Koppers Inc

General Information

ID	Branch	SIC	County	Basin	Start	End
876	Energy and Transportation	2491	Grenada	Yazoo River	11/09/1981	

Address

Physical Address (Primary)	Mailing Address
1 Koppers Drive Tie Plant, MS 38960	PO Box 160 Tie Plant, MS 38960

Telecommunications

Type	Address or Phone
Work phone number	(662) 226-4584, Ext. 11

Alternate / Historic AI Identifiers

Alt ID	Alt Name	Alt Type	Start Date	End Date
2804300012	Koppers Industries, Inc.	Air-AIRS AFS	10/12/2000	
096000012	Koppers Industries, Inc.	Air-Title V Fee Customer	03/11/1997	
096000012	Koppers Industries, Inc.	Air-Title V Operating	03/11/1997	03/01/2002
096000012	Koppers Industries, Inc.	Air-Title V Operating	01/13/2004	01/01/2009
MSR220005	Koppers Industries, Inc.	GP-Wood Treating	09/25/1992	
MSD007027543	Koppers Industries, Inc.	Hazardous Waste-EPA ID	08/27/1999	
HW8854301	Koppers Industries, Inc.	Hazardous Waste-TSD	06/28/1988	06/28/1998
HW8854301	Koppers Industries, Inc.	Hazardous Waste-TSD	11/10/1999	09/30/2009
876	Koppers Industries, Inc.	Historic Site Name	11/09/1981	12/11/2006
876	Koppers, Inc.	Official Site Name	12/11/2006	
MSP090300	Koppers Industries, Inc.	Water-Pretreatment	11/14/1995	11/13/2000
MSP090300	Koppers Industries, Inc.	Water-Pretreatment	09/18/2001	08/31/2006
MSU081080	Koppers Industries, Inc.	Water-SOP	11/09/1981	11/30/1985

Regulatory Programs

Program	SubProgram	Start Date	End Date
Air	Title V - major	06/01/1900	
Hazardous Waste	Large Quantity Generator	08/27/1999	
Hazardous Waste	TSD - Not Classified	06/28/1988	
Water	Baseline Stormwater	01/01/1900	
Water	PT CIU	11/14/1995	
	PT CIU - Timber Products		

Water	Processing (Subpart 429)	11/14/1995	
Water	PT SIU	11/14/1995	

Locational Data

Latitude	Longitude	Metadata	S / T / R	Map Links
33 ° 44 ' 3 .00 (033.734167)	89 ° 47 ' 8 .06 (089.785572)	**Point Desc:** PG- Plant Entrance (General). Data collected by Mike Hardy on 11/8/2005. Elevation 223 feet. Just inside entrance gate. **Method:** GPS Code (Psuedo Range) Standard Position (SA Off) **Datum:** NAD83 **Type:** MDEQ	Section: Township: Range:	SWIMS TerraServer Map It

12/20/2006 12:16:40 PM

enSearch
Department of Environmental Quality

Koppers Industries Inc

AI General Information

AI ID	Branch	SIC	County	Basin	Start	End
876	Energy and Transportation	2491	Grenada	Yazoo River Basin	11/09/1981	

Physical and Mailing Address

Physical Address (Primary)	Mailing Address
1 Koppers Drive Tie Plant, MS 38960	PO Box 160 Tie Plant, MS 38960

Telecommunications

Type	Address or Phone
Work phone number	(662) 226-4584, Ext. 11

Alternate / Historic AI Identifiers

Alt ID	Alt Name	Alt Type	Start Date	End Date
04300012	Koppers Industries, Inc.	Air-AIRS AFS	10/12/2000	
096000012	Koppers Industries, Inc.	Air-Title V Operating	03/11/1997	03/01/2002
096000012	Koppers Industries, Inc.	Air-Title V Operating	01/13/2004	01/01/2009
MSR220005	Koppers Industries, Inc.	GP-Wood Treating	09/25/1992	
MSD007027543	Koppers Industries, Inc.	Hazardous Waste-EPA ID	10/12/2000	
HW8854301	Koppers Industries, Inc.	Hazardous Waste-TSD	06/28/1988	06/28/1998
HW8854301	Koppers Industries, Inc.	Hazardous Waste-TSD	11/10/1999	09/30/2009
876	Koppers Industries, Inc.	Official Site Name	11/09/1981	
MSP090300	Koppers Industries, Inc.	Water-Pretreatment	11/14/1995	11/13/2000

MSP090300	Koppers Industries, Inc.	Water-Pretreatment	09/18/2001	08/31/2006
MSU081080	Koppers Industries, Inc.	Water-SOP	11/09/1981	11/30/1985

Regulatory Programs

Program	SubProgram
Air	Title V - major
Hazardous Waste	TSD - Not Classified
Water	Baseline Stormwater
Water	PT CIU
Water	PT CIU - Timber Products Processing (Subpart 429)
Water	PT SIU

Show/Hide NonPrint Sections
Date/Time: 4/22/2004 12:15:04 PM

MDEQ | EPD | ECED | DID | enSearch | enSearch Online | CTS

Koppers Industries Inc

Name:	Koppers Industries Inc
Site Location:	Tie Plant Road
	Tie Plant, MS 38960-
Contact Name:	Thomas Henderson
Contact Title:	Plant Manager
Phone:	(601) 226-4584
ECED Contact:	Russ Twitty
SIC1:	2491
SIC2:	
SIC3:	
	Timber and Wood Products, Misc Ind
AFS ID:	04300012
EPA ID:	MSD007027543
Out of Business:	☐
Air Facility Type:	Title V
HW Facility Type:	TSD
Water Facility Type:	Industrial

Permit Type	SubType	Permit Number	Permit Contact
AIR	Title V	096000012	Burchfield, David
HW	TSD	HW8854301	
WATER	NPDES	MSP090300	Collins, Bryan

KOPPERS INDUSTRIES INC.

FORM 2-P WATER PRE-TREATMENT PERMIT RENEWAL APPLICATION

TIE PLANT, MISSISSIPPI
5-21-2001

AI 876

KOPPERS INDUSTRIES

Koppers Industries, Inc.
P.O. Box 160
Tie Plant, MS 38960

Telephone: (601) 226-4584
FAX: (601) 226-4588

May 21, 2001

Ms. Mary E. Coleman
Environmental Permits Division
Mississippi Department of Environmental Quality
Office of Pollution Control
Post Office Box 10385
Jackson, MS 39289-0385

RECEIVED
MAY 24 2001
Dept. of Environmental Quality
Office of Pollution Control

RE: Response to May 4, 2001 Letter
Koppers Industries, Inc.
Grenada County, Mississippi
WATER PRE-TREATMENT
Ref. No. MSP090300

Dear Ms. Coleman,

This is in response to your letter dated May 4, 2001 and our phone conversation on May 15, 2001 requesting information pursuant to deficiencies you noted on our application for renewal of our water pre-treatment permit dated February 9, 2001.

Enclosed you will find information provided in response to items 1 through 4 of your letter and a complete re-signed copy of our application (complying with 40 CFR Part 403.12 (1)), including lab results, process flow diagrams, supporting information, and dioxin test results.

We believe this information addresses the deficiencies outlined in items 1through 4 of your May 4, 2001 letter. Please call me if you have any questions or would like to discuss this matter further. I can be contacted at 662-226-4584, Extension 40.

Yours truly,

Blair Simpson
Environmental Supervisor

Enclosures
CC. T. Basilone, Koppers Pittsburgh

STATE OF MISSISSIPPI
DAVID RONALD MUSGROVE, GOVERNOR
MISSISSIPPI DEPARTMENT OF ENVIRONMENTAL QUALITY
CHARLES H. CHISOLM, EXECUTIVE DIRECTOR

MAY 24 2001

May 4, 2001

Mr. Blair Simpson
Koppers Industries, Inc.
PO Box 160
Tie Plant, Mississippi 38960

Dear Mr. Henderson:

Re: Koppers Industries, Inc.
Grenada County
Water Ref. No. MSP090300

Based upon review of the above referenced amended application received from Koppers Industries Inc. on February 9, 2001 the following deficiencies were noted:

1. On Page 3 of 31, Item 13, please list all facility discharges.

2. Additional testing is needed because your industry falls under the Timber Products Processing Point Source Category. You are responsible for the testing indicated on page 31 of the 2P application. Per our conversation on April 4, 2001, this testing includes the following GC/MS Fractions: Volatiles, Acids, Base/Neutrals, and Pesticides. Please revise all applicable application pages to reflect required testing. Please note that the "Testing Required" column must be marked for these type pollutants in addition to marking either "Believed Present" or "Believed Absent". Also, submit a copy of analysis results used for this application including test method and detection limits (i.e., laboratory bench sheets).

3. Please submit a revised process flow diagram and a water balance. The POTW discharge system information showed a combined effluent stream value instead of individual values. Individual values are needed for the process water effluent stream, the boiler blow down effluent stream, and the drip pad rain/process water effluent stream. An example line drawing is enclosed. Please refer to it for guidance. As previously stated, the line drawing and water balance must support your discharge request.

4. Please note that the laboratory bench sheets may be faxed to expedite time; however, an amended application with supplemental information must be formally submitted with a signature of an individual meeting signatory requirements of 40 CFR Part 403.12(l).

A copy of your application is enclosed. For your convenience, please note that this working copy contains highlighted sections requiring your attention. Please use this copy as guidance in preparing

876 PER20000004

your newly amended application.

Please address the above deficiencies on or before May 18, 2001. Upon receipt of this information, the Environmental Permits Division will continue the permitting process for your facility.

If you have any questions regarding the application or the permitting process, please contact me at (601) 961-5561.

Sincerely,

Mary E. Coleman

Mary E. Coleman
Environmental Permits Division

Enclosures

cc: Mr. Thomas Henderson, Plant Manager w/o Enclosures

MAY 2 4 2001

FORM 2-P

For Agency Use
Application Number

Date Received

AI 870

STATE OF MISSISSIPPI
OFFICE OF POLLUTION CONTROL
P. O. BOX 10385
JACKSON, MISSISSIPPI 39289-0385

APPLICATION FOR A STATE OPERATING PRETREATMENT PERMIT

(Please print or type)

1. Name of Applicant:	Koppers Industries, Inc.				
2. Mailing Address of Applicant:					
Number & Street (P. O. Box):	160				
City:	Tie Plant	State:	MS	Zip:	38960
Telephone Number:	(662) 226-4584				
3. Applicant's Authorized Agent:					
Name and Title:	Thomas L. Henderson – Plant Manager				
Number & Street (P. O. Box):	160				
City:	Tie Plant	State:	MS	Zip:	38960
Telephone Number:	(662) 226-4584				
4. Facilities Location:					
Number & Street (P. O. Box):	543 Tie Plant Road				
City:	Tie Plant	County:	Grenada		
Latitude (Deg., Min., Sec.):	North 33° – 44.123'				
Longitude (Deg., Min., Sec.):	West 89° – 47.025'				

5. Nature of Business:		Wood Preservation					
6. Location Map: (Provide as an attachment to this application)							
7. SIC CODES (4-digit, in order of priority)							
A. FIRST				B. SECOND			
	2491				—		
C. THIRD				D. FOURTH			
	—				—		
8. Name of POTW Receiving Wastewater:				City of Grenada			
Number & Street (P. O. Box):				310			
City:	Grenada			County:	Grenada		
9. Discharge Type and Occurrence:							
A. Type of Discharge:		X		Continuous; If Continuous			
35,000	Gallons Per Day,			Batch			
B. Discharge Occurrence:		7		Days per Week			
C. Discharge Occurrence:							
X	January	X	February	X	March	X	April
X	May	X	June	X	July	X	August
X	September	X	October	X	November	X	December
10. If Batch: A.	N/A	Thousand Gallons per Discharge					
B.	N/A	Hours per Day					
C.	N/A	Discharge Occurrence per Day					
11. Maximum Period of Flow: From	November	to	June				
	Month		Month				

12. Facility Water Use:	
Estimate average volume in thousand gallons per day for the following types of water usage at this facility.	
Noncontact Cooling:	365,000
Boiler Feed:	5000
Process (Including Contact Cooling):	-0-
Sanitary:	400 - 500
Other:	
Total:	370,500
13. List all Facility Discharges:	Outfall # 001

Other water losses (surface water, product consumption, evaporation). Indicate volume in thousand gallons.

Process, Sanitary, boiler blowdown, contaminated stormwater to POTW. Stormwater runoff to surface discharge. Cooling Water evaporation, septic tank.

14. Give narrative description of process(es) producing discharge, or in case of no discharge, that generates wastewater.

Our wood preserving operation uses creosotes and pentachlorophenol in oil. The pressure treatment system causes water losses from raw materials (wood) creating process waste water. Stormwater collected on process areas becomes waste water, additionally, sanitary wastewater from offices and service buildings are discharged to septic tanks. Also boiler blowdown produces waste water.

15. List raw materials used:

Southern Pine and mixed hardwoods.

16. PRODUCTION

A. Does an effluent guideline limitation promulgated by EPA under Section 304 of the Clean Water Act apply to your Facility?

☐ Yes (complete Item 16-B) ☒ No (Go to 17)

B. Are the limitations in the applicable effluent guidelines expressed in terms of production (or other measure of operation)?

☐ Yes (complete Item 16-C) ☐ No (Go to 17)

C. If you answered "yes" to Item 16-B, list the quantity which represents an actual measurement of your level of production, expressed in the terms and units used in the applicable effluent guideline, and indicate the affected outfalls.

1. AVERAGE DAILY PRODUCTION			2. AFFECTED OUTFALLS (list outfall numbers)
a. QUANTITY PER DAY	B. UNITS OF MEASURE	C. OPERATION, PRODUCT, MATERIAL, ETC. (specify)	

17 Effluent Characteristics:

A. You must provide the results of at least one analysis for every pollutant in this table. Complete one table for each outfall to the city sewer. If your facility does not have a discharge indicate so and disregard.

1. POLLUTANT	2. EFFLUENT							3. UNITS (specify if blank)		4. INTAKE (optional)		
	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE (if available)		c. LONG TERM AVRG. VALUE (if available)		d. NO. OF ANALYSES			a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS		a. CONCENTRATION	b. MASS	(1) CONCENTRATION	(2) MASS	
a. Biochemical Oxygen Demand (BOD)	20 mg/L		240 mg/L		30 mg/L		1	NA	NA	NA	NA	NA
b. Chemical Oxygen Demand (COD)	75 mg/L		100 mg/L		75 mg/L		1	NA	NA	NA	NA	NA
c. Total Suspended Solids (TSS)	100 mg/L		250 mg/L		100 mg/L		1	NA	NA	NA	NA	NA
d. Ammonia (as N)	0.0 mg/L		0.0 mg/L		0.0 mg/L		1	NA	NA	NA	NA	NA
e. Flow	VALUE 35,000 gpd		VALUE		VALUE					VALUE		
f. Temperature (winter)	VALUE 10°		VALUE		VALUE			°C		VALUE		
g. Temperature (summer)	VALUE 98°		VALUE		VALUE			°C		VALUE		
h. pH	MIN 8.2	MAX 9.5	MIN 5.5	MAX 9.5				STANDARD UNITS				

PLEASE PRINT OR TYPE IN THE UNSHADED AREAS ONLY. You may report some or all of this information on separate sheets (*Use the same format*) instead of completing these pages.

B. INTAKE AND EFFLUENT CHARACTERISTICS

OUTFALL NO. 001

Mark "X" in column 2-a for each pollutant you know or have reason to believe is present. Mark "X" in column 2-b for each pollutant you believe to be absent. If you mark column 2a for any pollutant which is limited either directly, or indirectly but expressly, in an effluent limitations guideline, you must provide the results of at least one analysis for that pollutant. For other pollutants for which you mark column 2a, you must provide quantitive data or an explanation of their presence in your discharge. Complete one table for each outfall.

1. POLLUTANT AND CAS NO. (if available)	2. MARK "X"		3. EFFLUENT							4. UNITS		5. INTAKE (optional)		
	A. BELIEVED PRESENT	B. BELIEVED ABSENT	A. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE (if available)		c. LONG TERM AVERAGE VALUE (if available)		d. NO. OF ANALYSIS	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
			(1) CONC.	(2) MASS	(1) CONC.	(2) MASS	(1) CONC.	(2) MASS				(1) CONC.	(2) MASS	
a. Bromide (24959-67-9)		X							NA					
b. Chlorine, Total Residual		X							NA					
d. Fluoride (16984-48-8)		X							NA					
d. Nitrate-Nitrite (as N)		X							NA					

1. POLLUTANT AND CAS NO. (if available)	2. MARK "X"		3. EFFLUENT							4. UNITS		5. INTAKE (optional)		
	A. BELIEVED PRESENT	B. BELIEVED ABSENT	A. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE (if available)		c. LONG TERM AVERAGE VALUE (if available)		d. NO. OF ANALYSIS	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
			(1) CONC.	(2) MASS	(1) CONC.	(2) MASS	(1) CONC.	(2) MASS				(1) CONC.	(2) MASS	
e. Nitrogen, Total Organic (as N)		X							NA					
f. Oil and Grease	X		5 mg/L		100 mg/L		5 mg/L		1					
g. Phosphorus (as P), Total (7723-14-0)		X							NA					
h. Radioactivity														
1. Alpha, Total		X							NA					
2. Beta, Total		X							NA					
3. Radium Total		X							NA					
4. Radium 226, Total		X							NA					
i. Sulfate (as SO_4) (14808-79-8)		X							NA					

1. POLLUTANT AND CAS NO. (if available)	2. MARK "X"		3. EFFLUENT							4. UNITS		5. INTAKE (optional)		
	A. BELIEVED PRESENT	B. BELIEVED ABSENT	A. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE (if available)		c. LONG TERM AVERAGE VALUE (if available)		d. NO. OF ANALYSIS	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
			(1) CONC.	(2) MASS	(1) CONC.	(2) MASS	(1) CONC.	(2) MASS				(1) CONC.	(2) MASS	
j. Sulfide (as S)		X							NA					
k. Sulfite (as SO_3) (14265-45-3)		X							NA					
l. Surfactants		X							NA					
m. Aluminum Total (7429-90-5)		X							NA					
n. Barium Total (7440-39-3)		X							NA					
o. Boron, Total (7440-42-8)		X							NA					
p. Cobalt Total (7440-48-4)		X							NA					
q. Iron Total (7439-89-6)		X							NA					

1. POLLUTANT AND CAS NO. (if available)	2. MARK "X"		3. EFFLUENT							4. UNITS		5. INTAKE (optional)		
	A. BELIEVED PRESENT	B. BELIEVED ABSENT	A. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE (if available)		c. LONG TERM AVERAGE VALUE (if available)		d. NO. OF ANALYSIS	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
			(1) CONC.	(2) MASS	(1) CONC.	(2) MASS	(1) CONC.	(2) MASS				(1) CONC.	(2) MASS	
r. Magnesium Total (7439-95-4)		X								NA				
s. Molybdenum Total (7439-98-7)		X								NA				
t. Manganese Total (7439-96-5)		X								NA				
u. Tin, Total (4770-31-5)		X								NA				
v. Titanium Total (7440-32-6)		X								NA				

PART C - If you are a primary industry and this outfall contains process wastewater, refer to Table I (see attachment) to determine which of the GC/MS fractions you must test for. Mark "X" in column 2-a for all such GC/MS fractions that apply to your industry and for ALL toxic metals, cyanides, and total phenols. If you are not required to mark column 2-a (*secondary industries, nonprocess wastewater outfalls, and nonrequired GC/MS fractions*), mark "X" in column 2-b for each pollutant you know or have reason to believe is present. Mark "X" in column 2-c for each pollutant you believe is absent. If you mark column 2a for any pollutant, you must provide the results of at least one analysis for that pollutant. If you mark column 2b for any pollutant, you must provide the results of at least one analysis for that pollutant if you know or have reason to believe it will be discharged in concentrations of 10 ppb or greater. If you mark column 2b for acrolein, acrylonitrile, 2, 4 dinitrophenol, or 2-methyl-4, 6 dinitrophenol, you must provide the results of at least one analysis for each of these pollutants which you know or have reason to believe that you discharge in concentrations of 100 ppb or greater. Otherwise, for pollutants for which you mark column 2b, you must either submit at least one analysis or briefly describe the reasons the pollutant is expected to be discharged. Note that there are 30 pages to this part; please review each carefully. Complete one table (all 20 pages) for each outfall.

1. POLLUTANT AND CAS NO. (if available)	2. MARK "X"			3. EFFLUENT							4. UNITS		5. INTAKE (optional)		
	A. TESTING REQUIRED	B. BELIEVED PRESENT	C. BELIEVED ABSENT	A. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE (if available)		c. LONG TERM AVERAGE VALUE (if available)		d. NO. OF ANALYSIS	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
				(1) CONC.	(2) MASS	(1) CONC.	(2) MASS	(1) CONC.	(2) MASS				(1) CONC.	(2) MASS	
METALS, CYANIDE, AND TOTAL PHENOLS															
1M. Antimony, Total (7440-36-0)	X		X							1	ND = Not Detected				
2M. Arsenic, Total (7440-38-2)	X		X							1	ND				
3M. Beryllium Total 7440-41-7	X		X							1	ND				

1. POLLUTANT AND CAS NO. (if available)	2. MARK "X"			3. EFFLUENT							4. UNITS		5. INTAKE (optional)		
	A. TESTING REQUIRED	B. BELIEVED PRESENT	C. BELIEVED ABSENT	A. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE (if available)		c. LONG TERM AVERAGE VALUE (if available)		d. NO. OF ANALYSIS	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
				(1) CONC.	(2) MASS	(1) CONC.	(2) MASS	(1) CONC.	(2) MASS				(1) CONC.	(2) MASS	
4M. Cadmium, Total (7440-43-9)	X		X							1	ND				
5M. Chromium, Total (7440-47-3)	X		X							1	ND				
6M. Copper, Total (7440-50-8)	X		X							1	ND				
7M. Lead, Total (7439-92-1)	X		X							1	ND				
8M. Mercury, Total (7439-97-6)	X		X							1	ND				
9M. Nickel, Total (7440-02-0)	X		X							1	0.04				
10M. Selenium, Total (7782-49-2)	X		X							1	ND				

1. POLLUTANT AND CAS NO. (if available)	2. MARK "X"			3. EFFLUENT							4. UNITS		5. INTAKE (optional)		
	A. TESTING REQUIRED	B. BELIEVED PRESENT	C. BELIEVED ABSENT	A. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE (if available)		c. LONG TERM AVERAGE VALUE (if available)		d. NO. OF ANALYSIS	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
				(1) CONC.	(2) MASS	(1) CONC.	(2) MASS	(1) CONC.	(2) MASS				(1) CONC.	(2) MASS	
11M. Silver, Total (7440-22-4)	X		X							1	ND				
12M. Thallium, Total (7440-28-0)	X	X								1	ND				
13M. Zinc Total (7440-66-6)	X		X							1	1.36				
14M. Cyanide, Total (57-12-5)	X		X							1	ND				
15M. Phenols, Total	X	X								1	ND				
DIOXIN															
2,3,7,8-Tetrachlorodibenzo-P-Dioxin (1764-01-6)	X		X	DESCRIBE RESULTS No 2,3,7,8-TCDD was detected in the method blank above the target detection limit (TDL). See pages 2 + 32 of the Dioxin Test Results package.											

1. POLLUTANT AND CAS NO. (if available)	2. MARK "X"			3. EFFLUENT							4. UNITS		5. INTAKE (optional)		
	A. TESTING REQUIRED	B. BELIEVED PRESENT	C. BELIEVED ABSENT	A. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE (if available)		c. LONG TERM AVERAGE VALUE (if available)		d. NO. OF ANALYSIS	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
				(1) CONC.	(2) MASS	(1) CONC.	(2) MASS	(1) CONC.	(2) MASS				(1) CONC.	(2) MASS	
GC/MS FRACTION - VOLATILE COMPOUNDS															
1V. Acrolein (107-02-8)	X		X							1	ND				
2V. Acrylonitrile (107-13-1)	X		X							1	ND				
3V. Benzene (71-43-2)	X	X								1	ND				
4V. Bis (Chloromethyl) Ether (542-88-1)	X		X							1	ND				
5V. Bromoform (75-25-2)	X		X							1	ND				
6V. Carbon Tetrachloride (56-23-5)	X		X							1	ND				
7V. Chlorobenzene (108-90-7)	X		X							1	ND				

1. POLLUTANT AND CAS NO. (if available)	2. MARK "X"			3. EFFLUENT							4. UNITS		5. INTAKE (optional)		
	A. TESTING REQUIRED	B. BELIEVED PRESENT	C. BELIEVED ABSENT	A. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE (if available)		c. LONG TERM AVERAGE VALUE (if available)		d. NO. OF ANALYSIS	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
				(1) CONC.	(2) MASS	(1) CONC.	(2) MASS	(1) CONC.	(2) MASS				(1) CONC.	(2) MASS	
8V. Chlorodibromomethane (124-48-1)	X		X							1	ND				
9V. Chloroethane (75-00-3)	X		X							1	ND				
10V. 2-Chloroethylvinyl Ether (110-75-8)	X		X							1	ND				
11V. Chloroform (67-66-3)	X		X							1	ND				
12V. Dichlorobromomethane (75-27-4)	X		X							1	ND				
13V. Dichlorodifluoromethane (75-71-8)	X		X							1	ND				
14V. 1,1-Dichloroethane (75-34-3)	X		X							1	ND				

1. POLLUTANT AND CAS NO. (if available)	2. MARK "X"			3. EFFLUENT							4. UNITS		5. INTAKE (optional)		
	A. TESTING REQUIRED	B. BELIEVED PRESENT	C. BELIEVED ABSENT	A. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE (if available)		c. LONG TERM AVERAGE VALUE (if available)		d. NO. OF ANALYSIS	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
				(1) CONC.	(2) MASS	(1) CONC.	(2) MASS	(1) CONC.	(2) MASS				(1) CONC.	(2) MASS	
15V. 1,2-Dichloroethane (107-06-2)	X		X							1	ND				
16V. 1,1-Dichloroethylene (75-35-4)	X		X							1	ND				
17V. 1,2-Dichloropropane (78-87-5)	X		X							1	ND				
18V. 1,3-Dichloropropylene (542-75-6)	X		X							1	ND				
19V. Ethylbenzene (100-41-4)	X		X							1	ND				
20V. Methyl Bromide (74-83-9)	X		X							1	ND				
21V. Methyl Chloride (74-87-3)	X		X							1	ND				

1. POLLUTANT AND CAS NO. (if available)	2. MARK "X"			3. EFFLUENT							4. UNITS		5. INTAKE (optional)		
	A. TESTING REQUIRED	B. BELIEVED PRESENT	C. BELIEVED ABSENT	A. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE (if available)		c. LONG TERM AVERAGE VALUE (if available)		d. NO. OF ANALYSIS	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
				(1) CONC.	(2) MASS	(1) CONC.	(2) MASS	(1) CONC.	(2) MASS				(1) CONC.	(2) MASS	
GC/MS FRACTION - VOLATILE COMPOUNDS (continued)															
22V. Methylene Chloride (75-09-2)	X		X							1	ND				
23V. 1,1,2,2-Tetrachloroethane (79-34-5)	X		X							1	ND				
24V. Tetrachloroethylene (127-18-4)	X		X							1	ND				
25V. Toluene (108-88-3)	X		X							1	ND				
26V. 1,2-Trans-Dichloroethylene (156-60-5)	X		X							1	ND				

1. POLLUTANT AND CAS NO. (if available)	2. MARK "X"			3. EFFLUENT							4. UNITS		5. INTAKE (optional)		
	A. TESTING REQUIRED	B. BELIEVED PRESENT	C. BELIEVED ABSENT	A. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE (if available)		c. LONG TERM AVERAGE VALUE (if available)		d. NO. OF ANALYSIS	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
				(1) CONC.	(2) MASS	(1) CONC.	(2) MASS	(1) CONC.	(2) MASS				(1) CONC.	(2) MASS	
27V. 1,1,1-Trichloroethane (71-55-6)	X		X							1	ND				
28V. 1,1,2-Trichloroethane (79-00-5)	X		X							1	ND				
29V. Trichloroethylene (79-01-6)	X		X							1	ND				
30V. Trichlorofluoromethane (75-69-4)	X		X							1	ND				
31V. Vinyl Chloride (75-01-4)	X		X							1	ND				
GC/MS FRACTION - ACID COMPOUNDS															
1A. 2-Chlorophenol (95-57-8)	X		X							1	ND				
2A. 2,4-Dichlorophenol (120-83-2)	X		X							1	ND				

1. POLLUTANT AND CAS NO. (if available)	2. MARK "X"			3. EFFLUENT							4. UNITS		5. INTAKE (optional)		
	A. TESTING REQUIRED	B. BELIEVED PRESENT	C. BELIEVED ABSENT	A. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE (if available)		c. LONG TERM AVERAGE VALUE (if available)		d. NO. OF ANALYSIS	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
				(1) CONC.	(2) MASS	(1) CONC.	(2) MASS	(1) CONC.	(2) MASS				(1) CONC.	(2) MASS	
3A. 2,4-Dimethylphenol (105-67-9)	X		X							1	ND				
4A. 4,6-Dinitro-O-Cresol (534-52-1)	X		X							1	ND				
5A. 2,4-Dinitrophenol (51-28-5)	X		X							1	ND				
6A. 2-Nitrophenol (88-75-5)	X		X							1	ND				
7A. 4-Nitrophenol (100-02-7)	X		X							1	ND				
8A. P-Chloro-M-Cresol (59-50-7)	X		X							1	ND				
9A. Pentachlorophenol (87-86-5)	X	X								1	ND				

1. POLLUTANT AND CAS NO. (if available)	2. MARK "X"			3. EFFLUENT							4. UNITS		5. INTAKE (optional)		
	A. TESTING REQUIRED	B. BELIEVED PRESENT	C. BELIEVED ABSENT	A. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE (if available)		c. LONG TERM AVERAGE VALUE (if available)		d. NO. OF ANALYSIS	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
				(1) CONC.	(2) MASS	(1) CONC.	(2) MASS	(1) CONC.	(2) MASS				(1) CONC.	(2) MASS	
10A. Phenol (108-95-2)	X	X								1	ND				
11A. 2,4,6-Trichloro phenol (88-06-2)	X		X							1	ND				
GC/MS FRACTION - BASE/NEUTRAL COMPOUNDS															
1B. Acenaphthene (83-32-9)	X	X								1	ND				
2B. Acenaphtylene (208-96-8)	X		X							1	ND				
3B. Anthracene (120-12-7)	X		X							1	ND				
4B. Benzidine (92-87-5)	X		X							1	ND				
5B. Benzo (a) Anthracene (56-55-3)	X		X							1	ND				

1. POLLUTANT AND CAS NO. (if available)	2. MARK "X"			3. EFFLUENT							4. UNITS		5. INTAKE (optional)		
	A. TESTING REQUIRED	B. BELIEVED PRESENT	C. BELIEVED ABSENT	A. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE (if available)		c. LONG TERM AVERAGE VALUE (if available)		d. NO. OF ANALYSIS	a. CONCENTRATION	b. MASS	A. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
				(1) CONC.	(2) MASS	(1) CONC.	(2) MASS	(1) CONC.	(2) MASS				(1) CONC.	(2) MASS	
6B. Benzo (a) Pyrene (50-32-8)	X		X							1	ND				
7B. 3,4-Benzofluoranthene (205-99-2)	X		X							1	ND				
8B. Benzo (ghi) Perylene (191-24-2)	X		X							1	ND				
9B. Benzo (k) Fluoranthene (207-08-9)	X		X							1	ND				
10B. Bis (2-Chloroethoxy) Methane (111-91-1)	X		X							1	ND				
11B. Bis (2-Chloroethyl) Ether (111-44-4)	X		X							1	ND				

1. POLLUTANT AND CAS NO. (if available)	2. MARK "X"			3. EFFLUENT							4. UNITS		5. INTAKE (optional)		
	A. TESTING REQUIRED	B. BELIEVED PRESENT	C. BELIEVED ABSENT	A. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE (if available)		c. LONG TERM AVERAGE VALUE (if available)		d. NO. OF ANALYSIS	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
				(1) CONC.	(2) MASS	(1) CONC.	(2) MASS	(1) CONC.	(2) MASS				(1) CONC.	(2) MASS	
12B. Bis(2-Chloroisopropyl) Ether (102-60-1)	X		X							1	ND				
13B. Bis(2-Ethylhexyl) Phthalate (117-81-7)	X		X							1	ND				
14B. 4-Bromophenyl Phenyl Ether (101-55-3)	X		X							1	ND				
15B. Butyl Benzyl Phthalate (85-68-7)	X		X							1	ND				
16B. 2-Chloronaphthalene (91-58-7)	X		X							1	ND				
17B. 4-Chlorophenyl Phenyl Ether (7005-72-3)	X		X							1	ND				

1. POLLUTANT AND CAS NO. (if available)	2. MARK "X"			3. EFFLUENT							4. UNITS		5. INTAKE (optional)		
	A. TESTING REQUIRED	B. BELIEVED PRESENT	C. BELIEVED ABSENT	A. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE (if available)		c. LONG TERM AVERAGE VALUE (if available)		d. NO. OF ANALYSIS	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
				(1) CONC.	(2) MASS	(1) CONC.	(2) MASS	(1) CONC.	(2) MASS				(1) CONC.	(2) MASS	
18B. Chrysene (218-01-9)	X		X							1	ND				
19B. Dibenzo (a,h) Anthracene (53-70-3)	X		X							1	ND				
20B. 1,2-Dichlorobenzene (95-50-1)	X		X							1	ND				
21B. 1,3-Dichlorobenzene (541-73-1)	X		X							1	ND				
GC/MS FRACTION - BASE/NEUTRAL COMPOUNDS (continued)															
22B. 1,4-Dichlorobenzene (106-46-7)	X		X							1	ND				
23B. 3,3'-Dichlorobenzidine (91-94-1)	X		X							1	ND				

1. POLLUTANT AND CAS NO. (if available)	2. MARK "X"			3. EFFLUENT							4. UNITS		5. INTAKE (optional)		
	A. TESTING REQUIRED	B. BELIEVED PRESENT	C. BELIEVED ABSENT	A. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE (if available)		c. LONG TERM AVERAGE VALUE (if available)		d. NO. OF ANALYSIS	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
				(1) CONC.	(2) MASS	(1) CONC.	(2) MASS	(1) CONC.	(2) MASS				(1) CONC.	(2) MASS	
24B. Diethyl Phthalate (84-66-2)	X		X							1	ND				
25B. Dimethyl Phthalate (131-11-3)	X		X							1	ND				
26B. Di-N-Butyl Phthalate (84-74-2)	X		X							1	ND				
27B. 2,4-Dinitrotoluene (121-14-2)	X		X							1	ND				
28B. 2,6-Dinitrotoluene (606-20-2)	X		X							1	ND				
29B. Di-N-Octyl Phthalate (117-84-0)	X		X							1	ND				
30B. 1,2-Diphenylhydrazine (as Azobenzene) (122-66-7)	X		X							1	ND				

1. POLLUTANT AND CAS NO. (if available)	2. MARK "X"			3. EFFLUENT							4. UNITS		5. INTAKE (optional)		
	A. TESTING REQUIRED	B. BELIEVED PRESENT	C. BELIEVED ABSENT	A. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE (if available)		c. LONG TERM AVERAGE VALUE (if available)		d. NO. OF ANALYSIS	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
				(1) CONC.	(2) MASS	(1) CONC.	(2) MASS	(1) CONC.	(2) MASS				(1) CONC.	(2) MASS	
31B. Fluoranthene (206-44-0)	X		X							1	ND				
32B. Fluorene (86-73-7)	X		X							1	ND				
33B. Hexachlorobenzene (118-74-1)	X		X							1	ND				
34B. Hexachlorobutadiene (87-68-3)	X		X							1	ND				
35B. Hexachlorocyclopentadiene (77-47-4)	X		X							1	ND				
36B. Hexachloroethane (67-72-1)	X		X							1	ND				
37B. Indeno (1,2,3-cd) Pyrene (193-39-5)	X		X							1	ND				

1. POLLUTANT AND CAS NO. (if available)	2. MARK "X"			3. EFFLUENT							4. UNITS		5. INTAKE (optional)		
	A. TESTING REQUIRED	B. BELIEVED PRESENT	C. BELIEVED ABSENT	A. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE (if available)		c. LONG TERM AVERAGE VALUE (if available)		d. NO. OF ANALYSIS	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
				(1) CONC.	(2) MASS	(1) CONC.	(2) MASS	(1) CONC.	(2) MASS				(1) CONC.	(2) MASS	
38B. Isophorone (78-59-1)	X		X							1	ND				
39B. Naphthalene (91-20-3)	X	X								1	ND				
40B. Nitrobenzene (98-95-3)	X		X							1	ND				
41B. N-Nitrosodimethylamine (62-75-9)	X		X							1	ND				
42B. N-Nitrosodi N-Propylamine (621-64-7)	X		X							1	ND				
GC/MS FRACTION - BASE/NEUTRAL COMPOUNDS (continued)															
43B. N-Nitrosodiphenylamine (86-30-6)	X		X							1	ND				
44B. Phenanthrene (85-01-8)	X		X							1	ND				

1. POLLUTANT AND CAS NO. (if available)	2. MARK "X"			3. EFFLUENT							4. UNITS		5. INTAKE (optional)		
	A. TESTING REQUIRED	B. BELIEVED PRESENT	C. BELIEVED ABSENT	A. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE (if available)		c. LONG TERM AVERAGE VALUE (if available)		d. NO. OF ANALYSIS	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
				(1) CONC.	(2) MASS	(1) CONC.	(2) MASS	(1) CONC.	(2) MASS				(1) CONC.	(2) MASS	
45B. Pyrene (129-00-0)	X		X							1	ND				
46B. 1,2,4-Trichlorobenzene (120-82-1)	X		X							1	ND				
GC/MS FRACTION - PESTICIDES															
1P. Aldrin (309-00-2)	X		X							1	ND				
2P. α-BHC (319-84-6)	X		X							1	ND				
3P. β-BHC (319-85-7)	X		X							1	ND				
4P. γ-BHC (58-89-9)	X		X							1	ND				
5P. δ-BHC (319-86-8)	X		X							1	ND				
6P. Chlordane (57-74-9)	X		X							1	ND				
7P. 4,4'-DDT (50-29-3)	X		X							1	ND				

1. POLLUTANT AND CAS NO. (if available)	2. MARK "X"			3. EFFLUENT							4. UNITS		5. INTAKE (optional)		
	A. TESTING REQUIRED	B. BELIEVED PRESENT	C. BELIEVED ABSENT	A. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE (if available)		c. LONG TERM AVERAGE VALUE (if available)		d. NO. OF ANALYSIS	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
				(1) CONC.	(2) MASS	(1) CONC.	(2) MASS	(1) CONC.	(2) MASS				(1) CONC.	(2) MASS	
8P. 4,4'-DDE (72-55-9)	X		X							1	ND				
9P. 4,4'-DDD (72-54-8)	X		X							1	ND				
10P. Dieldrin (60-57-1)	X		X							1	ND				
11P. α-Endosulfan (115-29-7)	X		X							1	ND				
12P. β-Endosulfan (115-29-7)	X		X							1	ND				
13P Endosulfan Sulfate (1031-07-8)	X		X							1	ND				
14P. Endrin (72-20-8)	X		X							1	ND				
15P. Endrin Aldehyde (7421-93-4)	X		X							1	ND				

1. POLLUTANT AND CAS NO. (if available)	2. MARK "X"			3. EFFLUENT							4. UNITS		5. INTAKE (optional)		
	A. TESTING REQUIRED	B. BELIEVED PRESENT	C. BELIEVED ABSENT	A. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE (if available)		c. LONG TERM AVERAGE VALUE (if available)		d. NO. OF ANALYSIS	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
				(1) CONC.	(2) MASS	(1) CONC.	(2) MASS	(1) CONC.	(2) MASS				(1) CONC.	(2) MASS	
GC/MS FRACTION - PESTICIDES (continued)															
16P. Heptachlor (76-44-8)	X		X							1	ND				
17P. Heptachlor Epoxide (1024-57-3)	X		X							1	ND				
18P. PCB-1242 (53469-21-9)	X		X							1	ND				
19P. PCB-1254 (11097-69-1)	X		X							1	ND				
20P. PCB-1221 (11104-28-2)	X		X							1	ND				
21P. PCB-1232 (11141-16-5)	X		X							1	ND				

1. POLLUTANT AND CAS NO. (if available)	2. MARK "X"			3. EFFLUENT							4. UNITS		5. INTAKE (optional)		
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE (if available)		c. LONG TERM AVERAGE VALUE (if available)		d. NO. OF ANALYSIS	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
				(1) CONC	(2) MASS	(1) CONC	(2) MASS	(1) CONC	(2) MASS				(1) CONC	(2) MASS	
GC/MS FRACTION PESTICIDES (continued)															
22P. PCB-1248 (12672-29-6)	X		X							1	ND				
23P. PCB-1260 (11096-82-5)	X		X							1	ND				
24P. PCB-1016 (12674-11-2)	X		X							1	ND				
25P. Toxaphene (8001-35-2)	X		X							1	ND				

18. Treatment Units:

A. Do you provide treatment for your wastewater?	X	Yes		No

B. If yes, list and describe each treatment unit and attach a line schematic of the treatment system indicating each treatment unit and a water balance.

Oil and water seperation including floculation and gravity seperation followed by activated sludge biological treatment. Discharged to P.O.T.W.

Schematic Attached.

19. CONTRACT ANALYSIS INFORMATION

Were any of the analyses reported in Item 17 performed by a contract laboratory or consulting firm?

☒ YES (*list the name, address, and telephone number of, and pollutants analyzed by, each such laboratory or firm below*)

☐ NO (*go to Item 20*)

A. NAME	B. ADDRESS	C. TELEPHONE (area code & no.)	D. POLLUTANTS ANALYZED (list)
Argus Analytical, Inc.	235 HighPoint Drive Ridgeland, MS 39157	601-957-2676	All of Form 2-P Pretreatment Requirements -See Attachments with Argus Analytical, Inc. letterhead.

20. I certify that I am familiar with the information contained in this application and that to the best of my knowledge and belief such information is true and correct.

Randall D. Collins	Vice President, Environmental Affairs
Printed Name of Applicant's Authorized Agent Title and/or Individual Meeting Signatory Requirements of 40 CFR 403.12(1)	Title
May 22, 2001	[signature]
Date Application Signed	Signature of Authorized Agent and/or Individual Meeting Signatory Requirements of 40 CFR 403.12(1)

TABLE 1
TESTING REQUIREMENTS FOR ORGANIC TOXIC POLLUTANTS INDUSTRY CATEGORY

INDUSTRY CATEGORY	GC/MS FRACTION Volatile	Acid	Base/Neutral	Pesticide
Adhesives and sealants	X	X	X	-
Aluminum forming	X	X	X	-
Auto and other laundries	X	X	X	X
Battery manufacturing	X	-	X	-
Coal mining	-	-	-	-
Coil coating	X	X	X	-
Copper forming	X	X	X	-
Electric and electronic compounds	X	X	X	X
Electroplating	X	X	X	-
Explosives manufacturing	-	X	X	-
Foundries	X	X	X	-
Gum and wood chemicals				
Tall oil rosin (subpart D)	X	X	X	-
Rosin based derivatives subpart F)	X	X	X	-
All other subparts	X	X	-	-
Inorganic chemicals manufacturing	X	X	X	-
Iron and steel manufacturing	X	X	X	-
Leather tanning and finishing	X	X	X	-
Mechanical products manufacturing	X	X	X	-
Nonferrous metals manufacturing	X	X	X	X
Ore mining (applies to the base and precious metals/subpart B)	-	X	-	-
Organic chemicals manufacturing	X	X	X	X
Paint and ink formulation	X	X	X	-
Pesticides	X	X	X	X
Petroleum refining	X	-	-	-
Pharmaceutical preparations	X	X	X	-
Photographic equipment and supplies	X	X	X	-
Plastic and synthetic materials mfg.	X	X	X	X
Plastic processing	X	-	-	-
Porcelain enameling	-	-	-	-
Printing and publishing	X	X	X	X
Pulp and paperboard mills				
Unbleached Kraft (subpart A)	2	X	2	X
Semi-chemical (subpart B)	2	X	2	2
subpart C)	2	X	2	2
Unbleached Kraft-neutral sulfite semi-chemical (cross recovery) (subpart D)	2	X	2	2
Paperboard from wastepaper (subpart E)	X	X	2	X
Dissolving Kraft (subpart F)	X	X	2	2
Market bleached Kraft (subpart G)	X	X	2	2
BCT bleached Kraft (subpart H)	X	X	2	2
Fine bleached Kraft (subpart I)	X	X	2	2
Papergrade sulfite (subpart J)	X	X	X	2
Dissolving sulfite pulp (subpart K)	X	X	2	2
Groundwood-chemical-mechanical (subpart L)	X	X	2	2
Groundwood-termo-mechnical (subpart M)	X	X	2	2
Groundwood-CMN papers (subpart N)	X	X	2	2
Groundwood-fine papers (subpart O)	X	X	2	2
Soda (subpart P)	X	X	2	2
Deink (subpart Q)	X	X	2	X
Nonintegrated-fine papers (subpart R)	2	X	2	2
Nonintegrated-tissue papers (subpart S)	X	X	2	X
Tissue from wastepaper (subpart T)	X	X	2	X
Papergrade sulfite (subpart U)	X	X	X	2
All other subparts (V through Z)	Determined case by case, unless superseded by regulation.			
Rubber processing	X	X	X	-
Soap and detergent manufacturing	X	X	X	-
Steam electric power plants	X	X	-	-
Textile mills	X	X	X	-
Timber products processing	X	X	X	X

2 - Do not test unless "reason to believe" it is discharged.

Historical Discharge Data
Grenada Plant
KOPPERS INDUSTRIES

6 Year Composite

Discharge	(Gal)	# of days	Average/day	Max/month	1. % of months exc-	2. % of months exc-	3. % of months exc-	Rainfall/month
Avg./mnth/ 6yrs.		Avg./mnth.	Avg./day/6yrs.	Max/6 yrs.	eeding 30000 gal	eeding 25000 gal	eeding 20000 gal	Avg./month/ 6yrs.
423780.08	gal	29.5	14446.8	38300	33.33	70.83	90.28	4.18

Discharge
Avg./yr./6yrs.
5085361

1. Twenty-four (24) months out of a total of seventy-two (72) months had a discharge at or over 30,000 gallons. This translates to Thirty-three (33) percent % of seventy-two (72) months having discharges at or above 30,000 gallons.

2. Fifty-one (51) months out of a total of seventy-two (72) months had a discharge at or over 25,000 gallons. This translates to Seventy-one (71) percent % of seventy-two (72) months having discharges at or above 25,000 gallons.

3. Sixty-five (65) months out of a total of seventy-two (72) months had a discharge at or over 20,000 gallons. This translates to Ninety-one (91) percent % of seventy-two (72) months having discharges at or above 20,000 gallons.

Rainfall Data Acquired from
Army Corp of Engineers
Grenada Lake Office

Historical Discharge Data
Grenada Plant
KOPPERS INDUSTRIES

Rain Water Accumulation Possibilities
KOPPERS INDUSTRIES
Grenada Plant
4\24\2001

	Drip Pad		Tank Farm		WWTP		Cylinder Basement		Other Con-		
		Units used		Units used	Containment	Units used		Units used	tainment	Total	Units used
Sq. Ft.(ft^2)	26568	ft^2	21000	ft^2	5685	ft^2	9408	ft^2	1173	63834	ft^2
Curb Height (ft)	0.6666	ft	3	ft	4.66	ft	3	ft	0.666		ft
Cubic ft. (ft^3)	17710	ft^3	63000	ft^3	26492	ft^3	28224	ft^3	781	136208	ft^3
Gallon Capacity	132473	gal	471240	gal	198161	gal	211116	gal	5844	1018832	gal
One-inch rain	2214	ft^3	1750	ft^3	472	ft^3	784	ft^3	98	4748	ft^3
	16561	gal	13090	gal	3529	gal	5864	gal	731	39775	gal
Average one-month rain 4.18 inches 1995-2000 Grenada Average	9255	ft^3	7315	ft^3	1980	ft^3	3277	ft^3	409	19847	ft^3
	69224	gal	54716	gal	14812	gal	24513	gal	3056	166322	gal
24hr/ 25 year flood event - 7 inch rain	15498	ft^3	12250	ft^3	3316	ft^3	5488	ft^3	684	33236	ft^3
	115925	gal	91630	gal	24805	gal	41050	gal	5118	278529	gal
Rainfall Accum-ulation using 50inch/yr 4.16ft	110523	ft^3	87360	ft^3	23687	ft^3	39137	ft^3	4887	265595	ft^3
	826711	gal	653453	gal	177180	gal	292747	gal	36558	1986648	gal

Discharge time needed to treat one year (50in) worth of rain using our 35,000 gal/day limit if only stormwater was processed and discharged. 354 days production.

56.76 days

Process Water Data

Date	Process Water (gal)	# of dry charges	# of green charges	Total # of charges	Total ft^3 treated	Gallons/ft^3	Avg. # of treating days/month
4/23/2001	2770	6	1	7	12032	0.2	22
4/24/2001	7200	8	2	10	13731	0.5	22
4/25/2001	6000	7	1	8	11668	0.5	22
4/26/2001	4200	2	2	4	6197	0.7	22
4/27/2001	4600	2	4	6	9792	0.5	22
Average for this week	4954	5	2	7	10684	0.5	22

Averages based on production records

Total Ft^3 treated based on year 2000 production records
3330224

Average Ft^3/day treated based on year 2000 production records(264days)
12614.48

Average process gallons/day
6096.1
(Avg.Ft^3/day) x (Avg.Gal./Ft^3) x (1)

Average process gallons/month(22days)
134115.1
(Avg.Ft^3/day) x (Avg.Gal./Ft^3) x (Avg.#days/month)

Average process gallons/year(264days)
1609381.257
(Avg.Ft^3/day) x (Avg.Gal./Ft^3) x (Avg.#days/year)

Historical Waste Water Discharge Amounts from 1995 - 2000

KOPPERS INDUSTRIES INC.
Tie Plant, Mississippi
4\10\2001

Supporting Data for 6 Year Composite

Year	Month	Discharge	(Gal)	# of days	Average/day	Max/month	% of months exceeding 30000 gal	% of months exceeding 25000 gal	% of months exceeding 20000 gal	Rainfall/month (inches)
1995	January	431400	gal	31	13916.1	25300	o	y	z	3.74
1995	February	522000	gal	26	20076.9	33500	x	y	z	8.18
1995	March	634200	gal	31	20458.1	34800	x	y	z	5.94
1995	April	467200	gal	30	15573.3	32500	x	y	z	7.5
1995	May	294600	gal	31	9503.2	20300	o	o	z	5.3
1995	June	524000	gal	30	17466.7	27600	o	y	z	7.7
1995	July	467100	gal	31	15067.7	34800	x	y	z	5.6
1995	August	509700	gal	28	18203.6	33100	x	y	z	3.1
1995	September	338200	gal	28	12078.6	22400	o	o	z	0.52
1995	October	376400	gal	31	12141.9	26300	o	y	z	2.47
1995	November	410000	gal	28	14642.9	34000	x	y	z	3.69
1995	December	526300	gal	31	16977.4	38300	x	y	z	5.26
	Average	458425		Average	15509	38300	58.33	83.33	100.00	Total 59.00
				Max Avg.	20458					Avg. 4.91

x=month with discharge > than 30,000 gal
y=month with discharge > than 25,000 gal
z=month with discharge > than 20,000 gal

*Note: On December 14, 1995 our permit was exceeded due to a broken well water line. It was caused by the cold weather which burst the line and was dumped into the tank farm.

Rainfall Data Acquired from
Army Corp of Engineers
Grenada Lake Office

Historical Discharge Data
Grenada Plant
KOPPERS INDUSTRIES

Year	Month	Discharge	(Gal)	# of days	Average/day	Max/month	% of months exceeding 30000 gal	% of months exceeding 25000 gal	% of months exceeding 20000 gal	Rainfall/month (inches)
2000	January	605000	gal	31	19516.1	34800	x	y	z	1.8
2000	February	386700	gal	29	13334.5	31400	x	y	z	no data
2000	March	466800	gal	31	15058.1	29800	o	y	z	5.87
2000	April	570400	gal	28	20371.4	34000	x	y	z	10.3
2000	May	310900	gal	28	11103.6	22500	o	o	z	1.1
2000	June	404800	gal	30	13493.3	29600	o	y	z	4.6
2000	July	230900	gal	31	7448.4	18800	o	o	o	1.5
2000	August	370800	gal	22	16854.5	27500	o	y	z	0.7
2000	September	348900	gal	22	15859.1	23600	o	o	z	1.8
2000	October	566900	gal	31	18287.1	28900	o	y	z	0.2
2000	November	662900	gal	30	22096.7	34100	x	y	z	14.7
2000	December	381800	gal	17	22458.8	32900	x	y	z	7.7
	Average	442233.3		Average	16323.5	34800	41.67	75.00	91.67	Total 50.27
				Max Avg.	22458.8					Avg. 4.57

Rainfall Data Acquired from
Army Corp of Engineers
Grenada Lake Office

Historical Discharge Data
Grenada Plant
KOPPERS INDUSTRIES

Historical Discharge Data
Grenada Plant
KOPPERS INDUSTRIES

Year	Month	Discharge	(Gal)	# of days	Average/day	Max/month	% of months exceeding 30000 gal	% of months exceeding 25000 gal	% of months exceeding 20000 gal	Rainfall/month (inches)
1998	January	387000	gal	31	12483.9	27000	o	y	z	5.86
1998	February	398900	gal	28	14246.4	25000	o	y	z	5.14
1998	March	444400	gal	31	14335.5	28800	o	y	z	4.82
1998	April	411400	gal	30	13713.3	26200	o	y	z	6.27
1998	May	321200	gal	31	10361.3	33000	x	y	z	4.38
1998	June	337400	gal	30	11246.7	28800	o	y	z	2.27
1998	July	237000	gal	23	10304.3	27200	o	y	z	3.44
1998	August	333600	gal	21	15885.7	25400	o	y	z	2.34
1998	September	311200	gal	30	10373.3	21400	o	o	z	0.44
1998	October	280300	gal	31	9041.9	21400	o	o	z	0.91
1998	November	392000	gal	30	13066.7	23700	o	o	z	3.59
1998	December	538400	gal	28	19228.6	30300	x	y	z	6.18
	Average	366066.7		Average	12857.3	33000	16.67	75.00	100.00	Total 45.64
				Max Avg.	19228.6					Avg. 3.8

Year	Month	Discharge	(Gal)	# of days	Average/day	Max/month	% of months exceeding 30000 gal	% of months exceeding 25000 gal	% of months exceeding 20000 gal	Rainfall/month (inches)
1999	January	623100	gal	29	21486.2	30900	x	y	z	8.17
1999	February	432300	gal	28	15439.3	29100	o	y	z	1.3
1999	March	550500	gal	31	17758.1	30000	x	y	z	3.26
1999	April	542100	gal	30	18070.0	29400	o	y	z	5.44
1999	May	414000	gal	31	13354.8	23700	o	o	z	2.07
1999	June	485600	gal	30	16186.7	33200	x	y	z	2.66
1999	July	605100	gal	31	19519.4	30500	x	y	z	3.27
1999	August	611100	gal	31	19712.9	29300	o	y	z	0.58
1999	September	584500	gal	30	19483.3	33300	x	y	z	1.32
1999	October	501900	gal	31	16190.3	27000	o	y	z	0.6
1999	November	422600	gal	30	14086.7	25000	o	y	z	1.76
1999	December	639400	gal	31	20625.8	34300	x	y	z	2.85
	Average	534350		Average	17659.5	34300	50	91.67	100	Total 33.28
				Max Avg.	21486.2					Avg. 2.78

Historical Discharge Data
Grenada Plant
KOPPERS INDUSTRIES

Rainfall Data Acquired from
Army Corp of Engineers
Grenada Lake Office

Historical Discharge Data
Grenada Plant
KOPPERS INDUSTRIES

Year	Month	Discharge	(Gal)	# of days	Average/day	Max/month	% of months exceeding 30000 gal	% of months exceeding 25000 gal	% of months exceeding 20000 gal	Rainfall/month (inches)
1996	January	531900	gal	31	17158.1	26400	o	y	z	4.56
1996	February	399900	gal	29	13789.7	27900	o	y	z	3.28
1996	March	528000	gal	31	17032.3	30500	x	y	z	4.63
1996	April	398700	gal	30	13290.0	28400	o	y	z	5.29
1996	May	323500	gal	31	10435.5	27200	o	y	z	1.17
1996	June	295806	gal	30	9860.2	18900	o	o	o	4.65
1996	July	224100	gal	31	7229.0	16800	o	o	o	1.78
1996	August	300700	gal	31	9700.0	26100	o	y	z	5.16
1996	September	474500	gal	30	15816.7	25800	o	y	z	6.63
1996	October	316160	gal	31	10198.7	20500	o	o	z	1.84
1996	November	375800	gal	30	12526.7	23700	o	o	z	4.96
1996	December	301200	gal	31	9716.1	18900	o	o	o	5.87
	Average	372522		Average	12229	30500	8.33	58.33	75.00	Total 49.82
				Max Avg.	17158					Avg. 4.15

Year	Month	Discharge	(Gal)	# of days	Average/day	Max/month	% of months exceeding 30000 gal	% of months exceeding 25000 gal	% of months exceeding 20000 gal	Rainfall/month (inches)
1997	January	527000	gal	31	17000.0	27000	o	y	z	6.65
1997	February	305600	gal	28	10914.3	21700	o	o	z	3.96
1997	March	516800	gal	31	16671.0	32600	x	y	z	5.45
1997	April	201900	gal	30	6730.0	15600	o	o	o	3.05
1997	May	484300	gal	31	15622.6	28500	o	y	z	11
1997	June	394500	gal	30	13150.0	30000	x	y	z	7.52
1997	July	245500	gal	31	7919.4	17900	o	o	o	5
1997	August	432100	gal	31	13938.7	31600	x	y	z	4.52
1997	September	304200	gal	30	10140.0	20000	o	o	z	2.54
1997	October	330400	gal	31	10658.1	22800	o	o	z	2.71
1997	November	309600	gal	30	10320.0	19600	o	o	o	1.87
1997	December	377100	gal	31	12164.5	22600	o	o	z	4.68
	Average	369083.3		Average	12102.4	32600	25	41.67	75	Total 58.95
				Max Avg.	17000					Avg. 4.9

Historical Discharge Data
Grenada Plant
KOPPERS INDUSTRIES

Rainfall Data Acquired from
Army Corp of Engineers
Grenada Lake Office

TRIANGLE LABORATORIES, INC.
Transfer Chain-of-Custody Form
Project 53891

Transfer From: DWLI5 To: OMSS8

	Initials..	Date.......	Time...
Released by:	JJ	5/9/01	19:40
Accepted by:	dy	5/9/01	23:58

MILES.ID........		TLI_No......	Cust.Id................
53891-	-000	TLI Blank	TLI Blank
53891-	-001	290-41-1	BB07284
53891-	-002	TLI LCS	TLI LCS
53891-	-003	TLI LCSD	TLI LCSD

XfrCOC (Rev 11/01/94)

Additional comments or instructions:

TRIANGLE LABORATORIES, INC.
HR GC/HRMS ANALYSIS

Method: Method 613: 2,3,7,8-TCDD
Required Detection Limit: 2 ppt

PROJECT: 53891

SAMPLE INFORMATION

1ST COLUMN 2ND COLUMN

RS Conc
20 µl @ 0.5 NG/µl

S#.crd	TLI SAMPLE ID / CLIENT SAMPLE ID	GC/MS FILENAME COLUMN: DB-5	CONFIRM	CONFIRM FILENAME COLUMN:_____	USF-RS VOLUME SOLN ID	USF-RS INIT. DATE	ANALYSIS COMMENTS
000	TLI Blank / TLI Blank	VR80800			20 ul 7778A	[initials] 5/10/01	
001	290-41-1 / BB07284	VR81500			↓	↓	
002	TLI LCS / TLI LCS	VR81600 ~~VR81800~~			↓	↓	
003	TLI LCSD / TLI LCSD	VR81700 ~~VR81500~~ [initials] 5/11/01			20 ul 7778A	[initials] 5/10/01	

Comments: ______________________

Type: B

Spike File: SPM6131K

Amt of Extract: 20%

REV 03/07/95 (PSTMF 6)

Triangle Laboratories, Inc.
Run Log

Column Type	Column #	Analysis*	Acquisition Method	GC Method*	Find DBs*	Other*
DB-5	0160336		8280A			

Standards		
Internal / Surrogate / Recovery	Internal / Surrogate / Recovery	Analyte
7778A Exp 12/15/01 20uL @ 0.5 pg/uL	789A Rebhk Exp 8/1/01	N/A

Extract / Sample volume 2 (µL) mL

John Walton 5/11/01
Signature Date

Date**	Time**	Project	Sample#	Client ID	Filename	pH*	Operator/Date	Backup*	Proc	Comments***
5/11/01	9:46	N/A	7819	8280A Rebhk	VR805		JWt 5/11/01		JWt	
↓	10:31	N/A	7840	8280A CC3	VR806		↓		↓	
↓	11:19	N/A	N/A	Solvent Blank	VR807		↓		↓	
↓	12:03	53981	TLI BLANK	TLI BLANK	VR808		↓		↓	
↓	12:45	53902	290-52-9	109061	VR809		↓		↓	
↓	13:29	53902	290-52-10	112017	VR810		↓		↓	
5/11/01	14:12	53897	290-47-1	618218	VR811		↓		JWt	
~~↓~~		~~53897~~ ~~53891~~	~~290-47-2~~ ~~290-41-1~~	~~618220~~ ~~BB07284~~	~~VR812~~		↓			Sequence was changed JWt 5/11/01
~~↓~~		53891	~~TLI 290-41-1 LCS~~	~~BB07284~~ ~~TLI LCS~~	~~VR813~~		↓			
~~5/11/01~~		~~53891~~ ~~53891~~	~~TLI LCS~~ ~~LCSD~~	~~TLI LCS~~ ~~TLI LCSD~~	~~VR814~~		~~JWt 5/11/01~~			

* Volatile Data Only ** Transcribed Data *** Dated Signature/Initials Required

Triangle Laboratories, Inc.
Run Log

Column Type	Column #	Analysis*	Acquisition Method	GC Method*	Find DBs*	Other*
DB-5	0760336		82804			

Standards		
Internal / Surrogate / Recovery	Internal / Surrogate / Recovery	Analyte
7788A Exp 12/15/01 20uL @ 0.5ug/mL	7819 Retchk Exp 8/11/01	N/A

Extract / Sample volume 2 (µL) mL (Circle unit)

John Walton 5/11/01
Signature Date

Date**	Time**	Project	Sample#	Client ID	Filename	pH*	Operator/Date	Backup*	Proc	Comments***
~~5/11/01~~		~~53891~~	~~TLI LCSD~~	~~TLI LCSD~~	~~VR815~~		~~JWT 5/11/01~~			Sequence was
		~~N/A~~	~~7836~~	~~8280A CCI~~	~~VR816~~					changed JWT 5/11/01
		~~N/A~~	~~7819~~	~~8280A Retchk~~	~~VR817~~					
5/11/01	14:55	53891	290-47-2	618220	VR812		JWT 5/11/01		JWT	
5/11/01	15:39	N/A	7836	8280A CCI	VR813		JWT 5/11/01		JWT	
5/11/01	16:23	N/A	N/A	Solvent Blank	VR814		↓		JW	
↓	17:06	53891	290-41-1	BB07284	VR815				↓	
	17:49	↓	TLI LCS	TLI LCS	VR816					
	18:32	53891	TLI LCSD	TLI LCSD	VR817				JW	
5/11/01	19:16	N/A	7819	8280A Retchk	VR818		JWT 5/11/01		JWT	

* Volatile Data Only ** Transcribed Data *** Dated Signature/Initials Required

22

SRVR4\\APMSRL\LRRUNLOG.DOC (10/16/97)

TRIANGLE LABS

SAMPLE DATA

Triangle Laboratories, Inc.
801 Capitola Drive
Durham, NC 27713-4411
919-544-5729
P.O. Box 13485
Research Triangle Park, NC 27709-348
Fax # 919-544-5491

TLI Project: **53891**
Client Sample: **TLI Blank**

Method M613 TCDD Analysis (b)
Analysis File: **VR80800**

Client Project:	**Wastewater/ NPDES**				
Sample Matrix:	**WATER**	Date Received:	/ /	Spike File:	**SPM6131K**
TLI ID:	**TLI Blank**	Date Extracted:	**05/09/2001**	ICal:	**V85507T**
		Date Analyzed:	**05/11/2001**	ConCal:	**VR80600**
Sample Size:	**1.000 L**	Dilution Factor:	**n/a**	% Moisture:	**n/a**
Dry Weight:	**n/a**	Blank File:	**VR80800**	% Lipid:	**n/a**
GC Column:	**DB-5**	Analyst:	**JWL**	% Solids:	**n/a**

Analytes	Conc. (ppt)	DL	EMPC	Ratio	RT	Flags
2,3,7,8-TCDD	ND	0.1				U__

Internal Standard	Conc. (ppt)	% Recovery	QC Limits	Ratio	RT	Flags
$^{13}C_{12}$-2,3,7,8-TCDD	49.3	98.6	>50%	0.77	23:44	___

Surrogate Standard	Conc. (ppt)	% Recovery	QC Limits	RT	Flags
$^{37}Cl_4$-2,3,7,8-TCDD	1.4	103	>50%	23:45	___

Recovery Standard	Ratio	RT	Flags
$^{13}C_{12}$-1,2,3,4-TCDD	0.79	23:34	___

Data Reviewer: ________PAB________ 05/14/2001

M613_PSR v2.01, LARS 6.25.01

Triangle Laboratories, Inc.®
801 Capitola Drive • Durham, North Carolina 27713
Phone: (919) 544-5729 • Fax: (919) 544-5491

Printed: 01:27 05/14/2001

Initial ....Date...

Data Review By: PAB 5/14/01

Calculated Noise Area: 26.10

Page No. 1 Listing of VR80800B.dbf

05/14/2001 Matched GC Peaks / Ratio / Ret. Time

Compound/ M_Z....	QC.Log	Omit	Why	..RT.	OK Ratio	Total.Area...	Area.Peak.1..	Area.Peak.2..	Rel.RT	Compound.Name..	ID..	Flags.
37Cl-TCDD									0.988-1.041			
328		DC	NL			<0.01	0.00					
				23:45		1,567.00	1,567.00		1.001	37Cl-TCDD	CLS	
		DC	WH	26:28		252.00			1.115			
328			1 Peak			1,567.00						
13C12-TCDD					0.65-0.89				0.987-1.008			
332-334		DC	NL			<0.01	0.00	0.00				
				23:34	0.79	62,234.00	27,491.00	34,743.00	0.993	13C12-1234-TCDD	RS1	
				23:44	0.77	58,372.00	25,424.00	32,948.00	1.000	13C12-2378-TCDD	ISO	
332-334			2 Peaks			120,606.00						

Column Description............	"Why" Code Description.........	QC Log Desc.........
M_Z -Nominal Ion Mass(es)	WL-Below Retention Time Window	A-Peak Added
..RT. -Retention Time (mm:ss)	WH-Above Retention Time Window	K-Peak Kept
Rat.1 -Ratio of M/M+2 Ions	SN-Below Signal to Noise Level	D-Peak Deleted
OK -RO=Ratio Outside Limits	<M-Below Method Detection Limit	T-Time Changed
Rel.RT-Relative Retention Time	NL-Channel Specific Noise Level	M-Peak Area Changed
		N-Name Changed
		X-Ether Interference

*** End of Report ***

Triangle Laboratories, Inc.®
801 Capitola Drive • Durham, North Carolina 27713
Phone: (919) 544-5729 • Fax: (919) 544-5491

Printed: 01:27 05/14/2001

TRIANGLE LABORATORIES, INC.

SEMI-VOLATILE QUANTITATION REPORT

Data file : /chem/V.i/05-11-01.b/VR808.d
Lab. Id. : 53891-000
Inj Date : 11-MAY-~~73~~ 01 12:03
Operator : JWL
Smp Info : TLI BLANK
Misc Info : TLI BLANK
Comment :
Method : /chem/V.i/05-11-01.b/8280.m
Meth Date : 11-May-~~1973~~ 2001 09:31
Cal Date : 27-JUL-98 10:47
Als bottle: 3
Dil Factor: 1.000
Integrator: HP RTE
Sample Type: mm5

Autotune Date: 11-May-~~73~~ 01 09:37:0
Inst ID: V.i

Cal File: Vh485.d

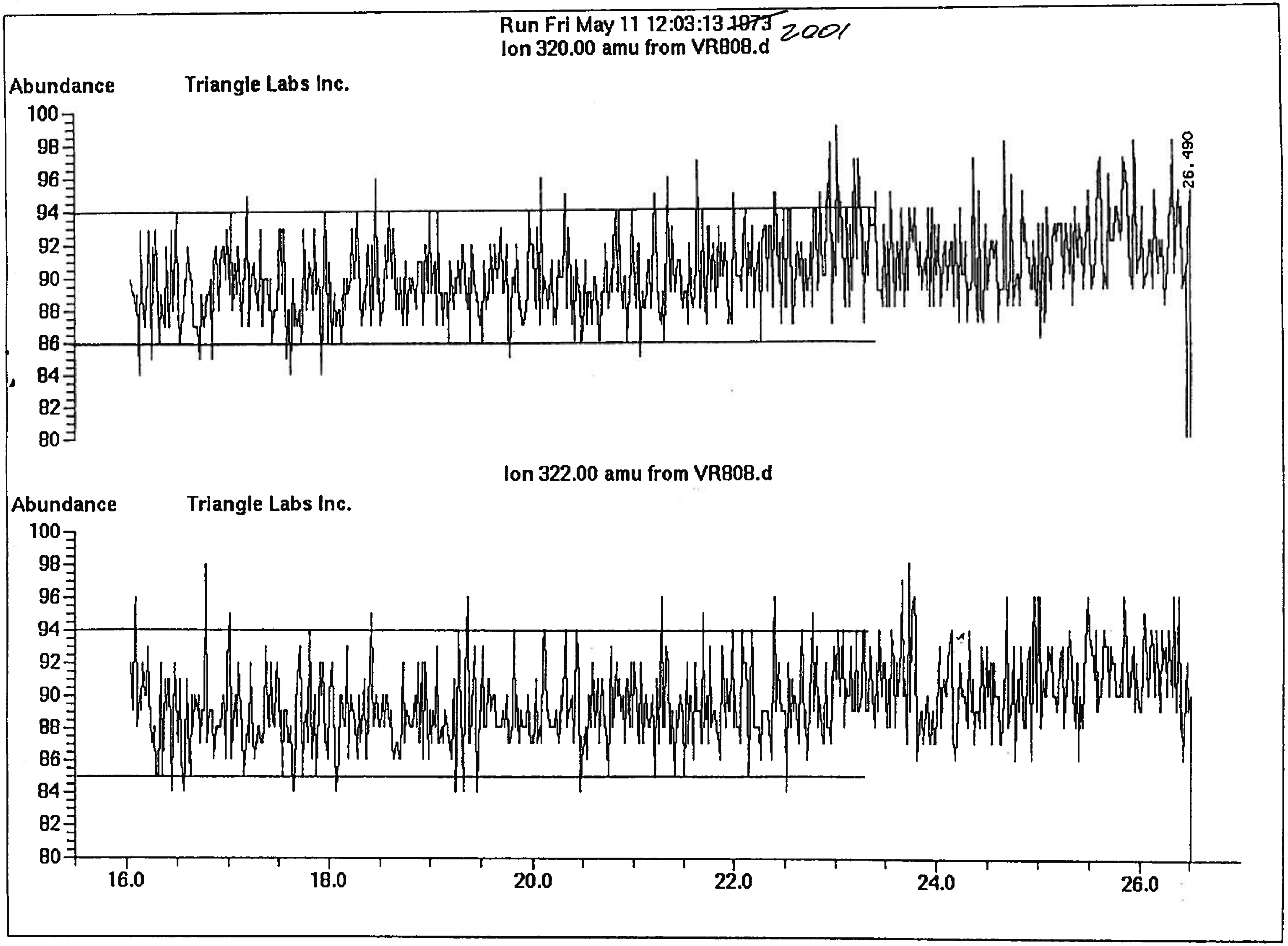
Target Version: Target 2.20
Compound Sublist: all.sub

No Target Compounds Detected.

8+9=(17)
JWL 5/11/01

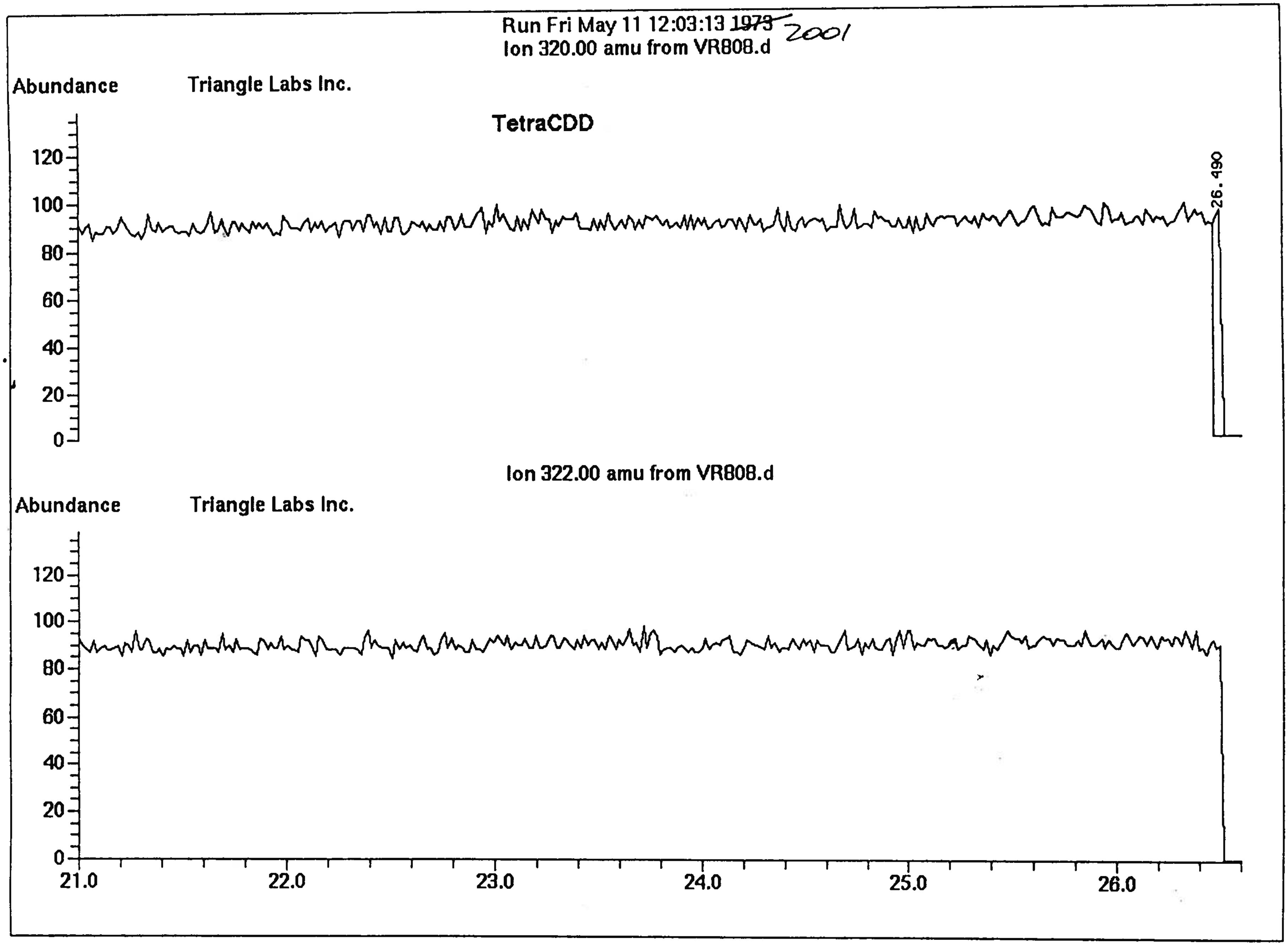
$\frac{(8)(25424)}{7792} = 26.10$

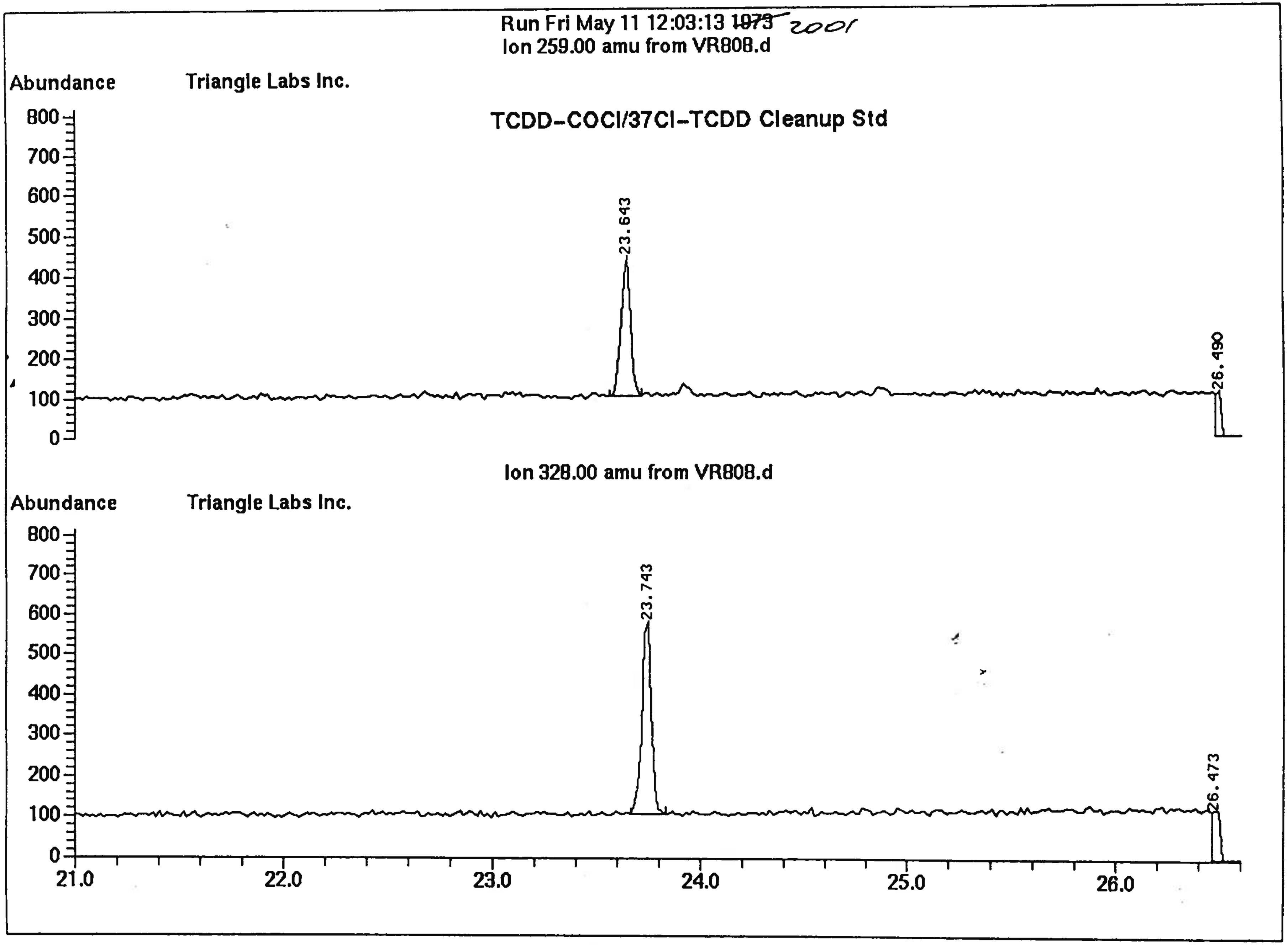
MS
5/14/01

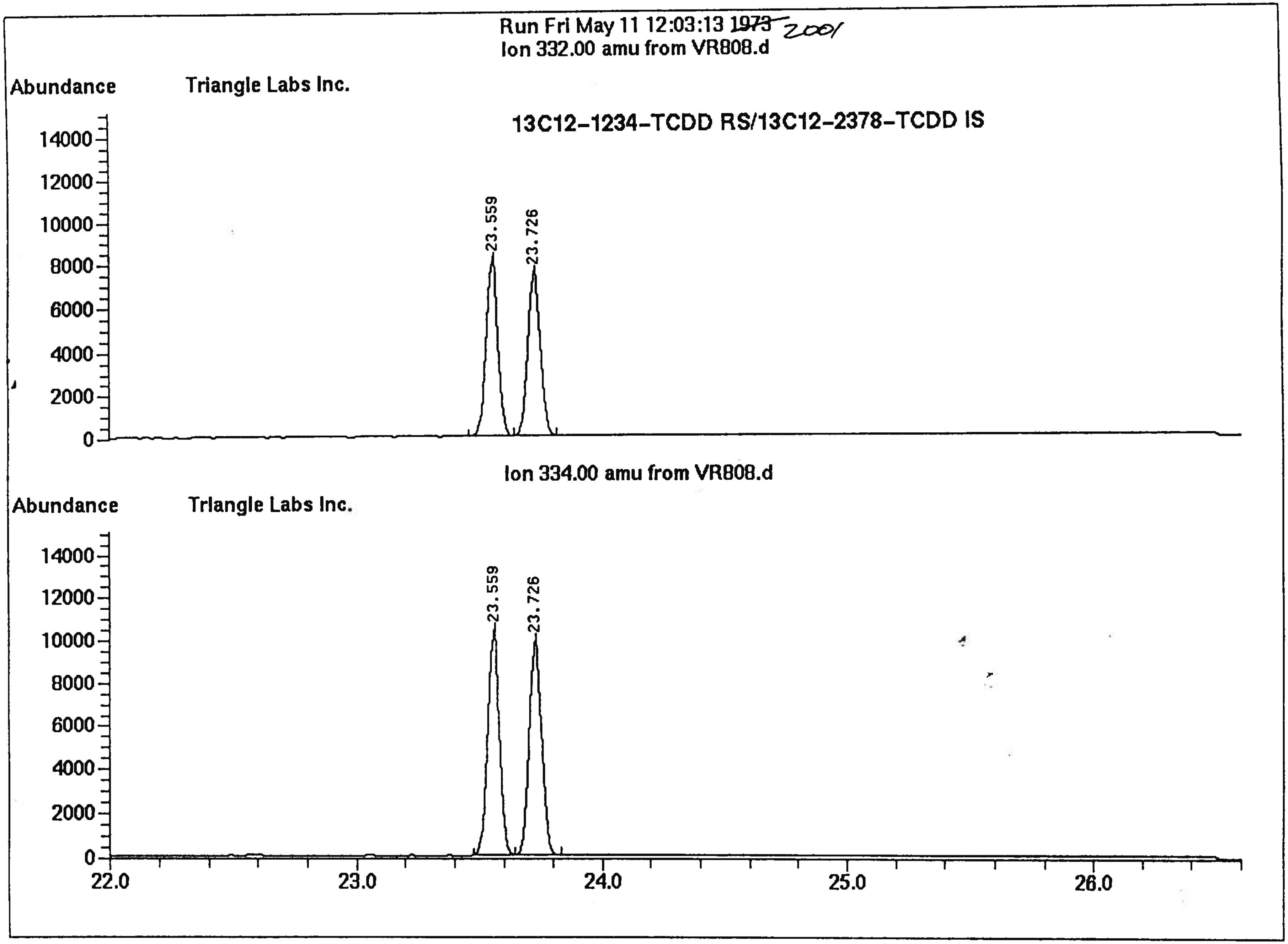

Run Fri May 11 12:03:13 ~~1973~~ 2001
Ion 320.00 amu from VR808.d
Abundance
Triangle Labs Inc.
26.490
Ion 322.00 amu from VR808.d
Abundance
Triangle Labs Inc.
100
98
96
94
92
90
88
86
84
82
80
16.0
18.0
20.0
22.0
24.0
26.0

8

9


Run Fri May 11 12:03:13 ~~1973~~ 2001
Ion 320.00 amu from VR808.d
Abundance
Triangle Labs Inc.
TetraCDD
120
100
80
60
40
20
0
26.490
Ion 322.00 amu from VR808.d
Abundance
Triangle Labs Inc.
120
100
80
60
40
20
0
21.0
22.0
23.0
24.0
25.0
26.0


Run Fri May 11 12:03:13 ~~1973~~ 2001
Ion 259.00 amu from VR808.d
Abundance
Triangle Labs Inc.
TCDD-COCl/37Cl-TCDD Cleanup Std
800
700
600
500
400
300
200
100
0
23.643
26.490
Ion 328.00 amu from VR808.d
Abundance
Triangle Labs Inc.
800
700
600
500
400
300
200
100
0
23.743
26.473
21.0
22.0
23.0
24.0
25.0
26.0


Run Fri May 11 12:03:13 1973 2001
Ion 332.00 amu from VR808.d
Abundance
Triangle Labs Inc.
13C12-1234-TCDD RS/13C12-2378-TCDD IS
14000
12000
10000
8000
6000
4000
2000
0
23.559
23.726
Ion 334.00 amu from VR808.d
Abundance
Triangle Labs Inc.
14000
12000
10000
8000
6000
4000
2000
0
23.559
23.726
22.0
23.0
24.0
25.0
26.0

```
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259, , , , ,
,1098,0,23,39,347
,119,0,26,29,112
328, , , , ,
,1567,0,23,45,478
,252,0,26,28,121
332, , , , ,
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,25424,0,23,44,7792
334, , , , ,
,34743,0,23,34,10709
,32948,0,23,44,10226
342, , , , ,
,129,0,28,21,29
,106,0,28,54,26
,129,0,30,23,32
277, , , , ,
,102,0,24,56,35
,105,0,25,37,42
,119,0,25,57,35
,115,0,26,8,55
,132,0,26,14,43
,106,0,26,50,42
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,120,0,27,32,35
,228,0,27,44,49
,145,0,27,51,41
,163,0,28,52,36
,130,0,28,57,37
,133,0,30,21,42
410, , , , ,
,183,0,26,31,87
,124,0,29,46,46
311, , , , ,
,133,0,31,5,62
446, , , , ,
,121,0,28,35,49
,129,0,28,42,46
,263,0,28,57,42
,131,0,29,8,35
,104,0,29,28,57
,205,0,29,35,57
,117,0,29,45,36
,117,0,30,41,49
,106,0,31,4,29
,107,0,31,14,40
,133,0,31,30,41
,397,0,31,36,80
,134,0,31,42,42
,227,0,32,59,41
,255,0,33,8,64
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404, , , , ,
,15404,0,31,5,6655
EOF
```

Argus Analytical

TLI Project: **53891**
Client Sample: **BB07284**

Method M613 TCDD Analysis (b
Analysis File: **VR8150(**

Client Project:	**Wastewater/ NPDES**				
Sample Matrix:	**WATER**				
TLI ID:	**290-41-1**	Date Received:	**05/05/2001**	Spike File:	**SPM6131K**
		Date Extracted:	**05/09/2001**	ICal:	**V85507T**
		Date Analyzed:	**05/11/2001**	ConCal:	**VR80600**
Sample Size:	**0.930 L**	Dilution Factor:	**n/a**	% Moisture:	**n/a**
Dry Weight:	**n/a**	Blank File:	**VR80800**	% Lipid:	**n/a**
GC Column:	**DB-5**	Analyst:	**JWL**	% Solids:	**n/a**

Analytes	Conc. (ppt)	DL	EMPC	Ratio	RT	Flags
2,3,7,8-TCDD	ND	0.1				U__

Internal Standard	Conc. (ppt)	% Recovery	QC Limits	Ratio	RT	Flags
$^{13}C_{12}$-2,3,7,8-TCDD	37.0	68.8	>50%	0.78	23:43	__

Surrogate Standard	Conc. (ppt)	% Recovery	QC Limits	RT	Flags
$^{37}Cl_4$-2,3,7,8-TCDD	1.4	90.6	>50%	23:44	__

Recovery Standard	Ratio	RT	Flags
$^{13}C_{12}$-1,2,3,4-TCDD	0.80	23:33	__

This page Koppers Ind. Inc. Tie Plant, MS Sample – Joan from Argus Analytical Inc. told me this.
Blair Simpson
5-21-01

Data Reviewer: VSL 05/14/2001

M613_PSR v2.01, LARS 6 25 01

Triangle Laboratories, Inc.®
801 Capitola Drive • Durham, North Carolina 27713
Phone: (919) 544-5729 • Fax: (919) 544-5491

Printed: 22:12 05/14/2001

Initial ....Date...

Data Review By: PAB 5.24.01

Calculated Noise Area: 19.64

Page No. 1 Listing of VR81500B.dbf

05/14/2001 Matched GC Peaks / Ratio / Ret. Time

Compound/ M_Z....	QC Log	Omit	Why	..RT.	OK	Ratio	Total.Area...	Area.Peak.1..	Area.Peak.2..	Rel.RT	Compound.Name..	ID..	Flags.
37Cl-TCDD										0.988-1.041			
328	DC		NL				<0.01	0.00					
				23:44			1,535.00	1,535.00		1.001	37Cl-TCDD	CLS	
	DC		WH	26:29			133.00			1.117			
328		1	Peak				1,535.00						
13C12-TCDD						0.65-0.89				0.987-1.008			
332-334	DC		NL				<0.01	0.00	0.00				
				23:33		0.80	68,775.00	30,504.00	38,271.00	0.993	13C12-1234-TCDD	RS1	
				23:43		0.78	44,986.00	19,681.00	25,305.00	1.000	13C12-2378-TCDD	ISO	
332-334		2	Peaks				113,761.00						

Column Description............	"Why" Code Description.........	QC Log Desc.........
M_Z -Nominal Ion Mass(es)	WL-Below Retention Time Window	A-Peak Added
..RT. -Retention Time (mm:ss)	WH-Above Retention Time Window	K-Peak Kept
Rat.1 -Ratio of M/M+2 Ions	SN-Below Signal to Noise Level	D-Peak Deleted
OK -RO=Ratio Outside Limits	<M-Below Method Detection Limit	T-Time Changed
Rel.RT-Relative Retention Time	NL-Channel Specific Noise Level	M-Peak Area Changed
		N-Name Changed
		X-Ether Interference

*** End of Report ***

TRIANGLE LABORATORIES, INC.

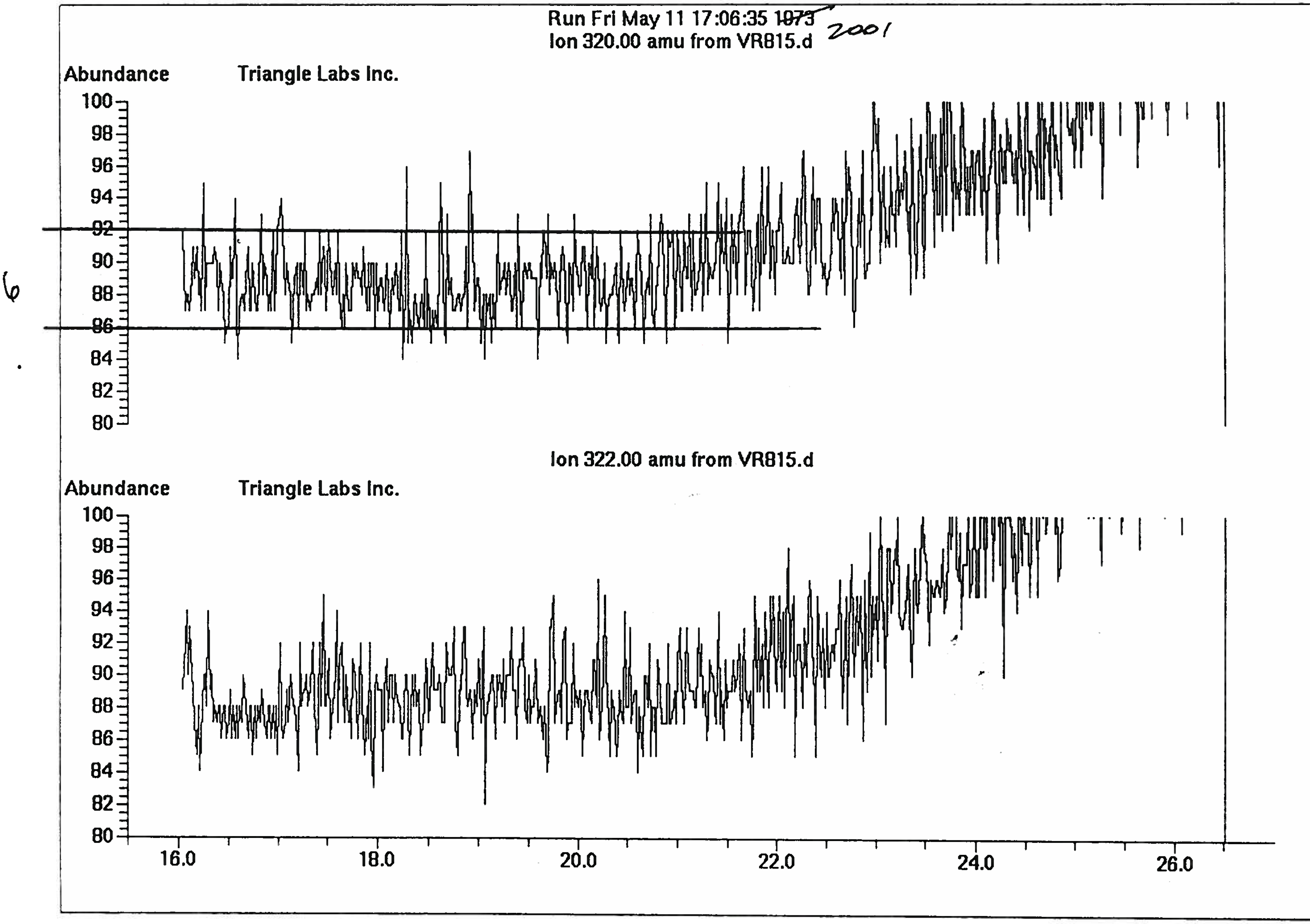
SEMI-VOLATILE QUANTITATION REPORT

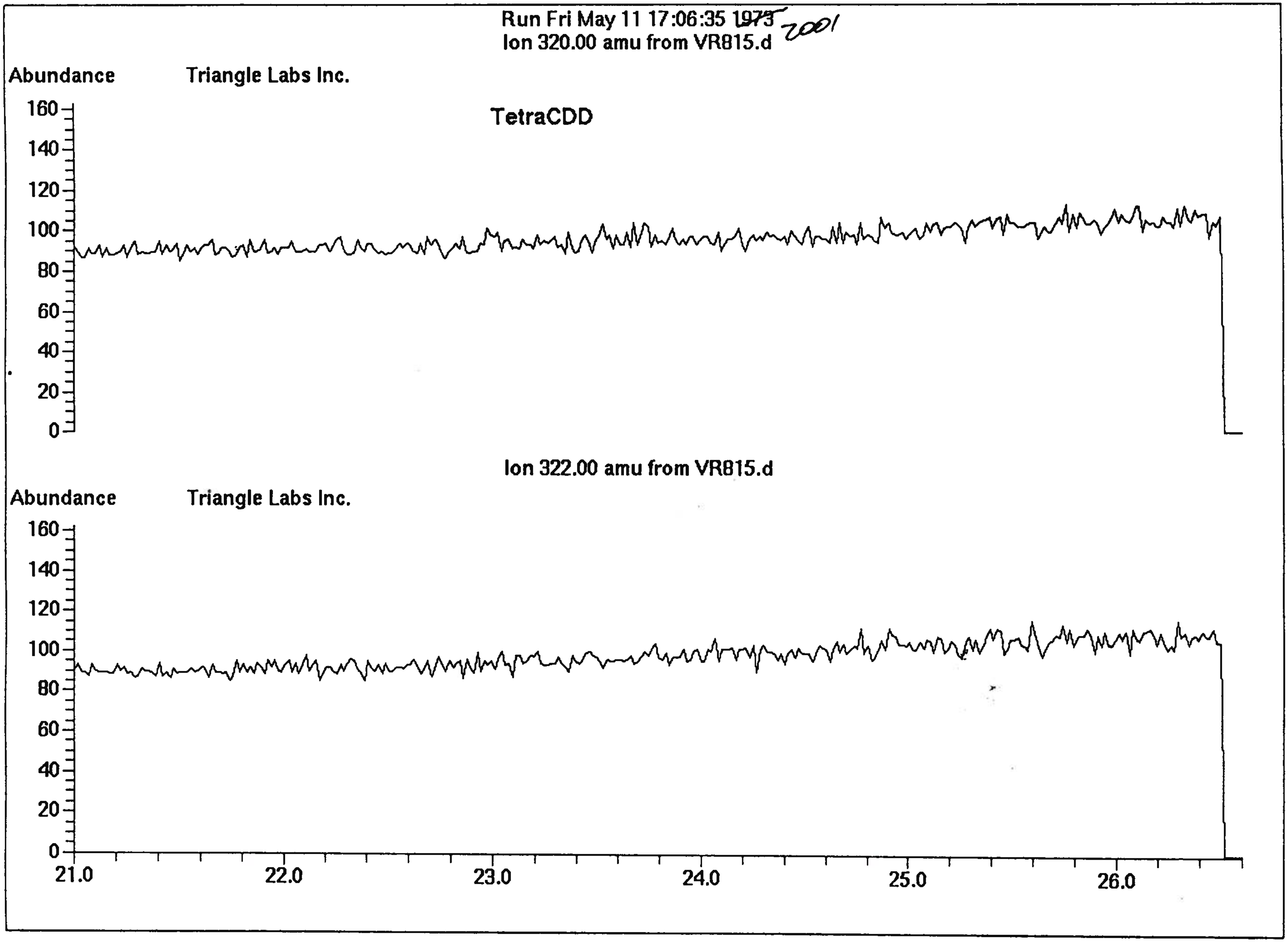
Data file : /chem/V.i/05-11-01.b/VR815.d
Lab. Id. : 53891-001
Inj Date : 11-MAY-~~73~~ 01 17:06 Autotune Date: 11-May-~~73~~ 01 09:37:0
Operator : JWL Inst ID: V.i
Smp Info : BB07284
Misc Info : 290-41-1
Comment :
Method : /chem/V.i/05-11-01.b/8280.m
Meth Date : 11-May-~~1973~~ 2001 09:31
Cal Date : 27-JUL-98 10:47 Cal File: Vh485.d
Als bottle: 9
Dil Factor: 1.000 Target Version: Target 2.20
Integrator: HP RTE Compound Sublist: all.sub
Sample Type: mm5

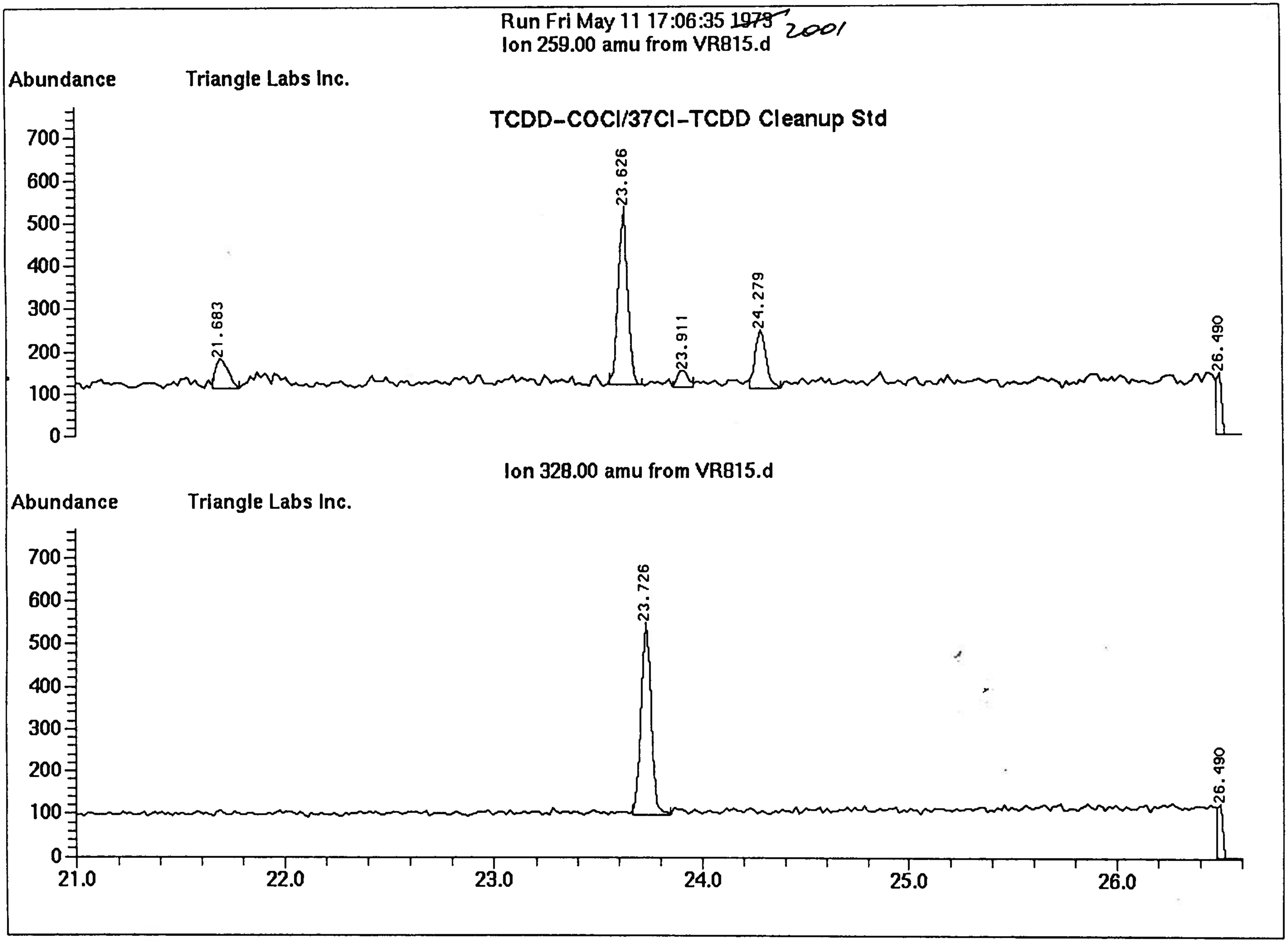
No Target Compounds Detected.

$$\frac{(6)\ (14681)}{6014} = 14.64$$

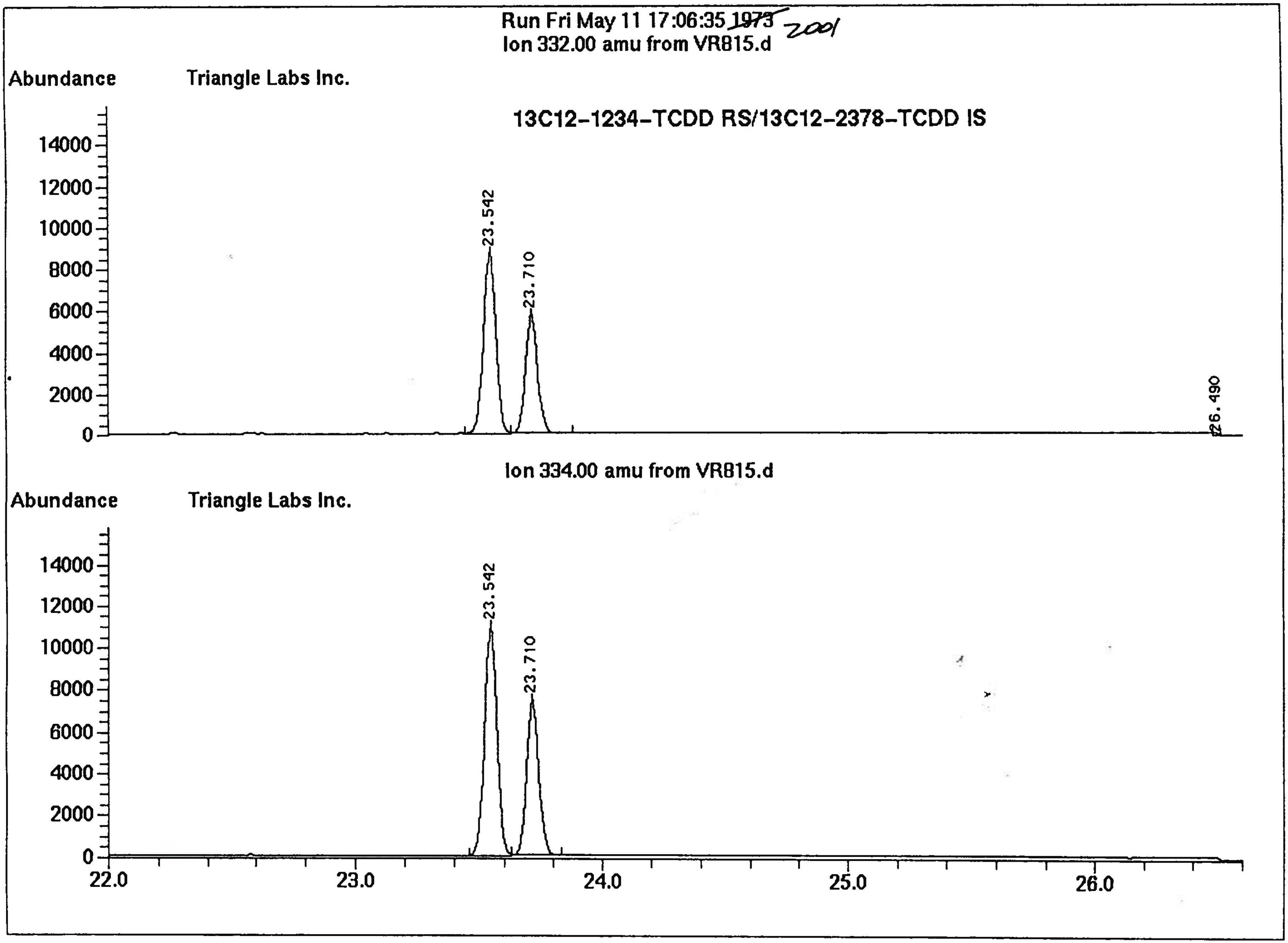
[signature] 5/14/01


Run Fri May 11 17:06:35 ~~1973~~ 2001
Ion 320.00 amu from VR815.d
Abundance
Triangle Labs Inc.
100
98
96
94
92
90
88
86
84
82
80
Ion 322.00 amu from VR815.d
Abundance
Triangle Labs Inc.
100
98
96
94
92
90
88
86
84
82
80
16.0
18.0
20.0
22.0
24.0
26.0
6


Run Fri May 11 17:06:35 1973 2001
Ion 320.00 amu from VR815.d
Abundance
Triangle Labs Inc.
TetraCDD
160
140
120
100
80
60
40
20
0
Ion 322.00 amu from VR815.d
Abundance
Triangle Labs Inc.
160
140
120
100
80
60
40
20
0
21.0
22.0
23.0
24.0
25.0
26.0



Run Fri May 11 17:06:35 1973 2001
Ion 259.00 amu from VR815.d
Abundance
Triangle Labs Inc.
TCDD-COCl/37Cl-TCDD Cleanup Std
700
600
500
400
300
200
100
0
21.683
23.626
23.911
24.279
26.490
Ion 328.00 amu from VR815.d
Abundance
Triangle Labs Inc.
700
600
500
400
300
200
100
0
23.726
26.490
21.0
22.0
23.0
24.0
25.0
26.0


Run Fri May 11 17:06:35 ~~1973~~ 2001
Ion 332.00 amu from VR815.d
Abundance
Triangle Labs Inc.
13C12-1234-TCDD RS/13C12-2378-TCDD IS
14000
12000
10000
8000
6000
4000
2000
0
23.542
23.710
26.490
Ion 334.00 amu from VR815.d
Abundance
Triangle Labs Inc.
14000
12000
10000
8000
6000
4000
2000
0
23.542
23.710
22.0
23.0
24.0
25.0
26.0

,,,,,,,/chem/V.i/05-11-01.b/VR815.RPT
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,204,0,23,32,69
259, , , , ,
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,203,0,31,43,46
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,162,0,32,32,43
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,8400,0,32,50,3686
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EOF
```

TLI Project: **53891** — Method M613 TCDD Analysis (b)

Client Sample: **TLI LCS** — Analysis File: **VR81600**

Client Project:	**Wastewater/ NPDES**				
Sample Matrix:	**WATER**	Date Received:	**/ /**	Spike File:	**SPM6131K**
TLI ID:	**TLI LCS**	Date Extracted:	**05/09/2001**	ICal:	**V85507T**
		Date Analyzed:	**05/11/2001**	ConCal:	**VR80600**
Sample Size:	**1.000 L**	Dilution Factor:	**n/a**	% Moisture:	**n/a**
Dry Weight:	**n/a**	Blank File:	**VR80800**	% Lipid:	**n/a**
GC Column:	**DB-5**	Analyst:	**JWL**	% Solids:	**n/a**

Analytes	Conc. (ppt)	DL	EMPC	Ratio	RT	Flags
2,3,7,8-TCDD	10.8			0.76	23:44	___

Internal Standard	Conc. (ppt)	% Recovery	QC Limits	Ratio	RT	Flags
$^{13}C_{12}$-2,3,7,8-TCDD	52.9	106	>50%	0.78	23:43	___

Surrogate Standard	Conc. (ppt)	% Recovery	QC Limits	RT	Flags
$^{37}Cl_4$-2,3,7,8-TCDD	1.4	102	>50%	23:44	___

Recovery Standard	Ratio	RT	Flags
$^{13}C_{12}$-1,2,3,4-TCDD	0.78	23:33	___

This Page from Argus Analytical
Lab Standard - Joan told me this.
Blair Simpson
5-21-01

Data Reviewer: Pab 05/14/2001

M613_PSR v2.01, LARS 6.25.01

Triangle Laboratories, Inc.®
801 Capitola Drive • Durham, North Carolina 27713
Phone: (919) 544-5729 • Fax: (919) 544-5491

Printed: 01:29 05/14/2001

	Initial	....Date...
Data Review By:	PaB	5/14/01

Calculated Noise Area: 22.33

Page No. 1 Listing of VR81600B.dbf
05/14/2001 Matched GC Peaks / Ratio / Ret. Time

Compound/ M_Z....	QC.Log	Omit	Why	..RT.	OK	Ratio	Total.Area...	Area.Peak.1..	Area.Peak.2..	Rel.RT	Compound.Name..	ID..	Flags.
TCDD						0.65-0.89				0.890-1.048			
320-322		DC	NL				<0.01	0.00	0.00				
				23:44		0.76	14,300.00	6,169.00	8,131.00	1.001	2378-TCDD		AN
320-322			1 Peak				14,300.00						
37Cl-TCDD										0.988-1.041			
328		DC	NL				<0.01	0.00					
				23:44			1,700.00	1,700.00		1.001	37Cl-TCDD		CLS
328			1 Peak				1,700.00						
13C12-TCDD						0.65-0.89				0.987-1.008			
332-334		DC	NL				<0.01	0.00	0.00				
				23:33		0.78	68,734.00	30,061.00	38,673.00	0.993	13C12-1234-TCDD	RS1	
				23:43		0.78	68,202.00	29,841.00	38,361.00	1.000	13C12-2378-TCDD	ISO	
332-334			2 Peaks				136,936.00						

Column Description............	"Why" Code Description.........	QC Log Desc.........
M_Z -Nominal Ion Mass(es)	WL-Below Retention Time Window	A-Peak Added
..RT. -Retention Time (mm:ss)	WH-Above Retention Time Window	K-Peak Kept
Rat.1 -Ratio of M/M+2 Ions	SN-Below Signal to Noise Level	D-Peak Deleted
OK -RO=Ratio Outside Limits	<M-Below Method Detection Limit	T-Time Changed
Rel.RT-Relative Retention Time	NL-Channel Specific Noise Level	M-Peak Area Changed
		N-Name Changed
		X-Ether Interference

*** End of Report ***

TRIANGLE LABORATORIES, INC.

SEMI-VOLATILE QUANTITATION REPORT

Data file : /chem/V.i/05-11-01.b/VR816.d
Lab. Id. : 53891-002
Inj Date : 11-MAY-~~73~~ 01 17:49
Operator : JWL
Smp Info : TLI LCS
Misc Info : TLI LCS
Comment :
Method : /chem/V.i/05-11-01.b/8280.m
Meth Date : 11-May-~~1973~~ 2001 09:31
Cal Date : 27-JUL-98 10:47
Als bottle: 10
Dil Factor: 1.000
Integrator: HP RTE
Sample Type: mm5

Autotune Date: 11-May-~~73~~ 01 09:37:0
Inst ID: V.i
Cal File: Vh485.d
Target Version: Target 2.20
Compound Sublist: all.sub

No Target Compounds Detected.

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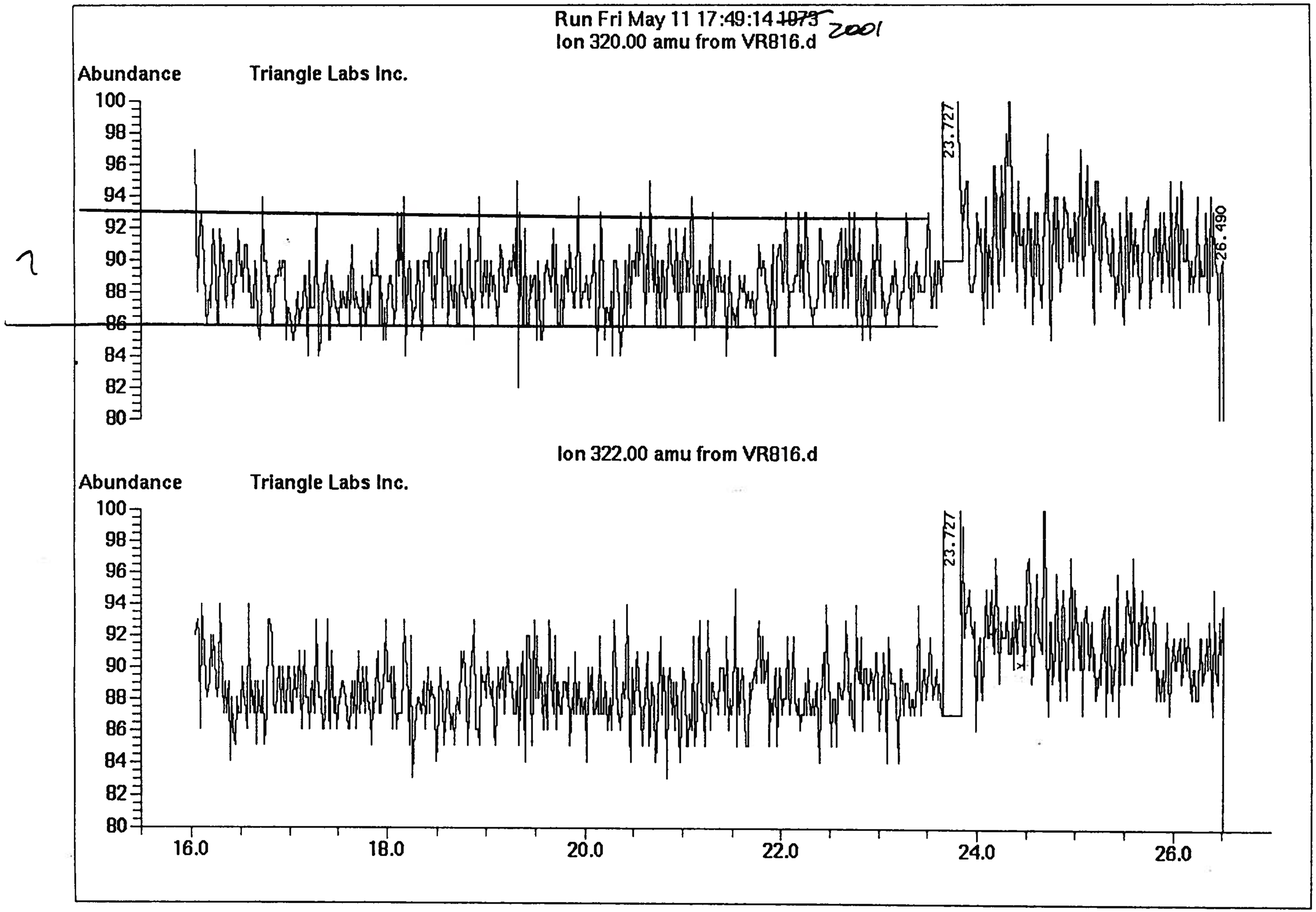
5/14/01



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Triangle Labs Inc.
23.727
26.490
Ion 322.00 amu from VR816.d
Abundance
Triangle Labs Inc.
23.727
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86
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18.0
20.0
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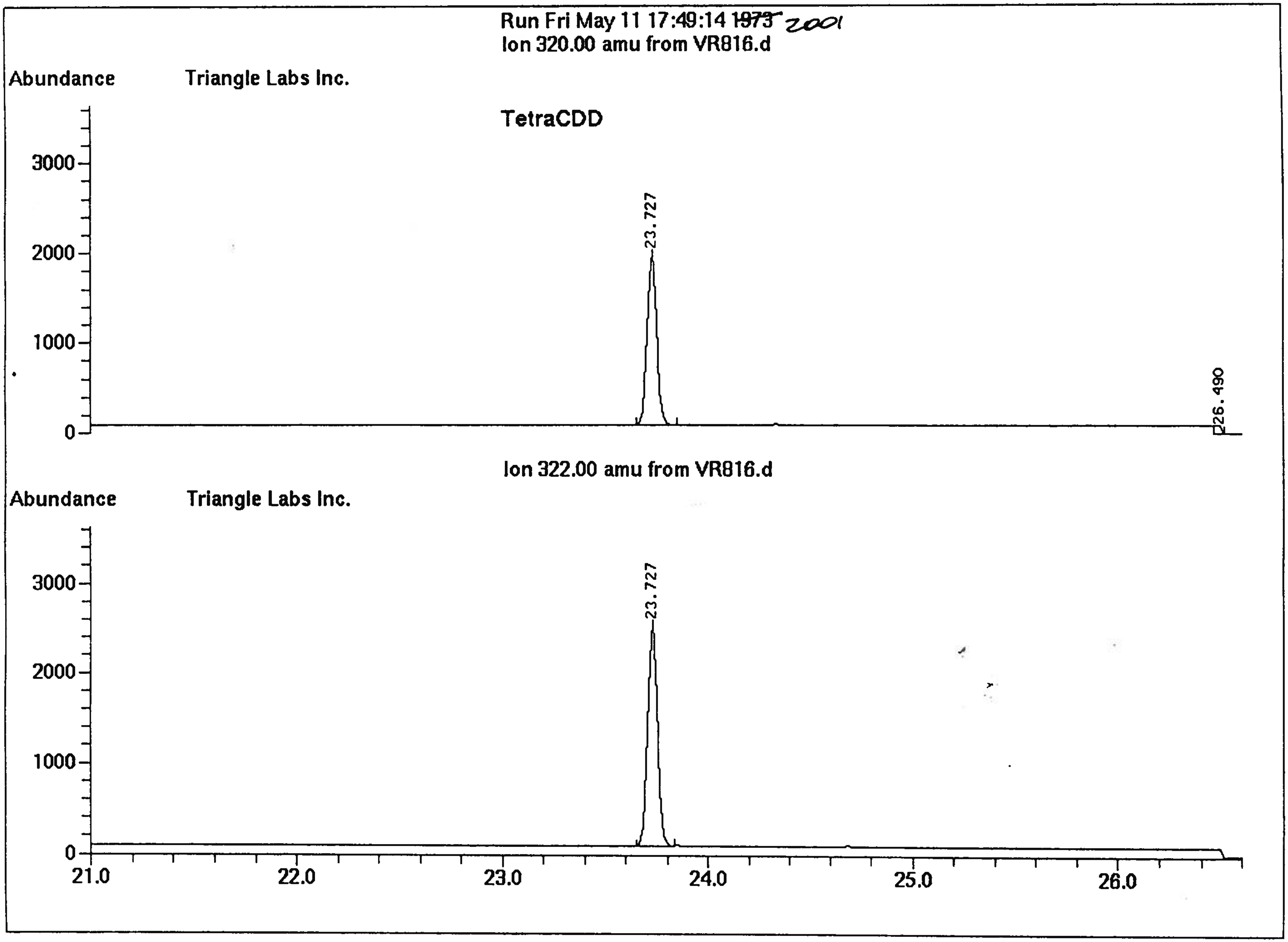
26.0



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Abundance
Triangle Labs Inc.
TetraCDD
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2000
1000
0
23.727
26.490
Ion 322.00 amu from VR816.d
Abundance
Triangle Labs Inc.
3000
2000
1000
0
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22.0
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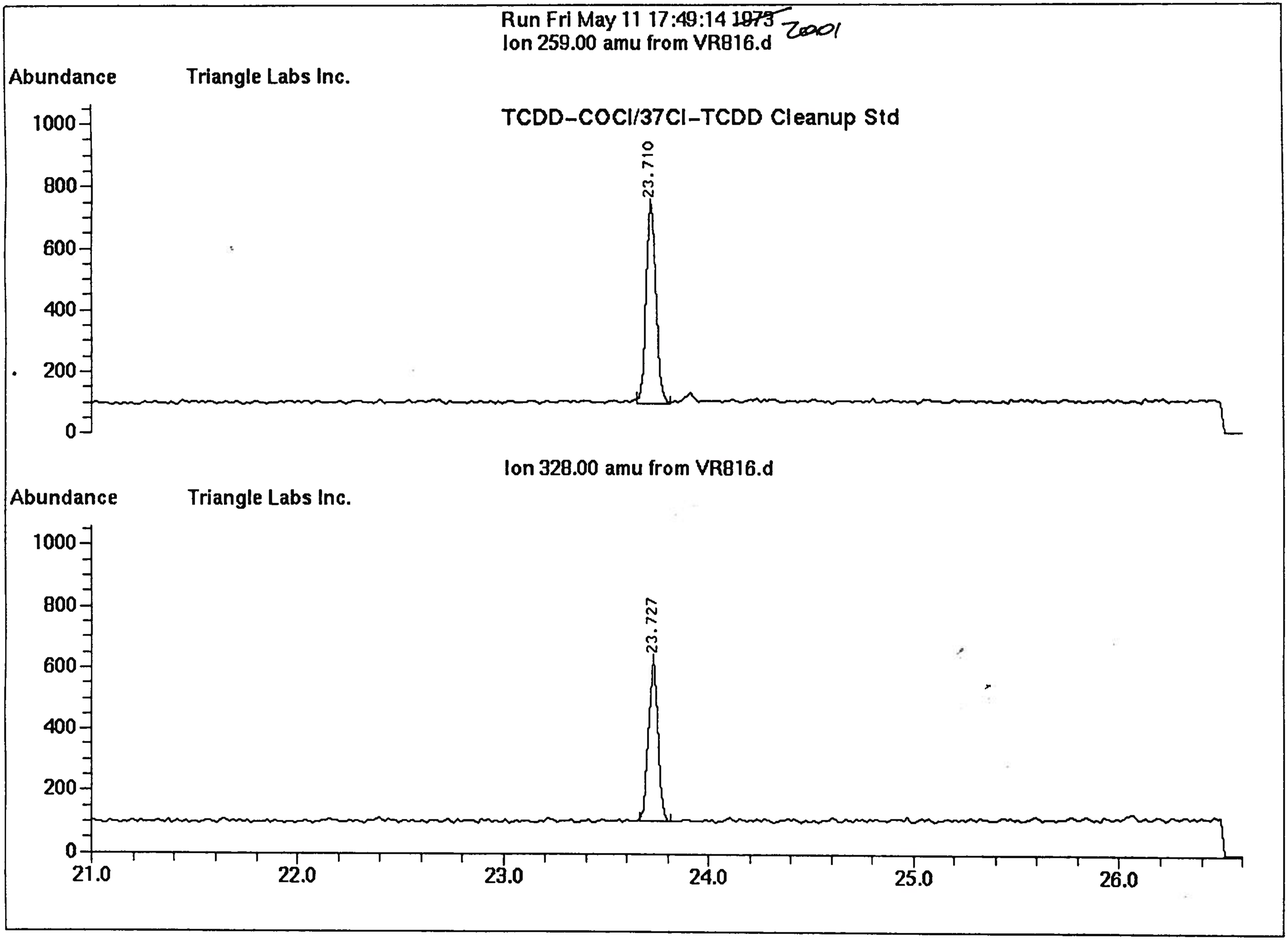

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Abundance
Triangle Labs Inc.
TCDD-COCl/37Cl-TCDD Cleanup Std
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800
600
400
200
0
23.710
Ion 328.00 amu from VR816.d
Abundance
Triangle Labs Inc.
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600
400
200
0
23.727
21.0
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24.0
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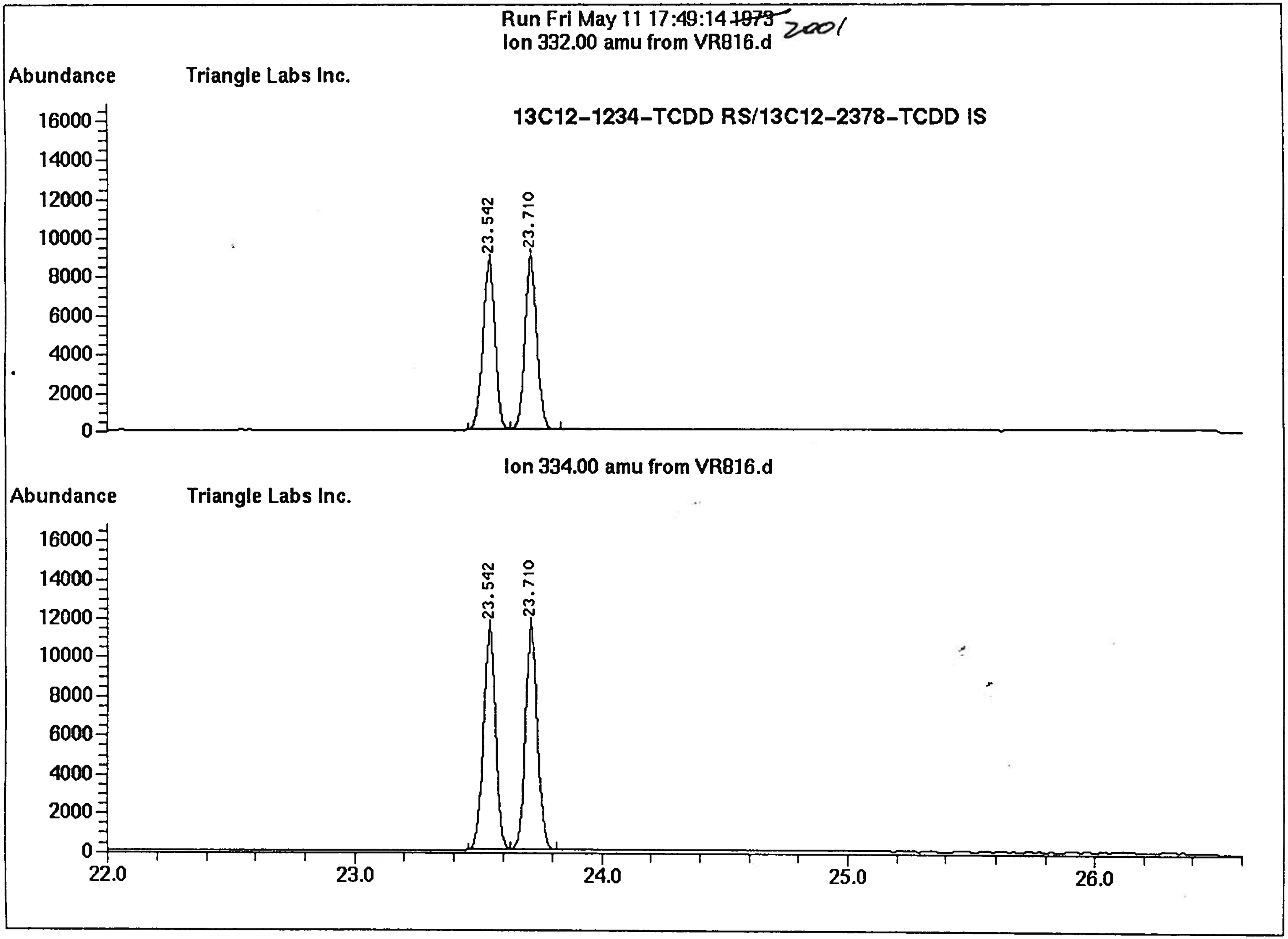
26.0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14000
12000
10000
8000
6000
4000
2000
0
23.542
23.710
Ion 334.00 amu from VR816.d
Abundance
Triangle Labs Inc.
16000
14000
12000
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6000
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23.542
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22.0
23.0
24.0
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26.0

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Argus Analytical

TLI Project: **53891**

Client Sample: **TLI LCSD**

Method M613 TCDD Analysis (b)

Analysis File: **VR81700**

Client Project:	**Wastewater/ NPDES**				
Sample Matrix:	**WATER**	Date Received:	**/ /**	Spike File:	**SPM6131K**
TLI ID:	**TLI LCSD**	Date Extracted:	**05/09/2001**	ICal:	**V85507T**
		Date Analyzed:	**05/11/2001**	ConCal:	**VR80600**
Sample Size:	**1.000 L**	Dilution Factor:	**n/a**	% Moisture:	**n/a**
Dry Weight:	**n/a**	Blank File:	**VR80800**	% Lipid:	**n/a**
GC Column:	**DB-5**	Analyst:	**JWL**	% Solids:	**n/a**

Analytes	Conc. (ppt)	DL	EMPC	Ratio	RT	Flags
2,3,7,8-TCDD	10.9			0.79	23:44	___

Internal Standard	Conc. (ppt)	% Recovery	QC Limits	Ratio	RT	Flags
$^{13}C_{12}$-2,3,7,8-TCDD	47.5	95.0	>50%	0.78	23:43	___

Surrogate Standard	Conc. (ppt)	% Recovery	QC Limits	RT	Flags
$^{37}Cl_4$-2,3,7,8-TCDD	1.4	98.6	>50%	23:44	___

Recovery Standard	Ratio	RT	Flags
$^{13}C_{12}$-1,2,3,4-TCDD	0.79	23:33	___

This Page Lab Standard - Joan from Argus An. Inc. Told me this.

Blair Simpson

5-21-01

Data Reviewer: PAB 05/14/2001

M613_PSR v2.01, LARS 6.25.01

Triangle Laboratories, Inc.®
801 Capitola Drive • Durham, North Carolina 27713
Phone: (919) 544-5729 • Fax: (919) 544-5491

Printed: 01:31 05/14/2001

Initial ....Date...

Data Review By: RaB 5/14/01

Calculated Noise Area: 23.46

Page No. 1 Listing of VR81700B.dbf

05/14/2001 Matched GC Peaks / Ratio / Ret. Time

Compound/ M_Z....	QC.Log	Omit	Why	..RT.	OK Ratio	Total.Area...	Area.Peak.1..	Area.Peak.2..	Rel.RT	Compound.Name..	ID..	Flags.
TCDD					0.65-0.89				0.890-1.048			
320-322	DC	NL				<0.01	0.00	0.00				
				23:44	0.79	12,550.00	5,530.00	7,020.00	1.001	2378-TCDD	AN	
320-322		1 Peak				12,550.00						
37Cl-TCDD									0.988-1.041			
328	DC	NL				<0.01	0.00					
				23:44		1,631.00	1,631.00		1.001	37Cl-TCDD	CLS	
328		1 Peak				1,631.00						
13C12-TCDD					0.65-0.89				0.987-1.008			
332-334	DC	NL				<0.01	0.00	0.00				
				23:33	0.79	67,732.00	29,791.00	37,941.00	0.993	13C12-1234-TCDD	RS1	
				23:43	0.78	60,753.00	26,550.00	34,203.00	1.000	13C12-2378-TCDD	ISO	
332-334		2 Peaks				128,485.00						

Column Description...........	"Why" Code Description.........	QC Log Desc.........
M_Z -Nominal Ion Mass(es)	WL-Below Retention Time Window	A-Peak Added
..RT. -Retention Time (mm:ss)	WH-Above Retention Time Window	K-Peak Kept
Rat.1 -Ratio of M/M+2 Ions	SN-Below Signal to Noise Level	D-Peak Deleted
OK -RO=Ratio Outside Limits	<M-Below Method Detection Limit	T-Time Changed
Rel.RT-Relative Retention Time	NL-Channel Specific Noise Level	M-Peak Area Changed
		N-Name Changed
		X-Ether Interference

*** End of Report ***

TRIANGLE LABORATORIES, INC.

SEMI-VOLATILE QUANTITATION REPORT

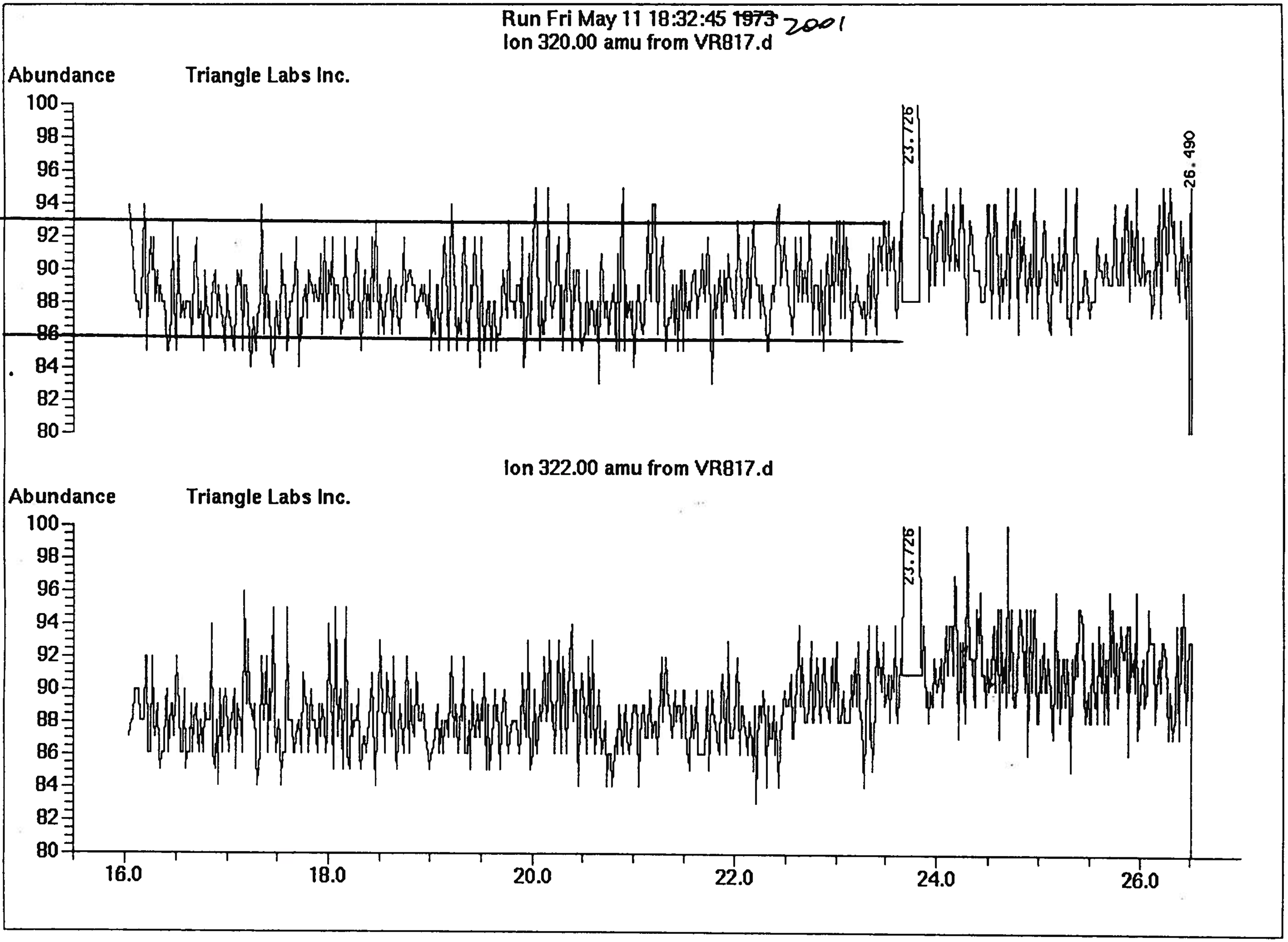
Data file : /chem/V.i/05-11-01.b/VR817.d
Lab. Id. : 53891-003
Inj Date : 11-MAY-~~73~~ 01 18:32
Operator : JWL
Smp Info : TLI LCSD
Misc Info : TLI LCSD
Comment :
Method : /chem/V.i/05-11-01.b/8280.m
Meth Date : 11-May-~~1973~~ 2001 09:31
Cal Date : 27-JUL-98 10:47
Als bottle: 11
Dil Factor: 1.000
Integrator: HP RTE
Sample Type: mm5

Autotune Date: 11-May-~~73~~ 01 09:37:0
Inst ID: V.i
Cal File: Vh485.d
Target Version: Target 2.20
Compound Sublist: all.sub

No Target Compounds Detected.

$\frac{(7)(26550)}{7920} = 23.46$

5/14/01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Triangle Labs Inc.
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98
96
94
92
90
88
86
84
82
80
23.726
26.490
Ion 322.00 amu from VR817.d
Abundance
Triangle Labs Inc.
100
98
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90
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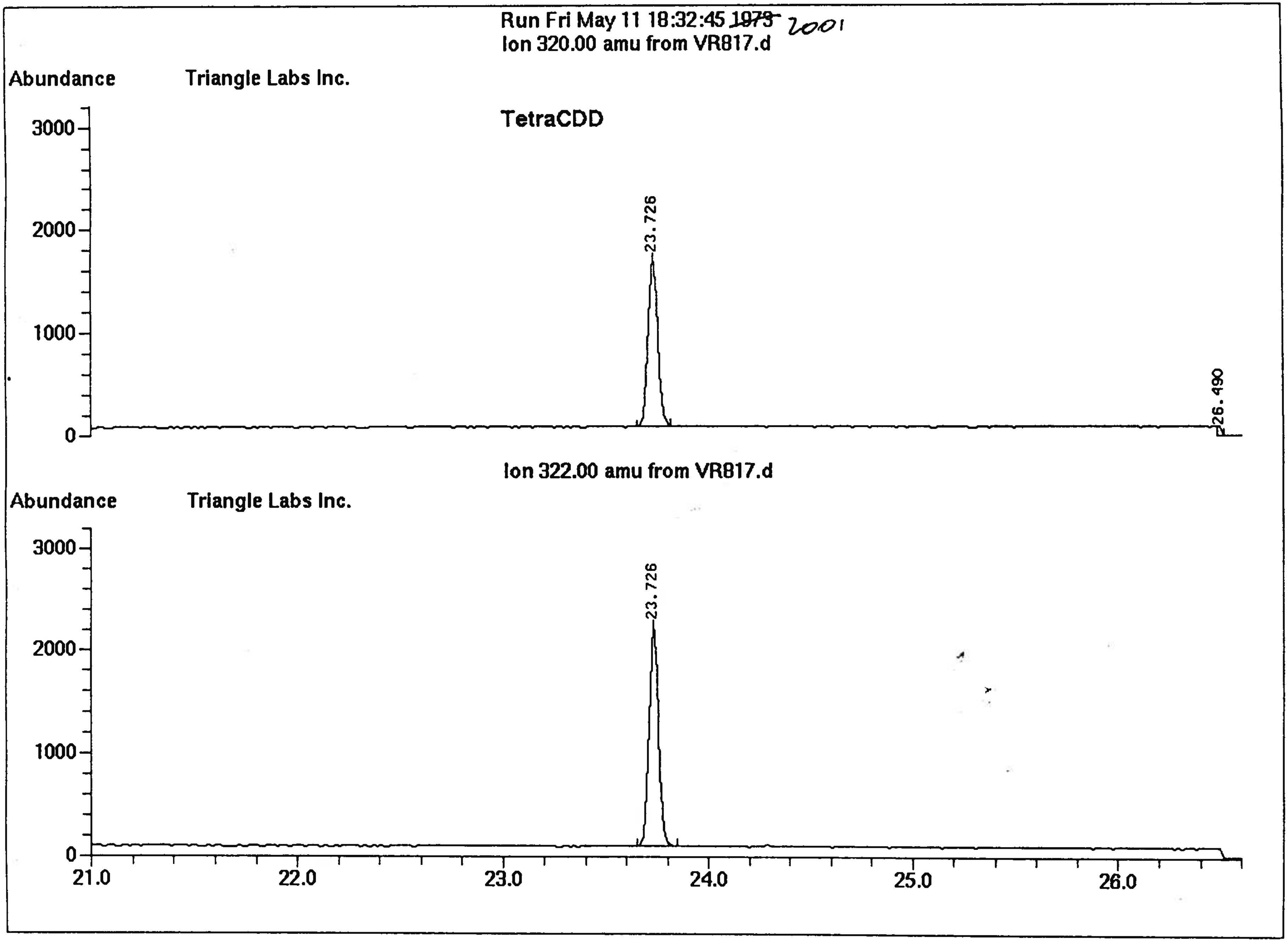
Run Fri May 11 18:32:45 1973 2001
Ion 320.00 amu from VR817.d
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Triangle Labs Inc.
TetraCDD
3000
2000
1000
0
23.726
26.490
Ion 322.00 amu from VR817.d
Abundance
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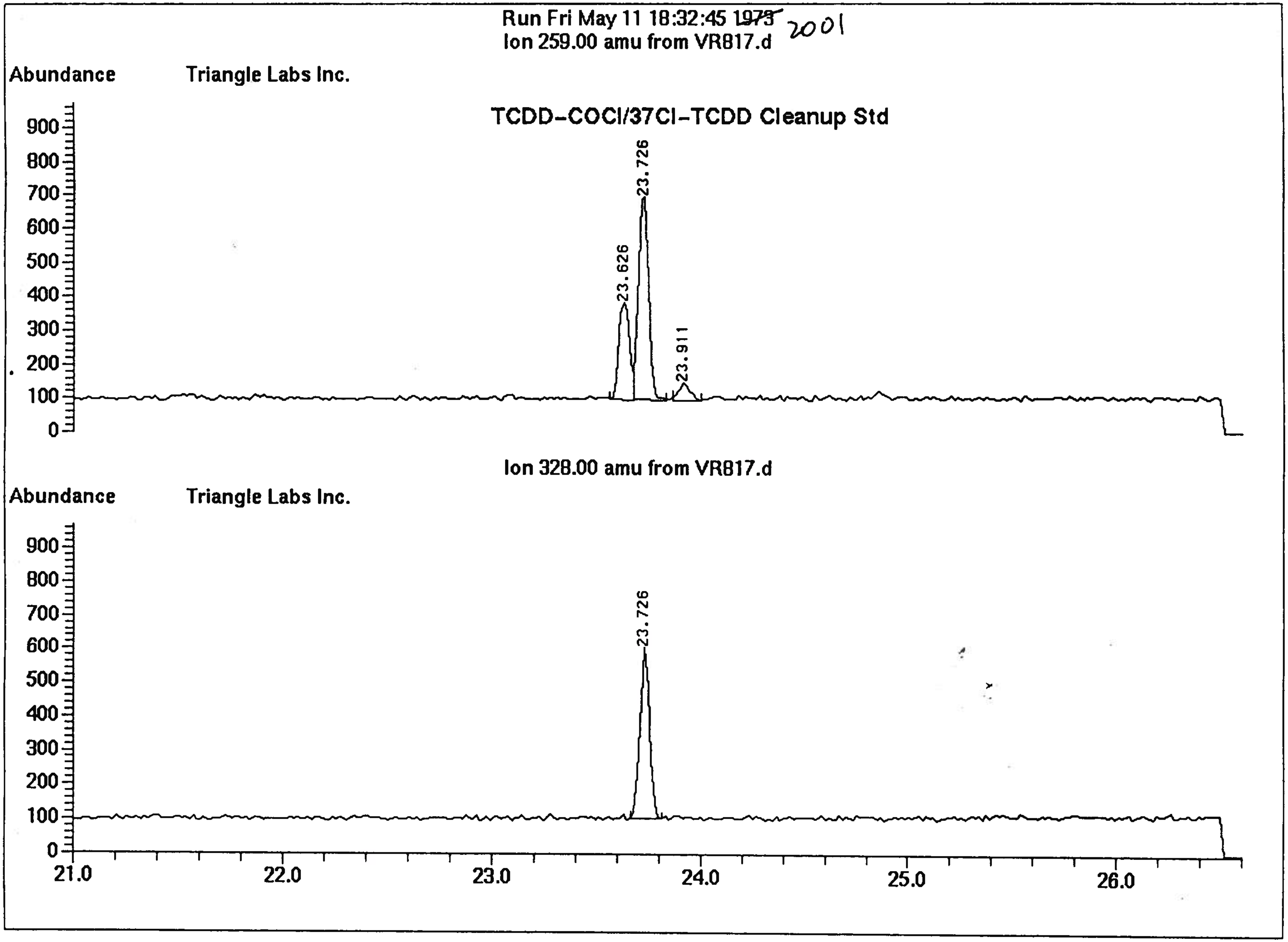

Run Fri May 11 18:32:45 ~~1973~~ 2001
Ion 259.00 amu from VR817.d
Abundance
Triangle Labs Inc.
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800
700
600
500
400
300
200
100
0
23.626
23.726
23.911
Ion 328.00 amu from VR817.d
Abundance
Triangle Labs Inc.
900
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700
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500
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300
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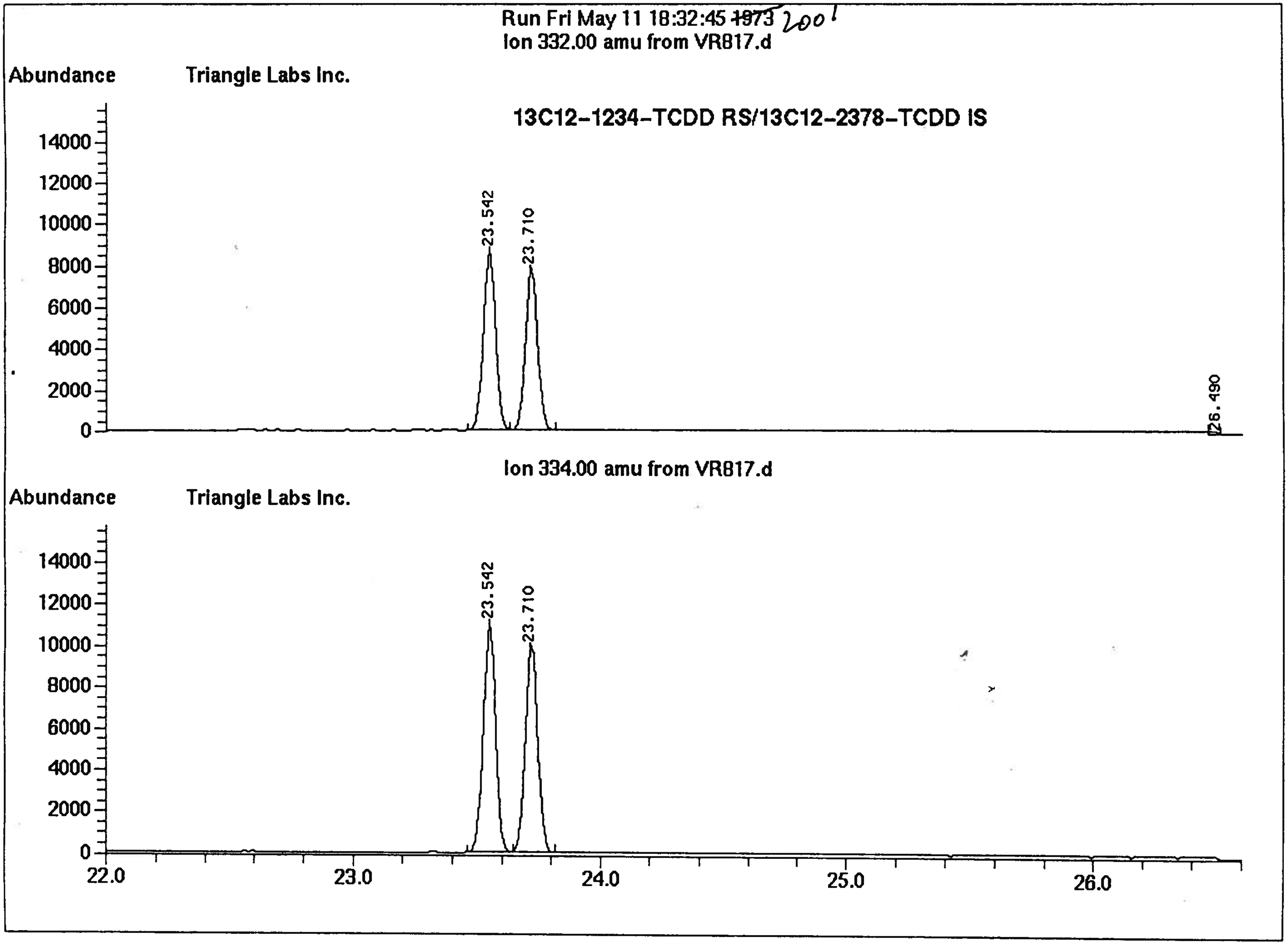
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Ion 332.00 amu from VR817.d
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13C12-1234-TCDD RS/13C12-2378-TCDD IS
14000
12000
10000
8000
6000
4000
2000
0
23.542
23.710
26.490
Ion 334.00 amu from VR817.d
Abundance
Triangle Labs Inc.
14000
12000
10000
8000
6000
4000
2000
0
23.542
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23.0
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```

TRIANGLE LABS

MAY 2

CALIBRATION DATA

Triangle Laboratories, Inc.
801 Capitola Drive
Durham, NC 27713-4411
919-544-5729
P.O. Box 13485
Research Triangle Park, NC 27709-3485
Fax # 919-544-5491

Initial Calibration Summary for V85507T

Analysis Date....: 05/07/2001 Method......: M613
Instrument.......: V

Analytes	RF	SD	%RSD	RT	RT/LO	RT/HI	Ratio1	Ratio2	N
2378-TCDD	0.958	0.013	1%	24:13	23:12	25:12	0.777		5

Other Standards	RF	SD	%RSD	RT	RT/LO	RT/HI	Ratio1	Ratio2	N
37Cl-TCDD	1.984	0.000	0%	24:11	22:12	26:12			1

Internal Standards	RF	SD	%RSD	RT	RT/LO	RT/HI	Ratio1	Ratio2	N
13C12-2378-TCDD	0.938	0.012	1%	24:12			0.783		5

Recovery Standards	RF	SD	%RSD	RT	RT/LO	RT/HI	Ratio1	Ratio2	N
13C12-1234-TCDD	1.000	0.000	0%	24:02	22:12	26:12	0.790		5

*** End of Report ***

Triangle Laboratories, Inc.®
801 Capitola Drive • Durham, North Carolina 27713
Phone: (919) 544-5729 • Fax: (919) 544-5491

Date: 05/11/2001 TRIANGLE LABORATORIES, INC.

Continuing Calibration for VR80600

Analysis Date....: 05/11/2001 Method......: M613
Operator.........: JWL Instrument..: V
Init Calibration.: V85507T Std.Conc....: 0.50
ICal Date........: 05/07/2001

Analyte Summary

Name	RF	Ratio 1&2	RT Lo/High	RT	Rel. RT	ICal RF	Delta RF	%D
2378-TCDD	0.940	0.78	21:09 24:55	23:46	1.0000	0.958	-0.018	-1.9%

Other Standard Summary

Name	RF	Ratio 1&2	RT Lo/High	RT	Rel. RT	ICal RF	Delta RF	%D
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Internal Standard Summary

Name	RF	Ratio 1&2	RT Lo/High	RT	Rel. RT	ICal RF	Delta RF	%D
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Recovery Standard Summary

Name	RF	Ratio 1&2	RT Lo/High	RT	Rel. RT	ICal RF	Delta RF	%D
13C12-1234-TCDD	1.000	0.79		23:35	0.9920	1.000	0.000	0.0%

Triangle Laboratories, Inc.®
801 Capitola Drive • Durham, North Carolina 27713
Phone: (919) 544-5729 • Fax: (919) 544-5491

Printed: 17:21 05/11/2001

STATE OF MISSISSIPPI

APPLICATION FOR A STATE OPERATING PERMIT AND SUPPORTING DOCUMENTS

Prepared for:

KOPPERS COMPANY, INC.
PITTSBURGH, PENNSYLVANIA

Prepared by:

KEYSTONE ENVIRONMENTAL RESOURCES, INC.
MONROEVILLE, PENNSYLVANIA

PROJECT NO. 184733

MARCH 1988

KEYSTONE
ENVIRONMENTAL RESOURCES, INC.

436 Seventh Avenue, Suite 1940, Pittsburgh, PA 15219

March 31, 1988

RECEIVED
APR 04 1988
Dept. of Natural Resources
Bureau of Pollution Control

Mr. Steven Spengler
State of Mississippi
Bureau of Pollution Control
Post Office Box 10385
Jackson, Mississippi 39209

Dear Mr. Spengler:

Enclosed is a signed updated application for a State Operating Permit with supporting documentation for the Koppers Company, Inc. Grenada, Mississippi plant. This application includes the conceptual design for an upgraded treatment system with the proposed treated waste water to be discharged into the city of Grenada's POTW system. A copy of this documentation will be sent to the city of Grenada.

After you have reviewed the enclosed information, please let me know if you feel a meeting is necessary to finalize the permit. I can be reached at 501-945-4581 or call Rob Anderson at 412-227-2683.

Sincerely,

David L. King

David L. King
Regional Environmental
Coordinator

DLK:vsb

cc: Rob Anderson
Jeff Spencer
J.D. Clayton
R.S. Ohlis
(without enclosures)

REGIONAL OFFICE
POST OFFICE BOX 15490
NORTH LITTLE ROCK, ARKANSAS 72231

STATE OF MISSISSIPPI

APPLICATION FOR A STATE OPERATING PERMIT AND SUPPORTING DOCUMENTS

Prepared for:

KOPPERS COMPANY, INC.
PITTSBURGH, PENNSYLVANIA

Prepared by:

KEYSTONE ENVIRONMENTAL RESOURCES, INC.
MONROEVILLE, PENNSYLVANIA

PROJECT NO. 184733

MARCH 1988

LIST OF TABLES

LIST OF FIGURE

drying under ambient conditions. After drying, the solids are placed in 55-gallon drums prior to on-site burning in the boiler.

Creosote is recovered from the surge tank and pumped to the dehydrator. In the dehydrator the creosote is conditioned to remove moisture and is returned to the 60/40 work tank.

Stormwater runoff, collected from the tank farm and drip track areas, is pumped to the surge tank. The storm water runoff collection area is approximately one acre. This surge tank has limited capacity for both stormwater runoff and process wastewater.

Non-contact cooling water and boiler blowdown are discharged to a cooling pond located near the work tank area. An emergency pond adjacent to the cooling pond collects overflow from the cooling pond. When the capacity of the emergency pond is exceeded the water discharges to a nearby drainage ditch.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURE

1.0 INTRODUCTION

This report presents a conceptual design prepared by Keystone Environmental Resources, Inc. for an upgrade of the existing wastewater handling and treatment system at Koppers Company, Inc., Treated Wood Products Plant in Grenada, MS. The current system must be upgraded to comply with recently developed environmental regulations regarding surface impoundments. These regulations require that the plant's existing surface impoundments be removed from operation by November 1988.

Technical and cost evaluations of wastewater treatment alternatives were performed in order to allow for the selection and design of the most cost-effective and technically feasible upgraded wastewater treatment system. A wastewater stream characterization study and analysis of available in-house treatability data from studies on similar wastewaters was conducted to provide information for initial screening of the technical feasibility of various wastewater treatment alternatives. This data was used in conjunction with wastewater pretreatment permit limits established by the Mississippi Department of Natural Resources (DNR) as a basis for the conceptual design presented in this document. It should be noted that a maximum flowrate of 20,000 gallons per day has been established by the Mississippi DNR for the upgraded treatment system since the Grenada POTW is near capacity.

The proposed upgraded wastewater handling and treatment system will be comprised of pretreatment and product recovery followed by biological oxidation (aeration tank process with no solids recycle). Treated wastewater will be discharged to the Publicly Owned Treatment Works (POTW) of the city of Grenada, MS.

2.0 BACKGROUND INFORMATION

2.1 Plant Process Information

The Grenada plant currently produces an average of 10,000 to 15,000 cubic feet of pressure treated wood daily. Preservative chemicals used at the facility include creosote and pentachlorophenol. Based on information provided by Koppers, the use of pentachlorophenol will be discontinued by May 1988. The maximum plant production rate following the discontinuation of pentachlorophenol treatment is projected to be 15,500 cubic feet per day.

Conditioning methods used at the plant to remove moisture prior to treatment of the wood are air seasoning, kiln drying, steaming, and boultonizing. The conditioning method used is dependent on the type of wood to be treated, the desired final moisture content, and the availability of air seasoned stock. Due to the recent installation of a new kiln at the plant, the predominant conditioning method for pole stock is now kiln drying. Current projections for the maximum production schedule at the plant indicate that approximately one-third of the pole stock treated will still be steam conditioned. The predominant conditioning method for tie stock has been and continues to be air seasoning. Limited boultonizing is done at the facility for tie stock when air seasoned stock is not available.

2.2 Existing Wastewater Treatment System Description

Primary sources of effluent generated at the Grenada plant are as follows:

-- water removed from the wood during the conditioning process
-- cylinder drippage
-- contaminated storm runoff from process areas
-- boiler blowdown
-- non-contact cooling water

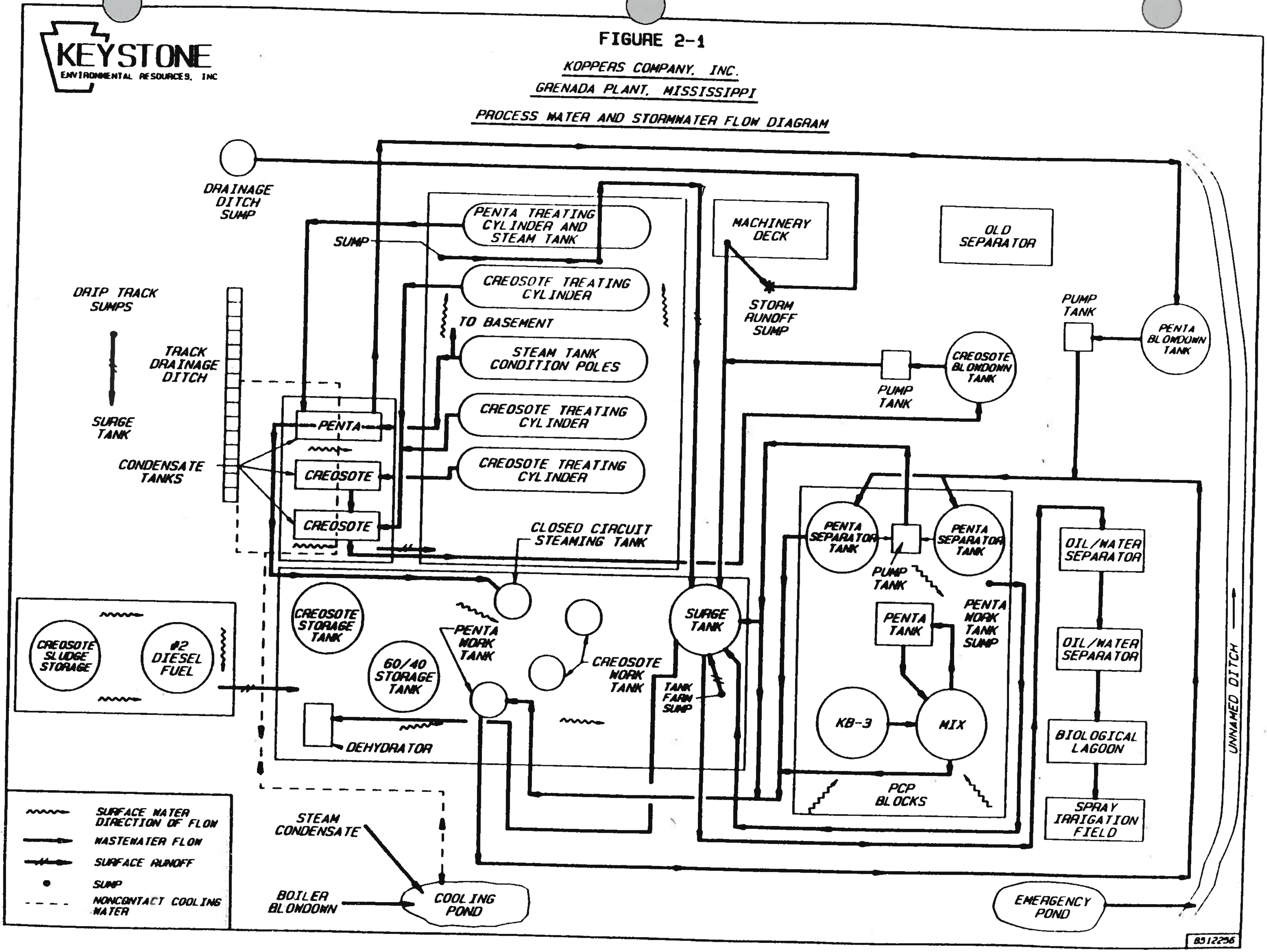
A schematic of the existing wastewater collection system is presented in Figure 2-1. Wastewater generated from the wood preserving operation and contaminated storm water runoff is collected in a series of basins located in the treating and tank farm areas. Wastewater from each collection basin is pumped to a 110,000 gallon

FIGURE 2-1

KOPPERS COMPANY, INC.

GRENADA PLANT, MISSISSIPPI

PROCESS WATER AND STORMWATER FLOW DIAGRAM



capacity surge tank. This surge tank serves as the central collection location for all process wastewaters and storm water runoff.

A total of seven individual wastewater and surface water runoff streams are presently pumped to the surge tank from four sumps:

(i) the tank farm sump, which collects surface runoff from both the work tank area and #2 diesel fuel area;

(ii) the cylinder door drippage sump, which is located beneath the grating immediately in front of the treating cylinders; and

(iii) two drip track sumps that collect water from the drip track area.

Creosote blowdown from cylinder numbers 1, 2 and 4 is collected in the creosote condensate tanks and pumped to the creosote blowdown tank, where separation of free oils is achieved. Reclaimed creosote flows by gravity into a pump tank and is pumped intermittently to the dehydrator. Using the same pump, the water phase is pumped to the 110,000 gallon surge tank.

Condensate from the steaming cylinder (cylinder#3) is either pumped to work tank #3 or is dumped from the cylinder to the basement area. From the basement area, the closed circuit steaming wastewater is pumped to the existing surge tank. There are no provisions for transferring closed circuit steaming wastewater from work tank #3 to the surge tank.

From the surge tank, the combined wastewater flows by gravity to the first of two in-series oil/water separators. Both cationic and anionic polymers are injected in-line to this surge tank discharge ahead of the oil/water separator. Effluent from the oil/water separators is pumped first to a lagoon where additional separation of solids occurs and is then pumped to the sprayfield.

The existing wastewater system treats approximately 5000 gallons per day of process water over an 8-hour period. Any additional water generated over the course of a day is accumulated in the surge tank.

Solids from the oil/water separators is removed with shoveling equipment by plant personnel, after the water level is lowered. The solids are placed in steel bins for drying under ambient conditions. After drying, the solids are placed in 55-gallon drums prior to on-site burning in the boiler.

Creosote is recovered from the surge tank and pumped to the dehydrator. In the dehydrator the creosote is conditioned to remove moisture and is returned to the 60/40 work tank.

Stormwater runoff, collected from the tank farm and drip track areas, is pumped to the surge tank. The storm water runoff collection area is approximately one acre. This surge tank has limited capacity for both stormwater runoff and process wastewater.

Non-contact cooling water and boiler blowdown are discharged to a cooling pond located near the work tank area. An emergency pond adjacent to the cooling pond collects overflow from the cooling pond. When the capacity of the emergency pond is exceeded the water discharges to a nearby drainage ditch.

3.0 PERMIT INFORMATION

Proposed effluent limitations for discharge to the Grenada POTW have been obtained from the Mississippi DNR and are presented in Table 3-1. The discharge limits for pentachlorophenol and total phenols were ultimately derived from State of Mississippi water quality standards for these parameters and the Q_{7-10} for the Yalobusha River, which is the receiving water body for the discharge from the Grenada POTW. Mississippi water quality standards limit the instream concentration of total phenols and pentachlorophenol to 0.05 mg/L and 0.005 mg/L, respectively. The Q_{7-10} for the Yalobusha River is 11.6 MGD.

Other information utilized to calculate discharge limits for the proposed discharge from the Koppers facility include

(i) flowrate of wastewater treated and discharged to the Yalobusha River by the POTW,

(ii) pentachlorophenol and total phenols removal achieved by the POTW,

(iii) Koppers' anticipated sewer discharge flowrate and

(iv) the concentration of pentachlorophenol and total phenols in the influent stream to the POTW.

Based on conversations with POTW personnel, a surcharge will apply for BOD and TSS concentrations in excess of the limits which are listed in the Grenada City Ordinance.

The Koppers' sewer discharge flowrate is limited by the permit to a daily maximum value of 20,000 gallons per day. This limit is based on the fact that the Grenada POTW is currently operating near capacity.

TABLE 3-1

GRENADA, MISSISSIPPI
PROPOSED SEWER DISCHARGE PERMIT REQUIREMENTS

Parameter	Discharge Limitations Daily Average	Discharge Limitations Daily Maximum	Monitoring Requirements Measurement Frequency	Monitoring Requirements Sample Typ
Flowrate, gallons per day	---	20,000	daily	continuous
Biochemical Oxygen Demand, mg/L	240	480	once/week	24-hr. Com
Total Suspended Solids, mg/L	300	600	once/week	24-hr. Com
Total Phenols, mg/L	3	6	once/week	Grab
Pentachlorophenol, mg/L	0.18	0.36	once/week	Grab
Oil & Grease, mg/L	---	100	once/week	Grab
Total Copper, mg/L	2.5	5	Twice/month	24-hr. Com
Total Chromium, mg/L	2	4	Twice/month	24-hr. Com
Total Arsenic, mg/L	2	4	Twice/month	24-hr. Com
pH, units	5.5 - 9.5	---	Twice/month	Grab
Temperature, ^{o}F	---	104		

NOTE: Comp. denotes composite sample.

4.0 PROPOSED TREATMENT SYSTEM PROCESS DESCRIPTION

(Refer to drawings A103230, A103231, A103233 and A103235)

The upgraded wastewater treatment system for the Grenada Treated Wood Products plant will consist of the following unit processes:

- o gravity oil/water separation
- o equalization
- o chemical coagulation/flocculation with pH adjustment
- o gravity settling
- o biological oxidation (aeration tank process with no solids recycle)

A process flowsheet for the proposed system is given in the attached drawings. Equipment associated with the existing pentachlorophenol process is not shown in the drawings since this equipment will be taken out of service.

Process wastewater from the treating cylinders will be collected in the creosote blowdown tank (T-101), where gravity oil/water separation will occur. The water phase will be discharged to the existing pump tank (T-100) and transferred to the existing process wastewater equalization tank (T-105). Recovered creosote from T-101 will be transferred to the existing dehydrator with a new sludge transfer pump (P-101). Light oils from the creosote blowdown tank will be manually drained to the new light oil sump (T-102) and pumped by the new sludge transfer pump to the creosote dehydrator.

The closed circuit steaming system will be modified to provide a more constant flow of less concentrated effluent to the treatment system. A conceptual schematic of the modified system is given on drawing #A103233. Closed circuit steaming water from cylinder #3 will continue to be returned to the closed circuit steaming tank. Vacuum condensate removed from the cylinder during the steaming process will be collected in the existing condensate tank and then pumped to the closed circuit steaming tank. Effluent from the closed circuit steaming tank will overflow to a new sump which will transfer the water to the process water equalization tank (T-105).

Process wastewater from the equalization tank (T-105) will be discharged to the chemical conditioning system weir box (T-106) via a manually operated valve. The design flowrate for process wastewater to the weir box is 4 gpm.

Reclaimed creosote recovered from T-105 will be pumped to the existing creosote dehydrator with a new sludge transfer pump (P-104). Light oils recovered from the process water surge tank will be drained to an oil sump (T-130) which will have a suction line valved to the sludge transfer pump.

Stormwater from the plant process area will be collected in a new 250,000 gallon surge tank (T-104). Table 4-1 provides a summary of the areas from which stormwater will be collected and the acreage for each area. Appropriate stormwater collection equipment (sumps, pumps, trenches, etc.) is to be provided for areas not included in the existing collection system at the plant.

Heavy oils and solids collected in the stormwater storage tank will be transferred by storm water/process water sludge transfer pump (P-104) to the creosote dehydrator. Light oils collected in the tank will be routed to a light oil sump (T-130) and pumped to the creosote dehydrator via a suction line from P-104.

Stormwater will discharge by gravity into the chemical conditioning system weir box (T-106). The design flowrate for the discharge from the stormwater storage tank to the treatment system is 10 gpm. This flowrate can be increased by the operator if the design capacity for the combined process wastewaters (4 gpm) is not being utilized. The stormwater will be introduced to the wastewater system through a manually controlled valve to the weir box at the head of the chemical conditioning system.

Water from the weir box will discharge to the pH adjustment tank (T-107), where 98% sulfuric acid and 25% caustic will be added as necessary for pH control. The acid and caustic feed pumps (P-119 and P-125) will be actuated by a pH controller (C-1). An agitator in the tank (A-107) will provide for complete mixing.

Effluent from the pH adjustment tank will overflow into the cationic polymer rapid mix tank (T-108). This tank will be equipped with an agitator (A-108) to provide constant mixing. The cationic polymer will be pumped "neat" from the drum (pump

TABLE 4-1

GRENADA, MS
STORMWATER RUNOFF AREAS

Site Description	Area, Acre
Treating Cylinder Basement Area	0.2
#5 and #6 Storage Tank Area	0.1
Concrete Drip Pad	0.1
Area in Front of Treating Cylinders	0.3
Area Behind Treating Cylinders	0.3
Total Acreage	1.0

controlled in the range of 20^{o}C to 30^{o}C. The aerator will be sized to provide a residual dissolved oxygen concentration in the tank of 3 mg/L and to provide adequate mixing. Two blowers (B-1 and B-2 - standby) will provide air to the tank. Service water will be supplied to the aeration tank for dilution water to bring the system on-line at initial start-up or after a shutdown period, and to provide dilution during an upset.

A pH controller (C-3) will activate the aeration tank acid and caustic feed pumps (P-120, P-126). A second pH monitor (C-2) will independently monitor the aeration tank pH. Solenoid controlled valves on the inlet line to the weir box (T-106) will be used to shut down the feed to the aeration tank in the event of an alarm signal from the pH monitor (C-2), loss of power to the aerator or blower motors, or a high level in the treated wastewater storage tank (T-114). An alarm signal from C-2 will also disable the aeration tank acid and caustic feed pumps (P-120, P-126).

The treated water storage tank will be equipped with a recycle pump (P-114) to maintain the biological solids in the tank in suspension. In the event that the effluent in the treated water storage tank cannot be discharged, the recycle pump will return the water to the aeration tank or the stormwater storage tank (T-104). Effluent from the treated water storage tank will be sent through a flow/water quality monitoring station prior to being discharged to the sewer.

5.0 DESIGN BASIS

5.1 Wastewater Flowrates

Source	Estimation Method	Maximum Flowrate
Creosote Wastewater	Production information	2.0 gpm
Steaming Wastewater	Production information	1.7 gpm
Total		3.7 gpm

Process Wastewater Design Flowrate - 4.0 gpm

5.2 Stormwater Flowrates and Required Storage Capacity

Source -- "Frequency Analysis for Industrial Stormwater Detention Basins: Grenada, MS" by Dr. Dale D. Meredith, SUNY, Buffalo, N.Y.

Process Area Acreage (see Table 4-1) -- 1.0 acre
Runoff Coefficient -- 1.0
Recurrence Interval -- 10 years
Flowrate to Treatment -- 10 gpm
Required Storage Capacity - 250,000 gallons

5.3 Total Treatment System Capacity

Process Wastewater -- 4.0 gpm
Stormwater -- 10.0 gpm
Total -- 14.0 gpm

Treatment System Design Basis -- 14 gpm

5.4 Existing Process Water Equalization Tank (T-105)

Capacity -- 110,000 gallons

5.5 Chemical Conditioning System Influent Weir Box (T-106)

Design Criteria

Maximum Wastewater Flow -- 14 gpm (0.031 cfs)
Minimum Wastewater Flow -- 2 gpm (0.004 cfs)

5.6 Chemical Conditioning System Tankage

Item	Required Minimum Residence Time @ Max Flow (14 gpm)	Working Volume
pH Adjustment Tank (T-107)	5 min	70 gal
Cationic Rapid Mix Tank (T-108)	2 min	30 gal
Anionic Rapid Mix Tank (T-109)	2 min	30 gal
Slow Mix Tank (T-110)	15 min	210 gal

Anionic Polymer Premix Tank (T-116) -- Design for minimum 1 day capacity and maximum 4 day residence time.

5.7 Existing Settling Basin Information (T-111 A,B)

Total Dimensions: 37' x 15' x 3.75' (LxWxD at effluent end)
Settling Area: 385 ft^2 per settling basin
Settling Volume: 4,425 ft^3 (33,099 gallons) per settling basin

5.8 Decanting Tanks (T-112 A,B)

Capacity - 5,000 gallons per tank

5.9 Aeration Tank System

Influent Data

Flowrate -- 14 gpm
Design COD -- 600 lbs/day
Design FSS -- 10 mg/L

Operational Design Parameters

COD reduction -- 80%
design HRT -- 5 days

Aerator Design Criteria

Required oxygen transfer 15 lbs. O_2/hour
Mixed liquor DO 3.0 mg/L
Temperature range 20^oC - 30^oC
MLTSS 770 mg/L
MLVSS 610 mg/L
MLFSS 160 mg/L

Nutrient Requirements

Phosphorus 3.7 lbs/day as P
Nitrogen 18.4 lbs/day as N

6.0 MAJOR EQUIPMENT LIST

6.1 Tankage

These general specifications define the required capacity, shape and any special functional parts of tankage required for the proper design and operation of the wastewater treatment plant. Existing spare tanks of appropriate capacity, shape and function might be utilized by the plant, either singularly or in combination, if economical and if determined by Koppers to be in serviceable condition.

T-101 Existing Creosote Blowdown Tank

The existing creosote blowdown tank will be modified, as necessary, through replacement/repair of the existing steam heating system, the installation of temperature control instrumentation, and repiping to allow continuous operation. The shell height of the tank is 14 feet. Existing piping will be modified to achieve an outlet line to a gravity overflow manifold with inverts at the 8 feet to 10 feet level and repiping of the influent line to a dip pipe with a disperser plate in the center of the tank discharging at the 4 feet level. A separate discharge manifold which will be higher in elevation than the upper overflow manifold, will be provided for reclaim of light oils from the top of the tank. A freeboard of 2 feet will be required in this tank.

The manifold will discharge to a new light oil sump. This tank will be modified to contain an internal weir.

T-104 Stormwater Storage Tank

The stormwater storage tank will have a capacity of 250,000 gallons and will be equipped with a level gauge, a steam bayonet heater, temperature indicator and valved discharge ports spaced at 4-foot intervals from the base of the tank to the midpoint of the tank. A separate valved drain manifold will be used for reclaim of light oils to a transfer sump. Two suction lines will be provided to pump P-104 from the bottom of the tank. The tank will be contained in a diked area.

T-105 Existing Process Water Equalization Tank

The existing process water equalization tank has a capacity of 110,000 gallons. This tank will be equipped with a steam bayonet heater, temperature indicator, and a level gauge. A discharge manifold with valved drain ports will be used for transfer of process water by gravity. A separate valved drain manifold will be provided for the reclaim of light oils to a transfer sump. Two suction lines will be provided from the bottom of the tank for pump P-104.

T-106 Chemical Conditioning System Weir Box

The chemical conditioning system weir box will be used to monitor the combined flowrate from the stormwater storage tank (T-104) and the process water storage tank (T-105) to the chemical conditioning system. The weir box will have inside dimensions of 7 feet x 2 feet x 1.5 feet (L x W x D) and a capacity of 160 gallons. The weir box will be equipped with a 22.5 degree V-notch weir at the discharge end. The weir plate should be constructed of 1/8-inch to 1/4-inch thick plate and installed level. The following dimensional criteria should be used in the construction of the weir plate and downstream tankage:

Maximum head on weir crest (H_{max}): 0.3 foot
Top of weir to crest of weir: 0.5 foot
Width of v-notch at top of weir plate: 0.2 foot
Top of v-notch to tank sidewall: 0.9 foot
Tank sidewall to crest of weir: 1 foot
V-notch crest to pH adjustment tank water level: 0.5 foot minimum

The inlet lines to the weir box are to be submerged to minimize turbulence in the channel and will be equipped with shut-off valves actuated by a level switch in the settling basin sump. The water level in the weir box will be measured manually for flowrate determination. A drain valve will be installed in the weir box to allow periodic purging of accumulated suspended solids. The chemical conditioning system weir box, pH adjustment tank (T-107), polymer rapid mix tanks (T-108, T-109) and the slow mix tank (T-110) will be elevated to allow gravity flow through the floc settling basins (T-111 A,B).

Access to the tanks will be required for monitoring and servicing of the weir, pH adjustment system and tank mixers. Drain valves from the tanks will drain to the pretreatment area common sump. All of the tanks will be constructed of carbon steel. The tanks will be primed and coated with Koppers Hi-Guard.

T-107 pH Adjustment Tank

The pH adjustment tank will have a minimum working volume of 70 gallons and will be equipped with an agitator (A-107) and 2 inch vertical baffles at the midpoint of each sidewall. The baffles will be offset from the sidewall with appropriate spacers (2 inch offset). The pH probe will be suspended in the tank and be easily removable for routine cleaning.

An underflow baffle on the tank wall opposite the influent line will discharge the pH adjusted water to the cationic polymer rapid mix tank (T-108).

T-108 and T-109 Polymer Rapid Mix Tanks

The cationic polymer rapid mix tank (T-108) and the anionic polymer rapid mix tank (T-109) will each have a minimum working volume of 30 gallons. The tanks will be equipped with 2 inch vertical baffles on the midpoint of each sidewall. The baffles will be offset from the wall with appropriate spacers (1 inch offset). Each tank will contain an agitator (A-108 and A-109). A drain valve will be installed on each tank to facilitate cleaning. The discharge from T-108 will be via an underflow baffle.

T-110 Slow Mix Tank

The slow mix tank will have a minimum working volume of 210 gallons and will be equipped with a variable speed mixer (A-110) with a flocculating impeller mounted over the center of the tank. Vertical sidewall baffles (3 inch) at the midpoint of each sidewall will be provided to enhance the mixing regime in the tank. The baffles will be offset from the tank sidewall with appropriate spacers (2 inch offset). A drain valve will be provided for tank cleanout. Effluent from the slow mix tank will discharge via an overflow to the settling basins (T-111 A,B).

T-111 A,B Existing Settling Basins

Each existing concrete settling basin has the dimension of 37 feet x 15 feet x 3.75 feet (L x W x D at effluent end). This includes a freeboard of 1 foot on the basin sidewall. These settling basins are arranged in series. The bottom slope is twenty percent T-111A will be retrofitted with a traveling solids collection system, a steel liner, and a surface skimmer pipe. An overflow sawtooth weir is existing at the inlet end of the basin to provide for uniform flow distribution across the basin. The discharge end of T-111A has an overflow baffle followed by an underflow baffle for surface oil/solids retention followed by a 4 inch discharge pipe which conveys by gravity this supernatant to the inlet of T-111B for additional clarification.

A new pump (P-112, Wilden air driven or equal) will be used to pump solids from the bottom of both settling basins to the new solids decant tanks (T-112 A,B). The discharge end of T-111B has an underflow baffle followed by an overflow baffle for flow distribution and surface oil/solids retention. This settling basin will be retrofitted with a surface skimmer pipe, and steel liner. A bottoms solids pump suction line is required for T-111B at the inlet end of the settling basin.

T-111 C Settling Basin Sump

This sump is connected to the discharge end of T-111B. Level switches in the settling basin sump will control the transfer of wastewater to the aeration tank. A high level switch in the basin will close the solenoid valves on the influent lines to the chemical conditioning system weir box (T-106). The sump will have 4 inch vertical baffles mounted at the midpoint of each tank wall and offset from the tank wall (2 inch offset). This sump will be lined with steel plate.

T-112 A,B Solids Decanting Tanks

The solids decanting tanks will be conical bottom tanks with a capacity of 5,000 gallons each. The tanks will be equipped with a valved drain manifold with takeoff ports spaced at 1 foot intervals along the straight side of the tanks and a discharge valve at the bottom. The bottom discharge valves will be tied to a common solids transfer pump. The tanks will be supplied with steam heating coils to facilitate transfer of recovered material to the creosote dehydrator. The existing conical penta separation tanks may be modified and substituted for these tanks if they are cleaned and in good condition.

Clarified wastewater recovered from the tanks will be drained by gravity to the inlet end of the chemical conditioning system.

T-113 Aeration Tank

The aeration tank will be an open-top steel tank on a reinforced concrete pad with a working volume of 150,000 gallons. The tank will be equipped with a submerged turbine aerator (AE-1) to provide the necessary oxygen transfer and mixing required for biological activity. The dimensions of the aeration tank as specified by the aeration equipment vendor, Lightnin Mixing Equipment Company, will be 38 feet in diameter with a 18 feet sidewater depth. Total height to the aerator mounting will be 21 feet, including approximately 2 feet of freeboard. The tank will have four-30 inch wide sidewall baffles as recommended by Lightnin Mixing Equipment Company.

Heat will be supplied to the tank to maintain the water temperature in the range of $20^{o}C$ to $30^{o}C$. Direct addition of plant steam will be utilized as the heat source. Insulation of the tank will also be required. Service water will be supplied to the tank for dilution purposes on an as needed basis.

A pH control system (C-3) will be utilized to maintain the pH of the system in the range of 7.0 to 7.5. A second pH monitor (C-2) will shut down flow to the unit during upset conditions.

A support system on the bottom of the tank will be required for the air sparger ring. The support system on the bottom of the tank will be designed to specifications provided by the aerator vendor. Aerator supports will be designed to handle loads specified by the aerator vendor. A wear plate will be provided on the tank bottom.

T-114 Treated Wastewater Storage Tank

The treated water storage tank will be an open-top steel tank with a working volume of 30,000 gallons. The tank foundation shall be reinforced concrete. The tank will have an instrument bridle. A sample box with sample ports at various elevations will be required for tank monitoring. The sample tank will drain into a small vessel which can be isolated such that it may be emptied into the treatment area sump.

T-116 Anionic Polymer Premix Tank

The anionic polymer premix tank will be a prefabricated plastic tank with a capacity of 100 gallons. The tank will be equipped with an agitator (A-116) and level switches. A flowmeter with an adjustable inlet valve will be used to control the flow of dilution water to the premix tank. The dilution water and polymer feed pump (P-115) discharge lines will be located in such a manner to discharge into the vortex created by the premix tank agitator. An air break will be provided between the polymer and dilution water feed lines and the maximum liquid level in the tank. The premixed polymer will be discharged through an outlet valve at the bottom of the tank and transferred to the anionic polymer rapid mix tank (T-109) by the premixed anionic polymer transfer pump (P-117).

T-122 Phosphoric Acid Dilution Tank

The phosphoric acid dilution tank will have a capacity of 100 gallons. Seventy-five percent strength phosphoric acid will be pumped by a transfer pump (P-121) from the 55 gallon drum to the dilution tank. A 7.5% strength phosphoric acid solution is required after dilution. This phosphoric acid dilution tank will be a prefabricated plastic tank, equipped with an agitator (A-122). Service water will be required for dilution of the 75% strength phosphoric acid. An air break will be provided between P-20 discharge and dilution water feed lines and the maximum liquid level in the tank. The diluted phosphoric acid will be discharged from T-122 by a chemical metering pump to be located on a shelf above T-122. This metering pump will transfer the diluted phosphoric acid to the settling basin sump (T-111C). The phosphoric acid dilution system will be manually operated.

T-125 Caustic Mix Tank

The caustic mix tank will be a stressed relieved carbon steel tank with a capacity of 200 gallons. The tank will be equipped with an agitator (A-125).

T-127 Chemical Building Sump

The chemical conditioning building sump will be constructed of concrete and should be poured as a monolithic structure with the building floor. This sump will have a capacity of 200 gallons. An appropriate chemical resistant coating should be applied.

T-110, T-102, T-103, T-130 Treatment Area Sumps

The treatment area sumps will be steel lined concrete sumps designed in accordance with regulatory approved leak detection methods. Existing sumps at the plant may be utilized as appropriate if they are upgraded to meet regulatory requirements.

6.2 Aerator

AE-1 Aeration Tank Aerator

The aerator for the aeration tank will be a 15 HP submerged turbine aerator (Lightning Model No. 75Q15 or equal). The impeller will be Lightning Model No. R321 or equal. Air will be introduced to the tank through an air sparger ring at the bottom of the tank supplied by the aerator vendor. Aerator performance should be guaranteed by the manufacturer in accordance with the specifications in accordance with the specifications given in Section 5.9. An interlock system on the aerator motor will automatically shut-off the feed to the aeration tank if the power supply to the aerator is interrupted.

6.3 Blowers

B-1 and B-2 Blowers

Each blower will be designed to deliver 180 scfm of air at 8.0 psig to the air sparger ring in the aeration tank. One blower will operate continuously and the second will serve as a standby. The blowers will be equipped with inlet filters and silencers. The blowers are to be housed in a soundproof enclosure. An interlock system on the blower motors will automatically shut off the feed to the aeration tank if the power supply to the blowers is interrupted.

6.4 Pumps

P-100 A,B Creosote Wastewater Transfer Pumps

The creosote wastewater transfer pumps will be located in the new sump which collects the overflow from the creosote blowdown tank. The pumps will transfer the wastewater to the new process water equalization tank (T-105) and will have capacities of 25 gpm each. One pump will be operating and the other will be an on-line standby with parallel operation capability. The pumps will be actuated by level switches in the sump.

P-101 Creosote Transfer Pump

Creosote transfer pump P-101 will pump creosote from the bottom of the creosote blowdown tank to the creosote dehydrator. A suction line from the pump will be used for transfer of oils collected in T-102 to the dehydrator. The pump will have the capability to pump heavy oils and will be operated manually.

P-103 A,B Pretreatment Area Sump Pumps

These pumps will be vertically submerged centrifugal pumps with a capacity of 100 gpm each. The pumps will be manually operated.

P-104 Storm Water/Process Water Sludge Transfer Pump

The stormwater/process water sludge transfer pump will transport oils accumulated in the stormwater storage tank and process water equalization tank to the creosote dehydrator. The pump will be of the positive displacement type, will have a capacity of 100 gpm, and will be capable of pumping viscous oils. The pump will be manually operated.

P-111 A,B Settling Basin Sump Pumps

The settling basin sump pumps will transfer wastewater from the settling basin sump to the aeration tank. The pumps will be actuated by level switches in the sump and will have a capacity of 30 gpm each.

P-112 Settling Basin Solids Transfer Pump

The settling basin sludge transfer pump will transfer settled solids from the settling basins (T-111 A,B) to the solids decant tanks (T-112 A,B) and will transfer the concentrated solids from the solids decant tanks to the creosote dehydrator. The new pump will be of the positive displacement type, will have a capacity of 50 gpm, and will be capable of pumping viscous oils and high-solids slurries. This pump will be operated manually.

P-114 Treated Wastewater Recycle Pump

The treated wastewater recycle pump will be used to maintain the biological solids in the treated water storage tank in suspension and to return water which requires additional treatment to the aeration tank or the stormwater storage tank. The pump will be a centrifugal pump with a capacity of 50 gpm.

P-115, P-118, P-140 Polymer Feed Pumps

The polymer feed pumps will be positive displacement diaphragm pumps (LMI or equivalent) with manually adjustable flowrates and be capable of handling viscous liquids (1300 cps @ 25°C). P-118 will have a capacity of 0-20 ml/min and P-115, P-140 will have capacities of 0-40 ml/min. Two pumps will be in operation and the third (P-140) will serve as a shelf spare. The pumps will be manually operated. The discharge from the cationic polymer feed pump (P-118) will be diluted in-line to a concentration of approximately 1%. Dilution water will be supplied through a rotameter with a range of 0-500 ml/min. The anionic polymer feed pump (P-115) will be actuated by a level switch located in the polymer premix tank (T-116) and shut off by a timer. The discharge line from P-115 should be located to discharge into the vortex created by the agitator in the premix tank.

P-117 A,B Premixed Anionic Polymer Feed Pumps

The premixed anionic polymer feed pumps will be used to transfer diluted polymer from the premix tank to the anionic polymer rapid mix tank (T-109). The pumps will be of the positive displacement type, have a capacity of 0-1 liters/min and will be capable of handling viscous liquids (0-500 cps @ 25°C). One pump will operate continuously and the second pump will serve as a shelf spare. The pumps will be manually operated.

P-119 A,B pH Adjustment Tank Acid Feed Pumps

The pH adjustment tank acid feed pumps will be used to transfer 98% sulfuric acid (66^{o} Baume) to the pH adjustment tank (T-107). One pump will be in service and the second pump will be used as a spare. The pumps will have an adjustable flowrate with a capacity of 0-50 ml/min and the required chemical resistance properties. The pump in service will be actuated by a pH controller (C-1). All pumps and chemicals associated with the pH control system and the polymer mixing/feed systems will be located indoors. This includes the anionic polymer premix tank (T-116). An unloading area will be provided for the pH control and polymer system chemicals. Safety stations are to be provided adjacent to areas where any chemical handling occurs.

P-120 Aeration Tank Acid Feed Pump

The aeration tank acid feed pump will be used to supply 98% sulfuric acid (66^{o} Baume) to the aeration tank (T-113). The pump will have an adjustable flowrate of 0-30 ml/min and possess the appropriate chemical resistance properties. The pump will be actuated by the aeration tank pH controller (C-3) which will have a sensor located in the aeration tank.

P-121 Phosphoric Acid Drum Transfer Pump

This pump will supply a "neat" 75% phosphoric acid solution from a 55 gallon drum to a 100 gallon dilution tank at a flowrate of 0-1 gpm. This pump will possess the appropriate chemical resistance properties.

P-122 A,B Phosphoric Acid Feed Pumps

The diluted phosphoric acid feed pumps will transfer phosphoric acid from the phosphoric acid dilution tank (T-122) to the settling basin sump (T-111C) at a maximum flowrate of 0-25 ml/min. There will be one phosphoric acid feed pump in service and a second pump as a shelf spare. The pumps will have an adjustable flowrate, will possess chemical resistance properties, and will be LMI or equal. The pumps will be manually operated.

P-123 A,B Urea Transfer Pumps

This pump will supply a "neat" 40% urea solution from a 55 gallon drum to the settling basin sump (T-111C). Each pump will be capable of pumping urea at a flowrate of 0-25 ml/min. There will be one pump in service and a second pump as a shelf spare. The pump will have an adjustable flowrate, will possess chemical resistance properties, and will be LMI or equal.

P-124 Caustic Transfer Pump

The caustic transfer pump will be a drum pump capable of pumping 50% caustic to the caustic mix tank (T-125).

P-125 pH Adjustment Tank Caustic Feed Pump

The pH adjustment tank caustic feed pump will be used to transfer 25% caustic to the pH adjustment tank (T-107). The pump will have have an adjustable flowrate with a capacity of 0-100 ml/min and possess the required chemical resistance properties. The pump will be actuated by a pH controller (C-1).

P-126 A,B Aeration Tank Caustic Feed Pumps

The aeration tank caustic feed pumps will be used to transfer 25% caustic to the aeration tank (T-113). One pump will be in operation and the second pump will serve as a shelf spare for the aeration tank caustic feed system and the pH adjustment tank (T-107) caustic feed system. The pumps will have an adjustable flowrate with a capacity of 0-60 ml/min and possess the appropriate chemical resistance properties. The pump in service will be actuated by a pH controller (C-3) which will have a sensor located in the aeration tank.

P-127 Chemical Building Sump Pump

The chemical building sump pump will be a vertically submerged centrifugal pump. This pump will have a capacity of 30 gpm and will be manually operated.

6.5 Agitators

A-107 pH adjustment Tank Agitator

The pH adjustment tank agitator will provide mixing for the pH adjustment tank (T-107). The agitator will be equipped with a 1/2 HP motor operating at 1,725 rpm. The agitator will be controlled with a manually operated switch. The shaft and impeller for the agitator will be constructed of 316 stainless steel.

A-108, A-109 Polymer Rapid Mix Agitators

The polymer rapid mix tank agitators will provide mixing to the cationic polymer rapid mix tank (T-108) and the anionic polymer rapid mix tank (T-109). The agitators will be equipped with a 1/2 HP motor gear-reduced to 420 rpm. The agitators will be controlled with a manually operated switch. The shaft and impeller of the agitators will be constructed of 316 stainless steel.

A-110 Slow Mix Tank Agitator

The slow mix tank agitator will provide mixing to the slow mix tank (T-110) in the chemical conditioning system. The agitator will be equipped with a 3/4 HP variable speed (42-420 rpm) gear-reduced motor and a low-shear flocculating impeller. The agitator will be controlled with a manually operated switch. The shaft and impeller of the agitator will be constructed of 316 stainless steel.

A-115 Anionic Polymer Drum Agitator

The anionic polymer drum agitator will be used to provide mixing to the anionic polymer drum feeding the polymer premix tank. The agitator (Neptune H-3.0 or equivalent) will be equipped with a 1/2 HP, 1,725 rpm motor and will designed for installation through a standard 2 inch bung. The mixer will be controlled by a timer which will have an on cycle of 1/2 hour per day.

A-116 Anionic Polymer Premix Tank Agitator

The polymer premix tank agitator will be used to provide mixing to the polymer premix tank (T-116). The agitator will be equipped with a 1/2 HP motor gear-reduced to 420 rpm and a low-shear impeller. The agitator will be controlled with a manually operated switch.

A-122 Phosphoric Acid Dilution Tank Agitator

The phosphoric acid dilution tank agitator will be used to provide mixing to the phosphoric acid dilution tank (T-122). The agitator will be equipped with a 1/2 HP motor gear-reduced to 420 rpm. The agitator will be controlled with a manually operated switch. The shaft and impeller of the agitator will be constructed of 316 stainless steel.

A-125 Caustic Mix Tank Agitator

The caustic mix tank agitator will be used to provide mixing to T-125. The agitator will be equipped with a 3/4 HP motor gear reduced to 420 rpm. The agitator will be controlled with a manually operated switch. The shaft and impeller of the agitator will be constructed of 316 stainless steel.

6.6 pH Controllers

C-1 pH Adjustment Tank pH Controller

The pH adjustment tank pH controller will be used to maintain the pH in the pH adjustment tank (T-107). The pH sensor will be mounted in the pH adjustment tank and will be removable for cleaning. The output from the pH controller will be used to control the flowrate from the pH adjustment tank acid feed pump (P-119) and caustic feed pump (P-125).

C-2 Aeration Tank pH Monitor

The aeration tank pH monitor will be used to independently monitor the pH of the aeration tank. High pH (pH = 8.0) and low pH (pH = 6.5) alarm set points on the monitor will actuate an alarm system which will automatically shut-off the feed to the aeration tank via solenoid controlled valves on the inlet line to the weir box (T-106) and will disable the aeration tank caustic feed pumps (P-126) and the aeration tank acid feed pump (P-120).

C-3 Aeration Tank pH Controller

The aeration tank pH controller will be used to maintain the pH in the aeration tank (T-113) in the range of 7.0 to 7.5. The pH sensor will be mounted in the aeration tank and will be removable for cleaning. The output from the controller will be used to actuate the aeration tank caustic feed pump (P-126) and the aeration tank acid feed pump (P-120).

6.7 Building

X-1 Chemical Conditioning Building

The chemical conditioning building will house the chemical mix tanks (T-116, T-122, and T-125), chemicals and pumping equipment associated with the chemical conditioning system. Adequate heat will be provided to prevent freezing of 50% caustic. A hose station, safety stations and sump will be provided. Adequate storage space will be provided for full and empty 55 gallons drums.

6.8 Fire Protection

Any additional fire protection equipment recommended by the insurance carrier will be provided.

6.9 Safety Stations

Safety shower, eyewash, signs and first aid equipment will be provided where personnel may come in contact with corrosive or hazardous substances.

6.10 Effluent Monitoring Station

The effluent monitoring station will be equipped with sampling equipment capable of taking both flow and time proportioned samples and include a recording flowmeter. Effluent samples will be stored in a refrigerated compartment ($4^{o}C$) prior to being sent out for analysis.

6.11 Laboratory

A laboratory for on-site chemical analyses will be installed at the Grenada plant. This laboratory will have a minimum of 100 ft^2 area. Benches and cabinets will be furnished for the laboratory. Laboratory supplies will be purchased prior to plant start-up.

DATA SUMMARY

DISCHARGE FROM BIOLOGICAL TREATMENT UNITS FOR WASTEWATERS GENERATED FROM WOOD PRESERVING PROCESSES

Prepared for:

KOPPERS COMPANY, INC.
PITTSBURGH, PENNSYLVANIA

Prepared by:

KEYSTONE ENVIRONMENTAL RESOURCES, INC.
MONROEVILLE, PENNSYLVANIA

PROJECT NO. 184733

MARCH 1988

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DISCHARGE FROM BIOLOGICAL TREATMENT UNITS TREATING WASTEWATERS FROM WOOD PRESERVING PROCESSES

1.0 INTRODUCTION

1.1 Purpose

The primary purpose of this report is to respond to the request of Mr. Wm. Stephen Spengler of the Mississippi Bureau of Pollution Control about anticipated total suspended solids (TSS) and biochemical oxygen demand (BOD) concentrations in the Koppers biological treatment system sewer discharge stream. The proposed aeration tank (without solids recycle) biological treatment system is to be installed at the Koppers plant in Grenada, MS. The currently proposed limits are:

- TSS - daily average of 300 and daily maximum of 600 mg/L
- BOD - daily average of 240 and daily maximum of 480 mg/L

Mr. Spengler has expressed concerns about the compounds associated with the effluent TSS discharged to the sewer. The compounds of concern are pentachlorophenol and potentially carcinogenic polynuclear aromatic hydrocarbons (PAH). Koppers will discontinue the use of pentachlorophenol as a wood preservative at the Grenada plant during May 1988. However, residual pentachlorophenol may be detected for some time in the influent to the proposed biological treatment system.

A discussion of potentially carcinogenic PAH compounds is presented with computational methods that may be utilized to determine the loadings of TSS, associated potentially carcinogenic PAH compounds, and pentachlorophenol to the sewer. Analytical data is presented for biological treatment units in Koppers' wood preserving plants that utilize (i) creosote only and (ii) pentachlorophenol and creosote. This information is presented so that upper limits (which are not the same as the POTW surcharge limit) for BOD and TSS can be established by the State for Koppers discharge to the Grenada POTW.

1.2 Summary

Based on the information presented in this report, the TSS initially discharged from Koppers proposed biological treatment system may contain potentially carcinogenic PAH and pentachlorophenol compounds at detectable concentrations. However, pentachlorophenol use as a preservative at the Koppers plant is to be discontinued prior to installation of the biological treatment system. After discontinued pentachlorophenol use, its concentration in the effluent is expected to decline.

BOD and TSS concentrations in the effluent wastewater sewer discharge stream may occasionally be greater than POTW ordinance limits. A surcharge would apply to any discharge in excess of the POTW ordinance limits.

2.0 BACKGROUND

Table 1 presents the Environmental Protection Agency's (EPA) classification of selected PAHs by their potential carcinogenicity. Of the sixteen PAHs listed, only six are potentially carcinogenic. These potentially carcinogenic PAHs include benz (a) anthracene, chrysene, benzo (b) fluoranthene, benzo (a) pyrene, dibenz (a,h) anthracene and indeno (1,2,3-c,d) pyrene.

3.0 PRESENTATION OF BENCH-SCALE AND FULL-SCALE ANALYTICAL RESULTS

The discharge of potentially carcinogenic PAHs and pentachlorophenol to the sewer occurs in two ways, (i) with the TSS discharged from the aeration tank and (ii) with the wastewater discharged from the aeration tank.

The TSS discharged from the aeration tank is generally comprised of volatile suspended solids (VSS) consisting primarily of biomass and fixed suspended solids (FSS), consisting of sand, dirt and ash particles. TSS is the sum of VSS and FSS.

Potentially carcinogenic PAHs and pentachlorophenol have a tendency to be adsorbed on the surface of the biomass because of their relatively low solubility in water. The concentration of these compounds is generally higher in the TSS than in the wastewater for this reason.

TABLE 1
EPA'S CLASSIFICATION OF SELECTED PAHs BY THEIR POTENTIAL CARCINOGENICITY

Noncarcinogenic PAHs

Naphthalene
Acenaphthylene
Acenaphthene
Fluorene
Phenanthrene
Anthracene
Fluoranthene
Pyrene
Benzo(g,h,i)perylene
Benzo(k)fluoranthene

Potentially Carcinogenic PAHs

Benz(a)anthracene
Chrysene
Benzo(b)fluoranthene
Benzo(a)pyrene
Dibenz(a,h)anthracene
Indeno(1,2,3-c,d)pyrene

Reference: **EPA Superfund Public Health Evaluation Manual**

3.1 Aeration Tank TSS Concentrations

Table 2 presents analytical data for TSS samples collected inside the bench-scale aeration tank during the treatability study conducted for the Koppers South Carolina plant. The South Carolina plant utilizes both creosote and pentachlorophenol as preservatives. The wastewater introduced to this aeration tank system was subjected to pH adjustment to enhance pentachlorophenol removal followed by polymer enhanced oil/water separation. The analytical results indicate a total potentially carcinogenic PAH concentration in the filtered TSS of 22.9 mg per Kg of dry solids. Dry solids are defined as TSS.

Analytical results for pentachlorophenol are also presented in Table 2. These results indicate that pentachlorophenol concentrations in the aeration tank filtered TSS is 290 mg/Kg TSS.

Additional analytical data from Koppers Illinois and Kentucky plants were evaluated to determine the total potentially carcinogenic PAH concentrations in the TSS for plants utilizing only creosote as the wood preservative. Each plant utilized the biological aeration tank treatment system. Four water samples were obtained, and passed through a sand filter to separate the water and the TSS. The filtered TSS was analyzed for PAH. One water sample was obtained from the aeration tank discharge stream at the Kentucky plant and analyzed for TSS, filtered and the filtered TSS analyzed for PAH. The average total potentially carcinogenic PAH associated with the five filtered TSS samples collected was 1,169 mg/Kg TSS.

3.2 Effluent Wastewater Quality

Table 3 presents aeration tank effluent wastewater quality results for the South Carolina treatability study. The results in Table 3 indicate that the mean BOD, TSS, VSS, FSS and pentachlorophenol concentrations were 1,094 mg/L, 1,005 mg/L, 856 mg/L, 149 mg/L, and 0.22 mg/L, respectively. The minimum BOD, TSS, VSS, FSS and pentachlorophenol concentrations were 316 mg/L, 51 mg/L, 51 mg/L, 0 mg/L and 0.01 mg/L, respectively. The maximum BOD, TSS, VSS, FSS and pentachlorophenol

TABLE 2
SOUTH CAROLINA WASTEWATER TREATABILITY STUDY
AERATION TANK
TSS ANALYSES

Parameter	Concentrations, mg/Kg Dry Solids
Potentially Carcinogenic PAHs	
Benz(a)anthracene	6.5
Chrysene	8.8
Benzo(b)fluoranthene	<0.1
Benzo(a)pyrene	5.1
Dibenz(a,h)anthracene	0.1
Indeno(1,2,3-c,d)pyrene	2.4
Total	22.9
Pentachlorophenol	290

Reference: Koppers Company Inc.; Wastewater Treatability Study Report for South Carolina Wood Treating Plant, February 1, 1985.

TABLE 3
SOUTH CAROLINA WASTEWATER TREATABILITY STUDY
AERATION TANK
EFFLUENT WASTEWATER ANALYSES

Parameter	**Concentration, mg/L** Mean	Minimum	Maximum
BOD	1,094	316	2,533
TSS	1,005	51	2,924
VSS	856	51	2,100
FSS	149	0	824
Pentachlorophenol	0.22	0.01	0.76

Note: All values have units of mg/L.

Reference: Keystone Environmental Resources, Inc.; Wastewater Treatability Study II for Koppers Company Inc., Treated Wood Products Plant in South Carolina; July 1986.

concentrations were 2,533 mg/L, 2,924 mg/L, 2,100 mg/L, 824 mg/L, and 0.76 mg/L, respectively.

Table 4 presents potentially carcinogenic PAHs that were detected in the aeration tank effluent wastewater during the South Carolina plant treatability study. The total potentially carcinogenic PAH value was 0.308 mg/L. This value of 0.308 mg/L includes potentially carcinogenic PAH in the wastewater and adsorbed on the TSS.

Table 5 presents analytical results for the effluent wastewater of the full-scale aeration tank system in Illinois. The results indicate concentration values for BOD, TSS, VSS and FSS which were achieved at the Illinois plant during three sampling periods. The BOD concentration of 31 mg/L was realized on both May 28 and June 4, 1986, and 26 mg/L on June 18, 1986. The TSS concentration was 320 mg/L on May 28, 316 mg/L on June 4 and 240 mg/L on June 18, 1986. VSS concentrations were 184 mg/L, 188 mg/L and 240 mg/L for the three dates. The FSS concentration of 136 mg/L was realized on May 28, 128 mg/L on June 4 and 0 mg/L on June 18, 1986.

Analytical results for a full-scale aeration tank system operated at Koppers' Illinois plant are shown in Table 6. Creosote is the only wood preservative utilized at this plant. Table 6 presents analytical data for three sampling periods. Total potentially carcinogenic PAH concentrations were 0.37 mg/L on May 28, 0.19 mg/L on June 4 and 0.55 mg/L on June 18, 1986. These values are comparable to the results obtained in the aeration tank treatability study for the South Carolina plant. A sample was not collected from the aeration tank and analyzed for TSS at the Illinois wastewater treatment plant.

4.0 CALCULATION OF EFFLUENT LOADINGS

The computations performed (see Attachment 1) for the TSS loading on the South Carolina treatability study data indicate that 0.004 pounds of total potentially carcinogenic PAH may be discharged to the sewer daily based on a TSS loading of 167.6 pounds per day. A pentachlorophenol loading of 0.049 pounds per day may be discharged to the sewer daily based on the same TSS loading. The sewer discharge flowrate utilized was the maximum value of 20,000 gallons per day, as proposed on the Pretreatment Draft Permit No. PT90300 presented in Attachment 2. A TSS value of 1,005 mg/L was utilized based on the information shown in Table 3.

TABLE 4
SOUTH CAROLINA WASTEWATER TREATABILITY STUDY
AERATION TANK
EFFLUENT WASTEWATER
POTENTIALLY CARCINOGENIC PAHs

Parameter	Concentration, mg/L
Benz(a)anthracene	0.05
Chrysene	0.05
Benzo(b)fluoranthene	0.08
Benzo(a)pyrene	0.08
Dibenz(a,h)anthracene	0.008
Indeno(1,2,3-c,d)pyrene	0.04
Total Potentially Carcinogenic PAH	0.308

Reference: Keystone Environmental Resources, Inc.; Wastewater Treatability Study II for Koppers Company Inc.; Treated Wood Products Plant in South Carolina; July 1986.

.000967

TABLE 5
ILLINOIS WASTEWATER EFFLUENT ANALYSES
FULL-SCALE AERATION TANK SYSTEM
EFFLUENT WASTEWATER ANALYSES

Parameter	Concentration, mg/L		
	5/28/86	6/4/86	6/18/86
BOD	31	31	26
TSS	320	316	240
VSS	184	188	240
FSS	136	128	0

Reference: Keystone Environmental Resources, Inc.; Illinois Biological Treatment System Data; October 29, 1986.

TABLE 6

ILLINOIS WASTEWATER EFFLUENT ANALYSES
FULL-SCALE AERATION TANK SYSTEM
WOOD PRESERVATION-CREOSOTE
POTENTIALLY CARCINOGENIC PAHs

	Concentration, mg/L		
	5/28/86	6/4/86	6/18/86
Benz(a)anthracene	0.01	0.01	0.02
Chrysene	0.01	0.01	0.02
Benzo(b)fluoranthene	0.11	0.05	0.15
Benzo(a)pyrene	0.16	0.07	0.23
Dibenz(a,h,)anthracene	0.01	0.01	0.02
Indeno(1,2,3-c,d)pyrene	0.07	0.04	0.11
Total Potentially Carcinogenic PAHs, mg/l	0.37	0.19	0.55

Reference: Keystone Environmental Resources, Inc.; Illinois Biological Treatment System Data, October 29, 1986.

The computations performed for the TSS loading on the Illinois and Kentucky aeration tank discharge indicate that 0.196 pounds of total potentially carcinogenic PAH may be discharged to the sewer daily based on a TSS loading of 167.6 pounds per day. The loading of a 0.196 pounds per day of total potentially carcinogenic PAH may be more representative of the future Grenada plant sewer discharge stream because the Grenada plant will treat wastewaters generated from a wood preserving process utilizing only creosote.

The calculation results indicate that total potentially carcinogenic PAH and pentachlorophenol loading to the sewer can occur when the TSS discharge concentration is 1,005 mg/L.

5.0 CONCLUSIONS

Based on information presented in this report, TSS discharged from Koppers proposed biological treatment system may contain potentially carcinogenic PAH and pentachlorophenol compounds at concentrations above background. However, pentachlorophenol use as a preservative at the Koppers plant is to be discontinued prior to installation of the biological treatment system.

BOD and TSS concentrations in the effluent wastewater sewer discharge stream may occasionally be greater than POTW ordinance limits. A surcharge would apply to any discharge in excess of the POTW ordinance limits.

ATTACHMENT 1

COMPUTATIONS

Problem: Determine the lbs/day of potentially toxic pollutants in the anticipated sewer discharge from the upgraded aeration tank treatment system. Potentially toxic pollutants are defined in terms of total carcinogenic PAH and pentachlorophenol.

Given: (1) maximum sewer discharge flowrate, Q = 20,000 gallons per day

(2) wet activated sludge consists of 98.5% moisture (Metcalf & Eddy, 1972 Edition, p. 581)

Solution: (1) Determine dry weight of activated sludge:
moisture content of wet activated sludge = 98.5%

$$\frac{W_w - W_d}{W_w} \times 100\% = \text{moisture content}$$

W_w = weight of wet activated sludge
W_d = weight of dry activated sludge

Dry weight of activated sludge

$$\frac{W_w - W_d}{W_w} = 0.985$$

$$W_w - W_d = (0.985)(W_w)$$
$$W_w - (0.985)(W_w) = W_d$$
$$W_d = W_w(1 - 0.985) = 0.015\,(W_w)$$

If $W_w = 1\ Kg$
$W_d = 0.015(1 Kg) = \boxed{0.015\ Kg}$

Solution cont'd:

(2) Determine weight of total carcinogenic PAH per weight of dry solids

From Table 2 – aeration Tank Biomass

$$22.9\ \frac{\text{mg Total carcinogenic PAH}}{\text{Kg dry solids}} \times \frac{0.454\ \text{Kg}}{\text{lb}} \times \frac{1\ \text{lb}}{454{,}000\ \text{mg}}$$

$$= \boxed{2.29 \times 10^{-5}\ \frac{\text{lbs Total carcinogenic PAH}}{\text{lbs dry solids}}}$$

(3) Determine weight of pentachlorophenol per weight of dry solids

From Table 2 – aeration Tank Biomass

$$290\ \frac{\text{mg pentachlorophenol}}{\text{Kg dry solids}} \times 0.454\ \frac{\text{Kg}}{\text{lb}} \times \frac{1\ \text{lb}}{454{,}000\ \text{mg}}$$

$$= \boxed{2.9 \times 10^{-4}\ \frac{\text{lbs pentachlorophenol}}{\text{lbs dry solids}}}$$

(4) Determine weight of TSS discharged to sewer per day

From Table 3 – Effluent wastewater analyses

Mean TSS concentration = 1,005 mg/L

$$\text{TSS loading} = 1{,}005\ \text{mg/L} \times \frac{8.34\ \text{lbs}}{\text{mg/L - MG}} \times \frac{1\ \text{MG}}{10^6\ \text{gallons}} \times 20{,}000\ \frac{\text{gallons}}{\text{day}}$$

$$= \boxed{167.6\ \frac{\text{lbs TSS}}{\text{day}}}$$

Maximum TSS concentration = 2,924 mg/L

TSS loading = $\boxed{487.7\ \text{lbs TSS/day}}$

Solution cont'd:

(5) Determine weight of Total potentially carcinogenic PAH discharged to the sewer daily

$$2.29 \times 10^{-5} \frac{\text{lbs Total potentially carcinogenic PAH}}{\text{lbs dry solids}} \times 167.6 \frac{\text{lbs dry solids as TSS}}{\text{day}}$$

$$= \boxed{0.004 \frac{\text{lbs Total potentially carcinogenic PAH}}{\text{day}}}$$

$$2.29 \times 10^{-5} \frac{\text{lbs Total potentially carcinogenic PAH}}{\text{lbs dry solids}} \times 487.7 \frac{\text{lbs dry solids as TSS}}{\text{day}}$$

$$= \boxed{0.011 \frac{\text{lbs Total potentially carcinogenic PAH}}{\text{day}}}$$

(6) Determine weight of pentachlorophenol discharged to the sewer daily, providing wood preserving plant utilizes pentachlorophenol as a preservative.

$$2.9 \times 10^{-4} \frac{\text{lbs pentachlorophenol}}{\text{lbs dry solids}} \times 167.6 \frac{\text{lbs dry solids as TSS}}{\text{day}}$$

$$= \boxed{0.049 \frac{\text{lbs pentachlorophenol}}{\text{day}}}$$

$$2.9 \times 10^{-4} \frac{\text{lbs pentachlorophenol}}{\text{lbs dry solids}} \times 487.7 \frac{\text{lbs dry solids as TSS}}{\text{day}}$$

$$= \boxed{0.141 \frac{\text{lbs pentachlorophenol}}{\text{lbs dry solids}}}$$

ATTACHMENT 2

DRAFT PERMIT

State of Mississippi
Water Pollution Control
PERMIT

TO OPERATE A WASTE DISPOSAL SYSTEM IN ACCORDANCE

WITH NATIONAL AND STATE PRETREATMENT STANDARDS

THIS CERTIFIES THAT
KOPPERS COMPANY, INC.
GRENADA, MISSISSIPPI

has been granted permission to discharge wastewater into
Grenada Publicly Owned Treatment Works

in accordance with effluent limitations, monitoring requirements and other conditions set forth in this permit. This permit is issued in accordance with the provisions of the Mississippi Water Pollution Control Law (Section 49-17-1 et seq., Mississippi Code of 1972), and the regulations and standards adopted and promulgated thereunder, and under authority granted pursuant to Section 402 (b) of the Federal Water Pollution Control Act.

The issuance of this permit does not relieve the permittee from complying with any requirements which the Publicly Owned Treatment Works (POTW) Authority may deem necessary as a prerequisite to the use of the Authority's sewage system and associated treatment works.

MISSISSIPPI NATURAL RESOURCES PERMIT BOARD

DIRECTOR, BUREAU OF POLLUTION CONTROL
MISSISSIPPI DEPARTMENT OF NATURAL RESOURCES

Issued:

Expires:

Permit No. PT90300

PART I

A. PRETREATMENT LIMITATIONS AND MONITORING REQUIREMENTS

1. During the period beginning and lasting until the permittee is authorized to discharge from outfall(s) serial number(s) 001 (Total Facility Discharge)

Such discharges shall be limited and monitored by the permittee as specified below:

PARAMETER	DISCHARGE LIMITATIONS kg/day (lbs/day) Daily Avg.	kg/day (lbs/day) Daily Max.	Other Units (Specify) Daily Avg.	Other Units (Specify) Daily Max.	MONITORING REQUIREMENTS Measurement Frequency	Sample Type
Flow-M^3/day (MGD)	--	--		(.02)	Daily	Continuous
Biochemical Oxygen Demand (5-Day)	18(40)	36(80)	240 mg/1	480 mg/1	Once/Week	24-Hr.Composite
Total Suspended Solids	23(50)	45(100)	300 mg/1	600 mg/1	Once/Week	24-hr.Composite
Total Phenols	.23(.51)	.46(1.02)	3 mg/1	6 mg/1	Once/Week	Grab
Pentachlorophenol	.01(.03)	.03(.06)	.18 mg/1	.36 mg/1	Once/Week	Grab
Oil & Grease	--	7.5(16.7)	--	100 mg/1	Once/Week	Grab
Copper,Total	.2(.4)	.4(.8)	2.5 mg/1	5 mg/1	Twice/Month	24-Hr.Composite
Chromium, Total	.15(.3)	.3(.7)	2 mg/1	4 mg/1	Twice/month	24-Hr.Composite
Arsenic, Total	.15(.3)	.3(.7)	2 mg/1	4 mg/1	Twice/Month	24-Hr.Composite

2. The pH shall not be less than 5.5 standard units nor greater than 9.5 standard units and shall be monitored twice per week with a grab sample of the effluent.

3. Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location(s): at the nearest accessible point after final treatment but prior to actual discharge into the POTW POTW collection system or mixing with non-regulated wastewater streams.

C. GENERAL PRETREATMENT PROHIBITIONS

1. In addition to those pollutants limited in Part I.A, the following pollutants shall not be discharged into the POTW:

   (a) Pollutants which create a fire or explosion hazard in the POTW;

   (b) Pollutants which will cause corrosive structural damage to the POTW, but in no case discharges with pH lower than 5.5, unless the treatment works is specifically designed to accommodate such discharges;

   (c) Solid or viscous pollutants in amounts which will cause obstruction to the flow in the POTW resulting in interference;

   (d) Any pollutant, including oxygen demanding pollutants (BOD, etc.) released in a discharge at a flow rate and/or pollutant concentration which will cause interference with the POTW; or,

   (e) Heat in amounts which will inhibit biological activity in the POTW resulting in interference, but in no case heat in such quantities that the temperature at the POTW treatment plant exceeds 40°C (104°F) unless the approval Authority, upon request of the POTW, approves alternate limits.

D. ORAL NOTIFICATION REQUIREMENTS

The permittee shall notify the Mississippi Natural Resources Permit Board and the POTW orally immediately upon becoming aware of the following:

1. A spill which would result in a discharge to the POTW;

2. Any diversion or bypass of the wastewater treatment system which would result in a discharge to the POTW; or,

3. Any system upset which would cause the facility to be in noncompliance with the limitations found in Part I.A or I.C of this permit.

E. OTHER SPECIFIC PRETREATMENT REQUIREMENTS

In order to minimize the potential for any upsets at the POTW, the discharge should be made on a continuous basis 24 hours per day and seven days per week.

PART II

A. MANAGEMENT REQUIREMENTS AND RESPONSIBILITIES

1. No Discharge of Wastewater to Surface Water

The discharge of any wastewater from this facility to the waters of the State of Mississippi shall constitute a violation of this permit, except as provided in Section A.4 of this permit, or as authorized under separate permit pursuant to Section 402 of the Federal Water Pollution Control Act.

2. Change in Wastewater Source

Any anticipated facility expansions, production increases, or process modifications which will result in new, different or increased wastewater flows, must be reported to the Mississippi Natural Resources Permit Board. Following such notice, if the Permit Board determines that such change will violate any condition of this permit, it may require the submittal of a new application or it may modify this permit accordingly.

3. Facilities Operation

The permittee shall at all times maintain in good working order and operate as efficiently as possible all treatment or control facilities or systems installed or used by the permittee to achieve compliance with the terms and conditions of this permit.

4. Bypassing

Any diversion from or bypass of wastewater collection and treatment or control facilities is prohibited, except (i) where unavoidable to prevent loss of life or severe property damage, or (ii) where excessive storm drainage or runoff would damage any facilities necessary for compliance with the effluent limitations and prohibitions of this permit. The permittee shall notify the Mississippi Natural Resources Permit Board in writing of each such diversion or bypass in advance where practicable but in any case, within 72 hours of the diversion or bypass, and shall submit to the permit board a plan to prevent recurrence of the diversion or bypass within thirty (30) days of the incident.

5. Removed Substances

Solids, sludges, filter backwash, or other residuals removed in the course of treatment or control of wastewaters shall be disposed of in a manner such as to prevent such materials from entering State waters and in a manner consistent with the Mississippi Solid Waste Disposal Act and the Federal Resource Conservation and Recovery Act.

5. Records Retention

(a) All records and information resulting from the monitoring activities required by this permit (including all records of analyses performed; calibration and maintenance of instrumentation; and recordings from continuous monitoring instrumentation) shall be retained for a minimum of three (3) years, or longer if requested by the Permit Board.

(b) The permittee shall furnish to the Permit Board, upon request, copies of records required to be kept by this permit.

6. Noncompliance Reporting

This permittee shall report any instances of noncompliance orally to the Director, or his representative, within 24 hours of becoming aware of the circumstances. A written report shall also be provied within five (5) days of such time, and shall contain the following information:

(a) A description of the noncompliance and its cause, if known.

(b) The period of noncompliance, including exact dates and times; or if not corrected, the anticipated time the noncompliance is expected to continue, and steps taken to reduce, eliminate, and prevent recurrence.

7. Right of Entry

The permittee shall allow the Mississippi Natural Resources Permit Board and/or their authorized representatives, upon the presentation of credentials:

(a) To enter upon the permittee's premises where a wastewater source is located or in which records are required to be kept under the terms and conditions of this permit; and

(b) At reasonable times to have access to and copy any records required to be kept under the terms and conditions of this permit; to inspect any monitoring equipment or monitoring method required in this permit; and to sample any wastewater generated at this facility.

8. Transfer of Ownership or Control

This permit is not transferable to any person except after proper notice. In the event of any change in control or ownership of facilities, the permittee shall notify the Mississippi Natural Resources Permit Board at least thirty (30) days in advance of the proposed transfer date. The notice should include a written agreement between the existing and new permittees containing a specific date for the transfer of permit responsibility, coverage, and liability.

9. Availability of Records

Except for data determined to be confidential under the Mississippi Air and Water Pollution Control Law, all reports prepared in accordance with the terms of this permit shall be available for public inspection at the offices of the Mississippi Bureau of Pollution Control.

15. Submittal of Discharge Monitoring Results

Monitoring results obtained during the previous 3 months shall be summarized for each month and reported on a Discharge Monitoring Report Form (EPA No. 3320-1), postmarked no later than the 28th day of the month following the completed reporting period. The first report is due on ______________________. Copies of these, and all other reports required herein, shall be signed in accordance with Sections 6 and 7 of the Mississippi Wastewater Permit Regulations, and shall be submitted to the Mississippi Natural Resources Permit Board at the following address:

MISSISSIPPI DEPARTMENT OF NATURAL RESOURCES
BUREAU OF POLLUTION CONTROL
P. O. Box 10385
Jackson, Mississippi 39209

16. Definitions.

(a) The "daily average" is the arithmetic mean of all samples collected in a one-month period.

(b) The "daily maximum" is the highest value recorded of any sample collected on any single day of the calendar month.

APPLICATION FOR A STATE OPERATING PERMIT FOR KOPPERS COMPANY, INC. WOOD TREATING PLANT GRENADA, MISSISSIPPI

Prepared by: Jeffrey D. Spencer
Koppers Company, Inc.
Water Quality Engineering
January 7, 1986

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List of Figures

For Agency Use
Application Number

Date Received

STATE OF MISSISSIPPI
BUREAU OF POLLUTION CONTROL
P. O. BOX 10385
JACKSON, MISSISSIPPI 39209

APPLICATION FOR A STATE OPERATING PERMIT

(Please print or type)

1. Name of Applicant: Koppers Company, Inc.

2. Mailing Address of Applicant:

Number & Street (P.O. Box): P.O. Box 160

City: Grenada State: Mississippi Zip: 38960

3. Applicant's Authorized Agent:

Name & Title: R. K. Wagner, Vice President and General Manager

Number & Street (P.O. Box): 901 Koppers Building

City: Pittsburgh State: PA Zip: 15219

Telephone Number: 412-227-2398

4. Facilities Location:

Number & Street: Grenada Tie Plant

City: Grenada County: Grenada

5. Nature of Business: Wood Preserving

6. Do you Discharge Wastewater to a POTW? ______ Yes __X__ No
If "Yes" Continue, if "No" go to Item 10.

Name of POTW Receiving Wastewater: Grenada County Water & Sewer District

Number & Street (P.O. Box): 1241 South Mound

City: Grenada County: Grenada

7. Discharge Type and Occurrence:

A. Type of Discharge: ____Continuous; If Continuous, ______Gallons per Day

____Batch

B. Discharge Occurrence: _____Days per Week

C. Discharge Occurrence: (Months per Year)

____Jan.	____Feb.	____Mar.	____Apr.
____May	____Jun.	____July	____Aug.
____Sept.	____Oct.	____Nov.	____Dec.

8. If Batch:

A. ________Thousand Gallons per Discharge

B. ________Hours per Day

C. ________Discharge Occurrences per Day

9. Maximum Period of Flow: From _______ (Month) to _______ (Month)

10. Facility Water Use:

Estimate average volume in thousand gallons per day for the following types of water usage at this facility.

Noncontact Cooling: 17

Boiler Feed: 30

Process (Including Contact Cooling): 0

Sanitary: 1 (septic tanks are located on site)

Other: polymer make-up water 3.2

Total: 51.2

11. List All Facility Discharges: Process Wastewater to Sprayfield

Other water losses (surface water, product consumption, evaporation). Indicate volume in thousand gallons.

Not Applicable

12. Give narrative description of process(es) producing discharge, or in the case of no discharge, that generates wastewater.

Refer to Attachment I of this report.

13. List raw materials used: Creosote and Pentachlorophenol

14. Effluent Characteristics:

A. You must provide the results of at least one analysis for every pollutant in this table. Complete one table for each outfall to the city sewer. If your facility does not have a discharge indicate so and disregard. At present, the Grenada, Miss. Wood Treating Plant does not discharge wastewater to the city sewer.

Parameter	Maximum Daily Value	Maximum 30 Day Value	Long Term Average Value
BOD_5			
COD	REFER TO	ATTACHMENT II -	Table II-1
TSS			
Ammonia			
Oil & Grease			
pH			

B. Review the substances listed in Table One and indicate which of these substances you have reason to believe may be in your discharge. For instance you may use solvents or Biocides that contain one or more of the indicated solvents. For each substance indicated you must perform at least one analysis and report results.

Refer to Attachment II for the supporting analytical data.

TABLE 1

65 Toxic Pollutants Listed in Consent Decree and
Referenced in 307(a) of the CWA of 1977

Believe Present		Concen.*	Believe Present		Concen.*
	Acenaphthene			Endrin and Metabolities	
	Acrolein		✓	Ethylbenzene	0.072
	Acrylonitrile			Flouranthene	
	Aldrin/Dieldrin			Haloethers	
	Antimony & compounds			Halomethanes	
	Arsenic & compounds			Heptachlor & metabolities	
	Asbestos			Hexachlorobutadiene	
✓	Benzene	0.90		Hexachlorocyclopentadiene	
	Benzidine			Hexachlorocylohexane	
	Beryllium & compounds			Isophorone	
	Cadmium & compounds			Lead & compounds	
	Carbon tetrachloride			Mercury & compounds	
	Chlordane		✓	Naphthalene	15.0
	Chlorinated benzenes			Nickel & compounds	
	Chlorinated ethanes			Nitrobenzene	
	Chlorinalkyl ethers			Nitrophenols	
	Chlorinated naphthalene			Nitrosamines	
	Chlorinated phenols		✓	Pentachlorophenol	5.0
	Chloroform		✓	Phenol	32.0
	2-Chlorophenol			Phthalate esters	
	Chromium & compounds			Polychlorinated byphenyls(PCB)	
	Copper & compounds		✓	Polynuclear aromatic	29.3*
✓	Cyanides	0.22	✓	Hydrocarbons	
	DDT & metabolities			Selenium & compounds	
	Dichlorobenzenes			Silver & compounds	
	Dichlorobenzidine			2,3,7,8-Tetrachlorodibenzo-	
	Dichloroethylenes			p-dioxine (TCDD)	
	2,4-Dichlorophenol			Tetrachloroethylene	
	Dichloropropane &			Thallium & compounds	
	Dichloropropene		✓	Toluene	0.60
✓	2,4-Dimethylphenol	5.8		Toxaphene	
	Dinitrotoluene			Trichloroethylene	
	Diphenylhydrazine			Vinyl chloride	
	Endosulfan &				
	metabolities		✓	Zinc & compounds	0.26

List any other toxicants known or anticipated to be present in the discharge:

Octochloro-dibenzo-p-dioxin, heptachloro dibenzo-p-dioxin, octochloro-dibenzo-p-furan, and phenanthrene.

(Taken from data in Attachment II)

*All concentration values have units of mg/l.

** See attachment II for polynuclear aromatic hydrocarbons (Table II-2)

15. Treatment Units:

A. Do you provide treatment for your wastewater? __X__ Yes _____ No

B. If yes, list and describe each treatment unit and attach a line schematic of the treatment system indicating each treatment unit and a water balance.

The wastewater treatment involves coagulation and flocculation of the wastewater, followed by gravity settling of the flocced particles. This pretreatment process involves adding two (2) polymers to the surge tank effluent. The polymers (coagulating and flocculating agents) aid in reducing the suspended solids concentration by causing these suspended particles to agglomerate and to eventually gravity settle, from the wastewater stream, into the oil/water separators. The line schematic of the treatment system is indicated in attached Figure 1, and the wastewater balance is indicated in Attachment III.

I certify that I am familiar with the information contained in this application and that to the best of my knowledge and belief such information is true and correct.

R. K. Wagner
Printed Name of Applicant's Authorized Agent

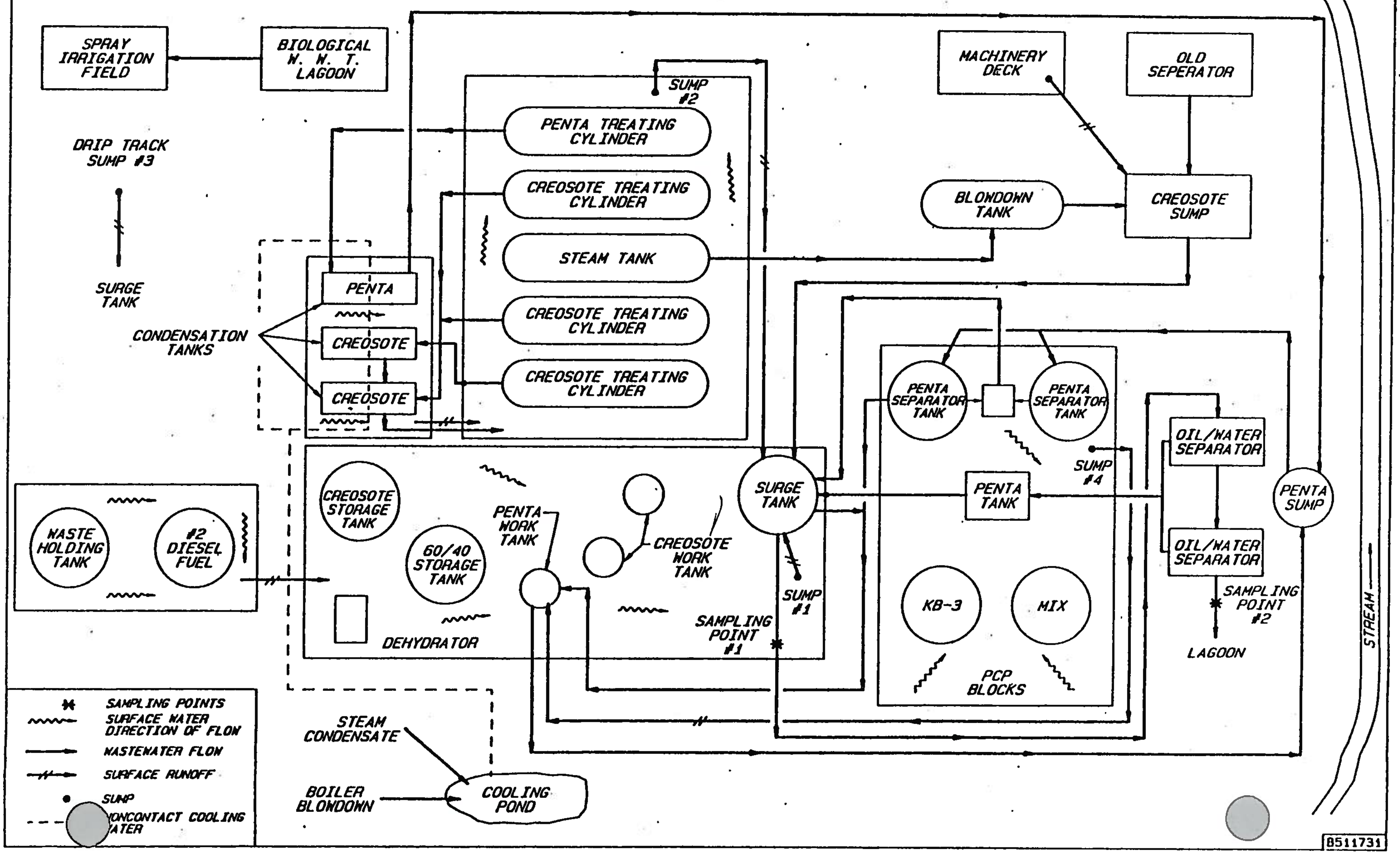
Vice President and General Manager
Title

2/4/86
Date Application Signed

RK Wagner
Signature of Authorized Agent

FIGURE 1

KOPPERS COMPANY, INC.
GRENADA PLANT, MISSISSIPPI
FLOW DIAGRAM OF THE
WASTEWATER TREATMENT SYSTEM



ATTACHMENT I

WASTEWATER GENERATION DESCRIPTION

WASTEWATER GENERATION DESCRIPTION

The information in this section is required for item 12 of the permit application.

Wood products such as lumber and railroad ties are placed in treating cylinders and treated with either creosote or pentachlorophenol wood preservatives. Four wood treating processes are utilized at the Grenada, Mississippi site, one wood conditioning process and three wood preservation processes.

Boultonizing is the method of conditioning green wood by boiling the wood in creosote while the wood is under vacuum. Wastewaters are generated from interstitial wood moisture which is replaced with the preservative. The interstitial wood moisture and any condensed light oils are removed from the treating cylinder and discharged to the surge tank.

The three wood preservation processes include the full-cell, Lowry cell, and Reuping processes. The full-cell process involves introducing conditioned or seasoned wood to a vacuum within the cylinder to evacuate any air from the wood surface. Preservative oil, either creosote or pentachlorophenol is added to the treating cylinder under vacuum, and eventually under pressure for full penetration of the oil within the wood and wood cells. Pressure is reduced and remaining preservative oils are recovered from the cylinder after the cylinder is placed under final vacuum. Wastewater is generated from door drippage when the cylinder doors are opened to remove the treated wood.

Both the Lowry and Reuping wood treating processes are empty-cell methods of preservation. In the Lowry process, air enters the treating cylinder under atmospheric pressure and this air is eventually forced into the wood in concert with the preservative. In the Reuping process, preliminary air pressure is applied within the cylinder prior to injection of the wood preservative. The empty-cell methods force deep penetration of preservative into the wood while coating the interior wood cells, instead of filling the wood cells with preservatives which is utilized in the full-cell method. The Reuping process is primarily utilized when creosote is the wood preservative whereas the Lowry process may be utilized with either creosote or pentachlorophenol.

Wastewaters are generated from door drippage and during preservative handling. The volume of wastewater is increased during rainfall as the door drippage is mixed with storm runoff.

ATTACHMENT II

WASTEWATER ANALYSES

WASTEWATER ANALYSES

This section contains the priority pollutant analyses from Compu Chem Laboratories, general wastewater parameters and polynuclear aromatic hydrocarbon analyses (Tables II-1 and II-2, respectively) from the Koppers Company, Inc., Monroeville Research Analytical Laboratory, and dioxin/-furan analyses from the IT Corporation (Table II-3). This information is required to support section 14.B (Effluent Characteristics) of the application for a State operating permit.

Wastewater grab samples were obtained during the week of Augst 19, 1985, at the oil/water separator number II discharge. This location represents sampling point number 2, as indicated in Figure I. All grab samples, following collection, were promptly packed and shipped to the above mentioned laboratories for analyses. PENTA DISCHARGE

Of the priority pollutant organic chemicals analyzed by the Compu Chem Laboratory for the Grenada, Mississippi plant, only the following were detected in the treated wastewater stream:

Volatile Organics	Concentration, mg/l
Benzene	0.9
Toluene	0.6
Ethylbenzene	0.07
Acid Extractables	
Phenol	32.0
2,4 Dimethylphenol	5.8
Pentachlorophenol	5.0
Base / Neutral Extractables	
Naphthalene	15.0
Phenanthrene	1.5

Total Phenols	120.0
Zinc	0.26
Cyanide	0.22

The Compu Chem Analytical Report is included as part of this attachment.

Dioxins and furans were also detected in the grab samples obtained from sampling point number 2. These constituents and their concentrations are as follows:

Constituents	Concentration, ppt.
Heptachloro dibenzo p-dioxin	75
Octachloro dibenzo p-dioxin	576
Octachloro dibenzo p-furan	3.9

The unit of parts per trillion is analogous to 10^{-6} mg/l, which indicates very low concentrations of the constituents. Included in Attachment V is a report from the Koppers Company, Inc. Occupational Health and Product Safety Group concerning Hepta and Octa chloro dibenzo p-dioxin. The complete results for dioxins and furans as analyzed by the IT Corporation, have been included in Table II-3 of this attachment.

TABLE II-1

GRENADA, MISSISSIPPI WASTEWATER ANALYSES

PARAMETERS	EFFLUENT FROM O/W SEPARATOR DISCHARGE TO CITY SEWER, mg/L	POTW DISCHARGE LIMITS, mg/L
pH, units	6.6	5.5-9.5*
TOC	522	
BOD (5-day-total	850	250
COD - Total	1875	
Phenols (4AAP)	160	
Alkalinity (as $CaCO_3$) to pH = 4.5	150	
Solids, Suspended Total - 103°C	96	250
Solids, Dissolved Total - 103°C	682	
Ammonia (NH_3)N-Total	6	
Phosphorus, Total P	2	
Oil & Grease	35	100
Cyanide - Total	0.339	
Pentachlorophenol	5.1	
Sulfate	125	
Sulfite	445	
Sulfide	0.03	

Note: O/W denotes oil/water

* Discharge limits have units of standard pH unit

TABLE II-2

POLYNUCLEAR AROMATIC HYDROCARBONS
GRENADA, MISSISSIPPI

PARAMETER	EFFLUENT FROM O/W SEPARATOR, DISCHARGE TO CITY SEWER, ug/L
Naphthalene	23,100
Acenaphthylene	230
Acenaphthene	1,100
Fluorene	760
Phenanthrene	2,150
Anthracene	360
Fluoranthene	770
Pyrene	440
Benz(a)anthracene	140
Chrysene	110
Benzo(b)fluoranthene	44
Benzo(k)fluoranthene	27
Benzo(a)pyrene	45
Dibenzo(a,h)anthracene	3.1
Benzo(g,h,i)perylene	19
Indenol (1,2,3-c,d)pyrene	15
TOTAL	**29,313.1**

Note: O/W denotes oil/water

TABLE II-3

DIOXIN AND FURAN RESULTS

COGENER	WATER BLANK ppt	WASTEWATER SAMPLE ppt
^{13}Cl-TCDD (%acc)	79%	78%
^{13}C-TCDD (%rec)	91%	98%
^{13}C-OCDD (%acc)	96%	130%
TCDD	ND (0.14)	ND (1.0)
PCDD	ND (0.64)	ND (7.9)
HxCDD	ND (0.37)	ND (4.7)
HpCDD	ND (0.27)	75
OCDD	ND (0.90)	576
TCDF	ND (0.07)	ND (1.1)
PCDF	ND (0.67)	ND (6.2)
HxCDF	ND (0.12)	ND (1.6)
HpCDF	ND (0.19)	ND (1.4)
OCDF	ND (0.14)	3.9

NOTES:

1. ND denotes non-detectable
2. The numbers is parentheses represent the detectable limit for the specified cogeners.
3. % acc denotes a comparison between the amount of cogener measured by the test method and the amount actually present.
4. % rec denotes % recovery of a spiked internal standard following the various extractions which are performed. It is a measure of the portion of ^{13}C-TCDD which is lost during extractions and sample preparation prior to analysis.

COMPUCHEM LABORATORIES

September 3, 1985

Mr. Robert Hepner
Koppers, Inc.
Research Department
440 College Park Drive
Monroeville, PA 15146

Dear Mr. Hepner:

We at CompuChem® are pleased to provide our report for the analysis you requested. Enclosed is data for the following sample:

YOUR ID NO.	C/C NO.	ANALYSIS CODE	ORDER NO.	DESCRIPTION OF WORK PERFORMED
GREN-INF	58926	001	7615	METALS
GREN-EFF	58907	001	7615	METALS

Should you require additional TECHNICAL EXPLANATION of this report, please do not hesitate to contact me at 1-919-549-8263. To place a NEW ORDER, request additional SAMPLESAVERS®, inquire about SAMPLE STATUS or if you need help with SAMPLE LOGISTICS your Customer Service Representative can be of assistance. Of course, your Sales Representative is always available to provide a complete overview of our LINE OF SERVICES and assist you in identifying those services which will support your monitoring program as well as provide you with a QUOTATION.

Thank you for this order. We at CompuChem® look forward to providing you with continued analytical support. We appreciate your comments regarding the level of service you feel you have received and look forward to receiving your written comments when possible. Comments should be directed to Mr. Kevin McConnaghy, Director of Marketing, at the address given below.

Sincerely,

Diana A. Scammell

Diana A. Scammell
Manager, Technical Review

cc: Cover letter only
Accounting

COMPUCHEM LABORATORIES

ANALYTICAL REPORT OF DATA
SUBMITTED TO:

Mr. Robert Hepner
Koppers, Inc.
Research Department
440 College Park Drive
Monroeville, PA 15146

CHRONICLE

ITEM NO.	SAMPLE IDENTIFIER	COMPUCHEM® NUMBER	DATE SAMPLE RECEIVED	DATE METALS FRACTION ANALYZED
1.	GREN-INF	58926	08/22/85	08/28/85
2.	GREN-EFF	58907	08/22/85	08/28/85

INORGANICS - PRIORITY POLLUTANTS

SAMPLE IDENTIFIER: GREN-EFF
COMPUCHEM SAMPLE NUMBER: 58907

		CONCENTRATION (MG/L)	DETECTION LIMIT (MG/L)
1.	ANTIMONY, TOTAL	BDL	0.050
2.	ARSENIC, TOTAL	BDL	0.050
3.	BERYLLIUM, TOTAL	BDL	0.020
4.	CADMIUM, TOTAL	BDL	0.010
5.	CHROMIUM, TOTAL	BDL	0.050
6.	COPPER, TOTAL	BDL	0.10
7.	LEAD, TOTAL	BDL	0.050
8.	MERCURY, TOTAL	BDL	0.00020
9.	NICKEL, TOTAL	BDL	0.10
10.	SELENIUM, TOTAL	BDL	0.010
11.	SILVER, TOTAL	BDL	0.050
12.	THALLIUM, TOTAL	BDL	0.050
13.	ZINC, TOTAL	0.26	0.020

BDL = BELOW DETECTION LIMITS

INORGANICS - PRIORITY POLLUTANTS

SAMPLE IDENTIFIER: GREN-EFF
COMPUCHEM SAMPLE NUMBER: 58908

	CONCENTRATION (MG/L)	DETECTION LIMIT (MG/L)
1. CYANIDE, TOTAL	0.22	0.010

INORGANICS - PRIORITY POLLUTANTS

SAMPLE IDENTIFIER: GREN-EFF
COMPUCHEM SAMPLE NUMBER: 58909

	CONCENTRATION (MG/L)	DETECTION LIMIT (MG/L)
1. PHENOLS, TOTAL	120	0.010

COMPUCHEM
LABORATORIES

August 28, 1985

Mr. Robert Hepner
Koppers, Inc.
Research Department
440 College Park Drive
Monroeville, PA 15146

Dear Mr. Hepner:

We at CompuChem® are pleased to provide our report for the analysis you requested. Enclosed is data for the following sample:

YOUR ID NO.	C/C NO.	ANALYSIS CODE	ORDER NO.	DESCRIPTION OF WORK PERFORMED	REPORT FORMAT
GREN-EFF	58902	079	7615	VOLATILES	SILVER

For your information and convenience, we have included in this report the analytical results, method reference and quality control summary. When anomalies are encountered in an analysis, they are referenced in the quality assurance notice(s). Additionally, instrumental documentation is provided with reports purchased in our GOLD REPORT FORMAT.

Should you require additional TECHNICAL EXPLANATION of this report, please do not hesitate to contact me at 1-919-549-8263. To place a NEW ORDER, request additional SAMPLESAVERS®, inquire about SAMPLE STATUS or if you need help with SAMPLE LOGISTICS your Customer Service Representative can be of assistance. Of course, your Sales Representative is always available to provide a complete overview of our LINE OF SERVICES and assist you in identifying those services which will support your monitoring program as well as provide you with a QUOTATION.

Thank you for this order. We at CompuChem® look forward to providing you with continued analytical support. We appreciate your comments regarding the level of service you feel you have received and look forward to receiving your written comments when possible. Comments should be directed to Mr. Kevin McConnaghy, Director of Marketing, at the address given below.

Sincerely,

Diana A. Scammell

Diana A. Scammell
Manager, Technical Review

cc: Cover letter only
Accounting

CompuChem Laboratories

ANALYTICAL REPORT OF DATA
SUBMITTED TO:

Mr. Robert Hepner
Koppers, Inc.
Research Department
440 College Park Drive
Monroeville, PA 15146

CHRONICLE

ITEM NO.	SAMPLE IDENTIFIER	COMPUCHEM® NUMBER	DATE SAMPLE RECEIVED	DATE VOLATILE FRACTION ANALYZED
1.	GREN-EFF	58902	08/22/85	08/27/85

METHOD REFERENCE

CompuChem® employs Method 624 for the GC/MS analysis of volatile priority pollutant organics in liquid matrices. This method is published in Volume 49, October 26, 1984 Federal Register.

Method Summary

As stated in the October 1984 reference, "An inert gas is bubbled through a 5 ml sample contained in a specially designed purging chamber at ambient temperature. The purgeables are efficiently transferred from the aqueous phase to the vapor phase. The vapor is swept througn a sorbent column where the purgeables are trapped. After purging is completed, the sorbent column is heated and backflushed with the inert gas to desorb the purgeables onto a gas chromatographic column." ".... which are then detected with a mass spectrometer."

The referenced methods are no longer appropriate for several of the original priority pollutant compounds. This is due to either the deletion from the toxic pollutant list (40 CFR Part 401) by EPA or the determination by EPA that the referenced methods may not be optimized for certain compounds (EPA-600/4-82-057) originally incorporated by the methods.

CompuChem® presents these compounds in its sample data report for completeness as many of the government compound list forms continue to display the affected compounds. For consistency, these compounds are reported as "BDL" or "Below Detection Limits" as they are either not likely to exist in the sample or are not likely to be detected by the method. Those compounds which have actually been deleted are listed below with the Federal Register deletion reference.

Compound Name	GC/MS Fraction	Federal Register	Date
Dichlorodifluoromethane	Volatile	46FR2264	1/8/81
*Trichlorofluoromethane	Volatile	46FR2264	1/8/81
Bis(Chloromethyl)Ether	Volatile	46FR10723	2/4/81

*While this compound has been deleted, CompuChem® continues to identify and quantitate for it.

COMPOUND LIST - VOLATILE ORGANICS

SAMPLE IDENTIFIER: GREN EFF
COMPUCHEM® SAMPLE NUMBER: 58902

		CONCENTRATION (UG/L)	DETECTION* LIMIT (UG/L)
1V.	CHLOROMETHANE	BDL	25
2V.	VINYL CHLORIDE	BDL	25
3V.	CHLOROETHANE	BDL	25
4V.	BROMOMETHANE	BDL	25
5V.	ACROLEIN	BDL	250
6V.	ACRYLONITRILE	BDL	250
7V.	METHYLENE CHLORIDE	BDL	25
8V.	TRICHLOROFLUOROMETHANE	BDL	25
9V.	1,1-DICHLOROETHYLENE	BDL	25
10V.	1,1-DICHLOROETHANE	BDL	25
11V.	TRANS-1,2-DICHLOROETHYLENE	BDL	25
12V.	CHLOROFORM	BDL	25
13V.	1,2-DICHLOROETHANE	BDL	25
14V.	1,1,1-TRICHLOROETHANE	BDL	25
15V.	CARBON TETRACHLORIDE	BDL	25
16V.	BROMODICHLOROMETHANE	BDL	25
17V.	1,2-DICHLOROPROPANE	BDL	25
18V.	TRANS-1,3-DICHLOROPROPENE	BDL	25
19V.	TRICHLOROETHYLENE	BDL	25
20V.	BENZENE	900	25
21V.	CIS-1,3-DICHLOROPROPENE	BDL	25
22V.	1,1,2-TRICHLOROETHANE	BDL	25
23V.	DIBROMOCHLOROMETHANE	BDL	25
24V.	BROMOFORM	BDL	25
25V.	1,1,2,2-TETRACHLOROETHYLENE	BDL	25
26V.	1,1,2,2-TETRACHLOROETHANE	BDL	25
27V.	TOLUENE	600	25
28V.	CHLOROBENZENE	BDL	25
29V.	ETHYLBENZENE	72	25
30V.	2-CHLOROETHYL VINYL ETHER	BDL	25
31V.	DICHLORODIFLUOROMETHANE†	BDL	
32V.	BIS(CHLOROMETHYL)ETHER†	BDL	

Surrogate Recoveries - Introduced at the instrument, volatile surrogate standards are deuterated and/or select compounds that analytically mimic the response of certain analytes. Known concentrations of these surrogates are added to the sample and a percent recovery is calculated. This recovery acts as a barometer of method efficiency for the individual sample.

	% Recovery	Control Range%
D_4-1,2-Dichloroethane	82	(77-120)
4-Bromofluorobenzene	106	(85-121)
D_8-Toluene	113	(86-119)

BDL= BELOW DETECTION LIMIT
†See Method Reference
*Sample analyzed using a 2.5:1 dilution, thus the higher than normal detection limits

CompuChem Laboratories

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*These notices are included where appropriate for data qualification.

**When the original chain of custody is submitted with the sample(s), a copy of it is included with the report.

METHOD REFERENCE

CompuChem® employs Method 625 for GC/MS analysis of acid and base/neutral organics in liquid matrices. This method is published in Volume 49, October 26, 1984 Federal Register.

METHOD SUMMARY

As stated in the October 1984 reference, "A measured volume of sample, approximately one liter, is serially extracted with methylene chloride at a pH greater than 11 and again at pH less than 2 using a separatory funnel or a continuous extractor. The methylene chloride extract is dried and concentrated to a volume of 1 ml."

"Qualitative identification is performed using the retention time and the relative abundance of three characteristic ions. Quantitative analysis is performed using either external or internal standard techniques."

COMPOUND LIST -- ACID EXTRACTABLES

SAMPLE IDENTIFIER: GREN-EFF
COMPUCHEM® SAMPLE NUMBER: 58905

		CONCENTRATION (UG/L)		DETECTION* LIMIT (UG/L)
1A.	PHENOL	32000		2500
2A.	2-CHLOROPHENOL		BDL	2500
3A.	2-NITROPHENOL		BDL	2500
4A.	2,4-DIMETHYLPHENOL	5800		2500
5A.	2,4-DICHLOROPHENOL		BDL	2500
6A.	P-CHLORO-M-CRESOL		BDL	2500
7A.	2,4,6-TRICHLOROPHENOL		BDL	2500
8A.	2,4-DINITROPHENOL		BDL	25000
9A.	4-NITROPHENOL		BDL	2500
10A.	4,6-DINITRO-O-CRESOL		BDL	25000
11A.	PENTACHLOROPHENOL	5000		2500

Surrogate Recoveries - Introduced at the beginning of the extraction, surrogate standards are deuterated and/or select compounds that analytically mimic the response of certain analytes. Known concentrations of these surrogates are added to the sample and a percent recovery is calculated. This recovery acts as a barometer of extraction efficiency and analytical response for the individual sample.

	%Recovery	Control Range%
2-Fluorophenol	BDL*	(23-121)
D_5-Phenol	BDL*	(15-103)
2,4,6-Tribromophenol	BDL*	(10-130)

BDL=BELOW DETECTION LIMIT
*See Quality Assurance Notice

COMPOUND LIST -- BASE-NEUTRAL EXTRACTABLES

SAMPLE IDENTIFIER: GREN-EFF
COMPUCHEM® SAMPLE NUMBER: 58905

		CONCENTRATION (UG/L)	DETECTION* LIMIT (UG/L)
1B.	N-NITROSODIMETHYLAMINE	BDL	1000
2B.	BIS (2-CHLOROETHYL) ETHER	BDL	1000
3B.	1,3-DICHLOROBENZENE	BDL	1000
4B.	1,4-DICHLOROBENZENE	BDL	1000
5B.	1,2-DICHLOROBENZENE	BDL	1000
6B.	BIS (2-CHLOROISOPROPYL) ETHER	BDL	1000
7B.	HEXACHLOROETHANE	BDL	1000
8B.	N-NITROSODI-N-PROPYLAMINE	BDL	1000
9B.	NITROBENZENE	BDL	1000
10B.	ISOPHORONE	BDL	1000
11B.	BIS(2-CHLOROETHOXY) METHANE	BDL	1000
12B.	1,2,4-TRICHLOROBENZENE	BDL	1000
13B.	NAPHTHALENE	15000	1000
14B.	HEXACHLOROBUTADIENE	BDL	1000
15B.	HEXACHLOROCYCLOPENTADIENE	BDL	1000
16B.	2-CHLORONAPHTHALENE	BDL	1000
17B.	DIMETHYLPHTHALATE	BDL	1000
18B.	ACENAPHTHYLENE	BDL	1000
19B.	2,6-DINITROTOLUENE	BDL	1000
20B.	ACENAPHTHENE	BDL	1000
21B.	2,4-DINITROTOLUENE	BDL	1000
22B.	DIETHYLPHTHALATE	BDL	1000
23B.	FLUORENE	BDL	1000
24B.	4-CHLOROPHENYL PHENYL ETHER	BDL	1000
25B.	DIPHENYLAMINE (N-NITROSO)	BDL	1000
26B.	1,2-DIPHENYLHYDRAZINE (AZOBENZENE)	BDL	1000
27B.	4-BROMOPHENYL PHENYL ETHER	BDL	1000
28B.	HEXACHLOROBENZENE	BDL	1000

(Continued)

BDL=BELOW DETECTION LIMIT
*See Quality Assurance Notice

COMPOUND LIST -- BASE-NEUTRAL EXTRACTABLES (Page Two)

SAMPLE IDENTIFIER: GREN-EFF
COMPUCHEM® SAMPLE NUMBER: 58905

		CONCENTRATION (UG/L)	DETECTION* LIMIT (UG/L)
29B.	PHENANTHRENE	1500	1000
30B.	ANTHRACENE	BDL	1000
31B.	DI-N-BUTYLPHTHALATE	BDL	1000
32B.	FLUORANTHENE	BDL	1000
33B.	BENZIDINE	BDL	1000
34B.	PYRENE	BDL	1000
35B.	BUTYLBENZYLPHTHALATE	BDL	1000
36B.	BENZO(A)ANTHRACENE	BDL	1000
37B.	3,3'-DICHLOROBENZIDINE	BDL	1000
38B.	CHRYSENE	BDL	1000
39B.	BIS(2-ETHYLHEXYL)PHTHALATE	BDL	1000
40B.	DI-N-OCTYLPHTHALATE	BDL	1000
41B.	BENZO(B)FLUORANTHENE	BDL	1000
42B.	BENZO(K)FLUORANTHENE	BDL	1000
43B.	BENZO(A)PYRENE	BDL	1000
44B.	INDENO(1,2,3-C,D)PYRENE	BDL	2500
45B.	DIBENZO(A,H)ANTHRACENE	BDL	2500
46B.	BENZO(G,H,I)PERYLENE	BDL	2500

Surrogates Recoveries - Introduced at the beginning of the extraction, surrogate standards are deuterated and/or select compounds that analytically mimic the response of certain analytes. Known concentrations of these surrogates are added to the sample and a percent recovery is calculated. This recovery acts as a barometer of extraction efficiency and analytical response for the individual sample.

	%Recovery	Control Range%
D_5-Nitrobenzene	BDL*	(41-120)
2-Fluorobiphenyl	BDL*	(44-119)
D_{14}-Terphenyl	BDL*	(33-128)
D_{10}-Pyrene**	BDL*	**

BDL=BELOW DETECTION LIMIT
*See Quality Assurance Notice

METHOD REFERENCE

CompuChem® employs Method 608 for the GC analysis of Pesticides and PCBs in aqueous matrices. This method is published in Volume 49, October 26, 1984 Federal Register.

Method Summary

As stated in the October 1984 reference, "A measured volume of sample, approximately one liter, is solvent extracted with methylene chloride using a separatory funnel or continuous extractor. The methylene chloride extract is dried and exchanged to hexane during concentration to a final volume of 10 ml or less. Gas chromatographic conditions... permit the separation and measurement of the parameters in the extract by electron capture GC".

COMPOUND LIST -- PP + RCRA PESTICIDES/PCBs

SAMPLE IDENTIFIER: GREN-EFF
COMPUCHEM® SAMPLE NUMBER: 58910

		CONCENTRATION (UG/L)	DETECTION† LIMIT (UG/L)
1P.	ALDRIN	BDL	2.0
2P.	ALPHA-BHC	BDL	2.0
3P.	BETA-BHC	BDL	2.0
4P.	GAMMA-BHC	BDL	2.0
5P.	DELTA-BHC	BDL	2.0
6P.	CHLORDANE (TECHNICAL)	BDL	10
7P.	4,4'-DDT	BDL	2.0
8P.	4,4'-DDE	BDL	2.0
9P.	4,4'-DDD	BDL	2.0
10P.	DIELDRIN	BDL	2.0
11P.	ALPHA-ENDOSULFAN	BDL	2.0
12P.	BETA-ENDOSULFAN	BDL	2.0
13P.	ENDOSULFAN SULFATE	BDL	2.0
14P.	ENDRIN	BDL	2.0
15P.	ENDRIN ALDEHYDE	BDL	2.0
16P.	HEPTACHLOR	BDL	2.0
17P.	HEPTACHLOR EPOXIDE	BDL	2.0
18P.	PCB-1242	BDL	20
19P.	PCB-1254	BDL	20
20P.	PCB-1221	BDL	20
21P.	PCB-1232	BDL	20
22P.	PCB-1248	BDL	20
23P.	PCB-1260	BDL	20
24P.	PCB-1016	BDL	20
25P.	TOXAPHENE	BDL	20
26P.	METHOXYCHLOR	BDL	2.0

Surrogate Recovery - Introduced at the beginning of the extraction, the surrogate standard is a select compound that analytically mimics the response of certain analytes. A known concentration of this surrogate is added to the sample and a percent recovery is calculated. This recovery acts as a barometer of extraction efficiency and analytical response for the individual sample.

	% Recovery	Control Range %
Dibutylchlorendate	*	(48-136)**

BDL=BELOW DETECTION LIMIT

†Sample analyzed using a dilution to properly evaluate the GC Chromatogram, thus the higher than normal detection limits.

*No surrogate recovery data available due to a dilution and/or matrix interference.

COMPOUND LIST

SAMPLE IDENTIFIER: GREN-EFF
COMPUCHEM SAMPLE NUMBER: 58912

RCRA/SDWA HERBICIDES	CONCENTRATION (MG/L)	DETECTION LIMIT (MG/L)
1. 2,4-D	BDL	0.10
2. 2,4,5-TP(Silvex)	BDL	0.010
3. 2,4,5-T	BDL	0.010

Surrogate Recovery - Introduced at the beginning of the extraction, the surrogate standard is a select compound that analytically mimics the response of certain analytes. A known concentration of this surrogate is added to the sample and a percent recovery is calculated. This recovery acts as a barometer of extraction efficiency and analytical response for the individual sample.

	% Recovery	Control Range %
2,4-DB	*	(28-104)

BDL=BELOW DETECTION LIMIT

*No surrogate recovery data available due to severe matrix interferences.

ATTACHMENT III

WASTEWATER BALANCE

WASTEWATER BALANCE

The information in this section is required for item 15.b. on the permit application.

Wastewater generated from wood treating operations is collected and pumped to a 110,000 gallon capacity surge tank. The dimensions of the surge tank are 28 feet in diameter by 23.5 feet high. These wastewaters include pentachlorophenol and creosote process wastewater, contaminated runnoff from the drip track and tank farm areas and from the creosote condensation tanks. From the surge tank the wastewater is routed to chemical addition tanks where polymers are added under rapid mix conditions. Following rapid mixing and flocculation, the wastewater flows to two (2) in-series oil/water separators for gravity settling of suspended solids. Effluent from the oil/water separators is pumped to a biological wastewater treatment lagoon and is eventually discharged to the sprayfield (See Figure 1 in main report).

A line diagram of the wastewater streams is indicated in Figure III-1. It represents both the actual and anticipated flow streams within the wastewater treatment system, in concert with the anticipated discharge flowrate to the local POTW.

The plant presently treats 5000 gallons of process wastewater over an eight (8) hour period. The additional process wastewater, if any, for the remaining 16 hour period is stored in the existing surge tank and is treated on the following day.

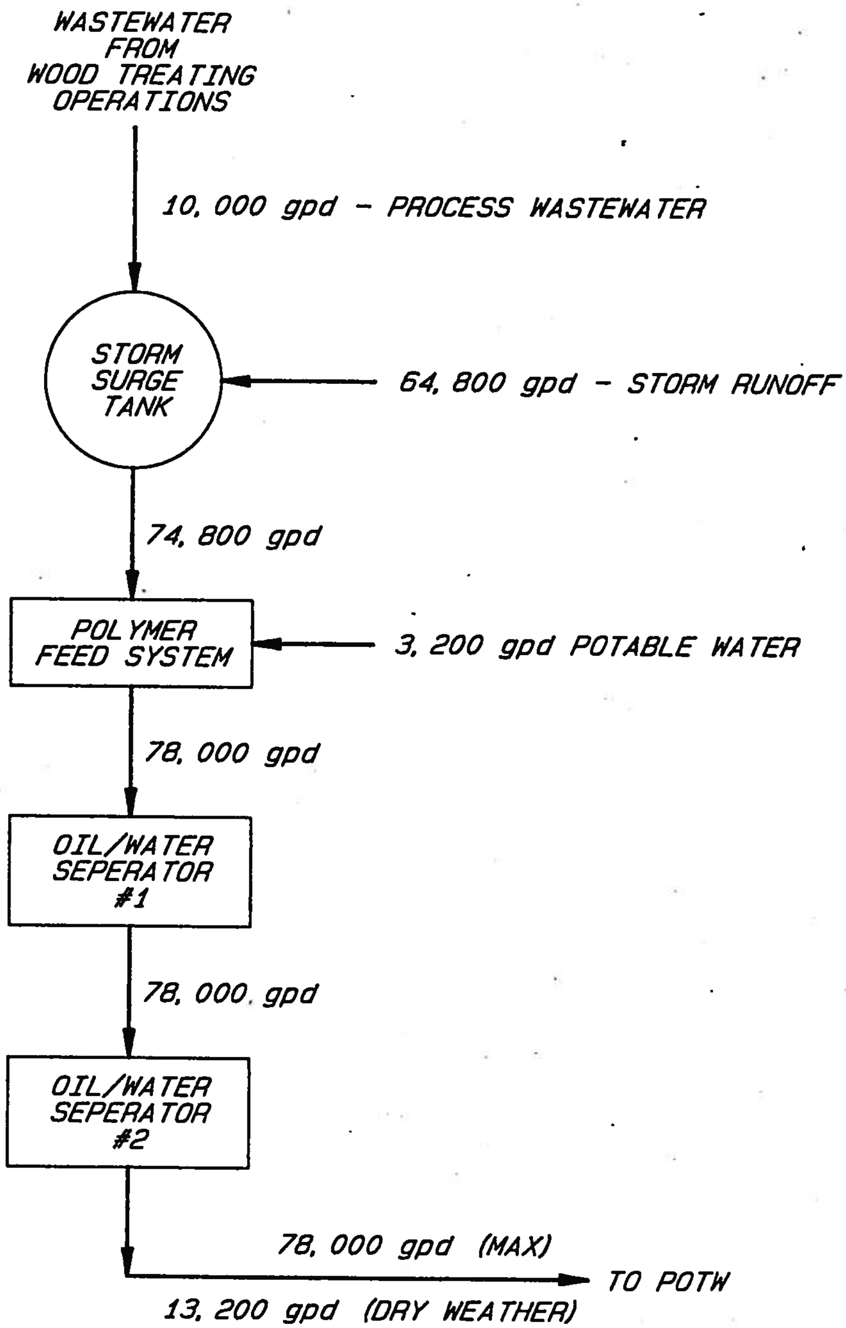
It has been estimated that a maximum of 10,000, (which is twice the average flowrate) gallons of process wastewater is generated during an eight hour day at the Wood Treating Plant. An additional maximum of 64,800 gallons per day of stormwater has been estimated based on the storm runoff model developed at the State University of New York at Buffalo, N.Y. This value of 64,800 gallons per day will be the maximum storm runoff flowrate that will be routed to the pretreatment system from the storm surge tank. The storm surge tank design is located in attachment IV. An estimated 3,200 gallons per day of potable water will be utilized for both cationic and anionic polymer make-up.

Based on the flowrate values listed above, the anticipated maximum daily flowrate of treated wastewater which will be discharged from the oil/-water separator to the sewer is 78,000 gallons per day. During dry weather, the flowrate will be 13,200 gallons per day. Storm surge capacity will be available at the Wood Treating Plant to ensure that the flowrate of treated wastewater, discharged to the sewer, will not exceed permit limitations.

FIGURE III - 1

KOPPERS COMPANY, INC.
GRENADA, MISSISSIPPI
WOOD TREATING PLANT

WASTEWATER BALANCE



LEGEND

gpd - GALLONS PER DAY

POTW - PUBLIC OWNED TREATMENT WORKS

8511782

ATTACHMENT IV

STORM SURGE TANK DESIGN

STORM SURGE TANK DESIGN

The storm surge tank is designed to accept storm runoff from an area of approximately two (2) acres within the Grenada, Mississippi plant. The storm water originates from drip track, cylinder and tank farm areas. Creosote and Pentachlorophenol wastewaters from the blowdown collecting tanks will also be routed to the storm surge tank. This tank will be capable of accepting and storing the penta and creosote wastewaters for two days at 10,000 gallons per day (maximum flowrate), in concert with the storm runoff from a 10 year return period storm.

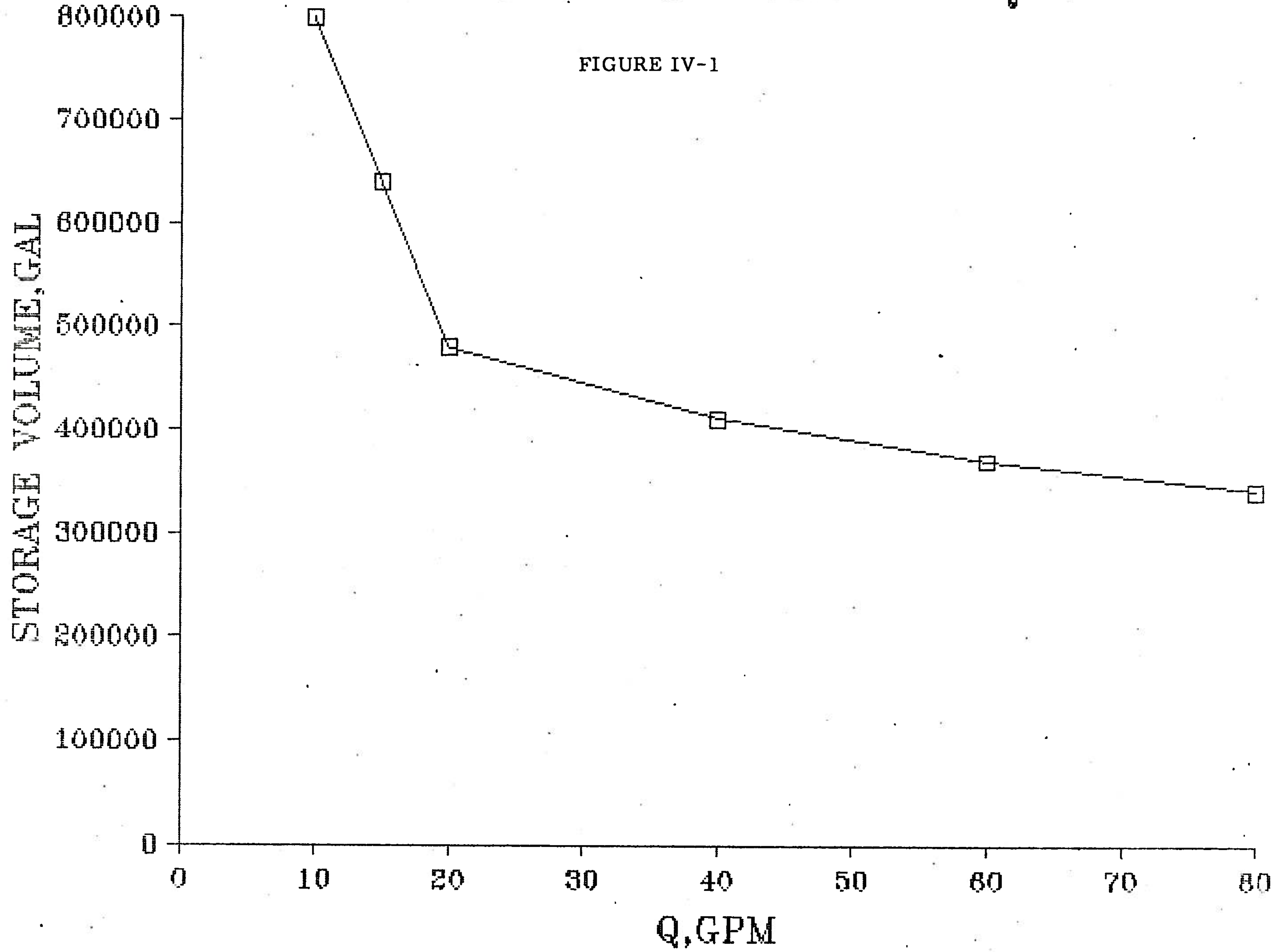
A storm runoff model was developed at the State University of New York at Buffalo, New York, for the purpose of estimating the volume of a storm tank and the flow rate of storm runoff discharging from this storm surge tank to the pretreatment system. The report entitled "Frequency Analysis for Industrial Stormwater Detention Basis for Florence, SC" is attached, as an example. This relationship for Grenada, Mississippi, is indicated in Figure IV-1. The rainfall data was obtained from a weather station located in Grenada, Mississippi. Hourly precipitation data from the U.S. Weather Bureau for the 29-year period from February 1954 through December 1983 was obtained from the storm runoff design model.

The ten (10) year storm recurrence interval was assumed for design purposes. From the model and Figure IV-1, it was determined that a 400,000 gallon storm surge tank would be required. This 400,000 gallon storm surge tank volume corresponds to a storm runoff volume that will not exceed the storm surge tank volume during a 10 year period. A storm surge tank volume of 84,000 gallons relates to the storm runoff volume equalling or exceeding the storage tank volume only 2 months during a 120 month period, or approximately 1.7 percent of the time as indicated in Figure IV-2. The 1.7 percent value represents a small percentage of time. Therefore, a storm surge tank volume of 108,000 gallons was chosen to include both storm runoff and 24,000 gallons of additional capacity for 2 days storage of the process wastewaters.

The existing wastewater surge tank has a capacity of approximately 108,000 gallons, therefore it may be utilized for storage of the anticipated storm runoff and process wasteaters. It is anticipated that the maximum flowrate of treated wastewater to the POTW would be 54 gallons per minute; 45 gpm of storm runoff, 6.9 gpm of process wastewater, and 2.2 gallons per minute of potable water.

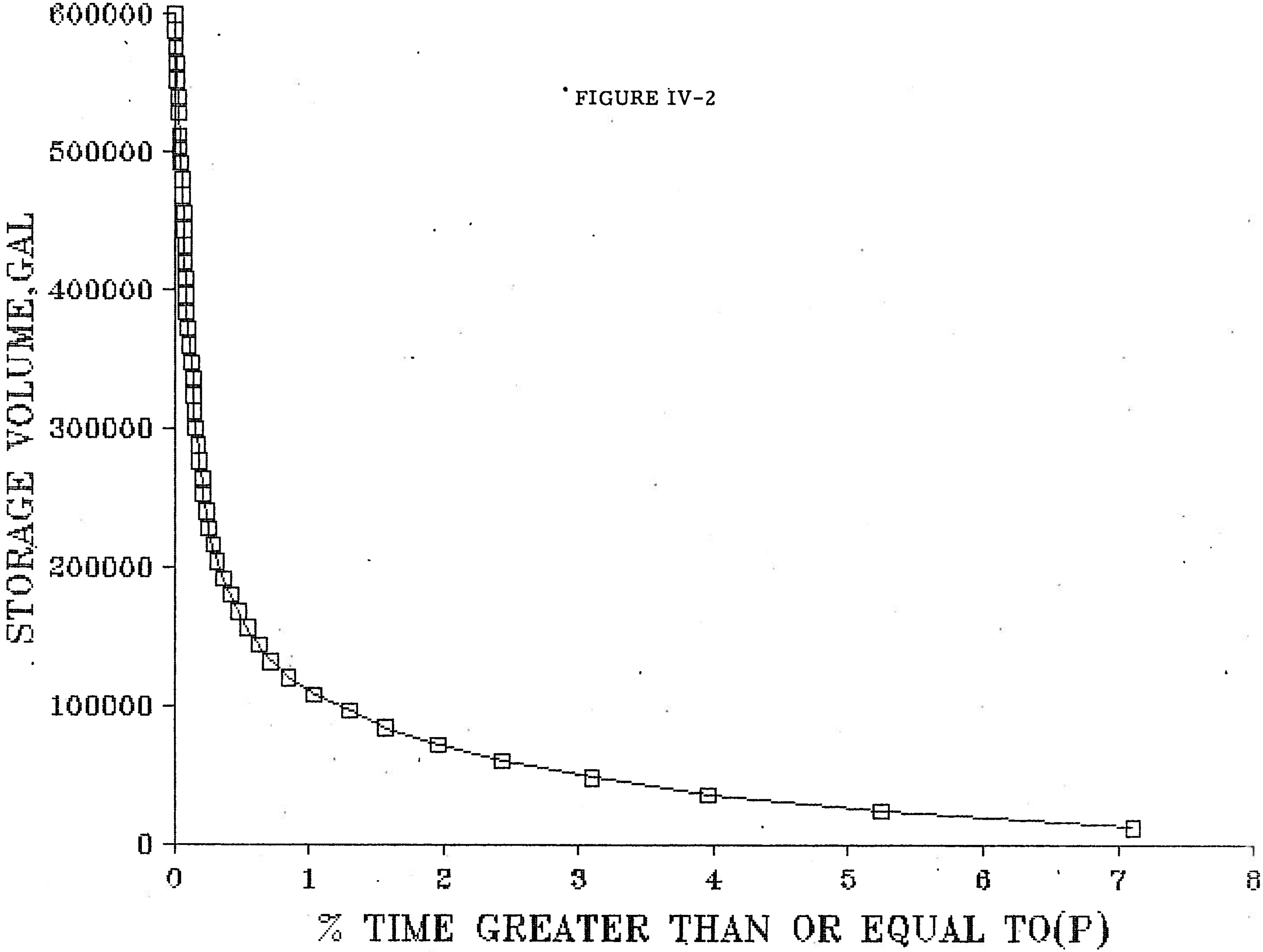
STORAGE VOLUME VS. Q

FIGURE IV-1



STORAGE VOLUME VS. P

FIGURE IV-2



FREQUENCY ANALYSIS
FOR INDUSTRIAL STORMWATER DETENTION BASINS

Florence, South Carolina

by

Dale D. Meredith
Professor of Civil Engineering
Department of Civil Engineering
State University of New York at Buffalo
Buffalo, New York 14260

February 24, 1984

1.0 Introduction

As requested by John Smith, the unit frequency analysis has been performed for Florence, S.C. The hourly precipitation data from the U.S. Weather Bureau for the 33-year period from January 1949 through December 1982, for weather station No. 0736 located at Bishopville 3W, S.C., was used. This is the nearest station to Florence, S.C., with the needed rainfall data.

2.0 Method of Analysis

A FORTRAN program written for the SUNY at Buffalo CDC Cyber 173 time-sharing system was used for the analysis. This program solved

$$\frac{V_t}{CA} = \frac{V_{t-1}}{CA} + I_t - \frac{Q_t}{CA}$$

for each time interval for the period of precipitation data. V_t is the volume of storage needed at the end of the t-th time interval to prevent the storage basin from overflowing; I_t is the amount of precipitation falling on the drainage area during the t-th time interval, Q_t is the amount of stormwater treated during the t-th time interval, C is the runoff coefficient, and A is the total drainage area. The time interval used was 1/4 day, i.e., 6 hours.

The amount of stormwater treated, Q_t, is computed as the minimum of the stormwater available during the time interval and the maximum amount that can be treated during the time interval. The computations were made for maximum Q_t/CA values of 2.5, 2.6, 2.7, 2.8, 2.9, 3.0, 3.5, 4.0, 5.0, 7.5, 10.0, 15.0, 20.0, 30.0, 40.0, 50.0, 60.0 and 75.0 gpm/acre.

The peak monthly storage volumes were then ranked and for each storage volume needed, the recurrence interval, T, was computed as

$$T = \frac{n+1}{m}$$

where n is the number of years of record, 33, and m is the rank of the event in decreasing order. The exceedence series was used in order to consider the n largest storage volumes needed regardless of when they occurred.

3.0 Results

The results of the computations are shown in Figures 1, 2, and 3. Because the storage volumes are expressed as V/CA and the maximum treatment rates are expressed as Q/CA, the results can be used for any drainage area and runoff coefficient for this site. The values obtained from the figures must be multiplied by CA to compute the value for the specific drainage area and runoff coefficient.

For example, for A = 12.5 acres, C = 0.8, and Q_{Tmax} = 40 gpm, one computes Q/CA = 5. Then, from Figure 1, for a maximum Q/CA of 5 and a recurrence interval of 5 years, the V/CA needed is approximately 151,000. Thus, V = (151,000) (12.5) (.8) = 1,510,000 gallons. This indicates that a storage basin of 1,510,000 gallons will overflow, on the average, once every 5 years if the maximum stormwater treatment rate is 40 gallons per minute. The same results are presented in tabular format in the computer printout.

Figure 2 presents the percent of time that a given Q/CA is equaled or exceeded. This is also presented in tabular form in the printout for file FREQ. Figure 3 presents the percent of time that a given volume of water in the detention basin is equaled or exceeded.

4.0 Computer Printout

The computer printout is explained using the section denoted by the phrase THIS IS A LISTING OF FILE FREQ.

The C and A are equal to 1.0 so that the results are unitized and can be used for any area and runoff coefficient. The results are presented for Q in the order listed, i.e., the results for Q = 2.5 gpm are presented first, followed by results for Q = 2.6 gpm, etc.

The computer printout presents the tabular form of the graphs. The first four columns of numbers for a specified Q/CA are the V/CA required, the day that volume was needed in year, month, and day, the return period T in years and the probability of occurrence in any year, respectively. Thus, the peak V/CA required for a maximum Q/CA of 2.5 is approximately 898,604 gallons/acre and would have been needed on 1965, September (09), the 2nd(02). This volume of water in storage would occur on the average approximately once each 33 years and has a probability of 0.03 of occurring in each year.

5.0 Duration of Detention Basin Use

It is often useful to know how long the stormwater will be stored in the detention basin. Therefore, the attached computer printout is presented for this purpose.

The computer printout is explained using the section denoted by the phrase THIS IS LISTING OF FILE HYDROFS. This is followed by the Q/CA for this run. Thus, the first section is for a Q/CA = 2.5.

The next numbers represent the volume-time relationship for the largest storage events. Thus, the first 6 digit represents the year, month and day on which one of the event occurred and is followed by V/CA at the end of each 6-hour period for 100 periods. Therefore, for Q/CA = 40 and for the storm of 1972(72), September(09), the 4th(04), there was water in the detention basin for 4 time periods or approximately 24 hours.

The last number at the end of this table is the number of times water is stored in the basin. For maximum Q/CA of 40 there are 647 times that water would be stored in the basin for the historical record analyzed.

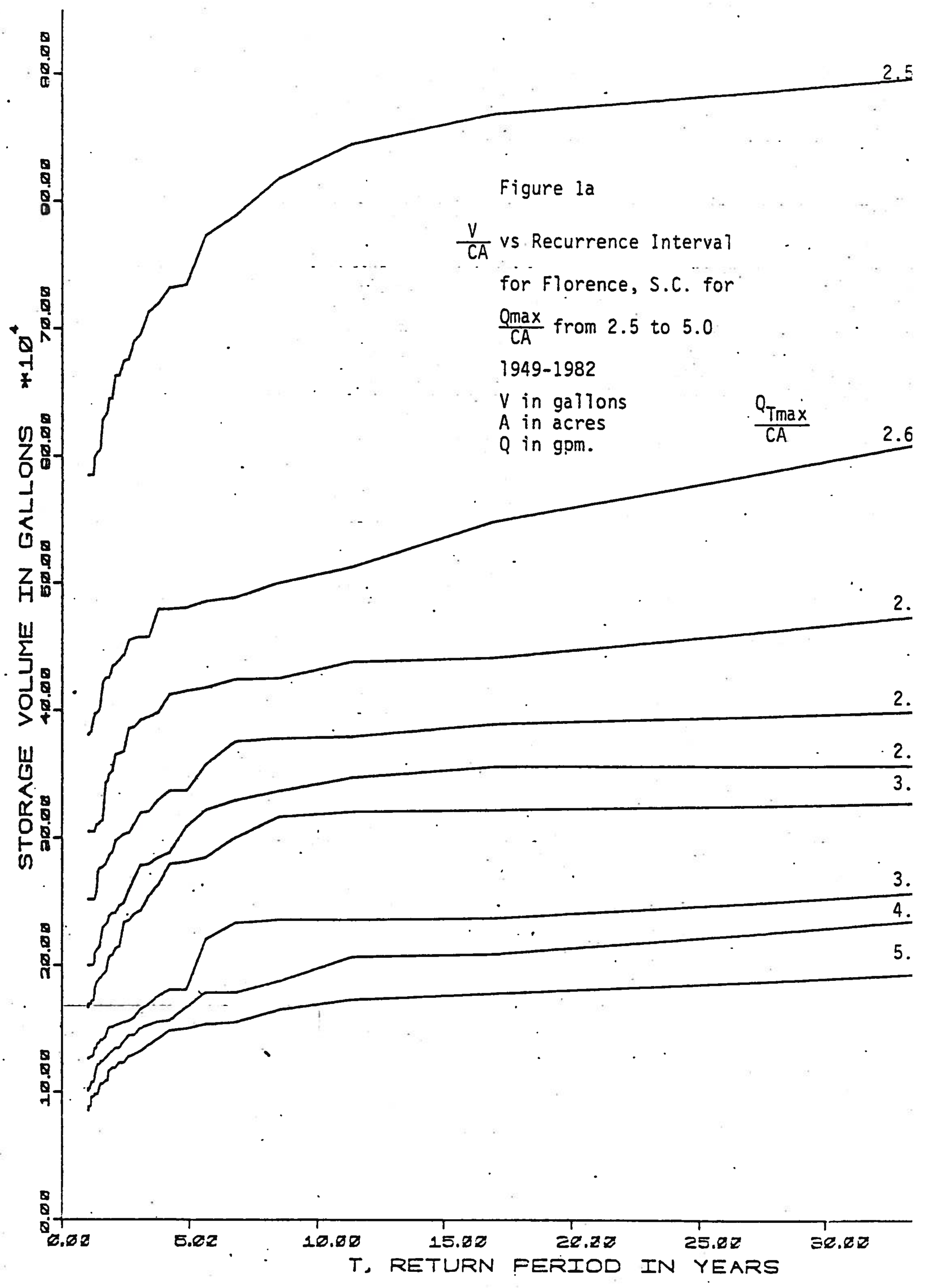


Figure 1a
$\frac{V}{CA}$ vs Recurrence Interval
for Florence, S.C. for
$\frac{Qmax}{CA}$ from 2.5 to 5.0
1949-1982
V in gallons
A in acres
Q in gpm.
$\frac{Q_{Tmax}}{CA}$
2.5
2.6
2.
2.
2.
3.
3.
4.
5.
STORAGE VOLUME IN GALLONS *10⁴
0.00
10.00
20.00
30.00
40.00
50.00
60.00
70.00
80.00
90.00
0.00
5.00
10.00
15.00
20.00
25.00
30.00
T, RETURN PERIOD IN YEARS

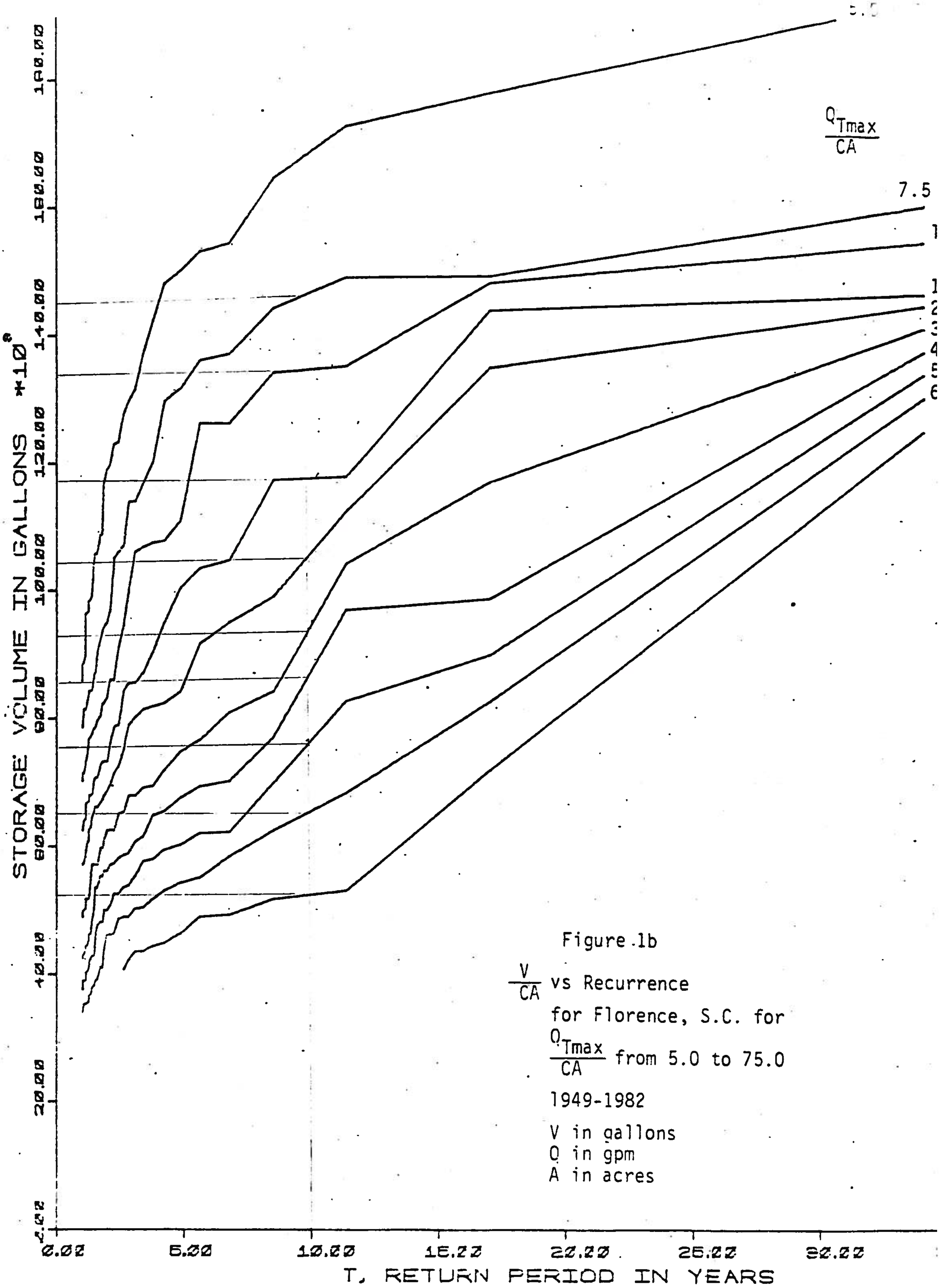


Figure 1b

$\frac{V}{CA}$ vs Recurrence for Florence, S.C. for $\frac{Q_{Tmax}}{CA}$ from 5.0 to 75.0

1949-1982

V in gallons
Q in gpm
A in acres

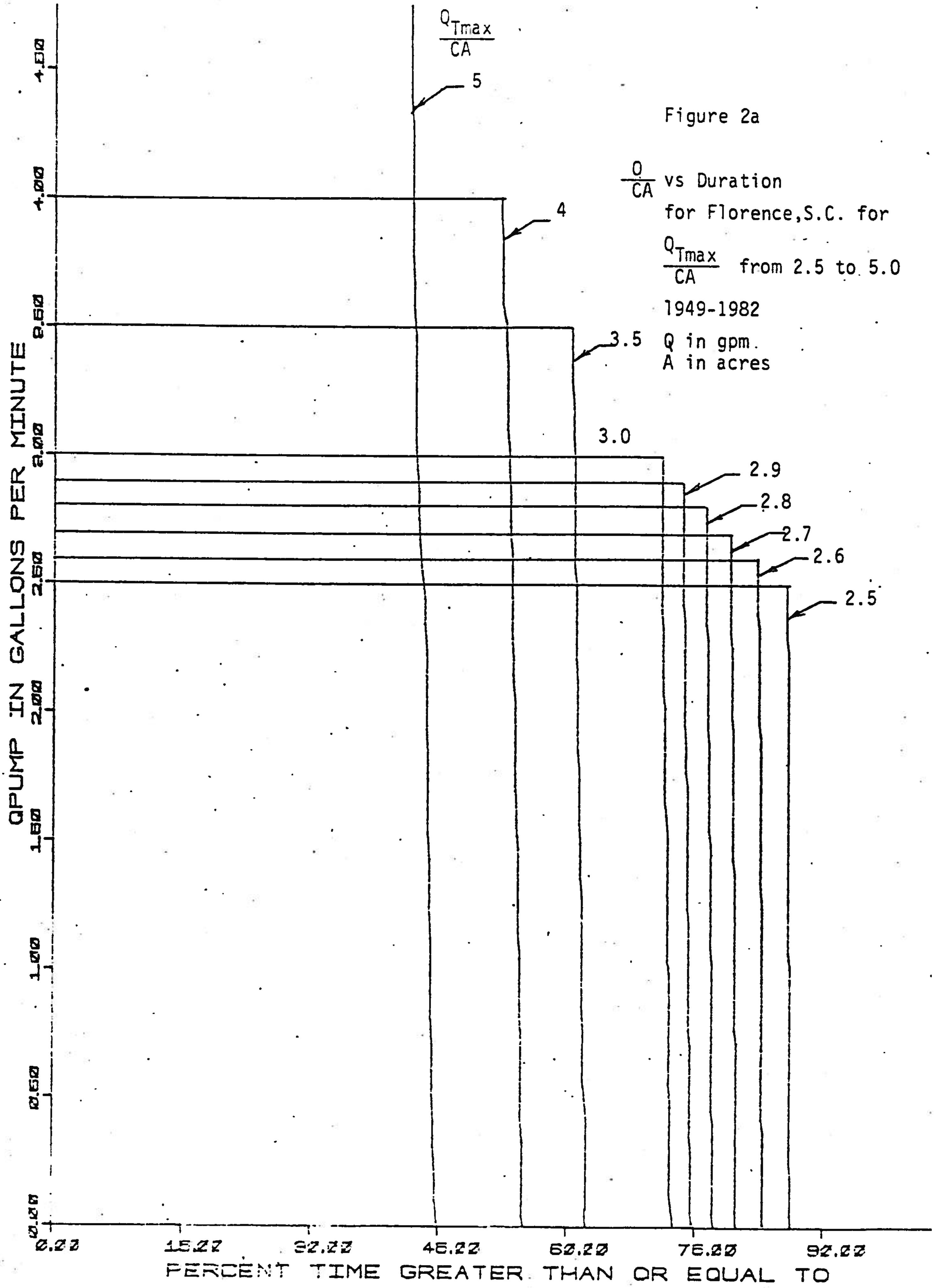


Figure 2a
Q/CA vs Duration
for Florence, S.C. for
QTmax/CA from 2.5 to 5.0
1949-1982
Q in gpm.
A in acres
QTmax/CA
5
4
3.5
3.0
2.9
2.8
2.7
2.6
2.5
QPUMP IN GALLONS PER MINUTE
PERCENT TIME GREATER THAN OR EQUAL TO

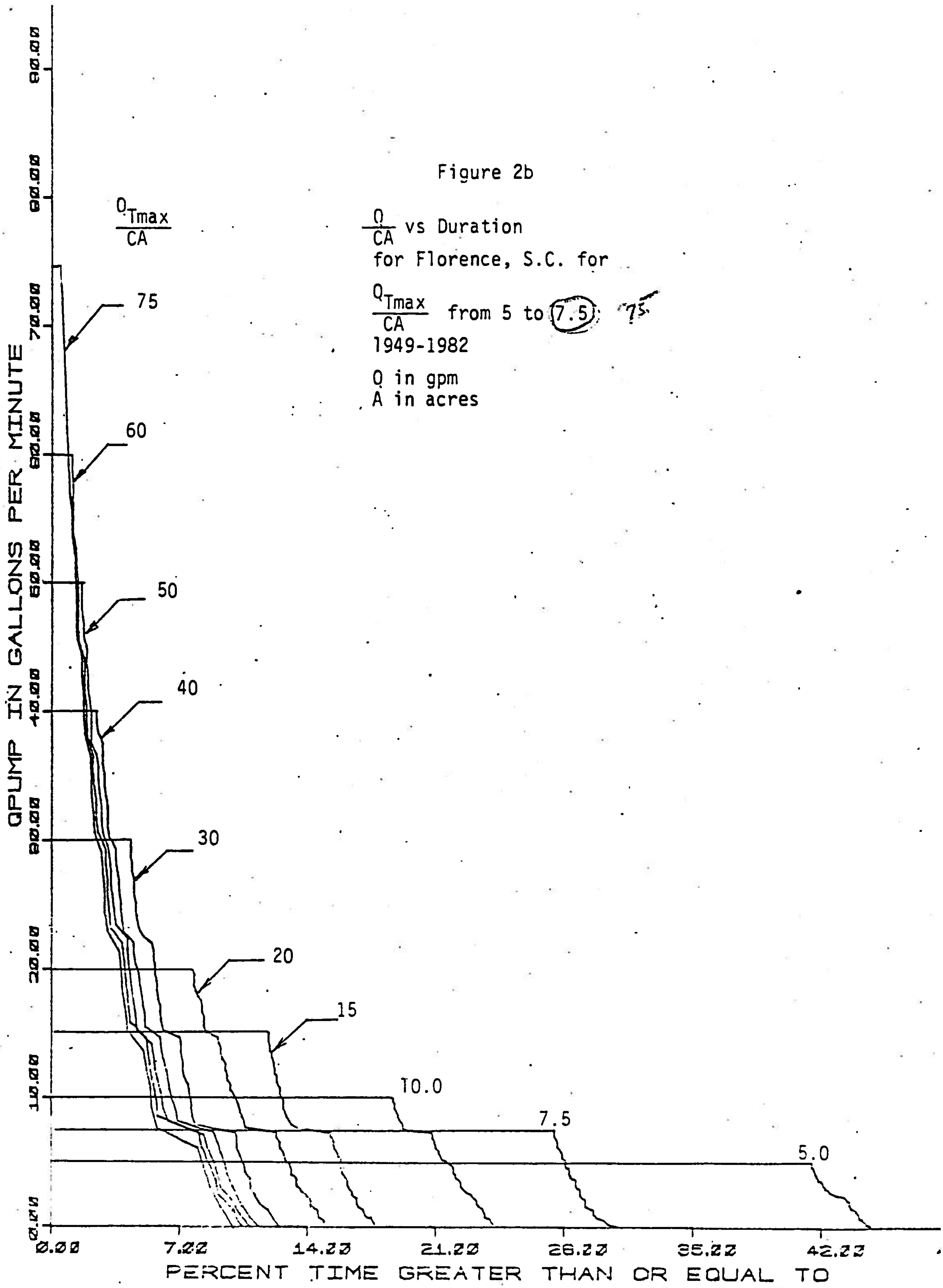


Figure 2b
Q/CA vs Duration
for Florence, S.C. for
Q_Tmax/CA from 5 to 7.5 75
1949-1982
Q in gpm
A in acres
Q_Tmax/CA
75
60
50
40
30
20
15
10.0
7.5
5.0
QPUMP IN GALLONS PER MINUTE
0.00
10.00
20.00
30.00
40.00
50.00
60.00
70.00
80.00
90.00
0.00
7.00
14.00
21.00
28.00
35.00
42.00
PERCENT TIME GREATER THAN OR EQUAL TO

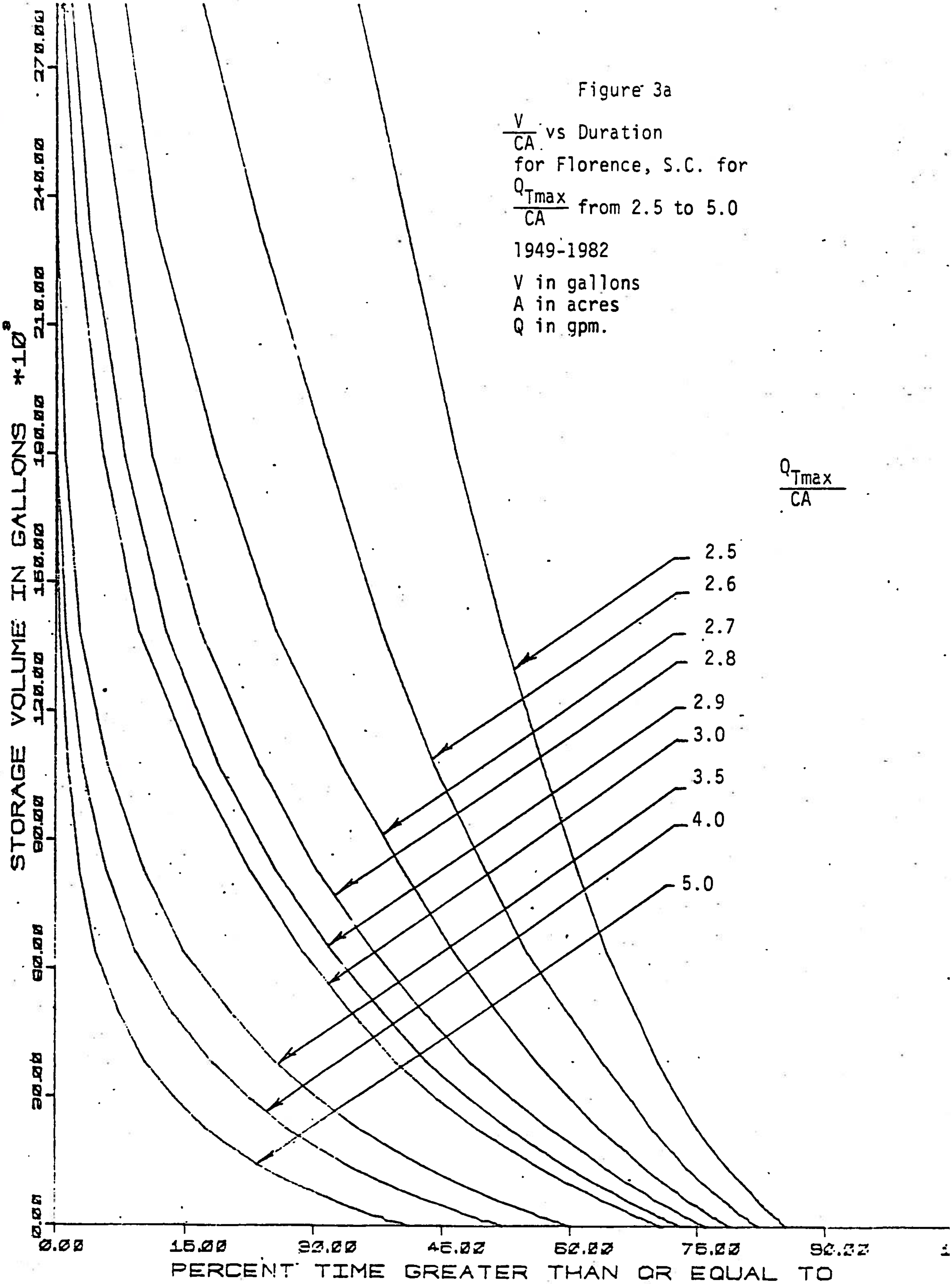


Figure 3a
$\frac{V}{CA}$ vs Duration
for Florence, S.C. for
$\frac{Q_{Tmax}}{CA}$ from 2.5 to 5.0
1949-1982
V in gallons
A in acres
Q in gpm.
$\frac{Q_{Tmax}}{CA}$
2.5
2.6
2.7
2.8
2.9
3.0
3.5
4.0
5.0
STORAGE VOLUME IN GALLONS $*10^{3}$
0.00
30.00
60.00
90.00
120.00
150.00
180.00
210.00
240.00
270.00
0.00
15.00
30.00
45.00
60.00
75.00
90.00
PERCENT TIME GREATER THAN OR EQUAL TO

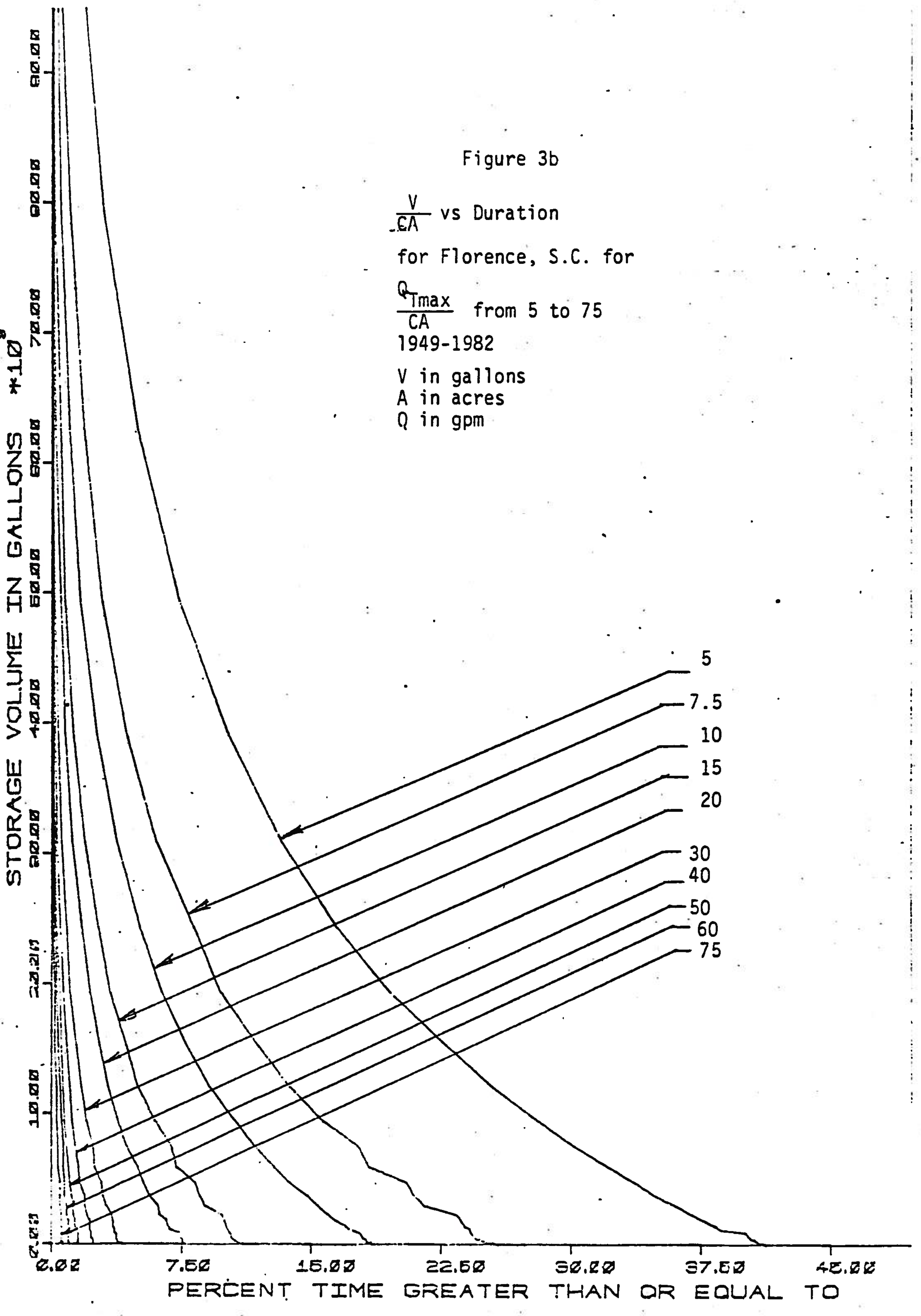


Figure 3b
V/CA vs Duration
for Florence, S.C. for
Q_{Tmax}/CA from 5 to 75
1949-1982
V in gallons
A in acres
Q in gpm
5
7.5
10
15
20
30
40
50
60
75
STORAGE VOLUME IN GALLONS *10³
PERCENT TIME GREATER THAN OR EQUAL TO
0.00
7.50
15.00
22.50
30.00
37.50
45.00
10.00
30.00
40.00
50.00
60.00
70.00
80.00
90.00

ATTACHMENT V

OCCUPATIONAL HEALTH AND PRODUCT SAFETY GROUP REPORT

KOPPERS

Interoffice Correspondence

To: Jeffrey D. Spencer	From: J. H. Butala
Location: Monroeville	Location: K-1201
Subject: GRENADA WASTEWATER	Date: December 3, 1985

Based on the analytical data you supplied for polychlorodibenzo-p-dioxins and polychlorodibenzofurans (attached), I have performed a health effects assessment for concentrations of these materials in process wastewater. The analysis employed the concept of "2,3,7,8-TCDD equivalents" as described by the EPA Chlorinated Dioxins Workgroup in April, 1985.

Briefly, given the lack of toxicity data on most of the 2,3,7,8-TCDD congeners, the poor understanding of additive effects from simultaneous exposure to more than one congener, and the high potency and strong structure-activity relationship observed in in vivo and in vitro studies of this group, it is reasonable to estimate the toxicity of mixtures of chlorinated dioxins or dibenzofurans based on a consideration of the mixture as being comprised of "equivalent amounts of 2,3,7,8-TCDD". It is the view of the EPA Chlorinated Dioxins Workgroup that sufficient scientific support exists for the Toxicity Equivalence Factor approach to risk estimation for chlorinated dioxins and dibenzofurans that the Agency should adopt the approach on an interim basis as a matter of science policy.

The assumptions used in the Toxicity Equivalence Factor (TEF) approach are:

1. 2,3,7,8-TCDD is the most toxic member of the group of chlorinated dioxins and dibenzofurans;

2. the toxicity of other members of the groups can be established relative to 2,3,7,8-TCDD by examination of available in vitro, animal, and human data;

3. once stated in terms of 2,3,7,8-TCDD equivalents, the toxicities of the components of a mixture are additive;

4. Risk assessment consists of a consideration of human exposure to the mixture in question in terms of 2,3,7,8-TCDD equivalents and the toxicity information available on 2,3,7,8-TCDD.

In this way, the following Toxicity Equivalency Factors have been established for dioxin or difuran isomers of chief concern.

EPA Chlorinated Dioxin Workgroup

Chlorinated Dibenzo-p-Dioxin and Chlorinated Dibenzofuran Isomers of Concern[a]

Dioxin Isomer	TEF[b]	Dibenzofuran Isomer	TEF
2,3,7,8-TCDD	1	2,3,7,8-TCDF	0.1
1,2,3,7,8-PeCDD	0.2	1,2,3,7,8-PeCDF	0.1
		2,3,4,7,8-PeCDF	0.1
1,2,3,6,7,8-HxCDD	0.04	1,2,3,6,7,8-HxCDF	0.01
1,2,3,7,8,9-HxCDD	0.04	1,2,3,7,8,9-HxCDF	0.01
1,2,3,4,7,8-HxCDD	0.04	1,2,3,4,7,8-HxCDF	0.01
		2,3,4,6,7,8-HxCDF	0.01
1,2,3,4,6,7,8-HpCDD	0.001	1,2,3,4,6,7,8-HpCDF	0.001
		1,2,3,4,7,8,9-HpCDF	0.001

[a]In each homologous group the relative toxicity factor for the isomers not listed above is 1/100 of the value listed above.

[b]TEF = toxic equivalency factor - relative toxicity assigned.

In the case of the Grenada process wastewater, the above TEF can be applied with two additional adjustments, both of which introduce a substantial safety margin: It is first necessary to assume that each of the undetected congeners is present at the limit of detection, and second that all isomeric species within a homologous group are the most toxic species. These assumptions provide a minimum safety factor of at least 100 fold.

Grenada, Mississippi Polychlorodibenzo-p-dioxin and Polychlorodibenzofuran Concentrations in Process Wastewater to Sprayfield

Congener	Concentration (ppt)	TEF	TCDD Equivalents
TCDD	ND (3.9)*	1	3.9
TCDF	ND (2.5)	0.1	0.25
PCDD	ND (0.82)	0.2	0.16
PCDF	ND (0.50)	0.1	0.05
HxCDD	ND (0.56)	0.4	0.22
HxCDF	ND (0.65)	0.01	0.006
HpCDD	26	0.001	0.003
HpCDF	ND (0.87)	0.001	0.0009
OCDD**	710	0.001	-
OCDF**	ND (1.4)	0.001	-
		SUM	4.6 ppt

* Limit of Detection

**Considered to have no significant toxicity

The 2,3,7,8-TCDD Toxicity Equivalency of the Grenada Plant water is 4.6 ppt. There is relatively little data on toxic effects of waterborne TCDD. One study, however, did address this point and can provide a perspective for the toxicity equivalent discerned for Grenada.

In order to evaluate the residue levels of 2,3,7,8-TCDD in the environment and in biota as a result of aerial application of the herbicide 2,4,5-T in Oregon forests, samples of several different matrices from the environment and biota were analyzed. This study was carried out jointly by the University of Nebraska and the U.S. Environmental Protection Agency (U.S. EPA), and replicate samples of a number of extracts were analyzed at both laboratories.

The study was divided into two phases. In phase I, water and sediment samples collected from the area were analyzed for 2,3,7,8-TCDD by GC/HRMS. Fourteen surface water samples were analyzed, and none were found to contain 2,3,7,8-TCDD at an average detection limit of ten part-per-quadrillion. Sediment samples were taken from ten sites which also had

[1]Gross, M.L. in Dioxins in the Environment. Kamrin and Rogers, ed., Hemisphere, 1985, p 135.

been sampled for water. No TCDD was detected in seven of the samples. Two samples showed low levels (2 ppt or less) which could not be confirmed in later analyses. A detectable level (3-20 ppt) of TCDD was found in one sample by both laboratories.

In phase II of this study, sampling was extended to drinking water filters, animal tissue, and whole animals (mice, shrew, birds and newts). No TCDD was detected in any samples except for a level of 3 ppt that was found in a sample of products of conception and one newt on the first round of analysis. These detections could not be confirmed.

I believe the data reported by Gross indicate that surface water concentrations of 2,3,7,8-TCDD very comparable to the Grenada process water equivalent concentration do not lead to harmful effects insofar as his studies were extended. That is, local flora and fauna showed little, if any, traces of TCDD exposure. While it is true that the Grenada equivalent concentration is greater than those TCDD concentrations actually measured by Gross, the 100-fold safety factor must be recalled. The actual chlorinated dioxin and dibenzofuran concentration in the process water is likely to be as much as two orders of magnitude below 2,3,7,8-TCDD concentrations observed by Gross. This possibility means that the toxicity of the contaminant in the water will be reduced proportionately.

It is my opinion, therefore, that the polychlorinated dibenzo-p-dioxin and polychlorinated dibenzofuran contamination in the Grenada plant wastewater is toxicologically insignificant.

J. H. Butala

JHB/pc

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APPLICATION FOR A STATE OPERATING PERMIT FOR KOPPERS COMPANY, INC. WOOD TREATING PLANT GRENADA, MISSISSIPPI

SUPPORTING DOCUMENT

Prepared by: Jeffrey D. Spencer
Koppers Company, Inc.
Water Quality Engineering
January 7, 1986

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1.0 INTRODUCTION

The purpose of this document is to present technical information which will support the fact that the chemical constituents encountered in wastewaters generated from wood treating operations are both biodegradable and non-toxic to biological treatment systems. As a result, the wastewater discharged to the sewer will not cause an interruption in the daily operation of the local Public Owned Treatment Works (POTW).

Koppers Company, Inc. proposes to discharge treated wastewater from the Grenada, Mississippi Wood Treating plant to the local POTW. This treated wastewater would be discharged from the oil/water separators to the sewer, following chemical coagulation, flocculation and sedimentation.

The information herein includes a characterization of the treated wastewater at the Grenada, Mississippi plant, the anticipated wastewater flowrate, the non-toxicity of this wastewater generated from wood treating operations on biological treatment units, and the concentration reduction of chemical constituents within the treated wastewater by dilution based on anticipated local sewer wastewater flowrates.

Biological treatment bench scale studies were performed at the Koppers Company, Inc., Monroeville, PA Research Center for the Wood Treating Plants in Florence, S.C. and Galesburg, Illinois. The results from these studies are included in this document, in concert with the results from a study conducted for the Chemical Manufacturers Association (CMA) and the U.S. Environmental Protection Agency (U.S. EPA) concerning the toxicity of base/neutral and acid extractable wastewater constituents on five (5) well-operated activated sludge units.

Appendix A includes information from the Koppers Company, Inc. Occupational Health and Product Safety Group concerning dioxins which were detected in the treated wastewater. Analytical results from the Compu Chem Laboratory for the Florence, S.C. bench scale biological unit are indicated in Appendix B.

This document will be utilized to support the information submitted by Koppers Company, Inc. in the State of Mississippi Application for a State Operating Permit.

2.0 CHARACTERIZATION STUDY

A wastewater characterization study of the Grenada, Mississippi Wood Treating Plant was performed on March 18-20, 1985, by the Koppers Company, Inc., Water Quality Engineering field group. Grab samples were obtained at sampling points 1 and 2 as located in Figure 2.1 and analyzed for parameters as indicated in Table 2.1. Sampling point 1 represents the influent wastewater stream prior to polymer addition and treatment, and sampling point 2 represents treated wastewater leaving the oil/water separators.

where is FIG. 2.1

The wastewater analysis methods for the parameters in Table 2.1 are indicated in Table 2.2. Sample analyses methods adopted by the Environmental Protection Agency (EPA) and by Standard Methods (SM) are primarily utilized by Koppers Company, Inc.

2.1 Results

Table 2.1 indicates the results from the previously conducted characterization study for sampling points 1 and 2, percentage removals and the wastewater discharge limits as stated in the local Sewer Use Ordinance. These results represent an anticipated worst case wastewater discharge to the city sewer. The pH of the wastewater effluent stream is 4.5. This value is 1 pH unit below the minimum sewer discharge limit. The wastewater pH can be increased prior to discharge to the sewer with the addition of caustic. TOC, BOD (5-day) and COD effluent values were 2,505, 3,850, and 7,360 mg/l, respectively. The discharge limit for BOD (5-day) is 250 mg/l. A 7% removal of phenols was realized following the addition of polymers to the influent stream. The TSS concentration, consisting largely of volatile matter, was reduced by 86% to 96 mg/l. This concentration of TSS is below the 250 mg/l required for discharge of wastewater into the sewer. Due to polymer addition, there was an increase

TABLE 2.1

GRENADA, MISSISSIPPI
WASTEWATER TREATMENT RESULTS

PARAMETERS	Influent to O/W Separators, mg/l	Effluent from O/W Separators, mg/l	% Removal	POTW Discharge Limits, mg/l
pH, units	4.4	4.5		5.5-9.5*
TOC	2,850	2,505	12	
BOD (5-day) - Total	5,900	3,850	35	250
COD - Total	12,840	7,360	43	
Phenols (4AAP)	443	410	7	
Solids, Suspended				
Total - 103°C	710	96	86	250
Fixed - 550°C	20	16	20	
Volatile - 550°C	690	80	88	
Solids, Dissolved				
Total - 103°C	4,210	4,376	-4	
Fixed - 550°C	410	564	-38	
Volatile - 550°C	3,800	3,812	0	
Ammonia (NH_3) N-Total	34	28	18	
Kjeldahl N	140	42	70	40
Phosphorus, Total P	5	4	20	
Oil & Grease	700	75	89	100
Pentachlorophenol	160	4.2	97	
Arsenic	0.013	0.014	-8	
Chromium				
Total	0.024	0.025	-4	4.0**
Hexavalent	0.05	0.05	0	4.0**
Copper	0.13	0.10	23	5.0**
Temperature, °F	ambient	ambient		150+

Note: O/W denotes oil/water
* Discharge limits have units of standard pH unit
\+ Discharge limit has the unit of °F
** Pretreatment Standards from Federal Register. 40 CFR 429.90, for the Wood Preserving Industry.

TABLE 2.2

WASTEWATER ANALYSIS METHODS
GRENADA, MISSISSIPPI

PARAMETER	TEST METHOD[1]
pH	EPA-150.1
Suspended Solids	EPA-160.2
Total Dissolved Solids	EPA-160.1
Total Organic Carbon (TOC)	EPA-415.2
Chemical Oxygen Demand (COD)	EPA-410.1 or HACH (FED. REG., 4/21/80)
Biochemical Oxygen Demand (BOD)	SM-507
Phenols (4-AAP)	EPA-420.2
Ammonia $(NH_3)N$	EPA-350.3
Kjeldahl-N	EPA-351.3
Total Phosphorus	EPA-365.1, 365.2
Oil and Grease	EPA-413.1
Pentachlorophenol (PCP)	EPA-604 or Koppers GC Method A2056
Arsenic	EPA-206.2
Total Chromium	EPA-218.2
Chromium-Hexavalent (Cr^{+6})	SM-312B
Copper	EPA-220.2
PAH	EPA-610
Priority Pollutants	EPA-624 and 625 for Organics
Furans	EPA-613 w/modifications
Dioxins	EPA-613 w/modifications

(1) EPA: Methods for chemical analysis of water and wastes, EPA 600/4-79-020.

SM: Standard Methods for the Examination of Water and Wastewater, 15th Edition, 1980.

in dissolved solids, both total and fixed, and a slight increase in the concentration of volatile dissolved solids. The concentrations of both ammonia and kjeldahl-nitrogen were determined to be 28 and 42 mg/l, respectively. The kjeldahl-nitrogen concentration is slightly higher than the discharge limit value of 40 mg/l. Reductions in concentrations of both oil and grease and pentachlorophenol were greater than 85%. The oil and grease effluent concentration was 75 mg/l, which is below the 100 mg/l discharge limit. Pentachlorophenol is present in the wastewater effluent stream at a concentration of 4.2 mg/l. As a result of polymer treatment, the concentration of pentachlorophenol was reduced 97%. Copper, chromium and arsenic were detected in the influent and treated effluent wastewater. The wastewater temperature was ambient.

Additional organic constituents were detected in the wastewater discharged from the lagoon to the sprayfield, and it is anticipated that these constituents will be encountered in the treated oil/water separator effluent. These constituents and their concentrations are as follows:

Constituents	Concentration, ppt.
Heptachloro dibenzo p-dioxin	26
Octachloro dibenzo p-dioxin	710

The unit of parts per trillion is analogous to 10^{-6} mg/l, which indicates very low concentrations of the constituents. Attached in Appendix A is a report from the Koppers Company, Inc. Occupational Health and Product Safety Group concerning Hepta and Octa chloro dibenzo p-dioxin and the complete results of the dioxin/furan analyses from the IT Corporation Analytical Laboratory.

As previously mentioned, Koppers Company, Inc. is proposing to discharge this effluent from the oil/water separator to the sewer. Koppers Company, Inc. is prepared to discuss any surcharge possibilities which the Grenada County Water and Sewer District deems appropriate for exceedance of the discharge limitations for BOD (5-day), and Total Kjeldahl Nitrogen.

3.0 TREATABILITY STUDIES

The Water Quality Engineering Group at Koppers has performed various bench scale wastewater treatability studies in the laboratory in Monroeville, PA. The purpose of these treatability studies is to determine whether the concentration of organic and inorganic constituents within the wastewater can be reduced below an acceptable limit and to determine the toxicity of the wastewater to microorganisms. Bench scale aeration tank type treatment units have been operated successfully for treating wastewaters generated from Wood Treating Operations at Kopper's Florence, South Carolina and Galesburg, Illinois plants. In both cases, the wastewaters contained phenols, pentachlorophenols, priority pollutants and polynuclear aromatic hydrocarbons (PAH's).

3.1 Florence, SC Study[1]

The Florence, SC wastewater treatability study was carried out from May 21, 1984 to July 27, 1984. In this bench scale study, five (5) wastewater streams were utilized as influent make-up. These influent streams were comprised of the following wastewaters:

Contaminated groundwater
pentachlorophenol wastewater
creosote wastewater
boiler blowdown water
NCX sump water ?

The contaminated groundwater, pentachlorophenol and creosote wastewaters were combined, pretreated with polymers, the suspended solids were allowed to settle and the supernatant was collected. This supernatant represented 89% by volume of the influent wastewater to the aeration tanks, and the remaining 11% by volume was comprised of boiler blowdown water (10% by volume) and NCX wastewater (1% by volume). NCX is a chemical used as a wood fire retardant. With the exception of NCX wastewater, these wastewater streams are representative of the wastewater streams at the wood treating plant in Grenada, Mississippi. Table 3.1 indicates the parameters of the raw wastewater utilized for influent

TABLE 3.1

KOPPERS COMPANY, INC.
FLORENCE WASTEWATER TREATABILITY STUDY

Raw Wastewater Used for Influent Makeup
Analytical Results

	Creosote Wastewater		Pentachlorophenol Wastewater		Test Recovery Well (S.E.)		Test Recovery Well (S.W.)				Boiler Blowdown	NCX Sump
DATE	4/25/84	5/10/84	4/24/84	5/10/84	4/30/84	5/10/84	4/25/84	4/26/84	5/10/84	7/11/84	5/10/84	5/10/84
PARAMETERS												
pH, units	4.44	4.9	3.62	4.2	5.8	6.1	5.41	5.53	5.2	5.12	10.5	2.8
Total Organic Carbon	2628	2675	2884	3490	7.9	5.7	448	453	381	455	13.3	1620
Biochemical Oxygen Demand - total	-	5775	-	10,820	-	4	-	-	1965	973	14	1415
Biochemical Oxygen Demand - soluble	-	3825	-	6390	-	3	-	-	820	643	11	915
Chemical Oxygen Demand - total	58,800	33,200	24,780	27,300	34	85	3645	4850	4500	2470	49	4100
Chemical Oxygen Demand - soluble	-	7500	-	16,000	-	16	-	-	1106	1278	18	3550
Phenols	203	240	73	35	0.06	0.013	102	92	101	74	0.54	0.031
Total Suspended Solids	1496	1700	988	1530	1	14	238	466	488	148	64	222
Fixed Suspended Solids	12	-	0	-	<1	-	14	24	-	-	-	-
Volatile Suspended Solids	1484	-	988	-	1	-	224	442	-	-	-	-
Total Dissolved Solids	-	4170	-	7760	-	52	-	-	290	334	270	14,086
Kjeldahl Nitrogen	-	80	-	40	-	<1	-	-	30	20	<1	4850
Total Phosphorus	-	10.4	-	16	-	0.15	-	-	0.075	2	6	360
Oil & Grease	4445	791	4455	203	2	2	1555	1565	6305	334	9	4
Pentachlorophenol	72	220	1100	1300	0.0043	0.018	8.9	13	11	2.5	2.7	0.0017
Conductivity, µmhos/cm	-	700	-	970	-	84	-	-	318	305	360	3100
Formaldehyde	-	-	-	-	-	-	-	-	-	-	-	-

TABLE 3.2

KOPPERS COMPANY, INC.

Statistical Data for Influent

Parameter	Number of Samples	Geometric Mean	Standard Deviation	Range	90% Less Than Value*
pH, units	51	6.18	1.08	5.0-6.8	6.78
Total Organic Carbon	10	1321	1.10	1100-1597	1482
Total Biochemical Oxygen Demand	10	1671	1.80	318-3094	3494
Soluble Biochemical Oxygen Demand	10	1642	1.83	320-3308	3526
Total Chemical Oxygen Demand	10	3651	1.17	2495-4430	4438
Soluble Chemical Oxygen Demand	10	3934	1.09	3355-4380	4396
Phenol (4-AAP)	10	74	1.13	53-83	86
Total Suspended Solids	9	177	1.63	80-540	326
Volatile Suspended Solids	8	137	1.58	60-280	243
Fixed Suspended Solids	8	40	661.85	0-260	1476
Total Dissolved Solids	4	2501	1.07	2246-2688	2719
Oil & Grease	8	29.87	1.83	9.3-82	63.9
Formaldehyde	10	23.83	1.35	10-28	34.79
Pentachlorophenol	10	13.34	1.56	6.7-24	23.38
Conductivity, umhos/cm	11	737	1.13	600-900	860
Total Phosphorus	10	18.51	1.27	11-25	24.92
Total Kjeldahl Nitrogen	10	92.6	1.04	90-100	96.8

NOTE: All values in mg/L unless otherwise noted.

*Corresponds to concentration which will be exceeded only 10 percent of the time, based on the assumption that the data follows a log-normal probability distribution.

make-up to the biological aeration tank type treatment units, and the date at which the samples were obtained. Table 3.2 indicates the statistical data for the influent.

Three (3) aeration tank type biological treatment bench scale units, as indicated in Figure 3.1, were operated in Monroeville, PA. The difference between the aeration tank units and an activated sludge unit is that the hydraulic retention time (HRT) equals the solids retention time (SRT) for the aeration tank, and there is no recycle of biological solids, as is experienced in an activated sludge unit. These aeration tank units were operated in 3-phases, (1) start-up and biological seeding, (2) steady-state, and (3) low temperature.

Start-up and biological seeding was carried out under carefully controlled conditions. The wastewater temperature was maintained at 25°C, and the HRT was 5-days. Nutrients such as phosphorus and nitrogen were added to each unit as required and wastewater pH control was utilized. Following the initial phase, each unit was operated in the steady-state mode with an HRT of 5 days and a temperature of 25°C. During low temperature operations, unit #1 was operated at 20°C, unit #2 at 15°C and unit #3 at 10°C. Wastewater samples were obtained and analyzed during the low temperature operation phase, and the results are indicated in Table 3.3. The data in Table 3.3 indicate that both phenol and pentachlorophenol concentrations were reduced by bacteria at wastewater temperatures as low as 10°C. Oil and grease, soluble BOD (5-day), TOC, and soluble COD reductions averaged 53%, 96%, 85% and 81%, respectively. TSS values were relatively high in the effluent because this effluent stream was unfiltered.

The influent and effluent results in Table 3.3 were presented on a statistical basis. The data was assumed to follow a log normal distribution, which is commonly utilized for influent and effluent wastewater data. The median value of the log normal distribution is represented by the geometric mean (G mean). The 90% value denotes that there is a 90% probability, based on a log normal probability distribution, that all data will be less than or equal to the stated value. Conversely, there is a 10% probability that the stated value will be exceeded.

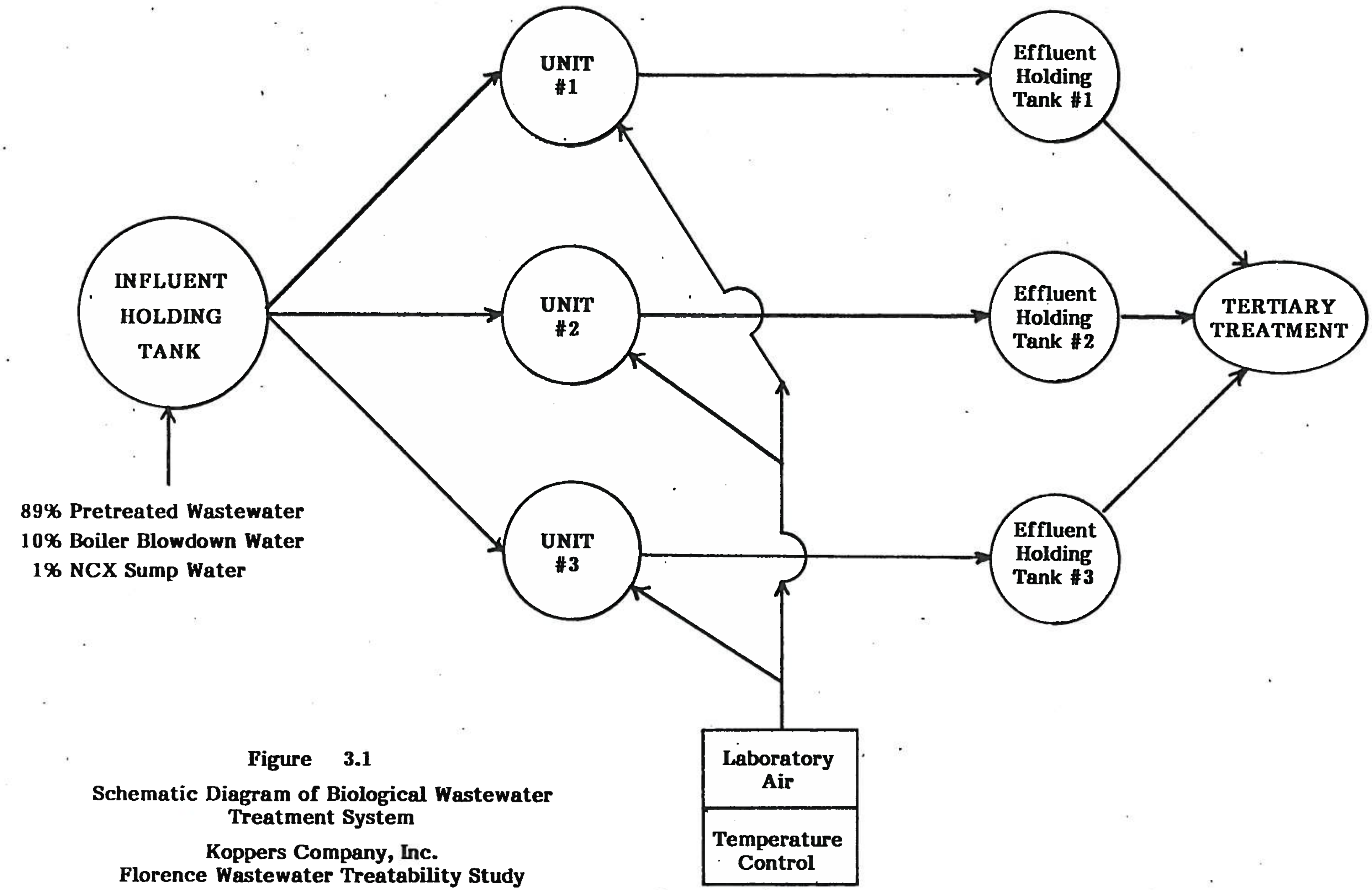

Figure 3.1

Schematic Diagram of Biological Wastewater Treatment System

Koppers Company, Inc.
Florence Wastewater Treatability Study

TABLE 3.3

KOPPERS COMPANY, INC.
FLORENCE WASTEWATER TREATABILITY STUDY

Removal Percentages for Biological Bench Units at Steady-State
(6/23/84 - 8/27/84)

Parameter	Influent G. Mean[1]	Unit #1 Effluent[2]			Unit #2 Effluent[2]			Unit #3 Effluent[2]			Average % Removal
		G. Mean	90% Value	% Removal	G. Mean	90% Value	% Removal	G. Mean	90% Value	% Removal	
pH, units	6.18	6.97	7.24	NA	7.07	7.2	NA	7.08	7.26	NA	NA
TOC	1321	218.8	238.9	83.4	142	2.66	89.3	233	265	82.4	85.0
S-BOD_5	1642	128.8	166.8	92.2	42.7	98.5	97.4	20.7	411	98.7	96.1
S-COD	3934	734	830.8	81.3	684	728	81.5	770	910	80.4	81.1
Phenol (4-AAP)	74	0.55	0.80	99.3	0.54	0.624	99.3	0.75	1.3	99.0	99.2
TSS	177	977	1393	NA	948	1228	NA	948	1730	NA	NA
VSS	137	864	1338	NA	830	1128	NA	829	1744	NA	NA
FSS	40	13	--	NA	118	--	NA	119	--	NA	NA
O & G	29.87	9.44	16.7	68.4	19.7	101	34.1	12.9	70	56.8	53.1
Formaldehyde	23.83	2	2	91.6	3.48	17.9	85.4	1.0	1.0	95.8	90.9
Pentachlorophenol	13.34	7.83	12.4	41.3	9.3	14.4	30.3	11.3	18.0	15.3	29.0

Note: All results in mg/L unless otherwise indicated. N/A = Not Applicable

1. Taken from Table 3.2
2. % removal based on removals of influent and effluent geometric means
3. 5 - denotes soluble
4. 4 - AAP denotes the 4 amino-antipyrine method for phenol analysis

Priority pollutant analyses were performed on the influent wastewater to the biological units, and on the effluent and filtered effluent samples from these units. A summary of the priority pollutant analyses results are shown in Table 3.4 and in Appendix B. The priority pollutant analyses were performed by CompuChem Laboratories, located in Research Triangle Park, North Carolina. This data confirms the fact that phenols, pentachlorophenols, and the polynuclear aromatic hydrocarbons (PAH), Pyrene (4-benzene ring PAH), phenanthrene (3-benzene ring PAH) and Fluoranthene (4-benzene ring PAH) are biodegradable and non-toxic to the microorganisms under study. Of the metal constituents listed in Table 3.4, lead showed the most significant decrease in concentration.

A bench scale activated sludge unit is presently operating in Monroeville, PA for Florence, SC. Results from this study will be available for your review at the end of the study. The influent wastewater to the unit is identical to that of the previous study, and this unit will be operated in 4 phases; (1) start-up, (2) steady-state, (3) cold temperature, (4) extended steady state.

3.2 Galesburg, Illinois Study[2]

One bench scale completely mixed biological aeration unit was evaluated at the Monroeville, PA Research Center (from September 17, 1981 to November 27, 1981), for the Galesburg, IL Wood Treating Plant in 1982. The purpose of this study was to determine the treatability of the wastewater generated at the Galesburg plant.

The influent wastewater to the aeration unit was comprised of condensate, contaminated storm runoff, contaminated cleaning and leakage wastewater, boultonizing wastewater and boiler blowdown. A chemical was added to this wastewater at the Wood Treating Plant to enhance flocculation of suspended particles. The influent wastewater for this biological study was collected from a 450,000 gallon wastewater holding tank, located at the plant.

The completely mixed aerated biological bench scale unit was operated at a 2-day HRT. The temperature during the initial phase of operation was

TABLE 3.4

KOPPERS COMPANY, INC.

FLORENCE, S.C. TREATABILITY STUDY

PRIORITY POLLUTANT ANALYSIS RESULTS SUMMARY

Parameter	Influent to Bench Unit	Unfiltered Effluent From Bench Units	Filtered Effluent From Bench Unit
Phenol	5.0	<0.025	<0.025
2,4-Dimethylphenol	4.0	<0.025	<0.025
Pentachlorophenol	16.0	3.8	7.1
Bis (2-Chloroethyl) Ether	0.21	<0.01	<0.01
2,6-Dinitrotoluene	< 0.01	0.015	<0.01
Phenanthrene	0.29	<0.01	<0.01
Fluoranthene	0.16	<0.01	<0.01
Pyrene	0.11	<0.01	<0.01
Copper	0.15	0.15	0.10
Lead	1.6	0.050	0.050
Mercury	0.00060	0.00060	0.00050
Zinc	0.35	0.31	0.27

Note: All results in mg/L.
Less than (<) value indicates below detectable limit.
Taken from results given in Appendix B.

controlled at 20°C. Nutrients and anti-foam were added to the aeration unit wastewater. The results of the study, during steady-state operations, are indicated in Table 3.5. The statistical parameters for the influent and effluent data were the number of observations (N), the arithmetic mean ($\bar{x}$) and the range of values obtained for the number of observations.

Total and soluble COD concentration reductions were 77% and 85%, respectively. Phenol analytical results indicate a 99.9% reduction in phenol concentration. The reduction in Oil & Grease concentration following biological treatment was 90%. The TSS value increased from an average of 6.8 mg/l to an average of 173 mg/l, primarily due to the presence of bacteria in the effluent solids.

Cold temperature operation of the biological aeration unit followed steady-state operation. The aeration unit temperature was decreased from 20°C to 11°C, and subsequently from 11°C to 9°C to evaluate the response of the treatment system. At an 11°C (52°F) wastewater temperature as indicated in Table 3.6, Total and Soluble COD concentration reductions were 79% and 87%, respectively. The phenol concentration reduction remained high with a value of 99.98% measured by the analytical method. Oil & Grease removal decreased to 83% from 90% at steady state, and TOC removal remained relatively constant at 89%.

At an aeration unit temperature of 9°C (48°F), as indicated in Table 3.7 phenol reduction decreased to 89% from greater than 99%. A phenol reduction of 89% is very respectable at the temperature encountered. The Soluble COD concentration reduction was 67%, and Oil & Grease concentration reduction was 85%. The average TOC concentration removal increased to 97% during this 9°C temperature operation.

Table 3.8 indicated the analytical results for PAH compounds and their respective % removals. The influent wastewater sample was collected at a sampling point in the field at the Galesburg Plant, prior to wastewater discharge to the sprayfield. The effluent wastewater sample was collected in the laboratory in Monroeville, following aerated lagoon treatment with the bench scale unit.

TABLE 3.5

KOPPERS COMPANY, INC.
FOREST PRODUCTS GROUP
GALESBURG PLANT
AERATED LAGOON TREATABILITY STUDY

STEADY STATE PHASE 2

PARAMETERS	n	$\bar{x}$	Range
Influent Statistical Data			
pH	4	7.6	7.5-7.75
COD (Total)	3	1230	1201-1272
COD (Soluble)	3	1237	1199-1264
TOC	4	445	425-465
BOD_5	3	586	568-603
Phenol (Analytical)	4	221	195-233
Phenol (Chemetrics)	4	191	175-213
O & G	4	62	16.2-188
TSS	4	6.80	3-10
VSS	4	6.80	3-10
FSS	4	0	0-0
TDS	4	687	686-688
Conductivity	4	991	975-1000
Effluent Statistical Data			
pH	17	7.69	7.4-7.9
COD (Total)	16	285	196-432
COD (Soluble)	16	183	134-268
BOD_5 (Total)	16	51	27-96
BOD_5 (Soluble)	16	28	5-62
TOC	16	63	55-80
Phenol (Analytical)	16	0.205	0.04-1.2
Phenol (Chemetrics)	17	0.1	0.1-0.1
O & G	16	6.34	5-12
TSS	17	173	100-340
VSS	17	173	100-340
FSS	17	0	0-0
TDS	16	652	618-732
Conductivity	17	1079	930-1390
Phosphate	17	13	5-23
Ammonia	17	14	6-25
Nitrates	17	16.3	13.2-17.6

All values are expressed in units of mg/l, except pH and conductivity (umhos/cm).

TABLE 3.6

KOPPERS COMPANY, INC.
FOREST PRODUCTS GROUP
GALESBURG PLANT
AERATED LAGOON TREATABILITY STUDY

COLD TEMPERATURE PHASE 3
(Effluent to 11°C)

PARAMETERS	n	x	Range
Influent Statistical Data			
pH	5	7.56	7.5-7.7
COD (Total)	5	1562	1390-1700
COD (Soluble)	5	1526	1406-1630
TOC	5	560	480-640
Phenol (Analytical)	4	267	246-288
Phenol (Chemetrics)	5	190	150-200
O & G	5	33.1	14-86
TSS	5	5.6	2-10
VSS	5	5.6	2-10
FSS	5	0	0-0
TDS	4	678	649-710
Conductivity	5	960	890-990
Effluent Statistical Data			
pH	6	7.48	7.4-7.7
COD (Total)	2	322	319-325
COD (Soluble)	5	193	176-208
BOD_5 (Total)	3	31	28-37
BOD_5 (Soluble)	3	21	18-23
TOC	5	62	58-66
Phenol (Analytical)	3	0.061	0.055-0.068
Phenol (Chemetrics)	5	0.1	0.1-0.1
O & G	3	5.67	5-7
TSS	5	102	20-130
VSS	5	102	20-130
FSS	5	0	0-0
TDS	3	636	624-656
Conductivity	6	957	920-1000
Phosphate	5	13	11-15
Ammonia	5	5.3	3-7
Nitrates	5	16.1	13.2-17.6

All values are expressed in units of mg/l except pH and conductivity (umhos/cm).

TABLE 3.7

KOPPERS COMPANY, INC.
FOREST PRODUCTS GROUP
GALESBURG PLANT
AERATED LAGOON TREATABILITY STUDY

COLD TEMPERATURE PHASE 3
(Effluent 11°C to 9°C)

PARAMETERS	n	x	Range
Influent Statistical Data			
pH	5	7.56	7.5-7.7
COD (Total)	5	1562	1390-1700
COD (Soluble)	5	1526	1406-1630
TOC	5	560	480-640
Phenol (Analytical)	4	267	246-288
Phenol (Chemetrics)	5	190	150-200
O & G	5	33.1	14-86
TSS	5	5.6	2-10
VSS	5	5.6	2-10
FSS	5	0	0-0
TDS	4	678	649-710
Conductivity	5	960	890-990
Effluent Statistical Data			
pH	4	7.24	7.1-7.4
COD (Soluble)	4	496	304-700
BOD_5 (Total)	2	82.5	80-85
BOD_5 (Soluble)	1	80	80-80
TOC	3	16.4	107-226
Phenol (Analytical)	2	28.5	0.028-57
Phenol (Chemetrics)	4	50	0.1-100
O & G	1	5	5-5
TSS	4	132.5	115-150
VSS	4	132.5	115-150
FSS	4	0	0-0
Conductivity	4	1035	950-1100
Phosphate	4	6.75	5-9
Ammonia	4	3.75	2-6
Nitrates	4	13.2	13.2-13.2

All values are expressed in units of mg/l except pH and conductivity (umhos/cm).

As shown in Table 3.8, all PAH compounds were reduced in concentration as a result of biological treatment. The concentration of Naphthalene was reduced by 99.96%, a maximum, and the minimum concentration reduction was 53.33% for Indeno (1,2,3 - c,d) pyrene. The results show that these PAH compounds were not toxic to the micro-organisms present in the aerated lagoon bench scale unit, and that effective wastewater treatment was realized.

In summary, both the Florence, SC and Galesburg, IL bench scale treatability studies clearly indicated that the wastewater produced from Wood Treating type operations is biodegradable, non-toxic to wastewater micro-organisms, and that low temperature can cause biological inhibition, but not complete biological kill.

3.3 CMA/EPA Five Plant Study[3]

The CMA/EPA five plant study was conducted by Engineering-Science, Inc., for the Chemical Manufacturers Association (CMA), to analyze the data developed by a cooperative study among CMA, the U.S. Environmental Protection Agency (EPA), and five chemical plants that participated in the study. One objective of the study was to assess the effectiveness of biological wastewater treatment for removal of toxic organic pollutants, such as volatile, base/neutral and acid extractable compounds. The five plants involved had well operated and maintained activated sludge units and these plants were considered representative of a variety of activated sludge treatment units.

Results from the CMA/EPA study are indicated in Tables 3.9 through 3.11. Both influent and effluent data were obtained and geometric means utilized for the data. The standard deviation of the influent and effluent values, in concert with the number of detections of each compound and percent removals are also indicated in Tables 3.9 through 3.11.

As shown in Table 3.9, all the volatile toxic organic compounds, which were detected in the influent, were biodegradable to some extent. In Table 3.10, the base/neutral compounds are shown and with the exception of benzo(a)-pyrene, bis (2-ethylhexyl) phthalate, chrysene and dibenzo (a,h) anthracene,

TABLE 3.8

KOPPERS COMPANY, INC.
GALESBURG PLANT
AERATED LAGOON TREATABILITY STUDY
BASE/NEUTRAL COMPOUNDS
AND % REMOVALS

COMPONENT	Influent Conc. mg/l	Effluent Conc. mg/l	% Removal
Naphthalene	3100	0.12	99.996
Acenaphthylene	2.4	0.05	-
Acenaphthene	62	0.08	99.87
Fluorene	9.5	0.15	98.42
Phenanthrene	7.4	0.11	98.51
Anthracene	1.6	0.03	98.12
Fluoranthene	1.4	0.23	83.57
Pyrene	1.0	0.13	87.00
Benz(a)anthracene	0.64	0.10	84.38
Chrysene	0.55	0.08	85.45
Benzo(b)fluoranthene	0.32	0.11	65.62
Benzo(k)fluoranthene	0.22	0.07	68.18
Benzo(a)pyrene	0.50	0.17	66.00
Dibenzo(a,h)anthracene	0.06	0.02	66.67
Benzo(g,h,i)perylene	0.16	0.07	56.25
Indeno(1,2,3-c,d)pyrene	0.15	0.07	53.33
Unknowns (No.)	2700 (22)*	-	-

* In addition to these unknowns, a very large unknown band eluting near the retention time of fluorene was present whose concentration is estimated at 7400 micrograms/liter water.

the base/neutral compounds were reduced in concentration at values greater than 58%. The acid extractable compounds, as listed in Table 3.11, were also biodegraded to some extent. The compound, 4-chloro-3-methylphenol, was not detected in the influent but was detected twice in the effluent, leading to it's suspected formation as a bi-product of the biodegradation of other organic compounds.

The results from the CMA/EPA 5-plant study indicate that the organic wastewater constituents, similar to the constituents found in wood treating plant wastewaters as shown in Table 3.9 through 3.11, are nontoxic to micro-organisms within activated sludge systems and are biodegradable.

4.0 MEETING WITH STATE OF MISSISSIPPI ENGINEERS

John Smith and Jeffrey Spencer, Environmental Engineers from Koppers' Water Quality Engineering Group, met with Stephen Spengler and Louis Lavallee, both Environmental Engineers at the Mississippi Bureau of Pollution Control, on Friday, July 19, 1985, in Jackson, Mississippi. At this meeting, it was mentioned by Stephen Spengler that the Grenada County activated sludge wastewater treatment plant had a design capacity of approximately 3 million gallons per day (MGD). At present, the maximum flowrate of wastewater to this treatment plant, as mentioned by Stephen, is 2 MGD, resulting in 1 MGD of available capacity. Since the Grenada, Mississippi Wood Treating Plant intends to discharge a maximum total daily flowrate of 0.078 MGD, there would be a dilution of the wastewater which is discharged from the Wood Treating Plant. A reduction in BOD (5-day) and total Kjeldahl Nitrogen concentrations would be realized primarily because of the wastewater dilution. No!

TABLE 3.9

TREATMENT SYSTEM PERFORMANCE FOR VOLATILE COMPOUNDS

Compound	Influent			Effluent			Percent Removal
	Geometric Mean (ppb)	Standard Deviation ($\log_e$ scale)	Number of Detections	Geometric Mean (ppb)	Standard Deviation ($\log_e$ scale)	Number of Detections	
Acrylonitrile	10,300	1.902	47	65	1.877	3	99
Benzene	581	1.963	129	6	0.704	58	99
Bromomethane	1,250	1.396	9	ND	-	0	100
Bromodichloromethane	20	1.251	29	5	0.000*	9	75
Carbon tetrachloride	51	2.025	3	ND	-	0	100
Chlorobenzene	20	1.086	29	16	-	1	20
Chloroethane	12	1.755	19	5	0.000*	2	58
Chloroform	348	2.230	63	13	0.879	62	96
Dibromochloromethane	6	0.475	22	ND	-	0	100
1,1-dichloroethane	9	1.398	22	5	-	1	44
1,2-dichloroethane	524	1.252	73	9	1.031	64	98
1,1-dichloroethene	42	2.064	53	ND	-	0	100
t-1,2-dichloroethene	42	1.931	7	5	0.000*	3	88
1,2-dichloropropane	138	1.133	54	7	0.619	27	95
1,3-dichloropropene	148	1.199	47	6	0.315	19	96
Ethylbenzene	283	1.640	107	5	0.000*	25	98
Methylene chloride	17	1.529	61	9	0.893	58	47
1,1,2,2-tetrachloroethane	17	1.733	2	5	-	1	71
Tetrachloroethene	6	0.521	31	5	0.000*	3	17
1,1,1-trichloroethane	7	0.543	38	5	0.000*	19	29
1,1,2-trichloroethane	12	0.876	15	5	-	1	58
Trichloroethene	7	0.586	31	5	0.000*	19	29
Trichlorofluoromethane	ND	-	0	8	0.824	4	-
Toluene	4,500	0.809	112	7	0.788	51	100
Vinyl chloride	6	0.438	4	ND	-	0	100
All Volatile Pollutants	166	2.655	1,007	8	0.831	430	95

NOTE: ND - not detected.

*All detections were less than 10 ppb.

TABLE 3.10
TREATMENT SYSTEM PERFORMANCE FOR BASE/NEUTRAL COMPOUNDS

Compound	Influent Geometric Mean (ppb)	Influent Standard Deviation ($\log_e$ scale)	Influent Number of Detections	Effluent Geometric Mean (ppb)	Effluent Standard Deviation ($\log_e$ scale)	Effluent Number of Detections	Percent Removal
Acenaphthene	64	0.611	9	5	0.000*	2	94
Acenaphthylene**	65	0.514	10	5	0.000*	3	92
Anthracene[1]/ Phenanthrene[1]	62	1.685	14	6	0.449	6	90
Benzo(a)anthracene[2]/ Chrysene[2]	20	1.027	10	8	1.111	6	60
Benzo(b)fluoranthene[3]/ Benzo(k)fluoranthene[3]	11	0.979	10	11	1.112	7	0
Benzo(a)pyrene	13	0.953	11	18	1.814	2	-
Bis(2-ethylhexyl)phthalate	24	2.070	47	28	1.382	44	-
Butylbenzylphthalate**	12	1.529	5	5	-	1	58
Chrysene	ND	-	0	5	-	1	-
Dibenzo(a,h)anthracene	15	-	1	75	-	1	-
Di-n-butylphthalate	86	2.098	44	6	0.762	24	93
1,3-dichlorobenzene[4]/ 1,4-dichlorobenzene[4]	5	-	1	ND	-	0	100
1,2-dichlorobenzene	331	1.354	43	28	1.105	17	92
Diethylphthalate**	134	1.964	36	9	0.693	19	93
Dimethylphthalate	46	2.011	31	5	0.000*	8	89
Dioctylphthalate	28	1.117	6	5	0.000*	3	82
Fluoranthene	17	1.347	19	6	0.577	7	65
Fluorene	56	0.693	10	5	-	1	91
Isophorone*	650	-	1	ND	-	0	100
Naphthalene	802	1.930	11	6	0.460	5	99
Nitrobenzene	3,000	2.010	32	91	1.775	2	97
Pyrene	17	1.357	19	6	0.496	10	65
1,2,4-trichlorobenzene**	234	1.026	46	39	1.097	39	83
All Base/Neutral Pollutants	119	2.157	416	15	1.271	208	87

[1,2,3,4] Reported as isomer pairs.

NOTE: ND - not detected.

*All detections were less than 10 ppb.

**Note: There was some question in the proper identification of these compounds in some of the samples, based on the following information:
(1) 1,2,4-trichlorobenzene — most likely the co-isomer, 2,4,6-trichlorobenzene, which is not on the priority pollutant list.
(2) Diethylphthalate — interference with dimethyl nitroaniline which coelutes with the phthalate ester.
(3) Acenaphthylene — interference with dichloroaniline or biphenyl which coelutes with acenaphtylene.
(4) Butylbenzylphthalate — most likely a product from a manufacturing process and not the phthalate ester.

TABLE 3.11

TREATMENT SYSTEM PERFORMANCE FOR ACID COMPOUNDS

Compound	Influent			Effluent			
	Geometric Mean (ppb)	Standard Deviation ($\log_e$ scale)	Number of Detections	Geometric Mean (ppb)	Standard Deviation ($\log_e$ scale)	Number of Detections	Percent Removal
4-chloro-3-methylphenol	ND	-	0	8	0.676	2	-
2-chlorophenol	53	1.183	57	35	1.085	23	34
2,4-dichlorophenol	347	0.765	43	24	1.062	33	93
2,4-dimethylphenol	270	1.992	12	5	0.000*	8	98
2,4-dinitrophenol	673	1.247	44	59	1.645	6	91
2-nitrophenol	40	0.628	38	9	0.634	4	78
Pentachlorophenol	216	1.330	49	115	1.462	57	47
Phenol	171	1.820	137	10	0.976	55	94
2,4,6-trichlorophenol	100	1.210	89	53	1.242	72	47
All Acid Pollutants	150	1.506	469	34	1.503	260	77

NOTE: ND - not detected.

*All detections were less than 10 ppb.

4.1 Discharged Wastewater Dilution in Sewer

The following is an example of the consequences of concentration reduction due to dilution:

> The wastewater flowrates are 2 MGD in the sewer and 0.078 MGD in the wood treating plant discharge stream. The sewer discharge limits based on values in the Sewer Ordinance for Kjeldahl Nitrogen and Total BOD (5-day) are 40 and 250 mg/l, respectively. Assume that these discharge limit concentrations are the actual concentrations of Total BOD (5-day) and Kjeldahl Nitrogen in the sewer wastewater stream. The discharge wastewater stream from the Grenada, Mississippi Wood Treating Plant contains Total BOD (5-day) and Kjeldahl Nitrogen concentrations of 3,850 and 42 mg/l, respectively. The concentrations of BOD (5-day) and Kjeldahl Nitrogen at a distance downstream of the mixing point would be 385 and 40 mg/l, respectively. Concentration reductions of 4% and 90% would be realized for Kjeldahl Nitrogen and Total BOD (5-day), because of dilution.

??? Not Logic

5.0 SUMMARY

Koppers Company, Inc. would not pursue the issue of discharging the treated wastewater from the Grenada, Mississippi Wood Treating Plant to the Grenada County sewer system if we anticipated any deleterious consequences. The Water Quality Engineering Group at Koppers is committed to maintaining the quality of water in the State of Mississippi. We strongly feel that this situation at the Grenada, Mississippi Wood Treating Plant should be given consideration by all parties involved primarily because of the dilution factor and the fact that wastewater constituents from Wood Treating Plants are non-toxic to the local POTW activated sludge unit microorganisms and are in fact biodegradable.

Koppers Company, Inc. would welcome a meeting with all involved parties concerning the discharge of wastewater from the Grenada Plant to the sewer. If any additional information is required, we will be more than happy to provide it.

REFERENCES

1. Koppers Water Quality Engineering Section, Wastewater Treatability Study - Appendix A - Koppers Company, Inc. Florence, South Carolina Wood Treating Plant, February 1, 1985.

2. Koppers Water Quality Engineering Section, Biological Wastewater Treatability Study - Koppers Company, Inc. Galesburg, Illinois Wood Treating Plant, June 18, 1982

3. Engineering-Science, Inc., CMA/EPA Five-Plant Study for Chemical Manufacturers Association (CMA), April, 1982

APPENDIX A

OCCUPATIONAL HEALTH AND PRODUCT SAFETY GROUP REPORT

KOPPERS

Interoffice Correspondence

To Jeffrey D. Spencer | From J. H. Butala
Location Monroeville | Location K-1201
Subject GRENADA WASTEWATER | Date December 3, 1985

Based on the analytical data you supplied for polychlorodibenzo-p-dioxins and polychlorodibenzofurans (attached), I have performed a health effects assessment for concentrations of these materials in process wastewater. The analysis employed the concept of "2,3,7,8-TCDD equivalents" as described by the EPA Chlorinated Dioxins Workgroup in April, 1985.

Briefly, given the lack of toxicity data on most of the 2,3,7,8-TCDD congeners, the poor understanding of additive effects from simultaneous exposure to more than one congener, and the high potency and strong structure-activity relationship observed in in vivo and in vitro studies of this group, it is reasonable to estimate the toxicity of mixtures of chlorinated dioxins or dibenzofurans based on a consideration of the mixture as being comprised of "equivalent amounts of 2,3,7,8-TCDD". It is the view of the EPA Chlorinated Dioxins Workgroup that sufficient scientific support exists for the Toxicity Equivalence Factor approach to risk estimation for chlorinated dioxins and dibenzofurans that the Agency should adopt the approach on an interim basis as a matter of science policy.

The assumptions used in the Toxicity Equivalence Factor (TEF) approach are:

1. 2,3,7,8-TCDD is the most toxic member of the group of chlorinated dioxins and dibenzofurans;

2. the toxicity of other members of the groups can be established relative to 2,3,7,8-TCDD by examination of available in vitro, animal, and human data;

3. once stated in terms of 2,3,7,8-TCDD equivalents, the toxicities of the components of a mixture are additive;

4. Risk assessment consists of a consideration of human exposure to the mixture in question in terms of 2,3,7,8-TCDD equivalents and the toxicity information available on 2,3,7,8-TCDD.

In this way, the following Toxicity Equivalency Factors have been established for dioxin or difuran isomers of chief concern.

EPA Chlorinated Dioxin Workgroup

Chlorinated Dibenzo-p-Dioxin and
Chlorinated Dibenzofuran Isomers of Concern[a]

Dioxin		Dibenzofuran	
Isomer	TEF[b]	Isomer	TEF
2,3,7,8-TCDD	1	2,3,7,8-TCDF	0.1
1,2,3,7,8-PeCDD	0.2	1,2,3,7,8-PeCDF	0.1
		2,3,4,7,8-PeCDF	0.1
1,2,3,6,7,8-HxCDD	0.04	1,2,3,6,7,8-HxCDF	0.01
1,2,3,7,8,9-HxCDD	0.04	1,2,3,7,8,9-HxCDF	0.01
1,2,3,4,7,8-HxCDD	0.04	1,2,3,4,7,8-HxCDF	0.01
		2,3,4,6,7,8-HxCDF	0.01
1,2,3,4,6,7,8-HpCDD	0.001	1,2,3,4,6,7,8-HpCDF	0.001
		1,2,3,4,7,8,9-HpCDF	0.001

[a]In each homologous group the relative toxicity factor for the isomers not listed above is 1/100 of the value listed above.

[b]TEF = toxic equivalency factor - relative toxicity assigned.

In the case of the Grenada process wastewater, the above TEF can be applied with two additional adjustments, both of which introduce a substantial safety margin: It is first necessary to assume that each of the undetected congeners is present at the limit of detection, and second that all isomeric species within a homologous group are the most toxic species. These assumptions provide a minimum safety factor of at least 100 fold.

Grenada, Mississippi Polychlorodibenzo-p-dioxin and Polychlorodibenzofuran Concentrations in Process Wastewater to Sprayfield

Congener	Concentration (ppt)	TEF	TCDD Equivalents
TCDD	ND (3.9)*	1	3.9
TCDF	ND (2.5)	0.1	0.25
PCDD	ND (0.82)	0.2	0.16
PCDF	ND (0.50)	0.1	0.05
HxCDD	ND (0.56)	0.4	0.22
HxCDF	ND (0.65)	0.01	0.006
HpCDD	26	0.001	0.003
HpCDF	ND (0.87)	0.001	0.0009
OCDD**	710	0.001	-
OCDF**	ND (1.4)	0.001	-
		SUM	4.6 ppt

* Limit of Detection

**Considered to have no significant toxicity

The 2,3,7,8-TCDD Toxicity Equivalency of the Grenada Plant water is 4.6 ppt. There is relatively little data on toxic effects of waterborne TCDD. One study, however, did address this point and can provide a perspective for the toxicity equivalent discerned for Grenada.

In order to evaluate the residue levels of 2,3,7,8-TCDD in the environment and in biota as a result of aerial application of the herbicide 2,4,5-T in Oregon forests, samples of several different matrices from the environment and biota were analyzed. This study was carried out jointly by the University of Nebraska and the U.S. Environmental Protection Agency (U.S. EPA), and replicate samples of a number of extracts were analyzed at both laboratories.

The study was divided into two phases. In phase I, water and sediment samples collected from the area were analyzed for 2,3,7,8-TCDD by GC/HRMS. Fourteen surface water samples were analyzed, and none were found to contain 2,3,7,8-TCDD at an average detection limit of ten part-per-quadrillion. Sediment samples were taken from ten sites which also had

[1]Gross, M.L. in Dioxins in the Environment. Kamrin and Rogers, ed., Hemisphere, 1985, p 135.

been sampled for water. No TCDD was detected in seven of the samples. Two samples showed low levels (2 ppt or less) which could not be confirmed in later analyses. A detectable level (3-20 ppt) of TCDD was found in one sample by both laboratories.

In phase II of this study, sampling was extended to drinking water filters, animal tissue, and whole animals (mice, shrew, birds and newts). No TCDD was detected in any samples except for a level of 3 ppt that was found in a sample of products of conception and one newt on the first round of analysis. These detections could not be confirmed.

I believe the data reported by Gross indicate that surface water concentrations of 2,3,7,8-TCDD very comparable to the Grenada process water equivalent concentration do not lead to harmful effects insofar as his studies were extended. That is, local flora and fauna showed little, if any, traces of TCDD exposure. While it is true that the Grenada equivalent concentration is greater than those TCDD concentrations actually measured by Gross, the 100-fold safety factor must be recalled. The actual chlorinated dioxin and dibenzofuran concentration in the process water is likely to be as much as two orders of magnitude below 2,3,7,8-TCDD concentrations observed by Gross. This possibility means that the toxicity of the contaminant in the water will be reduced proportionately.

It is my opinion, therefore, that the polychlorinated dibenzo-p-dioxin and polychlorinated dibenzofuran contamination in the Grenada plant wastewater is toxicologically insignificant.

J. H. Butala

JHB/pc

cc: D. K. Susa Anderson
C. P. Markle
D. J. McGraw
M. Schlesinger
J. Smith
M. Urbassik

DIOXIN AND FURAN RESULTS

COGENER	WATER BLANK ppt	WASTEWATER SAMPLE ppt
^{13}C-TCDD (%rec)	72%	89%
^{37}Cl-TCDD (%acc)	109%	100%
^{13}C-OCDD (%acc)	125%	80%
TCDD	ND (2.8)	ND (3.9)
TCDF	ND (0.66)	ND (2.5)
PCDD	ND (0.20)	ND (0.82)
PCDF	ND (0.62)	ND (0.50)
HxCDD	ND (0.86)	ND (0.56)
HxCDF	ND (2.2)	ND (0.65)
HpCDD	ND (0.31)	26
HpCDF	ND (1.0)	ND (0.87)
OCDD	ND (0.29)	710
OCDF	ND (0.29)	ND (1.4)

NOTES:

1. ND denotes non-detectable.
2. The numbers in parentheses represent the detectable limit for the specified cogeners.
3. % acc denotes a comparison between the amount of cogener measured by the test method (performed on a spiked sample), and the amount actually present.
4. % re denotes percent recovery of a spiked internal standard following the various extractions which are performed. It is a measure of the portion of ^{13}C-TCDD which is lost during extractions and sample preparation prior to analysis.

APPENDIX B

BIOLOGICAL BENCH SCALE UNIT DATA

Appendix B:

The data in this section represents the results from the biological treatment bench scale study for the Florence, S.C. Wood Treating Plant.

CompuChem Laboratories

REPORT OF DATA

SAMPLE IDENTIFIER: FTS-49, INFLUENT WASTEWATER

COMPUCHEM SAMPLE NUMBER: 32970

SUBMITTED TO:

Mr. Robert Hepner
Koppers, Inc.
Research Department
440 College Park Drive
Monroeville, PA 15146

Diana A. Scammell
DIANA A. SCAMMELL
TECHNICAL SPECIALIST, OPERATIONS

R. L. MYERS, PH.D., PRESIDENT

ROBERT E. MEIERER
DIRECTOR OF QUALITY ASSURANCE

LABORATORY CHRONICLE

SAMPLE IDENTIFIER: FTS-49, INFLUENT WASTEWATER
COMPUCHEM SAMPLE NUMBER: 32970

	Date
Received/Refrigerated	8-9-84
Organics	
Extracted	8-13-84
Analyzed	
1. Volatiles	8-13-84
2. Acid	8-17-84
3. Base/Neutrals	8-22-84
4. Pesticides/PCBS	8-22-84
Inorganics	
1. Metals	8-31-84
2. Cyanide	Not Requested
3. Phenols	Not Requested

COMPOUND LIST - VOLATILES ORGANICS

SAMPLE IDENTIFIER: FTS-49, INFLUENT WASTEWATER
COMPUCHEM SAMPLE NUMBER: 32970

		CONCENTRATION (UG/L)	DETECTION LIMIT (UG/L)
1V.	CHLOROMETHANE	BDL	10
2V.	VINYL CHLORIDE	BDL	10
3V.	CHLOROETHANE	BDL	10
4V.	BROMOMETHANE	BDL	10
5V.	ACROLEIN	BDL	100
6V.	ACRYLONITRILE	BDL	100
7V.	METHYLENE CHLORIDE	BDL	10
8V.	TRICHLOROFLUOROMETHANE	BDL	10
9V.	1,1-DICHLOROETHYLENE	BDL	10
10V.	1,1-DICHLOROETHANE	BDL	10
11V.	TRANS-1,2-DICHLOROETHYLENE	BDL	10
12V.	CHLOROFORM	BDL	10
13V.	1,2-DICHLOROETHANE	BDL	10
14V.	1,1,1-TRICHLOROETHANE	BDL	10
15V.	CARBON TETRACHLORIDE	BDL	10
16V.	BROMODICHLOROMETHANE	BDL	10
17V.	1,2-DICHLOROPROPANE	BDL	10
18V.	TRANS-1,3-DICHLOROPROPENE	BDL	10
19V.	TRICHLOROETHYLENE	BDL	10
20V.	BENZENE	BDL	10
21V.	CIS-1,3-DICHLOROPROPENE	BDL	10
22V.	1,1,2-TRICHLOROETHANE	BDL	10
23V.	DIBROMOCHLOROMETHANE	BDL	10
24V.	BROMOFORM	BDL	10
25V.	1,1,2,2-TETRACHLOROETHYLENE	BDL	10
26V.	1,1,2,2-TETRACHLOROETHANE	BDL	10
27V.	TOLUENE	BDL	10
28V.	CHLOROBENZENE	BDL	10
29V.	ETHYLBENZENE	BDL	10
30V.	2-CHLOROETHYL VINYL ETHER	BDL	10
31V.	DICHLORODIFLUOROMETHANE†	BDL	
32V.	BIS(CHLOROMETHYL)ETHER†	BDL	

BDL=BELOW DETECTION LIMIT

†See Data Report Notice

COMPOUND LIST -- ACID EXTRACTABLE ORGANICS

SAMPLE IDENTIFIER: FTS-49, INFLUENT WASTEWATER
COMPUCHEM SAMPLE NUMBER: 32970

		CONCENTRATION (UG/L)	DETECTION* LIMIT (UG/L)
1A.	PHENOL	5000(1)	250
2A.	2-CHLOROPHENOL	BDL	250
3A.	2-NITROPHENOL	BDL	250
4A.	2,4-DIMETHYLPHENOL	4000(1)	250
5A.	2,4-DICHLOROPHENOL	BDL	250
6A.	P-CHLORO-M-CRESOL	BDL	250
7A.	2,4,6-TRICHLOROPHENOL	BDL	250
8A.	2,4-DINITROPHENOL	BDL	2500
9A.	4-NITROPHENOL	BDL	250
10A.	4,6-DINITRO-O-CRESOL	BDL	2500
11A.	PENTACHLOROPHENOL	16000	250

(1)Quantitated using secondary ion

BDL=BELOW DETECTION LIMIT

*Sample analyzed using a 10:1 dilution, thus the higher than normal detection limits.

COMPOUND LIST -- BASE-NEUTRAL EXTRACTABLE ORGANICS

SAMPLE IDENTIFIER: FTS-49, INFLUENT WASTEWATER
COMPUCHEM SAMPLE NUMBER: 32970

		CONCENTRATION (UG/L)	DETECTION* LIMIT (UG/L)
1B.	N-NITROSODIMETHYLAMINE	BDL	100
2B.	BIS (2-CHLOROETHYL) ETHER	210	100
3B.	1,3-DICHLOROBENZENE	BDL	100
4B.	1,4-DICHLOROBENZENE	BDL	100
5B.	1,2-DICHLOROBENZENE	BDL	100
6B.	BIS (2-CHLOROISOPROPYL) ETHER	BDL	100
7B.	HEXACHLOROETHANE	BDL	100
8B.	N-NITROSODI-N-PROPYLAMINE	BDL	100
9B.	NITROBENZENE	BDL	100
10B.	ISOPHORONE	BDL	100
11B.	BIS(2-CHLOROETHOXY) METHANE	BDL	100
12B.	1,2,4-TRICHLOROBENZENE	BDL	100
13B.	NAPHTHALENE	BDL	100
14B.	HEXACHLOROBUTADIENE	BDL	100
15B.	HEXACHLOROCYCLOPENTADIENE	BDL	100
16B.	2-CHLORONAPHTHALENE	BDL	100
17B.	DIMETHYLPHTHALATE	BDL	100
18B.	ACENAPHTHYLENE	BDL	100
19B.	2,6-DINITROTOLUENE	BDL	100
20B.	ACENAPHTHENE	BDL	100
21B.	2,4-DINITROTOLUENE	BDL	100
22B.	DIETHYLPHTHALATE	BDL	100
23B.	FLUORENE	BDL	100
24B.	4-CHLOROPHENYL PHENYL ETHER	BDL	100
25B.	DIPHENYLAMINE (N-NITROSO)	BDL	100
26B.	1,2-DIPHENYLHYDRAZINE (AZOBENZENE)	BDL	100
27B.	4-BROMOPHENYL PHENYL ETHER	BDL	100
28B.	HEXACHLOROBENZENE	BDL	100

(Continued)

BDL=BELOW DETECTION LIMIT

*Sample analyzed using a 10:1 dilution, thus the higher than normal detection limits.

COMPOUND LIST -- BASE-NEUTRAL EXTRACTABLE ORGANICS (Page Two)

SAMPLE IDENTIFIER: FTS-49, INFLUENT WASTEWATER
COMPUCHEM SAMPLE NUMBER: 32970

		CONCENTRATION (UG/L)		DETECTION* LIMIT (UG/L)
29B.	PHENANTHRENE	290		100
30B.	ANTHRACENE		BDL	100
31B.	DI-N-BUTYLPHTHALATE		BDL	100
32B.	FLUORANTHENE	160		100
33B.	BENZIDINE		BDL	100
34B.	PYRENE	110		100
35B.	BUTYLBENZYLPHTHALATE		BDL	100
36B.	BENZO(A)ANTHRACENE		BDL	100
37B.	3,3'-DICHLOROBENZIDINE		BDL	100
38B.	CHRYSENE		BDL	100
39B.	BIS(2-ETHYLHEXYL)PHTHALATE		BDL	100
40B.	DI-N-OCTYLPHTHALATE		BDL	100
41B.	BENZO(B)FLUORANTHENE		BDL	100
42B.	BENZO(K)FLUORANTHENE		BDL	100
43B.	BENZO(A)PYRENE		BDL	100
44B.	INDENO(1,2,3-C,D)PYRENE		BDL	250
45B.	DIBENZO(A,H)ANTHRACENE		BDL	250
46B.	BENZO(G,H,I)PERYLENE		BDL	250

BDL=BELOW DETECTION LIMIT

*Sample analyzed using a 10:1 dilution, thus the higher than normal detection limits.

COMPOUND LIST -- PESTICIDES/PCB'S

SAMPLE IDENTIFIER: FTS-49, INFLUENT WASTEWATER
COMPUCHEM SAMPLE NUMBER: 32970

		CONCENTRATION (UG/L)	DETECTION LIMIT (UG/L)
1P.	ALDRIN	BDL	10
2P.	ALPHA-BHC	BDL	10
3P.	BETA-BHC	BDL	10
4P.	GAMMA-BHC	BDL	10
5P.	DELTA-BHC	BDL	10
6P.	CHLORDANE	BDL	10
7P.	4,4'-DDT	BDL	10
8P.	4,4'-DDE	BDL	10
9P.	4,4'-DDD	BDL	10
10P.	DIELDRIN	BDL	10
11P.	ALPHA-ENDOSULFAN	BDL	10
12P.	BETA-ENDOSULFAN	BDL	10
13P.	ENDOSULFAN SULFATE	BDL	10
14P.	ENDRIN	BDL	10
15P.	ENDRIN ALDEHYDE	BDL	10
16P.	HEPTACHLOR	BDL	10
17P.	HEPTACHLOR EPOXIDE	BDL	10
18P.	PCB-1242	BDL	10
19P.	PCB-1254	BDL	10
20P.	PCB-1221	BDL	10
21P.	PCB-1232	BDL	10
22P.	PCB-1248	BDL	10
23P.	PCB-1260	BDL	10
24P.	PCB-1016	BDL	10
25P.	TOXAPHENE	BDL	10

BDL=BELOW DETECTION LIMIT

COMPOUND LIST -- INORGANICS PRIORITY POLLUTANTS

SAMPLE IDENTIFIER: FTS-49, INFLUENT WASTEWATER
COMPUCHEM SAMPLE NUMBER: 32970

	CONCENTRATION (MG/L)	DETECTION LIMIT (MG/L)
1. ANTIMONY, TOTAL	BDL	0.050
2. ARSENIC, TOTAL	BDL	0.050
3. BERYLLIUM, TOTAL	BDL	0.020
4. CADMIUM, TOTAL	BDL	0.010
5. CHROMIUM, TOTAL	BDL	0.050
6. COPPER, TOTAL	0.15	0.10
7. LEAD, TOTAL	1.6	0.050
8. MERCURY, TOTAL	0.00060	0.00020
9. NICKEL, TOTAL	BDL	0.10
10. SELENIUM, TOTAL	BDL	0.010
11. SILVER, TOTAL	BDL	0.050
12. THALLIUM, TOTAL	BDL	0.050
13. ZINC, TOTAL	0.35	0.020

BDL=BELOW DETECTION LIMIT

COMPUCHEM LABORATORIES

REPORT OF DATA

SAMPLE IDENTIFIER: FTS-50, EFFLUENT FROM TREATMENT STUDY

COMPUCHEM SAMPLE NUMBER: 32971

SUBMITTED TO:

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Monroeville, PA 15146

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DIRECTOR OF QUALITY ASSURANCE

LABORATORY CHRONICLE

SAMPLE IDENTIFIER: FTS-50, EFFLUENT FROM TREATMENT STUDY
COMPUCHEM SAMPLE NUMBER: 32971

	Date
Received/Refrigerated	08/09/84
Organics	
Extracted	08/13/84 - 08/31/84*
Analyzed	
1. Volatiles	08/13/84
2. Acids	08/22/84
3. Base/Neutrals	08/17/84 - 09/28/84*
4. Pesticides/PCBS	08/17/84 - 09/28/84*
Inorganics	
1. Metals	08/31/84
2. Cyanide	Not Requested
3. Phenol	Not Requested

*See Quality Assurance Notice

COMPOUND LIST - VOLATILES ORGANICS

SAMPLE IDENTIFIER: FTS-50, EFFLUENT FROM TREATMENT STUDY
COMPUCHEM SAMPLE NUMBER: 32971

		CONCENTRATION (UG/L)	DETECTION LIMIT (UG/L)
1V.	CHLOROMETHANE	BDL	10
2V.	VINYL CHLORIDE	BDL	10
3V.	CHLOROETHANE	BDL	10
4V.	BROMOMETHANE	BDL	10
5V.	ACROLEIN	BDL	100
6V.	ACRYLONITRILE	BDL	100
7V.	METHYLENE CHLORIDE	BDL	10
8V.	TRICHLOROFLUOROMETHANE	BDL	10
9V.	1,1-DICHLOROETHYLENE	BDL	10
10V.	1,1-DICHLOROETHANE	BDL	10
11V.	TRANS-1,2-DICHLOROETHYLENE	BDL	10
12V.	CHLOROFORM	BDL	10
13V.	1,2-DICHLOROETHANE	BDL	10
14V.	1,1,1-TRICHLOROETHANE	BDL	10
15V.	CARBON TETRACHLORIDE	BDL	10
16V.	BROMODICHLOROMETHANE	BDL	10
17V.	1,2-DICHLOROPROPANE	BDL	10
18V.	TRANS-1,3-DICHLOROPROPENE	BDL	10
19V.	TRICHLOROETHYLENE	BDL	10
20V.	BENZENE	BDL	10
21V.	CIS-1,3-DICHLOROPROPENE	BDL	10
22V.	1,1,2-TRICHLOROETHANE	BDL	10
23V.	DIBROMOCHLOROMETHANE	BDL	10
24V.	BROMOFORM	BDL	10
25V.	1,1,2,2-TETRACHLOROETHYLENE	BDL	10
26V.	1,1,2,2-TETRACHLOROETHANE	BDL	10
27V.	TOLUENE	BDL	10
28V.	CHLOROBENZENE	BDL	10
29V.	ETHYLBENZENE	BDL	10
30V.	2-CHLOROETHYL VINYL ETHER	BDL	10
31V.	DICHLORODIFLUOROMETHANE†	BDL	
32V.	BIS(CHLOROMETHYL)ETHER†	BDL	

BDL=BELOW DETECTION LIMIT

†See Data Report Notice

COMPOUND LIST -- ACID EXTRACTABLE ORGANICS

SAMPLE IDENTIFIER: FTS-50, EFFLUENT FROM TREATMENT STUDY
COMPUCHEM SAMPLE NUMBER: 32971

		CONCENTRATION (UG/L)	DETECTION LIMIT (UG/L)
1A.	PHENOL	BDL	25
2A.	2-CHLOROPHENOL	BDL	25
3A.	2-NITROPHENOL	BDL	25
4A.	2,4-DIMETHYLPHENOL	BDL	25
5A.	2,4-DICHLOROPHENOL	BDL	25
6A.	P-CHLORO-M-CRESOL	BDL	25
7A.	2,4,6-TRICHLOROPHENOL	BDL	25
8A.	2,4-DINITROPHENOL	BDL	250
9A.	4-NITROPHENOL	BDL	25
10A.	4,6-DINITRO-O-CRESOL	BDL	250
11A.	PENTACHLOROPHENOL	3800	25

BDL=BELOW DETECTION LIMIT

COMPOUND LIST -- BASE-NEUTRAL EXTRACTABLE ORGANICS

SAMPLE IDENTIFIER: FTS-50, EFFLUENT FROM TREATMENT STUDY
COMPUCHEM SAMPLE NUMBER: 32971

		CONCENTRATION (UG/L)	DETECTION LIMIT (UG/L)
1B.	N-NITROSODIMETHYLAMINE	BDL	10
2B.	BIS (2-CHLOROETHYL) ETHER	BDL	10
3B.	1,3-DICHLOROBENZENE	BDL	10
4B.	1,4-DICHLOROBENZENE	BDL	10
5B.	1,2-DICHLOROBENZENE	BDL	10
6B.	BIS (2-CHLOROISOPROPYL) ETHER	BDL	10
7B.	HEXACHLOROETHANE	BDL	10
8B.	N-NITROSODI-N-PROPYLAMINE	BDL	10
9B.	NITROBENZENE	BDL	10
10B.	ISOPHORONE	BDL	10
11B.	BIS(2-CHLOROETHOXY) METHANE	BDL	10
12B.	1,2,4-TRICHLOROBENZENE	BDL	10
13B.	NAPHTHALENE	BDL	10
14B.	HEXACHLOROBUTADIENE	BDL	10
15B.	HEXACHLOROCYCLOPENTADIENE	BDL	10
16B.	2-CHLORONAPHTHALENE	BDL	10
17B.	DIMETHYLPHTHALATE	BDL	10
18B.	ACENAPHTHYLENE	BDL	10
19B.	2,6-DINITROTOLUENE	15	10
20B.	ACENAPHTHENE	BDL	10
21B.	2,4-DINITROTOLUENE	BDL	10
22B.	DIETHYLPHTHALATE	BDL	10
23B.	FLUORENE	BDL	10
24B.	4-CHLOROPHENYL PHENYL ETHER	BDL	10
25B.	DIPHENYLAMINE (N-NITROSO)	BDL	10
26B.	1,2-DIPHENYLHYDRAZINE (AZOBENZENE)	BDL	10
27B.	4-BROMOPHENYL PHENYL ETHER	BDL	10
28B.	HEXACHLOROBENZENE	BDL	10

(Continued)

BDL=BELOW DETECTION LIMIT

COMPOUND LIST -- BASE-NEUTRAL EXTRACTABLE ORGANICS (Page Two)

SAMPLE IDENTIFIER: FTS-50, EFFLUENT FROM TREATMENT STUDY
COMPUCHEM SAMPLE NUMBER: 32971

		CONCENTRATION (UG/L)	DETECTION LIMIT (UG/L)
29B.	PHENANTHRENE	BDL	10
30B.	ANTHRACENE	BDL	10
31B.	DI-N-BUTYLPHTHALATE	BDL	10
32B.	FLUORANTHENE	BDL	10
33B.	BENZIDINE	BDL	10
34B.	PYRENE	BDL	10
35B.	BUTYLBENZYLPHTHALATE	BDL	10
36B.	BENZO(A)ANTHRACENE	BDL	10
37B.	3,3'-DICHLOROBENZIDINE	BDL	10
38B.	CHRYSENE	BDL	10
39B.	BIS(2-ETHYLHEXYL)PHTHALATE	BDL	10
40B.	DI-N-OCTYLPHTHALATE	BDL	10
41B.	BENZO(B)FLUORANTHENE	BDL	10
42B.	BENZO(K)FLUORANTHENE	BDL	10
43B.	BENZO(A)PYRENE	BDL	10
44B.	INDENO(1,2,3-C,D)PYRENE	BDL	25
45B.	DIBENZO(A,H)ANTHRACENE	BDL	25
46B.	BENZO(G,H,I)PERYLENE	BDL	25

BDL=BELOW DETECTION LIMIT

COMPOUND LIST -- PESTICIDES/PCB'S

SAMPLE IDENTIFIER: FTS-50, EFFLUENT FROM TREATMENT STUDY
COMPUCHEM SAMPLE NUMBER: 32971

		CONCENTRATION (UG/L)	DETECTION LIMIT (UG/L)
1P.	ALDRIN	BDL	10
2P.	ALPHA-BHC	BDL	10
3P.	BETA-BHC	BDL	10
4P.	GAMMA-BHC	BDL	10
5P.	DELTA-BHC	BDL	10
6P.	CHLORDANE	BDL	10
7P.	4,4'-DDT	BDL	10
8P.	4,4'-DDE	BDL	10
9P.	4,4'-DDD	BDL	10
10P.	DIELDRIN	BDL	10
11P.	ALPHA-ENDOSULFAN	BDL	10
12P.	BETA-ENDOSULFAN	BDL	10
13P.	ENDOSULFAN SULFATE	BDL	10
14P.	ENDRIN	BDL	10
15P.	ENDRIN ALDEHYDE	BDL	10
16P.	HEPTACHLOR	BDL	10
17P.	HEPTACHLOR EPOXIDE	BDL	10
18P.	PCB-1242	BDL	10
19P.	PCB-1254	BDL	10
20P.	PCB-1221	BDL	10
21P.	PCB-1232	BDL	10
22P.	PCB-1248	BDL	10
23P.	PCB-1260	BDL	10
24P.	PCB-1016	BDL	10
25P.	TOXAPHENE	BDL	10

BDL=BELOW DETECTION LIMIT

COMPOUND LIST -- INORGANICS PRIORITY POLLUTANTS

SAMPLE IDENTIFIER: FTS-50, EFFLUENT FROM TREATMENT STUDY
COMPUCHEM SAMPLE NUMBER: 32971

	CONCENTRATION (MG/L)	DETECTION LIMIT (MG/L)
1. ANTIMONY, TOTAL	BDL	0.050
2. ARSENIC, TOTAL	BDL	0.050
3. BERYLLIUM, TOTAL	BDL	0.020
4. CADMIUM, TOTAL	BDL	0.010
5. CHROMIUM, TOTAL	BDL	0.050
6. COPPER, TOTAL	0.15	0.10
7. LEAD, TOTAL	0.050	0.050
8. MERCURY, TOTAL	0.00060	0.00020
9. NICKEL, TOTAL	BDL	0.10
10. SELENIUM, TOTAL	BDL	0.010
11. SILVER, TOTAL	BDL	0.050
12. THALLIUM, TOTAL	BDL	0.050
13. ZINC, TOTAL	0.31	0.020

INORGANICS/
CONVENTIONALS

(None Requested)

BDL=BELOW DETECTION LIMIT

COMPUCHEM LABORATORIES

REPORT OF DATA

SAMPLE IDENTIFIER: FTS-51, FILTERED EFFLUENT FROM TREATMENT STUDY

COMPUCHEM SAMPLE NUMBER: 32972

SUBMITTED TO:

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DIRECTOR OF QUALITY ASSURANCE

LABORATORY CHRONICLE

SAMPLE IDENTIFIER: FTS-51, FILTERED EFFLUENT FROM TREATMENT STUDY
COMPUCHEM SAMPLE NUMBER: 32972

	Date
Received/Refrigerated	08/09/84
Organics	
Extracted	08/13/84 - 08/31/84*
Analyzed	
1. Volatiles	08/13/84
2. Acids	08/17/84
3. Base/Neutrals	08/17/84 - 09/05/84*
4. Pesticides/PCBS	08/17/84 - 09/05/84*
Inorganics	
1. Metals	Not Requested
2. Cyanide	Not Requested
3. Phenol	Not Requested

*Base/Neutral/Pesticides fractions re-extracted and re-analyzed because initial endeavors did not meet quality control acceptance criteria.

COMPOUND LIST - VOLATILES ORGANICS

SAMPLE IDENTIFIER: FTS-51, FILTERED EFFLUENT FROM TREATMENT STUDY
COMPUCHEM SAMPLE NUMBER: 32972

		CONCENTRATION (UG/L)	DETECTION LIMIT (UG/L)
1V.	CHLOROMETHANE	BDL	10
2V.	VINYL CHLORIDE	BDL	10
3V.	CHLOROETHANE	BDL	10
4V.	BROMOMETHANE	BDL	10
5V.	ACROLEIN	BDL	100
6V.	ACRYLONITRILE	BDL	100
7V.	METHYLENE CHLORIDE	BDL	10
8V.	TRICHLOROFLUOROMETHANE	BDL	10
9V.	1,1-DICHLOROETHYLENE	BDL	10
10V.	1,1-DICHLOROETHANE	BDL	10
11V.	TRANS-1,2-DICHLOROETHYLENE	BDL	10
12V.	CHLOROFORM	BDL	10
13V.	1,2-BICHLOROETHANE	BDL	10
14V.	1,1,1-TRICHLOROETHANE	BDL	10
15V.	CARBON TETRACHLORIDE	BDL	10
16V.	BROMODICHLOROMETHANE	BDL	10
17V.	1,2-DICHLOROPROPANE	BDL	10
18V.	TRANS-1,3-DICHLOROPROPENE	BDL	10
19V.	TRICHLOROETHYLENE	BDL	10
20V.	BENZENE	BDL	10
21V.	CIS-1,3-DICHLOROPROPENE	BDL	10
22V.	1,1,2-TRICHLOROETHANE	BDL	10
23V.	DIBROMOCHLOROMETHANE	BDL	10
24V.	BROMOFORM	BDL	10
25V.	1,1,2,2-TETRACHLOROETHYLENE	BDL	10
26V.	1,1,2,2-TETRACHLOROETHANE	BDL	10
27V.	TOLUENE	BDL	10
28V.	CHLOROBENZENE	BDL	10
29V.	ETHYLBENZENE	BDL	10
30V.	2-CHLOROETHYL VINYL ETHER	BDL	10
31V.	DICHLORODIFLUOROMETHANE†	BDL	
32V.	BIS(CHLOROMETHYL)ETHER†	BDL	

BDL=BELOW DETECTION LIMIT

†See Data Report Notice

COMPOUND LIST -- ACID EXTRACTABLE ORGANICS

SAMPLE IDENTIFIER: FTS-51, FILTERED EFFLUENT FROM TREATMENT STUDY
COMPUCHEM SAMPLE NUMBER: 32972

		CONCENTRATION (UG/L)	DETECTION LIMIT (UG/L)
1A.	PHENOL	BDL	25
2A.	2-CHLOROPHENOL	BDL	25
3A.	2-NITROPHENOL	BDL	25
4A.	2,4-DIMETHYLPHENOL	BDL	25
5A.	2,4-DICHLOROPHENOL	BDL	25
6A.	P-CHLORO-M-CRESOL	BDL	25
7A.	2,4,6-TRICHLOROPHENOL	BDL	25
8A.	2,4-DINITROPHENOL	BDL	250
9A.	4-NITROPHENOL	BDL	25
10A.	4,6-DINITRO-O-CRESOL	BDL	250
11A.	PENTACHLOROPHENOL	7100(1)	25

BDL=BELOW DETECTION LIMIT
(1) Quantitated using secondary ion

COMPOUND LIST -- BASE-NEUTRAL EXTRACTABLE ORGANICS

SAMPLE IDENTIFIER: FTS-51, FILTERED EFFLUENT FROM TREATMENT STUDY
COMPUCHEM SAMPLE NUMBER: 32972

		CONCENTRATION (UG/L)	DETECTION LIMIT (UG/L)
1B.	N-NITROSODIMETHYLAMINE	BDL	10
2B.	BIS (2-CHLOROETHYL) ETHER	BDL	10
3B.	1,3-DICHLOROBENZENE	BDL	10
4B.	1,4-DICHLOROBENZENE	BDL	10
5B.	1,2-DICHLOROBENZENE	BDL	10
6B.	BIS (2-CHLOROISOPROPYL) ETHER	BDL	10
7B.	HEXACHLOROETHANE	BDL	10
8B.	N-NITROSODI-N-PROPYLAMINE	BDL	10
9B.	NITROBENZENE	BDL	10
10B.	ISOPHORONE	BDL	10
11B.	BIS(2-CHLOROETHOXY) METHANE	BDL	10
12B.	1,2,4-TRICHLOROBENZENE	BDL	10
13B.	NAPHTHALENE	BDL	10
14B.	HEXACHLOROBUTADIENE	BDL	10
15B.	HEXACHLOROCYCLOPENTADIENE	BDL	10
16B.	2-CHLORONAPHTHALENE	BDL	10
17B.	DIMETHYLPHTHALATE	BDL	10
18B.	ACENAPHTHYLENE	BDL	10
19B.	2,6-DINITROTOLUENE	BDL	10
20B.	ACENAPHTHENE	BDL	10
21B.	2,4-DINITROTOLUENE	BDL	10
22B.	DIETHYLPHTHALATE	BDL	10
23B.	FLUORENE	BDL	10
24B.	4-CHLOROPHENYL PHENYL ETHER	BDL	10
25B.	DIPHENYLAMINE (N-NITROSO)	BDL	10
26B.	1,2-DIPHENYLHYDRAZINE (AZOBENZENE)	BDL	10
27B.	4-BROMOPHENYL PHENYL ETHER	BDL	10
28B.	HEXACHLOROBENZENE	BDL	10

(Continued)

BDL=BELOW DETECTION LIMIT

COMPOUND LIST -- BASE-NEUTRAL EXTRACTABLE ORGANICS (Page Two)

SAMPLE IDENTIFIER: FTS-51, FILTERED EFFLUENT FROM TREATMENT STUDY
COMPUCHEM SAMPLE NUMBER: 32972

		CONCENTRATION (UG/L)	DETECTION LIMIT (UG/L)
29B.	PHENANTHRENE	BDL	10
30B.	ANTHRACENE	BDL	10
31B.	DI-N-BUTYLPHTHALATE	BDL	10
32B.	FLUORANTHENE	BDL	10
33B.	BENZIDINE	BDL	10
34B.	PYRENE	BDL	10
35B.	BUTYLBENZYLPHTHALATE	BDL	10
36B.	BENZO(A)ANTHRACENE	BDL	10
37B.	3,3'-DICHLOROBENZIDINE	BDL	10
38B.	CHRYSENE	BDL	10
39B.	BIS(2-ETHYLHEXYL)PHTHALATE	BDL	10
40B.	DI-N-OCTYLPHTHALATE	BDL	10
41B.	BENZO(B)FLUORANTHENE	BDL	10
42B.	BENZO(K)FLUORANTHENE	BDL	10
43B.	BENZO(A)PYRENE	BDL	10
44B.	INDENO(1,2,3-C,D)PYRENE	BDL	25
45B.	DIBENZO(A,H)ANTHRACENE	BDL	25
46B.	BENZO(G,H,I)PERYLENE	BDL	25

BDL=BELOW DETECTION LIMIT

COMPOUND LIST -- PESTICIDES/PCB'S

SAMPLE IDENTIFIER: FTS-51, FILTERED EFFLUENT FROM TREATMENT STUDY
COMPUCHEM SAMPLE NUMBER: 32972

		CONCENTRATION (UG/L)	DETECTION LIMIT (UG/L)
1P.	ALDRIN	BDL	10
2P.	ALPHA-BHC	BDL	10
3P.	BETA-BHC	BDL	10
4P.	GAMMA-BHC	BDL	10
5P.	DELTA-BHC	BDL	10
6P.	CHLORDANE	BDL	10
7P.	4,4'-DDT	BDL	10
8P.	4,4'-DDE	BDL	10
9P.	4,4'-DDD	BDL	10
10P.	DIELDRIN	BDL	10
11P.	ALPHA-ENDOSULFAN	BDL	10
12P.	BETA-ENDOSULFAN	BDL	10
13P.	ENDOSULFAN SULFATE	BDL	10
14P.	ENDRIN	BDL	10
15P.	ENDRIN ALDEHYDE	BDL	10
16P.	HEPTACHLOR	BDL	10
17P.	HEPTACHLOR EPOXIDE	BDL	10
18P.	PCB-1242	BDL	10
19P.	PCB-1254	BDL	10
20P.	PCB-1221	BDL	10
21P.	PCB-1232	BDL	10
22P.	PCB-1248	BDL	10
23P.	PCB-1260	BDL	10
24P.	PCB-1016	BDL	10
25P.	TOXAPHENE	BDL	10

BDL=BELOW DETECTION LIMIT

COMPOUND LIST -- INORGANICS PRIORITY POLLUTANTS

SAMPLE IDENTIFIER: FTS-51, FILTERED EFFLUENT FROM TREATMENT STUDY
COMPUCHEM SAMPLE NUMBER: 32972

	CONCENTRATION (MG/L)	DETECTION LIMIT (MG/L)
1. ANTIMONY, TOTAL	BDL	0.050
2. ARSENIC, TOTAL	BDL	0.050
3. BERYLLIUM, TOTAL	BDL	0.020
4. CADMIUM, TOTAL	BDL	0.010
5. CHROMIUM, TOTAL	BDL	0.050
6. COPPER, TOTAL	0.10	0.10
7. LEAD, TOTAL	0.050	0.050
8. MERCURY, TOTAL	0.00050	0.00020
9. NICKEL, TOTAL	BDL	0.10
10. SELENIUM, TOTAL	BDL	0.010
11. SILVER, TOTAL	BDL	0.050
12. THALLIUM, TOTAL	BDL	0.050
13. ZINC, TOTAL	0.27	0.020

INORGANICS/
CONVENTIONALS

(None Requested)

BDL=BELOW DETECTION LIMIT

CONCEPTUAL DESIGN OF AN UPGRADED WASTEWATER HANDLING AND TREATMENT SYSTEM

Prepared for:

KOPPERS COMPANY, INC.
GRENADA, MS WOOD PRESERVING PLANT

Prepared by:

KEYSTONE ENVIRONMENTAL RESOURCES, INC.
440 COLLEGE PARK DRIVE
MONROEVILLE, PA 15146

Project No. 184733-08

AUGUST, 1988

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EXECUTIVE SUMMARY

An upgrade of the existing wastewater handling and treatment system at the Koppers Treated Wood Products Plant in Grenada, MS is required to treat a maximum flowrate of 20,000 gallons per day of contaminated stormwater runoff and process wastewater. The treated wastewater will be discharged to the city of Grenada POTW. Upgrade of the existing wastewater handling and treatment system is required since the existing surface impoundment at the site has been removed from service to comply with a RCRA directive.

This design is a revision of the conceptual design submitted in February 1988 and was developed in response to the decision by Koppers treated Wood Products to continue the use of pentachlorophenol at the facility. The revised design incorporates equipment (tankage and pumps) provided in the November 1987 design. Primary modifications are the addition of a clarifier, the use of activated carbon for consistent removal of pentachlorophenol, and modifications to the aeration system.

The upgraded wastewater handling and treatment system will be comprised of pretreatment and product recovery, followed by an activated sludge biological treatment unit with activated carbon addition.

The design is based on wastewater pretreatment permit limits established by the Mississippi Department of Natural Resources (DNR) and information from other wood preserving plants. The maximum flowrate of 20,000 gallons per day was also established by the Mississippi DNR since the Grenada POTW is near hydraulic and organic loading capacity.

The maximum daily sewer discharge limit for pentachlorophenol for the Grenada plant is 0.36 mg/L. It is anticipated that this pentachlorophenol sewer discharge limit can be met with the proposed activated sludge treatment system. Tertiary treatment technology evaluation will be recommended only in the event that the pentachlorophenol sewer discharge limit is not met with biological treatment.

DISCLAIMER STATEMENT

Conceptual Design

This conceptual design describes an environmental remediation system, including the process to be utilized, detailed specifications including instrumentation, and general specifications for other equipment required intended to satisfy certain of client's environmental regulatory requirements. It utilizes, as appropriate, data supplied by client, and is tailored to an intended for use only on the project for which it was created. Keystone warrants only that it was prepared in accordance with generally accepted scientific and engineering principles, and disclaims any responsibility for any other warranties, expressed or implied. Keystone's liability for any errors or omissions in this conceptual design shall be limited to Keystone's fee for the preparation thereof.

1.0 INTRODUCTION

An upgrade of the existing wastewater handling and treatment system at the Koppers Treated Wood Products Plant in Grenada, MS is required to treat 20,000 gallons per day of contaminated stormwater runoff and process water. This treated wastewater will be discharged to the city of Grenada POTW. The existing surface impoundment at the site has been removed from service to comply with RCRA requirements.

The upgraded wastewater handling and treatment system will be comprised of pretreatment and product recovery followed by an activated sludge biological treatment unit with activated carbon addition.

The design is based on wastewater pretreatment permit limits established by the Mississippi Department of Natural Resources (DNR). The maximum flowrate of 20,000 gallons per day was also established by the Mississippi DNR since the Grenada POTW is near its' hydraulic and organic loading capacity.

Engineering design testing studies were performed on wastewaters from Koppers' Florence, S.C. and Feather River, CA Treated Wood Products Plants which utilize wood preservatives similar to those at Grenada. The results of these studies in conjunction with characterization data from the Grenada plant were utilized in the development of this conceptual design.

2.0 BACKGROUND INFORMATION

A search of available data was conducted by Keystone to identify information on the Grenada plant relating to wastewater characteristics and treatment. The results of this work effort are summarized in the sections below.

2.1 Wood Preserving Process Description

The Grenada plant currently utilizes creosote and pentachlorophenol as wood preservatives. Plant production is 10,000 to 15,000 cubic feet of wood daily. At present, wood is either air seasoned, steam conditioned, boultonized or kiln dried prior to treatment. Kiln drying of wood is planned to become the primary conditioning method. The projected maximum output used for the design basis is:

HARDWOODS	boultonized	30,000 cu ft/month
	air seasoned	220,000 cu ft/month
PINE	steam conditioned	55,775 cu ft/month
	kiln dried	148,440 cu ft/month

2.2 Existing Wastewater Treatment System Description

Wastewater generated from the wood preserving operation and contaminated storm water runoff flow by gravity or are pumped to a series of collection basins located in the treating and tank farm areas as shown in Figure 2-1. Wastewater from each collection basin is pumped to a 110,000 gallon capacity surge tank. This surge tank serves as the central collection location for all process wastewaters and storm water runoff. The various streams contributing wastewater to the surge tank include pentachlorophenol and creosote process wastewaters and contaminated runoff from drip track, treating cylinders and tank farm areas.

A total of seven individual wastewater and surface water runoff streams are presently pumped to the surge tank from six sumps: (i) the tank farm sump, which collects surface runoff from both the work tank area and #2 diesel fuel area; (ii) the treatment cylinder sump which collects wastewater and surface runoff from the treating cylinder basement and the condensate tank area; (iii) treatment cylinder door drippage from the sump located beneath the grating immediately in front of the treating cylinders; (iv) the penta mix tank sump, which collects stormwater from the diked area containing the penta mix and separator tanks; and (v) two drip track sumps that collect water from the drip track area.

All penta wastewater including overflow from the penta condensate tank is directed to the penta blowdown tank. At this point the penta-in-oil and wastewater are drained to a pump tank and pumped intermittently to two penta separator tanks. In the two penta separation tanks, separation of free oil and water occurs. This penta separation system has one pump tank dedicated to both separation tanks and the system is manually operated. Wastewater, decanted from various tank levels, is drained by gravity to the pump tank containing an air driven pump. Wastewater is pumped intermittently from the pump tank to the surge tank until a visible floating pentachlorophenol layer is encountered. Using the same pump, the penta-in-oil is pumped to the pentachlorophenol work tank.

A sump located in the pentachlorophenol mix tank diked area provides an additional source of pentachlorophenol wastewater that bypasses the blowdown tanks and is pumped directly to the surge tank.

Creosote blowdown from cylinder numbers 1, 2 and 4 is collected in creosote condensate tanks and transferred to the creosote blowdown tank. The creosote separates from the wastewater in this tank. The creosote flows by gravity into a pump tank and is pumped intermittently to the work tanks or a treating cylinder for dehydration. Using the same pump, the remaining wastewater is pumped to the existing surge tank.

Closed circuit steaming water from the steaming cylinder #3 is pumped to work tank #3. Steaming is required to dry the wood prior to impregnation with preservatives. The steaming water consists of interstitial moisture which is extracted from the wood under high temperature and vacuum in the cylinder. Closed circuit steaming wastewater is blown down from tank #3 on a periodic basis.

From the surge tank, the combined wastewater flows by gravity to the first of two in-series oil/water separators. Both cationic and anionic polymers are injected in-line to the surge tank discharge stream, before this wastewater enters the oil/water separator. Effluent from the oil/water separators is currently being evaporated on-site.

Sludge from the oil/water separators is removed with shoveling equipment by plant personnel, after the water level is lowered. This sludge is placed in a treating cylinder for dehydration or pumped to the creosote work tank for reuse.

Creosote is recovered from the surge tank and pumped to a treating cylinder for dehydration. The creosote is conditioned to remove moisture and is returned to the 60/40 work tank. Penta, recovered from the surge tank, is pumped to the penta work tank and reused in the wood treating process. Penta from the penta work tank sump and the penta separator tanks, is collected intermittently and recycled to the work tanks.

Stormwater runoff, collected from tank farm and drip track areas, is pumped to the surge tank. The storm water runoff collection area is approximately one acre. This surge tank has limited capacity for both stormwater runoff and process wastewater.

2.3 Wastewater Flow Streams

Major effluent streams are illustrated in Figure 2-1. The plant treats approximately 5,000 gallons of process wastewater over an 8 hour period. The additional process wastewater, if any, for the remaining 16 hour period is stored in the existing surge tank and is treated on the following day.

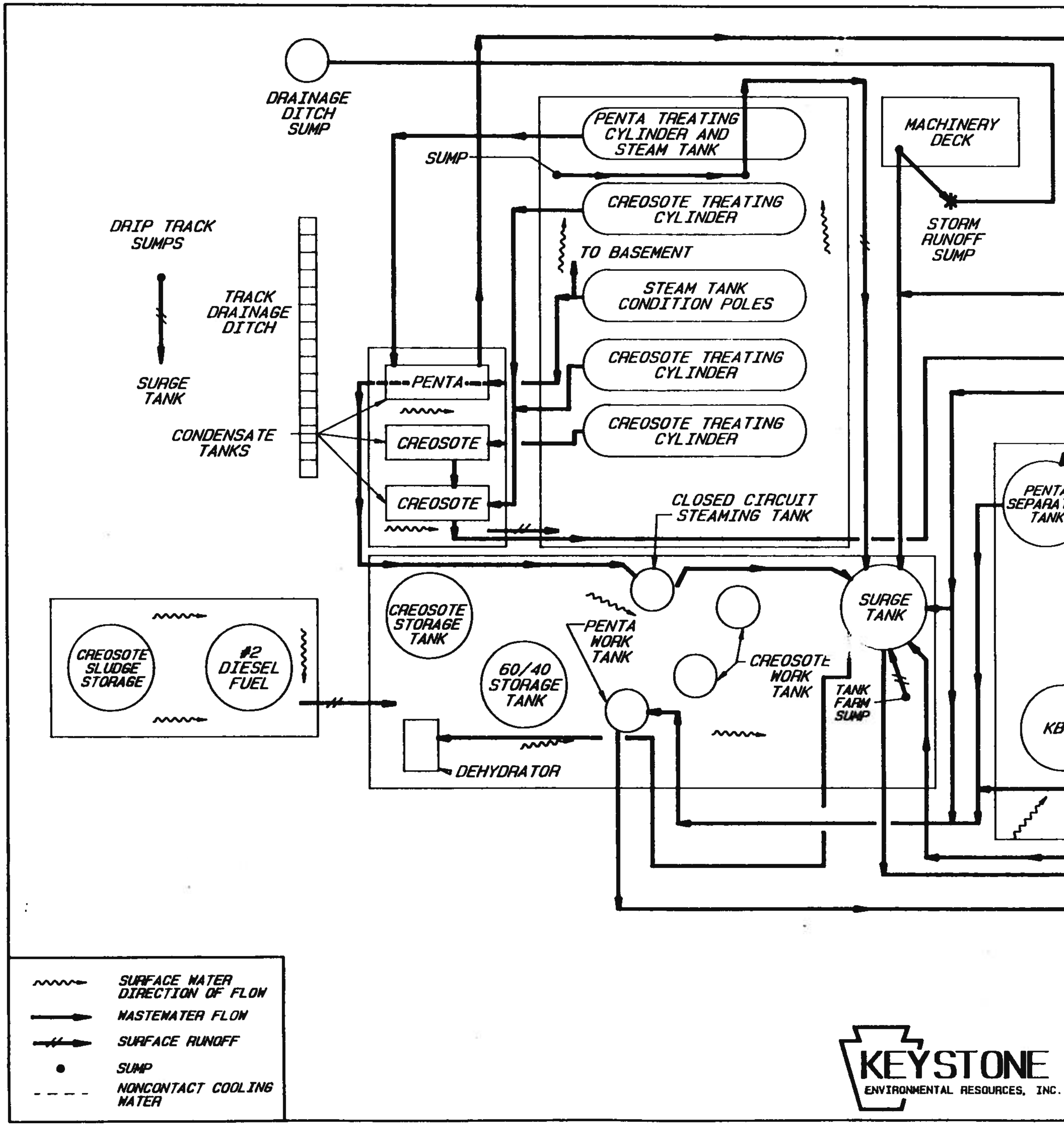

FIGURE 2-1

KOPPERS COMPANY, INC.

GRENADA PLANT, MISSISSIPPI

PREVIOUS PROCESS WATER AND STORMWATER FLOW DIAGRAM

B512467

3.0 PERMIT INFORMATION

This section presents sewer discharge limits for the upgraded wastewater treatment system. These sewer discharge limits and monitoring requirements, obtained from the Mississippi DNR, are presented in Table 3-1.

Sewer discharge limits for pentachlorophenol and total phenols were derived from a 7 day - 10 year low flowrate of 11.6 million gallons per day in the Yalobusha River. The State of Mississippi Water Quality Standards limit the instream concentration of total phenols and pentachlorophenol to 0.05 mg/L and 0.005 mg/L, respectively.

Other information utilized to develop sewer discharge concentrations include (i)flowrate of wastewater treated and discharged to the Yalobusha River by the POTW, (ii)the concentration of pentachlorophenol and total phenols removed by the POTW, (iii)Koppers' anticipated sewer discharge flowrate and (iv)the concentration of pentachlorophenol and total phenols in the influent stream to the POTW. The Koppers' sewer discharge flowrate is limited by the permit to a daily maximum value of 20,000 gallons per day.

Other permitted parameters listed in Table 3-1 include biochemical oxygen demand, total suspended solids, oil and grease, total copper, total chromium, total arsenic, pH and wastewater temperature.

TABLE 3-1

GRENADA, MISSISSIPPI
SEWER DISCHARGE PERMIT REQUIREMENTS

Parameter	Discharge Limitations: Daily Average	Discharge Limitations: Daily Maximum	Monitoring Requirements: Measurement Frequency	Monitoring Requirements: Sample Type
Flowrate, gallons per day	---	20,000	daily	continuous
Biochemical Oxygen Demand, mg/L	240	480	once/week	24-hr. Comp.
Total Suspended Solids, mg/L	300	600	once/week	24-hr. Comp.
Total Phenols, mg/L	3	6	once/week	Grab
Pentachlorophenol, mg/L	0.18	0.36	once/week	Grab
Oil & Grease, mg/L	---	100	once/week	Grab
Total Copper, mg/L	2.5	5	Twice/month	24-hr. Comp.
Total Chromium, mg/L	2	4	Twice/month	24-hr. Comp.
Total Arsenic, mg/L	2	4	Twice/month	24-hr. Comp.
pH, units	5.5 - 9.5	---	Twice/month	Grab
Temperature, ^{o}F	---	104		

NOTE: Comp. denotes composite sample.

4.0 PROPOSED TREATMENT SYSTEM PROCESS DESCRIPTION

(Refer to drawings A103230, A103231, A103233 and A103235)

The upgraded wastewater treatment system for the Grenada plant will consist of unit processes which include (i) gravity oil/water separation, (ii) equalization, (iii) chemical coagulation/ flocculating with pH adjustment, (iv) gravity settling, (v) neutralization, and (vi) activated sludge treatment (no waste system with carbon addition). A process flowsheet for the proposed system is given in the attached drawings.

The existing penta blowdown tank will remain in service. Two existing penta-in-oil wastewater separators and the creosote blowdown tank will remain in service for gravity oil/water separation and preservative recovery.

Wastewater from the penta separator tanks will be pumped from a new pump tank (T-2) to the process water equalization tank (T-105). The tanks will be decanted every one to two days, allowing enough time for separation of the free oil and wastewater. A valved sampling manifold will be utilized for determination of the oil/water interface. Free oil will be reclaimed from the penta-in-oil wastewater tanks on a batch basis and routed through the existing penta oil pump tank to the penta work tanks.

A maximum volume of 3000 gallons of closed circuit steaming system water from work tank #3 will be drained to the equalization tank (T-105) weekly to provide a more constant flow of the closed circuit steaming water to the treatment system. The purpose of the weekly discharge to the T-105 is to provide a more continuous input of the high COD wastewater to the treatment system. Vacuum condensate removed from the treating cylinder during the steaming process will be collected in the existing condensate tank and transferred to the penta blowndown tank.

Vacuum condensate and boulton wastewater will be collected in the creosote condensate tanks and transferred to the creosote blowdown tank. Separate pumping systems will be installed for pumping wastewater and creosote from the blowdown tank. Reclaimed light oils from the creosote blowdown tank will be drained from decanting lines to the penta separator penta oil pump tank. Creosote and heavy oils will be discharged to the existing pump tank and pumped to the creosote work tank or a treating cylinder for dehydration. A valved sampling manifold will be utilized for determination of the oil/water interface. Wastewater will discharge to a new pump tank (T-100) and be transferred to the existing process water equalization tank.

Reclaimed creosote recovered from the process water equalization tank (T-105) will be pumped to the creosote work tank or a treating cylinder for dehydration. Light oils recovered from the process water equalization tank will be drained to the penta separator pump tank where it will be pumped to the penta work tank.

Stormwater from the plant process area will be collected in a new 250,000 gallon surge tank. Table 4-1 provides a summary of the areas from which stormwater will be collected and the acreage for each area. Appropriate stormwater collection equipment (sumps, pumps, trenches, etc.) is to be provided for areas not included in the existing collection system at the plant. Provisions should be made as necessary to minimize runoff of stormwater into the treating room basement. Stormwater collected in the basement will be pumped from the existing sump the new stormwater storage tank. Provisions should be made to segregate the penta cylinder door pit from the remainder of the treating room basement.

Heavy oils and solids collected in the stormwater storage tank will be transferred by storm water/process water sludge transfer pump to the creosote work tanks or to a treating cylinder for dehydration. Light oils collected in the tank will be routed to the penta separator pump tank and pumped to the penta work tanks. A valved sampling manifold will be utilized for determination of the respective oil/water interface levels.

Stormwater will discharge by gravity into the wastewater treatment system ahead of the chemical conditioning system. The design flowrate for the stormwater discharged from the storage tank to the treatment system is 9.7 gpm. This flowrate can be increased by the operator if the design capacity for the process wastewater flow (3.8 gpm) is not being utilized. Stormwater and process water will be introduced to the wastewater treatment system through manually controlled valves to the weir box at the head of the chemical conditioning system.

The process wastewater equalization tank will discharge via gravity through a manually controlled valve to the weir box at the head of the new chemical conditioning system at a maximum flowrate of 4.0 gpm. Separate lines and valves

TABLE 4-1

GRENADA, MS
STORMWATER RUNOFF AREAS

Site Description	Area, Acres
Treating Cylinder Basement Area	0.2
Main Tank Area	0.3
#5 and #6 Storage Tank Area	0.1
Concrete Drip Pad	0.1
Area in Front of Treating Cylinders	0.3
Area Behind Treating Cylinders	0.3
Total Acreage	1.3

will be provided for the process water equalization tank and stormwater surge tank discharges to the weir box.

The chemical mix tanks, chemicals and pumping equipment associated with the chemical conditioning system will be housed in a new building. The building should be sized with provisions for chemical storage and have temperature control to prevent freezing of 50% caustic. A safety station equipped with an eyewash, shower, and necessary first aid equipment will be installed in the chemical handling area.

Effluent from the chemical conditioning system weir box will discharge to the pH adjustment tank. A pH controller will maintain the pH in the pH adjustment tank in the range of 3.5 to 4.0. 98% sulfuric acid (66^{o} Baume) and 25% caustic will be used for pH control. Output from the pH controller will be used to control the flowrate from the pH adjustment tank acid feed pump (P-119) and caustic feed pump (P-124). The pH sensor will be suspended in the pH adjustment tank with the provisions made for easy removal to facilitate routine cleaning. An agitator (A-107) in the tank will provide constant mixing.

Effluent from the pH adjustment tank will overflow into the cationic polymer rapid mix tank. This tank will be equipped with an agitator to provide constant mixing. The cationic polymer will be pumped "neat" from the 55 gallon drum and diluted in-line with service water prior to discharge to the cationic polymer rapid mix tank.

Effluent from the cationic polymer rapid mix tank will overflow to the anionic polymer rapid mix tank. The tank will be equipped with an agitator to provide constant mixing. Prior to being added to the rapid mix tank, the anionic polymer will be diluted to a required concentration and premixed in a tank to allow the polymer to attain maximum activity.

The premix tank will be filled by the anionic polymer feed pump and dilution water. The dilution water line will be equipped with an adjustable flowmeter. The premix tank will be equipped with an agitator with a low shear impeller. The premixed polymer will be transferred from the premix tank to the anionic polymer rapid mix tank by a metering pump. A drum agitator will be provided for the anionic polymer drum to maintain the contents in a well-mixed state. A timer on the drum agitator will control the frequency of agitation.

Effluent from the anionic polymer rapid mix tank will discharge to the slow mix tank which will be an integral part of the primary settling basin (T-111 A)). The solids generated from the polymer addition will flocculate into larger, more easily settled particles. A variable speed mixer with a low shear impeller will be used to mix the tank. Effluent from the slow mix tank will discharge into the primary concrete settling basin through 2 inch holes in the walls of the slow mix tank. The purpose of this type of system is to not break up the floc particles as they pass to the settling basin and to distribute the flow so it will not disturb the quiescent zone of the basin.

The first settling basin will be used for primary clarification of the wastewater. Water from the first settling basin flows by gravity via a 4" line to the front end of the second settling basin. The second settling basin will be used for additional clarification of flocced wastewater prior to entering the settling basin sump. This settling basin has an existing air driven sludge transfer pump.

Reclaimed oil from each settling basin will be transferred by a new settling basin sludge transfer pump to one of two new conical bottom sludge decanting tanks for additional separation before being pumped to the treating cylinders or work tanks for dehydration. Reclaimed oils will be removed on a weekly basis to prevent buildup of material in the basins. Water collected in these decanting tanks will be transferred by gravity to the head of the chemical conditioning system.

Clarified water will discharge from the settling basin via an overflow weir into the existing concrete settling basin sump. The settling basin sump pumps will be controlled by level switches mounted in the basin. A high level switch in the basin will be used to shut-off the feedwater to the chemical conditioning system in the event of pump failure or valve closure on the discharge line.

Urea and phosphoric acid will be pumped to the settling basin sump as nutrients for bacteria in the aeration tank. 40% urea solution will be delivered in drums. Metering pumps will pump urea solution neat from drums to the existing settling basin sump. 75% phosphoric acid will be pumped neat from drums by a transfer pump to a premix 55 gallon drum equipped with an agitator. Five gallons of phosphoric acid will be diluted with manually added service water. This diluted phosphoric acid will be pumped, by metering pump, to the settling basin sump.

Caustic for the pH control systems will be received in 55 gallon drums at 50% strength. The caustic transfer pump will be used to transfer the 50% caustic to the caustic mix tank. The caustic mix tank will contain the correct amount of water to dilute the caustic to 25% strength to prevent freezing problems in the caustic feed system.

The settling basin sump pump (P-111) will transfer clarified wastewater to the aeration tank. The quality and flowrate of the wastewater transferred to the aeration tank must be maintained at a relatively constant level to prevent upset of the biological system. The aeration tank will be equipped with a submerged turbine aerator, and pH and temperature control systems. Aeration tank pH will be controlled in the range of 7.0 to 7.5 and the aeration tank temperature will be controlled in the range of 20^{o}C to 30^{o}C.

The aerator will be sized to provide a residual dissolved oxygen concentration in the aeration tank of 3 mg/L, and provide adequate mixing to maintain the activated carbon in suspension. Activated carbon will be added to the aeration tank manually on an as-needed basis to maintain the carbon concentration at approximately 20 % of the MLTSS. An alarm signal from the pH monitoring system or the loss of power to the aerator or blower motors will be used to shut-off the settling basin sump pumps and aeration tank pH control system.

Effluent from the aeration tank will overflow to the clarifier, where the biological solids and activated carbon will be settled out for return to the aeration tank. Settled sludge collected in the clarifier will be recycled to the aeration tank by the sludge recycle pumps. A weir box in the aeration tank will be used to monitor the sludge recycle rate. Solids wasting from the activated sludge system will be limited to suspended solids carryover in the clarifier effluent.

Effluent from the clarifier will be sent to the treated wastewater storage tank and then through a flow/water quality monitoring station prior to being discharged to the sewer. A return line on the discharge from the treated water storage tank will be provided to allow recycle of effluent to the head of the activated sludge system.

5.0 DESIGN BASIS

5.1 Process Wastewater Flowrates

Source	Method	Average Flowrate	Maximum Flowrate
Creosote Wastewater	Projected from volume	2 gpm	2.3 gpm
Oil-Penta Wastewater	of wood treated and	1 gpm	1.5 gpm
Total	in plant monitoring	3 gpm	3.8 gpm

5.2 Stormwater Tank Design Data and Required Storage Capacity

Source -- "Frequency Analysis for Industrial Stormwater Detention Basins: Grenada, MS" by Dr. Dale D. Meredith, SUNY, Buffalo, N.Y.

Process Area Acreage (see Table 4-1) -- 1.3 acres
Runoff Coefficient -- 1.0
Recurrence Interval -- 10 years
Flowrate to Treatment -- 9.7 gpm
Required Storage Capacity - 250,000 gallons

5.3 Total Treatment System Capacity

Process Wastewater -- 3.8 gpm
Stormwater -- 9.7 gpm
Total -- 13.5 gpm

Treatment System Design Basis -- 13.5 gpm

5.4 Existing Process Water Equalization Tank (T-103)

Capacity -- 110,000 gallons

5.5 Chemical Conditioning System Influent Weir Box (T-104)

Design Criteria

Maximum Wastewater Flow -- 13.5 gpm (0.030 cfs)
Minimum Wastewater Flow -- 2.0 gpm (0.004 cfs)

5.6 Chemical Conditioning System Tankage

Item	Required Residence Time @ Max. Flow (13.5 gpm)	Minimum Working Volume, gallons
pH Adjustment Tank (T-105)	5 min	70
Cationic Rapid Mix Tank (T-106)	2 min	30
Anionic Rapid Mix Tank (T-107)	2 min	30
Slow Mix Tank (T-108)	15 min	210

Anionic Polymer Premix Tank (T-112) --250 gallons (designed for minimum 1 day capacity and maximum 4 day residence time.)

5.7 Existing Settling Basin Information (T-111 A,B)

Total Dimensions: 37 x 15 x 3.75 feet (LxWxD at effluent end)
Settling Area: 385 ft^2 per settling basin
Settling Volume: 4,425 ft^3 (33,099 gallons) per settling basin

5.8 Solids Decanting Tanks (T-112 A,B)

Capacity - 5,000 gallons per tank

5.9 Activated Sludge System

Influent Data

Flowrate -- 13.5 gpm
Design COD -- 600 lbs/day
Design FSS -- 10 mg/L

Operational Design Parameters

COD reduction -- 80%
design SRT -- 500 days
design HRT -- 7 days
recycle ratio -- 2
recycle sludge flowrate -- 30 gpm

Aerator Design Criteria

required oxygen transfer -- 20 lb O_2/hour
mixed liquor DO -- 3.0 mg/L
temperature range -- 20°C - 30°C
MLTSS -- 4,350 mg/L
MLVSS -- 2,950 mg/L
MLFSS -- 1,400 mg/L
MLTSS w/activated carbon -- 4,715 mg/L

Activated carbon will be maintained in the system at a level equal to 20% of MLTSS. The aerator must provide sufficient mixing to maintain the granular activated carbon in suspension.

Activated Carbon Specifications

Dosage -- 20% MLTSS
Sieve Size -- 80 to 150 mesh
Iodine number -- 1,000 minimum

Nutrient Requirements

Phosphorus -- 0.2 lb/day a P
Nitrogen -- 0.9 lb/day as N

6.0 MAJOR EQUIPMENT LIST

6.1 Tankage

These general specifications define the required capacity, shape and any special functional parts of tankage required for the proper design and operation of the wastewater treatment plant. Existing spare tanks of appropriate capacity, shape and function might be utilized by the plant, either singly or in combination, if economical and if determined by Koppers to be in serviceable condition.

T-100 A,B Existing Penta Separator Tanks

The existing penta separator tanks will be utilized for separation of penta-in-oil from the wastewater. These tanks will be retrofitted as necessary with level indicators, discharge manifolds, and sample ports. Sufficient sampling ports will be provided to allow determination of the oil/water interface across the height of the tank. Discharge piping to the penta wastewater pump tank (T-2) will be configured in such a manner that residual floating oil cannot be transferred to T-2.

T-101 Existing Creosote Blowdown Tank

The existing creosote blowdown tank will be modified, if necessary through replacement/repair of the existing steam heating system, the installation of temperature control instrumentation, a level gauge , and the installation of a discharge manifold and sample ports. The shell height of the tank is 14 feet. A separate discharge manifold will be provided for reclaiming light oils from the top of the tank. This manifold will discharge to the penta blowdown pump tank. A freeboard of 2 feet will be required in this tank.

T-100 Creosote Wastewater Pump Tank

A new tank will be provided to transfer wastewater from the creosote blowdown tank to the process wastewater surge tank (T-105). The volume should be approximately 250 gallons.

T-2 Penta Wastewater Pump Tank

A new tank will be provided to transfer wastewater from the penta separator tanks to the process wastewater equalization tank (T-105). The volume should be approximately 250 gallons.

T-104 Stormwater Storage Tank

The stormwater storage tank will have a capacity of 250,000 gallons and will be equipped with a level gauge, a steam bayonet heater, temperature indicator and valved discharge ports spaced at 4 feet intervals from the base of the tank to the midpoint of the tank. Sampling ports will be provided for determination of the oil/water interface levels. A separate valved drain manifold will be used for reclaiming light oils which will drain to the penta separator pump tank. Two suction lines will be provided to pump P-104 from the bottom of the tank. The tank will be contained in a diked area.

T-105 Existing Process Water Equalization Tank

The existing process water equalization tank has a capacity of 110,000 gallons. This tank will be equipped as necessary with a steam bayonet heater, temperature indicator, and a level gauge. Sampling ports will be provided at 2 foot intervals from the bottom to the top for determination of the oil/water interface levels. A discharge manifold with valved drain ports will be used for transfer of process water by gravity. A separate valved drain manifold will be provided for reclaiming light oils to the penta separator oil pump tank. Two suction lines will be provided from the bottom of the tank for pump P-104.

T-106 Chemical Conditioning System Weir Box

The chemical conditioning system weir box will be used to monitor the combined flowrate from the stormwater storage tank (T-104) and the process water storage tank (T-105) to the chemical conditioning system. The weir box will have inside dimensions of 7 ft x 2 ft x 1.5 ft (L x W x D) and a capacity of 160 gallons. The weir box will be equipped with a 22.5 degree V-notch weir at the discharge end. The weir plate should be constructed of 1/8" to 1/4" thick plate and installed level. The following dimensional criteria should be used in the construction of the weir plate and downstream tankage:

Maximum head on weir crest (H_{max}): 0.3 feet
Top of weir to crest of weir: 0.5 feet
Width of v-notch at top of weir plate: 0.2 feet
Top of v-notch to tank sidewall: 0.9 feet
Tank sidewall to crest of weir: 1 foot
V-notch crest to pH adjustment tank water level: 0.5 feet minimum

The inlet lines to the weir box are to be submerged to minimize turbulence in the channel and will be equipped with shut-off valves actuated by a level switch in the settling basin sump. The water level in the weir box will be measured manually for flowrate determination. A drain valve will be installed in the weir box to allow periodic purging of accumulated suspended solids. The chemical conditioning system weir box, pH adjustment tank (T-107), and polymer rapid mix tanks (T-108, T-109) will be elevated to allow gravity flow through the floc settling basins (T-111 A,B). The slow mix tank (T-110) will be an integral part of the primary settling basin (T-111 A).

Access to the tanks will be required for monitoring and servicing of the weir, pH adjustment system and tank mixers. Drains from the tanks will drain to the pretreatment area common sump. All of the tanks will be constructed of carbon steel. The tanks will be primed and coated with Koppers Hi-Guard.

T-107 pH Adjustment Tank

The pH adjustment tank will have a minimum working volume of 70 gallons and will be equipped with an agitator (A-107) and 2" vertical baffles at the midpoint of each sidewall. The baffles will be offset from the sidewall with appropriate spacers (2" offset). The pH probe will be suspended in the tank and be easily removable for routine cleaning.

An underflow baffle on the tank wall opposite the influent line will discharge the pH adjusted water to the cationic polymer rapid mix tank (T-108).

T-108 and T-109 Polymer Rapid Mix Tanks

The cationic polymer rapid mix tank (T-108) and the anionic polymer rapid mix tank (T-109) will each have a minimum working volume of 30 gallons. The tanks will be equipped with 2" vertical baffles on the midpoint of each sidewall. The baffles will be offset from the wall with appropriate spacers (1" offset). Each tank will contain an agitator (A-108 and A-109). A drain valve will be installed on each tank to facilitate cleaning. The discharge from T-108 will be via an underflow baffle.

T-110 Slow Mix Tank

The slow mix tank (T-110) will be an integral part of the primary settling basin (T-111 A). The slow mix tank will have a minimum working volume of 210 gallons and will be equipped with a variable speed mixer (A-110) with a flocculating impeller mounted over the center of the tank. Vertical sidewall baffles (3") at the midpoint of each sidewall will be provided to enhance the mixing regime in the tank. The baffles will be offset from the tank sidewall with appropriate spacers (2" offset). A drain valve will be provided for tank cleanout. The slow mix tank walls will have 2" perforations on 8" centers to allow passage of solids and water to the settling basin (T-111A).

T-111 A,B Existing Settling Basins

Each existing concrete settling basin has the dimension of 37 ft x 15 ft x 3.75 ft (L x W x D at effluent end). This includes a freeboard of 1 foot on the basin sidewall. These settling basins are arranged in series. The bottom slope is 20%. The discharge end of T-111 A has an overflow baffle followed by an underflow baffle for surface oil/solids retention followed by a 4" discharge pipe which conveys by gravity this supernatant to the inlet of T-111 B for additional clarification. Both settling basins should be drained, cleaned and inspected, a steel liner will be inserted if necessary.

A new pump (Wilden air driven or equal) will be used to pump sludge and floating scum from the bottom of both settling basins to the new solids decanting tanks (T-112 A,B). The discharge end of T-111 B has an underflow baffle followed by an overflow baffle for flow distribution and surface oil/solids retention. The effluent from the settling basin will be discharged to the existing settling basin sump (T-111 C).

T-111 C Settling Basin Sump

Level switches in the settling basin sump will control the transfer of wastewater to the aeration tank. A high level switch in the basin will close the solenoid valves on the influent lines to the chemical conditioning system weir box (T-106). A stilling well will be provided for the level switches. This sump will be lined with steel plate.

T-112 A,B Solids Decanting Tanks

The solids decanting tanks will be conical bottom tanks with a capacity of 5,000 gallons each. The tanks will be equipped with a valved drain manifold with takeoff ports spaced at 1 foot intervals along the straight side of the tanks and a discharge valve at the bottom. The bottom discharge valves will be tied to a common sludge transfer pump. The tanks will be supplied with steam heating coils to facilitate transfer of recovered material.

Clarified wastewater recovered from the tanks will be drained by gravity to the inlet end of the chemical conditioning system.

T-116 Anionic Polymer Premix Tank

The anionic polymer premix tank will be a prefabricated plastic tank. The tank will be equipped with an agitator (A-116) and level switches. A flowmeter with an adjustable inlet valve will be used to control the flow of dilution water to the premix tank. The dilution water and polymer feed pump discharge lines will be located in such a manner to discharge into the vortex created by the premix tank agitator. An air break will be provided between the polymer and dilution water feed lines and the maximum liquid level in the tank. The premixed polymer will be discharged through an outlet valve at the bottom of the tank and transferred to the anionic polymer rapid mix tank by the premixed anionic polymer transfer pump.

T-125 Caustic Mix Tank

The caustic mix tank will be a stressed relieved carbon steel tank with a capacity of 200 gallons. The tank will be equipped with an agitator (A-125).

T-113 Aeration Tank

The aeration tank will be a steel tank on a concrete pad with a working volume of 150,000 gallons. The tank will be equipped with a submerged turbine aerator (AE-1) to provide the necessary oxygen transfer and mixing required for biological activity. The dimensions of the aeration tank as specified by the equipment vendor (Lightnin) will be 38 feet in diameter with a 18 feet sidewater depth.

Total height to aerator mounting will be 21 feet, including approximately 2 feet of freeboard. The tank will have baffles as specified by the aerator vendor. Heat will be supplied to the tank to maintain the water temperature in the range of 20°C to 30°C. The tank will be insulated to reduce winter heat losses. A pH control system will be utilized to maintain the wastewater pH in the range of 7.0-7.5. The pH control probe will be mounted in the basin and will be easily removed for routine cleaning. A 1" thick steel wear plate and anti-vortex system will be required on the aeration tank bottom due to the abrasive action of the activated carbon which will be added to the system. A steel fillet plate will be installed at a 45 degree angle around the bottom joint side of the tank. The plate width will be 28 inches, and 3 plates are required according to Lightning. A weir box will be provided on the tank for monitoring of the discharge from the sludge recycle line. A support system on the bottom of the tank will be required for the air sparger ring. The aerator support system will be designed to specifications provided by the aerator vendor. The tank will require a service water supply line.

T-115 Clarifier

The clarifier for the aeration tank effluent will be a steel tank on a concrete pad. The clarifier will be 20 feet in diameter with a sidewater depth of 15 feet and have a sloped bottom. Influent water will enter the clarifier through a 4 foot diameter centerwell. Clarifier effluent will discharge via a 1 foot peripheral weir. A rotating sludge collection system will transport the settled solids to the center of the clarifier where it will be drawn off by sludge recycle pumps.

The sludge collection system will include a rake raise mechanism and an automatic torque limiter switch. The clarifier underflow line will be constructed of 316 stainless steel and be equipped with cleanout ports. A scum skimmer will be provided for collection of floating materials.

T-114 Treated Wastewater Storage Tank

The treated water storage tank will be an open-top steel tank with a working volume of 30,000 gallons. The tank foundation will be reinforced concrete. The tank will have an instrument bridle. A sample box with sample ports at various elevations will be required for tank monitoring. The sample box will drain into a small vessel which can be isolated such that it may be emptied into the treatment area sump.

T-122 Phosphoric Acid Dilution Tank

The phosphoric acid dilution tank will have a capacity of 100 gallons. 75% strength phosphoric acid will be pumped by a transfer pump (P-121) from the 55 gallon drum to the dilution tank. A 7.5% strength phosphoric acid solution is required after dilution. This phosphoric acid dilution tank will be a prefabricated plastic tank, equipped with an agitator (A-122). Service water will be required for dilution of the 75% strength phosphoric acid. An air break will be provided between P-121 discharge and dilution water feed lines and the maximum liquid level in the tank. The diluted phosphoric acid will be discharged from T-122 by a chemical metering pump. This metering pump will transfer the diluted phosphoric acid to the settling basin sump (T-111 C). The phosphoric acid dilution system will be manually operated.

T-130 Aeration Area Sump

The aeration tank will drain to the aeration area sump which will also collect water from the sample ports of the treated water storage tank (T-113). The treated water storage tank pump will pump (P-114) any water collected to the stormwater storage tank (T-104),the aeration tank (T-114) or the treated water storage tank (T-113)

6.2 Aerator

AE-1 Aeration Tank Aerator

The aerator for the aeration tank will be a 30 HP submerged turbine aerator (Lightning Model No. 76Q30 or equal). The impeller will be Lightning Model No. R321 or equal. Air will be introduced to the tank through an air sparger ring at the bottom of the tank supplied by the aerator vendor. The aerator will supply sufficient mixing to maintain the activated sludge in suspension. Aerator performance should be guaranteed by the manufacturer in accordance with the specifications in accordance with the specifications given in Section 5.9. An interlock system on the aerator motor will automatically shut-off the feed to the aeration tank if the power supply to the aerator is interrupted.

6.3 Blowers

B-1 and B-2 Blowers

Each blower will be designed to deliver 200 scfm of air at 8.0 psig to the air sparger ring in the aeration tank. One blower will operate continuously and the second will serve as a standby. The blowers will be equipped with inlet filters and silencers. The blowers are to be housed in a soundproof enclosure. An interlock system on the blower motors will automatically shut off the feed to the aeration tank if the power supply to the blowers is interrupted.

6.4 Pumps

P-1 A, Penta-in-Oil Transfer Pump

The existing penta-in-oil transfer pump will be repaired/replaced as necessary. The pump will transfer the penta-in-oil to the penta work tanks. The pumps will be manually operated.

P-2 A,B Penta Wastewater Transfer Pumps

Two penta wastewater transfer pumps will be located in the new sump collecting the batch wastewater discharge from the penta separator tanks. The pumps will transfer the water to the new process water equalization tank (T-105). The pumps will have a capacity of 50 gpm. One pump will be operating and the other will be an on-line standby with parallel operation capability. The pumps will be actuated by level switches in the sump.

P-100 A,B Creosote Wastewater Transfer Pumps

The creosote wastewater transfer pumps will be located in the new sump which collects the wastewater from the creosote blowdown tank. The pumps will transfer the wastewater to the existing process water equalization tank (T-105) and will have capacities of 50 gpm each. One pump will be operating and the other will be an on-line standby with parallel operation capability. The pumps will be actuated by level switches in the sump.

P-101 Creosote Oil Transfer Pump

The existing creosote oil transfer pump will be repaired/replaced as necessary. The pump will transfer recovered creosote to the dehydrator on a batch basis. This pump will have a capacity of 50 gpm. The pump will be operated manually.

P-5 A,B Clarifier Recycle Sludge Pumps

Each pump will have a capacity of 50 gpm and will be capable of handling primarily biological solids at a concentration of 3%. One pump will be operated continuously and the second pump will serve as a standby. The suction line to the pumps from the clarifier will be constructed of stainless steel and will have cleanout ports to minimize plugging problems. Access to the pumps will be required for routine maintenance. A manually controlled throttling valve in the vicinity of the discharge to the aeration tank will be used for flow control.

P-104 Storm Water/Process Water Sludge Transfer Pump

The stormwater/process water sludge transfer pump will transport oils accumulated in the stormwater storage tank and process water equalization tank to the creosote dehydrator. The pump will be of the positive displacement type, will have a capacity of 100 gpm, and will be capable of pumping viscous oils. The pump will be manually operated.

P-111 A,B Settling Basin Sump Pumps

The settling basin sump pumps will transfer wastewater from the settling basin sump to the aeration tank. The pumps will be actuated by level switches in the sump and will have a capacity of 30 gpm each.

P-112 Settling Basin Sludge Transfer Pump

The settling basin sludge transfer pump, common to each settling basin, will transfer settled sludge from the settling basins (T-111 A,B) to the sludge decant tanks (T-112 A,B) and will transfer the concentrated sludge from the sludge decant tanks to the treating cylinders or work tanks. The new pump will be of the positive displacement type, will have a capacity of

50 gpm, and will be capable of pumping viscous oils and high-solids slurries. This pump will be operated manually.

P-115 Anionic Polymer Feed Pump

The pumps will be of the positive displacement type, and will be capable of handling viscous liquids. This pump should be capable of pumping at a flowrate of 250 ml/min.

P-117 A,B Premixed Anionic Polymer Feed Pumps

The premixed anionic polymer feed pumps will be used to transfer diluted polymer from the premix tank to the anionic polymer rapid mix tank (T-108). The pumps will be of the positive displacement type, and will be capable of handling viscous liquids. One pump will operate continuously and the second pump will serve as a shelf spare. The pumps will be manually operated. These pumps should capable of pumping at a flowrate of 500 ml/min.

P-118 A,B Cationic Polymer Feed Pumps

The pumps will be of the positive displacement type, and will be capable of handling viscous liquids. This pump should be capable of pumping at a flowrate of 500 ml/min.

P-119 A,B pH Adjustment Tank Acid Feed Pumps

The pH adjustment tank acid feed pumps will be used to transfer 98% sulfuric acid (66^{O} Baume') to the pH adjustment tank (T-107). One pump will be in service and the second pump will be used as a spare. The pumps will have an adjustable flowrate with a capacity of 0-50 ml/min and the required chemical resistance properties. The pump in service will be actuated by a pH controller (C-1). All pumps and chemicals associated with the pH control system and the polymer mixing/feed systems will be located indoors. This includes the anionic polymer premix tank (T-116). An unloading area will be provided for the pH control and polymer system chemicals. Safety stations are to be provided adjacent to areas where any chemical handling occurs.

P-124 Caustic Transfer Pump

The caustic transfer pump will be a drum pump capable of pumping 50% caustic to the caustic mix tank (T-125).

P-125 pH Adjustment Tank Caustic Feed Pump

The pH adjustment tank caustic feed pump will be used to transfer 25% caustic to the pH adjustment tank (T-107). The pump will have an adjustable flowrate with a capacity of 0-200 ml/min and possess the required chemical resistance properties. The pump will be actuated by a pH controller (C-1).

P-120 Aeration Tank Acid Feed Pump

The aeration tank acid feed pump will be used to supply 98% sulfuric acid (66^{o} Baume) to the aeration tank (T-113). The pump will have an adjustable flowrate of 0-30 ml/min and possess the appropriate chemical resistance properties. The pump will be actuated by the aeration tank pH controller (C-3) which will have a sensor located in the aeration tank.

P-126 A,B Aeration Tank Caustic Feed Pump

The aeration tank caustic feed pumps will be used to transfer 25% caustic to the aeration tank (T-113). One pump will be in operation and the second pump will serve as a shelf spare for both the aeration tank caustic feed system and the pH adjustment tank (T-107) caustic feed system. The pumps will have an adjustable flowrate with a capacity of 0-200 ml/min and possess the appropriate chemical resistance properties. The pump in service will be actuated by either of two pH controllers (C-3 or C-4) which will have sensors located in the aeration tank.

P-127 Chemical Building Sump Pump

The chemical building sump pump will be a vertically submerged centrifugal pump. This pump will have a capacity of 30 gpm and will be manually operated.

P-18 Pretreatment Area Sump Pump

This pump will be a vertically submerged centrifugal pump with a capacity of 50 gpm. This pump will be manually operated.

P-19 A,B Urea Transfer Pumps

This pump will supply a "neat" 40% urea solution from a 55 gallon drum to the settling basin sump (T-110). Each pump will be capable of pumping urea at a flowrate of 0-25 ml/min. There will be one pump in service and a second pump as a shelf spare. The pump will have an adjustable flowrate, will possess the necessary chemical resistance properties, and will be LMI or equal.

P-121 Phosphoric Acid Drum Transfer Pump

This pump will supply a "neat" 75% phosphoric acid solution from a 55 gallon drum to a 55 gallon dilution tank at a flowrate of 0-1 gpm. This pump will possess the necessary chemical resistance properties.

P-122 A,B Phosphoric Acid Feed Pumps

The diluted phosphoric acid will be pumped from the phosphoric acid dilution tank (T-122) to the settling basin sump (T-111 C) at a flowrate of 0-25 ml/min. There will be one phosphoric acid feed pump in service and a second pump as a shelf spare. The pumps will have an adjustable flowrate, will possess the necessary chemical resistance properties, and will be LMI or equal. The pumps will be manually operated.

P-114 Treated Wastewater Recycle Pump

The treated wastewater recycle pump will be used to maintain the biological solids in the treated water storage tank in suspension and to return water which requires additional treatment to the aeration tank or the stormwater storage tank. The pump will be a centrifugal pump with a capacity of 50 gpm.

6.5 Agitators

A-107 pH Adjustment Tank Agitator

The pH adjustment tank agitator will provide mixing for the pH adjustment tank (T-107). The agitator will be equipped with a 1/2 HP motor operating at 1,725 rpm. The agitator will be controlled with a manually operated switch. The shaft and impeller for the agitator will be constructed of 316 stainless steel.

A-108, A-109 Polymer Rapid Mix Agitators

The polymer rapid mix tank agitators will provide mixing to the cationic polymer rapid mix tank (T-108) and the anionic polymer rapid mix tank (T-109). The agitators will be equipped with a 1/2 HP motor gear-reduced to 420 rpm. The agitators will be controlled with a manually operated switch. The shaft and impeller of the agitators will be constructed of 316 stainless steel.

A-110 Slow Mix Tank Agitator

The slow mix tank agitator will provide mixing to the slow mix tank (T-110) in the chemical conditioning system. The agitator will be equipped with a 3/4 HP variable speed (20-200 rpm) gear-reduced motor and a low-shear flocculating impeller. The agitator will be controlled with a manually operated switch. The shaft and impeller of the agitator will be constructed of 316 stainless steel.

A-115 Anionic Polymer Drum Agitator

The anionic polymer drum agitator will be used to provide mixing to the anionic polymer drum feeding the polymer premix tank. The agitator (Neptune H-3.0 or equivalent) will be equipped with a 1/2 HP, 1,725 rpm motor and will designed for installation through a standard 2" bung. The mixer will be controlled by a timer which will have an on cycle of 1/2 hour per day.

A-116 Anionic Polymer Premix Tank Agitator

The polymer premix tank agitator will be used to provide mixing to the polymer premix tank (T-116). The agitator will be equipped with a 1/2 HP motor gear-reduced to 420 rpm and a low-shear impeller. The agitator will be controlled with a manually operated switch.

A-1254 Caustic Mix Tank Agitator

The caustic mix tank agitator will be used to provide mixing to T-125. The agitator will be equipped with a 3/4 HP motor gear reduced to 420 rpm. The agitator will be controlled with a manually operated switch. The shaft and impeller of the agitator will be constructed of 316 stainless steel.

A-122 Phosphoric Acid Dilution Tank Agitator

The phosphoric acid dilution tank agitator will be used to provide mixing to the phosphoric acid dilution tank (T-122). The agitator will be equipped with a 1/2 HP motor gear-reduced to 420 rpm. The agitator will be controlled with a manually operated switch. The shaft and impeller of the agitator will be constructed of 316 stainless steel.

6.6 pH Controllers

C-1 pH Adjustment Tank pH Controller

The pH adjustment tank pH controller will be used to maintain the pH in the pH adjustment tank (T-107) in the range of 3.5 to 4.0. The pH sensor will be mounted in the pH adjustment tank and will be removable for cleaning. The output from the pH controller will be used to control the flowrate from the pH adjustment tank acid feed pump (P-119 A,B) and caustic feed pump (P-125).

C-3 Aeration Tank pH Controller

The aeration tank pH controller will be used to maintain the pH in the aeration tank (T-113) in the range of 7.0 to 7.5. The pH sensor will be mounted in the aeration tank and will be removable for cleaning. The output from the controller will be used to actuate the settling basin sump caustic feed pump (P-126 A,B) and the aeration tank acid feed pump (P-120).

C-4 Aeration Tank pH Monitor

The aeration tank pH monitor will be used to independently monitor the pH of the aeration tank. High pH (pH = 8.0) and low pH (pH = 6.5) alarm set points on the monitor will actuate an alarm system which will automatically shut-off the feed to the aeration tank and will disable the aeration tank acid (P-120) and caustic feed pump (P-126).

6.7 Building

X-1 Chemical Conditioning Building

The chemical conditioning building will house the chemical mix tanks (T-116, T-125 and T-122), chemicals and pumping equipment associated with the chemical conditioning system. Adequate heat will be provided to prevent freezing of 50% caustic. A hose station, safety stations and sump will be provided. Adequate storage space will be provided for full and empty 55 gallons drums.

6.8 Fire Protection

Any additional fire protection equipment recommended by the insurance carrier will be provided.

6.9 Safety Stations

Safety shower, eyewash, signs and first aid equipment will be provided where personnel may come in contact with corrosive or hazardous substances.

6.10 Effluent Monitoring Station

The effluent monitoring station will be equipped with sampling equipment capable of taking both flow and time proportioned composite samples and include a recording flowmeter.

Effluent samples will be stored in a refrigerated compartment ($4^{o}C$) prior to being sent out for analysis.

6.11 Laboratory

A laboratory for on-site chemical analyses will be required at the Grenada plant. This laboratory will have a minimum of 100 ft^2 area. Benches, cabinets and hooded vent will be furnished for the laboratory. Laboratory supplies will be purchased prior to plant start-up.

STATE OF MISSISSIPPI

APPLICATION FOR A STATE
OPERATING PERMIT
AND
SUPPORTING DOCUMENTS

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KEYSTONE ENVIRONMENTAL RESOURCES, INC.
MONROEVILLE, PENNSYLVANIA

PROJECT NO. 184733

AUGUST 1988

For Agency Use
Application Number

Date Received

STATE OF MISSISSIPPI
BUREAU OF POLLUTION CONTROL
P. O. BOX 10385
JACKSON, MISSISSIPPI 39209

APPLICATION FOR A STATE OPERATING PERMIT

(Please print or type)

1. Name of Applicant: Koppers Company, Inc.

2. Mailing Address of Applicant:

Number & Street (P.O. Box): P.O. Box 160

City: Grenada State: Mississippi Zip: 38960

3. Applicant's Authorized Agent:

Name & Title: James R. Batchelder; Vice President of Technical and Environmenta Services for Tar and Wood Sector

Number & Street (P.O. Box): 2700 Koppers Building

City: Pittsburgh State: Pennsylvania Zip: 15219

Telephone Number: (412) 227-2612

4. Facilities Location:

Number & Street: Grenada Tie Plant

City: Grenada County: Grenada

5. Nature of Business: Wood Preserving

6. Do you Discharge Wastewater to a POTW? X Yes ____ No (Proposed)
If "Yes" Continue, if "No" go to Item 10.

Name of POTW Receiving Wastewater: Grenada Wastewater Treatment Plant

Number & Street (P.O. Box): P.O. Box 310

City: Grenada County: Grenada

7. Discharge Type and Occurrence:

A. Type of Discharge: __X__ Continuous; If Continuous, __20,000__ Gallons per Day

_____ Batch

B. Discharge Occurrence: __7__ Days per Week

C. Discharge Occurrence: (Months per Year)
_____ Jan. _____ Feb. _____ Mar. _____ Apr.
_____ May _____ Jun. _____ July _____ Aug.
_____ Sept. _____ Oct. _____ Nov. _____ Dec.

8. If Batch:
A. _________ Thousand Gallons per Discharge

B. _________ Hours per Day

C. _________ Discharge Occurrences per Day

9. Maximum Period of Flow: From ________ to ________
Month Month

10. Facility Water Use:

Estimate average volume in thousand gallons per day for the following types of water usage at this facility.

Noncontact Cooling: **Closed-LOOP system with water obtained from and returned cooling Pond. Condenser pump capacities total - 5(MGD).**

Boiler Feed: **18 (Make-up from Groundwater reservoir)**

Process (Including Contact Cooling): **0.5 (modified closed circuit steaming)**

Sanitary: **1 (Septic tanks are located on-site)**

Other: **Polymer make-up water + Hosedown stations - 0.5**

Total: **20 (Excluding noncontact cooling water)**

11. List All Facility Discharges: **Collected stormwater and process water will be biologically treated and then discharged to the Grenada wastewater treatment plant. Discharge will not exceed 20,000 gal/day.**

Other water losses (surface water, product consumption, evaporation). Indicate volume in thousand gallons.

Losses include evaporation from cooling pond (noncontact water).
Evaporation in cooling pond accounts for nearly 17,000 gallons per day.

12. Give narrative description of process(es) producing discharge, or in the case of no discharge, that generates wastewater.

Wood conditioning process generates wastewater. These processes are required to remove interstitial wood moisture prior to pressure impregnation of wood with preservative. These conditioning processes include kiln drying, steaming and boultonizing. Steaming and boultonizing produce wastewater. Kiln drying utilizes heat from closed loop steam system to reduce moisture content in wood without producing wastewater.

13. List raw materials used: **Creosote and pentachlorophenol.**

14. Effluent Characteristics:

A. You must provide the results of at least one analysis for every pollutant in this table. Complete one table for each outfall to the city sewer. If your facility does not have a discharge indicate so and disregard.

Parameter	Maximum Daily Value	Maximum 30 Day Value	Long Term Average Value
BOD_5	**5,600**	**Data is not**	**Data is not**
COD	**6,800**	**Available**	**Available**
TSS	**48**		
Ammonia	**10**		
Oil & Grease	**101**		
pH	**4.4**		

B. Review the substances listed in Table One and indicate which of these substances you have reason to believe may be in your discharge. For instance you may use solvents or Biocides that contain one or more of the indicated solvents. For each substance indicated you must perform at least one analysis and report results.

TABLE 1

65 Toxic Pollutants Listed in Consent Decree and

Referenced in 307(a) of the CWA of 1977

Believe Present		Concen.
x	Acenaphthene	0.47mg/L
	Acrolein	
	Acrylonitrile	
	Aldrin/Dieldrin	
	Antimony & compounds	
x	Arsenic & compounds	0.07mg/L
	Asbestos	
	Benzene	
	Benzidine	
	Beryllium & compounds	
	Cadmium & compounds	
	Carbon tetrachloride	
	Chlordane	
	Chlorinated benzenes	
	Chlorinated ethanes	
	Chlorinalkyl ethers	
	Chlorinated naphthalene	
x	Chlorinated phenols	5.56mg/L
	Chloroform	
x	2-Chlorophenol	0.07mg/L
x	Chromium & compounds	0.02mg/L
x	Copper & compounds	0.10mg/L
	Cyanides	
	DDT & metabolities	
	Dichlorobenzenes	
	Dichlorobenzidine	
	Dichloroethylenes	
x	2,4-Dichlorophenol	3.91mg/L
	Dichloropropane & Dichloropropene	
x	2,4-Dimethylphenol	0.14mg/L
	Dinitrotoluene	
	Diphenylhydrazine	
	Endosulfan & metabolities	

Believe Present		Concen.
	Endrin and Metabolities	
	Ethylbenzene	
x	Flouranthene	0.38mg/L
	Haloethers	
	Halomethanes	
	Heptachlor & metabolities	
	Hexachlorobutadiene	
	Hexachlorocyclopentadiene	
	Hexachlorocylohexane	
	Isophorone	
	Lead & compounds	
	Mercury & compounds	
x	Naphthalene	3.05mg/L
	Nickel & compounds	
	Nitrobenzene	
x	Nitrophenols	34.26mg/L
	Nitrosamines	
x	Pentachlorophenol*	2.5mg/L
x	Phenol	18.9mg/L
	Phthalate esters	
	Polychlorinated byphenyls(PCB)	
x	Polynuclear aromatic Hydrocarbons	2.80 mg/L
	Selenium & compounds	
	Silver & compounds	
	2,3,7,8-Tetrachlorodibenzo-p-dioxine (TCDD)	
	Tetrachloroethylene	
	Thallium & compounds	
	Toluene	
	Toxaphene	
	Trichloroethylene	
	Vinyl chloride	
	Zinc & compounds	

List any other toxicants known or anticipated to be present in the discharge:

*** The toxicants for which analytical results are available have been included in this Table.**

15. Treatment Units:

A. Do you provide treatment for your wastewater? X Yes ___ No

B. If yes, list and describe each treatment unit and attach a line schematic of the treatment system indicating each treatment unit and a water balance.

The information required for this section is addressed in the attached document entitled **"Conceptual Design of an Upgraded Wastewater Handling and Treatment System."**

I certify that I am familiar with the information contained in this application and that to the best of my knowledge and belief such information is true and correct.

James R. Batchelder
Printed Name of Applicant's Authorized Agent

Vice President
Technical & Environmental Services
Tar and Wood Sector
Title

August 30, 1988
Date Application Signed

Signature of Authorized Agent

DATA SUMMARY

DISCHARGE FROM BIOLOGICAL TREATMENT UNITS FOR WASTEWATERS GENERATED FROM WOOD PRESERVING PROCESSES

Prepared for:

KOPPERS COMPANY, INC.
PITTSBURGH, PENNSYLVANIA

Prepared by:

KEYSTONE ENVIRONMENTAL RESOURCES, INC.
MONROEVILLE, PENNSYLVANIA

PROJECT NO. 184733

AUGUST 1988

1.0 INTRODUCTION

The primary purpose of this report is to respond to the request of Mr. Wm. Stephen Spengler of the Mississippi Bureau of Pollution Control about anticipated total suspended solids (TSS) and biochemical oxygen demand (BOD) concentrations in the Koppers biological treatment system sewer discharge stream. The proposed activated sludge biological treatment system is to be installed at the Koppers plant in Grenada, MS. The currently proposed limits are:

- o TSS - daily average of 300 and daily maximum of 600 mg/L
- o BOD - daily average of 240 and daily maximum of 480 mg/L

Mr. Spengler has expressed concerns about the compounds associated with the effluent TSS discharged to the sewer. The compounds of concern are pentachlorophenol and potentially carcinogenic polynuclear aromatic hydrocarbons (PAH).

A discussion of pentachlorophenol and potentially carcinogenic PAH compounds is presented with computational methods that may be utilized to determine the loadings of potentially carcinogenic PAH compounds, and pentachlorophenol associated with TSS to the sewer. Analytical data is presented for biological treatment units in Koppers' wood preserving plants that utilize pentachlorophenol and creosote. This information is presented so that upper limits (which are not the same as the POTW surcharge limit) for BOD and TSS can be established by the State for Koppers discharge to the Grenada POTW.

2.0 BACKGROUND

Table 1 presents the Environmental Protection Agency's (EPA) classification of selected PAHs by their potential carcinogenicity. Of the sixteen PAHs listed, only six are potentially carcinogenic. These potentially carcinogenic PAHs include benz (a) anthracene, chrysene, benzo (b) fluoranthene, benzo (a) pyrene, dibenz (a,h) anthracene and indeno (1,2,3-c,d) pyrene.

3.0 PRESENTATION OF BENCH-SCALE ANALYTICAL RESULTS

Results from two activated sludge with activated carbon addition bench-scale studies were used to aid in the estimate of overall effluent quality and to estimate the loadings of pentachlorophenol and potentially carcinogenic PAH adsorbed onto TSS to the Grenada POTW. The two studies were the from Koppers South Carolina wood preservative plant and the other was Koppers California wood preservative plant. Both utilize creosote and pentachlorophenol in their wood preserving processes. Primary differences in the wastewater from the two plants are that the organic concentrations from the South Carolina plant are approximately twice as great as the California plant, and the South Carolina plant influent water is combination of process wastewater, stormwater and groundwater, while the California influent water is a combination of process wastewater and stormwater runoff. Both wastewaters were subject to pH adjustment to enhance pentachlorophenol removal followed by polymer enhanced oil/water separation prior to biological treatment.

3.1 Effluent Wastewater Quality

Table 2 presents mean activated sludge influent and effluent wastewater quality results for the South Carolina bench-scale treatability study. The results in Table 4 show that effluent soluble BOD, total BOD, TSS, VSS, FSS and pentachlorophenol concentrations were 149 mg/L, 208 mg/l, 316 mg/L, 271 mg/L, 45 mg/L, and 2.5 mg/L, respectively. Full-scale clarifier efficiency will maintain reduced TSS levels.

Table 3 presents mean activated sludge influent and effluent wastewater quality results for the California bench-scale treatability study. The results in Table 4 show that the soluble BOD, total BOD, TSS, VSS, FSS and pentachlorophenol concentrations were 22 mg/L, 27 mg/l, 43 mg/L, 39 mg/L, 3.5 mg/L, and 0.82 mg/L, respectively.

3.2 Activated Sludge TSS Concentrations

The TSS discharged from the activated sludge system is generally comprised of volatile suspended solids (VSS) consisting primarily of biomass and fixed suspended solids (FSS), consisting of sand, dirt and ash particles. TSS is the sum of VSS and

FSS. Potentially carcinogenic PAHs and pentachlorophenol have been observed to be adsorbed on the surface of the biomass because of their relatively low solubility in water.

Table 4 presents analytical data for TSS samples collected from the bench-scale activated sludge unit treating the Koppers South Carolina plant wastewater. The analytical results indicate a total potentially carcinogenic PAH concentration in the TSS of 0.482 mg per Kg of dry solids. Dry solids are defined as TSS. Analytical results for pentachlorophenol are also presented in Table 4. It's concentration in the activated sludge TSS sample was 0.63 mg/Kg TSS.

Table 4 also presents analytical data for TSS sample collected from the bench-scale activated sludge unit during the treatability study conducted for the Koppers California plant. The analytical results indicate a total potentially carcinogenic PAH concentration in the TSS of 0.23 mg per Kg of dry solids. Analytical results for pentachlorophenol are also presented in Table 4. These results indicate that the pentachlorophenol concentration in the activated sludge TSS sample was 0.35 mg/Kg TSS.

4.0 CALCULATION OF EFFLUENT TSS LOADINGS

The computations performed (see Attachment 1) for the TSS loading for the South Carolina treatability study data indicate that 0.000025 pounds of total potentially carcinogenic PAH may be discharged to the sewer daily based on a TSS loading of 52.7 pounds per day. A pentachlorophenol loading of 0.000033 pounds per day is estimated be discharged to the sewer, based on the same TSS loading. The sewer discharge flowrate utilized was the maximum value of 20,000 gallons per day, as proposed on the Pretreatment Draft Permit No. PT90300 presented in Attachment 2. A TSS value of 316 mg/L was utilized based on the information shown in Table 2.

The computations performed (see Attachment 1) for the TSS loading on the California treatability study data indicate that 0.00000027 pounds of total potentially carcinogenic PAH may be discharged to the sewer daily based on a TSS loading of 7.17 pounds per day. A pentachlorophenol loading of 0.0000025 pounds per day may be discharged to the sewer daily based on the same TSS loading. A TSS value of 43 mg/L was utilized based on the information shown in Table 3.

TABLE 1

EPA'S CLASSIFICATION OF SELECTED PAHs BY THEIR POTENTIAL CARCINOGENICITY

Noncarcinogenic PAHs

Naphthalene
Acenaphthylene
Acenaphthene
Fluorene
Phenanthrene
Anthracene
Fluoranthene
Pyrene
Benzo(g,h,i)perylene
Benzo(k)fluoranthene

Potentially Carcinogenic PAHs

Benz(a)anthracene
Chrysene
Benzo(b)fluoranthene
Benzo(a)pyrene
Dibenz(a,h)anthracene
Indeno(1,2,3-c,d)pyrene

Reference: **EPA Superfund Public Health Evaluation Manual**

TABLE 2

KOPPERS COMPANY, SOUTH CAROLINA PLANT
BENCH-SCALE ACTIVATED SLUDGE SYSTEM
WITH ACTIVATED CARBON ADDITION
PRETREATED USING OIL/WATER SEPARATION[a][b]

Parameters[c]	Influent	Effluent
pH, units	6.5	7.2
TOC	1028	151
COD (total)	3235	874
COD (soluble)	NA[d]	716
BOD (total)	1707	208
BOD (soluble)	NA	149
Oil & Grease	80	12
Phenolics	91	0.12
TSS	410	316
VSS	325	271
FSS	87	45

(a) Activated carbon at 25% MLTSS.
(b) Values presented are mean values.
(c) All concentrations in mg/l unless otherwise noted.
(d) NA indicates not analyzed.

TABLE 3

KOPPERS COMPANY, CALIFORNIA PLANT BENCH-SCALE ACTIVATED SLUDGE SYSTEM WITH ACTIVATED CARBON ADDITION PRETREATED USING OIL/WATER SEPARATION[a][b]

Parameters[c]	Influent	Effluent
pH, units	5.6	7.1
TOC	390	57
COD (total)	1340	195
COD (soluble)	NA[d]	149
BOD (total)	910	27
BOD (soluble)	NA	22
Oil & Grease	39	8.1
Phenolics	135	0.03
TSS	135	43
VSS	66	39
FSS	69	3.5

(a) Activated carbon at 25% MLTSS.
(b) Values presented are mean values.
(c) All concentrations in mg/l unless otherwise noted.
(d) NA indicates not analyzed.

TABLE 4

SOUTH CAROLINA AND CALIFORNIA WASTEWATER TREATABILITY STUDY ACTIVATED SLUDGE WITH ACTIVATED CARBON ADDITION TSS ANALYSES

Parameter	Concentrations, mg/Kg Dry Solids	
	South Carolina	California
Potentially Carcinogenic PAHs		
Benz(a)anthracene	0.0871	0.011
Chrysene	0.0787	0.011
Benzo(b)fluoranthene	0.1249	0.006
Benzo(a)pyrene	0.0980	0.004
Dibenz(a,h)anthracene	0.0363	0.002
Indeno(1,2,3-c,d)pyrene	0.0557	0.003
Total	0.481	0.037
Pentachlorophenol	0.630	0.35

Reference: Koppers Company Inc.; Wastewater Treatability Study Report for South Carolina Wood Treating Plant, February 1, 1985.

Koppers Company Inc.; Wastewater Treatability Study Report for California Wood Treating Plant, July, 1986.

ATTACHMENT 1

COMPUTATIONS

Problem: Determine the amount (in lb/day) of potentially toxic pollutants in the anticipated TSS discharge from the upgraded activated sludge treatment system. Potentially toxic pollutants are defined in terms of total carcinogenic PAH and pentachlorophenol.

Design Basis: maximum discharge flowrate Q = 20,000 gallons per day

wet activated sludge consists of 98.5% moisture (Metcalf & Eddy, 1972 edition, p 581)

Solution ① Determine dry weight of activated sludge:

moisture content of wet activated sludge = 98.5%

$$\frac{W_w - W_d}{W_w} \times 100\% = \text{moisture content}$$

W_w = weight of wet activated sludge
W_d = weight of dry activated sludge

dry weight of activated sludge

$$\frac{W_w - W_d}{W_w} = 0.985$$

$$W_w - W_d = (0.985)(W_w)$$
$$W_w - (0.985)(W_d) = 0.985$$

$$W_d = (W_w(1 - 0.985) = 0.015(W_w)$$

if $W_w = 1\,kg$
$W_d = 0.015(1\,kg) = $ **0.015 kg**

Solution cont'd

South Carolina

(2) Determine weight of total potentially carcinogenic PAH per weight of dry solids

From Table 4 - activated sludge analysis, South Carolina

$$0.4807 \ \frac{\text{mg total carcinogenic PAH}}{\text{Kg dry solids}} \times 0.454 \frac{\text{Kg}}{\text{lb}} \times \frac{\text{lb}}{454{,}000\,\text{mg}}$$

$$= 4.807 \times 10^{-7} \ \frac{\text{lb total potentially caravogenic PAH}}{\text{lb dry solids}}$$

(3) Determine weight of pentachlorophenol per wt of dry solids

From Table 4 - activated sludge analysis, South Carolina

$$0.630 \ \frac{\text{mg total pentachlorophenol}}{\text{Kg dry solids}} \times 0.454 \frac{\text{Kg}}{\text{lb}} \times \frac{\text{lb}}{454{,}000\,\text{mg}}$$

$$= 6.3 \times 10^{-7} \ \frac{\text{lb pentachlorophenol}}{\text{lb dry solids}}$$

(4) Determine weight of TSS discharged to sewer per day
TSS From Table 2 - Effluent wastewater analysss

mean TSS concentration = 316 mg/l

$$\text{TSS loading} = 316 \frac{\text{mg}}{\text{l}} \times \frac{8.34\ \text{lbs}}{\text{mg/l} \cdot \text{MG}} \times \frac{1\,\text{MG}}{10^6\,\text{gal}} \times 20{,}000\ \text{gal/day}$$

$$= 52.7\ \text{lb TSS/day}$$

Solution cont'd: South Carolina cont'd

(5) Determine weight of Total potentially carcinogenic PAH discharged to the sewer daily

$$4.827 \times 10^{-7} \, \frac{\text{lb Total carcinogenic PAH}}{\text{lb dry solids}} \times 52.7 \, \frac{\text{lb dry solids as TSS}}{\text{day}}$$

$$= 2.5 \times 10^{-5} \, \frac{\text{lb total carcinogenic PAH}}{\text{day}}$$

(6) Determine weight of pentachlorophenol discharged to the sewer daily

$$6.3 \times 10^{-7} \, \frac{\text{lb pentachlorophenol}}{\text{lb dry solids}} \times 52.7 \, \frac{\text{lb dry solids as TSS}}{\text{day}}$$

$$= 3.3 \times 10^{-5} \, \frac{\text{lb pentachlorophenol}}{\text{day}}$$

Solutions cont'd

California

(7) Determine weight of total carcinogenic PAH per weight of dry solids

From Table 4

$$0.037 \frac{\text{mg total carcinogenic PAH}}{\text{Kg dry solids}} \times 0.454 \frac{\text{Kg}}{\text{lb}} \times \frac{\text{lb}}{454{,}000\ \text{mg}}$$

$$= 3.7 \times 10^{-8} \frac{\text{lb total carcinogenic PAH}}{\text{lb dry solids}}$$

(8) Determine weight of pentachlorophenol per weight of dry solids

$$\frac{0.35 \text{ mg total pentachlorophenol}}{\text{Kg dry solids}} \times 0.454 \frac{\text{Kg}}{\text{lb}} \times \frac{\text{lb}}{454{,}000\ \text{mg}}$$

$$= 3.5 \times 10^{-7} \frac{\text{lb pentachlorophenol}}{\text{lb dry solids}}$$

(9) Determine weight of TSS discharged to sewer per day (From Table 3)

mean TSS concentration = 43 mg/l

$$\text{TSS loading} = 43\ \text{mg/l} \times \frac{8.34\ \text{lb}}{\text{mg/l MG}} \times \frac{1\ \text{MG}}{10^6\ \text{gal}} \times 20{,}000\ \text{gal/day}$$

$$= 7.17\ \text{lb TSS/day}$$

Solutions cont'd California

(10) Determine weight of carcinogenic PAH discharged to sewer daily

$$3.7 \times 10^{-8} \frac{\text{lb carcinogenic PAH}}{\text{lb dry solids}} \times 7.17 \text{ lb TSS/day}$$

$$= 2.65 \times 10^{-7} \frac{\text{lb carcinogenic PAH}}{\text{day}}$$

(11) Determine weight of pentachlorophenol discharged to sewer daily

$$3.5 \times 10^{-7} \frac{\text{lb pentachlorophenol}}{\text{lb dry solids}} \times 7.17 \text{ lb TSS/day}$$

$$= 2.51 \times 10^{-6} \frac{\text{lb pentachlorophenol}}{\text{day}}$$

SUMMARY

Calculated daily discharge of potentially carcinogenic PAH and pentachlorophenol, for Grenada based on South Carolina and California treatability results.

Compounds	South Carolina	California
potentially carcinogenic PAH	2.5×10^{-5}	2.65×10^{-7}
pentachlorophenol	3.3×10^{-5}	2.51×10^{-6}

all values expressed in pounds/day

ATTACHMENT 2

DRAFT PERMIT

MISSISSIPPI DEPARTMENT OF NATURAL RESOURCES
Bureau of Pollution Control
P. O. Box 10385
Jackson, Mississippi 39209
(601) 961-5171

July 17, 1987

RECEIVED

JUL 24 1987

ENVIRONMENTAL
RESOURCES

Mr. David L. King,
Regional Environmental Coordinator
Koppers Company, Inc.
P. O. Box 15490
North Little Rock, Arkansas 72231

Dear Mr. King:

Re: Pretreatment Permit No. PT90300
Draft Permit
Grenada, Mississippi Facility

Shortly, the Mississippi Pollution Control Permit Board intends to issue to the above facility a State of Mississippi Pretreatment Permit. The enclosed draft permit contains conditions which we intend to incorporate as part of your final permit.

Please note the effluent limitations, schedule of compliance, monitoring requirements, and monitoring reporting dates in Part I of the permit.

Please be advised that this permit does not relieve the permittee from complying with any requirements which the Publicly Owned Treatment Works (POTW) Authority may deem necessary as a prerequisite to the use of the Authority's sewage system and associated treatment works. Additionally, the POTW Authority is being given an opportunity to comment on the enclosed draft permit.

If you have any comments concerning the information transmitted herewith, please notify this office in writing by July 30, 1987.

Respectfully,

Wm. Stephen Spengler, P.E.
Industrial Wastewater Control Section

WSS:eb
Enclosures
cc: Mr. Robert J. Anderson, Program Manager, Keystone Environmental Resources, Inc. (w/enclosures)
Mr. J. D. Clayton, Plant Manager, Koppers Company, Inc. (w/enclosures)

State of Mississippi
Water Pollution Control
PERMIT

TO OPERATE A WASTE DISPOSAL SYSTEM IN ACCORDANCE

WITH NATIONAL AND STATE PRETREATMENT STANDARDS

THIS CERTIFIES THAT
KOPPERS COMPANY, INC.
GRENADA, MISSISSIPPI

has been granted permission to discharge wastewater into
Grenada Publicly Owned Treatment Works

in accordance with effluent limitations, monitoring requirements and other conditions set forth in this permit. This permit is issued in accordance with the provisions of the Mississippi Water Pollution Control Law (Section 49-17-1 et. seq., Mississippi Code of 1972), and the regulations and standards adopted and promulgated thereunder, and under authority granted pursuant to Section 402 (b) of the Federal Water Pollution Control Act.

The issuance of this permit does not relieve the permittee from complying with any requirements which the Publicly Owned Treatment Works (POTW) Authority may deem necessary as a prerequisite to the use of the Authority's sewage system and associated treatment works.

MISSISSIPPI NATURAL RESOURCES PERMIT BOARD

____

DIRECTOR, BUREAU OF POLLUTION CONTROL
MISSISSIPPI DEPARTMENT OF NATURAL RESOURCES

Issued:

Expires:

Permit No. PT90300

PART I

A. PRETREATMENT LIMITATIONS AND MONITORING REQUIREMENTS

1. During the period beginning   and lasting until   the permittee is authorized to discharge from outfall(s) serial number(s) 001 (Total Facility Discharge)

Such discharges shall be limited and monitored by the permittee as specified below:

PARAMETER	DISCHARGE LIMITATIONS				MONITORING REQUIREMENTS	
	kg/day (lbs/day)		Other Units (Specify)			
	Daily Avg.	Daily Max.	Daily Avg.	Daily Max.	Measurement Frequency	Sample Type
Flow-M^3/day (MGD)	--	--		(.02)	Daily	Continuous
Biochemical Oxygen Demand (5-Day)	18(40)	36(80)	240 mg/l	480 mg/l	Once/Week	24-Hr.Composite
Total Suspended Solids	23(50)	45(100)	300 mg/l	600 mg/l	Once/Week	24-hr.Composite
Total Phenols	.23(.51)	.46(1.02)	3 mg/l	6 mg/l	Once/Week	Grab
Pentachlorophenol	.01(.03)	.03(.06)	.18 mg/l	.36 mg/l	Once/Week	Grab
Oil & Grease	--	7.5(16.7)	--	100 mg/l	Once/Week	Grab
Copper,Total	.2(.4)	.4(.8)	2.5 mg/l	5 mg/l	Twice/Month	24-Hr.Composite
Chromium, Total	.15(.3)	.3(.7)	2 mg/l	4 mg/l	Twice/month	24-Hr.Composite
Arsenic, Total	.15(.3)	.3(.7)	2 mg/l	4 mg/l	Twice/Month	24-Hr.Composite

2. The pH shall not be less than 5.5 standard units nor greater than 9.5 standard units and shall be monitored twice per week with a grab sample of the effluent.

3. Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location(s): at the nearest accessible point after final treatment but prior to actual discharge into the POTW POTW collection system or mixing with non-regulated wastewater streams.

C. GENERAL PRETREATMENT PROHIBITIONS

1. In addition to those pollutants limited in Part I.A, the following pollutants shall not be discharged into the POTW:

   (a) Pollutants which create a fire or explosion hazard in the POTW;

   (b) Pollutants which will cause corrosive structural damage to the POTW, but in no case discharges with pH lower than 5.5, unless the treatment works is specifically designed to accommodate such discharges;

   (c) Solid or viscous pollutants in amounts which will cause obstruction to the flow in the POTW resulting in interference;

   (d) Any pollutant, including oxygen demanding pollutants (BOD, etc.) released in a discharge at a flow rate and/or pollutant concentration which will cause interference with the POTW; or,

   (e) Heat in amounts which will inhibit biological activity in the POTW resulting in interference, but in no case heat in such quantities that the temperature at the POTW treatment plant exceeds 40°C (104°F) unless the approval Authority, upon request of the POTW, approves alternate limits.

D. ORAL NOTIFICATION REQUIREMENTS

The permittee shall notify the Mississippi Natural Resources Permit Board and the POTW orally immediately upon becoming aware of the following:

1. A spill which would result in a discharge to the POTW;

2. Any diversion or bypass of the wastewater treatment system which would result in a discharge to the POTW; or,

3. Any system upset which would cause the facility to be in noncompliance with the limitations found in Part I.A or I.C of this permit.

E. OTHER SPECIFIC PRETREATMENT REQUIREMENTS

In order to minimize the potential for any upsets at the POTW, the discharge should be made on a continuous basis 24 hours per day and seven days per week.

PART II

A. MANAGEMENT REQUIREMENTS AND RESPONSIBILITIES

1. No Discharge of Wastewater to Surface Water

   The discharge of any wastewater from this facility to the waters of the State of Mississippi shall constitute a violation of this permit, except as provided in Section A.4 of this permit, or as authorized under separate permit pursuant to Section 402 of the Federal Water Pollution Control Act.

2. Change in Wastewater Source

   Any anticipated facility expansions, production increases, or process modifications which will result in new, different or increased wastewater flows, must be reported to the Mississippi Natural Resources Permit Board. Following such notice, if the Permit Board determines that such change will violate any condition of this permit, it may require the submittal of a new application or it may modify this permit accordingly.

3. Facilities Operation

   The permittee shall at all times maintain in good working order and operate as efficiently as possible all treatment or control facilities or systems installed or used by the permittee to achieve compliance with the terms and conditions of this permit.

4. Bypassing

   Any diversion from or bypass of wastewater collection and treatment or control facilities is prohibited, except (i) where unavoidable to prevent loss of life or severe property damage, or (ii) where excessive storm drainage or runoff would damage any facilities necessary for compliance with the effluent limitations and prohibitions of this permit. The permittee shall notify the Mississippi Natural Resources Permit Board in writing of each such diversion or bypass in advance where practicable but in any case, within 72 hours of the diversion or bypass, and shall submit to the permit board a plan to prevent recurrence of the diversion or bypass within thirty (30) days of the incident.

5. Removed Substances

   Solids, sludges, filter backwash, or other residuals removed in the course of treatment or control of wastewaters shall be disposed of in a manner such as to prevent such materials from entering State waters and in a manner consistent with the Mississippi Solid Waste Disposal Act and the Federal Resource Conservation and Recovery Act.

5. Records Retention

(a) All records and information resulting from the monitoring activities required by this permit (including all records of analyses performed; calibration and maintenance of instrumentation; and recordings from continuous monitoring instrumentation) shall be retained for a minimum of three (3) years, or longer if requested by the Permit Board.

(b) The permittee shall furnish to the Permit Board, upon request, copies of records required to be kept by this permit.

6. Noncompliance Reporting

This permittee shall report any instances of noncompliance orally to the Director, or his representative, within 24 hours of becoming aware of the circumstances. A written report shall also be provied within five (5) days of such time, and shall contain the following information:

(a) A description of the noncompliance and its cause, if known.

(b) The period of noncompliance, including exact dates and times; or if not corrected, the anticipated time the noncompliance is expected to continue, and steps taken to reduce, eliminate, and prevent recurrence.

7. Right of Entry

The permittee shall allow the Mississippi Natural Resources Permit Board and/or their authorized representatives, upon the presentation of credentials:

(a) To enter upon the permittee's premises where a wastewater source is located or in which records are required to be kept under the terms and conditions of this permit; and

(b) At reasonable times to have access to and copy any records required to be kept under the terms and conditions of this permit; to inspect any monitoring equipment or monitoring method required in this permit; and to sample any wastewater generated at this facility.

8. Transfer of Ownership or Control

This permit is not transferable to any person except after proper notice. In the event of any change in control or ownership of facilities, the permittee shall notify the Mississippi Natural Resources Permit Board at least thirty (30) days in advance of the proposed transfer date. The notice should include a written agreement between the existing and new permittees containing a specific date for the transfer of permit responsibility, coverage, and liability.

9. Availability of Records

Except for data determined to be confidential under the Mississippi Air and Water Pollution Control Law, all reports prepared in accordance with the terms of this permit shall be available for public inspection at the offices of the Mississippi Bureau of Pollution Control.

15. Submittal of Discharge Monitoring Results

Monitoring results obtained during the previous 3 months shall be summarized for each month and reported on a Discharge Monitoring Report Form (EPA No. 3320-1), postmarked no later than the 28th day of the month following the completed reporting period. The first report is due on ________________ Copies of these, and all other reports required herein, shall be signed in accordance with Sections 6 and 7 of the Mississippi Wastewater Permit Regulations, and shall be submitted to the Mississippi Natural Resources Permit Board at the following address:

MISSISSIPPI DEPARTMENT OF NATURAL RESOURCES
BUREAU OF POLLUTION CONTROL
P. O. Box 10385
Jackson, Mississippi 39209

16. Definitions.

(a) The "daily average" is the arithmetic mean of all samples collected in a one-month period.

(b) The "daily maximum" is the highest value recorded of any sample collected on any single day of the calendar month.

WORK PLAN

WASTEWATER TREATMENT SYSTEM UPGRADE

KOPPERS COMPANY, INC.

GRENADA, MISSISSIPPI PLANT

Prepared by:

KEYSTONE ENVIRONMENTAL RESOURCES, INC.
MONROEVILLE, PENNSYLVANIA

DECEMBER 11, 1986

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WORK PLAN

WASTEWATER TREATMENT SYSTEM UPGRADE
KOPPERS COMPANY, INC. - GRENADA, MS PLANT

1.0 INTRODUCTION

This document presents a work plan prepared by Keystone Environmental Resources, Inc. for the Koppers Company, Inc. wood treating plant located in Grenada, Mississippi. Completion of tasks detailed herein will provide design and operational parameters needed to develop a conceptual design for a full-scale treatment facility capable of producing an effluent acceptable for Public Owned Treatment Works (POTW) discharge.

1.1 Background

The Grenada plant currently utilizes one wood conditioning process and three wood preservation processes. The preservatives used in the wood treating process are creosote and pentachlorophenol (PCP) with carry oil KB-3/#2 diesel fuel. The plant presently treats 12,000-13,000 cubic feet of wood daily.

All wastewater generated from the wood treating operations is channelled to a series of sumps located throughout the wood treating and tank farm areas. The various wastewater streams include the pentachlorophenol and creosote process wastewater and surface runoff from the drip track, tank farm areas and the creosote condensation tanks. The plant presently treats an average 5,000 gallons of process wastewater over an eight hour period. The additional process wastewater, if any, for the remaining 16 hour period is stored in the surge tank and is treated on the following day.

It has been estimated that a maximum of 10,000 (twice the average flowrate) gallons of process wastewater can be generated during a typical working day at the plant. An additional maximum of 64,800 gallons per day of stormwater has been estimated based on the storm runoff model developed at the State University of New York at Buffalo, NY. An estimated 3,200 gallons per day of potable water is utilized for both catonic and anionic polymer make-up. A diagram portraying the allotted wastewaster streams and contributing flowrates for the existing treatment system is presented in Figure 1-1.

1.2 Regulatory Status

An initial project meeting was held between Keystone, Koppers and the Mississippi Department of Natural Resources, Bureau of Pollution Control (MSDNR) on July 19, 1985 in Jackson, Mississippi. The purpose of the meeting was to discuss preliminary options for treatment and discharge of wastewater generated at the Grenada Plant. It was also discussed that an application for a State Operating (Pretreatment) Permit was required. This application was subsequently submitted on January 7, 1986.

A second meeting was held on July 31, 1986 between Keystone, Koppers, the City of Grenada and the MSDNR. The purpose of this meeting was to discuss the POTW permit application and to determine the next step in the permit process.

Two items were identified during this meeting:

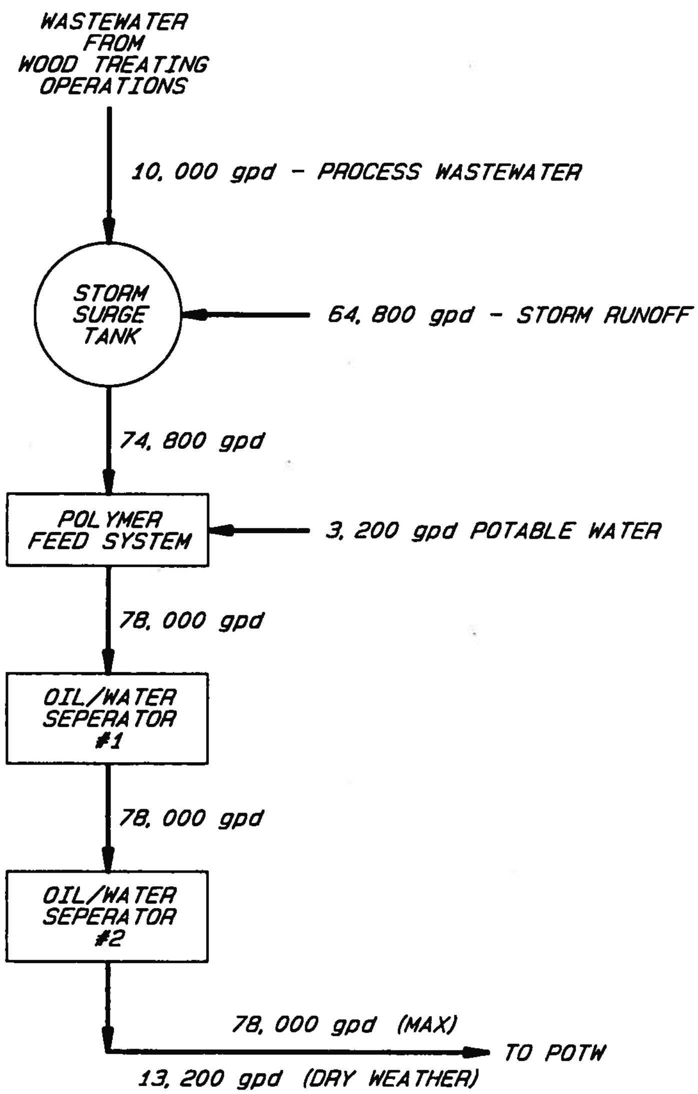
- the BOD discharge would have to be addressed by Koppers since the POTW plant was currently near capacity

- the phenols loading would have to be evaluated at the POTW plant so that reasonable phenols limits could be established

FIGURE 1-1

KOPPERS COMPANY, INC.
GRENADA, MISSISSIPPI
WOOD TREATING PLANT

WASTEWATER BALANCE FOR EXISTING TREATMENT SYSTEM



LEGEND

gpd - GALLONS PER DAY

POTW - PUBLIC OWNED TREATMENT WORKS

KEYSTONE ENVIRONMENTAL RESOURCES, INC.

B511782

Koppers agreed to submit a work plan that would outline the steps necessary to adequately design a system to meet POTW requirements. Additionally, a meeting which would be held once the POTW sampling data had been reviewed, was planned to further discuss reasonable discharge limits for the Grenada Plant.

During the week of December 8, 1986, several phone conversatons were held between Keystone and the regulatory agencies. Items discussed included the development and planned submittal of the work plan, PCP testing requirements, and the planned sampling schedule for the week of December 15.

2.0 WASTEWATER CHARACTERIZATION

The objective of the characterization program is to identify the oil/water separator influent and effluent and storm runoff quality. Maximum and minimum flowrates will be determined. The information obtained will be used to develop design and operational parameters, and required flowrates for a full scale treatment system. An additional objective is to characterize current POTW influent and effluent quality. The characterization study will consist of the following activities:

- On-Site Sampling of Process and Storm Runoff Waters
- Flow Estimation
- POTW Sampling
- Analytical Testing

2.1 On-Site Sampling and Flow Estimation

Sampling of the various sumps which contribute to the surge tank influent, the surge tank effluent, and storm runoff will be performed during this task.

Surge Tank Influent

Grab samples from the six sumps (illustrated in Figure 4-1), which serve as individual collection basins for process wastewater and surface runoff, will be collected and analyzed for the parameters listed in Table 4-1. Two sets of samples will be collected approximately one month apart. This water represents a portion of the plant surge tank influent, and its characterization is required to determine various qualities of water pumped to the tank. Additional influent sites will be sampled if appropriate, pending the initial site visit and discussion with plant personnel.

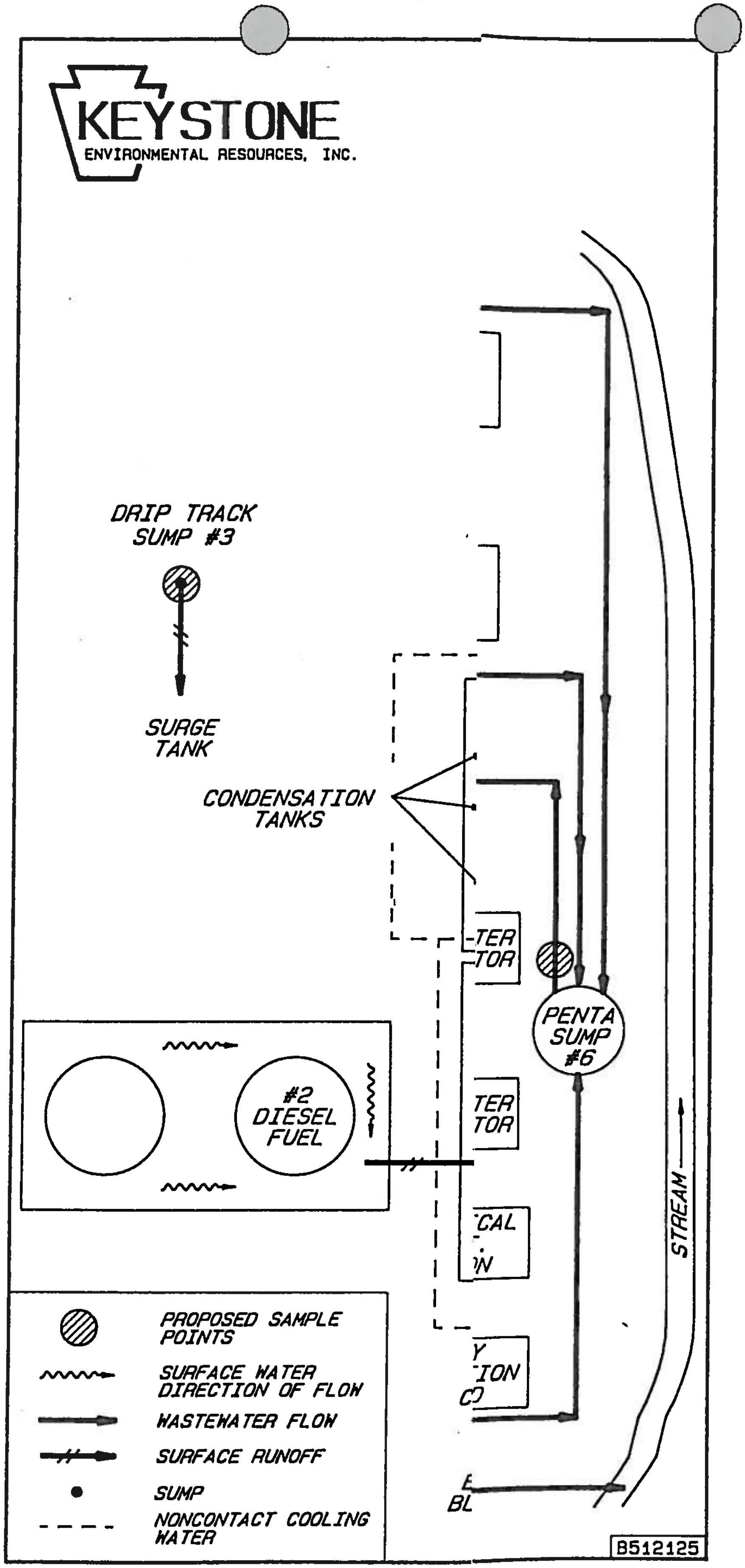

KEYSTONE
ENVIRONMENTAL RESOURCES, INC.
DRIP TRACK SUMP #3
SURGE TANK
CONDENSATION TANKS
TER
TOR
PENTA SUMP #6
TER
TOR
#2 DIESEL FUEL
CAL
N
Y
ION
C
STREAM
BL
PROPOSED SAMPLE POINTS
SURFACE WATER DIRECTION OF FLOW
WASTEWATER FLOW
SURFACE RUNOFF
SUMP
NONCONTACT COOLING WATER
B512125

TABLE 4-1
ANALYTICAL PROGRAM
KOPPERS COMPANY, INC.
GRENADA, MISSISSIPPI PLANT

Parameters	Analytical Method	Detection Limit, mg/L
BOD (Total)	EPA 405.1	1
BOD (Soluble)	EPA 405.1	1
TSS, VSS, FSS	EPA 160.2	1
Oil & Grease	EPA 413.1	5
Pentachlorophenol	EPA 604	0.001
pH	EPA 150.1	------
Phenolics	EPA 420.2	0.005
Total Kjehldahl Nitrogen	EPA 351.1/351.4	1
Ammonia - Nitrogen	EPA 350.1	1.0
Phosphorus (Total)	EPA 200.7	0.5
Polynuclear Aromatic Hydrocarbons	EPA 610	GC-SPECIFIC
TOC	EPA 415.2	1
COD (Total)	EPA 410.1	1
COD (Soluble)	EPA 410.1	1
Copper	EPA 220.2	0.005
Chromium	EPA 218.2	0.005
Arsenic	EPA 206.2	0.01

References: Methods for the Chemical Analysis of Water and Wastes, EPA 600/4-79-020.
Federal Register, Vol. 49 No. 209 October 26, 1984.

Surge Tank Effluent

The surge tank accepts all process wastewaters, boiler blowdown, storm and surface runoff from the wood treating and tank farm areas. The six sumps, illustrated in Figure 4-1, also contribute water to its volume. In order to properly assess the degree of contamination of this water, two grab samples will be collected, (approximately one month apart) of the surge tank effluent. These samples will also be analyzed for the parameters listed in Table 4-1.

Storm Runoff

The majority of the storm runoff from the plant is channelled to the various sumps and is pumped to the existing 110,000 gallon surge tank. Storm runoff grab samples are scheduled to be collected by plant personnel during two rainfall events. The location and need of the storm samples will be determined upon a site visit and discussion with plant personnel. The collected storm runoff samples will be analyzed for the parameters presented in Table 4-1. Storm runoff area sizes will be determined so that water volume requiring treatment can be calculated. A runoff modeling program will be utilized for this calculation.

Flow Estimation

Daily wastewater volumes requiring treatment will be obtained by estimating the flowrates of water from each sump as it is pumped to the surge tank. This will be accomplished by the installation of a recording ampmeter on the API separator discharge pump. The ampmeter with chart recorder will record the time over which the discharge pump utilizes electrical current during operation. The sump volume is also required for flowrate estimation. It is anticipated that the API Separator pump will operate more frequently during above-normal conditions, such as during treatment of a larger volume of wood or a rainfall event. The continuous flowrate monitoring will be conducted for approximately a six month period. Recording charts will be monitored by plant personnel.

2.2 POTW Sampling

A characterization study will be conducted at the POTW to determine current influent and effluent concentrations of phenols, PCP, and polynuclear aromatic hydrocarbons (PAH's). POTW sampling will occur during three separate events with at least one week separating each event. During each event, sequential samplers will be utilized to obtain one composited sample every eight hours for a 24-hour period of both the raw influent and treated effluent (a total of six samples per event). Each sample will be submitted to the laboratory for PCP and phenolics, and BOD(T) analysis. Additionally, a split of each of the three influent and three effluent samples will be composited separately for PAH analysis during each sampling event.

3.0 TECHNICAL EVALUATION

3.1 Characterization Data

Analytical results and flow data from the characterization study will be compiled and presented in a report format. These data will be compared with existing characterization information and utilized for the treatment alternative evaluation.

3.2 Treatment Alternatives

The objective of this task is to evaluate technically feasible treatment alternatives capable of producing an effluent acceptable for discharge to the Grenada POTW. Decisions will be based on the site characterization data and information collected from wastewater treatment systems previously installed at other Koppers wood preserving plants, treating with creosote and PCP. A treatability study may be necessary for the Grenada plant if the wastewater quality data are insufficient on which to base a full-scale treatment design.

3.3 Conclusion

Based on the results generated from the wastewater characterization and other tasks detailed above, technical and fiscal considerations of the treatment alternatives will be evaluated. This evaluation may also include the necessity for further treatability testing. A conclusion regarding the scope of the conceptual design will then be recommended.

4.0 CONCEPTUAL DESIGN FORMULATION AND REVIEW

A conceptual design will be developed for the Grenada plant based on the wastewater treatment system chosen during screening. The conceptual design will include the following items:

- Process flow diagram of the upgraded wastewater treatment system;
- Anticipated treated water quality and flowrate for discharge to the POTW;
- Anticipated wastewater treatment plant operating procedures; and
- Anticipated equipment sizes.

Following review of a draft report, pertinent revisions will be made and a final conceptual design report will be submitted.

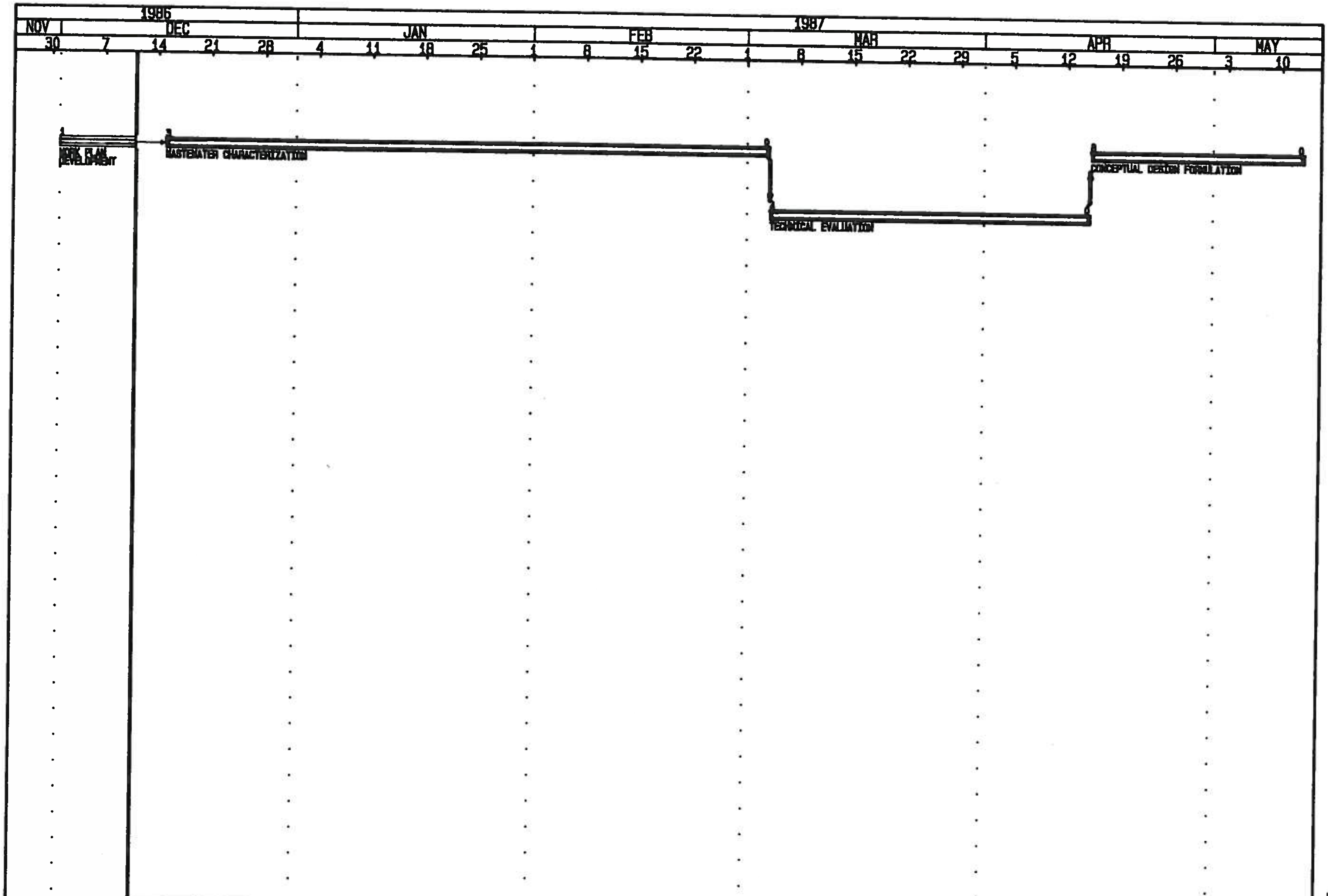
Keystone and Koppers will arrange a meeting with the Grenada POTW and the MSDNR following conceptual design finalization. The purpose of this meeting will be to discuss the conceptual design details. Revisions to the conceptual design will be made, if required, based on regulatory review.

5.0 PROJECT SCHEDULE

To ensure that this project is conducted in an interdependent and cost-effective manner, Keystone has incorporated the use of a computer-based project management system. This system will also track project activities and assess the impact of schedule changes.

The schedule is presented in Figure 5-1 and represents all the tasks presented in the original proposal including conceptual design development.

The schedule defines an actual start date of December 1, 1986 and exhibits an anticipated first round sampling during the week of December 15. Provided treatability work is not required, submittal of the finalized conceptual design report is anticipated for late May, 1987.



Legend:
- Activity Bar/Early Dates
- Critical Activity
- Progress Bar

1984, 1985, 1986

Project Start : 1DEC86
Project Finish:

WASTEWATER TREATMENT UPGRADE
GRENADA, MS PROJECT SCHEDULE
FIGURE 5-1

Sheet 1 of 1

Data Date: 11DEC86
Plot Date: 10DEC86

L. PEACH

Date	Revision	Checked	Approved