SO_2$ BACT economic analysis should be expanded. This analysis should include different alternatives to justify the use of a higher sulfur oil.

2. Recent letters that show current and projected cost and availability of the lower sulfur oil from at least three fuel oil suppliers.

3. Modeling information.

<u>Questions Pertaining to Occidental Chemical - Suwannee River</u>

A. It states in the plant description that the Suwannee River Chemical Complex (SRCC) was expanded in 1975. As any modification commencing construction after January 6, 1975 (of a major source) consumes increment, clarify the nature and dates of this expansion including all emission increases.

B. In the modeling analysis runs for SRCC using the PTMTPW dispersion model, the emission data is not consistant with that given in Table 5-1 of the report. The emission rates for the polyphos reactors A & B are given as 13.1 grams per second each in Table 5-1 and are modeled at 0.63 grams per second each. This can mean a significant difference in the results, approximately 20 ug/m$^3$ on the maximum computed value which is already 259 ug/m$^3$. Correct or explain this inconsistancy.

C. On the PTMTPW model runs concerning the NAAQS, the maximum concentrations given in the report were not always the maximum concentrations shown in the computer output. Correct or explain. These differences (eg. 3-hour $SO_2$ @ 360° 1976 day 161; and 3-hour $SO_2$ @ 30° 1975 day 82).

<u>Questions Pertaining to Occidental Chemical - Swift Creek</u>

A. In the determination of $SO_2$ increment consumption on a 24-hour basis, day 246 of 1973 was not included. This day contained a second-high concentration for that year and was in fact the highest of the second-high values over the five year period. Include this day in the 24-hour increment analysis.

As soon as the requested information is received, we will begin processing your federal application. If you have any questions on the data requested, please contact this office, (904) 488-1344. Tom Rogers should be contacted on any questions related to modeling and Willard Hanks on the other data requested.

Sincerely,

Clair Fancy, P.E.
Bureau of Air Quality Management

CF:TR:WMH:TH:dav

cc: John Koogler

SHOLTES & KOOGLER, ENVIRONMENTAL CONSULTANTS
1213 N.W. 6th Street Gainesville, Florida 32601 (904) 377-5822

SKEC 102-81-08

June 18, 1981

Mr. Steve Smallwood, Chief
Bureau of Air Quality Management
Florida Department of Environmental
Regulation
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, FL 32301

Subject: Application for Federal PSD Approval
Occidental Chemical Company
Swift Creek Chemical Complex
Hamilton County, Florida

Dear Mr. Smallwood:

On June 8, 1981 we submitted to your office an application for Federal PSD Approval for a sulfuric acid production rate increase and for the use of a fuel oil with a higher sulfur content at the Occidental Chemical Company, Swift Chemical Complex in Hamilton County, Florida. At the time this application was submitted we requested that we be able to retain Volume II of the application, the computer printouts generated during the Air Quality Review, so that we could make copies of this material for our file. This material has been copied and I am returning, under this letter, the originial computer printouts as submitted to your office on June 8, 1981. We appreciate the use of this material for copying purposes.

In reviewing Volume I of the application we noted some typographical errors which we would like to bring to your attention. These are described on the attached Errata sheet. We have corrected some of the pages containing errors and have attached four sets of corrected copies of these pages. These pages can be inserted into the application received in your office on June 8. The errors noted in no way change the content of the application or the conclusions reached therein.

If there any questions regarding the corrections referenced in the Errata sheet or the pages attached hereto or any questions regarding the application itself, please feel free to contact us. We are willing to work with your staff in anyway possible to assist in the review of this application.

Very truly yours,

SHOLTES & KOOGLER
ENVIRONMENTAL CONSULTANTS

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

JBK:ls

cc: W. W. Atwood, Occidental Chemical Company

# ERRATA

Page 2-8, line 4 - "1.3 pounds" should read "91.3 pounds"
line 6 - "3.9 pounds per hour or 17 tons . . ." should read "1.5 pounds per hour or 6.7 tons . . ."

Appendix 2-2 - Operating permit application for "B" Auxillary boiler is duplicated; duplicate should be removed.

Appendix 2-4 - Emission Summary - Hourly particulate matter emissions for Boiler "B"; Proposed should read "17.5 lb/hr" not "19.7 lb/hr" and Increase should read "1.5 lb/hr" not "3.7 lb/hr".

Page 5-2, Auxillary Boiler B(2)
(C & D Sulfuric) - Maximum emission rate of 28.64 gr/sec is at 100 percent of maximum rate; not at 25 percent of maximum rate.

Page 6-5, last paragraph, line 2 - "at this rate;" should read "at these rates;"

permitted to fire No. 6 fuel with a 1.5 percent sulfur content in some of the sources and No. 6 fuel oil with 0.8 percent sulfur content in other sources. Due to the increased difficulty in maintaining a reliable supply of No. 6 fuel oil with a 0.8 percent sulfur content and because of a more rapid rate in the cost of this fuel, Occidental is requesting, by this permit application, permit modifications that will permit the use of fuel oil with a 1.3 percent sulfur content in all sources at the SRCC presently permitted to use 0.8 percent sulfur oil. The sources that will be affected by this proposed modification are the No. 2 DAP plant, the "B" auxillary boiler serving the "C" and "D" sulfuric acid plants and the "C" and "D" boilers used primarily for providing auxillary steam to the SPA evaporators.

The proposed fuel change will affect sulfur dioxide and particulate matter emissions. The increases in the emission rates of both of these pollutants will exceed de minimus levels as established in 40 CFR 52.21 (Table 2-1). Because of this the proposed fuel change is subject to Federal PSD Review.

Other pollutants emitted from the affected sources include nitrogen oxides, carbon monoxide and hydrocarbons generated by fuel burning and fluorides from the No. 2 DAP plant. The emission rates of none of these pollutants will be affected by the proposed fuel conversion.

In the following paragraphs each of the affected sources are described and emission rate increases resulting from the proposed fuel change are estimated.

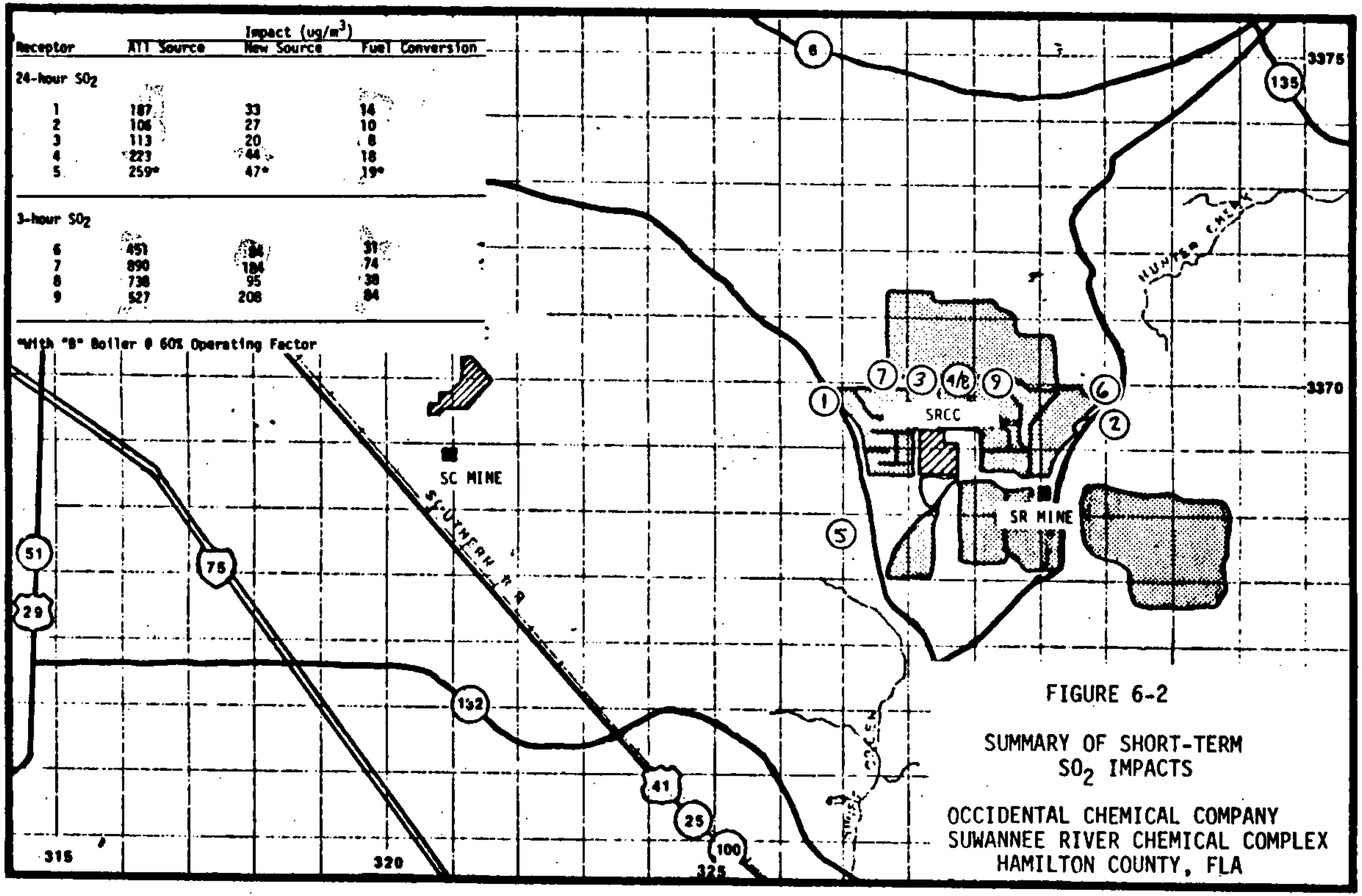
TABLE 6-1

SUMMARY OF AIR QUALITY REVIEW FOR SULFUR DIOXIDE & PARTICULATE MATTER

OCCIDENTAL CHEMICAL COMPANY
SUWANNEE RIVER CHEMICAL COMPLEX
HAMILTON COUNTY, FLORIDA

| Pollutant | CLASS II | | | CLASS I |
|---|---|---|---|---|
| | Max. New Source Impact ($ug/m^3$) | Max. Impact of all Sources ($ug/m^3$) | Max. Increase From Proposed Fuel Conversion ($ug/m^3$) | Max. New Source Impact ($ug/m^3$) |
| **Sulfur Dioxide** | | | | |
| Annual | 5 | 25 (at SRCC) | 2 | 1 |
| 24-Hour | 47* | 259*(at SRCC) | 19* | 4.9 |
| 3-Hour | 208 | 915 (at SRCC) | 94 | 19.4 |
| **Particulate Matter** | | | | |
| Annual | Not Significant | -- | -- | -- |
| 24-Hour | Not Significant | -- | -- | -- |

* With boiler "B" at 60 percent operating factor




| Receptor | Impact (ug/m³) All Source | New Source | Fuel Conversion |
|---|---|---|---|
| 24-hour $SO_2$ | | | |
| 1 | 187 | 33 | 14 |
| 2 | 106 | 27 | 10 |
| 3 | 113 | 20 | 8 |
| 4 | 223 | 44 | 18 |
| 5 | 259* | 47* | 19* |
| 3-hour $SO_2$ | | | |
| 6 | 451 | 86 | 31 |
| 7 | 890 | 184 | 74 |
| 8 | 738 | 95 | 38 |
| 9 | 527 | 208 | 84 |

*With "B" Boiler @ 60% Operating Factor

FIGURE 6-2

SUMMARY OF SHORT-TERM $SO_2$ IMPACTS

OCCIDENTAL CHEMICAL COMPANY
SUWANNEE RIVER CHEMICAL COMPLEX
HAMILTON COUNTY, FLA

SHOLTES & KOOGLER, ENVIRONMENTAL CONSULTANTS
1213 N.W. 6th Street Gainesville, Florida 32601 (904) 377-5822

MEMORANDUM

TO: W. W. Atwood
Occidental Chemical Company

FROM: Robert S. Sholtes, Ph.D., P.E.
Sholtes & Koogler Environmental Consultants

SUBJECT: Sulfur Dioxide Content of Pollyphos Reactor Stack Gases

DATE: February 24, 1981

---

This memorandum constitutes a brief report on the above subject. On February 23, 1981, I visited the Suwannee River Chemical Complex (SRCC) and obtained two samples from the "B" Pollyphos Reactor Stack. At the time the samples were collected the plant was reported to be operating normally at a production rate of 7.5 tons per hour. These samples were collected in Tedlar bags using an inlet tube made of teflon. Within approximately 1/2-hour of sample acquisition these gases were injected into the DuPont sulfur dioxide monitor installed at the "D" sulfuric acid plant at the SRCC. The DuPont monitor indicated that if any sulfur dioxide were present, it was in a concentration below 15 parts per million (ppm) by volume. The certainty of this quotation is mildly limited by the fact that welding activities in the vicinity of the "D" sulfuric acid plant imposed an electronic noise signal on the strip chart recorder at the time of these activities. It is my firm conclusion that if sulfur dioxide exists in the pollyphos reactor stack, it is at a very low concentration.

If you have any questions with respect to this brief evaluation, please let me know.

RSS:sc

**TSI**

# TECHNICAL SERVICES, INC.

**ENVIRONMENTAL CONSULTANTS — INDUSTRIAL CHEMISTS**
105 STOCKTON STREET — P.O. BOX 52329
JACKSONVILLE, FLORIDA 32201
(904) 353-5761

ANALYSIS · CONSULTANTS · SAMPLING · Research · TESTING

Laboratory No. 39238 Feb. 9, 19 81

Sample of CYLINDERS

Date Received Feb. 2, 1981

For Sholtes & Koogler, 1213 N. W. 6th Street, Gainesville, Fl 32601

Marks: OCCIDENTAL CHEMICAL CO. - POLYPHOF

## CERTIFICATE OF ANALYSIS OR TESTS

| INITIAL VACUUM ON EACH CYLINDER | SULFUR DIOXIDE ppm (V/V) |
|---|---|
| 25.55 in. Hg @ 67° F. | 0.50 |
| 26.95 in. Hg @ 67° F. | 0.80 |
| 26.45 in. Hg @ 67° F. | 0.97 |

Samples collected 1/29/81 in evacuated Stainless steel cylinders by J.Koogler at 1440-1450. Samples from "B" Reactor

Respectfully submitted,

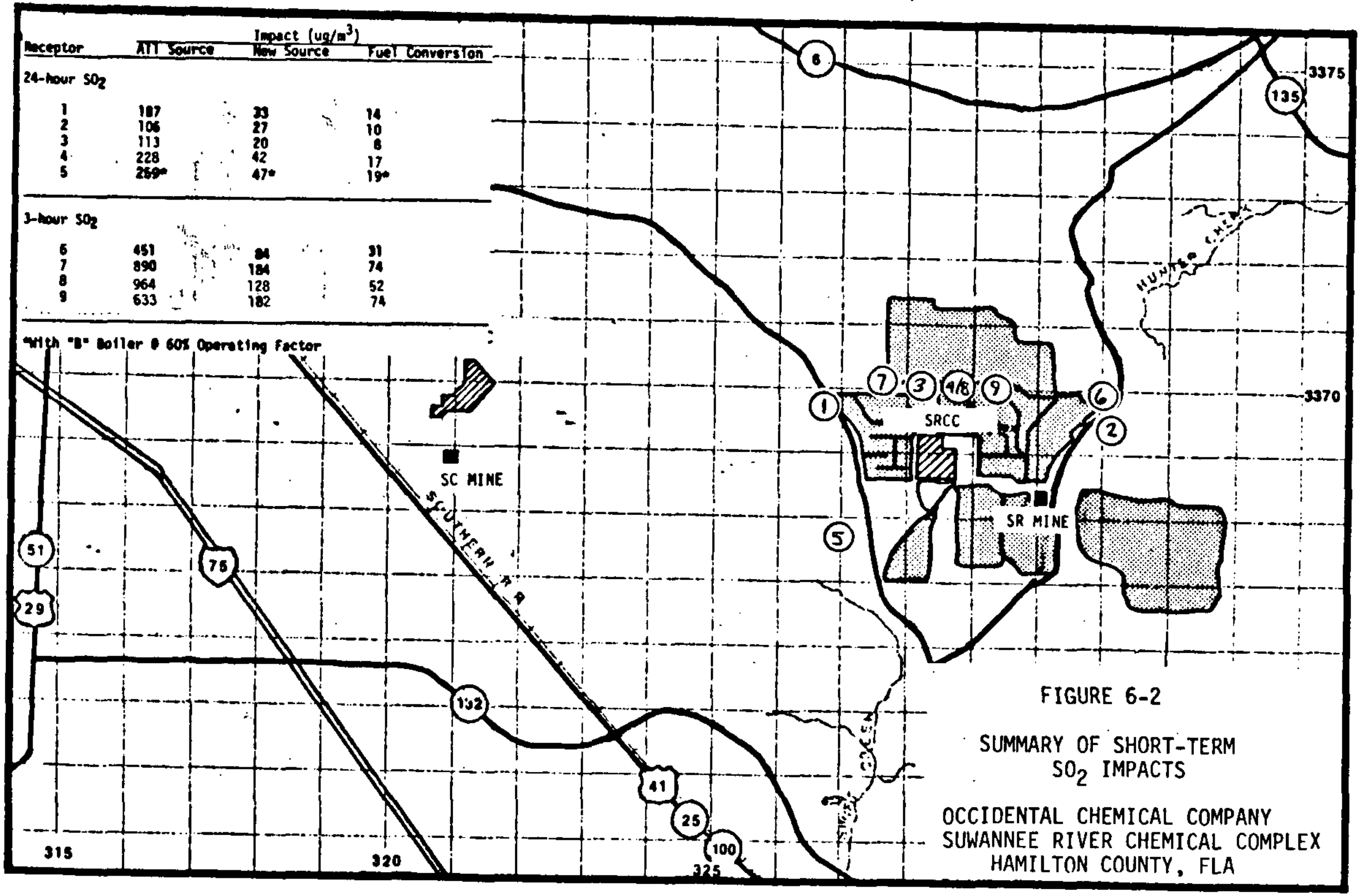
TECHNICAL SERVICES, INC.

BY Harvey C. Gray, Jr.

## PROJECT PARTICIPANTS

| | |
|---|---|
| John B. Koogler, Ph.D., P.E. | Project Advisor |
| Robert S. Sholtes, Ph.D., P.E. | Project Manager |
| Rodney C. Paul | Field Test Crew |
| George F. Gabel | Field Test Crew |

ATTACHMENT 4
REVISED FIGURE 6-2, PSD-FL-083
FUEL CONVERSION - SUWANNEE RIVER CHEMICAL COMPLEX




| Receptor | Impact (ug/m$^3$) All Source | New Source | Fuel Conversion |
|---|---|---|---|
| 24-hour $SO_2$ | | | |
| 1 | 187 | 33 | 14 |
| 2 | 106 | 27 | 10 |
| 3 | 113 | 20 | 8 |
| 4 | 228 | 42 | 17 |
| 5 | 259* | 47* | 19* |
| 3-hour $SO_2$ | | | |
| 6 | 451 | 84 | 31 |
| 7 | 890 | 184 | 74 |
| 8 | 964 | 128 | 52 |
| 9 | 633 | 182 | 74 |

*With "B" Boiler @ 60% Operating Factor

FIGURE 6-2

SUMMARY OF SHORT-TERM $SO_2$ IMPACTS

OCCIDENTAL CHEMICAL COMPANY
SUWANNEE RIVER CHEMICAL COMPLEX
HAMILTON COUNTY, FLA



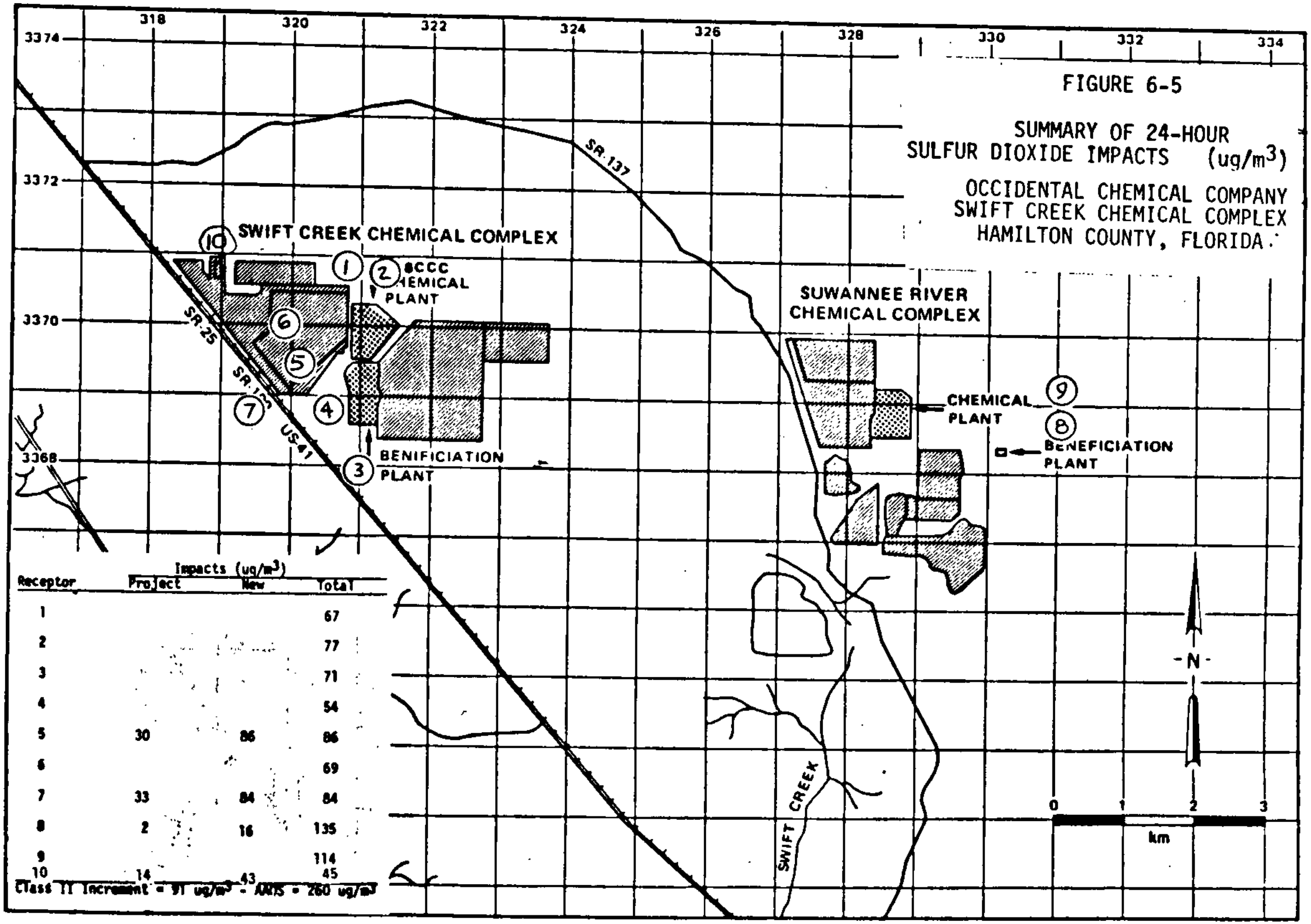
Revised 12/7/81
SHOLTES & KOOGLER

ATTACHMENT 5
REVISED FIGURE 6-5, PSD-FL-082
SULFURIC ACID PLANT RATE INCREASE
SWIFT CREEK CHEMICAL COMPLEX

FIGURE 6-5

SUMMARY OF 24-HOUR
SULFUR DIOXIDE IMPACTS ($\mu g/m^3$)

OCCIDENTAL CHEMICAL COMPANY
SWIFT CREEK CHEMICAL COMPLEX
HAMILTON COUNTY, FLORIDA




| Receptor | Impacts (ug/m³) Project | New | Total |
|---|---|---|---|
| 1 | | | 67 |
| 2 | | | 77 |
| 3 | | | 71 |
| 4 | | | 54 |
| 5 | 30 | 86 | 86 |
| 6 | | | 69 |
| 7 | 33 | 84 | 84 |
| 8 | 2 | 16 | 135 |
| 9 | | | 114 |
| 10 | 14 | 43 | 45 |

Class II Increment = 91 ug/m³ - AAQS = 260 ug/m³

ATTACHMENT 6

PTMTPW OUTPUT, PSD-FL-082

24-Hour Sulfur Dioxide Impact at Receptor 10
SUWANNEE RIVER CHEMICAL COMPLEX

Meteorology - Day 246, 1973

STACK HEIGHT ADJUSTMENT = 0.0

* * * S O U R C E D A T A * * *

| SOURCE NAME | EMM. RATE (G/SEC) | STACK HT. (M) | STACK TEMP. (DEG-K) | EXIT VEL. (M/SEC) | STACK DIA. (M) | VOL. FLOW (M**3/SEC) | X-COORD. (KM) | Y-COORD. (KM) |
|---|---|---|---|---|---|---|---|---|
| SULFURIC ACID A | 152.25 | 61.0 | 350.0 | 15.50 | 1.80 | 0. | 28.690 | 68.990 |
| SULFURIC ACID B | 152.25 | 61.0 | 350.0 | 15.50 | 1.80 | 0. | 28.690 | 69.070 |
| SULFURIC ACID C | 37.80 | 45.7 | 356.0 | 28.70 | 1.59 | 0. | 28.710 | 69.170 |
| SULFURIC ACID D | 37.80 | 45.7 | 356.0 | 28.70 | 1.59 | 0. | 28.710 | 69.230 |
| DAP 1 | 1.40 | 36.6 | 322.0 | 12.20 | 2.13 | 0. | 28.480 | 68.890 |
| DAP 2 | 0.79 | 42.7 | 325.0 | 13.10 | 2.44 | 0. | 28.450 | 68.870 |
| GTSP/DICAL | 1.40 | 32.3 | 314.0 | 13.10 | 2.13 | 0. | 28.490 | 69.030 |
| AUXILIARY BOILER A | 3.23 | 12.2 | 466.0 | 12.50 | 1.13 | 0. | 28.660 | 69.030 |
| POLLYPHOS FEED PREP. | 0.62 | 28.7 | 342.0 | 14.90 | 1.07 | 0. | 28.870 | 68.850 |
| POLLYPHOS REACTOR A | 0.63 | 30.5 | 322.0 | 10.10 | 1.22 | 0. | 28.870 | 68.830 |
| POLLYPHOS REACTOR B | 0.63 | 30.5 | 322.0 | 10.10 | 1.22 | 0. | 28.880 | 68.830 |
| SPA #1 | 0.10 | 30.5 | 318.0 | 17.80 | 0.43 | 0. | 28.680 | 68.790 |
| ROCK DRYER #3 (SCCC) | 4.80 | 15.2 | 317.0 | 17.20 | 2.16 | 0. | 20.900 | 68.960 |
| ROCK DRYER EAST | 3.61 | 18.3 | 343.0 | 5.70 | 2.95 | 0. | 30.170 | 68.470 |
| ROCK DRYER WEST | 3.61 | 18.3 | 343.0 | 5.70 | 2.95 | 0. | 30.150 | 68.470 |
| AUXILIARY BOILER B | 4.30 | 10.7 | 468.0 | 9.50 | 1.46 | 0. | 28.680 | 69.180 |
| AUXILIARY BOILERS C&D | 26.44 | 31.7 | 468.0 | 15.20 | 1.98 | 0. | 28.900 | 68.900 |
| SULFURIC ACID E | 52.50 | 61.0 | 356.0 | 9.30 | 2.90 | 0. | 20.950 | 69.820 |
| SULFURIC ACID F | 52.50 | 61.0 | 356.0 | 9.30 | 2.90 | 0. | 20.900 | 69.700 |
| AUXILIARY BOILER E | 32.25 | 15.3 | 428.0 | 15.90 | 1.60 | 0. | 20.900 | 69.750 |

* * * R E C E P T O R S * * *

| NO. | X(KM) | Y(KM) | Z(KM) |
|---|---|---|---|
| 1. | 18.500 | 70.900 | 0.0 |
| 2. | 18.600 | 70.900 | 0.0 |
| 3. | 18.700 | 70.900 | 0.0 |
| 4. | 18.800 | 70.900 | 0.0 |
| 5. | 18.900 | 70.900 | 0.0 |
| 6. | 19.000 | 70.900 | 0.0 |
| 7. | 19.100 | 70.900 | 0.0 |
| 8. | 19.200 | 70.900 | 0.0 |
| 9. | 19.300 | 70.900 | 0.0 |
| 10. | 19.400 | 70.900 | 0.0 |
| 11. | 19.500 | 70.900 | 0.0 |
| 12. | 19.600 | 70.900 | 0.0 |
| 13. | 19.700 | 70.900 | 0.0 |
| 14. | 19.800 | 70.900 | 0.0 |
| 15. | 19.900 | 70.900 | 0.0 |
| 16. | 20.000 | 70.900 | 0.0 |

* * * M E T E O R O L O G Y * * *

| | WIND DIR. (DEG) | WIND VEL. (M/SEC) | STABILITY CLASS | MIX.HT. (M) | AMB.TEMP. (DEG-K) | PRESS. (MB) |
|---|---|---|---|---|---|---|
| 1. | 46. | 3.10 | 6 | 592. | 297. | 1000.00 |
| 2. | 58. | 2.10 | 6 | 592. | 297. | 1000.00 |
| 3. | 60. | 2.60 | 6 | 592. | 296. | 1000.00 |
| 4. | 59. | 4.10 | 5 | 592. | 296. | 1000.00 |
| 5. | 61. | 3.60 | 5 | 592. | 296. | 1000.00 |
| 6. | 63. | 2.10 | 6 | 592. | 297. | 1000.00 |
| 7. | 85. | 2.10 | 5 | 663. | 297. | 1000.00 |
| 8. | 61. | 3.10 | 4 | 755. | 298. | 1000.00 |
| 9. | 92. | 4.10 | 3 | 847. | 301. | 1000.00 |
| 10. | 121. | 7.70 | 4 | 939. | 303. | 1000.00 |
| 11. | 109. | 5.10 | 3 | 1031. | 304. | 1000.00 |
| 12. | 116. | 5.10 | 3 | 1122. | 305. | 1000.00 |
| 13. | 116. | 2.10 | 2 | 1214. | 305. | 1000.00 |
| 14. | 95. | 3.10 | 2 | 1306. | 304. | 1000.00 |
| 15. | 116. | 4.10 | 3 | 1306. | 305. | 1000.00 |
| 16. | 117. | 3.60 | 2 | 1306. | 305. | 1000.00 |
| 17. | 116. | 5.10 | 3 | 1306. | 304. | 1000.00 |
| 18. | 116. | 3.10 | 4 | 1306. | 303. | 1000.00 |
| 19. | 125. | 3.10 | 5 | 1282. | 301. | 1000.00 |
| 20. | 92. | 2.10 | 6 | 1113. | 299. | 1000.00 |
| 21. | 92. | 3.10 | 6 | 943. | 299. | 1000.00 |
| 22. | 90. | 2.60 | 6 | 774. | 298. | 1000.00 |
| 23. | 88. | 2.60 | 6 | 604. | 297. | 1000.00 |
| 24. | 93. | 2.60 | 6 | 435. | 297. | 1000.00 |

AVERAGE CONCENTRATIONS (UG/M**3) AND PERCENT CONTRIBUTIONS FOR 24 HOURS

| RECEPTORS | 1. | | 2. | | 3. | | 4. | | 5. | | 6. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SOURCE NAME | PARTIAL CONC. | % CONT. | PARTIAL CONC. | % CONT. | PARTIAL CONC. | % CONT. | PARTIAL CONC. | % CONT. | PARTIAL CONC. | % CONT. | PARTIAL CONC. | % CONT. |
| SULFURIC ACID A | 0.57 | 1.38 | 0.58 | 1.34 | 0.59 | 1.32 | 0.60 | 1.33 | 0.61 | 1.37 | 0.62 | 1.45 |
| SULFURIC ACID B | 0.59 | 1.41 | 0.59 | 1.36 | 0.60 | 1.34 | 0.61 | 1.34 | 0.61 | 1.38 | 0.62 | 1.46 |
| SULFURIC ACID C | 0.16 | 0.38 | 0.16 | 0.37 | 0.16 | 0.36 | 0.16 | 0.36 | 0.16 | 0.37 | 0.17 | 0.39 |
| SULFURIC ACID D | 0.16 | 0.39 | 0.16 | 0.38 | 0.17 | 0.37 | 0.17 | 0.37 | 0.17 | 0.38 | 0.17 | 0.40 |
| DAP 1 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.02 |
| DAP 2 | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 | 0.01 |
| GTSP/DICAL | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.02 |
| AUXILIARY BOILER A | 0.02 | 0.04 | 0.02 | 0.04 | 0.02 | 0.04 | 0.02 | 0.04 | 0.02 | 0.04 | 0.02 | 0.04 |
| POLLYPHOS FEED PREP. | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 | 0.01 |
| POLLYPHOS REACTOR A | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 | 0.01 |
| POLLYPHOS REACTOR B | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 | 0.01 |
| SPA #1 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| ROCK DRYER #3 (SCCC) | 0.63 | 1.52 | 0.32 | 0.74 | 0.15 | 0.32 | 0.06 | 0.14 | 0.03 | 0.07 | 0.02 | 0.04 |
| ROCK DRYER EAST | 0.01 | 0.03 | 0.01 | 0.03 | 0.01 | 0.03 | 0.01 | 0.03 | 0.01 | 0.03 | 0.01 | 0.04 |
| ROCK DRYER WEST | 0.01 | 0.03 | 0.01 | 0.03 | 0.01 | 0.03 | 0.01 | 0.03 | 0.01 | 0.03 | 0.02 | 0.04 |
| AUXILIARY BOILER B | 0.02 | 0.06 | 0.02 | 0.05 | 0.02 | 0.05 | 0.02 | 0.05 | 0.02 | 0.05 | 0.02 | 0.06 |
| AUXILIARY BOILERS C&D | 0.11 | 0.26 | 0.11 | 0.25 | 0.11 | 0.25 | 0.11 | 0.25 | 0.11 | 0.26 | 0.12 | 0.27 |
| SULFURIC ACID E | 12.08 | 29.13 | 13.22 | 30.38 | 14.15 | 31.61 | 14.76 | 32.77 | 14.93 | 33.70 | 14.57 | 34.16 |
| SULFURIC ACID F | 13.15 | 31.69 | 13.37 | 30.74 | 13.21 | 29.52 | 12.63 | 28.03 | 11.61 | 26.19 | 10.18 | 23.86 |
| AUXILIARY BOILER E | 13.95 | 33.62 | 14.90 | 34.24 | 15.53 | 34.70 | 15.85 | 35.19 | 15.98 | 36.06 | 16.10 | 37.75 |
| TOTAL CONCENTRATION (UG/M**3) | 41.49 | | 43.51 | | 44.76 | | 45.05 | | 44.32 | | 42.66 | |

NEW = 43 ug/m3

Project = ($H_2SO_4$) × 0.2 + Boiler E × 0.51 = 14 ug/m3

| RECEPTORS | 7. | | 8. | | 9. | | 10. | | 11. | | 12. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SOURCE NAME | PARTIAL CONC. | % CONT. | PARTIAL CONC. | % CONT. | PARTIAL CONC. | % CONT. | PARTIAL CONC. | % CONT. | PARTIAL CONC. | % CONT. | PARTIAL CONC. | % CONT. |
| SULFURIC ACID A | 0.63 | 1.57 | 0.64 | 1.79 | 0.65 | 2.25 | 0.67 | 3.25 | 0.68 | 5.34 | 0.70 | 9.04 |
| SULFURIC ACID B | 0.63 | 1.58 | 0.64 | 1.79 | 0.65 | 2.24 | 0.66 | 3.22 | 0.68 | 5.27 | 0.69 | 8.89 |
| SULFURIC ACID C | 0.17 | 0.42 | 0.17 | 0.47 | 0.17 | 0.59 | 0.17 | 0.85 | 0.18 | 1.38 | 0.18 | 2.31 |
| SULFURIC ACID D | 0.17 | 0.43 | 0.17 | 0.48 | 0.17 | 0.60 | 0.18 | 0.86 | 0.18 | 1.40 | 0.18 | 2.34 |
| DAP 1 | 0.01 | 0.02 | 0.01 | 0.02 | 0.01 | 0.02 | 0.01 | 0.04 | 0.01 | 0.06 | 0.01 | 0.10 |
| DAP 2 | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 | 0.02 | 0.00 | 0.03 | 0.00 | 0.06 |
| GTSP/DICAL | 0.01 | 0.02 | 0.01 | 0.02 | 0.01 | 0.02 | 0.01 | 0.03 | 0.01 | 0.06 | 0.01 | 0.10 |
| AUXILIARY BOILER A | 0.02 | 0.04 | 0.02 | 0.05 | 0.02 | 0.06 | 0.02 | 0.09 | 0.02 | 0.15 | 0.02 | 0.26 |
| POLLYPHOS FEED PREP. | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 | 0.02 | 0.00 | 0.03 | 0.00 | 0.04 |
| POLLYPHOS REACTOR A | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 | 0.02 | 0.00 | 0.03 | 0.00 | 0.04 |
| POLLYPHOS REACTOR B | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 | 0.02 | 0.00 | 0.03 | 0.00 | 0.04 |
| SPA #1 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 |
| ROCK DRYER #3 (SCCC) | 0.01 | 0.03 | 0.01 | 0.02 | 0.00 | 0.01 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 |
| ROCK DRYER EAST | 0.02 | 0.04 | 0.02 | 0.04 | 0.02 | 0.06 | 0.02 | 0.08 | 0.02 | 0.13 | 0.02 | 0.22 |
| ROCK DRYER WEST | 0.02 | 0.04 | 0.02 | 0.04 | 0.02 | 0.06 | 0.02 | 0.08 | 0.02 | 0.13 | 0.02 | 0.23 |
| AUXILIARY BOILER B | 0.02 | 0.06 | 0.03 | 0.07 | 0.03 | 0.09 | 0.03 | 0.13 | 0.03 | 0.20 | 0.03 | 0.34 |
| AUXILIARY BOILERS C&D | 0.12 | 0.30 | 0.12 | 0.34 | 0.12 | 0.43 | 0.13 | 0.61 | 0.13 | 1.01 | 0.13 | 1.72 |
| SULFURIC ACID E | 13.62 | 34.05 | 12.07 | 33.76 | 9.98 | 34.33 | 7.56 | 36.71 | 5.15 | 40.21 | 3.19 | 41.05 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SULFURIC ACID F | 8.39 | 20.98 | 6.38 | 17.86 | 4.41 | 15.16 | 2.77 | 13.48 | 1.64 | 12.83 | 0.94 | 12.13 |
| AUXILIARY BOILER E | 16.16 | 40.41 | 15.44 | 43.19 | 12.80 | 44.03 | 8.34 | 40.50 | 4.07 | 31.71 | 1.64 | 21.08 |
| TOTAL CONCENTRATION (UG/M**3) | 40.00 | | 35.74. | | 29.08 | | 20.59 | | 12.82 | | 7.76 | |

| RECEPTORS | 13. | | 14. | | 15. | | 16. | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SOURCE NAME | PARTIAL CONC. | % CONT. | PARTIAL CONC. | % CONT. | PARTIAL CONC. | % CONT. | PARTIAL CONC. | % CONT. | PARTIAL CONC. | % CONT. | PARTIAL CONC. | % CONT. |
| SULFURIC ACID A | 0.72 | 14.16 | 0.74 | 20.22 | 0.76 | 26.50 | 0.79 | 31.59 | | | | |
| SULFURIC ACID B | 0.71 | 13.87 | 0.72 | 19.71 | 0.74 | 25.72 | 0.76 | 30.52 | | | | |
| SULFURIC ACID C | 0.18 | 3.59 | 0.19 | 5.07 | 0.19 | 6.59 | 0.19 | 7.77 | | | | |
| SULFURIC ACID D | 0.18 | 3.62 | 0.19 | 5.10 | 0.19 | 6.60 | 0.19 | 7.77 | | | | |
| DAP 1 | 0.01 | 0.16 | 0.01 | 0.23 | 0.01 | 0.31 | 0.01 | 0.37 | | | | |
| DAP 2 | 0.00 | 0.09 | 0.00 | 0.13 | 0.00 | 0.17 | 0.01 | 0.21 | | | | |
| GTSP/DICAL | 0.01 | 0.15 | 0.01 | 0.22 | 0.01 | 0.29 | 0.01 | 0.34 | | | | |
| AUXILIARY BOILER A | 0.02 | 0.40 | 0.02 | 0.57 | 0.02 | 0.75 | 0.02 | 0.89 | | | | |
| POLLYPHOS FEED PREP. | 0.00 | 0.07 | 0.00 | 0.10 | 0.00 | 0.13 | 0.00 | 0.15 | | | | |
| POLLYPHOS REACTOR A | 0.00 | 0.07 | 0.00 | 0.10 | 0.00 | 0.13 | 0.00 | 0.15 | | | | |
| POLLYPHOS REACTOR B | 0.00 | 0.07 | 0.00 | 0.10 | 0.00 | 0.13 | 0.00 | 0.15 | | | | |
| SPA #1 | 0.00 | 0.01 | 0.00 | 0.02 | 0.00 | 0.02 | 0.00 | 0.03 | | | | |
| ROCK DRYER #3 (SCCC) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | | | |
| ROCK DRYER EAST | 0.02 | 0.35 | 0.02 | 0.51 | 0.02 | 0.66 | 0.02 | 0.79 | | | | |
| ROCK DRYER WEST | 0.02 | 0.36 | 0.02 | 0.51 | 0.02 | 0.67 | 0.02 | 0.80 | | | | |
| AUXILIARY BOILER B | 0.03 | 0.53 | 0.03 | 0.75 | 0.03 | 0.98 | 0.03 | 1.15 | | | | |
| AUXILIARY BOILERS C&D | 0.14 | 2.69 | 0.14 | 3.85 | 0.15 | 5.05 | 0.15 | 6.03 | | | | |
| SULFURIC ACID E | 1.84 | 36.12 | 1.00 | 27.31 | 0.49 | 17.16 | 0.20 | 8.22 | | | | |
| SULFURIC ACID F | 0.51 | 9.96 | 0.24 | 6.61 | 0.10 | 3.34 | 0.03 | 1.19 | | | | |
| AUXILIARY BOILER E | 0.70 | 13.73 | 0.33 | 8.91 | 0.14 | 4.80 | 0.05 | 1.87 | | | | |
| TOTAL CONCENTRATION (UG/M**3) | 5.09 | | 3.66 | | 2.88 | | 2.49 | | | | | |

TCP OUTPUT CHARGE: $ .06