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			
Water	Processing (Subpart 429)	11/14/1995	
	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

Table 4

Northern Stream Sediment Sampling
December 14, 1998
Koppers Industries, Inc., Grenada, MS

Parameter	Location / Date / Units	KGNSS-07-3-12 12/14/98 (mg/kg)	KGNSS-08-0-3 12/14/98 (mg/kg)	KGNSS-08-3-12 12/14/98 (mg/kg)	KGNSS-09-0-3 12/14/98 (mg/kg)	KGNSS-09-3-12 12/14/98 (mg/kg)
PAHs						
Acenaphthene		<0.1	<1	<10	<1	<1
Acenaphthylene		<0.1	0.5 J	<10	<1	0.3 J
Anthracene		<0.01	<0.1	<1	<0.1	<0.1
Benz(a)anthracene		0.02	1	3	0.4	0.6
Benzo(a)pyrene		0.02	1.1	3	0.4	0.5
Benzo(b)fluoranthene		0.04	1.6	5	0.7	0.8
Benzo(g,h,i)perylene		0.02	0.8	2 J	0.4	0.4
Benzo(k)fluoranthene		0.02	0.8	2	0.3	0.5
Chrysene		0.03	1	2	0.4	0.7
Dibenz(a,h)anthracene		0.02	0.2	<1	<0.1	<0.1
Fluoranthene		0.09	1.6	<4	1	2
Fluorene		<0.02	<0.2	<2	<0.2	<0.2
Indeno(1,2,3-cd)pyrene		0.02	0.8	2	0.4	0.4
Naphthalene		<0.1	<1	<10	<1	<1
Phenanthrene		0.02	0.1	<1	0.2	0.2
Pyrene		0.08	1.7	<6	1	1.7
Total PAHs(1)		0.38	11.2	19	5.2	8.1
Total cPAHs(1)		0.15	6.3	17	2.6	3.5

Notes

(1) Concentrations below detection limits
< Constituent below reporting limit.
J Estimated concentration
ND Not detected

APPENDIX A

HSI GEOTRANS
A TETRA TECH COMPANY

BORING NUMBER KGSWMU17-1 Page 1 of 1
PROJECT Beazer\Grenada
PROJECT NUMBER N987
LOCATION Tie Plant, MS
LOGGED BY Ross Atkinson

SITE LOCATION
EASTING =
GSE
NORTHING =
DATUM

PID (ppm)	BLOW COUNT	% REC	SAMPLE DEPTH	DEPTH (ft)	GRAPHIC LOG	DESCRIPTION
				0		0 - 9': FILL [FILL]; 0 - 2 feet graded sand and gravel, below 2 feet, mixed silt-sand-gravel, NAPL stains throughout.
				5		
				10		9 - 16': SILT [ML]; red brown to medium brown, slightly plastic silt, minor fine sand, firm, few spots of NAPL stain.
				15		16 - 23': SANDY SILT [ML]; light gray brown, slightly plastic silt with 30% fine sand, firm, no visible NAPL.
				20		
				25		23 - 34': SILTY SAND [SP]; light to medium gray, fine grained sand, 20 - 30% silt, scattered wood fragments, no visible NAPL.
				30		
				35		34 - 36': SANDY SILT/CLAY [CL]; light gray-green, moderately plastic silt/clay mixture, minor fine sand.
						Total Depth = 36 Feet.

DRILLING CONTRACTOR	John Johnson
HOLE DIAMETER	4 Inch
DRILLING METHOD	Split Spoon
DRILLING EQUIPMENT	Wash Rig
DRILLING STARTED	12/11/98 ENDED 12/11/98

TOTAL DEPTH OF BORING (ft): 36.0
REMARKS: Boring destroyed by backfilling with cement grout.

HSI GeoTrans AUGER5 1/29/99

HSI GEOTRANS
A TETRA TECH COMPANY

BORING NUMBER KGSWMU17-2 Page 1 of 1
PROJECT Beazer\Grenada
PROJECT NUMBER N987
LOCATION Tie Plant, MS
LOGGED BY Ross Atkinson

SITE LOCATION
EASTING =
GSE
NORTHING =
DATUM

PID (ppm)	BLOW COUNT	% REC	SAMPLE DEPTH	DEPTH (ft)	GRAPHIC LOG	DESCRIPTION
				0		0 - 14': FILL; 0 - 1.5 feet graded sand and gravel, below 1.5 feet silt-sand-gravel, loose. 0 - 4' spots of NAPL stain and residual NAPL.
				5		
				10		
				15		14 - 20': SILT [ML]; light gray, slightly plastic, silt, minor fine grained sand, firm, no visible NAPL.
				20		20 - 24': SILTY SAND [SP]; light gray-brown, fine grained sand, 10 - 30% silt, alternating silt rich and silt poor layers, firm.
				25		24 - 26.5': SANDY SILT [ML]; light gray-green, slightly plastic, silt, 10 - 20% fine grained sand, firm, no visible NAPL. 26.5 - 29.5': SAND [SP]; medium to light brown, fine to medium grained sand, minor silt, loose.
				30		29.5 - 31.5': SANDY SILT; medium gray, nonplastic silt, 30% fine grained sand, firm, no visible NAPL. At 31.5: 2 inch sand bed saturated with NAPL. 31.5 - 32': SILT/CLAY [CL]; gray green, moderately plastic, silt/clay mixture, minor sand, no visible NAPL. Total Depth = 32 Feet.

DRILLING CONTRACTOR John Johnson
HOLE DIAMETER 4 Inch
DRILLING METHOD Split Spoon
DRILLING EQUIPMENT Wash Rig
DRILLING STARTED 12/13/98 ENDED 12/13/98

TOTAL DEPTH OF BORING (ft): 32.0
REMARKS: Boring destroyed by backfilling with cement grout.

HSI GeoTrans AUGERS 1/29/99

HSI GEOTRANS
A TETRA TECH COMPANY

BORING NUMBER KGSWMU17-3 Page 1 of 1
PROJECT Beazer\Grenada
PROJECT NUMBER N987
LOCATION Tie Plant, MS
LOGGED BY Ross Atkinson

SITE LOCATION
EASTING =
GSE
NORTHING =
DATUM

PID (ppm)	BLOW COUNT	% REC	SAMPLE DEPTH	DEPTH (ft)	GRAPHIC LOG	DESCRIPTION
				0		0 - 6': FILL; sand and gravel. 0.5 - 2': residual NAPL grading into saturated NAPL at base.
				5		6 - 17': SILT [ML]; olive gray, slightly plastic silt, minor sand, damp to wet. 6 - 8': few scattered spots of NAPL stain.
				10		
				15		17 - 20': SILTY SAND [SP]; medium brown, fine grained sand with 30 - 40% silt, firm, tight, no visible NAPL.
				20		20 - 23': SILT [ML]; light gray, non plastic silt, minor sand, firm.
				25		23 - 31.8': SILTY SAND [SP]; light gray to brown, fine grained sand, up to 30% silt, thin clay/silt lenses, alternating silt rich and silt poor layers. At 27': wood fragments.
				30		At 31 - 31.5': wood log (pine?). 31.8 - 32' CLAY [CL]: gray-green, plastic clay, no visible NAPL. Total Depth = 32 Feet.

DRILLING CONTRACTOR	John Johnson
HOLE DIAMETER	4 inch
DRILLING METHOD	Split Spoon
DRILLING EQUIPMENT	Wash Rig
DRILLING STARTED	12/11/98 ENDED 12/11/98

TOTAL DEPTH OF BORING (ft): 32.0
REMARKS: Boring destroyed by backfilling with cement grout.

HSI GeoTrans AUGER5 1/29/99

HSI GEOTRANS
A TETRA TECH COMPANY

BORING NUMBER KGSWMU17-4 Page 1 of 1
PROJECT Beazer\Grenada
PROJECT NUMBER N987
LOCATION Tie Plant, MS
LOGGED BY Ross Atkinson

SITE LOCATION
EASTING =
NORTHING =
GSE
DATUM

PID (ppm)	BLOW COUNT	% REC	SAMPLE DEPTH	DEPTH (ft)	GRAPHIC LOG	DESCRIPTION
			G	0		0 - 6': FILL, 0 - 2' graded sand and gravel, below 2' silt-sand-gravel, loose. 0 - 3': NAPL stain.
			G	5		6 - 18': SILT; light gray, non plastic, silt, minor fine grained sand, firm, no visible NAPL.
			G	10		
				15		
				20		18 - 22.5': SILTY SAND [SP]; medium brown, fine to medium grained sand, 10% silt, loose, wet. At 21 - 22.5': residual NAPL grading into saturated NAPL at base.
				25		22.5 - 26.5': SILT/CLAY [CL]; olive gray, moderately plastic, silt/clay mixture, firm. At 26': 3 inch sand bed, saturated with NAPL. 26.5 - 31': SILTY SAND [SP]; medium brown to gray, fine grained sand with variable amounts of silt, firm, wet.
				30		31 - 31.8': SILT/CLAY [CL]; gray green, moderately plastic, silt/clay mixture. 31.8 - 32': SAND [SP]; light brown, fine to medium grained sand, loose, wet, no visible NAPL. Total Depth = 32 Feet.

DRILLING CONTRACTOR John Johnson
HOLE DIAMETER 4 inch
DRILLING METHOD Split Spoon
DRILLING EQUIPMENT Wash Rig
DRILLING STARTED 12/14/98 ENDED 12/14/98

TOTAL DEPTH OF BORING (ft): 32.0
REMARKS: Boring destroyed by backfilling with cement grout.

HSI GeoTrans AUGERS 1/29/99

HSI GEOTRANS
A TETRA TECH COMPANY

BORING NUMBER KGSWMU17-5 Page 1 of 1
PROJECT Beazer\Grenada
PROJECT NUMBER N987
LOCATION Tie Plant, MS
LOGGED BY Ross Atkinson

SITE LOCATION
EASTING = NORTHING =
GSE DATUM

PID (ppm)	BLOW COUNT	% REC	SAMPLE DEPTH	DEPTH (ft)	GRAPHIC LOG	DESCRIPTION
			G	0		0 - 4': FILL; 0 - 1.5' graded sand and gravel, below 1.5' mixed silt-sand-gravel.
						At 1.3 - 1.8': saturated NAPL.
			G	5		4 - 16': SILT [ML]; medium brown, slightly plastic, silt, minor fine grained sand, few spots of NAPL stain.
				10		
			G	15		16 - 18': SILTY SAND [SP]; light gray to tan, fine to medium grained sand, 30% silt, firm, no visible NAPL.
				20		18 - 22': SANDY SILT [ML]; yellow brown, slightly plastic, silt, 30% fine grained sand, few spots of NAPL stain.
						At 22': 2 inch sand bed with residual NAPL.
				25		22 - 28': SANDY SILT/CLAY [CL]; light gray, moderately to slightly plastic silt/clay mixture, few 1 - 4" sand interbeds.
						At 25': 3 inch Sand bed, saturated with NAPL.
						At 26 - 27': Sand bed saturated with NAPL.
				30		28 - 34': SILTY SAND [SP]; medium brown, fine to medium grained sand, 20% silt, firm.
						28 - 31': few spots of NAPL stain.
						Below 31': no visible NAPL.
						32 - 34': SAND [SP]; medium to light brown, fine to medium grained sand, minor silt, loose, no visible NAPL.
						Total Depth = 34 Feet.

DRILLING CONTRACTOR John Johnson
HOLE DIAMETER 4 inch
DRILLING METHOD Split Spoon
DRILLING EQUIPMENT Wash Rig
DRILLING STARTED 12/10/98 ENDED 12/10/98

TOTAL DEPTH OF BORING (ft): 34.0
REMARKS: Boring destroyed by backfilling with cement grout.

HSI GeoTrans AUGERS 1/29/99

APPENDIX B

HSI GEOTRANS
A TETRA TECH COMPANY

BORING NUMBER **KGNSS-01** Page 1 of 1
PROJECT **Beazer\Grenada**
PROJECT NUMBER **N987**
LOCATION **Tie Plant, MS**
LOGGED BY **S. Farnsworth**

SITE LOCATION
EASTING =
GSE
NORTHING =
DATUM

SAMPLE TYPE	DEPTH (ft)	GRAPHIC LOG	DESCRIPTION
			0 - 1': SILTY SAND [SM]; medium to dark brown, well sorted, minor black pebbles, wet, no visible NAPL, no odor.
			1 - 2: SILTY SAND [SM]; medium brown to reddish brown with lenses of white sand, fine grained, well sorted, wet, no visible NAPL, no odor.
			Total Depth = 24 inches.

DRILLING CONTRACTOR **Ogden Environmental**
HOLE DIAMETER
DRILLING METHOD **Soil Core**
DRILLING EQUIPMENT **SS Hand Auger**
DRILLING STARTED **12/14/98** ENDED **12/14/98**

TOTAL DEPTH BORING ft: **2.0**
REMARKS: **Soil cores in loose sediment collected with a stainless steel hand auger.**

HSI GeoTrans AUGER1 2/2/99

HSI GEOTRANS
A TETRA TECH COMPANY

BORING NUMBER **KGNSS-02** Page **1** of **1**
PROJECT **Beazer\Grenada**
PROJECT NUMBER **N987**
LOCATION **Tie Plant, MS**
LOGGED BY **S. Farnsworth**

SITE LOCATION
EASTING = NORTHING =
GSE DATUM

SAMPLE TYPE	DEPTH (ft)	GRAPHIC LOG	DESCRIPTION
			0 - 0.25': SILTY SAND [SM]; medium gray to medium brown, fine grained, well sorted, wet, no visible NAPL, no odor.
			0.25 - 1': SILTY SAND [SM]; same as above; grades into SILTY GRAVEL [GM] bed, quartz gravel some R.R. ballast.
			0.5 -1': SILTY CLAY [CL]; light to medium gray, 60% clay, 40% silt, wet, no visible NAPL, no odor.
			1 - 2': CLAY [CL]; same as above, no visible NAPL, no odor.
			Total Depth = 24 inches.

DRILLING CONTRACTOR **Ogden Environmental**
HOLE DIAMETER
DRILLING METHOD **Soil Core**
DRILLING EQUIPMENT **SS Hand Auger**
DRILLING STARTED **12/14/98** ENDED **12/14/98**

TOTAL DEPTH BORING ft: **2.0**
REMARKS: **Soil cores in loose sediment collected with a stainless steel hand auger.**

HSI GeoTrans AUGER1 2/2/99

HSI GEOTRANS
A TETRA TECH COMPANY

BORING NUMBER **KGNSS-03** Page **1** of **1**
PROJECT **Beazer\Grenada**
PROJECT NUMBER **N987**
LOCATION **Tie Plant, MS**
LOGGED BY **S. Farnsworth**

SITE LOCATION
EASTING = NORTHING =
GSE DATUM

SAMPLE TYPE	DEPTH (ft)	GRAPHIC LOG	DESCRIPTION
			0 - 0.25': SILTY SAND [SM]; medium to dark brown, well sorted, grades into SILTY GRAVEL [GM], at 2 - 3 inches; wet, no visible NAPL, no odor.
			0.25 - 1': SILTY SANDY GRAVEL [GM]; light to medium brown, sand well graded, quartz gravel, well rounded, wet, no visible NAPL, no odor.
			1 - 1.5': SILTY SANDY GRAVEL [GM], same as above;
			1.5 - 2': SILTY CLAY [CL]; light to medium gray, 60% clay, 40% silt, wet, no visible NAPL, no odor.
			Total Depth = 24 inches.

DRILLING CONTRACTOR **Ogden Environmental**
HOLE DIAMETER
DRILLING METHOD **Soil Core**
DRILLING EQUIPMENT **SS Hand Auger**
DRILLING STARTED **12/14/98** ENDED **12/14/98**

TOTAL DEPTH BORING ft: **2.0**
REMARKS: **Soil cores in loose sediment collected with a stainless steel hand auger.**

HSI GeoTrans AUGER1 2/2/99

HSI GEOTRANS
A TETRA TECH COMPANY

BORING NUMBER **KGNSS-04** Page 1 of 1
PROJECT **Beazer\Grenada**
PROJECT NUMBER **N987**
LOCATION **Tie Plant, MS**
LOGGED BY **S. Farnsworth**

SITE LOCATION
EASTING =
GSE
NORTHING =
DATUM

SAMPLE TYPE	DEPTH (ft)	GRAPHIC LOG	DESCRIPTION
			0 - 0.25': SILTY SAND [SM]; light to medium brown, well sorted, fine to medium grained, quartz, wet, no visible NAPL, no odor.
			0.25 - 1': SILTY SANDY GRAVEL [GM]; medium to dark gray, sand well graded, quartz gravel, well rounded, wet, no visible NAPL, no odor.
			1 - 2': SILTY SANDY GRAVEL [GM], same as above. at 12 - 16 inches: organic layer (leaves).
			Total Depth = 24 inches.

DRILLING CONTRACTOR **Ogden Environmental**
HOLE DIAMETER
DRILLING METHOD **Soil Core**
DRILLING EQUIPMENT **SS Hand Auger**
DRILLING STARTED **12/14/98** ENDED **12/14/98**

TOTAL DEPTH BORING ft: **2.0**
REMARKS: **Soil cores in loose sediment collected with a stainless steel hand auger.**

HSI GeoTrans AUGER1 2/2/99

HSI GEOTRANS
A TETRA TECH COMPANY

BORING NUMBER **KGNSS-05** Page **1** of **1**

PROJECT **Beazer\Grenada**

PROJECT NUMBER **N987**

SITE LOCATION

EASTING = NORTHING =

GSE DATUM

LOCATION **Tie Plant, MS**

LOGGED BY **S. Farnsworth**

SAMPLE TYPE	DEPTH (ft)	GRAPHIC LOG	DESCRIPTION
			0 - 0.25': SILTY SAND [SM]; medium to dark brown, well sorted, fine to medium grained, quartz, wet, no visible NAPL, no odor.
			0.25 - 1': SILTY SAND [SM]; medium to dark gray, fine grained, well graded, wet, no visible NAPL, no odor.
			at 8 - 12 inches: CLAYEY SAND bed.
			1 - 2': SILTY SAND [SM], same as above, fine sand and clay lenses, no visible NAPL, no odor.
			at 16 inches: grades into fine sand with gravel stringers.
			grades back into sand.
			Total Depth = 24 inches.

DRILLING CONTRACTOR **Ogden Environmental**

HOLE DIAMETER

DRILLING METHOD **Soil Core**

DRILLING EQUIPMENT **SS Hand Auger**

DRILLING STARTED **12/14/98** ENDED **12/14/98**

TOTAL DEPTH BORING ft: **2.0**

REMARKS: **Soil cores in loose sediment collected with a stainless steel hand auger.**

HSI GeoTrans AUGER1 2/2/99

HSI GEOTRANS
A TETRA TECH COMPANY

BORING NUMBER **KGNSS-06** Page **1** of **1**
PROJECT **Beazer\Grenada**
PROJECT NUMBER **N987**
LOCATION **Tie Plant, MS**
LOGGED BY **S. Farnsworth**

SITE LOCATION
EASTING =
GSE
NORTHING =
DATUM

SAMPLE TYPE	DEPTH (ft)	GRAPHIC LOG	DESCRIPTION
			0 - 0.25': CLAYEY SILTY SAND [SC]; medium brown to dark yellow orange, 70% sand, 30% clay, fine grained, moist, no visible NAPL, no odor.
			0.25 - 1': CLAYEY SAND [SC]; dark yellow orange mottled with white bands, 60% sand 40% clay, fine grained sand; no visible NAPL, no odor.
			1 - 2': CLAYEY SAND [SC], same as above, grades into CLAYEY SILT [ML], pale orange, moist to wet, no visible NAPL, no odor.
			Total Depth = 24 inches.

DRILLING CONTRACTOR **Ogden Environmental**
HOLE DIAMETER
DRILLING METHOD **Soil Core**
DRILLING EQUIPMENT **SS Hand Auger**
DRILLING STARTED **12/14/98** ENDED **12/14/98**

TOTAL DEPTH BORING ft: **2.0**
REMARKS: **Soil cores in loose sediment collected with a stainless steel hand auger.**

HSI GeoTrans AUGER1 2/2/99

HSI GEOTRANS
A TETRA TECH COMPANY

BORING NUMBER **KGNSS-07** Page **1** of **1**
PROJECT **Beazer\Grenada**
PROJECT NUMBER **N987**
LOCATION **Tie Plant, MS**
LOGGED BY **S. Farnsworth**

SITE LOCATION
EASTING = NORTHING =
GSE DATUM

SAMPLE TYPE	DEPTH (ft)	GRAPHIC LOG	DESCRIPTION
			0 - 0.25': CLAYEY SAND [SC]; mottled pale yellow brown, very fine grained, wet to moist, no visible NAPL, no odor.
			0.25 - 1': CLAYEY SAND [SC]; same as above, grades into SILTY SAND [SM]; very pale orange, 90% sand, wet.
			1 - 2': SILTY CLAY [CL], pale yellow brown, 50% silt, 50% clay, wet, no visible NAPL, no odor.
			Total Depth = 24 inches.

DRILLING CONTRACTOR **Ogden Environmental**
HOLE DIAMETER
DRILLING METHOD **Soil Core**
DRILLING EQUIPMENT **SS Hand Auger**
DRILLING STARTED **12/14/98** ENDED **12/14/98**

TOTAL DEPTH BORING ft: **2.0**
REMARKS: **Soil cores in loose sediment collected with a stainless steel hand auger.**

HSI GeoTrans AUGER1 2/2/99

HSI GEOTRANS
A TETRA TECH COMPANY

BORING NUMBER **KGNSS-08** Page **1** of **1**
PROJECT **Beazer\Grenada**
PROJECT NUMBER **N987**
LOCATION **Tie Plant, MS**
LOGGED BY **S. Farnsworth**

SITE LOCATION
EASTING = NORTHING =
GSE DATUM

SAMPLE TYPE	DEPTH (ft)	GRAPHIC LOG	DESCRIPTION
			0 - 0.25': SILTY SAND [SM]; mottled yellow brown, 80% fine sand, 20% clay, wet, no visible NAPL, no odor.
			0.25 - 1': SILTY SAND [SM]; same as above, 80% sand, fine to medium grained, 20% silt, wet, organic layer (leaves), no visible NAPL, no odor.
			1 - 2': SILTY SAND [SM], same as above, grading into SAND [SW], pale yellow brown, 100% fine sand well sorted, no visible NAPL, no odor.
			Total Depth = 24 inches.

DRILLING CONTRACTOR **Ogden Environmental**
HOLE DIAMETER
DRILLING METHOD **Soil Core**
DRILLING EQUIPMENT **SS Hand Auger**
DRILLING STARTED **12/14/98** ENDED **12/14/98**

TOTAL DEPTH BORING ft: **2.0**
REMARKS: **Soil cores in loose sediment collected with a stainless steel hand auger.**

HSI GeoTrans AUGER1 2/2/99

HSI GEOTRANS
A TETRA TECH COMPANY

BORING NUMBER **KGNSS-09** Page 1 of 1
PROJECT **Beazer\Grenada**
PROJECT NUMBER **N987**
LOCATION **Tie Plant, MS**
LOGGED BY **S. Farnsworth**

SITE LOCATION
EASTING =
GSE
NORTHING =
DATUM

SAMPLE TYPE	DEPTH (ft)	GRAPHIC LOG	DESCRIPTION
			0 - 0.25': SANDY SILT [ML]; light to medium gray, well sorted, fine grained sand, wet, no visible NAPL, no odor.
			0.25 - 2': SILTY SAND [SM]; light to medium gray, well sorted fine to medium grained, 90% sand, 10% silt, wet, no visible NAPL, no odor.
			Total Depth = 24 inches.

DRILLING CONTRACTOR **Ogden Environmental**
HOLE DIAMETER
DRILLING METHOD **Soil Core**
DRILLING EQUIPMENT **SS Hand Auger**
DRILLING STARTED **12/14/98** ENDED **12/14/98**

TOTAL DEPTH BORING ft: **2.0**
REMARKS: **Soil cores in loose sediment collected with a stainless steel hand auger.**

HSI GeoTrans AUGER1 1/28/99

APPENDIX C

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: HSI GeoTrans
Project: Koppers Granada/Tie Plant MS
Sample Matrix Sediment

Service Request: K9808581
Date Collected: 12/14/98
Date Received: 12/16/98
Date Analyzed: 12/28/98

Particle Size Determination
ASTM Method D422 Modified

Sample Name: KGNSS-01-0-3
Lab Code: K9808581-001

Sand Fraction: Weight (Grams)	18.1518
Sand Fraction: Weight Recovered (Grams)	18.0434
Sand Fraction: Percent Recovery	99.4

Weight as received (Grams)	40.2003
Percent Solids	79.2
Weight Oven-Dried (Grams)	31.8386

Description	Sieve Size	Sieve Number	Dry Weight (Grams)	Percent of Total Weight Recovered
Medium Gravel	4.75 mm	4	0.2998	0.94
Fine Gravel	2.00 mm	10	1.2332	3.87
Very Coarse Sand	0.850 mm	20	0.8124	2.55
Coarse Sand	0.425 mm	40	0.6876	2.16
Medium Sand	0.250 mm	60	4.8629	15.3
Fine Sand	0.106 mm	140	9.5532	30.0
Very Fine Sand	0.075 mm	200	0.5015	1.58
Clay			2.2150	6.96
Silt			12.7400	40.0
		Total	32.9056	103

Approved By: _____ Date: 12/31/98

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: HSI GeoTrans
Project: Koppers Granada/Tie Plant MS
Sample Matrix Sediment

Service Request: K9808581
Date Collected: 12/14/98
Date Received: 12/16/98
Date Analyzed: 12/28/98

Particle Size Determination
ASTM Method D422 Modified

Sample Name: KGNSS-01-0-3
Lab Code: K9808581-001d

Sand Fraction: Weight (Grams)	19.0517
Sand Fraction: Weight Recovered (Grams)	19.0002
Sand Fraction: Percent Recovery	99.7

Weight as received (Grams)	40.5936
Percent Solids	79.2
Weight Oven-Dried (Grams)	32.1501

Description	Sieve Size	Sieve Number	Dry Weight (Grams)	Percent of Total Weight Recovered
Medium Gravel	4.75 mm	4	2.6526	8.25
Fine Gravel	2.00 mm	10	0.8889	2.76
Very Coarse Sand	0.850 mm	20	0.7572	2.36
Coarse Sand	0.425 mm	40	0.6069	1.89
Medium Sand	0.250 mm	60	4.7934	14.9
Fine Sand	0.106 mm	140	8.7240	27.1
Very Fine Sand	0.075 mm	200	0.4466	1.39
Clay			2.0300	6.31
Silt			11.5800	36.0
		Total	32.4796	101

Approved By: _____ Date: 12/31/98

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: HSI GeoTrans
Project: Koppers Granada/Tie Plant MS
Sample Matrix Sediment

Service Request: K9808581
Date Collected: 12/14/98
Date Received: 12/16/98
Date Analyzed: 12/28/98

Particle Size Determination
ASTM Method D422 Modified

Sample Name: KGNSS-01-3-12
Lab Code: K9808581-002

Sand Fraction: Weight (Grams)	16.4095
Sand Fraction: Weight Recovered (Grams)	16.0882
Sand Fraction: Percent Recovery	98.0

Weight as received (Grams)	40.3899
Percent Solids	81.0
Weight Oven-Dried (Grams)	32.7158

Description	Sieve Size	Sieve Number	Dry Weight (Grams)	Percent of Total Weight Recovered
Medium Gravel	4.75 mm	4	0.0000	0.00
Fine Gravel	2.00 mm	10	0.2159	0.66
Very Coarse Sand	0.850 mm	20	0.4709	1.44
Coarse Sand	0.425 mm	40	0.7532	2.30
Medium Sand	0.250 mm	60	5.0652	15.5
Fine Sand	0.106 mm	140	9.0530	27.7
Very Fine Sand	0.075 mm	200	0.5098	1.56
Clay			2.7950	8.54
Silt			12.3950	37.9
		Total	31.2580	95.5

Approved By: _____ Date: 12/31/98

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: HSI GeoTrans
Project: Koppers Granada/Tie Plant MS
Sample Matrix Sediment

Service Request: K9808581
Date Collected: 12/14/98
Date Received: 12/16/98
Date Analyzed: 12/28/98

Particle Size Determination
ASTM Method D422 Modified

Sample Name: KGNSS-02-0-3
Lab Code: K9808581-003

Sand Fraction: Weight (Grams)	26.2988
Sand Fraction: Weight Recovered (Grams)	26.5128
Sand Fraction: Percent Recovery	101

Weight as received (Grams)	50.3851
Percent Solids	73.9
Weight Oven-Dried (Grams)	37.2346

Description	Sieve Size	Sieve Number	Dry Weight (Grams)	Percent of Total Weight Recovered
Medium Gravel	4.75 mm	4	2.4114	6.48
Fine Gravel	2.00 mm	10	3.0739	8.26
Very Coarse Sand	0.850 mm	20	2.2029	5.92
Coarse Sand	0.425 mm	40	1.9117	5.13
Medium Sand	0.250 mm	60	7.5798	20.4
Fine Sand	0.106 mm	140	8.7742	23.6
Very Fine Sand	0.075 mm	200	0.3879	1.04
Clay			1.2150	3.26
Silt			8.6750	23.3
		Total	36.2318	97.3

Approved By: _____ Date: 12/31/98

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: HSI GeoTrans
Project: Koppers Granada/Tie Plant MS
Sample Matrix Sediment

Service Request: K9808581
Date Collected: 12/14/98
Date Received: 12/16/98
Date Analyzed: 12/28/98

Particle Size Determination
ASTM Method D422 Modified

Sample Name: KGNSS-02-3-12
Lab Code: K9808581-004

Sand Fraction: Weight (Grams)	6.9165
Sand Fraction: Weight Recovered (Grams)	6.9939
Sand Fraction: Percent Recovery	101

Weight as received (Grams)	40.3053
Percent Solids	87.4
Weight Oven-Dried (Grams)	35.2268

Description	Sieve Size	Sieve Number	Dry Weight (Grams)	Percent of Total Weight Recovered
Medium Gravel	4.75 mm	4	0.6462	1.83
Fine Gravel	2.00 mm	10	1.6777	4.76
Very Coarse Sand	0.850 mm	20	1.0409	2.95
Coarse Sand	0.425 mm	40	0.6687	1.90
Medium Sand	0.250 mm	60	1.4792	4.20
Fine Sand	0.106 mm	140	1.2392	3.52
Very Fine Sand	0.075 mm	200	0.1226	0.35
Clay			5.5900	15.9
Silt			16.2400	46.1
		Total	28.7045	81.5

Approved By: _____ Date: 12/31/98

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: HSI GeoTrans
Project: Koppers Granada/Tie Plant MS
Sample Matrix Sediment

Service Request: K9808581
Date Collected: 12/14/98
Date Received: 12/16/98
Date Analyzed: 12/28/98

Particle Size Determination
ASTM Method D422 Modified

Sample Name: KGNSS-03-0-3
Lab Code: K9808581-005

Sand Fraction: Weight (Grams)	29.3227
Sand Fraction: Weight Recovered (Grams)	29.5695
Sand Fraction: Percent Recovery	101

Weight as received (Grams)	50.4154
Percent Solids	73.6
Weight Oven-Dried (Grams)	37.1057

Description	Sieve Size	Sieve Number	Dry Weight (Grams)	Percent of Total Weight Recovered
Medium Gravel	4.75 mm	4	10.1677	27.4
Fine Gravel	2.00 mm	10	2.9209	7.87
Very Coarse Sand	0.850 mm	20	2.0092	5.41
Coarse Sand	0.425 mm	40	2.5851	6.97
Medium Sand	0.250 mm	60	6.4017	17.3
Fine Sand	0.106 mm	140	5.0535	13.6
Very Fine Sand	0.075 mm	200	0.2938	0.79
Clay			1.7900	4.82
Silt			7.5700	20.4
		Total	38.7919	105

Approved By: _____ Date: 12/31/98

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: HSI GeoTrans
Project: Koppers Granada/Tie Plant MS
Sample Matrix Sediment

Service Request: K9808581
Date Collected: 12/14/98
Date Received: 12/16/98
Date Analyzed: 12/28/98

Particle Size Determination
ASTM Method D422 Modified

Sample Name: KGNSS-03-3-12
Lab Code: K9808581-006

Sand Fraction: Weight (Grams)	37.2125
Sand Fraction: Weight Recovered (Grams)	37.4536
Sand Fraction: Percent Recovery	101

Weight as received (Grams)	50.2416
Percent Solids	80.5
Weight Oven-Dried (Grams)	40.4445

Description	Sieve Size	Sieve Number	Dry Weight (Grams)	Percent of Total Weight Recovered
Medium Gravel	4.75 mm	4	10.9577	27.1
Fine Gravel	2.00 mm	10	5.9841	14.8
Very Coarse Sand	0.850 mm	20	5.2878	13.1
Coarse Sand	0.425 mm	40	4.4595	11.0
Medium Sand	0.250 mm	60	7.3349	18.1
Fine Sand	0.106 mm	140	3.2602	8.06
Very Fine Sand	0.075 mm	200	0.1344	0.33
Clay			0.8500	2.10
Silt			2.3650	5.85
		Total	40.6336	100

Approved By: _____ Date: 12/31/98

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: HSI GeoTrans
Project: Koppers Granada/Tie Plant MS
Sample Matrix Sediment

Service Request: K9808581
Date Collected: 12/14/98
Date Received: 12/16/98
Date Analyzed: 12/28/98

Particle Size Determination
ASTM Method D422 Modified

Sample Name: KGNSS-04-0-3
Lab Code: K9808581-007

Sand Fraction: Weight (Grams)	18.834
Sand Fraction: Weight Recovered (Grams)	18.9151
Sand Fraction: Percent Recovery	100

Weight as received (Grams)	40.0638
Percent Solids	74.9
Weight Oven-Dried (Grams)	30.0078

Description	Sieve Size	Sieve Number	Dry Weight (Grams)	Percent of Total Weight Recovered
Medium Gravel	4.75 mm	4	1.4488	4.83
Fine Gravel	2.00 mm	10	1.9913	6.64
Very Coarse Sand	0.850 mm	20	1.4360	4.79
Coarse Sand	0.425 mm	40	1.5858	5.28
Medium Sand	0.250 mm	60	5.2784	17.6
Fine Sand	0.106 mm	140	6.7112	22.4
Very Fine Sand	0.075 mm	200	0.3656	1.22
Clay			1.8650	6.22
Silt			8.9500	29.8
		Total	29.6321	98.7

Approved By: _____ Date: 12/31/98

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: HSI GeoTrans
Project: Koppers Granada/Tie Plant MS
Sample Matrix Sediment

Service Request: K9808581
Date Collected: 12/14/98
Date Received: 12/16/98
Date Analyzed: 12/28/98

Particle Size Determination
ASTM Method D422 Modified

Sample Name: KGNSS-04-3-12
Lab Code: K9808581-008

Sand Fraction: Weight (Grams)	26.4478
Sand Fraction: Weight Recovered (Grams)	26.5908
Sand Fraction: Percent Recovery	101

Weight as received (Grams)	45.2994
Percent Solids	78.7
Weight Oven-Dried (Grams)	35.6506

Description	Sieve Size	Sieve Number	Dry Weight (Grams)	Percent of Total Weight Recovered
Medium Gravel	4.75 mm	4	2.3392	6.56
Fine Gravel	2.00 mm	10	2.0551	5.76
Very Coarse Sand	0.850 mm	20	2.5606	7.18
Coarse Sand	0.425 mm	40	4.4623	12.5
Medium Sand	0.250 mm	60	8.4442	23.7
Fine Sand	0.106 mm	140	6.2878	17.6
Very Fine Sand	0.075 mm	200	0.3552	1.00
Clay			1.8050	5.06
Silt			7.4850	21.0
		Total	35.7944	100

Approved By: _____ Date: 12/31/98

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: HSI GeoTrans
Project: Koppers Granada/Tie Plant MS
Sample Matrix Sediment

Service Request: K9808581
Date Collected: 12/14/98
Date Received: 12/16/98
Date Analyzed: 12/28/98

Particle Size Determination
ASTM Method D422 Modified

Sample Name: KGNSS-05-0-3
Lab Code: K9808581-009

Sand Fraction: Weight (Grams)	12.2593
Sand Fraction: Weight Recovered (Grams)	12.2961
Sand Fraction: Percent Recovery	100

Weight as received (Grams)	35.0222
Percent Solids	74.8
Weight Oven-Dried (Grams)	26.1966

Description	Sieve Size	Sieve Number	Dry Weight (Grams)	Percent of Total Weight Recovered
Medium Gravel	4.75 mm	4	0.9759	3.73
Fine Gravel	2.00 mm	10	1.8431	7.04
Very Coarse Sand	0.850 mm	20	1.3031	4.97
Coarse Sand	0.425 mm	40	1.1870	4.53
Medium Sand	0.250 mm	60	3.0286	11.6
Fine Sand	0.106 mm	140	3.5653	13.6
Very Fine Sand	0.075 mm	200	0.2482	0.95
Clay			1.8200	6.95
Silt			10.3550	39.5
		Total	24.3262	92.9

Approved By: _____ Date: 12/31/98

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: HSI GeoTrans
Project: Koppers Granada/Tie Plant MS
Sample Matrix Sediment

Service Request: K9808581
Date Collected: 12/14/98
Date Received: 12/16/98
Date Analyzed: 12/28/98

Particle Size Determination
ASTM Method D422 Modified

Sample Name: KGNSS-05-3-12
Lab Code: K9808581-010

Sand Fraction: Weight (Grams)	14.2776
Sand Fraction: Weight Recovered (Grams)	14.2822
Sand Fraction: Percent Recovery	100

Weight as received (Grams)	35.706
Percent Solids	72.0
Weight Oven-Dried (Grams)	25.7083

Description	Sieve Size	Sieve Number	Dry Weight (Grams)	Percent of Total Weight Recovered
Medium Gravel	4.75 mm	4	0.1998	0.78
Fine Gravel	2.00 mm	10	1.1402	4.44
Very Coarse Sand	0.850 mm	20	1.0598	4.12
Coarse Sand	0.425 mm	40	1.1440	4.45
Medium Sand	0.250 mm	60	3.7980	14.8
Fine Sand	0.106 mm	140	6.3575	24.7
Very Fine Sand	0.075 mm	200	0.4139	1.61
Clay			1.9600	7.62
Silt			9.9150	38.6
		Total	25.9882	101

Approved By: _____ Date: 12/31/98

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: HSI GeoTrans
Project: Koppers Granada/Tie Plant MS
Sample Matrix Sediment

Service Request: K9808581
Date Collected: 12/14/98
Date Received: 12/16/98
Date Analyzed: 12/28/98

Particle Size Determination
ASTM Method D422 Modified

Sample Name: KGNSS-06-0-3
Lab Code: K9808581-011

Sand Fraction: Weight (Grams)	19.6583
Sand Fraction: Weight Recovered (Grams)	19.5955
Sand Fraction: Percent Recovery	99.7

Weight as received (Grams)	40.1082
Percent Solids	79.4
Weight Oven-Dried (Grams)	31.8459

Description	Sieve Size	Sieve Number	Dry Weight (Grams)	Percent of Total Weight Recovered
Medium Gravel	4.75 mm	4	0.1034	0.32
Fine Gravel	2.00 mm	10	0.5874	1.84
Very Coarse Sand	0.850 mm	20	0.4326	1.36
Coarse Sand	0.425 mm	40	0.7335	2.30
Medium Sand	0.250 mm	60	4.5554	14.3
Fine Sand	0.106 mm	140	11.7476	36.9
Very Fine Sand	0.075 mm	200	1.1871	3.73
Clay			3.2150	10.1
Silt			8.6000	27.0
		Total	31.1620	97.9

Approved By: _____ Date: 12/31/98

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: HSI GeoTrans
Project: Koppers Granada/Tie Plant MS
Sample Matrix Sediment

Service Request: K9808581
Date Collected: 12/14/98
Date Received: 12/16/98
Date Analyzed: 12/28/98

Particle Size Determination
ASTM Method D422 Modified

Sample Name: KGNSS-06-3-12
Lab Code: K9808581-012

Sand Fraction: Weight (Grams)	19.9662
Sand Fraction: Weight Recovered (Grams)	19.9529
Sand Fraction: Percent Recovery	99.9

Weight as received (Grams)	40.9049
Percent Solids	80.7
Weight Oven-Dried (Grams)	33.0103

Description	Sieve Size	Sieve Number	Dry Weight (Grams)	Percent of Total Weight Recovered
Medium Gravel	4.75 mm	4	0.0749	0.23
Fine Gravel	2.00 mm	10	0.6420	1.94
Very Coarse Sand	0.850 mm	20	0.7996	2.42
Coarse Sand	0.425 mm	40	0.3647	1.10
Medium Sand	0.250 mm	60	3.2292	9.78
Fine Sand	0.106 mm	140	13.0134	39.4
Very Fine Sand	0.075 mm	200	1.5622	4.73
Clay			5.5000	16.7
Silt			7.5200	22.8
		Total	32.7060	99.1

Approved By: _____ Date: 12/31/98

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: HSI GeoTrans
Project: Koppers Granada/Tie Plant MS
Sample Matrix Sediment

Service Request: K9808581
Date Collected: 12/14/98
Date Received: 12/16/98
Date Analyzed: 12/28/98

Particle Size Determination
ASTM Method D422 Modified

Sample Name: KGNSS-06-3-12
Lab Code: K9808581-012d

Sand Fraction: Weight (Grams)	18.4056
Sand Fraction: Weight Recovered (Grams)	18.3783
Sand Fraction: Percent Recovery	99.9

Weight as received (Grams)	40.0001
Percent Solids	80.7
Weight Oven-Dried (Grams)	32.2801

Description	Sieve Size	Sieve Number	Dry Weight (Grams)	Percent of Total Weight Recovered
Medium Gravel	4.75 mm	4	0.0000	0.00
Fine Gravel	2.00 mm	10	0.2792	0.86
Very Coarse Sand	0.850 mm	20	0.3833	1.19
Coarse Sand	0.425 mm	40	0.4373	1.35
Medium Sand	0.250 mm	60	3.3804	10.5
Fine Sand	0.106 mm	140	12.2346	37.9
Very Fine Sand	0.075 mm	200	1.3992	4.33
Clay			6.2600	19.4
Silt			7.4500	23.1
		Total	31.8240	98.6

Approved By: _____ Date: 12/31/98

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: HSI GeoTrans
Project: Koppers Granada/Tie Plant MS
Sample Matrix Sediment

Service Request: K9808581
Date Collected: 12/14/98
Date Received: 12/16/98
Date Analyzed: 12/28/98

Particle Size Determination
ASTM Method D422 Modified

Sample Name: KGNSS-07-0-3
Lab Code: K9808581-013

Sand Fraction: Weight (Grams)	12.0061
Sand Fraction: Weight Recovered (Grams)	12.0145
Sand Fraction: Percent Recovery	100

Weight as received (Grams)	30.5739
Percent Solids	77.9
Weight Oven-Dried (Grams)	23.8171

Description	Sieve Size	Sieve Number	Dry Weight (Grams)	Percent of Total Weight Recovered
Medium Gravel	4.75 mm	4	0.3351	1.41
Fine Gravel	2.00 mm	10	0.9632	4.04
Very Coarse Sand	0.850 mm	20	0.9840	4.13
Coarse Sand	0.425 mm	40	1.1496	4.83
Medium Sand	0.250 mm	60	2.3339	9.80
Fine Sand	0.106 mm	140	5.4510	22.9
Very Fine Sand	0.075 mm	200	0.7170	3.01
Clay			2.5750	10.8
Silt			9.1550	38.4
		Total	23.6638	99.4

Approved By: _____ Date: 12/31/98

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: HSI GeoTrans
Project: Koppers Granada/Tie Plant MS
Sample Matrix Sediment

Service Request: K9808581
Date Collected: 12/14/98
Date Received: 12/16/98
Date Analyzed: 12/28/98

Particle Size Determination
ASTM Method D422 Modified

Sample Name: KGNSS-07-3-12
Lab Code: K9808581-014

Sand Fraction: Weight (Grams)	17.5885
Sand Fraction: Weight Recovered (Grams)	17.5721
Sand Fraction: Percent Recovery	99.9

Weight as received (Grams)	40.3265
Percent Solids	82.2
Weight Oven-Dried (Grams)	33.1484

Description	Sieve Size	Sieve Number	Dry Weight (Grams)	Percent of Total Weight Recovered
Medium Gravel	4.75 mm	4	0.2106	0.64
Fine Gravel	2.00 mm	10	0.0362	0.11
Very Coarse Sand	0.850 mm	20	0.1127	0.34
Coarse Sand	0.425 mm	40	0.2228	0.67
Medium Sand	0.250 mm	60	2.5173	7.59
Fine Sand	0.106 mm	140	12.6476	38.2
Very Fine Sand	0.075 mm	200	1.6428	4.96
Clay			3.7750	11.4
Silt			11.6650	35.2
		Total	32.8300	99.0

Approved By: _____ Date: 12/31/98

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: HSI GeoTrans
Project: Koppers Granada/Tie Plant MS
Sample Matrix Sediment

Service Request: K9808581
Date Collected: 12/14/98
Date Received: 12/16/98
Date Analyzed: 12/28/98

Particle Size Determination
ASTM Method D422 Modified

Sample Name: KGNSS-08-0-3
Lab Code: K9808581-015

Sand Fraction: Weight (Grams)	29.5112
Sand Fraction: Weight Recovered (Grams)	29.6595
Sand Fraction: Percent Recovery	100.5

Weight as received (Grams)	50.3008
Percent Solids	76.6
Weight Oven-Dried (Grams)	38.5304

Description	Sieve Size	Sieve Number	Dry Weight (Grams)	Percent of Total Weight Recovered
Medium Gravel	4.75 mm	4	2.1147	5.49
Fine Gravel	2.00 mm	10	0.9235	2.40
Very Coarse Sand	0.850 mm	20	1.2969	3.37
Coarse Sand	0.425 mm	40	3.0981	8.04
Medium Sand	0.250 mm	60	10.4652	27.2
Fine Sand	0.106 mm	140	11.2727	29.3
Very Fine Sand	0.075 mm	200	0.4299	1.12
Clay			1.1150	2.89
Silt			6.5900	17.1
		Total	37.3060	96.8

Approved By: _____ Date: 12/31/98

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: HSI GeoTrans
Project: Koppers Granada/Tie Plant MS
Sample Matrix Sediment

Service Request: K9808581
Date Collected: 12/14/98
Date Received: 12/16/98
Date Analyzed: 12/28/98

Particle Size Determination
ASTM Method D422 Modified

Sample Name: KGNSS-08-3-12
Lab Code: K9808581-016

Sand Fraction: Weight (Grams)	31.9736
Sand Fraction: Weight Recovered (Grams)	32.1042
Sand Fraction: Percent Recovery	100

Weight as received (Grams)	50.237
Percent Solids	73.0
Weight Oven-Dried (Grams)	36.6730

Description	Sieve Size	Sieve Number	Dry Weight (Grams)	Percent of Total Weight Recovered
Medium Gravel	4.75 mm	4	1.5912	4.34
Fine Gravel	2.00 mm	10	2.0567	5.61
Very Coarse Sand	0.850 mm	20	2.3799	6.49
Coarse Sand	0.425 mm	40	3.9865	10.9
Medium Sand	0.250 mm	60	10.5551	28.8
Fine Sand	0.106 mm	140	11.2377	30.6
Very Fine Sand	0.075 mm	200	0.2647	0.72
Clay			0.5250	1.43
Silt			3.7200	10.1
		Total	36.3168	99.0

Approved By: _____ Date: 12/31/98

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: HSI GeoTrans
Project: Koppers Granada/Tie Plant MS
Sample Matrix Sediment

Service Request: K9808581
Date Collected: 12/14/98
Date Received: 12/16/98
Date Analyzed: 12/28/98

Particle Size Determination
ASTM Method D422 Modified

Sample Name: KGNSS-09-0-3
Lab Code: K9808581-017

Sand Fraction: Weight (Grams)	23.2352
Sand Fraction: Weight Recovered (Grams)	23.2625
Sand Fraction: Percent Recovery	100

Weight as received (Grams)	50.7438
Percent Solids	72.2
Weight Oven-Dried (Grams)	36.6370

Description	Sieve Size	Sieve Number	Dry Weight (Grams)	Percent of Total Weight Recovered
Medium Gravel	4.75 mm	4	0.6573	1.79
Fine Gravel	2.00 mm	10	0.4222	1.15
Very Coarse Sand	0.850 mm	20	0.4807	1.31
Coarse Sand	0.425 mm	40	1.2867	3.51
Medium Sand	0.250 mm	60	6.9888	19.1
Fine Sand	0.106 mm	140	12.4619	34.0
Very Fine Sand	0.075 mm	200	0.7965	2.17
Clay			1.9350	5.28
Silt			9.8100	26.8
		Total	34.8391	95.1

Approved By: _____ Date: 12/31/98

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: HSI GeoTrans
Project: Koppers Granada/Tie Plant MS
Sample Matrix Sediment

Service Request: K9808581
Date Collected: 12/14/98
Date Received: 12/16/98
Date Analyzed: 12/28/98

Particle Size Determination
ASTM Method D422 Modified

Sample Name: KGNSS-09-3-12
Lab Code: K9808581-018

Sand Fraction: Weight (Grams)	33.4547
Sand Fraction: Weight Recovered (Grams)	33.6001
Sand Fraction: Percent Recovery	100

Weight as received (Grams)	50.5116
Percent Solids	77.9
Weight Oven-Dried (Grams)	39.3485

Description	Sieve Size	Sieve Number	Dry Weight (Grams)	Percent of Total Weight Recovered
Medium Gravel	4.75 mm	4	1.2726	3.23
Fine Gravel	2.00 mm	10	1.3270	3.37
Very Coarse Sand	0.850 mm	20	0.9209	2.34
Coarse Sand	0.425 mm	40	4.0477	10.3
Medium Sand	0.250 mm	60	15.3885	39.1
Fine Sand	0.106 mm	140	10.3569	26.3
Very Fine Sand	0.075 mm	200	0.2504	0.64
Clay			0.6850	1.74
Silt			3.2250	8.20
		Total	37.4740	95.2

Approved By: _____ Date: 12/31/98

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: HSI GeoTrans
Project: Koppers Granada/Tie Plant MS
Sample Matrix Sediment

Service Request: K9808581
Date Collected: 12/14/98
Date Received: 12/16/98
Date Analyzed: 12/28/98

Particle Size Determination
ASTM Method D422 Modified

Sample Name: KGNSS-10-0-3
Lab Code: K9808581-019

Sand Fraction: Weight (Grams)	28.3076
Sand Fraction: Weight Recovered (Grams)	28.4546
Sand Fraction: Percent Recovery	100.5

Weight as received (Grams)	50.4682
Percent Solids	75.5
Weight Oven-Dried (Grams)	38.1035

Description	Sieve Size	Sieve Number	Dry Weight (Grams)	Percent of Total Weight Recovered
Medium Gravel	4.75 mm	4	2.2247	5.84
Fine Gravel	2.00 mm	10	3.4172	8.97
Very Coarse Sand	0.850 mm	20	2.9623	7.77
Coarse Sand	0.425 mm	40	3.6247	9.51
Medium Sand	0.250 mm	60	8.8298	23.2
Fine Sand	0.106 mm	140	6.9070	18.1
Very Fine Sand	0.075 mm	200	0.3702	0.97
Clay			1.7950	4.71
Silt			7.7200	20.3
		Total	37.8509	99.3

Approved By: _____ Date: 12/31/98

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: HSI GeoTrans
Project: Koppers Granada/Tie Plant MS
Sample Matrix Sediment

Service Request: K9808581
Date Collected: 12/14/98
Date Received: 12/16/98
Date Analyzed: 12/28/98

Particle Size Determination
ASTM Method D422 Modified

Sample Name: KGNSS-10-3-12
Lab Code: K9808581-020

Sand Fraction: Weight (Grams)	43.7428
Sand Fraction: Weight Recovered (Grams)	44.0121
Sand Fraction: Percent Recovery	101

Weight as received (Grams)	60.3313
Percent Solids	78.6
Weight Oven-Dried (Grams)	47.4204

Description	Sieve Size	Sieve Number	Dry Weight (Grams)	Percent of Total Weight Recovered
Medium Gravel	4.75 mm	4	12.4790	26.3
Fine Gravel	2.00 mm	10	8.0645	17.0
Very Coarse Sand	0.850 mm	20	5.3930	11.4
Coarse Sand	0.425 mm	40	4.9813	10.5
Medium Sand	0.250 mm	60	9.1591	19.3
Fine Sand	0.106 mm	140	3.7198	7.84
Very Fine Sand	0.075 mm	200	0.1499	0.32
Clay			1.1400	2.40
Silt			2.9250	6.17
		Total	48.0116	101

Approved By: _____ Date: 12/31/98

APPENDIX D

MISSISSIPPI DEPARTMENT OF ENVIRONMENTAL QUALITY
Office of Land and Water Resources

P. O. Box 10631
Jackson, MS 39289-0631
WATER WELL PLUGGING
DECOMMISSIONING

COUNTY WELL LOCATED: Grenada

WELL NUMBER: SEE ATTACHMENT | CODED:

PERMIT NUMBER:

NAME OF DRILLING FIRM: Anderson Engineering Consultants Inc.

DATE WELL PLUGGED: 12/13 - 12/14

NAME & MAILING ADDRESS OF LANDOWNER:
Koppers Industries Inc.
543 Tie Plant Rd
Tie Plant MS 38960

WELL LOCATION: NW 1/4 SEC 33 TOWNSHIP 22N RANGE 5E

DISTANCE: DIRECTION: NEAREST TOWN:

OTHER LANDMARK:

WELL PURPOSE: Home, Irrigation, Municipal, Industrial, Fish Pond, etc.: Monitor Wells

NAME OF WELL CONTRACTOR WHO DRILLED THE WELL:
Anderson Engineering
Consultants Inc.

NAME OF LANDOWNER WHEN WELL WAS DRILLED:
Koppers Industries Inc.

WELL DATA

Well Depth	Casing Diameter (in.)	Casing Length (Ft.)
See Attachment		
Type of Casing	Hole Depth	Depth to Static Water Level

DATE WELL COMPLETED:

DESCRIBE HOW THE WELL OR HOLE WAS PLUGGED:
(AMOUNT OF CASING AND/OR SCREEN THAT WAS REMOVED, OR LEFT IN HOLE, MATERIAL USED IN PLUGGING, ETC.)

See Attachment

I CERTIFY THAT THE WELL WAS PLUGGED OR ABANDONED IN ACCORDANCE WITH THE STATE OF MISSISSIPPI REGULATIONS.

SIGNATURE

DATE 12/18/98

Post-it® Fax Note 7671
To ROSS
Co./Dept.
Phone #
Fax #
Date
From Johnny Biggert
Co.
Phone # 601-961-5213
Fax #
# of pages

Johnny Biggert
ENFORCEMENT OFFICER
Office of Land & Water Resources

MISSISSIPPI DEPARTMENT OF ENVIRONMENTAL QUALITY
P.O. Box 10631 Jackson, MS 39289-0631 Phone: 601.961.5210 Home: 601.857.5270
Fax: 601.354.6938 Email: Johnny_Biggert@deq.state.ms.us

ATTACHMENT

Koppers - Grenada MS.
Abandoned Monitor Wells

Well Number	Well Depth (ft)	Casing Diameter (inch)	Casing Type	Hole Depth (ft)	Depth to water level (ft)	Completion Date
OB-4	20	2	PVC/SS*	20.5	9.83	07/16/96
R96-5	12.5	2	PVC/SS*	14	5.27	07/23/96
R96-7	39.5	2	PVC/SS*	40	10.07	06/29/96
R96-8	26	2	PVC/SS*	35	7.46	07/02/96
R96-9	43	2	PVC/SS*	43	10.77	07/01/96
R96-10	35	2	PVC/SS*	35	8.80	06/27/96
R96-13	35	2	PVC/SS*	40	11.95	07/20/96
R-36	31.5	2	PVC	32	10.49	05/21/91

* These wells have stainless steel casing and screen below the static water level and PVC casing above the static water level.
Note: Well locations are shown on Figure 2-1.

Well Abandonment Procedures

Monitor wells OB-4, R96-5, R96-7, R96-8, R96-9, R96-10, R96-13, and R-36, were abandoned on December 13 through 14, in accordance with the State of Mississippi requirements. These wells were abandoned because they are no longer used to determine site conditions and they are potential pathways for the vertical migration of constituents. The well abandonment process consists of:

1. Confirm that the well casing is open to the total depth and free of obstructions by lowering a one half inch tremmie hose to the bottom of the well.

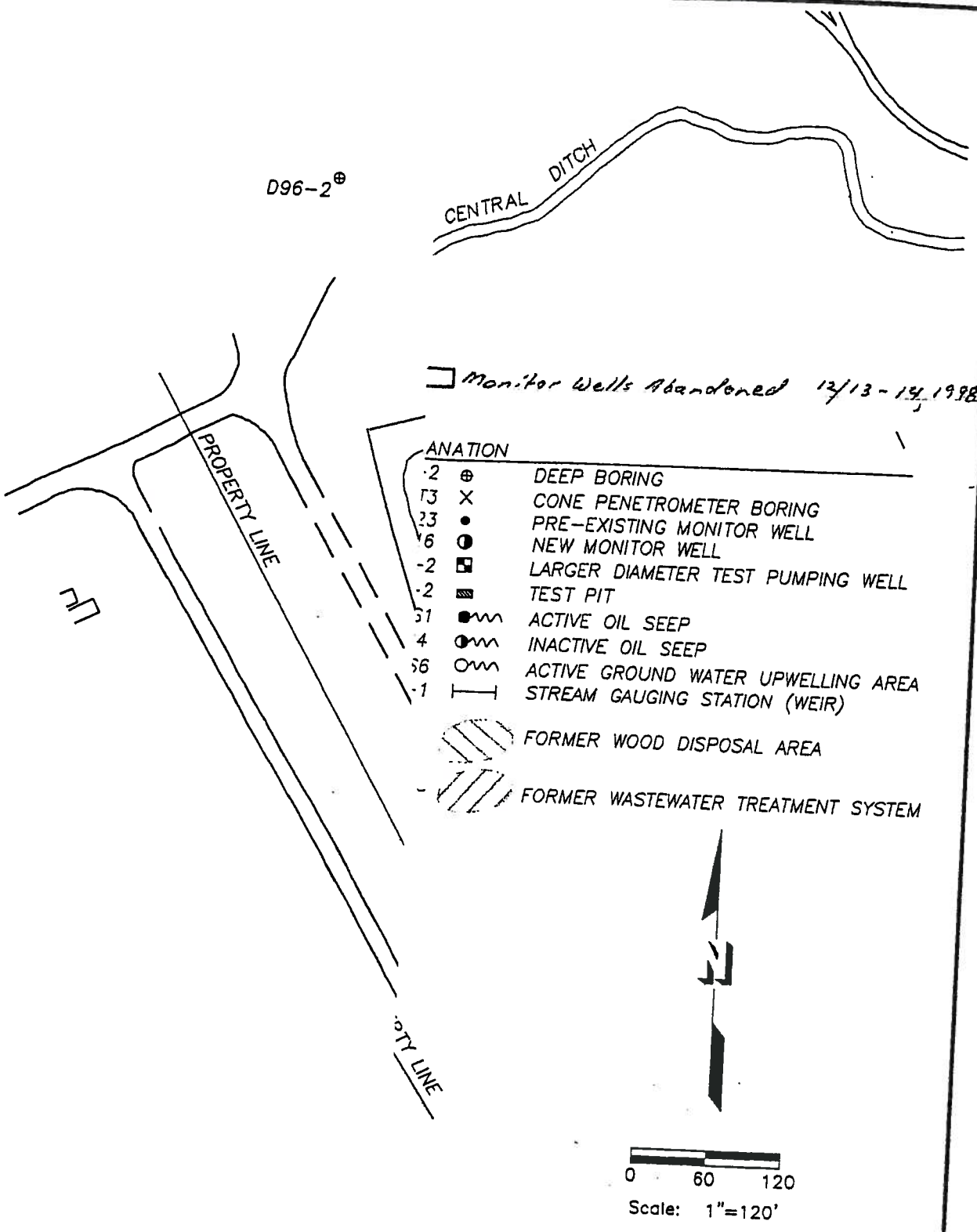
2. Prepare cement-bentonite grout consisting of: Type I cement, less than 10 gallons of water per 98 pound sack of cement and approximately 6% bentonite by dry weight of the cement .

3. Pressure grout the well casing by pumping the cement-bentonite grout through the tremmie hose filling the well casing from the bottom up. Continue pumping until full density grout runs out the top of the well casing.

4. Remove the protective outer well casing, the 2 feet by 2 feet concrete pad and the four steel traffic guard posts. Cut off the inner well casing approximately 1 foot below the ground surface.

5. Over fill the well casing with cement-bentonite grout, allowing the grout to mushroom over the well casing and fill the excavation made by the removal of the protective outer casing.

6. Fill in the holes left by the removal of the traffic guard post with soil.



Koppers Industries, Inc. Grenada Facility Grenada, MS	DATE: 11-19-96 DESIGNED: DL CHECKED: WMH APPROVED: DRAWN: TBL PROJ.: 506055100
Location of Test Pits, Borings, and Wells in the IM Study Area	
HYDRO-SEARCH, INC. A Tetra Tech Company	**Figure 2-1**

d\6055\00pbw

DAMES & MOORE
4949 ESSEN LANE, SUITE 900, BATON ROUGE, LOUISIANA 70809
(504) 769-2600 FAX: (504) 769-3695

November 3, 1992

Mr. James S. Kutzman, P.E.
U.S. Environmental Protection Agency, Region IV
Office of RCRA and Federal Facilities Branch
Waste Management
345 Courtland Street, N.E.
Atlanta, Georgia 30365

Additions/Revisions
Draft Phase II RCRA Facility Investigation Report
Class I Modification, Hazardous and Solid Waste Permit
Koppers Industries, Inc.
EPA I.D. No. MSD 007 027 543
Grenada, Mississippi
Job No. 18804-096-186A,C

Dear Mr. Kutzman:

As a follow-up to the submittal of the Draft Phase II RFI Report for the above-referenced site, Dames & Moore, Inc., on behalf of Beazer East, Inc., is enclosing three copies of additions/revisions to Section 4.2 (Spoil Piles) and Appendix G of the Draft Report. These additions/revisions are:

VOLUME I

- Page 4-60 has been revised to include the pentachlorophenol (PCP) analytical results which report PCP levels below the toxicity characteristic leaching procedure (TCLP) regulatory threshold limits.

- Page 4-60, last paragraph of Section 4.2, has been revised to reference the newly tabulated TCLP results of the large and small spoil pile samples in Appendix G, and the location of the laboratory reports in Attachment 10 of Volume II.

- Appendix G, List of Tables, has been revised to include Tables 4.1.1-45 through Table 4.1.1-50.

Accordingly, please insert these additions/revisions into the Draft Phase II Report. We apologize for any inconvenience that these inadvertent omissions may have caused. Unfortunately, these omissions occurred during final preparation of the report and did not become apparent to us until recently. Please call us at (504) 769-2600 if you have any questions.

Sincerely yours,

DAMES & MOORE, INC.

Jeffrey T. Jones
Project Hydrogeologist

Gregory W. Gardner
Manager, Louisiana
Geosciences/Environmental
Engineering Services

JTJ/GWG:drh

cc: Mr. Sam Mabry, MSDEQ
Mr. James A. Werling, Jr., Beazer East, Inc.

- Of the semi-volatile constituents, pentachlorophenol, 2,4,6-trichlorophenol, 2-methyl-phenol and 4-methyl-phenol were detected above the analytical detection limits, but below TCLP maximum concentration levels.

- Five organochlorine pesticide constituents, BMC-Gamma, Aldrin, Dieldrin, Endrin, and Heptachlor Epoxide were detected above analytical detection limits; however, at concentration levels below TCLP maximum concentration levels.

- Phenoxy herbicides were not detected above the analytical detection limits.

The laboratory analytical results are summarized in Appendix G, Tables 4.1.1-45 through 4.1.1-50. The laboratory reports are provided in Volume II, Attachment 10 of the Phase II RFI Report.

4.3 QUALITY ASSURANCE/QUALITY CONTROL

The KII Phase II RFI Investigation was conducted following the Quality Assurance/Quality Control (QA/QC) protocols in Section 4.2 of the Phase II RFI Workplan. The laboratory QA/QC for soil, sediment, groundwater, and surfacewater consisted of the following: method blanks, method blank spikes, matrix spikes, matrix spike duplicates and instrument blanks. Each laboratory instrument was calibrated using a set of five standards at different concentrations and a calibration blank. Laboratory Quality Control Summaries are provided with the analytical data presented in Volumes II and III.

Quality control reports, which include QA/QC tables, follow individual analytical data sets arranged chronologically by sampling date. For example, the quality control report for Drip Track soil boring samples DT-21 through DT-24 follows the analytical data in Attachment 6 of Appendix G.

APPENDIX G
TABLES

APPENDIX G
LIST OF TABLES (Continued)

APPENDIX G
LIST OF TABLES (Continued)

TABLE 4.1.1-45
SOIL ANALYTICAL DATA
SPOIL PILES FROM DRIP TRACK AND PROCESS AREAS
RCRA FACILITY INVESTIGATION
PHASE II
KOPPERS INDUSTRIES, INC.
GRENADA, MISSISSIPPI

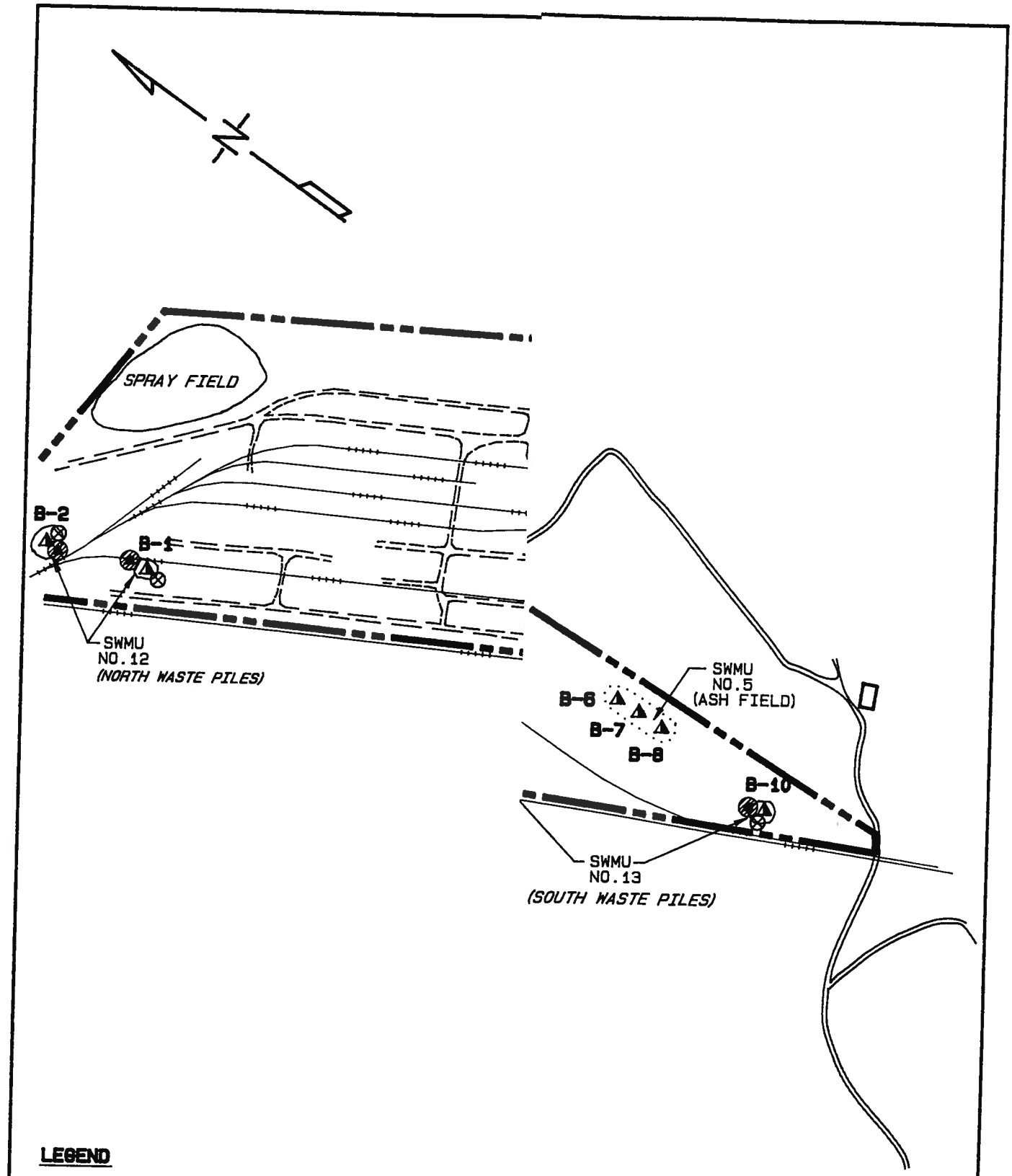
BORING NO. DEPTH IN FEET	SMH-1 (3)	SMH-2 (3)	LSP-1 (3)	LSP-2 (3)	LSP-3 (3)	LSP-4 (3)	LSP-5 (3)	LSP-6 (3)	LSP-7 (3)	LSP-8 (3)	LSP-9 (3)	LSP-10 (3)
pH (Standard Units)	7.30	7.25	7.60	7.60	7.65	7.55	7.55	7.60	7.55	7.55	7.55	7.55
REACTIVE CYANIDE (mg/kg)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
REACTIVE SULFIDE (mg/kg)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

NOTES:
1. ND means Not Detected
2. mg/kg = parts per million

TABLE 4.1.1-46
SOIL ANALYTICAL DATA
SPOIL PILES FROM DRIP TRACK AND PROCESS AREA
RCRA FACILITY INVESTIGATION
PHASE II
KOPPERS INDUSTRIES INC.
GRENADA, MISSISSIPPI

BORING NO. DEPTH IN FEET	SMH-1 (3)	SMH-2 (3)	LSP-1 (3)	LSP-2 (3)	LSP-3 (3)	LSP-4 (3)	LSP-5 (3)	LSP-6 (3)	LSP-7 (3)	LSP-8 (3)	LSP-9 (3)	LSP-10 (3)	* TLCP LEVELS
METALS(mg/L) TCLP LEACHATE													
SILVER	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5.0
BARIUM	0.715	0.575	0.460	0.576	0.340	0.766	0.684	0.555	0.754	0.695	0.641	0.500	100.0
CADMIUM	ND	ND	ND	ND	ND	ND	ND	ND	210	ND	ND	ND	1.0
CHROMIUM	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5.0
LEAD	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5.0
MERCURY	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.2
SELENIUM	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.0
ARSENIC	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5.0

NOTES:
1. ND means Not Detected
2. * TCLP Levels (Regulatory Threshold Limits,mg/L)
3. mg/L = parts per million



LEGEND

- ▲ – APPROXIMATE PHASE I SOIL BORING LOC
- ▲ – APPROXIMATE PROPOSED PHASE II BACKGR
- ⊘ – APPROXIMATE PROPOSED PHASE II SOIL B
- ⊗ – APPROXIMATE PROPOSED PHASE II SURFAC
- ✳ – APPROXIMATE PROPOSED PHASE II SOIL S

KEYSTONE
ENVIRONMENTAL RESOURCES, INC.

FIGURE 5-1
PHASE I AND PROPOSED PHASE II SOIL BORING LOCATIONS GRENADA, MS
KOPPERS INDUSTRIES, INC.
8/8/90 A105098

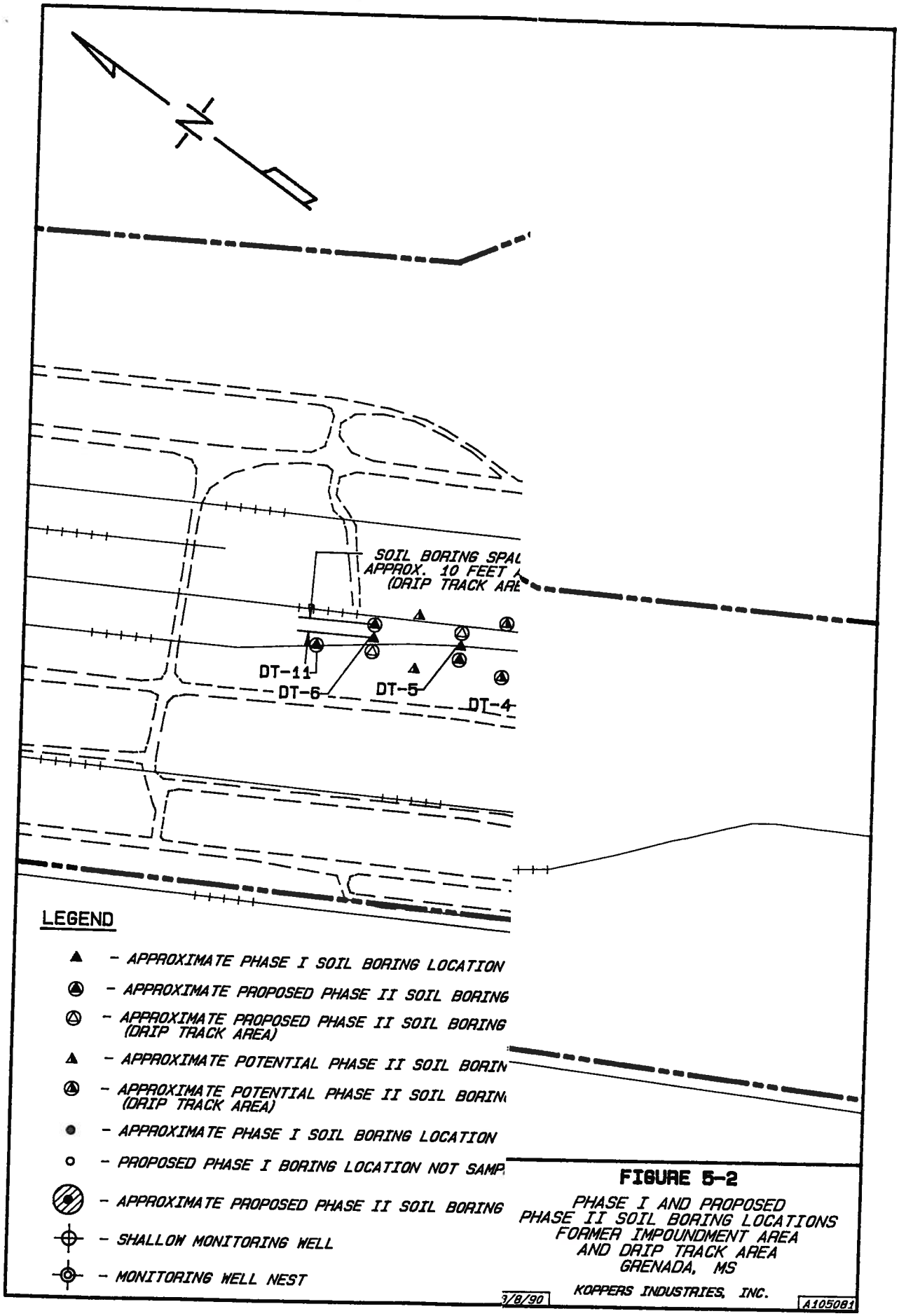


FIGURE 5-2

PHASE I AND PROPOSED
PHASE II SOIL BORING LOCATIONS
FORMER IMPOUNDMENT AREA
AND DRIP TRACK AREA
GRENADA, MS

TABLE 4.1.1-47
SOIL ANALYTICAL DATA
SPOIL PILES FROM DRIP TRACK AND PROCESS AREA
RCRA FACILITY INVESTIGATION
PHASE II
KOPPERS INDUSTRIES, INC.
GRENADA, MISSISSIPPI

BORING NO. DEPTH IN FEET	SMH-1 (3)	SMH-2 (3)	LSP-1 (3)	LSP-2 (3)	LSP-3 (3)	LSP-4 (3)	LSP-5 (3)	LSP-6 (3)	LSP-7 (3)	LSP-8 (3)	LSP-9 (3)	LSP-10 (3)	*TCLP LEVELS
PURGEABLE AROMATICS (ug/L) TCLP Leachate													
BENZENE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	500.0
CARBON TETRACHLORIDE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	500.0
CHLOROBENZENE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	100000.0
CHLOROFORM	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	6000.0
1,4-DICHLOROBENZENE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	570.0
1,2-DICHLOROETHANE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	500.0
1,1- DICHLOROETHENE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	700.0
TETRACHLOROETHENE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	700.0
TRICHLOROETHENE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	500.0
VINYL CHLORIDE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	200.0
2-BUTANONE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	200000.0

NOTES:
1. ND means Not Detected
2 *TCLP LEVELS(Regulatory Threshold Limits, ug/L)
3. ug/L = parts per billion

TABLE 4.1.1-48
SOIL ANALYTICAL DATA
SPOIL PILES FROM DRIP TRACK AND PROCESS AREA
RCRA FACILITY INVESTIGATION
PHASE II
KOPPERS INDUSTRIES, INC.
GRENADA, MISSISSIPPI

BORING NO. DEPTH IN FEET	SMH-1 (3)	SMH-2 (3)	LSP-1 (3)	LSP-2 (3)	LSP-3 (3)	LSP-4 (3)	LSP-5 (3)	LSP-6 (3)	LSP-7 (3)	LSP-8 (3)	LSP-9 (3)	LSP-10 (3)	*TCLP LEVELS
SEMIVOLATILES(ug/L) TCLP Leachate ========== PENTACHLOROPHENOL	*790	*1100	ND	25	ND	ND	160	ND	370	*540	*660	410	100000.0
2,4,5-TRICHLOROPHENOL	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	400000.0
2,4,6-TRICHLOROPHENOL	ND	ND	4.8	ND	ND	ND	ND	4.1	ND	ND	ND	ND	2000.0
1,4-DICHLOROBENZENE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	7500.0
HEXACHLOROBENZENE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	130.0
HEXACHLOROBUTADIENE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	500.0
HEXACHLOROETHANE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	3000.0
2-METHYL-PHENOL	ND	ND	38	27	33	ND	ND	ND	44	ND	ND	ND	—
3-METHYL-PHENOL	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	—
4-METHYL-PHENOL	ND	ND	ND	21	27	26	ND	ND	61	ND	ND	ND	—
2,4-DINITROTOLUENE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	130.0
NITROBENZENE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2000.0
PYRIDINE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5000.0

NOTES:
1. ND means Not Detected
2. *TCLP LEVELS (Regulatory Threshold Limits, ug/L)
3. * means Quantitated at Attitional Dilution
4. ug/L = parts per billion

TABLE 4.1.1-49
SOIL ANALYTICAL DATA
SPOIL PILES FROM DRIP TRACK AREA
RCRA FACILITY INVESTIGATION
PHASE II
KOPPER INDUSTRIES, INC.
GRENADA, MISSISSIPPI

BORING NO. DEPTH IN FEET	SMH-1 (3)	SMH-3 (3)	LSP-1 (3)	LSP-2 (3)	LSP-3 (3)	LSP-4 (3)	LSP-5 (3)	LSP-6 (3)	LSP-7 (3)	LSP-8 (3)	LSP-9 (3)	LSP-10 (3)	*TCLP LEVELS
ORGANOCHLORINE PESTICIDES(ug/L)													
TCLP Leachate													
==========													
ALDRIN	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.12	NA	NA	0.0
BHC-GAMMA	ND	ND	1.0	1.8	1.6	2.4	1.8	1.7	4.0	0.80	3.5	2.4	400.0
CHLORDANE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	30.0
DDT	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	NA	NA	0.0
DIELDRIN	NA	NA	ND	NA	NA	NA	NA	NA	NA	0.43	NA	NA	0.0
ENDRIN	ND	NA	0.16	ND	ND	ND	ND	ND	ND	0.18	ND	ND	20.0
HEPTACHLOR	ND	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	8.0
HEPTACHLOR EPOXIDE	ND	ND	1.3	1.1	1.3	1.8	1.6	1.4	0.99	1.5	1.3	1.5	8.0
TOXAPHENE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	500.0
METHOXYCHLOR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	10000.0

NOTES:
1. ND means Not Detected
2. NA Means Not Detected
3. *TCLP LEVELS (Regulatory Threshold Limits, ug/L)

Table 4.1.1-50
SOIL ANALYTICAL DATA
SPOIL PILES FROM DRIP TRACK AREA
RCRA FACILITY INVESTIGATION
PHASE II
KOPPERS INDUSTRIES, INC.
GRENADA, MISSISSIPPI

BORING NO. DEPTH IN FEET	SMH-1 (3)	SMH-3 (3)	LSP-1 (3)	LSP-2 (3)	LSP-3 (3)	LSP-4 (3)	LSP-5 (3)	LSP-6 (3)	LSP-7 (3)	LSP-8 (3)	LSP-9 (3)	LSP-10 (3)	*TCLP LEVELS
PHENOXY HERBICIDES (ug/L) TCLP Leachate ==========													
2,4-D	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	10000.0
SILVEX	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1000.0

1. ND Means Not Detected
2. TCLP Levels (Regulatory Threshold Limits, ug/L)

DAMES & MOORE A PROFESSIONAL LIMITED PARTNERSHIP
4949 ESSEN LANE, SUITE 900, BATON ROUGE, LOUISIANA 70809 (504) 769-2600
FAX NO. (504) 769-3695

December 12, 1991

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

U.S. Environmental Protection Agency
RCRA Federal Facilities Branch
Waste Management Division
345 Courtland Street, N.E.
Atlanta, Georgia 30365

Attention: Ms. Patricia Anderson
Environmental Engineer

Re: RCRA Facility Investigation
Revised Schedule
Koppers Industries, Inc., for
Beazer East, Inc.
Grenada, Mississippi
D&M Job No. 18804-096-186

Dear Ms. Anderson:

On behalf of Beazer East, Inc. (Beazer) and pursuant to your December 10, 1991, telephone conversation with Mr. Jim Werling of Beazer, Dames & Moore is submitting a revised schedule for completion of the Phase II RFI at the Koppers Industries, Inc. facility in Grenada, Mississippi. The previous schedule has been revised to include completion of the approved Supplemental Soil Boring Program (Dames & Moore, September 27, 1991) and offsite monitoring wells in accordance with the general understanding of the revised offsite access agreements (Beazer East, Inc., December, 1991).

The field work, sample analysis, and data evaluation tasks required by the Supplemental Work Plan will add approximately 90 days to the original schedule, moving the submittal date of the RFI report to May 1992.

We trust this information satisfies your needs. Upon request of the Agency's written approval, Beazer will implement the supplemental work in accordance with the revised schedule. If you have any questions, please contact us at (504) 769-2600 or Mr. Werling of Beazer at (412) 227-2189.

Very truly yours,

DAMES & MOORE
A Professional Limited Partnership

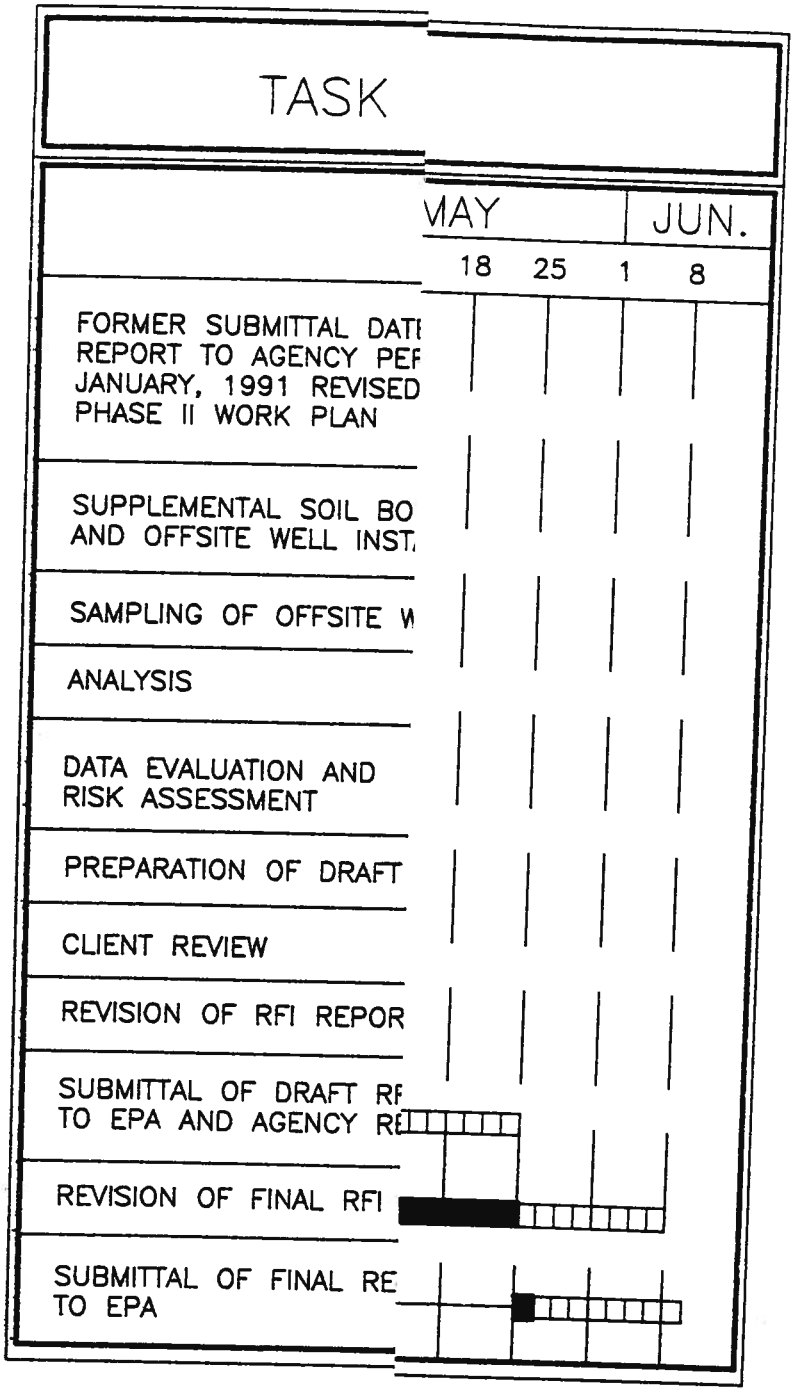
Fernando Iturralde
Staff Geologist

Gregory W. Gardner
Unit Leader, Baton Rouge
Geosciences/Environmental
Engineering Services

FI/GWG:drh

Attachment: Phase II RFI Revised Schedule

cc: Mr. James H. Scarbrough (U.S. EPA, Region IV)
Mr. David Pecock (MDEQ)
Mr. Jim Werling (Beazer East, Inc.)
Mr. Norbert Schulz (Beazer Program Office)



ATTACHMENT 1
PHASE II RFI
REVISED SCHEDULE

DAMES & MOORE

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IV
345 COURTLAND STREET, N.E.
ATLANTA, GEORGIA 30365

DEC 3 0 1991

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

4WD-RCRAFFB

Mr. James A. Werling, Jr.
Program Manager Environmental Services
Kopper's Industries, Inc.
Grenada Tie Plant
P.O. Box 160
Grenada, Mississippi 38960

DIVISION OF SOLID WASTE
REVIEWED BY DKP
DATE 01/02/92
COMMENTS
No ACTION

Re: Approval of RFI Supplemental Work Plan
Proposed Additional Soil Borings
Koppers Industries, Inc.
Grenada, Mississippi
EPA I.D. Number MSD 007 027 543

Dear Mr. Werling:

The United States Environmental Protection Agency (EPA) has reviewed Koppers Industries, Inc.'s RCRA Facility Investigation (RFI) Supplemental Work Plan dated October 2, 1991. Based on EPA's review, this Work Plan is approved. However, the EPA may require further investigation of Solid Waste Management Unit (SWMU) 12, if the laboratory analyses of surface soil samples, collected in this SWMU, determine chemical concentration values are above Action Levels.

This letter constitutes final approval of your RFI Supplemental Work Plan. Any deviations from this Work Plan, as approved is a violation of your RCRA permit and subject to enforcement actions. As per your letters dated June 28, 1991, and December 12, 1991, requesting an extension of the due date for the Draft RFI Report, this Report is due to this office no later than May 29, 1992. The Report should be mailed to:

Mr. James S. Kutzman, P.E.
Office of RCRA and Federal Facilities Branch
Waste Management Division
U.S. EPA Region IV
345 Courtland Street, NE
Atlanta, Georgia 30365

Failure to comply with any permit condition may result in an enforcement action initiated by EPA pursuant to Section 3008 of RCRA, 42 U.S.C. 6928, under which EPA may seek the imposition of penalties of up to $25,000 per day of continued non-compliance. If there are any questions, please contact Pat Anderson of my staff at (404) 347-3433.

Sincerely yours,

James S. Kutzman

James S. Kutzman, P.E.
Associate Director
Office of RCRA and Federal Facilities Branch
Waste Management Division

CC: Mr. Sam Mabry, MSDEQ

DAMES & MOORE A PROFESSIONAL LIMITED PARTNERSHIP
4949 ESSEN LANE, SUITE 900, BATON ROUGE, LOUISIANA 70809 (504) 769-2600
FAX NO. (504) 769-3695

October 4, 1991

Mr. David Pecock
Mississippi Department of Environmental Quality
Bureau of Pollution Control
2830 Highway 80 West
Jackson, Mississippi 39204

RE: Phase II RFI
Quarterly Progress Report
Koppers Industries, Inc.
Grenada, Mississippi
MSD007027543
D&M Job No. 18804-096-186

Dear Mr. Pecock:

On behalf of Beazer East, Inc., enclosed are three copies of the Phase II RFI, Quarterly Progress Report for the above-captioned facility. This report is being submitted in accordance with provision 11.F.4.i of the Hazardous Waste Permit.

We trust this information meets your needs. If you should have any questions regarding this submittal, please contact Mr. Jim Werling of Beazer at (412) 227-2189.

Sincerely yours,

DAMES & MOORE
A Professional Limited Partnership

Jeffrey T. Jones
Project Hydrogeologist

Zia O. Tammami, P.G.
Manager, Gulf Geosciences &
Environmental Engineering Services

PRS:sgt
Enclosure
cc: Mr. Jim Werling
Mr. James Scarbrough
Mr. Norbert Schulz

Curriculum Vitae

PAUL D. MILLS

TITLE: Lead Chemist

COMPANY: ACCULAB Environmental Services

EXPERTISE: Volatile and semivolatile analyses by GC/MS; Indoor air sampling; arson analyses.

REPRESENTATIVE WORK EXPERIENCE:

Joined ACCULAB in 1988.

- Supervisor of Gas Chromatography/Mass Spectrometry (GC/MS) department and GC/MS extractions.
- Supervise three GC/MS operators and two technicians for the analysis of environmental samples using Methods 8240, 8270, 624 and 625, utilizing Finnigan and Hewlett Packard GC/MS/DS.

PREVIOUS WORK EXPERIENCE:

Associate Chemist, Fireman's Fund Environmental Laboratory, Petaluma, CA (1988).

- Operated Finnigan GC/MS equipment (Models 1050 and 5100).
- Programmed in INCOS language and developed automatic quantitation procedures and autosampling routines.
- Devoloped new methods of sample analysis.

Chemist, ThermoAnaltical Environmental Laboratory, (1987-88).

- Operated Hewlett Packard GC/ECD equipment (Model 5880 and 5890).
- Used NELSON Analytical Database software and hardware.
- Supervised EPA CLP Pesticides and analyzed water and soil samples for chlorinated pesticides, PCB's and herbicides.

RCRA Facility Investigation Quarterly Progress Report
Kopper's Industries, Inc./Beazer East, Inc.
Grenada, Mississippi

In accordance with requirement II.F.4.i, of the Hazardous Waste Permit, the following represents the second quarterly progress report for the Kopper's Industries, Inc. Phase II RCRA Facility Investigation initiated May 1, 1991. This progress report addresses the following items:

a. A description of the portions of the RFI completed;

b. Summaries of the findings;

c. Summaries of all deviations from the approved RFI Work Plan during the reporting period;

d. Summaries of all problems or potential problems encountered during the reporting period;

e. Projected work for the next reporting period; and

f. Copies of daily reports, inspections, laboratory monitoring data, etc.

Each of the above issues are discussed below:

a. The field activity portions of the RFI Work Plan completed as of September 11, 1991 are:

   1. The monitoring well installation program, with the exception of the five off-site wells;

   2. The soil boring program;

   3. The surficial soil, stream, sediment and surface-water sampling;

   4. Ground-water sampling;

   5. Surveying of soil boring and monitoring well locations; and

   6. Aquifer characterization.

With the exception of the off-site wells discussed in Item C, the project is proceeding according to the Work Plan schedule.

b. The findings of the ground-water sampling and the aquifer characterization programs are incomplete as the ground-water analytical results have not yet been received from the laboratory.

c. There have been no deviations from the approved RFI Work Plan during this reporting period. Based on the field data collected during the initial soil boring investigation of SWMUs 1, 4, 9 and 10 (the Process Area), SWMU 8 (the Drip Track Area) and SWMU 11 (the Former Waste Treatment System Area) in which stains and/or non-aqueous phase liquids (NAPL) were observed, Dames & Moore prepared a Supplemental Soil Boring Investigation Work Plan which was submitted on September 27, 1991, for agency approval. The proposed scope of work for the supplemental investigation is as follows:

- The drilling of four soil borings in the Process Area;
- The drilling of 12 soil borings in the Drip Track Area;
- The drilling of three soil borings in the Former Waste Treatment System Area;
- Continuous sampling of each soil boring for lithologic characterization;
- Analysis of selected soil samples collected from the borings for the constituents outlined in the approved RFI Work Plan;
- Upon agency acceptance of the Work Plan, Beazer will initiate the proposed supplemental work; and
- In the previous progress report, it was stated that a supplemental monitoring well described in Section 5.1.2 of the RFI Work Plan would be installed in the vicinity of SWMU 12 based on a preliminary review of analytical results of soil samples. Upon further review of soil sample data, it was noted that the data reported in the previous progress report reflected spike sample recoveries. The actual results representative of field conditions are given in Table 1. As provided in Table 1 attached, the analytes detected in the soil samples were not considered to be at levels which would warrant the installation of an additional monitoring well. At this time, the installation of an

additional monitoring well downgradient from the southernmost waste pile in SWMU No. 12 (North Waste Piles) is not recommended.

Beazer East submitted a letter on August 30, 1991, informing EPA that efforts to secure access from the adjacent landowner east of the facility have been unsuccessful. This difficulty constituted a force majeure event which will prevent Beazer from installing the five off-site monitoring wells (R36, LR38/38B, and R39B/39C). Unless directed otherwise, Beazer will continue the Phase II RFI without the information from the offsite wells in accordance with the Work Plan schedule.

d. There were no problems encountered during this reporting period.

e. The remaining field activities, with the exception of the installation of the five off-site wells, were completed during the week of September 6, 1991. The date for the installation of the off-site wells has not been determined as of this submittal. We will proceed with the approved schedule without the off-site well information unless directed otherwise. Upon receiving agency approval of the Supplemental Soil Boring Work Plan, a schedule for performing these activities will be developed and submitted to EPA in the next quarterly progress report.

f. A database of the laboratory analytical data is being developed; however, the database has not been completed as of this submittal. We anticipate including this database information into the next quarterly progress report.

DAMES & MOORE A PROFESSIONAL LIMITED PARTNERSHIP
880 COMMERCE ROAD WEST, SUITE 400, NEW ORLEANS, LOUISIANA 70123
(504) 734-5818 FAX NO. (504) 734-5951

June 28, 1991

Ms. Gail Macalusa
Mississippi Department of Environmental Quality
Bureau of Pollution Control
2830 Highway 80 West
Jackson, Mississippi 39204

RE: Phase II RFI
Quarterly Progress Report
Koppers Industries, Inc.
Grenada, Mississippi
MSD007027543
D&M Job No. 18804-096-186

Dear Ms. Macalusa:

On behalf of Beazer East, Inc., enclosed are three copies of the Phase II RFI, Quarterly Progress Report for the above-captioned facility. This report is being submitted in accordance with provision 11.F.4.i of the Hazardous Waste Permit.

We trust this information meets your needs. If you should have any questions regarding this submittal, please contact Mr. Jim Wurling of Beazer at (412) 227-2189.

Sincerely yours,

DAMES & MOORE
A Professional Limited Partnership

Paul R. Schneider
Manager, New Orleans Office

PRS:sgt
Enclosure
cc: Mr. Jim Wurling
Mr. James Scarbrough
Mr. Norbert Schulz

RCRA Facility Investigation Quarterly Progress Report
Kopper's Industries, Inc./Beazer East, Inc.
Grenada, Mississippi

JUL - 1 1991

In accordance with requirement II.F.4.i, of the Hazardous Waste Permit, the following represents the first quarterly progress report for the Kopper's Industries, Inc. Phase II RCRA Facility Investigation initiated May 1, 1991. This progress report addresses the following items:

a. A description of the portion of the RFI completed;

b. Summaries of the findings;

c. Summaries of all deviations from the approved RFI Work Plan during the reporting period;

d. Summaries of all problems or potential problems encountered during the reporting period;

e. Projected work for the next reporting period; and

f. Copies of daily reports, inspections, laboratory monitoring data, etc.

The following responses address the above issues:

a. The field activity portions of the RFI Work Plan completed as of June 30, 1991 are:

1) The monitoring well installation program, with the exception of the five off-site wells;

2) The soil boring program; and

3) The surficial soil, stream, sediment, and surface water sampling.

Beazer East is continuing its negotiation with the adjacent landowner east of the facility regarding the installation of the five off-site monitoring wells(R37, R38, R38B, R39B, R39C). Due to this delay, additional time is required to complete the monitoring well installation program beyond the scheduled

completion date of May 28, 1991.

In order to assess the subsurface geologic conditions prior to aquifer characterization, four soil boring locations were selected and drilled for the collection of the geotechnical soil samples. The locations are as follows:

Boring	Location
GB-1	Half way between wells R-41 and PW-1
GB-2	Between wells PW-1 and R-23B
GB-3	South of well R-23B
GB-4	North of well R-23B

Soil samples were also collected from the process and container storage areas for characterization purposes.

In addition, two soil borings, SB-17 and SB-18, located downgradient from SWMU 12 (North Waste Piles), were drilled and sampled to 14 ft and 22 ft, respectively on May 6, 1991, preparatory to the potential installation of one monitoring well immediately downgradient from the southernmost waste pile. Based on the analytical results from these borings, provided in Table 2, the monitoring well will be installed.

With the exception of the off-site wells, the project is one week ahead of schedule.

b. A summary of the monitoring well construction details for the newly installed wells is provided in Table 1. The findings of the soil boring and surficial soil, stream, sediment and surface water sampling programs are incomplete because the analytical data are not yet available. The findings of these programs will be summarized in subsequent quarterly reports.

c. A summary of deviations from the approved RFI Work Plan during this reporting period include the following:

- Sample equipment preparation;
- Sample equipment decontamination procedure;
- Soil classification system;
- HNu calibration gas; and

- The screened interval for monitoring well R-23B.

Section 5.1 of the Quality Assurance Project Plan (QAPP) describes a rigorous sample equipment preparation procedure for bailers and funnels, well (bladder) pumps, and other equipment (e.g., trowel, trays). However, it is not clear if split spoon samplers are also required to undergo one of these procedures. In order to establish a consistent equipment preparation procedure, all of the miscellaneous sampling equipment (knives, trowels) were purchased new and a baseline equipment rinsate was created in the field prior to their use. The equipment blank was prepared using the field decontamination procedure discussed below. Baseline equipment blanks were prepared for split spoon samplers with the same procedure, although these were not purchased new.

The approved Work Plan is inconsistent with regard to the field decontamination procedure. Page 5-7 of the Work Plan calls for hexane for split spoon samplers, while page 5-10 of the QAPP specifies acetone. Hexane has been selected as the solvent for decontamination of all the equipment previously mentioned because of the potential interference of acetone in the analysis of volatile organic compounds.

The Burmeister Classification System is identified in the Work Plan for describing lithology. However, D&M standard procedures call for the use of the more widely accepted Unified Soil Classification System (USCS). Therefore, the USCS has been used. These methods vary only slightly as a means of describing lithology and direct correlations can be made between classifications.

The HNu calibration gas specified in the Work Plan is n-hexane. Based on discussion with Dames & Moore's industrial hygienist, isobutylene was selected as the preferred HNu calibration gas.

The locations for monitoring wells as shown in the Work Plan and as installed in the field are generally consistent. In some instances, the specific well location was moved due to access limitations and potential interference with plant operations. In no instance is the distance from the well location in the Work Plan to the actual location in the field greater than approximately 10 feet. In all instances of well relocation, due consideration was given to the new location's position relative to groundwater gradient from the designated SWMU.

The proposed depth for pumping well R-23B was 42 feet below land surface (ft-bls), such that the top of the screen (at 32 ft-bls) was to be ten feet below the bottom of the screen in the existing shallow well (at 22 ft-bls). During the

drilling of the borehole, sand was not encountered in the lower zone until a depth of 42 ft-bls had been reached. As the intended purpose of this well was for use as a pumping well during the aquifer characterization, the boring was drilled an additional eight feet to allow the well screen to be set entirely in the lower sand. As installed, the well is screened from 44 to 54 ft-bls, rather than the proposed 32 to 42 ft-bls.

d. A summary of problems encountered during the reporting period is contained in Item c., above, which discusses deviations from the Work Plan.

e. The anticipated sequence of field activities and estimated completion dates for the next quarter are as follows:

		Estimated Completion Date
1.	Surficial Soil, Stream Sediment and Water Sampling	07-01-91
2.	Aquifer Characterization	08-16-91
3.	Ground-Water Sampling	07-12-91
4.	Surveying	07-12-91
5.	Off-site monitoring well installation	To be determined

f. The soil data base is not complete as of this submittal. Copies of field and laboratory monitoring data will be provided in the next quarterly report.

TABLE 1
MONITORING WELL INSTALLATION PROGRAM

RCRA Facility Investigation
First Quarterly Progress Report
Kopper's Industries, Inc.Facility
Grenada, Mississippi

Well Construction Details

Well Name	Location	Depth (ft-bls)	Screened Interval (ft-bls)	Casing
R-32	S Portion of Plant	28.5	18-28	
R-33	SWMU 1, 4, 9, 10	26.5	16-26	
R-19B	SWMU 6	49.5	39-49	6 in., 20 ft.
R-25B	SWMU 8	53.5	43-53	6 in., 20 ft.
R-34	SWMU 8	32.5	22-32	
R-35	SWMU 8	27.5	17-27	
R-42	SWMU 13	25.8	15-25	
R-43	SWMU 13	24.5	14-24	
R-40	Process Cooling Pond	28.5	18-28	
R-41	NE Portion of Plant	26.5	16-26	
R-44	SW Portion of Plant	22.5	12-22	
R-45	NE Portion of Plant	30.5	20-30	
R-20B	SWMU 1,4,9,10	53.5	43-53	6 in., 30 ft.
R-21B	SWMU 1,4,9,10	50.0	39.5-49.5	6 in., 25 ft.
R-12C	SWMU 11	63.0	52.5-62.5	
R-16B	SWMU 11	42.5	32.0-42.0	
R-36	SWMU 11	32.0	21.5-31.5	
R-23B	SWMU 11 (Pumping Well)	44.5	34-44	8 in., 25 ft.
PW-1	NE/Central Portion of Plant (Pumping Well)	32.5	22-32	

TABLE 2
SOIL ANALYTICAL DATA

RCRA FACILITY INVESTIGATION
FIRST QUARTERLY REPORT
KOPPERS INDUSTRIES, INC. FACILITY
GRENADA, MISSISSIPPI

SOIL BORINGS SB-17(B-1) AND SB-18(B-2)
SWMU NO. 12 (NORTH WASTER PILES)

	SB-17 (2-4)	SB-17 (10-12)	SB-18 (8-10)	SB-18 (16-18)	HEALTH BASED CRITERIA FOR SYSTEMIC TOXICANTS SOIL(MG/KG)	WATER(UG/L)
PHENOLS(UG/KG)						
PHENOL	ND	ND	4,500	ND	3,000	1,000
2-CHLOROPHENOL	ND	ND	4,100	ND	NA	NA
4-CHLORO-M-CRESOL	ND	ND	5,000	ND	4,000	2,000
4-NITROPHENOL	ND	ND	5,200	ND	NA	NA
PENTACHLOROPHENOL	ND	ND	5,500	ND	2,000	1,000
PURGEABLE AROMATICS(UG/KG)						
BENZENE	210	ND	ND	ND	NA	5(MCL)
CHLOROBENZENE	250	ND	ND	ND	2,000	1,000
1,2-DICHLOROBENZENE	230	ND	ND	ND	NA	NA
POLYNUCLEAR AROMATICS(UG/KG)						
NAPTHALENE	2,400	ND	ND	2,280	NA	NA
ACENAPHTHYLENE	ND	ND	ND	4,150	NA	NA
ACENAPHTHENE	ND	ND	ND	2,310	NA	NA
FLUORENE	ND	ND	ND	485	NA	NA
PHENANTHRENE	475	ND	ND	1,070	NA	NA
ANTHRACENE	4,830	ND	ND	1,010	NA	NA
FLUORANTHENE	1,100	27.4	ND	956	NA	NA
PYRENE	1,260	45	ND	251	NA	NA
BENZO(A)ANTHRACENE	196	6.62	ND	40.7	NA	NA
CHRYSENE	546	ND	ND	453	NA	NA
BENZO(B)FLUORANTHENE	274	4.72	ND	34.9	NA	NA
BENZO(K)FLUORANTHENE	132	2.54	ND	10.1	NA	NA
BENZO(A)PYRENE	124	3.17	ND	25.5	NA	NA
DIBENZ(AH)ANTHRACENE	ND	ND	ND	51.3	NA	NA
BENZO(GHI)PERYLENE	129	2.77	ND	68.6	NA	NA
INDENO(123CD)PYRENE	79.7	ND	ND	277	NA	NA

Beazer

BEAZER EAST, INC., 436 SEVENTH AVENUE, PITTSBURGH, PA 15219 USA

June 7, 1991

Mr. James H. Scarbrough, P.E., Chief
RCRA and Federal Facilities Branch
Waste Management Division
U.S. EPA - Region IV
345 Courtland Street, NE
Atlanta, GA 30365

Re: Koppers Industries, Inc.
Grenada RFI
Grenada Tie Plant, Mississippi

Dear Mr. Scarbrough:

The purpose of this correspondence is to notify you our difficulties in obtaining access to offsite monitoring well locations for the above-referenced RFI. Beazer East, Inc. has been unable to obtain access to the properties owned by Mr. and Mrs. Wayne Carlin. A standard access agreement, forwarded to the owners on September 27, 1989 for purposes of the Groundwater Quality Assessment (GWQA) was initially rejected. A revised access agreement which included the offsite wells necessary for the RFI and GWQA was mailed to the owners on April 8, 1991. To date, the property owners have not provided access and are still reviewing the proposed agreement.

Access to the properties in question is necessary for the installation of offsite monitoring wells R-37, R-39B, R-39C, R38B, R-38 as shown on Figure 5-3 of the RFI Work Plan and for the Groundwater Quality Assessment. At this time, all other wells have been installed, and the test boring program is proceeding on schedule. Because access to the above-mentioned areas cannot be obtained Beazer East, Inc. will be unable to meet the schedule provided in the RFI Work Plan. These wells will be installed once access is obtained.

If you have any questions, please do not hesitate to contact me at 412/227-2185. We will keep you informed of our progress in obtaining access.

Sincerely,

Jane M Patarcity

Jane M. Patarcity
Program Manager - Environmental Services

JMP/dlk

cc: J. Mark Hansen
J. Werling
R. G. Hamilton
J. D. Clayton (KII - Grenada)
J. Batchelder (KII)
T. Hopper - (MDEQ)

BEAZER EAST, INC., 436 SEVENTH AVENUE, PITTSBURGH, PA 15219 USA

June 7, 1991

Mr. Thad Hopper
Mississippi Department of Environmental Quality
2380 Highway 80 West
Jackson, MS 39204

Re: Offsite Access - Groundwater Quality Assessment and RFI
Koppers Industries, Inc.
Grenada Facility
Tie Plant, Mississippi

Dear Mr. Hopper:

As per our phone conversation, attached is the access agreement sent to Mr. and Mrs. Wayne Carlin to obtain access to offsite monitoring well locations.

If you have any questions, please call me at 412/227-2185.

Sincerely,

Jane M Patarcity

Jane M. Patarcity
Program Manager-Environmental Services

/ldh

cc: J. Werling
M. Hansen

Beazer

BEAZER EAST, INC., 436 SEVENTH AVENUE, PITTSBURGH, PA 15219 USA

April 8, 1991 FEDERAL EXPRESS

Mr. Wayne E. and Mrs. Lucille B. Carlin
Route 2
Stryker, OH 43557

Re: Koppers Industries, Inc.
Tie Plant, Mississippi

Dear Mr. Carlin:

Attached is a revised access agreement for the installation and sampling of monitoring wells on property you own in the vicinity of the Koppers Industries, Inc. facility, Tie Plant, Mississippi. The revised access agreement addresses the concerns you expressed during our telephone conference on March 4, 1991. As we discussed, these wells are required by the U.S. Environmental Protection Agency and the Mississippi Department of Environmental Quality to be installed as part of a Groundwater Quality Assessment and Resource Conservation and Recovery Act (RCRA) Facility Investigation.

I will call you during the week of April 8, 1991 to discuss the agreement. At this time, we can also discuss the sampling you requested during out telephone conference.

If you have any questions, please call me at 412/227-2185.

Sincerely,

Jane M Patarcity

Jane M. Patarcity
Program Manager-Environmental Services

/ldh

cc: Mark Hansen

ACCESS AGREEMENT

Wayne E. Carlin and Lucille B. Carlin as owner of the real estate known as Parcel 2, T22N, R5E, Section 33, Grenada County, Grenada MS (hereinafter "Owner") hereby grants to Beazer East, Inc., formerly Koppers Company, Inc. (hereinafter "Beazer"), its employees agents and contractors, the right to, at Beazer's sole cost and expense, enter upon said real property for the sole purpose of surveying, excavating, drilling, coring, sampling, construction of water or other wells and well testing to be located on the said property. The locations of the wells to be installed are shown on Keystone Environmental Resources, Inc. Drawing No. A105096.

Such surveying, excavating, coring, sampling, construction of water or other wells and well testing is being conducted as part of a Groundwater Quality Assessment Investigation and a Resource Conservation and Recovery Act Facility Investigation.

It is expressly agreed and understood that this agreement shall not operate or be construed to create the relationship of landlord and tenant between the parties hereto under any circumstances whatsoever and Owner has absolute, complete and unimpeded right to deal with the real property in question as any other party with free and simple title except that Owners, their heirs, administrators, executors, successors and assigns shall, during the term of this Access Agreement, in no way interfere with the integrity of any water wells constructed on the property by Beazer, its employees, agents or contractors and the right of ingress and egress by Beazer, its employees, agents or contractors to monitor said water wells. This agreement is not to be considered as an easement for Beazer.

Beazer shall provide Owner with all written reports, data, information, conclusions, recommendations and all other work product that impact on the environmental condition of the property, provided such written material is given by Beazer to the Mississippi Department of Environmental Quality or United States EPA.

Beazer agrees to defend, indemnify and save harmless Owner, from all losses, claims, liabilities, expenses and costs (including death) occurring in connection with Beazer exercise of the rights herein granted, or arising from any wrongful or negligent act or omission of Beazer, its employees, agents or contractors, in the performance hereunder.

At such time when monitoring wells and other exploratory borings are no longer needed, Beazer shall remove and abandon each in accordance with applicable requirements of the State of Mississippi.

Upon removal of the wells, Beazer agrees to return the site to it's original condition.

This agreement shall be and remain in effect for a period of one year from the date hereof, and thereafter shall be automatically renewed from year to year until terminated by either party giving to the other not less than sixty (60) days period written notice of termination; provided, however, that any termination of this agreement by either party shall not occur without the prior written consent of the Mississippi Department of Environmental Quality or the United States EPA as the case may require.

IN WITNESS WHEREOF and intending to be legally bound, the parties hereto have caused this instrument to be duly signed this _____ day of _____, 1991.

WITNESS: Beazer East, Inc.

BY: _____

TITLE: _____

DATE: _____

WITNESS:

BY: _____

TITLE: _____

DATE: _____

BEAZER EAST, INC., 436 SEVENTH AVENUE, PITTSBURGH, PA 15219 USA

April 24, 1991

APR 25 1991

Mr. James H. Scarbrough
U.S. Environmental Protection Agency
Region IV
RCRA & Federal Facilities Branch
Waste Management Division
345 Courtland Street, NE
Atlanta, GA 30365

RE: Notification of Intent to
Begin Phase II RFI at
Koppers Industries, Inc.
Grenada, MS Facility
MSD007027543

Dear Mr. Scarbrough:

The purpose of this letter is to provide the U.S. Environmental Protection Agency, Region IV with notification of Beazer East, Inc.'s (Beazer) intention to initiate the Phase II RCRA Facility Investigation at the above-referenced facility. In accordance with the schedule presented in the approved workplan, work will begin on May 1, 1991.

In addition, please note that we have selected a different consultant and analytical laboratory to implement the RFI Workplan. Dames & Moore will now serve as our consultant and Acculab Environmental Services (Acculab) of Petaluma, California will provide the analytical services for the investigation. Analytical services will be performed in accordance with the approved laboratory Quality Assurance/Quality Control program.

The following are the key personnel now involved with the project:

- Project Manager - Mr. Paul Schneider of Dames & Moore
- Project Advisor - Mr. Norbert Schulz of Dames & Moore
- Laboratory Director - Mr. George Dunstan of Acculab
- Laboratory Project Manager - Mr. Greg Nagle of Acculab

Curriculum Vitae for these and other persons involved with the project are attached to this letter for reference. Please contact me at 412/227-2185 should you have any questions regarding the schedule or changes in the project team.

Sincerely,

Jane M Patarcity

Jane M. Patarcity
Program Manager-Environmental Services

/ldh
cc: P. Anderson - EPA
T. Hopper - MDEQ
G. Macalusa - MDEQ
M. Hansen (w/o encl.)
R.G. Hamilton (w/o encl.)
J. Batchelder - KII (w/o encl.)
J. D. Clayton - KII (w/o encl.)
N. Schulz - D&M (w/o encl.)
P. Schneider - D&M (w/o encl.)

Curriculum Vitae

JANE B. ANDERSON

TITLE: Sample Control Officer

COMPANY: ACCULAB Environmental Services

EXPERTISE:
Hiring and managing personnel
Planning and developing programs
Laboratory Technician
Record keeping
Analyst for designated toxic substances
Client consulting

REPRESENTATIVE WORK EXPERIENCE:

Joined ACCULAB in 1989.

- Development and implementation of log-in and sample tracking procedures.
- Manage sample control personnel to see that sample control S.O.P.'s are followed.
- Client contact pertaining to corrections needed so that their analyses can be processed.

PREVIOUS WORK EXPERIENCE:

Supervisor (1985-89), Senior Laboratory Technical Manager (1982-85), TMA-NORCAL, Richmond, CA.

- Developed Sample Control Procedures Manual and responsible for publication of Environmental Impact Reports.
- Worked with operations managers and QA manager to establish standard operating procedures for all aspects of sample management.
- Enter data into computer system, generate sample related reports, inform operations of sample receipt and tests required, and maintain all logs and data paperwork, including sample storage and disposal.

Curriculum Vitae

- Work with program manager and clients to unravel ambiguous inputs regarding analysis requirements, sampling container shipments, subcontracting of analyses, and transfer of data from laboratory.
- Track sample status, run weekly status meeting, and distribute weekly status report.
- Conduct audits with clients regarding sample management procedures.

Microscopy Lab Technician, EAL Corporation, Richmond, CA (1979-82).

- Responsible for counting asbestos fibers and identifying other particulates in ambient air.

Independent Consultant, Fairfax, San Anselmo and San Rafael School Districts, Marin County, CA.

- Program developer of outdoor nature series for children geared toward ecological enrichment and awareness.
- Created a six-week educational study course for teachers, enabling them to design ecological programs of their own.
- Botanist for the study of C. Faude Park in San Anselmo, CA.
- Prepared Botanical Research Study for City of San Anselmo, CA.

- Writer and researcher for The Leaf Book: A Field Guide to Plants of Northern California.

ACADEMIC BACKGROUND:

Studied Botany, Marine Biology and Plant Ecology at the College of Marin, Kentfield, CA (1955-70).

Studied Geology and Chemistry at Wilson's Teachers College, Washington, D.C. (1950-51).

Studied Chemistry and Physics at Oregon State Teachers College, Mammoth, OR (1949-40).

Curriculum Vitae

CITIZENSHIP:

United States

LANGUAGE PROFICIENCY:

English

PROFESSIONAL AFFILIATIONS:

None

PUBLICATIONS AND PRESENTATIONS:

Botanical Research Study - City of San Anselmo, California.

The Leaf Book: A Field Guide to Plants of Northern California. published by Tamal Land Press, Ida Geary, Jane Anderson, Al Molino, Dr. Robert C. West, Dr. William Bortfield.

Environmental Impact Studies, Botany section for Ring Mountain, Larkspur Landing - County of Marin, California.

Curriculum Vitae

TIMOTHY I. AOKI

TITLE: Project Manager/Lead Chemist

COMPANY: ACCULAB Environmental Services

EXPERTISE: Analysis of chemicals which present potential health hazards in the environment and workplace.
Gas Chromatography
High Performance Liquid Chromatography (HPLC)
Ion Chromatography
Fluorescence Spectroscopy

REPRESENTATIVE WORK EXPERIENCE:

Joined ACCULAB in 1988.

- Providing information to clients regarding collection and analysis of Industrial Hygiene and environmental samples.
- Providing instruction and supervision to analysts in the areas of IC and HPLC.
- Implementing of new or unusual analytical protocols in IC and HPLC areas.
- Writing and implementation of Chemical Hygiene Plan to comply with OSHA ruling 29 CFR 1910.1450 to insure employee safety with regard to hazardous materials.

PREVIOUS WORK EXPERIENCE:

A total of eight years experience in Environmental and Industrial Hygiene analytical chemistry.

Chemist, Fireman's Fund Environmental Laboratory, Petaluma, CA (1986-88).

- Implemented approved analytical protocols for analysis of polycyclic

Curriculum Vitae

aromatic hydrocarbons and carbamate pesticides.

- Provided primary analytical data in Johns Hopkins University study of exposure of forest fire fighters to polycyclic aromatic hydrocarbons (PAH's).

- Performed routine analyses of industrial hygiene and environmental samples using a variety of chromatographic systems.

Chemist, I.T. Analytical Services, Santa Clara, CA (1984-86).

- Analysis of soil and water samples for pesticides, PCB's and PAH's using GC and HPLC.

Chemist, B.C. Laboratories, Bakersfield, CA (1983-84).

- Analysis of PCB's in transformer oil; pesticides in soil and water by GC and HPLC.

Research Associate, Fisheries Bioassay Laboratory, Bozeman, MT (1981-83).

- GC analysis of Organic Toxicants used in Fish Bioassay Tests.

ACADEMIC BACKGROUND:

Certified Industrial Hygienist, Certificate #4590.

Ph.D. (1981), Chemistry, Montana State University, Bozeman, MT.

B.A. (1975), Chemistry, Sonoma State University, Rohnert Park, CA.

CITIZENSHIP:

United States

LANGUAGE PROFICIENCY:

Curriculum Vitae

English

PUBLICATIONS AND PRESENTATIONS:

Aoki, T.I, and P.R. Callis, 1982, The Fluorescence of Native DNA at Room Temperature. Chemical Physics letter 92 (3) :327-332.

Thurston, R.V., T.A. Gilfoil, E.L. Meyn, R.K. Zajdel, T.I. Aoki and G.D.Veith, 1985. Comparative Toxicity of Ten Organic Chemicals to Ten Common Aquatic Species. Water Research 19 (9) :1145-1155.

Room Temperature Fluorescence of DNA (Effects of pH and Temperature) Northwest Regional ACS meeting, Bozeman, Montana, 1981.

Curriculum Vitae

ROBERTA S. COCKERHAM

TITLE: Lead Chemist

COMPANY: ACCULAB Environmental Services

EXPERTISE: Wet chemistry and Colorimetry Analysis of Environmental and Industrial Hygiene, Fiber Counting of Airborne Dust.

REPRESENTATIVE WORK EXPERIENCE

- Technologist at ACCULAB since December 1988. Analysis on Industrial Hygiene and Environmental samples in wet chemistry area as well as method validation, quality control and client consultation.
- Supervisor of wet chemistry and chromotrography. Current duties include supervising 3 full time technologists or technicians and 1 part time technician in wet chemistry and 1 full time and 1 part time technician in ion chromotrography.
- Analysis using spectrophotometer and infrared spectrophotometer using NIOSH methods for IH samples and EPA and standard methods for environmental samples.
- Analysis using ion chromotrography for both environmental and IH samples as well as machine maintenance and quality control.
- Analysis using ion specific electrodes.
- Titrimetry and other wet chemistry.
- Fiber counting of airborne dust using phase contrast microscopy (NIOSH 7400).
- Develop and validate new methods.
- Maintain quality control program.

PREVIOUS WORK EXPERIENCE:

One year experience in wet chemistry and fiber counting with Fireman's Fund Environmental Laboratory.

Technologist, (April 1988 to December 1988).

- Analysis using spectrophotometer and infrared spectrophotometer using NIOSH methods for IH samples and EPA and standard methods for environmental samples.

Curriculum Vitae

- Analysis using ion specific electrodes.
- Titrimetry and other wet chemistry.
- Fiber counting of airborne dust using phase contrast microscopy (NIOSH 7400).
- Develop and validate new methods.
- Maintain quality control program.

Technician, (September 1987 to April 1988).

- Analysis using spectrophotometer and infrared spectrophotometer using NIOSH methods for IH samples and EPA and standard methods for environmental samples.
- Analysis using ion specific electrodes.
- Titrimetry and other wet chemistry.
- Fiber counting of airborne dust using phase contrast microscopy (NIOSH 7400).
- Develop and validate new methods.
- Maintain quality control program.

Freelance Computer Consultant, (September 1987 to April 1988).

- Designed forms and applications for D.C. Heath and ALK Construction using LOTUS 1-2-3.
- Freelance telemarketing.

Computer Science Editorial Assistant, D.C. Heath and Co., College Division, Novato, California (September 1985 - May 1986).

- Investigated prospective authors and reviewers.
- Set up new office and part-time secretary.

Telemarketing Sales Representative, D.C. Heath & Co., College Division, Novato, California (December 1983 to May 1985).

- Sold college textbooks, primarily science and mathematics.
- Sampled textbooks and supplements.
- Tracked sales and sales territories on PC.

Pharmacy Clerk, Part-time bookkeeper, Pay-N-Save (Bill's Drugs), Petaluma, California (November 1981 to April 1983).

- Assist pharmacist in filling prescription.
- Assist customers and contact doctors for refills.

Curriculum Vitae

- o Maintain records and bill insurance.
- o Order and stock Rx drugs and OTC for department.
- o Responsible for deposits, daily sales, reports and payroll as part-time bookkeeper.

Head Medical Technician in Endocrinology, Bioregional Laboratory, San Antonio, Texas (March 1975 to December 1975).

- o Supervised Endocrinology Department.
- o Researched and developed new procedures and techniques.
- o Trained assistants.
- o Performed manual and automated tests.
- o Maintained quality control and ordered all supplies.

Medical Technician, BioAssay Laboratory, Dallas, Texas (December 1970 to May 1974).

- o Performed all tests in Steroids, Special Chemistry and Electrophoresis.
- o Developed new procedures.
- o Ordered supplies.
- o Supervised Logging Room.

ACADEMIC BACKGROUND

B.S. - Animal Science (Science option), Texam A & M University (1970).

NIOSH course #582 - Sampling and Evaluating Airborne Asbestos Dust, University of California - Berkeley, (January 1988).

CITIZENSHIP:

United States

COUNTRIES WORKED IN:

United States

LANGUAGE:

English

Curriculum Vitae

GEORGE E. DUNSTAN

TITLE: Laboratory Director

COMPANY: ACCULAB Environmental Services

EXPERTISE: Project Management
Hazardous and Mixed Waste Characterization
Inorganic Analytical Chemistry
Hazardous Waste Disposal

REPRESENTATIVE WORK EXPERIENCE:

Management of Project Managers, Front Office and Sample Control sections of the laboratory. Project management for hazardous waste, wastewater and industrial hygiene projects.

PREVIOUS WORK EXPERIENCE:

Twenty-three years experience in the areas of project and program management, environmental chemistry and radiochemistry.

Director of Program Management, TMA Norcal, Richmond, California (1986-1989).

- Directed the activities of a group of four Program Managers involving water and wastewater, field sampling activities and industrial hygiene.
- Program Manager for hazardous and mixed waste programs assisting clients in determination of appropriate sampling strategies and analytical methodologies to meet regulatory requirements.
- Data review to determine if data "made sense". QA review and QA summary preparation.
- Bid and proposal preparation and other marketing efforts.

Hazardous Waste Program Manager, TMA Norcal, Richmond, California (1982-1986).

- Managed hazardous waste sampling and analysis contracts, including a two year EPA contract for methods development for hazardous waste testing.

DAMES & MOORE

Curriculum Vitae

Laboratory Supervisor, TMA Norcal, Richmond, California (1979-1982).

- Supervised inorganics laboratory performing water, wastewater and hazardous waste analysis.

Senior Laboratory Technician, TMA Norcal, Richmond, California (1977-1979).

- Performed environmental analyses using atomic absorption and wet chemical techniques.

Assistant Director/Laboratory Supervisor, Brelje and Race, Santa Rosa, California (1975-1977).

- Supervised inorganic laboratory performing water and wastewater analyses.

Laboratory Technician, TMA Norcal, Richmond, California (1965-1969, 1971-1975).

- Performed inorganic analysis of water and wastewater and radiochemical separations and purifications on biological and atmospheric samples.

ACADEMIC BACKGROUND:

Physics, Calculus, San Francisco State University
Chemistry, San Francisco City College

CITIZENSHIP:

United States

LANGUAGE PROFICIENCY:

English, German (basic skills)

Curriculum Vitae

PROFESSIONAL AFFILIATIONS:

Air and Waste Management Association

PUBLICATIONS AND PRESENTATIONS:

K.A. Strom, J. Gendron, M. Hersh, G.E. Dunstan, L Penfold and D.R. Fielder, Geothermal Air Emission Characterization, EPA Report, submitted June 1980.

G.E. Dunstan, Development and Evaluation of a Test Procedure for Reactivity Criteria for Hazardous Wastes, EPA Report, submitted July 1982.

D. Karkhar, D. Rogers, L. Penfold, G.E. Dunstan, L. Leventhal, Laboratory Protocol for Co-contaminated Waste, presented at the Health Physics Society meeting, Knoxville, Tennessee, February 2-7, 1986.

L. Leventhal, R. Wessman, G.E. Dunstan, Laboratory Analysis of Mixed Waste Oils, presented at Waste Management '89, Tucson, Arizona, February 28, 1989.

Curriculum Vitae

DOUGLAS LINDELOF

TITLE: QA/QC Manager

COMPANY: ACCULAB Environmental Services

EXPERTISE: Inorganic chemistry
Quality control/Quality Assurance

REPRESENTATIVE WORK EXPERIENCE:

QA/QC Manager for ACCULAB Environmental Services since 1990.

PREVIOUS WORK EXPERIENCE:

Inorganic Section Supervisor; ETC-Santa Rosa (1989-90).

- Supervised inorganic section in a commercial environmental laboratory. Scheduled work, reviewed data and reports, prepared personnel evaluations, consulted with clients by telephone to determine analytical needs.

Laboratory Manager; Center for Limnology, University of Wisconsin (1984-1989.

- Managed a research and instructional inorganic chemistry laboratory for inter-departmental and research projects. Areas of study involved geology, limnology, hydrogeology, botany and zoology. Supervised and trained graduate student and departmental/project employees in lab and instrument usage. Maintained supplies and equipment.

Research Specialist; Department of Geology, University of Wisconsin (1981-1984.

- Supervised graduate students and departmental and project employees in instrumentation and lab routine. Performed analysis of natural waters and geological materials.

Curriculum Vitae

Senior Laboratory Assistant: Regional Laboratory, Kaiser Permanente Medical Center, Berkeley, CA (1978-81).

- Performed analysis for therapeutic drugs in blood. Trained medical technology students in instrumentation and lab procedures. Member of the safety committee.

Research Specialist: Institute for Environmental Studies, University of Wisconsin (1974-77).

- Perform chemical analysis of water samples. Set up and maintain lab experiments. Field sampling. Train students in analysis and field methods.

ACADEMIC BACKGROUND:

B.A. (1976), Anthropology, University of Wisconsin, Madison, WI.

CITIZENSHIP:

United States

LANGUAGE PROFICIENCY:

English

Curriculum Vitae

MARCIA MANIX

TITLE: Lead Chemist

COMPANY: ACCULAB Environmental Services

EXPERTISE: Pesticide analyses by GC ECD, NPD.

REPRESENTATIVE WORK EXPERIENCE:

- Performing analyses on soil and water samples looking for pesticides using gas chromatography techniques as described by EPA Methods.
- Performing analyses on Industrial Hygiene samples which use gas chromatograph with electron capture detectors as described by NIOSH.

PREVIOUS WORK EXPERIENCE:

Analyst, ETC-MULTI TECH, Santa Rosa, California, October 1986 - April 1989.

- Duties included operation of GC and HPLC using EPA Methods 601, 602, 608, 615, 505, 508, 515 and 632.
- Instruments used: Varian GC 5890. Familiar with EDC, PID, FID, Hall, Coulson and UV. Data systems used: Varian 402 and HP Q-Chrom.

Laboratory Technician, Santa Rosa Junior College, Santa Rosa, California, May 1981 - August 1985.

- Regular duties included supervision and training of other lab technicians and student aides, planning and estimation of future needs of the department with respect to chemicals and equipment, maintenance and transferral of all chemicals and equipment, and general organization of all the labs.

Curriculum Vitae

Assistant Laboratory Technician, Santa Rosa Junior College, Santa Rosa, California, November 1979 - May 1981.

- Duties included set-up of chemical reagents and equipment, and cleaning and upkeep of the labs.

Laboratory Technician, Veterans Administration, Martinez, California, July 1978 - July 1979.

- Duties included operation of GC, general organization and performance of experiments, computations data, ordering and receiving of supplies.

Laboratory Aid, University of California, Berkeley, California, January 1978 - June 1978.

- Duties included preparation of media, and organization and performance of experiments for graduate students.

ACADEMIC BACKGROUND:

University of California, Berkeley, California Degree: Bachelor of Arts in Biochemistry, 1978.

Chabot College, Hayward, California Attended: 1973-1976, course work emphasis on Biological Sciences.

CITIZENSHIP:

United States

LANGUAGE PROFICIENCY:

English

Curriculum Vitae

- Technical Advisor to extraction laboratory.
- Back-up GC/MS operator.

GC/MS Chemist, ThermoAnalytical Environmental Laboratory (9/86 to 3/87).

- Operated Finnigan GC/MS equipment (Models 4000 and 4500).
- Analyzed samples for volatile and semivolatile target compounds using CLP protocols.

ACADEMIC BACKGROUND:

B.S. in Chemistry (1986), Portland State University, Portland, Oregon.

CITIZENSHIP:

United States

LANGUAGE PROFICIENCY:

English

PROFESSIONAL AFFILIATIONS:

- Bay Area Mass Spectrometry
- Bay Area Chromatography Colloquium
- American Society of Mass Spectroscopists
- American Chemical Society

PUBLICATIONS AND PRESENTATIONS:

NONE

Curriculum Vitae

GREG F. NAGLE

TITLE: Project Manager

COMPANY: ACCULAB Environmental Services

EXPERTISE:
Quality Assurance
Analytical Chemistry
Project Management
Environmental Regulation

REPRESENTATIVE WORK EXPERIENCE:

- Provide information to clients concerning regulatory requirements, analytical methods, detection limits, quality assurance, laboratory capabilities and pricing of Industrial Hygiene and environmental samples.
- Act as liaison between lab personnel and clients, communicate sample progress to clients, and any delays or problems with projects.
- Arrange for subcontracting services which includes assuring adequate profit margins for our lab and keeping track of turnaround times, sample identification and reports to our clients.
- Responsible for analytical reports, data review and invoicing to clients.
- Responsible for bid and proposal preparation and other marketing efforts.

PREVIOUS WORK EXPERIENCE:

Project Manager, Canonie Environmental Services Corporation, February, 1989 to October, 1990.

- Act as primary laboratory contact for large scale projects: submit quotations, track project status and make final review of laboratory reports to ensure all analytical requests and data quality objectives have been addressed.

- Provide technical assistance to clients and staff with regard to CERCLA, RCRA, CWA, SDWA, CAC Title 22, and local regulatory requirements: review of QAPP's and SAPP's as they apply to the laboratory to ensure analytical integrity and regulatory compliance.
- Coordinate a three-member client services team: project workload, determine pricing strategies, establish terms and conditions and provide support services for small scale projects.
- Supervise a nine-member sample and data control staff: conduct employee hiring, performance evaluations, counseling and terminations.
- Act as Emergency Response Coordinator in the event of fire, explosion or unplanned release of hazardous chemicals.

Inorganic Department Head, Canonie Environmental Services Corporation, February, 1989 to August, 1989.

- Managed a thirteen-member inorganic staff on two shifts: monitor training procedures, evaluated employee development and made recommendations to upper management with respect to hiring, salary adjustments and termination.
- Acquired instrumentation and operating supplies, met turnaround times and maintained a high quality analytical product.
- Performed method development, maintenance and trouble-shooting for Thermo Jarrel Ash ICAP 61, Leeman Labs Plasma Spec 2.5 ICP, Varian 300Z (Zeeman) GFAA, Dionex Series 2000i Ion Chromatograph and other inorganic instrumentation.

Senior Inorganic Chemist, American Environmental Management Corporation, June, 1988 to February, 1989.

- Operator/Analyst: Leeman Labs Plasma Spec ICP, Varian Spectra 20 AA and various other common inorganic instrumentation.
- Responsible for organization, method development, QA/QC procedures and SOP's; supervised two technicians.

Curriculum Vitae

STACY A. PEDERSEN

TITLE: Lead Chemist

COMPANY: ACCULAB Environmental Services

EXPERTISE: Analysis of purgeable hydrocarbons utilizing EPA 601/602 methodology.

REPRESENTATIVE WORK EXPERIENCE:

- Responsible for volatile organic analysis of soil and water samples.
- Operate and maintain automatic volatile samplers and the gas chromatograph systems which perform the analyses.
- Operate a PC-based chromatography data system.
- Supervise four analysts in fuel-hydrocarbon section.

PREVIOUS WORK EXPERIENCE:

- Assistant Chemist, McLaren, Rancho Cordova, California, February 1988 - April 1990
- Student Assistant, Office of the State Fire Marshal, Sacramento, California, September 1987 - March 1988.
- Laboratory Assistant, California State University, Sacramento, California, September 1984 - February 1988.
- Laboratory Technician, Campbell's Soup Company, Sacramento, California, Summers of 1986 & 1987.

ACADEMIC BACKGROUND:

California State University, Sacramento, California, September 1984 - December 1987; B.A. in Chemistry.

Merced Junior College, Merced, California, August 1983 - May 1985; Chemistry major.

Merced Union High School, Merced, California, September 1978 - May 1982

Curriculum Vitae

Inorganic Technician/Chemist, Canonie Environmental Services Corporation, April, 1987 to June, 1988.

- Operator/Analyst: Performed inorganic analyses using a Thermo Jerral Ash ICAP 61, Leeman Labs Plasma Spec 2.5 ICP, Varian 300Z (Zeeman) GFAA, Dionex 2000i Ion Chromatograph and other inorganic instrumentation; coordinated production between shifts; supervised two or more technicians.

ACADEMIC BACKGROUND:

B.S. in Environmental Science, Chemistry emphasis, Northern Arizona University (1985).

B.S. in Applied Geography, Planning emphasis, Northern Arizona University (1985).

Graduate Studies, Ecology and Evolutionary Biology, University of Arizona.

CITIZENSHIP:

United States

LANGUAGE PROFICIENCY:

English

PROFESSIONAL AFFILIATIONS:

American Chemical Society
American Water Works Association
Water Pollution Control Federation

PUBLICATIONS AND PRESENTATIONS:

None

Curriculum Vitae

CITIZENSHIP:

United States

LANGUAGE PROFICIENCY:

English

PROFESSIONAL AFFILIATIONS:

None

PUBLICATIONS AND PRESENTATIONS:

None

Curriculum Vitae

LEE CAROLLO PFORSICH

TITLE: Project Manager

COMPANY: ACCULAB Environmental Services

EXPERTISE: Organic Chemistry
GC/MS
Air Toxics
Project Management

REPRESENTATIVE WORK EXPERIENCE:

- Provide information to clients conerning analytical methods, detection limits, current turnaround time, laboratory capabilities and pricing of Industrial Hygiene and environmental samples.
- Act as liason between lab personnel and clients, communicate sample progress to clients, and any delays or problems with projects.
- Arrange for subcontracting services which includes assuring adequate profit margins for our lab and keeping track of turnaround times, sample identification and reports to our clients.
- Responsible for analytical reports, data review and invoicing to clients.
- Responsible for bid and proposal preparation and other marketing efforts.

PREVIOUS WORK EXPERIENCE:

Chemist, ACCULAB Environmental Services, Petaluma, CA (1989-90).

- Performed routine analyses of industrial hygiene and environmental samples using GC/MS techniques.
- Operated Finnigan GC/MS equipment (Model 5100 and 1050).
- Installed, operated and interpreted data from Perkin-Elmer 8500 GC, Tekmar Model 5010 and ITD/MS for air toxics.
- Developed new methods of air sample analysis for T014 canister as well as for Tenax and charcoal tubes.
- Trained technologists to run GC/MS analyses.

Science Teacher, Redwood High School, Larkspur, California, (1987-89).

- Taught Chemistry, Honors Chemistry and Biology. One of six science teachers in a 1200 student high school.

Product Manager, "Science Toolkit", Broderbund Software, Inc., San Rafael, California (1988-90).

- Responsible for coordinating 10 subcontractors and managing a major revision of "Science Toolkit", an educational software product. Conducted extensive national research among users, directed revisions, wrote and supervised publication of a 200 page manual that featured charts and graphs for the first time. Completed project in time for release on a planned date. Program acclaimed by peers and potential users. Sales exceeded plan.

Curriculum Fellow, Industrial Initiatives for Science and Math Educators (IISME, Lawrence Hall of Science, Berekeley, California (1988-89).

- Developed activities, resources, and curricular materials to translate industrial experience into classroom practices and professional development activities. Advised 41 teacher fellows (in 35 Bay Area companies) and IISME Education Staff in planning and implementing follow-up activities. Arranged and facilitated meeting between Dow and DuPont representatives. Gave presentations and lead group discussions at meetings of the IISME fellows and mentors.

Chemist, IBM, Research and Development Department, San Jose, California (1987).

- Conducted Thermogravimetric Analyses for quality control and characterization of new compounds, included use of mass spectrometer. Wrote user's manual for TGA/mass spectrometer interface. Researched new phenolic compound and reported findings to Princeton creators. Recrystallized experimental compound for purity.

Materials Design Engineer, Westinghouse Electric Company, Marine Division, Sunnyvale, California (1986).

Curriculum Vitae

- Researched the cure rate of solventless epoxy coating and determined properties of the cured coating. Wrote training manual for infrared spectrometer. Initiated a speakers bureau and designed a curriculum unit on careers within Westinghouse in support of recruitment efforts.

Science Teacher, Oak Grove High School, San Jose California (1984-87)

- Taught Chemistry, Honors Chemistry and Life Science in a 3200 student High School.

Reviewer/Consultant, Addison-Wesley Publishers, Menlo Park, California (1984-86)

- Edited and revised college level text, "Essentials for Chemistry".

Chemistry Professor, College of the Desert, Palm Desert, California (1984)

- Taught both lecture and lab for Health Sciences (Pre-Nursing).

Department Chair/Science Teacher, Yucaipa High School, Yucaipa, California, (1978-84)

- Taught Chemistry, Biology and Life Science. Managed 5 person department including budget analysis, staff assignments and purchasing.

ACADEMIC BACKGROUND:

Clinical Supervision/Chemical Compounds/Right to Know, San Jose State University, California, (1986).

Microcomputers, University of California-Riverside, California, (1984)

M.A., Education, Claremont Graduate School, Claremont, California (1980)

B.A., Chemistry, Sweet Briar College, Virginia, (1978)

Chemistry, University of St. Andrews, St. Andrews, Scotland, (1976-77)

Curriculum Vitae

CITIZENSHIP:

United States

LANGUAGE PROFICIENCY:

English, Spanish and French (basic skills)

PROFFESSIONAL AFFILIATIONS:

American Chemical Society	Since 1988
American Association for the Advancement of Sciences	Since 1988
Helen Gager "Contribution to Chemistry" Award	1986
California Association of Chemistry Teachers	Since 1985
National Science Teachers Association	Since 1979
Pi Lambda Theta	Since 1979
Phi Beta Kappa	Since 1978

PUBLICATIONS AND PRESENTATIONS:

Essentials for Chemistry, edited textbook published by Addison Wesley.

Themal Characterization Studies of Epoxy Phenolics, Paper published through IBM with Dr. Bruce Prime.

Curriculum Vitae

DAVID ROBERT ESCUDE', P.E.

TITLE Project Engineer

EXPERTISE
Civil Design/Landfills
Hydraulics
Geometric Layout and Design

PAST EXPERIENCE

- Project engineer for several pond lining/earthwork backfill projects. Responsibilities included preparation of all plans, specifications, oversite of construction and preparation of final certification reports.

- Project engineer for civil design of a 100-acre solid waste landfill in Louisiana. Responsibilities included design of all site and grading plans, drainage, and leachate collection, pumping and treatment. Prepared contract documents for construction of the solid waste landfill.

- Project engineer for design of closure plans for several solid waste sites in Louisiana. Responsibilities included cap design, and final site and grading plans.

- Prepared permit application for a solid waste facility in Louisiana. Responsibilities included performing all planning, data collection, site survey, and conceptual design of landfill in order to obtain Louisiana Department of Environmental Quality approval. Attended meetings throughout review process and coordinated and communicated with LADEQ to finalize permit application.

- Project engineer for an $8-million drainage improvement program for the City of Gretna, Louisiana. Responsibilities included coordinating all field surveys, preparing plans, and specifications for eight major drainage improvement areas. Projects included installing subsurface drainage through residential areas, installing major drainage trunk lines, canal enlargement, and slope protection.

FILE COPY

February 29, 1988

Mr. Leo Romanowski
Waste Engineering Section
U.S. Environmental Protection Agency
345 Courtland Street, N.E.
Atlanta, Georgia 30365

Dear Mr. Romanowski:

Re: Koppers RFA Report
Grenada, Mississippi

Attached is a list of comments and recommendations on Koppers solid waste management units investigation. Please let me know if you would like to make any additions or changes in these.

If you have any questions concerning these comments, please contact me at (601) 961-5171.

Sincerely,

David J. Bockelmann
Hazardous Waste Division

DJB:dmh
Enclosure

July 1, 1988

FILE COPY

Mr. Robert J. Anderson
Keystone Environmental Resources, Inc.
436 Seventh Avenue, Suite 1940
Pittsburgh, Pennsylvania 15219

Dear Mr. Anderson:

Re: Solid Waste Management Unit
(SWMU)
Investigation Work Plan
Koppers Company, Inc.
Grenada, Mississippi
MSD007027543

Mississippi Bureau of Pollution Control and U. S. EPA have reviewed the report titled "Soil and Groundwater Investigation of Solid Waste Management Units" dated January 1988. Attached is a letter and a list of comments (from James H. Scarbrough, EPA, addressed to Robert J. Anderson, Keystone, and dated June 10, 1988) pertaining to Koppers' Solid Waste Management Unit Investigation. This letter constitutes the Bureau's approval of the above referenced SWMU Work Plan provided that the attached comments, with the exception of comment number 5, be incorporated into the SWMU investigation. In a meeting on June 15, 1988 it was agreed between Koppers personnel and the Bureau that the monitor well recommended in comment number 5 would not be necessary.

Please be advised that this approval directly relates to Mississippi Commission on Natural Resources Order Number 1208-87; specifically items (6) and (7) as listed below:

(6) Within forty-five days after the Respondent receives Bureau of Pollution Control approval of the work plan and schedule referenced in item (5) above, the Respondent must complete the installation of groundwater monitoring wells identified in the approved plan.

Note: This must include the installation of those wells identified in the comments included in EPA letter of June 10, 1988 which is attached.

(7) Within one hundred and fifty days after the Respondent receives Bureau of Pollution Control approval of the work plan and schedule referenced in item (5) above, the Respondent must submit a comprehensive report which demonstrates whether or not releases from any of the solid waste management units to the subsoils or groundwater have

occurred, and a work plan and schedule for determining the vertical and horizontal extent of any contamination found.

If you should have any questions concerning the attached comments, please submit them by July 12, 1988. The installation of the groundwater wells referenced in item (6) of Commission Order 1208-87 should be scheduled to be completed on or before August 25, 1988 and the report referenced in item (7) of Commission Order 1208-87 should be submitted on or before December 8, 1988.

If you should have any additional questions or if you should require any additional information, please contact me at (601) 961-5171.

Sincerely,

Dave Bockelmann
Hazardous Waste Branch

DB:cm
Attachment
cc: Mr. James H. Scarbrough, P. E., EPA

To further characterize the lateral and vertical extent of soil contamination in this area, a minimum of ten borings are proposed (Figure 5-1). The selected locations are intended to characterize soil quality from the locations around the process area expected to contain elevated concentrations of wood treating constituents, and outward to those areas in which soils are expected to be relatively clean. If field observations indicate that the outlying soil is contaminated, locations for additional borings will be field selected to delineate the boundary between visually affected and visually clean soils which do not have chemical odor. If necessary, borings will be extended 50 feet outward from the initial boring location using a radial pattern. The approximate center of the process area will be considered as the central point. The lines and arrows on Figure 5-1 indicate the directional line along which each subsequent potential boring will be placed. Soil borings will extend outward until apparently clean soil (visually clean and without chemical odor) is reached or until boundaries with adjacent areas of investigation are reached.

The uppermost apparently clean sample (below any visible or odorous evidence of wood-treating constituents) and one to two additional samples per borehole will be submitted for analysis for the list of parameters in Table 5-1. All other split-spoon soil samples collected above the water table will also be submitted for oil and grease analysis.

Section 5.1.2 describes some additional soil sampling for this area which will be performed in well bores.

SWMU 2 (Impoundment):

The surface impoundment is a RCRA regulated unit which was closed in 1989, in accordance with a closure plan approved by MDNR. A groundwater monitoring network is in place which is in compliance with RCRA requirements, thus no soil or groundwater sampling is proposed for this unit.

TABLE 5-1

SOIL SEDIMENT SAMPLE ANALYSIS SUMMARY

Approximate Number of Samples*	Compound	Method[1]	Quantitation Limit	Field Duplicates	Field Blanks	Trip Blanks
105-106/24+	- Polycyclic Aromatic Hydrocarbons	SW 8310		10/3Ô	10/3Ô	0/0Ô
	carbazole		100 ug/kg			
	naphthalene		100 ug/kg			
	acenaphthylene		100 ug/kg			
	acenaphthene		100 ug/kg			
	fluorene		20 ug/kg			
	phenanthrene		50 ug/kg			
	anthracene		50 ug/kg			
	fluoranthene		20 ug/kg			
	pyrene		20 ug/kg			
	benzo(a)anthracene		2 ug/kg			
	chrysene		15 ug/kg			
	benzo(b)fluoranthene		2 ug/kg			
	benzo(k)fluoranthene		2 ug/kg			
	benzo(a)pyrene		2 ug/kg			
	dibenz(ah)anthracene		3 ug/kg			
	benzo(ghi)perylene		5 ug/kg			
	indeno(1,2,3-cd)pyrene		5 ug/kg			
105-127/24+	- Phenolics	SW 8040		10/3Ô	10/3Ô	0/0Ô
	phenol		50 ug/kg			
	2-chlorophenol		50 ug/kg			
	2-nitrophenol		50 ug/kg			
	2,4-dimethylphenol		50 ug/kg			
	2,4-dichlorophenol		50 ug/kg			
	4-chloro-3-methylphenol		50 ug/kg			
	2,4,6-trichlorophenol		100 ug/kg			
	2,4-dinitrophenol		100 ug/kg			
	4-nitrophenol		100 ug/kg			
	2,3,5,6-tetrachlorophenol		100 ug/kg			
	4,6-dinitro-2-methylphenol		100 ug/kg			
	pentachlorophenol		100 ug/kg			

TABLE 5-1 (Continued)

Approximate Number of Samples	Compound	Method[1]	Quantitation Limit	Field Duplicates	Field Blanks	Trip Blanks
105-127/24+	- Aromatic Volatiles	SW 8020		10/3Ô	10/3Ô	10/1Ô
	benzene		20 ug/kg			
	toluene		20 ug/kg			
	ethylbenzene		20 ug/kg			
	xylenes		30 ug/kg			
	styrene		30 ug/kg			
105-127/24+	- Total Organic Carbon	EPA 9060	1000 mg/kg	0/0Ô	0/0Ô	0/0Ô
511/24+	- Oil and Grease	EPA 9071		0/0Ô	0/0Ô	0/0Ô
105-127/24+	- pH	EPA 9045	-	0/0Ô	0/0Ô	0/0Ô
2/0+	Thermal Gravimetric Analysis	ASTM E537	-	0/0Ô	0/0Ô	0/0Ô
2/0+	Ultimate Analysis	ASTM D3176	-	0/0Ô	0/0Ô	0/0Ô
2/0+	BTU Content	ASTM D2015	-	0/0Ô	0/0Ô	0/0Ô
6/2+	Sieve and Hydrometer	ASTM D422	-	0/0Ô	0/0Ô	0/0Ô
6/2+	Atterburg Limits	ASTM D4318	-	0/0Ô	0/0Ô	0/0Ô
1/0+	Major & Minor Elements in Ash	ASTM D3682	-	0/0Ô	0/0Ô	0/0Ô
1/0+	Polycyclic Aromatic Hydrocarbons in Ash	SW 8310	(see above)	0/0Ô	0/0Ô	0/0Ô

NOTE: Soil samples will be collected from selected well borings during the Phase II investigation

1 **Test Methods for Evaluating Solid Waste - Physical/Chemical Methods (third edition) SW 846, 1986.**

* **Number of proposed soil boring samples may increase depending upon field conditions.**

\+ **Number of proposed soil samples are represented by the first value. Number of proposed sediment samples are represented by the second value.**

SWMU 3 (Sprayfield):

No further investigation of the sprayfield is proposed for the reasons stated in Section 3.1.

SWMU 5 (Landfarm):

The boiler ash landfarm is also classified as a RCRA-regulated unit. A closure plan for this unit has been approved by MDNR. At the present time, the initiation of closure activities is being scheduled. The closure is expected to be completed in early 1990. Thus, no soil sampling will be proposed for this unit.

SWMU 6 (Process Cooling Pond):

Soil sampling will be performed in the vicinity of the process cooling pond during the drilling of proposed well R-19B (Figure 5-3). Additionally, two additional soil borings will be drilled along the banks of the cooling pond. The locations of the proposed well and borings are shown on Figures 5-1 and 5-3. Up to three soil samples from each boring location will be submitted for analysis for the parameters listed in Table 5-1. Additional soil samples will be submitted for oil and grease analysis.

Soil samples will also be collected within both the process cooling pond and smaller overflow pond using a hand auger. Two soil samples will be collected in each pond at depths of 6 to 12 inches and 18 to 24 inches below the bottom of the sediments. The samples will be analyzed for the parameters listed in Table 5-1.

SWMU 7 (Container Storage Area):

Further soil sampling is proposed for the container storage area. One boring will be drilled in the vicinity of this area. The uppermost visibly clean sample which is also free of chemical order will be submitted for analyses. Additionally, one location will be randomly chosen for surface soil sampling. The sample will be collected from the 0.0 to 1.0 foot depth interval using a clean spade, shovel or hand auger. The

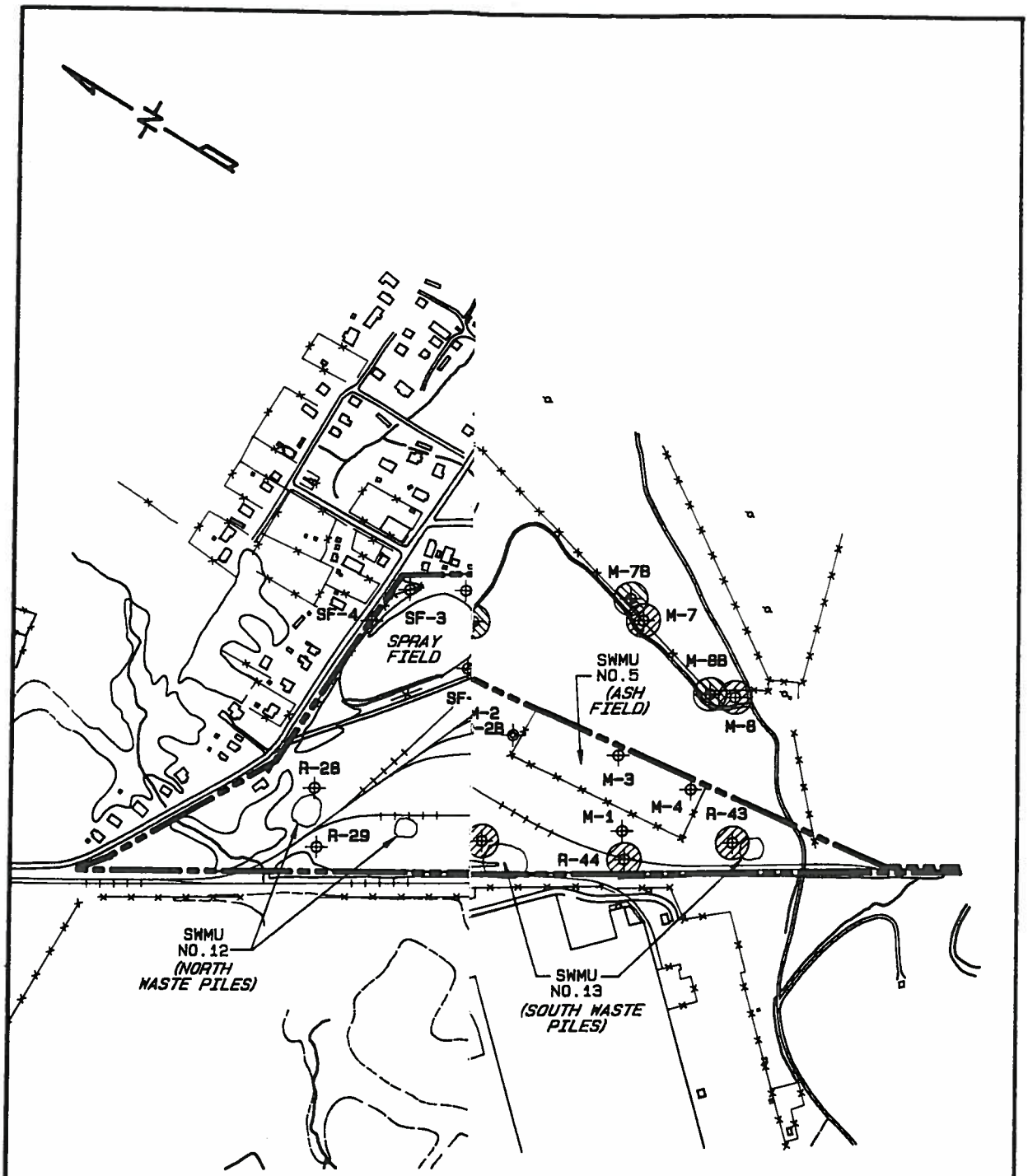


FIGURE 5-3

APPROXIMATE EXISTING & PROPOSED PHASE II MONITORING WELL LOCATIONS GRENADA, MS

1/8/91 KOPPERS INDUSTRIES, INC. A105096

approximate sampling locations are shown on Figure 5-1. These two soil samples will be analyzed for the parameters listed in Table 5-1. In addition, all split-spoon samples collected from the boring will be analyzed for oil and grease.

SWMU 8 (Drip Track Area):

Further soil sampling in the drip track area is proposed in conjunction with subsequent well installation. Visual evidence of wood-treating constituents had been observed to the depth of the water table in several Phase I RFI borings.

Two lines of additional drip track borings will be placed approximately 10 feet outward (east and west) from each side of the nine Phase I drip track borings (Figure 5-2). These additional borings will provide further definition of the lateral extent of soil contamination from the drip track. Depending on field conditions, further borings may be added to this program, if necessary.

The placement of additional borings would proceed in a similar, laterally-expanding pattern; further lateral placement, if necessary, will be staggered between borings, and dependent on field observations. The lateral extension will continue in ten-foot increments until visually clean soil conditions are encountered. The first potential set of borings which may be extended laterally is shown in Figure 5-2.

Soil samples will be selected for analysis as outlined in Section 5.1.1.2. Figure 5-2 indicates that seven of the inner proposed Phase II borings and seven of the first outer set of proposed Phase II borings have been selected for additional analyses. This means that these locations will have the 0.0 to 2.0 foot depth sample and the 4.0 to 6.0 foot depth sample submitted for analysis for the list of parameters in Table 5-1. In addition, all borings in the drip track area completed for the Phase II investigation will have the uppermost apparently clean sample (below any visible or odorous evidence of wood-treating constituents) submitted for analysis for the list of parameters in Table 5-1. Again, all individual split-spoon samples will be analyzed for oil and grease.

SWMU 11 (Former Wastewater Treatment System):

The former wastewater treatment system consists of two abandoned surface impoundments and two abandoned oil/water separators. Two borings (B-4 and B-5) had been sampled for soil quality during the Phase I RFI. These borings were associated with the abandoned oil/water separator. Over twenty L-series borings were sampled in association with the two abandoned impoundments.

The area of impacted soil within the area of the two former impoundments has been delineated laterally to extend eastward from the impoundments toward the unnamed ditch (mid-plant). The extent of apparently clean soils has been preliminarily defined both laterally and vertically. Some refinement of apparently clean soil delineation to the south-southwest and north-northeast of the two abandoned impoundments is warranted. Thus, seven additional soil borings (L-28 through L-34) are proposed in the locations shown on Figure 5-2. Soil samples will also be collected during the drilling of well R-16B. For this area of investigation, the uppermost apparently clean sample and an additional one to two samples per boring will be analyzed for the parameters listed in Table 5-1. All soil samples collected above the water table will also be analyzed for oil and grease. It may be necessary to remove stockpiled wood chips/sawdust from this area with a front end loader prior to drilling.

For the oil/water separators, borings will be advanced to the water table on three of the outer four sides of the two separators; the area between the two separators will not be included. Soil contamination between the two separators is known to extend to the depth of the water table. These boring locations are represented on Figure 5-1. For this area of investigation the uppermost apparently clean sample and an additional one to two samples per boring will be analyzed for the parameters listed in Table 5-1. All soil samples collected above the water table will also be analyzed for oil and grease. Additional borings may be installed if significant evidence of wood-treating constituents is observed. The number and placement of these borings will be determined in the field by a Keystone hydrogeologist.

SWMU 12 (North Waste Piles):

Soil samples collected from the north waste piles during the Phase I RFI were relatively clean. However, surface soil sampling will occur at two locations randomly selected in the vicinity of the two waste piles. These two surface soil sampling locations (one at each waste pile) are represented on Figure 5-1. The actual locations will depend on the configuration of the waste piles and will be determined in the field. The soil samples will be collected from the 0.0 to 1.0 foot depth interval, using a clean spade, shovel or a hand auger. The sampling implement will be washed with soapy water and rinsed with clean water, followed by rinses with hexane and distilled water. The two soil samples will be analyzed for the parameters listed in Table 5-1.

Additionally, two borings will be drilled in the vicinity of the two waste piles (one boring at each pile). Two samples from each boring will be collected for analysis of the parameters listed in Table 5-1. The uppermost visibly clean sample which is free of chemical odor will be submitted for analysis in addition to a sample from the interval immediately above the water table. Additionally, all split-spoon samples collected from the borings will be analyzed for oil and grease.

SWMU 13 (South Waste Piles):

Three borings are proposed for this area of the site. The borings will be advanced within or near each south waste pile. The uppermost visibly clean sample which is also free of chemical odor will be submitted for complete analysis. These samples will be below any apparent contamination, but above the water table. A sample from the interval immediately above the water table will also be submitted for analysis. Additionally, two locations (one at each waste pile) will be randomly chosen for surface soil sampling. The samples will be collected from the 0.0 to 1.0 foot depth interval, using a clean spade, shovel or a hand auger. The sampling implement will be washed with soapy water and rinsed with clean water, followed by rinses with hexane and distilled water. These three boring locations and two surface soil sampling locations are represented on Figure 5-1. The actual locations will depend on the configuration of the waste piles and will be chosen in the field. All

soil samples described above will be analyzed for the parameters listed in Table 5-1. In addition, all split-spoon samples collected from the three borings will also be analyzed for oil and grease.

Background Borings:

To determine background soil quality, one boring (BB-1) is proposed at the location shown on Figure 5-1. Data from this boring will provide a quantitative comparison of background soil quality to soil quality of potentially site-affected borings. The 0.0 to 2.0 foot depth interval will be submitted for complete analysis (Table 5-1 parameters) in this boring. Two additional split-spoon samples will also be submitted for complete analysis (Table 5-1 parameters) from the background boring. The second split-spoon interval (2.0 to 4.0 feet) and the split-spoon interval just above the water table will comprise these two additional samples. The boring will be terminated when the water table is encountered. All split-spoon samples above the water table from boring BB-1 will be submitted for oil and grease analysis.

5.1.1.1 Soil Sampling

Prior to initiation of drilling activities at the Grenada site, all drilling equipment will be thoroughly steam-cleaned. All down-hole equipment will also be steam-cleaned between each drilling location. Steam-cleaning of the entire drill rig will take place before drilling proceeds in a different area of investigation. The soil borings will be drilled using hollow-stem augers to facilitate soil sampling. Samples will be collected continuously at 2.0 foot intervals using a split-spoon sampler. An HNU photoionization device (PID) will be used to continuously monitor the breathing zone for organic vapors. The HNU will be calibrated with n-hexane (a standard of approximately 10 ppm will be used for calibration). The HNU will be calibrated daily in accordance with the procedure outlined in the H&S Plan contained in the RFI Work Plan. The split-spoon sampler will be washed between each use in soapy water, followed by a clean water rinse and rinses with hexane and distilled water.

All cuttings or drilling mud resulting from drilling activities during the Phase II RFI will be contained in sealed DOT 55 gallon steel drums. The origin(s) of the cuttings/drilling mud in each drum will be indicated on an appropriate waste label affixed to the drum. The drums will be stored on the KII plant property while disposal options are evaluated. Soil boreholes will be grouted upon completion with a cement-bentonite slurry.

All borings will be advanced either until the water table is encountered or until three consecutive apparently clean soil samples are obtained. Apparently, clean soils will be those in which no visual or olfactory evidence of chemical constituents are observed. The water table is approximately ten to twenty feet below grade, depending on the location. The depth to groundwater noted in the site wells will be used in the field to help in determining the water table depth. All borings will be grouted to the surface with a cement/bentonite slurry upon completion.

Soil samples will be field-classified by a Keystone hydrogeologist in accordance with the Burmeister classification system. Any visible or odorous indications of the presence of chemical constituents will be noted. Samples will be placed in clean, labeled glass jars. Samples not selected for soil analysis will be stored on-site.

5.1.1.2 Soil Analysis

All valid split-spoon soil samples collected will be analyzed for oil and grease to allow correlation between oil and grease concentrations and other analytical parameters. Soils selected for more complete analysis will be analyzed for the complete parameter list shown in Table 5-1. The selection of the soils to receive more complete analysis was detailed for each area of investigation in Section 5.1.1. The samples will be selected to represent a range of apparent contamination conditions, but in many cases, surface soils and soils just above the water table will be included for complete analysis. These two intervals provide valuable information for risk assessment determination and the determination of the potential for groundwater contamination at a given location. In addition, the first split-spoon sample below any apparent contamination (using visual and olfactory criterion) in

each boring will also be analyzed. Laboratory QA/QC requirements and holding times will be strictly observed to insure reliable data results from this investigation. Soil samples collected during this investigation will be analyzed by Keystone's Analytical Division Laboratory in Monroeville, Pennsylvania.

In addition to chemical analysis of soils/sediments, several physical tests will be performed. The physical parameters are presented in Table 5-1. For sieve and hydrometer analysis and Atterburg limits determination, approximately eight samples will be obtained. The locations of these eight samples will be chosen in the field at the discretion of the supervising hydrogeologist and will represent variations in soil type and location. Samples for ultimate analysis, thermal gravimetric analysis, and BTU content will be collected from the process area to represent highly impacted soil and from the container storage area to represent less impacted soil. One soil sample will be collected from the process area, incinerated, and the resultant ash will be analyzed for extractable metals and chemicals of concern. All of the physical soil testing will be performed by a qualified laboratory.

5.1.2 Groundwater Monitoring Wells

This section details the proposed location and general purpose of wells proposed to be installed at the KII site for the Phase II RFI. In several cases, elevated levels of wood treating constituents have been observed in shallow groundwater. The placement of the proposed Phase II RFI wells reflect an attempt to further define both the lateral and vertical extent of contaminant plumes observed. These wells proposed in Phase II are shown in Figure 5-3. Table 5-2 lists a summary of selected proposed well locations and the purpose of each well. Details regarding shallow well and deeper well/well nest installation are presented in Section 5.1.2.1. Section 5.1.2.3 details groundwater sampling and analysis procedures. All groundwater samples collected are to be analyzed for all parameters listed in Table 5-3.

<u>SWMUs 1,4,9 and 10 (Process Area):</u>

Three wells are proposed to help define the lateral and vertical extent of the groundwater contaminant plume originating from the process area. One of these

TABLE 5-2

PROPOSED PHASE II RFI
MONITORING WELL SUMMARY
KOPPERS INDUSTRIES, INC.
GRENADA, MISSISSIPPPI

Well No.	Location	Purpose
R-12C	Downgradient (northeast) of two abandoned surface impoundments.	Provide deeper groundwater quality data and vertical gradient data at existing well nest R-12/12B.
R-16B	Downgradient (southeast) of two abandoned surface impoundments.	Provide deeper groundwater quality data, vertical gradient data and well nest at existing well R-16.
R-19B	Downgradient (northeast) of large process cooling pond.	Provide deeper groundwater quality data, vertical gradient data, and well nest at existing well R-19.
R-20B	Downgradient (north) of process area.	Provide deeper groundwater quality data, vertical gradient data, and well nest at existing well R-20.
R-21B	Downgradient (northeast) of process area.	Provide deeper groundwater quality data, vertical gradient data, and well nest at existing well R-21.
R-23B	Downgradient of oil/water separators.	Provide deeper groundwater quality data, vertical gradient data, and well nest at existing well R-23.
R-25B	Downgradient of drip track area.	Provide deeper groundwater quality dat, vertical gradient data, and well nest at existing well R-25.
R-32	In the southern portion of the plant.	Provide shallow groundwater quality data.
R-33	Remotely downgradient (northeast) of process area.	Provide shallow groundwater quality data to further plume delineation.
R-34	Downgradient of drip track area.	Provide shallow groundwater quality data to further plume definition.
R-35	Downgradient of drip track area.	Provide shallow groundwater quality data to further plume definition.

NOTE:
Groundwater elevations will be determined in all wells at the time of sampling.

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TABLE 5-2 (Continued)

PROPOSED PHASE II RFI
MONITORING WELL SUMMARY
KOPPERS INDUSTRIES, INC.
GRENADA, MISSISSIPPI

Well No.	Location	Purpose
R-36	At southeast of abandoned impoundments.	Provide shallow groundwater quality data/check quality of groundwater recharging mid-plant ditch.
R-37	Reomtely downgradient of site (off-site).	Provide shallow groundwater quality check.
R-38	Remotely downgradient (east) of two abandoned impoundments (off-site).	Provide shallow groundwater quality data/check quality of groundwater recharging mid-plant unnamed ditch.
R-38B	Remotely downgradient (northeast) of two abandoned impoundments (off-site).	Provide deeper groundwater quality data, vertical gradient data and well nest at proposed well R-37/check quality of groundwater recharging mid-plant unnamed ditch.
R-39B	Remotely downgradient (northeast) of two abandoned impoundments (off-site).	Provide further plume definition and R-38B/38C well nest.
R-39C	Remotely downgradient (northeast) of two abandoned impoundments (off-site).	Provide further plume definition and R-38B/38C well nest.
R-40	Remotely downgradient (north) of large process cooling pond and side gradient to process area.	Provide shallow groundwater data to further plume definition.
R-41	Remotely downgradient of drip track area.	Provide shallow groundwater quality check.
R-42	Downgradient of southern waste pile.	Provide shallow groundwater quality data.
R-43	Downgradient of southern waste pile.	Provide shallow groundwater quality data.
R-44	Southwestern property boundary.	Provide background groundwater quality data.
R-45	Remotely side/downgradient of drip track area.	Provide shallow groundwater quality data.

NOTE:
Groundwater elevations will be determined in all wells at the time of sampling.

DCC#R487

TABLE 5-3

GROUNDWATER/SURFACE WATER SAMPLE ANALYSIS SUMMARY

Approximate Number of Samples	Compound	Method	Quantitation Limit	Field Duplicates	Field Blanks	Trip Blanks
37/16*	- Polycyclic Aromatic Hydrocarbons	EPA 610		4/2*	4/2*	0/0*
	carbazole		2 ug/L			
	naphthalene		2 ug/L			
	acenaphthylene		2 ug/L			
	acenaphthene		2 ug/L			
	fluorene		0.2 ug/L			
	phenanthrene		0.5 ug/L			
	anthracene		0.5 ug/L			
	fluoranthene		0.2 ug/L			
	pyrene		0.2 ug/L			
	benzo(a)anthracene		0.02 ug/L			
	chrysene		0.15 ug/L			
	benzo(b)fluoranthene		0.02 ug/L			
	benzo(k)fluoranthene		0.02 ug/L			
	benzo(a)pyrene		0.02 ug/L			
	dibenz(ah)anthracene		0.03 ug/L			
	benzo(ghi)perylene		0.05 ug/L			
	indeno(1,2,3-cd)pyrene		0.05 ug/L			
37/16*	- Phenolics	EPA 604	-	4/2*	4/2*	0/0*
	phenol		0.05 ug/L			
	2-chlorophenol		0.05 ug/L			
	2-nitrophenol		0.05 ug/L			
	2,4-dimethylphenol		0.05 ug/L			
	2,4-dichlorophenol		0.05 ug/L			
	4-chloro-3-methylphenol		0.05 ug/L			
	2,4,6-trichlorophenol		1.0 ug/L			
	2,4-dinitrophenol		1.0 ug/L			
	4-nitrophenol		1.0 ug/L			
	2,3,5,6-tetrachlorophenol		1.0 ug/L			
	4,6-dinitro-2-methylphenol		1.0 ug/L			
	pentachlorophenol		1.0 ug/L			

TABLE 5-3 (Continued)

Approximate Number of Samples	Compound	Method[1]	Quantitation Limit	Field Duplicates	Field Blanks	Trip Blanks
37/16*	- Aromatic Volatiles	EPA 8020	-	4/2*	4/2*	2/1*
	benzene		0.2 ug/L			
	toluene		0.2 ug/L			
	ethylbenzene		0.2 ug/L			
	xylenes		0.3 ug/L			
	styrene		0.3 ug/L			
37/0*	- Oil & Grease	EPA 9070	5 mg/l	4/2*	4/2*	0/0*
37/0*	- Chemical Oxygen Demand	EPA 410.4	10 mg/l	0/0*	0/0*	0/0*
37/0*	- Biochemical Oxygen Demand	EPA 405.1	1 mg/l	0/0*	0/0*	0/0*
37/16*	- Specific Conductance	EPA 120.1	1 umho/cm	0/0*	0/0*	0/0*
37/0*	- Total Organic Carbon	EPA 415.1	1 mg/l	0/0*	0/0*	0/0*
37/0*	- Total Dissolved Solids	EPA 160.1	1000 ug/L	0/0*	0/0*	0/0*
37/0*	- Total Suspended Solids	EPA 160.2	1000 ug/L	0/0*	0/0*	0/0*
37/16*	- pH	EPA 150.1	-	0/0*	0/0*	0/0*
	- Halogenated Volatiles**	EPA 8010	-	1/0	1/0	1/0
	tetrachloroethene		0.03 ug/L			
	Trichloroethene		0.05 ug/L			
	cis-1,2-dichloroethene		0.05 ug/L			
	trans-1,2-dichloroethene		0.05 ug/L			
	1,2-dichloroethene		0.05 ug/L			
	1,1-dichloroethane		0.05 ug/L			
	1,2-dichloroethane		0.05 ug/L			
	vinylchloride		0.20 ug/L			

* Number of proposed groundwater samples are represented by the first value.
Number of proposed surface water samples are represented by the second value.

** South Waste Pile wells only.

wells (well R-33) will be a shallow well installed to characterize water quality at the water table in a downgradient direction from the process area. The remaining two wells (R-20B and R-21B) are intended to complete two well nests at the existing well R-20 and R-21 locations. These wells will be completed at a deeper interval within the sand aquifer. The wells will be screened so that the top of the screen is ten feet below the bottom of the screen in the adjacent well. In order to prevent oil from being carried down to the well depth during drilling, it is proposed that six-inch PVC casing be installed and grouted to a depth of 30 feet in the well R-20B borehole and 25 feet in the well R-21B borehole. The depths to which the PVC casing will be installed are based on the visual/odorous observations that were made in the previous shallow well borehole. A minimum of two and a maximum of six soil samples will be submitted for complete analysis from the three proposed well locations for this area of the investigation. The parameter list for complete chemical analysis for soils is contained in Table 5-1. All other split-spoon samples above the water table from the well bores will be submitted for oil and grease analysis only.

SWMU 2 (Impoundment):

Under RCRA, the surface impoundment currently has a groundwater monitoring network in place. Recently, a quarterly compliance monitoring program was submitted to and approved by the MDNR.

The impoundment was closed in 1989. The closure was carried out according to specifications in the approved closure plan. No additional groundwater monitoring wells are proposed for the surface impoundment. Groundwater monitoring is currently occurring under RCRA, and will therefore be modified as necessary, if required.

SWMU 3 (Sprayfield):

No further investigation of the sprayfield is proposed for the reasons stated in Section 3.1.

SWMU 5 (Landfarm):

The boiler ash landfarm is also classified as a RCRA unit. A closure plan for this unit has been submitted to and approved by MDNR. At the present time, commencement of closure activities is being scheduled. The closure is expected to be completed in early 1990. A groundwater quality assessment (GWQA) monitoring program was approved by the MDNR. The Work Plan for the GWQA called for the installation of nine new wells, which were intended to supplement the existing four-well monitoring network. Three of these wells (M-2B, M-5 and M-5B) were located on the facility property, and were installed in October 1989, as shown on Figure 5-3. Six additional wells were to be located off-site, but permission to install these wells has not yet been procured from the adjacent property owner. Negotiations are still underway with the landowner to secure access for the drilling. The landowner has requested that the proposed locations for the wells be altered, so that the wells would not interfere with farming practices. The new proposed locations for the six off-site wells for the ash pile GWQA (M-6, M-6B, M-7, M-7B, M-8 and M-8B) are also shown on Figure 5-3. The landfarm GWQA investigation will continue to be considered as separate from the rest of the RFI. MDNR will be apprised of any progress in the access negotiations. Details on proposed well installation methods/locations may be found in the report entitled "A Draft Proposed Work Plan Groundwater Quality Assessment Boiler Ash Disposal Area Grenada, Mississippi" prepared by Keystone for BM&S and submitted to MDNR in May 1989.

SWMU 6 (Process Cooling Pond):

One well (R-19) is currently located downgradient of the large process cooling pond and has been found to contain slightly elevated concentrations of wood-treating constituents. It is proposed that a deep well (R-19B) be installed adjacent to well R-19 to determine if constituents apparently originating from the pond extend to the deeper zone of the sand aquifer. In order to prevent contaminants from migrating to the well depth during drilling activities, a six-inch PVC casing will be grouted to a depth of 20 feet in the borehole. Up to three soil samples above the water table will be submitted for complete laboratory analysis from this well borehole, for the

parameters listed in Table 5-1. All other split-spoon samples above the water table will also be submitted for oil and grease analysis.

SWMU 7 (Container Storage Area):

This area has been adequately characterized during the Phase I investigation; therefore, no well installation is proposed.

SWMU 8 (Drip Track Area):

Three new monitoring wells are proposed for the drip track area. One of these wells (R-25B) is proposed to be installed adjacent to well R-25, in order to complete a two-well nest at that location. To prevent the introduction of contaminants to the deeper depth, a six-inch PVC casing will be installed to a depth of 20 feet in the well borehole. Two shallow monitoring wells are proposed (R-34 and R-35) to monitor groundwater further downgradient of the drip track. Details on well installation are contained in Section 5.1.2.1.

SWMU 11 (Former Waste Treatment System):

Installation of three on-site wells and five off-site wells is proposed to identify groundwater quality in the area of the former impoundments. Two of the proposed on-site wells R-12C and R-16B will be installed such that they provide a well nest, and will determinate deeper groundwater quality at their respective locations. Well R-36, the third on-site well, is intended to provide information on the quality of groundwater which enters the unnamed ditch (mid-plant).

The remaining five wells are scheduled for installation off-site. One of the wells (R-37) will be a shallow well intended to provide additional spatial information on shallow groundwater quality. In addition, two wells nests (R-38/38B and R-39B/39C) are proposed to provide further information on the lateral and vertical extent of the constituent plume associated with the two abandoned impoundments. The locations of these wells are represented on Figure 5-3. The landowner of the adjacent property has requested that all wells be located along the fenceline or

treeline so that farming practices will not be disturbed. Thus, final locations may be partially dependent on meeting this criterion. Negotiations with the landowner are in progress to secure access to the property for drilling and well sampling purposes.

One well (R-23B) is proposed for installation adjacent to well R-23 to provide information on deeper groundwater quality in that area. This well will be installed as a four-inch diameter stainless steel well, for additional use as a pumping well. The well will be used for a pump test as part of this Phase II RFI. During installation of well R-23B, to prevent contaminants from migrating downward to the well depth, an eight-inch ID PVC casing will be grouted to a depth of 25 feet in the well borehole.

SWMU 12 (North Waste Piles):

No further well installation is planned in association with the north waste piles at this time. Existing well R-28 is located immediately downgradient of the northernmost waste pile in this area. If the results of the proposed soil investigation show constituent concentrations at levels of potential concern in the sample collected immediately above the water table, the one shallow monitoring well will be installed immediately downgradient of the southernmost waste pile in this area.

SWMU 13 (South Waste Piles):

Two shallow monitoring wells, R-42 and R-43, are proposed for installation in this area. One well is to be located immediately downgradient of each waste pile as shown on Figure 5-3.

Other Wells:

A four-inch diameter PVC pumping well (PW-1) will be installed east of the closed RCRA surface impoundment (Figure 5-3). This well will be used for aquifer characterization described in Section 5.1.2.4.

elevated, development will be prolonged until this reading is within the range of that noted at existing site wells. When wells are bailed, dedicated laboratory-cleaned stainless steel bailers will be used.

Development water/purge water will be processed in the plant's wastewater treatment system.

A designated reference point will be marked on the top of the PVC or stainless steel casing of all newly-installed monitoring/pumping wells. The elevation above mean sea level of this reference point and the ground surface will be determined to the nearest 0.01 foot. The horizontal coordinates of all newly-installed wells will also be determined, and tied into the Mississippi State Plane coordinate system.

5.1.2.3 Groundwater Sampling and Analysis

One groundwater sampling round will be conducted on all newly-installed and selected existing monitoring wells. The existing wells which will also be analyzed will include wells R-5/5B, R-12/12B, R-13, R-16, R-17, R-19, R-20, R-21, R-22, R-23, R-24, R-25, R-26, R-28 and R-29. This event will be scheduled approximately one month after all well installation activities are completed. Prior to sampling, water levels will be measured to an accuracy of 0.01 foot in all wells at the site. An oil/water interface probe will be used to take the field measurements to enable the detection of sinking or floating non-aqueous phase liquids.

An equivalent of three casing volumes of water will be purged from each well with dedicated laboratory cleaned stainless-steel bailers. Samples will be collected by bailing and field tested for pH and specific conductance. Appendix C details Keystone's standard protocol for groundwater sampling from monitoring wells.

Development water/purge water will be processed in the plant's wastewater treatment system.

Samples will be preserved as appropriate before being placed on ice and shipped to the laboratory via overnight service. Sample chain-of-custody procedures will be

Five additional shallow monitoring wells are proposed which are not closely associated with a particular area of investigation. These five wells (wells R-32, R-40, R-41, R-43 and R-45) are shown on Figure 5-3. Well R-32 is to be located south of the mid-plant unnamed ditch and will provide shallow groundwater quality data in this area. Well R-40 may be influenced by both the process cooling pond and partially by the process area and is intended to provide information on groundwater quality in this location. Well R-41 is intended for extra spatial coverage of the site in general, and to provide groundwater quality information for shallow groundwater near the site boundary. Well R-44 is to be located at the southwestern properly boundary to characterize background groundwater quality in this area. Well R-45 is to be located to the north of the drip track area to provide shallow groundwater quality data in this area.

5.1.2.1 Well Installation

Well boreholes will be advanced by mud rotary until the completion depth is reached. Mud rotary has been used successfully for well installation at this site. The use of hollow stem augers for well installation is not recommended due to formation collapse below the water table. Health and Safety protocol and decontamination procedures will be the same as that proposed for the soil borings. Health and Safety procedures are detailed in Appendix D. A ten foot, two inch ID, schedule 40 PVC flush joint screen and appropriate length of riser will be installed to the desired completion depth. In the case of pumping well PW-1, a four inch ID schedule 40 PVC screen and riser will be used for well completion. In the case of pumping well R-23B, a four-inch ID stainless steel screen and riser will be used for well completion. The PVC or stainless steel stickup will extend approximately 2.5 feet above ground surface, in all cases, unless plant operation jeopardizes the wells, in which case flush mount covers will be used. Flush mounts may possibly be needed for wells R-34 and R-35.

The sand used for the sand pack around the screen will be a medium to coarse, inert silica sand which will be compatible with the 0.010 inch slot screen. This sand will be extended two feet above the top of the screen. A pelletized bentonite seal at least two feet in thickness will be installed above the sand pack.

Any remaining annulus will be grouted with a cement-bentonite slurry, forming the annular space seal. A steel locking protective casing will be installed to complete the wells. A sloping concrete collar with a radius of one foot will be installed around the steel protective pipe to support the pipe and facilitate surface drainage away from the well.

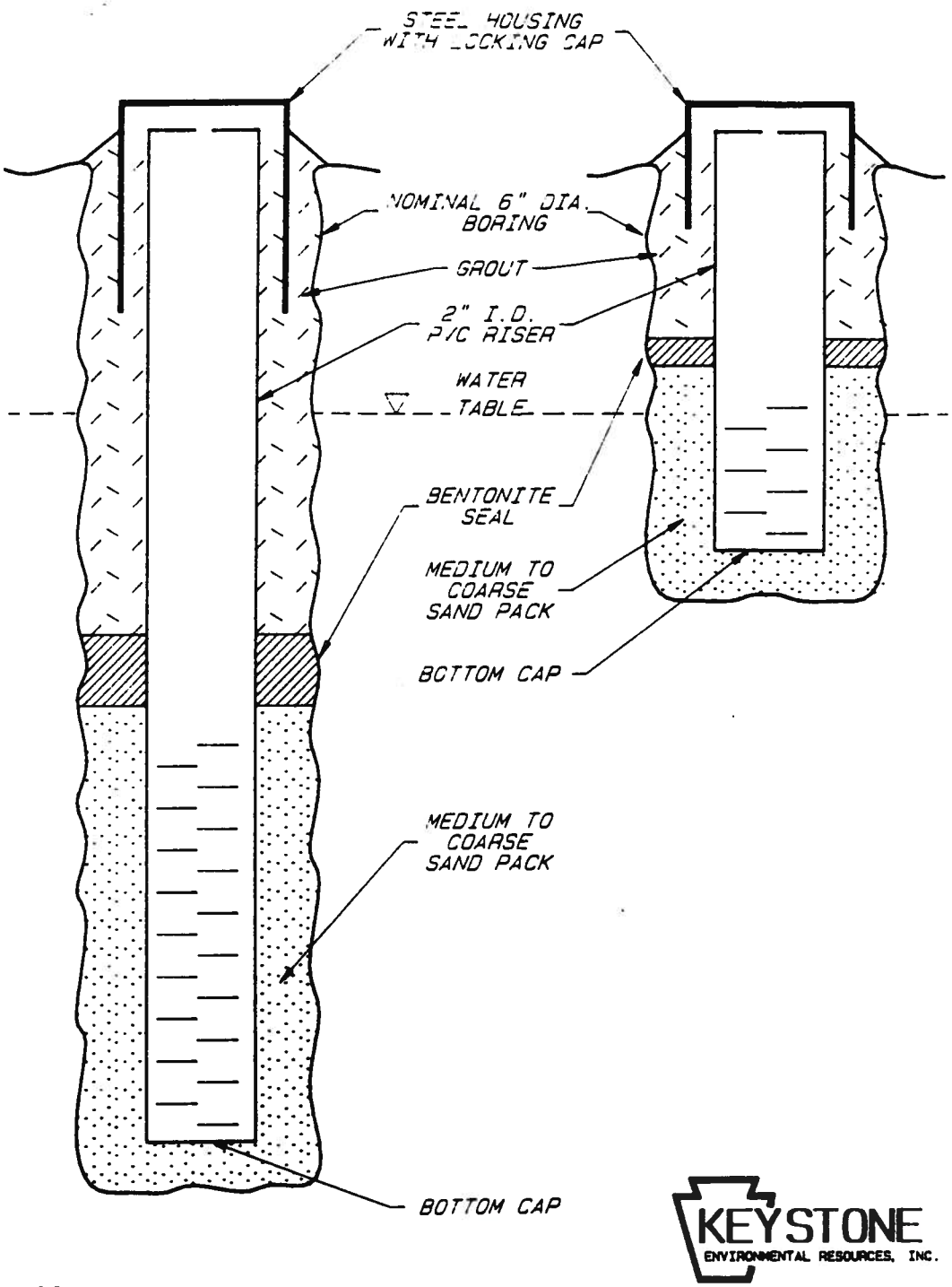
A generalized well construction diagram is shown in Figure 5-4. Well logs showing well construction details will be completed for all newly-installed site wells. The wells will be clearly and permanently labeled in the field. Details on the completion of well nests are presented below.

At locations which were selected as sites for well nests to be completed, the borings will be advanced to a completion depth which will allow the top of the well screen to be ten feet below the bottom of the well screen in the adjacent shallow wells. A ten foot long PVC well screen will then be installed for the deeper well; well completion will be similar to that described above. Thus, the bottom of the deeper well in each well nest will be approximately 20 feet below the adjacent well.

All cuttings or drilling mud resulting from drilling activities during the Phase II RFI will be contained in sealed DOT 55 gallon steel drums. The origin(s) of the cuttings/drilling mud in each drum will be indicated on an appropriate waste label affixed to the drum. The drums will be stored on the KII plant property while disposal options are evaluated. Soil boreholes will be grouted upon completion with a cement-bentonite slurry.

5.1.2.2 Well Development and Survey

For each of the new wells completed at the Grenada site, well development will occur by use of a surge block to pull fine material (clays and silts) into the well. Water and fines will be removed by airlifting or pumping. Development will continue until repeated surging causes no visibly detectable change in the turbidity of the groundwater. To supplement this general procedure, pH, specific conductance and temperature will be monitored during well development, to determine whether these readings have stabilized. If the pH is significantly



KEYSTONE ENVIRONMENTAL RESOURCES, INC.

NOTES -

1. DRAWING NOT TO SCALE.
2. CONSTRUCTION DETAILS DEPENDENT UPON HYDROGEOLOGIC CONDITIONS ENCOUNTERED.
3. FOR WELL NESTS, APPROXIMATELY TEN FEET WILL BE MAINTAINED BETWEEN THE TOP OF THE SCREEN OF THE DEEPER WELL AND THE BOTTOM OF THE SCREEN OF THE ADJACENT SHALLOW WELL. THIS WILL BE TRUE BETWEEN SHALLOW WELLS AND PROPOSED B-LEVEL WELLS AND BETWEEN B-LEVEL WELLS AND PROPOSED C-LEVEL WELLS.

FIGURE 5-4

WELL CONSTRUCTION DETAILS

GRENADA, MS

KOPPERS INDUSTRIES, INC.

C67501

followed and laboratory holding times and QA/QC procedures strictly adhered to as detailed in Appendix B. Groundwater samples collected during this investigation will be analyzed by Keystone's Analytical Division Laboratory in Monroeville, Pennsylvania.

The Quality Assurance Project Plan presented in Appendix B details laboratory quality control procedures. Analyses to be run on samples collected during the Phase II RFI include the primary indicator parameters for chemical releases at wood-treating plant such as the Grenada facility. A complete list of parameters and methods of analysis for groundwater and surface water samples is displayed in Table 5-3.

5.1.2.4 Aquifer Characterization

In-situ hydraulic conductivity tests will be conducted in twelve shallow wells and six B-level wells. The wells selected may be either existing wells or wells to be completed during the Phase II RFI, and will be distributed across the site so that representative hydraulic conductivities may be calculated. The slug tests will be performed in shallow wells R-10, R-11, R-19, R-22, R-24, R-26, R-27, R-29, R-33, R-36, R-40 and R-41. The deep (B-level) wells proposed for slug testing include wells R-8B, R-10B, R-16B, R-19B, R-20B and R-38B.

The tests performed will be rising or falling head slug tests. Rising head tests will be performed when the water table is below the top of the screened interval and will involve the fast removal of one long bailer of water. Falling head tests will be performed when the entire screen is saturated, and will involve the addition of a known volume of distilled water to fill the riser pipe. In both cases, as soon as the removal or addition of the slug of water is complete, an electronic data logger and pressure transducer assemblage will be used to measure the recovery of the water level to static level. Static level will be measured prior to the removal or addition of any water. The slug tests will be performed approximately one week after the groundwater monitoring wells are sampled. Appropriate graphical data evaluation techniques will be used to calculate the hydraulic conductivity, considering the hydrogeologic setting for each well.

In addition, two continuous pump tests will be performed; one in the vicinity of the surface impoundments using well PW-1 as the pumping well, and one near the oil/water separators, using well R-23B as the pumping well. The pump tests will be continued for 48 hours, with continuous monitoring of the pumping well and several observation wells.

Prior to the commencement of any step tests or pump tests, several wells will be monitored on an hourly basis for 24 hours to assess normal diurnal variations. Wells to be included in this are all site wells north of the mid-plant unnamed ditch except the SF-series wells, and wells R-27, R-28 and R-29. Newly-installed wells will also be monitored during this diurnal variation test.

A step test will also be conducted in both pumping wells prior to the initiation of either continuous pump test to determine the optimum pumping rate which should be maintained during the tests. Both pump tests will provide valuable information on aquifer characteristics such as transmissivity, and specific yield, as well as determination of the response of the aquifer to the long term pumping stimulus. The interconnection of different levels of the aquifer will also be determined.

The four inch well described in the well installation section (PW-1) will be used as the pumping well for the pump test, in the vicinity of surface impoundments (Figure 5-3). The location of the well was chosen both due to its proximity to other wells screened at various depths, providing good observation wells, and its proximity to electricity. The use of a constant electrical source is much more reliable than the use of a generator for long term pump tests. Wells R-1R, R-2, R-3, R-4, R-5/5B, R-6, R-7, R-8/8B, R-9/9C/9D, R-11, R-13, R-17 and R-18 will all be monitored as observation wells. However, only wells R-2, R-3, R-7, R-8/8B and R-9 will be monitored frequently enough to allow the data to be used in the determination of aquifer properties.

For the second 48 hour pump test, well R-23B will be used as the pumping well. Wells R-20/20B, R-21/21B, R-22, R-23B, R-33, R-36, and R-40 will be used as

observation wells. Wells R-21/21B, R-22 and R-23 will be monitored frequently enough to allow the data to be used in the determination of aquifer properties.

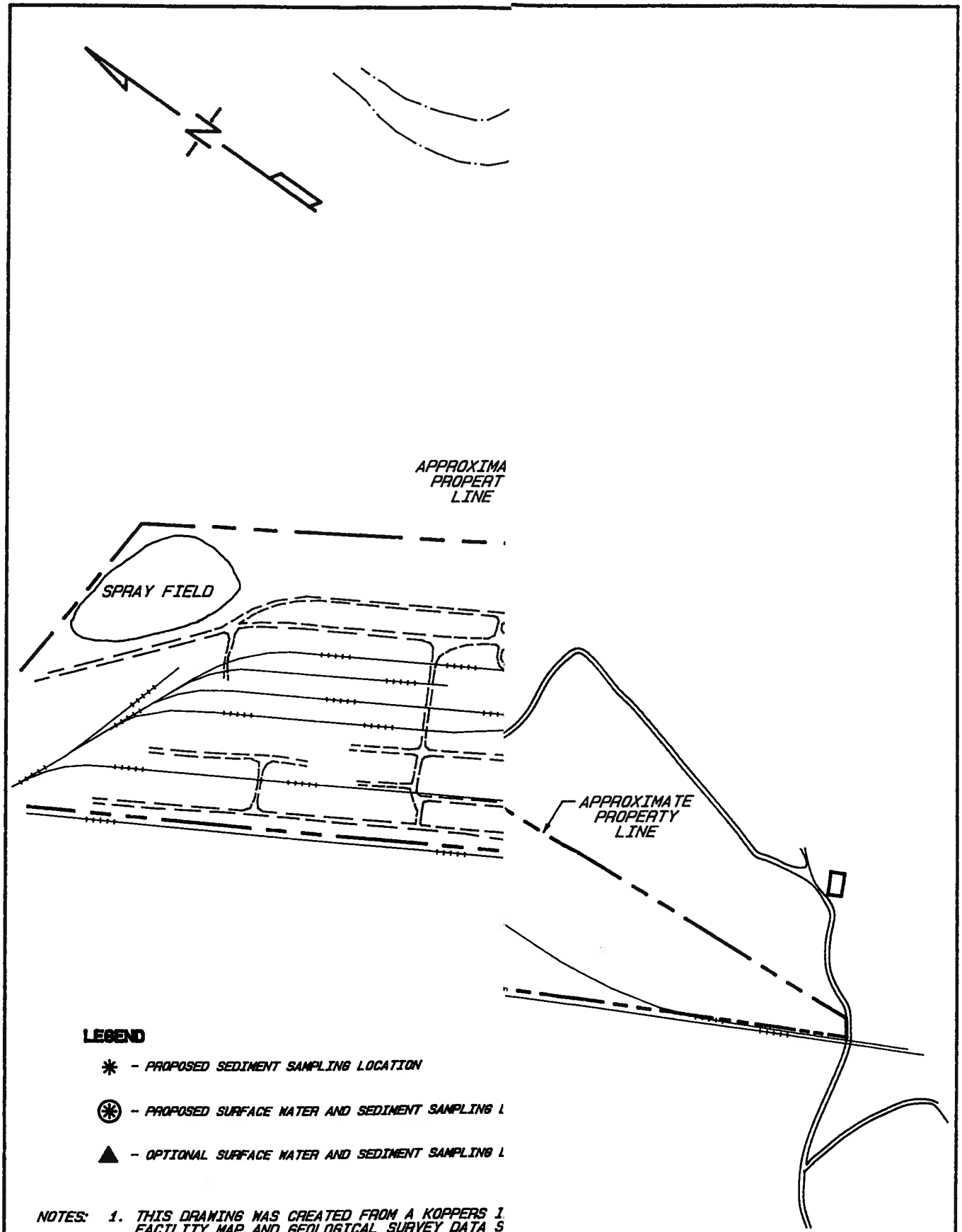
If, during either test, appreciable drawdown is noted in any of the most distant wells, water levels in other site wells even more remote from the pumping area will be occasionally checked for drawdown. The water levels in the pumping well and observation wells will be measured with a combination of an electronic data logger and pressure transducer assemblage and with a manual water level indicator.

For both pump tests, water removed from the pumping wells will be piped to the sump which is located in the decon area adjacent to the shop. This will insure that the water is treated and that no recirculation occurs.

After the continuous pump tests are completed, recovery tests will be performed, using the same observation wells. The pump tests will be scheduled approximately five weeks after all well installation is complete (one week after the sampling of the wells). It is anticipated that the 24 hour diurnal variation study will be performed initially, followed by the step tests and slug tests, which may be performed simultaneously. The 48 hour continuous pump test in well PW-1 will be started after the pumping well has recovered to static level. Upon cessation of the pumping test, the recovery test will begin immediately, and continue until the pumping well has recovered to static level. The 48 hour pump test in well R-23B will begin after well PW-1 has reached static level. All usable data will be evaluated using standard graphical techniques.

5.2 Surface Water Characterization

A surface water characterization will be performed at the Grenada site to determine the nature and extent of impact from the site. The areas to be characterized are: (1) the Unnamed Ditch which flows from west to east, bisecting the site, (2) the Unnamed Stream, which flows from southwest to northeast across the northwestern portion of the site, and (3) the aeration and overflow ponds.


N
APPROXIMA
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LEGEND
- PROPOSED SEDIMENT SAMPLING LOCATION
- PROPOSED SURFACE WATER AND SEDIMENT SAMPLING L
- OPTIONAL SURFACE WATER AND SEDIMENT SAMPLING L
NOTES: 1. THIS DRAWING WAS CREATED FROM A KOPPERS I
FACILITY MAP AND GEOLOGICAL SURVEY DATA S
THE DEPT. OF THE INTERIOR TIE PLANT QUADRA
2. THE BATUPAN BOGUE IS LOCATED APPROXIMATEL
EAST OF THE GRENADA KOPPERS INDUSTRIES. I
EYSTONE
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FIGURE 5-5
PROPOSED SURFACE WATER AND
SEDIMENT SAMPLING LOCATIONS
UNNAMED DITCH
GRENADA, MS
KOPPERS INDUSTRIES, INC.
8/8/90
A105093

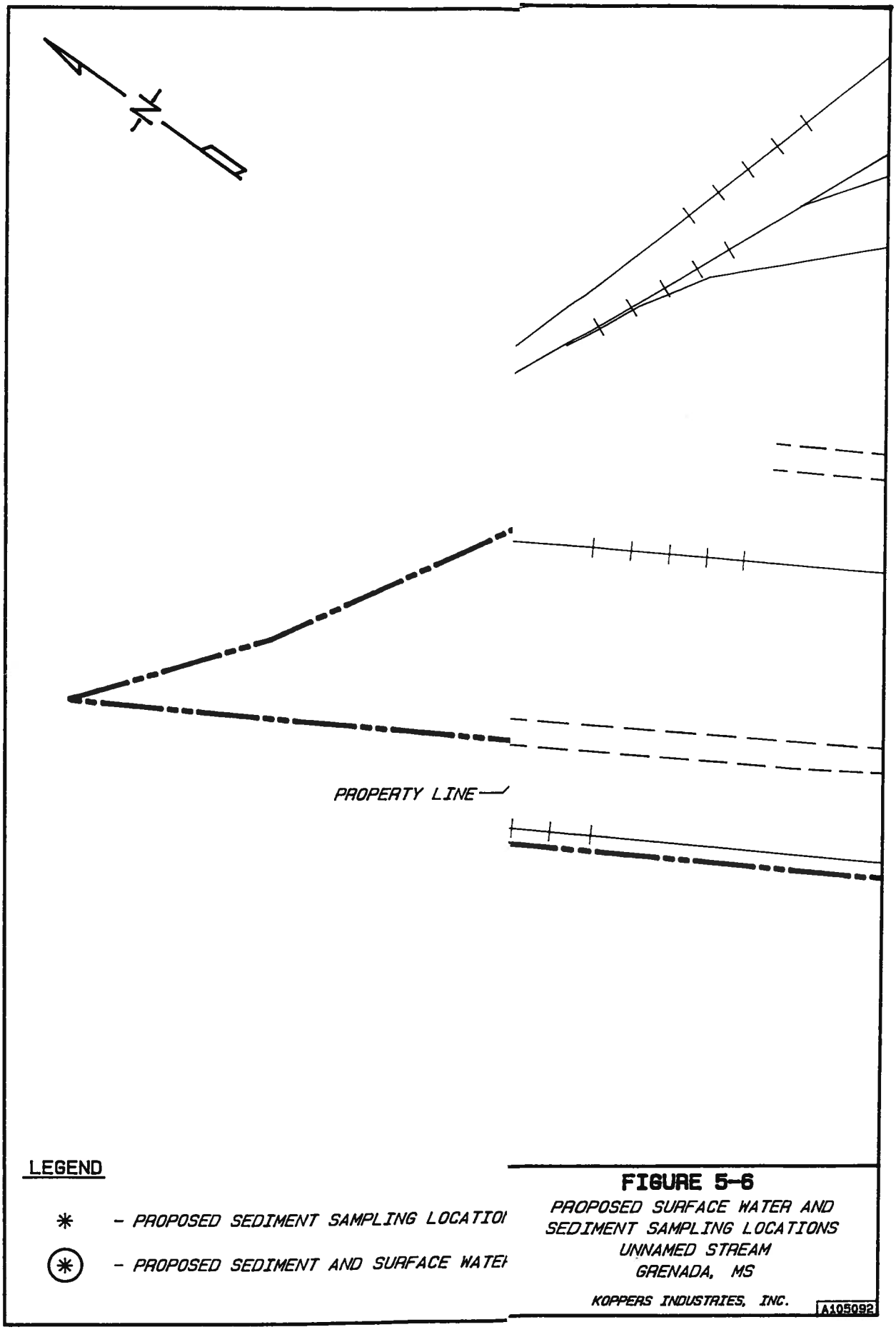

FIGURE 5-6

PROPOSED SURFACE WATER AND SEDIMENT SAMPLING LOCATIONS UNNAMED STREAM GRENADA, MS

KOPPERS INDUSTRIES, INC. A105092

One round of surface water sampling and analysis will be completed coincident with groundwater sampling and the sediment characterization which are described in Sections 5.1 and 5.3, respectively. The proposed sampling locations for Unnamed Ditch, the aeration pond and overflow pond are presented in Figure 5-5 and the proposed locations for the Unnamed Stream are presented in Figure 5-6. Six surface water samples will be collected from Unnamed Ditch; samples will be collected from each of the upstream tributary ditches to provide background information (UDSW-1 and UDSW-2), and, to determine extent of impact, one sample each will be collected at the downstream property line (UDSW-7), at a point approximately 700 feet downstream from the property line (UDSW-9), from a location immediately upstream of the confluence of Unnamed Ditch and Batupan Bogue (UDSW-11), and from a storm water runoff ditch which flows into Unnamed Ditch (UDSW-5). One surface water sample will be collected from the aeration pond (APSW-1) and overflow pond (APSW-2). Eight surface water samples will be collected from Unnamed Stream; approximately 250 feet upstream of the site to provide background information (USSW-1), at the upstream property line (USSW-2), in each of three tributary storm water runoff ditches (USSW-3, USSW-4, and USSW-5), approximately 20 feet downstream of the confluence of the last tributary storm water ditch (USSW-6), at the downstream property line (USSW-8), and approximately 200 feet downstream from USSW-8 (USSW-9). The tributary storm water collection ditches may run dry during low flow conditions; therefore it may not be possible to collect surface water samples from all locations.

Additionally, if the surface water sample collected at location UDSW-13 displays concentrations of site-related compounds of interest at levels of potential concern, then surface water samples (BBSW-1 and BBSW-2) will be collected at one upstream and one downstream location in Batupan Bogue (Figure 5-5).

The surface water samples will be collected as grab samples from approximately mid-depth and sampling will be conducted prior to sediment sampling to minimize turbidity in the surface water samples. The surface water samples will be analyzed for the parameters presented in Table 5-3.

In addition to chemical analysis, the flowrates of Unnamed Ditch and Unnamed Stream will be determined by one of the methods outlined in the Field Sampling Plan. The elevations of each sampling location will be surveyed to determine if any correlation between groundwater and surface water exists.

5.3 Sediment Characterization

Sediment sampling will be conducted at Unnamed Ditch, Unnamed Stream, and the aeration ponds. Proposed sampling locations for Unnamed Ditch and the aeration ponds are presented on Figure 5-5 and the locations for Unnamed Stream are shown on Figure 5-6. Thirteen samples will be collected from Unnamed Ditch; six of the samples will be collected from the same locations as the surface water samples described in Section 5.2. One of the remaining seven sediment sampling points in Unnamed Ditch is located at the upstream property line (UDSD-3), four sampling points are located at approximately 200-foot intervals starting near the railroad tracks and proceeding downstream (UDSD-4, UDSD-5, UDSD-7, and UDSD-8), another is located approximately 400 feet downstream from the downstream property line (UDSD-10), and the final location is approximately 900 feet upstream from UDSD-13 (UDSD-12). Sediment samples from the aeration and overflow ponds will be collected from the same sample locations as the surface water samples. Nine sediment samples will be collected from Unnamed Stream; eight of these samples will be collected from the same locations as the surface water samples and the other sample will be collected approximately 150 feet upstream from the downstream property line (USSD-7).

Additionally, if the sediment sample collected at DSD-13 displays concentrations of site-related compounds of interest at levels of potential concern, then sediment samples (BBSD-1 and BBSD-2) will be collected at one upstream and one downstream sampling location in Batupan Bogue (Figure 5-5).

Sediment samples will be collected from the ditch and stream using a 2-inch diameter core sampler and will collect sediment to a depth of 12 inches. At each sampling location, four separate sediment cores will be collected along the width of the channel in areas of deposition (i.e. slow moving water, etc.). Samples from the

aeration ponds will be collected using a ponar sampler which collects the top six inches of sediment. At each pond location four samples will be collected. The four cores or dredge samples will be composited and submitted for analysis for the parameters presented in Table 5-1.

5.4 Air Monitoring Investigation

An air investigation is not being proposed at this time. The potential routes of release into the air of constituents found at the site would include direct volatilization of vapor phase constituents and wind borne entrainment of contaminated soil particles. Examination of vapor pressure data for pentachlorophenol (PCP) shows a value of 0.00011 mm Hg at ambient temperature. The true partial pressure of the above compound in waste materials, however, would be appreciably less than the pure compound. Creosote, the second wood preservative used at the facility, is a coal tar distillate composed of polycyclic aromatic hydrocarbons with a wide range of boiling points. Although dependant on the actual composition, a vapor pressure of 0.005 mm Hg may be estimated for creosote at ambient temperature. Because the partial pressures of the above wood treating agents at ambient temperature and concentrations would be extremely low, the potential for airborne release of these compounds via volatilization is considered to be minimal.

Following the exposure assessment, a risk characterization will be performed. The potential effects of the concentrations of PCOCs will be assessed by two methods. The estimated concentration of each PCOC will be compared qualitatively with its corresponding standard or guideline.

In addition, a quantitative risk calculation also will be performed. First, plausible exposure scenarios will be developed. Then based on the potential constituent concentrations estimated for the receptor endpoints, the potential average daily intake (D) of each PCOC (i), will be estimated for a receptor (D_i) . These potential average daily intakes will be combined with quantitative indices of toxicity, when available, to estimate the potential for human health effects.

The potential for noncarcinogenic health effects are evaluated by comparing an exposure level over a specified time period (e.g. lifetime) with a reference dose derived for a similar exposure period. This quantitative ratio is defined as the hazard quotient (HQ):

$$HQ = E/RfD$$

where;

E = exposure level (or intake)
RfD = reference dose

The Hazard Quotient is based on the theory that there is a level of exposure (i.e. RfD) below which it is unlikely for even sensitive populations to experience adverse health effects.

In order to assess the overall potential for noncarcinogenic health effects to multiple chemicals, the Hazard Index (HI) based on EPA's (1986) "Guidelines for Health Risk Assessment of Chemical Mixtures" will be used. The HI is defined as:

$$HI = E_1/RfD_1 + E_2/RfD_2 + \cdots\cdots E_i/RfD_i$$
$$= Æ\ HQ_i$$

CHESTER
ENVIRONMENTAL

Ref. No. 176925-01

May 21, 1993

Mr. Wayne Stover
State of Mississippi
Department of Environmental Quality
Hazardous Waste Division
P. O. Box 10385
Jackson, MS 39289-0385

Re: Groundwater Quality Assessment
Boiler Ash Disposal Area
Koppers Industries, Inc.
Grenada, MS

Dear Mr. Stover:

Per your request and on behalf of Beazer East, Inc. (Beazer), Chester Environmental is submitting an additional copy of the Groundwater Quality Assessment (GWQA) Final Report for the above-referenced facility for your submittal to the Environmental Protection Agency.

If you have any questions, please contact Rob Markwell, Beazer, at (412) 227-2946 or me at (412) 825-9609.

Sincerely,

David L. King
Project Manager

DLK:erh dk-84

Encl.

cc: R. Markwell - Beazer

3000 Tech Center Drive
Monroeville, Pennsylvania 15146
412-825-9600: Fax 412-825-9699

beneath the waste piles and entered the groundwater. It is therefore recommended that a monitor well be constructed immediately downgradient of each of the north waste piles and groundwater samples collected and analyzed.

9. It is noted in the boring log for piezometer well P-12 that there was a chemical odor in the soils to a depth of 27.5 feet. It is recommended that a monitor well be constructed in the vicinity of well P-12 in order to determine the existence of any groundwater contamination in this area.

10. An additional area of concern is the contamination found in surface water and soil samples along the unnamed ditch which flows through the central part of the facility (Report of Findings - Unnamed Ditch Characterization). The contamination found along the unnamed ditch is apparently the result of contaminants released from nearby facility units. This could include runoff from the plant process area, runoff and leachate from the closed impoundments or contaminants released from other facility units. It is reported in the Unnamed Ditch Characterization document that "Numerous tractor tires, and railroad ties, partially buried in the sediment, were also observed in the ditch". These may also be a contributing factor to the contamination found along the unnamed ditch. In as much as the contamination in the unnamed ditch has apparently resulted from contaminants released from various facility units, including solid waste management units, it will be necessary to further define the extent of these releases. Because of the interactive nature of surface water and groundwater, it is recommended that several monitor wells be constructed along both sides of the unnamed ditch in order to establish the existence of any groundwater contamination that may be associated with contaminant releases to or from the unnamed ditch.

11. It is reported in the RFA that "prior to 1970 different treatment chemicals may have been used at the facility" and that "salts of chromium, copper and arsenic are other commonly used wood preservatives at other wood preserving facilities". Because of the lack of historical data on past wood treating processes at the facility, it is recommended that soil and groundwater samples from the following areas be analyzed for total metals (acid digestion procedure); specifically chromium, copper and arsenic:

    a. Facility process area (SWMU 1, 4, 9 and 10);
    b. Boiler ash landfarm (SWMU5);
    c. Process cooling ponds (SWMU6);
    d. Abandoned waste treatment system (SWMU11);
    e. North waste piles (SWMU12);
    f. Area in the vicinity of piezometer well P-12; and
    g. Area in the vicinity of the unnamed ditch.

Comments and Recommendations

1. It is agreed that solid waste management units (SWMUs) 1, 4, 9 and 10 should be grouped together in one area. However, the boiler (SWMU4) should not be excluded from consideration as a SWMU until such time as EPA rules on Koppers petition to delist the boiler ash as a hazardous waste. In addition, the holding tank used to store back-up water for the facilities fire protection system (SWMU10) should also continue to be considered a SWMU. This tank is reported to be 15 to 18 feet deep with the top of the tank (which is uncontained) at ground elevation. Thus, contaminated surface runoff from the surrounding process area could enter the tank and leak into the subsurface and groundwater through cracks or seams.

2. The surface impoundment (identified as SWMU2) is a RCRA regulated hazardous waste unit and will not require any additional investigation at this time.

3. The spray field (identified as SWMU3) should not require any additional investigation at this time, except for that work recommended and outlined in Bureau letter dated January 25, 1988 and addressed to Mr. J.D. "Rock" Clayton, Plant Manager, Koppers Company, Inc.

4. The investigation at the boiler ash landfarm (identified as SWMU5) should include several shallow soil borings within the perimeter of the landfarm in order to characterize the extent of any contamination present in the soils. In addition, groundwater sampling will be required as outlined in Bureau letter dated February 11, 1988 and addressed to Mr. Robert J. Anderson, Keystone Environmental Resources, Inc.

5. It is recommended that a monitor well be constructed immediately downgradient of the container storage area (SWMU7) and groundwater samples collected and analyzed.

6. Because of the length of the drip track area (SWMU8), it is recommended that several monitor wells be constructed immediately downgradient of this area and groundwater samples collected and analyzed.

7. It is recommended that a monitor well be constructed immediately downgradient of the former separator tanks which are part of the abandoned waste treatment system (SWMU11).

8. It is reported in the RCRA Facility Assessment (RFA) that at the north waste piles (SWMU12) a "brown oily water" was leaching from the northernmost waste pile down a gully and into an unnamed stream that flows across the northern facility boundary. If possible, a sample of this leachate should be collected and analyzed. Surface water samples and soil samples should be collected at points upgradient, downgradient and at the juncture of the gully and the unnamed stream. Soil samples should also be collected along the gully. It is also possible that that leachate may have moved downward through the soils

disposal options are evaluated. Soil boreholes will be grouted upon completion with a cement-bentonite slurry. Section 5.0 of the Phase II RFI Work Plan for the Grenada site has been revised to indicate this.

KEYSTONE
ENVIRONMENTAL RESOURCES, INC.

436 Seventh Avenue, Suite 1940, Pittsburgh, PA 15219

February 11, 1988

Mr. Charles Estes, P.E., Coordinator
Mississippi Department of Natural Resources
Hazardous Waste Division
Bureau of Pollution Control
2380 Highway 80 West
Jackson, MI 39204

Re: Koppers Company, Inc.
SWMU Investigation Work Plan
US EPA ID No. MSD007027543

Dear Mr. Estes:

In reference to the SWMU Investigation Work Plan for Koppers' Grenada, Mississippi facility submitted to you on January 22, 1988, please note that an omission was made in the introduction. Please insert attached pages 1, 1-1a and 1-1b for these same pages in the work plan you received. I apologize for any inconvenience this may cause you.

If you have any questions or would like additional information, please call me.

Sincerely,

Robert Anderson

Robert J. Anderson
Staff Program Manager

DIRECT DIAL #
412-227-2683

RJA/cr
Attachments

cc: J. H. Scarbrough
J. Blundon
J. Batchelder
R. Clayton
B. Ice

1.0 INTRODUCTION

The United States Environmental Protection Agency (U.S. EPA) identified thirteen solid waste management units (SWMU) on the Koppers Company, Inc. (Koppers), Grenada, MS property during a RCRA facility assessment (RFA) conducted in 1987. These SWMU units as identified by the U.S. EPA (December 1987) are listed on Table 1-1 and their locations are shown on Figure 1-1.

This document details investigative methods which will be used to evaluate the extent of soils and groundwater adversely affected by the U.S. EPA identified SWMUs at the Koppers wood treating facility near Grenada, Mississippi. This work plan has been prepared by Keystone Environmental Resources, Inc. (Keystone) at the request of Koppers.

The SWMUs will be referred to throughout this document by their process descriptive name and not the U.S. EPA identification numbers. This will simplify discussion of the SWMUs.

Units that Koppers does not consider to be solid waste management units, or units that Koppers believes do not need additional investigation are listed on pages 1-1 (a) and 1-1 (b).

- Solid waste management units 1, 4, 9 and 10 (oil/water separator, boiler, chemical unloading area, underground storage tank) are within the process area of the plant. Because it would be impossible to delineate the extent of contamination, if any, emanating from one source, and because previous hydrogeologic studies show that groundwater contamination exists in a downgradient direction from the process area, these identified areas will be grouped into one general area. Groundwater will be investigated in the suspected downgradient direction offsite in order to try to expedite delineating any groundwater plume emanating from this area.

- The surface impoundment, SWMU 2, is a RCRA-regulated unit, and is operating in compliance with RCRA. Since a groundwater

monitoring system is in place around this unit, further investigation will not be proposed.

- The unit identified as SWMU 4, the wood-fired boiler, burns creosote wastes, pentachlorophenol wastes, contaminated soils if they contain at least 5,000 BTU/lb, and the unreclaimable wood preservative as fuel. However, the boiler does not burn bottom sediments, as listed in the Solid Waste Management Unit document. This material does not meet Koppers' internal standards for burning fuel-additive material in the boiler.

  Because the unit is periodically tested for emissions in compliance with its operating permit, the boiler will not be investigated. However, emission test reports and a previously collected ash analysis will be submitted with the final report to document that hazardous constituents are not being released from the boiler into the environment.

- Solid waste management unit five, the landfarm, is the current site of the boiler ash pile. Mississippi Commission on Natural Resources Order No. 1209-87 was issued to address this area as a RCRA unit. To comply with this order, Koppers installed a RCRA groundwater monitoring detection network. No further work is proposed for this area unless a statistical evaluation of groundwater monitoring results indicates that a groundwater quality assessment program is needed.

- SWMU 10 is not an underground storage tank, but a tank used to hold water for fire protection. A sample of the water was collected in April 1987. Results will be included with the final report. Except to the extent this unit is grouped with the other areas identified near the process area, no further action will be taken to investigate this unit.

- SWMU 13 is an area where untreated wood and clean, empty drums used by the railroad for railroad spikes are stored. It is not expected that any contaminants of any type will be released from these items. However, soil borings are proposed for this area.

- The spray-irrigation field, SWMU 3, has a groundwater monitoring network surrounding it. No further work is being proposed for this unit.

For clarification, it should be noted that SWMU 7 is not the container storage area listed in the Part A Application. This area is a staging area where drums of fuel-additive material are unloaded from in-coming trucks. This area is addressed in the work plan.

Koppers reserves all of its rights to challenge the classification of any of the units described herein as SWMUs and the submittal of this work shall not be deemed to constitute Koppers agreement that any of the said units are SWMUs.

KEYSTONE
ENVIRONMENTAL RESOURCES, INC.

436 Seventh Avenue, Suite 1940, Pittsburgh, PA 15219

February 11, 1988

Mr. Charles Estes, P.E., Coordinator
Mississippi Department of Natural Resources
Hazardous Waste Division
Bureau of Pollution Control
2380 Highway 80 West
Jackson, MI 39204

Re: Koppers Company, Inc.
SWMU Investigation Work Plan
US EPA ID No. MSD007027543

Dear Mr. Estes:

In reference to the SWMU Investigation Work Plan for Koppers' Grenada, Mississippi facility submitted to you on January 22, 1988, please note that an omission was made in the introduction. Please insert attached pages 1, 1-1a and 1-1b for these same pages in the work plan you received. I apologize for any inconvenience this may cause you.

If you have any questions or would like additional information, please call me.

Sincerely,

Robert Anderson
Robert J. Anderson
Staff Program Manager

DIRECT DIAL #
412-227-2683

RJA/cr
Attachments

cc: J. H. Scarbrough
J. Blundon
J. Batchelder
R. Clayton
B. Ice

DIVISION OF SOLID WASTE
REVIEWED BY _____
DATE _____
COMMENTS Sent to EPA
2-25-88
DJB

1.0 INTRODUCTION

The United States Environmental Protection Agency (U.S. EPA) identified thirteen solid waste management units (SWMU) on the Koppers Company, Inc. (Koppers), Grenada, MS property during a RCRA facility assessment (RFA) conducted in 1987. These SWMU units as identified by the U.S. EPA (December 1987) are listed on Table 1-1 and their locations are shown on Figure 1-1.

This document details investigative methods which will be used to evaluate the extent of soils and groundwater adversely affected by the U.S. EPA identified SWMUs at the Koppers wood treating facility near Grenada, Mississippi. This work plan has been prepared by Keystone Environmental Resources, Inc. (Keystone) at the request of Koppers.

The SWMUs will be referred to throughout this document by their process descriptive name and not the U.S. EPA identification numbers. This will simplify discussion of the SWMUs.

Units that Koppers does not consider to be solid waste management units, or units that Koppers believes do not need additional investigation are listed on pages 1-1 (a) and 1-1 (b).

- Solid waste management units 1, 4, 9 and 10 (oil/water separator, boiler, chemical unloading area, underground storage tank) are within the process area of the plant. Because it would be impossible to delineate the extent of contamination, if any, emanating from one source, and because previous hydrogeologic studies show that groundwater contamination exists in a downgradient direction from the process area, these identified areas will be grouped into one general area. Groundwater will be investigated in the suspected downgradient direction offsite in order to try to expedite delineating any groundwater plume emanating from this area.

- The surface impoundment, SWMU 2, is a RCRA-regulated unit, and is operating in compliance with RCRA. Since a groundwater

monitoring system is in place around this unit, further investigation will not be proposed.

- The unit identified as SWMU 4, the wood-fired boiler, burns creosote wastes, pentachlorophenol wastes, contaminated soils if they contain at least 5,000 BTU/lb, and the unreclaimable wood preservative as fuel. However, the boiler does not burn bottom sediments, as listed in the Solid Waste Management Unit document. This material does not meet Koppers' internal standards for burning fuel-additive material in the boiler.

  Because the unit is periodically tested for emissions in compliance with its operating permit, the boiler will not be investigated. However, emission test reports and a previously collected ash analysis will be submitted with the final report to document that hazardous constituents are not being released from the boiler into the environment.

- Solid waste management unit five, the landfarm, is the current site of the boiler ash pile. Mississippi Commission on Natural Resources Order No. 1209-87 was issued to address this area as a RCRA unit. To comply with this order, Koppers installed a RCRA groundwater monitoring detection network. No further work is proposed for this area unless a statistical evaluation of groundwater monitoring results indicates that a groundwater quality assessment program is needed.

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- SWMU 13 is an area where untreated wood and clean, empty drums used by the railroad for railroad spikes are stored. It is not expected that any contaminants of any type will be released from these items. However, soil borings are proposed for this area.

- The spray-irrigation field, SWMU 3, has a groundwater monitoring network surrounding it. No further work is being proposed for this unit.

For clarification, it should be noted that SWMU 7 is not the container storage area listed in the Part A Application. This area is a staging area where drums of fuel-additive material are unloaded from in-coming trucks. This area is addressed in the work plan.

Koppers reserves all of its rights to challenge the classification of any of the units described herein as SWMUs and the submittal of this work shall not be deemed to constitute Koppers agreement that any of the said units are SWMUs.

KEYSTONE
ENVIRONMENTAL RESOURCES, INC.

436 Seventh Avenue, Suite 1940, Pittsburgh, PA 15219

January 22, 1988 FEDERAL EXPRESS

Mr. Charles Estes, P.E., Coordinator
Hazardous Waste Division
Mississippi Department of Natural Resources
Bureau of Pollution Control
Box 10385
Jackson, MS 39209

Re: Koppers Company, Inc.
SWMU Investigation Work Plan
U.S. EPA ID No. MSD007027543

Dear Mr. Estes:

In accordance with Mississippi Commission on Natural Resources Order No. 1208-87 and your December 3, 1987 letter to Mr. J. R. Batchelder of Koppers, a comprehensive work plan and schedule for investigating EPA - identified solid waste management units is attached. The introduction to the work plan includes a list of units Koppers does not consider to be solid waste management units, or which Koppers feels do not require additional investigation.

Wells will be installed in accordance with the dates listed in items 6 and 7 of the Commission Order.

If you would like additional information or have any questions, please call me.

Sincerely,

Robert J. Anderson
Staff Program Manager

DIRECT DIAL #
412-227-2683

RJA/cr

cc: J. H. Scarbrough, EPA
J. Blundon
J. Batchelder
R. Clayton
B. Ice

Dave, 1/25
Here is the report. Please make a note on the report that a copy was sent to EPA by the company. Chuck

KEYSTONE
ENVIRONMENTAL RESOURCES, INC.

Phone: 412/825-9600 3000 Tech Center Dr., Monroeville, PA 15146 Fax: 412/825-9699

FEDERAL EXPRESS

Ref. No. 176930-01

January 11, 1991

Mr. James H. Scarbrough, P.E., Chief
RCRA and Federal Facility Branch
Waste Management Division
U. S. Environmental Protection Agency
Region IV
345 Courtland Street N. E.
Atlanta, Georgia 30365

Dear Mr. Scarbrough:

Re: Phase II RFI Work Plan
Koppers Industries, Inc.
Grenada, Mississippi
MSD 007-027-543

On behalf of Beazer East, Inc. (Beazer), enclosed are the following documents which address the RFI Work Plan comments outlined in your December 17, 1990 letter to Beazer:

- A line by line response to each comment from U.S. EPA and MSDEQ.
- Table of Contents revisions
- Section 3 revisions, page 3-24
- Section 5 revisions

If you have any question or want to meet to further discuss the Grenada RFI Work Plan, please contact Ms. Jane Patarcity, Beazer, at 412/227-2185.

Sincerely,

David L King

David L. King
Project Manager
Regulatory Affairs Department

DLK:erh H-118

Encl.

cc: J. Patarcity (Beazer)
M. Hansen (Beazer)
J. Batchelder (KII)
J. Clayton (KII)
R. Anderson (wo/encl)

Mississippi Department of Environmental Quality
Ms. Gail Macalusa
Mr. Thad Hopper

Mississippi Department of Natural Resources Comments
Phase II RFI
Koppers Industries, Inc.
Grenada, Mississippi

Comment 1

1. As indicated in your responses, health-based levels are criteria or "action levels" for constituents in environmental media to determine if a Corrective Measures Study (CMS) or an interim corrective measure is warranted; and, health-based levels do not necessarily represent clean-up target levels, nor do they require corrective action if the owner or operator, because of site specific factors, present data and information to support a determination that no further action is necessary. However, the purpose of the RFI phase is to fully characterize the extent of releases. This is necessary to determine the following:

   a. potential public health risks;

   b. if interim corrective measures are necessary;

   c. if a corrective measures study (CMS) is necessary.

Response to Comment 1

Acknowledged.

Comment 2

2. Section 5.1.2 - Groundwater Monitoring Wells

   We are in agreement that it would be very difficult to differentiate contamination between SWMUs in the Central Segment. This is why the areal extent of contamination resulting from the entire Central Segment should be delineated rather than from each SWMU. Additional monitoring wells should be installed to achieve this.

Response to Comment 2

Clarification was obtained on the intent of Comment 2 via a January 7, 1991 telephone conference call between Ms. Jane Patarcity of Beazer East, Inc. (Beazer), Mr. Thad Hopper of the Mississippi Department of Natural Resources (MDNR) and Mr. David King and Ms. Diane Smith of Keystone Environmental Resources, Inc. (Keystone). It was determined that the intent of installing additional wells in the vicinity of the Central Segment of the Grenada plant was to delineate a clean shallow groundwater zone around the perimeter of the Central Segment. (Note: the Central Segment of the Koppers Industries, Inc. (KII) Grenada, MS wood treating plant had been defined in the July 31, 1990 letter from MDNR to Beazer containing the first round of comments on the Phase II RFI as including SWMUs 1,4,9 and 10 (process area), SWMU 2 (former RCRA K001 surface impoundment), SWMU 6 (process cooling pond), SWMU 7 (container storage building) and SWMU 8 (drip track area)).

It was indicated by Thad Hopper that MDNR personnel would prefer to see well R-41 moved to the northwest, and wells R-26 and R-35 moved to the north-northwest. Also, he stated that it would be preferable to locate a well in the southern portion of the plant for coverage southeast of wells R-30 and R-31. He also indicated that some proposed wells may be located in areas already defined as being within impacted areas and thus could be eliminated.

Upon reexamination of the well locations proposed for the Phase II RFI, the following Work Plan revisions were made. Locations originally proposed for shallow wells R-32 and R-33 were combined into one location and called well R-33. A new location was identified for a shallow well in the southern portion of the property, to the southeast of wells R-30 and R-31 and called well R-32. An additional well was added to the northwest of well R-41 and called well R-45. (It was decided to retain the original locations for proposed wells R-35 and R-41, and well R-26 is an existing well which was installed during the Phase I RFI investigation).

Figure 5-3 in the Phase II RFI Work Plan for the Grenada site depicts all existing and proposed well locations. This figure has been revised to reflect the changes described above. Several portions of the text in Section 5.0 were also revised to reflect these changes in locations of proposed Phase II well installation.

Comment 3

3. SWMU 12 - North Waste Piles

Surface soil sampling has already been done at the two waste piles, and dibenz(ah)anthracene was detected at concentrations of 122 ppb and 131 ppb. This is significantly higher than the health-based level of 14.3 ppb and warrants further sampling. Either monitoring wells should be installed at each waste pile, or the soil at each waste pile should be sampled to the depth of the water table. If contamination extends to the groundwater surface, monitoring wells should be installed at each waste pile.

Response to Comment 3

This comment had basically been stated originally in the July 31, 1990 letter from MDNR to Beazer containing the first round of comments on the Phase II RFI. It is believed that this comment is addressed in the current version of the Phase II RFI Work Plan for the Grenada site, as documented below.

As shown in Figure 5-3, a well is already located at the larger of the two northern waste piles (well R-28). As stated in the SWMU 12 (North Waste Piles) subsection of Section 5.1.1 of the Phase II RFI Work Plan, surface soil samples will be collected at both of the waste piles, and analyzed for all parameters listed on Table 5-1. Also, two soil borings (one soil boring at each of the waste piles) will be installed. Soil from the two borings will be sampled continuously with a split-spoon sampler, and all soil samples analyzed for oil and grease. In addition, four samples (two from each boring) will be submitted for analysis for all parameters listed on Table 5-1. These two samples in each boring will be the uppermost visibly clean sample which is free of chemical odor (has no HNu reading) and also the sample which is immediately above the water table.

In addition, as described in the SWMU 12 (North Waste Piles) subsection of Section 5.1.2 of the Phase II RFI Work Plan, if the results of the proposed soil investigation show constituent concentrations at levels of potential concern in the sample collected immediately above the water table, then one shallow monitoring well will be installed immediately downgradient of the southernmost (Northern) waste pile.

Thus, the concerns listed in Comment 3 have been addressed in the Phase II RFI Work Plan.

Sprayfield Comment 1

With regard to the closure plan for the Sprayfield, we concur with the plan with the following exceptions:

1. Monitoring wells SF-1, SF-2, SF-3 and SF-4 should be sampled and analyzed quarterly for one year for the acid extractable phenolics and polynuclear aromatic hydrocarbons. The first quarter sampling event should begin within twenty (20) days after the 180 day closure period.

Response to Sprayfield Comment 1

Agreed.

Sprayfield Comment 2

With regard to the closure plan for the Sprayfield, we concur with the plan with the following exceptions:

2. If analytical data indicates hazardous constituent concentrations are at a level of concern a RFI/CMS will be required for the unit.

Response to Sprayfield Comment 2

Agreed.

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TABLE OF CONTENTS (Continued)

TABLE OF CONTENTS (Continued)

LIST OF FIGURES

TABLE OF CONTENTS (Continued)

LIST OF TABLES

TABLE OF CONTENTS (Continued)

5.0 SITE INVESTIGATION

This section of the report describes the investigative work to be performed for the Phase II RFI at the Grenada site. Section 5.1 describes the hydrogeologic investigation and details the soil and groundwater monitoring programs to be conducted. Sections 5.2 and 5.3 discuss the proposed surface water and sediment characterization, respectively. Environmental characterizations of both the mid-plant unnamed ditch and the northern unnamed stream will be presented. Additional sampling requirements for the two process cooling ponds will also be addressed.

5.1 Hydrogeologic Investigation

The purpose of this section is to outline the field data collection activities that will be associated with the hydrogeologic investigation. The objectives of this program are to determine the extent of soil and water media affected by site-related constituents, and provide data on aquifer properties to assist in design of remedial measures.

5.1.1 Soil Boring Locations

Existing (Phase I) and proposed (Phase II) soil borings are shown on Figures 5-1 and 5-2 for the different areas of interest. Each separate area of investigation is described below. The soil boring program was designed to allow some flexibility so that field observations and drilling clearance can be considered. Soil sampling for physical characterization will take place at all well and boring locations. Selected soil samples will be submitted for laboratory analysis.

SWMUs 1, 4, 9 and 10 (Process Area):

During the Phase I RFI (SWMU investigation), soil sampling was performed in well boreholes R-20 and R-21. This data provided soil quality information for soils within the process area. Presence of creosote and/or a creosote-like odor was noted in both of these boreholes at depths extending at the water table.

U.S. Environmental Protection Agency Region IV Comments
Phase II RFI
Koppers Industries, Inc.
Grenada, Mississippi

Comment 1, Section 3.5.3.

"Future Work for the Final Public Health and Environmental Assessment." page 3-24 1st paragraph

The reference to ARARs terminology needs to be eliminated from this paragraph. The document needs to be proof read carefully for any references to ARARs terminology, and all such terminology needs to be eliminated from this document.

Response to Comment 1, Section 3.5.3

The indicated reference to ARARs terminology has been eliminated. A search of the entire document revealed that no other references to ARARs terminology remained.

Comment 2, Section 5.1.1.1,

"Soil Sampling," page 5-7, 2nd paragraph

It is not acceptable to place soils that show no visible or odorous evidence of compounds of interest back into the boring. All soil placed back into a boring needs to be analyzed chemically, and proven to be below detection limits or background values for all possible contaminants.

Response to Comment 2, Section 5.1.1.1

All cuttings or drilling mud resulting from drilling activities during the Phase II RFI will be contained in sealed DOT 55 gallon steel drums. The origin(s) of the cuttings/drilling mud in each drum will be indicated on an appropriate waste label affixed to the drum. The drums will be stored on the KII plant property while

Curriculum Vitae

ROBERT A. ESCHER

TITLE Project Engineer, EIT

EXPERTISE Environmental Engineer/
Hazardous Waste Management

EXPERIENCE WITH FIRM Supervised and performed field work on the following projects:

- Soil boring investigation for a proposed parking lot expansion and closure of an industrial waste treatment plant for a confidential client, Tulsa, Oklahoma.
- Quarterly ground-water sampling and monitoring for AT&T Information Systems Facility, Shreveport, Louisiana.
- Environmental soil boring investigation for Shell Chemical Company, Norco, Louisiana.
- UST repair and upgrade for the United States Postal Service Vehicle Maintenance Facility in Hattiesburg, Mississippi.
- Assisted in the preparation of Current Conditions/Task I for an on-going RCRA Facility Investigation at Shell Chemical Company, Norco, Louisiana.
- Assisted in performing environmental audits at grain handling facilities for property transfers at nine locations in Kansas.

PREVIOUS EXPERIENCE Project Engineer on hazardous waste site closures. Responsibilities included supervision of field activities, liaison between company and contractor, negotiating scope of work, project time table and budgets, and generating construction specifications.

Curriculum Vitae

FERNANDO A. ITURRALDE

TITLE Staff Geologist

EXPERTISE Hydrogeologic Investigations
Environmental Site Assessments, Regulatory Compliance Audits for Natural Gas Pipelines and Scrubber Stations.

EXPERIENCE WITH FIRM Project management, supervision and assistance on the following projects:

- Soil boring investigation for Grow Group, Inc. at Baton Rouge, Louisiana facility. Analyzed and interpreted results of this project.
- International Paper Company, Natchez, Mississippi: hydrogeologic investigation; analysis and interpretation of geologic and ground-water monitoring data.
- The Western Company of North America, Fayette, Alabama: Project management, supervision, data analysis, and interpretation for a soil, surface-water and ground-water investigation program.
- The Western Company of North America, Fayette, Alabama: Project management, supervision, data analysis, and interpretation for a soil and surface-water remediation program.
- Brezeale, Sachse, & Wilson, Baton Rouge, Louisiana: Phase I Site Assessment/Environmental Audit of the Maison Blanche facilities located in Baton Rouge, Louisiana.
- The Western Company of North America, Fayette, Alabama: Project management supervision, quality control, data analysis and interpretation for the closure of two underground storage tanks.

Curriculum Vitae

- Public Relations and Marketing Manager, Alma Plantation, Lakeland, Louisiana. Responsibilities included: coordinating entrance visas for the company's employees in South America; interpreter for all spanish speaking employees and client contact and liason.

- Goodwill Ambassador for the State of Louisiana and the Louisiana Sugar Industry. Responsibilities included: traveling through the Yucatan Pennisula of Mexico giving speeches and seminars on the Louisiana Sugar Industry and public relations and promotional campaign for the State of Louisiana.

- Instructor, Louisiana State University
  Department of Speech Communication, Theatre and Communication Disorders

- Educator, Louisiana Private School System
  Responsibilities included: Mathematics and Computer Science Department Chairman and teaching environmental science, calculus, and computer science at the secondary level. Coaching responsibilities included: Head Basketball and assistant football and baseball coach.

ACADEMIC BACKGROUND

M.F.A., Communications and Theatre, Louisiana State University, Baton Rouge, Louisiana, 1990

B.S., Professional Geology, Louisiana State University, Baton Rouge, Louisiana, 1984.

B.S., Speech Communications and Education, Louisiana State University, Baton Rouge, Louisiana, 1980.

LANGUAGE PROFICIENCY

English, Spanish

Curriculum Vitae

EUGENE J. JOANEN

TITLE Environmental Technician

EXPERTISE
- Soil/Ground-Water Sampling
- Regulatory Analysis
- Biological Sampling

EXPERIENCE

- Extensive ground-water monitoring, well sampling, water-level measurement, and field testing in support of various ground-water surveys in Louisiana, Oklahoma, and Mississippi. Responsible for all documentation associated with these efforts including chain-of-custody, field log reports, and report documentation.

- Soil sampling as part of site assessment for manufacturing facility.

- Performed soil boring sampling in an old metal plating shop at confidential client in Oklahoma in Level C and assisted in logging of wells and installation.

- Data evaluation for ground-water investigation conducted at various petrochemical facilities throughout the south.

- Support to policy and planning group at the Office of the Secretary at the Louisiana Department of Environmental Quality. Emphasis on air quality research and oil spill contingency plans.

- As part of undergraduate thesis, conducted an environmental toxicology experiment involving the american alligator at Louisiana State University under Dr. Gary Winston, Department Head for the Institute of Biochemistry.

- Performed an assessment of 77 monitoring wells at Georgia Gulf Corporation's Petrochemical Facility in Plaquemine, Louisiana, 18 monitoring wells for Occidental Chemical in Convent, Louisiana, and performed subsequent repair and upgrade.

Curriculum Vitae

JEFFREY T. JONES

TITLE Project Hydrogeologist

EXPERTISE Hydrogeologic Investigations
Analysis and Interpretation of Geologic Field Data

EXPERIENCE WITH FIRM

Supervised and performed field work on the following projects:

- Soil neutralization/remediation program for Grow Group, Inc. at Fort Worth, Texas facility. Work included field quality control, soil sampling and data analysis, and interpretation of results.
- Soil boring investigation for Occidental Chemical Corporation, Convent, Louisiana. Analyzed and interpreted results of this project and the ground-water sampling program.
- Ground-water sampling and monitoring well abandonment projects for AT&T Information Systems Facility, Shreveport, Louisiana.
- Ground-water sampling program for a confidential client, Tulsa, Oklahoma. Work included data analysis and interpretation of results.
- Monitoring well installation project for Grow Group, Inc. Devoe & Raynolds retail branch at Leon Valley, Texas. Analyzed data and interpreted results of the program.
- Conducted geotechnical investigations which consisted of soil boring and sampling for Georgia-Pacific Corporation, Port Hudson, Louisiana, and BASF Corporation, Geismar, Louisiana. The sampling programs were completed under ASTM protocol.
- Underground storage tank investigation which included soil borings, sampling, and installation of piezometers and monitoring wells for the U.S. Postal Service, Gulfport, Mississippi. Work included data analysis and interpretation of results.

Curriculum Vitae

LANGUAGE PROFICIENCY English, German; Read French; Taught Latin, Ancient Greek

Curriculum Vitae

RONALD J. MANUEL

TITLE Project Engineer

EXPERTISE
Process Feasibility and Design
Bioremediation
Nonhazardous Oilfield Waste Treatment

EXPERIENCE Mr. Manuel has over 15 years of process design experience in the chemical, petrochemical, and oil related industries. He has participated in process development from laboratory scale R&D to commercial plant startup. His areas of expertise include: chemical processes, liquid-liquid solvent extraction, nonhazardous oilfield waste, bioprocessing and preparing testing programs.

- Project Manager of a multi-disciplinary team responsible for ongoing bioremediation effort of 30,000 cubic yards of s-Triazine contaminated soil.

- Part of team responsible for novel conceptual design based on NASA developed technology utilizing a rock/reed type artificial marshland filter system to treat creosote contaminated ground water. This bio-process is currently in the pilot plant testing stage at a confidential client's RCRA facility.

- Member of conceptual design team responsible for implementation of vacuum extraction as a means of enhanced *in situ* biotreatment and nutrient delivery to treat cyanide/phenol contaminated subsurface soils in the vadose zone above a pristine aquifer.

- Responsible for conceptual design of a novel system to oxygenate ground water below ground surface, without the use of peroxide, to enhance *in situ* biotreatment of contaminated aquifers.

- Bioremediation Task Coordinator responsible for a conceptual land farm design for bioremediation of 4,000 cubic yards of soils contaminated with oil/grease and other organic compounds at a former railcar maintenance facility.

Curriculum Vitae

LANGUAGE PROFICIENCY	English, French
PROFESSIONAL AFFILIATIONS	American Chemical Society American Institute of Chemical Engineers
PATENT	Process to treat interfacial solids formed during liquid-liquid solvent extraction.
PUBLICATIONS	Co-authored report to Ministry of Industry, Republic of Kenya, stating findings of bioprocess engineering feasibility study and program of implementation.

Curriculum Vitae

JOHN NELSON SALVINO

TITLE Staff Geologist

EXPERTISE

Ground-Water and Aquifer Testing
Underground Storage Tank Site Assessment
Well and Piezometer Installation
Environmental Audits

EXPERIENCE WITH FIRM

- Field coordinator for well installation, ground-water sampling and aquifer testing; and completed the hydrogeologic investigation for Montgomery, Alabama wood treating facility.
- Conducted environmental site assessments for property ownership transfers which included state, RCRA and CERCLIS data base research and site reconnaissance at Kansas grain elevators, New Orleans offices, warehouses and retail centers.
- Conducted and complied a regional data search for a large oil transporting corporation to generate a Mississippi River and Coastal Louisiana Oil Spill Response Plan.
- Conducted Phase II field investigation of a shallow Louisiana aquifer system impacted by creosote constituents.
- Supervised the installation of piezometer and cone penetronmeter tests at a vinyl chloride manufacturing plant to define subsurface soils and delineate a suspected contaminant plume.
- Supervised piezometer installation, ground-water sampling and conducted hydraulic conductivity testing in residual sediment ponds associated with bauxite processing and in sediment and bedrock associated with TCE contamination.

PREVIOUS EXPERIENCE

- Staff Hydrogeologist, Dell Engineering, Inc., Holland, Michigan 1988-1989.

Curriculum Vitae

PAUL R. SCHNEIDER

TITLE Senior Environmental Scientist

EXPERTISE
- Hazardous and Solid Waste Permit Applications
- Site Assessments/Compliance Audits
- Waste Characterization

EXPERIENCE Permitting of solid and hazardous waste facilities, site assessments and investigations, compliance audits and technical support for industrial clients.

- Site Assessments/Compliance Audits: Senior Scientist responsible for performing a site assessment and compliance audit of Marine Shale Processors' Amelia, Louisiana facility. The scope of work included site reconnaissance to observe facility operations, environmental control structures, and other compliance requirements and site conditions. Also conducted a review of agency files regarding compliance history of the facility. Project Manager for site assessments at 16 grain handling facilities in five states which included a review of each facility's compliance history.

- Hazardous Waste Applications: Staff Scientist for the preparation of four, and Project Manager for two Part B hazardous waste permit applications for various TSD facilities including incinerators, landfills, container storage areas, tanks, and surface impoundments. Responsibilities included preparation of Waste Analysis, Operations, Contingency, Training, and Closure/Post-Closure Plans, and preparation of cost estimates for closure.

- SPCC Plans: Developed emergency preparedness plan for fabrication facility. Spill prevention control and counter measures, and RCRA contingency requirements were incorporated into a single plan for this facility. Types of units addressed included container storage and aboveground storage tanks. Also developed SPCC plan for a Rhone-Poulenc sulfuric acid plant. Performed an evaluation of secondary containment structures and developed emergency response decision

Koppers (Grenada) Co., Inc. (MSD 007 027 543)

Comments and Recommendations
SWMU Investigation Work Plan

1. It is agreed that solid waste management units (SWMUs) 1, 4, 9 and 10 should be grouped together in one area. However, the boiler (SWMU4) should not be excluded from consideration as a SWMU until such time as EPA rules on Koppers petition to delist the boiler ash as a hazardous waste. In addition, the holding tank used to store back-up water for the facilities fire protection system (SWMU10) should also continue to be considered a SWMU. This tank is reported to be 15 to 18 feet deep with the top of the tank (which is uncontained) at ground elevation. Thus, contaminated surface runoff from the surrounding process area could enter the tank and leak into the subsurface and groundwater through cracks or seams.

2. The surface impoundment (identified as SWMU2) is a RCRA regulated hazardous waste unit and will not require any additional investigation at this time.

3. The spray field (identified as SWMU3) should not require any additional investigation at this time, except for that work recommended and outlined in Bureau letter dated January 25, 1988 and addressed to Mr. J.D. "Rock" Clayton, Plant Manager, Koppers Company, Inc.

4. The investigation at the boiler ash landfarm (identified as SWMU5) should include several shallow soil borings within the perimeter of the landfarm in order to characterize the extent of any contamination present in the soils. In addition, groundwater sampling will be required as outlined in Bureau letter dated February 11, 1988 and addressed to Mr. Robert J. Anderson, Keystone Environmental Resources, Inc.

5. It is recommended that a monitor well be constructed immediately downgradient of the container storage area (SWMU7) and groundwater samples collected and analyzed.

6. Because of the length of the drip track area (SWMU8), it is recommended that several monitor wells be constructed immediately downgradient of this area and groundwater samples collected and analyzed.

7. It is recommended that a monitor well be constructed immediately downgradient of the former separator tanks which are part of the abandoned waste treatment system (SWMU11).

8. It is reported in the RCRA Facility Assessment (RFA) that at the north waste piles (SWMU12) a "brown oily water" was leaching from the northernmost waste pile down a gully and into an unnamed stream that flows across the northern facility boundary. If possible, a sample of this leachate should be collected and analyzed. Surface water samples and soil samples should be collected at points upgradient, downgradient and at the juncture of the gully and the unnamed stream. Soil samples should also be collected along the gully. It is also possible that that leachate may have moved downward through the soils

beneath the waste piles and entered the groundwater. It is therefore recommended that a monitor well be constructed immediately downgradient of each of the north waste piles and groundwater samples collected and analyzed.

9. It is noted in the boring log for piezometer well P-12 that there was a chemical odor in the soils to a depth of 27.5 feet. It is recommended that a monitor well be constructed in the vicinity of well P-12 in order to determine the existence of any groundwater contamination in this area.

10. An additional area of concern is the contamination found in surface water and soil samples along the unnamed ditch which flows through the central part of the facility (Report of Findings - Unnamed Ditch Characterization). The contamination found along the unnamed ditch is apparently the result of contaminants released from nearby facility units. This could include runoff from the plant process area, runoff and leachate from the closed impoundments or contaminants released from other facility units. It is reported in the Unnamed Ditch Characterization document that "Numerous tractor tires, and railroad ties, partially buried in the sediment, were also observed in the ditch". These may also be a contributing factor to the contamination found along the unnamed ditch. In as much as the contamination in the unnamed ditch has apparently resulted from contaminants released from various facility units, including solid waste management units, it will be necessary to further define the extent of these releases. Because of the interactive nature of surface water and groundwater, it is recommended that several monitor wells be constructed along both sides of the unnamed ditch in order to establish the existence of any groundwater contamination that may be associated with contaminant releases to or from the unnamed ditch.

11. It is reported in the RFA that "prior to 1970 different treatment chemicals may have been used at the facility" and that "salts of chromium, copper and arsenic are other commonly used wood preservatives at other wood preserving facilities". Because of the lack of historical data on past wood treating processes at the facility, it is recommended that soil and groundwater samples from the following areas be analyzed for total metals (acid digestion procedure); specifically chromium, copper and arsenic:

    a. Facility process area (SWMU 1, 4, 9 and 10);
    b. Boiler ash landfarm (SWMU5);
    c. Process cooling ponds (SWMU6);
    d. Abandoned waste treatment system (SWMU11);
    e. North waste piles (SWMU12);
    f. Area in the vicinity of piezometer well P-12; and
    g. Area in the vicinity of the unnamed ditch.

12. Groundwater samples, as recommended above, may be obtained through borings and temporary well point systems. Prescribed well development procedures must be maintained.

Curriculum Vitae

PUBLICATIONS

Coauthor - Industrial Process Profile to Support PMN Review for Metal Treatment Chemicals: Economics and Technology Division, Office of Toxic Substances, in press.

Coauthor - Development Document for Effluent Limitations, Guidelines and Standards for the Pharmaceutical Point Source Category, EPA 440/1-82/084, November, 1982.

PROFESSIONAL AFFILIATIONS

American Chemical Society
Louisiana Environmental Federation

Curriculum Vitae

NORBERT J. SCHULZ

TITLE

Project Manager/Geologist, Quality Assurance Coordinator - Southern California

EXPERTISE

Geologic and Environmental Site Characterization
Ground-water Monitoring
Application of Geophysical Techniques to Hazardous Waste Site Evaluation
Quality Assurance

EXPERIENCE WITH FIRM

Provide geologic and geophysical consultation dealing with the performance of hazardous waste site characterization.

Serves as Quality Assurance Coordinator for Dames & Moore's southern California offices. Provides guidance and oversees the implementation of Dames & Moore's Quality Assurance Procedures. Performs audits of ongoing projects.

Project experience includes:

- Project Manager and principal client contact for multi-site project for PPG Industries, Inc. Project consists of three sites in California requiring: (1) UST removal and facility closure, (2) soil excavation, and (3) remediation by vapor extraction. Responsibilities include client contact, planning, and inter-office coordination of Dames & Moore staff.

- Project Manager for ongoing RCRA closure of the Thatcher Glass site, a former DHS "Superfund" site in Saugus, California. Responsibilities include the oversight of hazardous waste source removal activities, performance of a site characterization involving both soil and ground-water quality evaluation, and agency interactions.

- Project Manager for ongoing site investigation and remediation at Diceon Electronics, Inc. printed circuit board facility in Irvine, California. Site investigation includes workplan preparation, soil and ground water sampling and data analysis, and regulatory agency interaction.

- Ground-water Monitoring: Responsible for the management of long term, state regulated ground-water monitoring and remediation program at Digital Equipment Corporation site in Maynard, Massachusetts.

- Geologic and Site Characterizations: Completed several site investigations involving characterization, delineation, and remediation of both chlorinated and aromatic hydrocarbon and metals contamination of soil and ground water.

ACADEMIC BACKGROUND

M.S. Oceanography (Marine Geophysics), University of Rhode Island, Graduate School of Oceanography, 1988.

B.S. Geology/Geophysics, University of Rhode Island, 1983.

REGISTRATIONS

Registered Environmental Assessor, State of California, Number 01599.

PROFESSIONAL AFFILIATIONS

Geological Society of America
American Geophysical Union
National Water Well Association

ACADEMIC HONORS

Phi Beta Kappa
Phi Kappa Phi

PUBLICATIONS

"Two and Three-Dimensional Inversions of Magnetic Anomalies in the MARK Area (Mid-Atlantic Ridge 23° N)", Marine Geophysical Researches 10:41-57, 1988. First presented at Annual Meeting, AGU, San Francisco, 1986 in EOS. Transactions of the American Geophysical Union, Volume 67, Page 1213, 1986.

Co-Author, "Drilling in the Snake-Pit Hydrothermal Area", Proceedings of the Ocean Drilling Program, Part A, Initial Reports, Volume 106, Pages 15-22.

Technical Article, "Geophysics for Plume Mapping", the GZA Explorer, Volume 1, Number 2, 1988.

BEAZER EAST, INC., 436 SEVENTH AVENUE, PITTSBURGH, PA 15219 USA

December 21, 1990

FEDERAL EXPRESS

Mr. James Scarbrough, P.E. Chief
RCRA and Federal Facilities Branch
Waste Management Division
U. S. Environmental Protection Agency
Region IV
345 Courtland Street, N.E.
Atlanta, GA 30365

Re: Phase II RFI Work Plan
Koppers Industries, Inc.
Grenada, Mississippi
MSD 007-027-543

Dear Mr. Scarbrough:

This letter requests a 7-day extension to address the RFI Work Plan comments outlined in your December 17, 1990 letter for the referenced site. This extension is needed to adequately address the comments given the holiday season. Additionally, Beazer East, Inc. will revise the required pages of the RFI Work Plan, as appropriate, in lieu of the complete RFI Work Plan to allow for a more efficient review process.

Your assistance in this matter is appreciated. Please call me at (412) 227-2185 if you have any questions.

Sincerely

Jane M. Patarcity

Jane M. Patarcity
Program Manager - Environmental Services

JMP/dlk

cc: G. Macalusa (MDNR)
P. Anderson (EPA)
B. Donaldson (EPA)

Koppers - C-4

STATE OF MISSISSIPPI

DEPARTMENT OF ENVIRONMENTAL QUALITY

RAY MABUS
GOVERNOR

November 29, 1990

Ms. Jane M. Patarcity
Program Manager
Environmental Services
Beazer East, Inc.
436 Seventh Avenue
Suite 1450
Pittsburgh, Pennsylvania 15219-1822

Re: Phase II RFI Workplan
Koppers Industries, Inc.
Grenada, Mississippi Facility
MSD007027543

The Mississippi Department of Environmental Quality (MSDEQ) has reviewed the responses to comments, made by the MSDEQ and the USEPA, on the Phase II RFI Workplan for the Koppers Industries, Inc. - Grenada Mississippi Facility, and have the following comments:

1. As indicated in your responses, health-based levels are criteria or "action levels" for constituents in environmental media to determine if a Corrective Measures Study (CMS) or an interim corrective measure is warranted; and, health-based levels do not necessarily represent clean-up target levels, nor do they require corrective action if the owner or operator, because of site specific factors, present data and information to support a determination that no further action is necessary. However, the purpose of the RFI phase is to fully characterize the extent of releases. This is necessary to determine the following:

    a. potential public health risks;

    b. if interim corrective measures are necessary;

    c. if a corrective measures study (CMS) is necessary.

2. Section 5.1.2 - Groundwater Monitoring Wells

    We are in agreement that it would be very difficult to differentiate contamination between SWMUs in the Central Segment. This is why the areal extent of contamination resulting from the entire Central Segment should be delineated rather than from each

SWMU. Additional monitoring wells should be installed to achieve this.

3. SWMU 12 - North Waste Piles

Surface soil sampling has already been done at the two waste piles, and dibenz(ah)anthracene was detected at concentrations of 122 ppb and 131 ppb. This is significantly higher than the health-based level of 14.3 ppb and warrants further sampling. Either monitoring wells should be installed at each waste pile, or the soil at each waste pile should be sampled to the depth of the water table. If contamination extends to the groundwater surface, monitoring wells should be installed at each waste pile.

With regard to the closure plan for the Sprayfield, we concur with the plan with the following exceptions:

1. Monitoring wells SF-1, SF-2, SF-3, and SF-4 should be sampled and analyzed quarterly for one year for the acid extractable phenolics and polynuclear aromatic hydrocarbons. The first quarter sampling event should begin within twenty (20) days after the 180 day closure period.

2. If analytical data indicates hazardous constituent concentrations are at a level of concern, a RFI/CMS will be required for the unit.

If you have any questions, please call me at (601) 961-5171.

Sincerely,

Gail Macalusa

Gail Macalusa
Hazardous Waste Division

GM-12:dh

GM-12:dh

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IV
345 COURTLAND STREET, N.E.
ATLANTA, GEORGIA 30365

AUG - 3 1990

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

4WD-RCRAFFB

Mr. Matthew C. Plautz, P.E.
Program Manager
Environmental Services
436 Seventh Avenue
Pittsburgh, Pennsylvania 15219

RE: Review of the RCRA Facility Investigation Phase II Workplan
Koppers Industries, Inc.
Tie Plant, Mississippi
EPA I.D. Number - MSD 007 027 543

Dear Mr. Plautz:

The U.S. Environmental Protection Agency (U.S. EPA) has reviewed the RFI Phase II Workplan, and found the following deficiencies:

1. Table 3-5; This information needs to be presented graphically by showing both of the hydraulic heads for each well nest on each of the respective dates. This information needs to be presented on five (5) separate graphs. Also, is there a typographical error for well R-9D on 6/20/89? Should the value be 0.0210/d rather than 0.210/d?

3. Section 4.0 "Plans and Management," page 4-2, fifth paragraph. Section 3.5.03 "Future Work for the Final PHEA," pages 3-22, second paragraph. The remedial alternatives will need to be evaluated using Tables 8-5 through 8-10 of Volume I of the RFI Guidance. The "ARARS" terminology is applicable to CERCLA activities and is not used in the RCRA Program.

4. Section 5.1.1.1 "Soil Sampling," page 5-6, second paragraph. The apparently clean soil cuttings should be placed in drums and analyzed for any contamination. If the soil is found to be contaminated, then it will have to be treated as a hazardous waste.

5. Section 5.1.2.2 "Well Development and Survey Analysis," page 5-13, second paragraph. If the apparently clean "development water/purge" water is analyzed for contaminants, and determined to be uncontaminated, then it can be allowed to run onto the ground surface. Otherwise, all water/purge water should be processed in the wastewater treatment system.

6. Section 5.1.2.3 "Ground Water Sampling and Analysis," page 5-14, third paragraph (see comment 5).

7. There is a typographical problem in the last sentence of the last paragraph, on page 5-14 that needs to be corrected.

8. Figure 5-5 - If sediment and/or water samples at UDSW-13 are contaminated, then sediment and water samples need to be collected in Batupan Bogue upstream and downstream of the confluence of the unnamed ditch with Batupan Bogue.

9. Table 7-7 - What are Ultimate and Thermal Gravimetric tests, and how will the results of these tests be used at this site?

The following two (2) comments refer to the deficiencies which Gail Macalusa of the Mississippi Department of Environmental Quality identified in her letter to Koppers Industries, Inc., dated June 12, 1990:

3. Section 5.1.2 - Groundwater Monitoring Wells. The extent of contamination in the entire central segment (SWMUs 1,4,9 and 10 (Process Area)), SWMU 2 (Impoundment), SWMU 6 (Process Cooling Pond), SWMU 7 (Container Storage Area), and SWMU 8 (Drip Track Area) needs to be delineated both horizontally and vertically to the Minimum Detection Concentration Limit for each contaminant.

SWMU 12 - North Waste Piles

The soil at each waste pile needs to be sampled to the depth of the groundwater surface to determine the depth of contamination from dibenz (ah) anthracene. If the contamination extends to the groundwater surface, then monitoring wells need to be installed at each waste pile.

Also, Pat Anderson of my staff would like to be notified in advance of any borehole or well drilling activities, so she can schedule a site visit to observe these activities and have a tour of the site.

Because these deficiencies will require only minor revisions to the RFI Phase II Workplan, the U.S. EPA requests that this workplan be resubmitted by August 20, 1990. If you have any questions, please contact Pat Anderson of my staff at (404)347-3433.

Sincerely yours,

James H. Scarbrough, P.E., Chief
RCRA & Federal Facilities Branch
Waste Management Division

cc: Mr. Sam Mabry, MSDEQ

Koppers Comp. #4

STATE OF MISSISSIPPI

DEPARTMENT OF ENVIRONMENTAL QUALITY

RAY MABUS
GOVERNOR

July 24, 1990

Mr. Matthew C. Plautz, P.E.
Program Manager
Environmental Serivces
Beazer East, Inc.
436 Seventh Avenue
Pittsburgh, Pennsylvania 15219

Dear Mr. Plautz:

Re: Koppers Industries, Inc.
Grenada, MS Facility

The Mississippi Department of Environmental Quality (MSDEQ) is in receipt of your request for an extension of time to address our comments regarding the RFI Phase II Work Plan. We understand that USEPA has basically the same comments, and plans to send them by the end of July. Both MSDEQ and USEPA have agreed to an August 20, 1990, deadline for addressing all comments on the RFI Phase II Work Plan.

In October, 1989, Beazer Materials and Services submitted the report, Risk-Based Engineering Assessment Grenada County Landfill. We have reviewed it, and concur with the findings of the report - the potential impact of the ash disposal is very low and no further action is warranted at this time.

If you have any questions, please call me at (601) 961-5171.

Sincerely,

Gail Macalusa

Gail Macalusa
Hazardous Waste Division

GM-6:lr
pc: Ms. Pat Anderson, EPA

Keppers Compliance

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IV

345 COURTLAND STREET, N.E.
ATLANTA, GEORGIA 30365

JUL 19 1990

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

4WD-RCRAFFB

Mr. Matthew C. Plautz
Program Manager, Environmental Services
Beazer East, Inc.
Environmental Services
436 Seventh Avenue
Pittsburgh, PA 15219

Dear Mr. Plautz:

The U.S. Environmental Protection Agency (U.S. EPA) has reviewed the Mississippi Department of Environmental Quality's (MSDEQ's) comments relative to the Phase II RFI Work Plan. We concur with MSDEQ's comments, and have agreed with the state to grant Beazer an extension of time until August 15, 1990, to address MSDEQ's comments.

The U.S. EPA plans to review the Phase II RFI Work Plan, and send Beazer their comments by July 31, 1990. We will decide, at such time, whether Beazer will need a further extension of time to answer our comments and the length of that extension.

If there are any questions, please contact Patricia A. Anderson of my staff at (404)347-3433.

Sincerely yours,

James H. Scarbrough, P.E., Chief
RCRA & Federal Facilities Branch
Waste Management Division

cc: Mr. Sam Mabry, MSDEQ

Beazer East, Inc.
Environmental Services
436 Seventh Avenue
Pittsburgh, PA 15219
Phone: 412-227-2500
Fax: 412-227-2950

Beazer

July 3, 1990

Ms. Gail Macalusa
MS Department of Natural Resources
2380 Highway 80 West
Jackson, MS 39204

Re: Extension Request
RFI PHase II Work Plan
Koppers Industries, Inc.
Grenada, MS Facility

Dear Ms. Macalusa:

Beazer East, Inc. is in receipt of MSDNR's comments relative to the Phase II RFI Work Plan. These comments were received in our offices on June 27, 1990. As we have discussed by telephone, Beazer is seeking a extension of time until August 15, 1990, to adequately address the comments provided.

Beazer will be preparing an addendum for the Phase II RFI Work Plan in lieu of reformatting the entire work plan to allow for a more efficient review process. We are also concerned that we have not, as of yet, received comments from USEPA Region IV on the plan, as we are under permit to conduct this study under USEPA regulatory authority. We would, therefore, ask MSDNR to coordinate this work plan review effort so that all parties are satisfied with its content. We are uncertain at this time whether we can initiate additional field activities without concurrence from USEPA.

Should you have any questions, please do not hesitate to call.

Sincerely,

Matthew C. Plautz
Program Manager-Environmental Services

MCP/dlk

cc: B. Nolan
D. King (KER)
J.D. Clayton (KII)
J. Batchelder (KII)
P. Anderson (USEPA IV)

Koppers #4 Conf.

STATE OF MISSISSIPPI

DEPARTMENT OF ENVIRONMENTAL QUALITY

RAY MABUS
GOVERNOR

June 19, 1990

Mr. Matthew C. Plautz, P.E.
Program Manager
Environmental Services
436 Seventh Avenue
Pittsburgh, Pennsylvania 15219

Dear Mr. Plautz:

Re: Koppers Industries, Inc.
Tie Plant, Mississippi
MSD007027543

The Mississippi Department of Enviornmental Quality (MSDEQ) has reviewed the RCRA Facility Investigation (RFI) Phase II Work Plan, and found the following deficiencies:

1. Section 3.1 - The sprayfield is not a RCRA unit but it is a SWMU. It should either be addressed in this investigation, or a closure and sampling plan should be submitted along with the revisions to the RFI Phase II Work Plan.

2. Section 5.1.1 - Soil Boring Locations

   SWMU 6 - Process Cooling Pond - At least one soil sample should be taken from both the process cooling pond and the smaller overflow pond since constituent levels in the sediment samples were above health-based levels.

   SWMU 7 - Container Storage Area - Soil boring B-3 has constituent levels above health-based levels. This area should be further investigated.

   SWMU 8 - Drip Track Area - Additional drip track borings should be placed beyond DT-6 and DT-9 to completely define the longitudinal extent of soil contamination from the drip track.

   SWMU 11 - Former Wastewater Treatment System - Impacted soil within the area of the two abandoned impoundments has not been delineated laterally. Many of the outer L-series borings have constituent levels above health-based levels. Additional soil borings are needed beyond the existing borings, including offsite, to characterize the extent of contamination.

SWMU 13 - South Waste Piles - Additional soil borings are needed at each waste pile to characterize the extent of contamination.

3. Section 5.1.2 - Groundwater Monitoring Wells

The entire central segment; including SWMU's 1, 4, 9, 10 (Process Area); SWMU 2 (Impoundment); SWMU 6 (Process Cooling Pond); SWMU 7 (Container Storage Area); and SWMU 8 (Drip Track Area); and SWMU 11 (Former Waste Treatment System) has contaminant levels above health-based levels. Monitoring wells delineating a "clean" line should surround the central segment.

SWMU 12 - North Waste Piles - Concentration levels of Dibenz(ah)anthracene are significantly higher than health-based levels. A monitoring well should be installed at each waste pile.

SWMU 13 - South Waste Piles - Constituent levels in the soil borings were well above health-based levels. Monitoring wells should be installed at each waste pile.

4. Section 5.1.2.3 - Existing wells R-28 and R-29 should also be analyzed.

5. In addition to the constituents listed in Table 5-1 and Table 5-3, all samples; including soil, surface water, sediment, and groundwater samples; should be analyzed for total unfiltered arsenic, chromium and copper.

6. Bis(2-ethylhexyl)phthalate should be added to Tables 5-1 and 5-3.

We request that you revise the RFI Phase II Work Plan addressing the above comments, and resubmit the workplan within 20 days of receipt of this letter. If you have any questions, feel free to contact me at (601) 961-5171.

Sincerely,

Gail Macalusa

Gail Macalusa
Hazardous Waste Division

GM-43:lr
pc: Ms. Pat Anderson, EPA
Mr. James R. Batchelder, KII

KEYSTONE
ENVIRONMENTAL RESOURCES, INC.

Phone: 412/825-9600 3000 Tech Center Dr., Monroeville, PA 15146 Fax: 412/825-9699

FEDERAL EXPRESS

January 26, 1990

Ms. Gail Macalusa
Mississippi Department of Environmental Quality
Bureau of Pollution Control
2380 Highway 80 West
Jackson, Mississippi 39204

Dear Ms. Macalusa:

RE: Work Plan for Facility-Wide Assessment
Koppers Industries, Inc.
Grenada, MS Facility
MSD007027543
Project No. 176940-03

On behalf of Beazer Materials and Services, Inc. (BM&S), enclosed are two copies of a Phase II, RFI/CMS Work Plan for the above-referenced facility.

If you have any questions concerning the work plan, please call Matthew C. Plautz, BM&S at 412/227-2952, or me at 412/825-9609.

Sincerely,

David L King

David L. King
Project Manager

DLK:ss
Enc.
cc: G. Edwards
M. Plautz (BM&S)

DIVISION OF SOLID WASTE
REVIEWED BY DM
DATE
COMMENTS Sent to EPA 1/29/90

KEYSTONE
ENVIRONMENTAL RESOURCES, INC.

Phone: 412/733-9500 440 College Park Dr., Monroeville, PA 15146 Fax: 412/325-3103

FEDERAL EXPRESS

January 16, 1989

Mr. Dave Bockelmann
Hazardous Waste Branch
Mississippi Department of Natural Resources
Bureau of Pollution Control
2380 Highway 80 West
Jackson, MS 39204

Re: SWMU Investigation Report
Koppers Company, Inc.
Grenada, Mississippi
MSD007027543

Dear Mr. Bockelmann:

Enclosed are two (2) copies of a document titled Soil and Groundwater Investigation of Solid Waste Management Units - Koppers Company, Inc. - Grenada, Mississippi. This report supersedes the interim report issued in December and includes results of a second round of sampling and analysis of groundwater, as well as elevations and contours associated with the "unnamed ditch" and other additional information. This report is submitted in fulfillment of the requirements stipulated in the SWMU Investigation Work Plan as approved by the Agency, including the additions outlined in our letter of July 21, 1988. This work relates to Mississippi Commission on Natural Resources Order No. 1208-87.

If you have any questions regarding this submittal, do not hesitate to call me at 412/733-9490.

Very truly yours,

W. L. Ice

W. L. Ice

WLI:ss
Enc.
cc: R. Anderson
J. Batchelder
R. Hamilton

bcc: D. Kerschner
D. Smith

4.0 CONCLUSIONS

Releases of hazardous constituents which have occurred from several units identified as SWMUs during the U.S. EPA's RFA at the Grenada plant were identified. These units include the process area, drip track, and abandoned wastewater treatment system. The RCRA impoundments, sprayfield, and boiler ash areas, which are being investigated separately, display hazardous constituents in lower concentrations than these listed SWMUs. Specific conclusions related to the Grenada site investigation may be listed as follows.

- Clays and silts are present from near the surface to depths ranging from 8 to 12 feet. A fill layer 1 to 2 feet in thickness is present in some areas. Below the surficial clays and silts, a sand unit of indeterminate thickness is present. This unit has been observed to extend to 145 feet in depth; the bottom of this unit has not been located with any borings at the site.

- Groundwater flow at the Grenada site is primarily in a north-northeast direction. The mid-plant unnamed ditch and the north-end unnamed stream deflect contours in their immediate vicinities however.

- Vertical groundwater gradients at the Grenada site are inconsistent. Groundwater within the sand unit, probably occurs under unconfined to semi-confined conditions.

- There appears to be potential for leakage from the cooling pond and overflow pond. The water elevation measured in each was a few feet higher than nearby wells.

- Soils in the vicinity of the drip track, treatment area and former waste treatment system were visibly contaminated to depths extending to the water table in several areas. Groundwater is also impacted in these area.

- Sinking product was measured in three wells. These wells are located downgradient of the treatment area and drip track area.

Additional field investigation is recommended for the purpose of further delineating the extents of releases to soil and groundwater from the process area, drip track and abandoned wastewater treatment system. The optimum placement of additional monitoring wells has yet to be determined; a few additional soil borings may also be necessary. It is recommended that drilling be conducted to depths of the uppermost confining layer or aquitard at the plant to fully realize the depth of impacted groundwater, due to the possible vertical groundwater quality stratification. Aquifer characterization work is also recommended to allow evaluation of potential remedial technologies. This must be well planned with input from Keystone personnel experienced in remediation of wood-treating plants to maximize the utility of the information. Additional sampling of surface water and sediments from the north-end unnamed stream is also recommended to determine the downstream extent of observed elevated concentrations of wood-treating chemicals in those media. It is recommended that a detailed work plan be developed to address these concerns. A schedule for implementation of any proposed field work can be included in the work plan. The start date for implementation of additional work would be contingent upon approval of the Mississippi Department of Natural Resources and approval of adjacent property owners to drill off-site.

KEYSTONE
ENVIRONMENTAL RESOURCES, INC.

Phone: 412/733-9500 | 440 College Park Dr., Monroeville, PA 15146 | Fax: 412/325-3103

July 21, 1988

Mr. Dave Bockelman
Hazardous Waste Branch
Mississippi Department of
Natural Resources
Bureau of Pollution Control
P.O. Box 10385
Jackson, MS 39209

Re: SWMU Investigation Work Plan
Koppers Company, Inc.
Grenada, Mississippi
MSD007027543

Dear Mr. Bockelman:

In response to your letter of July 1, 1988 to Mr. Robert J. Anderson, which approved the above subject work plan, we plan to perform the investigation including the incorporation of comments 1 thru 12 (with the exception of No. 5) of the attachment to the June 10, 1988 letter.

Our approach to accomplishing the intent of those comments will require nine (9) wells and three (3) borings in addition to those specified in the SWMU Investigation Work Plan dated, January 1988. Our response to the individual comments is as follows:

Comment No.	Response
1.	No comment.
2.	No additional work.
3.	No additional work.
4.	Add three (3) borings to the water table.
5.	Excluded.
6.	Add three (3) shallow monitoring wells.
7.	Add one (1) shallow monitoring well.
8.	Add three (3) surface water samples. Add three (3) sediment samples. Add two (2) wells.
9.	Add one (1) well.
10.	Add two (2) wells.
11.	Cu, Cr and As will be added to analytical parameters for items a thru g.
12.	No well points are anticipated. Prescribed well development procedures will be employed.

DIVISION OF SOLID WASTE
REVIEWED BY _____
DATE _____
COMMENTS Sent to ERA
7-27-88.
DMB

The approximate location of the additional wells and borings are shown on the attached marked print of drawing number A103614.

Please note that the above tabulation indicates wells and borings in addition to those specified in the work plan and that some wells, either existing or in the plan will, in conjunction with the new wells and borings, provide the required information.

Our plan is to begin drilling in August 1, 1988 so as to complete well installation by August 25, 1988, unless we are informed to the contrary by the agency. Final well locations will be defined at the site on August 1, 1988.

If you have any questions, please do not hesitate to call me at 412/733-9490.

Very truly yours,

W. L. Ice

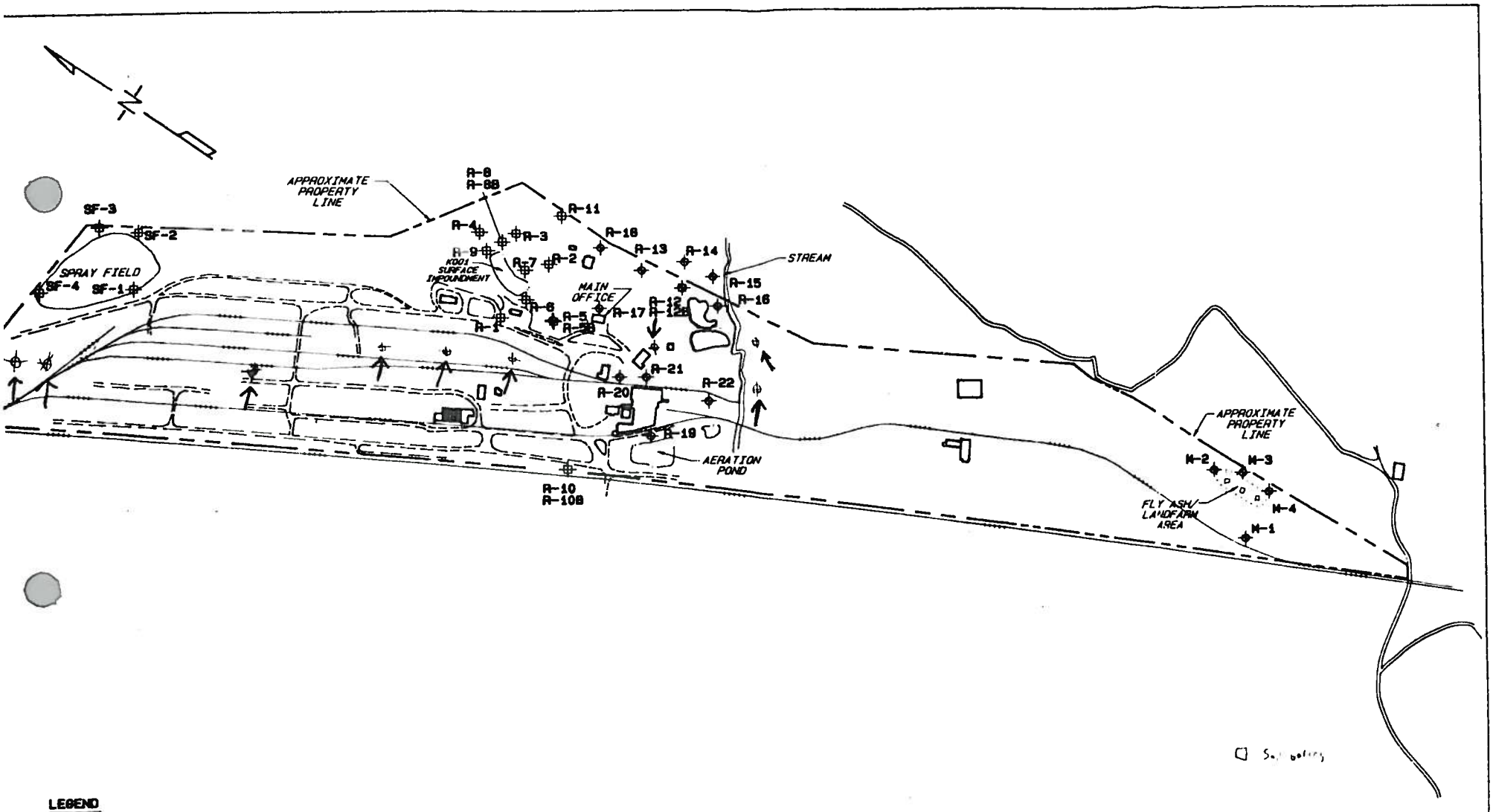
W. L. Ice
Senior Project Manager

WLI/dac

Attachment

cc: R. Anderson
M. Urbassik
S. Colton
M. Dvorsky

KEYSTONE
ENVIRONMENTAL RESOURCES, INC.



LEGEND

- EXISTING MONITORING WELL
- PROPOSED SHALLOW MONITORING WELL
- PROPOSED DEEP MONITORING WELL ADJACENT TO EXISTING SHALLOW WELL
- Wells added per agency comments

SCALE (FEET)

0 400

KEYSTONE ENVIRONMENTAL RESOURCES, INC.

FIGURE 2-3

PROPOSED MONITORING WELL LOCATIONS GRENADA, MS SITE

KOPPERS COMPANY, INC.

A103614

MISSISSIPPI DEPARTMENT OF NATURAL RESOURCES
Bureau of Pollution Control
P. O. Box 10385
Jackson, Mississippi 39209
(601) 961-5171

MEMORANDUM

TO: Koppers File

FROM: Dave Bockelmann

Through: Karen McKinney, EPA, Leo Romanowski, EPA

DATE: July 1, 1988

REFERENCE: June 15, 1988, meeting between Mississippi Department of Natural Resources personnel and personnel from Koppers Company, Inc. and Keystone Environmental Resources, Inc.

ATTENDEES: Sam Mabry, MSDNR
Art Prestage, MSDNR
Steve Spengler, MSDNR
Dave Bockelmann, MSDNR
Robert Anderson, Keystone
Dave King, Keystone
J. D. "Rock" Clayton, Koppers

A copy of the meeting agenda is attached. The following items were addressed during the meeting:

1. Surface Impoundment

   a. Koppers submitted an updated schedule for the completion and hook-up of their pretreatment system to the city POTW. A copy of this is attached and has been included in the permit.

   b. MSDNR requested Koppers to submit an updated closure schedule for the surface impoundment. An updated schedule as well as a revised closure plan was received on June 13, 1988, and was forwarded to EPA on June 24, 1988.

   c. An order will be issued requiring Koppers to submit a contingency plan for closure of the surface impoundment if their pretreatment system is not completed or permitted by November 8, 1988. Additionally, Koppers was informed that if the Land Ban Regulations are adopted as is, they will have to cease use of the surface impoundment on August 8, 1988. Koppers said that if this happened they would shut the plant down

until their pretreatment system is permitted and completed.

2. Boiler Ash Landfarm

   a. Koppers did not have their groundwater sampling results; however, they did say that the results showed that there is groundwater contamination in this area. This is consistent with EPA sampling results from a CDEI performed on May 2 to 5, 1988.

   b. An order will be issued requiring Koppers to submit an updated Part A which includes the boiler ash landfarm and a Part B which addresses compliance monitoring and corrective action. MSDNR will move to review and public notice the existing closure plan and close this unit under interim status.

3. Spray Irrigation Field

   a. After reviewing the existing data on the spray field, Koppers was informed that both the Bureau and EPA considered it a RCRA regulated hazardous waste management unit.

   b. An order will be issued requiring Koppers to submit an updated Part A which includes the spray field and a Part B which includes post-closure care. Additionally, Koppers was informed that they would have to cease using the spray field on August 8, 1988, if Land Ban restrictions for K001 are adopted as proposed.

4. Unnamed Ditch

   a. Reviewed existing data on the contamination in and adjacent to this unit.

   b. An order will be issued requiring Koppers to place absorbent booms across the stream to prevent the off-site movement of contamination in the surface water. Additional assessment will be performed during the RFI.

5. RFA/RFI

   a. Discussed EPA letter of June 10, 1988, and the comments contained in that letter. MSDNR and Koppers agreed that the well recommended in comment number 5 was not necessary. MSDNR will send a letter to Koppers addressing the RFI, EPA comments and items 6 and 7 of Commission Order 1208-87.

6. Boiler and Boiler Ash

a. Koppers will submit a more detailed schedule of events concerning the switch-over from burning hazardous to non-hazardous waste in the boiler.

DB:lr

SCHEDULE FOR WASTEWATER
PRETREATMENT SYSTEM
KOPPERS COMPANY, INC.
TREATED WOOD PRODUCTS
GRENADA, MISSISSIPPI

Begin Construction	July 23, 1988
Finish Construction	October 13, 1988
Process Start-up (cease using surface impoundment)	October 19, 1988
Full Operation	November 2, 1988

MEETING AGENDA

Koppers Company, Inc.

June 15, 1988

1.) Surface Impoundment Permit.

a.) Submittal of schedule for completion of pretreatment system and hook-up to POTW.

b.) Submittal of updated schedule for closure.

c.) Contingency plan for closure if pretreatment system is not permitted or completed by November 8, 1988.

2. Boiler Ash Landfarm.

a.) Review groundwater sampling results.

b.) Closure & Post-Closure requirements.

1) Submittal of updated Part A.

2) Submittal of Part B.

3. Spray Irrigation Field

a.) Review existing data.

b.) Closure & Post-Closure requirements.

1) Submittal of updated Part A

2) Submittal of Part B

4. Unnamed Ditch

a.) Review existing data.

b.) Discuss interim measures for remediating contamination.

5. RFA/RFI for Solid Waste Management Units.

a.) EPA letter and comments

6. Boiler & Boiler ash

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IV
345 COURTLAND STREET
ATLANTA, GEORGIA 30365

JUN 10 1988

4WD-RCRA

Mr. Robert J. Anderson
Staff Program Manager
Keystone Environmental
Resources, Inc.
436 Seventh Avenue, Suite 1940
Pittsburgh, Pennsylvania 15219

RE: Solid Waste Management Unit (SWMU) Investigation Work Plan
Koppers (Grenada) Company, Mississippi
EPA I.D. MSD 007 027 543

Dear Mr. Anderson:

The U.S. EPA and the Mississippi Departmental of Natural Resources (MSDNR) have reviewed the aforementioned report titled "Soil and Groundwater Investigation of Solid Waste Management Units" dated January 1988. This report is conditionally approved upon Koppers' incorporation of the enclosed Comments and Recommendations into the proposed work plan and schedule. Both EPA and the MSDNR contend that the recommended additional groundwater and soil sampling will provide a more complete evaluation of releases from SWMUs of hazardous waste or hazardous constituents, as required under the authority of the 1984 Hazardous and Solid Waste Amendments (HSWA). Approximately fourteen additional groundwater, six to eight soil, and about three surface water samples have been recommended.

Although not specifically identified by the facility as a Resources Conservation and Recovery Act (RCRA) Facility Investigation (RFI) Plan, this report has also been reviewed based on the RFI requirements described within the HSWA portion of the RCRA operating permit for the facility. The HSWA permit, which should become effective by July 1988, requires the submittal of an RFI Plan which includes schedules of implementation and completion of specific actions necessary to determine the nature and extent of releases to the air, land, surface water, and groundwater. With minimal modifications, particularly with regard to defining potential pathways of contaminant releases, the aforementioned report should be revised to include: 1) the enclosed Comments and Recommendations and 2) the RFI Plan requirements (Appendix B of the HSWA permit).

If you have any questions, please contact Leo Romanowski of my staff at (404)347-3433.

Sincerely yours,

James H. Scarbrough, P.E.
Chief, RCRA Branch
Waste Management Division

Enclosure

cc: David Bockelman, Mississippi Department of Natural Resources

Koppers (Grenada) Co., Inc. (MSD 007 027 543)

Comments and Recommendations
SWMU Investigation Work Plan

1. It is agreed that solid waste management units (SWMUs) 1, 4, 9 and 10 should be grouped together in one area. However, the boiler (SWMU4) should not be excluded from consideration as a SWMU until such time as EPA rules on Koppers petition to delist the boiler ash as a hazardous waste. In addition, the holding tank used to store back-up water for the facilities fire protection system (SWMU10) should also continue to be considered a SWMU. This tank is reported to be 15 to 18 feet deep with the top of the tank (which is uncontained) at ground elevation. Thus, contaminated surface runoff from the surrounding process area could enter the tank and leak into the subsurface and groundwater through cracks or seams.

2. The surface impoundment (identified as SWMU2) is a RCRA regulated hazardous waste unit and will not require any additional investigation at this time.

3. The spray field (identified as SWMU3) should not require any additional investigation at this time, except for that work recommended and outlined in Bureau letter dated January 25, 1988 and addressed to Mr. J.D. "Rock" Clayton, Plant Manager, Koppers Company, Inc.

4. The investigation at the boiler ash landfarm (identified as SWMU5) should include several shallow soil borings within the perimeter of the landfarm in order to characterize the extent of any contamination present in the soils. In addition, groundwater sampling will be required as outlined in Bureau letter dated February 11, 1988 and addressed to Mr. Robert J. Anderson, Keystone Environmental Resources, Inc.

5. It is recommended that a monitor well be constructed immediately downgradient of the container storage area (SWMU7) and groundwater samples collected and analyzed.

6. Because of the length of the drip track area (SWMU8), it is recommended that several monitor wells be constructed immediately downgradient of this area and groundwater samples collected and analyzed.

7. It is recommended that a monitor well be constructed immediately downgradient of the former separator tanks which are part of the abandoned waste treatment system (SWMU11).

8. It is reported in the RCRA Facility Assessment (RFA) that at the north waste piles (SWMU12) a "brown oily water" was leaching from the northernmost waste pile down a gully and into an unnamed stream that flows across the northern facility boundary. If possible, a sample of this leachate should be collected and analyzed. Surface water samples and soil samples should be collected at points upgradient, downgradient and at the juncture of the gully and the unnamed stream. Soil samples should also be collected along the gully. It is also possible that that leachate may have moved downward through the soils

beneath the waste piles and entered the groundwater. It is therefore recommended that a monitor well be constructed immediately downgradient of each of the north waste piles and groundwater samples collected and analyzed.

9. It is noted in the boring log for piezometer well P-12 that there was a chemical odor in the soils to a depth of 27.5 feet. It is recommended that a monitor well be constructed in the vicinity of well P-12 in order to determine the existence of any groundwater contamination in this area.

10. An additional area of concern is the contamination found in surface water and soil samples along the unnamed ditch which flows through the central part of the facility (Report of Findings - Unnamed Ditch Characterization). The contamination found along the unnamed ditch is apparently the result of contaminants released from nearby facility units. This could include runoff from the plant process area, runoff and leachate from the closed impoundments or contaminants released from other facility units. It is reported in the Unnamed Ditch Characterization document that "Numerous tractor tires, and railroad ties, partially buried in the sediment, were also observed in the ditch". These may also be a contributing factor to the contamination found along the unnamed ditch. In as much as the contamination in the unnamed ditch has apparently resulted from contaminants released from various facility units, including solid waste management units, it will be necessary to further define the extent of these releases. Because of the interactive nature of surface water and groundwater, it is recommended that several monitor wells be constructed along both sides of the unnamed ditch in order to establish the existence of any groundwater contamination that may be associated with contaminant releases to or from the unnamed ditch.

11. It is reported in the RFA that "prior to 1970 different treatment chemicals may have been used at the facility" and that "salts of chromium, copper and arsenic are other commonly used wood preservatives at other wood preserving facilities". Because of the lack of historical data on past wood treating processes at the facility, it is recommended that soil and groundwater samples from the following areas be analyzed for total metals (acid digestion procedure); specifically chromium, copper and arsenic:

    a. Facility process area (SWMU 1, 4, 9 and 10);
    b. Boiler ash landfarm (SWMU5);
    c. Process cooling ponds (SWMU6);
    d. Abandoned waste treatment system (SWMU11);
    e. North waste piles (SWMU12);
    f. Area in the vicinity of piezometer well P-12; and
    g. Area in the vicinity of the unnamed ditch.

12. Groundwater samples, as recommended above, may be obtained through borings and temporary well point systems. Prescribed well development procedures must be maintained.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IV
345 COURTLAND STREET
ATLANTA, GEORGIA 30365

JUN 10 1988

4WD-RCRA

Mr. Robert J. Anderson
Staff Program Manager
Keystone Environmental
Resources, Inc.
436 Seventh Avenue, Suite 1940
Pittsburgh, Pennsylvania 15219

RE: Solid Waste Management Unit (SWMU) Investigation Work Plan
Koppers (Grenada) Company, Mississippi
EPA I.D. MSD 007 027 543

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Although not specifically identified by the facility as a Resources Conservation and Recovery Act (RCRA) Facility Investigation (RFI) Plan, this report has also been reviewed based on the RFI requirements described within the HSWA portion of the RCRA operating permit for the facility. The HSWA permit, which should become effective by July 1988, requires the submittal of an RFI Plan which includes schedules of implementation and completion of specific actions necessary to determine the nature and extent of releases to the air, land, surface water, and groundwater. With minimal modifications, particularly with regard to defining potential pathways of contaminant releases, the aforementioned report should be revised to include: 1) the enclosed Comments and Recommendations and 2) the RFI Plan requirements (Appendix B of the HSWA permit).

If you have any questions, please contact Leo Romanowski of my staff at (404)347-3433.

Sincerely yours,

James H. Scarbrough, P.E.
Chief, RCRA Branch
Waste Management Division

Enclosure

cc: David Bockelman, Mississippi Department of Natural Resources

HSI GEOTRANS

MEMO

To: Mr. Wes Hardegree, EPA
cc: Mr. David Peacock, MS DEQ
Mr. Mike Bollinger, Beazer
Mr. Rob Markwell, Beazer
Mr. Peter Rich, HSI GeoTrans
Mr. Paul Anderson, Ogden

From: Ms. Jennifer Abrahams, HSI GeoTrans JA

Subject: Results of Investigations at the South Drip Pad/Track and Northern Stream Areas
Koppers Industries, Inc., Grenada Facility
Grenada, Mississippi

Date: February 5, 1999
P:\PROJECTS\BEAZER\GRENADA\N987\suppsoil.wpd

This technical memorandum is submitted on behalf of Beazer East, Inc. to document the results of field investigations conducted from December 10 through 14, 1998 at the Koppers Industries, Inc. (KII) facility in Grenada, Mississippi (Site). This field work was performed in accordance with HSI GeoTrans' December 2, 1998 *Workplan to Investigate the South Drip Pad/Track and Northern Stream Areas, KII Grenada Facility, Grenada, Mississippi* (Workplan), and subsequent correspondence from HSI GeoTrans to the EPA discussing the Workplan, dated December 9 and 21, 1998. The work was performed to support the final design of the Interim Measures (IM). The field activities included soil sampling at the South Drip Pad/Track, sediment sampling in the Northern Stream and abandonment of eight monitor wells at the Former Wastewater Treatment System. This work compliments previous investigations presented in the *Revised Final Phase II RCRA Facility Investigation Report, KII Grenada Facility, Grenada, Mississippi* (RFI Report) (HSI GeoTrans, November 1998).

OBJECTIVE

The purpose of the December 1998 field investigations at the Site was to further characterize the soils at the South Drip Pad/Track and the sediments at the Northern Stream. The results of the characterization are used to evaluate the need for any modification of the IM.

3035 Prospect Park Drive · Suite 40 · Rancho Cordova, California · 95670 916 853-1800 FAX: 916 853-1860

FIELD ACTIVITIES

The field investigations were performed in accordance with sampling procedures and quality assurance objectives specified in the January 8, 1997 *RCRA Facility Investigation, Work Plan Addendum, Koppers Industries, Inc., Grenada Facility, Grenada, Mississippi* (Work Plan Addendum). The Health and Safety Plan presented in the Work Plan Addendum was revised and reissued to encompass the supplemental sampling and abandonment procedures described in this report. This report presents results from the South Drip Pad/Track, the Northern Stream sediment, and well abandonment activities.

South Drip Pad/Track (SWMU 17)

The HSI GeoTrans field geologist performed a visual reconnaissance of the Central Ditch from the South Drip Pad/Track area to the Former Wastewater Treatment System area and identified four active NAPL seeps. The seeps are located near the bottom of the ditch on the north side and appeared to be discharging small amounts of oily water. The seep locations are shown on Figure 1. These seeps are in similar locations to seeps previously observed and reported (*RCRA Interim Measure Predesign Investigation Report and Conceptual Design, Koppers Industries, Inc., Grenada Facility, Grenada, Mississippi*, Hydro-Search, Inc., 1996). The seeps are located within the area where the IM sheet pile wall will be installed.

Five soil borings were drilled and sampled in the South Drip Pad/Track area. Two borings are located on the west side of the drip tracks, and two borings are located on the east side of the drip tracks. The fifth, and northernmost boring, is located in the middle of the drip tracks. The boring locations are identified on Figure 1. The borings were drilled until the Upper Low-Permeability Zone was encountered; this depth ranged from 22 to 34 feet below ground surface (bgs). A rotary wash drill rig with continuous core collected samples by driving a split spoon ahead of the bit. The soil core was visually inspected to identify the lithology and the presence of NAPL. The soil boring logs are presented in Appendix A.

Discrete sand layers in some of the borings were observed to be impacted with NAPL above residual saturation, as itemized below:

Boring KGSWMU17-01:	NAPL stains were noted above 16 feet bgs, no layers were observed to contain NAPL above residual saturation;
Boring KGSWMU17-02:	NAPL above residual saturation was noted in a two-inch layer at 31.5 feet bgs;
Boring KGSWMU17-03:	NAPL above residual saturation was observed from 1 to 2 feet bgs;
Boring KGSWMU17-04:	NAPL above residual saturation was noted in two discrete layers: from 21.5 to 22.5 feet bgs and a three-inch layer at 26 feet, bgs; and
Boring KGSWMU17-05:	NAPL above residual saturation was observed in three discrete layers: a two-inch layer at 22 feet bgs, a three-inch layer at 25 feet bgs, and from 26 to 27 feet bgs.

Soil samples were collected from the core at the surface, 5 or 6 feet bgs (the vadose zone), and 15 feet bgs (the saturated zone). The samples were placed in glass jars, labeled, packed in chilled coolers, and shipped to Columbia Analytical Services of Kelso, Washington under custody seal with chain-of-custody documentation. The samples were analyzed for polynuclear aromatic hydrocarbons (PAHs), pentachlorophenol, and benzene. Table 1 summarizes the analytical results for these samples. Table 2 presents the PAH results for these samples.

The borings were pressure grouted with cement-bentonite grout pumped through a tremmie pipe installed to the bottom of the boring immediately upon completion.

Northern Stream Sediment

The Northern Stream flows from southwest to northeast across the northern portion of the Site. This stream flows under railroad tracks located in the northwest corner of the Site. One sediment

sampling location was upgradient of the Site, four locations were collected on the Site, and four locations were sampled downstream of the Site. The nine sampling locations extend approximately 1/4 mile along the stream course, as shown in Figure 2.

Two sediment samples were collected for analysis from each of the nine sampling locations. The initial sample, collected from 0-3 inches bgs, was composited from five sublocations across the stream channel. The pattern of the five sublocations consisted of two sublocations along the northern stream bank, one sublocation in the center of the stream, and two sublocations along the southern stream bank. The five sublocation samples were collected with a hand auger. The five subsamples were lithologically logged, examined for the presence of NAPL, then placed in a stainless steel bowl and thoroughly mixed to composite the sediments using a stainless steel spoon. The composited sediments were placed in glass jars, labeled, and packed in chilled coolers.

The second sample collected at each of the nine locations was a grab sample from 3-12 inch bgs. This sample location was selected based on visual assessment of the most impacted sublocation sample collected from 0-3 inches bgs. The sample was logged, placed in a glass jar, labeled, packed in chilled coolers. The augered borehole was advanced an additional 12 inches, to a total depth of 24 inches bgs, to characterize the soil and check for the presence of NAPL. There were no indications of NAPL in any of the Northern Stream sediment samples. The sediment boring logs are presented in Appendix B. The sediment samples were shipped to Columbia Analytical Services of Kelso, Washington under custody seal with chain-of-custody documentation. The samples were analyzed for PAHs, pentachlorophenol, total organic carbon (TOC) and grain size analysis. Table 3 summarizes the analytical results for the sediment samples. Table 4 presents the PAH results for these samples. The grain size analysis results are presented in Appendix C.

Well Abandonment

Monitor wells OB-4, R96-5, R96-7, R96-8, R96-9, R96-10, R96-13, and R-36, were abandoned on December 13 through 14, 1998, in accordance with the State of Mississippi requirements. The well abandonment process consisted of the following:

1. The well casing was determined to be open and free of obstructions by lowering a one half inch tremmie hose to the bottom of the well.

2. A cement-bentonite grout consisting of less than 10 gallons of water per 98 pound sack of Type I cement and approximately 6% bentonite by dry weight of the cement was prepared.

3. The well casing was pressure grouted by pumping the cement-bentonite grout through the tremmie hose. The well casing was filled from the bottom up. The grout was pumped into the well until full density grout ran out the top of the well casing.

4. The protective outer well casing was removed, as were the four steel traffic guard posts and the 2 by 2 foot concrete pad around the well. The inner well casing was removed approximately 1 foot below the ground surface.

5. The well casing was overfilled with cement-bentonite grout. The grout was allowed to mushroom over the well casing and fill the excavation made by the removal of the protective outer casing.

6. The holes created by removing the traffic guard posts were filled with soil.

A copy of the documentation of the well destructions submitted to the Mississippi Department of Environmental Quality is included in Appendix D.

DISCUSSION OF NORTHERN STREAM SEDIMENT SAMPLES

As shown in Tables 3 and 4, PAHs were detected in Northern Stream sediment samples. At the upgradient sampling location, the concentration of total PAHs in shallow sediment (0-3") was 0.2 mg/kg, and the concentration in deeper sediment (3"-12") was 0.006 mg/kg. In the four on-Site locations, total PAH concentrations in shallow sediment ranged from 6 mg/kg at location KGNSS-02 to 194 mg/kg at location KGNSS-04, with a mean concentration of 75 mg/kg. Concentrations of total PAHs in deeper sediment on-Site ranged from 0.12 mg/kg at location KGNSS-02 to 47 mg/kg at location KGNSS-03 (average of original and duplicate sample), with a mean concentration of 22 mg/kg.

Among the four off-Site downgradient sample locations, total PAH concentrations in shallow sediment ranged from 1.5 mg/kg at KGNSS-06 (closest to the Site) to 12 mg/kg at KGNSS-08, with a mean concentration of 6 mg/kg. Concentrations of total PAHs in deeper sediment off-Site ranged from 0.05 mg/kg at location KGNSS-06 (closest to the Site) to 19 mg/kg at location KGNSS-08, with a mean concentration of 7 mg/kg.

In all samples, lower molecular weight PAHs (e.g., naphthalene, acenaphthene, and acenaphthylene) were either not detected or comprised less than 1 mg/kg of the total concentration of PAHs. Virtually the entire concentration of total PAHs in all samples is comprised of higher molecular weight PAH constituents. The physical-chemical properties of higher molecular weight PAHs (e.g., low solubility, low vapor pressure, and high sorption coefficients) result in these constituents being more persistent in environmental media than lower molecular weight constituents. Therefore, the presence of higher molecular weight PAHs and absence of lower molecular weight PAHs in a sample typically suggests a "weathered" source of PAH constituents, with the lower molecular weight PAHs lost via degradation and other mechanisms. The absence of lower molecular weight PAHs in Northern Stream sediment samples provides evidence that no on-going source of PAH constituents to the Northern Stream exists.

The lack of any odor or sheen observations during collection of Northern Stream sediment samples also supports this conclusion.

The samples with the highest concentrations of PAHs in sediment (KGNSS-03 and KGNSS-04) are located on-Site, downgradient of the railroad bridge that crosses the Northern Stream. Downgradient of KGNSS-04, concentrations of total PAHs decrease sharply, ranging from 1.5 mg/kg to 12 mg/kg. These observations suggest that the area of higher concentrations on-Site is localized and may be related to the presence of the nearby railroad bridge, constructed of creosote-treated timber. It is possible that a piece of treated wood or weathered creosote in the surface sediment samples collected on-Site downstream of the railroad bridge are responsible for the two higher concentrations.

As mentioned above, the mean concentration of total PAHs in shallow sediment off-Site is 6 mg/kg. This concentration is only minimally above the Effects Range - Low (ER-L) concentration of 4 mg/kg for PAH, and is below the Effects Range - Medium (ER-M) concentration of 35 mg/kg (Long and Morgan, 1990)[1]. Because ER-Ls and ER-Ms represent concentrations below which effects are not expected, it is very unlikely that the concentrations observed in off-Site sediment pose a potential risk to benthos or other aquatic receptors in the Northern Stream.

Pentachlorophenol was not detected in sediment upgradient of the Site. Concentrations of pentachlorophenol in shallow sediment in the on-Site portion of the Northern Stream ranged from 74 µg/kg at KGNSS-02 to 200 µg/kg at KGNSS-03, with a mean of 116 µg/kg. In off-Site downgradient locations, concentrations in shallow sediment ranged from 15 µg/kg at KGNSS-06 to 117 µg/kg at KGNSS-08, with a mean of 52 µg/kg.

[1] Long, E.R. and L.G. Morgan. 1990. The Potential for Biological Effects of Sediment Sorbed Contaminants Tested in the National Status and Trends Program. NOAA Technical Memorandum NOA OMA 52. National Oceanic and Atmospheric Administration.

In deeper sediment, concentrations on-Site ranged from 8 µg/kg at KGNSS-02 to 135 µg/kg at KGNSS-04, with a mean of 76 µg/kg. In off-Site downgradient locations, concentrations in deeper sediment ranged from non-detect at KGNSS-06 to 75 µg/kg at KGNSS-08, with a mean of 25 µg/kg.

ER-Ls or ER-Ms are not available for pentachlorophenol. The State of Washington Department of Ecology (WDOE) has developed Marine Sediment Management Standards (SMS) based upon the lowest of four Apparent Effects Thresholds (AET) derived from toxicity data using marine sediments. AETs are screening values derived from empirical toxicity data, and represent the concentration at which no statistical difference exists between the occurrence of biological effects and the occurrence of biological effects at a reference location. The AET-Low (AET-L) represents the lowest of four AETs derived from four different species. In developing freshwater sediment standards, WDOE performed a statistical evaluation to determine whether SMS accurately predicted effects associated with constituents in freshwater sediments. The results of this evaluation indicated that SMS values were "relatively robust" in predicting freshwater effects[2].

For evaluation of constituent concentrations in sediments nationwide, EPA (1997)[3] has used the AET-L value for pentachlorophenol of 360 µg/kg as a screening concentration. Note that EPA (1997) also reports an AET-High (AET-H) of 690 µg/kg for pentachlorophenol. Concentrations of pentachlorophenol detected in sediment from the Northern Stream were compared to the AET-L for pentachlorophenol as a conservative evaluation of the potential for adverse ecological effects. Detected concentrations of pentachlorophenol are listed in Table 3. As shown in the Table, all detected concentrations are less than the AET-L, and the mean concentration of pentachlorophenol in shallow on-Site sediment is more than three-fold lower than the AET-L.

[2] Washington Department of Ecology. 1997. Creation and Analysis of Freshwater Sediment Quality Values in Washington State. Publication No. 97-323a. July 1997.
[3] EPA. 1997. The Incidence and Severity of Sediment Contamination in Surface Waters of the United States. Volume I: National Sediment Quality Survey. EPA/823/R-97/006. September 1997.

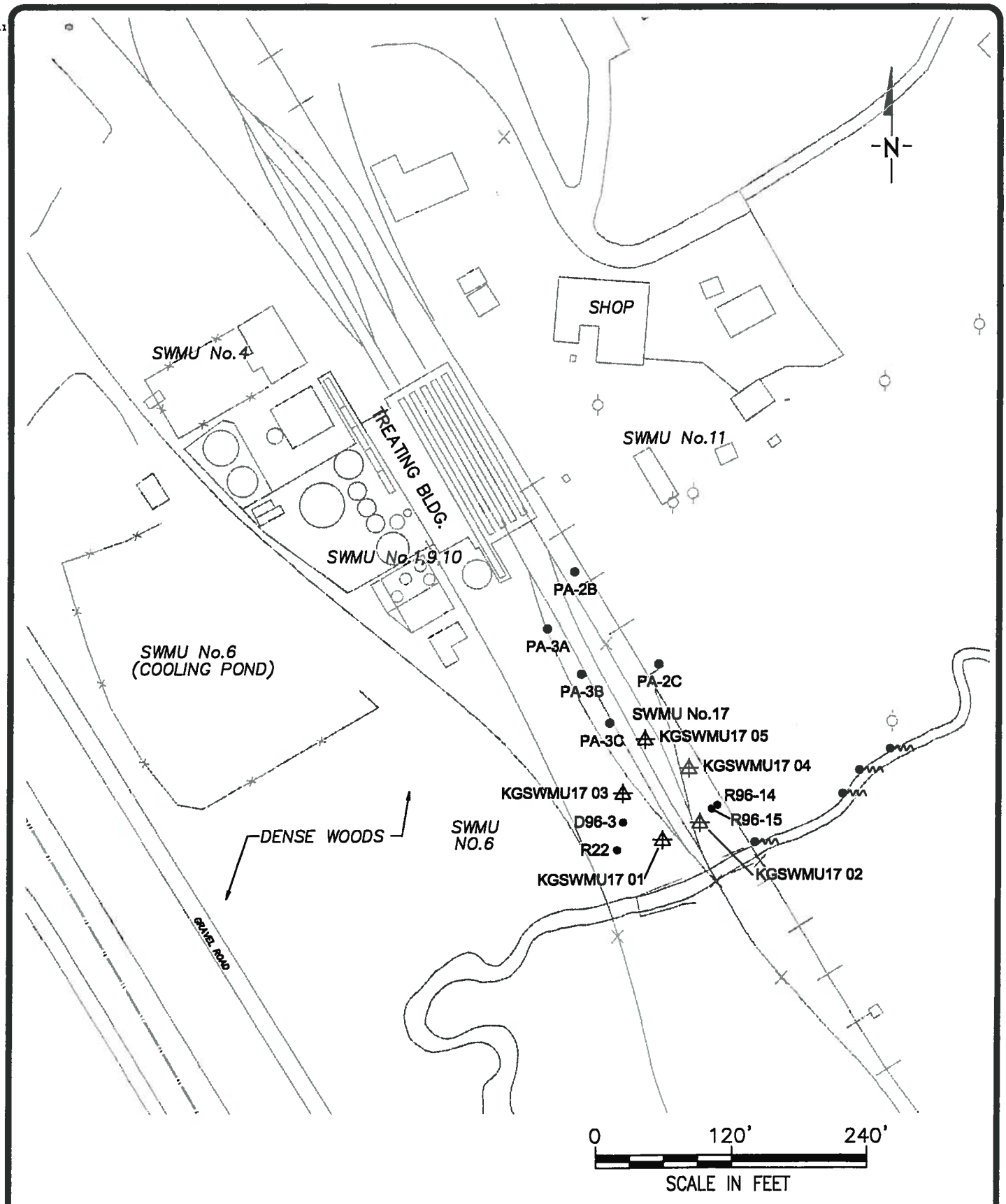
Therefore, no adverse ecological effects are expected to occur as a result of detected concentrations of pentachlorophenol in Northern Stream sediment.

CONCLUSIONS

The field investigations in the South Drip Pad/Track area noted discrete sand layers to be impacted with NAPL above residual saturation in four of the borings, and also identified four active NAPL seeps in the Central Ditch. Groundwater modeling conducted for the IM design was reviewed and it was determined that the current IM design will effectively mitigate the NAPL impacts. The IM design was also reviewed with respect to the locations of the active seeps, and the design team concluded that the sheet pile wall will effectively mitigate these discharges.

The analytical results of the Northern Stream sediment samples reported detection of PAHs and pentachlorophenol. The majority of the PAHs detected in the samples are comprised of the higher molecular weight PAHs. The relative absence of the lower molecular weight PAHs and the presence of the higher molecular weight, combined with the lack of any odor or sheen associated with the samples, indicate there is no on-going source of PAHs to the Northern Stream. The mean total PAH concentration in shallow sediments detected off-Site is only minimally above the ER-L and is below the ER-M. Therefore, it is very unlikely that these concentrations pose a potential risk to benthos or other aquatic receptors in the Northern Stream. The pentachlorophenol concentrations detected in the Northern Stream sediments are below the AET-L for pentachlorophenol, therefore, no adverse ecological effects are expected as a result of pentachlorophenol concentrations detected in the Northern Stream sediments.

Therefore, the December 1998 characterization of the South Drip Pad/Track area and Northern Stream sediments does not warrant a modification of the IM design, which remains as presented in the *IM Workplan, SWMU 11, Koppers Industries, Inc., Grenada, Mississippi* (HSI GeoTrans, February 1999).



EXPLANATION

- ● PREVIOUS SOIL BORINGS
- ⛤ DECEMBER 1998 SOIL BORINGS
- ●〰 NAPL SEEP

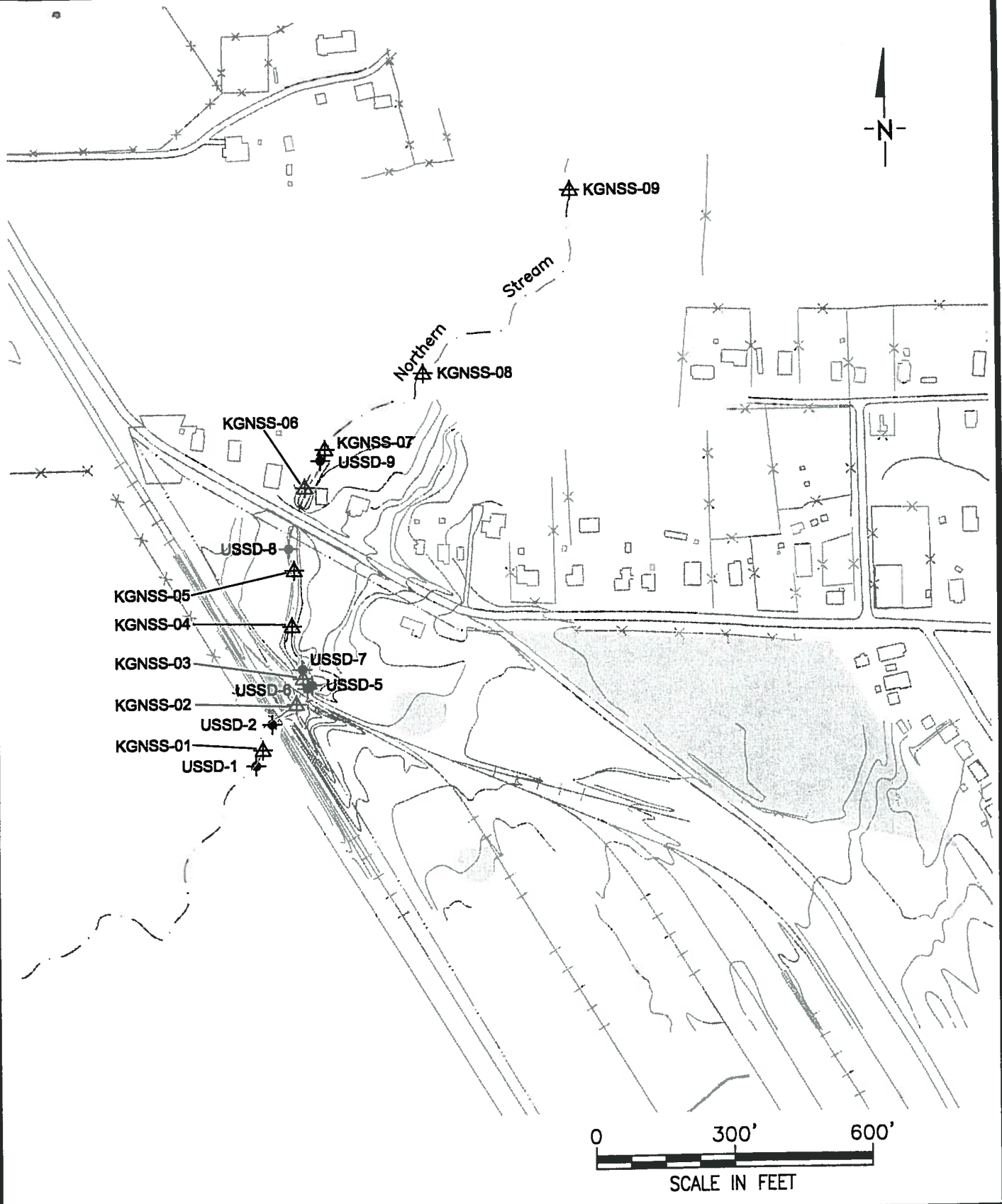
TITLE: Soil Boring Locations at South Drip Pad/Track

LOCATION: Koppers Industries, Inc., Grenada, MS

HSI GEOTRANS
A TETRA TECH COMPANY

CHECKED:	GIB
DRAFTED:	GHP
JOB/FILE:	N987/sdt2.dwg
DATE:	01-27-99

FIGURE: 1



EXPLANATION

- PREVIOUS SEDIMENT SAMPLING LOCATIONS
- DECEMBER 1998 SEDIMENT SAMPLING LOCATIONS

TITLE: **Sediment Sampling Locations at Northern Stream**

LOCATION: Koppers Industries, Inc., Grenada, MS

HSI GEOTRANS A TETRA TECH COMPANY

CHECKED:	GIB
DRAFTED:	GHP
JOB/FILE:	N987/Ssns.dwg
DATE:	01-28-99

FIGURE: 2

Table 1
South Drip Pad/Track Soil Sampling
December 1998
Koppers Industries, Inc., Grenada, MS

Sample Location	Pentachlorophenol µg/kg	Benzene µg/kg	Total PAHs mg/kg	cPAHs mg/kg
KGSWMU17 1-0	<10	<500 (a)	17,320	1,190
KGSWMU17 1-5	<35	<500 (a)	10,460	710
KGSWMU17 1-15	<15	<500 (a)	8,553	463
KGSWMU17 2-0	26	<50	186.3	15.7
KGSWMU17 2-5	10 J (a)	<50	153.1	11.1
KGSWMU17 2-15	<50 (a)	<50	9.8	1.02
KGSWMU17 3-0	11,000	1,800	2,730	780
KGSWMU17 3-6	1,100	<50	39.9	3.7
KGSWMU17 3-15	210	<50	110.4	10.4
KGSWMU17 4-0	420	<50	17.6	6.7
KGSWMU17 4-6	60	<50	210.6	17.8
KGSWMU17 4-15	4 J	<50	0.104	0.035
KGSWMU17 5-0	340,000	<50	144	28
KGSWMU17 5-5	54,000	<500 (a)	2,345	148
KGSWMU17 5-15	5,200	30 J	3,436	255

Note: J = estimated concentration
(a) = sample diluted due to matrix interference

Table 2

South Drip Pad/Track Soil Sampling
December 1998
Koppers Industries, Inc., Grenada, MS

Parameter	Location Date Units	KGSMU17 1-0 12/11/98 (mg/kg)	KGSMU17 1-5 12/11/98 (mg/kg)	KGSMU17 1-15 12/11/98 (mg/kg)	KGSMU17 2-0 12/11/98 (mg/kg)	KGSMU17 2-5 12/11/98 (mg/kg)
PAHs						
Acenaphthene		900	700	590	16	10
Acenaphthylene		<500	<500	20 J	<10	<10
Anthracene		680	450	230	7	5
Benz(a)anthracene		340	210	129	5	3
Benzo(a)pyrene		150	80	62	2	2
Benzo(b)fluoranthene		200	100	80	3	2 J
Benzo(g,h,i)perylene		50 J	<100	20	0.7 J	<2
Benzo(k)fluoranthene		90	60	37	1	0.6 J
Chrysene		360	230	136	4	3
Dibenz(a,h)anthracene		<50	<50	30	0.9 J	<1
Fluoranthene		2000	1000	900	30	19
Fluorene		1000	800	600	16	13
Indeno(1,2,3-cd)pyrene		50	30 J	19	0.7 J	0.5 J
Naphthalene		3100	1900	1900	10	20
Phenanthrene		4400	2900	2000	50	41
Pyrene		4000	2000	1800	40	34
Total PAHs[(1)]		17320	10460	8553	186.3	153.1
Total cPAHs[(1)]		1190	710	463	15.7	11.1

Notes

(1) Concentrations below detection limits set at zero.
< Constituent below reporting limit.
J Estimated concentration

Table 2

South Drip Pad/Track Soil Sampling
December 1998
Koppers Industries, Inc., Grenada, MS

Parameter	Location / Date / Units	KGSMU17 2-15 12/11/98 (mg/kg)	KGSWMU17 3-0 12/11/98 (mg/kg)	KGSWMU17 3-6 12/11/98 (mg/kg)	KGSWMU17 3-15 12/11/98 (mg/kg)	KGSWMU17 4-0 12/14/98 (mg/kg)
PAHs						
Acenaphthene		0.5	<500	1	3 J	<10
Acenaphthylene		<0.1	<500	<1	<10	<10
Anthracene		0.3	80	1.6	4	<10
Benz(a)anthracene		0.23	160	1	2	1
Benzo(a)pyrene		0.18	110	0.5	1	0.9 J
Benzo(b)fluoranthene		0.2	200	0.5	2 J	2 J
Benzo(g,h,i)perylene		0.08	70 J	0.2 J	<0.005	0.9 J
Benzo(k)fluoranthene		0.1	100	0.3	0.8 J	1 J
Chrysene		0.24	140	1.2	4	1
Dibenz(a,h)anthracene		0.1	70	0.2	<0.005	<1
Fluoranthene		1.4	400	7	21	5
Fluorene		0.6	100	2.6	7	<2
Indeno(1,2,3-cd)pyrene		0.07	70	0.2	0.6 J	0.8 J
Naphthalene		1	<500	0.6 J	<10	<10
Phenanthrene		2.5	530	12	31	1
Pyrene		2.3	700	11	34	4
Total PAHs[(1)]		9.8	2730	39.9	110.4	17.6
Total cPAHs[(1)]		1.02	780	3.7	10.4	6.7

Notes

(1) Concentrations below detection limits
< Constituent below reporting limit.
J Estimated concentration

Table 2

South Drip Pad/Track Soil Sampling
December 1998
Koppers Industries, Inc., Grenada, MS

Parameter	Location Date Units	KGSWMU17 4-6 12/14/98 (mg/kg)	KGSWMU17 4-15 12/14/98 (mg/kg)	KGSWMU17 5-1 12/10/98 (mg/kg)	KGSWMU17 5-5 12/10/98 (mg/kg)	KGSWMU17 5-15 12/10/98 (mg/kg)
PAHs						
Acenaphthene		15	0.04 J	<10	190	300
Acenaphthylene		<10	<0.1	<10	<10	<13
Anthracene		6	0.002 J	8	100	100
Benz(a)anthracene		5	0.004 J	4	40	80
Benzo(a)pyrene		3	0.006 J	4	22	40
Benzo(b)fluoranthene		3	0.01 J	8	24	40
Benzo(g,h,i)perylene		0.8 J	0.007 J	3	7	11
Benzo(k)fluoranthene		1	0.004 J	4	15	23
Chrysene		5	0.004 J	5	40	60
Dibenz(a,h)anthracene		<1	<0.01	<1	<6	<8
Fluoranthene		30	<0.03	40	300	400
Fluorene		17	<0.02	6	200	170
Indeno(1,2,3-cd)pyrene		0.8 J	0.007 J	3	7	12
Naphthalene		10 J	<0.1	<10	300	800
Phenanthrene		59	0.02	19	600	700
Pyrene		55	<0.03	40	500	700
Total PAHs[(1)]		210.6	0.104	144	2345	3436
Total cPAHs[(1)]		17.8	0.035	28	148	255

Notes
(1) Concentrations below detection limits
< Constituent below reporting limit.
J Estimated concentration

Table 3
Northern Steam Sediment Sampling
December 14, 1998
Koppers Industries, Inc., Grenada, MS

Sample Location	Pentachlorophenol µg/kg	TOC %	Total PAH mg/kg	cPAH mg/kg
KGNSS-01-0-3	<5	0.63	0.216	0.09
KGNSS-01-3-12	<5	0.12	0.006 J	ND
KGNSS-02-0-3	74	1.34	5.89	3.2
KGNSS-02-3-12	8	0.94	0.119	0.068
KGNSS-03-0-3	210	1.05	88	20
KGNSS-03-0-3 Dup	190	1.04	9	5.3
KGNSS-03-3-12	37	1.04	48.2	22
KGNSS-03-3-12 Dup	39	0.84	45.3	17.9
KGNSS-04-0-3	110	1.10	194	106
KGNSS-04-3-12	135	1.81	23.5	13
KGNSS-05-0-3	78	1.84	11.15	5.5
KGNSS-05-3-12	123	2.62	19.2	8.9
KGNSS-06-0-3	15	0.18	1.49	0.79
KGNSS-06-3-12	<5	0.19	0.049	0.036
KGNSS-07-0-3	20	2.79	6.5	3.1
KGNSS-07-3-12	3 J	0.11	0.38	0.15
KGNSS-08-0-3	117	1.00	11.2	6.3
KGNSS-08-3-12	75	1.06	19	17
KGNSS-09-0-3	55	1.00	5.2	2.6
KGNSS-09-3-12	21	2.74	8.1	3.5

Note: J = estimated concentration

Table 4

Northern Stream Sediment Sampling
December 14, 1998
Koppers Industries, Inc., Grenada, MS

Parameter	Location / Date / Units	KGNSS-01-0-3 12/14/98 (mg/kg)	KGNSS-01-3-12 12/14/98 (mg/kg)	KGNSS-02-0-3 12/14/98 (mg/kg)	KGNSS-02-3-12 12/14/98 (mg/kg)	KGNSS-03-0-3 12/14/98 (mg/kg)
PAHs						
Acenaphthene		<0.1	<0.1	<1	<0.1	<10
Acenaphthylene		<0.1	<0.1	0.3 J	<0.1	<10
Anthracene		0.003 J	<0.01	0.03 J	<0.01	<1
Benz(a)anthracene		0.02	<0.01	0.6	0.007 J	4
Benzo(a)pyrene		0.01	<0.01	0.6	0.01	2
Benzo(b)fluoranthene		0.02	<0.02	0.8	0.03	4
Benzo(g,h,i)perylene		<0.02	<0.02	0.4	0.009 J	1 J
Benzo(k)fluoranthene		0.01	<0.01	0.4	0.004 J	2
Chrysene		0.01	<0.01	0.5	0.009 J	7
Dibenz(a,h)anthracene		<0.01	<0.01	0.06 J	<0.01	<1
Fluoranthene		0.04	<0.02	0.8	0.02 J	33
Fluorene		0.003 J	<0.02	<0.2	<0.02	<2
Indeno(1,2,3-cd)pyrene		0.02	<0.01	0.3	0.008 J	1
Naphthalene		<0.1	<0.1	<1	<0.1	<10
Phenanthrene		0.02	0.006 J	0.1	0.002 J	3
Pyrene		0.06	<0.02	1	0.02	31
Total PAHs(1)		0.216	0.006	5.89	0.119	88
Total cPAHs(1)		0.09	ND	3.2	0.068	20

Notes

(1) Concentrations below detection limits set at zero.
< Constituent below reporting limit.
J Estimated concentration
ND Not detected

Table 4

Northern Stream Sediment Sampling
December 14, 1998
Koppers Industries, Inc., Grenada, MS

Parameter	Location / Date / Units	KGNSS-03-3-12 12/14/98 (mg/kg)	KGNSS-03-0-3 Dup 12/14/98 (mg/kg)	KGNSS-03-3-12 Dup 12/14/98 (mg/kg)	KGNSS-04-0-3 12/14/98 (mg/kg)	KGNSS-04-3-12 12/14/98 (mg/kg)
PAHs						
Acenaphthene		<10	<1	<1	<10	<10
Acenaphthylene		<10	0.3 J	1	<13	<10
Anthracene		0.2 J	<0.1	0.2	<1	<1
Benz(a)anthracene		5	0.7	4	22	2
Benzo(a)pyrene		3	0.9	2.5	14	2
Benzo(b)fluoranthene		5	1.4	3.8	26	3
Benzo(g,h,i)perylene		2 J	0.9	2	11	2 J
Benzo(k)fluoranthene		2	0.7	2.1	12	2
Chrysene		5	0.8	3.8	22	2
Dibenz(a,h)anthracene		<1	0.1	0.2	<2	<1
Fluoranthene		10	1.1	12	33	4
Fluorene		<2	<0.2	0.3	<2	<2
Indeno(1,2,3-cd)pyrene		2	0.8	1.7	10	2
Naphthalene		<10	<1	<1	<10	<10
Phenanthrene		2	<0.1	1.7	4	0.5 J
Pyrene		12	1.3	10	40	4
Total PAHs[(1)]		48.2	9	45.3	194	23.5
Total cPAHs[(1)]		22	5.3	17.9	106	13

Notes

(1) Concentrations below detection limits
< Constituent below reporting limit.
J Estimated concentration
ND Not detected

Table 4

Northern Stream Sediment Sampling
December 14, 1998
Koppers Industries, Inc., Grenada, MS

Parameter	Location / Date / Units	KGNSS-05-0-3 12/14/98 (mg/kg)	KGNSS-05-3-12 12/14/98 (mg/kg)	KGNSS-06-0-3 12/14/98 (mg/kg)	KGNSS-06-3-12 12/14/98 (mg/kg)	KGNSS-07-0-3 12/14/98 (mg/kg)
PAHs						
Acenaphthene		<1	<10	<1	<0.1	<1
Acenaphthylene		0.5 J	<10	<1	<0.1	<1
Anthracene		0.05 J	0.6 J	<0.1	<0.01	<0.1
Benz(a)anthracene		1.1	2	0.1	0.005 J	0.6
Benzo(a)pyrene		0.9	1	0.2	0.006 J	0.5
Benzo(b)fluoranthene		1.3	2	0.2	0.01 J	0.8
Benzo(g,h,i)perylene		0.6	0.9 J	0.1 J	0.006 J	0.3
Benzo(k)fluoranthene		0.6	0.9 J	0.09 J	0.006 J	0.4
Chrysene		1	2	0.1 J	0.005 J	0.5
Dibenz(a,h)anthracene		0.1	<1	0.2	<0.01	0.1 J
Fluoranthene		2	4	0.2	<0.02	1.3
Fluorene		<0.2	<2	<0.2	<0.02	<0.2
Indeno(1,2,3-cd)pyrene		0.6	1 J	0.1	0.004 J	0.3
Naphthalene		<1	<10	<1	<0.1	<1
Phenanthrene		0.2	0.8 J	<0.1	<0.01	0.2
Pyrene		2.2	4	0.2	0.007 J	1.5
Total PAHs(1)		11.15	19.2	1.49	0.049	6.5
Total cPAHs(1)		5.5	8.9	0.79	0.036	3.1

Notes
(1) Concentrations below detection limits
< Constituent below reporting limit.
J Estimated concentration
ND Not detected