NORTHWEST NATURAL GAS COMPANY
220 NW Second Avenue
Portland, Or 97209

MERCHANDISE ACCOUNT NUMBER RENT

MERCHANDISE-KOPPERS CO ACCOUNT NUMBER RENT

DATE OF BILL	01-Dec-95	DESCRIPTION	TOTAL AMOUNT DUE
APPLIANCE			
MISCELLANEOUS		DECEMBER 1995 RENT	8,866.00

DATE OF BILL	01-Dec-95	TOTAL AMOUNT DUE
APPLIANCE		
MISCELLANEOUS		8,866.00
PAYMENT DUE DATE		29-Dec-95

KOPPERS CO
7540 NW ST HELENS RD
PORTLAND OR 97210

RECEIVED
DEC 1 1995
KOPPERS INDS., INC.
PORTLAND, OR

Please enclose this stub
If you remit by mail
NORTHWEST NATURAL GAS CO.
220 NW Second Avenue
Portland, Or 97209
Attn: Linda Hearing
Cust. Acct. Svc.

FORM 60

KI 37G REV 2 2M 6/90

CIRCLE TERMS ON INVOICE

GIL	DET.	S-DET.	LOC.	DEPT.	TAX	EMP #	MOVE # PO #	AMOUNT
305	974		9270	910	0362			4433.00
305	974		9270	925	0362			4433.00

INV # 120195 DATE 12/01/95

A/P DEPARTMENT USE ONLY

VENDOR NUMBER 0 0 9 9 6 2 0 1 3

TERMS CODE: 740 DUE DATE: / /

DIVISION	MONTH	AUDIT NUMBER
483	12	92701081

OK TO PAY

GROSS AMOUNT 8866.00

DISCOUNT $

NET $

IMPORTANT: CIRCLE TERMS ON INVOICE

NORTHWEST NATURAL GAS COMPANY
220 NW Second Avenue
Portland, Or 97209

MERCHANDISE ACCOUNT NUMBER RENT

MERCHANDISE-KOPPERS CO ACCOUNT NUMBER RENT

DATE OF BILL	01-Nov-95	DESCRIPTION	TOTAL AMOUNT DUE
APPLIANCE			
MISCELLANEOUS		NOVEMBER 1995 RENT	8,866.00

DATE OF BILL	01-Nov-95	TOTAL AMOUNT DUE
APPLIANCE		
MISCELLANEOUS		8,866.00
PAYMENT DUE DATE		29-Nov-95

KOPPERS CO
7540 NW ST HELENS RD
PORTLAND OR 97210

RECEIVED
NOV - 2 1995
KOPPERS INDS., INC.
PORTLAND, OR

Please enclose this stub
If you remit by mail
NORTHWEST NATURAL GAS CO.
220 NW Second Avenue
Portland, Or 97209
Attn: Linda Hearing
Cust. Acct. Svc.

FORM 60

KI 37G REV 2 2M 6/90

CIRCLE TERMS ON INVOICE

GIL	DET.	S-DET.	LOC.	DEPT.	TAX	EMP #	MOVE # PO #	AMOUNT
305	974		9270	910	0362			4433.00
305	974		9270	925	0362			4433.00

INV # 110195 DATE 11/1/95

A/P DEPARTMENT USE ONLY

VENDOR NUMBER 0 0 9 9 6 2 0 1 3

TERMS. CODE 740 DUE DATE / /

OK TO PAY

GROSS AMOUNT 8866.00

DISCOUNT $

NET $

DIVISION	MONTH	AUDIT NUMBER
483	11	9270099

IMPORTANT: CIRCLE TERMS ON INVOICE

NORTHWEST NATURAL GAS COMPANY
220 NW Second Avenue
Portland, Or 97209

MERCHANDISE ACCOUNT NUMBER RENT

MERCHANDISE-KOPPERS COMPANY INC ACCOUNT NUMBER RENT

DATE OF BILL	01-Oct-95	DESCRIPTION	TOTAL AMOUNT DUE
APPLIANCE			
MISCELLANEOUS		OCTOBER 1995 RENT	8,866.00

DATE OF BILL	01-Oct-95	TOTAL AMOUNT DUE
APPLIANCE		
MISCELLANEOUS		8,866.00
PAYMENT DUE DATE		29-Oct-95

KOPPERS COMPANY INC
NW ST HELENS ROAD PLANT
NW TERMINAL
7540 N.W. St. Helens Rd.
Portland, OR 97210

RECEIVED
OCT 17 1995
KOPPERS INDS., INC.
PORTLAND, OR

Please enclose this stub
If you remit by mail
NORTHWEST NATURAL GAS CO.
220 NW Second Avenue
Portland, Or 97209
Attn: Linda Hearing
Cust. Acct. Svc.

FORM 60

KI 37G REV 2 2M 6/90

CIRCLE TERMS ON INVOICE

GIL	DET.	S-DET.	LOC.	DEPT.	TAX	EMP #	MOVE # PO #	AMOUNT
305	974		9270	910	0362			4433.00
305	974		9270	925	0362			4433.00

INV # 100195 DATE 10/1/95

A/P DEPARTMENT USE ONLY

VENDOR NUMBER 0 0 9 9 6 2 0 1 3

TERMS. CODE 740 DUE DATE: / /

OK TO PAY

GROSS AMOUNT 8866.00

DISCOUNT $

NET $

DIVISION	MONTH	AUDIT NUMBER
483	10	92700905

IMPORTANT: CIRCLE TERMS ON INVOICE

NORTHWEST NATURAL GAS COMPANY
220 NW Second Avenue
Portland, Or 97209

MERCHANDISE
ACCOUNT
NUMBER RENT

DATE OF BILL	01-Sep-95	DESCRIPTION	TOTAL AMOUNT DUE
APPLIANCE			
MISCELLANEOUS		SEPTEMBER 1995 RENT	8,866.00

KOPPERS COMPANY INC
NW ST HELENS ROAD PLANT
NW TERMINAL

RECEIVED
SEP 07 1995
KOPPERS INDS., INC.
PORTLAND, OR

FORM 60

MERCHANDISE-KOPPERS COMPANY INC
ACCOUNT
NUMBER RENT

DATE OF BILL	01-Sep-95	TOTAL AMOUNT DUE
APPLIANCE		
MISCELLANEOUS		8,866.00
PAYMENT DUE DATE		29-Sep-95

Please enclose this stub
If you remit by mail
NORTHWEST NATURAL GAS CO.
220 NW Second Avenue
Portland, Or 97209
Attn: Linda Hearing
Cust. Acct. Svc.

KI 37G REV 2 2M 6/90

CIRCLE TERMS ON INVOICE

GIL	DET.	S-DET.	LOC.	DEPT.	TAX	EMP.#	MOVE # PO #	AMOUNT
305	974		9270	910	0362			4433.00
305	974		9270	925	0362			4433.00

INV # 90195 DATE 9/1/95

A/P DEPARTMENT USE ONLY

VENDOR NUMBER 0 0 9 9 6 2 0 1 3

TERMS CODE 740 DUE DATE / /

OK TO PAY

GROSS AMOUNT 8866.00

DISCOUNT $

NET $

IMPORTANT: CIRCLE TERMS ON INVOICE

DIVISION	MONTH	AUDIT NUMBER
483	09	92700749

NORTHWEST NATURAL GAS COMPANY
220 NW Second Avenue
Portland, Or 97209

MERCHANDISE ACCOUNT NUMBER RENT

DATE OF BILL	03-Jul-95	DESCRIPTION	TOTAL AMOUNT DUE
APPLIANCE			
MISCELLANEOUS		JULY 1995 RENT	8,866.00

KOPPERS COMPANY
7540 NW ST HELENS RD
PORTLAND OR 97210

RECEIVED
JUL - 5 1995
KOPPERS INDS., INC.
PORTLAND, OR

FORM 60

MERCHANDISE-KOPPERS COMPANY
ACCOUNT NUMBER RENT

DATE OF BILL	03-Jul-95	TOTAL AMOUNT DUE
APPLIANCE		
MISCELLANEOUS		8,866.00

PAYMENT DUE DATE 31-Jul-95

Please enclose this stub
If you remit by mail
NORTHWEST NATURAL GAS CO.
220 NW Second Avenue
Portland, Or 97209
Attn: Linda Hearing
Cust. Acct. Svc.

KI 37G REV 2 2M 6/90

GIL	DET.	S-DET.	LOC.	DEPT.	TAX	EMP #	MOVE # PO #	AMOUNT
305	914		9270	910	0362			4433 00
305	914		9270	925	0362			4433 00

OK TO PAY

IMPORTANT: CIRCLE TERMS ON INVOICE

GROSS AMOUNT 8866 00
DISCOUNT $
NET $

CIRCLE TERMS ON INVOICE

INV # 70395 DATE 7/3/95

A/P DEPARTMENT USE ONLY

VENDOR NUMBER 0 0 9 9 6 2 0 1 3

TERMS CODE 740 DUE DATE / /

DIVISION	MONTH	AUDIT NUMBER
483	07	92700580

NORTHWEST NATURAL GAS COMPANY
220 NW Second Avenue
Portland, Or 97209

MERCHANDISE
ACCOUNT
NUMBER RENT

MERCHANDISE-KOPPERS COMPANY
ACCOUNT
NUMBER RENT

DATE OF BILL	05-Jun-95	DESCRIPTION	TOTAL AMOUNT DUE
APPLIANCE			
MISCELLANEOUS		JUNE 1995 RENT	8,866.00

DATE OF BILL	05-Jun-95	TOTAL AMOUNT DUE
APPLIANCE		
MISCELLANEOUS		8,866.00
PAYMENT DUE DATE		03-Jul-95

KOPPERS COMPANY
7540 NW ST HELENS RD
PORTLAND OR 97210

Please enclose this stub
If you remit by mail
NORTHWEST NATURAL GAS CO.
220 NW Second Avenue
Portland, Or 97209
Attn: Linda Hearing
Cust. Acct. Svc.

FORM 60

KI 37G REV 2 2M 6/90

CIRCLE TERMS ON INVOICE

GIL	DET.	S-DET.	LOC.	DEPT.	TAX	EMP #	MOVE # PO #	AMOUNT
305	974		9270	910	0362			4433 00
305	974		9270	925	0362			4433 00

INV # 60595 DATE 6/5/95

A/P DEPARTMENT USE ONLY

VENDOR NUMBER 0 0 9 9 6 2 0 1 3

TERMS CODE 740 DUE DATE / /

OK TO PAY Linda Robinson

GROSS AMOUNT 8866 00

DISCOUNT $

NET $

DIVISION	MONTH	AUDIT NUMBER
483	06	92700464

IMPORTANT: CIRCLE TERMS ON INVOICE

NORTHWEST NATURAL GAS COMPANY
220 NW Second Avenue
Portland, Or 97209

MERCHANDISE ACCOUNT NUMBER RENT

DATE OF BILL	03-May-95	DESCRIPTION	TOTAL AMOUNT DUE
APPLIANCE			
MISCELLANEOUS		MAY 1995 RENT	8,866.00

KOPPERS COMPANY INC
7540 NW ST HELENS RD
PORTLAND OR 97210

RECEIVED
MAY 05 1995
KOPPERS INDS., INC.
PORTLAND, OR

FORM 60

MERCHANDISE-KOPPERS COMPANY INC ACCOUNT NUMBER RENT

DATE OF BILL	03-May-95	TOTAL AMOUNT DUE
APPLIANCE		
MISCELLANEOUS		8,866.00
PAYMENT DUE DATE		31-May-95

Please enclose this stub
If you remit by mail
NORTHWEST NATURAL GAS CO.
220 NW Second Avenue
Portland, Or 97209
Attn: Linda Hearing
Cust. Acct. Svc.

KI 37G REV 2 2M 6/90

CIRCLE TERMS ON INVOICE

GIL	DET.	S-DET.	LOC.	DEPT.	TAX	EMP #	MOVE # PO #	AMOUNT
305	974		9270	910	0362			4433 00
305	974		9270	925	0362			4433 00

INV # 50395 DATE 5/3/95

A/P DEPARTMENT USE ONLY

VENDOR NUMBER 0 0 9 9 6 2 0 1 3

TERMS CODE 740 DUE DATE / /

OK TO PAY

GROSS AMOUNT 8866 00

DISCOUNT $

NET $

IMPORTANT: CIRCLE TERMS ON INVOICE

DIVISION	MONTH	AUDIT NUMBER
483	05	92700383

NORTHWEST NATURAL GAS COMPANY
220 NW Second Avenue
Portland, Or 97209

MERCHANDISE ACCOUNT NUMBER RENT

DATE OF BILL	17-Apr-95	DESCRIPTION	TOTAL AMOUNT DUE
APPLIANCE			
MISCELLANEOUS		APRIL 1995 RENT	8,866.00

KOPPERS COMPANY INC
7540 NW ST HELENS RD
PORTLAND OR 97210

MERCHANDISE-KOPPERS COMPANY INC
ACCOUNT NUMBER RENT

DATE OF BILL	17-Apr-95	TOTAL AMOUNT DUE
APPLIANCE		
MISCELLANEOUS		8,866.00

PAYMENT DUE DATE 15-May-95

Please enclose this stub
If you remit by mail
NORTHWEST NATURAL GAS CO.
220 NW Second Avenue
Portland, Or 97209
Attn: Linda Hearing
Cust. Acct. Svc.

FORM 60

KI 37G REV 2 2M 6/90

CIRCLE TERMS ON INVOICE

GIL	DET.	S-DET.	LOC.	DEPT.	TAX	EMP #	MOVE # PO #	AMOUNT	
305	974		9270	910	0362			4433	00
305	974		9270	925	0362			4433	00

INV # 41795 DATE 4/17/95

A/P DEPARTMENT USE ONLY

VENDOR NUMBER 0 0 9 9 6 2 0 1 3

TERMS CODE: 740 DUE DATE: / /

OK TO PAY

GROSS AMOUNT 8866 00

DISCOUNT $

NET $

DIVISION	MONTH	AUDIT NUMBER
483	04	92700347

IMPORTANT: CIRCLE TERMS ON INVOICE

NORTHWEST NATURAL GAS COMPANY
220 NW Second Avenue
Portland, Or 97209

MERCHANDISE ACCOUNT NUMBER RENT

DATE OF BILL	03-Mar-95	DESCRIPTION	TOTAL AMOUNT DUE
APPLIANCE			
MISCELLANEOUS		1995 MARCH RENT	8,866.00

KOPPERS COMPANY INC
7540 NW ST HELENS RD
PORTLAND OR 97210

MERCHANDISE-KOPPERS COMPANY INC ACCOUNT NUMBER RENT

DATE OF BILL	03-Mar-95	TOTAL AMOUNT DUE
APPLIANCE		
MISCELLANEOUS		8,866.00

PAYMENT DUE DATE 31-Mar-95

Please enclose this stub
If you remit by mail
NORTHWEST NATURAL GAS CO.
220 NW Second Avenue
Portland, Or 97209
Attn: Linda Hearing
Cust. Acct. Svc.

FORM 60

KI 37G REV 2 2M 6/90

CIRCLE TERMS ON INVOICE

GIL	DET.	S-DET.	LOC.	DEPT.	TAX	EMP #	MOVE # PO #	AMOUNT
305	974		9270	910	0362			4433.00
305	974		9270	925	0362			4433.00

INV # 30395 DATE 3/3/95

A/P DEPARTMENT USE ONLY

VENDOR NUMBER 0 0 9 9 6 2 0 1 3

TERMS CODE 740 DUE DATE: / /

OK TO PAY

GROSS AMOUNT 8866.00

DISCOUNT $

NET $

DIVISION	MONTH	AUDIT NUMBER
483	03	9270 0220

IMPORTANT: CIRCLE TERMS ON INVOICE

NORTHWEST NATURAL GAS COMPANY
220 NW Second Avenue
Portland, Or 97209

MERCHANDISE
ACCOUNT
NUMBER RENT

DATE OF BILL	03-Feb-95	DESCRIPTION	TOTAL AMOUNT DUE
APPLIANCE		FEBRUARY 1995	
MISCELLANEOUS		~~DECEMBER 1994~~ RENT	8,866.00

KOPPERS COMPANY INC
7540 NW ST HELENS RD
PORTLAND OR 97210

MERCHANDISE-KOPPERS COMPANY INC
ACCOUNT
NUMBER RENT

DATE OF BILL	03-Feb-95	TOTAL AMOUNT DUE
APPLIANCE		
MISCELLANEOUS		8,866.00
PAYMENT DUE DATE		03-Mar-95

Please enclose this stub
If you remit by mail
NORTHWEST NATURAL GAS CO.
220 NW Second Avenue
Portland, Or 97209
Attn: Linda Hearing
Cust. Acct. Svc.

FORM 60

KI 37G REV 2 2M 6/90

CIRCLE TERMS ON INVOICE

GIL	DET.	S-DET.	LOC.	DEPT.	TAX	EMP #	MOVE # PO #	AMOUNT
305	974		9270	910	0362			4433.00
305	974		9270	925	0362			4433.00

INV # 20395 DATE 2/3/95

A/P DEPARTMENT USE ONLY

VENDOR NUMBER 0 0 9 9 6 2 0 1 3

TERMS CODE 740 DUE DATE: / /

OK TO PAY

GROSS AMOUNT 8866.00

DISCOUNT $

NET $

DIVISION	MONTH	AUDIT NUMBER
483	02	92700100

IMPORTANT: CIRCLE TERMS ON INVOICE

NORTHWEST NATURAL GAS COMPANY
220 NW Second Avenue
Portland, Or 97209

MERCHANDISE ACCOUNT NUMBER RENT

MERCHANDISE-KOPPERS COMPANY INC ACCOUNT NUMBER RENT

DATE OF BILL	01-Jan-95	DESCRIPTION	TOTAL AMOUNT DUE
APPLIANCE			
MISCELLANEOUS		JANUARY 1995 RENT	8,866.00

DATE OF BILL	01-Jan-95	TOTAL AMOUNT DUE
APPLIANCE		
MISCELLANEOUS		8,866.00

PAYMENT DUE DATE ~~29-Jan-95~~ Feb. 6, 1995

KOPPERS COMPANY INC
7540 NW ST HELENS RD
PORTLAND OR 97210

RECEIVED JAN 3 1995 KOPPERS INDS. INC PORTLAND, OR

Please enclose this stub
If you remit by mail
NORTHWEST NATURAL GAS CO.
220 NW Second Avenue
Portland, Or 97209
Attn: Linda Hearing
Cust. Acct. Svc.

FORM 60

KI 37G REV 2 2M 6/90

CIRCLE TERMS ON INVOICE

GIL	DET.	S-DET.	LOC.	DEPT.	TAX	EMP.#	MOVE # PO #	AMOUNT
305	974		9270	910	0362			4433.00
305	974		9270	925	0362			4433.00

INV # 1019 DATE 1/1/95

A/P DEPARTMENT USE ONLY

VENDOR NUMBER 0 0 9 9 6 2 0 1 3

TERMS CODE 740 DUE DATE / /

OK TO PAY

GROSS AMOUNT 8866.00

DISCOUNT $

NET $

IMPORTANT: CIRCLE TERMS ON INVOICE

DIVISION	MONTH	AUDIT NUMBER
483	02	92700087

Northwest Natural Gas Company
220 N.W. Second Avenue
Portland, Oregon 97209

ACCOUNT NO. RENTAL

ACCOUNT NO. KOPPERS COMPANY INC RENTAL

DATE OF BILL 1-9-91	DESCRIPTION	TOTAL AMOUNT DUE	DATE OF BILL 1-9-91	TOTAL AMOUNT DUE
APPLIANCE			APPLIANCE	
MISCELLANEOUS	FEBRUARY 1991 RENT	$7,226.00	MISCELLANEOUS	$7,226.00

SERVICE ADDRESS IF OTHER THAN MAILING:
NW ST HELENS RD PLANT PROPERTY

RECEIVED
JAN 11 1991
KOPPERS INDS., INC.
PORTLAND, OR

PAYMENT DUE DATE 2-11-91

KOPPERS COMPANY INC.
ATTN: JOHN OXFORD, TERMINAL MANAGER
NW TERMINAL
7540 NW ST HELENS RD
PORTLAND OR 97229

PLEASE ENCLOSE THIS STUB IF YOU REMIT BY MAIL
NORTHWEST NATURAL GAS CO.
220 N.W. Second Avenue
Portland, Oregon 97209

Form 60

LITE-TAC®
REMOVE TO EXPOSE ADHESIVE

KI 37G REV 2 2M 6/90

CIRCLE TERMS ON INVOICE

GIL	DET.	S-DET.	LOC.	DEPT.	TAX	EMP #	MOVE # PO #	AMOUNT	
305	974		9270	910	2362			4336	—
305	974		1670	910	2362			2890	—

INV # 1-9-91 DATE 1/9/91

A/P DEPARTMENT USE ONLY

VENDOR NUMBER 0 0 9 9 6 2 0 1 3

TERMS CODE 735 DUE DATE: / /

DIVISION	MONTH	AUDIT NUMBER
483	01	

OK TO PAY

GROSS AMOUNT
DISCOUNT $
NET $ 7226 —

IMPORTANT: CIRCLE TERMS ON INVOICE

Northwest Natural Gas Company
220 N.W. Second Avenue
Portland, Oregon 97209

ACCOUNT NO.

ACCOUNT NO. KOPPERS COMPANY INC. RENTAL

TE OF LL	DESCRIPTION	TOTAL AMOUNT DUE	DATE OF BILL	TOTAL AMOUNT DUE
11-08-90			11-08-90	
PPLIANCE			APPLIANCE	
ISCELLANEOUS	DECEMBER 1990 RENT	$ 7226.00	MISCELLANEOUS	$ 7226.00

RVICE ADDRESS IF OTHER THAN MAILING:
NW ST. HELENS ROAD PLANT PROPERTY

PAYMENT DUE DATE 12-08-90

KOPPERS COMPANY INC.
NW TERMINAL
7540 NW ST. HELENS ROAD
PORTLAND
OREGON 97229

PLEASE ENCLOSE THIS STUB IF YOU REMIT BY MAIL
NORTHWEST NATURAL GAS CO.
220 N.W. Second Avenue
Portland, Oregon 97209

rm 60

LITE-TAC® REMOVE TO EXPOSE ADHESIVE

37G REV 2 2M 6/90

GIL	DET.	S-DET.	LOC.	DEPT.	TAX	EMP #	MOVE # PO #	AMOUNT
05	974		1670	910	2362			2890 —
05	974		9270	910	2362			4336 —

OK TO PAY J. A. O'Ford

IMPORTANT: CIRCLE TERMS ON INVOICE

GROSS AMOUNT
DISCOUNT $
NET $ 7226 —

CIRCLE TERMS ON INVOICE

INV # 11-08-90 DATE 11/08/90

A/P DEPARTMENT USE ONLY

VENDOR NUMBER 0 0 9 9 6 2 8 1 3

TERMS CODE 740 DUE DATE / /

DIVISION	MONTH	AUDIT NUMBER
483	11	

Northwest Natural Gas Company
220 N.W. Second Avenue
Portland, Oregon 97209

ACCOUNT NO.

ACCOUNT NO.

Koppers Company Inc
Rental

DATE OF BILL 10-8-90	DESCRIPTION	TOTAL AMOUNT DUE	DATE OF BILL 10-8-90	TOTAL AMOUNT DUE
APPLIANCE			APPLIANCE	
MISCELLANEOUS	November 1990 Rent	$ 7,226.00	MISCELLANEOUS	$7,226.00

SERVICE ADDRESS IF OTHER THAN MAILING:

NW St Helens Road Plant Property

PAYMENT DUE DATE 11-9-90

Koppers Company
NW Terminal
7540 NW St Helens Road
Portland OR 97229
ATTN: John Oxford, Terminal Manager

RECEIVED
OCT 9 1990
KOPPERS INDS., INC.
PORTLAND OR

PLEASE ENCLOSE THIS STUB IF YOU REMIT BY MAIL
NORTHWEST NATURAL GAS CO.
220 N.W. Second Avenue
Portland, Oregon 97209

Form 60

KI 37G REV 2 6M 8/89

CIRCLE TERMS ON INVOICE

GIL	DET.	S-DET.	LOC.	DEPT.	TAX	EMP #	MOVE # PO #	AMOUNT
305	974		1670	910	0362			2890 —
305	974		9270	910	0362			4336 —

INV # 10-8-90 DATE 1018 190

A/P DEPARTMENT USE ONLY

VENDOR NUMBER 0 0 9 9 6 2 0 1 3

TERMS CODE 740 DUE DATE: 11 19 0 190

OK TO PAY

GROSS AMOUNT

DISCOUNT $

NET $ 7226 —

DIVISION	MONTH	AUDIT NUMBER
483	10	

IMPORTANT: CIRCLE TERMS ON INVOICE

CI 37G REV 2 6M 8/89

CIRCLE TERMS ON INVOICE

GIL	DET.	S-DET.	LOC.	DEPT.	TAX	EMP #	MOVE # PO #	AMOUNT
305	974		1670	910	2362			2890 —
305	974		9270	910	2362			4336 —

INV # 9-1-90 DATE 9/1/90

A/P DEPARTMENT USE ONLY

VENDOR NUMBER 0099620 13

TERMS CODE 740 DUE DATE: / /

DIVISION	MONTH	AUDIT NUMBER
483	09	

OK TO PAY

GROSS AMOUNT

DISCOUNT $

NET $ 7226 —

IMPORTANT: CIRCLE TERMS ON INVOICE

Northwest Natural Gas Company
220 N.W. Second Avenue
Portland, Oregon 97209

ACCOUNT NO.

ACCOUNT NO. KOPPERS COMPANY INC. RENTAL

DATE OF BILL 9-1-90	DESCRIPTION	TOTAL AMOUNT DUE	DATE OF BILL 9-1-90	TOTAL AMOUNT DUE
APPLIANCE			APPLIANCE	
MISCELLANEOUS	OCTOBER 1990 RENT	$ 7,226.00	MISCELLANEOUS	$ 7,226.00

SERVICE ADDRESS IF OTHER THAN MAILING:

SERVICE: NW ST. HELENS ROAD PLANT PROPERTY

RECEIVED
SEP 6 1990
KOPPERS INDS., INC.
PORTLAND, OR

PAYMENT DUE DATE 10-1-90

KOPPERS COMPANY INC.
NW TERMINAL
7540 NW ST. HELENS ROAD
PORTLAND
OREGON 97229

PLEASE ENCLOSE THIS STUB IF YOU REMIT BY MAIL
NORTHWEST NATURAL GAS CO.
220 N.W. Second Avenue
Portland, Oregon 97209

Form 60

:I 37G REV 2 6M 8/89

CIRCLE TERMS ON INVOICE

GIL	DET.	S-DET.	LOC.	DEPT.	TAX	EMP #	MOVE # PO #	AMOUNT
305	974		9270	910	2362			4336 —
305	974		1670	910	2362			2890 —

INV # 8-1-90 DATE 811 190

A/P DEPARTMENT USE ONLY

VENDOR NUMBER 0 0 9 9 6 2 0 1 3

TERMS CODE 740 DUE DATE: 9/10/90

DIVISION	MONTH	AUDIT NUMBER
483	08	

OK TO PAY

GROSS AMOUNT

DISCOUNT $

NET $ 7226 —

IMPORTANT: CIRCLE TERMS ON INVOICE

Northwest Natural Gas Company
220 N.W. Second Avenue
Portland, Oregon 97209

ACCOUNT NO.

ACCOUNT NO. KOPPERS COMPANY INC RENTAL

DATE OF BILL 8-1-90	DESCRIPTION	TOTAL AMOUNT DUE	DATE OF BILL 8-1-90	TOTAL AMOUNT DUE
APPLIANCE			APPLIANCE	
MISCELLANEOUS	SEPTEMBER 1990 RENT	$ 7226.00	MISCELLANEOUS	$ 7226.00

SERVICE ADDRESS IF OTHER THAN MAILING:

NW ST. HELENS ROAD PLANT PROPERTY

PAYMENT DUE DATE 9-10-90

KOPPERS COMPANY INC.
7540 NW ST. HELENS ROAD
PORTLAND
OREGON 97229
ATTN: JOHN OXFORD TERMINAL MANAGER

RECEIVED
AUG 1 5 1990
KOPPERS COMPANY INC.
PORTLAND OR

PLEASE ENCLOSE THIS STUB IF YOU REMIT BY MAIL
NORTHWEST NATURAL GAS CO.
220 N.W. Second Avenue
Portland, Oregon 97209

orm 60

KI 37G REV 2 6M 8/89

CIRCLE TERMS ON INVOICE

GIL	DET.	S-DET.	LOC.	DEPT.	TAX	EMP #	MOVE # PO #	AMOUNT
305	974		7690	910	2362			2890 —
305	974		9270	910	2362			4336 —

INV # 6-4-90 DATE / /

A/P DEPARTMENT USE ONLY

VENDOR NUMBER 0 0 9 9 6 2 0 1 3

TERMS CODE 740 DUE DATE 7/10/90

DIVISION	MONTH	AUDIT NUMBER
483	06	

OK TO PAY

GROSS AMOUNT

DISCOUNT $

NET $ 7226 —

IMPORTANT: CIRCLE TERMS ON INVOICE

Northwest Natural Gas Company
220 N.W. Second Avenue
Portland, Oregon 97209

ACCOUNT NO.

ACCOUNT NO. KOPPERS COMPANY INC.
RENTAL

DATE OF BILL 6-4-90	DESCRIPTION	TOTAL AMOUNT DUE
APPLIANCE		
MISCELLANEOUS	JULY 1990 RENT	$ 7226.00

DATE OF BILL 6-4-90	TOTAL AMOUNT DUE
APPLIANCE	
MISCELLANEOUS	$ 7226.00

SERVICE ADDRESS IF OTHER THAN MAILING:
NW ST. HELENS ROAD PLANT PROPERTY

KOPPERS COMPANY INC.
7540 NW ST. HELENS ROAD
PORTLAND, OREGON 97229
ATTN: JOHN OXFORD TERMINAL MANAGER

RECEIVED
JUN - 5 1990
KOPPERS INDS., INC.
PORTLAND, OR

PAYMENT DUE DATE 7-10-90

PLEASE ENCLOSE THIS STUB IF YOU REMIT BY MAIL
NORTHWEST NATURAL GAS CO.
220 N.W. Second Avenue
Portland, Oregon 97209

Form 60

KI 37G REV 2 6M 8/89

GIL	DET.	S-DET.	LOC.	DEPT.	TAX	EMP #	MOVE # PO #	AMOUNT
305	974		9270	910	2362			4336 70
305	974		1670	910	2362			2890 -

CIRCLE TERMS ON INVOICE

INV # 3-1-90 DATE 3/1/90

A/P DEPARTMENT USE ONLY

VENDOR NUMBER 0 0 9 9 6 2 0 1 3

TERMS CODE: 740 DUE DATE: 4/10/90

DIVISION	MONTH	AUDIT NUMBER
483	03	

OK TO PAY

GROSS AMOUNT

DISCOUNT $

NET $ 7226 00

IMPORTANT: CIRCLE TERMS ON INVOICE

Northwest Natural Gas Company
220 N.W. Second Avenue
Portland, Oregon 97209

ACCOUNT NO.

DATE OF BILL 3-1-90	DESCRIPTION	TOTAL AMOUNT DUE
APPLIANCE		
MISCELLANEOUS	APRIL 1990 RENT	$ 7226.00

SERVICE ADDRESS IF OTHER THAN MAILING:

NW ST. HELENS ROAD PLANT PROPERTY

KOPPERS COMPANY, INC.
7540 NW ST. HELENS ROAD
PORTLAND, OREGON 97229
ATTN: JOHN OXFORD TERMINAL MANAGER

MAR 1

ACCOUNT NO. KOPPERS COMPANY RENTAL

DATE OF BILL 3-1-90	TOTAL AMOUNT DUE
APPLIANCE	
MISCELLANEOUS	$ 7226.00

PAYMENT DUE DATE 4-10-90

PLEASE ENCLOSE THIS STUB IF YOU REMIT BY MAIL
NORTHWEST NATURAL GAS CO.
220 N.W. Second Avenue
Portland, Oregon 97209

Form 60

KI 37G REV 2 6M 8/89

CIRCLE TERMS ON INVOICE

GIL	DET.	S-DET.	LOC.	DEPT.	TAX	EMP #	MOVE # PO #	AMOUNT	
305	974		1670	910	2362			2890	—
305	974		9270	910	2362			4336	—

INV # 2-5-90 DATE 2-15-90

A/P DEPARTMENT USE ONLY

VENDOR NUMBER 0 0 9 9 6 2 0 1 3

TERMS CODE 740 DUE DATE 2-15-90

DIVISION	MONTH	AUDIT NUMBER
483	02	

OK TO PAY

GROSS AMOUNT

DISCOUNT $

NET $ 7226 —

IMPORTANT: CIRCLE TERMS ON INVOICE

Northwest Natural Gas Company
220 N.W. Second Avenue
Portland, Oregon 97209

ACCOUNT NO.

DATE OF BILL 2-5-90	DESCRIPTION	TOTAL AMOUNT DUE
APPLIANCE		
MISCELLANEOUS	MARCH 1990 RENT	$ 7226.00

SERVICE ADDRESS IF OTHER THAN MAILING:
NW ST. HELENS ROAD PLANT PROPERTY

KOPPERS COMPANY, INC.
7540 NW ST. HELENS ROAD
PORTLAND, OREGON 97229
ATTN: JOHN OXFORD TERMINAL MANAGER

Form 60

ACCOUNT NO. KOPPERS COMPANY

DATE OF BIL 2-5-90	TOTAL AMOUNT DUE
APPLIANCE	
MISCELLANEOUS	$ 7226.00

PAYMENT DUE DATE 3-5-90

PLEASE ENCLOSE THIS STUB
IF YOU REMIT BY MAIL
NORTHWEST NATURAL GAS CO.
220 N.W. Second Avenue
Portland, Oregon 97209

KI 37G REV 2 6M 8/89

CIRCLE TERMS ON INVOICE

GIL	DET.	S-DET.	LOC.	DEPT.	TAX	EMP #	MOVE # PO #	AMOUNT	
305	974		1670	910	0362			2890	—
305	974		9270	910	0362			4336	—

INV # 1-12-90 DATE 1/12/90

A/P DEPARTMENT USE ONLY

VENDOR NUMBER 0 0 9 9 6 2 0 1 3

TERMS CODE 740 DUE DATE: 2/12/90

DIVISION	MONTH	AUDIT NUMBER
482	1	

OK TO PAY

GROSS AMOUNT

DISCOUNT $

NET $ 7226 00

IMPORTANT: CIRCLE TERMS ON INVOICE

Northwest Natural Gas Company
220 N.W. Second Avenue
Portland, Oregon 97209

ACCOUNT NO.

ACCOUNT NO. KOPPERS COMPANY RENTAL

DATE OF BILL 1-12-90	DESCRIPTION	TOTAL AMOUNT DUE	DATE OF BILL 1-12-90	TOTAL AMOUNT DUE
APPLIANCE			APPLIANCE	
MISCELLANEOUS	FEBRUARY 1990 RENT	$ 7226.00	MISCELLANEOUS	$ 7226.00

SERVICE ADDRESS IF OTHER THAN MAILING:

NW ST. HELENS ROAD PLANT PROPERTY

PAYMENT DUE DATE 2-12-90

KOPPERS COMPANY INC.
7540 NW ST. HELENS ROAD
PORTLAND, OREGON 97229
ATTN: JOHN OXFORD TERMINAL MANAGER

PLEASE ENCLOSE THIS STUB IF YOU REMIT BY MAIL
NORTHWEST NATURAL GAS CO.
220 N.W. Second Avenue
Portland, Oregon 97209

Form 60

REFER ALL INQUIRIES TO CHEM SECURITY, INC.
STAR ROUTE, ARLINGTON, OR

136258

No. 136258

YOUR INVOICE NO.	DATED	DESCRIPTION	GROSS AMOUNT	DISCOUNT	NET AMOUNT
REFUND	04/11/90		200.00	.00	200.00

RECEIVED
MAY 4 1990
KOPPERS INDS., INC.
PORTLAND, OR

WM0014 9/81 PLEASE DETACH BEFORE DEPOSITING ATTACHED CHECK IS IN FULL PAYMENT OF ITEMS LISTED ABOVE 200.00 .00 200.00

CHEM SECURITY, INC.
ARLINGTON, OR 97812
A Waste Management Company

No. 136258

450455 136258

66-156
531

DATE 04/26/90

PAY EXACTLY
TWO HUNDRED & 00/100

TO THE ORDER OF

KOPPERS COMPANY, INC.
ATT: W.E. SWEARINGEN
7540 N.W. SAINT HELENS RD
PORTLAND OR 97229

$ ******200.00

CHIEF FINANCIAL OFFICER

FIRST UNION NATIONAL BANK OF NORTH CAROLINA, CHARLOTTE, N.C.

⑈136258⑈ ⑆053101561⑆ 7999802588⑈

▲6" ▲7" ▲8"

NOTE - Tear Tape To Size Of Invoice

Accounts Payable Invoice Sticker

KOPPERS INDUSTRIES

Transmittal Number ____ Plant Audit No. 7-27

For Plant or Purchasing Dept. Use

Purchase Order No. ____ Requisition Number ____

Terms ____

F.O.B. ____ ☐ Prepaid ☐ Collect

Prices Verified By KM Calculations Verified By KM

Date Inv. Rec'd. 7/13 Date Mat'l. Received ____

Receiving Report No. ____ Date Inv. F'W'D. To Pittsburgh 7/20

Used For ____

Commitment Change Approval

Increase $ ____

Decrease $ ____

Commitment Change Approved By ____

Vendor Number 3288240007 Invoice Number 12265 Invoice Date 7/10/89 Terms Code ____ Due Date / /

Account Distribution

General Ledger	Detail	Sub Detail	Location or Contract	Dept. or Orig. Loc.	Tax* Codes	Emp. No.	Purchase Order No. or Rec ID	Br.	P.O. No.	P.O. Add.	P.O. Add. or Resource	Quantity			* Unit Code	Amount Distributed
305	715		9270	910	0362											143

O.K. to Pay

For Treasury & Accounting Section Use Only

Invoice Audited By ____ Check Audited By ____

Audit Number			
Division	Send. Loc.	Month	Serial No.
483			

Invoice Amt. (Gross)	
Cash Discount	
Net Amount Payable	1431 —

KI-37G REV. 1 1/89 *See Reverse Side For Instructions

Koppers000024

CHEM-SECURITY SYSTEMS, INC.
STAR ROUTE, BOX 9
ARLINGTON OR 97812
503/454-2643

NET 30 DAYS AFTER
INVOICE DATE

SERVICE PROVIDED BY:
ARLINGTON FACILITY

KOPPERS CO. INC.
ATTN:W.E.SWEARINGEN ENV PROG.M
7540 NW SAINT HELENS ROAD
PORTLAND OR 97229

450 450 4011611
INVOICE NUMBER

12265 07/10/89 1

890710

REFERENCE NO.	PROFILE	DESC / UNIT	QUANTITY	RATE	AMOUNT
0000101920-01	PDX-J09414	CREOSOTE SPILL CLEANUP		SVC DATE:	07/05/89
	DISPOSAL	55 GAL DRM	15.00	77.0000	1,155.00
	TRANSPORTATION	LOADS	15.00	14.0000	210.00
	OREGON HAZD. TAX	DRY TONS	3.30	20.0000	66.00
				SUBTOTAL	1,431.00 *

REMIT TO ADDRESS

CHEM-SECURITY SYSTEMS, INC
STAR ROUTE, BOX 9
ARLINGTON OR 97812

PLEASE PAY THIS AMOUNT

1,431.00**

CHEM-SECURITY SYSTEMS, INC.

NATIONAL RESPONSE CENTER 1-800-424-8802
OREGON ACCIDENT RESPONSE CENTER 1-800-452-0311

Please print or type. *(Form designed for use on elite (12-pitch) typewriter.)* 101920 *Form Approved. OMB No. 2050-0039. Expires 9-30-91*

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. O R D 0 2 7 7 3 4 3 5 9 6 — Manifest Document No. 30 89
2. Page 1 of 1
Information in the shaded areas is not required by Federal law.

GENERATOR

3. Generator's Name and Mailing Address
KOPPERS INDUSTRIES INC
7540 NW ST HELENS RD PORTLAND OREGON 97210
4. Generator's Phone (503) 286-3681

A. State Manifest Document Number
B. State Generator's ID

5. Transporter 1 Company Name: CHEM-SECURITY SYSTEMS INC
6. US EPA ID Number: O R D 0 8 9 4 5 2 3 5 3
C. State Transporter's ID 135002
D. Transporter's Phone

7. Transporter 2 Company Name
8. US EPA ID Number
E. State Transporter's ID
F. Transporter's Phone

9. Designated Facility Name and Site Address
Chem-Security Systems, Inc.
Star Route
Arlington, Oregon 97812
10. US EPA ID Number: O R D 0 8 9 4 5 2 3 5 3
G. State Facility's ID
H. Facility's Phone **503-454-2643**

11. US DOT Description *(Including Proper Shipping Name, Hazard Class, and ID Number)*	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	EPA/I. Waste No.
a. HAZARDOUS WASTE SOLID NOS ORME NA 9188	15	DM	825	G	U051
b.					
c.					
d.					

J. Additional Descriptions for Materials Listed Above
a.
b.
c.
d.

K. WPS: J09414
Handling Code: D81
Cu. Yd.: 4.05
Area: L13 S: 14 D: D Q: X PR: 4
Lbs.: 6600
Gal.:

15. Special Handling Instructions and Additional Information **Waste Profile Sheet Number(s)**
a.
b. J09414
c.
d.

16. **GENERATOR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; **OR**, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name: JOHN A OXFORD — Signature: John A Oxford — Month Day Year: 0 6 3 0 8 9

TRANSPORTER

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: GREG MARRETT — Signature: Greg Marrett — Month Day Year: 0 6 3 0 8 9

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name — Signature — Month Day Year

FACILITY

19. Discrepancy Indication Space Sec D omitted. Sec. 11a additional info omitted
SEC 11a ID NUMBER INCORRECT OKD

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name: Betty L Reed — Signature: Betty L Reed — Month Day Year: 0 7 0 5 8 9

EPA Form 8700-22 (Rev. 9/88) Previous editions are obsolete.

ORIGINAL - RETURN TO GENERATOR

Public reporting burden for this collection of information is estimated to average: 37 minutes for generators, 15 minutes for transporters, and 10 minutes for treatment, storage and disposal facilities. This includes time for reviewing instructions, gathering data, and completing and reviewing the form.

Send comments regarding the burden estimate, including suggestions for reducing this burden, to Chief, Information Policy Branch, PM-223, US Environmental Protection Agency, 401 M St. S.W., Washington D.C. 20460; and to the Office of Information and Regulatory Affairs, Office of Management and Budget, Washington D.C. 20503.

Accounts Payable Invoice Sticker

KOPPERS INDUSTRIES

Transmittal Number ____ Plant Audit No. 7-14

For Plant or Purchasing Dept. Use

Purchase Order No. ____ Requisition Number ____

Terms ____

F.O.B. ____ ☐ Prepaid ☐ Collect

Prices Verified By KM Calculations Verified By KM

Date Inv. Rec'd 7/7 Date Mat'l. Received ____

Receiving Report No. ____ Date Inv. F'W'D. To Pittsburgh 7/11

Used For ____

Commitment Change Approval

Increase $ ____

Decrease $ ____

Commitment Change Approved By ____

Vendor Number	Invoice Number	Invoice Date	Terms Code	Due Date
3288940007	12235	6/30/89		/ /

Account Distribution

General Ledger	Detail	Sub Detail	Location or Contract	Dept. or Orig. Loc.	Tax* Codes	Emp. No.	Purchase Order No. or Rec ID	Br.	P.O. No.	P.O. Add.	P.O. Add. or Resource	Quantity			* Unit Code	Amount Distributed		
305	767	+	9270	910	0362												400	—

O.K. to Pay

For Treasury & Accounting Section Use Only

Invoice Audited By ____ Check Audited By ____

Audit Number			
Division	Send. Loc.	Month	Serial No.
483			

Invoice Amt. (Gross)		
Cash Discount		
Net Amount Payable	400	—

*See Reverse Side For Instructions

Koppers000028

CHEM-SECURITY SYSTEMS, INC.
STAR ROUTE, BOX 9
ARLINGTON OR 97812
503/454-2643

INVOICE

NET 30 DAYS AFTER
INVOICE DATE

SERVICE PROVIDED BY:
ARLINGTON FACILITY

KOPPERS CO. INC.
ATTN:W.E.SWEARINGEN ENV PROG.M
7540 NW SAINT HELENS ROAD
PORTLAND OR 97229

INVOICE NUMBER		
450	450	4011611
12235	06/30/89	1

SST Number:

890705

REFERENCE NO.	PROFILE	DESC / UNIT	QUANTITY	RATE	AMOUNT
0000004750-A0	PDX-J09414	CREOSOTE SPILL CLEANUP		SVC DATE:	06/29/89
	WASTE EVALUATION	FEE	1.00	400.0000	400.00
	PO# OR CONTRACT#	89-1			
				SUBTOTAL	400.00 *

JUL 7

REMIT TO ADDRESS
CHEM-SECURITY SYSTEMS, INC
STAR ROUTE, BOX 9
ARLINGTON OR 97812

PLEASE PAY THIS AMOUNT
400.00**

THANK YOU FOR YOUR BUSINESS

Koppers000029

WASTE APPROVAL INVOICE

SST Number: 4750

Profile number: J09414-1DX

Customer Number: 450-4011611

Generator Name: Koppers Co. Inc

Customer Name: same

Purchase Order No: 89-1

==========

Invoice Date..... same

Rebate Unit Code.....776.....577

Cost per Waste Stream..... 400.00

Total charges..... 400.00

KI 37G REV 2 6M 8/89

CIRCLE TERMS ON INVOICE

GIL	DET.	S-DET.	LOC.	DEPT.	TAX	EMP #	MOVE # PO #	AMOUNT
305	974		1670	910	2362			2890 –
305	974		9270	910	2362			4336 –

INV # 12-1-89 DATE 12/1/89

A/P DEPARTMENT USE ONLY

VENDOR NUMBER 0 0 9 9 6 2 0 1 3

TERMS CODE: 7/0 DUE DATE: 1/10/90

DIVISION	MONTH	AUDIT NUMBER
483	12	

OK TO PAY

GROSS AMOUNT

DISCOUNT $

NET $ 7226 – –

IMPORTANT: CIRCLE TERMS ON INVOICE

Koppers000031

Northwest Natural Gas Company
220 N.W. Second Avenue
Portland, Oregon 97209

ACCOUNT NO.

DATE OF BILL 12-1-89	DESCRIPTION	TOTAL AMOUNT DUE
APPLIANCE		
MISCELLANEOUS	JANUARY 1990 RENT	$ 7226.00

SERVICE ADDRESS IF OTHER THAN MAILING:
NW ST. HELENS RD. PLANT PROPERTY

KOPPERS COMPANY, INC.
ATTN: JOHN OXFORD TERMINAL MANAGER
7540 NW ST. HELENS ROAD
PORTLAND, OREGON 97229

Form 60

ACCOUNT NO. KOPPERS COMPANY RENTAL

DATE OF BILL 12-1-89	TOTAL AMOUNT DUE
APPLIANCE	
MISCELLANEOUS	$ 7226.00

PAYMENT DUE DATE 1-10-90

PLEASE ENCLOSE THIS STUB IF YOU REMIT BY MAIL
NORTHWEST NATURAL GAS CO.
220 N.W. Second Avenue
Portland, Oregon 97209

4375

NORTHWEST NATURAL GAS COMPANY

220 N.W. SECOND AVENUE
PORTLAND, OREGON 97209

Area Code 503
226-4211

YOUR ORDER NO.

DATE OF INVOICE
11-15-89

OUR INVOICE NO.
067-12285
TERMS: NET CASH

CLAIM NO.

MAIL TO

KOPPERS
NW TERMINAL
7540 NW ST. HELENS ROAD
PORTLAND, OR 97229
ATTN: JOHN OXFORD - TERMINAL MANAGER

ACCOUNTS RECEIVABLE GENERAL

DATE	DESCRIPTION	AMOUNT
11-15-89	PROPERTY TAXES ON PROPERTY LEASED BY KOPPERS AS PER ATTACHED STATEMENTS	$ 34,750.28

NOV 20

OREGON
Property Taxes For Fiscal Year July 1, 1989 to June 30, 1990
MULTNOMAH COUNTY

REAL
Property Taxes

Code Area	Account Number
001	R-96112-1110

Property Description (Tax Lot Number)

PROPERTY ADDRESS
7540 NW ST HELENS RD
PORTLAND, OR

TAX COMPARISON

Assessed Value	Last Year	This Year
LAND VALUE	498,500	498,500
BUILDING VALUE	555,900	555,900
TOTAL VALUE	1,054,400	1,054,400
NET ASSESS VAL	1,054,400	1,054,400
TAX RATE/$1000	31.0217	33.2298
PROPERTY TAXES	32,709.29	35,037.50

Current Taxes Levied By	% OF Tax Rate	Tax Amount
PORT OF PORTLAND	.9	315.34
PORT BONDS	.0	0.00
EDUCATION SERVICE DIST	4.5	1,576.69
PORTLAND COMMUNITY COLL	2.8	981.05
PORTLAND SCHOOL DIST	50.9	17,834.09
CITY OF PORTLAND	26.2	9,179.83
METRO SERVICE DIST (ZOO)	1.0	350.38
MULTNOMAH COUNTY	13.7	4,800.12

YOUR CANCELLED CHECK IS YOUR RECEIPT
RETURNED CHECK WILL INCUR A SERVICE CHARGE

MAILING ADDRESS

MILLER,DONALD J
TREASURER
ONE PACIFIC SQUARE
220 NW 2ND AV
PORTLAND, OREGON 97209

LEGAL DESCR:
SECTION 12 1 N 1 W LOT BLOCK
STL# 111 6.85 ACRES

Interest Included

Delinquent Taxes	Tax Year	Amount
Foreclosure proceedings will be started after July 15 on real property accounts with an unpaid balance for any tax year marked with an asterisk (*).		

Property Tax Totals	35,037.50
SPECIAL ASSESSMENTS	
Total Taxes and Assessments	35,037.50

	Discount Allowed *	Pay By	Pay One of These Amounts
FULL - 3%	1,051.13	NOV. 15	33,986.37
2/3 - 2%	467.17	NOV. 15	22,891.17
1/3 - None		NOV. 15	11,679.17

PLEASE MAKE PAYMENT TO:
Tax Collector, Multnomah County
P.O. Box 2716
Portland, Oregon 97272-0029
(For tax information, call (503) 248-3326)

* READ PAYMENT INSTRUCTIONS ON REVERSE

058621
150-353-006-2 (Rev. 5-89)

SAVE THIS PART FOR YOUR RECORDS

NOV 20

Koppers000034

OREGON Property Taxes For Fiscal Year July 1, 1989 to June 30, 1990 MULTNOMAH COUNTY REAL Property Taxes	Code Area 001	Account Number R-96113-0410
	Property Description (Tax Lot Number)	
	PROPERTY ADDRESS WI/7540 NW ST HELENS RD PORTLAND, OR	

TAX COMPARISON

Assessed Value	Last Year	This Year
LAND VALUE	5,600	5,600
BUILDING VALUE	18,100	18,100
TOTAL VALUE	23,700	23,700
NET ASSESS VAL	23,700	23,700
TAX RATE/$1000	31.0217	33.2298
PROPERTY TAXES	735.22	787.54

Current Taxes Levied By	% OF Tax Rate	Tax Amount
PORT OF PORTLAND	.9	7.09
PORT BONDS	.0	0.00
EDUCATION SERVICE DIST	4.5	35.44
PORTLAND COMMUNITY COLL	2.8	22.05
PORTLAND SCHOOL DIST	50.9	400.86
CITY OF PORTLAND	26.2	206.34
METRO SERVICE DIST (ZOO)	1.0	7.88
MULTNOMAH COUNTY	13.7	107.88

YOUR CANCELLED CHECK IS YOUR RECEIPT
RETURNED CHECK WILL INCUR A SERVICE CHARGE

MAILING ADDRESS

MILLER,DONALD J
TREASURER
ONE PACIFIC SQUARE
220 NW 2ND AV
PORTLAND, OREGON 97209

LEGAL DESCR:
SECTION 13 1 N 1 W LOT BLOCK
TL# 41 0.09 ACRES

Interest Included

Delinquent Taxes	Tax Year	Amount
Foreclosure proceedings will be started after July 15 on real property accounts with an unpaid balance for any tax year marked with an asterisk (*).		

Property Tax Totals	787.54
SPECIAL ASSESSMENTS	
Total Taxes and Assessments	787.54

PLEASE MAKE PAYMENT TO: Tax Collector, Multnomah County
P.O. Box 2716
Portland, Oregon 97272-0029
(For tax information, call (503) 248-3326)

* READ PAYMENT INSTRUCTIONS ON REVERSE

	Discount Allowed *	Pay By	Pay One of These Amounts
FULL - 3%	23.63	NOV. 15	763.91
2/3 - 2%	10.50	NOV. 15	514.53
1/3 - None		NOV. 15	262.52

058628
150-353-008-2 (Rev. 5-89)

SAVE THIS PART FOR YOUR RECORDS

LITE-TAC®
REMOVE TO EXPOSE
ADHESIVE

G/L	DET.	S-DET.	LOC.	DEPT.	TAX	EMP. #	AMOUNT
305	974		9270	910	2362		4336
305	974		1670	910	2362		2890
						GROSS AMOUNT:	

OK TO PAY: J. a. O'Hard

DISC. $

NET $ 7226.-

VENDOR NUMBER	INV. #:	INV. DATE:	TERMS:	DUE DATE:
009962013	11-1-89	11/1/89	740	/ /

DIVISION	MONTH	AUDIT NUMBER
483	11	

Northwest Natural Gas Company
220 N.W. Second Avenue
Portland, Oregon 97209

ACCOUNT NO.

ACCOUNT NO. KOPPERS COMPANY RENTAL

DATE OF BILL 11-1-89	DESCRIPTION	TOTAL AMOUNT DUE	DATE OF BILL 11-1-89	TOTAL AMOUNT DUE
APPLIANCE			APPLIANCE	
MISCELLANEOUS	DECEMBER 1989 RENT	$ 7226.00	MISCELLANEOUS	$ 7226.00

SERVICE ADDRESS IF OTHER THAN MAILING:
NW ST. HELENS ROAD PLANT PROPERTY

PAYMENT DUE DATE 12-10-89

OCT 30 1989

KOPPERS CO. INC.
ATTN: JOHN OXFORD TERMINAL MANAGER
7540 NW ST. HELENS ROAD
PORTLAND, OREGON 97229

PLEASE ENCLOSE THIS STUB
IF YOU REMIT BY MAIL
NORTHWEST NATURAL GAS CO.
220 N.W. Second Avenue
Portland, Oregon 97209

Form 60

Koppers000037

LITE-TAC®
REMOVE TO EXPOSE ADHESIVE

G/L	DET.	S-DET.	LOC.	DEPT.	TAX	EMP. #	AMOUNT
305	914		9270	910	2362		4336.
305	914		1670	910	2362		2890.
						GROSS AMOUNT:	

OK TO PAY:

DISC. $:

NET $ 7226.—

VENDOR NUMBER: 0 0 9 9 6 2 0 1 3

INV. #: 10-2-89

INV. DATE: 10/2/89

TERMS: 1/10 DUE DATE: 11/10/89

DIVISION	MONTH	AUDIT NUMBER
483	10	

Northwest Natural Gas Company
220 N.W. Second Avenue
Portland, Oregon 97209

ACCOUNT NO.

ACCOUNT NO. KOPPERS CO. INC.
RENTAL

DATE OF BILL 10-2-89	DESCRIPTION	TOTAL AMOUNT DUE	DATE OF BILL 10-2-89	TOTAL AMOUNT DUE
APPLIANCE			APPLIANCE	
MISCELLANEOUS	NOVEMBER 1989 RENT	$ 7226.00	MISCELLANEOUS	$ 7226.00

SERVICE ADDRESS IF OTHER THAN MAILING:

NW ST. HELENS ROAD PLANT PROPERTY

PAYMENT DUE DATE 11-10-89

KOPPERS COMPANY INC.
NW TERMINAL
7540 NW ST. HELENS RD.
PORTLAND, OR 97229

OCT 2 1989

ATTN: JOHN OXFORD/TERM. MGN.

PLEASE ENCLOSE THIS STUB
IF YOU REMIT BY MAIL
NORTHWEST NATURAL GAS CO.
220 N.W. Second Avenue
Portland, Oregon 97209

Form 60

ITE-TAC®
OVE TO EXPOSE
ADHESIVE

LITE-TAC®
REMOVE TO EXPOSE
ADHESIVE

LITE-TAC
REMOVE TO EXPOSE
ADHESIVE

LITE-TAC®
REMOVE TO EXPOSE
ADHESIVE

G/L	DET.	S-DET.	LOC.	DEPT.	TAX	EMP. #	AMOUNT
305	974		9270	910	2362		4336-
305	974		1670	910	2362		2890.-
						GROSS AMOUNT:	
OK TO PAY:						DISC. $:	
						NET $:	7226.-

VENDOR NUMBER	0 0 9 9 6 2 0 1 3
INV. #:	91-89
INV. DATE:	8/1/89
TERMS: 7/10	DUE DATE: / /

DIVISION	MONTH	AUDIT NUMBER
483	9	

Koppers000040

Northwest Natural Gas Company
220 N.W. Second Avenue
Portland, Oregon 97209

ACCOUNT NO. RENTAL

DATE OF BILL 9-1-89	DESCRIPTION	TOTAL AMOUNT DUE
APPLIANCE		
MISCELLANEOUS	OCTOBER 1989 RENT	$7,226.00

SERVICE ADDRESS IF OTHER THAN MAILING:
NW ST HELENS RD PLANT PROPERTY

SEP 1 1989

•KOPPERS CO., INC
ATTN: JOHN OXFORD TERMINAL MANAGER
7540 NW ST HELENS RD
PORTLAND, OREGON 97229

Form 60

ACCOUNT NO. KOPPERS CO RENTAL

DATE OF BILL 9-1-89	TOTAL AMOUNT DUE
APPLIANCE	
MISCELLANEOUS	$7,226.00

PAYMENT DUE DATE 10-10-89

PLEASE ENCLOSE THIS STUB
IF YOU REMIT BY MAIL
NORTHWEST NATURAL GAS CO.
220 N.W. Second Avenue
Portland, Oregon 97209

Northwest Natural Gas Company
220 N.W. Second Avenue
Portland, Oregon 97209

ACCOUNT NO. RENTAL			ACCOUNT NO. KOPPERS RENTAL	
DATE OF BILL 8-3-89	DESCRIPTION	TOTAL AMOUNT DUE	DATE OF BILL 8-3-89	TOTAL AMOUNT DUE
APPLIANCE			APPLIANCE	
MISCELLANEOUS	MONTHLY RENTAL FOR SEPT. 1989	$7,226.00	MISCELLANEOUS	$7,226.00

SERVICE ADDRESS IF OTHER THAN MAILING:

PAYMENT DUE DATE 9-10-89

KOPPERS CO INC ATTN: JOHN OXFORD
NW TERMINAL
7540 NW ST HELENS RD
PORTLAND, OREGON 97229

PLEASE ENCLOSE THIS STUB IF YOU REMIT BY MAIL
NORTHWEST NATURAL GAS CO.
220 N.W. Second Avenue
Portland, Oregon 97209

AUG 7

Form 60

G/L	DET.	S-DET.	LOC.	DEPT.	TAX	EMP. #	AMOUNT
305	974		9270	910		4	336
305	974		1670	910			2890
						GROSS AMOUNT:	

OK TO PAY:

DISC. $:

NET $: 7226.-

VENDOR NUMBER 0 0 9 9 6 2 0 1 3

INV. #: 8-3-89

INV. DATE: 8/3/89

TERMS: DUE DATE: / /

DIVISION	MONTH	AUDIT NUMBER
483	8	8-11

Accounts Payable Invoice Sticker

KOPPERS INDUSTRIES

▲6" ▲7" ▲8"
NOTE - Tear Tape To Size Of Invoice

Transmittal Number ____ Plant Audit No. 7-22

Purchase Order No. ____ Requisition Number ____

Terms ____

F.O.B. ____ ☐ Prepaid ☐ Collect

Prices Verified By KM Calculations Verified By KM

For Plant or Purchasing Dept. Use

Date Inv. Rec'd 7/12 Date Mat'l. Received ____

Receiving Report No. ____ Date Inv. F'W'D. To Pittsburgh 7/20

Used For ____

Commitment Change Approval

Increase $ ____

Decrease $ ____

Commitment Change Approved By ____

Vendor Number 0099620/3 Invoice Number 7-7-89 Invoice Date 7/7/89 Terms Code ____ Due Date / /

Account Distribution

General Ledger	Detail	Sub Detail	Location or Contract	Dept. or Orig. Loc.	Tax* Codes	Emp. No.	Purchase Order No. or Rec ID	Br.	P.O. No.	P.O. Add.	P.O. Add. or Resource	Quantity	* Unit Code	Amount Distributed
305	974	X	1670	910	0362									2890 —
305	974	X	9270	910	0362									4336 —

O.K. to Pay ____

For Treasury & Accounting Section Use Only

Invoice Audited By ____ Check Audited By ____

Division	Send. Loc.	Month	Audit Number Serial No.	
483				Invoice Amt. (Gross)
				Cash Discount
				Net Amount Payable 7226 —

KI 270 REV-1-1/90 *See Reverse Side For Instructions

Koppers000043

OF BILL 7-7-89	DESCRIPTION	AMOUNT DUE	BILL	
APPLIANCE			APPLIANCE	
MISCELLANEOUS	MONTHLY RENT FOR AUGUST 1989	$7,226.00	MISCELLANEOUS	$7,226.00

SERVICE ADDRESS IF OTHER THAN MAILING:
NW ST. HELENS RD PLANT PROPERTY

PAYMENT DUE DATE 8-10-89

KOPPERS CO NW TERMINAL
ATTN: JOHN OXFORD, TERMINAL MGR.
7540 NW ST. HELENS RD
PORTLAND, OREGON 97229

JUL 12 1989

PLEASE ENCLOSE THIS STUB
IF YOU REMIT BY MAIL
NORTHWEST NATURAL GAS CO.
220 N.W. Second Avenue
Portland, Oregon 97209

Form 60

Koppers000044

NOTE - Tear Tape To Size Of Invoice

Accounts Payable Invoice Sticker

KOPPERS

Transmittal Number _____ Plant Audit No. 6 ~~7~~ 16

For Plant or Purchasing Dept. Use

Purchase Order No. _____ Requisition Number _____

Terms _____

F.O.B. _____ ☐ Prepaid ☐ Collect

Prices Verified By KM Calculations Verified By KM

Date Inv. Rec'd. 6/2 Date Mat'l. Received _____

Receiving Report No. _____ Date Inv. F'W'D To Pittsburgh 6/5

Used For _____

Commitment Change Approval

Increase $ _____

Decrease $ _____

Commitment Change Approved By _____

Vendor Number 00996200 05 Invoice Number 110-10025179 Invoice Date 6/1/89 Terms Code _____ Due Date / /

Account Distribution

General Ledger	Detail	Sub Detail	Location or Contract	Dept. or Orig. Loc.	Tax* Codes	Emp. No.	Purchase Order No. or Rec ID	Br.	P.O. No.	P.O. Add.	P.O. Add. or Resource	Quantity			* Unit Code	Amount Distributed		
305	515	x	9270	910	0362												47	—

O.K. to Pay

For Treasury & Accounting Section Use Only

Invoice Audited By _____ Check Audited By _____

Audit Number			
Division	Send Loc.	Month	Serial No.
483			

Invoice Amt. (Gross)		
Cash Discount		
Net Amount Payable	46	68

Koppers000045

Accounts Payable Invoice Sticker

KOPPERS INDUSTRIES

▲6" ▲7" ▲8"

NOTE - Tear Tape To Size Of Invoice

Purchase Order No. _____ Requisition Number _____

Terms _____

F.O.B. _____ ☐ Prepaid ☐ Collect

Prices Verified By KM Calculations Verified By KM

Vendor Number 60996201 2

For Plant or Purchasing Dept. Use

Transmittal Number _____ Plant Audit No. 629

Date Inv. Rec'd 6/13 Date Mat'l. Received _____

Receiving Report No. _____ Date Inv. F'W'D. To Pittsburgh 6/14

Used For _____

Commitment Change Approval

Increase $ _____

Decrease $ _____

Commitment Change Approved By _____

Invoice Number 6-12-89

Invoice Date 6/12/89

Terms Code _____

Due Date / /

Account Distribution

General Ledger	Detail	Sub Detail	Location or Contract	Dept. or Orig. Loc.	Tax* Codes	Emp. No.	Purchase Order No. or Rec ID	Br.	P.O. No.	P.O. Add.	P.O. Add. or Resource	Quantity	* Unit Code	Amount Distributed
305	974		1670	910	2360									2890 —
305	974		9220	910	2360									4336 —

O.K. to Pay _____

For Treasury & Accounting Section Use Only

Invoice Audited By _____ Check Audited By _____

Division 483 | Send. Loc. | Audit Number: Month | Serial No.

Invoice Amt. (Gross)	
Cash Discount	—
Net Amount Payable	7226 —

*See Reverse Side For Instructions

Koppers000046

Northwest Natural Gas Company
220 N.W. Second Avenue
Portland, Oregon 97209

ACCOUNT NO. RENT-KOPPERS

DATE OF BILL 6-12-89	DESCRIPTION	TOTAL AMOUNT DUE
APPLIANCE		
MISCELLANEOUS	JULY 1989 RENT	$7,226.00

SERVICE ADDRESS IF OTHER THAN MAILING:

NW ST. HELENS RD PLANT PROPERTY
KOPPERS CO. INC.
NW TERMINAL
7540 NW ST HELENS RD
PORTLAND OR 97229
ATTN: JOHN OXFORD

JUN 13 1989

Form 60

ACCOUNT NO. RENT-KOPPERS

DATE OF BILL 6-12-89	TOTAL AMOUNT DUE
APPLIANCE	
MISCELLANEOUS	$7,226.00

PAYMENT DUE DATE 7-10-89

PLEASE ENCLOSE THIS STUB IF YOU REMIT BY MAIL
NORTHWEST NATURAL GAS CO.
220 N.W. Second Avenue
Portland, Oregon 97209

Koppers000047

NORTHWEST NATURAL GAS
YOUR LOCAL GAS COMPANY OFFICE

220 N.W. SECOND AVE
PORTLAND, OR 97209
PHONE NOS. ON REVERSE

FOR SERVICE TO:
KOPPERS CO INC
7540 NW ST HELENS RD
PORTLAND OR 97229

ACCOUNT NUMBER
110-1002579-001

PAGE 1 C/D

FROM / TO	METER READING PRESENT	METER READING PREVIOUS	VOLUME FACTOR	CALCULATED CCF	BTU FACTOR	THERMS	RATE CODE	AMOUNT
04-28 05-30	2213	2179	2.3714	81	1.032	84 03		45.69

CITY TAX	0.91
MULTNOMAH COUNTY TAX	0.08

VOLUME FACTOR COMPONENTS

SEQ NO	METER NO	INDEX MULTIPLIER	PRESSURE FACTOR	TEMPERATURE FACTOR
001	200561	1	2.3622	1.0039

RATE INFORMATION SCH 03
$3.50 SERVICE CHARGE
50.229 CENTS PER THERM

JUN 2 1989

***TOTAL AMOUNT DUE ON OR BEFORE 06-16-89

BILLING DATE 06-01-89

TOTAL AMOUNT DUE

PREVIOUS AMOUNT DUE	PAYMENT CREDITS	ACCOUNT ADJUSTMENTS	CURRENT BILLING	TOTAL AMOUNT DUE
95.95	95.95		46.68	46.68

RETAIN THIS PORTION FOR YOUR RECORDS

SEE REVERSE SIDE FOR IMPORTANT INFORMATION

ACCOUNT NUMBER	MO YR	CURRENT	PREVIOUS BALANCE	AMOUNT DUE	DUE DATE
110-1002579-001	05-89	46.68		46.68	06-16-89

PLEASE RETURN THIS STUB IF PAYING BY MAIL - BRING ENTIRE BILL IF PAYING IN PERSON

$ _____

KOPPERS CO INC
7540 NW ST HELENS RD
PORTLAND OR 97229

NORTHWEST NATURAL GAS
P.O. BOX 4100-72
PORTLAND, OR 97208

PLEASE BE SURE ADDRESS ABOVE SHOWS THROUGH RETURN ENVELOPE WINDOW.

Accounts Payable Invoice Sticker

KOPPERS

NOTE - Tear Tape To Size Of Invoice

Transmittal Number _____ Plant Audit No. 5-~~30~~ 32

For Plant or Purchasing Dept. Use

Purchase Order No. _____ Requisition Number _____

Terms _____

F.O.B. _____ ☐ Prepaid ☐ Collect

Prices Verified By KM Calculations Verified By KM

Date Inv. Rec'd. 5/17 Date Mat'l. Received _____

Receiving Report No. _____ Date Inv. F'W'D. To Pittsburgh 5/18

Used For _____

Commitment Change Approval

Increase $ _____

Decrease $ _____

Commitment Change Approved By _____

Vendor Number 0099620/3 Invoice Number 5-16-89 Invoice Date 5/16/89 Terms Code _____ Due Date / /

Account Distribution

General Ledger	Detail	Sub Detail	Location or Contract	Dept. or Orig. Loc.	Tax* Codes	Emp. No.	Purchase Order No. or Rec ID	Br.	P.O. No.	P.O. Add.	P.O. Add. or Resource	Quantity	* Unit Code	Amount Distributed
305	974		1670	910	2362									2890 —
305	974		9270	910	2362									4336 —

O.K. to Pay

For Treasury & Accounting Section Use Only

Invoice Audited By _____ Check Audited By _____

*See Reverse Side For Instructions

Division	Send Loc.	Month	Serial No.
483			

Audit Number

Invoice Amt. (Gross)	
Cash Discount	
Net Amount Payable	7226 —

Koppers000049

Northwest Natural Gas Company
220 N.W. Second Avenue
Portland, Oregon 97209

ACCOUNT NO. RENT-KOPPERS

DATE OF BILL 5-16-89	DESCRIPTION	TOTAL AMOUNT DUE
APPLIANCE		
MISCELLANEOUS	JUN 1989 RENT	$7,226.00

SERVICE ADDRESS IF OTHER THAN MAILING:

NW ST. HELENS RD PLANT PROPERTY
•KOPPERS CO. INC.
NW TERMINAL, ATTN:JOHN OXFORD
7540 NW ST. HELENS RD
PORTLAND OR 97229

MAY 17 1989

Form 60

ACCOUNT NO. RENT-KOPPERS

DATE OF BILL 5-16-89	TOTAL AMOUNT DUE
APPLIANCE	
MISCELLANEOUS	$7,226.00

PAYMENT DUE DATE 6-10-89

PLEASE ENCLOSE THIS STUB IF YOU REMIT BY MAIL
NORTHWEST NATURAL GAS CO.
220 N.W. Second Avenue
Portland, Oregon 97209

Koppers000050

Accounts Payable Invoice Sticker

KOPPERS

Transmittal Number _____ Plant Audit No. 3-33

For Plant or Purchasing Dept. Use

Purchase Order No. _____ Requisition Number _____

Terms _____

F.O.B. _____ ☐ Prepaid ☐ Collect

Prices Verified By KM Calculations Verified By KM

Date Inv. Rec'd. 3/15 Date Mat'l. Received _____

Receiving Report No. _____ Date Inv. F'W'D. To Pittsburgh 3/16

Used For _____

Commitment Change Approval

Increase $ _____

Decrease $ _____

Commitment Change Approved By _____

Vendor Number	Invoice Number	Invoice Date	Terms Code	Due Date
0099620/13	3-14-89	3/14/89		/ /

Account Distribution

General Ledger	Detail	Sub Detail	Location or Contract	Dept. or Orig. Loc.	Tax* Codes	Emp. No.	Purchase Order No. or Rec ID	Br.	P.O. No.	P.O. Add.	P.O. Add. or Resource	Quantity	* Unit Code	Amount Distributed
305	974	x	9270	910	236V									4336 —
305	974	x	1670	910	236V									2890 —

O.K. to Pay

For Treasury & Accounting Section Use Only

Invoice Audited By _____ Check Audited By _____

Audit Number			
Division	Send Loc.	Month	Serial No.
483			

Invoice Amt. (Gross)	
Cash Discount	
Net Amount Payable	7226 —

Koppers000051

Northwest Natural Gas Company
220 N.W. Second Avenue
Portland, Oregon 97209

ACCOUNT NO. RENTAL-KOPPERS

DATE OF BILL 3-14-89	DESCRIPTION	TOTAL AMOUNT DUE
APPLIANCE		
MISCELLANEOUS	APRIL 1989 RENT	$7,226.00

SERVICE ADDRESS IF OTHER THAN MAILING:

NW ST. HELENS RD PLANT PROPERTY
KOPPERS CO. INC.
NW TERMINAL, ATTN: JOHN OXFORD
7540 NW ST. HELENS RD
PORTLAND OR 97229

ACCOUNT NO. RENTAL-KOPPERS

DATE OF BILL 3-14-89	TOTAL AMOUNT DUE
APPLIANCE	
MISCELLANEOUS	$7,226.00

PAYMENT DUE DATE 4-10-89

PLEASE ENCLOSE THIS STUB IF YOU REMIT BY MAIL
NORTHWEST NATURAL GAS CO.
220 N.W. Second Avenue
Portland, Oregon 97209

MAR 1 5 1989

Form 60

Koppers000052

Accounts Payable Invoice Sticker

KOPPERS

Transmittal Number

Plant Audit No. 433

For Plant or Purchasing Dept. Use

Purchase Order No.

Requisition Number

Terms

F.O.B.

☐ Prepaid
☐ Collect

Prices Verified By TM

Calculations Verified By TM

Date Inv. Rec'd. 4/13

Date Mat'l. Received

Receiving Report No.

Date Inv. F.W.D. To Pittsburgh 4/19

Used For

Commitment Change Approval

Increase $

Decrease $

Commitment Change Approved By

Vendor Number 0099620/13

Invoice Number 4-11-89

Invoice Date 4/11/89

Terms Code

Due Date / /

Account Distribution

General Ledger	Detail	Sub Detail	Location or Contract	Dept. or Orig. Loc.	Tax Codes	Emp. No.	Purchase Order No. or Rec ID	Br.	P.O. No.	P.O. Add.	P.O. Add. or Resource	Quantity	Unit Code	Amount Distributed
305	994	X	9270	910	2362									4336 —
305	994	X	1670	910	2362									2890 —

O.K. to Pay

For Treasury & Accounting Section Use Only

Invoice Audited By

Check Audited By

Audit Number			
Division	Send Loc.	Month	Serial No.
483			

Invoice Amt. (Gross) 7226 —

Cash Discount

Net Amount Payable

Koppers000053

Northwest Natural Gas Company
220 N.W. Second Avenue
Portland, Oregon 97209

ACCOUNT NO. RENT- KOPPERS

DATE OF BILL 4-11-89	DESCRIPTION	TOTAL AMOUNT DUE
APPLIANCE		
MISCELLANEOUS	MAY 1989 RENT	$7,226.00

SERVICE ADDRESS IF OTHER THAN MAILING:

NW ST. HELENS RD PLANT PROPERTY
• KOPPERS CO. INC
NW TERM, 7540 NW ST HELENS RD
PORTLAND OR 97229

ACCOUNT NO. RENT- KOPPERS

DATE OF BILL 4-11-89	TOTAL AMOUNT DUE
APPLIANCE	
MISCELLANEOUS	$7,226.00

PAYMENT DUE DATE 5-10-89

PLEASE ENCLOSE THIS STUB
IF YOU REMIT BY MAIL
NORTHWEST NATURAL GAS CO.
220 N.W. Second Avenue
Portland, Oregon 97209

APR 13 1989

Form 60

Koppers000054

▲ 6" ▲ 7" ▲ 8"

NOTE - Tear Tape To Size Of Invoice

Accounts Payable Invoice Sticker

KOPPERS

Transmittal Number _____ Plant Audit No. 2-~~15~~-21

For Plant or Purchasing Dept. Use

Purchase Order No. _____ Requisition Number _____

Terms _____

F.O.B. _____ ☐ Prepaid ☐ Collect

Prices Verified By K.M Calculations Verified By K.M

Date Inv. Rec'd. 2/16 Date Mat'l. Received _____

Receiving Report No. _____ Date Inv. F'W'D. To Pittsburgh 2/17

Used For _____

Commitment Change Approval

Increase $ _____

Decrease $ _____

Commitment Change Approved By _____

Vendor Number	Invoice Number	Invoice Date	Terms Code	Due Date
0099620/3	2-13-89	2/13/89		/ /

Account Distribution

General Ledger	Detail	Sub Detail	Location or Contract	Dept. or Orig. Loc.	Tax* Codes	Emp. No.	Purchase Order No. or Rec ID	Br.	P.O. No.	P.O. Add.	P.O. Add. or Resource	Quantity			* Unit Code	Amount Distributed	
305	974	x	9270	910	0362											4336	—
305	974	x	1670	910	0362											2890	—

O.K. to Pay

For Treasury & Accounting Section Use Only

Invoice Audited By _____ Check Audited By _____

Audit Number					
Division	Send Loc.	Month	Serial No.	Invoice Amt. (Gross)	
483				Cash Discount	
				Net Amount Payable	7226 —

Koppers000055

Northwest Natural Gas Company
220 N.W. Second Avenue
Portland, Oregon 97209

ACCOUNT NO. RENTAL-KOPPERS

ACCOUNT NO. RENTAL-KOPPERS

DATE OF BILL 2-13-89	DESCRIPTION	TOTAL AMOUNT DUE	DATE OF BILL 2-13-89	TOTAL AMOUNT DUE
APPLIANCE			APPLIANCE	
MISCELLANEOUS	MARCH 1989 RENT	$7,226.00	MISCELLANEOUS	$7,226.00

SERVICE ADDRESS IF OTHER THAN MAILING:

NW ST. HELENS RD PLANT PROPERTY

PAYMENT DUE DATE 3-10-89

• KOPPERS CO. INC.
NW TERMINAL ATTN: JOHN OXFORD
7540 NW ST. HELENS RD
PORTLAND OR 97229

FEB 1 6 1989

PLEASE ENCLOSE THIS STUB
IF YOU REMIT BY MAIL
NORTHWEST NATURAL GAS CO.
220 N.W. Second Avenue
Portland, Oregon 97209

Form 60

Northwest Natural Gas Company
220 N.W. Second Avenue
Portland, Oregon 97209

DATE OF BILL 1-12-89	DESCRIPTION	TOTAL AMOUNT DUE	ACCOUNT NO. RENT-KOPPERS / DATE OF BILL 1-12-89	TOTAL AMOUNT DUE
APPLIANCE			APPLIANCE	
MISCELLANEOUS	DELINQUENT AMOUNT DUE 1-10-88 FEBRUARY 1989 RENT	$7,226.00 7,226.00	MISCELLANEOUS	$14,452.00

SERVICE ADDRESS IF OTHER THAN MAILING:

NW ST. HELENS RD PLANT PROPERTY

• KOPPERS CO INC
NW TERMINAL
7540 NW ST HELENS RD
PORTLAND OR 97229
ATTN: JOHN OXFORD, TERMINAL MGR.

PAYMENT DUE DATE 2-10-89

PLEASE ENCLOSE THIS STUB IF YOU REMIT BY MAIL
NORTHWEST NATURAL GAS CO.
220 N.W. Second Avenue
Portland, Oregon 97209

JAN 1 7

Form 60

** DELINQUENT AMOUNT DUE WITHIN 10 DAYS **

MOORE BUSINESS FORMS, INC. TRANSFER TAPE E
PEEL TAPE SLOWLY - PRESS ADHESIVE FIRMLY AGAINST ANY SMOOTH DRY CLEAN SURFACE

▲ 6" ▲ 7" ▲ 8"

NOTE - Tear Tape To Size Of Invoice

Accounts Payable Invoice Sticker

KOPPERS

Transmittal Number ____ Plant Audit No. 1-20

For Plant or Purchasing Dept. Use

Purchase Order No. ____ Requisition Number ____
Terms ____
F.O.B. ____ ☐ Prepaid ☐ Collect
Prices Verified By KM Calculations Verified By KM

Date Inv. Rec'd. 1/11 Date Mat'l. Received ____
Receiving Report No. ____ Date Inv. F'W'D. To Pittsburgh 1/18
Used For ____

Commitment Change Approval
Increase $ ____
Decrease $ ____
Commitment Change Approved By ____

Vendor Number 60996203 Invoice Number 1-12-89 Invoice Date 1/12/89 Terms Code ____ Due Date ____

Account Distribution

General Ledger	Detail	Sub Detail	Location or Contract	Dept. or Orig. Loc.	Tax* Codes	Emp. No.	Purchase Order No. or Rec ID	Br.	P.O. No.	P.O. Add.	P.O. Add. or Resource	Quantity	* Unit Code	Amount Distributed
305	974	X	9270	910	1362									4336 —
305	974	X	1670	910	1362									2890 —

O.K. to Pay

For Treasury & Accounting Section Use Only

Invoice Audited By ____ Check Audited By ____

Audit Number				
Division	Send. Loc.	Month	Serial No.	
483				

Invoice Amt. (Gross) ____
Cash Discount ____
Net Amount Payable 7226 00

ADS-37G REV. 9 50M 6/85 *See Reverse Side For Instructions

Koppers000057

SWEENEY METZ FOX MCGRANN & S

11 Stanwix Street Pittsburgh, Pennsylvania 15222
Phone 412.918.1100 Fax 412.918.1199

CLAYTON A. SWEENEY
Direct Dial: 412.918.1101 Cellular: 412.491.8747
Email: csweeney@sweeneymetz.com

cc WWT
DED
KK
TK

file Beazer Notice

March 24, 1999

Copies to:
Jim Dietz - K-1650
Amos Kamerer - Portland
Tom Golubic - Follansbee
Jerry Morris - Woodward
Mike Mancione - Stickney
File - Beazer Permanent

SWEENEY METZ
ATTORNEYS AT LAW

Jill M. Blundon, Esq.
Vice President and General Counsel
Beazer East, Inc.
One Oxford Centre, Suite 3000
Pittsburgh, PA 15219-6401

Re: Section 7.09(c) of the Asset Purchase Agreement of December 28, 1988

Dear Ms. Blundon:

We draw your attention to Section 7.09 of the Asset Purchase Agreement, entitled "Transition Matters".

Now that ten (10) years have passed since the execution of the Asset Purchase Agreement, Koppers Industries, Inc. ("KII") hereby notifies Beazer ("BEI") that KII is terminating the provision of services as called for under Section 7.09(c) as of the date indicated below. More than enough time has passed for the transition to be completed.

BEI should conduct an exhaustive inventory of all activities which KII has been conducting for BEI pursuant to this section. Further, given that all such duties are done "at the request of" BEI, KII believes such a comprehensive review would be beneficial to both parties in order to avoid future misunderstandings.

KII intends to comply with all aspects of the Asset Purchase Agreement and to continue to comply with all monitoring and reporting activities for which it has a legal responsibility. However, effective May 1, 1999, KII will cease performing discretionary transition activities encompassed by Section 7.09(c). Pursuant to the "Access and Cooperation" provisions (Section 7.08) of the Asset Purchase Agreement, KII stands ready to assist BEI in the discharge of its obligations under the Asset Purchase Agreement. Furthermore, KII is willing to enter into discussions with you concerning whether or not the parties may wish to enter into negotiations for the provision of services to you in the future, and

the terms thereof. Steve Smith and Rob Markwell, for instance, have recently been working with Retec to define the roles of each company at each plant. Steve's letter to Mr. Markwell of March 2, 1999 summarizes these discussions in draft form and may form a useful beginning point to negotiate any future services which may be thought necessary for KII to provide to BEI.

Please call me if you have any questions.

Very truly yours,

Clayton A. Sweeney

cc: Randall D. Collins
Stephen C. Kifer, Esq.

SWEENEY METZ FOX MCGRANN & S

11 Stanwix Street Pittsburgh, Pennsylvania 15222
Phone 412.918.1100 Fax 412.918.1199

CLAYTON A. SWEENEY
Direct Dial: 412.918.1101 Cellular: 412.491.8747
Email: csweeney@sweeneymetz.com

cc: WWT
DEO
KF
TL

file Beazer Notice

March 24, 1999

SWEENEY METZ
ATTORNEYS AT LAW

Jill M. Blundon, Esq.
Vice President and General Counsel
Beazer East, Inc.
One Oxford Centre, Suite 3000
Pittsburgh, PA 15219-6401

Re: KII-BEI Relationship, Asset Purchase Agreement of December 28, 1998

Dear Ms. Blundon:

Koppers Industries, Inc. ("KII") has recently become aware of a series of matters relating to KII operating facilities as to which Beazer East, Inc. ("BEI") has made submittals or representations to relevant regulatory agencies, pursuant to BEI's obligations under Article VII of the Asset Purchase Agreement, without prior consultation with or prior notice to KII. In each of those instances, as related below, KII's interests may be affected detrimentally. KII believes that BEI's failure to afford prior consultation to KII on these matters is contrary to the clear terms, as well as the spirit, of the Asset Purchase Agreement.

To place this matter in perspective, I relate below several of these incidents:

1. Follansbee: BEI has, in several filings and, apparently, in meetings with EPA, stated that continuing releases from KII operations are contributing to contamination that BEI is obligated to address and interfering with BEI's ability to address its RCRA obligations at Follansbee. KII was not afforded the opportunity to review BEI's submittals prior to transmittal to EPA nor was KII given an opportunity to participate in BEI's discussions with EPA.

2. Woodward Tar: Without prior opportnity for KII to comment, BEI has submitted both an RFI Work Plan and a Focused Groundwater Investigation Report to EPA. Both documents suggest courses of action which may affect KII's operation of the facility and, based on

KII's subsequent review, may not contain adequate consideration of KII employee health and safety or KII's potential operations at the site.

3. Grenada: Again without consultation with KII, BEI has made an RFI submittal to EPA that makes unverified assumptions about KII's future operational use of the site, as well as detailed present-day operational assumptions which were not verified with KII. As with Woodward Tar, the FRI also makes assumptions in the health and safety considerations which do not consider adequately KII worker safety.

4. Superior: KII has recently received BEI submittals to the Wisconsin DNR which make assumptions about future site use, again without consultation from KII.

These specific instances, and perhaps others unknown to KII, have the potential to put KII at risk in the operation of its facilities and potentially to put KII at risk with regulators based on assertions or positions taken by BEI without KII's prior knowledge.

Section 7.06(b) of the Asset Purchase Agreement states that, if BEI agrees to assume at least 51% of a given environmental estimated responsibility, it "shall have the right to control, manage, and direct all discussions, proceedings and activities regarding the satisfaction and discharge of such responsibility, liability or obligation." In each of the instances cited above, or indeed in any other instance in which BEI is dealing with governmental authorities directly with respect to KII plants, KII assumes that BEI has acknowledged at least this 51% responsibility.

This right to control submittals and discussions with agencies is, however, subject to two important exceptions. First, Section 7.06(c) states that:

> If any action or omission of [BEI] pursuant to such clause (b) would cause a shut-down or substantial impairment of the Business, [KII] shall have the right to approve such action, which approval shall not be unreasonably withheld, or request [BEI] to remedy such omission, which request shall not be unreasonably denied.

This clause is applicable to situations such as occurred in the RFI at Grenada, which makes assumptions on future operations, worker safety and health, etc., which may fundamentally affect KII operations; and also the proposals at Woodward Tar. In each instance, KII has the right of approval and, without prior access to documentation, is being deprived of this right.

The second exception is found in Section 7.07 of the Asset Purchase Agreement. This Section states:

> Any party to this Agreement that could incur liability under this Article VII shall have the full right, at its own expense, to consult, through counsel or otherwise, with respect to all meetings and proceedings with adverse parties or governmental authorities and with respect to all activities pertaining to that matter. Prior to initiating, or participating in, any meeting or proceeding in which decisions or discussions adverse to one party may be made, the party attending the meeting or proceeding shall consult with the other.

Thus, unless BEI acknowledges that, with respect to a given submittal, meeting or proceeding, KII has no liability, KII insists on prior review, consultation, and participation with governmental authorities.

Based on these sections of the Asset Purchase Agreement, as well as the pattern set forth above of potential impacts to KII of BEI's sole contact with regulatory agencies regarding KII facilities, KII hereby demands that:

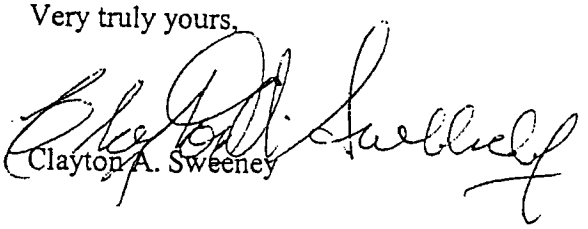
1. Under Section 7.06(c) of the Asset Purchase Agreement, KII be given access to all anticipated submittals to relevant regulatory agencies prior to such submission in order that KII may review and comment thereon.

2. Under Section 7.07 of the Asset Purchase Agreement, BEI give notice to KII of any meeting with regulatory agencies relating to any KII facility for which BEI will or may assert any claim against KII for cost sharing, and, if KII so elects, the opportunity to be present at and participate in such meetings.

Further, KII hereby puts BEI on notice that if KII is not afforded the opportunities set forth in the above paragraphs, such failure will be taken as an admission by BEI that it has no cost sharing claim against KII with respect to such facility or, in the alternative, a waiver of any such potential claim.

KII stands ready to meet with you at any time to discuss the matters set forth in this letter.

Very truly yours,



Clayton A. Sweeney

cc: Randall D. Collins
Stephen C. Kifer, Esq.

RECEIVED

APR 2 0 1999

KOPPERS INDS, INC.
PORTLAND OR

NORTHWEST NATURAL GAS COMPANY

220 N.W. SECOND AVENUE PORTLAND, OREGON 97209 - 3991

February 1, 1993

Mr. Lawrence F. Flaherty
Vice President and Manager
Tar Operations
Koppers Industries, Inc.
436 Seventh Avenue
Pittsburgh, PA 15219-1800

Dear Mr. Flaherty:

Pursuant to the receipt of your letter dated January 8, 1993, I thought it prudent to inform you that we do not believe the recent increase in your monthly rent is either unilateral or unjustified.

The recent five-year extension of your lease follows an agreement that had been in effect for a period of five (5) years. Such a long period without periodic short term adjustments to the monthly rental amount will naturally create a larger percentage of increase when the rate is finally adjusted, thus the 22.7% increase in rent.

In our letter which committed to a five-year extension of the lease, we informed you that an adjustment to the monthly rental amount would be implemented. Considering that the terms of the previous lease were expiring and that we had not received any correspondence from you concerning the expiration of the prior lease and its level of rent, we felt it prudent to act prior to the expiration of the current lease term. Additionally, your expanded use of our property also lends to an increase in rent.

Northwest Natural Gas Company has enjoyed a long and fruitful relationship with your company and we certainly intend to work with you in solidifying that in the future. However, in this particular instance, we do believe the increase in rent to be most justifiable.

Mr. Lawrence F. Flaherty
February 1, 1993
Page 2

Should I be of any further assistance, please feel free to call.

Sincerely,

Ronald K. Opltz, Manager
Risk & Land Management

RKO:dg

KOPPERS INDUSTRIES

Koppers Industries, Inc.
436 Seventh Avenue
Pittsburgh, PA 15219-1800

Lawrence F. Flaherty
Vice President and Manager
Tar Operations

Telephone: (412) 227-2304
FAX: (412) 227-2022

TELEFAX

January 8, 1993

Ronald K. Opitz, Manager
Risk & Land Management
Northwest Natural Gas Company
220 N.W. Second Avenue
Portland, Oregon 97209-3991

Dear Mr. Opitz:

Received your letter of December 18, 1992 regarding the proposed increase in monthly rental rate for the plant property we lease from Northwest Natural. While a change in the lease rate was anticipated, we were surprised at a 22.7% increase.

The notification of lease extension we received last February indicated that the terms were to be renegotiated, your actions in this matter seem somewhat unilateral.

Given the commitment we have made to our facility in the way of capital improvements, we have little choice but to accept your rate increase. However, in light of the long-standing relationship between our companies, we feel that a negotiated agreement on the lease rate is proper.

Sincerely,

Lawrence F. Flaherty/rs

Lawrence F. Flaherty

LFF:rs

NORTHWEST NATURAL GAS COMPANY

220 N.W. SECOND AVENUE PORTLAND, OREGON 97209 - 3991

(503) 226-4211

December 18, 1992

Mr. Amos Kammerer
General Manager
Koppers Industries, Inc.
7540 N.W. St. Helens Road
Portland, Oregon 97210-3663

Dear Mr. Kammerer:

Effective January 1, 1993, Northwest Natural Gas agreed to extend your current lease for a five (5) year period. Additionally, it was noted in our letter of commitment that the monthly rental would be subject to renegotiation and would be based on either the reappraisal of the property site, or would be subject to the incorporation of a Consumer Price Index factor.

We have decided to implement a rental increase based on a Consumer Price Index provided to us by U.S. Bancorp. The standard, the Portland Metropolitan Statistical Area CPI, indicates the following inflation occurred during the terms of the existing lease.

Index, November 1992	142.0
Index, January 1988	115.7
	26.3
	/ 115.7
=	0.227

0.227 X 100 = 22.7 (Total Increase 1/88 through 11/92)

22.7 X $7,226 (Current Rent) = $1,640.30

$1,640.00 + $7,226.00 = New Monthly Rental Rate of:

$8,866.00 per month

RECEIVED

DEC 21 1992

KOPPERS INDS., INC.
PORTLAND, OR

The new rental rate of $8,866 per month will commence effective January 1, 1993. Should you have any questions please feel free to call me.

Sincerely,

Ronald K. Opitz, Manager
Risk & Land Management

RKO:jd

LEASEHOLD CONSENT

LESSOR: Northwest Natural Gas Company, an Oregon corporation

LESSEE: Koppers Company, Inc., a Delaware corporation

ASSIGNEE: Koppers Industries, Inc., a Pennsylvania corporation

MELLON: Mellon Bank, N.A., as agent for certain lenders

LEASE: That certain Lease Agreement dated August 17, 1965 as subsequently amended and extended, and as most recently amended on November 23, 1987, whereby Lessor leased to Lessee that certain real property (the Leased Premises) more particularly described on Exhibit A, for a term beginning January 1, 1966 and ending January 1, 1993.

1. Subject to the conditions set forth in Paragraph No. 2 hereof, Lessor hereby consents:

   (a) to the assignment of the Lease and all of Lessee's right, title and interest therein, to Assignee;

   (b) to the pledge and collateral assignment of the Lease and all Assignee's right, title and interest in the Lease and Assignee's personal property located on the Leased Premises, to Mellon; and

   (c) to the waiver and release unto Mellon, its successors and assigns, of all right, title and interest which Lessor may have in and to any personal property of Assignee on the Leased Premises.

2. Assignee hereby agrees:

   (a) To assume and be bound by all obligations and liabilities of the Lessee under the Lease from and after the effective date of the assignment; and

   (b) To indemnify and reimburse Lessor for all necessary costs of response (as that term is used in the Comprehensive Environmental Response, Compensation and

Liability Act, as amended) and damages to natural resources, that Lessor may be required to expend or pay as the result of any release of hazardous substances at the Leased Premises by Lessee prior to the effective date of the assignment, but only to the extent that Lessor is unable (after reasonable efforts) to recover the same from Lessee.

3. Lessor certifies that (i) the Lease is in full force and effect, and embodies the entire agreement between the parties thereto with respect to the Leased Premises and has not been amended except as stated above; (ii) all rent and other charges reserved in the Lease due and payable have been paid; and (iii) other than releases of hazardous substances at the Leased Premises by Lessee in possible violation of Sections 2 and 16 of the Lease, no other event or currently existing condition of default under the Lease exists as of the date hereof.

4. Nothing herein shall be deemed to release or waive any liability or responsibility incurred by Lessee under the Lease or resulting from Lessee's activities on the Leased Premises, prior to the effective date of the assignment of the Lease from Lessee to Assignee.

5. Lessor acknowledges and agrees that this document and Exhibit A attached hereto may and shall constitute a memorandum of lease and that this document may be recorded in the public land records of the county where the Leased Premises are located and indexed against the name of Lessor.

Dated this 25th day of January, 1989.

NORTHWEST NATURAL GAS COMPANY

By: [signature]
Title: SR VICE-PRES

KOPPERS INDUSTRIES, INC.

By: [signature]
Title: Vice President

STATE OF OREGON)
) ss.
County of Multnomah)

The foregoing instrument was acknowledged before me this 25th day of January, 1989, by [illegible] on behalf of Northwest Natural Gas Company.

Notary Public for Oregon
My commission expires: [illegible]

COMMONWEALTH OF PENNSYLVANIA)
) ss.
County of Allegheny)

The foregoing instrument was acknowledged before me this 25 day of January, 1989, by LAWRENCE F. FLAHERTY on behalf of Koppers Industries, Inc.

Larry P. White
Notary Public for: PENNSYLVANIA
My commission expires: MAY 9, 1989

NOTARIAL SEAL
LARRY P. WHITE, NOTARY PUBLIC
PITTSBURGH, ALLEGHENY COUNTY
MY COMMISSION EXPIRES MAY 9, 1989
Member, Pennsylvania Association of Notaries

EXHIBIT A

TAR PRODUCTS

Production Facility

Portland, Oregon Terminal

LEGAL DESCRIPTION

PARCEL I:

That portion of Sections 12 and 13, Township 1 North, Range 1 West of the Willamette Meridian lying within the W.W. Baker Donation Land Claim, in the City of Portland, County of Multnomah and State of Oregon, described as follows:

Beginning at the point of intersection of the centerline of the Spokane, Portland, and Seattle Railroad and the East line of the W.W. Baker Donation Land Claim; thence North 32°00' East, 162.55 feet to a fence corner at the true point of beginning; thence continuing North 32°00' East along a fence 456.40 feet to a fence corner; thence North 29°58'00" West 150.40 feet; thence North 33°37'00" West 147.88 feet; thence North 49°51'00" West 139.00 feet to a hub; thence South 56°29'00" West 265.15 feet to a nail; thence North 33°13'00" West 260.70 feet to a railroad spike at a point known as point "A"; thence South 56°29'00" West 111.55 feet to a railroad spike; thence South 31°12'30" East 102.90 feet; thence South 56°46'00" West 38.57 feet; thence South 33°14'00" East 36.00 feet; thence South 56°46'00" West 9.00 feet; thence South 33°14'00" East 106.58 feet to a hub; thence South 25°44'30" West 10.51 feet to a hub; thence South 56°24'30" West 54.40 feet; thence South 33°05'30" East 277.30 feet; thence North 56°51'00" East 34.30 feet; thence South 75°03'00" East 34.55 feet; thence South 47°41'30" East 190.00 feet to a nail; thence South 35°16'30" East 140.05 feet to the true point of beginning.

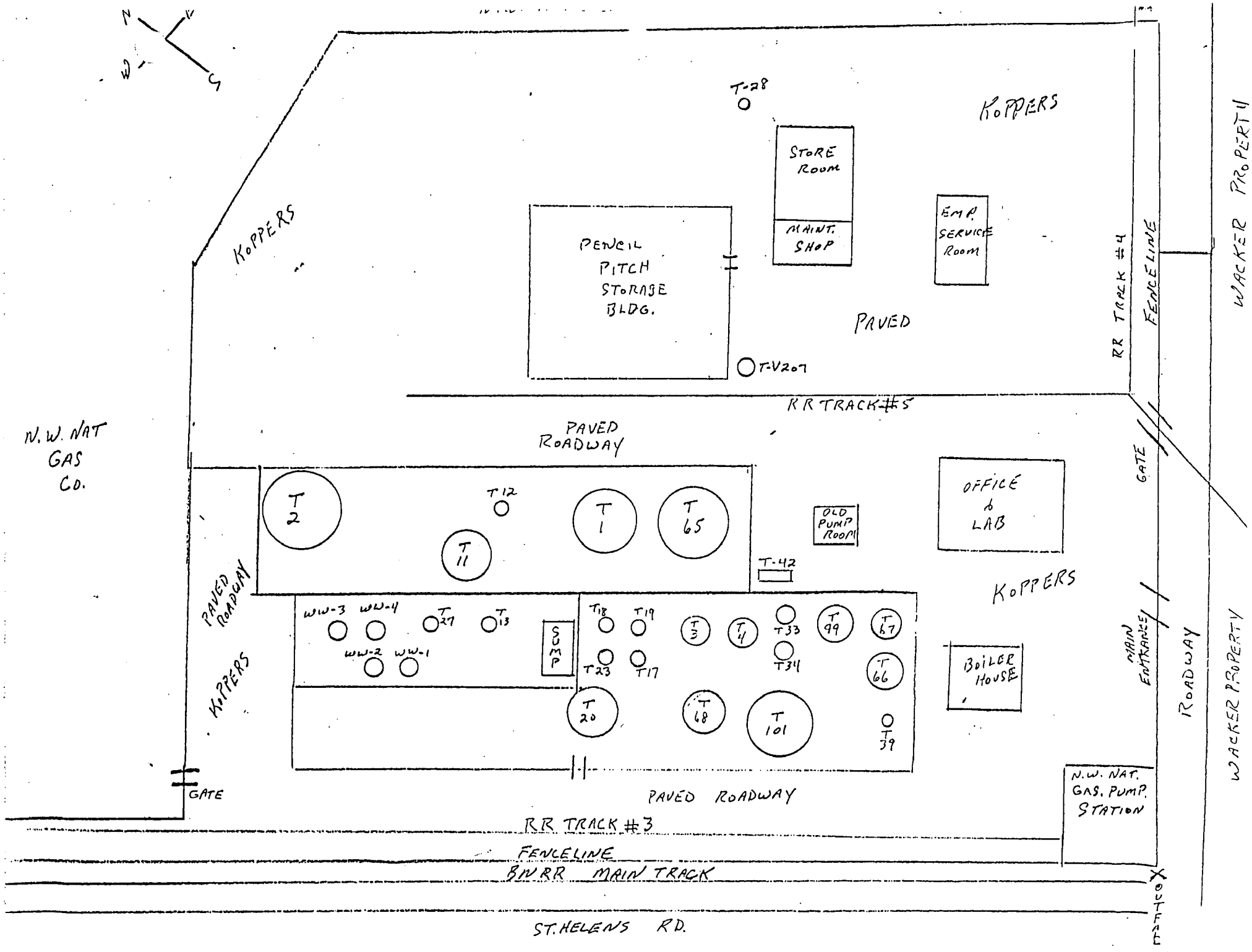
EXCEPT a 30 foot strip of land parallel and contiguous with the East line of the W.W. Baker DLC in Sections 12 and 13, Township 1 North, Range 1 West, said strip of land being 30 feet Westerly of the said DLC line and more particularly described as: Beginning at a point 162.55 feet North 32° East from the intersection of the centerline of the SP & S Railway with the East line of the said Baker DLC; thence North 32° East 456.4 feet; thence North 29°58' West 34 feet; thence South 32° West 459.8 feet; thence South 35°16'30" East 32.5 feet to the point of beginning. ALSO EXCEPT rights of the public to part in City street.

PARCEL II:

That portion of Section 12, Township 1 North, Range 1 West of the Willamette Meridian lying within the W.W. Baker Donation Land

Claim, in the City of Portland, County of Multnomah and State of Oregon, described as follows:

Beginning at a point 769.61 feet North and 365.57 feet West of a tack marking the point of intersection of the centerline of the SP&S Railway with the Southeasterly line of the W.W. Baker DLC in said Township and Range; thence South 56°46' West 70.52 feet; thence South 33°05'30" East 149 feet; thence North 56°24'30" East 54.4 feet; thence North 25°44'30" East 10.51 feet; thence North 33°14' West 106.58 feet; thence North 56°46' East 9 feet; thence North 33°14' West 36 feet to the point of beginning.



Koppers000075

KOPPERS INDUSTRIES

INTEROFFICE CORRESPONDENCE

To:	L. L. Flaherty	From:	A. s. Kamerer
Location:	K-1750	Location:	Portland
Subject:	Five-Year Lease Extension	Date:	February 27, 1991

The attached is self-explanatory and is the original copy, for your file. If you have any questions or comments, please advise.

Amos

A. S. Kamerer

ASK/km

CC: W. W. Turner

Fax 1/7/93 11:05 AM

NORTHWEST NATURAL GAS COMPANY

ONE PACIFIC SQUARE
220 N.W. SECOND AVENUE · PORTLAND, OREGON 97209

CARLA UTECH KELLEY
Assistant Counsel
(503) 220-2403

February 25, 1991

Mr. Amos S. Kamerer
Koppers Industries, Inc.
7540 N.W. St. Helens Road
Portland, Oregon 97210

Re: Five-Year Lease Extension

Dear Mr. Kamerer:

As we discussed at our meeting of February 11, 1991, at which time you described the plant modifications Koppers intends to make to its plant located on Northwest Natural Gas Company ("Company") property, the Company will commit to extending Koppers Industries lease for a five-year period, to commence at the expiration of the current lease on January 1, 1993.

This extension will be subject to the renegotiation of the monthly rental fee based on the reappraisal of the property site and the incorporation of a Consumer Price Index factor. All terms of the lease will be subject to renegotiation at the time of renewal.

The extension will also be subject to Koppers' agreement to amend the lease to assure Koppers' full cooperation with any environmental investigation by the Company and/or a state or federal agency which includes the property under lease.

The Company acknowledges and has no objection to the new procedures and modifications Koppers intends to make to its equipment as described at the meeting of February 11 and in the Material Safety Data Sheet presented to the Company at that meeting. We assume that you will obtain all necessary environmental permits to modify these facilities.

Very truly yours,

Carla U. Kelley

Carla U. Kelley

CUK:lt

KOPPERS INDUSTRIES

Koppers Industries, Inc.
7540 N.W. Saint Helens Road
Portland, OR 97210-3663

Amos S. Kamerer
Regional Sales Manager

Telephone: (503) 286-3681
FAX: (503) 285-2831

February 1, 1993

Mr. George Markwood
Pacific Northern Oil
100 West Harrison
Suite 200, North Tower
Seattle, Wa 98119

Subject: Pipeline lease

Dear George,

We have just completed a review of the Portland Metropolitan Statistical Area CPI and have found that the following inflation has occurred:

Index, December 1992	142.0
Index, December 1991	135.1
	6.9

6.9 - 135.1 = .05 x 100 = 5% increase

Accordingly, effective February 1, 1993 the new monthly rental rate for the pipeline will be $672.00. Should you have any questions please feel free to call me.

Sincerely

Amos S. Kamerer

NORTHWEST NATURAL GAS COMPANY

220 N.W. SECOND AVENUE PORTLAND, OREGON 97209 - 3991

(503) 226-4211

January 13, 1993

RECEIVED

JAN 15 1993

KOPPERS INDS., INC.
PORTLAND, OR

Mr. Amos Kamerer
General Manager
Koppers Industries, Inc.
7540 NW St. Helens Road
Portland, OR 97210-3663

Dear Amos:

In response to our recent conversation, I have obtained the Consumer Price Index readings that you requested.

12-31-88	115.9	
12-31-89	121.6	
12-31-90	129.8	
12-31-91	135.1	
Nov. 92	142.00	
Total Index		19.2

The numbers listed above represent only the indexes and must be converted to percentages by using the following:

Total Index / 115.9 X 100 = Percent

Should you have any questions, please feel free to give me a call at your convenience, Amos.

Best regards,

Ronald K. Opitz, Manager
Risk & Land Management

RKO:dg

KOPPERS INDUSTRIES

Koppers Industries, Inc.
7540 N.W. Saint Helens Road
Portland, OR 97210-3663

Amos S. Kamerer
Regional Sales Manager

Telephone: (503) 286-3681
FAX: (503) 285-2831

November 25, 1991

Mr. George Markwood
Manager, Marine Terminals & Operations
Pacific Northern Oil
100 West Harrison
Suite 200, North Tower
Seattle, Wash. 98119

Subject: Pipeline Lease

Dear George,

Thank you for the information in your letter of November 19, 1991. After a very through review of the volume involved and the resulting effects that would be required in our plant operations to provide you with the unloading service that we discussed, we have decided to revise our plans and will thus not be needing the use of track #4 as we originally thought.

I am sorry for the misunderstanding that existed on our part, as to the exact nature of our rental agreement. In retrospect, I'm sure that had we correctly understood the agreement, we would have come to our final conclusion on using tract #3 and could have avoided causing you and Northwest Natural Gas all of the concern and inconvenience that we did.

However, this whole process has brought to light the fact that the rent for the use of the pipeline and the related equipment has never been adjusted to reflect any increases in our costs of operations or the rent increases that we have incurred from Northwest Natural Gas, over this 11 year period of time.

Northwest Natural Gas Company tells me that they use the Portland Economic Indicator as their basis for rental adjustments. They advise that this has averaged just under 5% per year over this period of time. Consequently we have decided to increase our rental rate to you for the pipeline & related equipment. Using a 4% per year adjustment factor, the new rental rate will be $640.00 month, effective January 1, 1992.

(page #2 Pipeline Lease)

Again, I'm sorry for the misunderstanding. If you have any questions please feel free to contact me at any time.

Sincerely,

A. S. Kamerer

ASK/km

cc: R. K. Opitz, Northwest Natural Gas Co.
J. A. Oxford, Koppers Industries, Inc.

INTER-OFFICE MEMO

TO _____ DATE _____

		+5/year	4%	3%
400	80	400		400
420	81	416		412
441	82	433		424
463	83	450		437
486	84	468		450
510	85	487		464
536	86	506		478
563	87	526		492
591	88	547		507
621	89	569		522
652	90	592		538
685	91	616		554
719	92	641		571

Ron Opitz 11/25
NWNG uses Ind. Economic indicator
has averaged just under 590 per year

BY _____

GREIF BROS. CONTAINERS

PACIFIC NORTHERN OIL
100 West Harrison • Suite 200 North Tower • Seattle, WA 98119
Telephone 206 / 282-4421 • Telex 32-1034 Panoco Sea
Telecopier 206 / 282-6574 • TWX 910-444-4043 PNO SEA

November 19, 1991

Mr. Amos Kamerer
Koppers Industries
7530 N.W. St. Helens Rd.
Portland, OR 97210-3663

Dear Amos:

Pursuant to our meeting on November 15, 1991 with representatives of Northwest Natural Gas, Pacific Northern Oil is providing Koppers Industries with the information describing our operational and volume requirements for the off loading of rail cars at the Gasco facility in Portland.

Pacific Northern Oil receives rail cars from refiners and suppliers in the Midwest. The volume of product to be received each month will range from 20000-30000 bbls. or 40 to 60 cars. The product specifications can range from 200-2000 cst. and from a minus 2 api to a plus 15 api. On arrival the cars will require steam 75% of the time, and typically come in sets of 5 cars. Due to our operation we require 24 hour a day capability of off load rail cars, and our present pumping capacity is 500 bbls/hr.

As we discussed in our meeting, Pacific Northern Oil is willing to work with Koppers and NWNG to find an acceptable alternative, but due to the importance of the rail car products to both our volume and blending requirements any interruption of this stream of product is unacceptable and would have severe financial impact on our continued operation.

Pacific Northern Oil would like to suggest that Koppers research alternatives and present them in a meeting with NWNG and PNO as soon as possible. We have a long term relationship and I believe we will be able to work together to work out a solution to fulfill all of our requirements.

If you have any questions or require additional information please contact me. I will be more than happy to make a trip

to Portland to have a preliminary meeting with you prior to submitting your proposal to NWNG and Pacific Northern Oil.

Very truly yours,

George Markwood

George Markwood
Manager of Marine Terminals
and Operations

cc: Ronald K. Opitz

GM/bje

PACTERM

May 8, 2001

James Dietz
Koppers Industries, Inc.
436 Seventh Avenue
Pittsburgh, PA 15219-1800

Dear Mr. Dietz:

Thank you for the opportunity to meet with you and discuss the operation of your Portland Terminal. Pacific Terminals objective is to reduce terminal costs for Koppers during a declining pitch market while retaining the capability to respond quickly when the pitch market rebounds. I am pleased to present you with the following option for your consideration:

- Pacific Terminals proposes to market and operate the terminal as an independent terminal company while sharing the revenue potential with Koppers.
- By assuming the lease, operating expense, and maintenance of the Portland facility, Pacific Terminals can save Koppers $300-$400K annually. As the pitch business may be limited for 3-5 years, this equates to $1-2 million in cost savings to Koppers.
- When the pitch business rebounds Pacific Terminals will be able to manage the operation to meet your demands. Pacific Terminals can provide flexible operations suited to meet Koppers future throughput requirements.

We are indeed most interested in working with you. We sincerely believe that Pacific Terminal Services is uniquely qualified to successfully operate and market the terminal. Thank you for considering Pacific Terminal Services. We are looking forward to working with you on this important project. Until then, if there are any questions please give me a call.

Sincerely,

Troy M. Goodman, PE
General Manager

Pacific Terminal Services, Inc.

Proposal to Operate the Koppers Portland Terminal

Scope:

1. Koppers Industries (Koppers) assigns their Northwest Natural Gas Lease to Pacific Terminal Services (PTSI).
2. Koppers assigns all permits (boiler, air, operations, fire, NPDES, etc.) to PTSI.
3. Koppers leases the Leasehold Improvements to PTSI for $1/month for the term of the agreement. At the end of the lease the leasehold improvements become the property of PTSI. PTSI has the options to purchase the leasehold improvements at any time during the agreement for $_____ payable in cash at the time of closing. By exercising this option the agreement between Koppers and PTSI shall end.
4. Koppers will terminate their agreement with the union by closing their operation. PTSI will give consideration, consistent with its ordinary course of business and in accordance with applicable employment laws, to hire former Koppers employees.
5. Koppers must maintain ownership and responsibility for all products in the terminal including tank bottoms. Koppers agrees to clean the tanks, as requested, but such requests must not be unreasonable.
6. Koppers has the option with six months notice to lease Tank 65 for a minimum of 24 months of throughput. Such option will be at a rate of $35.00 per short ton basis August 1, 2001. This option shall be for a minimum of 15,000 short tons of annual throughput
7. Koppers has the option with 12 month notice to lease Tank 200 after August 1, 2005. Such options will be at a rate of $35.00 per short ton of throughput basis August 1, 2001. This option shall be for a minimum of 25,000 short tons of annual throughput.
8. Koppers will provide the warehouses empty by August 1, 2001 or provide a storage agreement for storage services at a rate of $0.35/sf basis August 1, 2001.
9. PTSI shall:

    a) Schedule, receive, store, inventory, melt and deliver pitch from and to trucks, rail cars, and/or vessels;
    b) Ensure that Products are properly transferred into and out of the storage tanks and ensure Product quality and quantity;
    c) Provide Koppers with a inventory report in form and manner satisfactory to Koppers, and;
    d) Normal operating hours are 0800 to 1600, Monday through Friday excluding holidays. Regular dock hours 24 hours per day, 7 days per week including holidays.

Koppers000086

Fee:

1. PTSI assumes the lease payment, insurance, and maintenance cost for the facility.
2. Koppers shall loan PTSI $250,000 for Terminal Conversion Cost for three years interest only payments at LIBOR plus 100 points. At the end of three years the note is due in full.
3. PTSI shall provide additional services as requested by Koppers for cost of labor and materials plus 15%.
4. Koppers shall receive 5% of the Gross Revenue over $100,000 per month on existing assets.

Term:

The initial term of the agreement is until 9/30/08. An option for additional term(s) will be consistent with Northwest Natural Gas property lease.

Escalation:

Effective August 1, 2002 and each subsequent August, all charges set forth in this agreement shall escalate annually on August 1 of each year by the greater of either the percentage increase in the Producers Price Index (PPI) for Portland, Oregon or 4%. The PPI for January of each subsequent year of this Agreement shall be divided by the same index number for January of the prior year. The resultant ratio shall be multiplied by the rates then in effect to calculate new rates effective August 1 of each subsequent year.

Insurance:

PTSI shall maintain insurance consistent with a first class terminal operation.

Koppers shall maintain cargo insurance on any product in the terminal.

Maintenance:

PTSI shall maintain the terminal assets in the existing condition reasonable wear and tear excepted.

Additional Equipment:

1. Koppers shall pay for any fixtures, equipment, improvements and/or modifications to the pitch system.
2. PTSI shall pay for any fixtures, equipment, improvements and/or modifications for other assets.

Tank Cleaning:

1. At termination, Koppers must remove any and all product and leave the tank and/or buildings in a squeegee and/or broom clean or other mutually agreed condition.
2. When Koppers calls for Tank 65 and/or Tank 200 they will be provided in a squeegee clean or other mutually agreed condition.

KOPPERS INDUSTRIES

FAX TRANSMITTAL

7540 N.W. Saint Helens Rd.
Portland, Oregon 97210-3663
Phone: (503) 286-3681
Fax: (503) 285-2831
Web Page: www.koppers.com

TO: J. Dietz, K. Fitzgerald, J. Konkle DATE: 3/16/01

FROM: Amos TOTAL # OF PAGES: 5

Jim, Troy stopped by this PM to drop off the attached. He said that he & Vince would be back in Portland next tuesday and would like to stop by, to see if I had any questions — we have a 10:30 AM appointment. Is $100,000 capital & elimination of an environmental problem justified for $56,040 annual revenue?

IF THIS TRANSMITTAL IS IN ERROR, PLEASE CALL 503-286-3681 FAX # 503-285-2831

Would Beazer East be liable for the $100,000?

PACIFIC TERMINAL SERVICES, INC.
910 SW Spokane Street, Seattle, Washington 98134
P.O. Box 24005, Seattle, Washington 98124-0005
Tele. (206) 628-0051 Fax (206) 628-0293

March 16, 2001

Amos Kamerer
Koppers Industries, Inc.
7540 NW St. Helens Road
Portland, OR 97210-3663

Dear Mr. Kamerer:

As we have discussed, Pacific Terminals would like to find revenue opportunities for Koppers' underutilized assets. Attached is a summary of the key features of a marketing agreement for your review.

In addition, our first priority is to put Tank 1 and Tank 11 into fuel service for Fuel and Marine Marketing. We recommend putting these tanks into service for a rate of $0.45 per barrel of storage capacity (Portland market rates). This creates $9,340 per month of revenue. Per our marketing agreement you would receive 50% or $4,670 per month. In addition, the project would result in the removal of the current tank heels and eliminate any long-term liability associated with them. Pacific Terminals has developed a plan to turn these tanks into revenue producing assets. Our plan to accomplish this is as follows:

1. Pacific Terminals estimates it will cost Koppers a total of $100,000 to clean the tanks and complete an API 653 inspection. Pacific Terminals has received an estimate from Emerald Services of $81,000 to clean the tanks.
2. Pacific Terminals estimates it will cost $126,000 to connect the two tanks to the current Fuel and Marine Marketing Portland System. This estimate includes PTSI management of the project.

The total estimated cost is $226,000 to create assets capable of many years of revenue generating service. The project has a short payback and removes the liability of the tank heels. This is a great example of the opportunities Pacific Terminals can bring to Koppers. Attached is a summary of the key features of a tank lease agreement for your review.

In order to proceed, Pacific Terminals needs to have a signed marketing agreement with Koppers. Then, Pacific Terminals would like to develop a capital construction estimate with a +/-10% accuracy. Finally, Pacific Terminals would like to develop a terminaling agreement for FAMM. I will call you next week to complete the marketing agreement. I look forward to working with you on this and additional opportunities.

Sincerely,

Troy M. Goodman, PE
General Manager

PACIFIC TERMINAL SERVICES, INC.
100 W. Harrison – North Tower #420 Seattle, WA 98119
(206) 282-4421

Date: 3/16/2001

Re: Koppers Marketing Summary

Scope:

Pacific Terminal Services will have the exclusive right to market mutually agreed upon, underutilized Kopper's assets.

Fee:

Pacific Terminals and Koppers will share equally in all revenue generated. Payment will be made consistent with the terms of each asset use agreement.

Term:

Initial term for five years beginning April 1, 2001. This term shall renew automatically thereafter for period of five years, unless canceled by either party on notice of 90 days prior to the expiration of the term.

Escalation: None

Insurance:

Koppers shall maintain insurance coverage customary for a first class terminal operator. Such insurance will include a waiver of subrogation in favor of Pacific Terminals and shall be evidenced by a Certificate given to Pacific Terminals.

Operations:

Determined by assets leased.

Maintenance:

Tanks are maintained in useable condition by Koppers.

Capital:

Capital is paid by Koppers. Capital cost may be amortized over term of contract.

Tank Cleaning:

Tanks will be returned in same condition as the beginning of the lease.

PACIFIC TERMINAL SERVICES, INC.
100 W. Harrison – North Tower #420 Seattle, WA 98119
(206) 282-4421

Date: 3/16/2001

Re: Kopper Tank Lease Summary

Scope:

FAMM will lease two tanks (1 and 11) from Kopper's. The tanks are located at the Koppers Terminal located at 7900 NW St. Helens Road. Tanks may be used for storage of No.6 Fuel Oil, Marine Diesel, Cutter, and Recycled Fuel Oil.

Tank	Size in gallons	Size in barrels	Monthly Rate
Tank 1	650,000 gallons	15,400 bbls	$6,930.00
Tank 11	225,000 gallons	5357 bbls	$2,410.65
Total	875,000 gallons	20,757 bbls	$9,340.65

Fee:

Lease rate is $0.45/bbl throughput ex-terminal each month.
Minimum throughput is one times the shell capacity.
Minimum throughput shall be paid at the beginning of each month.

Heat charged at $45 per hour of boiler operation. No heat is anticipated for these tanks.

Koppers will invoice FAMM, and FAMM shall pay Koppers in accordance with the instructions on the invoice.

Koppers will pay Pacific Terminal Services 50% of the amount invoiced to FAMM as fee for services.

Term:

Initial term beginning May 1, 2001 until October 31, 2004. This term shall renew automatically thereafter for period of five years, unless canceled by either party on notice of 90 days prior to the expiration of the term.

SAME AS NWN lease

Escalation:

Effective May 1, 2002 and each subsequent May, all charges set forth in this agreement shall escalate annually on May 1 of each year by the greater of either the percentage increase in the Producers Price Index (PPI) as calculated by the U.S. Department of Commerce or 4%. The PPI for January of each subsequent year of this Agreement shall be divided by the same index number for January of the prior year. The resultant ratio

shall be multiplied by the rates then in effect to calculate new rates effective May 1 of each subsequent year.

Insurance:

FAMM shall maintain insurance for products at their own expense.
FAMM shall maintain commercial general liability insurance coverage with a limit not less that $1,000,000 (One Million Dollars) per occurrence

Koppers shall maintain insurance coverage customary for a first class terminal operator. Such insurance will include a waiver of subrogation in favor of FAMM and shall be evidenced by a Certificate given to FAMM.

Operations:

Pacific Terminal Services employees will operate the tanks, pumps, and valves (collectively called the tank system. Steam and/or hot oil use will be coordinated with Koppers boiler operations.

Maintenance:

Tanks are maintained in useable condition by Koppers.

Capital:

Capital to set up tanks is paid by Koppers and/or FAMM. Capital cost may be amortized over term of contract.

Tank Cleaning:

Tanks will be leased in a clean condition and must be returned in same condition.

PACTERM

PACIFIC TERMINAL SERVICES, INC.
910 SW Spokane Street, Seattle, Washington 98134
P.O. Box 24005, Seattle, Washington 98124-0005
Tele. (206) 628-0051 Fax (206) 628-0293

November 14, 2000

Amos Kamerer
Koppers Industries, Inc.
7540 NW St. Helens Road
Portland, OR 97210-3663

Dear Mr. Kamerer:

As you know, Koppers and Pacific Terminal Services operate separate facilities co-located on Northwest Natural Gas property. There is an opportunity to merge our operations and reduce the overall operating cost of our two facilities. Pacific Terminals is willing to assume operations and maintenance for Koppers Portland Terminal for less than your current cost of operations with a contract structure that provides an incentive for Pacific Terminals to improve productivity, maintain safety, and protect the environment.

Pacific Terminal Services is an independent terminal operator with expertise in bulk logistics and plant operations. Currently, we provide dock services for Koppers. During our first year of operations for Koppers there have been no service problems.

Our Portland operations are both similar: we both have heated liquid operations with marine receipts, truck loading, and rail loading. Pacific Terminals can provide trained operators and an experienced management staff. In addition to reduced operating cost, Koppers will realize increased flexibility, reduced liability, and a partner willing to help you grow your business. Pacific Terminals can also aggressively market any undervalued assets in the third party terminal business. This revenue generation can have a great impact on improving plant productivity and lowering your operating cost.

The enclosed proposal for the operations of the Koppers Portland Terminal outlines a mutually agreed fee approach; however, Pacific Terminals is willing to discuss other contract methods that may be acceptable to you. Please contact me at your convenience to discuss the proposal. Thank you for your consideration.

Sincerely,

Troy M. Goodman, PE
General Manager

KOPPERS INDUSTRIES

Koppers Industries, Inc.
436 Seventh Avenue
Pittsburgh, PA 15219-1800

Lawrence F. Flaherty
Vice President and Manager
Tar Operations

Telephone: (412) 227-2304
FAX: (412) 227-2022

March 25, 1994

Mr. Ronald K. Opitz, Manager
Risk & Land Management
Northwest Natural Gas Company
220 N. W. Second Avenue
Portland, Oregon 97209-3991

Dear Mr. Opitz:

I have been advised by our local manager, Amos Kamerer, that your letter of December 16, 1993 has not been answered by our company. It was my responsibility to respond to you and I apologize for being so tardy with this reply. I hope that this following will present our position with regard to the preparation of the site proposed as an unloading facility and will clarify the Koppers Industries, Inc. (KII) position on the issue of our role in the investigation and resulting remediation of the larger Gasco plant site.

1. If KII were to proceed with the unloading facility being considered, we would dismantle the existing unloading ramp located at the North end of the property and further, we would be responsible for any new releases, spills or discharges brought about during construction. We would not expect to be responsible for any prior pre-existing contamination uncovered in construction.

2. Regarding the Gasco site investigation and resulting remediation work, Koppers Industries has occupied its leased property only since its formation on December 29, 1988. Given our short tenure, with no history of environmental incident, we presume KII not to be a potentially responsible party to the contamination at the site. We will, however, fully cooperate with Northwest Natural Gas regarding this issue as appropriate.

3. The predecessor to KII at the Gasco Site was Koppers Company, Inc. (KCI). KCI managed operations at that site from approximately 1960 through 1988. KCI was acquired by Beazer, PLC in June, 1988 and in December, 1988, sold off the KCI assets now know as Koppers Industries. In the transaction agreement, KCI retained all the pre-closing environmental liabilities associated with the KII properties. Koppers Company, Inc. is now known as Beazer East, Inc.

We have had discussions with Beazer regarding the situation at the Northwest Natural Gas Company Site and they have expressed a willingness to discuss the issues with you. The Beazer contact is:

William F. Giarla, Esq.
Beazer East, Inc.
436 Seventh Avenue
Pittsburgh, PA 15219
Phone: (412) 227-2635

If you would like to discuss further, please write or call at (412) 227-2304. Perhaps on my next trip to Portland we could visit.

Sincerely,

Lawrence F. Flaherty

LFF:rs

RECEIVED
APR - 4 1994
KOPPERS INDS., INC.
PORTLAND, OR

NORTHWEST NATURAL GAS COMPANY

220 N.W. SECOND AVENUE PORTLAND, OREGON 97209 - 3991

December 30, 1993

Multnomah County Board of Equalization Office
2115 SE Morrison St. Room 101
Portland, OR 97214

RECEIVED
JAN 04 1994
KOPPERS INDS., INC.
PORTLAND, OR

re: Appeal for Change in Valuation
for 1993-94 Tax Year

Dear Board of Equalization:

Attached is the real property petition for the 1993-94 tax year on behalf of Northwest Natural Gas Company for its owned property at 7540 NW St. Helens Road, Portland and the tax lot account number R-96112-1110 at that address.

This petition is filed at the recommendation of the Oregon Department of Revenue appraiser who determined the assessable value was overstated on the tax roll after he performed an facility tour in November 1993. A copy of his findings are attached to the petition.

Although the county provided me with a Income and Expense Data Sheet to include with the appeal, it appears this information is unnecessary in this instance.

Please acknowledge receipt of this filing by date stamping and initialling the enclosed copy of this letter. A self addressed envelope is provided returning the acknowledgement copy.

Should you have further questions or comments, please contact me at 226-4211 extension 3421 during regular business hours.

Sincerely,

Deanna R Trail

Deanna R. Trail
Sr. Corporate Tax Analyst

DRT/kp
attachments
cc: David Moreland, Oregon Dept. of Revenue Property Tax Division
a:93corr:appeal

bcc w/ Attachments:
Ron Hordichok, Risk & Land Management
Mr. Amos Kamerer, Koppers Industries, 7540 NW St. Helens Road, Portland 97210
Ms. Cheryl Thomas, Tax Dept., Koppers Industries, 436 7th Ave., Pittsburgh, PA 15219-2159

VALUE CHANGE NOTICE

	Last Year	This Year
L MARKET VAL (RMV)		
/ LAND	542,800	542,800
IMPROVEMENTS	478,700	498,940
AL RMV	1,021,500	1,041,740
TAL TAXES	23,711.58	21,557.87

$ .02

Code Area: 001

Account Number: R-96112-1110

OREGON PROPERTY TAX YEAR
July 1, 1993 To June 30, 1994

MULTNOMAH COUNTY REAL Property Taxes

Property Description (Tax Lot Number)

PROPERTY ADDRESS
7540 NW ST HELENS RD
PORTLAND, OR

TAX ROLL DESC: LOT BLOCK
SECTION 12 1 N 1 W
LAND & IMPS
TL 111 6.85 ACRES

APPEAL RIGHTS AND PROPERTY TAX PAYMENT OPTIONS
(See Enclosure)

Pay	By	Discount Allowed		Net Amount
N FULL	Nov 15	646.74	3%	20,911.13
2/3	Nov 15	287.44	2%	14,084.48
1/3	Nov 15	NONE		7,185.96

NOVEMBER BILLING
RETURNED CHECK WILL INCUR A SERVICE CHARGE

Koppers

NORTHWEST NATURAL GAS CO
ONE PACIFIC SQ
ATTN TRAIL,DEANNA
220 NW 2ND AVE
PORTLAND OR 97209-3943

DELINQUENT TAXES

erest and fees included thru:
Nov 15, 1993

eal property accounts with unpaid balance for any tax r marked with an asterisk (*) e subject to foreclosure if paid on or before May 15. payments received on this unt MUST BE applied to inquent taxes first

Tax Year Amount

Total Delinquent Amount:

AL TAXES OWED ON THIS ACCOUNT
PAID BY November 15 20,911.13

PLEASE MAKE PAYMENT TO:
Tax Collector, Multnomah County
P.O. Box 2716
Portland, Oregon 97208-2716
PHONE: (503) 248-3326

EASE ETURN IS PART ITH YOUR AYMENT

OREGON PROPERTY TAX YEAR
July 1, 1993 To June 30, 1994
MULTNOMAH COUNTY REAL Property Taxes
PROPERTY ADDRESS
7540 NW ST HELENS RD
PORTLAND, OR

Property Tax Payment Options

Code Area 001

Account Number R-96112-1110

				Net Amount
PAY IN FULL	Nov 15	646.74	3%	20,911.13
2/3	Nov 15	287.44	2%	14,084.48
1/3	Nov 15	NONE		7,185.96

1961121110	0000718596	0001408448	0002091113	03

0/09/93

NORTHWEST NATURAL GAS CO
ONE PACIFIC SQ
ATTN TRAIL,DEANNA
220 NW 2ND AVE
3929 PORTLAND OR 97209-3943

PLEASE MAKE PAYMENT TO:
Tax Collector, Multnomah County

PLEASE INSERT THIS STUB IN THE RETURN WINDOW ENVELOPE WITH THE ADDRESS ON THE BACK SHOWING THRU THE WINDOW

Enter Amount Paid This Statement

ISD ELITE MAGR36 TP SEP 93

NORTHWEST NATURAL GAS

TANK FARM AT KOPPERS INDUSTRIES, INC.

TANK #	CAPACITY (bbl)		RCN	% GOOD	DRC
3	2357.14 *		60,000	0.2	12,000
4	2357.14		60,000	0.2	12,000
17	476.19		42,000	0.2	8,400
18	476.19		42,000	0.1	4,200
19	476.19		42,000	0.2	8,400
20	7547.62		92,000	0.2	18,400
23	476.19		42,000	0.2	8,400
33	1071.43		50,500	0.2	10,100
34	1071.43		50,500	0.2	10,100
39	476.19		42,000	0.2	8,400
65	18119.05		160,000	0.2	32,000
66	4257.71		76,000	0.1	7,600
67	2380.95		61,000	0.2	12,200
68	5833.33		85,000	0.2	17,000
99	4785.71		74,000	0.2	14,800
101	17857.14		142,300	0.1	14,230
102	238.11		20,000	0.2	4,000
			1,141,300		202,230
CONC. FIRE WALL	1200	65	78,000	0.30	23,400
FENCE	2400	15	36,000	0.30	10,800
			1,255,300		236,400

* Richardson Engineering Services
Vol 4, 100-370, 1993 ed.

MULTNOMAH COUNTY

Read All Instructions On Reverse Side Before Completing This Form

REAL PROPERTY PETITION FOR 1993-94 TAX YEAR

SECTION A - Property Description

Assessor's Account Number: (from Tax Statement)

R- 9 6 1 1 2 - 1 1 1 0

(One Account Number per form only)

Property Address under appeal

7540 NW St. Helens Road, Portland, OR

So that your hearings are all scheduled for the same date and time, please indicate the total number of tax accounts you are appealing: How Many? 1

I wish to be present at the hearing: ☐ YES ☒ NO

Dates I cannot attend: _____

TYPE OF PROPERTY

☐ House ☐ 5-20 Units

☐ Condominium ☐ Over 20 Units

☐ 2-4 Units ☐ Commercial

If any of above three property types are non-owner occupied, give monthly gross rent: ☒ Industrial

$_____ ☐ Vacant Land

☐ Other: _____

SECTION B - Notification Information - Person to whom hearing notification/decision should be sent:

Name	Daytime Telephone		
Deanna Trail, C/O Northwest NaTURAL Gas Co, 226-4211 Extension 3421			
Address	**City**	**State**	**Zip Code**
220 NW Second Ave..	Portland	OR	97209

SECTION C - Property Value

	Land	Building	Total
Real Market Value of Property from 1993-94 tax statement:	~~542,800~~	498,940	1,041,740
I am petitioning for the Real Market Value to be reduced to:	542,800	236,400	779,200 (262,540)

NOTE: It is not necessary to separate Land and Building values, but there must be a value requested for the Total

I am petitioning for reduced value for the following reasons: (attach supporting evidence or provide at hearing)

Oregon Dept. of Revenue appraiser reduced value after on site inspection. See attache

The following facts relate to the value of the property described above.

Purchase Price if within last year	Date of Purchase	Terms:
N/A	Early 1900's	☐ Cash ☐ Contract ☐ Trade ☐ Other

Has the property been offered for sale within the last year? ☐ YES ☒ NO	When?	How Long?	How offered?	Asking Price

Was the property appraised by someone other than the assessor? ☐ YES ☒ NO	Purpose and date of appraisal	Appraised by	Appraised value
See attachment on amended appraisal value by			Ore. Dept of Rev

SECTION D - Declaration

I, Deanna R. Trail (please print name clearly) ☒ Owner of the property, or ☐ Attorney for owner _____ (O.S.B. #), or ☐ Person in whose name property is assessed, or ☐ Other (Attach Authorization to Represent Form - SEE INSTRUCTIONS), declare under the penalties for false swearing contained in ORS 305.990(4), that the contents of the foregoing Petition and any evidence and testimony are true.

Deanna R Trail on behalf of Northwest Natural Gas Co., Portland, OR 97209

signature required — address 220 NW 2nd Ave. — city — state — zip

SECTION E - Refund Information

In the event your appeal results in a refund, please indicate to whom it should be made payable and where it should be sent:

Payable to Name: _____

Mail to Name: _____

Address _____

City _____ State _____ Zip _____

Daytime Telephone Number _____

DECISION:

Land: _____

Building: _____

TOTAL: _____

Initials: _____

Date: _____

PETITION NO.

Vendor Nan NW Natural - Rent

G/L	Detail	Subdetail	Location	Department	Tax	Emp No.	Move No./ PO No.	Amount	Inv No.	Date
305	974		9270	925	0362			$11,356	89050 172001	12/30/2005
									Vendor Number	
									389157007	
									Net 10 days	
				Gross Amount				$11,356.30	Terms	Due
				Discount					Code	
Authorization				Net				$11,356.30	755	1/10/2005
								Division	483	Audit No.
								483	1	92706010003

REMEMBER THIS RENT IS A DIFFERENT VENDOR # THAN THE GAS!!

PPF 9270 000 21

JAN 4 2006

KOPPERS
7540 SW ST HELENS RD
PORTLAND, OREGON 97210-3663

DATE OF INVOICE 12/30/2005
OUR INVOICE NO.
ACCOUNT # 89050 172001

TERMS: NET CASH

ACCOUNTS RECEIVABLE GENERAL

DATE	DESCRIPTION	AMOUNT
12/1/05	DECEMBER 2005 RENT	11,356.30
12/16/05	Payment Received - *Thank You*	(11,356.30)
1/3/06	JANUARY 2005 RENT	11,356.30
	Balance Due	$11,356.30

**** As per the lease agreement, rent is expected to be prepaid by the first of each month.**

Please Remit Payment To:

NW Natural
Attn: Payment Processing
PO Box 8905
Portland, OR 97255-0001

Vendor Nan NW Natural - Rent

G/L	Detail	Subdetail	Location	Department	Tax	Emp No.	Move No./ PO No.	Amount	Inv No.	Date
305	974		9270	925	0362			$11,356	89050 172001	1/30/2006
									Vendor Number	
									389157007	
									Net 10 days	
Authorization				Gross Amount				$11,356.30	Terms	Due
				Discount					Code	
				Net				$11,356.30	755	2/10/2006
								Division	483	Audit No.
								483	1	92706020004

REMEMBER THIS RENT IS A DIFFERENT VENDOR # THAN THE GAS!!

PPI 92700003 3

FEB 1 2006

KOPPERS
7540 SW ST HELENS RD
PORTLAND, OREGON 97210-3663

DATE OF INVOICE 1/30/2006
OUR INVOICE NO.
ACCOUNT # 89050 172001

TERMS: NET CASH

ACCOUNTS RECEIVABLE GENERAL

DATE	DESCRIPTION	AMOUNT
12/31/05	JANUARY 2006 RENT	11,356.30
1/18/06	Payment Received - *Thank You*	(11,356.30)
1/30/06	FEBRUARY 2006 RENT	11,356.30
	Balance Due	$11,356.30

**** As per the lease agreement, rent is expected to be prepaid by the first of each month.**

Please Remit Payment To:

NW Natural
Attn: Payment Processing
PO Box 8905
Portland, OR 97255-0001

Vendor Nan NW Natural - Rent

G/L	Detail	Subdetail	Location	Department	Tax	Emp No.	Move No./ PO No.	Amount	Inv No.	Date
305	974		9270	925	0362			$11,356	89050 172001	2/15/2006
									Vendor Number	
									389157007	
									Net 10 days	
				Gross Amount				$11,356.30	Terms	Due
				Discount					Code	
Authorization				Net				$11,356.30	755	2/23/2006
								Division	483	Audit No.
								483	2	92706020020

REMEMBER THIS RENT IS A DIFFERENT VENDOR # THAN THE GAS!!

PPI 9270000 50

FEB 20 2006

Correction to Invoice Dated
1/30/06

KOPPERS
7540 SW ST HELENS RD
PORTLAND, OREGON 97210-3663

DATE OF INVOICE 2/15/2006
OUR INVOICE NO.
ACCOUNT # 89050 172001

TERMS: NET CASH

ACCOUNTS RECEIVABLE GENERAL

DATE	DESCRIPTION	AMOUNT
12/31/05	FEBRUARY 2006 RENT	11,356.30
1/18/06	Payment Received - *Thank You*	(11,356.30)
1/30/06	MARCH 2006 RENT	11,356.30
	Balance Due	$11,356.30

** **As per the lease agreement, rent is expected to be prepaid by the first of each month.**

Please Remit Payment To:

NW Natural
Attn: Payment Processing
PO Box 8905
Portland, OR 97255-0001

Vendor Nan NW Natural - Rent

G/L	Detail	Subdetail	Location	Department	Tax	Emp No.	Move No./ PO No.	Amount	Inv No.	Date
305	974		9270	925	0362			$11,356	89050 172001	3/1/2006
									Vendor Number	
									389157007	
									Net 10 days	
Authorization				Gross Amount				$11,356.30	Terms	Due
				Discount					Code	
				Net				$11,356.30	755	3/14/2006
								Division	483	Audit No.
								483	3	92706030005

REMEMBER THIS RENT IS A DIFFERENT VENDOR # THAN THE GAS!!

MAR 3 2006

KOPPERS
7540 SW ST HELENS RD
PORTLAND, OREGON 97210-3663

DATE OF INVOICE 3/1/2006
OUR INVOICE NO.
ACCOUNT # 89050 172001

TERMS: NET CASH

ACCOUNTS RECEIVABLE GENERAL

DATE	DESCRIPTION	AMOUNT
1/30/06	MARCH 2006 RENT	11,356.30
2/15/06	Payment Received - *Thank You*	(11,356.30)
2/28/06	APRIL 2006 RENT	11,356.30
	Balance Due	$11,356.30

** **As per the lease agreement, rent is expected to be prepaid by the first of each month.**

Please Remit Payment To:

NW Natural
Attn: Payment Processing
PO Box 8905
Portland, OR 97255-0001

APR 7 - 2006

KOPPERS
7540 SW ST HELENS RD
PORTLAND, OREGON 97210-3663

DATE OF INVOICE 4/3/2006
OUR INVOICE NO.
ACCOUNT # 89050 172001

TERMS: NET CASH

ACCOUNTS RECEIVABLE GENERAL

DATE	DESCRIPTION	AMOUNT
2/28/06	APRIL 2006 RENT	11,356.30
3/20/06	Payment Received - *Thank You*	(11,356.30)
4/1/06	MAY 2006 RENT	11,356.30

#PPI 927000008

Balance Due $11,356.30

** **As per the lease agreement, rent is expected to be prepaid by the first of each month.**

Please Remit Payment To:

NW Natural
Attn: Payment Processing
PO Box 8905
Portland, OR 97255-0001

PURCHASE INVOICE

Purchase Invoice Number: 89050 172001

Purchase Invoice Date: 04/03/06

Page: 1

Pay
To: NW NATURAL
NW NATURAL
PO BOX 8905
PORTLAND, OR 97255-0001

Ship
To: PORTLAND TERMINAL
7540 NW Saint Helens Road
Portland, OR 97210

Ship Via		Confirm To	
Receive By	04/12/06	Buyer	
Terms	Net 10 Days	P.O. Number	
Vendor ID	389157007	P.O. Date	04/12/06

Item No.	Description	Unit	Quantity	Unit Price	Total Price
	RENT	Each	1	11,356.30	11,356.30

Subtotal:	11,356.30
Invoice Discount:	0.00
Tax:	0.00
Total:	11,356.30

Post-it® Fax Note 7671	Date 4-19-06	# of pages ▶ 1
To Amos	From Linda	
Co./Dept. Koppers	Co. NW Natural	
Phone #	Phone # 503-226-4211	
Fax # 503-285-2831	Fax # x 5844	

NW Natural®
220 NW 2ND AVENUE
PORTLAND, OR 97209
TEL 503.226.4211
800.422.4012
www.nwnatural.com

KOPPERS
7540 SW ST HELENS RD
PORTLAND, OREGON 97210-3663

DATE OF INVOICE 4/19/2006
OUR INVOICE NO.
ACCOUNT # 89050 172001

TERMS: NET CASH

ACCOUNTS RECEIVABLE GENERAL

DATE	DESCRIPTION	AMOUNT
12/16/05	*Payment -Ck 564366*	*(11,356.30)*
12/31/05	JAN 2006 RENT	11,356.30
1/18/06	*Payment - Ck 566297*	*(11,356.30)*
1/31/06	FEB 2006 RENT	11,356.30
2/16/06	*Payment - Ck 568825*	*(11,356.30)*
2/28/06	MAR 2006 RENT	11,356.30
3/7/06	*Payment - Ck 569901*	*(11,356.30)*
3/31/06	APRIL 2006 RENT	11,356.30
3/20/06	*Payment -Ck 570795*	*(11,356.30)*
4/30/06	MAY 2006 RENT	11,356.30
4/18/06	Payment - Ck 10313 - pays June 2006	(11,356.30)
		(11,356.30)

**** As per the lease agreement, rent is expected to be prepaid by the first of each month.**

Please Remit Payment To:

NW Natural
Attn: Payment Processing
PO Box 8905
Portland, OR 97255-0001

PURCHASE INVOICE

7

Purchase Invoice Number: 172001-07

Purchase Invoice Date: 07/05/06

Page: 1

Pay
To: NW NATURAL
NW NATURAL
PO BOX 8905
PORTLAND, OR 97255-0001

Ship
To: PORTLAND TERMINAL
7540 NW Saint Helens Road
Portland, OR 97210

Ship Via		Confirm To	
Receive By	07/14/06	Buyer	
Terms	Net 10 Days	P.O. Number	
Vendor ID	389157007	P.O. Date	07/14/06

Item No.	Description	Unit	Quantity	Unit Price	Total Price
	RENT	Each	1	11,356.30	11,356.30

Subtotal:	11,356.30
Invoice Discount:	0.00
Tax:	0.00
Total:	11,356.30

JUL 6 2006

INVOICE

KOPPERS
7540 SW ST HELENS RD
PORTLAND, OREGON 97210-3663

DATE OF INVOICE 7/5/2006
OUR INVOICE NO.
ACCOUNT 89050 172001

TERMS: NET CASH

ACCOUNTS RECEIVABLE GENERAL

DATE	DESCRIPTION	AMOUNT
6/1/06	JULY 2006 RENT	11,356.30
6/20/06	Payment Received - *Thank You*	(11,356.30)
7/1/06	AUGUST 2006 RENT	11,356.30
	Balance Due	$11,356.30

PPI92700000 7/

**** As per the lease agreement, rent is expected to be prepaid by the first of each month.**

Please Remit Payment To:

NW Natural
Attn: Payment Processing
PO Box 8905
Portland, OR 97255-0001

PURCHASE INVOICE

Purchase Invoice Number: JAN 07 RENT

Purchase Invoice Date: 12/01/06

Page: 1

Pay
To: NORTHWEST NATURAL GAS CO
NORTHWEST NATURAL
PO BOX 8905
PORTLAND, OR 97255-0001

Ship
To: PORTLAND TERMINAL
7540 NW Saint Helens Road
Portland, OR 97210

Ship Via		Confirm To	
Receive By	12/07/06	Buyer	
Terms	Net 10 Days	P.O. Number	
Vendor ID	009962021	P.O. Date	12/07/06

Item No.	Description	Unit	Quantity	Unit Price	Total Price
	RENT		1	11,356.30	11,356.30

Subtotal:	11,356.30
Invoice Discount:	0.00
Total Sales Tax:	0.00
Total:	11,356.30

NW Natural®
220 NW 2ND AVENUE
PORTLAND, OR 97209
TEL 503.226.4211
800.422.4012
www.nwnatural.com

INVOICE

KOPPERS
7540 SW ST HELENS RD
PORTLAND, OREGON 97210-3663

DATE OF INVOICE 12/1/2006
OUR INVOICE NO.
ACCOUNT # 89050 184300

TERMS: NET CASH

ACCOUNTS RECEIVABLE GENERAL

DATE	DESCRIPTION	AMOUNT
11/1/06	DECEMBER 2006 RENT	11,356.30
12/1/06	JANUARY 2007 RENT	11,356.30
	Balance Due	$22,712.60

**** As per the lease agreement, rent is expected to be prepaid by the first of each month.**

Please Remit Payment To:

NW Natural
Attn: Payment Processing
PO Box 8905
Portland, OR 97255-0001

15260
PPI9270000-
218

PURCHASE INVOICE

Purchase Invoice Number: 172001-9

Purchase Invoice Date: 08/01/06

Page: 1

Pay
To: NW NATURAL
NW NATURAL
PO BOX 8905
PORTLAND, OR 97255-0001

Ship
To: PORTLAND TERMINAL
7540 NW Saint Helens Road
Portland, OR 97210

Ship Via	
Receive By	08/31/06
Terms	Net 10 Days
Vendor ID	389157007

Confirm To	
Buyer	
P.O. Number	
P.O. Date	08/31/06

Item No.	Description	Unit	Quantity	Unit Price	Total Price
	RENT		1	11,356.30	11,356.30

Subtotal:	11,356.30
Invoice Discount:	0.00
Tax:	0.00
Total:	11,356.30

NW Natural®
220 NW 2ND AVENUE
PORTLAND, OR 97209
TEL 503.226.4211
800.422.4012
www.nwnatural.com

INVOICE

AUG 1 2006

KOPPERS
7540 SW ST HELENS RD
PORTLAND, OREGON 97210-3663

DATE OF INVOICE 7/31/2006
OUR INVOICE NO.
ACCOUNT # 89050 172001

TERMS: NET CASH

PI-~~8~~
9180

ACCOUNTS RECEIVABLE GENERAL

DATE	DESCRIPTION	AMOUNT
7/1/06	AUGUST 2006 RENT	11,356.30
7/28/06	Payment Received - *Thank You*	(11,356.30)
8/1/06	SEPTEMBER 2006 RENT	11,356.30
	Balance Due	$11,356.30

PPI92700000
109

**** As per the lease agreement, rent is expected to be prepaid by the first of each month.**

Please Remit Payment To:

NW Natural
Attn: Payment Processing
PO Box 8905
Portland, OR 97255-0001

PURCHASE INVOICE

Purchase Invoice Number: 172001-12

Purchase Invoice Date: 10/31/06

Page: 1

Pay
To: NW NATURAL
NW NATURAL
PO BOX 8905
PORTLAND, OR 97255-0001

Ship
To: PORTLAND TERMINAL
7540 NW Saint Helens Road
Portland, OR 97210

Ship Via		Confirm To	
Receive By	11/09/06	Buyer	
Terms	Net 10 Days	P.O. Number	
Vendor ID	389157007	P.O. Date	11/09/06

Item No.	Description	Unit	Quantity	Unit Price	Total Price
	RENT		1	11,356.30	11,356.30

Subtotal:	11,356.30
Invoice Discount:	0.00
Total Sales Tax:	0.00
Total:	11,356.30

NW Natural®

220 NW 2ND AVENUE
PORTLAND, OR 97209
TEL 503.226.4211
800.422.4012
www.nwnatural.com

NOV - 2 2006

INVOICE

KOPPERS
7540 SW ST HELENS RD
PORTLAND, OREGON 97210-3663

DATE OF INVOICE 10/31/2006
OUR INVOICE NO.
ACCOUNT # 89050 172001

TERMS: NET CASH

ACCOUNTS RECEIVABLE GENERAL

DATE	DESCRIPTION	AMOUNT
10/1/06	NOVEMBER 2006 RENT	11,356.30
10/23/06	*Payment-Thank You*	*(11,356.30)*
11/1/06	DECEMBER 2006 RENT	11,356.30
	Balance Due	$11,356.30

PI 13557
PPI9270000-
176

**** As per the lease agreement, rent is expected to be prepaid by the first of each month.**

Please Remit Payment To:

NW Natural
Attn: Payment Processing
PO Box 8905
Portland, OR 97255-0001

PURCHASE INVOICE

Purchase Invoice Number: 172001-11

Purchase Invoice Date: 09/29/06

Page: 1

Pay
To: NW NATURAL
NW NATURAL
PO BOX 8905
PORTLAND, OR 97255-0001

Ship
To: PORTLAND TERMINAL
7540 NW Saint Helens Road
Portland, OR 97210

Ship Via	
Receive By	10/03/06
Terms	Net 10 Days
Vendor ID	389157007

Confirm To	
Buyer	
P.O. Number	
P.O. Date	10/03/06

Item No.	Description	Unit	Quantity	Unit Price	Total Price
	RENT		1	11,356.30	11,356.30

Subtotal:	11,356.30
Invoice Discount:	0.00
Total Sales Tax:	0.00
Total:	11,356.30

NW Natural®
220 NW 2ND AVENUE
PORTLAND, OR 97209
TEL 503.226.4211
800.422.4012
www.nwnatural.com

INVOICE

KOPPERS
7540 SW ST HELENS RD
PORTLAND, OREGON 97210-3663

DATE OF INVOICE 9/29/2006
OUR INVOICE NO.
ACCOUNT # 89050 172001

TERMS: NET CASH

ACCOUNTS RECEIVABLE GENERAL

DATE	DESCRIPTION	AMOUNT
8/1/06	SEPTEMBER 2006 RENT	11,356.30
	Payment-9-12-06-Thank You	*(11,356.30)*
9/1/06	OCTOBER 2006 RENT	11,356.30
	Payment-9-25-06-Thank You	*(11,356.30)*
10/1/06	NOVEMBER 2006 RENT	11,356.30
	Balance Due	$11,356.30

**** As per the lease agreement, rent is expected to be prepaid by the first of each month.**

Please Remit Payment To:

NW Natural
Attn: Payment Processing
PO Box 8905
Portland, OR 97255-0001

SEP 29 2006

PI 11152

PPI9270000
137

THE BACK OF THIS DOCUMENT CONTAINS AN ARTIFICIAL WATERMARK

KOPPERS

15057

Date: October 10, 2006

Amount
*****11,356.30

Pay To The Order Of: NW NATURAL

***ELEVEN THOUSAND THREE HUNDRED FIFTY SIX AND 30/100

NW NATURAL
PO BOX 8905
PORTLAND OR 97255-8001

KOPPERS INC.

National City Ashland OH

⑈15057⑈ ⑆041203895⑆ 0235280⑈

Koppers Inc. Pittsburgh PA 15057

SP CD	Vendor	Div	Our Audit	Your Inv No.	Inv Date	Inv Amount	Disc	Net Amount Payable
	389157007		PPI927000137	172001-11	09/29/06	11,356.30		11,356.30

Portland

Total 11,356.30

PURCHASE INVOICE

Purchase Invoice Number: 172001-10

Purchase Invoice Date: 09/01/06

Page: 1

Pay
To: NW NATURAL
NW NATURAL
PO BOX 8905
PORTLAND, OR 97255-0001

Ship
To: PORTLAND TERMINAL
7540 NW Saint Helens Road
Portland, OR 97210

Ship Via		Confirm To	
Receive By	09/13/06	Buyer	
Terms	Net 10 Days	P.O. Number	
Vendor ID	389157007	P.O. Date	09/13/06

Item No.	Description	Unit	Quantity	Unit Price	Total Price
	RENT		1	11,356.30	11,356.30

Subtotal:	11,356.30
Invoice Discount:	0.00
Total Sales Tax:	0.00
Total:	11,356.30

NW Natural®
220 NW 2ND AVENUE
PORTLAND, OR 97209
TEL 503.226.4211
800.422.4012
www.nwnatural.com

INVOICE

KOPPERS
7540 SW ST HELENS RD
PORTLAND, OREGON 97210-3663

DATE OF INVOICE 8/31/2006
OUR INVOICE NO.
ACCOUNT # 89050 172001

TERMS: NET CASH

ACCOUNTS RECEIVABLE GENERAL

DATE	DESCRIPTION	AMOUNT
8/1/06	SEPTEMBER 2006 RENT	11,356.30
9/1/06	OCTOBER 2006 RENT	11,356.30
	Balance Due	$22,712.60

**** As per the lease agreement, rent is expected to be prepaid by the first of each month.**

Please Remit Payment To:

NW Natural
Attn: Payment Processing
PO Box 8905
Portland, OR 97255-0001

PI9834

SEP 6 2006

PPI9270000
115

NW Natural Lease – 10/1/98 to 9/30/08

Koppers000126

Gregory P. Traczek
Operations Manager

KOPPERS

Koppers Inc.
Carbon Materials and Chemicals
436 Seventh Ave.
Pittsburgh, PA 15219
Tel 412 227 2318
Fax 412 227 2202
TraczekGP@koppers.com
www.koppers.com

March 26, 2008

Northwest Natural Gas Company
220 NW Second Avenue
Portland, Oregon 97209

Attn: Sandra K. Hart, Manager: Risk, Environmental and Land
Fax Number: (503) 721-2516

Notice of Lease Renewal

Dear Ms. Hart:

Pursuant to Section 2.3 of the Lease Agreement between Northwest Natural Gas Company and Koppers Industries, Inc. ("Koppers") dated October 1, 1998, Koppers is hereby giving notice of its intent to exercise its option to renew the Lease Agreement. This Renewal Term shall begin on October 1, 2008 and shall end at September 30, 2013 unless Koppers exercises its right to a second renewal period as provided in the Lease Agreement. The rent to be paid by Koppers during this Renewal Term shall be as provided in Section 4.2 of the original Lease Agreement.

Sincerely,

Gregory P. Traczek

cc: Mike Mancione (Koppers-Pittsburgh)
Mike Trygar (Koppers-Pittsburgh)
Steve Kifer (Koppers-Pittsburgh)
TJ Turner (Koppers-Portland)

NW Natural

Koppers Industries Inc #562285
7540 NW Saint Helens Rd, Portland
32ISI N L3C

NW Natural
Major Account Services
220 N.W. Second Avenue
Portland, OR 97209-3991
Phone: 503.721.2512
Fax: 503.721.2527

CUSTOMER EMERGENCY CONTACT LIST as of Thursday, October 04, 2007

Official emergency curtailment notification will be accomplished via a telephone call to an authorized contact listed below. Restoration notification will be posted at www.nwnatural.com. NW Natural (NWN) will use reasonable efforts to provide notices on its Web site, but it is the Customer's responsibility to contact NWN if difficulty is experienced with this service and to supply NWN with updated contact information.

Please supply a prioritized list that provides for 24-hour, 7-day-a-week notification of ***authorized contacts*** in the event of an emergency. Add paper if needed.

Priority of Call	Contact Name	E-Mail Address	Work Hours in Military Time From/To	Work#	Home#	Pager#	Cellular#
1	T Turner	turnertj@koppers.com	8:00 / 16:30	503-286-3681 x15	360-896-5139	000-000-0000	503-705-9507
2	Jason Christensen	Christensenjc@koppers.com	8:00/16:30	502-286-3681	503-746-7716		503-705-8748

FOR INTERRUPTIBLE CUSTOMERS ONLY:

Customer elects to receive natural gas service to this site under an interruptible rate schedule that is subject to curtailment upon no less than two-hours advance oral or written notice. Customer understands that during a curtailment period: (1) unless otherwise notified, gas usage must be reduced to zero therms within two hours of receipt of notice; (2) Customer is responsible for taking any and all steps to discontinue gas usage; (3) under most circumstances NWN will not come to this site and physically valve off or disconnect gas service; and (4) any gas used by Customer after the two-hour notice period will be subject to the unauthorized use charge in NWN's tariff.

Authorized Signature: _____

FOR ALL CUSTOMERS:

I warrant that I have the authority to provide this information.

Signed: _____ **Title:** Plant Superintendent **Date:** _____

Print Name: T.J. Turner **Phone:** (503) 286-3681

F-9003 (11/29/05)

Koppers000128

NORTHWEST NATURAL GAS COMPANY

220 N.W. SECOND AVENUE PORTLAND, OREGON 97209 - 3991

RONALD K. OPITZ
Manager, Risk & Land
Management
(503) 226-4211 Ext. 2440

June 9, 1997

Mr. Amos S. Kamerer
Koppers Industries, Inc.
7540 NW St. Helens Road
Portland, OR 97210

Dear Mr. Amos:

Pursuant to our recent conversation, I thought it prudent to recapitulate our intentions concerning the renewal of the lease agreement between our companies, effective January 1, 1998.

First, it is our intention to completely rewrite the original lease, which has been amended numerous times over the recent years. The lease will be proposed for a period of 10 years.

Second, the monthly lease charge will reflect an amount for the total plant, which will include the existing facilities and the improvements now being planned. The additional lease amount for the proposed improvements will be incorporated into the monthly lease payment over the first five years of the lease. We are proposing that the total rental amount be adjusted at the end of the first five-year period of the lease through the use of a local Consumer Price Index (CPI).

As you are aware, we have already proposed the increased rent amount for your existing facilities at the renewal of our lease. However, the actual amount of the **total** monthly rent will not be proposed for at least sixty (60) days to allow for a reappraisal to be completed. Upon completion of the appraisal, we can discuss the rent issue further.

Should you have any questions, Amos, please call me at your convenience.

Sincerely,

Ronald K. Opitz, Manager
Risk & Land Management

RKO:dg

cc: S. K. Hart
C. L. Kelley

dsg.wpdata.leases.koppers.let3.doc 060997

NORTHWEST NATURAL GAS COMPANY

220 N.W. SECOND AVENUE PORTLAND, OREGON 97209 - 3991

RONALD K. OPITZ
Manager, Risk & Land
Management
(503) 226-4211 Ext. 2440

April 2, 1997

Mr. Amos S. Kamerer
Koppers Industries, Inc.
7540 NW St. Helens Road
Portland, OR 97210

Dear Mr. Kamerer:

As previously described in a letter to you dated January 21, 1997, Northwest Natural Gas Company will commit to extending Koppers Industries lease for a five-year period, to commence at the expiration of the current lease on December 31, 1997, and a first right to renew for a second five-year period, effective December 31, 2002.

The extension will be subject to the renegotiating of the monthly rental fee based on the incorporation of the Portland All Urban Consumer Price Index. Currently, that CPI indicates an index increase of 13.9 points from 1993 through 1996. Should the 1997 index duplicate 1996 increase of 5.4 points, then the total estimated CPI increase would be 19.8 points. The 19.8 point increase translates into a monthly rental increase of 13.7%, or $1,215.00 per month. That increase would bring the monthly rent to $10,081.00 and an annual rent of $120,172.00. The actual rent will be determined following the issuing of the 1997 CPI.

Given the current CPI and the increased use of our property, we deem the above estimated increase to be prudent.

In addition, as a consideration for the extension of the lease, the following will be required:

1. Continued cooperation with any environmental investigation by company and/or a state or federal agency which includes the property under lease;

2. Any improvements or additions to the current facilities of Koppers Industries shall be approved by the company.

Northwest Natural Gas Company looks forward to a continuation of our current relationship and, should you have any questions concerning any of the issues addressed in this letter, please feel free to call me.

Should you have any questions, please feel free to call me at 721-2440.

Sincerely,

Ronald K. Opitz, Manager
Risk & Land Management

RKO:dg

dsg.wpdata.leases.koppers.let2.doc

NORTHWEST NATURAL GAS COMPANY

220 N.W. SECOND AVENUE PORTLAND, OREGON 97209 - 3991

RONALD K. OPITZ
Manager, Risk & Land
Management
(503) 226-4211 Ext. 2440

January 21, 1997

RECEIVED
JAN 24 1997
KOPPERS INDS., INC.
PORTLAND, OR

Mr. Amos S. Kamerer
Koppers Industries, Inc.
7540 NW St. Helens Road
Portland, OR 97210

Dear Mr. Kamerer:

Pursuant to our conversation of January 14, 1997, I thought it prudent to notify you, in writing, that the lease between Northwest Natural Gas Company (Company) and Koppers Industries, Inc. (Lessee) is scheduled to expire December 31, 1997.

As a result of the expiration of the current five-year lease, the Company is proposing to extend Koppers Industries' lease for another five-year period, to commence at the expiration of the current lease.

The lease extension shall be subject to:

1. The renegotiating of the monthly rental fee based on the Portland All Urban Consumer Price Index (CPI).

2. Continued cooperation with any environmental investigation by the Company and/or a state or federal agency which includes the property under lease.

3. Any improvements or additions to the current Koppers Industries' facilities shall be approved by the Company.

Northwest Natural and Koppers Industries have long enjoyed an excellent working relationship and it is our intention to continue that relationship in the future.

cc: W.W.T. 1/24/97

Should you have any questions, please feel free to call me at 721-2440.

Sincerely,

Ronald K. Opitz, Manager
Risk & Land Management

RKO:dg

cc: B. B. Samson
C. L. Kelley
S. K. Hart

dsg.wpdata.leases.koppers.let.doc

5 0 3 2 8 6 3 6 8 1

5/29/97

Ron Opitz

will confirm

- lease
  addem, etc.

1) ~~re~~write the whole lease
2) leaning strong to a 10 lease
3) going to do an appraisal
   - product line SF of the total
   - Allocate the increase over the 1st 5 years
   - then after 5 years would be up to the CPI
4) Attorneys monday
   30 to 60 days there after
5) will provide us letter of explanation

KOPPERS INDUSTRIES

FAX TRANSMITTAL

Koppers Industries, Inc.
7540 N.W. St. Helens Road
Portland, OR 97210-3663

Telephone: 503-286-3681
Fax: 503-285-2831

TO: W. Turner, K. Fitzgerald, T. Dietz DATE: 6/11/97

FROM: Amos TOTAL # OF PAGES: 2

The attached is self explanatory. Ron advises that he has now given this to their counsel for review and he expects to have it back by the end of August, for our review.

IF THIS TRANSMITTAL IS IN ERROR, PLEASE CALL 503-286-3681 FAX # 503-285-2831

KOPPERS INDUSTRIES

FAX TRANSMITTAL

Koppers Industries, Inc.
7540 N.W. Saint Helens Road
Portland, OR 97210-3663

TO: W. Turner, K. Fitzgerald

DATE: 2/14/97

FROM: Amos

TOTAL # OF PAGES: 1

RE: N.W. Natural Gas Lease

When you were here a couple of weeks ago you mentioned that I should pursue a "back-loading" approach for my new lease — 1998 thru 2002.

The actual rate increase is based on the Portland C.P.I. and won't be available until the 4th Quarter of this year. I'm estimating that the increase will be about 15%. The current rate is $8866/mo. + 15% = $10,200/mo. or $80,040 for the 5 year term. Is the following what you might have in mind?

YEAR	INCREASE/MO.	ANNUAL INCREASE
1998	$500	$6,000
1999	$1000	$12,000
2000	$1500	$18,000
2001	$1825	$21,900
2002	$1850	$22,200
		$80,100

Let me know what your thoughts are —

IF THIS TRANSMITTAL IS IN ERROR, PLEASE CALL 503-286-3681. FAX # (503)285-2831

NWNGAS

EST. Increase 15%

8866 X 15% = 1330 = 10,196

1330 X 60 = $79,800 TOTAL / ANNUAL = $15,960

MO	ANNUAL
500	6000
1000	12000
1500	18000
1825	21,900
1850	22,200
$ 50,100	80,100

- Tank + building removal expense by N.W.Gas

TO AND FROM
ARIZONA - CALIFORNIA - NEVADA - OREGON - WASHINGTON
FASTEST LTL SERVICE

Call
PICK UP
(213) 585-4055
RATES & CUSTOMER SERVICE
(213) 585-3012
LOS ANGELES

WILLIG

DELIVERY BY NOON

1/8/97

TERRY PEARSON # 275-6705
U.S. BANCORP
ECONOMICS DEPT.

Developed every 6 months — end of June and December

JUNE 96 WAS 157.2 (3.5% FROM JUNE 95)

Dec. 96 will be available mid February 97

Dec. 94	157.2	JUNE 96 (3.1% INC. FROM JUNE 95 - 152.5)
150.1	142.0	NOV. 92
	15.2	INCREASE = 10.7%

CURRENT RATE $8866/MO. × 10.7% = $949 (INCREASE OF $949/MO, $11,388/YEAR)

EST. DECEMBER 97 - JUNE 96 PLUS 4.7% = 7.4 + 157.2 = 164.6

164.6
142.0
22.6 INCREASE = 15.9% × $8866/MO. = $1410 (INCREASE $1410/MO, $16,920/YEAR)

$16,920 × 5 = $84,600 TOTAL INCREASE OVER 5 YEARS

U.S. BANCORP

Drew Bachman
K-1600
Per your Request
Amos

FAX COVER SHEET

SENDING TO:

Attention: Amos Kemmer

Fax Number: 285-2831

Company: Koppers Industries

Telephone Number:

ORIGINATOR:

Terry A. Pearson
Economics Department
P. O. Box 8837
Portland, OR 97208

Phone: (503) 275-6705
Fax: (503) 275-4005

Number of Pages (including cover): 20

Comments/Instructions:

Using the Consumer Price Index for Escalation

U.S. Department of Labor
Bureau of Labor Statistics
January 1989

Report 761

This guide is intended for those persons contemplating the incorporation of an escalation provision into their contracts to adjust future payments based on changes in the Consumer Price Index (CPI). In addition, it provides some details related to the CPI revision in 1987 and the change in the reference base period beginning in 1988.

The general purpose of escalation mechanisms is to adjust payments for changes in prices. The CPI is the most widely used measure of inflation and is frequently used for escalation purposes. Although such adjustments are sometimes called cost-of-living adjustments (COLA's), the CPI is not strictly a cost-of-living index. The CPI measures the change in the prices of a fixed market basket of consumption goods and services purchased, on average, by the population covered by the index (either All Urban Consumers or Urban Wage Earners and Clerical Workers). It does not reflect substitution among items in response to relative price change. In addition, it does not include such factors as income taxes and changes in preferences.

There are many applications of the CPI for escalation. Some of the most common are reflected in private sector collective bargaining agreements, long-term rental contracts, insurance policies with automatic inflation protection, and alimony payments. In addition, largely as a result of statutory action, movements in the CPI affect Social Security beneficiaries, retired military and Federal Civil Service employees and survivors, and the eligibility of and benefits for food stamp recipients. Finally, the Economic Recovery Tax Act of 1981 provided for adjustments to the income tax structure to prevent inflation-induced rate increases known as "bracket creep."

When drafting the terms of the escalation provision, contracting parties should keep in mind that BLS cannot develop specific wording for contracts. Nor can BLS mediate or arbitrate any disputes relating to legal questions such as interpretation of the terms of escalation. The function of BLS is informative—to provide basic technical and statistical assistance to those who are developing escalation procedures.

In addition, it should be understood that the CPI may not be applicable to all questions about price movements for all specific groups. For example, the indexes are designed to represent the average movement of prices for the U.S. urban population and, thus, are not precisely appropriate for use by nonurban residents. Also, the CPI does not provide data separately for the rate of inflation experienced by any particular demographic subgroup of the population, such as the aged.

Guidelines for developing escalator clauses

The following are general principles to consider when developing escalator clauses:

1. Clearly define the base price, rent, wage rate, or other value that is subject to escalation.
2. Select and identify the specific index to be used for escalation. There are five descriptive items necessary for unique identification of the index:

a. *Title:*	Consumer Price Index.
b. *Subtitle:*	All Urban Consumers (CPI-U) or Urban Wage Earners and Clerical Workers (CPI-W).
c. *Geographic coverage:*	U.S. City Average or local area index. (See table A.) Users should be aware that local area CPI indexes are by-products of the U.S. City Average. As a subset of the national index, each local index has a smaller sample size, and, therefore, is subject to substantially more sampling and other measurement errors. It follows that local area indexes often exhibit greater volatility than the national index, although long-term trends remain quite similar. BLS strongly recommends that users adopt the U.S. City Average CPI for use in escalator clauses.
d. *Index component:*	All items; Residential rent; or any of the other index components or special indexes. (See table B.) Users should avoid specifying a narrow index in a local area to escalate that same item. For example, if a municipal rent control authority limited rent increases to the increase in the local published residential rent index, landlords would be unable to raise a tenant's rent until the index rose. But

the local area index would not rise until landlords were permitted to raise their rents. In a situation where not all rental units were controlled, the effect would be less severe, but the net result could still be undesirable. Users should also be aware of what a narrow index does not measure. For example, an agreement to index *commercial* rents to the CPI rent index may be inappropriate because the CPI covers *residential* rental units exclusively.

e. *Index base:* The current "standard reference base period" is 1982-84=100. The base period is changed periodically at the direction of the Office of Management and Budget. Prior to the release of the January 1988 indexes, the reference base was 1967=100. Parties to escalation agreements should consider specifying a procedure to be followed in the event the index base is changed during the course of the agreement. BLS will continue to publish all items CPI indexes on the 1967=100 reference base for the U.S. City Average and previously published regional and local areas, except Northeast Pennsylvania, until the next change in the official reference base.

3. Specify a reference period from which changes in the price index will be measured. This base may be a single month (the CPI does not correspond to a specific day or week of the month), an average of several months, or an annual average. If a local area is used, be sure that the index is available for the specified base month or time period, since different area indexes are published on different schedules—monthly, bimonthly, or semiannual. (See table A.) Also, note that there is a lag from the reference period (e.g., the index for January 1989) to the date on which the index is released (e.g., February 22, 1989). Because the release date may vary from time to time, it is preferable to specify the reference period rather than the release date.
4. State the frequency of adjustment. Adjustments are usually made at fixed time intervals, such as bimonthly, quarterly, semiannually, or annually. Less frequent are cases where adjustments are made at variable time intervals. For example, a contract increase may be triggered only if and when the CPI registers a certain agreed upon percentage increase. The time period necessary to achieve such movement is inherently unpredictable and, thus, variable.
5. Specify the precise formula for the adjustment calculations. If the purpose of the escalation is to ensure that changes in payments are fully proportional to changes in the CPI, the formula should specify that the percentage change in the payment be the same as the percentage change in the index. Such a method yields the same result irrespective of the index base period, except possibly for rounding, and can provide a way for explicitly "sharing" inflation risks. For example, an increase may be limited to 75 percent of the percentage rise in the CPI. The formula may even provide for variability. That is, one sharing ratio would apply if the CPI increase remained below a given level, and a different ratio if that level were exceeded. If agreed upon, the formula may also be modified easily to provide for "caps" and "floors" to adjustments.

   A second type of formula for adjustment states that, for a given increase in CPI index points, payments will increase so many cents per hour. This cents per-hour-per-index-point method is used in many collective bargaining agreements. Normally, this type of formulation will eventually require some adjustment when a change in the index reference base occurs. Users should be aware that this method, if applied across the board in a wage settlement, can lead to employees at the low end of the pay scale receiving proportionately larger adjustments than those at the high end. Whatever method is used, clear specification of the adjustment formula can help eliminate confusion in determining the actual payment adjustment.
6. Define the upper and lower limits of the escalation agreement if they are agreed upon. Many contracts have "caps" which limit the increase in wages, rent, or other value to a specific amount regardless of the increase in the CPI. Another form of cap limits the escalation to only a portion of the CPI increase or the CPI increase minus a prearranged amount (e.g., 75 percent of the CPI increase or the CPI percentage increase minus 2 percentage points). Some contracts have a provision for a "floor" or minimum payment increase. This can take the form of either a minimum percentage increase or an agreed upon dollar amount. Some contracts allow for downward adjustments; most do not. (The last yearly decline in the U.S. City Average CPI occurred in 1954—down 0.5 percent—although, during the first quarter of 1986, the index dropped 0.4 percent.)
7. Provide a built-in method for handling corrections, revisions, or changes in the index. A contract should stipulate what procedures are to be followed if a correction is made to previously published data or if a change occurs in the structure of the index. Examples of the latter include major revisions, a change in the reference base period, and the introduction of the improved method of measuring homeowner shelter costs. In these cases, there often exist two overlapping series for a short period of time—one with the old structure or method and the other with the new. Or, as with a change in the reference base, conversion factors are supplied. Provision should be made in the contract to permit transition to the new measure.

In order to facilitate the process of developing escalation procedures, some recent background on the CPI indexes and a further clarification of certain BLS policies and procedures may prove helpful.

CPI-W and CPI-U

Since the 1978 revision, the CPI has been calculated monthly for two population groups: Urban Wage Earners and Clerical Workers (CPI-W) and All Urban Consumers (CPI-U).

The CPI-W is a continuation of the historical index which was initiated during World War I for use in wage negotiations. It is based on the expenditures of urban consumer units which meet additional requirements related to employment: more than one-half of the consumer unit's income had to be earned from clerical or wage occupations, and at least one of the members had to be employed for 37 weeks or more in such an occupation. The CPI-W population included 28 percent of the U.S. population as of 1982-84.

Publication of the second, more broadly based index—the CPI-U—was begun with data for January 1978. The CPI-U represents 81 percent of the total U.S. population and is based on the expenditures reported by *all* consumer units in urban areas with two exceptions: Consumer units on farms within urban areas and consumer units receiving a majority of their income from a member who is in the Armed Forces but lives within the consumer unit.

Currently, the only difference in movement of the two indexes arises from the differences in the expenditure weights for the two market baskets. Both indexes price goods and services with the same specifications and from the same retail outlets. For the period January 1978 through December 1981, the two indexes did use separate, through overlapping, samples. However, due to the similar behavior of the samples as well as to budgetary considerations, the separate CPI-W outlet sample was discontinued in January 1982.

The two indexes also differed in their treatment of homeownership from January 1983 through December 1984. Before 1983, homeownership costs in both indexes were measured by changes in current house prices, mortgage interest rates, property taxes, property insurance, and maintenance and repair costs. A rental equivalence approach to homeownership costs was introduced in the CPI-U in January 1983 and in the CPI-W in January 1985. The rental equivalence measure estimates the change in shelter costs as the change in rents which would have to be paid for tenancy of owner-occupied housing units (implicit rent). The central purpose of the change was to separate shelter costs from the investment component of homeownership so that the index would measure only the cost of consuming shelter services provided by a house. This approach is consistent with the underlying concept of the CPI as a measure of price change for consumption.

The 1987 revision of the CPI further improved sampling, data collection, processing, and statistical estimation. In addition, the housing survey was redesigned to represent optimally both owners and renters, which improved the estimation method for shelter costs.

Seasonally adjusted indexes

While the U.S. City Average CPI's are published on a seasonally adjusted basis, such data are used in escalation agreements only rarely, because seasonal factors are updated annually and seasonally adjusted data that have been published earlier are subject to revision for up to 5 years after their original release.

The purpose of seasonal adjustment is to remove the estimated effect of changes that normally occur at the same time and in about the same magnitude every year (such as price movements resulting from changing climatic conditions, production cycles, model change-overs, holidays, sales, etc.). The primary use of seasonally adjusted data is for current economic analysis.

Change in availability of published indexes

Users who tie their escalation agreements to the U.S. City Average CPI or regional CPI's (Northeast, South, etc.) should have confronted no significant contractual difficulties when the revised indexes were introduced in 1987. However, changes in publication policy may have affected escalation contracts tied to some of the local area indexes.

BLS continues to publish indexes for all but one of the local areas—Northeast Pennsylvania (Scranton-Wilkes-Barre). But, because the sample was allocated to provide the most accurate national CPI possible, beginning in 1987, 14 of the remaining 27 published areas had a change in the frequency of their publication.

As in the past, the Bureau published selected indexes using the old expenditure weights for a 6-month period immediately following the issuance of the revised CPI. These overlap indexes differed from the revised indexes only in that they were based on 1972-73 spending patterns.

Based on population growth since 1970 and the expanded definitions of Consolidated Metropolitan Statistical Areas issued by the Office of Management and Budget, the San Francisco-Oakland-San Jose area replaced the Detroit-Ann Arbor area as the fifth largest area covered by CPI indexes. For this reason, beginning with data for January 1987, the San Francisco area index is published monthly, while the Detroit area index is on a bimonthly publication schedule.

Indexes for 12 areas published bimonthly prior to January 1987 are now compiled on a semiannual basis. (See table A.) The semiannual average indexes, which refer to the arithmetic averages of the 6-month periods from January through June and July through December, are published with release of the CPI for July and January, respectively, i.e., in the months of August and February. Also, data on annual averages will be published for two additional metropolitan areas, New Orleans, La., and Tampa-St. Petersburg-

Clearwater, Fla., beginning with the release of the data for 1988 in February 1989.

As of January 1987, monthly publication began for indexes for the 4 regions, 4 size classes, and 13 region-by-size groups—previously they were published bimonthly. At that time, indexes for the two largest national size classes were combined; and two of the region-by-size groups (nonmetropolitan areas in the West and in the East) were discontinued. In April 1988, reallocation of the CPI budget to comply with the Older Americans Act Amendments of 1987 resulted in the reduction of the CPI area sample from 91 to 86 areas. Publication of the B-West region by population size area was discontinued at that time due to insufficient sample size.

BLS recognizes that there are instances where users have adopted escalation clauses tied to a local index that changed in frequency of publication—from monthly to bimonthly or from bimonthly to semiannually. Parties to agreements using these indexes, it is hoped, established some mechanism to effect this transition prior to the release of the CPI for January 1987, when most of the changes in the publication schedule occurred. BLS cannot, of course, mediate disputes or provide assistance on interpreting contract provisions during the transition period. But, if requested by both parties, the Bureau can offer technical guidance on calculations that can be used for transition.

Aids to transition

Two types of transition calculations can be provided for those who require data for areas that are now published semiannually. The first method involves linking future escalation provisions to a broader index (national or regional). If the parties agree, BLS can calculate an adjustment factor that, in effect, eliminates the difference between the local and the broader index at the point of transition. This factor would be the ratio of the local index to the broader index for the last month in which the local index was used in escalation. When multiplied by the broader index at any point in the future, the adjustment factor would permit escalation free from the impact of the initial difference between the local and broader indexes.

Or, as an alternative, BLS could provide an adjustment factor which would allow only semiannual application of the local index. This factor would be the ratio of the last bimonthly local area index used in escalation to the semiannual average index for the 6 months which includes the bimonthly index in question. Multiplying a future semiannual index by this adjustment factor would eliminate the difference that existed between the two indexes at the time of transition.

Rebasing the CPI

Beginning with the release of data for January 1988, the standard reference base for the CPI was changed from 1967=100 to 1982-84=100. The rebasing by BLS, after review by the Office of Management and Budget, was in keeping with the Government's longstanding policy that index bases should be updated periodically. BLS chose the 1982-84 period in order to coincide with the time period of the updated CPI expenditure weights, which are based on the Consumer Expenditure Surveys for the years 1982, 1983, and 1984. Prior to the rebasing, BLS did publish a few indexes with a reference base period more recent than January 1982. These indexes cannot be rebased and will continue to be available with their reference bases unchanged.

As a convenience to users, the Bureau will continue to compile and publish the all items indexes on the former reference base (1967=100 in most cases) for the U.S. City Average and for all regional and local areas. However, with release of data for January 1988, the Bureau discontinued calculation and publication of the all items indexes based on the 1957-59=100 reference period.

Methods of conversion. The historical index series has been rebased to the new reference period by dividing each index value, on the original base, by the average index value for the 1982-84 period, on the original base, and then multiplying the result by 100. Another way to convert to the new index base would be to calculate a conversion factor and then multiply the original series index value by the factor. These conversion factors are reciprocals of the average index for the period 1982-84 on the 1967=100 base multiplied by 100 and carried to seven decimal places. The two methods are equivalent and, except for rounding differences, yield the same numerical results.

Effects of conversion. The rebasing of the index does not involve changes in the content or coverage of the CPI. Nor does the adoption of the new base period affect the measurement of percent changes in a given index series from one time period to another, except for rounding differences. The change in the base period does usually affect index point differences (see example below). Parties who use index point differentials in their escalation contracts should consider this fact when determining whether or not to switch to indexes on the new reference base.

Base period	*7/87 index*	*7/88 index*	*Index point change*	*Percent change*
1967=100	340.8	354.9	14.1	4.1
1982-84=100	113.8	118.5	4.7	4.1

To minimize the effect on users with escalation contracts tied to the CPI, the BLS will continue to publish the all items indexes for the U.S. City Average and all regional and local areas on their former official reference bases. In addition, factors to convert an all items index from a 1982-84=100 base to the previous base index (and vice versa) are provided in table C for the U.S. and all published regional and local areas. Also included are factors to be used in converting U.S. City Average all items indexes on the new base to the

1957-59 reference base. Conversion factors for indexes other than all items are available on request. These provisions will enable most users to continue to use the former official reference base for the remainder of their contract. The Bureau does, however, urge users to incorporate the change in reference base into new contracts or at the time of renegotiation.

Corrections

BLS at all times strives to produce the most reliable and accurate indexes possible. This is especially important in view of the significant applications of the CPI to Federal transfer payments, tax structures, and collective bargaining agreements. However unlikely, the publication of an incorrect index can have immediate and substantial repercussions. The most recent example of a correction to a U.S. All Items index occurred with publication of the November 1974 CPI. An error was discovered in past calculations of the used car component of the index. As a result, the All Items indexes for April through October 1974 were lowered by 0.1 to 0.3 of an index point. Other lower level components of the index affected by used cars experienced proportionately larger revisions. Parties to agreements using the CPI may find it advantageous to specify precisely how corrections to previously published data will be handled.

Calculating index changes

Movements of the indexes from one month to another are usually expressed as percent changes rather than changes in index points because index point changes are affected by the level of the index in relation to its base period while percent changes are not. The example in the accompanying box illustrates the computation of index points and percent changes.

Index Point Change	
CPI	118.5
Less CPI for previous period	113.8
Equals index point change	4.7

Percent Change	
Index point difference	4.7
Divided by the previous index	113.8
Equals	0.041
Results multiplied by 100	0.041 x 100
Equals percent change	4.1

Table A. Pricing schedule for Consumer Price Index beginning January 1987

Area, region, and population size class	Pricing schedule[1]
Local area	
Anchorage, Alaska	S
Atlanta, Ga	S
Baltimore, Md	1
Boston, Mass	1
Buffalo-Niagara Falls, NY	S
Chicago, Ill.-Northwestern Ind.	M
Cincinnati-Hamilton, Ohio-Ky-Ind.	S
Cleveland-Akron-Lorain, Ohio	1
Dallas-Fort Worth, Tex.	2
Denver-Boulder, Colo.	S
Detroit-Ann Arbor, Mich.	2
Honolulu, Hawaii	S
Houston, Tex.	2
Kansas City, Mo.-Kansas City, Kans.	S
Los Angeles-Long Beach-Anaheim, Calif.	M
Miami, Fla	1
Milwaukee, Wis.	S
Minneapolis-St. Paul, Minn.-Wis.	S
New Orleans, La.[2]	A
N.Y., N.Y.-Northeastern N.J.	M
Philadelphia, Pa.	M
Pittsburgh, Pa.	2
Portland-Vancouver, Ore.-Wash.	S
St. Louis, Mo.-Ill.	1
San Diego, Calif.	S
San Francisco-Oakland-San Jose, Calif.	M
Seattle-Tacoma, Wash.	S
Tampa-St. Petersburg-Clearwater, Fla.[2]	A
Washington, D.C.-Md.-Va.	1

Area, region, and population size class	Pricing schedule[1]
Region	
Northeast	M
North Central	M
South	M
West	M
Population size class	
A	M
B	M
C	M
D	M
Region/population size class cross-classification	
Northeast/A	M
North Central/A	M
South/A	M
West/A	M
Northeast/B	M
North Central/B	M
South/B	M
Northeast/C	M
North Central/C	M
South/C	M
West/C	M
North Central/D	M
South/D	M

[1] M-Every month.
1-January, March, May, July, September, and November.
2-February, April, June, August, October, and December.
S-Semiannual.
A-Annual.

[2] Beginning January 1989.

NOTE: Foods, fuels, and several other items are priced every month in all areas; most other goods and services are priced as indicated.

Table B. Major groups and components for Consumer Price Index beginning January 1987

Expenditure group

All items
All items (1967=100)

Food and beverages
Food
Food at home
Cereals and bakery products
Meats, poultry, fish, and eggs
Dairy products
Fruits and vegetables
Other food at home
Sugar and sweets
Fats and oils
Nonalcoholic beverages
Other prepared foods
Food away from home
Alcoholic beverages

Housing
Shelter
Renters' costs
Rent, residential
Other renters' costs
Homeowners' costs
Owners' equivalent rent
Household insurance
Maintenance and repairs
Maintenance and repair services
Maintenance and repair commodities
Fuel and other utilities
Fuels
Fuel oil and other household fuel commodities
Gas (piped) and electricity
Other utilities and public services
Household furnishings and operation
Housefurnishings
Housekeeping supplies
Housekeeping services

Apparel and upkeep
Apparel commodities
Men's and boys' apparel
Women's and girls' apparel
Infants' and toddlers' apparel
Footwear
Other apparel commodities
Apparel services

Transportation
Private transportation
New vehicles
New cars
Used cars
Motor fuel
Gasoline
Maintenance and repairs
Other private transportation
Other private transportation commodities
Other private transportation services
Public transportation

Medical care
Medical care commodities
Medical care services
Professional medical services

Entertainment
Entertainment commodities
Entertainment services

Other goods and services
Tobacco and smoking products
Personal care
Toilet goods and personal care appliances
Personal care services
Personal and educational expenses
School books and supplies
Personal and educational services

Commodity and service group

All items
Commodities
Food and beverages
Commodities less food and beverages
Nondurables less food and beverages
Apparel commodities
Nondurables less food, beverages, and apparel
Durables

Services
Rent of shelter
Household services less rent of shelter
Transportation services
Medical care services
Other services

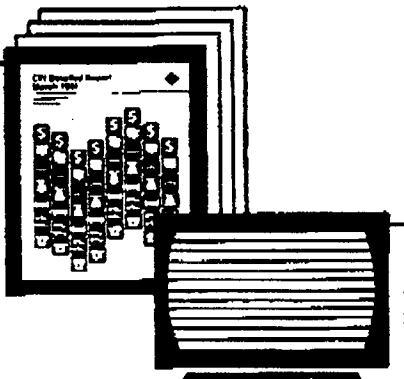
Special indexes

All items less food, shelter, and energy
All items less food
All items less shelter
All items less homeowners' costs
All items less medical care
Commodities less food
Nondurables less food
Nondurables less food and apparel
Nondurables
Services less rent of shelter
Services less medical care
Energy
All items less energy
All items less food and energy
Commodities less food and energy
Energy commodities
Services less energy

Table C. 1982-84 all items averages on former base and factors for converting to the base 1982-84=100: Consumer Price Index for All Urban Consumers (CPI-U) and Consumer Price Index for Urban Wage Earners and Clerical Workers (CPI-W)

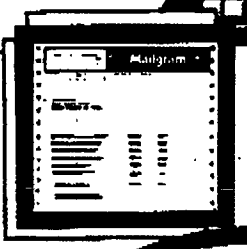
Area and size class	Former index base	CPI-U		CPI-W	
		1982-84 average	Factor	1982-84 average	Factor
U.S. city average	1967	299.55556	0.3338279	297.66944	0.3357175
U.S. city average	1957-59	346.37778	0.2870447	346.41944	0.2886874
Region and area size					
Northeast	12/77	157.46944	0.6350438	156.19444	0.6402276
Size A - More than 1,200,000	12/77	154.51944	0.6471677	152.80556	0.6544265
Size B - 500,000 to 1,200,000	12/77	160.87222	0.6216114	159.56056	0.6266426
Size C - 50,000 to 500,000	12/77	166.02222	0.6023290	166.29444	0.6013430
North Central	12/77	162.70556	0.6146072	161.72222	0.6183442
Size A - More than 1,200,000	12/77	165.10556	0.6056731	163.48056	0.6118936
Size B - 360,000 to 1,200,000	12/77	161.62778	0.6187055	161.07500	0.6208288
Size C - 50,000 to 360,000	12/77	159.21944	0.6280640	157.21389	0.6360761
Size D - Nonmetropolitan (less than 50,000)	12/77	160.32222	0.6237438	162.02500	0.6171887
South	12/77	162.21389	0.6164700	161.86111	0.6174322
Size A - More than 1,200,000	12/77	161.43333	0.6194508	162.00000	0.6172840
Size B - 450,000 to 1,200,000	12/77	163.25000	0.6125574	162.05556	0.6170729
Size C - 50,000 to 450,000	12/77	161.84444	0.6178772	161.88333	0.6177266
Size D - Nonmetropolitan (less than 50,000)	12/77	162.39167	0.6157951	161.87778	0.6177500
West	12/77	161.84444	0.6186417	160.89444	0.6215255
Size A - More than 1,200,000	12/77	163.06389	0.6132566	161.88056	0.6177394
Size B - 330,000 to 1,200,000	12/77	162.69444	0.6146491	162.46333	0.6154477
Size C - 50,000 to 330,000	12/77	156.11389	0.6446876	154.21667	0.6484393
Size classes					
B	12/77	162.35278	0.6159426	161.43889	0.6194294
C	12/77	160.78611	0.6219443	160.21111	0.6241764
D	12/77	161.27500	0.6200589	161.61667	0.6187481
Selected local areas					
Anchorage, Alaska	10/67	266.91389	0.3746527	260.26389	0.3842254
Atlanta, Ga.	1967	301.55944	0.3315988	302.36389	0.3307273
Baltimore, Md.	1967	299.09167	0.3343457	298.10278	0.3354546
Boston, Mass.	1967	290.65278	0.3440531	289.03611	0.3459775
Buffalo, N.Y.	1967	282.01667	0.3545890	278.45278	0.3591273
Chicago, Ill.-Northwestern Ind.	1967	298.75833	0.3347187	293.68611	0.3404996
Cincinnati-Hamilton, Ohio-Ky.-Ind.	1967	309.42222	0.3231830	307.31111	0.3254031
Cleveland, Ohio	1967	320.44722	0.3120639	312.46944	0.3200313
Dallas-Fort Worth, Tex.	1967	313.69444	0.3187815	308.36667	0.3242899
Denver-Boulder, Colo.	1967	333.45833	0.2998875	332.85278	0.3004331
Detroit, Mich.	1967	297.24167	0.3364266	294.51944	0.3395362
Honolulu, Hawaii	1967	275.29722	0.3632438	279.37222	0.3579464
Houston, Tex.	1967	320.73611	0.3117828	319.15556	0.3133256
Kansas City, Mo.-Kans.	1967	296.83611	0.3367728	293.00000	0.3412969
L.A.-Long Beach, Anaheim, Calif.	1967	295.44444	0.3384731	295.53056	0.3383745
Miami, Fla.	11/77	161.18611	0.6204006	162.46944	0.6155004
Milwaukee, Wis.	1967	308.86111	0.3237701	319.68611	0.3128068
Minneapolis-St. Paul, Minn.-Wis.	1967	314.25278	0.3182152	313.86111	0.3186123
N.Y., N.Y.-Northeastern N.J.	1967	289.06611	0.3459177	284.72500	0.3512161
Philadelphia, Pa.	1967	288.89444	0.3461472	290.46667	0.3442736
Pittsburgh, Pa.	1967	305.14722	0.3277107	297.41667	0.3362286
Portland, Oreg.-Wash.	1967	292.75833	0.3415787	288.20278	0.3469779
St. Louis, Mo.	1967	297.01667	0.3366814	294.20556	0.3398984
San Diego, Calif.	1967	338.13056	0.2957438	322.48333	0.3100935
San Francisco-Oakland, Calif.	1967	307.42778	0.3252797	304.50833	0.3283982
Seattle-Tacoma, Wash.	1967	304.83889	0.3280421	296.60000	0.3371544
Washington, D.C.-Md.-Va.	1967	295.22778	0.3387215	299.48889	0.3339022

Where To Find CPI Information



Monthly Periodical:
Most comprehensive report available. Order CPI Detailed Report, $21 a year, $7 a single copy, from Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. Includes text, statistical tables, and technical notes.

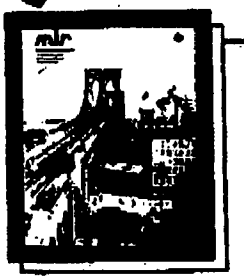
Electronic News Release:
Quickest. Accessible electronically immediately at release time through BLS news release service. Write the Office of Publications, Bureau of Labor Statistics, Washington, D.C. 20212, or call (202) 523-1913.



Mailgram:
Overnight. Through the National Technical Information Service, U.S. Department of Commerce, 5285 Port Royal Road, Springfield, Va. 22151. $145 in contiguous United States. Provides selected U.S. City Average CPI data.

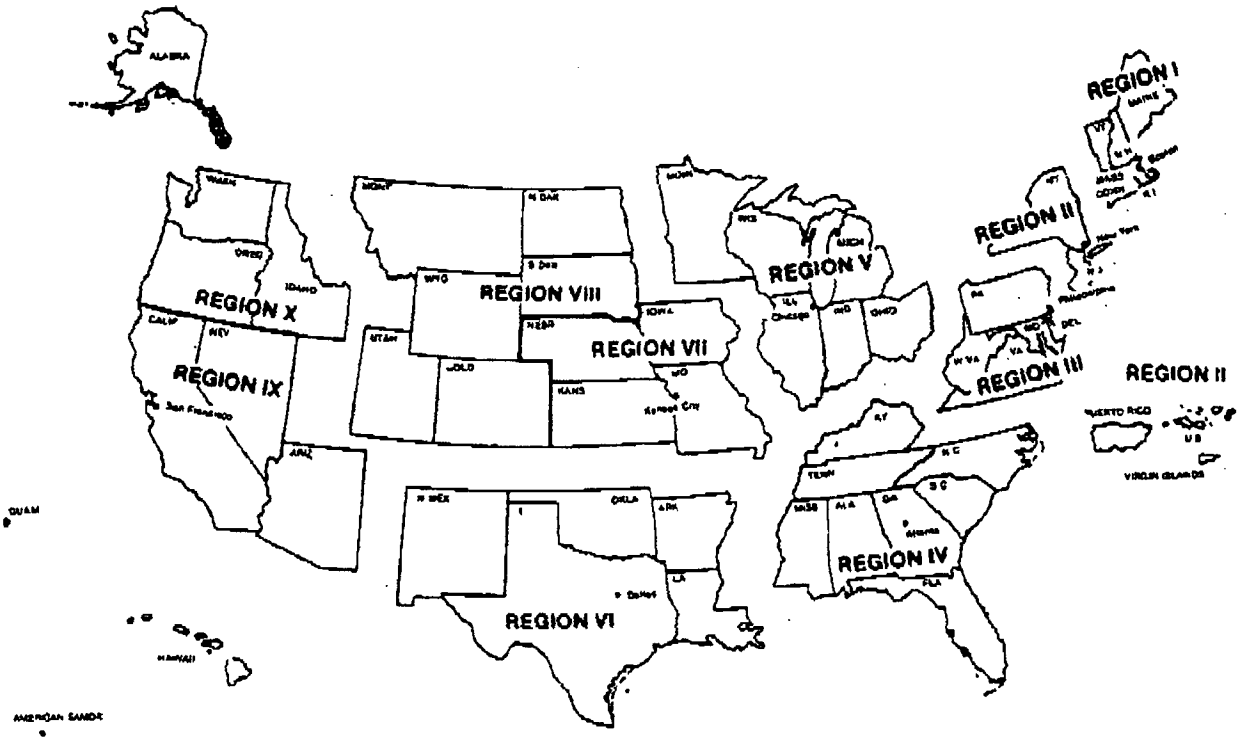
Telephone:
Summary data on 24-hour recorded message. Key CPI numbers plus upcoming release date. Call (202) 523-1239.

Machine-Readable Form:
For users who need current and historical CPI data in machine-readable form, a single magnetic tape is $65. Data diskettes offer CPI-U and CPI-W indexes for all items and 104 detailed items for the U.S. City-averages; 54 detailed items for selected local areas—for all released months of the current year plus the previous year. Single copy, $35; 12-month subscription, $288. For information, write the Office of Publications, Bureau of Labor Statistics, Washington, D.C. 20212, or call (202) 523-1090.



Monthly Labor Review:
Selected CPI data included in monthly summary of BLS data and in analytical articles. $20 a year, $5 a single copy. Available from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

Bureau of Labor Statistics Regional Offices



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US BANCORP
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PORTLAND OR 97208

Dear CPI user:

Our recent survey of users of the Consumer Price Index indicated that over 75 percent of them use the CPI to adjust payments (rents, wages, alimony, etc.) for changes in inflation. Many of you asked for more information about using the CPI for escalation purposes. This booklet will answer many of your questions.

A similar booklet describing how the Producer Price Index can be used for escalation is in preparation and will be available later this year.

If you have any additional questions about using the CPI for escalation purposes that are not answered in this booklet, please write to the Bureau of Labor Statistics, Consumer Prices and Price Indexes, Washington, DC 20212, or call area code (202) 272-5160.

Sincerely,

Paul A. Armknecht

Paul A. Armknecht
Assistant Commissioner for
Consumer Prices and Price Indexes

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ity to become self-supporting members of the community. It moves welfare recipients into active learning roles in which they will begin shaping their own futures. It is a program whose time has come. ■ *Ron Wahlers and Ivars Graudins*

Demographic And Lifestyle Changes Shape The New CPI

New patterns of consumer preferences are incorporated in the updated Consumer Price Index (CPI), a measure of the average change in the prices paid by urban consumers for a fixed market basket of goods and services. The CPI is revised about every 10 years by the Bureau of Labor Statistics (BLS) due to changes in demographics, especially the age composition, as well as labor force participation, geographic distribution and consumer unit size. Lifestyles and technological advances modify tastes of consumers over time. Economics, reflecting income differentials and relative prices over time, also play a part in altering the CPI. When a 1 percent change in the CPI is reported, it seems a paltry amount. That 1 percent change in the CPI, however, results in $2.8 billion in entitlements (Social Security, etc.) and $1.8 billion in income tax.

This article is divided into two parts. The first is a general discussion on the revised CPI and the second gives specific guidelines on how to use the CPI as an escalation mechanism.

PART I: *The New CPI*

Uses Of The CPI

The new market basket is based on consumer spending habits in the 1982-84 period, replacing the 1972-73 period. The CPI is used as an economic indicator to measure inflation and real production and consumption. It is also used as an economic decision-making tool for formulating fiscal and monetary policy, other government economic decisions and private business. It is used to escalate federal social entitlements, such as Social Security benefits. Major collective bargaining Cost-of-Living-Allowances (COLAs), rents and alimony are all affected by movements of the CPI.

The New CPI Is Greeted With Caution And With Yuppie Labeling

Reviews for the revised CPI range from tentative, "let's wait and see how it tracks the old CPI,"[1] to overstatement, "the yuppie generation gets its own inflation yardstick."[2] The wait-and-see attitude reflects concern with the performance of the new index and comparability over time with the old index. The Labor Department is addressing this issue by publishing both measures for a six-month period.

The yuppie claim is made because the CPI will cover new items, (including home computers), videocassette rentals and pet services (principally, those of veterinarians). Other items and services covered by the CPI for the first time are indoor plants and flowers, child daycare and nursery schools and home care services.

[1] *The Daily Labor Report*, March 3, 1987.

[2] Carl T. Hall, *USA Today*, February 27, 1987.

continued page 26

Programs & Services *continued*

Separate indexes now exist for a number of items which were previously combined. These include: watches, jewelry, new trucks, new motorcycles, eye care, inpatient services, outpatient services, club memberships, fees for lessons and instruction, legal fees, banking and accounting expenses and funeral expenses.

The bulge of baby boomers has now moved into the more affluent span of middle-aged, peak-earnings years. This birth cohort has come of age, and because of sheer numbers, now affects much of the buying patterns of urban Americans.

Dual-earner households have increased dramatically over the decade, and are reflected in the expansion of daycare services and convenience items and services. Also, both the average age and geographic distribution of the population have changed. "Thus, expenditure patterns of the elderly and of those consumers in the warmer climates will have a larger influence on the CPI than before."[3]

More Services Found In Market Basket

The weighting scheme will now be tipped in favor of services over goods, mirroring the preponderance of services in the economy. "Services' weight will rise to 52 percent of the index from about 46 percent, compared with 48 percent for goods or commodity prices. That implies that wage trends will have a more direct impact on consumer inflation from here on in, since labor costs are the chief determinants of most service prices."[4]

Medical Costs Held Constant

Medical costs have escalated over the decade and, yet, are given the same 5 percent share of the index that they held previously. The rationale for holding medical costs at the same proportion is that government programs and employer-sponsored insurance have greatly offset household medical outlays. The fear is that holding the medical share constant may understate future medical costs as many employers have reduced insurance coverage and are asking employees to pay more and more of the costs themselves.

Housing Up, Food And Apparel Down

Housing, already one of the largest subcategories in the index, will now account for 43 percent of the index, up from 38 percent. The growth in this component of the index is due primarily to the increase in homeowners' equivalent rent, which reflects expanding homeownership, changes in the stock of housing and in household composition.

Food and apparel will now influence the CPI to a lesser extent. Food moves from 19 percent of the market basket to 16 percent, and apparel drops from 7.5 percent to 6.5 percent.

Declines in food purchases are influenced by smaller households, consumer preferences and caloric intake requirements. Apparel has dwindled for several reasons: men have favored more casual attire over suits, sportscoats, coats and

[3] U.S. Department of Labor, Bureau of Labor Statistics, *Revising the Consumer Price Index*, Report 734, November 1986.

[4] Gene Koretz, *The Changes Behind the CPI's New Look*, Business Week, March 2, 1987.

jackets; there is less time and, therefore, demand for sewing goods; and easy-care fabrics have reduced demand for drycleaning and laundry services.[5]

Statistical And Coverage Improvements

There have been two major statistical improvements: there is now better shelter coverage and sampling error is now 22 percent smaller. The shelter sample is twice as large as it was previously, and it is jointly optimized for rent and owners' equivalent rent. Other improvements include: the sample updating is more current; the population distribution in 1980 replaces that of 1970; and metropolitan definitions have been revised.

Changes In The Local Area Index

The CPI by region, size and region-by-size will be published monthly. The five largest metropolitan areas will continue to be published monthly. San Francisco replaces Detroit as the fifth largest metropolitan area. Detroit will be published bimonthly for even months. The frequency of publication for the Anchorage, Honolulu, Portland, San Diego and Seattle indexes will be changed from bimonthly to semiannually.

In the state, the geographic coverage was for the Seattle-Tacoma area, but now will cover King, Pierce and Snohomish counties. It is important to stress that the improvements in the CPI have occurred in the national sample only. The local area indexes are based on much smaller samples and are, therefore, subject to greater sampling error. That is why the local area indexes will be published semiannually instead of bimonthly. Use of the national CPI is urged due to the less reliable nature of the Seattle CPI.

PART II: *Using The CPI For Escalation In The Private Sector*

Escalation mechanisms are used to adjust payments for changes in prices. The CPI, as the most widely applied measure of inflation, is often employed for escalation purposes. Some examples of common application of the CPI for escalation are: collective bargaining agreements, rental agreements, insurance policies with automatic inflation protection and alimony payments. The following BLS guidelines should be considered when developing escalator clauses:

1. Clearly define the base price, rent, wage rate or other value that is subject to escalation.
2. Select and identify the specific index to be used for escalation.
   a. Subtitle: All Urban Consumers (CPI-U) or Urban Wage Earners Clerical Workers (CPI-W).
   b. Geographic Coverage: U.S. City Average or local area index. Each local area index has a smaller sample size and is subject to substantially more errors. Because of the volatility of local area indexes, BLS strongly recommends that persons adopt the U.S. City Average CPI for use in escalator clauses.

[5] Charles Mason and Clifford Butler, *New Basket of Goods and Services Being Priced in Revised CPI*, Monthly Labor Review, January 1987.

continued page 28

Programs & Services *continued*

c. Index Component: All Items; Residential Rent or any of the other index components or special indexes. Avoid specifying a narrow index in a local area to escalate that same item. Be aware of what an index does and does not measure.

d. Index Base: The old standard reference base is 1967 = 100. The new reference base is 1982-84 = 100.

3. Specify the reference period from which changes in the price index will be measured. This time period may be a month, an average of several months or an annual average.

4. State how frequently the adjustments will be made. Usually, adjustments are made at fixed time intervals.

5. State the precise formula for the adjustment calculations. "If the purpose of the escalation is to ensure that changes in payments are fully proportional to changes in the CPI, the formula should specify that the percentage change in the payment be the same as the percentage change in the index."[6] This method yields the same result regardless of the index base period, and provides a way for explicitly sharing inflation risks. The formula may also be modified to provide for caps and floors to adjustments.

   A second formula, used for many collective bargaining agreements, states that for a given increase in CPI index points, payments will increase so many cents per hour. Applied across-the-board, employees at the low end of the payment scale can receive proportionately greater adjustments than those at the high end.

6. Define the upper and lower limits of the escalation agreement, if they are agreed upon.

7. Provide a built-in method for handling corrections, revisions or changes in the index. Stipulate procedures to follow if corrections are made to previously published data or if changes occur in the structure of the index.

■ *Carol Welch*

[6] U.S. Department of Labor, Bureau of Labor Statistics, *Using the Consumer Price Index for Escalation*, Report 732, 1986.

page 28-1

Technical Notes

Brief Explanation of the CPI

The Consumer Price Index (CPI) is a measure of the average change in prices over time in a fixed market basket of goods and services. Effective with the January 1978 index, the Bureau of Labor Statistics began publishing CPI's for two population groups: (1) a new CPI for All Urban Consumers (CPI-U) which covers approximately 80 percent of the total noninstitutional civilian population; and (2) a revised CPI for Urban Wage Earners and Clerical Workers (CPI-W) which represents about half the population covered by the CPI-U. The CPI-U includes, in addition to wage earners and clerical workers, groups which historically have been excluded from CPI coverage, such as professional, managerial, and technical workers, the self-employed, short-term workers, the unemployed, and retirees and others not in the labor force.

The CPI is based on prices of food, clothing, shelter, and fuels, transportation fares, charges for doctors' and dentists' services, drugs, and the other goods and services that people buy for day-to-day living. Prices are collected in 85 urban areas across the country from about 18,000 tenants, 18,000 housing units for property taxes, and about 24,000 establishments—grocery and department stores, hospitals, filling stations, and other types of stores and service establishments. All taxes directly associated with the purchase and use of items are included in the index. Prices of food, fuels, and a few other items are obtained every month in all 85 locations. Prices of most other commodities and services are collected every month in the five largest geographic areas and every other month in other areas. Prices of most goods and services are obtained by personal visits of the Bureau's trained representatives. Mail questionnaires are used to obtain public utility rates, some fuel prices, and certain other items.

In calculating the index, price changes for the various items in each location are averaged together with weights which represent their importance in the spending of the appropriate population group. Local data are then combined to obtain a U.S. city average. Separate indexes are also published by size of city, by region of the country, for cross-classifications of regions and population-size classes, and for 28 local areas. Area indexes do not measure differences in the level of prices among cities; they only measure the average change in prices for each area since the base period.

The index measures price changes from a designated reference date—1967—which equals 100.0. An increase of 122 percent, for example, is shown as 222.0. This change can also be expressed in dollars as follows: The price of a base period "market basket" of goods and services in the CPI has risen from $10 in 1967 to $22.20.

For further details see the following: *The Consumer Price Index: Concepts and Content Over the Years*, Report 517, revised edition (Bureau of Labor Statistics, May 1978); *The Revision of the Consumer Price Index*, by W. John Layng, reprinted from the *Statistical Reporter*, February 1978, No. 78-5 (U.S. Dept. of Commerce), *Revisions in the Medical Care Service Component of the Consumer Price Index*, by Daniel H. Ginsburg, *Monthly Labor Review*, August 1978; and *CPI Issues*, Report 593, (Bureau of Labor Statistics, February 1980).

A Note About Calculating Index Changes

Movements of the indexes from one month to another are usually expressed as percent changes rather than changes in index points because index point changes are affected by the level of the index in relation to its base period while percent changes are not. The example in the accompanying box illustrates the computation of index point and percent changes.

Percent changes for 3-month and 6-month periods are expressed as annual rates and are computed according to the standard formula for compound growth rates. These data indicate what the percent change would be if the current rate were maintained for a 12-month period.

Index Point Change	
CPI	236.4
Less previous index	233.2
Equals index point change:	3.2
Percent Change	
Index point difference	3.2
Divided by the previous index	233.2
Equals:	0.014
Results multiplied by one hundred	0.014x100
Equals percent change:	1.4

West urban	M	[illegible]	[illegible]	[illegible]	[illegible]	3.5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Size A - More than 1,250,000	M	115.0	114.8	115.0	116.0						
Size B - 330,000 to 1,250,000	M	115.1	115.9	116.0							
Size C - 50,000 to 330,000											
Size classes											
A 2/	M	104.6	104.8	104.7	105.0	4.4	.2	.3	4.7	.1	-.1
B	M	114.4	114.5	114.5	115.0	4.0	.3	.4	4.1	.1	-.1
C	M	114.1	114.3	114.2	114.6	3.6	.2	.3	4.1	.1	-.1
D	M	112.3	112.6	112.7	112.9	3.4	.3	.2	3.7	.6	.1
Selected local areas											
Chicago, Ill.-Northwestern Ind.	M	115.1	115.7	115.7	115.3	3.0	-.3	-.3	4.4	-.5	.0
L.A.-Long Beach, Anaheim, Calif.	M	118.6	118.2	118.5	118.9	4.9	.8	.3	5.1	-.1	.3
N.Y., N.Y.-Northeastern N.J.	M	120.2	120.5	120.6	121.3	5.8	.7	.6	6.0	.3	.1
Philadelphia, Pa.-N.J.	M	119.1	118.6	118.9	119.3	5.2	.6	.3	5.6	-.2	.3
San Francisco-Oakland, Calif.	M	117.1	117.3	117.4	118.4	5.2	.9	.9	5.0	.3	.1
Baltimore, Md.	1	-	115.7	-	116.8	4.6	1.0	-	-	-	-
Boston, Mass.	1	-	119.9	-	120.1	4.8	.2	-	-	-	-
Cleveland, Ohio	1	-	114.5	-	119.9	3.5	-.5	-	-	-	-
Miami, Fla.	1	-	113.8	-	114.5	4.2	.6	-	-	-	-
St. Louis, Mo.-Ill.	1	-	113.1	-	113.4	3.1	.3	-	-	-	-
Washington, D.C.-Md.-Va.	1	-	110.5	-	110.3	4.0	-.2	-	-	-	-
Dallas-Fort Worth, Tex.	2	114.9	-	113.9	-	-	-	-	4.2	-.8	-
Detroit, Mich.	2	114.1	-	112.6	-	-	-	-	3.1	-1.3	-
Houston, Tex.	2	108.0	-	107.3	-	-	-	-	4.0	-.6	-
Pittsburgh, Pa.	2	112.8	-	113.0	-	-	-	-	3.6	.2	-

1/ Foods, fuels, and several other items priced every month in all areas; most other goods and services priced as indicated:
M - Every month.
1 - January, March, May, July, September, and November.
2 - February, April, June, August, October, and December.

2/ Regions are defined as the four Census regions.

3/ Indexes on a December 1986=100 base.

- Data not available.

NOTE: Local area CPI indexes are byproducts of the national CPI program. Each local index has a smaller sample size than the national index and is, therefore, subject to substantially more sampling and other measurement error. As a result, local area indexes show greater volatility than the national index, although their long-term trends are similar. Therefore, the Bureau of Labor Statistics strongly urges users to consider adopting the national average CPI for use in their escalator clauses.

Questions and answers about the Consumer Price Index (CPI)

We need your assistance in measuring the rate of inflation in the U.S. economy. The Bureau of Labor Statistics is asking for your voluntary participation in the Consumer Price Index survey to help provide an accurate measurement of changes in the cost of the many goods and services normally purchased by urban consumers. Here are several questions and answers that provide information about the CPI. Thank you for your cooperation in this important program.

What is the CPI?

The CPI is the Nation's chief measure of inflation at the retail level. It measures changes over time in the cost of buying a fixed market basket of goods and services needed for day-to-day living. Calculated and published by the Bureau of Labor Statistics, the CPI is used by business, labor, and government for making informed economic decisions. It is widely used to adjust payments under collective bargaining agreements, and the Federal Government uses the CPI to adjust Social Security, personal income taxes, and other program payments for the effects of inflation.

What does the CPI include?

The CPI measures price change for all types of goods and services that are purchased by urban consumers, whether costly or inexpensive, whether purchased often or infrequently. Each item is represented in the index to the degree that it is purchased. These items are divided into seven major groups: Food and beverages, apparel and upkeep, transportation, medical care, entertainment, other goods and services, and housing. Investment items, such as the purchase of stocks, bonds, or homes, are not priced in the CPI, since they do not represent direct consumption of goods and services by consumers.

How does BLS get the information on price change for the CPI?

BLS employees visit selected retail stores, houses, apartments, and other establishments in 91 urban areas on a regular basis to collect the prices of the items included. Prices are collected monthly in Chicago, Los Angeles, New York, Philadelphia, and San Francisco. In all other areas, food, fuel, and other selected items are priced monthly. The rest of the items are priced every other month.

Who is covered by the CPI?

There are, in effect, two CPI's. One represents the expenditures of all urban consumers (CPI-U); the other represents urban wage earners and clerical workers (CPI-W). The indexes do not take into account the buying habits of persons living on farms or in rural areas, persons in military service, or those in institutions.

How was I selected to participate?

Your establishment was selected primarily from information obtained from a household survey. In this survey, households provided data on where they purchased various types of goods and services and the dollar amount of these purchases. From these data, a sample of establishments was selected for pricing of several categories of items.

When and how is the CPI published?

The CPI data appear first in a news release usually issued between the 20th and 25th day of each month, reporting data for the previous month. Generally, the CPI is reported in the newspapers and on TV at this time. The *Monthly Labor Review* also publishes CPI data each month. The most comprehensive report on the CPI appears in the periodical *CPI Detailed Report*, issued monthly.

Will the information I give you be kept confidential?

All information given by you to BLS for this survey is confidential. BLS staff are sworn to maintain the confidentiality of all responses. No one, not even other government agencies, has access to any of the individual information. All information is represented only in the form of statistical summaries.

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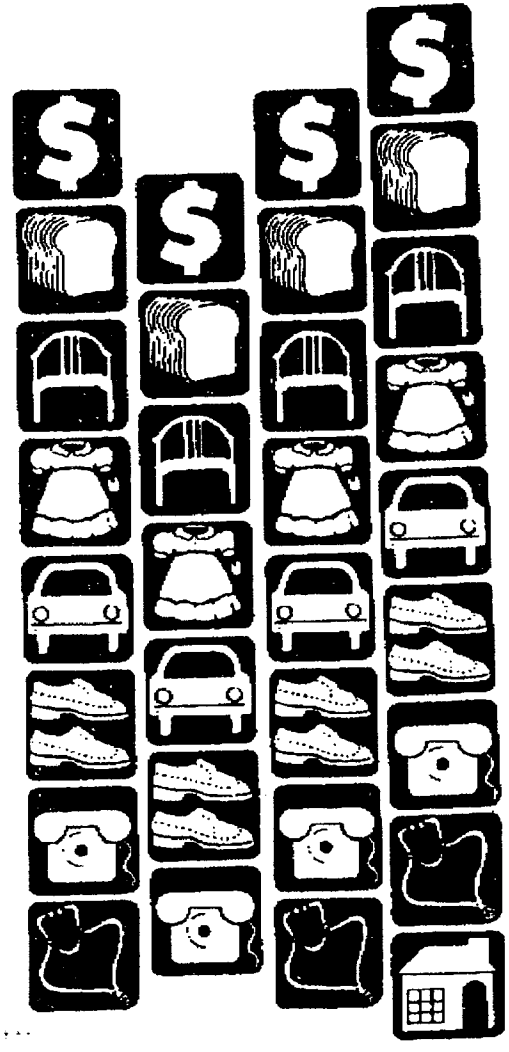
The Consumer Price Index: Questions and Answers

U.S. Department of Labor
Bureau of Labor Statistics



Koppers000158

NW Natural
220 NW 2ND AVENUE
PORTLAND, OR 97209
TEL 503.226.4211
www.nwnatural.com

March 31, 1998

Mr. Amos S. Kamerer
General Manager
Koppers Industries, Inc.
7540 N.W. St. Helens Road
Portland, Oregon 97210

RE: Lease Extension
Koppers Plant Site Lease
7540 N.W. St. Helens Road

Dear Mr. Kamerer:

In response to your telephone request of March 27th, this is to confirm that Northwest Natural Gas Company agrees to further extend the lease agreement to and including the 30th day of April, 1998. This extension will be on the same terms as the original lease, including all amendments and subsequent extensions.

Please indicate your acceptance of the lease extension by signing in the space provided on the enclosed copy of this letter and returning it to me in the enclosed self-addressed envelope.

Sincerely,

Sandra K. Hart, Manager
Risk Environment & Land

SKH:jd

Agreed:

Koppers Industries, Inc.

By A.S. KAMERER

Date 4/3/98

cc: Susan K. Alterman, Perkins Coie

Author: AMOS KAMERER at PITT
Date: 3/30/98 11:09 AM
Priority: Normal
TO: Don Evans at PITT
CC: Kevin Fitzgerald at PITT
Subject: N. W. Natural - Terminal Lease
---------- Message Contents ----------

They have agreed to the 30 day extension, through April.

You will need to let me know if you want a meeting on the 13th, and the sooner you let me know about that, the better. Sandy Hart, the Lands Mgr. is a busy woman and difficult to see on short notice.

Amos

To Amos K.

Date 3-30-98 Time

While You Were Out

M Ron Hordichok

of MW Natural Gas

Phone 721-2441

AREA CODE NUMBER EXTENSION

TELEPHONED	X	PLEASE CALL	
WAS IN TO SEE YOU		WILL CALL AGAIN	
WANTS TO SEE YOU		URGENT	
RETURNED YOUR CALL			

Message will send you a 30 day lease extention

Operator

CHALLENGER® 01761 QUALITY PARK PRODUCTS

Author: AMOS KAMERER at PITT
Date: 3/13/98 3:37 PM
Priority: Normal
TO: Don Evans at PITT
TO: Kevin Fitzgerald at PITT
Subject: Plant Lease - N. W. Natural

---------- Message Contents ----------

Don, as a reminder, our 90 day lease extension is over as of 3/31/98. I have reviewed the new proposed lease and did not see anything that looks out of the ordinary, to me. Regardless, we need to get this done in the next 2 weeks. Thanks.
Amos

3/27/98 LVM SAMMY & RON - RE 30 day extension

Remember DON EVANS IN town MON April 13th

PURCHASE INVOICE

Purchase Invoice Number: RE450

Purchase Invoice Date: 10/31/07

Page: 1

Pay
To: NW NATURAL
NW NATURAL
PO BOX 6017
PORTLAND, OR 97228-6017

Ship
To: PORTLAND TERMINAL
7540 NW Saint Helens Road
Portland, OR 97210

Ship Via		Confirm To	
Receive By	11/01/07	Buyer	
Terms	Net 10 Days	P.O. Number	
Vendor ID	389157007	P.O. Date	11/01/07

Item No.	Description	Unit	Quantity	Unit Price	Total Price
	RENT		1	11,356.30	11,356.30

Subtotal:	11,356.30
Invoice Discount:	0.00
Total Sales Tax:	0.00
Total:	11,356.30

NW Natural®
220 NW 2ND AVENUE
PORTLAND, OR 97209
TEL 503.226.4211
800.422.4012
www.nwnatural.com

Invoice Number: RE450
Invoice Date: 9/30/2007
Terms: Due Upon Receipt of Invoice

Bill To:
KOPPERS, INC
7540 NW ST HELENS RD
PORTLAND, OR 97210-3663

Line Item/Description	Quantity/ Price	UOM	Discount	Net Amount
1 AR-7540 NW ST HELENS RD	1.00	MTH	0.00	11,356.30
RE: LEASE FOR NOVEMBER 2007	11356.30	MTH		

PPI9270000- 503 32444

**AS PER THE LEASE AGREEMENT, RENT IS EXPECTED TO BE PREPAID BY THE FIRST OF EACH MONTH.

Please return this portion with your payment.

Invoice Number: RE450

Please Remit Payment To:
NW NATURAL
ATTN: PAYMENT PROCESSING/ JENNEY DOWD
PO BOX 8905
PORTLAND OR 97255-0001

Freight Charge:	0.00
Gross Amount:	11,356.30
Invoice Discount	0.00
Net Amount:	11,356.30
Tax Amount:	0.00
Downpayment:	0.00
Net Amount Due:	11,356.30

PURCHASE INVOICE

Purchase Invoice Number: 2007 TAX

Purchase Invoice Date: 12/12/07

Page: 1

Pay
To: NW NATURAL
NW NATURAL
PO BOX 6017
PORTLAND, OR 97228-6017

Ship
To: PORTLAND TERMINAL
7540 NW Saint Helens Road
Portland, OR 97210

Ship Via		Confirm To	
Receive By	12/13/07	Buyer	
Terms	Net 10 Days	P.O. Number	
Vendor ID	389157007	P.O. Date	12/13/07

Item No.	Description	Unit	Quantity	Unit Price	Total Price
	RENT		1	19,654.20	19,654.20

Subtotal:	19,654.20
Invoice Discount:	0.00
Total Sales Tax:	0.00
Total:	19,654.20

NW Natural®
220 NW 2ND AVENUE
PORTLAND, OR 97209
TEL 503.226.4211
800.422.4012
www.nwnatural.com

Invoice Number: 2007 TAX
Invoice Date: 12/12/2007
Terms: Due Upon Receipt of Invoice

Bill To:
KOPPERS, INC
7540 NW ST HELENS RD
PORTLAND, OR 97210-3663

Line Item/Description	Quantity/ Price	UOM	Discount	Net Amount
Oregon Property Taxes	1.00	EA	0.00	19,654.20
	19654.20	EA		

PPI9270000- 534 34461

Please return this portion with your payment.

Invoice Number: 2007 TAX

Please Remit Payment To:
NW NATURAL
ATTN: PAYMENT PROCESSING/ JENNEY DOWD
PO BOX 8905
PORTLAND OR 97255-0001

Freight Charge:	0.00
Gross Amount:	19,654.20
Invoice Discount	0.00
Net Amount:	19,654.20
Tax Amount:	0.00
Downpayment:	0.00
Net Amount Due:	19,654.20

PURCHASE INVOICE

Purchase Invoice Number: RE433

Purchase Invoice Date: 09/30/07

Page: 1

Pay
To: NW NATURAL
NW NATURAL
PO BOX 6017
PORTLAND, OR 97228-6017

Ship
To: PORTLAND TERMINAL
7540 NW Saint Helens Road
Portland, OR 97210

Ship Via		Confirm To	
Receive By	09/27/07	Buyer	
Terms	Net 10 Days	P.O. Number	
Vendor ID	389157007	P.O. Date	09/27/07

Item No.	Description	Unit	Quantity	Unit Price	Total Price
	RENT		1	11,356.30	11,356.30

Subtotal:	11,356.30
Invoice Discount:	0.00
Total Sales Tax:	0.00
Total:	11,356.30

NW Natural®
220 NW 2ND AVENUE
PORTLAND, OR 97209
TEL 503.226.4211
800.422.4012
www.nwnatural.com

Invoice Number: RE433
Invoice Date: 9/30/2007
Terms: Due Upon Receipt of Invoice

Bill To:
KOPPERS, INC
7540 NW ST HELENS RD
PORTLAND, OR 97210-3663

Line Item/Description	Quantity/ Price	UOM	Discount	Net Amount
1 AR-7540 NW ST HELENS RD	1.00	MTH	0.00	11,356.30
RE: LEASE FOR OCTOBER 2007	11356.30	MTH		

PPI9270000- 480
30600

**AS PER THE LEASE AGREEMENT, RENT IS EXPECTED TO BE PREPAID BY THE FIRST OF EACH MONTH.

Please return this portion with your payment.

Invoice Number: RE433

Please Remit Payment To:
NW NATURAL
ATTN: PAYMENT PROCESSING/ JENNEY DOWD
PO BOX 8905
PORTLAND OR 97255-0001

Freight Charge:	0.00
Gross Amount:	11,356.30
Invoice Discount	0.00
Net Amount:	11,356.30
Tax Amount:	0.00
Downpayment:	0.00
Net Amount Due:	11,356.30

PURCHASE INVOICE

Purchase Invoice Number: RE416

Purchase Invoice Date: 08/31/07

Page: 1

Pay
To: NW NATURAL
NW NATURAL
PO BOX 6017
PORTLAND, OR 97228-6017

Ship
To: PORTLAND TERMINAL
7540 NW Saint Helens Road
Portland, OR 97210

Ship Via		Confirm To	
Receive By	09/11/07	Buyer	
Terms	Net 10 Days	P.O. Number	
Vendor ID	389157007	P.O. Date	09/11/07

Item No.	Description	Unit	Quantity	Unit Price	Total Price
	RENT		1	11,356.30	11,356.30

Subtotal:	11,356.30
Invoice Discount:	0.00
Total Sales Tax:	0.00
Total:	11,356.30

NW Natural®
220 NW 2ND AVENUE
PORTLAND, OR 97209
TEL 503.226.4211
800.422.4012
www.nwnatural.com

Invoice Number: RE416
Invoice Date: 8/31/2007
Terms: Due Upon Receipt of Invoice

Bill To:
KOPPERS, INC
7540 NW ST HELENS RD
PORTLAND, OR 97210-3663

Line Item/Description	Quantity/ Price	UOM	Discount	Net Amount
1 AR-7540 NW ST HELENS RD	1.00	MTH	0.00	11,356.30
RE: LEASE FOR SEPTEMBER 2007	11356.30	MTH		

PPI9270000- 4C?
PZ-29799

**AS PER THE LEASE AGREEMENT, RENT IS EXPECTED TO BE PREPAID BY THE FIRST OF EACH MONTH.

Please return this portion with your payment.

Invoice Number: RE 237

Please Remit Payment To:
NW NATURAL
ATTN: PAYMENT PROCESSING/ LINDA FURIE
PO BOX 8905
PORTLAND OR 97255-0001

Freight Charge:	0.00
Gross Amount:	11,356.30
Invoice Discount	0.00
Net Amount:	11,356.30
Tax Amount:	0.00
Downpayment:	0.00
Net Amount Due:	11,356.30

PURCHASE INVOICE

Purchase Invoice Number: IN 106 SEPT 0

Purchase Invoice Date: 08/07/07

Page: 1

Pay
To: NORTHWEST NATURAL GAS CO
NORTHWEST NATURAL
PO BOX 8905
PORTLAND, OR 97255-0001

Ship
To: PORTLAND TERMINAL
7540 NW Saint Helens Road
Portland, OR 97210

Ship Via		Confirm To	
Receive By	08/09/07	Buyer	
Terms	Net 10 Days	P.O. Number	
Vendor ID	009962021	P.O. Date	08/09/07

Item No.	Description	Unit	Quantity	Unit Price	Total Price
	RENT		1	11,356.30	11,356.30

Subtotal:	11,356.30
Invoice Discount:	0.00
Total Sales Tax:	0.00
Total:	11,356.30

NW Natural®

220 NW 2ND AVENUE
PORTLAND, OR 97209
TEL 503.226.4211
800.422.4012
www.nwnatural.com

Invoice Number: IN 106
Invoice Date: 8/07/2007
Terms: Due Upon Receipt of Invoice

Bill To:
KOPPERS
7540 NW ST HELENS RD

PORTLAND, OR 97210-3663

Order Date	Description	Price/Month	Net Amount
8/07/2007	MONTHLY UTILITY LEASE - SEPTEMBER 2007 CHEMICAL PLANT 7540 NW ST HELENS RD	11,356.30	11,356.30

PPI9270000- 412
PI- 28299

Please return this portion with your payment.

Invoice Number: IN 106

Please Remit Payment To:
NW NATURAL
ATTN: PAYMENT PROCESSING/ LINDA FURIE
PO BOX 8905
PORTLAND OR 97255-0001

Freight Charge:	0.00
Gross Amount:	11,356.30
Invoice Discount	0.00
Net Amount:	11,356.30
Tax Amount:	0.00
Downpayment:	0.00
Net Amount Due:	11,356.30

PURCHASE INVOICE

Purchase Invoice Number: IN92 AUG07 R

Purchase Invoice Date: 07/02/07

Page: 1

Pay
To: NORTHWEST NATURAL GAS CO
NORTHWEST NATURAL
PO BOX 8905
PORTLAND, OR 97255-0001

Ship
To: PORTLAND TERMINAL
7540 NW Saint Helens Road
Portland, OR 97210

Ship Via
Receive By 07/05/07
Terms Net 10 Days
Vendor ID 009962021

Confirm To
Buyer
P.O. Number
P.O. Date 07/05/07

Item No.	Description	Unit	Quantity	Unit Price	Total Price
	RENT		1	11,356.30	11,356.30

Subtotal:	11,356.30
Invoice Discount:	0.00
Total Sales Tax:	0.00
Total:	11,356.30

NW Natural®

220 NW 2ND AVENUE
PORTLAND, OR 97209
TEL 503.226.4211
800.422.4012
www.nwnatural.com

Invoice Number: IN 92
Invoice Date: 7/2/07
Terms: Due Upon Receipt of Invoice

Bill To:
KOPPERS
7540 NW ST HELENS RD

PORTLAND, OR 97210-3663

Description	Price/Month	Net Amount
MONTHLY UTILITY LEASE - AUGUST 2007 CHEMICAL PLANT 7540 NW ST HELENS RD	11,356.30	11,356.30

PPI9270000- 416
PI - 26794

Please return this portion with your payment.

Invoice Number: IN 92

Please Remit Payment To:
NW NATURAL
ATTN: PAYMENT PROCESSING/ LINDA FURIE
PO BOX 8905
PORTLAND OR 97255-0001

Freight Charge:	0.00
Gross Amount:	11,356.30
Invoice Discount	0.00
Net Amount:	11,356.30
Tax Amount:	0.00
Downpayment:	0.00
Net Amount Due:	11,356.30

PURCHASE INVOICE

Purchase Invoice Number: FEB07 RENT 8

Purchase Invoice Date: 01/01/07

Page: 1

Pay
To: NORTHWEST NATURAL GAS CO
NORTHWEST NATURAL
PO BOX 8905
PORTLAND, OR 97255-0001

Ship
To: PORTLAND TERMINAL
7540 NW Saint Helens Road
Portland, OR 97210

Ship Via		Confirm To	
Receive By	02/01/07	Buyer	
Terms	Net 10 Days	P.O. Number	
Vendor ID	009962021	P.O. Date	02/01/07

Item No.	Description	Unit	Quantity	Unit Price	Total Price
	RENT		1	11,356.30	11,356.30

Subtotal:	11,356.30
Invoice Discount:	0.00
Total Sales Tax:	0.00
Total:	11,356.30

NW Natural®
220 NW 2ND AVENUE
PORTLAND, OR 97209
TEL 503.226.4211
800.422.4012
www.nwnatural.com

INVOICE

KOPPERS
7540 SW ST HELENS RD
PORTLAND, OREGON 97210-3663

DATE OF INVOICE 1/2/2007
OUR INVOICE NO.
ACCOUNT # 89050 184300

TERMS: NET CASH

ACCOUNTS RECEIVABLE GENERAL

DATE	DESCRIPTION	AMOUNT
12/1/06	JANUARY 2007 RENT	11,356.30
12/27/06	*Payment - Thank You*	*(11,356.30)*
1/1/07	FEBRUARY 2007 RENT	11,356.30
	Balance Due	$11,356.30

**** As per the lease agreement, rent is expected to be prepaid by the first of each month.**

Please Remit Payment To:

NW Natural
Attn: Payment Processing
PO Box 8905
Portland, OR 97255-0001

JAN 03 2007

PP192700000 -253

PI 16840

PURCHASE INVOICE

Purchase Invoice Number: MAR 07 89050

Purchase Invoice Date: 02/07/07

Page: 1

Pay
To: NORTHWEST NATURAL GAS CO
NORTHWEST NATURAL
PO BOX 8905
PORTLAND, OR 97255-0001

Ship
To: PORTLAND TERMINAL
7540 NW Saint Helens Road
Portland, OR 97210

Ship Via		Confirm To	
Receive By	02/06/07	Buyer	
Terms	Net 10 Days	P.O. Number	
Vendor ID	009962021	P.O. Date	02/06/07

Item No.	Description	Unit	Quantity	Unit Price	Total Price
	RENT		1	11,356.30	11,356.30

Subtotal:	11,356.30
Invoice Discount:	0.00
Total Sales Tax:	0.00
Total:	11,356.30

NW Natural®
220 NW 2ND AVENUE
PORTLAND, OR 97209
TEL 503.226.4211
800.422.4012
www.nwnatural.com

INVOICE

KOPPERS
7540 SW ST HELENS RD
PORTLAND, OREGON 97210-3663

DATE OF INVOICE 2/1/2007
CUSTOMER NUMBER 8
ACCOUNT NUMBER 89050 184300

TERMS: NET CASH

ACCOUNTS RECEIVABLE GENERAL

DATE	DESCRIPTION	AMOUNT
1/1/07	FEBRUARY 2007 RENT	11,356.30
1/22/07	*Payment - Thank You*	*(11,356.30)*
2/1/07	MARCH 2007 RENT	11,356.30
	Balance Due	$11,356.30

** **As per the lease agreement, rent is expected to be prepaid by the first of each month.**

Please Remit Payment To:

NW Natural
Attn: Payment Processing
PO Box 8905
Portland, OR 97255-0001

FEB 05 2007

PPI9270000- 200
PZ-18804

PURCHASE INVOICE

Purchase Invoice Number: RE 237 APRIL

Purchase Invoice Date: 03/07/07

Page: 1

Pay
To: NORTHWEST NATURAL GAS CO
NORTHWEST NATURAL
PO BOX 8905
PORTLAND, OR 97255-0001

Ship
To: PORTLAND TERMINAL
7540 NW Saint Helens Road
Portland, OR 97210

Ship Via
Receive By 03/12/07
Terms Net 10 Days
Vendor ID 009962021

Confirm To
Buyer
P.O. Number
P.O. Date 03/12/07

Item No.	Description	Unit	Quantity	Unit Price	Total Price
	RENT		1	11,356.30	11,356.30

Subtotal:	11,356.30
Invoice Discount:	0.00
Total Sales Tax:	0.00
Total:	11,356.30

NW Natural®
220 NW 2ND AVENUE
PORTLAND, OR 97209
TEL 503.226.4211
800.422.4012
www.nwnatural.com

Invoice Number: RE 237
Invoice Date: 2/28/2007
Terms: Due Upon Receipt of Invoice

Bill To:
KOPPERS, INC
7540 NW ST HELENS RD
PORTLAND, OR 97210-3663

Line Item/Description	Quantity/ Price	UOM	Discount	Net Amount
1 AR-7540 NW ST HELENS RD	1.00	MTH	0.00	11,356.30
RE: LEASE FOR APRIL 2007	11356.30	MTH		

PPI9270000- 311
PZ-20476

**AS PER THE LEASE AGREEMENT, RENT IS EXPECTED TO BE PREPAID BY THE FIRST OF EACH MONTH.

Please return this portion with your payment.

Invoice Number: RE 237

Please Remit Payment To:
NW NATURAL
ATTN: PAYMENT PROCESSING/ LINDA FURIE
PO BOX 8905
PORTLAND OR 97255-0001

Freight Charge:	0.00
Gross Amount:	11,356.30
Invoice Discount	0.00
Net Amount:	11,356.30
Tax Amount:	0.00
Downpayment:	0.00
Net Amount Due:	11,356.30

PURCHASE INVOICE

Purchase Invoice Number: MAY 07 RENT

Purchase Invoice Date: 04/01/07

Page: 1

Pay
To: NORTHWEST NATURAL GAS CO
NORTHWEST NATURAL
PO BOX 8905
PORTLAND, OR 97255-0001

Ship
To: PORTLAND TERMINAL
7540 NW Saint Helens Road
Portland, OR 97210

Ship Via		Confirm To	
Receive By	04/04/07	Buyer	
Terms	Net 10 Days	P.O. Number	
Vendor ID	009962021	P.O. Date	04/04/07

Item No.	Description	Unit	Quantity	Unit Price	Total Price
	RENT		1	11,356.30	11,356.30

Subtotal:	11,356.30
Invoice Discount:	0.00
Total Sales Tax:	0.00
Total:	11,356.30

NW Natural®
220 NW 2ND AVENUE
PORTLAND, OR 97209
TEL 503.226.4211
800.422.4012
www.nwnatural.com

Invoice Number: RE 288
Invoice Date: 3/31/2007
Terms: Due Upon Receipt of Invoice

Bill To:
KOPPERS INDUSTRIES
7540 SW ST HELENS RD
PORTLAND, OR 97210

Line Item/Description	Quantity/ Price	UOM	Discount	Net Amount
1 AR-7540 NW ST HELENS RD	1.00	MTH	0.00	11,356.30
RE: LEASE FOR MAY 2007	11356.30	MTH		

PPI9270000- 343
PI- 21756

**AS PER THE LEASE AGREEMENT, RENT IS EXPECTED TO BE PREPAID BY THE FIRST OF EACH MONTH.

Please return this portion with your payment.

Invoice Number: RE 288

Please Remit Payment To:
NW NATURAL
ATTN: PAYMENT PROCESSING/ LINDA FURIE
PO BOX 8905
PORTLAND OR 97255-0001

Freight Charge:	0.00
Gross Amount:	11,356.30
Invoice Discount	0.00
Net Amount:	11,356.30
Tax Amount:	0.00
Downpayment:	0.00
Net Amount Due:	11,356.30

PURCHASE INVOICE

Purchase Invoice Number: JUN 07 RENT

Purchase Invoice Date: 05/07/07

Page: 1

Pay
To: NORTHWEST NATURAL GAS CO
NORTHWEST NATURAL
PO BOX 8905
PORTLAND, OR 97255-0001

Ship
To: PORTLAND TERMINAL
7540 NW Saint Helens Road
Portland, OR 97210

Ship Via
Receive By 05/14/07
Terms Net 10 Days
Vendor ID 009962021

Confirm To
Buyer
P.O. Number
P.O. Date 05/14/07

Item No.	Description	Unit	Quantity	Unit Price	Total Price
	RENT		1	11,356.30	11,356.30

Subtotal:	11,356.30
Invoice Discount:	0.00
Total Sales Tax:	0.00
Total:	11,356.30

NW Natural®
220 NW 2ND AVENUE
PORTLAND, OR 97209
TEL 503.226.4211
800.422.4012
www.nwnatural.com

INVOICE

KOPPERS
7540 SW ST HELENS RD
PORTLAND, OREGON 97210-3663

DATE OF INVOICE 5/7/2007
CUSTOMER NUMBER 8
ACCOUNT NUMBER 89050 184300

TERMS: NET CASH

ACCOUNTS RECEIVABLE GENERAL

DATE	DESCRIPTION	AMOUNT
5/1/07	JUNE 2007 RENT	11,356.30

Balance Due $11,356.30

PPI9270000- 375
PI - 23939

** **As per the lease agreement, rent is expected to be prepaid by the first of each month.**

Please Remit Payment To:

NW Natural
Attn: Payment Processing
PO Box 8905
Portland, OR 97255-0001

PURCHASE INVOICE

July 07 Rent

Purchase Invoice Number: IN 83

Purchase Invoice Date: 06/01/07

Page: 1

Pay
To: NW NATURAL
NW NATURAL
PO BOX 8905
PORTLAND, OR 97255-0001

Ship
To: PORTLAND TERMINAL
7540 NW Saint Helens Road
Portland, OR 97210

Ship Via		Confirm To	
Receive By	06/06/07	Buyer	
Terms	Net 10 Days	P.O. Number	
Vendor ID	389157007	P.O. Date	06/06/07

Item No.	Description	Unit	Quantity	Unit Price	Total Price
	RENT		1	11,356.30	11,356.30

Subtotal:	11,356.30
Invoice Discount:	0.00
Total Sales Tax:	0.00
Total:	11,356.30

NW Natural®

220 NW 2ND AVENUE
PORTLAND, OR 97209
TEL 503.226.4211
800.422.4012
www.nwnatural.com

Invoice Number: IN 83
Invoice Date: 5/31/2007
Terms: Due Upon Receipt of Invoice

Bill To:
KOPPERS
7540 NW ST HELENS RD

PORTLAND, OR 97210-3663

Description	Price/Month	Net Amount
MONTHLY UTILITY LEASE - ~~JUNE~~ JULY 2007 CHEMICAL PLANT 7540 NW ST HELENS RD	11,356.30	11,356.30

PPI9270000- 93
PI-25159

Please return this portion with your payment.

Invoice Number: IN 83

Please Remit Payment To:
NW NATURAL
ATTN: PAYMENT PROCESSING/ LINDA FURIE
PO BOX 8905
PORTLAND OR 97255-0001

Freight Charge:	0.00
Gross Amount:	11,356.30
Invoice Discount	0.00
Net Amount:	11,356.30
Tax Amount:	0.00
Downpayment:	0.00
Net Amount Due:	11,356.30

KOPPERS INDUSTRIES

FAX TRANSMITTAL

7540 N.W. Saint Helens Rd.
Portland, Oregon 97210-3663
Phone: (503) 286-3681
Fax: (503) 285-2831
Web Page: www.koppers.com

TO: B. Meisinger, J. Stephenson, S. Kifer, J. Dietz DATE: 4/21/99

FROM: Amos TOTAL # OF PAGES: 2

Please review the Attached And give me A call

To: Jim Dietz K 1650

THIS TRANSMITTAL IS IN ERROR, PLEASE CALL 503-286-3681 FAX # 503-285-2831

NW Natural
220 NW 2ND AVENUE
PORTLAND, OR 97209
TEL 503.226.4211
www.nwnatural.com

April 19, 1999

Mr. Amos Kamerer
Koppers Industries, Inc.
7540 N W St. Helens Road
Portland, Or 97210-3663

Re: N W Natural/Koppers Lease Agreement – October 1. 1998
Leasehold Improvements.

Dear Mr. Kamerer,

Section 5.3 of the lease agreement between N W Natural (landlord) and Koppers Industries, Inc (tenant) requires N W Natural's written consent to proposed leasehold improvements. You have requested that N W Natural provide consent for placement of a liquid or solid coal tar processing plant on the Kopper's lease area.

N W Natural has no objection to your installation of a liquid or solid coal tar processing plant on the property. However, Section 5.3.2 of the lease agreement requires that the improvements must be in compliance with all governmental regulations. As you know, the property is under environmental investigation through the Oregon Department of Environmental Quality (ODEQ) Voluntary Clean-up Program. Accordingly, the ODEQ must review and approve the installation of the proposed tank pilings before we can give our consent and installation can begin.

Thank you for delivering the tank drawings to me on April 6,1999. The drawings and related construction documents were sent to Michelle Schupe of the ODEQ on April 8, 1999. I suggest that Koppers and N W Natural meet with Ms. Schupe to explain the construction and the environmental condition of the area.

I will notify you as soon as I hear from Ms Schupe.

Please call me if you need any further information.

Sincerely,

Sandra Hart

Sandra K. Hart
Manager Risk Environment and Land

RECEIVED
APR 21 1999
KOPPERS INDS, INC.
PORTLAND OR

NORTHWEST NATURAL GAS
220 NW SECOND AVENUE (503) 226-4211
PORTLAND OR 97209

DATE OF INVOICE 11/3/97
OUR INVOICE NO.
ACCOUNT NO. 9.172.1

TERM: NET CASH

KOPPERS
MAIL TO: 7540 ST HELENS RD
PORTLAND OR 97210

ACCOUNTS RECEIVABLE GENERAL

DATE	DESCRIPTION	AMOUNT
	DECEMBER 1997 RENT	$ 8,866.00
		$ $ 8,866.00

PLEASE REMIT TO:

ATTN: PAT TRASK

NORTHWEST NATURAL GAS
220 NW 2ND
PORTLAND OR 97209

RECEIVED
NOV 04 1997
KOPPERS INDS., INC.
PORTLAND, OR

NORTHWEST NATURAL GAS
220 NW SECOND AVENUE (503) 226-4211
PORTLAND OR 97209

MAIL TO: KOPPERS
7540 ST HELENS RD
PORTLAND OR 97210

DATE OF INVOICE 11/3/97
OUR INVOICE NO.
ACCOUNT NO. 9.172.1

TERM: NET CASH

ACCOUNTS RECEIVABLE GENERAL

DATE	DESCRIPTION	AMOUNT
	DECEMBER 1997 RENT	$ 8,866.00
		$ $ 8,866.00

PLEASE REMIT TO:

ATTN: PAT TRASK

NORTHWEST NATURAL GAS
220 NW 2ND
PORTLAND OR 97209

KI 37W REV 2 6M 6/90

CIRCLE TERMS ON INVOICE

GIL	DET.	S-DET.	LOC.	DEPT.	TAX	EMP #	MOVE # PO #	AMOUNT
305	974		9270	910	0362			8866 -

INV # 91721 DATE 11/3/97

A/P DEPARTMENT USE ONLY

VENDOR NUMBER 0 0 9 9 6 2 0 1 3

TERMS CODE 740 DUE DATE: / /

OK TO PAY

GROSS AMOUNT 8866 -

DISCOUNT $

NET $

DIVISION	MONTH	AUDIT NUMBER
483	12	92700627

IMPORTANT: CIRCLE TERMS ON INVOICE

NORTHWEST NATURAL GAS
220 NW SECOND AVENUE (503) 226-4211
PORTLAND OR 97209

DATE OF INVOICE 10/2/97
OUR INVOICE NO.
ACCOUNT NO. 9.172.1

TERM: NET CASH

MAIL TO: KOPPERS
7540 ST HELENS RD
PORTLAND OR 97210

ACCOUNTS RECEIVABLE GENERAL

DATE	DESCRIPTION	AMOUNT
	NOVEMBER 1997 RENT	$ 8,866.00
		$ $ 8,866.00

RECEIVED
OCT 03 1997
KOPPERS INDS., INC.
PORTLAND, OR

PLEASE REMIT TO:

ATTN: PAT TRASK

NORTHWEST NATURAL GAS
220 NW 2ND
PORTLAND OR 97209

NORTHWEST NATURAL GAS
220 NW SECOND AVENUE (503) 226-4211
PORTLAND OR 97209

MAIL TO: KOPPERS
7540 ST HELENS RD
PORTLAND OR 97210

DATE OF INVOICE 10/2/97
OUR INVOICE NO.
ACCOUNT NO. 9.172.1

TERM: NET CASH

ACCOUNTS RECEIVABLE GENERAL

DATE	DESCRIPTION	AMOUNT
	NOVEMBER 1997 RENT	$ 8,866.00
		$ $ 8,866.00

PLEASE REMIT TO:

ATTN: PAT TRASK

NORTHWEST NATURAL GAS
220 NW 2ND
PORTLAND OR 97209

KI 37W REV 2 6M 6/90

CIRCLE TERMS ON INVOICE

GIL	DET.	S-DET.	LOC.	DEPT.	TAX	EMP #	MOVE # PO #	AMOUNT
305	974		9270	910	0362			8866 -

INV # 91721 DATE 10/02/97

A/P DEPARTMENT USE ONLY

VENDOR NUMBER 0 0 9 9 6 2 0 1 3

TERMS. CODE 740 DUE DATE: / /

DIVISION	MONTH	AUDIT NUMBER
403	11	92700590

OK TO PAY

GROSS AMOUNT 8866 -
DISCOUNT $
NET $

IMPORTANT: CIRCLE TERMS ON INVOICE

NORTHWEST NATURAL GAS
220 NW SECOND AVENUE (503) 226-4211
PORTLAND OR 97209

MAIL TO: KOPPERS
7540 ST HELENS RD
PORTLAND OR 97210

DATE OF INVOICE 9/3/97
OUR INVOICE NO.
ACCOUNT NO. 9.172.1

TERM: NET CASH

ACCOUNTS RECEIVABLE GENERAL

DATE	DESCRIPTION	AMOUNT
	OCTOBER 1997 RENT	$ 8,866.00
		$ $ 8,866.00

PLEASE REMIT TO:

ATTN: PAT TRASK

NORTHWEST NATURAL GAS
220 NW 2ND
PORTLAND OR 97209

RECEIVED
SEP 05 1997
KOPPERS INDS. INC.
PORTLAND OR

NORTHWEST NATURAL GAS
220 NW SECOND AVENUE (503) 226-4211
PORTLAND OR 97209

MAIL TO: KOPPERS
7540 ST HELENS RD
PORTLAND OR 97210

DATE OF INVOICE 9/3/97
OUR INVOICE NO.
ACCOUNT NO. 9.172.1

TERM: NET CASH

ACCOUNTS RECEIVABLE GENERAL

DATE	DESCRIPTION	AMOUNT
	OCTOBER 1997 RENT	$ 8,866.00
		$ $ 8,866.00

PLEASE REMIT TO:

ATTN: PAT TRASK

NORTHWEST NATURAL GAS
220 NW 2ND
PORTLAND OR 97209

KI 37W REV 2 6M 6/90

CIRCLE TERMS ON INVOICE

GIL	DET.	S-DET.	LOC.	DEPT.	TAX	EMP #	MOVE # PO #	AMOUNT
305	974		9270	910	0362			8866.00

INV # 91721 DATE 9/3/97

A/P DEPARTMENT USE ONLY

VENDOR NUMBER 0 0 9 9 6 2 0 1 3

TERMS. CODE 740 DUE DATE: / /

OK TO PAY

GROSS AMOUNT 8866.00
DISCOUNT $
NET $

DIVISION	MONTH	AUDIT NUMBER
483	10	92700641

IMPORTANT: CIRCLE TERMS ON INVOICE

NORTHWEST NATURAL GAS
220 NW SECOND AVENUE (503) 226-4211
PORTLAND OR 97209

		DATE OF INVOICE	8/5/97
	KOPPERS	**OUR INVOICE NO.**	
MAIL TO:	7540 ST HELENS RD	**ACCOUNT NO.**	9.172.1
	PORTLAND OR 97210		
		TERM: NET CASH	

ACCOUNTS RECEIVABLE GENERAL

DATE	DESCRIPTION	AMOUNT
	SEPTEMBER RENT	$ 8,866.00
		$ $ 8,866.00

PLEASE REMIT TO:

ATTN: PAT TRASK

NORTHWEST NATURAL GAS
220 NW 2ND
PORTLAND OR 97209

RECEIVED
AUG 12 1997
KOPPERS INDS., INC.
PORTLAND, OR

NORTHWEST NATURAL GAS
220 NW SECOND AVENUE (503) 226-4211
PORTLAND OR 97209

MAIL TO: KOPPERS
7540 ST HELENS RD
PORTLAND OR 97210

DATE OF INVOICE 8/5/97
OUR INVOICE NO.
ACCOUNT NO. 9.172.1

TERM: NET CASH

ACCOUNTS RECEIVABLE GENERAL

DATE	DESCRIPTION	AMOUNT
	SEPTEMBER RENT	$ 8,866.00
		$ $ 8,866.00

PLEASE REMIT TO:

ATTN: PAT TRASK

NORTHWEST NATURAL GAS
220 NW 2ND
PORTLAND OR 97209

RECEIVED
AUG 12 1997
KOPPERS INDS., INC.
PORTLAND, OR

KI 37W REV 2 6M 6/90

CIRCLE TERMS ON INVOICE

GIL	DET.	S-DET.	LOC.	DEPT.	TAX	EMP #	MOVE # PO #	AMOUNT
305	974		9270	910	0362			8866 —

INV # 8597 DATE 08/05/97

A/P DEPARTMENT USE ONLY

VENDOR NUMBER 0 0 9 9 6 2 0 1 3

TERMS. CODE 740 DUE DATE: / /

OK TO PAY

GROSS AMOUNT 8866.00

DISCOUNT $

NET $

DIVISION	MONTH	AUDIT NUMBER
483	09	92700491

IMPORTANT: CIRCLE TERMS ON INVOICE

NORTHWEST NATURAL GAS
220 NW SECOND AVENUE (503) 226-4211
PORTLAND OR 97209

MAIL TO: KOPPERS
7540 ST HELENS RD
PORTLAND OR 97210

DATE OF INVOICE 7/2/97
OUR INVOICE NO.
ACCOUNT NO. 9.172.1

TERM: NET CASH

ACCOUNTS RECEIVABLE GENERAL

DATE	DESCRIPTION	AMOUNT
	AUGUST RENT	$ 8,866.00
		$ $ 8,866.00

PLEASE REMIT TO:

ATTN: PAT TRASK
NORTHWEST NATURAL GAS
220 NW 2ND
PORTLAND OR 97209

RECEIVED
JUL - 7 1997
KOPPERS INDS. INC.
PORTLAND, OR

KI 37W REV 2 6M 6/90

CIRCLE TERMS ON INVOICE

GIL	DET.	S-DET.	LOC.	DEPT.	TAX	EMP #	MOVE # PO #	AMOUNT
305	974		9270	910	0362			8866 —

INV # 7297 DATE 07/02/97

A/P DEPARTMENT USE ONLY

VENDOR NUMBER 0 0 9 9 6 2 0 1 3

TERMS CODE 740 DUE DATE: / /

OK TO PAY

GROSS AMOUNT 8866 00
DISCOUNT $
NET $

IMPORTANT: CIRCLE TERMS ON INVOICE

DIVISION	MONTH	AUDIT NUMBER
483	08	92700435

NORTHWEST NATURAL GAS
220 NW SECOND AVENUE (503) 226-4211
PORTLAND OR 97209

MAIL TO: KOPPERS
7540 ST HELENS RD
PORTLAND OR 97210

DATE OF INVOICE 6/3/97
OUR INVOICE NO.
ACCOUNT NO. 9.172.1

TERM: NET CASH

ACCOUNTS RECEIVABLE GENERAL

DATE	DESCRIPTION	AMOUNT
	JULY RENT	$ 8,866.00
		$ $ 8,866.00

PLEASE REMIT TO:

ATTN: PAT TRASK
NORTHWEST NATURAL GAS
220 NW 2ND
PORTLAND OR 97209

RECEIVED
JUN - 5 1997
KOPPERS INDS., INC.
PORTLAND, OR

KI 37W REV 2 6M 6/90

CIRCLE TERMS ON INVOICE

GIL	DET.	S-DET.	LOC.	DEPT.	TAX	EMP #	MOVE # PO #	AMOUNT
305	974		9270	910	0.362			8,866.00

INV # 6397 DATE 7/01/97

A/P DEPARTMENT USE ONLY

VENDOR NUMBER 0 0 9 9 6 2 0 1 3

TERMS. CODE 740 DUE DATE: / /

DIVISION	MONTH	AUDIT NUMBER
483	07	92700386

OK TO PAY

GROSS AMOUNT 8866 —

DISCOUNT $

NET $

IMPORTANT: CIRCLE TERMS ON INVOICE

NORTHWEST NATURAL GAS
220 NW SECOND AVENUE (503) 226-4211
PORTLAND OR 97209

DATE OF INVOICE 5/8/97
OUR INVOICE NO.
ACCOUNT NO. 9.172.1

TERM: NET CASH

MAIL TO:
KOPPERS
7540 ST HELENS RD
PORTLAND OR 97210

ACCOUNTS RECEIVABLE GENERAL

DATE	DESCRIPTION	AMOUNT
	JUNE RENT	$ 8,866.00
		$ $ 8,866.00

RECEIVED
MAY 19 1997
KOPPERS INDS., INC.
PORTLAND, OR

PLEASE REMIT TO:

ATTN: PAT TRASK

NORTHWEST NATURAL GAS
220 NW 2ND
PORTLAND OR 97209

KI 37W REV 2 6M 6/90

CIRCLE TERMS ON INVOICE

GIL	DET.	S-DET.	LOC.	DEPT.	TAX	EMP #	MOVE # PO #	AMOUNT
305	974		9270	910	0362			8866 -

INV # 91721 DATE 5/8/97

A/P DEPARTMENT USE ONLY

VENDOR NUMBER 0 0 9 9 6 2 0 1 3

TERMS CODE 740 DUE DATE: / /

DIVISION	MONTH	AUDIT NUMBER
483	6	92700343

OK TO PAY

GROSS AMOUNT 8866 -
DISCOUNT $
NET $

IMPORTANT: CIRCLE TERMS ON INVOICE

Koppers000199

NORTHWEST NATURAL GAS
220 NW SECOND AVENUE (503) 226-4211
PORTLAND OR 97209

DATE OF INVOICE 4/8/97
OUR INVOICE NO.
ACCOUNT NO. 9.172.1

TERM: NET CASH

MAIL TO:
KOPPERS
7540 ST HELENS RD
PORTLAND OR 97210

ACCOUNTS RECEIVABLE GENERAL

DATE	DESCRIPTION	AMOUNT
	MAY RENT	$ 8,866.00
		$ $ 8,866.00

RECEIVED
APR - 9 1997
KOPPERS INDS., INC.
PORTLAND, OR

PLEASE REMIT TO:

ATTN: PAT TRASK
NORTHWEST NATURAL GAS
220 NW 2ND
PORTLAND OR 97209

KI 37W REV 2 6M 6/90

CIRCLE TERMS ON INVOICE

GIL	DET.	S-DET.	LOC.	DEPT.	TAX	EMP #	MOVE # PO #	AMOUNT
305	974		9270	910	0362			8866 -

INV # 91721 DATE 4 / 8 / 97

A/P DEPARTMENT USE ONLY

VENDOR NUMBER 0 0 9 9 6 2 0 1 3

TERMS CODE 740 DUE DATE: / /

DIVISION	MONTH	AUDIT NUMBER
483	05	92700283

OK TO PAY Linda Robinson

GROSS AMOUNT 8866 -
DISCOUNT $
NET $

IMPORTANT: CIRCLE TERMS ON INVOICE

NORTHWEST NATURAL GAS
220 NW SECOND AVENUE (503) 226-4211
PORTLAND OR 97209

DATE OF INVOICE 3/11/97
OUR INVOICE NO.
ACCOUNT NO. 9.172.1

MAIL TO:
KOPPERS
7540 ST HELENS RD
PORTLAND OR 97210

TERM: NET CASH

ACCOUNTS RECEIVABLE GENERAL

DATE	DESCRIPTION	AMOUNT
	APRIL RENT	$ 8,866.00
		$ $ 8,866.00

PLEASE REMIT TO:

ATTN: PAT TRASK
NORTHWEST NATURAL GAS
220 NW 2ND
PORTLAND OR 97209

RECEIVED
MAR 12 1997
KOPPERS INDS., INC.
PORTLAND, OR

KI 37W REV 2 6M 6/90

CIRCLE TERMS ON INVOICE

GIL	DET.	S-DET.	LOC.	DEPT.	TAX	EMP #	MOVE # PO #	AMOUNT
305	974		9270	910	0362			8866 -

INV # 91721 DATE 3/11/97

A/P DEPARTMENT USE ONLY

VENDOR NUMBER 0 0 9 9 6 2 0 1 3

TERMS CODE 740 DUE DATE: / /

OK TO PAY

GROSS AMOUNT 8866 -

DISCOUNT $

NET $

DIVISION	MONTH	AUDIT NUMBER
483	4	92700225

IMPORTANT: CIRCLE TERMS ON INVOICE

NORTHWEST NATURAL GAS COMPANY
220 NW SECOND AVENUE (503) 226-4211
PORTLAND OREGON 97209

DATE OF INVOICE 11-Feb-97
OUR INVOICE NO.
ACCOUNT NO. 9-172.1

MAIL TO KOPPERS CO
7540 NW ST HELENS RD
PORTLAND OR 97210

TERMS: NET CASH

ACCOUNTS RECEIVABLE GENERAL

DATE	DESCRIPTION	AMOUNT
	MARCH 1997 RENT	$ 8,866.00
		$ 8,866.00

PLEASE REMIT TO:

NORTHWEST NATURAL GAS
220 NW 2ND
PORTLAND OR 97209

ATTN PAT TRASK

RECEIVED
FEB 12 1997
KOPPERS INDS., INC.
PORTLAND, OR

KI 37W REV 2 6M 6/90

CIRCLE TERMS ON INVOICE

GIL	DET.	S-DET.	LOC.	DEPT.	TAX	EMP #	MOVE # PO #	AMOUNT
305	974		9270	910	0362			8866—

INV # 91721 DATE 2/11/97

A/P DEPARTMENT USE ONLY

VENDOR NUMBER 0 0 9 9 6 2 0 1 3

TERMS CODE 740 DUE DATE: / /

OK TO PAY

GROSS AMOUNT 8866—

DISCOUNT $

NET $

IMPORTANT: CIRCLE TERMS ON INVOICE

DIVISION	MONTH	AUDIT NUMBER
483	2	92700160

Koppers000202

NORTHWEST NATURAL GAS COMPANY
220 NW SECOND AVENUE (503) 226-4211
PORTLAND OREGON 97209

DATE OF INVOICE 27-Jan-97
OUR INVOICE NO.
ACCOUNT NO. 9-172.1

MAIL TO KOPPERS CO
7540 NW ST HELENS RD
PORTLAND OR 97210

TERMS: NET CASH

ACCOUNTS RECEIVABLE GENERAL

DATE	DESCRIPTION	AMOUNT
	FEBUARY 1997 RENT	$ 8,866.00
		$ 8,866.00

PLEASE REMIT TO:

NORTHWEST NATURAL GAS
220 NW 2ND
PORTLAND OR 97209

ATTN PAT TRASK

RECEIVED
JAN 28 1997
KOPPERS INDS., INC.
PORTLAND, OR

KI 37G REV 2 2M 6/90

CIRCLE TERMS ON INVOICE

GIL	DET.	S-DET.	LOC.	DEPT.	TAX	EMP #	MOVE # PO #	AMOUNT
305	974		9270	910	0362			8866 —

INV # 91721 DATE 1/27/97

A/P DEPARTMENT USE ONLY

VENDOR NUMBER 0 0 9 9 6 2 0 1 3

TERMS CODE 740 DUE DATE: / /

OK TO PAY

GROSS AMOUNT 8866 —

DISCOUNT $

NET $

IMPORTANT: CIRCLE TERMS ON INVOICE

DIVISION	MONTH	AUDIT NUMBER
483	2	92700076

Koppers000203

A Member of THE BEAZER GROUP
Law Department
436 Seventh Avenue, Pittsburgh, PA 15219
Phone: 412-227-2430 Fax: 412-227-2042

Jill M. Blundon
General Counsel
Thomas Burgunder
Thomas F. Reid
George Carroll
Mary Dombrowski Wright
Billie Schrecker Nolan
William F. Giarla
Babette Magee
James B. Springfield
Real Estate Manager

June 2, 1989

Fred Hansen
Director
Department of Environmental Quality
811 SW Sixth Ave.
Portland, OR 97204-1390

Jay F. Young
NL Industries, Inc.
P. O. Box 1090
Hightstown, NJ 08520

RE: Doane Lake

Gentlemen:

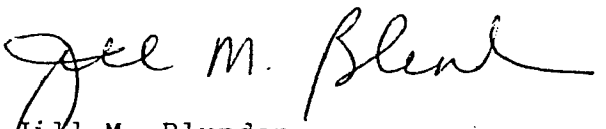
Please be advised that as a result of the December 28, 1988 sale of the former Koppers Company, Inc. (now known as Beazer Materials and Services, Inc. ("BM&S")) tar terminal located in Portland, Oregon ("plant") to Koppers Industries, Inc. ("KII"), BM&S has assumed liability, if any, arising out of environmental contamination at the plant, if any, occurring before December 28, 1988. Accordingly, with respect to the Doane Lake site, if any liability is determined to arise from activities at the plant before December 28, 1988, that liability will be BM&S', not KII's. As you know, BM&S continues to take the position that no such liability exists.

Therefore, all future communications with respect to the Doane Lake site should be directed to Billie Nolan, Beazer Materials and Services, Inc., 1400 Koppers Building, Pittsburgh, PA 15219 and not to the plant or to anyone else at KII.

Writer's Direct Dial Number 412/227-2414

Thank you for your assistance in this regard.

Very truly yours,



Jill M. Blundon
Vice President and
General Counsel

cc: J. Batchelder
L. Flaherty
J. Oxford - KII Portland

COPY

LEASE AGREEMENT

BETWEEN

NORTHWEST NATURAL GAS COMPANY,
dba NW Natural,
as Landlord

and

KOPPERS INDUSTRIES, INC.,
as Tenant

as of October 1, 1998

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Koppers000208

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Koppers000210

BASIC LEASE INFORMATION

Lease Date:	October 1, 1998
Landlord:	Northwest Natural Gas Company, dba NW Natural
Address of Landlord:	220 NW Second Avenue Portland, Oregon 97209 Attention: Manager: Risk, Environmental and Land
All Payments Made To:	220 NW Second Avenue Portland, Oregon 97209 Attention: Manager: Risk, Environmental and Land
Tenant:	Koppers Industries, Inc.
Address of Tenant:	7540 NW St. Helens Road Portland, Oregon 97210
Contact:	Amos Kamerer
Premises:	That section of the real property identified on Exhibit B to the Lease, and such portions of Landlord's Plant Property required for the Dock Improvements.
Lease Term:	Number of Months: 120 Scheduled Commencement Date: 10/01/1998 Expiration Date: 09/30/2008
Rent:	$9,900.00 per month for the initial term
Special Provisions:	Two five-year renewal terms; option to construct additional improvements and modify Landlord's existing docking facility.

LEASE AGREEMENT

THIS LEASE AGREEMENT (this "Lease") is made and entered into effective as of September 1, 1998, by and between NORTHWEST NATURAL GAS COMPANY (dba NW Natural), an Oregon corporation ("Landlord"), and KOPPERS INDUSTRIES, INC., a Pennsylvania corporation ("Tenant").

RECITALS

A. Landlord owns certain real property located in Portland, Multnomah County, Oregon, more particularly described in Exhibit A ("Landlord's Plant Property"), a portion of which is used by Landlord to conduct its liquid natural gas operations and a portion of which is currently leased to Tenant pursuant to the Prior Lease (as defined below). Portions of Landlord's Plant Property are also leased to other tenants from time to time.

B. Landlord desires to continue to lease to Tenant that portion of Landlord's Plant Property currently occupied by Tenant and such additional portions of the Landlord's Plant Property required for the Dock Improvements, and Tenant desires to lease the same from Landlord, on the terms and conditions set forth below.

AGREEMENT

Landlord and Tenant therefore agree as follows:

1. DEFINITIONS

As used in this Lease, the following terms shall have the following respective meanings:

"Dock Improvements" has the meaning specified in Section 5.2.

"Docking Facility" has the meaning specified in Section 5.2.

"Environmental Laws" means all state, federal and local statutes, regulations and ordinances relating to the protection of human health and the environment.

"Existing Environmental Liabilities" means the liability of Landlord, and Koppers Company, Inc. (now known as Beazer East, Inc. and the previous tenant under the Prior Lease) for certain environmental contamination of Landlord's Plant Property, as established and allocated pursuant to an agreement between Landlord and Beazer East, Inc..

"Existing Improvements" has the meaning specified in Section 5.1.

"Existing Mortgage" means the Mortgage and Deed of Trust dated July 1, 1946, and recorded in the Mortgage Records of Multnomah County, Oregon, on July 19, 1946 at Book 911, Page 203, as modified encumbering Landlord's Plant Property.

"Governmental Requirements" means any and all laws, statutes, ordinances, rules, orders, requirements, resolutions, policy statements and regulations of any federal, state or local governmental or quasi-governmental bodies or agencies having jurisdiction over the Landlord's Plant Property or the business and operations conducted by any party on any portion of Landlord's Plant Property.

"Hazardous Material" means any hazardous or toxic substance, material or waste, including, but not limited to, those substances, materials and wastes listed in the United States Department of Transportation Hazardous Materials Table (49 C.F.R. § 172.101) or by the United States Environmental Protection Agency as hazardous substances (40 C.F.R. pt. 302 and amendments thereto), petroleum products and their derivatives, and such other substances, materials and wastes as become regulated or subject to cleanup authority under any Environmental Laws.

"Landlord's Plant Property" has the meaning specified in Recital A.

"Lease Term" means the initial term of this Lease, as extended by any renewal terms.

"Real Property Taxes" means all taxes, assessments (general and special) and other charges that may be imposed on or against all or any portion of or in relation to the Premises, any leasehold estate in the Premises or measured by rent from the Premises. "Real Property Taxes" also includes any assessment, charge or tax (other than estate, inheritance, net income or franchise taxes) imposed by any authority having a direct or indirect power to tax or charge, including, without limitation, any city, county, state, federal or any improvement or other district.

"Premises" means that portion of Landlord's Plant Property consisting of all of Tax Lot 111 as more particularly described and depicted in Exhibit B and such portions of Landlord's Plant Property required for the Dock Improvements.

"Prior Lease" means the Lease dated August 17, 1965, between Landlord and Koppers Company, Inc. (now known as Beazer East, Inc.), recorded in the Records of Multnomah County, Oregon, on September 7, 1965 at Book 373, Page 271, the tenant's interests and obligations thereunder having been assigned to and assumed by Tenant by instrument dated March 13, 1989 and recorded in the Records of

Multnomah County, Oregon, at Book 2185, Page 289, as such Lease has been previously amended and as affected by the allocation of Existing Environmental Liabilities.

2. LEASE OF PREMISES; TERM

2.1 Premises; Demising Clause

Landlord hereby leases to Tenant, and Tenant hereby leases from Landlord, the Premises on the terms and conditions set forth in this Lease. Tenant acknowledges that other tenants of Landlord from time to time may use the loading and unloading facilities located along the southeasterly boundary of the Premises.

2.2 Initial Term of Lease

The initial ten (10) year term of this Lease shall commence on October 1, 1998, and shall end at 11:59 P.M. on September 30, 2008. The Prior Lease shall terminate on the commencement date of this Lease; provided, however, such termination shall not release or otherwise affect Tenant's obligations with respect to any environmental condition of Landlord's Plant Property caused by Tenant or Beazer East, Inc. under the Prior Lease in connection with operations on the Premises under this Lease or the Prior Lease or any party's obligations with respect to the Existing Environmental Liabilities. Tenant may terminate this Lease at any time during the initial term or any renewal term hereof upon giving twelve (12) months' prior written notice to Landlord. Any such termination shall not affect any amount of rent due and owing under this Lease up to the effective date of such termination or affect any liability of Tenant under Environmental Laws.

12 MOS. TERM. NOTICE

2.3 Renewal Terms

If there is no default under this Lease when each option is exercised or when the renewal term is to commence, then Tenant shall have the option to renew this Lease for two (2) successive terms of five (5) years each, as follows:

15 + 20 YRS.

2.3.1 Each renewal term shall commence on the day following expiration of the immediately preceding term.

2.3.2 Tenant shall exercise the renewal option, if at all, by written notice to Landlord given not less than one hundred eighty (180) days before the applicable renewal term begins. Tenant may exercise its option to renew for the second renewal term if (a) Tenant timely exercises its renewal option, and (b) Tenant leased the Premises for the immediately preceding renewal term. If Tenant gives such

notice, then this Lease shall be binding for the applicable renewal term without further act of the parties.

2.3.3 The terms and conditions applicable to Tenant's leasing of the Premises for each renewal term shall be as set forth in this Lease with respect to the initial term, except for rent and except that Tenant may not renew this Lease for the renewal term that has been exercised. Rent for each renewal term shall be subject to adjustment as provided in Section 4.2 below.

3. USE

Tenant is authorized to use the Premises for purchasing, loading and unloading, storing, processing and selling coal tar, products derived from coal tar and petroleum pitch, and for other purposes incidental and directly related to such operations, including, but not limited to, incidental office space and parking for its employees and visitors. Tenant shall not use the Premises for any other purpose without the prior written consent of Landlord, which will not be unreasonably withheld. Tenant shall have the right to install signs on the Premises identifying its operations, to the extent permitted by law. Tenant shall coordinate its use of the Docking Facility with Landlord and other tenants of Landlord's Plant Property. Landlord may, in its sole discretion, resolve any dispute among tenants regarding the time, duration, and nature of the use of the Docking Facility. Tenant may not perform any excavating or digging operation of any type or kind on the Premises without prior written notice to Landlord and without Landlord's prior written consent, which will not be unreasonably withheld.

4. RENT

4.1 Basic Monthly Rent

Tenant shall pay as basic monthly rent to Landlord during the first five (5) years of the initial Lease Term the sum of $9,900.00 per month (subject to adjustment as provided in Section 4.2 for the second five (5) years of the initial Lease Term and for any renewal terms, and subject to adjustment as provided in Section 5.2 with respect to any Dock Improvements made by Tenant). Rent shall be paid in advance on the first day of each calendar month, at Landlord's address set forth in Section 22.4 below, or at such other place as Landlord may designate in writing from time to time. Rent due for any partial month shall be prorated. Except as may be specifically provided otherwise herein, all rent shall be paid without billing and without prior demand or notice and without any deduction or offset.

4.2 Rent During Second Five Years and During Renewal Terms

The basic monthly rent shall be adjusted in accordance with this Section 4.2 on the first day of the sixth (6th) year of the Lease Term and, if Tenant has exercised its renewal options with respect thereto on the first day of each renewal term of this Lease, the basic monthly rent shall be adjusted in accordance with this Section 4.2. Each such adjustment date is hereinafter referred to as a "Rent Adjustment Date". The base for computing such increases is the Consumer Price Index All Urban Consumers U.S. City Average (1982-84 = 100), published by the United States Department of Labor, Bureau of Labor Statistics ("Index"), in effect on November 1, 1997 ("Beginning Index"). The Index published and in effect on the date that is two (2) months prior to each Rent Adjustment Date ("Adjustment Index") is to be used in determining the amount of the increase on such Rent Adjustment Date. Beginning with the basic monthly rent due on and after the first Rent Adjustment Date, and on and after each subsequent Rent Adjustment Date, the basic monthly rent due shall be increased by an amount equal to the product achieved by multiplying the basic monthly rent in effect immediately preceding such Rent Adjustment Date by a fraction. On the first Rent Adjustment Date, the numerator of the fraction will be the Adjustment Index and the denominator will be the Beginning Index. On the second and each subsequent Rent Adjustment Date, the numerator of the fraction will be the current Adjustment Index and the denominator will be the Adjustment Index used to calculate the immediately preceding rental increase pursuant to this Section 4.2. In no event, however, shall any adjustments made under this Section 4.2 cause the basic monthly rent to be reduced below the basic monthly rent amount most recently in effect. If the Index is changed so that the base year index differs from that in effect on November 1, 1997, the Index shall be converted in accordance with the conversion factor published by the United States Department of Labor Bureau of Labor Statistics. If the Index is discontinued or revised during the Term, such other government index or computation with which it is replaced, as agreed to by both parties to this Lease, shall be used in order to obtain substantially the same result as would be obtained if the Index had not been discontinued or revised.

By way of example, but not by way of limitation, for the rental adjustment taking place on January 1, 2003, the Index in effect for November 2002 shall be compared to the Index in effect for the month of November 1997. For the adjustment taking place with respect to the first renewal term on January 1, 2008, the parties will compare the Index in effect for November 2007 to the Index for November 2002.

4.3 Additional Rent

All other costs, charges and reimbursements that Tenant is required elsewhere in this Lease to pay, and any other sum that Tenant is required to pay to Landlord or

third parties in connection with this Lease, shall constitute additional rent under this Lease. All delinquent rent shall bear interest at the rate of nine percent (9)% per annum from the date due until paid.

5. LEASEHOLD IMPROVEMENTS AND PERSONAL PROPERTY

5.1 Existing Improvements

Pursuant to the Prior Lease, Tenant constructed and is in possession of substantial improvements on the Premises (the "Existing Improvements"). Tenant shall accept possession under this Lease of the Existing Improvements and any other improvements located on the Premises as of the date of this Lease in their current, AS IS, WHERE IS condition, without representation or warranty as to condition, fitness for purpose or any other representation or warranty by Landlord whatsoever, express or implied. Tenant may relocate, modify, dismantle and remove, or replace any of the Existing Improvements without Landlord's consent and, with Landlord's prior written consent, any other improvements on the Premises as of the date of this Lease (save and except the fire walls surrounding the light oil tank farm), which consent shall not be unreasonably withheld. Pre-KBI?

5.2 Future Leasehold Improvements--Modification of Existing Marine Petroleum Terminal

Landlord acknowledges that Tenant intends to modify Tenant's operations at the Premises to use liquid coal tar pitch, in addition to or in place of solid coal tar pitch. As part of this change in Tenant's operations, Tenant wishes to construct additional improvements to Tenant's Existing Improvements and to modify Landlord's existing docking facility (consisting of a crane, a wharf, the dock, and any improvements, additions, or replacements thereto, together defined as the "Docking Facility") located on the northerly boundary of Landlord's Plant Property. The additional improvements contemplated by Tenant to the Docking Facility are referred to collectively as the "Dock Improvements." If the Dock Improvements are constructed, the basic monthly rent payable by Tenant to Landlord shall be increased by $100.00 per month as a result of Tenant's increased use of Landlord's Plant Property. Landlord shall cooperate with Tenant as reasonably necessary to allow Tenant to construct the Dock Improvements, at Tenant's sole cost and expense, subject to the following limitations:

5.2.1 Prior to any construction of the Dock Improvements by or for Tenant, Landlord and Tenant shall reach substantial written agreement regarding the scheduling and level of use of the Docking Facility by Tenant and Landlord, and any other tenant or subtenant of Landlord at Landlord's Plant Property; provided, however,

that the Docking Facility but not the Dock Improvements shall be deemed to be a common area and may be used by other tenants of Landlord in addition to Tenant.

5.2.2 Tenant shall construct the Dock Improvements, if at all, substantially as and where described in the U. S. Army Corps of Engineers Portland District Public Notice for Permit Application No. 97-903 issued July 30, 1997, a copy of which is attached hereto as Exhibit C;

5.2.3 Tenant shall, upon five (5) days' written request from Landlord, provide Landlord with the most current copies of any and all plans, specifications, and drawings for the Dock Improvements, including any "as-built" survey;

5.2.4 Construction of the Dock Improvements shall not interfere with Landlord's operations at Landlord's Plant Property; and

5.2.5 Construction of the Dock Improvements shall not interfere with the operations of any existing or future tenant of Landlord's Plant Property.

5.3 Leasehold Improvements--General Requirements

5.3.1 Tenant, at its sole cost and expense, may construct on the Premises such other improvements and structures Tenant may wish in connection with a liquid or solid coal tar processing plant, provided Tenant first obtains Landlord's prior written consent, which consent shall not be unreasonably withheld.

5.3.2 With regard to any such other improvements made by Tenant, and with regard to the Dock Improvements described in Section 5.2 above, Tenant hereby covenants that (1) all improvements and structures shall be constructed in a good and workmanlike manner and in compliance at all times with all applicable Governmental Requirements; (2) if any mechanic's liens shall be filed against any portion of Landlord's Plant Property or any building or improvement thereon, Tenant shall, at its own cost and expense, cause the same to be canceled and discharged within thirty (30) days after notice of the filing thereof; and (3) if Landlord is required to appear at any hearing or other proceeding, to take any action, or review any document related in anyway to improvements constructed by Tenant (including any appearance at any land use or other hearing), Tenant shall pay to Landlord all costs and expenses incurred by Landlord related to such appearance, action, or review, including, without limitation, Landlord's costs for Landlord's employees and contractors, and all attorney fees.

5.3.3 All improvements, including the Existing Improvements and the Dock Improvements (except the Docking Facility and the items owned by Landlord or any existing or future tenant at the Premises that are currently located on the Premises) shall be deemed to be personal property of Tenant and shall remain the

property of Tenant during the Lease Term. At the expiration or earlier termination of this Lease, Tenant shall remove all Dock Improvements and all improvements located on the Premises, regardless of when or where built. If Tenant does not remove all improvements within one hundred eighty (180) days of the date of Landlord's notice, all improvements remaining on the Premises shall become Landlord's property, and Landlord may, in Landlord's discretion, remove all or some of such improvements at Tenant's expense, or may retain all or some of the improvements.

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6. COMPLIANCE WITH LAW; PERMITS

6.1 Compliance with Law

Tenant shall, at Tenant's expense, comply with all applicable Governmental Requirements, covenants and restrictions of record, and requirements in effect during the Lease Term or any part thereof.

6.2 Permits

Tenant shall obtain all approvals, consents, permits and licenses required under applicable Governmental Requirements for the conduct of Tenant's business on the Premises. Landlord will cooperate reasonably with Tenant's efforts to obtain the permits, but Tenant shall bear all costs of obtaining the permits.

7. LANDLORD'S ACCESS AND RESERVATION OF RIGHTS

Landlord, its agents and employees, may enter the Premises at reasonable times to inspect the same, maintain, repair and/or replace existing utility lines, conduct any environmental remediation and monitor such work, and perform Landlord's obligations under this Lease. Landlord reserves the right to install additional utility or other lines, so long as such additional lines do not materially interfere with Tenant's operations on the Premises.

8. TAXES, UTILITIES AND OTHER FEES

8.1 Real Property Taxes

8.1.1 Obligation to Pay

Tenant shall pay promptly to Landlord, before the same become delinquent, all Real Property Taxes due during the Lease Term against the Premises or by reason of the use or occupancy thereof, and the amount of any increase in Real Property Taxes payable by Landlord attributable to Tenant's Dock Improvements. Real Property Taxes attributable to any partial year in the Lease Term shall be prorated.

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8.1.2 LID Assessments

Notwithstanding any contrary term in this Lease, for any special or local improvement district or similar tax or assessment levied or assessed on or against the Premises that can be paid in installments or that cover improvements with a useful life extending beyond the Lease Term, only the amount due and payable for the Lease year in question shall be included within "Real Property Taxes" for the Lease year.

8.1.3 Separate Tax Lot; Tax Bills

The Premises are taxed as a separate tax lot with their own tax lot number. Landlord shall pay all tax bills for all portions of the Premises, and shall thereafter forward a copy of such tax bill to Tenant. Tenant shall pay to Landlord the full amount of each such tax bill within thirty (30) days of receiving notice from Landlord of the amount due. If any tax bill is sent to Tenant and not directly to Landlord, Tenant shall promptly deliver copies of such tax bill to Landlord.

8.1.4 Contests

If Tenant in good faith believes any tax appraisal or assessment is excessive, and if there is a process for contesting or appealing such valuation, then Tenant may contest such appraisal or assessment and, to the extent possible, Landlord will cooperate with Tenant in such effort. Costs of the contest shall be borne by Tenant. The foregoing shall not limit Landlord's right to contest any such appraisal or assessment, at Landlord's own expense. Landlord and Tenant agree to cooperate in good faith with regard to any tax contest.

8.2 Personal Property Taxes

Tenant will promptly pay all personal property taxes assessed on or with respect to Tenant's trade fixtures, equipment, and other personal property.

8.3 Utilities

Tenant shall promptly pay for all utilities and services used in, on or from the Premises during the Lease Term. Tenant shall arrange and pay for its janitorial and trash removal services and other costs of operating and maintaining the Premises, it being understood that, except as expressly provided in this Lease, this Lease is a "net" lease and Tenant shall be responsible for all such expenses.

9. REPAIRS

9.1 Tenant's Obligation

Tenant shall maintain the Premises, all improvements, alterations and additions to the Premises, the Dock Improvements (if any), and all other personal property of Tenant located on or around the Premises or the Docking Facility in a good state of repair, and shall keep the same and all parts thereof in good, clean, healthful and safe order and condition, all in accordance with applicable Governmental Requirements. Except as provided in Section 9.2, Landlord shall not be required to make any improvement or repair of any kind for Tenant's benefit on the Premises or any other portion of Landlord's Plant Property. Subject to the Existing Environmental Liabilities, Tenant shall at all times keep the Premises and the Dock Improvements, if any, in compliance with all Legal Requirements and in accordance with all directions, rules and regulations of the health officer, fire marshal, building inspector or other proper officer of any governmental entity, at the sole cost and expense of Tenant.

9.2 Landlord's Obligation

Landlord shall maintain and repair the underground waterlines used for the fire suppression system serving the Premises up to and including the hydrants, including periodic testing of such fire suppression system not less than one (1) time per year the Lease Term.

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9.3 Self-Help

If Tenant or Landlord fail to perform its obligations under this Section 9 after notice and a reasonable opportunity to cure (such period not to exceed twenty (20) days, unless (1) cure cannot reasonably be completed within twenty (20) days, and (2) cure is commenced within twenty (20) days and thereafter diligently and continuously pursued to completion), the other party may perform or cause such obligation to be performed. Any cost incurred shall be paid by the party required to perform such obligation and shall accrue interest at the rate of 9% per annum, from the date of expenditure until reimbursed. Notwithstanding the foregoing, if any condition on the Premises or Docking Facility poses an immediate risk of injury or harm, the parties may take such emergency action as may be reasonably necessary without providing an opportunity to cure to the other party, so long as the party taking such action promptly notifies the other party of the action taken.

10. INDEMNIFICATION AND INSURANCE

10.1 Indemnification

10.1.1 Tenant's Indemnification of Landlord

Except as limited in Section 10.1.3 and except as provided to the contrary in any agreement between the parties regarding or related to the Existing Environmental Liabilities, Tenant shall indemnify, defend and save Landlord, its directors, officers, agents, contractors and employees, harmless from all liabilities, claims, losses, demands and expenses (including reasonable fees of professionals) incurred or suffered by Landlord, its directors, officers, agents, contractors and employees, and relating to or resulting from the acts or omissions of Tenant, its officers, directors, agents, contractors and employees on or about the Premises or any other portions of Landlord's Plant Property.

10.1.2 Landlord's Indemnification of Tenant

Except as limited in Section 10.1.3 and except as provided to the contrary in any agreement between the parties regarding or related to the Existing Environmental Liabilities, Landlord shall indemnify, defend and save Tenant, its directors, officers, agents, contractors and employees, harmless from all liabilities, claims, losses, demands and expenses (including reasonable fees of professionals) incurred or suffered by Tenant, its directors, officers, agents, contractors and employees, and relating to or resulting from the acts or omissions of Landlord, its officers, directors, agents, contractors and employees on or about Landlord's Plant Property.

10.1.3 Limitation; Mutual Responsibility

No party shall be required to indemnify the other party or hold the other party harmless for any loss, damage, or claim due to the negligence or misconduct of such other party. In case of joint or concurrent negligence of the parties giving rise to a loss or claim against either or both of them, each party shall have full rights of contribution from the other.

10.1.4 Notice of Claims; Defense and Settlement

Any party entitled to indemnification under this Lease shall promptly notify the indemnifying party of the act, omission, or occurrence for which the indemnified party intends to seek indemnification. The party seeking indemnification will reasonably cooperate in providing information and testimony to assist in the defense of the matter, but all out-of-pocket costs of such cooperation shall be a part of the indemnified amounts for which the indemnifying party shall hold the party seeking

indemnification harmless. Control of the defense of the claims shall be the right and responsibility of the indemnifying party, which shall have authority to contest, compromise, or settle the matter in its reasonable discretion. If the indemnifying party fails to take reasonable and timely action to defend the party seeking indemnification, the party seeking indemnification may take reasonable action to defend itself, without limiting its right to seek indemnification and reimbursement from the indemnifying party.

10.2 Insurance

10.2.1 Liability Insurance

Tenant, at Tenant's expense, shall maintain, or cause to be maintained, a commercial general liability policy or policies (including fire and legal liability) with not less than a combined single limit of $10,000,000. Each policy shall be for the protection of Tenant and Landlord, and their directors, officers, agents, and employees, insuring Tenant and Landlord and naming Landlord as an additional insured against liability for damages because of personal injury, bodily injury, death, or damage to property, including loss of use thereof, and occurring on or in any way related to the Premises or Docking Facilities, Tenant's operations or activities on the Premises or Docking Facilities or occasioned by reason of the operations of Tenant. By written notice to Tenant, Landlord may increase the minimum limit requirement set forth above based on customary and commercially reasonable standards for insurance coverage limits, when changing market and coverage conditions and practices reasonably justify such increase.

10.2.2 Tenant's Casualty Insurance

Tenant, at Tenant's expense, shall keep the Premises, all improvements thereon, the Dock Improvements, and all of Tenant's trade fixtures, equipment, and other personal property owned by Tenant and located on or about the Premises or the Docking Facility, continuously insured against fire and other casualty with a reputable, solvent insurance underwriter(s). The policy(ies) shall be written on an all-risk form, in an amount equal to one hundred percent (100%) of the replacement value of the improvements, and in such amounts as may be elected by Tenant with respect to its personal property.

10.2.3 Docking Facility Insurance

Landlord shall keep the Docking Facility continuously insured against fire and other casualty with a reputable, solvent insurance underwriter. The policy shall be written on an all-risk form, in an amount equal to one hundred percent (100%) of the replacement value of the Dock (exclusive of Tenant's Dock Improvements, which

shall be insured by Tenant as provided in Section 10.2.2). Landlord and Tenant shall each bear any additional, special or excess premium attributable to special hazards or risks on the portions of the Plant Property controlled by each party. If Landlord, in its sole discretion, believes that Tenant's use of the Docking Facility has created a special hazard or risk, Landlord shall have the right to deliver written notice to Tenant describing the risk or hazard and requiring Tenant to provide proof to Landlord within ten (10) days that Tenant has insurance covering the additional hazard or risk. Tenant's failure to provide such proof of insurance within the time provided shall constitute a default under this Lease.

10.2.4 Workers' Compensation

Tenant shall maintain in force workers' compensation insurance, including coverage for employer's liability, and longshoremen's and harborworkers' coverage with respect to any operations of Tenant involving the Docking Facilities, as appropriate or required by law.

10.2.5 Certificates

Each party shall, upon full execution of this Lease, furnish to the other party a certificate(s) of insurance evidencing the date, amount, and type of insurance required by this Lease. All policies of insurance will provide for not less than thirty (30) days' written notice to Landlord and Tenant before such policies may be revised, nonrenewed, or canceled. Upon request, each party shall provide to the other a copy or copies of any insurance policy required to be carried by such party under this Lease.

10.3 Waiver of Liability and Subrogation

Neither Landlord nor Tenant shall be liable to the other for losses arising out of damage to or destruction of all or any part of the Premises or the Docking Facilities or for damage to other parties' properties or injuries to other persons, when such losses are caused by any of the perils that are insured against, to the extent of available insurance proceeds. Claims for any and all losses, however caused, hereby are waived, to the extent of available insurance proceeds. However, nothing in this Section 10.3 shall be deemed to exculpate a party from liability for such losses if such party fails to obtain and keep in effect insurance against such losses as required under this Lease, nor shall this section be deemed to exculpate any party for liability for such losses it such exculpation would void or nullify any insurance coverage for such loss that might otherwise exist for the benefit of the other party. All insurance policies to be procured under this Lease shall contain an express waiver of any right of subrogation by the insurer.

11. ENVIRONMENTAL COMPLIANCE

11.1 Definitions

For purposes of this Section 11, (1) "Applicable Premises" means the Premises defined and described in Section 1 and all land or interests in land appurtenant to such Premises or used by Tenant under the terms of this Lease, including, without limitation, the Docking Facilities, the bed, shores and waters of the Willamette River adjacent to the Docking Facilities, parking areas and any easements, and (2) "Tenant's Operations" shall mean all operations of Tenant in the conduct of Tenant's business described in Section 3, and/or all operations by any subtenant of Tenant, on or about the Applicable Premises or conducted off the Applicable Premises and related to operations conducted on or about the Applicable Premises.

11.2 Compliance with Environmental Laws

Tenant shall:

11.2.1 Cause all of Tenant's Operations on the Applicable Premises to comply with all Environmental Laws and orders of any governmental authorities having jurisdiction under any Environmental Laws;

11.2.2 Obtain, keep in effect and comply with all governmental permits and authorizations required by Environmental Laws with respect to the Applicable Premises or Tenant's Operations;

11.2.3 Furnish Landlord, upon request, with copies of all such permits and authorizations and any amendments or renewals thereof, and notify Landlord of any expiration or revocation of such permits or authorizations.

11.2.4 Limitation on Uses of Hazardous Materials

(a) Tenant shall not use, or allow any person to use, the Applicable Premises to generate, manufacture, refine, transport, treat, store, handle, recycle, release or dispose of any Hazardous Material, except for coal tar, products made from coal tar, petroleum pitch and materials reasonably necessary for Tenant's Operations.

(b) All Hazardous Material used, kept and stored on or about the Applicable Premises shall be handled, used, kept and stored in compliance with Environmental Laws and in a manner that minimizes the likelihood of any release.

11.3 Tenant's Obligation to Undertake Environmental Measures

Except for matters pertaining to Existing Environmental Liabilities, Tenant shall undertake any and all preventive, investigatory or remedial actions (including emergency response, removal, containment and other remedial actions) that are either (a) required by any applicable Environmental Laws or governmental authorities, or (b) necessary to prevent or minimize property damage (including damage to the Applicable Premises), personal injury or damage to the environment and natural resources, or the threat of any such damage or injury, in either case arising out of releases of or exposure to Hazardous Material in connection with the Tenant's Operations.

11.4 Notices

Except for matters pertaining to the Existing Environmental Liabilities, Tenant shall immediately notify Landlord in writing if Tenant becomes aware of any of the following:

PITCH SHIP SPILL NOTICE GIVEN?

(a) Any spill, release or disposal of any Hazardous Material, or imminent threat thereof, on, in, over, under or from the Applicable Premises or in connection with Tenant's Operations, unless a release or disposal is necessary and reasonable for Tenant's Operations, is permitted by governmental agency (or is authorized for release without permit) does not violate any Environmental Laws and poses no threat to human health or the environment;

(b) Any spill, release or disposal of any Hazardous Material, or imminent threat thereof, at any adjacent properties, which spill, release or disposal could migrate to, through, over or under the Applicable Premises;

(c) Any violation of Environmental Laws regarding the Applicable Premises or Tenant's Operations;

(d) Any administrative or judicial investigation or proceeding relating to Hazardous Material or Environmental Laws and to the Applicable Premises or Tenant's Operations;

(e) Any order, notice of violation, fine, penalty or other similar action relating to Hazardous Material or Environmental Laws and to the Applicable Premises or Tenant's Operations; and

(f) Any complaint or lawsuit filed or threatened to be filed by any person or other entity, including, without limitation, any governmental authority,

relating to Hazardous Material or Environmental Laws and to the Applicable Premises or Tenant's Operations.

11.5 Access to Environmental Records

At Landlord's request, Tenant will deliver to Landlord, at Tenant's expense, copies of any and all documents in its possession, or to which it has access, relating to Hazardous Material or Environmental Laws and (a) the physical conditions existing on or about the Applicable Premises, or (b) Tenant's Operations including, without limitation, (i) results of any laboratory analyses of samples, site assessments or studies, environmental audit reports, and/or other environmental studies or reports, and (ii) copies of all reports, manifests and identification numbers at the same time as they are required to be and/or are submitted to the appropriate governmental authorities. If requested by Tenant, Landlord will execute an agreement to maintain the confidentiality of any environmental record which Tenant delivers to Landlord, provided that Landlord shall have the right to notify appropriate governmental authorities of any violations of environmental laws disclosed by the environmental records if Landlord is required to make such notification by any applicable Environmental Law or if disclosure is required to avoid an immediate and substantial risk of harm to persons or property.

11.6 Environmental Audits and Site Assessments

If Landlord believes Tenant is not complying with all Environmental Laws or the requirements of this Lease, or that a material spill, release or disposal of a Hazardous Material has occurred on or about the Applicable Premises, then Landlord may require Tenant to furnish Landlord with an environmental audit or site assessment satisfactory to Landlord. The environmental audit or site assessment shall be performed at Tenant's expense by a qualified consultant approved by Landlord. If requested by Tenant, Landlord will execute an agreement to maintain the confidentiality of any environmental audit or site assessment conducted pursuant to this section, provided that Landlord shall have the right to notify appropriate governmental authorities of any violations of environmental laws disclosed by the environmental audit or site assessment if Landlord is required to make such notification by any applicable Environmental Law or if disclosure is required to avoid an immediate and substantial risk of harm to persons or property.

11.7 Landlord's Rights

11.7.1 Inspections

Landlord may conduct reasonable inspections and investigations of the Applicable Premises and Tenant's Operations at any time. Tenant shall cooperate fully

with Landlord during such inspections and investigations and Tenant shall have the right to observe any such inspections and investigations.

11.7.2 Preventive, Investigatory and Remedial Actions

If Tenant fails to perform any obligation under Section 11.3 (Tenant's Obligation to Undertake Environmental Measures), then Landlord may (but shall not be required to) perform such obligations at Tenant's expense. All costs and expenses incurred by Landlord under this Section shall be reimbursed by Tenant within thirty (30) days after demand with interest at the rate of eighteen percent (18%) per annum. In performing any of Tenant's obligations under this Section, Landlord shall be deemed to be Tenant's agent and shall not, by reason of such performance, be deemed to assume any responsibility or liability of Tenant or any subtenant under any Environmental Laws, to any governmental agency or to any other third party. Landlord is authorized to perform Tenant's obligations under Section 11.3 as Landlord deems necessary and appropriate.

11.8 Indemnification

Without limiting Tenant's obligations under Section 10.1.1, but subject to the allocations of liability for the Existing Environmental Liabilities, Tenant shall defend (with counsel approved by Landlord), fully indemnify and hold free and harmless Landlord from and against (i) all claims, judgments, damages, penalties, fines, costs, liabilities or losses (including, without limitation, diminution in value of the Applicable Premises, damages for the loss or restriction on the use of rentable or usable space or of any amenity of the Premises, damages arising from any adverse impact on marketing of space, sums paid in settlement of claims, attorneys' fees, consultant fees and expert fees) that arise during or after the Lease Term or that arose under the term of the Prior Lease, and (ii) are imposed on, or paid by or asserted against Landlord by reason or on account of, or in connection with, or arising out of (a) Tenant's use, generation, manufacture, refinement, transportation, treatment, storage, handling, recycling or disposal of Hazardous Material, or any release of Hazardous Material in connection with or as a result of Tenant's use or activities, or (b) the use or activities of Tenant's agents, contractors or subtenants relating to Hazardous Materials, or (c) any violation of any Environmental Law by Tenant or its agents, subcontractors or subtenants.

This indemnification of Landlord by Tenant includes, without limitation, costs incurred in connection with any of the following:

(a) any investigative or remedial action involving the presence of or releases of Hazardous Material on or about the Applicable Premises;

(b) any allegations made as to the violation of any Environmental Laws involving the Applicable Premises or Tenant's Operations; and/or

(c) any injury or harm of any type to any person or entity or damage to any property (including natural resources) arising out of, in connection with or in any way relating to (i) the use, generation, manufacture, refinement, transportation, treatment, storage, handling, recycling, disposal, release or other handling of Hazardous Material on or about the Applicable Premises or during Tenant's Operations, or (ii) the violation of any Environmental Laws, or (iii) the contamination of the Applicable Premises during the period of this Lease.

11.9 Pre-Termination Environmental Assessment

Within sixty (60) days before expiration of the Lease Term, or upon receiving notice of termination, Landlord may retain the services of an independent professional engineer licenses to practice in the State of Oregon to conduct an environmental assessment to establish the environmental condition of the Applicable Premises. On completion of the assessment, Landlord shall provide Tenant with an environmental report that describes the results of such efforts. The parties agree that there shall be a rebuttable presumption that the assessment establishes the environmental condition of the Applicable Premises as of the date this Lease expires or terminates.

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11.10 Existing Environmental Liabilities; Disclaimer

Nothing contained in this Section 11 releases, modifies or otherwise affect any party's duties or obligations under any other agreement regarding the Existing Environmental Liabilities. Landlord shall have access to the Applicable Premises at all times to perform any remediation and monitoring activities required of Landlord under any agreement with any party addressing the Existing Environmental Liabilities, or any order of or agreement with a governmental agency. LANDLORD MAKES NO REPRESENTATIONS OR WARRANTIES REGARDING THE CONDITION OF THE APPLICABLE PREMISES, COMPLIANCE WITH ANY ENVIRONMENTAL LAWS, OR THE EXISTENCE OF OR COMPLIANCE WITH ANY REQUIRED PERMITS OF ANY GOVERNMENTAL AGENCY. TENANT ACKNOWLEDGES THAT TENANT IS AND HAS BEEN OCCUPIED THE PREMISES UNDER THE PRIOR LEASE AND IS NOT RELYING ON ANY STATEMENT MADE BY LANDLORD OR LANDLORD'S AGENTS REGARDING THE CONDITION OF THE APPLICABLE PREMISES.

11.12 Survival

The provisions of this Section 11 shall survive the expiration or earlier termination of this Lease.

12. TRANSFER OR SUBLEASE

12.1 General

Except as set forth in Section 12.2, Tenant may not assign this Lease, or sublet the Premises, or any part thereof, without the prior written consent of Landlord. } IS THIS AN OPTION?

12.2 Permitted Transfers

The prohibitions of Section 12.1 shall not apply to any of the following ("Permitted Transfer"): (1) an assignment or sublease to an entity controlled by, controlling of, or under common control with Tenant; or (2) an assignment to a corporation with or into which Tenant has merged or consolidated. Landlord's consent will not be necessary to any such Permitted Transfer, but no transfer of this Lease shall be effective until Landlord receives written notice thereof and executed documents evidencing such transfer, including assumption by the transferee, if there is an assignment of the Lease. No Permitted Transfer shall release Tenant from any obligation under this Lease. A transferee under a Permitted Transfer shall be subject to all provisions of this Lease, including the limitations on transfer and assignment set forth in this Section 12.

13. DAMAGE OR DESTRUCTION OF IMPROVEMENTS

If any improvements on the Premises or any of the Dock Improvements are damaged or destroyed by fire or other casualty, then Tenant may either repair and restore the Premises or remove the damaged improvement(s) and clear Landlord's Plant Property of all related debris (including any Hazardous Material released as a result of such fire or casualty). Such election shall be made by Tenant and the restoration work or removal work, as the case may be, commenced within fourteen (14) days following the casualty event, except for damage to the Dock Improvements, which election and commencement of work shall be made and undertaken by Tenant within twenty-one (21) days after the casualty event. All work shall be prosecuted diligently and continuously to completion. If Tenant fails to commence repair or removal activities within the applicable time period, then all proceeds from insurance carried by Tenant covering the improvements and Dock Improvements shall be paid to Landlord for application to such repair and/or removal. All proceeds relating to Tenant's trade fixtures, equipment and other personal property shall be paid to and belong to Tenant.

14. LIENS

Tenant shall keep the Premises and all other portions of Landlord's Plant Property free from all liens of every kind and description caused, incurred, permitted

or suffered by any act or omission of Tenant, including, without limitation, any mechanic's, laborer's, suppliers' construction or any other liens; provided, Tenant shall not be in default under this Section if Tenant removes or adequately bonds (by posting a bond in accordance with applicable law) any such unpermitted lien within thirty (30) days of receipt of actual notice of the existence of any such lien.

15. EMINENT DOMAIN

15.1 Definitions

The term "takes by (or taken or taking by) eminent domain" includes the exercise of any power of condemnation, whether by public authority or private corporation and any purchase or other acquisition in lieu of condemnation. The expression "date of taking" means the date the order adjudicating public use becomes final or the date the authority exercising its right of "eminent domain" agrees in writing to the purchase price in lieu of condemnation, or, if earlier, takes title to the Premises.

15.2 Material Taking

If a condemning authority takes by eminent domain all of the Premises or a portion of the Premises that is, the reasonable judgment of Tenant, sufficient to prevent Tenant from using the remaining Premises to conduct its operations in a manner substantially equivalent to its operations as conducted immediately prior to the taking, then this Lease shall terminate as of the date of taking and all rental shall be paid up to that date. All condemnation proceeds shall belong to Landlord, except that Tenant shall be entitled to seek a separate award for any cost or loss incurred or expected to be incurred by Tenant in removing Tenant's trade fixtures, equipment and other personalty, and Tenant's relocation expenses. If, at any time after Tenant has constructed Dock Improvements and is using the Docking Facilities, a condemning authority takes all of the Docking Facilities or a portion of the Docking Facilities that is, in the reasonable judgment of Tenant, sufficient to prevent Tenant from using the Premises to conduct its operations in a manner substantially equivalent to its operations as conducted immediately prior to the taking, then such taking shall be subject to and covered by the provisions of this Section 15.2.

15.3 Partial Taking

If the portion of the Premises or Docking Facilities taken by eminent domain does not prevent Tenant from conducting its operations in a manner substantially equivalent to its operations as conducted immediately prior to the taking, then Tenant shall promptly restore the Premises to a condition comparable to their condition on the date of taking, less the portion lost in the taking, and this Lease shall continue in

effect. Tenant's obligation to restore shall be limited to the amount of condemnation proceeds made available to Tenant by Landlord. Landlord shall promptly restore the Docking Facilities to a condition comparable to its condition on the date of the taking, less the portion lost in the taking. Landlord's obligation to restore shall be limited to application of available condemnation proceeds.

16. DEFAULT BY TENANT

16.1 Default in Payment of Rent

Tenant's failure to pay any item of rent for a period of five (5) days after the receipt by Tenant of Landlord's notice of Tenant's failure to make such payment shall be a "Default" under this Lease. With respect to Tenant's obligation to pay basic monthly rental under Section 4.1, Landlord shall be required to provide only one (1) written notice of default in any calendar year. Landlord shall not be required to give additional notice of any subsequent payment default with respect to basic monthly rental as a prerequisite to the exercise of remedies and such subsequent default shall be an immediate "Default" under this Lease.

16.2 Other Defaults

Except with respect to the failure to pay rent as set forth in Section 16.1, Tenant shall not be considered in "Default" by reason of any act or omission in breach of any requirement hereof, until and unless Landlord gives Tenant notice of such act or omission, and Tenant fails to cure the same within twenty (20) days after the receipt by Tenant of such notice. As to any breach that cannot reasonably be cured within twenty (20) days, Tenant shall not be in "Default" if Tenant commences to cure such act or omission within such 20-day period, and thereafter diligently and continuously prosecutes such cure to completion. Tenant's failure to cure such breach within the applicable cure period shall be a "Default" under this Lease. Notwithstanding the foregoing, Tenant shall provide to Landlord a written plan and schedule for the repair of any improvement, alteration or addition on the Premises, any Dock Improvements or any personal property of Tenant, the condition of which poses an immediate risk of harm to persons or property, within five (5) days after such condition occurs. In addition to Landlord's rights under Section 9.3, Tenant's failure to provide such information to Landlord within such five (5) day period shall constitute a "Default" under this Lease.

16.3 Automatic Defaults

Tenant shall be in "Default" under this Lease if (1) Tenant vacates or abandons the Premises for a period in excess of thirty (30) consecutive days, or (2) Tenant becomes bankrupt or insolvent or files any debtor proceedings or has taken against it

KOPPERS EMPLOYED OCCUPANT;

in any court pursuant to state or federal statute, a petition in bankruptcy or insolvency, reorganization or appointment of a receiver or trustee; or Tenant petitions for or enters into any such arrangement; or suffers this Lease to be taken under a writ of execution.

17. REMEDIES

17.1 Remedies for Default by Tenant

If Tenant is in Default, Landlord may at any time thereafter pursue any and all of the following remedies, which shall be cumulative and non-exclusive to the maximum extent possible:

17.1.1 Declare this Lease terminated by giving written notice of the termination to Tenant.

17.1.2 Terminate Tenant's right to possession of the Premises by any lawful means, in which case Tenant shall immediately and peaceably surrender possession of the Premises to Landlord, and Landlord may recover from Tenant all damages incurred by Landlord by reason of Tenant's Default including, but not limited to, the cost of recovering possession of the Premises; expenses of reletting, including necessary renovation and alteration of the Premises; and reasonable attorney's fees.

17.1.3 Pursue any remedy provided in this Lease for breach of the provision specified in the remedy.

17.1.4 Pursue any other remedy now or hereafter available to Landlord under Oregon laws or judicial decisions.

17.2 Performance by Landlord of Tenant's Obligations

All covenants and agreements to be performed by Tenant under any of the terms of this Lease shall be performed by Tenant at Tenant's sole cost and expense. If Tenant fails to pay any sum owed to any party, other than Landlord, for which Tenant is liable hereunder, or if Tenant fails to perform any other act to be performed by Tenant hereunder or otherwise violate any term or provision of this Lease, then, after giving Tenant any required notice and opportunity to cure, Landlord may cure Tenant's default. Landlord shall not be obligated to cure any Tenant default, and any such cure will not waive any default or release Tenant from any obligation hereunder. All sums paid by Landlord and all necessary incidental costs, together with interest thereon from the date of such payment by Landlord at the rate of 18% per annum, shall be payable to Landlord on demand. Tenant covenants to pay any such sums.

18. QUIET ENJOYMENT; SUBORDINATION

18.1 Quiet Enjoyment

Landlord covenants that Tenant shall quietly and peaceably have, hold and enjoy the Premises in accordance with this Lease throughout the Lease Term, free and clear of any claim by, through or under Landlord, or having rights paramount to Landlord, subject to the rights of the holder of the Existing Mortgage and subject to easements and restrictions currently of record.

18.2 Subordination

This Lease is subject and subordinate to the Existing Mortgage. At Landlord's option, this Lease shall also be subordinate to any ground lease, mortgage, deed of trust, or any other hypothecation or security hereafter placed on Landlord's Plant Property, to any and all advances made on the security thereof, and to all renewals, modifications, consolidations, replacements and extensions thereof. Notwithstanding such future subordination, Tenant's right to quiet possession of the Premises shall not be disturbed if Tenant is not in default and if Tenant pays the rent and observes and performs all of the provisions of this Lease, unless this Lease is otherwise terminated pursuant to its terms if any mortgagee, trustee or ground Landlord shall elect to have this Lease prior to the lien of its mortgage, deed of trust or ground lease, and shall give written notice thereof to Tenant, this Lease shall be deemed prior to such mortgage, deed of trust, or ground lease, whether this Lease is dated prior or subsequent to the date of said mortgage, deed of trust or ground lease or the date of recording thereof. Tenant shall execute any documents required to effectuate an attornment, a subordination or to make this Lease prior to the lien of any mortgage, deed of trust or ground lease. If Tenant fails to execute such documents within ten (10) days after written demand, then Landlord shall either (a) declare such failure constitutes a Default by Tenant hereunder, or, (b) Landlord shall execute such documents on behalf of Tenant as Tenant's attorney-in-fact. Tenant hereby makes, constitutes and irrevocably appoints Landlord as Tenant's attorney-in-fact to execute such documents in accordance with this section.

19. SURRENDER OF PREMISES

Upon the expiration or earlier termination of the Lease Term, Tenant shall surrender the Premises in the same condition Tenant is required to maintain the Premises hereunder, with all improvements and items removed pursuant to Section 5.3.3, and any damage to the Premises or any other portions of Landlord's Plant Property caused by such removal restored by Tenant.

SUBGRADE REMOVAL

20. NO BROKERS

Landlord and Tenant each represent and warrant to the other that they have not engaged or had discussions with any broker or agent who would be entitled to any commission or fees in connection with the negotiation or execution of this Lease. Each party agrees to indemnify and hold the other harmless from all costs, expenses or liability for such commissions or other compensation or charges claimed by or awarded to any broker or agent on the basis of any assignments or agreements made or alleged to have been made by or on behalf of the indemnifying party.

21. RENT, VALUATION AND ACCOUNTING DISPUTES

21.1 General

As to any dispute concerning valuation, costs, proration of expenses or determination of rent, Landlord and Tenant shall seek in good faith to resolve their dispute. If the parties cannot resolve their dispute within thirty (30) days after the date that a party delivers to the other party a notice of the existence of the dispute (for example, by objecting in writing to a rent calculation), the matter shall be submitted to independent certified public accountants (or, as to fair market valuation of real property, a certified real estate appraiser). The parties shall jointly select a certified public accounting firm (or certified appraiser) that is not then employed by either party and that is familiar with the Tenant's type of business (or, as to fair market valuation of real property, familiar with the local market for the type of property involved). The determination of such accounting firm or appraiser shall bind on the parties as to the matter submitted for such determination. The fees of the accounting firm or appraiser shall be borne equally.

21.2 Arbitration

Any dispute or controversy relating to valuation, costs or determination of rent that is not settled under the previous subsection within ninety (90) days after a party delivers a written notice of dispute, shall, unless otherwise agreed, be settled by arbitration in accordance with the Commercial Arbitration Rules (or, as to fair market valuation of real property, the Real Estate Valuation Rules) of the American Arbitration Association. Judgment upon the award rendered by the arbitrator(s) may be entered in any court having jurisdiction. The cost of arbitration shall be allocated between the parties by the arbitrator(s) on the basis of the extent to which the position of one or the other party is adopted in the decision of the arbitrator(s). Any such arbitration proceeding shall be held in Portland, Oregon.

22. MISCELLANEOUS

22.1 Authority

Each party represents and warrants to the other that it has full power and authority to enter into and to perform its obligations under this Lease, and that the person executing this Lease on its behalf is authorized to do so.

22.2 No Partnership

The relationship created by this Lease is that of landlord and tenant only. The parties are not, shall not be considered to be, and shall not hold themselves out to be, partners or joint venturers.

22.3 Consent

Wherever in this Lease Landlord has the right to give or withhold its consent to a matter requested by Tenant, such consent may be withheld by Landlord in its sole and absolute discretion except as set forth to the contrary in any specific provision of this Lease.

22.4 Notices

All notices to be given under this Lease shall be in writing. Notices may be served by certified or registered mail or by facsimile to the party at the address shown below, unless the address has been changed by written notice. Mailed notices shall be deemed delivered five (5) days after mailing, properly addressed.

LANDLORD:	NW NATURAL 220 NW Second Avenue Portland, Oregon 97209 Attn: Manager: Risk, Environmental and Land Facsimile No.: (503) 721-2516
TENANT:	KOPPERS INDUSTRIES, INC. 7540 NW St. Helens Road Portland, Oregon 97210 Attn: Amos Kamerer, Plant Manager Facsimile No.: (503) 285-2831

With a copy to: Koppers Industries, Inc.
436 Seventh Avenue
Pittsburgh, PA 15219-1800
Attn: VP and Corporate Secretary
Facsimile No.: (412) 227-2333

22.5 Headings; Exhibits

The section headings in this Lease are included for convenience only; they do not give full notice of the terms of any portion of this Lease and are not relevant to the interpretation of any provision of this Lease. All exhibits referenced in this Lease are attached hereto and incorporated herein by this reference.

22.6 Governing Law

This Lease shall be governed by and construed in accordance with Oregon law.

22.7 Severability

To the fullest extent permitted by law, any provision of this Lease deemed invalid or unenforceable shall be ineffective to the extent of such invalidity or unenforceability, without rendering invalid or unenforceable the remaining provisions of this Lease.

22.8 Integration; Amendment

This Lease is the entire agreement of the parties relating to the subject matter hereof, and supersedes all prior communications, representations, or agreements, verbal or written, among the parties relating to the subject matter hereof. This Lease may not be amended except in writing executed by the parties.

22.9 Waiver

No provision of this Lease shall be deemed to have been waived unless such waiver is in writing signed by the waiving party. No failure by any party to insist upon the strict performance of any provision of this Lease, or to exercise any right or remedy consequent upon a breach thereof, shall constitute a waiver of any such breach, of such provision or of any other provision. No waiver of any provision of this Lease shall be deemed a waiver of any other provision of this Lease or a waiver of such provision with respect to any subsequent breach, unless expressly provided in writing.

22.10 Attorneys' Fees

22.10.1 No Suit or Action Filed

If, after good-faith attempts to settle the matter have failed, this Lease is placed in the hands of an attorney due to a default in the payment or performance of any of its terms, the defaulting party shall pay, immediately upon demand, the other party's attorney fees, collection costs, and any other fees or expenses incurred by the nondefaulting party, even though no suit or action is filed thereon..

22.10.2 Arbitration or Mediation; Trial and Appeal

If any arbitration, mediation, or other proceeding is brought in lieu of litigation, or if legal action is instituted to enforce or interpret any of the terms of this Lease, or if legal action is instituted in a Bankruptcy Court for a United States District Court to enforce or interpret any of the terms of this Lease, to seek relief from an automatic stay, to obtain adequate protection, or to otherwise assert the interest of Landlord in a bankruptcy proceeding, the party not prevailing shall pay the prevailing party's costs and disbursements, the fees and expenses of expert witnesses in determining reasonable attorney fees pursuant to ORCP 68, and such sums as the court may determine to be reasonable for the prevailing party's attorney fees connected with the trial and any appeal and by petition for review thereof.

22.11 Successors; No Third-Party Beneficiary Rights

This Lease shall be binding on and inure to the benefit of the parties and their successors and assigns, subject to the provisions of Section 12 above. No person not a party to this Lease is an intended beneficiary of this Lease, and no person not a party to this Lease shall have any right to enforce any term of this Lease; provided, the third parties referenced in Section 10.1 as indemnified parties shall have the indemnification rights described therein.

22.12 Further Assurances

Each party agrees, at the request of the other party, at any time after the date hereof, to promptly execute and deliver all further documents, and to promptly take and forbear from all such action, as may be reasonably necessary or appropriate to more effectively to confirm or carry out the provisions of this Lease.

22.13 Survival

Each provision of this Lease which may require the payment of money by, to or on behalf of Landlord or Tenant or third parties after the expiration of the Lease

Term or earlier termination of the Lease, or which requires the performance of some action on the Premises or other property covered by this Lease that is not performed at the time of such expiration or earlier termination, shall survive such expiration or earlier termination.

22.13 Counterparts

This Lease may be executed in any number of counterparts, each of which shall be deemed an original and all of which shall constitute one and the same instrument.

IN WITNESS WHEREOF, the parties have executed this Lease as of the date first set forth above.

LANDLORD:	TENANT:
NORTHWEST NATURAL GAS COMPANY (d/b/a Northwest Natural), an Oregon corporation	KOPPERS INDUSTRIES, INC., a Pennsylvania corporation
By: _____	By: _____
Typed Name: _____	Typed Name: _____
Title: _____	Title: _____

Exhibits

A Description of Landlord's Plant Property
B Map of the Premises
C Copy of U.S. Army Corps of Engineers Portland District Public Notice for Permit Application No. 97-903, issued July 30, 1997

Term or earlier termination of the Lease, or which requires the performance of some action on the Premises or other property covered by this Lease that is not performed at the time of such expiration or earlier termination, shall survive such expiration or earlier termination.

22.13 Counterparts

This Lease may be executed in any number of counterparts, each of which shall be deemed an original and all of which shall constitute one and the same instrument.

IN WITNESS WHEREOF, the parties have executed this Lease as of the date first set forth above.

LANDLORD:	TENANT:
NORTHWEST NATURAL GAS COMPANY (d/b/a Northwest Natural), an Oregon corporation	KOPPERS INDUSTRIES, INC., a Pennsylvania corporation
By: _____	By: Walter W. Turner
Typed Name: _____	Typed Name: Walter W. Turner
Title: _____	Title: President and Chief Executive Officer

Exhibits

A Description of Landlord's Plant Property
B Map of the Premises
C Copy of U.S. Army Corps of Engineers Portland District Public Notice for Permit Application No. 97-903, issued July 30, 1997

Term or earlier termination of the Lease, or which requires the performance of some action on the Premises or other property covered by this Lease that is not performed at the time of such expiration or earlier termination, shall survive such expiration or earlier termination.

22.13 Counterparts

This Lease may be executed in any number of counterparts, each of which shall be deemed an original and all of which shall constitute one and the same instrument.

IN WITNESS WHEREOF, the parties have executed this Lease as of the date first set forth above.

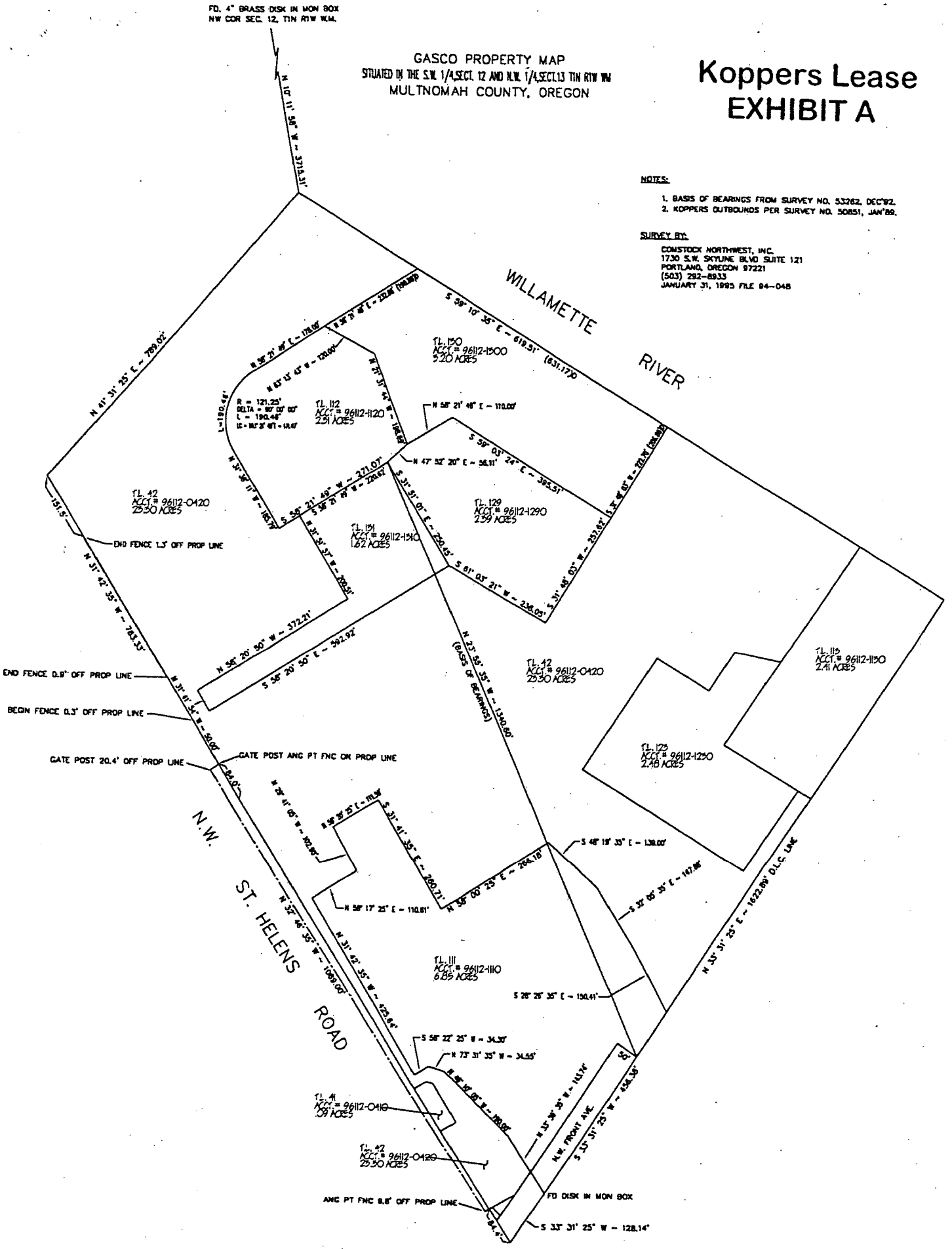
LANDLORD:	TENANT:
NORTHWEST NATURAL GAS COMPANY (d/b/a Northwest Natural), an Oregon corporation	KOPPERS INDUSTRIES, INC., a Pennsylvania corporation
By: Sandra K. Hart	By: _____
Typed Name: SANDRA K. HART	Typed Name: _____
Title: MANAGER, RISK ENVIRONMENT & LAND	Title: _____

Exhibits

A Description of Landlord's Plant Property
B Map of the Premises
C Copy of U.S. Army Corps of Engineers Portland District Public Notice for Permit Application No. 97-903, issued July 30, 1997

Koppers Lease
EXHIBIT A

GASCO PROPERTY MAP
SITUATED IN THE S.W. 1/4 SEC. 12 AND N.W. 1/4 SEC. 13 T1N R1W W.M.
MULTNOMAH COUNTY, OREGON



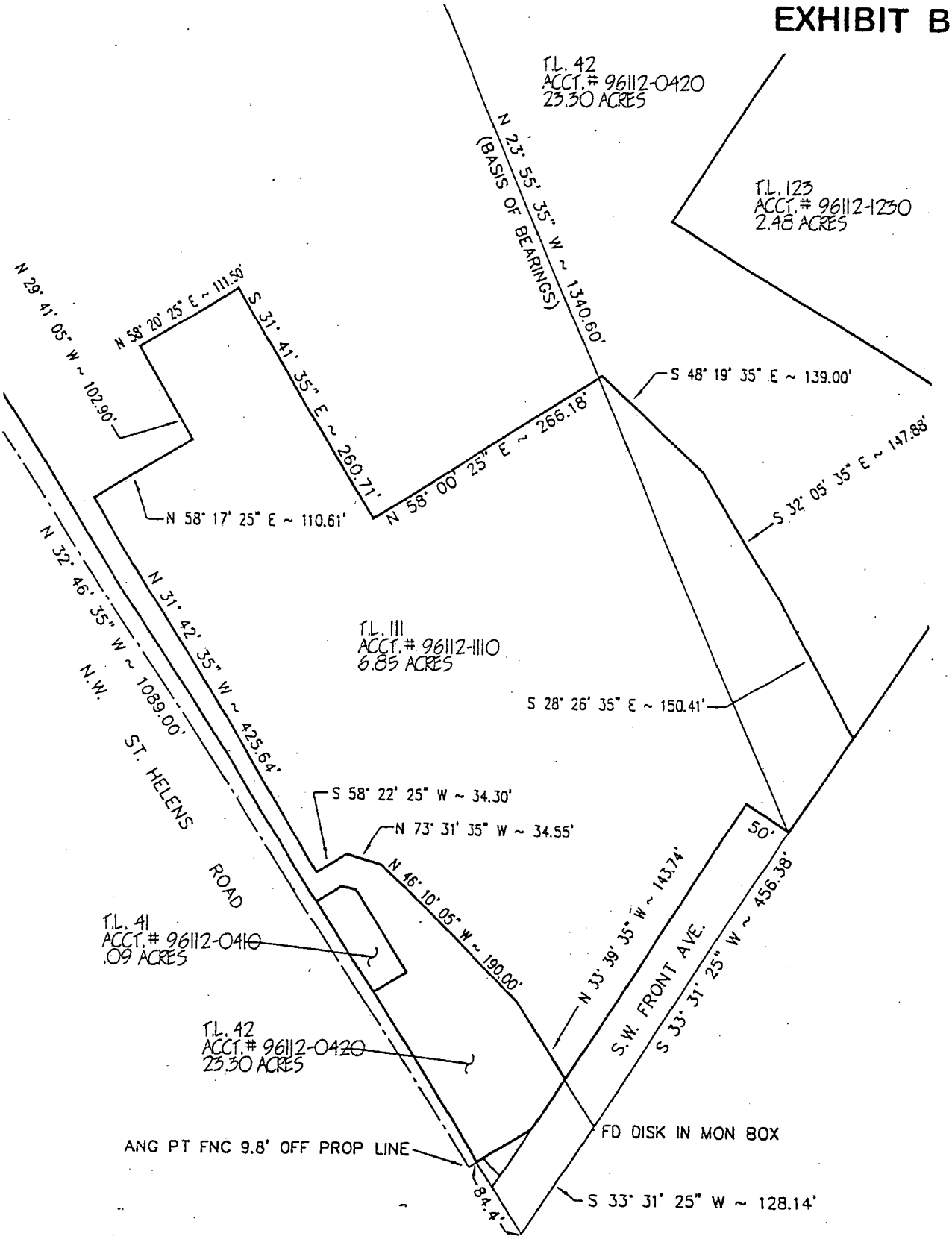
NOTES:

1. BASIS OF BEARINGS FROM SURVEY NO. 53262, DEC'92.
2. KOPPERS OUTBOUNDS PER SURVEY NO. 50851, JAN'89.

SURVEY BY:

COMSTOCK NORTHWEST, INC.
1730 S.W. SKYLINE BLVD SUITE 121
PORTLAND, OREGON 97221
(503) 292-8933
JANUARY 31, 1995 FILE 94-048

Koppers Lease
EXHIBIT B



Gregory P. Traczek
Operations Manager

KOPPERS

Koppers Inc.
Carbon Materials and Chemicals
436 Seventh Ave.
Pittsburgh, PA 15219
Tel 412 227 2318
Fax 412 227 2202
TraczekGP@koppers.com
www.koppers.com

March 26, 2008

Northwest Natural Gas Company
220 NW Second Avenue
Portland, Oregon 97209

Attn: Sandra K. Hart, Manager: Risk, Environmental and Land
Fax Number: (503) 721-2516

Notice of Lease Renewal

Dear Ms. Hart:

Pursuant to Section 2.3 of the Lease Agreement between Northwest Natural Gas Company and Koppers Industries, Inc. ("Koppers") dated October 1, 1998, Koppers is hereby giving notice of its intent to exercise its option to renew the Lease Agreement. This Renewal Term shall begin on October 1, 2008 and shall end at September 30, 2013 unless Koppers exercises its right to a second renewal period as provided in the Lease Agreement. The rent to be paid by Koppers during this Renewal Term shall be as provided in Section 4.2 of the original Lease Agreement.

Sincerely,

Gregory P. Traczek

cc: Mike Mancione (Koppers-Pittsburgh)
Mike Trygar (Koppers-Pittsburgh)
Steve Kifer (Koppers-Pittsburgh)
TJ Turner (Koppers-Portland)

LEASEHOLD CONSENT

LESSOR: Northwest Natural Gas Company, an Oregon corporation

LESSEE: Koppers Company, Inc., a Delaware corporation

ASSIGNEE: Koppers Industries, Inc., a Pennsylvania corporation

MELLON: Mellon Bank, N.A., as agent for certain lenders

LEASE: That certain Lease Agreement dated August 17, 1965 as subsequently amended and extended, and as most recently amended on November 23, 1987, whereby Lessor leased to Lessee that certain real property (the Leased Premises) more particularly described on Exhibit A, for a term beginning January 1, 1966 and ending January 1, 1993.

1. Subject to the conditions set forth in Paragraph No. 2 hereof, Lessor hereby consents:

   (a) to the assignment of the Lease and all of Lessee's right, title and interest therein, to Assignee;

   (b) to the pledge and collateral assignment of the Lease and all Assignee's right, title and interest in the Lease and Assignee's personal property located on the Leased Premises, to Mellon; and

   (c) to the waiver and release unto Mellon, its successors and assigns, of all right, title and interest which Lessor may have in and to any personal property of Assignee on the Leased Premises.

2. Assignee hereby agrees:

   (a) To assume and be bound by all obligations and liabilities of the Lessee under the Lease from and after the effective date of the assignment; and

   (b) To indemnify and reimburse Lessor for all necessary costs of response (as that term is used in the Comprehensive Environmental Response, Compensation and

Liability Act, as amended) and damages to natural resources, that Lessor may be required to expend or pay as the result of any release of hazardous substances at the Leased Premises by Lessee prior to the effective date of the assignment, but only to the extent that Lessor is unable (after reasonable efforts) to recover the same from Lessee.

3. Lessor certifies that (i) the Lease is in full force and effect, and embodies the entire agreement between the parties thereto with respect to the Leased Premises and has not been amended except as stated above; (ii) all rent and other charges reserved in the Lease due and payable have been paid; and (iii) other than releases of hazardous substances at the Leased Premises by Lessee in possible violation of Sections 2 and 16 of the Lease, no other event or currently existing condition of default under the Lease exists as of the date hereof.

4. Nothing herein shall be deemed to release or waive any liability or responsibility incurred by Lessee under the Lease or resulting from Lessee's activities on the Leased Premises, prior to the effective date of the assignment of the Lease from Lessee to Assignee.

5. Lessor acknowledges and agrees that this document and Exhibit A attached hereto may and shall constitute a memorandum of lease and that this document may be recorded in the public land records of the county where the Leased Premises are located and indexed against the name of Lessor.

Dated this 25th day of January, 1989.

NORTHWEST NATURAL GAS COMPANY

By: [signature]
Title: SR VICE PRES

KOPPERS INDUSTRIES, INC.

By: [signature]
Title: Vice President

RDBS#2.046

STATE OF OREGON)
) ss.
County of Multnomah)

The foregoing instrument was acknowledged before me this 25th day of January, 1989, by [illegible] on behalf of Northwest Natural Gas Company.

Notary Public for Oregon
My commission expires: [illegible]

COMMONWEALTH OF PENNSYLVANIA)
) ss.
County of Allegheny)

The foregoing instrument was acknowledged before me this 25 day of January, 1989, by LAWRENCE F. FLAHERTY on behalf of Koppers Industries, Inc.

Notary Public for: PENNSYLVANIA
My commission expires: MAY 9, 1989

NOTARIAL SEAL
LARRY P. WHITE, NOTARY PUBLIC
PITTSBURGH, ALLEGHENY COUNTY
MY COMMISSION EXPIRES MAY 9, 1989
Member, Pennsylvania Association of Notaries

EXHIBIT A

TAR PRODUCTS

Production Facility

Portland, Oregon Terminal

LEGAL DESCRIPTION

PARCEL I:

That portion of Sections 12 and 13, Township 1 North, Range 1 West of the Willamette Meridian lying within the W.W. Baker Donation Land Claim, in the City of Portland, County of Multnomah and State of Oregon, described as follows:

Beginning at the point of intersection of the centerline of the Spokane, Portland, and Seattle Railroad and the East line of the W.W. Baker Donation Land Claim; thence North 32°00' East, 162.55 feet to a fence corner at the true point of beginning; thence continuing North 32°00' East along a fence 456.40 feet to a fence corner; thence North 29°58'00" West 150.40 feet; thence North 33°37'00" West 147.88 feet; thence North 49°51'00" West 139.00 feet to a hub; thence South 56°29'00" West 265.15 feet to a nail; thence North 33°13'00" West 260.70 feet to a railroad spike at a point known as point "A"; thence South 56°29'00" West 111.55 feet to a railroad spike; thence South 31°12'30" East 102.90 feet; thence South 56°46'00" West 38.57 feet; thence South 33°14'00" East 36.00 feet; thence South 56°46'00" West 9.00 feet; thence South 33°14'00" East 106.58 feet to a hub; thence South 25°44'30" West 10.51 feet to a hub; thence South 56°24'30" West 54.40 feet; thence South 33°05'30" East 277.30 feet; thence North 56°51'00" East 34.30 feet; thence South 75°03'00" East 34.55 feet; thence South 47°41'30" East 190.00 feet to a nail; thence South 35°16'30" East 140.05 feet to the true point of beginning.

EXCEPT a 30 foot strip of land parallel and contiguous with the East line of the W.W. Baker DLC in Sections 12 and 13, Township 1 North, Range 1 West, said strip of land being 30 feet Westerly of the said DLC line and more particularly described as: Beginning at a point 162.55 feet North 32° East from the intersection of the centerline of the SP & S Railway with the East line of the said Baker DLC; thence North 32° East 456.4 feet; thence North 29°58' West 34 feet; thence South 32° West 459.8 feet; thence South 35°16'30" East 32.5 feet to the point of beginning. ALSO EXCEPT rights of the public to part in City street.

PARCEL II:

That portion of Section 12, Township 1 North, Range 1 West of the Willamette Meridian lying within the W.W. Baker Donation Land

Claim, in the City of Portland, County of Multnomah and State of Oregon, described as follows:

Beginning at a point 769.61 feet North and 365.57 feet West of a tack marking the point of intersection of the centerline of the SP&S Railway with the Southeasterly line of the W.W. Baker DLC in said Township and Range; thence South 56°46' West 70.52 feet; thence South 33°05'30" East 149 feet; thence North 56°24'30" East 54.4 feet; thence North 25°44'30" East 10.51 feet; thence North 33°14' West 106.58 feet; thence North 56°46' East 9 feet; thence North 33°14' West 36 feet to the point of beginning.

LAW OFFICES OF
DICKIE, MCCAMEY & CHILCOTE
A PROFESSIONAL CORPORATION

SUITE 400
TWO PPG PLACE
PITTSBURGH, PA
15222-5402

TEL. 412/281-7272

FAX. 412/392-5367

J. LAWRENCE MCBRIDE
DAVID B. FAWCETT
DAVID J. ARMSTRONG
RICHARD D. KLABER
THEODORE O. STRUK
HERMAN C. KIMPEL
WILBUR MCCOY OTTO
CLAYTON A. SWEENEY
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W. ALAN TORRANCE, JR.
HOWARD A. CHAJSON
MARCELLE M. THEIS
BRIAN T. MUST
DAVID S. BLOOM
DIONYSIOS G. RASSIAS

January 6, 1989 DIRECT DIAL: 392-5327

Kellie McKiege, Esquire
Clearly, Gottlieb, Steen & Hamilton
One State Street Plaza
New York, New York 10004

Dear Kellie:

Pursuant to your request of this date, enclosed please find the following:

1. Temporary Access Easement Agreement
2. Assignment of Tenant's Interest in Leases
3. Woodward - Deeds (2) and Termination of Lease Agreements (3)

If you require any additional documents, please contact me at (412) 392-5327.

Very truly yours,

Suzanne McCartney

M. Suzanne McCartney

ASSIGNMENT OF TENANT'S INTEREST IN LEASES

KNOW ALL MEN BY THESE PRESENTS, that for good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, Koppers Company, Inc., a Delaware corporation (the "Assignor"), hereby assigns, transfers and conveys unto Koppers Industries, Inc., a Pennsylvania corporation (the "Assignee"), with recourse as and to the extent provided in the Asset Purchase Agreement of even date between Assignor and Assignee and incorporated herein by reference, any and all right, title and interest of the Assignor as lessee in and to each and every lease, occupancy or use agreement (each, a "Lease") listed on Exhibit A attached hereto and incorporated herein by reference.

Assignee hereby accepts the foregoing assignments and agrees to assume and perform all of the obligations of Assignor under each of the Leases arising from and after the date hereof as if Assignee had originally signed each such Lease as tenant thereunder (except as and to the extent provided in said Asset Purchase Agreement). Assignee agrees that the obligations thus assumed shall benefit the landlord named in each Lease as well as the Assignor.

The Assignor hereby transfers and delivers to the Assignee the original executed copies of all Leases in Assignor's possession, and any amendments thereto, and Assignee acknowledges receipt thereof.

IN WITNESS WHEREOF, the Assignor and the Assignee have each executed this Assignment of Tenant's Interest in Leases as of December 29, 1988.

ASSIGNOR

KOPPERS COMPANY, INC.

By: _____
Name: Jill M. Blundon
Title: Vice President

ASSIGNEE

KOPPERS INDUSTRIES, INC.

By: _____
Name: Robert K. Wagner
Title: President and Chief Executive Officer

Koppers000252

Exhibit A

SCHEDULE OF LEASES TO BE ASSIGNED

TAR PRODUCTS DIVISION

Production Facilities:

Chicago, Illinois
Houston, Texas
Portland, Oregon

Miscellaneous Facilities:

Atlanta, Georgia office
Elmhurst, Illinois office
Charlotte, North Carolina

WOOD PRODUCTS DIVISION

Production Facilities:

Galesburg, Illinois
Port Newark, New Jersey

Tie & Pole Yards:

*Evergreen, South Carolina
Lane, South Carolina
Danville, Louisiana
*Flat Rock, Alabama
*Fulton, Alabama
*Fraser, Colorado
*Lima, Ohio
*St. Paul, Minnesota
*Corpus Christi, Texas
*Old Bridge, New Jersey
Hamden, Ohio
*Merrimac, New Hampshire
*Raynham, Massachusetts
*Syracuse, New York
Yarmouth, Maine
*Tri-City, Michigan
Corinth, Mississippi
Quakertown, Pennsylvania
Batesville, Arkansas
Hoxie, Arkansas (Burlington Northern R.R. Co.)
Hoxie, Arkansas (Union Pacific R.R. Co.)
Knobel, Arkansas

Hamlin, Arkansas
Beaver Dam, Kentucky
Paducah, Kentucky
Brownsville, Tennessee
Doyle, Tennessee
Henderson, Tennessee
White Bluff, Tennessee
Morrison, Tennessee
Hohenwald, Tennessee
Jackson (Bemis), Tennessee
Memphis, Tennessee
*Paris, Tennessee
*Portsmouth, Ohio
Doniphan, Missouri
Viburnam, Missouri
*Poplar Bluff, Missouri
Piedmont, Missouri
West Plains, Missouri (Gary Butler)
West Plains, Missouri (W.J. Barrett)
*Dillwyn, Virginia
Crewe, Virginia (year to year)
Crewe, Virginia (month to month)
Loogootee, Indiana
Brownstown, Indiana
Watson, Indiana
Huntington, West Virginia
Crawford, West Virginia
Belington, West Virginia
Kenova, West Virginia

Distribution Yards

*Bethel, Connecticut
*Forestville, Connecticut
*Willimantic, Connecticut
*Danville, Kentucky
*Frankfort, Kentucky
*Louisville, Kentucky
*Paris, Kentucky
*Bowling Green, Kentucky
*Hopkinsville, Kentucky
*Madisonville, Kentucky
*Owensboro, Kentucky
*Paducah, Kentucky
*Prestonburg, Kentucky
*Pineville, Kentucky
*Winchester, Kentucky
*Shreveport, Louisiana
*Monroe, Louisiana

Koppers000254

*West Bank, Louisiana
*East Bank, Louisiana
*Baton Rouge, Louisiana
*Hammond, Louisiana
*Covington, Louisiana
*Thibodaux, Louisiana
*Lake Charles, Louisiana
*Lafayette, Louisiana
*Rosepine, Louisiana
*New Iberia, Louisiana
*Alexandria, Louisiana
Batesville, Mississippi
Booneville, Mississippi
Greenwood, Mississippi
Gulfport, Mississippi
Hattiesburg, Mississippi
*Jackson, Mississippi
Kosciusko, Mississippi
Meridian, Mississippi
Starkville, Mississippi
Tupelo, Mississippi
Vicksburg, Mississippi
*Pikeville, Mississippi

Miscellaneous Properties:

Memphis, Tennessee office
Atlanta, Georgia office
Elmhurst, Illinois office

COMMERCIAL ROOFING DIVISION

Miscellaneous Properties:

Northampton, Pennsylvania office

* Verbal leases

Koppers000255

PRODUCTION FACILITY DEEDS INDEX

WOOD PRODUCTS DIVISION

A. Montgomery, Alabama (Montgomery County)
B. North Little Rock, Arkansas (Pulaski County)
C. Oroville, California (Butte County)
D. Denver, Colorado (Adams County)
E. Gainesville, Florida (Alachua County)
F. Carbondale, Illinois (Jackson County)
G. Galesburg, Illinois (Knox County) *
H. Guthrie, Kentucky (Todd County)
I. Grenada, Mississippi (Grenada County)
J. Port Newark, New Jersey (Essex County) *
K. Muncy, Pennsylvania (Lycoming County)
L. Florence, South Carolina (Florence County)
M. Roanoke, Virginia (Roanoke County)
N. Green Spring, West Virginia (Hampshire County)
O. Superior, Wisconsin (Douglas County)

TAR PRODUCTS DIVISION

P. Woodward, Alabama (Jefferson County)
Q. Chicago, Illinois (Cook County) *
R. Chicago, Illinois (Cook County)
S. Portland, Oregon (Multnomah County) *
T. Houston, Texas (Harris County) *
U. Follansbee, West Virginia (Brooke County)

COKE PRODUCTS DIVISION

V. Woodward, Alabama (Jefferson County)

* Leased Property

PRODUCTION FACILITY LEASE SUMMARIES

1. GALESBURG, ILLINOIS (KNOX COUNTY)
2. PORT NEWARK, NEW JERSEY (ESSEX COUNTY)
3. CHICAGO, ILLINOIS (COOK COUNTY)
4. PORTLAND, OREGON (MULTNONIAK COUNTY)
5. HOUSTON, TEXAS (HARRIS COUNTY)

P/F

LAW OFFICES OF
DICKIE, MCCAMEY & CHILCOTE
A PROFESSIONAL CORPORATION

SUITE 400
TWO PPG PLACE
PITTSBURGH, PA
15222-5402

TEL. 412/281-7272

FAX. 412/392-5367

J. LAWRENCE MCBRIDE
DAVID B. FAWCETT
DAVID J. ARMSTRONG
RICHARD D. KLABER
THEODORE O. STRUK
HERMAN C. KIMPEL
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M. SUZANNE MCCARTNEY
ALYSON J. KIRLEIS
S. JANE ANDERSON
KENNETH S. KOMOROSKI
JOHN C. CARLOS
W. SCOTT CAMPBELL
WILLIAM M. THOMSON

March 10, 1989

Debra W. Lentz
Legal Assistant
Reed, Smith, Shaw & McClay
435 Sixth Avenue
P.O. Box 2009
Pittsburgh, PA 15230

RE: Consents and Leases

Dear Debbie:

Per our phone conversation of March 9, 1989, enclosed please find a copy of the executed leasehold consent obtained from Northwest Natural Gas Company relating to the Portland, Oregon production facility.

Also enclosed are copies of the leases that you requested. Please note that with respect to the Flat Rock, AL, Fulton, AL and Pikeville, KY sites, no written agreements exist. With respect to the following locations, we have not yet received copies of the leases:

Elmhurst, IL	Lake Development Limited
Crewe, VA	Norfolk Southern RR (yr. to yr.)
Follansbee, WV	Conrail (track siding)
Mississippi properties	D&C Construction Co., Inc.

Should you have any questions regarding the attached, do not hesitate to contact me at 392-5423.

Very truly yours,

Elena M. Rago

Elena M. Rago
Paralegal

EMR/lp
Enclosure

TOOZE MARSHALL SHENKER HOLLOWAY & DUDEN
ATTORNEYS AT LAW
333 S. W. TAYLOR STREET
PORTLAND, OREGON 97204-2496
TELEPHONE (503) 223-5181
TELEX 9103508016 TOOZE UD
FACSIMILE (503) 223-5550

L. GUY MARSHALL
ARDEN E. SHENKER
CHAS R. HOLLOWAY, III
PAUL R. DUDEN
STEPHEN R. FRANK
WM. G. SHERIDAN, JR.
MICHAEL J. GENTRY
NEALE E. CREAMER**
WILLIAM P. HUTCHISON, JR.
ELIZABETH A. TRAINOR*
ERIC J. NEIMAN*
DAVID R. SIMON
MONTGOMERY W. COBB
ROBERT E. L. BONAPARTE***
MATTHEW K. ROSSMAN
JOHN OSTRANDER
MARK L. HUGLIN

ROBERT M. KERR
COUNSEL

LAMAR TOOZE
1895-1971

LAMAR TOOZE, JR.
1922-1985

ADMITTED IN OREGON
WASHINGTON*
CALIFORNIA**
NEW YORK***
WASHINGTON, D. C.***

December 29, 1988

The "Banks" Defined Below
Mellon Bank, N.A., Agent
One Mellon Bank Center
Pittsburgh, Pennsylvania 15258

Re: Koppers Industries, Inc.

Gentlemen:

We have acted as special counsel in the State of Oregon (together with political subdivisions thereof, the "State") for Koppers Industries, Inc. (the "Borrower") in connection with the Credit Agreement dated as of December 28, 1988 (the "Credit Agreement"), among the Borrower, Koppers Holdings Corporation, Mellon Bank, N.A. ("Mellon") and Mellon Bank, N.A., as agent (the "Agent") for Mellon and the other financial institutions which hereafter may become parties thereto (together with Mellon, the "Banks"). Terms used herein which are defined in the Credit Agreement shall have the same meaning herein as therein provided unless the context hereof clearly otherwise requires.

We have examined executed copies of the Deed of Trust and Security Agreement (the "Oregon Deed of Trust"); the Security Agreement; the Assignment; the Credit Agreement; and the Notes (collectively, the "Documents").

We have also examined financing statements in the form of Exhibit A hereto (the "Financing Statements"). In making such examinations, we have assumed the genuineness of all signatures, the authenticity of all documents submitted to us as originals and the conformity to original documents of all documents submitted to us as certified, conformed or photostatic copies.

In rendering this opinion, we have assumed with your permission that (i) the Documents were duly authorized, executed and delivered by the respective parties thereto, that (ii) the Documents were negotiated by the various parties hereto in the Commonwealth of Pennsylvania and such documents were executed and delivered in said Commonwealth, where the closing and the funding took place, and that (iii) the parties had the corporate power and authority to execute and deliver the Documents.

Based upon the foregoing and subject to the qualifications hereinafter set forth, we are of the opinion that:

1. The Documents constitute legal, valid and binding obligations of the parties thereto other than the Mellon and the Agent (the "Loan Parties") and are enforceable in accordance with the terms thereof, except as the enforceability thereof may be limited by bankruptcy, insolvency or other similar laws of general application affecting the enforcement of creditors' rights or by general principles of equity limiting the availability of equitable remedies.

2. No authorization, consent (unless required of the lessor of the Mortgaged Property), approval, license, exemption or other action by, and no registration, qualification, designation, declaration or filing with, any Official Body of the State is or will be, as of the date of closing, necessary or advisable in connection with execution and delivery of the Documents, consummation of the transactions therein contemplated, or to ensure the legality, validity, enforceability and admissibility in evidence thereof, except as referred to in paragraphs 4 and 5 below. We are advised by counsel for the Borrower that Borrower has registered to do business in Oregon as a foreign corporation.

3. Neither the execution and delivery of the Documents nor consummation of the transactions therein contemplated nor performance of or compliance with the terms and conditions thereof will violate any law or governmental rule or regulation of Oregon.

4. The Oregon Deed of Trust is in proper form for execution under the laws of Oregon and is in proper form (a) for the creation of the Lien contemplated thereby on and against the Mortgaged Property (as defined in the Deed of Trust) and (b) for recording in the Multnomah County Recorder's office. Under and pursuant to the Oregon Deed of Trust there has been granted to and created in favor of the Agent, for the ratable benefit of the Banks, as security for the Secured Obligations (as defined therein), a legal, valid and enforceable mortgage lien on, and security interest in, the Mortgaged Property described therein. When such Oregon Deed of Trust is duly recorded in the Multnomah County Recorder's office, such Oregon Deed of Trust shall constitute a fully perfected mortgage lien on, and security interest in, all real property (including fixtures) included in the Mortgaged Property; and when the Financing Statements have been filed in the offices listed on Exhibit B hereto, such Oregon Deed of Trust shall also constitute a fully perfected lien on, and security interest in, all personal property included in the Mortgaged Property.

5. To the extent Oregon law may be applicable, under and pursuant to the Security Agreement there has been granted to and created in favor of the Agent, for the ratable benefit of the Banks, as security for the Debt (as defined therein), a legal, valid and enforceable security interest in the Collateral (as defined therein) and, upon filing of the Financing Statements in the offices listed on Exhibit B hereto and the delivery to the Agent of any Documents and Instruments (as such terms are defined in such Security Agreement), will constitute a fully perfected lien on, and security interest in, the Collateral. The Financing Statements are in proper form for filing and for perfecting such security interest.

6. The Assignment is in proper form for execution under the laws of the State and is in proper form for the creation of the Lien comtemplated thereby on and against the Agreements defined therein and the rights of the Borrower thereunder. Under and pursuant to the Assignment there has been granted to and created in favor of the Agent, for the ratable benefit of the Banks, as security for the due performance by the Borrower of its obligations under the Credit Agreement , the Notes and the Related Documents to which it is a party, a legal, valid and enforceable security interest on and against the Agreements defined therein and the rights of the Borrower thereunder. We note that we have not reviewed the Agreements listed on Schedule I to the Assignment and express no opinion as to the requirements, if any, contained therein, to be met in order to create a lien in and to such Agreements.

7. The courts of Oregon will enforce the choice of law provisions contained in the Documents which expressly provide that the terms and provisions thereof will be governed by and construed in accordance with the laws of the Commonwealth of Pennsylvania except to the extent set forth in the proviso to Section 5.11 of the Oregon Deed of Trust.

8. Neither the Agent nor any Bank is required to register or qualify as a foreign corporation, or to file any designation for service of process, in Oregon by reason of the transactions contemplated by the Documents.

9. The transactions contemplated by the Documents will not subject the Agent or any Bank to any tax, assessment or other governmental charge under the laws of Oregon except for statutory, recording and filing fees to be paid upon the recording or filing of the Oregon Deed of Trust and the Financing Statements.

10. There is no Law of Oregon which would impose on a person whose interest in real or personal property situated within the State is limited to a collateral security interest an obligation to effect an environmental cleanup or fund the costs of an environmental cleanup with respect to any such property, <u>except as hereinafter set forth.</u>

11. Our review of the Oregon Deed of Trust requires that we express the following additional opinions.

(i) Subparagraphs (i), (ii) and (iii) of Paragraph (a) on page 2 include in the description of the "Land" property in which the Beneficiary will gain an interest only to the extent that the Borrower/ Grantor might have a legal interest or right to convey; we do not express any opinion as to whether or not the Grantor has any interest in rights of way, etc. Similarly, Paragraph (e) on page 2 includes within Mortgaged Property certain rights issued by Official Bodies; we express no opinion as to whether Borrower has the ability to create a security interest in such rights.

(ii) We would advise that the subject Land has been proposed for inclusion in the Oregon Department of Environmental Quality (DEQ) Inventory List of facilities where there have been confirmed releases of hazardous substances; this is being promulgated for public information purposes pursuant to ORS 466.557. We note that the Oregon Environmental Quality Commission has just deferred promulgation of the Inventory List. A copy of page 11 from that listing is enclosed and the status of the remedial action reference indicates that the site is currently being overseen by the DEQ for technical assistance to responsible party for investigation, cleanup, closure, or removal. The liability of Beneficiary under the Oregon Deed of Trust for cleanup costs is limited to those situations where said Beneficiary becomes an owner or operator of the property, a circumstance which might arise if said Beneficiary foreclosed its interest in the property and "owned" or "operated" it.

(iii) The opinions expressed with respect to the Oregon Deed of Trust are those which relate to Oregon state law; we have not and are not expressing any opinion with respect to the enforceability of provisions of the Oregon Deed of Trust where Oregon's Uniform Commercial Code provisions are consistent with those adopted generally throughout the country; for example, in paragraph 3.02(e), we do not express an opinion as to whether or not the Beneficiary may purchase at a private sale.

(iv) With respect to paragraph 2.18(c), we do not express any opinion as to whether or not an attempt by Grantor to alter the ground lease would be null and void as to the lessor.

(v) The Article 4, page 23 provisions with respect to a trustee may not be enforceable as against the trustee without the trustee's prior approval. We would note that the trustee is not a signatory to the Oregon Deed of Trust.

(vi) With respect to article 5, section 5.01, page 24, ORS 86.155, a copy of which is enclosed, appears to require that the first page of the Oregon Deed of Trust contain in the caption a reference to the fact that this is a "Line of Credit Mortgage" and that on the first page the term (if any) of the Oregon Deed of Trust and the maximum amount to be advanced be set forth. If these provisions are not included, it may jeopardize the availability of the real property as security for future advances.

(vii) With respect to paragraph 3.02(g), the availability of this remedy will be subject to state law and Rule 67(F) of the Oregon Rules of Civil Procedure providing for judgment by stipulation.

We are members of the bar of Oregon and do not purport to be experts in the laws of any jurisdiction other than the State and the United States. To the extent Pennsylvania law applies to any of the matters on which we have opined, we have assumed that Pennsylvania law is the same as the State's law with respect to such matters.

All of our opinions expressed in this letter are specifically subject to and limited by the following:

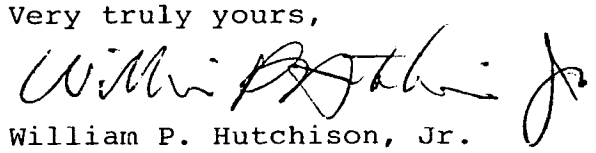
(a) The effect of laws or court decisions relating to bankruptcy, insolvency, reorganization, liquidation, readjustment of debt or other laws or court decisions relating to or affecting the enforcement of creditors' rights generally, whether now or hereafter in effect; the effect of applicable court decisions, invoking statutes or principles of equity or public policy, which hold that certain covenants or provisions of agreements are unenforceable where, for example, the breach of such covenants or provisions imposes restrictions or burdens upon the party thereto and it cannot be demonstrated that the imposition of such restrictions or burdens is reasonably necessary for the protection of the other party, or where the enforcement of such covenants or provisions would violate the covenant of good faith and fair dealing or other public policy implied under law.

(b) The effect of general principles of equity or public policy (regardless of whether considered in a proceeding at law or in equity) which, among other things may limit the enforceability of waivers of rights or the availability of specific performance, appointment of a receiver, injunctive relief or other equitable remedies.

(c) The unenforceability under certain circumstances, under state or federal law or court decisions of provisions indemnifying a party against liability for its own wrongful or negligent acts, requiring contribution to such party under such circumstances or where indemnification or contribution is otherwise contrary to public policy.

This opinion is intended solely for the use of the Agent and the Banks, their successors and assigns in connection with the transactions discussed herein, and is not to be used, released, quoted or relied upon by anyone else or for any other purpose without our prior written consent. The information set forth in this letter is as of the date hereof, and we assume no obligation to advise the addressees of changes, whether or not deemed material, which may hereafter come to our attention.

Very truly yours,



William P. Hutchison, Jr.

WPH:kd
Enc.
cc: Steven B. Larchuk, Dickie, McCamey & Chilcote
Frederick C. Leech, Reed Smith Shaw & McClay

NOTE: Our statement will follow shortly

INSTRUCTIONS:

1. **PLEASE TYPE THIS FORM.**
2. Enclose fee of $2.00 for each debtor/or trade name shown.
3. This form is to be filed only with the Secretary of State.
4. Send the Alphabetical, Numerical and Acknowledgment copies with interleaved carbon paper intact to the filing officer. The Debtor(s) and Secured Party(ies) copies are retained by party making the filing.
5. If the space provided for any item(s) on the form is inadequate, the item(s) should be continued on additional sheets, size 5" x 8". Only one copy of such additional sheets need be presented to the filing officer. Long schedules of collateral, indentures, etc. may be on any size paper that is convenient for the secured party. **DO NOT STAPLE OR TAPE ANYTHING TO LOWER PORTION OF THIS FORM.**
6. At the time of original filing, filing officer will return acknowledgment copy to the assignee if noted on form or secured party. If secured party requires acknowledgment of long schedules of collateral, two copies should be presented and one will be returned.
7. When a copy of the security agreement is used as a financing statement, it is requested that it be accompanied by a completed UCC-21 form. Enclose $3.00 plus $2.00 per debtor more than one.
8. When filing is to be terminated the acknowledgment copy may be sent to the filing officer signed by the secured party or assignee or he may use Form UCC-3 as a Termination Statement.

STATE OF OREGON

UNIFORM COMMERCIAL CODE—FINANCING STATEMENT—FORM UCC-1A

Secretary of State

This FINANCING STATEMENT is presented to filing officer pursuant to the Uniform Commercial Code.

1A. Debtor(s):	2A. Secured Party(ies):	Filing Officer Use Only
Koppers Industries, Inc.	Mellon Bank, N.A., Agent	
1B. Mailing Address(es):	2B. Address of Secured Party from which security information obtainable:	
Koppers Building 436 Seventh Avenue Pittsburgh, PA 15219	One Mellon Bank Center Pittsburgh, PA 15258-0001	

3. This financing statement covers the following types (or items) of collateral (ORS 79.4020):

See Exhibit A attached hereto.

4A. Assignee of Secured Party(ies) if any:

4B. Address of Assignee from which security information obtainable:

Check box if products of collateral are also covered [XX] No. of additional sheets attached [3]

*Signature(s) of Debtor(s) required in most cases.

Signature(s) of Secured Party(ies) in cases covered by ORS 79.4020.

Koppers Industries, Inc.

By: .....

Signature(s) of Debtor(s)*
Signature(s) of Secured Party(ies) or Assignee(s)

This form of Financing Statement approved by the Secretary of State.

STANDARD FORM—UNIFORM COMMERCIAL CODE—FORM UCC-1A

7/1/78 FILING OFFICER COPY - ALPHABETICAL

EXHIBIT A

All right, title and interest of Debtor now owned or held or hereafter acquired or arising in and to the following:

(a) all buildings, structures and other improvements (collectively, the "Improvements") now or hereafter erected or placed on the land and premises described in Exhibit B hereto (the "Land");

(b) all machinery, apparatus, equipment, fittings, fixtures, goods, chattels and other articles of personal property now or hereafter located on, attached to or used in connection with the Land or the Improvements, and all replacements thereof, additions thereto and substitutions therefor (all of the foregoing, being hereinafter collectively called the "Equipment"), together with all deposits or payments made on any Equipment in connection with the conditional purchase thereof and all leases by Debtor as lessee of Equipment;

(c) all licenses, permits, authorizations and agreements from governmental authorities relating to the ownership, construction, occupancy, operation, management or use of the Land, the Improvements or the Equipment;

(d) all contracts, licenses and agreements relating to the ownership, design, construction, occupancy, operation, management or use of the Land, the Improvements or the Equipment;

(e) all the remainder or remainders, reversion or reversions, rents, revenues, issues, profits, royalties, income and other benefits derived from any of the foregoing;

(f) all proceeds of the conversion, voluntary or involuntary, of any of the foregoing into cash or liquidated claims, including all proceeds of insurance; and

(g) all proceeds, both cash and non-cash, of any and all of the foregoing.

EXHIBIT B

TAR PRODUCTS

Production Facility

Portland, Oregon Terminal

LEGAL DESCRIPTION

PARCEL I:

That portion of Sections 12 and 13, Township 1 North, Range 1 West of the Willamette Meridian lying within the W.W. Baker Donation Land Claim, in the City of Portland, County of Multnomah and State of Oregon, described as follows:

Beginning at the point of intersection of the centerline of the Spokane, Portland, and Seattle Railroad and the East line of the W.W. Baker Donation Land Claim; thence North 32°00' East, 162.55 feet to a fence corner at the true point of beginning; thence continuing North 32°00' East along a fence 456.40 feet to a fence corner; thence North 29°58'00" West 150.40 feet; thence North 33°37'00" West 147.88 feet; thence North 49°51'00" West 139.00 feet to a hub; thence South 56°29'00" West 265.15 feet to a nail; thence North 33°13'00" West 260.70 feet to a railroad spike at a point known as point "A"; thence South 56°29'00" West 111.55 feet to a railroad spike; thence South 31°12'30" East 102.90 feet; thence South 56°46'00" West 38.57 feet; thence South 33°14'00" East 36.00 feet; thence South 56°46'00" West 9.00 feet; thence South 33°14'00" East 106.58 feet to a hub; thence South 25°44'30" West 10.51 feet to a hub; thence South 56°24'30" West 54.40 feet; thence South 33°05'30" East 277.30 feet; thence North 56°51'00" East 34.30 feet; thence South 75°03'00" East 34.55 feet; thence South 47°41'30" East 190.00 feet to a nail; thence South 35°16'30" East 140.05 feet to the true point of beginning.

EXCEPT a 30 foot strip of land parallel and contiguous with the East line of the W.W. Baker DLC in Sections 12 and 13, Township 1 North, Range 1 West, said strip of land being 30 feet Westerly of the said DLC line and more particularly described as: Beginning at a point 162.55 feet North 32° East from the intersection of the centerline of the SP & S Railway with the East line of the said Baker DLC; thence North 32° East 456.4 feet; thence North 29°58' West 34 feet; thence South 32° West 459.8 feet; thence South 35°16'30" East 32.5 feet to the point of beginning. ALSO EXCEPT rights of the public to part in City street.

PARCEL II:

That portion of Section 12, Township 1 North, Range 1 West of the Willamette Meridian lying within the W.W. Baker Donation Land

Claim, in the City of Portland, County of Multnomah and State of Oregon, described as follows:

Beginning at a point 769.61 feet North and 365.57 feet West of a tack marking the point of intersection of the centerline of the SP&S Railway with the Southeasterly line of the W.W. Baker DLC in said Township and Range; thence South 56°46' West 70.52 feet; thence South 33°05'30" East 149 feet; thence North 56°24'30" East 54.4 feet; thence North 25°44'30" East 10.51 feet; thence North 33°14' West 106.58 feet; thence North 56°46' East 9 feet; thence North 33°14' West 36 feet to the point of beginning.

STATE OF OREGON

UNIFORM COMMERCIAL CODE—FINANCING STATEMENT—FORM UCC-1 A

Secretary of State

INSTRUCTIONS:

1. **PLEASE TYPE THIS FORM.**
2. Enclose fee of $2.00 for each debtor/or trade name shown.
3. This form is to be filed only with the Secretary of State.
4. Send the Alphabetical, Numerical and Acknowledgment copies with interleaved carbon paper intact to the filing officer. The Debtor(s) and Secured Party(ies) copies are retained by party making the filing.
5. If the space provided for any item(s) on the form is inadequate, the item(s) should be continued on additional sheets, size 5" x 8". Only one copy of such additional sheets need be presented to the filing officer. Long schedules of collateral, indentures, etc. may be on any size paper that is convenient for the secured party. **DO NOT STAPLE OR TAPE ANYTHING TO LOWER PORTION OF THIS FORM.**
6. At the time of original filing, filing officer will return acknowledgment copy to the assignee if noted on form or secured party. If secured party requires acknowledgment of long schedules of collateral, two copies should be presented and one will be returned.
7. When a copy of the security agreement is used as a financing statement, it is requested that it be accompanied by a completed UCC-21 form. Enclose $3.00 plus $2.00 per debtor more than one.
8. When filing is to be terminated the acknowledgment copy may be sent to the filing officer signed by the secured party or assignee or he may use Form UCC-3 as a Termination Statement.

This FINANCING STATEMENT is presented to filing officer pursuant to the Uniform Commercial Code.

1A. Debtor(s):	2A. Secured Party(ies):	Filing Officer Use Only
Koppers Industries, Inc.	Mellon Bank, N.A., Agent	
1B. Mailing Address(es): Koppers Building, 436 Seventh Avenue, Pittsburgh, PA 15219	2B. Address of Secured Party from which security information obtainable: One Mellon Bank Center, Pittsburgh, PA 15258-0001	

3. This financing statement covers the following types (or items) of collateral (ORS 79.4020):

See Exhibit A attached hereto.

4A. Assignee of Secured Party(ies) if any:

4B. Address of Assignee from which security information obtainable:

Check box if products of collateral are also covered [XX] No. of additional sheets attached [7]

Koppers Industries, Inc.

*Signature(s) of Debtor(s) required in most cases.

By: [signature] Signature(s) of Debtor(s)*

Signature(s) of Secured Party(ies) in cases covered by ORS 79.4020. Signature(s) of Secured Party(ies) or Assignee(s)

This form of Financing Statement approved by the Secretary of State.

STANDARD FORM—UNIFORM COMMERCIAL CODE—FORM UCC-1 A

7/1/78 FILING OFFICER COPY - ALPHABETICAL

EXHIBIT A

All of Debtor's present and future rights, title and interest in and to the following property, whether now owned or held or hereafter existing or acquired and wherever located: all property and assets of Debtor, including without limitation all accounts, contract rights, chattel paper, equipment, inventory, instruments, documents and general intangibles (as such terms are defined in the Uniform Commercial Code); and all products and proceeds, both cash and non-cash, of the foregoing.

STATE OF OREGON

UNIFORM COMMERCIAL CODE—FINANCING STATEMENT—FORM UCC-1 A

Moultnomah County Clerk's Office

INSTRUCTIONS:

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3. This financing statement covers the following types (or items) of collateral (ORS 79.4020):

See Exhibit A attached hereto.
The collateral described in Exhibit A is or is to become fixtures on the land described in Exhibit B attached hereto.

4A. Assignee of Secured Party(ies) if any:

4B. Address of Assignee from which security information obtainable:

Check box if products of collateral are also covered [X] No. of additional sheets attached [3]

Koppers Industries, Inc.

By: ..... Signature(s) of Debtor(s)*
Signature(s) of Secured Party(ies) or Assignee(s)

*Signature(s) of Debtor(s) required in most cases.

Signature(s) of Secured Party(ies) in cases covered by ORS 79.4020.

This form of Financing Statement approved by the Secretary of State.

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STATE OF OREGON

UNIFORM COMMERCIAL CODE—FINANCING STATEMENT—FORM UCC-1 A

Moultnomah County Clerk's Office

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Check box if products of collateral are also covered [X] No. of additional sheets attached [/]

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Signature(s) of Secured Party(ies) in cases covered by ORS 79.4020.

Koppers Industries, Inc.

By: R. L. Wagner

Signature(s) of Debtor(s)*

Signature(s) of Secured Party(ies) or Assignee(s)

This form of Financing Statement approved by the Secretary of State.

STANDARD FORM—UNIFORM COMMERCIAL CODE—FORM UCC-1

7/1/78 FILING OFFICER COPY - ALPHABETICAL

EXHIBIT A

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EXHIBIT "B"

	Location to be filed
FORM UCC-1	Secretary of State UCC Division, Room 41 State Capitol Salem, Oregon 97310 (503) 378-4146
FORM UCC-1A Cost $5 per page	Multnomah County Recorder's Office 610 SW Alder, Room 300 Portland, Oregon 97205 (503) 248-3034

OREGON

(1) Production Facility Lease
(1) Tar Products Division, Production Facility Deed

DUE DILIGENCE REPORT

(1) Under Oregon Administrative Rules 340-100-002, Oregon has adopted Title 40 of the Code of Federal Regulations Section 264 and 265.

(2) However, Oregon Revised Statutes 466.360 through 466.385 sets forth Oregon's "notice of environmental hazards" procedure. This statute is somewhat unusual in that instead of the owner or operator of property being required to give notice to a subsequent purchaser, the State Department of Environmental Quality notifies an owner of a hazardous waste disposal site, and the DEQ files the required notice. Within 120 days of receipt of an environmental hazard notice from the Department of Environmental Quality, the city or county shall amend its zoning maps to identify the disposal sites.

(3) As noted in the Babst Calland report, Section 340-61-040(27) of the Oregon Administrative Regulations requires notice for closure of "solid waste landfills"

(4) No other apparent statutory restrictions or regulations appear to exist.

OREGON

COMPLIANCE REPORT

(1) No documentation of compliance with state requirements is on record.

(2) Oregon requires notification to subsequent purchasers. Oregon also adopts 40 C.F.R. §§264 and 265, which would require notation on the deed and recording of the deed notation with the local land authority.

(3) Furthermore, the State Department of Environmental Quality is required to notify an owner of a hazardous waste disposal site and file the required notice with the appropriate zoning authority.

(4) Property transferred in Oregon consists of one lease and one deed; however, only the deed would require a formal recording of the hazardous waste notation.

TOOZE MARSHALL SHENKER HOLLOWAY & DUDEN
ATTORNEYS AT LAW
333 S. W. TAYLOR STREET
PORTLAND, OREGON 97204-2496
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WILLIAM P. HUTCHISON, JR.
ELIZABETH A. TRAINOR*
ERIC J. NEIMAN*
DAVID R. SIMON
MONTGOMERY W. COBB
ROBERT E. L. BONAPARTE***
MATTHEW A. ROSSMAN
JOHN OSTRANDER
MARK L. HUGLIN

ROBERT M. KERR
COUNSEL

LAMAR TOOZE
1895-1971

LAMAR TOOZE, JR.
1922-1985

ADMITTED IN OREGON
WASHINGTON*
CALIFORNIA**
NEW YORK***
WASHINGTON, D.C.***

TELECOPY COVER LETTER

TO: Steve Larchuk

OF: Dickie, McCamey & Chilcote

FROM: William P. Hutchison, Jr.

RE: Koppers Industries, Inc.

DATE: 12/29/88 TIME: 12:41

NO. OF PAGES (INCLUDING THIS PAGE): 25

CLIENT NO. 880021 PHONE NO. CALLED: 412-392-5367

IF YOU DO NOT RECEIVE ALL PAGES, PLEASE CALL: Karen

AT (503) 223-5181, EXT. 312. TELECOPY PHONE NO.: 223-5550.

MESSAGE:

TOOZE MARSHALL SHENKER HOLLOWAY & DUDEN
ATTORNEYS AT LAW
333 S. W. TAYLOR STREET
PORTLAND, OREGON 97204-2495
TELEPHONE (503) 223-5181
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JOHN OSTRANDER
MARK L. HUGLIN

ROBERT M. KERR
COUNSEL

LAMAR TOOZE
1895-1971

LAMAR TOOZE, JR.
1928-1985

ADMITTED IN: OREGON
WASHINGTON*
CALIFORNIA**
NEW YORK***
WASHINGTON, D. C.****

December 29, 1988

Steven B. Larchuk, Esq.
Dickie, McCamey & Chilcote
Suite 400
Two PPG Place
Pittsburgh, PA 15222-5402

Dear Mr. Larchuk:

Re: Koppers Company, Inc. to
Pittsburgh Acquisition Corporation, Inc.
Our File 880021

This letter is in response to your December 20, 1988 letter requesting our opinion as to whether or not Oregon law requires the owner or operator of property where hazardous waste is located to give notice to buyers or tenants and whether such notice is to be recorded in documents of conveyance. In addition, you also requested our advice as to whether or not any state or local agency must be advised of or must approve of the transfer.

It is our understanding that there may be hazardous waste on the Oregon property. We are unaware as to the type of hazardous waste involved, how it is being stored or whether it is being released into the environment.

ORS 466.360-466.385 sets forth Oregon's "Notice of Environmental Hazards" procedure. Under the relevant statutes, no notice by an owner or operator of property is required to be given to a subsequent purchaser. Instead, the state Department of Environmental Quality (DEQ) notifies an owner of a hazardous waste disposal site and the DEQ files the required notice. Once an owner receives such a notice the property may be subject to various rules adopted by the Environmental Quality Commission which oversees the DEQ. The procedure is covered under ORS 466.370. The DEQ is to notify the owner by certified mail that a disposal site exists. The notice must describe the restrictions that will be imposed. A copy of the applicable statutes is attached.

Notwithstanding the fact that the aforementioned statute does not require specifically the furnishing or recording of a hazardous waste notice by either party to this transaction, circumstances may exist that require the furnishing of notice to the DEQ, that a hazardous waste "release" has occurred. This might in turn result in the agency taking action to require the recording of the aforementioned statutory notice. You have not requested that we determine the status of the property with respect to hazardous waste contamination. Accordingly, we furnish no opinion with respect to existing or potential liability stemming from hazardous substance use or hazardous waste disposal. As we believe you are aware, if contamination is present, the liability stemming therefrom under pertinent state and federal statutes will survive this transaction. Because of the relationship between the parties, we understand and assume that the issues of disclosure, warranty, and indemnification have been otherwise negotiated and resloved between them and the Mellon Bank.

We have also determined that the property is proposed for inclusion in DEQ's current (hazardous waste) release list. A copy of page 11 from the proposed list is attached. All property owners on the list have received notice of the agency's intent to include them on the list and we presume the property will be on the final list of properties requiring remediation.

If you have any further questions or need additional information, please advise.

Very truly yours,

William P. Hutchison, Jr.

WPH:kd
Enclosures

OWNERS NOTIFIED OF PROPOSED LISTING ON THE INVENTORY OF
CONFIRMED RELEASES PURSUANT TO ORS 466.557(4)
****THIS IS NOT THE INVENTORY OF CONFIRMED RELEASES****
LIST SUBJECT TO CHANGE BASED ON OREGON LAW

SITE ID	SITE LOCATION	LEGAL OWNER(S)	SUBSTANCE(S)	STATUS OF REMEDIAL ACTION
666	John C. Taylor Lumber Sales, Inc. Rock Creek Road and Hwy. 18 Sheridan	Taylor Lumber and Treating, Inc.	pentachlorophenol tetrachlorophenol napthalene acenaphthene fluorene	
59	Johnson Controls - Globe Battery Divn. 800 N.W. 3rd Avenue Canby	Johnson Controls Inc.	lead sulfuric acid	RPIC
266	K-Lines, Inc 375 S.W. Boones Ferry Road Lake Oswego	Jamey K. Berry	lead	FIR
62	Koppers Company (Portland), Inc. 7540 N.W. St. Helen's Road Portland	Northwest Natural Gas	lead phenol, total ethylbenzene napthalene acenaphthene fluorene anthracene phenanthrene fluoranthene pyrene dibenzofuran	RPIC
131	Lenda 4920 N.E. 122nd Avenue Portland	Pacific Realty Associates	sulfuric acid hydrofluoric acid Caustic solution	RPP

Koppers000283

(2) The department may, upon direction from the commission and after payment of just compensation, acquire and own an existing facility for use in the disposal of PCB. In order to secure such a facility, the commission may modify or waive any of the requirements of ORS chapter 459 and ORS 466.005 to 466.385, 466.880 (1) and (2), 466.890 and 466.995 (1) and (2), but not ORS 469.375 or 469.525, if the commission finds that waiver or modification:

(a) Is necessary to make operation of the facility economically feasible; and

(b) Will not endanger the public health and safety or the environment. [1985 c.670 §30; 1987 c.540 §50]

466.340 Restrictions on treatment or disposal of PCB at facility. (1) The department may limit, prohibit or otherwise restrict the treatment or disposal of PCB at a disposal facility if appropriate to protect public health and safety or the environment.

(2) The department shall monitor the origin and volume of PCB received at a disposal facility acquired and regulated under ORS 466.335, and may curtail or reduce the volume of the PCB that may be accepted for disposal as necessary to:

(a) Protect public health and safety or the environment; or

(b) Assure that the operation of the facility is economically feasible.

(3) The department shall not accept any PCB at a disposal facility owned by the state from a state that is not a party to the Northwest Interstate Compact on Low-Level Radioactive Waste Management as set forth in ORS 469.930. [1985 c.670 §31]

466.345 PCB facility permit fee. (1) The PCB disposal facility permit shall require a fee based either on the volume of PCB accepted at the facility or a percentage of the fee collected, or both. The fees shall be calculated in amounts estimated to produce over the facility use period a sum sufficient to:

(a) Secure performance of permit requirements;

(b) Close the facility;

(c) Provide for any monitoring or security of the facility after closure; and

(d) Provide for any remedial action by the state necessary after closure to protect the public health and safety and the environment.

(2) The amount so paid shall be held in a separate account and when the amount paid in by the permittee together with the earnings thereon equals the amount of the financial assurance required under ORS 466.320, the permittee shall be allowed to withdraw the financial assurance.

(3) If the facility is closed before the fees reach an amount equal to the financial assurance, appropriate adjustment shall be made and the reduced portion of the financial assurance may be withdrawn. [1985 c.670 §32; 1987 c.284 §4; 1987 c.540 §51]

466.350 Post-closure permit; fee. (1) At the time a PCB disposal facility is closed, the person permitted under ORS 466.025 to 466.065, 466.250, 466.255 (2) and (3) and 466.260 to 466.350 to operate the facility must obtain a post-closure permit from the department.

(2) A post-closure permit issued under this section must be maintained until the end of the post-closure period established by the commission by rule.

(3) In order to obtain a post-closure permit the permittee must provide post-closure care which shall include at least the following:

(a) Monitoring and security of the PCB disposal facility; and

(b) Any remedial action necessary to protect the public health and safety and environment.

(4) The commission may by rule establish a post-closure permit application fee. [1985 c.670 §33; 1987 c.540 §52]

NOTICE OF ENVIRONMENTAL HAZARDS

466.360 Policy. (1) The Legislative Assembly finds that:

(a) Disposal sites exist on certain lots or parcels of real property within Oregon that may restrict future land development or constitute a potential hazard to the health, safety and welfare of Oregon's citizens, particularly if present or future owners use or modify the parcels without taking into consideration the use restrictions or environmental hazards posed by the former disposal activity.

(b) Permits, licenses and approvals that have been or may be granted by the Environmental Quality Commission, the Department of Environmental Quality or the Energy Facility Siting Council authorizing disposal of waste upon real property protect the health, safety and welfare of Oregon citizens only if adequate notice of post-closure use restrictions is given to future purchasers of the real property.

(c) Disposal sites created prior to regulation may be potentially hazardous if use restrictions are not imposed.

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Oregon

HAZARDOUS WASTE MANAGEMENT

DIVISION 100

HAZARDOUS WASTE MANAGEMENT SYSTEM: GENERAL

[illegible] Waste Management System: General
[illegible]-001 thru 340-100-022:

[DEQ 7-1984, f. & ef. 4-26-84;
DEQ 17-1984, f. & ef. 8-22-84;
DEQ 21-1984, f. & ef. 11-8-84;
Superceded by DEQ 8-1985,
f. & ef. 7-25-85]

[illegible] (1) The Department finds that increasing [illegible] of hazardous waste are being generated in Oregon [illegible] without adequate safeguards, can create conditions [illegible] public health and the environment. It is there- [illegible] public interest to establish a comprehensive [illegible] provide for the safe management of such waste. [illegible] of the management program contained [illegible] 10 of this Chapter is to control haz- [illegible] time of generation through transporta- [illegible] and disposal. Waste reduction at the [illegible] beneficial use, recycling and treatment [illegible] to land disposal. To this end, the [illegible] to minimize the number of disposal [illegible] control their operation.

[illegible] 100 to 106 incorporate, by reference, [illegible] management regulations of the federal [illegible] 40 CFR Parts 260 to 266, 270 and [illegible] Oregon Administrative Rules. There- [illegible] consult these parts of 40 CFR in addition [illegible] 106 of these rules to determine all [illegible] waste management requirements.

[illegible] purpose is to obtain EPA Final Autho- [illegible] hazardous waste in Oregon in lieu of the [illegible]

[illegible] publication(s) referred to or incorporated by reference [illegible] the office of the Department of Environmental [illegible]

[illegible] 183, 459 & 468
[illegible] f. & ef. 7-25-85

[illegible] **United States Environmental Protection Agency [illegible]**

(1) Except as otherwise modified or spec- [illegible] 340, Divisions 100 to 106, the rules [illegible] the management of hazardous [illegible] generation, transportation by air or [illegible] and disposal, prescribed by the [illegible] Protection Agency in Title 40 [illegible], Part 260 to 266, 270 and Subpart A of 124, amendments thereto promulgated prior to July 1, 1986, and amendments listed below in section (2) of this rule are adopted and prescribed by the Commission to be observed by all persons subject to ORS 466.005 to 466.080, and 466.090 to 466.215.

(2) In addition to the regulations and amendments promulgated prior to July 1, 1986, as described in section (1) of this rule, the following amendments to **Title 40 Code of Federal Regulations, Part 260 to 266, 270 and Subpart A of 124**, as published in volumes 51 and 52 of the **Federal Register (FR)**, are adopted and prescribed by the Commission to be observed by all persons subject to ORS 466.005 to 466.080, and 466.090 to 466.215:

(a) Amendments pertaining to liability coverage for hazardous waste management facilities, in **51 FR 25354-56** (July 11, 1986).

(b) Revised standards for hazardous waste storage and treatment tank systems, in **51 FR 25470-86** (July 14, 1986).

(c) Amendments to the rules concerning identification and listing of hazardous waste, in **51 FR 28298-310** (August 6, 1986).

(d) Technical corrections to the HSWA final codification rule, in **51 FR 28556** (August 8, 1986).

(e) Corrections to the revised standards for hazardous waste storage and treatment tank systems, in **51 FR 29430-31** (August 15, 1986).

(f) Amendments clarifying the listing for spent pickle liquor from steel finishing operations, in **51 FR 33612** (September 22, 1986).

(g) Technical corrections to the rules concerning burning of hazardous waste fuel and used oil fuel in boilers and industrial furnances, in **51 FR 11821-22** (April 13, 1987).

[**Publications:** The publication(s) referred to or incorporated by reference in this rule are available from the office of the Department of Environmental Quality.]

Stat. Auth.: ORS Ch. 183, 466 & 468
Hist.: DEQ 8-1985, f. & ef. 7-25-85; DEQ 10-1987, f. &.ef. 6-11-87; DEQ 23-1987, f. & ef. 12-16-87

Confidentiality

340-100-003 (1) The provisions of this rule replace the provisions of **40 CFR 260.2**.

(2) Records, reports, and information submitted pursuant to these rules may be claimed as confidential by the submitter. Such claim must be asserted at the time of submission by stamping the words "confidential business information" or the equivalent on each page containing such information. If no claim is made at the time of submission, the Department may make the information available to the public without further notice. If a claim is asserted, the information will be treated in accordance with ORS 192.500 and 459.460.

(3) Records, reports, and information submitted pursuant to these rules shall be made available to EPA upon request. If the records, reports, or information has been submitted under a claim of confidentiality, the state shall make that claim of confidentiality to EPA for the requested records, reports or information. The federal agency shall treat the records, reports or information that is subject to the confidentiality claim as confidential in accordance with applicable federal law.

(Comment: It is suggested that claims of confidentiality be restricted to that information considered absolutely necessary and

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(d) Proper precautions and maintenance cannot be taken and continued unless the location of the disposal site, the nature and extent of its potential hazard and use restrictions are known to cities and counties and those who own and occupy the property.

(2) It is hereby declared to be the public policy of this state to give notice to local governments of potential hazardous disposal sites and to impose use restrictions on those sites. [1985 c.273 §2]

466.365 Commission authority to establish sites for which notice is required; rulemaking; report to Legislative Assembly. (1) The commission may establish by rule adopted under ORS 183.310 to 183.550:

(a) A list of sites for which environmental hazard notices must be given and use restrictions must be imposed. The list shall be consistent with the policy set forth in ORS 466.360 and may include any of the following sites that contain potential hazards to the health, safety and welfare of Oregon's citizens:

(A) A land disposal site as defined by ORS 459.005;

(B) A hazardous waste disposal site as defined by ORS 466.005;

(C) A disposal site containing radioactive waste as defined by ORS 469.300 (17); and

(D) A facility.

(b) The form and content of use restrictions to be imposed on the sites, which shall require at least that post-closure use of the site not disturb the integrity of the final cover, liners or any other components of any containment system or the function of the facility's monitoring systems, unless the department finds that the disturbance:

(A) Will not increase the potential hazard to human health or the environment; or

(B) Is necessary to reduce a threat to human health or the environment.

(c) The form and content of the environmental hazard notices to be filed with cities and counties.

(d) The circumstances allowing and procedures for removal or amendment of environmental hazard notices and use restrictions provided by the department.

(e) Any other provisions the commission considers necessary for the department to accomplish the purpose of ORS 466.360 to 466.385.

(2) Spills and releases cleaned up pursuant to ORS 466.205 and 468.795 shall not be listed as sites to be regulated under subsection (1) of this section.

(3) Before hearings on and adoption of rules under subsection (1) of this section, the department shall notify each person who owns a disposal site or an owner or operator of a facility of the rulemaking proceedings.

(4) The department shall report to each Legislative Assembly on any site or facility for which environmental hazard notices and use restrictions have been amended or removed as provided by rule adopted under paragraph (d) of subsection (1) of this section.

(5) The commission shall not list a site, spill or release under subsection (1) of this section, if the commission finds that within 90 days of receipt of notice under subsection (3) of this section, the owner cleaned up the site, spill or release so it is no longer a potential hazard to the health, safety and welfare of Oregon's citizens.

(6) As used in this section, "facility" has the meaning given in ORS 466.540. [1985 c.273 §3; 1987 c.735 §25]

466.370 Notice to owner; hearing; filing of notice if no objection. (1) The department shall notify by certified mail any person who owns a lot or parcel upon which a disposal site listed under ORS 466.365 exists. The notice shall:

(a) Describe the disposal site and potentially hazardous environmental conditions;

(b) Describe the use restrictions that will be imposed;

(c) Explain that an environmental hazard notice will be sent to the appropriate city or county under ORS 466.375; and

(d) Advise the person of the procedure for requesting a hearing under subsection (2) of this section.

(2) If any person receiving notice under subsection (1) of this section objects to the use restrictions, the person may request a hearing before the commission. The request shall be in writing and must be submitted to the department within 20 days after the person receives the notice under subsection (1) of this section. The hearing shall be conducted according to the provisions for a contested case hearing in ORS 183.413 to 183.497.

(3) If no hearing is requested within 20 days after receipt of the notice, the department shall file the environmental hazard notice with the appropriate city or county. [1985 c.273 §4]

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466.375 Filing of notice; content of notice. The department shall file an environmental hazard notice with the city or county in which a site listed under ORS 466.365 (1) is located. The notice shall contain the following information:

(1) A description of the lot or parcel upon which the disposal site is located;

(2) The restrictions that apply to post-closure use of the property; and

(3) Information regarding the potential environment hazards posed by the disposal site to assist the city or county in complying with ORS 466.385. [1985 c.273 §5]

466.380 Interagency agreement for notices for radioactive waste disposal sites. The Department of Environmental Quality and the Department of Energy shall enter into an interagency agreement providing for the implementation of the provisions of ORS 466.360 to 466.385 relating to radioactive waste disposal sites. [1985 c.273 §6]

466.385 Amendment of comprehensive plan and land use regulations; model language; appeal of land use decision related to site requiring notice. (1) By the first periodic review under ORS 197.640 after development of model language under subsection (2) of this section, the governing body of a city or county shall amend its comprehensive plan and land use regulations as provided in ORS 197.610 to 197.640 to establish and implement policies regarding potentially hazardous environmental conditions on sites listed under ORS 466.365. The land use regulations shall provide that:

(a) The city or county shall not approve any proposed use of a disposal site for which the city or county has received notice under ORS 466.370 until the Department of Environmental Quality has been notified and provided the city or county with comments on the proposed use; and

(b) Within 120 days of receipt of an environmental hazard notice from the Department of Environmental Quality, the city or county shall amend its zoning maps to identify the disposal site.

(2) The Department of Environmental Quality and the Department of Land Conservation and Development shall:

(a) Develop model language for comprehensive plans and land use regulations for use by cities and counties in complying with this section; and

(b) Provide technical assistance to cities and counties in complying with ORS 466.360 to 466.385.

(3) The Department of Environmental Quality may appeal to the Land Use Board of Appeals any final land use decision made by a city or county regarding any proposed use of a disposal site that has been identified under its comprehensive plan and land use regulations pursuant to this section. [1985 c.273 §7]

PACIFIC STATES AGREEMENT ON RADIOACTIVE MATERIALS TRANSPORTATION MANAGEMENT

466.450 Pacific State Agreement on Radioactive Materials Transportation Management. The Pacific States Agreement on Radioactive Materials Transportation Management is enacted into law and entered into by the State of Oregon and entered into with all other jurisdictions lawfully joining the agreement in a form as provided for as follows:

ARTICLE I

Policy and Purpose

The party states recognize that protection of the health and safety of citizens and the environment, and the most economical transportation of radioactive materials, can be accomplished through cooperation and coordination among neighboring states. It is the purpose of this agreement to establish a committee comprised of representatives from each party state to further cooperation between the states on emergency response and to coordinate activities by the states to eliminate unnecessary duplication of rules and regulations regarding the transportation and handling of radioactive material.

The party states intend that this agreement facilitate both interstate commerce and protection of public health and the environment. To accomplish this goal, the party states direct the committee to develop model regulatory standards for party states to act upon and direct the committee to coordinate decisions by party states relating to the routing and inspection of shipments of radioactive material.

ARTICLE II

Definitions

As used in this agreement:

(1) "Carrier" includes common, private, and contract carriers.

(2) "Hazardous material" means a substance or material which has been determined by the United States Department of Transportation to be capable of posing an unreasonable risk to health, safety, and property when transported in commerce, and which has been so designated.

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MARK L. HUGLIN

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COUNSEL

LAMAR TOOZE
1895-1971

LAMAR TOOZE, JR.
1922-1985

ADMITTED IN OREGON
WASHINGTON*
CALIFORNIA**
NEW YORK***
WASHINGTON, D. C.****

December 29, 1988

Mellon Bank, N.A.
One Mellon Bank Center
Pittsburgh, Pennsylvania 15258

Re: Koppers Industries, Inc.

Gentlemen:

We have acted as special counsel in the State of Oregon (together with political subdivisions thereof, the "State") for Koppers Industries, Inc. (the "Borrower") in connection with the Credit Agreement dated as of December 31, 1988 (the "Credit Agreement"), among the Borrower, PAC Holdings Corporation (to be renamed Koppers Holdings Corporation), Mellon Bank, N.A. ("Mellon") and Mellon Bank, N.A., as agent (the "Agent") for Mellon and the other financial institutions which hereafter may become parties thereto (together with Mellon, the "Banks"). Terms used herein which are defined in the Credit Agreement shall have the same meaning herein as therein provided unless the context hereof clearly otherwise requires.

We have examined execution copies of the Deed of Trust and Security Agreement (the Oregon Mortgage), Pledge and Security Agreement and the Collateral Assignment (collectively, the "Documents").

We have also examined financing statements in the form of Exhibit A hereto (the "Financing Statements"). In making such examinations, we have assumed the genuineness of all signatures, the authenticity of all documents submitted to us as originals and the conformity to original documents of all documents submitted to us as certified, conformed or photostatic copies.

In rendering this opinion, we have assumed with your permission that (i) the Documents were duly authorized, executed and delivered by the respective parties thereto in the form of the execution copies reviewed by us, that (ii) the Documents were negotiated by the various parties hereto in the Commonwealth of Pennsylvania and such documents were executed and delivered in

said Commonwealth, where the closing and the funding are to take place, and that (iii) the parties had the corporate power and authority to execute and deliver the subject documents.

Based upon the foregoing and subject to the qualifications hereinafter set forth, we are of the opinion that:

1. The Documents constitute legal, valid and binding obligations of the parties thereto other than the Mellon and the Agent (the "Loan Parties") and are enforceable in accordance with the terms thereof, except as the enforceability thereof may be limited by bankruptcy, insolvency or other similar laws of general application affecting the enforcement of creditors' rights or by general principles of equity limiting the availability of equitable remedies.

2. No authorization, consent (unless required of lessor or Oregon's Public Utility Commission), approval, license, exemption or other action by, and no registration, qualification, designation, declaration or filing with, any Official Body of the State is or will be, as of the date of closing, necessary or advisable in connection with execution and delivery of the Documents, consummation of the transactions therein contemplated, or to ensure the legality, validity, enforceability and admissibility in evidence thereof, except as referred to in paragraphs 4 and 5 below. Based on oral advice from the Corporation Division of the Oregon Secretary of State's office, Koppers Industries, Inc. is not registered to transact business in Oregon. The borrower should register to do business in Oregon as a foreign corporation once the transaction is completed.

3. Neither the execution and delivery of the Documents nor consummation of the transactions therein contemplated nor performance of or compliance with the terms and conditions thereof will violate any law or governmental rule or regulation of Oregon.

4. The Oregon Mortgage is in proper form for execution under the laws of Oregon and is in proper form (a) for the creation of the Lien contemplated thereby on and against the Mortgaged Property (as defined in the Mortgage) and (b) for recording in the Multnomah County Recorder's office. Under and pursuant to the Oregon Mortgage there has been granted to and created in favor of the Agent, for the ratable benefit of the Banks, as security for the Secured Obligations (as defined therein), a legal, valid and enforceable mortgage lien on, and security interest in, the Mortgaged Property described therein. When such

Oregon Mortgage is duly recorded in the Multnomah County Recorder's office, such Mortgage shall constitute a fully perfected mortgage lien on, and security interest in, all real property (including fixtures) included in the Mortgaged Property; and when the Financing Statements have been filed in the offices listed on Exhibit B hereto, such Mortgage shall also constitute a fully perfected lien on, and security interest in, all personal property included in the Mortgaged Property.

5. To the extent Oregon law may be applicable, under and pursuant to the Oregon Mortgage there has been granted to and created in favor of the Agent, for the ratable benefit of the Banks, as security for the Debt (as defined therein), a legal, valid and enforceable security interest in the Collateral (as defined therein) and, upon filing of the Financing Statements in the offices listed on Exhibit B hereto and the delivery to the Agent of any Documents and Instruments (as such terms are defined in such Oregon Mortgage, will constitute a fully perfected lien on, and security interest in, the Collateral. The Financing Statements are in proper form for filing and for perfecting such security interest.

6. The Oregon Assignment is in proper form for execution under the laws of the State and is in proper form for the creation of the Lien contemplated thereby on and against the Agreement defined therein and the rights of the Borrower thereunder. Under and pursuant to the Oregon Assignment there has been granted to and created in favor of the Agent, for the ratable benefit of the Banks, as security for the due performance by the Borrower of its obligations under the Credit Agreement (we have not seen or reviewed Schedule I or the Agreements referenced therein except for the ground lease) , the Notes and the related Documents to which it is a party, a legal, valid and enforceable security interest on and against the Agreement defined therein and the rights of the Borrower thereunder.

7. The courts of Oregon will enforce the choice of law provisions contained in the Documents which expressly provide that the terms and provisions thereof will be governed by and construed in accordance with the laws of the Commonwealth of Pennsylvania except to the extent set forth in the proviso to Section 5.11 of the Oregon Mortgages.

8. Neither the Agent nor any Bank is required to register or qualify as a foreign corporation, or to file any designation for service of process, in Oregon by reason of the transactions contemplated by the Documents.

9. The transactions contemplated by the Documents will not subject the Agent or any Bank to any tax, assessment or other governmental charge under the laws of Oregon except for statutory, recording and filing fees to be paid upon the recording or filing of the Oregon Mortgages and the Financing Statements.

10. There is no Law of Oregon which would impose on a person whose interest in real or personal property situated within the State is limited to a collateral security interest an obligation to effect an environmental cleanup or fund the costs of an environmental cleanup with respect to any such property, except as hereinafter set forth.

11. Our review of the Deed of Trust and Security Agreement requires that we express the following additional opinions:

(i) Subparagraphs (i), (ii) and (iii) of Paragraph (a) on page 2 includes in the description of the "Land" property in which the Beneficiary will gain an interest only to the extent that the Borrower/Mortgagor might have a legal interest or right to convey; we do not express any opinion as to whether or not the Grantor has any interest in rights of way, etc.; similarly, Paragraph (e) on page 2 includes within mortgaged property certain rights issued by Official Bodies; we express no opinion as to whether Borrower has the ability to create a security interest in such rights;

(ii) On page 4, paragraph 1.02, there is a reference to Schedule 1.02 which has not been furnished to us. Accordingly, we would advise that the subject Land has been included in the proposed Oregon Department of Environmental Quality (DEQ) Inventory List of properties where there have been confirmed releases of hazardous wastes; this is pursuant to ORS 466.557(4). A copy of page 11 from that listing is enclosed and the status of the remedial action reference indicates that the site is currently being overseen by the DEQ for technical assistance to responsible party for investigation, cleanup, closure, or removal. The liability of Beneficiary for cleanup costs is limited to those situations where Beneficiary becomes an owner or operator of the property, a circumstance which might arise if Beneficiary foreclosed its interest in the property and "owned" or "operated" it;

(iii) The opinions expressed with respect to the Deed of Trust and Security Agreement are those which relate to state law; we have not and are not expressing any opinion with respect to the enforceability of provisions of the Deed of Trust and Security Agreement as those may be determined by the general provisions of the Uniform Commercial Code adopted generally

throughout the country; for example, in paragraph 3.02(e), we do not express an opinion as to whether or not the Beneficiary may purchase at a private sale;

(iv) With respect to paragraph 2.18(c), we do not express any opinion as to whether or not an attempt by Grantor to alter the ground lease would be null and void as to the lessor.

(v) The article 4, page 23 provisions with respect to a trustee may not be enforceable as against the trustee without the trustee's prior approval; we would note that the trustee is not a signatory to the Oregon Mortgage;

(vi) With respect to article 5, section 5.01, page 24, ORS 86.155, a copy of which is enclosed, appears to require that the first page of the Oregon Mortgage contain in the caption a reference to the fact that this is a "Line of Credit Mortgage" and that on the first page the term (if any) of the Deed of Trust and the maximum amount to be advanced be set forth; if these provisions are not included, it may jeopardize the availability of the real property as security for future advances.

(vii) With respect to paragraph 3.02(g), the availability of this remedy will be subject to state law and Rule 67(F) of the Oregon Rules of Civil Procedure providing for judgment by stipulation.

We are members of the bar of Oregon and do not purport to be experts in the laws of any jurisdiction other than the State and the United States. To the extent Pennsylvania law applies to any of the matters on which we have opined, we have assumed that Pennsylvania law is the same as the State's law with respect to such matters.

All of our opinions expressed in this letter are specifically subject to and limited by the following:

(a) The effect of laws or court decisions relating to bankruptcy, insolvency, reorganization, liquidation, readjustment of debt or other laws or court decisions relating to or affecting the enforcement of creditors' rights generally, whether now or hereafter in effect; the effect of applicable court decisions, invoking statutes or principles of equity or public policy, which hold that certain covenants or provisions of agreements are unenforceable where, for example, the breach of such covenants or provisions imposes restrictions or burdens upon the party thereto and it cannot be demonstrated that the imposition of such restrictions or burdens is reasonably necessary for the protection of the other party, or where the enforcement of such covenants or provisions would violate the covenant of good faith and fair dealing or other public policy implied under law.

(b) The effect of general principles of equity or public policy (regardless of whether considered in a proceeding at law or in equity) which, among other things may limit the enforceability of waivers of rights or the availability of specific performance, appointment of a receiver, injunctive relief or other equitable remedies.

(c) The unenforceability under certain circumstances, under state or federal law or court decisions of provisions indemnifying a party against liability for its own wrongful or negligent acts, requiring contribution to such party under such circumstances or where indemnification or contribution is otherwise contrary to public policy.

This opinion is intended solely for the use of Bank, its successors and assigns in connection with the transactions discussed herein, and is not to be used, released, quoted or relied upon by anyone else or for any other purpose without our prior written consent. The information set forth in this letter is as of the date hereof, and we assume no obligation to advise Bank of changes, whether or not deemed material, which may hereafter come to our attention.

Very truly yours,

William P. Hutchison, Jr.

WPH:kd

Enc.
cc: Steven B. Larchuk
Mary Jo Potter, REED SMITH SHAW & McCLAY

STATE OF OREGON
UNIFORM COMMERCIAL CODE—FINANCING STATEMENT—FORM UCC-1

SECRETARY OF STATE

INSTRUCTIONS:
1. PLEASE TYPE THIS FORM.
2. Read all instructions carefully. Failure to provide complete and legible information may result in the rejection of the filing document.
3. This financing statement is effective for a period of 5 or 10 years. Indicate the effective period that pertains to your filing by checking either box 5A or 5B. If neither box is checked, the filing document will be regarded as applicable to a 5 year effective period.
4. Enclose fee of $3.75 per debtor name listed plus $2 per identified trade name. If checking the 10 Year Effective Period box (5B), enclose an additional $10.
5. This form must be signed by the Debtor(s) unless the statement pertains to one of the exceptions listed under ORS 79.4020. If filing without the Debtor(s) signature, the Secured Party should indicate specifically by checking one of the boxes provided for in item No. 6.
6. Send the Alphabetical, Numerical and Acknowledgment copies with the interleaved carbons intact to the filing officer. The Debtor(s) and Secured Party(ies) copies are retained by the party making the filing.
7. If the space provided for any item(s) on the form is inadequate, submit additional information on 5" x 8" sheets. Only one copy of such additional sheets need be presented to the filing officer. Long schedules of collateral, indentures, etc., may be on any size paper that is convenient for the filer. DO NOT STAPLE OR TAPE ANYTHING TO THE LOWER PORTION OF THIS FORM.
8. At the time of original filing, filing officer will return the acknowledgment copy to the assignee or secured party. If the secured party requires acknowledgment of long schedules of collateral, two copies should be presented and one will be returned.
9. When a filing is to be terminated the acknowledgment copy may be sent to the filing officer signed by the secured party or assignee, or use Form UCC-3 as a Termination Statement.
10. Submit this form to: Secretary of State, UCC Section, Capitol Bldg., Rm 41, Salem, OR 97310 (Tele. 503-378-4146)

This Financing Statement is presented to filing officer pursuant to the Uniform Commercial Code. This statement remains effective for a period of five years (unless 10 year option is noted) from the date of filing, subject to extensions for additional periods of five years by refiling or filing a continuation statement (UCC-3) within six months prior to the expiration date.

1A. Debtor(s): (If individual(s) last name first)	2A. Secured Party(ies)	Reserved For Filing Officer Use Only
Koppers Industries, Inc.	Mellon Bank, N.A., Agent	
1B. Mailing Address(es): *Koppers Building 436 Seventh Avenue Pittsburgh, PA 15219	2B. Address of Secured Party from which security information is obtainable: One Mellon Bank Center Pittsburgh, PA 15258-0001 Tele. No.	

3. This financing statement covers the following types (or items) of collateral (ORS 79.4020)

No. of additional Sheets attached ____

See Exhibit "A"

*Debtor's Oregon address is:
7900 SW St. Helens Road
Portland, Oregon

4A. Assignee of Secured Party(ies) if any:

4B. Address of Assignee:

5. File: INDICATE WHETHER DOCUMENT IS BEING FILED WITH AN EFFECTIVE PERIOD OF. (check box) 5A. ☐ 5 YEARS or 5B. ☐ 10 YEARS (Read instructions 3 & 4)

6. This statement is filed without the debtor's signature to perfect a security interest in collateral (if applicable check box below):
☐ collateral already subject to a security interest in another jurisdiction;
☐ which is proceeds of the described original collateral which was perfected;
☐ collateral as to which the filing has lapsed; or
☐ collateral acquired after a change of name, identity or corporate structure of the debtor.

By: ____
Signature(s) of Debtor(s) or
Signature(s) of Secured Party(ies) or Assignee(s)

STANDARD FORM—UNIFORM COMMERCIAL CODE—FORM UCC-1
01-01-88

STEVENS-NESS LAW PUBLISHING CO., PORTLAND, OR. 97204 • 223-3137

FILING OFFICER – ALPHABETICAL

EXHIBIT A

All right, title and interest of Debtor now owned or held or hereafter acquired or arising in and to the following:

(a) all buildings, structures and other improvements (collectively, the "Improvements") now or hereafter erected or placed on the land and premises described in Exhibit B hereto (the "Land");

(b) all machinery, apparatus, equipment, fittings, fixtures, goods, chattels and other articles of personal property now or hereafter located on, attached to or used in connection with the Land or the Improvements, and all replacements thereof, additions thereto and substitutions therefor (all of the foregoing, being hereinafter collectively called the "Equipment"), together with all deposits or payments made on any Equipment in connection with the conditional purchase thereof and all leases by Debtor as lessee of Equipment;

(c) all licenses, permits, authorizations and agreements from governmental authorities relating to the ownership, construction, occupancy, operation, management or use of the Land, the Improvements or the Equipment;

(d) all contracts, licenses and agreements relating to the ownership, design, construction, occupancy, operation, management or use of the Land, the Improvements or the Equipment;

(e) all the remainder or remainders, reversion or reversions, rents, revenues, issues, profits, royalties, income and other benefits derived from any of the foregoing;

(f) all proceeds of the conversion, voluntary or involuntary, of any of the foregoing into cash or liquidated claims, including all proceeds of insurance; and

(g) all proceeds, both cash and non-cash, of any and all of the foregoing.

(h) All of Debtor's present and future rights, title and interest in and to the following property, whether now owned or held or hereafter existing or acquired and wherever located: all property and assets of Debtor, including without limitation all accounts, contract rights, chattel paper, equipment, inventory, instruments, documents and general intangibles (as such terms are defined in the Uniform Commercial Code); and all products and proceeds, both cash and non-cash, of the foregoing.

INSTRUCTIONS:

STATE OF OREGON MULTNOMAH COUNTY RECORDER'S OFFICE

1. PLEASE TYPE THIS FORM. UNIFORM COMMERCIAL CODE—FINANCING STATEMENT—REAL PROPERTY—FORM UCC-1A
2. Enclose fee of $3.75 per name listed plus $2.00 per trade name.
3. Send the Alphabetical, Numerical and Acknowledgment copies with interleaved carbon paper intact to the filing officer. The Debtor(s) and Secured Party(ies) copies are retained by party making the filing.
4. If the space provided for any item(s) on the form is inadequate, the item(s) should be continued on additional sheets, size 5" x 8". Only one copy of such additional sheets need be presented to the filing officer. Long schedules of collateral, indentures, etc. may be on any size paper that is convenient for the secured party. DO NOT STAPLE OR TAPE ANYTHING TO LOWER PORTION OF THIS FORM.
5. The Form UCC-1A should be filed with the county filing officers who record real estate mortgages.
6. At the time of original filing, filing officer will return acknowledgment copy to the assignee if noted on form or secured party.
7. When a copy of the security agreement is used as a financing statement, it is requested that it be accompanied by a completed UCC-21 form.
8. When filing is to be terminated the acknowledgment copy may be sent to the filing officer signed by the secured party or assignee or he may use Form UCC—3 or UCC-3A as a Termination Statement.

THIS FINANCING STATEMENT is presented to filing officer pursuant to the Uniform Commercial Code

1A. Debtor(s):	2A. Secured Party(ies):	Filing Officer Use Only
Koppers Industries, Inc.	Mellon Bank, N.A., Agent	
1B. Mailing Address(es): Koppers Building 436 Seventh Avenue Pittsburgh, PA 15219	2B. Address of Secured Party from which security information obtainable: One Mellon Bank Center Pittsburgh, PA 15258-0001	

3. This financing statement covers the following types (or items) of property:

(The goods are to become fixtures on Ex. B) (The above timber is standing on _____) (The above minerals or the like (including gas and oil) or accounts will be financed at the wellhead or minehead of the well or mine located on _____) (Strike what is inapplicable) (Describe real estate)

See Exhibit A for description of property
See Exhibit B for legal description of real property

4A. Assignee of Secured Party(ies) if any:

4B. Address of Assignee from which security information obtainable:

And the financing statement is to be filed in the real estate records. If the debtor does not have an interest of records, the name of record owner is:

Check box if products of collateral are also covered [X] No. of additional sheets attached [ ]

File with: [X] COUNTY REAL ESTATE FILING OFFICER Multnomah COUNTY

*Signature(s) of Debtor(s) required in most cases.

Signature(s) of Secured Party(ies) in cases covered by ORS 79.4020.

By: _____
Signature(s) of Debtor(s)*
Signature of Secured Party(ies) or Assignee(s)

FILING OFFICER — ALPHABETICAL

This form of Financing Statement approved by Secretary of State.

STANDARD FORM—UNIFORM COMMERCIAL CODE

STEVENS-NESS LAW PUBLISHING CO., PORTLAND, OR. 97

9/1/81

EXHIBIT A

All right, title and interest of Debtor now owned or held or hereafter acquired or arising in and to the following:

(a) all buildings, structures and other improvements (collectively, the "Improvements") now or hereafter erected or placed on the land and premises described in Exhibit B hereto (the "Land");

(b) all machinery, apparatus, equipment, fittings, fixtures, goods, chattels and other articles of personal property now or hereafter located on, attached to or used in connection with the Land or the Improvements, and all replacements thereof, additions thereto and substitutions therefor (all of the foregoing, being hereinafter collectively called the "Equipment"), together with all deposits or payments made on any Equipment in connection with the conditional purchase thereof and all leases by Debtor as lessee of Equipment;

(c) all licenses, permits, authorizations and agreements from governmental authorities relating to the ownership, construction, occupancy, operation, management or use of the Land, the Improvements or the Equipment;

(d) all contracts, licenses and agreements relating to the ownership, design, construction, occupancy, operation, management or use of the Land, the Improvements or the Equipment;

(e) all the remainder or remainders, reversion or reversions, rents, revenues, issues, profits, royalties, income and other benefits derived from any of the foregoing;

(f) all proceeds of the conversion, voluntary or involuntary, of any of the foregoing into cash or liquidated claims, including all proceeds of insurance; and

(g) all proceeds, both cash and non-cash, of any and all of the foregoing.

(h) All of Debtor's present and future rights, title and interest in and to the following property, whether now owned or held or hereafter existing or acquired and wherever located: all property and assets of Debtor, including without limitation all accounts, contract rights, chattel paper, equipment, inventory, instruments, documents and general intangibles (as such terms are defined in the Uniform Commercial Code); and all products and proceeds, both cash and non-cash, of the foregoing.

EXHIBIT B

TAR PRODUCTS

Production Facility

Portland, Oregon Terminal

LEGAL DESCRIPTION

PARCEL I:

That portion of Sections 12 and 13, Township 1 North, Range 1 West of the Willamette Meridian lying within the W.W. Baker Donation Land Claim, in the City of Portland, County of Multnomah and State of Oregon, described as follows:

Beginning at the point of intersection of the centerline of the Spokane, Portland, and Seattle Railroad and the East line of the W.W. Baker Donation Land Claim; thence North 32°00' East, 162.55 feet to a fence corner at the true point of beginning; thence continuing North 32°00' East along a fence 456.40 feet to a fence corner; thence North 29°58'00" West 150.40 feet; thence North 33°37'00" West 147.88 feet; thence North 49°51'00" West 139.00 feet to a hub; thence South 56°29'00" West 265.15 feet to a nail; thence North 33°13'00" West 260.70 feet to a railroad spike at a point known as point "A"; thence South 56°29'00" West 111.55 feet to a railroad spike; thence South 31°12'30" East 102.90 feet; thence South 56°46'00" West 38.57 feet; thence South 33°14'00" East 36.00 feet; thence South 56°46'00" West 9.00 feet; thence South 33°14'00" East 106.58 feet to a hub; thence South 25°44'30" West 10.51 feet to a hub; thence South 56°24'30" West 54.40 feet; thence South 33°05'30" East 277.30 feet; thence North 56°51'00" East 34.30 feet; thence South 75°03'00" East 34.55 feet; thence South 47°41'30" East 190.00 feet to a nail; thence South 35°16'30" East 140.05 feet to the true point of beginning.

EXCEPT a 30 foot strip of land parallel and contiguous with the East line of the W.W. Baker DLC in Sections 12 and 13, Township 1 North, Range 1 West, said strip of land being 30 feet Westerly of the said DLC line and more particularly described as: Beginning at a point 162.55 feet North 32° East from the intersection of the centerline of the SP & S Railway with the East line of the said Baker DLC; thence North 32° East 456.4 feet; thence North 29°58' West 34 feet; thence South 32° West 459.8 feet; thence South 35°16'30" East 32.5 feet to the point of beginning. ALSO EXCEPT rights of the public to part in City street.

PARCEL II:

That portion of Section 12, Township 1 North, Range 1 West of the Willamette Meridian lying within the W.W. Baker Donation Land

Claim, in the City of Portland, County of Multnomah and State of Oregon, described as follows:

Beginning at a point 769.61 feet North and 365.57 feet West of a tack marking the point of intersection of the centerline of the SP&S Railway with the Southeasterly line of the W.W. Baker DLC in said Township and Range; thence South 56°46' West 70.52 feet; thence South 33°05'30" East 149 feet; thence North 56°24'30" East 54.4 feet; thence North 25°44'30" East 10.51 feet; thence North 33°14' West 106.58 feet; thence North 56°46' East 9 feet; thence North 33°14' West 36 feet to the point of beginning.

EXHIBIT "B"

	Location to be filed
FORM UCC-1	Secretary of State UCC Division, Room 41 State Capitol Salem, Oregon 97310 (503) 378-4146
FORM UCC-1A Cost $5 per page	Multnomah County Recorder's Office 610 SW Alder, Room 300 Portland, Oregon 97205 (503) 248-3034

with a particular loan which sets forth the terms upon which the loan will be made. "Loan agreement" does not include a mortgage or trust deed which secures a promissory note. Nothing in this section shall be deemed to require a lender to issue a loan agreement.

(4) This section does not apply to any loan agreement executed on or before September 13, 1967, or any loan not primarily for personal, family or household use. [1967 c.336 §§1, 2; 1987 c.716 §5]

86.155 Line of credit mortgage; required terms; procedures. (1) As used in this section, "line of credit mortgage" means a mortgage or trust deed which secures a credit agreement, including subsequent optional or obligatory advances, up to a stated amount, provided that the front page of the mortgage or trust deed:

(a) Contains the legend "line of credit mortgage" either in capital letters or underscored above the body of the mortgage or trust deed;

(b) States the maximum amount to be advanced pursuant to the credit agreement; and

(c) States the term, if any, of the credit agreement.

(2) Advances, at any time, pursuant to the credit agreement shall have the same priority as established by the date of recording of any line of credit mortgage recorded under this section.

(3) The debtor may limit the indebtedness secured by a line of credit mortgage to the amount of the credit outstanding by delivering a notice by personal service upon the mortgage holder by certified mail, return receipt requested, to the mortgage holder at the address given for payment or, if none, to the address of the mortgage holder indicated in the mortgage. To be sufficient to limit indebtedness under this subsection, the notice must:

(a) State that it is made under this section;

(b) Contain the legal description in the line of credit mortgage or the street address of the real property;

(c) Provide the information necessary to locate the line of credit mortgage in the public record;

(d) State the debtor's intention to limit the amount of credit secured by the line of credit mortgage to the amount owed at the time the notice is received;

(e) State the date sent; and

(f) Be signed and acknowledged by all debtors obligated under the line of credit mortgage.

(4) Not later than the 20th day after receipt of the notice described in subsection (3) of this section, the mortgage holder shall:

(a) Indorse on the notice, or on an addendum to the notice, the principal amount of the indebtedness secured by the line of credit mortgage on the date the mortgage holder received notice;

(b) Sign and acknowledge the notice or the addendum, if applicable; and

(c) Record the notice and addendum in the public record where the line of credit mortgage was originally recorded.

(5) If the mortgage holder fails to record the notice and addendum, if applicable, within the time period specified in subsection (4) of this section, the debtor may record the notice in the public record where the line of credit mortgage was originally recorded, together with proof of receipt by, or personal delivery to, the mortgage holder.

(6) Notwithstanding subsection (3) of this section, the line of credit mortgage shall continue to have priority as of its date of recording as to:

(a) All advances, including any advance the creditor is required to honor, that was made before a notice under subsection (3) of this section is received;

(b) Interest, lawful charges and any amounts advanced, including reasonable attorney fees, following the debtor's default, to protect the security; and

(c) All advances made after a notice under subsection (3) of this section is received which are within the amount owed at the time the notice under subsection (3) of this section is given. [1987 c.716 §4]

Note: 86.155 was enacted into law by the Legislative Assembly but was not added to or made a part of ORS chapter 86 or any series therein by legislative action. See Preface to Oregon Revised Statutes for further explanation.

LATE CHARGES

86.160 Definitions for ORS 86.160 to 86.185. As used in ORS 86.160 to 86.185:

(1) "Late charge" means a sum payable by a mortgagor to the holder of a mortgage pursuant to a note or mortgage to compensate the holder for servicing and other costs attributable to the receipt of mortgage payments [illegible] after the date upon which payment is due.

(2) "Mortgagor" includes the grantor under a deed of trust.

(3) "Mortgage" includes a deed of trust.

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GENERAL REQUIREMENTS FOR DISPOSITION OF REALTY

93.010 Conveyances, how made. Conveyances of lands, or of any estate or interest therein, may be made by deed, signed by the person of lawful age from whom the estate or interest is intended to pass, or by the lawful agent or attorney of the person, and acknowledged or proved, and recorded without any other act or ceremony. No seal of the grantor, corporate or otherwise, shall be required on the deed. [Amended by 1965 c.502 §4]

93.020 Creating, transferring or declaring estates or interests in realty. (1) No estate or interest in real property, other than a lease for term not exceeding one year, nor any trust or power concerning such property, can be created, transferred or declared otherwise than by operation of law or by a conveyance or other instrument in writing, subscribed by the party creating, transferring or declaring it, or by the lawful agent of the party under written authority, and executed with such formalities as are required by law.

(2) This section does not affect the power of a testator in the disposition of real property by a last will and testament, nor to prevent a trust from arising or being extinguished by implication or operation of law, nor to affect the power of a court to compel the specific performance of an agreement in relation to such property.

93.030 Contracts to convey, instruments of conveyance and related memoranda to state consideration. (1) All instruments conveying or contracting to convey fee title to any real estate, and all memoranda of such instruments, shall state on the face of such instruments the true and actual consideration paid for such transfer, stated in terms of dollars. As used in this section, "consideration" includes the amount of cash and the amount of any lien, mortgage, contract, indebtedness or other encumbrance existing against the property to which the property remains subject or which the purchaser agrees to pay or assume. However, if the actual consideration consists of or includes other property or other value given or promised, neither the monetary value nor a description of such other property or value need be stated so long as it is noted on the face of the instrument that other property or value was either part or the whole consideration.

(2) The statement of consideration as required by subsection (1) of this section shall be made by a grantor or a grantee. Failure to make such statement does not invalidate the conveyance.

(3) If the statement of consideration is in the body of the instrument preceding the signatures, execution of the instrument shall constitute a certification of the truth of the statement. If there is a separate statement of consideration on the face of the instrument, it shall be signed separately from the instrument, and such execution shall constitute a certification of the truth of the statement by the person signing. No particular form is required for the statement so long as the requirements of this section are reasonably met.

(4) No instrument conveying or contracting to convey fee title to any real estate nor any memorandum of such an instrument shall be accepted for recording by any county clerk or recording officer in this state unless the statement of consideration required by this section is included on the face of the instrument.

(5) This section applies to instruments executed on or after January 1, 1968. [1967 c.462 §§1, 3; 1967 s.s. c.7 §1; 1977 c.605 §1]

93.040 Warning in instrument relating to approved uses of land; liability of drafter and recorder. (1) The following statement shall be included in the body of an instrument transferring or contracting to transfer fee title to real property: "THIS INSTRUMENT WILL NOT ALLOW USE OF THE PROPERTY DESCRIBED IN THIS INSTRUMENT IN VIOLATION OF APPLICABLE LAND USE LAWS AND REGULATIONS. BEFORE SIGNING OR ACCEPTING THIS INSTRUMENT, THE PERSON ACQUIRING FEE TITLE TO THE PROPERTY SHOULD CHECK WITH THE APPROPRIATE CITY OR COUNTY PLANNING DEPARTMENT TO VERIFY APPROVED USES."

(2) No action may be maintained against the county recording officer for recording an instrument that does not contain the statement required in subsection (1) of this section.

(3) No action may be maintained against any person for failure to include in the instrument, or for recording an instrument that does not contain the statement required in subsection (1) of this section, unless the person acquiring or agreeing to acquire fee title to the real property would not have executed or accepted the instrument but for the absence in the instrument of the statement required by subsection (1) of this section. No action may be maintained by the person acquiring or agreeing to acquire title to the real property

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against any person other than the person transferring or contracting to transfer fee title to the real property. [1983 c.718 §2; 1985 c.719 §1]

SPECIAL MATTERS IN PARTICULAR CONVEYANCES

93.110 Quitclaim deed sufficient to pass estate. A deed of quitclaim and release, of the form in common use, is sufficient to pass all the estate which the grantor could lawfully convey by a deed of bargain and sale.

93.120 Words of inheritance unnecessary to convey fee; conveyances deemed to convey all grantor's estate. The term "heirs," or other words of inheritance, is not necessary to create or convey an estate in fee simple. Any conveyance of real estate passes all the estate of the grantor, unless the intent to pass a lesser estate appears by express terms, or is necessarily implied in the terms of the grant.

93.130 Conveyance of land in adverse possession of another. No grant or conveyance of lands or interest therein is void for the reason that at the time of its execution the lands were in the actual possession of another claiming adversely.

93.140 Implied covenants. No covenant shall be implied in any conveyance of real estate, whether it contains special covenants or not, except as provided by ORS 93.850 to 93.870. [Amended by 1973 c.194 §6]

93.150 Conveyance by tenant of greater estate than that possessed. A conveyance made by a tenant for life or years, purporting to grant a greater estate than the tenant possesses or could lawfully convey, does not work a forfeiture of the estate of the tenant, but passes to the grantee all the estate which the tenant could lawfully convey.

93.160 Conveyance by reversioners and remaindermen to life tenant vests fee. Where real property has been devised to a person for life, and in case of the death of the life tenant without leaving lawful issue born alive and living at the time of death, then to other heirs of the testator, a conveyance to the life tenant from all reversioners or remaindermen and all issue of the life tenant as are in being, of all their interest in the real property, vests a fee simple estate in the life tenant.

93.170 [Repealed by 1969 c.591 §305]

93.180 Tenancy in common, when created; joint tenancy abolished. Every conveyance or devise of lands, or interest therein, made to two or more persons, other than to a husband and wife, as such, or to executors or trustees, as such, creates a tenancy in common unless it is in some manner clearly and expressly declared in the conveyance or devise that the grantees or devisees take the lands with right of survivorship. Such a declaration of a right to survivorship shall create a tenancy in common in the life estate with cross-contingent remainders in the fee simple. Joint tenancy is abolished and the use in a conveyance or devise of the words "joint tenants" or similar words without any other indication of an intent to create a right of survivorship shall create a tenancy in common. [Amended by 1983 c.555 §1]

93.190 Trustees or personal representatives as joint tenants; filling vacancies in office. (1) Every conveyance, deed of trust, mortgage or devise of an interest in or lien upon real or personal property to two or more persons as trustees or personal representatives, creates a joint tenancy in such interest or lien in the trustees or personal representatives unless it is expressly declared in the conveyance, deed of trust, mortgage or devise that the trustees or personal representatives shall take or hold the property as tenants in common or otherwise.

(2) If the conveyance, deed of trust, mortgage or devise provides for filling any vacancy in the office of trustee or personal representative, it may be filled as therein provided, but a court of competent jurisdiction may fill a vacancy in the trusteeship according to the established rules and principles of equity. In whichever way the vacancy is filled, the new trustee shall hold the property with all powers, rights and duties of an original trustee unless otherwise directed by conveyance, deed of trust, mortgage or devise, or order or decree of the court. [Amended by 1969 c.591 §275]

93.200 Trustees or executors now hold as joint tenants. All trustees or executors holding real or personal property in trust on May 19, 1905, hold as joint tenants and not as tenants in common unless the conveyance, deed of trust, mortgage or devise, or order or decree of court creating or appointing the trustees or executors has declared otherwise.

93.210 Presumption respecting deed from trustee of undisclosed beneficiary. If a deed to real estate has been made to a grantee in trust or designating the grantee as trustee, and no beneficiary is indicated or named in the deed, a deed thereafter executed by such grantee conveying the property is presumed to have been executed with full right and authority and conveys prima facie title to the property. The grantee

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OWNERS NOTIFIED OF PROPOSED LISTING ON THE INVENTORY OF
CONFIRMED RELEASES PURSUANT TO ORS 466.557(4)
****THIS IS NOT THE INVENTORY OF CONFIRMED RELEASES****
LIST SUBJECT TO CHANGE BASED ON OREGON LAW

SITE ID	SITE LOCATION	LEGAL OWNER(S)	SUBSTANCE(S)	STATUS OF REMEDIAL ACTION
666	John C. Taylor Lumber Sales, Inc. Rock Creek Road and Hwy. 18 Sheridan	Taylor Lumber and Treating, Inc.	pentachlorophenol tetrachlorophenol napthalene acenaphthene fluorene	
59	Johnson Controls - Globe Battery Divs. 800 N.W. 3rd Avenue Canby	Johnson Controls Inc.	lead sulfuric acid	RPIC
266	K-Lines, Inc 375 S.W. Boones Ferry Road Lake Oswego	Jenny E. Berry	lead	FIR
62	Koppers Company (Portland), Inc. 7540 N.W. St. Helen's Road Portland	Northwest Natural Gas	lead phenol, total ethylbenzene napthalene acenaphthene fluorene anthracene phenanthrene fluoranthene pyrene dibenzofuran	RPIC
131	Lands 4920 N.E. 122nd Avenue Portland	Pacific Realty Associates	sulfuric acid hydrofluoric acid Caustic solution	RPP

Koppers000304

SPECIAL WARRANTY DEED
(Corporate)

This Deed, made and entered into this _____ day of December, 1988, by and between KOPPERS COMPANY, INC., a corporation, organized and existing under the laws of the State of Delaware, party of the first part and KOPPERS INDUSTRIES, INC., a corporation organized and existing under the laws of the Commonwealth of Pennsylvania, party of the second part.

W I T N E S S E T H:

That the said party of the first part, conveys and specially warrants to the said party of the second part, the following described real property free of encumbrances created or suffered by the grantor except as specifically set forth herein: The real property, situated in the County of Multnomah, State of Oregon, to-wit:

THE LEGAL DESCRIPTION IS ATTACHED HERETO AS EXHIBIT "A"

This conveyance is made subject to all easements, convenants and conditions of record.

THIS INSTRUMENT WILL NOT ALLOW USE OF THE PROPERTY DESCRIBED IN THIS INSTRUMENT IN VIOLATION OF APPLICABLE LAND USE LAWS AND REGULATIONS. BEFORE SIGNING OR ACCEPTING THIS INSTRUMENT, THE PERSON ACQUIRING FEE TITLE TO THE PROPERTY SHOULD CHECK WITH THE APPROPRIATE CITY OR COUNTY PLANNING DEPARTMENT TO VERIFY APPROVED USES.

The true consideration for this conveyance is _____ _____ Dollars ($_____). (Here comply with the requirements of ORS 93.030.)

KOPPERS COMPANY, INC.
Grantor, Party of the First Part

By_____
Vice-President

Corporate Seal

Attest: _____
Corporate Secretary

COMMONWEALTH OF PENNSYLVANIA)
) ss.
_____ of _____)

On this ____ day of December, 1988, before me appeared _____ _____ to me personally known, who being duly sworn, did say that he, the said _____, is the Vice-President of KOPPERS COMPANY, INC., a corporation of the State of Delaware, and that the seal affixed to said instrument is the corporate seal of said corporation, and that the said instrument was signed and sealed in behalf of said corporation by authority of its Board of Directors, and _____ acknowledges said instrument to be the free act and deed of said corporation.

IN TESTIMONY WHEREOF, I have hereunto set my hand and affixed my official seal the day and year last above written.

(NOTARIAL SEAL)

_____
Notary Public for Oregon
My Commission expires:_____

AFTER RECORDING RETURN TO:

SEND TAX STATEMENTS TO:

TOOZE MARSHALL SHENKER HOLLOWAY & DUDEN
ATTORNEYS AT LAW
333 S. W. TAYLOR STREET
PORTLAND, OREGON 97204-2496
TELEPHONE (503) 223-5181
TELEX 9103508016 TOOZE UD
FACSIMILE (503) 223-5550

L. GUY MARSHALL
ARDEN E. SHENKER
CHAS R. HOLLOWAY, III
PAUL R. DUDEN
STEPHEN R. FRANK
WM. G. SHERIDAN, JR.
MICHAEL J. GENTRY
NEALE E. CREAMER**
WILLIAM P. HUTCHISON, JR.
ELIZABETH A. TRAINOR*
ERIC J. NEIMAN*
DAVID R. SIMON
MONTGOMERY W. COBB
ROBERT E. L. BONAPARTE*,**
MATTHEW K. ROSSMAN
JOHN OSTRANDER
MARK L. HUGLIN

ROBERT M. KERR
COUNSEL

LAMAR TOOZE
1895-1971

LAMAR TOOZE, JR.
1922-1985

ADMITTED IN OREGON
WASHINGTON*
CALIFORNIA**
NEW YORK***
WASHINGTON, D.C.***

December 29, 1988

Mellon Bank, N.A.
One Mellon Bank Center
Pittsburgh, Pennsylvania 15258

Re: Koppers Industries, Inc.

Gentlemen:

We have acted as special counsel in the State of Oregon (together with political subdivisions thereof, the "State") for Koppers Industries, Inc. (the "Borrower") in connection with the Credit Agreement dated as of December 31, 1988 (the "Credit Agreement"), among the Borrower, PAC Holdings Corporation (to be renamed Koppers Holdings Corporation), Mellon Bank, N.A. ("Mellon") and Mellon Bank, N.A., as agent (the "Agent") for Mellon and the other financial institutions which hereafter may become parties thereto (together with Mellon, the "Banks"). Terms used herein which are defined in the Credit Agreement shall have the same meaning herein as therein provided unless the context hereof clearly otherwise requires.

We have examined execution copies of the Deed of Trust and Security Agreement (the Oregon Mortgage), Pledge and Security Agreement and the Collateral Assignment (collectively, the "Documents").

We have also examined financing statements in the form of Exhibit A hereto (the "Financing Statements"). In making such examinations, we have assumed the genuineness of all signatures, the authenticity of all documents submitted to us as originals and the conformity to original documents of all documents submitted to us as certified, conformed or photostatic copies.

In rendering this opinion, we have assumed with your permission that (i) the Documents were duly authorized, executed and delivered by the respective parties thereto in the form of the execution copies reviewed by us, that (ii) the Documents were negotiated by the various parties hereto in the Commonwealth of Pennsylvania and such documents were executed and delivered in

said Commonwealth, where the closing and the funding are to take place, and that (iii) the parties had the corporate power and authority to execute and deliver the subject documents.

Based upon the foregoing and subject to the qualifications hereinafter set forth, we are of the opinion that:

1. The Documents constitute legal, valid and binding obligations of the parties thereto other than the Mellon and the Agent (the "Loan Parties") and are enforceable in accordance with the terms thereof, except as the enforceability thereof may be limited by bankruptcy, insolvency or other similar laws of general application affecting the enforcement of creditors' rights or by general principles of equity limiting the availability of equitable remedies.

2. No authorization, consent (unless required of lessor or Oregon's Public Utility Commission), approval, license, exemption or other action by, and no registration, qualification, designation, declaration or filing with, any Official Body of the State is or will be, as of the date of closing, necessary or advisable in connection with execution and delivery of the Documents, consummation of the transactions therein contemplated, or to ensure the legality, validity, enforceability and admissibility in evidence thereof, except as referred to in paragraphs 4 and 5 below. Based on oral advice from the Corporation Division of the Oregon Secretary of State's office, Koppers Industries, Inc. is not registered to transact business in Oregon. The borrower should register to do business in Oregon as a foreign corporation once the transaction is completed.

3. Neither the execution and delivery of the Documents nor consummation of the transactions therein contemplated nor performance of or compliance with the terms and conditions thereof will violate any law or governmental rule or regulation of Oregon.

4. The Oregon Mortgage is in proper form for execution under the laws of Oregon and is in proper form (a) for the creation of the Lien contemplated thereby on and against the Mortgaged Property (as defined in the Mortgage) and (b) for recording in the Multnomah County Recorder's office. Under and pursuant to the Oregon Mortgage there has been granted to and created in favor of the Agent, for the ratable benefit of the Banks, as security for the Secured Obligations (as defined therein), a legal, valid and enforceable mortgage lien on, and security interest in, the Mortgaged Property described therein. When such

Oregon Mortgage is duly recorded in the Multnomah County Recorder's office, such Mortgage shall constitute a fully perfected mortgage lien on, and security interest in, all real property (including fixtures) included in the Mortgaged Property; and when the Financing Statements have been filed in the offices listed on Exhibit B hereto, such Mortgage shall also constitute a fully perfected lien on, and security interest in, all personal property included in the Mortgaged Property.

5. To the extent Oregon law may be applicable, under and pursuant to the Oregon Mortgage there has been granted to and created in favor of the Agent, for the ratable benefit of the Banks, as security for the Debt (as defined therein), a legal, valid and enforceable security interest in the Collateral (as defined therein) and, upon filing of the Financing Statements in the offices listed on Exhibit B hereto and the delivery to the Agent of any Documents and Instruments (as such terms are defined in such Oregon Mortgage, will constitute a fully perfected lien on, and security interest in, the Collateral. The Financing Statements are in proper form for filing and for perfecting such security interest.

6. The Oregon Assignment is in proper form for execution under the laws of the State and is in proper form for the creation of the Lien comtemplated thereby on and against the Agreement defined therein and the rights of the Borrower thereunder. Under and pursuant to the Oregon Assignment there has been granted to and created in favor of the Agent, for the ratable benefit of the Banks, as security for the due performance by the Borrower of its obligations under the Credit Agreement (we have not seen or reviewed Schedule I or the Agreements referenced therein except for the ground lease) , the Notes and the related Documents to which it is a party, a legal, valid and enforceable security interest on and against the Agreement defined therein and the rights of the Borrower thereunder.

7. The courts of Oregon will enforce the choice of law provisions contained in the Documents which expressly provide that the terms and provisions thereof will be governed by and construed in accordance with the laws of the Commonwealth of Pennsylvania except to the extent set forth in the proviso to Section 5.11 of the Oregon Mortgages.

8. Neither the Agent nor any Bank is required to register or qualify as a foreign corporation, or to file any designation for service of process, in Oregon by reason of the transactions contemplated by the Documents.

9. The transactions contemplated by the Documents will not subject the Agent or any Bank to any tax, assessment or other governmental charge under the laws of Oregon except for statutory, recording and filing fees to be paid upon the recording or filing of the Oregon Mortgages and the Financing Statements.

10. There is no Law of Oregon which would impose on a person whose interest in real or personal property situated within the State is limited to a collateral security interest an obligation to effect an environmental cleanup or fund the costs of an environmental cleanup with respect to any such property, except as hereinafter set forth.

11. Our review of the Deed of Trust and Security Agreement requires that we express the following additional opinions:

(i) Subparagraphs (i), (ii) and (iii) of Paragraph (a) on page 2 includes in the description of the "Land" property in which the Beneficiary will gain an interest only to the extent that the Borrower/Mortgagor might have a legal interest or right to convey; we do not express any opinion as to whether or not the Grantor has any interest in rights of way, etc.; similarly, Paragraph (e) on page 2 includes within mortgaged property certain rights issued by Official Bodies; we express no opinion as to whether Borrower has the ability to create a security interest in such rights;

(ii) On page 4, paragraph 1.02, there is a reference to Schedule 1.02 which has not been furnished to us. Accordingly, we would advise that the subject Land has been included in the proposed Oregon Department of Environmental Quality (DEQ) Inventory List of properties where there have been confirmed releases of hazardous wastes; this is pursuant to ORS 466.557(4). A copy of page 11 from that listing is enclosed and the status of the remedial action reference indicates that the site is currently being overseen by the DEQ for technical assistance to responsible party for investigation, cleanup, closure, or removal. The liability of Beneficiary for cleanup costs is limited to those situations where Beneficiary becomes an owner or operator of the property, a circumstance which might arise if Beneficiary foreclosed its interest in the property and "owned" or "operated" it;

(iii) The opinions expressed with respect to the Deed of Trust and Security Agreement are those which relate to state law; we have not and are not expressing any opinion with respect to the enforceability of provisions of the Deed of Trust and Security Agreement as those may be determined by the general provisions of the Uniform Commercial Code adopted generally

throughout the country; for example, in paragraph 3.02(e), we do not express an opinion as to whether or not the Beneficiary may purchase at a private sale;

(iv) With respect to paragraph 2.18(c), we do not express any opinion as to whether or not an attempt by Grantor to alter the ground lease would be null and void as to the lessor.

(v) The article 4, page 23 provisions with respect to a trustee may not be enforceable as against the trustee without the trustee's prior approval; we would note that the trustee is not a signatory to the Oregon Mortgage;

(vi) With respect to article 5, section 5.01, page 24, ORS 86.155, a copy of which is enclosed, appears to require that the first page of the Oregon Mortgage contain in the caption a reference to the fact that this is a "Line of Credit Mortgage" and that on the first page the term (if any) of the Deed of Trust and the maximum amount to be advanced be set forth; if these provisions are not included, it may jeopardize the availability of the real property as security for future advances.

(vii) With respect to paragraph 3.02(g), the availability of this remedy will be subject to state law and Rule 67(F) of the Oregon Rules of Civil Procedure providing for judgment by stipulation.

We are members of the bar of Oregon and do not purport to be experts in the laws of any jurisdiction other than the State and the United States. To the extent Pennsylvania law applies to any of the matters on which we have opined, we have assumed that Pennsylvania law is the same as the State's law with respect to such matters.

All of our opinions expressed in this letter are specifically subject to and limited by the following:

(a) The effect of laws or court decisions relating to bankruptcy, insolvency, reorganization, liquidation, readjustment of debt or other laws or court decisions relating to or affecting the enforcement of creditors' rights generally, whether now or hereafter in effect; the effect of applicable court decisions, invoking statutes or principles of equity or public policy, which hold that certain covenants or provisions of agreements are unenforceable where, for example, the breach of such covenants or provisions imposes restrictions or burdens upon the party thereto and it cannot be demonstrated that the imposition of such restrictions or burdens is reasonably necessary for the protection of the other party, or where the enforcement of such covenants or provisions would violate the covenant of good faith and fair dealing or other public policy implied under law.

(b) The effect of general principles of equity or public policy (regardless of whether considered in a proceeding at law or in equity) which, among other things may limit the enforceability of waivers of rights or the availability of specific performance, appointment of a receiver, injunctive relief or other equitable remedies.

(c) The unenforceability under certain circumstances, under state or federal law or court decisions of provisions indemnifying a party against liability for its own wrongful or negligent acts, requiring contribution to such party under such circumstances or where indemnification or contribution is otherwise contrary to public policy.

This opinion is intended solely for the use of Bank, its successors and assigns in connection with the transactions discussed herein, and is not to be used, released, quoted or relied upon by anyone else or for any other purpose without our prior written consent. The information set forth in this letter is as of the date hereof, and we assume no obligation to advise Bank of changes, whether or not deemed material, which may hereafter come to our attention.

Very truly yours,

William P. Hutchison, Jr.

WPH:kd

Enc.
cc: Steven B. Larchuk
Mary Jo Potter, REED SMITH SHAW & McCLAY

STATE OF OREGON
UNIFORM COMMERCIAL CODE—FINANCING STATEMENT—FORM UCC-1

SECRETARY OF STATE

INSTRUCTIONS:

1. PLEASE TYPE THIS FORM.
2. Read all instructions carefully. Failure to provide complete and legible information may result in the rejection of the filing document
3. This financing statement is effective for a period of 5 or 10 years. Indicate the effective period that pertains to your filing by checking either box 5A or 5B. If neither box is checked, the filing document will be regarded as applicable to a 5 year effective period
4. Enclose fee of $3.75 per debtor name listed plus $2 per identified trade name. If checking the 10 Year Effective Period box (5B), enclose an additional $10.
5. This form must be signed by the Debtor(s) unless the statement pertains to one of the exceptions listed under ORS 79.4020 If filing without the Debtor(s) signature, the Secured Party should indicate specifically by checking one of the boxes provided for in item No 6.
6. Send the Alphabetical, Numerical and Acknowledgment copies with the interleaved carbons intact to the filing officer The Debtor(s) and Secured Party(ies) copies are retained by the party making the filing.
7. If the space provided for any item(s) on the form is inadequate, submit additional information on 5" x 8" sheets Only one copy of such additional sheets need be presented to the filing officer. Long schedules of collateral, indentures, etc , may be on any size paper that is convenient for the filer DO NOT STAPLE OR TAPE ANYTHING TO THE LOWER PORTION OF THIS FORM.
8. At the time of original filing, filing officer will return the acknowledgment copy to the assignee or secured party If the secured party requires acknowledgment of long schedules of collateral, two copies should be presented and one will be returned
9. When a filing is to be terminated the acknowledgment copy may be sent to the filing officer signed by the secured party or assignee, or use Form UCC-3 as a Termination Statement.
10. Submit this form to: Secretary of State, UCC Section, Capitol Bldg , Rm 41, Salem, OR 97310 (Tele 503-378-4146)

This Financing Statement is presented to filing officer pursuant to the Uniform Commercial Code. This statement remains effective for a period of five years (unless 10 year option is noted) from the date of filing, subject to extensions for additional periods of five years by refiling or filing a continuation statement (UCC-3) within six months prior to the expiration date.

1A. Debtor(s): (If individual(s) last name first)	2A. Secured Party(ies)	Reserved For Filing Officer Use Only
Koppers Industries, Inc.	Mellon Bank, N.A., Agent	
1B. Mailing Address(es): *Koppers Building 436 Seventh Avenue Pittsburgh, PA 15219	2B. Address of Secured Party from which security information is obtainable One Mellon Bank Center Pittsburgh, PA 15258-0001 Tele. No. _____	

3. This financing statement covers the following types (or items) of collateral (ORS 79.4020)

No. of additional Sheets attached _____

See Exhibit "A"

*Debtor's Oregon address is:
7900 SW St. Helens Road
Portland, Oregon

4A. Assignee of Secured Party(ies) if any:

4B. Address of Assignee:

5. Filer INDICATE WHETHER DOCUMENT IS BEING FILED WITH AN EFFECTIVE PERIOD OF (check box) 5A. ☐ 5 YEARS or 5B. ☐ 10 YEARS (Read instructions 3 & 4)

6. This statement is filed without the debtor's signature to perfect a security interest in collateral (if applicable check box below)
   - ☐ collateral already subject to a security interest in another jurisdiction,
   - ☐ which is proceeds of the described original collateral which was perfected;
   - ☐ collateral as to which the filing has lapsed, or
   - ☐ collateral acquired after a change of name, identity or corporate structure of the debtor.

By: _____
Signature(s) of Debtor(s) or
Signature(s) of Secured Party(ies) or Assignee(s)

STANDARD FORM—UNIFORM COMMERCIAL CODE—FORM UCC-1
01-01-88

STEVENS-NESS LAW PUBLISHING CO., PORTLAND, OR. 97204 - 223-5133

FILING OFFICER – ALPHABETICAL

EXHIBIT A

All right, title and interest of Debtor now owned or held or hereafter acquired or arising in and to the following:

(a) all buildings, structures and other improvements (collectively, the "Improvements") now or hereafter erected or placed on the land and premises described in Exhibit B hereto (the "Land");

(b) all machinery, apparatus, equipment, fittings, fixtures, goods, chattels and other articles of personal property now or hereafter located on, attached to or used in connection with the Land or the Improvements, and all replacements thereof, additions thereto and substitutions therefor (all of the foregoing, being hereinafter collectively called the "Equipment"), together with all deposits or payments made on any Equipment in connection with the conditional purchase thereof and all leases by Debtor as lessee of Equipment;

(c) all licenses, permits, authorizations and agreements from governmental authorities relating to the ownership, construction, occupancy, operation, management or use of the Land, the Improvements or the Equipment;

(d) all contracts, licenses and agreements relating to the ownership, design, construction, occupancy, operation, management or use of the Land, the Improvements or the Equipment;

(e) all the remainder or remainders, reversion or reversions, rents, revenues, issues, profits, royalties, income and other benefits derived from any of the foregoing;

(f) all proceeds of the conversion, voluntary or involuntary, of any of the foregoing into cash or liquidated claims, including all proceeds of insurance; and

(g) all proceeds, both cash and non-cash, of any and all of the foregoing.

(h) All of Debtor's present and future rights, title and interest in and to the following property, whether now owned or held or hereafter existing or acquired and wherever located: all property and assets of Debtor, including without limitation all accounts, contract rights, chattel paper, equipment, inventory, instruments, documents and general intangibles (as such terms are defined in the Uniform Commercial Code); and all products and proceeds, both cash and non-cash, of the foregoing.

INSTRUCTIONS:

STATE OF OREGON MULTNOMAH COUNTY RECORDER'S OFFICE

1. PLEASE TYPE THIS FORM. **UNIFORM COMMERCIAL CODE—FINANCING STATEMENT—REAL PROPERTY—FORM UCC-1A**
2. Enclose fee of $3.75 per name listed plus $2.00 per trade name.
3. Send the Alphabetical, Numerical and Acknowledgment copies with interleaved carbon paper intact to the filing officer. The Debtor(s) and Secured Party(ies) copies are retained by party making the filing.
4. If the space provided for any item(s) on the form is inadequate, the item(s) should be continued on additional sheets, size 5" x 8". Only one copy of such additional sheets need be presented to the filing officer. Long schedules of collateral, indentures, etc. may be on any size paper that is convenient for the secured party. **DO NOT STAPLE OR TAPE ANYTHING TO LOWER PORTION OF THIS FORM.**
5. The Form UCC-1A should be filed with the county filing officers who record real estate mortgages.
6. At the time of original filing, filing officer will return acknowledgment copy to the assignee if noted on form or secured party.
7. When a copy of the security agreement is used as a financing statement, it is requested that it be accompanied by a completed UCC-21 form.
8. When filing is to be terminated the acknowledgment copy may be sent to the filing officer signed by the secured party or assignee or he may use Form UCC—3 or UCC-3A as a Termination Statement.

THIS FINANCING STATEMENT is presented to filing officer pursuant to the Uniform Commercial Code

1A. Debtor(s):	2A. Secured Party(ies):	Filing Officer Use Only
Koppers Industries, Inc.	Mellon Bank, N.A., Agent	
1B. Mailing Address(es): Koppers Building 436 Seventh Avenue Pittsburgh, PA 15219	2B. Address of Secured Party from which security information obtainable: One Mellon Bank Center Pittsburgh, PA 15258-0001	

3. This financing statement covers the following types (or items) of property:

(The goods are to become fixtures on Ex. B) (The above timber is standing on _____) (The above minerals or the like (including gas and oil) or accounts will be financed at the wellhead or minehead of the well or mine located on _____) (Strike what is inapplicable) (Describe real estate)

See Exhibit A for description of property
See Exhibit B for legal description of real property

4A. Assignee of Secured Party(ies) if any:

4B. Address of Assignee from which security information obtainable:

And the financing statement is to be filed in the real estate records. If the debtor does not have an interest of records, the name of record owner is:

Check box if products of collateral are also covered [X] No. of additional sheets attached [ ]

File with: [X] COUNTY REAL ESTATE FILING OFFICER Multnomah COUNTY

*Signature(s) of Debtor(s) required in most cases.

Signature(s) of Secured Party(ies) in cases covered by ORS 79.4020.

By: _____
Signature(s) of Debtor(s)*
Signature of Secured Party(ies) or Assignee(s)

FILING OFFICER — ALPHABETICAL

This form of Financing Statement approved by Secretary of State.

STEVENS-NESS LAW PUBLISHING CO., PORTLAND, OR. 972

STANDARD FORM—UNIFORM COMMECIAL CODE

9/1/81

EXHIBIT A

All right, title and interest of Debtor now owned or held or hereafter acquired or arising in and to the following:

(a) all buildings, structures and other improvements (collectively, the "Improvements") now or hereafter erected or placed on the land and premises described in Exhibit B hereto (the "Land");

(b) all machinery, apparatus, equipment, fittings, fixtures, goods, chattels and other articles of personal property now or hereafter located on, attached to or used in connection with the Land or the Improvements, and all replacements thereof, additions thereto and substitutions therefor (all of the foregoing, being hereinafter collectively called the "Equipment"), together with all deposits or payments made on any Equipment in connection with the conditional purchase thereof and all leases by Debtor as lessee of Equipment;

(c) all licenses, permits, authorizations and agreements from governmental authorities relating to the ownership, construction, occupancy, operation, management or use of the Land, the Improvements or the Equipment;

(d) all contracts, licenses and agreements relating to the ownership, design, construction, occupancy, operation, management or use of the Land, the Improvements or the Equipment;

(e) all the remainder or remainders, reversion or reversions, rents, revenues, issues, profits, royalties, income and other benefits derived from any of the foregoing;

(f) all proceeds of the conversion, voluntary or involuntary, of any of the foregoing into cash or liquidated claims, including all proceeds of insurance; and

(g) all proceeds, both cash and non-cash, of any and all of the foregoing.

(h) All of Debtor's present and future rights, title and interest in and to the following property, whether now owned or held or hereafter existing or acquired and wherever located: all property and assets of Debtor, including without limitation all accounts, contract rights, chattel paper, equipment, inventory, instruments, documents and general intangibles (as such terms are defined in the Uniform Commercial Code); and all products and proceeds, both cash and non-cash, of the foregoing.

EXHIBIT B

TAR PRODUCTS

Production Facility

Portland, Oregon Terminal

LEGAL DESCRIPTION

PARCEL I:

That portion of Sections 12 and 13, Township 1 North, Range 1 West of the Willamette Meridian lying within the W.W. Baker Donation Land Claim, in the City of Portland, County of Multnomah and State of Oregon, described as follows:

Beginning at the point of intersection of the centerline of the Spokane, Portland, and Seattle Railroad and the East line of the W.W. Baker Donation Land Claim; thence North 32°00' East, 162.55 feet to a fence corner at the true point of beginning; thence continuing North 32°00' East along a fence 456.40 feet to a fence corner; thence North 29°58'00" West 150.40 feet; thence North 33°37'00" West 147.88 feet; thence North 49°51'00" West 139.00 feet to a hub; thence South 56°29'00" West 265.15 feet to a nail; thence North 33°13'00" West 260.70 feet to a railroad spike at a point known as point "A"; thence South 56°29'00" West 111.55 feet to a railroad spike; thence South 31°12'30" East 102.90 feet; thence South 56°46'00" West 38.57 feet; thence South 33°14'00" East 36.00 feet; thence South 56°46'00" West 9.00 feet; thence South 33°14'00" East 106.58 feet to a hub; thence South 25°44'30" West 10.51 feet to a hub; thence South 56°24'30" West 54.40 feet; thence South 33°05'30" East 277.30 feet; thence North 56°51'00" East 34.30 feet; thence South 75°03'00" East 34.55 feet; thence South 47°41'30" East 190.00 feet to a nail; thence South 35°16'30" East 140.05 feet to the true point of beginning.

EXCEPT a 30 foot strip of land parallel and contiguous with the East line of the W.W. Baker DLC in Sections 12 and 13, Township 1 North, Range 1 West, said strip of land being 30 feet Westerly of the said DLC line and more particularly described as: Beginning at a point 162.55 feet North 32° East from the intersection of the centerline of the SP & S Railway with the East line of the said Baker DLC; thence North 32° East 456.4 feet; thence North 29°59' West 34 feet; thence South 32° West 459.8 feet; thence South 35°16'30" East 32.5 feet to the point of beginning. ALSO EXCEPT rights of the public to part in City street.

PARCEL II:

That portion of Section 12, Township 1 North, Range 1 West of the Willamette Meridian lying within the W.W. Baker Donation Land

Claim, in the City of Portland, County of Multnomah and State of Oregon, described as follows:

Beginning at a point 769.61 feet North and 365.57 feet West of a tack marking the point of intersection of the centerline of the SP&S Railway with the Southeasterly line of the W.W. Baker DLC in said Township and Range; thence South 56°46' West 70.52 feet; thence South 33°05'30" East 149 feet; thence North 56°24'30" East 54.4 feet; thence North 25°44'30" East 10.51 feet; thence North 33°14' West 106.58 feet; thence North 56°46' East 9 feet; thence North 33°14' West 36 feet to the point of beginning.

EXHIBIT "B"

	Location to be filed
FORM UCC-1	Secretary of State UCC Division, Room 41 State Capitol Salem, Oregon 97310 (503) 378-4146
FORM UCC-1A Cost $5 per page	Multnomah County Recorder's Office 610 SW Alder, Room 300 Portland, Oregon 97205 (503) 248-3034

with a particular loan which sets forth the terms upon which the loan will be made. "Loan agreement" does not include a mortgage or trust deed which secures a promissory note. Nothing in this section shall be deemed to require a lender to issue a loan agreement.

(4) This section does not apply to any loan agreement executed on or before September 13, 1967, or any loan not primarily for personal, family or household use. [1967 c.336 §§1, 2; 1987 c.716 §3]

86.155 Line of credit mortgage; required terms; procedures. (1) As used in this section, "line of credit mortgage" means a mortgage or trust deed which secures a credit agreement, including subsequent optional or obligatory advances, up to a stated amount, provided that the front page of the mortgage or trust deed:

(a) Contains the legend "line of credit mortgage" either in capital letters or underscored above the body of the mortgage or trust deed;

(b) States the maximum amount to be advanced pursuant to the credit agreement; and

(c) States the term, if any, of the credit agreement.

(2) Advances, at any time, pursuant to the credit agreement shall have the same priority as established by the date of recording of any line of credit mortgage recorded under this section.

(3) The debtor may limit the indebtedness secured by a line of credit mortgage to the amount of the credit outstanding by delivering a notice by personal service upon the mortgage holder by certified mail, return receipt requested, to the mortgage holder at the address given for payment or, if none, to the address of the mortgage holder indicated in the mortgage. To be sufficient to limit indebtedness under this subsection, the notice must:

(a) State that it is made under this section;

(b) Contain the legal description in the line of credit mortgage or the street address of the real property;

(c) Provide the information necessary to locate the line of credit mortgage in the public record;

(d) State the debtor's intention to limit the amount of credit secured by the line of credit mortgage to the amount owed at the time the notice is received;

(e) State the date sent; and

(f) Be signed and acknowledged by all debtors obligated under the line of credit mortgage.

(4) Not later than the 20th day after receipt of the notice described in subsection (3) of this section, the mortgage holder shall:

(a) Indorse on the notice, or on an addendum to the notice, the principal amount of the indebtedness secured by the line of credit mortgage on the date the mortgage holder received notice;

(b) Sign and acknowledge the notice or the addendum, if applicable; and

(c) Record the notice and addendum in the public record where the line of credit mortgage was originally recorded.

(5) If the mortgage holder fails to record the notice and addendum, if applicable, within the time period specified in subsection (4) of this section, the debtor may record the notice in the public record where the line of credit mortgage was originally recorded, together with proof of receipt by, or personal delivery to, the mortgage holder.

(6) Notwithstanding subsection (3) of this section, the line of credit mortgage shall continue to have priority as of its date of recording as to:

(a) All advances, including any advance the creditor is required to honor, that was made before a notice under subsection (3) of this section is received;

(b) Interest, lawful charges and any amounts advanced, including reasonable attorney fees, following the debtor's default, to protect the security; and

(c) All advances made after a notice under subsection (3) of this section is received which are within the amount owed at the time the notice under subsection (3) of this section is given. [1987 c.716 §4]

Note: 86.155 was enacted into law by the Legislative Assembly but was not added to or made a part of ORS chapter 86 or any series therein by legislative action. See Preface to Oregon Revised Statutes for further explanation.

LATE CHARGES

86.160 Definitions for ORS 86.160 to 86.185. As used in ORS 86.160 to 86.185:

(1) "Late charge" means a sum payable by a mortgagor to the holder of a mortgage pursuant to a note or mortgage to compensate the holder for servicing and other costs attributable to the receipt of mortgage payments [illegible] after the date upon which payment is due.

(2) "Mortgagor" includes the grantor under a deed of trust.

(3) "Mortgage" includes a deed of trust.

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GENERAL REQUIREMENTS FOR DISPOSITION OF REALTY

93.010 Conveyances, how made. Conveyances of lands, or of any estate or interest therein, may be made by deed, signed by the person of lawful age from whom the estate or interest is intended to pass, or by the lawful agent or attorney of the person, and acknowledged or proved, and recorded without any other act or ceremony. No seal of the grantor, corporate or otherwise, shall be required on the deed. [Amended by 1965 c.502 §4]

93.020 Creating, transferring or declaring estates or interests in realty. (1) No estate or interest in real property, other than a lease for term not exceeding one year, nor any trust or power concerning such property, can be created, transferred or declared otherwise than by operation of law or by a conveyance or other instrument in writing, subscribed by the party creating, transferring or declaring it, or by the lawful agent of the party under written authority, and executed with such formalities as are required by law.

(2) This section does not affect the power of a testator in the disposition of real property by a last will and testament, nor to prevent a trust from arising or being extinguished by implication or operation of law, nor to affect the power of a court to compel the specific performance of an agreement in relation to such property.

93.030 Contracts to convey, instruments of conveyance and related memoranda to state consideration. (1) All instruments conveying or contracting to convey fee title to any real estate, and all memoranda of such instruments, shall state on the face of such instruments the true and actual consideration paid for such transfer, stated in terms of dollars. As used in this section, "consideration" includes the amount of cash and the amount of any lien, mortgage, contract, indebtedness or other encumbrance existing against the property to which the property remains subject or which the purchaser agrees to pay or assume. However, if the actual consideration consists of or includes other property or other value given or promised, neither the monetary value nor a description of such other property or value need be stated so long as it is noted on the face of the instrument that other property or value was either part or the whole consideration.

(2) The statement of consideration as required by subsection (1) of this section shall be made by a grantor or a grantee. Failure to make such statement does not invalidate the conveyance.

(3) If the statement of consideration is in the body of the instrument preceding the signatures, execution of the instrument shall constitute a certification of the truth of the statement. If there is a separate statement of consideration on the face of the instrument, it shall be signed separately from the instrument, and such execution shall constitute a certification of the truth of the statement by the person signing. No particular form is required for the statement so long as the requirements of this section are reasonably met.

(4) No instrument conveying or contracting to convey fee title to any real estate nor any memorandum of such an instrument shall be accepted for recording by any county clerk or recording officer in this state unless the statement of consideration required by this section is included on the face of the instrument.

(5) This section applies to instruments executed on or after January 1, 1968. [1967 c.462 §§1, 3; 1967 s.s. c.7 §1; 1977 c.605 §1]

93.040 Warning in instrument relating to approved uses of land; liability of drafter and recorder. (1) The following statement shall be included in the body of an instrument transferring or contracting to transfer fee title to real property: "THIS INSTRUMENT WILL NOT ALLOW USE OF THE PROPERTY DESCRIBED IN THIS INSTRUMENT IN VIOLATION OF APPLICABLE LAND USE LAWS AND REGULATIONS. BEFORE SIGNING OR ACCEPTING THIS INSTRUMENT, THE PERSON ACQUIRING FEE TITLE TO THE PROPERTY SHOULD CHECK WITH THE APPROPRIATE CITY OR COUNTY PLANNING DEPARTMENT TO VERIFY APPROVED USES."

(2) No action may be maintained against the county recording officer for recording an instrument that does not contain the statement required in subsection (1) of this section.

(3) No action may be maintained against any person for failure to include in the instrument, or for recording an instrument that does not contain the statement required in subsection (1) of this section, unless the person acquiring or agreeing to acquire fee title to the real property would not have executed or accepted the instrument but for the absence in the instrument of the statement required by subsection (1) of this section. No action may be maintained by the person acquiring or agreeing to acquire title to the real property

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against any person other than the person transferring or contracting to transfer fee title to the real property. [1983 c.718 §2; 1985 c.719 §1]

SPECIAL MATTERS IN PARTICULAR CONVEYANCES

93.110 Quitclaim deed sufficient to pass estate. A deed of quitclaim and release, of the form in common use, is sufficient to pass all the estate which the grantor could lawfully convey by a deed of bargain and sale.

93.120 Words of inheritance unnecessary to convey fee; conveyances deemed to convey all grantor's estate. The term "heirs," or other words of inheritance, is not necessary to create or convey an estate in fee simple. Any conveyance of real estate passes all the estate of the grantor, unless the intent to pass a lesser estate appears by express terms, or is necessarily implied in the terms of the grant.

93.130 Conveyance of land in adverse possession of another. No grant or conveyance of lands or interest therein is void for the reason that at the time of its execution the lands were in the actual possession of another claiming adversely.

93.140 Implied covenants. No covenant shall be implied in any conveyance of real estate, whether it contains special covenants or not, except as provided by ORS 93.850 to 93.870. [Amended by 1973 c.194 §6]

93.150 Conveyance by tenant of greater estate than that possessed. A conveyance made by a tenant for life or years, purporting to grant a greater estate than the tenant possesses or could lawfully convey, does not work a forfeiture of the estate of the tenant, but passes to the grantee all the estate which the tenant could lawfully convey.

93.160 Conveyance by reversioners and remaindermen to life tenant vests fee. Where real property has been devised to a person for life, and in case of the death of the life tenant without leaving lawful issue born alive and living at the time of death, then to other heirs of the testator, a conveyance to the life tenant from all reversioners or remaindermen and all issue of the life tenant as are in being, of all their interest in the real property, vests a fee simple estate in the life tenant.

93.170 [Repealed by 1969 c.591 §305]

93.180 Tenancy in common, when created; joint tenancy abolished. Every conveyance or devise of lands, or interest therein, made to two or more persons, other than to a husband and wife, as such, or to executors or trustees, as such, creates a tenancy in common unless it is in some manner clearly and expressly declared in the conveyance or devise that the grantees or devisees take the lands with right of survivorship. Such a declaration of a right to survivorship shall create a tenancy in common in the life estate with cross-contingent remainders in the fee simple. Joint tenancy is abolished and the use in a conveyance or devise of the words "joint tenants" or similar words without any other indication of an intent to create a right of survivorship shall create a tenancy in common. [Amended by 1983 c.555 §1]

93.190 Trustees or personal representatives as joint tenants; filling vacancies in office. (1) Every conveyance, deed of trust, mortgage or devise of an interest in or lien upon real or personal property to two or more persons as trustees or personal representatives, creates a joint tenancy in such interest or lien in the trustees or personal representatives unless it is expressly declared in the conveyance, deed of trust, mortgage or devise that the trustees or personal representatives shall take or hold the property as tenants in common or otherwise.

(2) If the conveyance, deed of trust, mortgage or devise provides for filling any vacancy in the office of trustee or personal representative, it may be filled as therein provided, but a court of competent jurisdiction may fill a vacancy in the trusteeship according to the established rules and principles of equity. In whichever way the vacancy is filled, the new trustee shall hold the property with all powers, rights and duties of an original trustee unless otherwise directed by conveyance, deed of trust, mortgage or devise, or order or decree of the court. [Amended by 1969 c.591 §275]

93.200 Trustees or executors now hold as joint tenants. All trustees or executors holding real or personal property in trust on May 19, 1905, hold as joint tenants and not as tenants in common unless the conveyance, deed of trust, mortgage or devise, or order or decree of court creating or appointing the trustees or executors has declared otherwise.

93.210 Presumption respecting deed from trustee of undisclosed beneficiary. If a deed to real estate has been made to a grantee in trust or designating the grantee as trustee, and no beneficiary is indicated or named in the deed, a deed thereafter executed by such grantee conveying the property is presumed to have been executed with full right and authority and conveys prima facie title to the property. The grantee

Koppers000321

OWNERS NOTIFIED OF PROPOSED LISTING ON THE INVENTORY OF
CONFIRMED RELEASES PURSUANT TO ORS 466.557(4)
****THIS IS NOT THE INVENTORY OF CONFIRMED RELEASES****
LIST SUBJECT TO CHANGE BASED ON OREGON LAW

SITE ID	SITE LOCATION	LEGAL OWNER(S)	SUBSTANCE(S)	STATUS OF REMEDIAL ACTION
666	John C. Taylor Lumber Sales, Inc. Rock Creek Road and Hwy. 18 Sheridan	Taylor Lumber and Treating, Inc.	pentachlorophenol tetrachlorophenol napthalene acenaphthene fluorene	
59	Johnson Controls - Globe Battery Divn. 800 N.W. 3rd Avenue Canby	Johnson Controls Inc.	lead sulfuric acid	RPIC
266	K-Lines, Inc 375 S.W. Boones Ferry Road Lake Oswego	Jamey E. Berry	lead	FIR
62	Koppers Company (Portland), Inc. 7540 N.W. St. Helen's Road Portland	Northwest Natural Gas	lead phenol, total ethylbenzene napthalene acenaphthene fluorene anthracene phenanthrene fluoranthene pyrene dibenzofuran	RPIC
131	Landa 4920 N.E. 122nd Avenue Portland	Pacific Realty Associates	sulfuric acid hydrofluoric acid Caustic solution	RPP

Koppers000322

TOOZE MARSHALL SHENKER HOLLOWAY & DUDEN

ATTORNEYS AT LAW
333 S. W. TAYLOR STREET
PORTLAND, OREGON 97204-2496

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MICHAEL J. GENTRY
NEALE E. CREAMER**
WILLIAM P. HUTCHISON, JR.
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ERIC J. NEIMAN*
DAVID R. SIMON
MONTGOMERY W. COBB
ROBERT E L. BONAPARTE***
MATTHEW K. ROSSMAN
JOHN OSTRANDER
MARK L. HUGLIN

ROBERT M. KERR
COUNSEL

LAMAR TOOZE
1895-1971

LAMAR TOOZE, JR.
1922-1985

ADMITTED IN OREGON
WASHINGTON*
CALIFORNIA**
NEW YORK***
WASHINGTON, D. C.***

December 29, 1988

Mellon Bank, N.A.
One Mellon Bank Center
Pittsburgh, Pennsylvania 15258

Re: Koppers Industries, Inc.

Gentlemen:

We have acted as special counsel in the State of Oregon (together with political subdivisions thereof, the "State") for Koppers Industries, Inc. (the "Borrower") in connection with the Credit Agreement dated as of December 31, 1988 (the "Credit Agreement"), among the Borrower, PAC Holdings Corporation (to be renamed Koppers Holdings Corporation), Mellon Bank, N.A. ("Mellon") and Mellon Bank, N.A., as agent (the "Agent") for Mellon and the other financial institutions which hereafter may become parties thereto (together with Mellon, the "Banks"). Terms used herein which are defined in the Credit Agreement shall have the same meaning herein as therein provided unless the context hereof clearly otherwise requires.

We have examined execution copies of the Deed of Trust and Security Agreement (the Oregon Mortgage), Pledge and Security Agreement and the Collateral Assignment (collectively, the "Documents").

We have also examined financing statements in the form of Exhibit A hereto (the "Financing Statements"). In making such examinations, we have assumed the genuineness of all signatures, the authenticity of all documents submitted to us as originals and the conformity to original documents of all documents submitted to us as certified, conformed or photostatic copies.

In rendering this opinion, we have assumed with your permission that (i) the Documents were duly authorized, executed and delivered by the respective parties thereto in the form of the execution copies reviewed by us, that (ii) the Documents were negotiated by the various parties hereto in the Commonwealth of Pennsylvania and such documents were executed and delivered in

said Commonwealth, where the closing and the funding are to take place, and that (iii) the parties had the corporate power and authority to execute and deliver the subject documents.

Based upon the foregoing and subject to the qualifications hereinafter set forth, we are of the opinion that:

1. The Documents constitute legal, valid and binding obligations of the parties thereto other than the Mellon and the Agent (the "Loan Parties") and are enforceable in accordance with the terms thereof, except as the enforceability thereof may be limited by bankruptcy, insolvency or other similar laws of general application affecting the enforcement of creditors' rights or by general principles of equity limiting the availability of equitable remedies.

2. No authorization, consent (unless required of lessor or Oregon's Public Utility Commission), approval, license, exemption or other action by, and no registration, qualification, designation, declaration or filing with, any Official Body of the State is or will be, as of the date of closing, necessary or advisable in connection with execution and delivery of the Documents, consummation of the transactions therein contemplated, or to ensure the legality, validity, enforceability and admissibility in evidence thereof, except as referred to in paragraphs 4 and 5 below. Based on oral advice from the Corporation Division of the Oregon Secretary of State's office, Koppers Industries, Inc. is not registered to transact business in Oregon. The borrower should register to do business in Oregon as a foreign corporation once the transaction is completed.

3. Neither the execution and delivery of the Documents nor consummation of the transactions therein contemplated nor performance of or compliance with the terms and conditions thereof will violate any law or governmental rule or regulation of Oregon.

4. The Oregon Mortgage is in proper form for execution under the laws of Oregon and is in proper form (a) for the creation of the Lien contemplated thereby on and against the Mortgaged Property (as defined in the Mortgage) and (b) for recording in the Multnomah County Recorder's office. Under and pursuant to the Oregon Mortgage there has been granted to and created in favor of the Agent, for the ratable benefit of the Banks, as security for the Secured Obligations (as defined therein), a legal, valid and enforceable mortgage lien on, and security interest in, the Mortgaged Property described therein. When such

Oregon Mortgage is duly recorded in the Multnomah County Recorder's office, such Mortgage shall constitute a fully perfected mortgage lien on, and security interest in, all real property (including fixtures) included in the Mortgaged Property; and when the Financing Statements have been filed in the offices listed on Exhibit B hereto, such Mortgage shall also constitute a fully perfected lien on, and security interest in, all personal property included in the Mortgaged Property.

5. To the extent Oregon law may be applicable, under and pursuant to the Oregon Mortgage there has been granted to and created in favor of the Agent, for the ratable benefit of the Banks, as security for the Debt (as defined therein), a legal, valid and enforceable security interest in the Collateral (as defined therein) and, upon filing of the Financing Statements in the offices listed on Exhibit B hereto and the delivery to the Agent of any Documents and Instruments (as such terms are defined in such Oregon Mortgage, will constitute a fully perfected lien on, and security interest in, the Collateral. The Financing Statements are in proper form for filing and for perfecting such security interest.

6. The Oregon Assignment is in proper form for execution under the laws of the State and is in proper form for the creation of the Lien comtemplated thereby on and against the Agreement defined therein and the rights of the Borrower thereunder. Under and pursuant to the Oregon Assignment there has been granted to and created in favor of the Agent, for the ratable benefit of the Banks, as security for the due performance by the Borrower of its obligations under the Credit Agreement (we have not seen or reviewed Schedule I or the Agreements referenced therein except for the ground lease) , the Notes and the related Documents to which it is a party, a legal, valid and enforceable security interest on and against the Agreement defined therein and the rights of the Borrower thereunder.

7. The courts of Oregon will enforce the choice of law provisions contained in the Documents which expressly provide that the terms and provisions thereof will be governed by and construed in accordance with the laws of the Commonwealth of Pennsylvania except to the extent set forth in the proviso to Section 5.11 of the Oregon Mortgages.

8. Neither the Agent nor any Bank is required to register or qualify as a foreign corporation, or to file any designation for service of process, in Oregon by reason of the transactions contemplated by the Documents.

9. The transactions contemplated by the Documents will not subject the Agent or any Bank to any tax, assessment or other governmental charge under the laws of Oregon except for statutory, recording and filing fees to be paid upon the recording or filing of the Oregon Mortgages and the Financing Statements.

10. There is no Law of Oregon which would impose on a person whose interest in real or personal property situated within the State is limited to a collateral security interest an obligation to effect an environmental cleanup or fund the costs of an environmental cleanup with respect to any such property, except as hereinafter set forth.

11. Our review of the Deed of Trust and Security Agreement requires that we express the following additional opinions:

(i) Subparagraphs (i), (ii) and (iii) of Paragraph (a) on page 2 includes in the description of the "Land" property in which the Beneficiary will gain an interest only to the extent that the Borrower/Mortgagor might have a legal interest or right to convey; we do not express any opinion as to whether or not the Grantor has any interest in rights of way, etc.; similarly, Paragraph (e) on page 2 includes within mortgaged property certain rights issued by Official Bodies; we express no opinion as to whether Borrower has the ability to create a security interest in such rights;

(ii) On page 4, paragraph 1.02, there is a reference to Schedule 1.02 which has not been furnished to us. Accordingly, we would advise that the subject Land has been included in the proposed Oregon Department of Environmental Quality (DEQ) Inventory List of properties where there have been confirmed releases of hazardous wastes; this is pursuant to ORS 466.557(4). A copy of page 11 from that listing is enclosed and the status of the remedial action reference indicates that the site is currently being overseen by the DEQ for technical assistance to responsible party for investigation, cleanup, closure, or removal. The liability of Beneficiary for cleanup costs is limited to those situations where Beneficiary becomes an owner or operator of the property, a circumstance which might arise if Beneficiary foreclosed its interest in the property and "owned" or "operated" it;

(iii) The opinions expressed with respect to the Deed of Trust and Security Agreement are those which relate to state law; we have not and are not expressing any opinion with respect to the enforceability of provisions of the Deed of Trust and Security Agreement as those may be determined by the general provisions of the Uniform Commercial Code adopted generally

throughout the country; for example, in paragraph 3.02(e), we do not express an opinion as to whether or not the Beneficiary may purchase at a private sale;

(iv) With respect to paragraph 2.18(c), we do not express any opinion as to whether or not an attempt by Grantor to alter the ground lease would be null and void as to the lessor.

(v) The article 4, page 23 provisions with respect to a trustee may not be enforceable as against the trustee without the trustee's prior approval; we would note that the trustee is not a signatory to the Oregon Mortgage;

(vi) With respect to article 5, section 5.01, page 24, ORS 86.155, a copy of which is enclosed, appears to require that the first page of the Oregon Mortgage contain in the caption a reference to the fact that this is a "Line of Credit Mortgage" and that on the first page the term (if any) of the Deed of Trust and the maximum amount to be advanced be set forth; if these provisions are not included, it may jeopardize the availability of the real property as security for future advances.

(vii) With respect to paragraph 3.02(g), the availability of this remedy will be subject to state law and Rule 67(F) of the Oregon Rules of Civil Procedure providing for judgment by stipulation.

We are members of the bar of Oregon and do not purport to be experts in the laws of any jurisdiction other than the State and the United States. To the extent Pennsylvania law applies to any of the matters on which we have opined, we have assumed that Pennsylvania law is the same as the State's law with respect to such matters.

All of our opinions expressed in this letter are specifically subject to and limited by the following:

(a) The effect of laws or court decisions relating to bankruptcy, insolvency, reorganization, liquidation, readjustment of debt or other laws or court decisions relating to or affecting the enforcement of creditors' rights generally, whether now or hereafter in effect; the effect of applicable court decisions, invoking statutes or principles of equity or public policy, which hold that certain covenants or provisions of agreements are unenforceable where, for example, the breach of such covenants or provisions imposes restrictions or burdens upon the party thereto and it cannot be demonstrated that the imposition of such restrictions or burdens is reasonably necessary for the protection of the other party, or where the enforcement of such covenants or provisions would violate the covenant of good faith and fair dealing or other public policy implied under law.

(b) The effect of general principles of equity or public policy (regardless of whether considered in a proceeding at law or in equity) which, among other things may limit the enforceability of waivers of rights or the availability of specific performance, appointment of a receiver, injunctive relief or other equitable remedies.

(c) The unenforceability under certain circumstances, under state or federal law or court decisions of provisions indemnifying a party against liability for its own wrongful or negligent acts, requiring contribution to such party under such circumstances or where indemnification or contribution is otherwise contrary to public policy.

This opinion is intended solely for the use of Bank, its successors and assigns in connection with the transactions discussed herein, and is not to be used, released, quoted or relied upon by anyone else or for any other purpose without our prior written consent. The information set forth in this letter is as of the date hereof, and we assume no obligation to advise Bank of changes, whether or not deemed material, which may hereafter come to our attention.

Very truly yours,

William P. Hutchison, Jr.

WPH:kd

Enc.
cc: Steven B. Larchuk
Mary Jo Potter, REED SMITH SHAW & McCLAY

STATE OF OREGON

UNIFORM COMMERCIAL CODE—FINANCING STATEMENT—FORM UCC-1

SECRETARY OF STATE

INSTRUCTIONS:

1. PLEASE TYPE THIS FORM.
2. Read all instructions carefully. Failure to provide complete and legible information may result in the rejection of the filing document
3. This financing statement is effective for a period of 5 or 10 years. Indicate the effective period that pertains to your filing by checking either box 5A or 5B. If neither box is checked, the filing document will be regarded as applicable to a 5 year effective period.
4. Enclose fee of $3.75 per debtor name listed plus $2 per identified trade name. If checking the 10 Year Effective Period box (5B), enclose an additional $10.
5. This form must be signed by the Debtor(s) unless the statement pertains to one of the exceptions listed under ORS 79.4020. If filing without the Debtor(s) signature, the Secured Party should indicate specifically by checking one of the boxes provided for in item No. 6.
6. Send the Alphabetical, Numerical and Acknowledgment copies with the interleaved carbons intact to the filing officer. The Debtor(s) and Secured Party(ies) copies are retained by the party making the filing.
7. If the space provided for any item(s) on the form is inadequate, submit additional information on 5" x 8" sheets. Only one copy of such additional sheets need be presented to the filing officer. Long schedules of collateral, indentures, etc., may be on any size paper that is convenient for the filer. DO NOT STAPLE OR TAPE ANYTHING TO THE LOWER PORTION OF THIS FORM.
8. At the time of original filing, filing officer will return the acknowledgment copy to the assignee or secured party. If the secured party requires acknowledgment of long schedules of collateral, two copies should be presented and one will be returned.
9. When a filing is to be terminated the acknowledgment copy may be sent to the filing officer signed by the secured party or assignee, or use Form UCC-3 as a Termination Statement.
10. Submit this form to: Secretary of State, UCC Section, Capitol Bldg., Rm 41, Salem, OR 97310 (Tele: 503-378-4146).

This Financing Statement is presented to filing officer pursuant to the Uniform Commercial Code. This statement remains effective for a period of five years (unless 10 year option is noted) from the date of filing, subject to extensions for additional periods of five years by refiling or filing a continuation statement (UCC-3) within six months prior to the expiration date.

1A. Debtor(s): (If individual(s) last name first)	2A. Secured Party(ies)	Reserved For Filing Officer Use Only
Koppers Industries, Inc.	Mellon Bank, N.A., Agent	
1B. Mailing Address(es): *Koppers Building 436 Seventh Avenue Pittsburgh, PA 15219	2B. Address of Secured Party from which security information is obtainable One Mellon Bank Center Pittsburgh, PA 15258-0001 Tele. No. _____	

3. This financing statement covers the following types (or items) of collateral (ORS 79.4020)

No. of additional Sheets attached _____

See Exhibit "A"

*Debtor's Oregon address is:
7900 SW St. Helens Road
Portland, Oregon

4A. Assignee of Secured Party(ies) if any:

4B. Address of Assignee:

5. Filer: INDICATE WHETHER DOCUMENT IS BEING FILED WITH AN EFFECTIVE PERIOD OF: (check box) 5A. ☐ 5 YEARS or 5B. ☐ 10 YEARS (Read instructions 3 & 4)

6. This statement is filed without the debtor's signature to perfect a security interest in collateral (if applicable check box below):
   - ☐ collateral already subject to a security interest in another jurisdiction;
   - ☐ which is proceeds of the described original collateral which was perfected;
   - ☐ collateral as to which the filing has lapsed, or
   - ☐ collateral acquired after a change of name, identity or corporate structure of the debtor.

By: _____
Signature(s) of Debtor(s) or
Signature(s) of Secured Party(ies) or Assignee(s)

STANDARD FORM—UNIFORM COMMERCIAL CODE—FORM UCC-1
01-01-88

STEVENS-NESS LAW PUBLISHING CO., PORTLAND, OR. 97204 - 223-3137

FILING OFFICER — ALPHABETICAL

EXHIBIT A

All right, title and interest of Debtor now owned or held or hereafter acquired or arising in and to the following:

(a) all buildings, structures and other improvements (collectively, the "Improvements") now or hereafter erected or placed on the land and premises described in Exhibit B hereto (the "Land");

(b) all machinery, apparatus, equipment, fittings, fixtures, goods, chattels and other articles of personal property now or hereafter located on, attached to or used in connection with the Land or the Improvements, and all replacements thereof, additions thereto and substitutions therefor (all of the foregoing, being hereinafter collectively called the "Equipment"), together with all deposits or payments made on any Equipment in connection with the conditional purchase thereof and all leases by Debtor as lessee of Equipment;

(c) all licenses, permits, authorizations and agreements from governmental authorities relating to the ownership, construction, occupancy, operation, management or use of the Land, the Improvements or the Equipment;

(d) all contracts, licenses and agreements relating to the ownership, design, construction, occupancy, operation, management or use of the Land, the Improvements or the Equipment;

(e) all the remainder or remainders, reversion or reversions, rents, revenues, issues, profits, royalties, income and other benefits derived from any of the foregoing;

(f) all proceeds of the conversion, voluntary or involuntary, of any of the foregoing into cash or liquidated claims, including all proceeds of insurance; and

(g) all proceeds, both cash and non-cash, of any and all of the foregoing.

(h) All of Debtor's present and future rights, title and interest in and to the following property, whether now owned or held or hereafter existing or acquired and wherever located: all property and assets of Debtor, including without limitation all accounts, contract rights, chattel paper, equipment, inventory, instruments, documents and general intangibles (as such terms are defined in the Uniform Commercial Code); and all products and proceeds, both cash and non-cash, of the foregoing.

INSTRUCTIONS:

STATE OF OREGON MULTNOMAH COUNTY RECORDER'S OFFICE

1. PLEASE TYPE THIS FORM. **UNIFORM COMMERCIAL CODE—FINANCING STATEMENT—REAL PROPERTY—FORM UCC-1A**
2. Enclose fee of $3.75 per name listed plus $2.00 per trade name.
3. Send the Alphabetical, Numerical and Acknowledgment copies with interleaved carbon paper intact to the filing officer. The Debtor(s) and Secured Party(ies) copies are retained by party making the filing.
4. If the space provided for any item(s) on the form is inadequate, the item(s) should be continued on additional sheets, size 5" x 8". Only one copy of such additional sheets need be presented to the filing officer. Long schedules of collateral, indentures, etc. may be on any size paper that is convenient for the secured party. **DO NOT STAPLE OR TAPE ANYTHING TO LOWER PORTION OF THIS FORM.**
5. The Form UCC-1A should be filed with the county filing officers who record real estate mortgages.
6. At the time of original filing, filing officer will return acknowledgment copy to the assignee if noted on form or secured party.
7. When a copy of the security agreement is used as a financing statement, it is requested that it be accompanied by a completed UCC-21 form.
8. When filing is to be terminated the acknowledgment copy may be sent to the filing officer signed by the secured party or assignee or he may use Form UCC—3 or UCC-3A as a Termination Statement.

THIS FINANCING STATEMENT is presented to filing officer pursuant to the Uniform Commercial Code

1A. Debtor(s):
Koppers Industries, Inc.

1B. Mailing Address(es):
Koppers Building
436 Seventh Avenue
Pittsburgh, PA 15219

2A. Secured Party(ies):
Mellon Bank, N.A., Agent

2B. Address of Secured Party from which security information obtainable:
One Mellon Bank Center
Pittsburgh, PA 15258-0001

Filing Officer Use Only

3. This financing statement covers the following types (or items) of property:
(The goods are to become fixtures on Ex. B) (The above timber is standing on _____) (The above minerals or the like (including gas and oil) or accounts will be financed at the wellhead or minehead of the well or mine located on _____) (Strike what is inapplicable) (Describe real estate)

See Exhibit A for description of property
See Exhibit B for legal description of real property

4A. Assignee of Secured Party(ies) if any:

4B. Address of Assignee from which security information obtainable:

And the financing statement is to be filed in the real estate records. If the debtor does not have an interest of records, the name of record owner is:

Check box if products of collateral are also covered [X] No. of additional sheets attached [ ]

File with: [X] **COUNTY REAL ESTATE FILING OFFICER** Multnomah **COUNTY**

*Signature(s) of Debtor(s) required in most cases.
Signature(s) of Secured Party(ies) in cases covered by ORS 79.4020.

By: _____
Signature(s) of Debtor(s)*
Signature of Secured Party(ies) or Assignee(s)

FILING OFFICER — ALPHABETICAL

This form of Financing Statement approved by Secretary of State.

STEVENS-NESS LAW PUBLISHING CO., PORTLAND, OR. 9720

STANDARD FORM—UNIFORM COMMECIAL CODE

9/1/81

EXHIBIT A

All right, title and interest of Debtor now owned or held or hereafter acquired or arising in and to the following:

(a) all buildings, structures and other improvements (collectively, the "Improvements") now or hereafter erected or placed on the land and premises described in Exhibit B hereto (the "Land");

(b) all machinery, apparatus, equipment, fittings, fixtures, goods, chattels and other articles of personal property now or hereafter located on, attached to or used in connection with the Land or the Improvements, and all replacements thereof, additions thereto and substitutions therefor (all of the foregoing, being hereinafter collectively called the "Equipment"), together with all deposits or payments made on any Equipment in connection with the conditional purchase thereof and all leases by Debtor as lessee of Equipment;

(c) all licenses, permits, authorizations and agreements from governmental authorities relating to the ownership, construction, occupancy, operation, management or use of the Land, the Improvements or the Equipment;

(d) all contracts, licenses and agreements relating to the ownership, design, construction, occupancy, operation, management or use of the Land, the Improvements or the Equipment;

(e) all the remainder or remainders, reversion or reversions, rents, revenues, issues, profits, royalties, income and other benefits derived from any of the foregoing;

(f) all proceeds of the conversion, voluntary or involuntary, of any of the foregoing into cash or liquidated claims, including all proceeds of insurance; and

(g) all proceeds, both cash and non-cash, of any and all of the foregoing.

(h) All of Debtor's present and future rights, title and interest in and to the following property, whether now owned or held or hereafter existing or acquired and wherever located: all property and assets of Debtor, including without limitation all accounts, contract rights, chattel paper, equipment, inventory, instruments, documents and general intangibles (as such terms are defined in the Uniform Commercial Code); and all products and proceeds, both cash and non-cash, of the foregoing.

EXHIBIT B

TAR PRODUCTS

Production Facility

Portland, Oregon Terminal

LEGAL DESCRIPTION

PARCEL I:

That portion of Sections 12 and 13, Township 1 North, Range 1 West of the Willamette Meridian lying within the W.W. Baker Donation Land Claim, in the City of Portland, County of Multnomah and State of Oregon, described as follows:

Beginning at the point of intersection of the centerline of the Spokane, Portland, and Seattle Railroad and the East line of the W.W. Baker Donation Land Claim; thence North 32°00' East, 162.55 feet to a fence corner at the true point of beginning; thence continuing North 32°00' East along a fence 456.40 feet to a fence corner; thence North 29°58'00" West 150.40 feet; thence North 33°37'00" West 147.88 feet; thence North 49°51'00" West 139.00 feet to a hub; thence South 56°29'00" West 265.15 feet to a nail; thence North 33°13'00" West 260.70 feet to a railroad spike at a point known as point "A"; thence South 56°29'00" West 111.55 feet to a railroad spike; thence South 31°12'30" East 102.90 feet; thence South 56°46'00" West 38.57 feet; thence South 33°14'00" East 36.00 feet; thence South 56°46'00" West 9.00 feet; thence South 33°14'00" East 106.58 feet to a hub; thence South 25°44'30" West 10.51 feet to a hub; thence South 56°24'30" West 54.40 feet; thence South 33°05'30" East 277.30 feet; thence North 56°51'00" East 34.30 feet; thence South 75°03'00" East 34.55 feet; thence South 47°41'30" East 190.00 feet to a nail; thence South 35°16'30" East 140.05 feet to the true point of beginning.

EXCEPT a 30 foot strip of land parallel and contiguous with the East line of the W.W. Baker DLC in Sections 12 and 13, Township 1 North, Range 1 West, said strip of land being 30 feet Westerly of the said DLC line and more particularly described as: Beginning at a point 162.55 feet North 32° East from the intersection of the centerline of the SP & S Railway with the East line of the said Baker DLC; thence North 32° East 456.4 feet; thence North 29°58' West 34 feet; thence South 32° West 459.8 feet; thence South 35°16'30" East 32.5 feet to the point of beginning. ALSO EXCEPT rights of the public to part in City street.

PARCEL II:

That portion of Section 12, Township 1 North, Range 1 West of the Willamette Meridian lying within the W.W. Baker Donation Land

Claim, in the City of Portland, County of Multnomah and State of Oregon, described as follows:

Beginning at a point 769.61 feet North and 365.57 feet West of a tack marking the point of intersection of the centerline of the SP&S Railway with the Southeasterly line of the W.W. Baker DLC in said Township and Range; thence South 56°46' West 70.52 feet; thence South 33°05'30" East 149 feet; thence North 56°24'30" East 54.4 feet; thence North 25°44'30" East 10.51 feet; thence North 33°14' West 106.58 feet; thence North 56°46' East 9 feet; thence North 33°14' West 36 feet to the point of beginning.

EXHIBIT "B"

	Location to be filed
FORM UCC-1	Secretary of State UCC Division, Room 41 State Capitol Salem, Oregon 97310 (503) 378-4146
FORM UCC-1A Cost $5 per page	Multnomah County Recorder's Office 610 SW Alder, Room 300 Portland, Oregon 97205 (503) 248-3034

with a particular loan which sets forth the terms upon which the loan will be made. "Loan agreement" does not include a mortgage or trust deed which secures a promissory note. Nothing in this section shall be deemed to require a lender to issue a loan agreement.

(4) This section does not apply to any loan agreement executed on or before September 13, 1967, or any loan not primarily for personal, family or household use. [1967 c.336 §§1, 2; 1987 c.716 §3]

86.155 Line of credit mortgage; required terms; procedures. (1) As used in this section, "line of credit mortgage" means a mortgage or trust deed which secures a credit agreement, including subsequent optional or obligatory advances, up to a stated amount, provided that the front page of the mortgage or trust deed:

(a) Contains the legend "line of credit mortgage" either in capital letters or underscored above the body of the mortgage or trust deed;

(b) States the maximum amount to be advanced pursuant to the credit agreement; and

(c) States the term, if any, of the credit agreement.

(2) Advances, at any time, pursuant to the credit agreement shall have the same priority as established by the date of recording of any line of credit mortgage recorded under this section.

(3) The debtor may limit the indebtedness secured by a line of credit mortgage to the amount of the credit outstanding by delivering a notice by personal service upon the mortgage holder by certified mail, return receipt requested, to the mortgage holder at the address given for payment or, if none, to the address of the mortgage holder indicated in the mortgage. To be sufficient to limit indebtedness under this subsection, the notice must:

(a) State that it is made under this section;

(b) Contain the legal description in the line of credit mortgage or the street address of the real property;

(c) Provide the information necessary to locate the line of credit mortgage in the public record;

(d) State the debtor's intention to limit the amount of credit secured by the line of credit mortgage to the amount owed at the time the notice is received;

(e) State the date sent; and

(f) Be signed and acknowledged by all debtors obligated under the line of credit mortgage.

(4) Not later than the 20th day after receipt of the notice described in subsection (3) of this section, the mortgage holder shall:

(a) Indorse on the notice, or on an addendum to the notice, the principal amount of the indebtedness secured by the line of credit mortgage on the date the mortgage holder received notice;

(b) Sign and acknowledge the notice or the addendum, if applicable; and

(c) Record the notice and addendum in the public record where the line of credit mortgage was originally recorded.

(5) If the mortgage holder fails to record the notice and addendum, if applicable, within the time period specified in subsection (4) of this section, the debtor may record the notice in the public record where the line of credit mortgage was originally recorded, together with proof of receipt by, or personal delivery to, the mortgage holder.

(6) Notwithstanding subsection (3) of this section, the line of credit mortgage shall continue to have priority as of its date of recording as to:

(a) All advances, including any advance the creditor is required to honor, that was made before a notice under subsection (3) of this section is received;

(b) Interest, lawful charges and any amounts advanced, including reasonable attorney fees, following the debtor's default, to protect the security; and

(c) All advances made after a notice under subsection (3) of this section is received which are within the amount owed at the time the notice under subsection (3) of this section is given. [1987 c.716 §4]

Note: 86.155 was enacted into law by the Legislative Assembly but was not added to or made a part of ORS chapter 86 or any series therein by legislative action. See Preface to Oregon Revised Statutes for further explanation.

LATE CHARGES

86.160 Definitions for ORS 86.160 to 86.185. As used in ORS 86.160 to 86.185:

(1) "Late charge" means a sum payable by a mortgagor to the holder of a mortgage pursuant to a note or mortgage to compensate the holder for servicing and other costs attributable to the receipt of mortgage payments [illegible] after the date upon which payment is due.

(2) "Mortgagor" includes the grantor under a deed of trust.

(3) "Mortgage" includes a deed of trust.

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GENERAL REQUIREMENTS FOR DISPOSITION OF REALTY

93.010 Conveyances, how made. Conveyances of lands, or of any estate or interest therein, may be made by deed, signed by the person of lawful age from whom the estate or interest is intended to pass, or by the lawful agent or attorney of the person, and acknowledged or proved, and recorded without any other act or ceremony. No seal of the grantor, corporate or otherwise, shall be required on the deed. [Amended by 1965 c.502 §4]

93.020 Creating, transferring or declaring estates or interests in realty. (1) No estate or interest in real property, other than a lease for term not exceeding one year, nor any trust or power concerning such property, can be created, transferred or declared otherwise than by operation of law or by a conveyance or other instrument in writing, subscribed by the party creating, transferring or declaring it, or by the lawful agent of the party under written authority, and executed with such formalities as are required by law.

(2) This section does not affect the power of a testator in the disposition of real property by a last will and testament, nor to prevent a trust from arising or being extinguished by implication or operation of law, nor to affect the power of a court to compel the specific performance of an agreement in relation to such property.

93.030 Contracts to convey, instruments of conveyance and related memoranda to state consideration. (1) All instruments conveying or contracting to convey fee title to any real estate, and all memoranda of such instruments, shall state on the face of such instruments the true and actual consideration paid for such transfer, stated in terms of dollars. As used in this section, "consideration" includes the amount of cash and the amount of any lien, mortgage, contract, indebtedness or other encumbrance existing against the property to which the property remains subject or which the purchaser agrees to pay or assume. However, if the actual consideration consists of or includes other property or other value given or promised, neither the monetary value nor a description of such other property or value need be stated so long as it is noted on the face of the instrument that other property or value was either part or the whole consideration.

(2) The statement of consideration as required by subsection (1) of this section shall be made by a grantor or a grantee. Failure to make such statement does not invalidate the conveyance.

(3) If the statement of consideration is in the body of the instrument preceding the signatures, execution of the instrument shall constitute a certification of the truth of the statement. If there is a separate statement of consideration on the face of the instrument, it shall be signed separately from the instrument, and such execution shall constitute a certification of the truth of the statement by the person signing. No particular form is required for the statement so long as the requirements of this section are reasonably met.

(4) No instrument conveying or contracting to convey fee title to any real estate nor any memorandum of such an instrument shall be accepted for recording by any county clerk or recording officer in this state unless the statement of consideration required by this section is included on the face of the instrument.

(5) This section applies to instruments executed on or after January 1, 1968. [1967 c.462 §§1, 3; 1967 s.s. c.7 §1; 1977 c.605 §1]

93.040 Warning in instrument relating to approved uses of land; liability of drafter and recorder. (1) The following statement shall be included in the body of an instrument transferring or contracting to transfer fee title to real property: "THIS INSTRUMENT WILL NOT ALLOW USE OF THE PROPERTY DESCRIBED IN THIS INSTRUMENT IN VIOLATION OF APPLICABLE LAND USE LAWS AND REGULATIONS. BEFORE SIGNING OR ACCEPTING THIS INSTRUMENT, THE PERSON ACQUIRING FEE TITLE TO THE PROPERTY SHOULD CHECK WITH THE APPROPRIATE CITY OR COUNTY PLANNING DEPARTMENT TO VERIFY APPROVED USES."

(2) No action may be maintained against the county recording officer for recording an instrument that does not contain the statement required in subsection (1) of this section.

(3) No action may be maintained against any person for failure to include in the instrument, or for recording an instrument that does not contain the statement required in subsection (1) of this section, unless the person acquiring or agreeing to acquire fee title to the real property would not have executed or accepted the instrument but for the absence in the instrument of the statement required by subsection (1) of this section. No action may be maintained by the person acquiring or agreeing to acquire title to the real property

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against any person other than the person transferring or contracting to transfer fee title to the real property. [1983 c.718 §2; 1985 c.719 §1]

SPECIAL MATTERS IN PARTICULAR CONVEYANCES

93.110 Quitclaim deed sufficient to pass estate. A deed of quitclaim and release, of the form in common use, is sufficient to pass all the estate which the grantor could lawfully convey by a deed of bargain and sale.

93.120 Words of inheritance unnecessary to convey fee; conveyances deemed to convey all grantor's estate. The term "heirs," or other words of inheritance, is not necessary to create or convey an estate in fee simple. Any conveyance of real estate passes all the estate of the grantor, unless the intent to pass a lesser estate appears by express terms, or is necessarily implied in the terms of the grant.

93.130 Conveyance of land in adverse possession of another. No grant or conveyance of lands or interest therein is void for the reason that at the time of its execution the lands were in the actual possession of another claiming adversely.

93.140 Implied covenants. No covenant shall be implied in any conveyance of real estate, whether it contains special covenants or not, except as provided by ORS 93.850 to 93.870. [Amended by 1973 c.194 §6]

93.150 Conveyance by tenant of greater estate than that possessed. A conveyance made by a tenant for life or years, purporting to grant a greater estate than the tenant possesses or could lawfully convey, does not work a forfeiture of the estate of the tenant, but passes to the grantee all the estate which the tenant could lawfully convey.

93.160 Conveyance by reversioners and remaindermen to life tenant vests fee. Where real property has been devised to a person for life, and in case of the death of the life tenant without leaving lawful issue born alive and living at the time of death, then to other heirs of the testator, a conveyance to the life tenant from all reversioners or remaindermen and all issue of the life tenant as are in being, of all their interest in the real property, vests a fee simple estate in the life tenant.

93.170 [Repealed by 1969 c.591 §305]

93.180 Tenancy in common, when created; joint tenancy abolished. Every conveyance or devise of lands, or interest therein, made to two or more persons, other than to a husband and wife, as such, or to executors or trustees, as such, creates a tenancy in common unless it is in some manner clearly and expressly declared in the conveyance or devise that the grantees or devisees take the lands with right of survivorship. Such a declaration of a right to survivorship shall create a tenancy in common in the life estate with cross-contingent remainders in the fee simple. Joint tenancy is abolished and the use in a conveyance or devise of the words "joint tenants" or similar words without any other indication of an intent to create a right of survivorship shall create a tenancy in common. [Amended by 1983 c.555 §1]

93.190 Trustees or personal representatives as joint tenants; filling vacancies in office. (1) Every conveyance, deed of trust, mortgage or devise of an interest in or lien upon real or personal property to two or more persons as trustees or personal representatives, creates a joint tenancy in such interest or lien in the trustees or personal representatives unless it is expressly declared in the conveyance, deed of trust, mortgage or devise that the trustees or personal representatives shall take or hold the property as tenants in common or otherwise.

(2) If the conveyance, deed of trust, mortgage or devise provides for filling any vacancy in the office of trustee or personal representative, it may be filled as therein provided, but a court of competent jurisdiction may fill a vacancy in the trusteeship according to the established rules and principles of equity. In whichever way the vacancy is filled, the new trustee shall hold the property with all powers, rights and duties of an original trustee unless otherwise directed by conveyance, deed of trust, mortgage or devise, or order or decree of the court. [Amended by 1969 c.591 §275]

93.200 Trustees or executors now hold as joint tenants. All trustees or executors holding real or personal property in trust on May 19, 1905, hold as joint tenants and not as tenants in common unless the conveyance, deed of trust, mortgage or devise, or order or decree of court creating or appointing the trustees or executors has declared otherwise.

93.210 Presumption respecting deed from trustee of undisclosed beneficiary. If a deed to real estate has been made to a grantee in trust or designating the grantee as trustee, and no beneficiary is indicated or named in the deed, a deed thereafter executed by such grantee conveying the property is presumed to have been executed with full right and authority and conveys prima facie title to the property. The grantee

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OWNERS NOTIFIED OF PROPOSED LISTING ON THE INVENTORY OF
CONFIRMED RELEASES PURSUANT TO ORS 466.557(4)
****THIS IS NOT THE INVENTORY OF CONFIRMED RELEASES****
LIST SUBJECT TO CHANGE BASED ON OREGON LAW

SITE ID	SITE LOCATION	LEGAL OWNER(S)	SUBSTANCE(S)	STATUS OF REMEDIAL ACTION
666	John C. Taylor Lumber Sales, Inc. Rock Creek Road and Hwy. 18 Sheridan	Taylor Lumber and Treating, Inc.	pentachlorophenol tetrachlorophenol napthalene acenaphthene fluorene	
59	Johnson Controls - Globe Battery Divn. 800 N.W. 3rd Avenue Canby	Johnson Controls Inc.	lead sulfuric acid	RPIC
266	K-Lines, Inc 375 S.W. Boones Ferry Road Lake Oswego	Jamey E. Berry	lead	FIR
62	Koppers Company (Portland), Inc. 7540 N.W. St. Helen's Road Portland	Northwest Natural Gas	lead phenol, total ethylbenzene napthalene acenaphthene fluorene anthracene phenanthrene fluoranthene pyrene dibenzofuran	RPIC
131	Landa 4920 N.E. 122nd Avenue Portland	Pacific Realty Associates	sulfuric acid hydrofluoric acid Caustic solution	RPP

Koppers000339

SPECIAL WARRANTY DEED
(Corporate)

This Deed, made and entered into this _____ day of December, 1988, by and between KOPPERS COMPANY, INC., a corporation, organized and existing under the laws of the State of Delaware, party of the first part and KOPPERS INDUSTRIES, INC., a corporation organized and existing under the laws of the Commonwealth of Pennsylvania, party of the second part.

W I T N E S S E T H:

That the said party of the first part, conveys and specially warrants to the said party of the second part, the following described real property free of encumbrances created or suffered by the grantor except as specifically set forth herein: The real property, situated in the County of Multnomah, State of Oregon, to-wit:

THE LEGAL DESCRIPTION IS ATTACHED HERETO AS EXHIBIT "A"

This conveyance is made subject to all easements, convenants and conditions of record.

THIS INSTRUMENT WILL NOT ALLOW USE OF THE PROPERTY DESCRIBED IN THIS INSTRUMENT IN VIOLATION OF APPLICABLE LAND USE LAWS AND REGULATIONS. BEFORE SIGNING OR ACCEPTING THIS INSTRUMENT, THE PERSON ACQUIRING FEE TITLE TO THE PROPERTY SHOULD CHECK WITH THE APPROPRIATE CITY OR COUNTY PLANNING DEPARTMENT TO VERIFY APPROVED USES.

The true consideration for this conveyance is _____ _____ Dollars ($_____). (Here comply with the requirements of ORS 93.030.)

KOPPERS COMPANY, INC.
Grantor, Party of the First Part

By_____
Vice-President

Corporate Seal

Attest: _____
Corporate Secretary

COMMONWEALTH OF PENNSYLVANIA)
) ss.
_____ of _____)

On this ____ day of December, 1988, before me appeared _____ _____ to me personally known, who being duly sworn, did say that he, the said _____, is the Vice-President of KOPPERS COMPANY, INC., a corporation of the State of Delaware, and that the seal affixed to said instrument is the corporate seal of said corporation, and that the said instrument was signed and sealed in behalf of said corporation by authority of its Board of Directors, and _____ acknowledges said instrument to be the free act and deed of said corporation.

IN TESTIMONY WHEREOF, I have hereunto set my hand and affixed my official seal the day and year last above written.

(NOTARIAL SEAL)

_____
Notary Public for Oregon
My Commission expires:_____

AFTER RECORDING RETURN TO:

SEND TAX STATEMENTS TO:

TOOZE MARSHALL SHENKER HOLLOWAY & DUDEN

ATTORNEYS AT LAW
333 S. W. TAYLOR STREET
PORTLAND, OREGON 97204-2496

TELEPHONE (503) 223-5181
TELEX 9103508016 TOOZE UD
FACSIMILE (503) 223-5550

L. GUY MARSHALL
ARDEN E. SHENKER
CHAS R. HOLLOWAY, III
PAUL R. DUDEN
STEPHEN R. FRANK
WM. G. SHERIDAN, JR.
MICHAEL J. GENTRY
NEALE E. CREAMER**
WILLIAM P. HUTCHISON, JR.
ELIZABETH A. TRAINOR*
ERIC J. NEIMAN*
DAVID R. SIMON
MONTGOMERY W. COBB
ROBERT E. L. BONAPARTE***
MATTHEW K. ROSSMAN
JOHN OSTRANDER
MARK L. HUGLIN

ROBERT M. KERR
COUNSEL

LAMAR TOOZE
1895-1971

LAMAR TOOZE, JR.
1922-1985

ADMITTED IN OREGON
WASHINGTON*
CALIFORNIA**
NEW YORK***
WASHINGTON, D. C.***

December 29, 1988

The "Banks" Defined Below
Mellon Bank, N.A., Agent
One Mellon Bank Center
Pittsburgh, Pennsylvania 15258

Re: Koppers Industries, Inc.

Gentlemen:

We have acted as special counsel in the State of Oregon (together with political subdivisions thereof, the "State") for Koppers Industries, Inc. (the "Borrower") in connection with the Credit Agreement dated as of December ~~31~~, 1988 (the "Credit Agreement"), among the Borrower, ~~DAC Holdings Corporation (to be renamed~~ Koppers Holdings Corporation), Mellon Bank, N.A. ("Mellon") and Mellon Bank, N.A., as agent (the "Agent") for Mellon and the other financial institutions which hereafter may become parties thereto (together with Mellon, the "Banks"). Terms used herein which are defined in the Credit Agreement shall have the same meaning herein as therein provided unless the context hereof clearly otherwise requires.

We have examined executed copies of the Deed of Trust and Security Agreement (the Oregon ~~Mortgage~~) ~~Pledge and~~ Security Agreement, ~~and~~ the ~~Collateral~~ Assignment (collectively, the "Documents"). Deed of Trust; the Credit Agreement; and the Notes

We have also examined financing statements in the form of Exhibit A hereto (the "Financing Statements"). In making such examinations, we have assumed the genuineness of all signatures, the authenticity of all documents submitted to us as originals and the conformity to original documents of all documents submitted to us as certified, conformed or photostatic copies.

In rendering this opinion, we have assumed with your permission that (i) the Documents were duly authorized, executed and delivered by the respective parties thereto ~~in the form of the execution copies reviewed by us~~, that (ii) the Documents were negotiated by the various parties hereto in the Commonwealth of Pennsylvania and such documents were executed and delivered in

said Commonwealth, where the closing and the funding ~~are to take~~ place, and that (iii) the parties had the corporate power and authority to execute and deliver the ~~subject~~ documents.

Based upon the foregoing and subject to the qualifications hereinafter set forth, we are of the opinion that:

1. The Documents constitute legal, valid and binding obligations of the parties thereto other than the Mellon and the Agent (the "Loan Parties") and are enforceable in accordance with the terms thereof, except as the enforceability thereof may be limited by bankruptcy, insolvency or other similar laws of general application affecting the enforcement of creditors' rights or by general principles of equity limiting the availability of equitable remedies.

describe this

2. No authorization, consent (unless required of the lessor or of the Mortgaged Property Oregon's Public Utility Commission), approval, license, exemption or other action by, and no registration, qualification, designation, declaration or filing with, any Official Body of the State is or will be, as of the date of closing, necessary or advisable in connection with execution and delivery of the Documents, consummation of the transactions therein contemplated, or to ensure the legality, validity, enforceability and admissibility in evidence thereof, except as referred to in paragraphs 4 and 5 below. Based on oral advice from the Corporation Division of the Oregon Secretary of State's office, Koppers Industries, Inc. is not registered to transact business in Oregon. The borrower should register to do business in Oregon as a foreign corporation once the transaction is completed.

this should be done by now

3. Neither the execution and delivery of the Documents nor consummation of the transactions therein contemplated nor performance of or compliance with the terms and conditions thereof will violate any law or governmental rule or regulation of Oregon.

4. The Oregon ~~Mortgage~~ Deed of Trust is in proper form for execution under the laws of Oregon and is in proper form (a) for the creation of the Lien contemplated thereby on and against the Mortgaged Property (as defined in the ~~Mortgage~~) and (b) for recording in the Multnomah County Recorder's office. Under and pursuant to the Oregon ~~Mortgage~~ there has been granted to and created in favor of the Agent, for the ratable benefit of the Banks, as security for the Secured Obligations (as defined therein), a legal, valid and enforceable mortgage lien on, and security interest in, the Mortgaged Property described therein. When such

Oregon

Deed of Trust

Oregon ~~Mortgage~~ is duly recorded in the Multnomah County Recorder's office, such ~~Mortgage~~ shall constitute a fully perfected mortgage lien on, and security interest in, all real property (including fixtures) included in the Mortgaged Property; and when the Financing Statements have been filed in the offices listed on Exhibit B hereto, such ~~Mortgage~~ shall also constitute a fully perfected lien on, and security interest in, all personal property included in the Mortgaged Property.

Security Agreement

5. To the extent Oregon law may be applicable, under and pursuant to the ~~Oregon Mortgage~~ there has been granted to and created in favor of the Agent, for the ratable benefit of the Banks, as security for the Debt (as defined therein), a legal, valid and enforceable security interest in the Collateral (as defined therein) and, upon filing of the Financing Statements in the offices listed on Exhibit B hereto and the delivery to the Agent of any Documents and Instruments (as such terms are defined in such ~~Oregon Mortgage~~), will constitute a fully perfected lien on, and security interest in, the Collateral. The Financing Statements are in proper form for filing and for perfecting such security interest.

6. The ~~Oregon~~ Assignment is in proper form for execution under the laws of the State and is in proper form for the creation of the Lien contemplated thereby on and against the Agreement defined therein and the rights of the Borrower thereunder. Under and pursuant to the ~~Oregon~~ Assignment there has been granted to and created in favor of the Agent, for the ratable benefit of the Banks, as security for the due performance by the Borrower of its obligations under the Credit Agreement ~~(we have not seen or reviewed Schedule I or the Agreements referenced therein except for the ground lease)~~, the Notes and the Related Documents to which it is a party, a legal, valid and enforceable security interest on and against the Agreement defined therein and the rights of the Borrower thereunder.

7. The courts of Oregon will enforce the choice of law provisions contained in the Documents which expressly provide that the terms and provisions thereof will be governed by and construed in accordance with the laws of the Commonwealth of Pennsylvania except to the extent set forth in the proviso to Section 5.11 of the Oregon ~~Mortgages~~ Deed of Trust.

8. Neither the Agent nor any Bank is required to register or qualify as a foreign corporation, or to file any designation for service of process, in Oregon by reason of the transactions contemplated by the Documents.

to be met in order to create a lien in and to such Agreements.

We note that we have not reviewed the Agreements listed on Schedule I to the Assignment and express no opinion as to the requirements, if any, contained therein.

9. The transactions contemplated by the Documents will not subject the Agent or any Bank to any tax, assessment or other governmental charge under the laws of Oregon except for statutory, recording and filing fees to be paid upon the recording or filing of the Oregon ~~Mortgages~~ and the Financing Statements.

10. There is no Law of Oregon which would impose on a person whose interest in real or personal property situated within the State is limited to a collateral security interest an obligation to effect an environmental cleanup or fund the costs of an environmental cleanup with respect to any such property, except as hereinafter set forth.

11. Our review of the Deed of Trust ~~and Security Agreement~~ requires that we express the following additional opinions:

(i) Subparagraphs (i), (ii) and (iii) of Paragraph (a) on page 2 includes in the description of the "Land" property in which the Beneficiary will gain an interest only to the extent that the Borrower/~~Mortgagor~~ might have a legal interest or right to convey; we do not express any opinion as to whether or not the Grantor has any interest in rights of way, etc.; Similarly, Paragraph (e) on page 2 includes within Mortgaged Property certain rights issued by Official Bodies; we express no opinion as to whether Borrower has the ability to create a security interest in such rights.

(ii) ~~On page 4, paragraph 1.02, there is a reference to Schedule 1.02 which has not been furnished to us. Accordingly,~~ we would advise that the subject Land has been included in the proposed Oregon Department of Environmental Quality (DEQ) Inventory List of properties where there have been confirmed releases of hazardous wastes; this is pursuant to ~~ORS~~ 466.557(4). A copy of page 11 from that listing is enclosed and the status of the remedial action reference indicates that the site is currently being overseen by the DEQ for technical assistance to responsible party for investigation, cleanup, closure, or removal. The liability of Beneficiary for cleanup costs is limited to those situations where Beneficiary becomes an owner or operator of the property, a circumstance which might arise if Beneficiary foreclosed its interest in the property and "owned" or "operated" it.

(iii) The opinions expressed with respect to the Deed of Trust ~~and Security Agreement~~ are those which relate to state law; we have not and are not expressing any opinion with respect to the enforceability of provisions of the Deed of Trust ~~and Security Agreement~~ as those may be ~~determined by the general provisions of the Uniform Commercial Code adopted generally~~

Deed of Trust

~~throughout the country~~; for example, in paragraph 3.02(e), we do not express an opinion as to whether or not the Beneficiary may purchase at a private sale;

(iv) With respect to paragraph 2.18(c), we do not express any opinion as to whether or not an attempt by Grantor to alter the ground lease would be null and void as to the lessor.

(v) The Article 4, page 23 provisions with respect to a trustee may not be enforceable as against the trustee without the trustee's prior approval; We would note that the trustee is not a signatory to the Oregon ~~Mortgage~~;

(vi) With respect to Article 5, section 5.01, page 24, ORS 86.155, a copy of which is enclosed, appears to require that the first page of the Oregon ~~Mortgage~~ contain in the caption a reference to the fact that this is a "Line of Credit Mortgage" and that on the first page the term (if any) of the Deed of Trust and the maximum amount to be advanced be set forth. If these provisions are not included, it may jeopardize the availability of the real property as security for future advances.

Oregon

(vii) With respect to paragraph 3.02(g), the availability of this remedy will be subject to state law and Rule 67(F) of the Oregon Rules of Civil Procedure providing for judgment by stipulation.

We are members of the bar of Oregon and do not purport to be experts in the laws of any jurisdiction other than the State and the United States. To the extent Pennsylvania law applies to any of the matters on which we have opined, we have assumed that Pennsylvania law is the same as the State's law with respect to such matters.

All of our opinions expressed in this letter are specifically subject to and limited by the following:

(a) The effect of laws or court decisions relating to bankruptcy, insolvency, reorganization, liquidation, readjustment of debt or other laws or court decisions relating to or affecting the enforcement of creditors' rights generally, whether now or hereafter in effect; the effect of applicable court decisions, invoking statutes or principles of equity or public policy, which hold that certain covenants or provisions of agreements are unenforceable where, for example, the breach of such covenants or provisions imposes restrictions or burdens upon the party thereto and it cannot be demonstrated that the imposition of such restrictions or burdens is reasonably necessary for the protection of the other party, or where the enforcement of such covenants or provisions would violate the covenant of good faith and fair dealing or other public policy implied under law.

(b) The effect of general principles of equity or public policy (regardless of whether considered in a proceeding at law or in equity) which, among other things may limit the enforceability of waivers of rights or the availability of specific performance, appointment of a receiver, injunctive relief or other equitable remedies.

(c) The unenforceability under certain circumstances, under state or federal law or court decisions of provisions indemnifying a party against liability for its own wrongful or negligent acts, requiring contribution to such party under such circumstances or where indemnification or contribution is otherwise contrary to public policy.

This opinion is intended solely for the use of the Agent and the Bank, ~~its~~ successors and assigns in connection with the transactions discussed herein, and is not to be used, released, quoted or relied upon by anyone else or for any other purpose without our prior written consent. The information set forth in this letter is as of the date hereof, and we assume no obligation to advise ~~Bank~~ the addressees of changes, whether or not deemed material, which may hereafter come to our attention.

Very truly yours,

William P. Hutchison, Jr.

WPH:kd

Enc.
cc: Steven B. Larchuk
Mary Jo Potter, REED SMITH SHAW & McCLAY

STATE OF OREGON

UNIFORM COMMERCIAL CODE—FINANCING STATEMENT—FORM UCC-1

SECRETARY OF STATE

INSTRUCTIONS:

1. PLEASE TYPE THIS FORM.
2. Read all instructions carefully. Failure to provide complete and legible information may result in the rejection of the filing document
3. This financing statement is effective for a period of 5 or 10 years. Indicate the effective period that pertains to your filing by checking either box 5A or 5B. If neither box is checked, the filing document will be regarded as applicable to a 5 year effective period.
4. Enclose fee of $3.75 per debtor name listed plus $2 per identified trade name. If checking the 10 Year Effective Period box (5B), enclose an additional $10.
5. This form must be signed by the Debtor(s) unless the statement pertains to one of the exceptions listed under ORS 79.4020. If filing without the Debtor(s) signature, the Secured Party should indicate specifically by checking one of the boxes provided for in item No. 6.
6. Send the Alphabetical, Numerical and Acknowledgment copies with the interleaved carbons intact to the filing officer. The Debtor(s) and Secured Party(ies) copies are retained by the party making the filing.
7. If the space provided for any item(s) on the form is inadequate, submit additional information on 5" x 8" sheets. Only one copy of such additional sheets need be presented to the filing officer. Long schedules of collateral, indentures, etc., may be on any size paper that is convenient for the filer. DO NOT STAPLE OR TAPE ANYTHING TO THE LOWER PORTION OF THIS FORM.
8. At the time of original filing, filing officer will return the acknowledgment copy to the assignee or secured party. If the secured party requires acknowledgment of long schedules of collateral, two copies should be presented and one will be returned.
9. When a filing is to be terminated the acknowledgment copy may be sent to the filing officer signed by the secured party or assignee, or use Form UCC-3 as a Termination Statement.
10. Submit this form to: Secretary of State, UCC Section, Capitol Bldg., Rm 41, Salem, OR 97310 (Tele. 503-378-4146)

This Financing Statement is presented to filing officer pursuant to the Uniform Commercial Code. This statement remains effective for a period of five years (unless 10 year option is noted) from the date of filing, subject to extensions for additional periods of five years by refiling or filing a continuation statement (UCC-3) within six months prior to the expiration date.

1A. Debtor(s): (If individual(s) last name first)	2A. Secured Party(ies)	Reserved For Filing Officer Use Only
Koppers Industries, Inc.	Mellon Bank, N.A., Agent	
1B. Mailing Address(es): *Koppers Building 436 Seventh Avenue Pittsburgh, PA 15219	2B. Address of Secured Party from which security information is obtainable One Mellon Bank Center Pittsburgh, PA 15258-0001 Tele. No. _____	

3. This financing statement covers the following types (or items) of collateral (ORS 79.4020)

No. of additional Sheets attached _____

See Exhibit "A"

*Debtor's Oregon address is:
7900 SW St. Helens Road
Portland, Oregon

4A. Assignee of Secured Party(ies) if any:

4B. Address of Assignee:

5. Filer: INDICATE WHETHER DOCUMENT IS BEING FILED WITH AN EFFECTIVE PERIOD OF (check box) 5A. ☐ 5 YEARS or 5B. ☐ 10 YEARS (Read instructions 3 & 4)

6. This statement is filed without the debtor's signature to perfect a security interest in collateral (if applicable check box below):
   - ☐ collateral already subject to a security interest in another jurisdiction;
   - ☐ which is proceeds of the described original collateral which was perfected;
   - ☐ collateral as to which the filing has lapsed; or
   - ☐ collateral acquired after a change of name, identity or corporate structure of the debtor.

By: _____
Signature(s) of Debtor(s) or
Signature(s) of Secured Party(ies) or Assignee(s)

STANDARD FORM—UNIFORM COMMERCIAL CODE—FORM UCC-1
01-01-88

STEVENS-NESS LAW PUBLISHING CO., PORTLAND, OR. 97204 - 223-3137

FILING OFFICER – ALPHABETICAL

EXHIBIT A

All right, title and interest of Debtor now owned or held or hereafter acquired or arising in and to the following:

(a) all buildings, structures and other improvements (collectively, the "Improvements") now or hereafter erected or placed on the land and premises described in Exhibit B hereto (the "Land");

(b) all machinery, apparatus, equipment, fittings, fixtures, goods, chattels and other articles of personal property now or hereafter located on, attached to or used in connection with the Land or the Improvements, and all replacements thereof, additions thereto and substitutions therefor (all of the foregoing, being hereinafter collectively called the "Equipment"), together with all deposits or payments made on any Equipment in connection with the conditional purchase thereof and all leases by Debtor as lessee of Equipment;

(c) all licenses, permits, authorizations and agreements from governmental authorities relating to the ownership, construction, occupancy, operation, management or use of the Land, the Improvements or the Equipment;

(d) all contracts, licenses and agreements relating to the ownership, design, construction, occupancy, operation, management or use of the Land, the Improvements or the Equipment;

(e) all the remainder or remainders, reversion or reversions, rents, revenues, issues, profits, royalties, income and other benefits derived from any of the foregoing;

(f) all proceeds of the conversion, voluntary or involuntary, of any of the foregoing into cash or liquidated claims, including all proceeds of insurance; and

(g) all proceeds, both cash and non-cash, of any and all of the foregoing.

(h) All of Debtor's present and future rights, title and interest in and to the following property, whether now owned or held or hereafter existing or acquired and wherever located: all property and assets of Debtor, including without limitation all accounts, contract rights, chattel paper, equipment, inventory, instruments, documents and general intangibles (as such terms are defined in the Uniform Commercial Code); and all products and proceeds, both cash and non-cash, of the foregoing.

INSTRUCTIONS:

STATE OF OREGON MULTNOMAH COUNTY RECORDER'S OFFICE

1. PLEASE TYPE THIS FORM. **UNIFORM COMMERCIAL CODE—FINANCING STATEMENT—REAL PROPERTY—FORM UCC-1A**
2. Enclose fee of $3.75 per name listed plus $2.00 per trade name.
3. Send the Alphabetical, Numerical and Acknowledgment copies with interleaved carbon paper intact to the filing officer. The Debtor(s) and Secured Party(ies) copies are retained by party making the filing.
4. If the space provided for any item(s) on the form is inadequate, the item(s) should be continued on additional sheets, size 5" x 8". Only one copy of such additional sheets need be presented to the filing officer. Long schedules of collateral, indentures, etc. may be on any size paper that is convenient for the secured party. **DO NOT STAPLE OR TAPE ANYTHING TO LOWER PORTION OF THIS FORM.**
5. The Form UCC-1A should be filed with the county filing officers who record real estate mortgages.
6. At the time of original filing, filing officer will return acknowledgment copy to the assignee if noted on form or secured party.
7. When a copy of the security agreement is used as a financing statement, it is requested that it be accompanied by a completed UCC-21 form.
8. When filing is to be terminated the acknowledgment copy may be sent to the filing officer signed by the secured party or assignee or he may use Form UCC—3 or UCC-3A as a Termination Statement.

THIS FINANCING STATEMENT is presented to filing officer pursuant to the Uniform Commercial Code

1A. Debtor(s):	2A. Secured Party(ies):	Filing Officer Use Only
Koppers Industries, Inc.	Mellon Bank, N.A., Agent	
1B. Mailing Address(es):	2B. Address of Secured Party from which security information obtainable:	
Koppers Building 436 Seventh Avenue Pittsburgh, PA 15219	One Mellon Bank Center Pittsburgh, PA 15258-0001	

3. This financing statement covers the following types (or items) of property:

(The goods are to become fixtures on Ex. B) (The above timber is standing on _____) (The above minerals or the like (including gas and oil) or accounts will be financed at the wellhead or minehead of the well or mine located on _____) (Strike what is inapplicable) (Describe real estate)

See Exhibit A for description of property
See Exhibit B for legal description of real property

4A. Assignee of Secured Party(ies) if any:

4B. Address of Assignee from which security information obtainable:

And the financing statement is to be filed in the real estate records. If the debtor does not have an interest of records, the name of record owner is:

Check box if products of collateral are also covered [X] No. of additional sheets attached [ ]

File with: [X] COUNTY REAL ESTATE FILING OFFICER Multnomah COUNTY

*Signature(s) of Debtor(s) required in most cases.

Signature(s) of Secured Party(ies) in cases covered by ORS 79.4020.

By: _____
Signature(s) of Debtor(s)*
Signature of Secured Party(ies) or Assignee(s)

FILING OFFICER — ALPHABETICAL

This form of Financing Statement approved by Secretary of State.

STEVENS-NESS LAW PUBLISHING CO., PORTLAND, OR. 972

STANDARD FORM—UNIFORM COMMECIAL CODE

9/1/81

EXHIBIT A

All right, title and interest of Debtor now owned or held or hereafter acquired or arising in and to the following:

(a) all buildings, structures and other improvements (collectively, the "Improvements") now or hereafter erected or placed on the land and premises described in Exhibit B hereto (the "Land");

(b) all machinery, apparatus, equipment, fittings, fixtures, goods, chattels and other articles of personal property now or hereafter located on, attached to or used in connection with the Land or the Improvements, and all replacements thereof, additions thereto and substitutions therefor (all of the foregoing, being hereinafter collectively called the "Equipment"), together with all deposits or payments made on any Equipment in connection with the conditional purchase thereof and all leases by Debtor as lessee of Equipment;

(c) all licenses, permits, authorizations and agreements from governmental authorities relating to the ownership, construction, occupancy, operation, management or use of the Land, the Improvements or the Equipment;

(d) all contracts, licenses and agreements relating to the ownership, design, construction, occupancy, operation, management or use of the Land, the Improvements or the Equipment;

(e) all the remainder or remainders, reversion or reversions, rents, revenues, issues, profits, royalties, income and other benefits derived from any of the foregoing;

(f) all proceeds of the conversion, voluntary or involuntary, of any of the foregoing into cash or liquidated claims, including all proceeds of insurance; and

(g) all proceeds, both cash and non-cash, of any and all of the foregoing.

(h) All of Debtor's present and future rights, title and interest in and to the following property, whether now owned or held or hereafter existing or acquired and wherever located: all property and assets of Debtor, including without limitation all accounts, contract rights, chattel paper, equipment, inventory, instruments, documents and general intangibles (as such terms are defined in the Uniform Commercial Code); and all products and proceeds, both cash and non-cash, of the foregoing.

EXHIBIT B

TAR PRODUCTS

Production Facility

Portland, Oregon Terminal

LEGAL DESCRIPTION

PARCEL I:

That portion of Sections 12 and 13, Township 1 North, Range 1 West of the Willamette Meridian lying within the W.W. Baker Donation Land Claim, in the City of Portland, County of Multnomah and State of Oregon, described as follows:

Beginning at the point of intersection of the centerline of the Spokane, Portland, and Seattle Railroad and the East line of the W.W. Baker Donation Land Claim; thence North 32°00' East, 162.55 feet to a fence corner at the true point of beginning; thence continuing North 32°00' East along a fence 456.40 feet to a fence corner; thence North 29°58'00" West 150.40 feet; thence North 33°37'00" West 147.88 feet; thence North 49°51'00" West 139.00 feet to a hub; thence South 56°29'00" West 265.15 feet to a nail; thence North 33°13'00" West 260.70 feet to a railroad spike at a point known as point "A"; thence South 56°29'00" West 111.55 feet to a railroad spike; thence South 31°12'30" East 102.90 feet; thence South 56°46'00" West 38.57 feet; thence South 33°14'00" East 36.00 feet; thence South 56°46'00" West 9.00 feet; thence South 33°14'00" East 106.58 feet to a hub; thence South 25°44'30" West 10.51 feet to a hub; thence South 56°24'30" West 54.40 feet; thence South 33°05'30" East 277.30 feet; thence North 56°51'00" East 34.30 feet; thence South 75°03'00" East 34.55 feet; thence South 47°41'30" East 190.00 feet to a nail; thence South 35°16'30" East 140.05 feet to the true point of beginning.

EXCEPT a 30 foot strip of land parallel and contiguous with the East line of the W.W. Baker DLC in Sections 12 and 13, Township 1 North, Range 1 West, said strip of land being 30 feet Westerly of the said DLC line and more particularly described as: Beginning at a point 162.55 feet North 32° East from the intersection of the centerline of the SP & S Railway with the East line of the said Baker DLC; thence North 32° East 456.4 feet; thence North 29°58' West 34 feet; thence South 32° West 459.8 feet; thence South 35°16'30" East 32.5 feet to the point of beginning. ALSO EXCEPT rights of the public to part in City street.

PARCEL II:

That portion of Section 12, Township 1 North, Range 1 West of the Willamette Meridian lying within the W.W. Baker Donation Land

Claim, in the City of Portland, County of Multnomah and State of Oregon, described as follows:

Beginning at a point 769.61 feet North and 365.57 feet West of a tack marking the point of intersection of the centerline of the SP&S Railway with the Southeasterly line of the W.W. Baker DLC in said Township and Range; thence South 56°46' West 70.52 feet; thence South 33°05'30" East 149 feet; thence North 56°24'30" East 54.4 feet; thence North 25°44'30" East 10.51 feet; thence North 33°14' West 106.58 feet; thence North 56°46' East 9 feet; thence North 33°14' West 36 feet to the point of beginning.

EXHIBIT "B"

	Location to be filed
FORM UCC-1	Secretary of State UCC Division, Room 41 State Capitol Salem, Oregon 97310 (503) 378-4146
FORM UCC-1A Cost $5 per page	Multnomah County Recorder's Office 610 SW Alder, Room 300 Portland, Oregon 97205 (503) 248-3034

with a particular loan which sets forth the terms upon which the loan will be made. "Loan agreement" does not include a mortgage or trust deed which secures a promissory note. Nothing in this section shall be deemed to require a lender to issue a loan agreement.

(4) This section does not apply to any loan agreement executed on or before September 13, 1967, or any loan not primarily for personal, family or household use. [1967 c.336 §§1, 2; 1987 c.716 §3]

86.155 Line of credit mortgage; required terms; procedures. (1) As used in this section, "line of credit mortgage" means a mortgage or trust deed which secures a credit agreement, including subsequent optional or obligatory advances, up to a stated amount, provided that the front page of the mortgage or trust deed:

(a) Contains the legend "line of credit mortgage" either in capital letters or underscored above the body of the mortgage or trust deed;

(b) States the maximum amount to be advanced pursuant to the credit agreement; and

(c) States the term, if any, of the credit agreement.

(2) Advances, at any time, pursuant to the credit agreement shall have the same priority as established by the date of recording of any line of credit mortgage recorded under this section.

(3) The debtor may limit the indebtedness secured by a line of credit mortgage to the amount of the credit outstanding by delivering a notice by personal service upon the mortgage holder by certified mail, return receipt requested, to the mortgage holder at the address given for payment or, if none, to the address of the mortgage holder indicated in the mortgage. To be sufficient to limit indebtedness under this subsection, the notice must:

(a) State that it is made under this section;

(b) Contain the legal description in the line of credit mortgage or the street address of the real property;

(c) Provide the information necessary to locate the line of credit mortgage in the public record;

(d) State the debtor's intention to limit the amount of credit secured by the line of credit mortgage to the amount owed at the time the notice is received;

(e) State the date sent; and

(f) Be signed and acknowledged by all debtors obligated under the line of credit mortgage.

(4) Not later than the 20th day after receipt of the notice described in subsection (3) of this section, the mortgage holder shall:

(a) Indorse on the notice, or on an addendum to the notice, the principal amount of the indebtedness secured by the line of credit mortgage on the date the mortgage holder received notice;

(b) Sign and acknowledge the notice or the addendum, if applicable; and

(c) Record the notice and addendum in the public record where the line of credit mortgage was originally recorded.

(5) If the mortgage holder fails to record the notice and addendum, if applicable, within the time period specified in subsection (4) of this section, the debtor may record the notice in the public record where the line of credit mortgage was originally recorded, together with proof of receipt by, or personal delivery to, the mortgage holder.

(6) Notwithstanding subsection (3) of this section, the line of credit mortgage shall continue to have priority as of its date of recording as to:

(a) All advances, including any advance the creditor is required to honor, that was made before a notice under subsection (3) of this section is received;

(b) Interest, lawful charges and any amounts advanced, including reasonable attorney fees, following the debtor's default, to protect the security; and

(c) All advances made after a notice under subsection (3) of this section is received which are within the amount owed at the time the notice under subsection (3) of this section is given. [1987 c.716 §4]

Note: 86.155 was enacted into law by the Legislative Assembly but was not added to or made a part of ORS chapter 86 or any series therein by legislative action. See Preface to Oregon Revised Statutes for further explanation.

LATE CHARGES

86.160 Definitions for ORS 86.160 to 86.185. As used in ORS 86.160 to 86.185:

(1) "Late charge" means a sum payable by a mortgagor to the holder of a mortgage pursuant to a note or mortgage to compensate the holder for servicing and other costs attributable to the receipt of mortgage payments [illegible] after the date upon which payment is due.

(2) "Mortgagor" includes the grantor under a deed of trust.

(3) "Mortgage" includes a deed of trust.

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GENERAL REQUIREMENTS FOR DISPOSITION OF REALTY

93.010 Conveyances, how made. Conveyances of lands, or of any estate or interest therein, may be made by deed, signed by the person of lawful age from whom the estate or interest is intended to pass, or by the lawful agent or attorney of the person, and acknowledged or proved, and recorded without any other act or ceremony. No seal of the grantor, corporate or otherwise, shall be required on the deed. [Amended by 1965 c.502 §4]

93.020 Creating, transferring or declaring estates or interests in realty. (1) No estate or interest in real property, other than a lease for term not exceeding one year, nor any trust or power concerning such property, can be created, transferred or declared otherwise than by operation of law or by a conveyance or other instrument in writing, subscribed by the party creating, transferring or declaring it, or by the lawful agent of the party under written authority, and executed with such formalities as are required by law.

(2) This section does not affect the power of a testator in the disposition of real property by a last will and testament, nor to prevent a trust from arising or being extinguished by implication or operation of law, nor to affect the power of a court to compel the specific performance of an agreement in relation to such property.

93.030 Contracts to convey, instruments of conveyance and related memoranda to state consideration. (1) All instruments conveying or contracting to convey fee title to any real estate, and all memoranda of such instruments, shall state on the face of such instruments the true and actual consideration paid for such transfer, stated in terms of dollars. As used in this section, "consideration" includes the amount of cash and the amount of any lien, mortgage, contract, indebtedness or other encumbrance existing against the property to which the property remains subject or which the purchaser agrees to pay or assume. However, if the actual consideration consists of or includes other property or other value given or promised, neither the monetary value nor a description of such other property or value need be stated so long as it is noted on the face of the instrument that other property or value was either part or the whole consideration.

(2) The statement of consideration as required by subsection (1) of this section shall be made by a grantor or a grantee. Failure to make such statement does not invalidate the conveyance.

(3) If the statement of consideration is in the body of the instrument preceding the signatures, execution of the instrument shall constitute a certification of the truth of the statement. If there is a separate statement of consideration on the face of the instrument, it shall be signed separately from the instrument, and such execution shall constitute a certification of the truth of the statement by the person signing. No particular form is required for the statement so long as the requirements of this section are reasonably met.

(4) No instrument conveying or contracting to convey fee title to any real estate nor any memorandum of such an instrument shall be accepted for recording by any county clerk or recording officer in this state unless the statement of consideration required by this section is included on the face of the instrument.

(5) This section applies to instruments executed on or after January 1, 1968. [1967 c.462 §§1, 3; 1967 s.s. c.7 §1; 1977 c.605 §1]

93.040 Warning in instrument relating to approved uses of land; liability of drafter and recorder. (1) The following statement shall be included in the body of an instrument transferring or contracting to transfer fee title to real property: "THIS INSTRUMENT WILL NOT ALLOW USE OF THE PROPERTY DESCRIBED IN THIS INSTRUMENT IN VIOLATION OF APPLICABLE LAND USE LAWS AND REGULATIONS. BEFORE SIGNING OR ACCEPTING THIS INSTRUMENT, THE PERSON ACQUIRING FEE TITLE TO THE PROPERTY SHOULD CHECK WITH THE APPROPRIATE CITY OR COUNTY PLANNING DEPARTMENT TO VERIFY APPROVED USES."

(2) No action may be maintained against the county recording officer for recording an instrument that does not contain the statement required in subsection (1) of this section.

(3) No action may be maintained against any person for failure to include in the instrument, or for recording an instrument that does not contain the statement required in subsection (1) of this section, unless the person acquiring or agreeing to acquire fee title to the real property would not have executed or accepted the instrument but for the absence in the instrument of the statement required by subsection (1) of this section. No action may be maintained by the person acquiring or agreeing to acquire title to the real property

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against any person other than the person transferring or contracting to transfer fee title to the real property. [1983 c.718 §2; 1985 c.719 §1]

SPECIAL MATTERS IN PARTICULAR CONVEYANCES

93.110 Quitclaim deed sufficient to pass estate. A deed of quitclaim and release, of the form in common use, is sufficient to pass all the estate which the grantor could lawfully convey by a deed of bargain and sale.

93.120 Words of inheritance unnecessary to convey fee; conveyances deemed to convey all grantor's estate. The term "heirs," or other words of inheritance, is not necessary to create or convey an estate in fee simple. Any conveyance of real estate passes all the estate of the grantor, unless the intent to pass a lesser estate appears by express terms, or is necessarily implied in the terms of the grant.

93.130 Conveyance of land in adverse possession of another. No grant or conveyance of lands or interest therein is void for the reason that at the time of its execution the lands were in the actual possession of another claiming adversely.

93.140 Implied covenants. No covenant shall be implied in any conveyance of real estate, whether it contains special covenants or not, except as provided by ORS 93.850 to 93.870. [Amended by 1973 c.194 §6]

93.150 Conveyance by tenant of greater estate than that possessed. A conveyance made by a tenant for life or years, purporting to grant a greater estate than the tenant possesses or could lawfully convey, does not work a forfeiture of the estate of the tenant, but passes to the grantee all the estate which the tenant could lawfully convey.

93.160 Conveyance by reversioners and remaindermen to life tenant vests fee. Where real property has been devised to a person for life, and in case of the death of the life tenant without leaving lawful issue born alive and living at the time of death, then to other heirs of the testator, a conveyance to the life tenant from all reversioners or remaindermen and all issue of the life tenant as are in being, of all their interest in the real property, vests a fee simple estate in the life tenant.

93.170 [Repealed by 1969 c.591 §305]

93.180 Tenancy in common, when created; joint tenancy abolished. Every conveyance or devise of lands, or interest therein, made to two or more persons, other than to a husband and wife, as such, or to executors or trustees, as such, creates a tenancy in common unless it is in some manner clearly and expressly declared in the conveyance or devise that the grantees or devisees take the lands with right of survivorship. Such a declaration of a right to survivorship shall create a tenancy in common in the life estate with cross-contingent remainders in the fee simple. Joint tenancy is abolished and the use in a conveyance or devise of the words "joint tenants" or similar words without any other indication of an intent to create a right of survivorship shall create a tenancy in common. [Amended by 1983 c.555 §1]

93.190 Trustees or personal representatives as joint tenants; filling vacancies in office. (1) Every conveyance, deed of trust, mortgage or devise of an interest in or lien upon real or personal property to two or more persons as trustees or personal representatives, creates a joint tenancy in such interest or lien in the trustees or personal representatives unless it is expressly declared in the conveyance, deed of trust, mortgage or devise that the trustees or personal representatives shall take or hold the property as tenants in common or otherwise.

(2) If the conveyance, deed of trust, mortgage or devise provides for filling any vacancy in the office of trustee or personal representative, it may be filled as therein provided, but a court of competent jurisdiction may fill a vacancy in the trusteeship according to the established rules and principles of equity. In whichever way the vacancy is filled, the new trustee shall hold the property with all powers, rights and duties of an original trustee unless otherwise directed by conveyance, deed of trust, mortgage or devise, or order or decree of the court. [Amended by 1969 c.591 §275]

93.200 Trustees or executors now hold as joint tenants. All trustees or executors holding real or personal property in trust on May 19, 1905, hold as joint tenants and not as tenants in common unless the conveyance, deed of trust, mortgage or devise, or order or decree of court creating or appointing the trustees or executors has declared otherwise.

93.210 Presumption respecting deed from trustee of undisclosed beneficiary. If a deed to real estate has been made to a grantee in trust or designating the grantee as trustee, and no beneficiary is indicated or named in the deed, a deed thereafter executed by such grantee conveying the property is presumed to have been executed with full right and authority and conveys prima facie title to the property. The grantee

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SPECIAL WARRANTY DEED
(Corporate)

This Deed, made and entered into this _____ day of December, 1988, by and between KOPPERS COMPANY, INC., a corporation, organized and existing under the laws of the State of Delaware, party of the first part and KOPPERS INDUSTRIES, INC., a corporation organized and existing under the laws of the Commonwealth of Pennsylvania, party of the second part.

W I T N E S S E T H:

That the said party of the first part, conveys and specially warrants to the said party of the second part, the following described real property free of encumbrances created or suffered by the grantor except as specifically set forth herein: The real property, situated in the County of Multnomah, State of Oregon, to-wit:

THE LEGAL DESCRIPTION IS ATTACHED HERETO AS EXHIBIT "A"

This conveyance is made subject to all easements, convenants and conditions of record.

THIS INSTRUMENT WILL NOT ALLOW USE OF THE PROPERTY DESCRIBED IN THIS INSTRUMENT IN VIOLATION OF APPLICABLE LAND USE LAWS AND REGULATIONS. BEFORE SIGNING OR ACCEPTING THIS INSTRUMENT, THE PERSON ACQUIRING FEE TITLE TO THE PROPERTY SHOULD CHECK WITH THE APPROPRIATE CITY OR COUNTY PLANNING DEPARTMENT TO VERIFY APPROVED USES.

The true consideration for this conveyance is _____ _____ Dollars ($_____). (Here comply with the requirements of ORS 93.030.)

KOPPERS COMPANY, INC.
Grantor, Party of the First Part

By_____
Vice-President

Corporate Seal

Attest: _____
Corporate Secretary

COMMONWEALTH OF PENNSYLVANIA)
) ss.
_____ of _____)

On this ____ day of December, 1988, before me appeared _____ _____ to me personally known, who being duly sworn, did say that he, the said _____, is the Vice-President of KOPPERS COMPANY, INC., a corporation of the State of Delaware, and that the seal affixed to said instrument is the corporate seal of said corporation, and that the said instrument was signed and sealed in behalf of said corporation by authority of its Board of Directors, and _____ acknowledges said instrument to be the free act and deed of said corporation.

IN TESTIMONY WHEREOF, I have hereunto set my hand and affixed my official seal the day and year last above written.

(NOTARIAL SEAL)

_____
Notary Public for Oregon
My Commission expires:_____

AFTER RECORDING RETURN TO:

SEND TAX STATEMENTS TO:

OWNERS NOTIFIED OF PROPOSED LISTING ON THE INVENTORY OF
CONFIRMED RELEASES PURSUANT TO ORS 466.557(4)
****THIS IS NOT THE INVENTORY OF CONFIRMED RELEASES****
LIST SUBJECT TO CHANGE BASED ON OREGON LAW

SITE ID	SITE LOCATION	LEGAL OWNER(S)	SUBSTANCE(S)	STATUS OF REMEDIAL ACTION
666	John C. Taylor Lumber Sales, Inc. Rock Creek Road and Hwy. 18 Sheridan	Taylor Lumber and Treating, Inc.	pentachlorophenol tetrachlorophenol napthalene acenaphthene fluorene	
59	Johnson Controls - Globe Battery Divn. 800 N.W. 3rd Avenue Canby	Johnson Controls Inc.	lead sulfuric acid	RPIC
266	K-Lines, Inc 375 S.W. Boones Ferry Road Lake Oswego	Jamey E. Berry	lead	FIR
62	Koppers Company (Portland), Inc. 7540 N.W. St. Helen's Road Portland	Northwest Natural Gas	lead phenol, total ethylbenzene napthalene acenaphthene fluorene anthracene phenanthrene fluoranthene pyrene dibenzofuran	RPIC
131	Landa 4920 N.E. 122nd Avenue Portland	Pacific Realty Associates	sulfuric acid hydrofluoric acid Caustic solution	RPP

Koppers000358

TOOZE MARSHALL SHENKER HOLLOWAY & DUDEN
ATTORNEYS AT LAW
333 S. W. TAYLOR STREET
PORTLAND, OREGON 97204-2496
TELEPHONE (503) 223-5181
TELEX 910350801B TOOZE UD
FACSIMILE (503) 223-5550

L. GUY MARSHALL
ARDEN E. SHENKER
CHAS. R. HOLLOWAY, III
PAUL R. DUDEN
STEPHEN R. FRANK
WM. D. SHERIDAN, JR.
MICHAEL J. GENTRY
NEALE E. CREAMER**
WILLIAM R. HUTCHISON, JR.
ELIZABETH A. TRAINOR*
ERIC J. NEIMAN*
DAVID R. SIMON
MONTGOMERY W. COBB
ROBERT E. L. BONAPARTE***
MATTHEW K. ROSSMAN
JOHN OSTRANDER
MARK L. HUGLIN

ROBERT M. KERR
COUNSEL

LAMAR TOOZE
(1908-1971)

LAMAR TOOZE, JR.
(1922-1988)

ADMITTED IN OREGON
WASHINGTON*
CALIFORNIA**
NEW YORK***
WASHINGTON, D. C.***

TELECOPY COVER LETTER

TO: Steven B Sarchet

OF: Dickie McCamey + Chilcote

FROM: William P Hutchison

RE: Koppers Industries, Inc.

DATE: 1/26/89 TIME: 4:15

NO. OF PAGES (INCLUDING THIS PAGE): 7.

CLIENT NO. _____ PHONE NO. CALLED: 414 3926367.

IF YOU DO NOT RECEIVE ALL PAGES, PLEASE CALL: Martha

AT (503) 223-5181, EXT. 313. TELECOPY PHONE NO.: 223-5550.

MESSAGE: Please call Mr Hutchison, once you have had a chance to review the enclosed letter, with your approval or any changes

(Thank you)!

Martha

TOOZE MARSHALL SHENKER HOLLOWAY & DUDEN
ATTORNEYS AT LAW
333 S. W. TAYLOR STREET
PORTLAND, OREGON 97204-2496

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MONTGOMERY W. COSS
ROBERT E. L. BONAPARTE***
MATTHEW K. ROSSMAN
JOHN OSTRANDER
MARK L. HUGLIN

ROBERT M. KERR
COUNSEL

LAMAR TOOZE
1868-1971

LAMAR TOOZE, JR.
1922-1985

ADMITTED IN OREGON
WASHINGTON*
CALIFORNIA**
NEW YORK***
WASHINGTON, D.C.***

TELECOPY COVER LETTER

TO: Steven B. Larchuk and Lu Ann Datesh

OF: Dickie, McCamey & Chilcote

FROM: William P. Hutchison, Jr.

RE: Koppers

DATE: 12/27/88 TIME: 3:12

NO. OF PAGES (INCLUDING THIS PAGE): 17

CLIENT NO. 880021 PHONE NO. CALLED: 412/392-5367

IF YOU DO NOT RECEIVE ALL PAGES, PLEASE CALL: Kam

AT (503) 223-5181, EXT. 312 TELECOPY PHONE NO.: 223-5550.

MESSAGE:

TOOZE MARSHALL SHENKER HOLLOWAY & DUDEN
ATTORNEYS AT LAW
333 S. W. TAYLOR STREET
PORTLAND, OREGON 97204-2495
TELEPHONE (503) 223-5181
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L. GUY MARSHALL
ARDEN E. SHENKER
CHAS. R. HOLLOWAY, III
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WM. G. SHERIDAN, JR.
MICHAEL J. GENTRY
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MONTGOMERY W. COBB
ROBERT E. L. BONAPARTE***
MATTHEW K. ROSSMAN
JOHN OSTRANDER
MARK L. HUGLIN

ROBERT H. KERR
COUNSEL

LAMAR TOOZE
1895-1971

LAMAR TOOZE, JR.
1922-1985

ADMITTED IN OREGON
WASHINGTON*
CALIFORNIA**
NEW YORK***
WASHINGTON, D. C.****

December 27, 1988

Mr. Steven B. Larchuk
Ms. Lu Ann Datesh
Dickie, McCamey & Chilcote
Attorneys at Law
Suite 400
Two PPG Place
Pittsburgh, PA 15222-5402

Dear Steve and Lu Ann:

Re: Koppers Company, Inc. to
Kopper Industries, Inc. transaction

For your review and approval, I enclose a copy of our draft response to your December 20, 1988 letter. In the event one is needed, I am also enclosing a revised draft of the form of Special Warranty Deed which we have prepared. For your reference and information, a copy of our draft opinion letter to the Mellon Bank is also enclosed.

Please telephone me with your approval, questions, or proposed modifications.

Very truly yours,

Mark L. Huglin for

William P. Hutchison, Jr.

WPH:jc

Enclosure

DRAFT

SPECIAL WARRANTY DEED
(Corporate)

This Deed, made and entered into this _____ day of December, 1988, by and between KOPPERS COMPANY, INC., a corporation, organized and existing under the laws of the State of Delaware, party of the first part and KOPPERS INDUSTRIES, INC., a corporation organized and existing under the laws of the Commonwealth of Pennsylvania, party of the second part.

W I T N E S S E T H:

That the said party of the first part, conveys and specially warrants to the said party of the second part, the following described real property free of encumbrances created or suffered by the grantor except as specifically set forth herein: The real property, situated in the County of Multnomah, State of Oregon, to-wit:

THE LEGAL DESCRIPTION IS ATTACHED HERETO AS EXHIBIT "A"

This conveyance is made subject to all easements, convenants and conditions of record.

THIS INSTRUMENT WILL NOT ALLOW USE OF THE PROPERTY DESCRIBED IN THIS INSTRUMENT IN VIOLATION OF APPLICBLE LAND USE LAWS AND REGULATIONS. BEFORE SIGNING OR ACCEPTING THIS INSTRUMENT, THE PERSON ACQUIRING FEE TITLE TO THE PROPERTY SHOULD CHECK WITH THE APPROPRIATE CITY OR COUNTY PLANNING DEPARTMENT TO VERIFY APPROVED USES.

The true consideration for this conveyance is _____ _____ Dollars ($_____).

KOPPERS COMPANY, INC.
Grantor, Party of the First Part

By _____
Vice-President

Corporate Seal

Attest: _____
Corporate Secretary

COMMONWEALTH OF PENNSYLVANIA)
) ss.
_____ of _____)

On this ____ day of December, 1988, before me appeared _____ to me personally known, who being duly sworn, did say that he, the said _____, is the Vice-President of KOPPERS COMPANY, INC., a corporation of the State of Delaware, and that the seal affixed to said instrument is the corporate seal of said corporation, and that the said instrument was signed and sealed in behalf of said corporation by authority of its Board of Directors, and _____ acknowledges said instrument to be the free act and deed of said corporation.

IN TESTIMONY WHEREOF, I have hereunto set my hand and affixed my official seal the day and year last above written.

(NOTARIAL SEAL)

_____
Notary Public for Oregon
My Commission expires: _____

TAR PRODUCTS
Production facility
Portland, Oregon Terminal

LEGAL DESCRIPTION

PARCEL I:

That portion of Sections 12 and 13, Township 1 North, Range 1 West of the Willamette Meridian lying within the W.W. Baker Donation Land Claim, in the City of Portland, County of Multnomah and State of Oregon, described as follows:

Beginning at the point of intersection of the centerline of the Spokane, Portland, and Seattle Railroad and the East line of the W.W. Baker Donation Land Claim; thence North 32°00' East, 162.55 feet to a fence corner at the true point of beginning; thence continuing North 32°00' East along a fence 456.40 feet to a fence corner; thence North 29°58'00" West 150.40 feet; thence North 33°37'00" West 147.88 feet; thence North 49°51'00" West 139.00 feet to a hub; thence South 56°29'00" West 265.15 feet to a nail; thence North 33°13'00" West 260.70 feet to a railroad spike at a point known as point "A"; thence South 56°29'00" West 111.55 feet to a railroad spike; thence South 31°12'30" East 102.90 feet; thence South 56°46'00" West 38.57 feet; thence South 33°14'00" East 36.00 feet; thence South 56°46'00" West 9.00 feet; thence South 33°14'00" East 106.58 feet to a hub; thence South 25°44'30" West 10.51 feet to a hub; thence South 56°24'30" West 54.40 feet; thence South 33°05'30" East 277.30 feet; thence North 56°51'00" East 34.30 feet; thence South 75°03'00" East 34.55 feet; thence South 47°41'30" East 190.00 feet to a nail; thence South 35°16'30" East 140.05 feet to the true point of beginning.

EXCEPT a 30 foot strip of land parallel and contiguous with the East line of the W.W. Baker DLC in Sections 12 and 13, Township 1 North, Range 1 West, said strip of land being 30 feet Westerly of the said DLC line and more particularly described as: Beginning at a point 162.55 feet North 32° East from the intersection of the centerline of the SP & S Railway with the East line of the said Baker DLC; thence North 32° East 456.4 feet; thence North 29°58' West 34 feet; thence South 32° West 459.8 feet; thence South 35°16'30" East 32.5 feet to the point of beginning. ALSO EXCEPT rights of the public to part in City street.

PARCEL II:

That portion of Section 12, Township 1 North, Range 1 West of the Willamette Meridian lying within the W.W. Baker Donation Land Claim, in the City of Portland, County of Multnomah and State of Oregon, described as follows:

Beginning at a point 769.61 feet North and 365.57 feet West of a tack marking the point of intersection of the centerline of the SP&S Railway with the Southeasterly line of the W.W. Baker DLC in said Township and Range; thence South 56°46' West 70.52 feet; thence South 33°05'30" East 149 feet; thence North 56°24'30" East 54.4 feet; thence North 25°44'30" East 10.51 feet; thence North 33°14' West 106.58 feet; thence North 56°46' East 9 feet; thence North 33°14' West 36 feet to the point of beginning.

EXHIBIT "A"

GENERAL REQUIREMENTS FOR DISPOSITION OF REALTY

93.010 Conveyances, how made. Conveyances of lands, or of any estate or interest therein, may be made by deed, signed by the person of lawful age from whom the estate or interest is intended to pass, or by the lawful agent or attorney of the person, and acknowledged or proved, and recorded without any other act or ceremony. No seal of the grantor, corporate or otherwise, shall be required on the deed. [Amended by 1965 c.502 §4]

93.020 Creating, transferring or declaring estates or interests in realty. (1) No estate or interest in real property, other than a lease for term not exceeding one year, nor any trust or power concerning such property, can be created, transferred or declared otherwise than by operation of law or by a conveyance or other instrument in writing, subscribed by the party creating, transferring or declaring it, or by the lawful agent of the party under written authority, and executed with such formalities as are required by law.

(2) This section does not affect the power of a testator in the disposition of real property by a last will and testament, nor to prevent a trust from arising or being extinguished by implication or operation of law, nor to affect the power of a court to compel the specific performance of an agreement in relation to such property.

93.030 Contracts to convey, instruments of conveyance and related memoranda to state consideration. (1) All instruments conveying or contracting to convey fee title to any real estate, and all memoranda of such instruments, shall state on the face of such instruments the true and actual consideration paid for such transfer, stated in terms of dollars. As used in this section, "consideration" includes the amount of cash and the amount of any lien, mortgage, contract, indebtedness or other encumbrance existing against the property to which the property remains subject or which the purchaser agrees to pay or assume. However, if the actual consideration consists of or includes other property or other value given or promised, neither the monetary value nor a description of such other property or value need be stated so long as it is noted on the face of the instrument that other property or value was either part or the whole consideration.

(2) The statement of consideration as required by subsection (1) of this section shall be made by a grantor or a grantee. Failure to make such statement does not invalidate the conveyance.

(3) If the statement of consideration is in the body of the instrument preceding the signatures, execution of the instrument shall constitute a certification of the truth of the statement. If there is a separate statement of consideration on the face of the instrument, it shall be signed separately from the instrument, and such execution shall constitute a certification of the truth of the statement by the person signing. No particular form is required for the statement so long as the requirements of this section are reasonably met.

(4) No instrument conveying or contracting to convey fee title to any real estate nor any memorandum of such an instrument shall be accepted for recording by any county clerk or recording officer in this state unless the statement of consideration required by this section is included on the face of the instrument.

(5) This section applies to instruments executed on or after January 1, 1968. [1967 c.462 §§1, 3; 1967 s.s. c.7 §1; 1977 c.605 §1]

93.040 Warning in instrument relating to approved uses of land; liability of drafter and recorder. (1) The following statement shall be included in the body of an instrument transferring or contracting to transfer fee title to real property: "THIS INSTRUMENT WILL NOT ALLOW USE OF THE PROPERTY DESCRIBED IN THIS INSTRUMENT IN VIOLATION OF APPLICABLE LAND USE LAWS AND REGULATIONS. BEFORE SIGNING OR ACCEPTING THIS INSTRUMENT, THE PERSON ACQUIRING FEE TITLE TO THE PROPERTY SHOULD CHECK WITH THE APPROPRIATE CITY OR COUNTY PLANNING DEPARTMENT TO VERIFY APPROVED USES."

(2) No action may be maintained against the county recording officer for recording an instrument that does not contain the statement required in subsection (1) of this section.

(3) No action may be maintained against any person for failure to include in the instrument, or for recording an instrument that does not contain the statement required in subsection (1) of this section, unless the person acquiring or agreeing to acquire fee title to the real property would not have executed or accepted the instrument but for the absence in the instrument of the statement required by subsection (1) of this section. No action may be maintained by the person acquiring or agreeing to acquire title to the real property

Koppers000365

against any person other than the person transferring or contracting to transfer fee title to the real property. [1983 c.718 §2; 1985 c.719 §1]

SPECIAL MATTERS IN PARTICULAR CONVEYANCES

93.110 Quitclaim deed sufficient to pass estate. A deed of quitclaim and release, of the form in common use, is sufficient to pass all the estate which the grantor could lawfully convey by a deed of bargain and sale.

93.120 Words of inheritance unnecessary to convey fee; conveyances deemed to convey all grantor's estate. The term "heirs," or other words of inheritance, is not necessary to create or convey an estate in fee simple. Any conveyance of real estate passes all the estate of the grantor, unless the intent to pass a lesser estate appears by express terms, or is necessarily implied in the terms of the grant.

93.130 Conveyance of land in adverse possession of another. No grant or conveyance of lands or interest therein is void for the reason that at the time of its execution the lands were in the actual possession of another claiming adversely.

93.140 Implied covenants. No covenant shall be implied in any conveyance of real estate, whether it contains special covenants or not, except as provided by ORS 93.850 to 93.870. [Amended by 1973 c.194 §6]

93.150 Conveyance by tenant of greater estate than that possessed. A conveyance made by a tenant for life or years, purporting to grant a greater estate than the tenant possesses or could lawfully convey, does not work a forfeiture of the estate of the tenant, but passes to the grantee all the estate which the tenant could lawfully convey.

93.160 Conveyance by reversioners and remaindermen to life tenant vests fee. Where real property has been devised to a person for life, and in case of the death of the life tenant without leaving lawful issue born alive and living at the time of death, then to other heirs of the testator, a conveyance to the life tenant from all reversioners or remaindermen and all issue of the life tenant as are in being, of all their interest in the real property, vests a fee simple estate in the life tenant.

93.170 [Repealed by 1969 c.591 §305]

93.180 Tenancy in common, when created; joint tenancy abolished. Every conveyance or devise of lands, or interest therein, made to two or more persons, other than to a husband and wife, as such, or to executors or trustees, as such, creates a tenancy in common unless it is in some manner clearly and expressly declared in the conveyance or devise that the grantees or devisees take the lands with right of survivorship. Such a declaration of a right to survivorship shall create a tenancy in common in the life estate with cross-contingent remainders in the fee simple. Joint tenancy is abolished and the use in a conveyance or devise of the words "joint tenants" or similar words without any other indication of an intent to create a right of survivorship shall create a tenancy in common. [Amended by 1983 c.555 §1]

93.190 Trustees or personal representatives as joint tenants; filling vacancies in office. (1) Every conveyance, deed of trust, mortgage or devise of an interest in or lien upon real or personal property to two or more persons as trustees or personal representatives, creates a joint tenancy in such interest or lien in the trustees or personal representatives unless it is expressly declared in the conveyance, deed of trust, mortgage or devise that the trustees or personal representatives shall take or hold the property as tenants in common or otherwise.

(2) If the conveyance, deed of trust, mortgage or devise provides for filling any vacancy in the office of trustee or personal representative, it may be filled as therein provided, but a court of competent jurisdiction may fill a vacancy in the trusteeship according to the established rules and principles of equity. In whichever way the vacancy is filled, the new trustee shall hold the property with all powers, rights and duties of an original trustee unless otherwise directed by conveyance, deed of trust, mortgage or devise, or order or decree of the court. [Amended by 1969 c.591 §275]

93.200 Trustees or executors now hold as joint tenants. All trustees or executors holding real or personal property in trust on May 19, 1905, hold as joint tenants and not as tenants in common unless the conveyance, deed of trust, mortgage or devise, or order or decree of court creating or appointing the trustees or executors has declared otherwise.

93.210 Presumption respecting deed from trustee of undisclosed beneficiary. If a deed to real estate has been made to a grantee in trust or designating the grantee as trustee, and no beneficiary is indicated or named in the deed, a deed thereafter executed by such grantee conveying the property is presumed to have been executed with full right and authority and conveys prima facie title to the property. The grantee

Koppers000366

PRODUCTION FACILITIES

CONSENT REQUESTS

1.	Galesburg, Illinois	Burlington Northern Railroad Co.
2.	Port Newark, New Jersey	The Port Authority of New York & New Jersey
3.	Chicago, Illinois	The Metropolitan Sanitary District of Greater Chicago
4.	Portland, Oregon	Northwest Natural Gas Company
5.	Houston, Texas	Amerada Hess Corporation

GALESBURG, ILL.

Koppers000368

PITTSBURGH ACQUISITION CORPORATION, INC.

Memorandum of Lease
Landlord's Consent to Leasehold Mortgage
and
Landlord's Waiver

Galesburg, Illinois, Wood Products

December 16, 1988

Burlington Northern Railroad Company
176 East Fifth St.
P.O. Box 64959
St. Paul, MN 55164

Gentlemen:

Please be advised that Koppers Company, Inc. ("Koppers") has tentatively agreed to sell certain of its assets and certain of its divisions to Pittsburgh Acquisition Corporation, Inc. (the "Purchaser"). One of the assets to be acquired by the Purchaser is Koppers' interest in that certain lease more particularly described on Exhibit A attached hereto and made a part hereof (the "Lease"), whereby Burlington Northern Railroad Company (formerly Chicago Burlington & Quincy Railroad Company) ("Lessor"), leased to Koppers, as lessee, that certain real property more particularly described on Exhibit B attached hereto and made a part hereof (the "Leased Premises"). The Purchaser will assume all liabilities and obligations of Koppers under the Lease from and after the effective date of the acquisition.

In addition, in connection with the financing of the acquisition, the Purchaser simultaneously will be pledging and assigning as collateral to Mellon Bank, N.A., as Agent, ("Mellon") all of the Purchaser's interest in the Lease and all of the personal property of the Purchaser located on the Leased Premises.

We are writing to request your consent to the pledge and collateral assignment to Mellon of all of the Purchaser's interest in the Lease and the personal property of the Purchaser located on the Leased Premises.

Accordingly, please indicate your consent to and approval of the pledge and collateral assignment by the Purchaser of its interest in the Lease and personal property to Mellon by signing and dating the enclosed copy of this letter in the spaces provided below and returning the enclosure to the undersigned.

The acquisition is scheduled to close on or about December 28, 1988, and the assignments will become effective as of the closing. Therefore, your timely consideration of this matter is greatly appreciated. If you have any questions about this letter or the assignments, please call my office at (412) 281-7272.

Thank you for your cooperation.

Very truly yours,

PITTSBURGH ACQUISITION
CORPORATION, INC.

By: Clayton A. Sweeney
Clayton A. Sweeney, Director

CONSENT

Lessor hereby consents to and approves the pledge and collateral assignment to Mellon, as Agent, of all of the right, title and interest of the Purchaser in and to such Lease and of all personal property of the Purchaser located on the Leased Premises. Lessor further waives and releases unto Mellon, its successors and assigns all right, title and interest which Lessor may have in and to any personal property of the Purchaser on the Leased Premises. Lessor acknowledges and agrees that this document and Exhibits A and B attached hereto may and shall constitute a memorandum of lease and that this document may be recorded in the public land records of the county where the Leased Premises are located and indexed against the name of Lessor.

Dated this ____ day of _____, 198_.

LESSOR:

Attest:

By: _____

Name: _____

Title: _____

_____
Secretary

[Corporate Seal]

COMMONWEALTH OF PENNSYLVANIA)
) SS:
COUNTY OF Allegheny)

On this, the 16 day of December, 1988, before me, a Notary Public, the undersigned officer, personally appeared Clayton A. Sweeney, who acknowledged himself to be the Director of PITTSBURGH ACQUISITION CORPORATION, INC., a Pennsylvania corporation, and that he as such Director, being authorized to do so, executed the foregoing instrument for the purposes therein contained by signing the name of the corporation by himself as Director.

In witness whereof, I hereunto set my hand and official seal.

Loretta Pettinato
Notary Public

[Notarial Seal]

My commission expires:

NOTARIAL SEAL
LORETTA PETTINATO, NOTARY PUBLIC
PITTSBURGH, ALLEGHENY COUNTY
MY COMMISSION EXPIRES OCT. 7, 1991
Member, Pennsylvania Association of Notaries

STATE OF ILLINOIS)
) SS:
COUNTY OF _____)

I, _____, a _____, do hereby certify that on the ____ day of _____, 1988, _____, personally appeared before me and being first duly sworn by me acknowledged that he signed the foregoing document in the capacity therein set forth and declared that the statements therein contained are true.

In Witness Whereof, I have hereunto set my hand and seal the day and year before written.

_____
Notary Public

[Notarial Seal]

My commission expires:

EXHIBIT A

That certain lease agreement dated December 9, 1966, as amended from time to time, the most recent amendment being pursuant to the Timber Treating Agreement dated November 6, 1986, whereby Chicago Burlington & Quincy Railroad Company, as lessor, leased to Koppers, as lessee, that certain real property more particularly described on Exhibit B, which lease extends year to year, unless terminated by 12 months prior written notice by either party.

EXHIBIT B

WOOD PRODUCTS

Production Facility

Galesburg, Illinois Plant

LEGAL DESCRIPTION

Part of Section 33, Township 11 North, Range 1 East of the Fourth Principal Meridian, Knox County, Illinois, being more particularly described as follows: Commencing at the Northwest corner of said Section 33, thence 1283.18 feet South 0 degrees 15 minutes 05 seconds West along the West line of said Section 33, thence 35.89 feet South 89 degrees 29 minutes 20 seconds East to the point of beginning of the tract of land to be described, thence 1277.55 feet South 0 degrees 30 minutes 40 seconds West, thence 564.84 feet along the arc of a curve to the right having a radius of 3156.18 feet and a central angle of 10 degrees 15 minutes 14 seconds to a point of tangency with the next course (said curve having a chord distance of 564.09 feet bearing South 77 degrees 46 minutes 34 seconds East), thence 1704.83 feet South 72 degrees 38 minutes 57 seconds East, thence 444.29 feet along the arc of a curve to the left having a radius of 800.00 feet and a central angle of 31 degrees 49 minutes 13 seconds to a point of tangency with the next course (said curve having a chord distance of 438.61 feet bearing North 75 degrees 49 minutes 52 seconds East), thence 877.42 feet North 59 degrees 55 minutes 15 seconds East to a point of curve with the next course, thence 54.27 feet along the arc of a curve to the left having a radius of 981.46 feet and a central angle of 3 degrees 10 minutes 06 seconds (said curve having a chord distance of 54.27 feet bearing North 58 degrees 20 minutes 12 seconds East) thence 90.00 feet North 33 degrees 14 minutes 45 seconds West, thence 480.08 feet North 55 degrees 19 minutes 10 seconds East, thence 312.81 feet along the arc of a curve to the left having a radius of 493.91 feet and a central angle of 36 degrees 17 minutes 14 seconds to a point of tangency with the next course (said curve having a chord distance of 307.61 feet bearing North 37 degrees 36 minutes 02 seconds East), thence 464.57 feet North 19 degrees 27 minutes 25 seconds East, thence 281.59 feet North 24 degrees 32 minutes 02 seconds East, thence 161.06 feet North 19 degrees 45 minutes 01 second East, thence 11.67 feet North 70 degrees 15 minutes 01 second West, thence 69.72 feet South 28 degrees 04 minutes 57 seconds West, thence 48.98 feet South 42 degrees 23 minutes 56 seconds West, thence 464.39 feet along the arc of a curve to the right having a radius of 463.89 feet and a central angle of 57 degrees 21 minutes 28 seconds to a point of tangency with the next course (said curve having a chord distance of 445.24 feet bearing South 60 degrees 32 minutes 01 second West), thence 3668.55 feet South 89 degrees 12 minutes 45 seconds West, thence 277.74 feet along the arc of a curve to the right having a radius of 381.52 feet and a central angle of 41

degrees 42 minutes 38 seconds (said curve having a chord distance of 271.65 feet bearing North 20 degrees 20 minutes 39 seconds West), thence 30.00 feet North 89 degrees 29 minutes 20 seconds West to the point of beginning and containing 119.44 acres, more or less.

436 Seventh Avenue
Pittsburgh, PA 15219
Telephone 412-227-2000

KOPPERS

DHL WORLDWIDE EXPRESS

December 16, 1988

Burlington Northern Railroad
Company
176 East Fifth Street
P. O. Box 64959
St. Paul, MN 55164

Attn: Purchasing and Material Dept.

Dear Sirs:

Koppers Company, Inc. ("Koppers") has agreed to sell certain of the assets of certain of its divisions to Pittsburgh Acquisition Corporation, Inc. (the "Purchaser"). One of the assets which is being acquired by the Purchaser is Koppers' interest in the agreement relating to property located in Galesburg, Illinois between the Chicago, Burlington & Quincy Railroad Company dated December 9, 1966, as amended from time to time, the most recent amendment being pursuant to the Timber Treating Agreement, dated November 6, 1986, and Koppers Company, Inc. (such agreement or agreements all together referred to as the "Agreement"). The Purchaser will assume all liabilities and obligations of Koppers under the Agreement from and after the effective date of the acquisition. The Purchaser has requested your consent to the assignment of the Agreement.

Please indicate your consent to and approval of the assignment to the Purchaser by Koppers of Koppers' interest in the Agreement by signing and dating the enclosed copy of this letter in the spaces provided below and returning the enclosure to the undersigned. We have also enclosed a separate letter requested by the Purchaser with respect to the financing of the acquisition to be returned together with the copy of this letter. Your consent to the assignment only relates to the interests of Koppers and the Purchaser in the Agreement and does not apply to or encumber your interests in the Agreement or the subject property.

Lessor further certifies, that (i) such Agreement is in full force and effect, and embodies the entire agreement between the parties thereto with respect to the leased premises and has not been amended, except for the aforementioned amendments and (ii) all rent and other charges reserved in such Agreement due and payable have been paid, and no other event or currently existing condition of default under the Lease exists as of the date indicated below.

Date: December , 1988.

Burlington Northern Railroad Company

By:_____

Name:_____

Title:_____

The acquisition is scheduled to close on or about December 28, 1988, and the assignments will become effective as of the closing. (For your information, the Purchaser is planning to change its name to Koppers Industries Inc. soon after closing which will be a subsidiary of a corporation initially known as PAC Holdings Corporation which will change its name to Koppers Holdings Corporation soon after closing.) Therefore, your timely consideration of this matter is greatly appreciated. If you have any questions about this letter or the assignments, please call my office at (412) 227-2621.

Thank you for your cooperation.

Very truly yours,

James B. Springfield

James B. Springfield
Corporate Real Estate

JBS/sjd

Enclosures

Burlington Northern Railroad Company ("Lessor") hereby approves (i) the assignment to Pittsburgh Acquisition Corporation, Inc. of all of the right, title and interest of Koppers Company, Inc. in and to the Agreement referred to above.

PORT NEWARK, N.J.

Koppers000380

PITTSBURGH ACQUISITION CORPORATION, INC.

Memorandum of Lease
Landlord's Consent to Leasehold Mortgage
and
Landlord's Waiver

Port Newark, New Jersey, Wood Products

December 16, 1988

The Port Authority of New York
and New Jersey
One World Trade Centre
Room 64-W
New York, NY 10048

Gentlemen:

Please be advised that Koppers Company, Inc. ("Koppers") has tentatively agreed to sell certain of its assets and certain of its divisions to Pittsburgh Acquisition Corporation, Inc. (the "Purchaser"). One of the assets to be acquired by the Purchaser is Koppers' interest in that certain lease more particularly described on Exhibit A attached hereto and made a part hereof (the "Lease"), whereby The Port Authority of New York and New Jersey ("Lessor"), leased to Koppers, as lessee, that certain real property more particularly described on Exhibit B attached hereto and made a part hereof (the "Leased Premises"). The Purchaser will assume all liabilities and obligations of Koppers under the Lease from and after the effective date of the acquisition.

In addition, in connection with the financing of the acquisition, the Purchaser simultaneously will be pledging and assigning as collateral to Mellon Bank, N.A., as Agent, ("Mellon") all of the Purchaser's interest in the Lease and all of the personal property of the Purchaser located on the Leased Premises.

We are writing to request your consent to the pledge and collateral assignment to Mellon of all of the Purchaser's interest in the Lease and the personal property of the Purchaser located on the Leased Premises.

Accordingly, please indicate your consent to and approval of the pledge and collateral assignment by the Purchaser of its interest in the Lease and personal property to Mellon by signing and dating the enclosed copy of this letter in the spaces provided below and returning the enclosure to the undersigned.

The acquisition is scheduled to close on or about December 28, 1988, and the assignments will become effective as of the closing. Therefore, your timely consideration of this matter is greatly appreciated. If you have any questions about this letter or the assignments, please call my office at (412) 281-7272.

Thank you for your cooperation.

Very truly yours,

PITTSBURGH ACQUISITION CORPORATION, INC.

By: Clayton A. Sweeney, Director

CONSENT

Lessor hereby consents to and approves the pledge and collateral assignment to Mellon, as Agent, of all of the right, title and interest of the Purchaser in and to such Lease and of all personal property of the Purchaser located on the Leased Premises. Lessor further waives and releases unto Mellon, its successors and assigns all right, title and interest which Lessor may have in and to any personal property of the Purchaser on the Leased Premises. Lessor acknowledges and agrees that this document and Exhibits A and B attached hereto may and shall constitute a memorandum of lease and that this document may be recorded in the public land records of the county where the Leased Premises are located and indexed against the name of Lessor.

Dated this ____ day of _____, 198_.

LESSOR:

Attest:

By: _____

Name: _____

Title: _____

_____
Secretary

[Corporate Seal]

COMMONWEALTH OF PENNSYLVANIA)
) SS:
COUNTY OF Allegheny)

On this, the 16 day of December, 1988, before me, a Notary Public, the undersigned officer, personally appeared Clayton A. Sweeney, who acknowledged himself to be the Director of PITTSBURGH ACQUISITION CORPORATION, INC., a Pennsylvania corporation, and that he as such Director, being authorized to do so, executed the foregoing instrument for the purposes therein contained by signing the name of the corporation by himself as Director.

In witness whereof, I hereunto set my hand and official seal.

Loretta Pettinato
Notary Public

[Notarial Seal]

My commission expires:

NOTARIAL SEAL
LORETTA PETTINATO, NOTARY PUBLIC
PITTSBURGH, ALLEGHENY COUNTY
MY COMMISSION EXPIRES OCT. 7, 1991

Member, Pennsylvania Association of Notaries

STATE OF NEW JERSEY)
) SS:
COUNTY OF _____)

On this, the ____ day of _____, 1988, before me, a Notary Public, the undersigned officer, personally appeared _____, who acknowledged himself to be the _____ of THE PORT AUTHORITY OF NEW YORK AND NEW JERSEY, a corporation, and that he as such _____, being authorized to do so, executed the foregoing instrument for the purposes therein contained by signing the name of the corporation by himself as _____.

In witness whereof, I hereunto set my hand and official seal.

_____
Notary Public

[Notarial Seal]

My commission expires:

EXHIBIT A

That certain lease agreement dated June 15, 1976, as amended and extended by Supplemental Agreement dated October 15, 1986, whereby The Port Authority of New York and New Jersey, as lessor, leased to Koppers, as lessee, that certain real property more particularly described on Exhibit B for a term beginning April 1, 1977 and ending November 1, 1991. Koppers has the option to extend the term of the Lease to November 1, 1994.

EXHIBIT B

WOOD PRODUCTS

Production Facility

Port Newark, New Jersey Plant

LEGAL DESCRIPTION

All that certain tract or parcel of land and premises, situate, lying and being in the City of Newark, County of Essex and State of New Jersey more particularly described as follows:

Beginning at a point in the southeasterly line of Maritime Street said point being distant 50.00 feet northeasterly from the corner, formed by the intersection of said southeasterly line of Maritime Street and the northeasterly line of Tyler Street and running thence;

(1) Along said southeasterly line of Maritime Street, North 41 degrees 48 minutes 12 seconds East 496.00 feet; thence

(2) South 48 degrees 11 minutes 48 seconds east 752.63 feet; thence

(3) South 41 degrees 48 minutes 12 seconds west 174.41 feet; thence

(4) Southwesterly, on a curve to the right having a radius of 620.43 feet an arc distance of 124.32 feet; thence

(5) Southwesterly, on a curve to the right having a radius of 201.50 feet an arc distance of 132.32 feet; thence

(6) Southwesterly, on a curve to the right having a radius of 360.23 feet an arc distance of 142.24 feet; thence

(7) North 48 degrees 11 minutes 48 seconds west 561.63 feet to the southeasterly line of Maritime Street the point and place of Beginning.

Said description being in accordance with a survey made by Capasso & Hingos, dated November 18, 1988.

Koppers Company, Inc.
436 Seventh Avenue
Pittsburgh, PA 15219
Telephone 412-227-2000

KOPPERS

DHL WORLDWIDE EXPRESS

December 16, 1988

The Port Authority of New
York and New Jersey
One World Trade Centre
Room 64-W
New York, NY 10048

Attn: Carl Alleyne

Dear Mr. Alleyne:

Koppers Company, Inc. ("Koppers") has agreed to sell certain of the assets of certain of its divisions to Pittsburgh Acquisition Corporation, Inc. (the "Purchaser"). One of the assets which is being acquired by the Purchaser is Koppers' interest in the Agreement of Lease dated June 15, 1976, as amended by Supplemental Agreement dated October 15, 1986 between The Port Authority of New York and New Jersey and Koppers Company, Inc. (such agreement or agreements all together referred to as the "Agreement"). The Purchaser will assume all liabilities and obligations of Koppers under the Agreement from and after the effective date of the acquisition. The Purchaser has requested your consent to the assignment of the Agreement.

Please indicate your consent to and approval of the assignment to the Purchaser by Koppers of Koppers' interest in the Agreement by signing and dating the enclosed copy of this letter in the spaces provided below and returning the enclosure to the undersigned. We have also enclosed a separate letter requested by the Purchaser with respect to the financing of the acquisition to be returned together with the copy of this letter. Your consent to the assignment only relates to the interests of Koppers and the Purchaser in the Agreement and does not apply to or encumber your interests in the Agreement or the subject property.

Lessor further certifies, that (i) such Agreement is in full force and effect, and embodies the entire agreement between the parties thereto with respect to the leased premises and has not been amended except for the aforementioned amendments and (ii) all rent and other charges reserved in such Agreement due and payable have been paid, and no other event or currently existing condition of default under the Lease exists as of the date indicated below.

Date: December , 1988.

The Port Authority of New
York and New Jersey

By:_____

Name:_____

Title:_____

The acquisition is scheduled to close on or about December 28, 1988, and the assignments will become effective as of the closing. (For your information, the Purchaser is planning to change its name to Koppers Industries Inc. soon after closing which will be a subsidiary of a corporation initially known as PAC Holdings Corporation which will change its name to Koppers Holdings Corporation soon after closing.) Therefore, your timely consideration of this matter is greatly appreciated. If you have any questions about this letter or the assignments, please call my office at (412) 227-2621.

Thank you for your cooperation.

Very truly yours,

James B. Springfield

James B. Springfield
Corporate Real Estate

JBS/sjd

Enclosures

The Port Authority of New York and New Jersey ("Lessor") hereby approves (i) the assignment to Pittsburgh Acquisition Corporation, Inc. of all of the right, title and interest of Koppers Company, Inc. in and to the Agreement referred to above.

Koppers Company, Inc., Corporate Real Estate
436 Seventh Avenue, Pittsburgh, PA 15219
Telephone 412-227-2000

KOPPERS

Thomas E. Bourne - 227-2622
Assistant Secretary and
Manager

Thomas F. McGuire - 227-2626
Real Estate Representative
James B. Springfield - 227-2621
Real Estate Representative
Sally M. Karanzas - 227-2625
Housing Administrator

December 20, 1988

DHL EXPRESS

Mr. Carl Alleyne
The Port Authority of
New York and New Jersey
One World Trade Centre
Room 64-W
New York, NY 10048

Re: Assignment of Lease

Dear Mr. Alleyne:

Pursuant to our request for assignment of Koppers lease agreement with The Port Authority of New York and New Jersey and our recent telephone conversation, please find enclosed a copy of Koppers most recent audited, consolidated financial statements.

We have forwarded your request for financial statements of the proposed assignee, Pittsburgh Acquisition Corporation, Inc., and the draft of loan agreement to PAC. Please be advised that PAC is a newly formed corporation. We are confident they will quickly supply you with this information.

Koppers is most appreciative of your prompt response to our request and trust your consent to the assignment will be timely received.

Very truly yours,

James B Springfield

James B. Springfield

JBS/smk

Enclosure

Koppers Company, Inc., Corporate Real Estate
436 Seventh Avenue, Pittsburgh, PA 15219
Telephone 412-227-2000

KOPPERS

Thomas E. Bourne - 227-2622
Assistant Secretary and
Manager

Thomas F. McGuire - 227-2626
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James B. Springfield - 227-2621
Real Estate Representative
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December 20, 1988

DHL EXPRESS

Mr. Carl Alleyne
The Port Authority of
New York and New Jersey
One World Trade Centre
Room 64-W
New York, NY 10048

Re: Assignment of Lease

Dear Mr. Alleyne:

Pursuant to our request for assignment of Koppers lease agreement with The Port Authority of New York and New Jersey and our recent telephone conversation, please find enclosed a copy of Koppers most recent audited, consolidated financial statements.

We have forwarded your request for financial statements of the proposed assignee, Pittsburgh Acquisition Corporation, Inc., and the draft of loan agreement to PAC. Please be advised that PAC is a newly formed corporation. We are confident they will quickly supply you with this information.

Koppers is most appreciative of your prompt response to our request and trust your consent to the assignment will be timely received.

Very truly yours,

James B Springfield

James B. Springfield

JBS/smk

Enclosure

CHICAGO, ILLINOIS

Koppers000393

PITTSBURGH ACQUISITION CORPORATION, INC.

Memorandum of Lease
Landlord's Consent to Leasehold Mortgage
and
Landlord's Waiver

Chicago, Illinois, Tar Products

December 16, 1988

The Metropolitan Sanitary
District of Greater Chicago
100 East Erie St.
Chicago, Illinois 60611

Gentlemen:

Please be advised that Koppers Company, Inc. ("Koppers") has tentatively agreed to sell certain of its assets and certain of its divisions to Pittsburgh Acquisition Corporation, Inc. (the "Purchaser"). One of the assets to be acquired by the Purchaser is Koppers' interest in that certain lease more particularly described on Exhibit A attached hereto and made a part hereof (the "Lease"), whereby The Metropolitan Sanitary District of Greater Chicago ("Lessor"), leased to Koppers, as lessee, that certain real property more particularly described on Exhibit B attached hereto and made a part hereof (the "Leased Premises"). The Purchaser will assume all liabilities and obligations of Koppers under the Lease from and after the effective date of the acquisition.

In addition, in connection with the financing of the acquisition, the Purchaser simultaneously will be pledging and assigning as collateral to Mellon Bank, N.A., as Agent, ("Mellon") all of the Purchaser's interest in the Lease and all of the personal property of the Purchaser located on the Leased Premises.

We are writing to request your consent to the pledge and collateral assignment to Mellon of all of the Purchaser's interest in the Lease and the personal property of the Purchaser located on the Leased Premises.

Accordingly, please indicate your consent to and approval of the pledge and collateral assignment by the Purchaser of its interest in the Lease and personal property to Mellon by signing and dating the enclosed copy of this letter in the spaces provided below and returning the enclosure to the undersigned.

The acquisition is scheduled to close on or about December 28, 1988, and the assignments will become effective as of the closing. Therefore, your timely consideration of this matter is greatly appreciated. If you have any questions about this letter or the assignments, please call my office at (412) 281-7272.

Thank you for your cooperation.

Very truly yours,

PITTSBURGH ACQUISITION
CORPORATION, INC.

By: Clayton A. Sweeney
Clayton A. Sweeney, Director

CONSENT

Lessor hereby consents to and approves the pledge and collateral assignment to Mellon, as Agent, of all of the right, title and interest of the Purchaser in and to such Lease and of all personal property of the Purchaser located on the Leased Premises. Lessor further waives and releases unto Mellon, its successors and assigns all right, title and interest which Lessor may have in and to any personal property of the Purchaser on the Leased Premises. Lessor acknowledges and agrees that this document and Exhibits A and B attached hereto may and shall constitute a memorandum of lease and that this document may be recorded in the public land records of the county where the Leased Premises are located and indexed against the name of Lessor.

Dated this ____ day of _____, 198_.

LESSOR:

Attest:

By: _____

Name: _____

Title: _____

_____
Secretary

[Corporate Seal]

COMMONWEALTH OF PENNSYLVANIA)
) SS:
COUNTY OF Allegheny)

On this, the 16 day of December, 1988, before me, a Notary Public, the undersigned officer, personally appeared Clayton A. Sweeney, who acknowledged himself to be the Director of PITTSBURGH ACQUISITION CORPORATION, INC., a Pennsylvania corporation, and that he as such Director, being authorized to do so, executed the foregoing instrument for the purposes therein contained by signing the name of the corporation by himself as Director.

In witness whereof, I hereunto set my hand and official seal.

Loretta Pettinato
Notary Public

[Notarial Seal]

My commission expires:

NOTARIAL SEAL
LORETTA PETTINATO, NOTARY PUBLIC
PITTSBURGH, ALLEGHENY COUNTY
MY COMMISSION EXPIRES OCT. 7, 1991
Member, Pennsylvania Association of Notaries

STATE OF ILLINOIS)
) SS:
COUNTY OF _____)

I, _____, a _____, do hereby certify that on the ____ day of _____, 1988, _____, personally appeared before me and being first duly sworn by me acknowledged that he signed the foregoing document in the capacity therein set forth and declared that the statements therein contained are true.

In Witness Whereof, I have hereunto set my hand and seal the day and year before written.

_____
Notary Public

[Notarial Seal]

My commission expires:

EXHIBIT A

That certain lease agreement dated April 13, 1944, and recorded in the Recorder's Office of Cook County, Illinois, at Book 41699, Page 37, as subsequently amended and extended, whereby The Metropolitan Sanitary District of Greater Chicago, as lessor, leased to Louis C. Ruthy and Bernard C. Ruthy, d/b/a Metropolitan Petroleum, as lessee, that certain real property more particularly described on Exhibit B for a term beginning August 14, 1943 and ending August 14, 2018; which lease was assigned to Koppers pursuant to the Assignment of Lease between Stickney Terminal Corporation and Koppers dated June 1, 1984.

EXHIBIT B

TAR PRODUCTS

Production Facility

Chicago, Illinois Plant

LEGAL DESCRIPTION

Leasehold Estate created in and by a certain Indenture of Lease mady by the Sanitary District of Chicago, a municipal corporation of Illinois to Louis C. Ruthy and Bernard C. Ruthy, co-partners doing business under the name and style of Metropolitan Petroleum Company, dated April 13, 1944 and recorded September 17, 1946 as Document 13894245 demising and leasing for a term of 75 years commencing August 15, 1943 and ending August 14, 2018, the land described as follows:

All those portions of Lots 61, 59 and the West 1/2 of Lot 57 of the Sanitary District Trustee's subdivision of right of way from North and South center line of Section 30, Township 39 North, Range 14 East of the Third Principal Meridian to Will County line, lying south of the following described line:

Beginning at a point in the West line of the East 1/2 of said Lot 57, which is 92.5 feet Southerly of the Northerly line of said Lot 57, measured at right angles thereto; thence Westerly parallel to the Northerly lot lines of said Lots 57 and 59 to the West line of said Lot 59; thence Westerly along a continuation of last described course to a point which is 192.52 feet East of the West line of said Lot 61, measured at right angles thereto; thence Westerly to a point in the East line of Lot 63 of said subdivision which is 64.56 feet South of the North East corner of said Lot 63, (except that part of said Lot 61, lying Southwesterly of a line extending Northwesterly from the Easterly end of the Southerly face of the headwall of the 52nd Avenue Sewer Outfall, being a point in the Southerly lot line of said Lot 61, 297.08 feet, more or less, from the South West corner thereof, to said point in the East line of Lot 63, 64.56 feet South of the North East corner thereof), in Cook County, Illinois.

Koppers Company, Inc.
436 Seventh Avenue
Pittsburgh, PA 15219
Telephone 412-227-2000

KOPPERS

DHL WORLDWIDE EXPRESS

December 16, 1988

The Metropolitan Sanitary District
of Greater Chicago
100 East Erie Street
Chicago, IL 60611

Attn: Mr. James B. Murray

Dear Mr. Murray:

Koppers Company, Inc. ("Koppers") has agreed to sell certain of the assets of certain of its divisions to Pittsburgh Acquisition Corporation, Inc. (the "Purchaser"). One of the assets which is being acquired by the Purchaser is Koppers' interest in the Indenture of Lease between The Sanitary District of Chicago and Louis C. Ruthy and Bernard C. Ruthy, co-partners, doing business under the name of Metropolitan Petroleum, which Lease was assigned to Koppers Company pursuant to the Assignment of Lease between Stickney Terminal Corporation dated June 1, 1984 and Koppers Company, Inc. (such agreement or agreements all together referred to as the "Agreement"). The Purchaser will assume all liabilities and obligations of Koppers under the Agreement from and after the effective date of the acquisition. The Purchaser has requested your consent to the assignment of the Agreement.

Please indicate your consent to and approval of the assignment to the Purchaser by Koppers of Koppers' interest in the Agreement by signing and dating the enclosed copy of this letter in the spaces provided below and returning the enclosure to the undersigned. We have also enclosed a separate letter requested by the Purchaser with respect to the financing of the acquisition to be returned together with the copy of this letter. Your consent to the assignment only relates to the interests of Koppers and the Purchaser in the Agreement and does not apply to or encumber your interests in the Agreement or the subject property.

Lessor further certifies, that (i) such Agreement is in full force and effect, and embodies the entire agreement between the parties thereto with respect to the leased premises and has not been amended except for the aforementioned amendments and (ii) all rent and other charges reserved in such Agreement due and payable have been paid, and no other event or currently existing condition of default under the Lease exists as of the date indicated below.

Date: December , 1988.

The Metropolitan Sanitary District of
Greater Chicago

By:_____

Name:_____

Title:_____

The acquisition is scheduled to close on or about December 28, 1988, and the assignments will become effective as of the closing. (For your information, the Purchaser is planning to change its name to Koppers Industries Inc. soon after closing which will be a subsidiary of a corporation initially known as PAC Holdings Corporation which will change its name to Koppers Holdings Corporation soon after closing.) Therefore, your timely consideration of this matter is greatly appreciated. If you have any questions about this letter or the assignments, please call my office at (412) 227-2621.

Thank you for your cooperation.

Very truly yours,

James B. Springfield

James B. Springfield
Corporate Real Estate

JBS/sjd

Enclosures

The Metropolitan Sanitary District of Greater Chicago ("Lessor") hereby approves (i) the assignment to Pittsburgh Acquisition Corporation, Inc. of all of the right, title and interest of Koppers Company, Inc. in and to the Agreement referred to above.

PORTLAND, OREGON

Koppers000404

2/17

TO Lu Ann Vatesh
Dickie, McCamey & Chilcote

Executed & Returned as
per your request.

JF

LAW OFFICES OF
DICKIE, MCCAMEY & CHILCOTE
A PROFESSIONAL CORPORATION

SUITE 400
TWO PPG PLACE
PITTSBURGH, PA
15222-5402

TEL. 412/281-7272

FAX. 412/392-5367

J. LAWRENCE MCBRIDE
DAVID B. FAWCETT
DAVID J. ARMSTRONG
RICHARD D. KLABER
THEODORE O. STRUK
HERMAN C. KIMPEL
WILBUR MCCOY OTTO
CLAYTON A. SWEENEY
HERBERT BENNETT CONNER
RICHARD S. DORFZAUN
DANIEL P. STEFKO
JAMES F. MALONE, III
M. RICHARD DUNLAP
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CHARLES W. KENRICK
JOHN EDWARD WALL
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PAUL W. ROMAN, JR.
JOSEPH S. D. CHRISTOF, II
STEWART M. FLAM
STUART W. BENSON, III
THOMAS P. LUTZ
J. LAWSON JOHNSTON
SUSAN K. WRIGHT
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ANDREW G. KIMBALL
W. ALAN TORRANCE, JR.
HOWARD A. CHAJSON
MARCELLE M. THEIS
BRIAN T. MUST
DAVID S. BLOOM
DIONYSIOS G. RASSIAS

February 13, 1989

Mr. Larry F. Flaherty
Vice President
Koppers Industries, Inc.
1750 Koppers Building
Pittsburgh, PA 15219

RE: Northwest Natural Gas Company Lease,
Portland, Oregon

Dear Larry:

Enclosed please find original Leasehold Consents with regard to the above-referenced Lease. If you will recall, you had executed identical Consents in early February 1989. These Consents were forwarded onto Northwest Natural Gas Company for their execution and permanent records.

As you can see, the Consents that I am enclosing herewith have been executed by the Northwest Natural Gas Company before a notary public. The Enclosures are for our permanent records and recording. Please execute the enclosed Consents before a notary public and thereafter return the same to me so that I may have them recorded in the appropriate recording office. Thank you for your cooperation in this matter.

Very truly yours,

Lu Ann Datesh

LAD/lp
Enclosure
cc: Frederick C. Leech, Esquire
Clayton A. Sweeney, Esquire
R. F. Wagner, Esquire

LAW OFFICES OF
DICKIE, MCCAMEY & CHILCOTE
A PROFESSIONAL CORPORATION

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DIONYSIOS G. RASSIAS

February 13, 1989

Mr. Larry F. Flaherty
Vice President
Koppers Industries, Inc.
1750 Koppers Building
Pittsburgh, PA 15219

RE: Northwest Natural Gas Company Lease,
Portland, Oregon

Dear Larry:

Enclosed please find original Leasehold Consents with regard to the above-referenced Lease. If you will recall, you had executed identical Consents in early February 1989. These Consents were forwarded onto Northwest Natural Gas Company for their execution and permanent records.

As you can see, the Consents that I am enclosing herewith have been executed by the Northwest Natural Gas Company before a notary public. The Enclosures are for our permanent records and recording. Please execute the enclosed Consents before a notary public and thereafter return the same to me so that I may have them recorded in the appropriate recording office. Thank you for your cooperation in this matter.

Very truly yours,

Lu Ann Datesh

LAD/lp
Enclosure
cc: Frederick C. Leech, Esquire
Clayton A. Sweeney, Esquire
R. F. Wagner, Esquire

LEASEHOLD CONSENT

LESSOR: Northwest Natural Gas Company, an Oregon corporation

LESSEE: Koppers Company, Inc., a Delaware corporation

ASSIGNEE: Koppers Industries, Inc., a Pennsylvania corporation

MELLON: Mellon Bank, N.A., as agent for certain lenders

LEASE: That certain Lease Agreement dated August 17, 1965 as subsequently amended and extended, and as most recently amended on November 23, 1987, whereby Lessor leased to Lessee that certain real property (the Leased Premises) more particularly described on Exhibit A, for a term beginning January 1, 1966 and ending January 1, 1993.

1. Subject to the conditions set forth in Paragraph No. 2 hereof, Lessor hereby consents:

   (a) to the assignment of the Lease and all of Lessee's right, title and interest therein, to Assignee;

   (b) to the pledge and collateral assignment of the Lease and all Assignee's right, title and interest in the Lease and Assignee's personal property located on the Leased Premises, to Mellon; and

   (c) to the waiver and release unto Mellon, its successors and assigns, of all right, title and interest which Lessor may have in and to any personal property of Assignee on the Leased Premises.

2. Assignee hereby agrees:

   (a) To assume and be bound by all obligations and liabilities of the Lessee under the Lease from and after the effective date of the assignment; and

   (b) To indemnify and reimburse Lessor for all necessary costs of response (as that term is used in the Comprehensive Environmental Response, Compensation and

Liability Act, as amended) and damages to natural resources, that Lessor may be required to expend or pay as the result of any release of hazardous substances at the Leased Premises by Lessee prior to the effective date of the assignment, but only to the extent that Lessor is unable (after reasonable efforts) to recover the same from Lessee.

3. Lessor certifies that (i) the Lease is in full force and effect, and embodies the entire agreement between the parties thereto with respect to the Leased Premises and has not been amended except as stated above; (ii) all rent and other charges reserved in the Lease due and payable have been paid; and (iii) other than releases of hazardous substances at the Leased Premises by Lessee in possible violation of Sections 2 and 16 of the Lease, no other event or currently existing condition of default under the Lease exists as of the date hereof.

4. Nothing herein shall be deemed to release or waive any liability or responsibility incurred by Lessee under the Lease or resulting from Lessee's activities on the Leased Premises, prior to the effective date of the assignment of the Lease from Lessee to Assignee.

5. Lessor acknowledges and agrees that this document and Exhibit A attached hereto may and shall constitute a memorandum of lease and that this document may be recorded in the public land records of the county where the Leased Premises are located and indexed against the name of Lessor.

Dated this 25th day of January, 1989.

NORTHWEST NATURAL GAS COMPANY

By: Bruce R. McBain
Title: SR VICE PRES

KOPPERS INDUSTRIES, INC.

By: _____
Title: _____

Koppers000409

STATE OF OREGON)
) ss.
County of Multnomah)

The foregoing instrument was acknowledged before me this 25th day of January, 1989, by Brian R. DeBolt on behalf of Northwest Natural Gas Company.

Notary Public for Oregon
My commission expires: January

COMMONWEALTH OF PENNSYLVANIA)
) ss.
County of Allegheny)

The foregoing instrument was acknowledged before me this _____ day of January, 1989, by _____ on behalf of Koppers Industries, Inc.

Notary Public for: _____
My commission expires: _____

EXHIBIT A

TAR PRODUCTS

Production Facility

Portland, Oregon Terminal

LEGAL DESCRIPTION

PARCEL I:

That portion of Sections 12 and 13, Township 1 North, Range 1 West of the Willamette Meridian lying within the W.W. Baker Donation Land Claim, in the City of Portland, County of Multnomah and State of Oregon, described as follows:

Beginning at the point of intersection of the centerline of the Spokane, Portland, and Seattle Railroad and the East line of the W.W. Baker Donation Land Claim; thence North 32°00' East, 162.55 feet to a fence corner at the true point of beginning; thence continuing North 32°00' East along a fence 456.40 feet to a fence corner; thence North 29°58'00" West 150.40 feet; thence North 33°37'00" West 147.88 feet; thence North 49°51'00" West 139.00 feet to a hub; thence South 56°29'00" West 265.15 feet to a nail; thence North 33°13'00" West 260.70 feet to a railroad spike at a point known as point "A"; thence South 56°29'00" West 111.55 feet to a railroad spike; thence South 31°12'30" East 102.90 feet; thence South 56°46'00" West 38.57 feet; thence South 33°14'00" East 36.00 feet; thence South 56°46'00" West 9.00 feet; thence South 33°14'00" East 106.58 feet to a hub; thence South 25°44'30" West 10.51 feet to a hub; thence South 56°24'30" West 54.40 feet; thence South 33°05'30" East 277.30 feet; thence North 56°51'00" East 34.30 feet; thence South 75°03'00" East 34.55 feet; thence South 47°41'30" East 190.00 feet to a nail; thence South 35°16'30" East 140.05 feet to the true point of beginning.

EXCEPT a 30 foot strip of land parallel and contiguous with the East line of the W.W. Baker DLC in Sections 12 and 13, Township 1 North, Range 1 West, said strip of land being 30 feet Westerly of the said DLC line and more particularly described as: Beginning at a point 162.55 feet North 32° East from the intersection of the centerline of the SP & S Railway with the East line of the said Baker DLC; thence North 32° East 456.4 feet; thence North 29°58' West 34 feet; thence South 32° West 459.8 feet; thence South 35°16'30" East 32.5 feet to the point of beginning. ALSO EXCEPT rights of the public to part in City street.

PARCEL II:

That portion of Section 12, Township 1 North, Range 1 West of the Willamette Meridian lying within the W.W. Baker Donation Land

Claim, in the City of Portland, County of Multnomah and State of Oregon, described as follows:

Beginning at a point 769.61 feet North and 365.57 feet West of a tack marking the point of intersection of the centerline of the SP&S Railway with the Southeasterly line of the W.W. Baker DLC in said Township and Range; thence South 56°46' West 70.52 feet; thence South 33°05'30" East 149 feet; thence North 56°24'30" East 54.4 feet; thence North 25°44'30" East 10.51 feet; thence North 33°14' West 106.58 feet; thence North 56°46' East 9 feet; thence North 33°14' West 36 feet to the point of beginning.

LEASEHOLD CONSENT

LESSOR: Northwest Natural Gas Company, an Oregon corporation

LESSEE: Koppers Company, Inc., a Delaware corporation

ASSIGNEE: Koppers Industries, Inc., a Pennsylvania corporation

MELLON: Mellon Bank, N.A., as agent for certain lenders

LEASE: That certain Lease Agreement dated August 17, 1965 as subsequently amended and extended, and as most recently amended on November 23, 1987, whereby Lessor leased to Lessee that certain real property (the Leased Premises) more particularly described on Exhibit A, for a term beginning January 1, 1966 and ending January 1, 1993.

1. Subject to the conditions set forth in Paragraph No. 2 hereof, Lessor hereby consents:

   (a) to the assignment of the Lease and all of Lessee's right, title and interest therein, to Assignee;

   (b) to the pledge and collateral assignment of the Lease and all Assignee's right, title and interest in the Lease and Assignee's personal property located on the Leased Premises, to Mellon; and

   (c) to the waiver and release unto Mellon, its successors and assigns, of all right, title and interest which Lessor may have in and to any personal property of Assignee on the Leased Premises.

2. Assignee hereby agrees:

   (a) To assume and be bound by all obligations and liabilities of the Lessee under the Lease from and after the effective date of the assignment; and

   (b) To indemnify and reimburse Lessor for all necessary costs of response (as that term is used in the Comprehensive Environmental Response, Compensation and

Liability Act, as amended) and damages to natural resources, that Lessor may be required to expend or pay as the result of any release of hazardous substances at the Leased Premises by Lessee prior to the effective date of the assignment, but only to the extent that Lessor is unable (after reasonable efforts) to recover the same from Lessee.

3. Lessor certifies that (i) the Lease is in full force and effect, and embodies the entire agreement between the parties thereto with respect to the Leased Premises and has not been amended except as stated above; (ii) all rent and other charges reserved in the Lease due and payable have been paid; and (iii) other than releases of hazardous substances at the Leased Premises by Lessee in possible violation of Sections 2 and 16 of the Lease, no other event or currently existing condition of default under the Lease exists as of the date hereof.

4. Nothing herein shall be deemed to release or waive any liability or responsibility incurred by Lessee under the Lease or resulting from Lessee's activities on the Leased Premises, prior to the effective date of the assignment of the Lease from Lessee to Assignee.

5. Lessor acknowledges and agrees that this document and Exhibit A attached hereto may and shall constitute a memorandum of lease and that this document may be recorded in the public land records of the county where the Leased Premises are located and indexed against the name of Lessor.

Dated this 25th day of January, 1989.

NORTHWEST NATURAL GAS COMPANY

By: [signature]
Title: SR VICE-PRES

KOPPERS INDUSTRIES, INC.

By: _____
Title: _____

Koppers000414

STATE OF OREGON)
) ss.
County of Multnomah)

The foregoing instrument was acknowledged before me this 15th day of January, 1989, by [illegible] on behalf of Northwest Natural Gas Company.

[illegible]
Notary Public for Oregon
My commission expires: [illegible]

COMMONWEALTH OF PENNSYLVANIA)
) ss.
County of Allegheny)

The foregoing instrument was acknowledged before me this _____ day of January, 1989, by _____ on behalf of Koppers Industries, Inc.

_____
Notary Public for: _____
My commission expires: _____

Koppers000415

EXHIBIT A

TAR PRODUCTS

Production Facility

Portland, Oregon Terminal

LEGAL DESCRIPTION

PARCEL I:

That portion of Sections 12 and 13, Township 1 North, Range 1 West of the Willamette Meridian lying within the W.W. Baker Donation Land Claim, in the City of Portland, County of Multnomah and State of Oregon, described as follows:

Beginning at the point of intersection of the centerline of the Spokane, Portland, and Seattle Railroad and the East line of the W.W. Baker Donation Land Claim; thence North 32°00' East, 162.55 feet to a fence corner at the true point of beginning; thence continuing North 32°00' East along a fence 456.40 feet to a fence corner; thence North 29°58'00" West 150.40 feet; thence North 33°37'00" West 147.88 feet; thence North 49°51'00" West 139.00 feet to a hub; thence South 56°29'00" West 265.15 feet to a nail; thence North 33°13'00" West 260.70 feet to a railroad spike at a point known as point "A"; thence South 56°29'00" West 111.55 feet to a railroad spike; thence South 31°12'30" East 102.90 feet; thence South 56°46'00" West 38.57 feet; thence South 33°14'00" East 36.00 feet; thence South 56°46'00" West 9.00 feet; thence South 33°14'00" East 106.58 feet to a hub; thence South 25°44'30" West 10.51 feet to a hub; thence South 56°24'30" West 54.40 feet; thence South 33°05'30" East 277.30 feet; thence North 56°51'00" East 34.30 feet; thence South 75°03'00" East 34.55 feet; thence South 47°41'30" East 190.00 feet to a nail; thence South 35°16'30" East 140.05 feet to the true point of beginning.

EXCEPT a 30 foot strip of land parallel and contiguous with the East line of the W.W. Baker DLC in Sections 12 and 13, Township 1 North, Range 1 West, said strip of land being 30 feet Westerly of the said DLC line and more particularly described as: Beginning at a point 162.55 feet North 32° East from the intersection of the centerline of the SP & S Railway with the East line of the said Baker DLC; thence North 32° East 456.4 feet; thence North 29°58' West 34 feet; thence South 32° West 459.8 feet; thence South 35°16'30" East 32.5 feet to the point of beginning. ALSO EXCEPT rights of the public to part in City street.

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LAW OFFICES OF
DICKIE, MCCAMEY & CHILCOTE
A PROFESSIONAL CORPORATION

SUITE 400
TWO PPG PLACE
PITTSBURGH, PA
15222-5402

TEL. 412/281-7272

LFF
2 pls. call Lu Ann and ask if, as a duly elected officer of this Corp., you aren't qualified to execute the. If not for some reason, I'll do it.
RK

J. LAWRENCE MCBRIDE
DAVID B. FAWCETT
DAVID J. ARMSTRONG
RICHARD D. KLABER
THEODORE O. STRUK
HERMAN C. KIMPEL
WILBUR MCCOY OTTO
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W. ALAN TORRANCE, JR.
HOWARD A. CHAJSON
MARCELLE M. THEIS
BRIAN T. MUST
DAVID S. BLOOM
DIONYSIOS G. RASSIAS

January 23, 1989 By Messenger

Mr. Robert K. Wagner
President
Koppers Industries, Inc.
436 7th Avenue
Pittsburgh, PA 15219

RE: Northwest Natural Gas Company Lease, Portland, Oregon

Dear Mr. Wagner:

Enclosed please find original Leasehold Consents with regard to the above-referenced Lease. Kindly execute the Consents before a notary public and return the same to me as soon as possible. Thank you.

Very truly yours,

Lu Ann Datesh

LAD/lp
Enclosure

To: Lu Ann Datesh
Dickie, McCamey & Chilcote

Lu Ann,
Documents executed & returned. Thanks
LF

STOEL RIVES BOLEY
JONES & GREY

ATTORNEYS AT LAW
SUITE 2300
STANDARD INSURANCE CENTER
900 SW FIFTH AVENUE
PORTLAND, OREGON 97204-1268

Telephone (503) 224-3380
Telecopier (503) 220-2480
Cable Lawport
Telex 703455
Writer's Direct Dial Number

294-9213

(2) (LG
AIRBURNE
to smaller
to LAD

JAN 20 1989
DICKIE, McCAMEY & Chil.

January 13, 1989

LuAnn Datesh, Esq.
Dickey, McCamey
2 PPG Place, Suite 400
Pittsburgh, PA 15222

Dear Ms. Datesh:

Re: Northwest Natural Gas Company

In accordance with my telephone conversation of January 12, 1989 with Mr. Webb Moniz, I have revised, arranged to have executed on behalf of the Gas Company, and enclose herewith two counterparts of the "Leasehold Consent" by which Northwest Natural Gas Company consents to an assignment of the Portland property from Koppers Company, Inc. to Koppers Industries, Inc. Mr. Moniz assured me that this Consent would be acceptable to your client as revised.

Please have one counterpart of the Leasehold Consent executed on behalf of Koppers Industries, Inc. and returned to me for the gas company's files. The Consent will become effective, and Koppers Company, Inc. will be entitled to make the assignment, at such time as the executed counterpart has been delivered to me.

Please call me if you should have any questions or comments.

Very truly yours,

Richard D. Bach

RDBS#2.052:twa
Enclosures
cc: Webb Moniz, Esq. (w/enclosure)
Bruce R. DeBolt, Esq.
Mr. Edmund L. Bolin

STOEL RIVES BOLEY
JONES & GREY

ATTORNEYS AT LAW
SUITE 2300
STANDARD INSURANCE CENTER
900 SW FIFTH AVENUE
PORTLAND, OREGON 97204-1268

Telephone (503) 224-3380
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Writer's Direct Dial Number

294-9213

January 13, 1989

LuAnn Datesh, Esq.
Dickey, McCamey
2 PPG Place, Suite 400
Pittsburgh, PA 15222

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Please call me if you should have any questions or comments.

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Richard D. Bach

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cc: Webb Moniz, Esq. (w/enclosure)
Bruce R. DeBolt, Esq.
Mr. Edmund L. Bolin

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January 23, 1989 By Messenger

Mr. Robert K. Wagner
President
Koppers Industries, Inc.
436 7th Avenue
Pittsburgh, PA 15219

RE: Northwest Natural Gas Company Lease,
Portland, Oregon

Dear Mr. Wagner:

Enclosed please find original Leasehold Consents with regard to the above-referenced Lease. Kindly execute the Consents before a notary public and return the same to me as soon as possible. Thank you.

Very truly yours,

Lu Ann Datesh

LAD/lp
Enclosure

LEASEHOLD CONSENT

LESSOR: Northwest Natural Gas Company, an Oregon corporation

LESSEE: Koppers Company, Inc., a Delaware corporation

ASSIGNEE: Koppers Industries, Inc., a Pennsylvania corporation

MELLON: Mellon Bank, N.A., as agent for certain lenders

LEASE: That certain Lease Agreement dated August 17, 1965 as subsequently amended and extended, and as most recently amended on November 23, 1987, whereby Lessor leased to Lessee that certain real property (the Leased Premises) more particularly described on Exhibit A, for a term beginning January 1, 1966 and ending January 1, 1993.

1. Subject to the conditions set forth in Paragraph No. 2 hereof, Lessor hereby consents:

   (a) to the assignment of the Lease and all of Lessee's right, title and interest therein, to Assignee;

   (b) to the pledge and collateral assignment of the Lease and all Assignee's right, title and interest in the Lease and Assignee's personal property located on the Leased Premises, to Mellon; and

   (c) to the waiver and release unto Mellon, its successors and assigns, of all right, title and interest which Lessor may have in and to any personal property of Assignee on the Leased Premises.

2. Assignee hereby agrees:

   (a) To assume and be bound by all obligations and liabilities of the Lessee under the Lease from and after the effective date of the assignment; and

   (b) To indemnify and reimburse Lessor for all necessary costs of response (as that term is used in the Comprehensive Environmental Response, Compensation and

Liability Act, as amended) and damages to natural resources, that Lessor may be required to expend or pay as the result of any release of hazardous substances at the Leased Premises by Lessee prior to the effective date of the assignment, but only to the extent that Lessor is unable (after reasonable efforts) to recover the same from Lessee.

3. Lessor certifies that (i) the Lease is in full force and effect, and embodies the entire agreement between the parties thereto with respect to the Leased Premises and has not been amended except as stated above; (ii) all rent and other charges reserved in the Lease due and payable have been paid; and (iii) other than releases of hazardous substances at the Leased Premises by Lessee in possible violation of Sections 2 and 16 of the Lease, no other event or currently existing condition of default under the Lease exists as of the date hereof.

4. Nothing herein shall be deemed to release or waive any liability or responsibility incurred by Lessee under the Lease or resulting from Lessee's activities on the Leased Premises, prior to the effective date of the assignment of the Lease from Lessee to Assignee.

5. Lessor acknowledges and agrees that this document and Exhibit A attached hereto may and shall constitute a memorandum of lease and that this document may be recorded in the public land records of the county where the Leased Premises are located and indexed against the name of Lessor.

Dated this _____ day of January, 1989.

NORTHWEST NATURAL GAS COMPANY

By:_____
Title:_____

KOPPERS INDUSTRIES, INC.

By:_____
Title:_____

Koppers000423

STATE OF OREGON)
) ss.
County of Multnomah)

The foregoing instrument was acknowledged before me this _____ day of January, 1989, by _____ on behalf of Northwest Natural Gas Company.

_____
Notary Public for Oregon
My commission expires: _____

COMMONWEALTH OF PENNSYLVANIA)
) ss.
County of Allegheny)

The foregoing instrument was acknowledged before me this _____ day of January, 1989, by _____ on behalf of Koppers Industries, Inc.

_____
Notary Public for: _____
My commission expires: _____

EXHIBIT A

TAR PRODUCTS

Production Facility

Portland, Oregon Terminal

LEGAL DESCRIPTION

PARCEL I:

That portion of Sections 12 and 13, Township 1 North, Range 1 West of the Willamette Meridian lying within the W.W. Baker Donation Land Claim, in the City of Portland, County of Multnomah and State of Oregon, described as follows:

Beginning at the point of intersection of the centerline of the Spokane, Portland, and Seattle Railroad and the East line of the W.W. Baker Donation Land Claim; thence North 32°00' East, 162.55 feet to a fence corner at the true point of beginning; thence continuing North 32°00' East along a fence 456.40 feet to a fence corner; thence North 29°58'00" West 150.40 feet; thence North 33°37'00" West 147.88 feet; thence North 49°51'00" West 139.00 feet to a hub; thence South 56°29'00" West 265.15 feet to a nail; thence North 33°13'00" West 260.70 feet to a railroad spike at a point known as point "A"; thence South 56°29'00" West 111.55 feet to a railroad spike; thence South 31°12'30" East 102.90 feet; thence South 56°46'00" West 38.57 feet; thence South 33°14'00" East 36.00 feet; thence South 56°46'00" West 9.00 feet; thence South 33°14'00" East 106.58 feet to a hub; thence South 25°44'30" West 10.51 feet to a hub; thence South 56°24'30" West 54.40 feet; thence South 33°05'30" East 277.30 feet; thence North 56°51'00" East 34.30 feet; thence South 75°03'00" East 34.55 feet; thence South 47°41'30" East 190.00 feet to a nail; thence South 35°16'30" East 140.05 feet to the true point of beginning.

EXCEPT a 30 foot strip of land parallel and contiguous with the East line of the W.W. Baker DLC in Sections 12 and 13, Township 1 North, Range 1 West, said strip of land being 30 feet Westerly of the said DLC line and more particularly described as: Beginning at a point 162.55 feet North 32° East from the intersection of the centerline of the SP & S Railway with the East line of the said Baker DLC; thence North 32° East 456.4 feet; thence North 29°58' West 34 feet; thence South 32° West 459.8 feet; thence South 35°16'30" East 32.5 feet to the point of beginning. ALSO EXCEPT rights of the public to part in City street.

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LESSEE: Koppers Company, Inc., a Delaware corporation

ASSIGNEE: Koppers Industries, Inc., a Pennsylvania corporation

MELLON: Mellon Bank, N.A., as agent for certain lenders

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Dated this _____ day of January, 1989.

NORTHWEST NATURAL GAS COMPANY

By:_____
Title:_____

KOPPERS INDUSTRIES, INC.

By:_____
Title:_____

Koppers000428

STATE OF OREGON)
) ss.
County of Multnomah)

The foregoing instrument was acknowledged before me this _____ day of January, 1989, by _____ on behalf of Northwest Natural Gas Company.

_____
Notary Public for Oregon
My commission expires: _____

COMMONWEALTH OF PENNSYLVANIA)
) ss.
County of Allegheny)

The foregoing instrument was acknowledged before me this _____ day of January, 1989, by _____ on behalf of Koppers Industries, Inc.

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Notary Public for: _____
My commission expires: _____

EXHIBIT A

TAR PRODUCTS

Production Facility

Portland, Oregon Terminal

LEGAL DESCRIPTION

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That portion of Sections 12 and 13, Township 1 North, Range 1 West of the Willamette Meridian lying within the W.W. Baker Donation Land Claim, in the City of Portland, County of Multnomah and State of Oregon, described as follows:

Beginning at the point of intersection of the centerline of the Spokane, Portland, and Seattle Railroad and the East line of the W.W. Baker Donation Land Claim; thence North 32°00' East, 162.55 feet to a fence corner at the true point of beginning; thence continuing North 32°00' East along a fence 456.40 feet to a fence corner; thence North 29°58'00" West 150.40 feet; thence North 33°37'00" West 147.88 feet; thence North 49°51'00" West 139.00 feet to a hub; thence South 56°29'00" West 265.15 feet to a nail; thence North 33°13'00" West 260.70 feet to a railroad spike at a point known as point "A"; thence South 56°29'00" West 111.55 feet to a railroad spike; thence South 31°12'30" East 102.90 feet; thence South 56°46'00" West 38.57 feet; thence South 33°14'00" East 36.00 feet; thence South 56°46'00" West 9.00 feet; thence South 33°14'00" East 106.58 feet to a hub; thence South 25°44'30" West 10.51 feet to a hub; thence South 56°24'30" West 54.40 feet; thence South 33°05'30" East 277.30 feet; thence North 56°51'00" East 34.30 feet; thence South 75°03'00" East 34.55 feet; thence South 47°41'30" East 190.00 feet to a nail; thence South 35°16'30" East 140.05 feet to the true point of beginning.

EXCEPT a 30 foot strip of land parallel and contiguous with the East line of the W.W. Baker DLC in Sections 12 and 13, Township 1 North, Range 1 West, said strip of land being 30 feet Westerly of the said DLC line and more particularly described as: Beginning at a point 162.55 feet North 32° East from the intersection of the centerline of the SP & S Railway with the East line of the said Baker DLC; thence North 32° East 456.4 feet; thence North 29°58' West 34 feet; thence South 32° West 459.8 feet; thence South 35°16'30" East 32.5 feet to the point of beginning. ALSO EXCEPT rights of the public to part in City street.

PARCEL II:

That portion of Section 12, Township 1 North, Range 1 West of the Willamette Meridian lying within the W.W. Baker Donation Land

Claim, in the City of Portland, County of Multnomah and State of Oregon, described as follows:

Beginning at a point 769.61 feet North and 365.57 feet West of a tack marking the point of intersection of the centerline of the SP&S Railway with the Southeasterly line of the W.W. Baker DLC in said Township and Range; thence South 56°46' West 70.52 feet; thence South 33°05'30" East 149 feet; thence North 56°24'30" East 54.4 feet; thence North 25°44'30" East 10.51 feet; thence North 33°14' West 106.58 feet; thence North 56°46' East 9 feet; thence North 33°14' West 36 feet to the point of beginning.

PITTSBURGH ACQUISITION CORPORATION, INC.

Memorandum of Lease
Landlord's Consent to Leasehold Mortgage
and
Landlord's Waiver

(Portland, Oregon, Tar Products)

December 16, 1988

Northwest Natural Gas Company
220 N.W. Second Avenue
Portland, Oregon 97209

Gentlemen:

Please be advised that Koppers Company, Inc. ("Koppers") has tentatively agreed to sell certain of its assets and certain of its divisions to Pittsburgh Acquisition Corporation, Inc. (the "Purchaser"). One of the assets to be acquired by the Purchaser is Koppers' interest in that certain lease more particularly described on Exhibit A attached hereto and made a part hereof (the "Lease"), whereby Northwest Natural Gas Company ("Lessor") leased to Koppers, as lessee, that certain real property more particularly described on Exhibit B attached hereto and made a part hereof (the "Leased Premises"). The Purchaser will assume all liabilities and obligations of Koppers under the Lease from and after the effective date of the acquisition.

In addition, in connection with the financing of the acquisition, the Purchaser simultaneously will be pledging and assigning as collateral to Mellon Bank, N.A., as Agent, ("Mellon") all of the Purchaser's interest in the Lease and all of the personal property of the Purchaser located on the Leased Premises.

We are writing to request your consent to the pledge and collateral assignment to Mellon of all of the Purchaser's interest in the Lease and the personal property of the Purchaser located on the Leased Premises.

Accordingly, please indicate your consent to and approval of the pledge and collateral assignment by the Purchaser of its interest in the Lease and personal property to Mellon by signing and dating the enclosed copy of this letter in the spaces provided below and returning the enclosure to the undersigned.

The acquisition is scheduled to close on or about December 28, 1988, and the assignments will become effective as of the closing. Therefore, your timely consideration of this matter is greatly appreciated. If you have any questions about this letter or the assignments, please call my office at (412) 281-7272.

Thank you for your cooperation.

Very truly yours,

PITTSBURGH ACQUISITION
CORPORATION, INC.

By: Clayton A. Sweeney
Clayton A. Sweeney, Director

CONSENT

Lessor hereby consents to and approves the pledge and collateral assignment to Mellon, as Agent, of all of the right, title and interest of the Purchaser in and to such Lease and of all personal property of the Purchaser located on the Leased Premises. Lessor further waives and releases unto Mellon, its successors and assigns all right, title and interest which Lessor may have in and to any personal property of the Purchaser on the Leased Premises. Lessor acknowledges and agrees that this document and Exhibits A and B attached hereto may and shall constitute a memorandum of lease and that this document may be recorded in the public land records of the county where the Leased Premises are located and indexed against the name of Lessor.

Dated this ____ day of _____, 198_.

LESSOR:

Attest:

By: _____

Name: _____

Title: _____

_____
Secretary

[Corporate Seal]

COMMONWEALTH OF PENNSYLVANIA)
) SS:
COUNTY OF Allegheny)

On this, the 16 day of December, 1988, before me, a Notary Public, the undersigned officer, personally appeared Clayton A. Sweeney, who acknowledged himself to be a Director of PITTSBURGH ACQUISITION CORPORATION, INC., a Pennsylvania corporation, and that he as such Director, being authorized to do so, executed the foregoing instrument for the purposes therein contained by signing the name of the corporation by himself as Director.

In witness whereof, I hereunto set my hand and official seal.

Loretta Pettinato
Notary Public

[Notarial Seal]

My commission expires:

NOTARIAL SEAL
LORETTA PETTINATO, NOTARY PUBLIC
PITTSBURGH, ALLEGHENY COUNTY
MY COMMISSION EXPIRES OCT. 7, 1991
Member, Pennsylvania Association of Notaries

STATE OF _____)
) SS:
COUNTY OF _____)

This instrument was acknowledged before me on

_____, 1988, by _____ as

_____ of NORTHWEST NATURAL GAS COMPANY.

_____
Notary Public

[Notarial Seal]

My commission expires:

EXHIBIT A

That certain lease agreement dated August 17, 1965, as subsequently amended and extended, and as most recently amended on November 23, 1987, whereby Northwest Natural Gas Company, as lessor, leased to Koppers, as lessee, that certain real property more particularly described on Exhibit B for a term beginning January 1, 1966 and ending January 1, 1993.

EXHIBIT B

TAR PRODUCTS

Production Facility

Portland, Oregon Terminal

LEGAL DESCRIPTION

PARCEL I:

That portion of Sections 12 and 13, Township 1 North, Range 1 West of the Willamette Meridian lying within the W.W. Baker Donation Land Claim, in the City of Portland, County of Multnomah and State of Oregon, described as follows:

Beginning at the point of intersection of the centerline of the Spokane, Portland, and Seattle Railroad and the East line of the W.W. Baker Donation Land Claim; thence North 32°00' East, 162.55 feet to a fence corner at the true point of beginning; thence continuing North 32°00' East along a fence 456.40 feet to a fence corner; thence North 29°58'00" West 150.40 feet; thence North 33°37'00" West 147.88 feet; thence North 49°51'00" West 139.00 feet to a hub; thence South 56°29'00" West 265.15 feet to a nail; thence North 33°13'00" West 260.70 feet to a railroad spike at a point known as point "A"; thence South 56°29'00" West 111.55 feet to a railroad spike; thence South 31°12'30" East 102.90 feet; thence South 56°46'00" West 38.57 feet; thence South 33°14'00" East 36.00 feet; thence South 56°46'00" West 9.00 feet; thence South 33°14'00" East 106.58 feet to a hub; thence South 25°44'30" West 10.51 feet to a hub; thence South 56°24'30" West 54.40 feet; thence South 33°05'30" East 277.30 feet; thence North 56°51'00" East 34.30 feet; thence South 75°03'00" East 34.55 feet; thence South 47°41'30" East 190.00 feet to a nail; thence South 35°16'30" East 140.05 feet to the true point of beginning.

EXCEPT a 30 foot strip of land parallel and contiguous with the East line of the W.W. Baker DLC in Sections 12 and 13, Township 1 North, Range 1 West, said strip of land being 30 feet Westerly of the said DLC line and more particularly described as: Beginning at a point 162.55 feet North 32° East from the intersection of the centerline of the SP & S Railway with the East line of the said Baker DLC; thence North 32° East 456.4 feet; thence North 29°58' West 34 feet; thence South 32° West 459.8 feet; thence South 35°16'30" East 32.5 feet to the point of beginning. ALSO EXCEPT rights of the public to part in City street.

PARCEL II:

That portion of Section 12, Township 1 North, Range 1 West of the Willamette Meridian lying within the W.W. Baker Donation Land

Claim, in the City of Portland, County of Multnomah and State of Oregon, described as follows:

Beginning at a point 769.61 feet North and 365.57 feet West of a tack marking the point of intersection of the centerline of the SP&S Railway with the Southeasterly line of the W.W. Baker DLC in said Township and Range; thence South 56°46' West 70.52 feet; thence South 33°05'30" East 149 feet; thence North 56°24'30" East 54.4 feet; thence North 25°44'30" East 10.51 feet; thence North 33°14' West 106.58 feet; thence North 56°46' East 9 feet; thence North 33°14' West 36 feet to the point of beginning.

Koppers000439

Koppers Company, Inc.
436 Seventh Avenue
Pittsburgh, PA 15219
Telephone 412-227-2000

KOPPERS

DHL WORLDWIDE EXPRESS

December 16, 1988

Northwest Natural Gas Company
220 N. W. Second Avenue
Portland, OR 97209

Attn: Mr. E. L. Bolin, Manager
Land & Claims Department

Dear Mr. Bolin:

Koppers Company, Inc. ("Koppers") has agreed to sell certain of the assets of certain of its divisions to Pittsburgh Acquisition Corporation, Inc. (the "Purchaser"). One of the assets which is being acquired by the Purchaser is Koppers' interest in the Lease in Portland, Oregon dated August 7, 1965, and subsequently amended and extended between Northwest Natural Gas Company and Koppers Company, Inc. (such agreement or agreements all together referred to as the "Agreement"). The Purchaser will assume all liabilities and obligations of Koppers under the Agreement from and after the effective date of the acquisition. The Purchaser has requested your consent to the assignment of the Agreement.

Please indicate your consent to and approval of the assignment to the Purchaser by Koppers of Koppers' interest in the Agreement by signing and dating the enclosed copy of this letter in the spaces provided below and returning the enclosure to the undersigned. We have also enclosed a separate letter requested by the Purchaser with respect to the financing of the acquisition to be returned together with the copy of this letter. Your consent to the assignment only relates to the interests of Koppers and the Purchaser in the Agreement and does not apply to or encumber your interests in the Agreement or the subject property.

The acquisition is scheduled to close on or about December 28, 1988, and the assignments will become effective as of the closing. (For your information, the Purchaser is planning to change its name to Koppers Industries Inc. soon after closing which will be a subsidiary of a corporation initially known as PAC Holdings Corporation which will change its name to Koppers Holdings Corporation soon after closing.) Therefore, your timely consideration of this matter is greatly appreciated. If you have any questions about this letter or the assignments, please call my office at (412) 227-2621.

Thank you for your cooperation.

Very truly yours,

James B. Springfield

James B. Springfield
Corporate Real Estate

JBS/sjd

Enclosures

Northwest Natural Gas Company ("Lessor") hereby approves (i) the assignment to Pittsburgh Acquisition, Corporation, Inc., of all of the right, title and interest of Koppers Company, Inc. in and to the Agreement referred to above.

Lessor further certifies, that (i) such Agreement is in full force and effect, and embodies the entire agreement between the parties thereto with respect to the leased premises and has not been amended, except for the aforementioned amendments and (ii) all rent and other charges reserved in such Agreement due and payable have been paid, and no other event or currently existing condition of default under the Lease exists as of the date indicated below.

Date: December , 1988.

Northwest Natural Gas Company

By: _____

Name: _____

Title: _____

Koppers Company, Inc.
436 Seventh Avenue
Pittsburgh, PA 15219
Telephone 412-227-2000

KOPPERS

December 22, 1988

Northwest Natural Gas Company
220 N. W. Second Avenue
Portland, OR 97209

Attn: Mr. E. L. Bolin
Manager, Land & Claims
Department

Dear Mr. Bolin:

This will respond to your telephonic request for additional information regarding our letter to you of December 16 requesting Northwest Natural Gas' consent to the assignment by Koppers to Pittsburgh Acquisition Corporation, Inc. ("PAC") of our lease with you dated August 7, 1965.

The business of the Tar and Wood Division, and certain other portions of Koppers' Chemical and Allied Products sector, are being sold to PAC, a newly formed company to be operated by the existing management of those businesses. The management group and others will be shareholders in the new company; Koppers itself will have approximately a 40% equity interest. In addition to the equity financing, Mellon Bank, N.A., is acting as agent for a syndicate of banks which will be providing approximately $230 million of the aggregate purchase price.

It is understood that notwithstanding the assignment, Koppers will remain liable to Northwest Natural Gas in accordance with the terms and conditions of the lease. Furthermore, the asset purchase agreement provides, in general, that liability under applicable environmental laws arising prior to the closing date will remain Koppers' responsibility.

We trust that the foregoing is responsive to your concerns. Please feel free to contact me at 412-227-2621 if you have any additional questions.

Very truly yours,

James B. Springfield /sjd

James B. Springfield
Corporate Real Estate

JBS/sjd

Koppers Company, Inc.
436 Seventh Avenue
Pittsburgh, PA 15219
Telephone 412-227-2000

KOPPERS

December 22, 1988

Northwest Natural Gas Company
220 N. W. Second Avenue
Portland, OR 97209

Attn: Mr. E. L. Bolin
Manager, Land & Claims
Department

Dear Mr. Bolin:

This will respond to your telephonic request for additional information regarding our letter to you of December 16 requesting Northwest Natural Gas' consent to the assignment by Koppers to Pittsburgh Acquisition Corporation, Inc. ("PAC") of our lease with you dated August 7, 1965.

The business of the Tar and Wood Division, and certain other portions of Koppers' Chemical and Allied Products sector, are being sold to PAC, a newly formed company to be operated by the existing management of those businesses. The management group and others will be shareholders in the new company; Koppers itself will have approximately a 40% equity interest. In addition to the equity financing, Mellon Bank, N.A., is acting as agent for a syndicate of banks which will be providing approximately $230 million of the aggregate purchase price.

It is understood that notwithstanding the assignment, Koppers will remain liable to Northwest Natural Gas in accordance with the terms and conditions of the lease. Furthermore, the asset purchase agreement provides, in general, that liability under applicable environmental laws arising prior to the closing date will remain Koppers' responsibility.

We trust that the foregoing is responsive to your concerns. Please feel free to contact me at 412-227-2621 if you have any additional questions.

Very truly yours,

James B. Springfield /sjd

James B. Springfield
Corporate Real Estate

JBS/sjd

HOUSTON, TEXAS

Koppers000445

PITTSBURGH ACQUISITION CORPORATION, INC.

Memorandum of Lease
Landlord's Consent to Leasehold Mortgage
and
Landlord's Waiver

Houston, Texas, Tar Products

December 16, 1988

Amerada Hess Corporation
1200 Milam Street
Sixth Floor
Houston, TX 77002

Gentlemen:

Please be advised that Koppers Company, Inc. ("Koppers") has tentatively agreed to sell certain of its assets and certain of its divisions to Pittsburgh Acquisition Corporation, Inc. (the "Purchaser"). One of the assets to be acquired by the Purchaser is Koppers' interest in those certain leases more particularly described on Exhibit A attached hereto and made a part hereof (herein collectively referred to as the "Lease") whereby Oil & Chemical Division, Amerada Hess Corporation ("Lessor"), leased to Koppers, as lessee, that certain property more particularly described on Exhibit B attached hereto and made a part hereof (the "Leased Premises"). The Purchaser will assume all liabilities and obligations of Koppers under the Lease from and after the effective date of the acquisition.

In addition, in connection with the financing of the acquisition, the Purchaser simultaneously will be pledging and assigning as collateral to Mellon Bank, N.A., as Agent, ("Mellon") all of the Purchaser's interest in the Lease and all of the personal property of the Purchaser located on the Leased Premises.

We are writing to request your consent to the pledge and collateral assignment to Mellon of all of the Purchaser's interest in the Lease and the personal property of the Purchaser located on the Leased Premises.

Accordingly, please indicate your consent to and approval of the pledge and collateral assignment by the Purchaser of its interest in the Lease and personal property to Mellon by signing and dating the enclosed copy of this letter in the spaces provided below and returning the enclosure to the undersigned.

The acquisition is scheduled to close on or about December 28, 1988, and the assignments will become effective as of the closing. Therefore, your timely consideration of this matter is greatly appreciated. If you have any questions about this letter or the assignments, please call my office at (412) 281-7272.

Thank you for your cooperation.

Very truly yours,

PITTSBURGH ACQUISITION
CORPORATION, INC.

By: Clayton A. Sweeney, Director

CONSENT

Lessor hereby consents to and approves the pledge and collateral assignment to Mellon, as Agent, of all of the right, title and interest of the Purchaser in and to such Lease and of all personal property of the Purchaser located on the Leased Premises. Lessor further waives and releases unto Mellon, its successors and assigns all right, title and interest which Lessor may have in and to any personal property of the Purchaser on the Leased Premises. Lessor acknowledges and agrees that this document and Exhibits A and B attached hereto may and shall constitute a memorandum of lease and that this document may be recorded in the public land records of the county where the Leased Premises are located and indexed against the name of Lessor.

Dated this ____ day of _____, 198_.

LESSOR:

Attest:

By: _____

Name: _____

_____ Title: _____

Secretary

[Corporate Seal]

COMMONWEALTH OF PENNSYLVANIA)
) SS:
COUNTY OF Allegheny)

On this, the 16 day of December, 1988, before me, a Notary Public, the undersigned officer, personally appeared Clayton A. Sweeney, who acknowledged himself to be the Director of PITTSBURGH ACQUISITION CORPORATION, INC., a Pennsylvania corporation, and that he as such Director, being authorized to do so, executed the foregoing instrument for the purposes therein contained by signing the name of the corporation by himself as Director.

In witness whereof, I hereunto set my hand and official seal.

Loretta Pettinato
Notary Public

[Notarial Seal]

My commission expires:

NOTARIAL SEAL
LORETTA PETTINATO, NOTARY PUBLIC
PITTSBURGH, ALLEGHENY COUNTY
MY COMMISSION EXPIRES OCT. 7, 1991
Member, Pennsylvania Association of Notaries

EXHIBIT A

That certain Terminal Service Contract #005-373 dated March 16, 1962, as amended and extended from time to time, the most current amendment being designated as Amendment No. 5, dated June 28, 1979, whereby Hess Terminal Corporation (now Hess Oil & Chemical Division, Amerada Hess Corporation), as lessor, leased to Koppers, as lessee, that certain real property more particularly described on Exhibit B for a term beginning July 5, 1962 and ending July 5, 1992; and

That certain Terminal Service Contract #005-374 dated February 16, 1962, as amended and extended from time to time, the most current amendment being designated as Amendment No. 3, dated June 28, 1979, whereby Hess Terminal Corporation (now Hess Oil & Chemical Division, Amerada Hess Corporation), as lessor, leased to Koppers, as lessee, certain facilities located on that certain property more particularly described on Exhibit B for a term beginning July 5, 1962 and ending July 5, 1992.

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EXHIBIT B

TAR PRODUCTS

Production Facility

Houston, Texas Terminal

LEGAL DESCRIPTION

Description of 10.8427 acres (472,308 sq. ft.) of land being a Northerly portion of a called 180.00 acre tract of land as recorded in Volume 2338, Page 581 of the Deed Records of Harris County, Texas, in the Harris and Wilson Survey, Abstract No. 31, in Harris County, Texas, said 10.8427 acre tract being more fully described by metes and bounds as follows (with bearings being referenced to said called 180.00 acre tract):

BEGINNING at a 2-inch iron pipe found for the most Northerly corner of the aforementioned called 180.00 acre tract in the Southeasterly right-of-way line of the Public Belt Railway and the Southwesterly right-of-way line of a 50-foot private way or road;

THENCE, S. 43 deg. 15 min. 00 sec. E, with the Northeasterly line of the said called 180.00 acre tract along the Southwesterly right-of-way line of a 50-foot private way or road, a distance of 673.54 feet to a 5/8-inch iron rod set for the most Easterly corner of the herein described tract;

THENCE, S. 46 deg. 35 min. 35 sec. W, a distance of 683.78 feet to a 5/8-inch iron rod set for the most Southerly corner of the herein described tract;

THENCE, N 43 deg. 22 min. 10 sec. W, a distance of 550.15 feet to a 5/8-inch iron rod set for an interior corner of the herein described tract;

THENCE, S 77 deg. 58 min. 00 sec. W, a distance of 231.78 feet to a 5/8-inch iron rod set in the Northwesterly line of the said called 180.00 acre tract and the Southeasterly right-of-way line of the said Public Belt Railway for the most Westerly corner of the herein described tract;

THENCE, 46 deg. 25 min. 00 sec. E, with the Northwesterly line of the said called 180.00 acre tract along the Southeasterly right-of-way line of the said Public Belt Railway, a distance of 883.16 feet to the POINT OF BEGINNING and containing 10.8427 acres of land. This description is based on the ground survey and plat prepared by Marion R. Clark, Registered Public Surveyor, dated October 21, 1988.

Koppers Company, Inc.
436 Seventh Avenue
Pittsburgh, PA 15219
Telephone 412-227-2000

KOPPERS

DHL WORLDWIDE EXPRESS

December 16, 1988

Amerada Hess Corporation
1200 Milam Street
Sixth Floor
Houston, TX 77002

Attn: Mr. H. W. McCollum

Dear Mr. McCollum:

Koppers Company, Inc. ("Koppers") has agreed to sell certain of the assets of certain of its divisions to Pittsburgh Acquisition Corporation, Inc. (the "Purchaser"). One of the assets which is being acquired by the Purchaser is Koppers' interest in the Terminal Service Contract #005-373 dated March 16, 1962, as amended from time to time, the most current amendment being designated as Amendment No. 5, dated June 28, 1979, and the Terminal Service Contract #005-374 dated February 16, 1962, as amended from time to time, the most current amendment being designated as Amendment No. 3, dated June 28, 1979, both of which are between the then Hess Terminal Corporation and Koppers Company, Inc. (such agreement or agreements all together referred to as the "Agreement"). The Purchaser will assume all liabilities and obligations of Koppers under the Agreement from and after the effective date of the acquisition. The Purchaser has requested your consent to the assignment of the Agreement.

Please indicate your consent to and approval of the assignment to the Purchaser by Koppers of Koppers' interest in the Agreement by signing and dating the enclosed copy of this letter in the spaces provided below and returning the enclosure to the undersigned. We have also enclosed a separate letter requested by the Purchaser with respect to the financing of the acquisition to be returned together with the copy of this letter. Your consent to the assignment only relates to the interests of Koppers and the Purchaser in the Agreement and does not apply to or encumber your interests in the Agreement or the subject property.

Lessor further certifies, that (i) such Agreement is in full force and effect, and embodies the entire agreement between the parties thereto with respect to the leased premises and has not been amended except for the aforementioned amendments and (ii) all rent and other charges reserved in such Agreement due and payable have been paid, and no other event or currently existing condition of default under the Lease exists as of the date indicated below.

Date: December , 1988.

Amerada Hess Corporation

By:_____

Name:_____

Title:_____

The acquisition is scheduled to close on or about December 28, 1988, and the assignments will become effective as of the closing. (For your information, the Purchaser is planning to change its name to Koppers Industries Inc. soon after closing which will be a subsidiary of a corporation initially known as PAC Holdings Corporation which will change its name to Koppers Holdings Corporation soon after closing.) Therefore, your timely consideration of this matter is greatly appreciated. If you have any questions about this letter or the assignments, please call my office at (412) 227-2621.

Thank you for your cooperation.

Very truly yours,

James B. Springfield

James B. Springfield
Corporate Real Estate

JBS/sjd

Enclosures

Amerada Hess Corporation ("Lessor") hereby approves (i) the assignment to Pittsburgh Acquisition Corporation, Inc. of all of the right, title and interest of Koppers Company, Inc. in and to the Agreement referred to above.

PRODUCTION FACILITIES

CONSENT REQUESTS

1.	Galesburg, Illinois	Burlington Northern Railroad Co.
2.	Port Newark, New Jersey	The Port Authority of New York & New Jersey
3.	Chicago, Illinois	The Metropolitan Sanitary District of Greater Chicago
4.	Portland, Oregon	Northwest Natural Gas Company
5.	Houston, Texas	Amerada Hess Corporation

COPY

PRINTED 8/31/07

LEASE AGREEMENT

BETWEEN

NORTHWEST NATURAL GAS COMPANY,
dba NW Natural,
as Landlord

and

KOPPERS INDUSTRIES, INC.,
as Tenant

as of October 1, 1998

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BASIC LEASE INFORMATION

Lease Date:	October 1, 1998
Landlord:	Northwest Natural Gas Company, dba NW Natural
Address of Landlord:	220 NW Second Avenue Portland, Oregon 97209 Attention: Manager: Risk, Environmental and Land
All Payments Made To:	220 NW Second Avenue Portland, Oregon 97209 Attention: Manager: Risk, Environmental and Land
Tenant:	Koppers Industries, Inc.
Address of Tenant:	7540 NW St. Helens Road Portland, Oregon 97210
Contact:	Amos Kamerer
Premises:	That section of the real property identified on Exhibit B to the Lease, and such portions of Landlord's Plant Property required for the Dock Improvements.
Lease Term:	Number of Months: 120 Scheduled Commencement Date: 10/01/1998 Expiration Date: 09/30/2008
Rent:	$9,900.00 per month for the initial term $11,356.30 For Jan 08
Special Provisions:	Two five-year renewal terms; option to construct additional improvements and modify Landlord's existing docking facility.

LEASE AGREEMENT

THIS LEASE AGREEMENT (this "Lease") is made and entered into effective as of September 1, 1998, by and between NORTHWEST NATURAL GAS COMPANY (dba NW Natural), an Oregon corporation ("Landlord"), and KOPPERS INDUSTRIES, INC., a Pennsylvania corporation ("Tenant").

RECITALS

A. Landlord owns certain real property located in Portland, Multnomah County, Oregon, more particularly described in Exhibit A ("Landlord's Plant Property"), a portion of which is used by Landlord to conduct its liquid natural gas operations and a portion of which is currently leased to Tenant pursuant to the Prior Lease (as defined below). Portions of Landlord's Plant Property are also leased to other tenants from time to time.

B. Landlord desires to continue to lease to Tenant that portion of Landlord's Plant Property currently occupied by Tenant and such additional portions of the Landlord's Plant Property required for the Dock Improvements, and Tenant desires to lease the same from Landlord, on the terms and conditions set forth below.

AGREEMENT

Landlord and Tenant therefore agree as follows:

1. DEFINITIONS

As used in this Lease, the following terms shall have the following respective meanings:

"Dock Improvements" has the meaning specified in Section 5.2.

"Docking Facility" has the meaning specified in Section 5.2.

"Environmental Laws" means all state, federal and local statutes, regulations and ordinances relating to the protection of human health and the environment.

"Existing Environmental Liabilities" means the liability of Landlord, and Koppers Company, Inc. (now known as Beazer East, Inc. and the previous tenant under the Prior Lease) for certain environmental contamination of Landlord's Plant Property, as established and allocated pursuant to an agreement between Landlord and Beazer East, Inc..

"Existing Improvements" has the meaning specified in Section 5.1.

"Existing Mortgage" means the Mortgage and Deed of Trust dated July 1, 1946, and recorded in the Mortgage Records of Multnomah County, Oregon, on July 19, 1946 at Book 911, Page 203, as modified encumbering Landlord's Plant Property.

"Governmental Requirements" means any and all laws, statutes, ordinances, rules, orders, requirements, resolutions, policy statements and regulations of any federal, state or local governmental or quasi-governmental bodies or agencies having jurisdiction over the Landlord's Plant Property or the business and operations conducted by any party on any portion of Landlord's Plant Property.

"Hazardous Material" means any hazardous or toxic substance, material or waste, including, but not limited to, those substances, materials and wastes listed in the United States Department of Transportation Hazardous Materials Table (49 C.F.R. § 172.101) or by the United States Environmental Protection Agency as hazardous substances (40 C.F.R. pt. 302 and amendments thereto), petroleum products and their derivatives, and such other substances, materials and wastes as become regulated or subject to cleanup authority under any Environmental Laws.

"Landlord's Plant Property" has the meaning specified in Recital A.

"Lease Term" means the initial term of this Lease, as extended by any renewal terms.

"Real Property Taxes" means all taxes, assessments (general and special) and other charges that may be imposed on or against all or any portion of or in relation to the Premises, any leasehold estate in the Premises or measured by rent from the Premises. "Real Property Taxes" also includes any assessment, charge or tax (other than estate, inheritance, net income or franchise taxes) imposed by any authority having a direct or indirect power to tax or charge, including, without limitation, any city, county, state, federal or any improvement or other district.

"Premises" means that portion of Landlord's Plant Property consisting of all of Tax Lot 111 as more particularly described and depicted in Exhibit B and such portions of Landlord's Plant Property required for the Dock Improvements.

"Prior Lease" means the Lease dated August 17, 1965, between Landlord and Koppers Company, Inc. (now known as Beazer East, Inc.), recorded in the Records of Multnomah County, Oregon, on September 7, 1965 at Book 373, Page 271, the tenant's interests and obligations thereunder having been assigned to and assumed by Tenant by instrument dated March 13, 1989 and recorded in the Records of

Multnomah County, Oregon, at Book 2185, Page 289, as such Lease has been previously amended and as affected by the allocation of Existing Environmental Liabilities.

2. LEASE OF PREMISES; TERM

2.1 Premises; Demising Clause

Landlord hereby leases to Tenant, and Tenant hereby leases from Landlord, the Premises on the terms and conditions set forth in this Lease. Tenant acknowledges that other tenants of Landlord from time to time may use the loading and unloading facilities located along the southeasterly boundary of the Premises.

2.2 Initial Term of Lease

The initial ten (10) year term of this Lease shall commence on October 1, 1998, and shall end at 11:59 P.M. on September 30, 2008. The Prior Lease shall terminate on the commencement date of this Lease; provided, however, such termination shall not release or otherwise affect Tenant's obligations with respect to any environmental condition of Landlord's Plant Property caused by Tenant or Beazer East, Inc. under the Prior Lease in connection with operations on the Premises under this Lease or the Prior Lease or any party's obligations with respect to the Existing Environmental Liabilities. Tenant may terminate this Lease at any time during the initial term or any renewal term hereof upon giving twelve (12) months' prior written notice to Landlord. Any such termination shall not affect any amount of rent due and owing under this Lease up to the effective date of such termination or affect any liability of Tenant under Environmental Laws.

2.3 Renewal Terms

If there is no default under this Lease when each option is exercised or when the renewal term is to commence, then Tenant shall have the option to renew this Lease for two (2) successive terms of five (5) years each, as follows:

2.3.1 Each renewal term shall commence on the day following expiration of the immediately preceding term.

2.3.2 Tenant shall exercise the renewal option, if at all, by written notice to Landlord given not less than one hundred eighty (180) days before the applicable renewal term begins. Tenant may exercise its option to renew for the second renewal term if (a) Tenant timely exercises its renewal option, and (b) Tenant leased the Premises for the immediately preceding renewal term. If Tenant gives such

notice, then this Lease shall be binding for the applicable renewal term without further act of the parties.

2.3.3 The terms and conditions applicable to Tenant's leasing of the Premises for each renewal term shall be as set forth in this Lease with respect to the initial term, except for rent and except that Tenant may not renew this Lease for the renewal term that has been exercised. Rent for each renewal term shall be subject to adjustment as provided in Section 4.2 below.

3. USE

Tenant is authorized to use the Premises for purchasing, loading and unloading, storing, processing and selling coal tar, products derived from coal tar and petroleum pitch, and for other purposes incidental and directly related to such operations, including, but not limited to, incidental office space and parking for its employees and visitors. Tenant shall not use the Premises for any other purpose without the prior written consent of Landlord, which will not be unreasonably withheld. Tenant shall have the right to install signs on the Premises identifying its operations, to the extent permitted by law. Tenant shall coordinate its use of the Docking Facility with Landlord and other tenants of Landlord's Plant Property. Landlord may, in its sole discretion, resolve any dispute among tenants regarding the time, duration, and nature of the use of the Docking Facility. Tenant may not perform any excavating or digging operation of any type or kind on the Premises without prior written notice to Landlord and without Landlord's prior written consent, which will not be unreasonably withheld.

4. RENT

4.1 Basic Monthly Rent

Tenant shall pay as basic monthly rent to Landlord during the first five (5) years of the initial Lease Term the sum of $9,900.00 per month (subject to adjustment as provided in Section 4.2 for the second five (5) years of the initial Lease Term and for any renewal terms, and subject to adjustment as provided in Section 5.2 with respect to any Dock Improvements made by Tenant). Rent shall be paid in advance on the first day of each calendar month, at Landlord's address set forth in Section 22.4 below, or at such other place as Landlord may designate in writing from time to time. Rent due for any partial month shall be prorated. Except as may be specifically provided otherwise herein, all rent shall be paid without billing and without prior demand or notice and without any deduction or offset.

4.2 Rent During Second Five Years and During Renewal Terms

The basic monthly rent shall be adjusted in accordance with this Section 4.2 on the first day of the sixth (6th) year of the Lease Term and, if Tenant has exercised its renewal options with respect thereto on the first day of each renewal term of this Lease, the basic monthly rent shall be adjusted in accordance with this Section 4.2. Each such adjustment date is hereinafter referred to as a "Rent Adjustment Date". The base for computing such increases is the Consumer Price Index All Urban Consumers U.S. City Average (1982-84 = 100), published by the United States Department of Labor, Bureau of Labor Statistics ("Index"), in effect on November 1, 1997 ("Beginning Index"). The Index published and in effect on the date that is two (2) months prior to each Rent Adjustment Date ("Adjustment Index") is to be used in determining the amount of the increase on such Rent Adjustment Date. Beginning with the basic monthly rent due on and after the first Rent Adjustment Date, and on and after each subsequent Rent Adjustment Date, the basic monthly rent due shall be increased by an amount equal to the product achieved by multiplying the basic monthly rent in effect immediately preceding such Rent Adjustment Date by a fraction. On the first Rent Adjustment Date, the numerator of the fraction will be the Adjustment Index and the denominator will be the Beginning Index. On the second and each subsequent Rent Adjustment Date, the numerator of the fraction will be the current Adjustment Index and the denominator will be the Adjustment Index used to calculate the immediately preceding rental increase pursuant to this Section 4.2. In no event, however, shall any adjustments made under this Section 4.2 cause the basic monthly rent to be reduced below the basic monthly rent amount most recently in effect. If the Index is changed so that the base year index differs from that in effect on November 1, 1997, the Index shall be converted in accordance with the conversion factor published by the United States Department of Labor Bureau of Labor Statistics. If the Index is discontinued or revised during the Term, such other government index or computation with which it is replaced, as agreed to by both parties to this Lease, shall be used in order to obtain substantially the same result as would be obtained if the Index had not been discontinued or revised.

— 161.5

— 211.693 on 2/1/08

By way of example, but not by way of limitation, for the rental adjustment taking place on January 1, 2003, the Index in effect for November 2002 shall be compared to the Index in effect for the month of November 1997. For the adjustment taking place with respect to the first renewal term on January 1, 2008, the parties will compare the Index in effect for November 2007 to the Index for November 2002.

4.3 Additional Rent

All other costs, charges and reimbursements that Tenant is required elsewhere in this Lease to pay, and any other sum that Tenant is required to pay to Landlord or

third parties in connection with this Lease, shall constitute additional rent under this Lease. All delinquent rent shall bear interest at the rate of nine percent (9)% per annum from the date due until paid.

5. LEASEHOLD IMPROVEMENTS AND PERSONAL PROPERTY

5.1 Existing Improvements

Pursuant to the Prior Lease, Tenant constructed and is in possession of substantial improvements on the Premises (the "Existing Improvements"). Tenant shall accept possession under this Lease of the Existing Improvements and any other improvements located on the Premises as of the date of this Lease in their current, AS IS, WHERE IS condition, without representation or warranty as to condition, fitness for purpose or any other representation or warranty by Landlord whatsoever, express or implied. Tenant may relocate, modify, dismantle and remove, or replace any of the Existing Improvements without Landlord's consent and, with Landlord's prior written consent, any other improvements on the Premises as of the date of this Lease (save and except the fire walls surrounding the light oil tank farm), which consent shall not be unreasonably withheld.

5.2 Future Leasehold Improvements--Modification of Existing Marine Petroleum Terminal

Landlord acknowledges that Tenant intends to modify Tenant's operations at the Premises to use liquid coal tar pitch, in addition to or in place of solid coal tar pitch. As part of this change in Tenant's operations, Tenant wishes to construct additional improvements to Tenant's Existing Improvements and to modify Landlord's existing docking facility (consisting of a crane, a wharf, the dock, and any improvements, additions, or replacements thereto, together defined as the "Docking Facility") located on the northerly boundary of Landlord's Plant Property. The additional improvements contemplated by Tenant to the Docking Facility are referred to collectively as the "Dock Improvements." If the Dock Improvements are constructed, the basic monthly rent payable by Tenant to Landlord shall be increased by $100.00 per month as a result of Tenant's increased use of Landlord's Plant Property. Landlord shall cooperate with Tenant as reasonably necessary to allow Tenant to construct the Dock Improvements, at Tenant's sole cost and expense, subject to the following limitations:

5.2.1 Prior to any construction of the Dock Improvements by or for Tenant, Landlord and Tenant shall reach substantial written agreement regarding the scheduling and level of use of the Docking Facility by Tenant and Landlord, and any other tenant or subtenant of Landlord at Landlord's Plant Property; provided, however,

that the Docking Facility but not the Dock Improvements shall be deemed to be a common area and may be used by other tenants of Landlord in addition to Tenant.

5.2.2 Tenant shall construct the Dock Improvements, if at all, substantially as and where described in the U. S. Army Corps of Engineers Portland District Public Notice for Permit Application No. 97-903 issued July 30, 1997, a copy of which is attached hereto as Exhibit C;

5.2.3 Tenant shall, upon five (5) days' written request from Landlord, provide Landlord with the most current copies of any and all plans, specifications, and drawings for the Dock Improvements, including any "as-built" survey;

5.2.4 Construction of the Dock Improvements shall not interfere with Landlord's operations at Landlord's Plant Property; and

5.2.5 Construction of the Dock Improvements shall not interfere with the operations of any existing or future tenant of Landlord's Plant Property.

5.3 Leasehold Improvements--General Requirements

5.3.1 Tenant, at its sole cost and expense, may construct on the Premises such other improvements and structures Tenant may wish in connection with a liquid or solid coal tar processing plant, provided Tenant first obtains Landlord's prior written consent, which consent shall not be unreasonably withheld.

5.3.2 With regard to any such other improvements made by Tenant, and with regard to the Dock Improvements described in Section 5.2 above, Tenant hereby covenants that (1) all improvements and structures shall be constructed in a good and workmanlike manner and in compliance at all times with all applicable Governmental Requirements; (2) if any mechanic's liens shall be filed against any portion of Landlord's Plant Property or any building or improvement thereon, Tenant shall, at its own cost and expense, cause the same to be canceled and discharged within thirty (30) days after notice of the filing thereof; and (3) if Landlord is required to appear at any hearing or other proceeding, to take any action, or review any document related in anyway to improvements constructed by Tenant (including any appearance at any land use or other hearing), Tenant shall pay to Landlord all costs and expenses incurred by Landlord related to such appearance, action, or review, including, without limitation, Landlord's costs for Landlord's employees and contractors, and all attorney fees.

5.3.3 All improvements, including the Existing Improvements and the Dock Improvements (except the Docking Facility and the items owned by Landlord or any existing or future tenant at the Premises that are currently located on the Premises) shall be deemed to be personal property of Tenant and shall remain the

property of Tenant during the Lease Term. At the expiration or earlier termination of this Lease, Tenant shall remove all Dock Improvements and all improvements located on the Premises, regardless of when or where built. If Tenant does not remove all improvements within one hundred eighty (180) days of the date of Landlord's notice, all improvements remaining on the Premises shall become Landlord's property, and Landlord may, in Landlord's discretion, remove all or some of such improvements at Tenant's expense, or may retain all or some of the improvements.

6. COMPLIANCE WITH LAW; PERMITS

6.1 Compliance with Law

Tenant shall, at Tenant's expense, comply with all applicable Governmental Requirements, covenants and restrictions of record, and requirements in effect during the Lease Term or any part thereof.

6.2 Permits

Tenant shall obtain all approvals, consents, permits and licenses required under applicable Governmental Requirements for the conduct of Tenant's business on the Premises. Landlord will cooperate reasonably with Tenant's efforts to obtain the permits, but Tenant shall bear all costs of obtaining the permits.

7. LANDLORD'S ACCESS AND RESERVATION OF RIGHTS

Landlord, its agents and employees, may enter the Premises at reasonable times to inspect the same, maintain, repair and/or replace existing utility lines, conduct any environmental remediation and monitor such work, and perform Landlord's obligations under this Lease. Landlord reserves the right to install additional utility or other lines, so long as such additional lines do not materially interfere with Tenant's operations on the Premises.

8. TAXES, UTILITIES AND OTHER FEES

8.1 Real Property Taxes

8.1.1 Obligation to Pay

Tenant shall pay promptly to Landlord, before the same become delinquent, all Real Property Taxes due during the Lease Term against the Premises or by reason of the use or occupancy thereof, and the amount of any increase in Real Property Taxes payable by Landlord attributable to Tenant's Dock Improvements. Real Property Taxes attributable to any partial year in the Lease Term shall be prorated.

8.1.2 LID Assessments

Notwithstanding any contrary term in this Lease, for any special or local improvement district or similar tax or assessment levied or assessed on or against the Premises that can be paid in installments or that cover improvements with a useful life extending beyond the Lease Term, only the amount due and payable for the Lease year in question shall be included within "Real Property Taxes" for the Lease year.

8.1.3 Separate Tax Lot; Tax Bills

The Premises are taxed as a separate tax lot with their own tax lot number. Landlord shall pay all tax bills for all portions of the Premises, and shall thereafter forward a copy of such tax bill to Tenant. Tenant shall pay to Landlord the full amount of each such tax bill within thirty (30) days of receiving notice from Landlord of the amount due. If any tax bill is sent to Tenant and not directly to Landlord, Tenant shall promptly deliver copies of such tax bill to Landlord.

8.1.4 Contests

If Tenant in good faith believes any tax appraisal or assessment is excessive, and if there is a process for contesting or appealing such valuation, then Tenant may contest such appraisal or assessment and, to the extent possible, Landlord will cooperate with Tenant in such effort. Costs of the contest shall be borne by Tenant. The foregoing shall not limit Landlord's right to contest any such appraisal or assessment, at Landlord's own expense. Landlord and Tenant agree to cooperate in good faith with regard to any tax contest.

8.2 Personal Property Taxes

Tenant will promptly pay all personal property taxes assessed on or with respect to Tenant's trade fixtures, equipment, and other personal property.

8.3 Utilities

Tenant shall promptly pay for all utilities and services used in, on or from the Premises during the Lease Term. Tenant shall arrange and pay for its janitorial and trash removal services and other costs of operating and maintaining the Premises, it being understood that, except as expressly provided in this Lease, this Lease is a "net" lease and Tenant shall be responsible for all such expenses.

9. REPAIRS

9.1 Tenant's Obligation

Tenant shall maintain the Premises, all improvements, alterations and additions to the Premises, the Dock Improvements (if any), and all other personal property of Tenant located on or around the Premises or the Docking Facility in a good state of repair, and shall keep the same and all parts thereof in good, clean, healthful and safe order and condition, all in accordance with applicable Governmental Requirements. Except as provided in Section 9.2, Landlord shall not be required to make any improvement or repair of any kind for Tenant's benefit on the Premises or any other portion of Landlord's Plant Property. Subject to the Existing Environmental Liabilities, Tenant shall at all times keep the Premises and the Dock Improvements, if any, in compliance with all Legal Requirements and in accordance with all directions, rules and regulations of the health officer, fire marshal, building inspector or other proper officer of any governmental entity, at the sole cost and expense of Tenant.

9.2 Landlord's Obligation

Landlord shall maintain and repair the underground waterlines used for the fire suppression system serving the Premises up to and including the hydrants, including periodic testing of such fire suppression system not less than one (1) time per year the Lease Term.

9.3 Self-Help

If Tenant or Landlord fail to perform its obligations under this Section 9 after notice and a reasonable opportunity to cure (such period not to exceed twenty (20) days, unless (1) cure cannot reasonably be completed within twenty (20) days, and (2) cure is commenced within twenty (20) days and thereafter diligently and continuously pursued to completion), the other party may perform or cause such obligation to be performed. Any cost incurred shall be paid by the party required to perform such obligation and shall accrue interest at the rate of 9% per annum, from the date of expenditure until reimbursed. Notwithstanding the foregoing, if any condition on the Premises or Docking Facility poses an immediate risk of injury or harm, the parties may take such emergency action as may be reasonably necessary without providing an opportunity to cure to the other party, so long as the party taking such action promptly notifies the other party of the action taken.

10. INDEMNIFICATION AND INSURANCE

10.1 Indemnification

10.1.1 Tenant's Indemnification of Landlord

Except as limited in Section 10.1.3 and except as provided to the contrary in any agreement between the parties regarding or related to the Existing Environmental Liabilities, Tenant shall indemnify, defend and save Landlord, its directors, officers, agents, contractors and employees, harmless from all liabilities, claims, losses, demands and expenses (including reasonable fees of professionals) incurred or suffered by Landlord, its directors, officers, agents, contractors and employees, and relating to or resulting from the acts or omissions of Tenant, its officers, directors, agents, contractors and employees on or about the Premises or any other portions of Landlord's Plant Property.

10.1.2 Landlord's Indemnification of Tenant

Except as limited in Section 10.1.3 and except as provided to the contrary in any agreement between the parties regarding or related to the Existing Environmental Liabilities, Landlord shall indemnify, defend and save Tenant, its directors, officers, agents, contractors and employees, harmless from all liabilities, claims, losses, demands and expenses (including reasonable fees of professionals) incurred or suffered by Tenant, its directors, officers, agents, contractors and employees, and relating to or resulting from the acts or omissions of Landlord, its officers, directors, agents, contractors and employees on or about Landlord's Plant Property.

10.1.3 Limitation; Mutual Responsibility

No party shall be required to indemnify the other party or hold the other party harmless for any loss, damage, or claim due to the negligence or misconduct of such other party. In case of joint or concurrent negligence of the parties giving rise to a loss or claim against either or both of them, each party shall have full rights of contribution from the other.

10.1.4 Notice of Claims; Defense and Settlement

Any party entitled to indemnification under this Lease shall promptly notify the indemnifying party of the act, omission, or occurrence for which the indemnified party intends to seek indemnification. The party seeking indemnification will reasonably cooperate in providing information and testimony to assist in the defense of the matter, but all out-of-pocket costs of such cooperation shall be a part of the indemnified amounts for which the indemnifying party shall hold the party seeking

indemnification harmless. Control of the defense of the claims shall be the right and responsibility of the indemnifying party, which shall have authority to contest, compromise, or settle the matter in its reasonable discretion. If the indemnifying party fails to take reasonable and timely action to defend the party seeking indemnification, the party seeking indemnification may take reasonable action to defend itself, without limiting its right to seek indemnification and reimbursement from the indemnifying party.

10.2 Insurance

10.2.1 Liability Insurance

Tenant, at Tenant's expense, shall maintain, or cause to be maintained, a commercial general liability policy or policies (including fire and legal liability) with not less than a combined single limit of $10,000,000. Each policy shall be for the protection of Tenant and Landlord, and their directors, officers, agents, and employees, insuring Tenant and Landlord and naming Landlord as an additional insured against liability for damages because of personal injury, bodily injury, death, or damage to property, including loss of use thereof, and occurring on or in any way related to the Premises or Docking Facilities, Tenant's operations or activities on the Premises or Docking Facilities or occasioned by reason of the operations of Tenant. By written notice to Tenant, Landlord may increase the minimum limit requirement set forth above based on customary and commercially reasonable standards for insurance coverage limits, when changing market and coverage conditions and practices reasonably justify such increase.

10.2.2 Tenant's Casualty Insurance

Tenant, at Tenant's expense, shall keep the Premises, all improvements thereon, the Dock Improvements, and all of Tenant's trade fixtures, equipment, and other personal property owned by Tenant and located on or about the Premises or the Docking Facility, continuously insured against fire and other casualty with a reputable, solvent insurance underwriter(s). The policy(ies) shall be written on an all-risk form, in an amount equal to one hundred percent (100%) of the replacement value of the improvements, and in such amounts as may be elected by Tenant with respect to its personal property.

10.2.3 Docking Facility Insurance

Landlord shall keep the Docking Facility continuously insured against fire and other casualty with a reputable, solvent insurance underwriter. The policy shall be written on an all-risk form, in an amount equal to one hundred percent (100%) of the replacement value of the Dock (exclusive of Tenant's Dock Improvements, which

shall be insured by Tenant as provided in Section 10.2.2). Landlord and Tenant shall each bear any additional, special or excess premium attributable to special hazards or risks on the portions of the Plant Property controlled by each party. If Landlord, in its sole discretion, believes that Tenant's use of the Docking Facility has created a special hazard or risk, Landlord shall have the right to deliver written notice to Tenant describing the risk or hazard and requiring Tenant to provide proof to Landlord within ten (10) days that Tenant has insurance covering the additional hazard or risk. Tenant's failure to provide such proof of insurance within the time provided shall constitute a default under this Lease.

10.2.4 Workers' Compensation

Tenant shall maintain in force workers' compensation insurance, including coverage for employer's liability, and longshoremen's and harborworkers' coverage with respect to any operations of Tenant involving the Docking Facilities, as appropriate or required by law.

10.2.5 Certificates

Each party shall, upon full execution of this Lease, furnish to the other party a certificate(s) of insurance evidencing the date, amount, and type of insurance required by this Lease. All policies of insurance will provide for not less than thirty (30) days' written notice to Landlord and Tenant before such policies may be revised, nonrenewed, or canceled. Upon request, each party shall provide to the other a copy or copies of any insurance policy required to be carried by such party under this Lease.

10.3 Waiver of Liability and Subrogation

Neither Landlord nor Tenant shall be liable to the other for losses arising out of damage to or destruction of all or any part of the Premises or the Docking Facilities or for damage to other parties' properties or injuries to other persons, when such losses are caused by any of the perils that are insured against, to the extent of available insurance proceeds. Claims for any and all losses, however caused, hereby are waived, to the extent of available insurance proceeds. However, nothing in this Section 10.3 shall be deemed to exculpate a party from liability for such losses if such party fails to obtain and keep in effect insurance against such losses as required under this Lease, nor shall this section be deemed to exculpate any party for liability for such losses it such exculpation would void or nullify any insurance coverage for such loss that might otherwise exist for the benefit of the other party. All insurance policies to be procured under this Lease shall contain an express waiver of any right of subrogation by the insurer.

11. ENVIRONMENTAL COMPLIANCE

11.1 Definitions

For purposes of this Section 11, (1) "Applicable Premises" means the Premises defined and described in Section 1 and all land or interests in land appurtenant to such Premises or used by Tenant under the terms of this Lease, including, without limitation, the Docking Facilities, the bed, shores and waters of the Willamette River adjacent to the Docking Facilities, parking areas and any easements, and (2) "Tenant's Operations" shall mean all operations of Tenant in the conduct of Tenant's business described in Section 3, and/or all operations by any subtenant of Tenant, on or about the Applicable Premises or conducted off the Applicable Premises and related to operations conducted on or about the Applicable Premises.

11.2 Compliance with Environmental Laws

Tenant shall:

11.2.1 Cause all of Tenant's Operations on the Applicable Premises to comply with all Environmental Laws and orders of any governmental authorities having jurisdiction under any Environmental Laws;

11.2.2 Obtain, keep in effect and comply with all governmental permits and authorizations required by Environmental Laws with respect to the Applicable Premises or Tenant's Operations;

11.2.3 Furnish Landlord, upon request, with copies of all such permits and authorizations and any amendments or renewals thereof, and notify Landlord of any expiration or revocation of such permits or authorizations.

11.2.4 Limitation on Uses of Hazardous Materials

(a) Tenant shall not use, or allow any person to use, the Applicable Premises to generate, manufacture, refine, transport, treat, store, handle, recycle, release or dispose of any Hazardous Material, except for coal tar, products made from coal tar, petroleum pitch and materials reasonably necessary for Tenant's Operations.

(b) All Hazardous Material used, kept and stored on or about the Applicable Premises shall be handled, used, kept and stored in compliance with Environmental Laws and in a manner that minimizes the likelihood of any release.

11.3 Tenant's Obligation to Undertake Environmental Measures

Except for matters pertaining to Existing Environmental Liabilities, Tenant shall undertake any and all preventive, investigatory or remedial actions (including emergency response, removal, containment and other remedial actions) that are either (a) required by any applicable Environmental Laws or governmental authorities, or (b) necessary to prevent or minimize property damage (including damage to the Applicable Premises), personal injury or damage to the environment and natural resources, or the threat of any such damage or injury, in either case arising out of releases of or exposure to Hazardous Material in connection with the Tenant's Operations.

11.4 Notices

Except for matters pertaining to the Existing Environmental Liabilities, Tenant shall immediately notify Landlord in writing if Tenant becomes aware of any of the following:

(a) Any spill, release or disposal of any Hazardous Material, or imminent threat thereof, on, in, over, under or from the Applicable Premises or in connection with Tenant's Operations, unless a release or disposal is necessary and reasonable for Tenant's Operations, is permitted by governmental agency (or is authorized for release without permit) does not violate any Environmental Laws and poses no threat to human health or the environment;

(b) Any spill, release or disposal of any Hazardous Material, or imminent threat thereof, at any adjacent properties, which spill, release or disposal could migrate to, through, over or under the Applicable Premises;

(c) Any violation of Environmental Laws regarding the Applicable Premises or Tenant's Operations;

(d) Any administrative or judicial investigation or proceeding relating to Hazardous Material or Environmental Laws and to the Applicable Premises or Tenant's Operations;

(e) Any order, notice of violation, fine, penalty or other similar action relating to Hazardous Material or Environmental Laws and to the Applicable Premises or Tenant's Operations; and

(f) Any complaint or lawsuit filed or threatened to be filed by any person or other entity, including, without limitation, any governmental authority,

relating to Hazardous Material or Environmental Laws and to the Applicable Premises or Tenant's Operations.

11.5 Access to Environmental Records

At Landlord's request, Tenant will deliver to Landlord, at Tenant's expense, copies of any and all documents in its possession, or to which it has access, relating to Hazardous Material or Environmental Laws and (a) the physical conditions existing on or about the Applicable Premises, or (b) Tenant's Operations including, without limitation, (i) results of any laboratory analyses of samples, site assessments or studies, environmental audit reports, and/or other environmental studies or reports, and (ii) copies of all reports, manifests and identification numbers at the same time as they are required to be and/or are submitted to the appropriate governmental authorities. If requested by Tenant, Landlord will execute an agreement to maintain the confidentiality of any environmental record which Tenant delivers to Landlord, provided that Landlord shall have the right to notify appropriate governmental authorities of any violations of environmental laws disclosed by the environmental records if Landlord is required to make such notification by any applicable Environmental Law or if disclosure is required to avoid an immediate and substantial risk of harm to persons or property.

11.6 Environmental Audits and Site Assessments

If Landlord believes Tenant is not complying with all Environmental Laws or the requirements of this Lease, or that a material spill, release or disposal of a Hazardous Material has occurred on or about the Applicable Premises, then Landlord may require Tenant to furnish Landlord with an environmental audit or site assessment satisfactory to Landlord. The environmental audit or site assessment shall be performed at Tenant's expense by a qualified consultant approved by Landlord. If requested by Tenant, Landlord will execute an agreement to maintain the confidentiality of any environmental audit or site assessment conducted pursuant to this section, provided that Landlord shall have the right to notify appropriate governmental authorities of any violations of environmental laws disclosed by the environmental audit or site assessment if Landlord is required to make such notification by any applicable Environmental Law or if disclosure is required to avoid an immediate and substantial risk of harm to persons or property.

11.7 Landlord's Rights

11.7.1 Inspections

Landlord may conduct reasonable inspections and investigations of the Applicable Premises and Tenant's Operations at any time. Tenant shall cooperate fully

with Landlord during such inspections and investigations and Tenant shall have the right to observe any such inspections and investigations.

11.7.2 Preventive, Investigatory and Remedial Actions

If Tenant fails to perform any obligation under Section 11.3 (Tenant's Obligation to Undertake Environmental Measures), then Landlord may (but shall not be required to) perform such obligations at Tenant's expense. All costs and expenses incurred by Landlord under this Section shall be reimbursed by Tenant within thirty (30) days after demand with interest at the rate of eighteen percent (18%) per annum. In performing any of Tenant's obligations under this Section, Landlord shall be deemed to be Tenant's agent and shall not, by reason of such performance, be deemed to assume any responsibility or liability of Tenant or any subtenant under any Environmental Laws, to any governmental agency or to any other third party. Landlord is authorized to perform Tenant's obligations under Section 11.3 as Landlord deems necessary and appropriate.

11.8 Indemnification

Without limiting Tenant's obligations under Section 10.1.1, but subject to the allocations of liability for the Existing Environmental Liabilities, Tenant shall defend (with counsel approved by Landlord), fully indemnify and hold free and harmless Landlord from and against (i) all claims, judgments, damages, penalties, fines, costs, liabilities or losses (including, without limitation, diminution in value of the Applicable Premises, damages for the loss or restriction on the use of rentable or usable space or of any amenity of the Premises, damages arising from any adverse impact on marketing of space, sums paid in settlement of claims, attorneys' fees, consultant fees and expert fees) that arise during or after the Lease Term or that arose under the term of the Prior Lease, and (ii) are imposed on, or paid by or asserted against Landlord by reason or on account of, or in connection with, or arising out of (a) Tenant's use, generation, manufacture, refinement, transportation, treatment, storage, handling, recycling or disposal of Hazardous Material, or any release of Hazardous Material in connection with or as a result of Tenant's use or activities, or (b) the use or activities of Tenant's agents, contractors or subtenants relating to Hazardous Materials, or (c) any violation of any Environmental Law by Tenant or its agents, subcontractors or subtenants.

This indemnification of Landlord by Tenant includes, without limitation, costs incurred in connection with any of the following:

(a) any investigative or remedial action involving the presence of or releases of Hazardous Material on or about the Applicable Premises;

(b) any allegations made as to the violation of any Environmental Laws involving the Applicable Premises or Tenant's Operations; and/or

(c) any injury or harm of any type to any person or entity or damage to any property (including natural resources) arising out of, in connection with or in any way relating to (i) the use, generation, manufacture, refinement, transportation, treatment, storage, handling, recycling, disposal, release or other handling of Hazardous Material on or about the Applicable Premises or during Tenant's Operations, or (ii) the violation of any Environmental Laws, or (iii) the contamination of the Applicable Premises during the period of this Lease.

11.9 Pre-Termination Environmental Assessment

Within sixty (60) days before expiration of the Lease Term, or upon receiving notice of termination, Landlord may retain the services of an independent professional engineer licenses to practice in the State of Oregon to conduct an environmental assessment to establish the environmental condition of the Applicable Premises. On completion of the assessment, Landlord shall provide Tenant with an environmental report that describes the results of such efforts. The parties agree that there shall be a rebuttable presumption that the assessment establishes the environmental condition of the Applicable Premises as of the date this Lease expires or terminates.

11.10 Existing Environmental Liabilities; Disclaimer

Nothing contained in this Section 11 releases, modifies or otherwise affect any party's duties or obligations under any other agreement regarding the Existing Environmental Liabilities. Landlord shall have access to the Applicable Premises at all times to perform any remediation and monitoring activities required of Landlord under any agreement with any party addressing the Existing Environmental Liabilities, or any order of or agreement with a governmental agency. LANDLORD MAKES NO REPRESENTATIONS OR WARRANTIES REGARDING THE CONDITION OF THE APPLICABLE PREMISES, COMPLIANCE WITH ANY ENVIRONMENTAL LAWS, OR THE EXISTENCE OF OR COMPLIANCE WITH ANY REQUIRED PERMITS OF ANY GOVERNMENTAL AGENCY. TENANT ACKNOWLEDGES THAT TENANT IS AND HAS BEEN OCCUPIED THE PREMISES UNDER THE PRIOR LEASE AND IS NOT RELYING ON ANY STATEMENT MADE BY LANDLORD OR LANDLORD'S AGENTS REGARDING THE CONDITION OF THE APPLICABLE PREMISES.

11.12 Survival

The provisions of this Section 11 shall survive the expiration or earlier termination of this Lease.

12. TRANSFER OR SUBLEASE

12.1 General

Except as set forth in Section 12.2, Tenant may not assign this Lease, or sublet the Premises, or any part thereof, without the prior written consent of Landlord.

12.2 Permitted Transfers

The prohibitions of Section 12.1 shall not apply to any of the following ("Permitted Transfer"): (1) an assignment or sublease to an entity controlled by, controlling of, or under common control with Tenant; or (2) an assignment to a corporation with or into which Tenant has merged or consolidated. Landlord's consent will not be necessary to any such Permitted Transfer, but no transfer of this Lease shall be effective until Landlord receives written notice thereof and executed documents evidencing such transfer, including assumption by the transferee, if there is an assignment of the Lease. No Permitted Transfer shall release Tenant from any obligation under this Lease. A transferee under a Permitted Transfer shall be subject to all provisions of this Lease, including the limitations on transfer and assignment set forth in this Section 12.

13. DAMAGE OR DESTRUCTION OF IMPROVEMENTS

If any improvements on the Premises or any of the Dock Improvements are damaged or destroyed by fire or other casualty, then Tenant may either repair and restore the Premises or remove the damaged improvement(s) and clear Landlord's Plant Property of all related debris (including any Hazardous Material released as a result of such fire or casualty). Such election shall be made by Tenant and the restoration work or removal work, as the case may be, commenced within fourteen (14) days following the casualty event, except for damage to the Dock Improvements, which election and commencement of work shall be made and undertaken by Tenant within twenty-one (21) days after the casualty event. All work shall be prosecuted diligently and continuously to completion. If Tenant fails to commence repair or removal activities within the applicable time period, then all proceeds from insurance carried by Tenant covering the improvements and Dock Improvements shall be paid to Landlord for application to such repair and/or removal. All proceeds relating to Tenant's trade fixtures, equipment and other personal property shall be paid to and belong to Tenant.

14. LIENS

Tenant shall keep the Premises and all other portions of Landlord's Plant Property free from all liens of every kind and description caused, incurred, permitted

or suffered by any act or omission of Tenant, including, without limitation, any mechanic's, laborer's, suppliers' construction or any other liens; provided, Tenant shall not be in default under this Section if Tenant removes or adequately bonds (by posting a bond in accordance with applicable law) any such unpermitted lien within thirty (30) days of receipt of actual notice of the existence of any such lien.

15. EMINENT DOMAIN

15.1 Definitions

The term "takes by (or taken or taking by) eminent domain" includes the exercise of any power of condemnation, whether by public authority or private corporation and any purchase or other acquisition in lieu of condemnation. The expression "date of taking" means the date the order adjudicating public use becomes final or the date the authority exercising its right of "eminent domain" agrees in writing to the purchase price in lieu of condemnation, or, if earlier, takes title to the Premises.

15.2 Material Taking

If a condemning authority takes by eminent domain all of the Premises or a portion of the Premises that is, the reasonable judgment of Tenant, sufficient to prevent Tenant from using the remaining Premises to conduct its operations in a manner substantially equivalent to its operations as conducted immediately prior to the taking, then this Lease shall terminate as of the date of taking and all rental shall be paid up to that date. All condemnation proceeds shall belong to Landlord, except that Tenant shall be entitled to seek a separate award for any cost or loss incurred or expected to be incurred by Tenant in removing Tenant's trade fixtures, equipment and other personalty, and Tenant's relocation expenses. If, at any time after Tenant has constructed Dock Improvements and is using the Docking Facilities, a condemning authority takes all of the Docking Facilities or a portion of the Docking Facilities that is, in the reasonable judgment of Tenant, sufficient to prevent Tenant from using the Premises to conduct its operations in a manner substantially equivalent to its operations as conducted immediately prior to the taking, then such taking shall be subject to and covered by the provisions of this Section 15.2.

15.3 Partial Taking

If the portion of the Premises or Docking Facilities taken by eminent domain does not prevent Tenant from conducting its operations in a manner substantially equivalent to its operations as conducted immediately prior to the taking, then Tenant shall promptly restore the Premises to a condition comparable to their condition on the date of taking, less the portion lost in the taking, and this Lease shall continue in

effect. Tenant's obligation to restore shall be limited to the amount of condemnation proceeds made available to Tenant by Landlord. Landlord shall promptly restore the Docking Facilities to a condition comparable to its condition on the date of the taking, less the portion lost in the taking. Landlord's obligation to restore shall be limited to application of available condemnation proceeds.

16. DEFAULT BY TENANT

16.1 Default in Payment of Rent

Tenant's failure to pay any item of rent for a period of five (5) days after the receipt by Tenant of Landlord's notice of Tenant's failure to make such payment shall be a "Default" under this Lease. With respect to Tenant's obligation to pay basic monthly rental under Section 4.1, Landlord shall be required to provide only one (1) written notice of default in any calendar year. Landlord shall not be required to give additional notice of any subsequent payment default with respect to basic monthly rental as a prerequisite to the exercise of remedies and such subsequent default shall be an immediate "Default" under this Lease.

16.2 Other Defaults

Except with respect to the failure to pay rent as set forth in Section 16.1, Tenant shall not be considered in "Default" by reason of any act or omission in breach of any requirement hereof, until and unless Landlord gives Tenant notice of such act or omission, and Tenant fails to cure the same within twenty (20) days after the receipt by Tenant of such notice. As to any breach that cannot reasonably be cured within twenty (20) days, Tenant shall not be in "Default" if Tenant commences to cure such act or omission within such 20-day period, and thereafter diligently and continuously prosecutes such cure to completion. Tenant's failure to cure such breach within the applicable cure period shall be a "Default" under this Lease. Notwithstanding the foregoing, Tenant shall provide to Landlord a written plan and schedule for the repair of any improvement, alteration or addition on the Premises, any Dock Improvements or any personal property of Tenant, the condition of which poses an immediate risk of harm to persons or property, within five (5) days after such condition occurs. In addition to Landlord's rights under Section 9.3, Tenant's failure to provide such information to Landlord within such five (5) day period shall constitute a "Default" under this Lease.

16.3 Automatic Defaults

Tenant shall be in "Default" under this Lease if (1) Tenant vacates or abandons the Premises for a period in excess of thirty (30) consecutive days, or (2) Tenant becomes bankrupt or insolvent or files any debtor proceedings or has taken against it

20. NO BROKERS

Landlord and Tenant each represent and warrant to the other that they have not engaged or had discussions with any broker or agent who would be entitled to any commission or fees in connection with the negotiation or execution of this Lease. Each party agrees to indemnify and hold the other harmless from all costs, expenses or liability for such commissions or other compensation or charges claimed by or awarded to any broker or agent on the basis of any assignments or agreements made or alleged to have been made by or on behalf of the indemnifying party.

21. RENT, VALUATION AND ACCOUNTING DISPUTES

21.1 General

As to any dispute concerning valuation, costs, proration of expenses or determination of rent, Landlord and Tenant shall seek in good faith to resolve their dispute. If the parties cannot resolve their dispute within thirty (30) days after the date that a party delivers to the other party a notice of the existence of the dispute (for example, by objecting in writing to a rent calculation), the matter shall be submitted to independent certified public accountants (or, as to fair market valuation of real property, a certified real estate appraiser). The parties shall jointly select a certified public accounting firm (or certified appraiser) that is not then employed by either party and that is familiar with the Tenant's type of business (or, as to fair market valuation of real property, familiar with the local market for the type of property involved). The determination of such accounting firm or appraiser shall bind on the parties as to the matter submitted for such determination. The fees of the accounting firm or appraiser shall be borne equally.

21.2 Arbitration

Any dispute or controversy relating to valuation, costs or determination of rent that is not settled under the previous subsection within ninety (90) days after a party delivers a written notice of dispute, shall, unless otherwise agreed, be settled by arbitration in accordance with the Commercial Arbitration Rules (or, as to fair market valuation of real property, the Real Estate Valuation Rules) of the American Arbitration Association. Judgment upon the award rendered by the arbitrator(s) may be entered in any court having jurisdiction. The cost of arbitration shall be allocated between the parties by the arbitrator(s) on the basis of the extent to which the position of one or the other party is adopted in the decision of the arbitrator(s). Any such arbitration proceeding shall be held in Portland, Oregon.

22. MISCELLANEOUS

22.1 Authority

Each party represents and warrants to the other that it has full power and authority to enter into and to perform its obligations under this Lease, and that the person executing this Lease on its behalf is authorized to do so.

22.2 No Partnership

The relationship created by this Lease is that of landlord and tenant only. The parties are not, shall not be considered to be, and shall not hold themselves out to be, partners or joint venturers.

22.3 Consent

Wherever in this Lease Landlord has the right to give or withhold its consent to a matter requested by Tenant, such consent may be withheld by Landlord in its sole and absolute discretion except as set forth to the contrary in any specific provision of this Lease.

22.4 Notices

All notices to be given under this Lease shall be in writing. Notices may be served by certified or registered mail or by facsimile to the party at the address shown below, unless the address has been changed by written notice. Mailed notices shall be deemed delivered five (5) days after mailing, properly addressed.

LANDLORD: NW NATURAL
220 NW Second Avenue
Portland, Oregon 97209
Attn: Manager: Risk, Environmental and Land
Facsimile No.: (503) 721-2516

TENANT: KOPPERS INDUSTRIES, INC.
7540 NW St. Helens Road
Portland, Oregon 97210
Attn: Amos Kamerer, Plant Manager
Facsimile No.: (503) 285-2831

With a copy to: Koppers Industries, Inc.
436 Seventh Avenue
Pittsburgh, PA 15219-1800
Attn: VP and Corporate Secretary
Facsimile No.: (412) 227-2333

22.5 Headings; Exhibits

The section headings in this Lease are included for convenience only; they do not give full notice of the terms of any portion of this Lease and are not relevant to the interpretation of any provision of this Lease. All exhibits referenced in this Lease are attached hereto and incorporated herein by this reference.

22.6 Governing Law

This Lease shall be governed by and construed in accordance with Oregon law.

22.7 Severability

To the fullest extent permitted by law, any provision of this Lease deemed invalid or unenforceable shall be ineffective to the extent of such invalidity or unenforceability, without rendering invalid or unenforceable the remaining provisions of this Lease.

22.8 Integration; Amendment

This Lease is the entire agreement of the parties relating to the subject matter hereof, and supersedes all prior communications, representations, or agreements, verbal or written, among the parties relating to the subject matter hereof. This Lease may not be amended except in writing executed by the parties.

22.9 Waiver

No provision of this Lease shall be deemed to have been waived unless such waiver is in writing signed by the waiving party. No failure by any party to insist upon the strict performance of any provision of this Lease, or to exercise any right or remedy consequent upon a breach thereof, shall constitute a waiver of any such breach, of such provision or of any other provision. No waiver of any provision of this Lease shall be deemed a waiver of any other provision of this Lease or a waiver of such provision with respect to any subsequent breach, unless expressly provided in writing.

22.10 Attorneys' Fees

22.10.1 No Suit or Action Filed

If, after good-faith attempts to settle the matter have failed, this Lease is placed in the hands of an attorney due to a default in the payment or performance of any of its terms, the defaulting party shall pay, immediately upon demand, the other party's attorney fees, collection costs, and any other fees or expenses incurred by the nondefaulting party, even though no suit or action is filed thereon..

22.10.2 Arbitration or Mediation; Trial and Appeal

If any arbitration, mediation, or other proceeding is brought in lieu of litigation, or if legal action is instituted to enforce or interpret any of the terms of this Lease, or if legal action is instituted in a Bankruptcy Court for a United States District Court to enforce or interpret any of the terms of this Lease, to seek relief from an automatic stay, to obtain adequate protection, or to otherwise assert the interest of Landlord in a bankruptcy proceeding, the party not prevailing shall pay the prevailing party's costs and disbursements, the fees and expenses of expert witnesses in determining reasonable attorney fees pursuant to ORCP 68, and such sums as the court may determine to be reasonable for the prevailing party's attorney fees connected with the trial and any appeal and by petition for review thereof.

22.11 Successors; No Third-Party Beneficiary Rights

This Lease shall be binding on and inure to the benefit of the parties and their successors and assigns, subject to the provisions of Section 12 above. No person not a party to this Lease is an intended beneficiary of this Lease, and no person not a party to this Lease shall have any right to enforce any term of this Lease; provided, the third parties referenced in Section 10.1 as indemnified parties shall have the indemnification rights described therein.

22.12 Further Assurances

Each party agrees, at the request of the other party, at any time after the date hereof, to promptly execute and deliver all further documents, and to promptly take and forbear from all such action, as may be reasonably necessary or appropriate to more effectively to confirm or carry out the provisions of this Lease.

22.13 Survival

Each provision of this Lease which may require the payment of money by, to or on behalf of Landlord or Tenant or third parties after the expiration of the Lease

Term or earlier termination of the Lease, or which requires the performance of some action on the Premises or other property covered by this Lease that is not performed at the time of such expiration or earlier termination, shall survive such expiration or earlier termination.

22.13 Counterparts

This Lease may be executed in any number of counterparts, each of which shall be deemed an original and all of which shall constitute one and the same instrument.

IN WITNESS WHEREOF, the parties have executed this Lease as of the date first set forth above.

LANDLORD:	TENANT:
NORTHWEST NATURAL GAS COMPANY (d/b/a Northwest Natural), an Oregon corporation	KOPPERS INDUSTRIES, INC., a Pennsylvania corporation
By: _____	By: _____
Typed Name: _____	Typed Name: _____
Title: _____	Title: _____

Exhibits

A Description of Landlord's Plant Property
B Map of the Premises
C Copy of U.S. Army Corps of Engineers Portland District Public Notice for Permit Application No. 97-903, issued July 30, 1997

Term or earlier termination of the Lease, or which requires the performance of some action on the Premises or other property covered by this Lease that is not performed at the time of such expiration or earlier termination, shall survive such expiration or earlier termination.

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LANDLORD:	TENANT:
NORTHWEST NATURAL GAS COMPANY (d/b/a Northwest Natural), an Oregon corporation	KOPPERS INDUSTRIES, INC., a Pennsylvania corporation
By: _____	By: _____
Typed Name: _____	Typed Name: Walter W. Turner
Title: _____	Title: President and Chief Executive Officer

Exhibits

A Description of Landlord's Plant Property
B Map of the Premises
C Copy of U.S. Army Corps of Engineers Portland District Public Notice for Permit Application No. 97-903, issued July 30, 1997

Term or earlier termination of the Lease, or which requires the performance of some action on the Premises or other property covered by this Lease that is not performed at the time of such expiration or earlier termination, shall survive such expiration or earlier termination.

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IN WITNESS WHEREOF, the parties have executed this Lease as of the date first set forth above.

LANDLORD:	TENANT:
NORTHWEST NATURAL GAS COMPANY (d/b/a Northwest Natural), an Oregon corporation	KOPPERS INDUSTRIES, INC., a Pennsylvania corporation
By: Sandra K. Hart	By: _____
Typed Name: SANDRA K. HART	Typed Name: _____
Title: MANAGER, RISK ENVIRONMENT & LAND	Title: _____

Exhibits

A Description of Landlord's Plant Property
B Map of the Premises
C Copy of U.S. Army Corps of Engineers Portland District Public Notice for Permit Application No. 97-903, issued July 30, 1997

Koppers Lease
EXHIBIT A

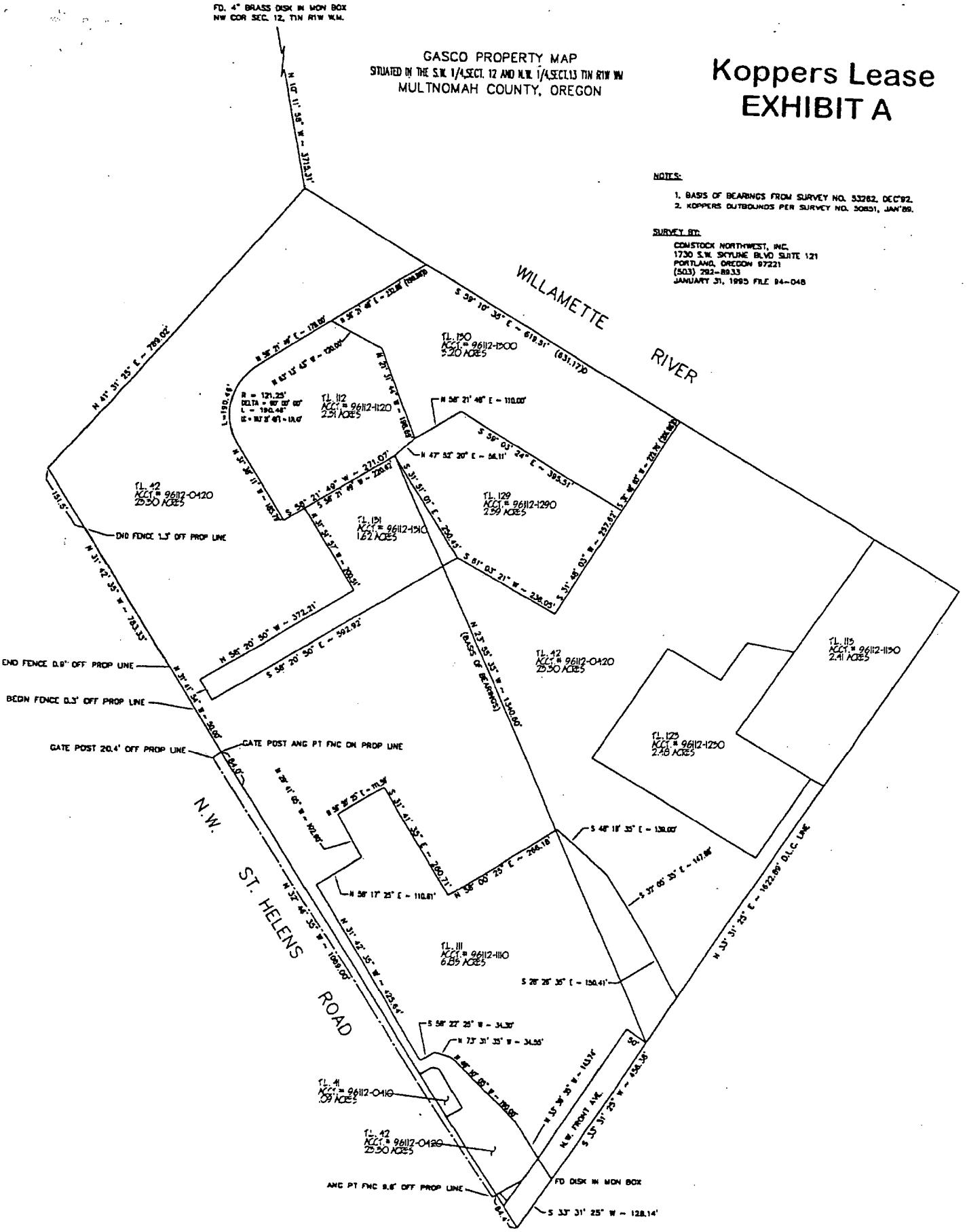
GASCO PROPERTY MAP
SITUATED IN THE S.W. 1/4 SECT. 12 AND N.W. 1/4 SECT. 13 T1N R1W W.M.
MULTNOMAH COUNTY, OREGON

NOTES:

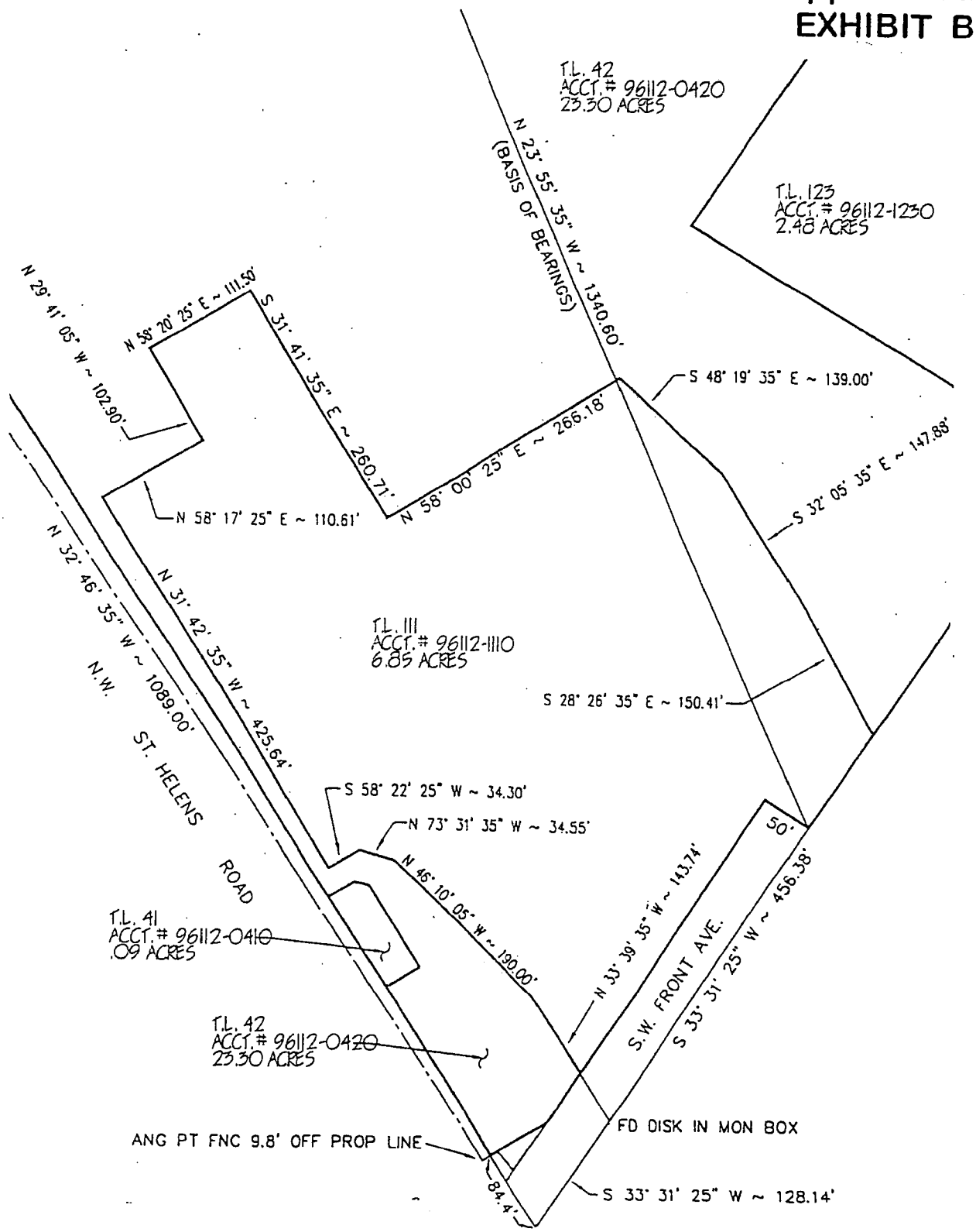
1. BASIS OF BEARINGS FROM SURVEY NO. 53262, DEC'92.
2. KOPPERS OUTBOUNDS PER SURVEY NO. 30851, JAN'89.

SURVEY BY:

CONSTOCK NORTHWEST, INC.
1730 S.W. SKYLINE BLVD SUITE 121
PORTLAND, OREGON 97221
(503) 292-8833
JANUARY 31, 1995 FILE 94-048



Koppers Lease
EXHIBIT B



PACIFIC TERMINAL SERVICES, INC.
910 SW Spokane Street, Seattle, Washington 98134
P.O. Box 24005, Seattle, Washington 98124-0005
Tele. (206) 628-0051 Fax (206) 628-0293

Wednesday, December 15, 1999

RECEIVED
DEC 17 1999
KOPPERS INDS, INC.
PORTLAND OR

Mr. Stephen C. Kifer
Koppers Industries, Inc.
436 Seventh Avenue
Pittsburgh, PA 15219-1800

Re: Pacific Terminal Services, Inc., Dock Services Agreement

Dear Mr. Kifer:

Enclosed please find a fully executed copy of this agreement

Sincerely,

Vincent P. Godfrey
President

cc: With Agreement
Todd Prophet - Harley Marine Services, Inc.
Allan Sullivan - Fuel and Marine Marketing
Dave Bever - Carney, Badley, Smith & Spellman
Tina Garrett - Pacific Terminal Services, Inc.-Portland

12/16/99 CC: A. S. Kamerer
J. T. Dietz

KOPPERS INDUSTRIES

Koppers Industries, Inc.
436 Seventh Avenue
Pittsburgh, PA 15219-1800

Stephen C. Kifer
Assistant General Counsel

Telephone: (412) 227-2421
Fax: (412) 227-2333
steve_kifer@koppers.com

December 14, 1999

VIA OVERNIGHT MAIL

Mr. Vincent P. Godfrey
PACIFIC TERMINAL SERVICES, INC.
910 S. W. Spokane Street
Seattle, WA 98124-0005

RE: PTSI Dock Service Agreement with Koppers

Dear Mr. Godfrey:

As per attorney David Bever's instructions, enclosed please find two sets of the Dock Service Agreement which has now been executed by Koppers. Please note that this reflects the final change to Recital B which was agreed upon by you and Amos Kamerer.

Please execute and date both sets and return one of the sets to me.

Should you have any questions concerning this matter, please do not hesitate to contact me.

I look forward to receiving the fully executed Agreement.

Very truly yours,

Stephen C. Kifer

SCK/rmh

Enclosures

cc: J. T. Dietz
A. S. Kamerer

RECEIVED
JAN 18 2000
KOPPERS INDS, INC.
PORTLAND OR

DOCK SERVICE AGREEMENT

This Dock Service Agreement ("Agreement") is entered into and effective this ____ day of December, 1999, between KOPPERS INDUSTRIES, INC., a Pennsylvania corporation ("Koppers"), and PACIFIC TERMINAL SERVICES, INC., a Washington corporation ("PTSI").

RECITALS

A. PTSI is a terminal operator which provides dock services at the GASCO fuel oil tank farm terminal site in Portland, Oregon (the "GASCO Portland Terminal").

B. Koppers receives liquid pitch shipments from ocean going vessels discharging at the GASCO Portland Terminal in shipments of approximately Fifty Thousand (50,000) barrels each.

C. Koppers desires to use PTSI for dock services pertaining to liquid pitch shipments at the GASCO Portland Terminal dock on the terms and conditions set forth herein.

AGREEMENT

In consideration of the mutual promises set forth below, the adequacy of which is hereby acknowledged and intending to be legally bound, the parties hereby agree to the terms and conditions as set forth below:

1. **Scope of Services.** PTSI agrees to perform terminal operator services for the benefit of Koppers at the GASCO Portland Terminal. Services are to include: (a) receiving and letting go of vessel lines; (b) hooking up and unhooking hoses; (c) putting out and retrieving oil spill boom; (d) opening and closing dock valves upon instructions from Koppers' representative; (e) providing dock watch and constant surveillance of the operation; (f) participate in emergency response activities, including jointly conducted drills; (g) performing all securing, connection testing and drainage of products as required prior to and after vessel unloading; (h) participating in agency testing; and (i) such other services as are necessary or incidental the services described above. PTSI will provide two trained operating personnel per eight-hour shift, who are certified and licensed to operate the dock at the GASCO Portland Terminal and certified and licensed to operate all oil spill equipment. PTSI, its employees and agents shall comply with all federal, state, county and municipal laws, regulations, ordinances, standards, rules and orders existing or hereinafter promulgated or otherwise established in any manner applicable to the performance of the operating services performed hereunder. PTSI recognizes and agrees that its operating personnel will be made available for training from Koppers concerning the products being delivered and concerning Koppers' standards of safety, health and environmental performance; provided, however, that all such personnel are at all times acting solely as the agents of PTSI. PTSI

and PTSI's operating personnel shall at all times operate and perform their responsibilities under this Agreement in accordance with any safety rules and other requirements of Koppers applicable to the GASCO Portland Terminal so long as in compliance with federal and state regulatory law and shall otherwise at all times perform their duties with due regard to the safety of all personnel.

2. **Parties' Responsibilities.** Koppers will provide all hoses and equipment needed to perform the services with the exception of the oil spill boom, which will be provided by PTSI. The maintenance, repair and testing of Koppers' hoses and equipment shall be the responsibility of Koppers. PTSI shall immediately notify Koppers of any leak or other problem with any hose or equipment observed or discovered. Koppers will provide PTSI with a minimum of fifteen (15) days notice of estimated tanker arrival with updated notice seventy-two (72) hours, forty-eight (48) hours and twenty-four (24) hours before estimated tanker arrival.

3. **Compensation and Payment.**

a. As compensation for all Services provided hereunder including training provided by Koppers as identified in Paragraph 1 above, Koppers will pay PTSI a service rate of fifty-four Dollars and 00/00 ($54.00) per hour, per dock operator, working eight (8) hour minimum shifts, and a fixed fee of Six Hundred Dollars and 00/100 ($600.00) per vessel for the oil spill boom plus any applicable state sales or use tax therefrom. PTSI shall provide documents and materials reasonably requested by Koppers regarding invoices and the provision of services hereunder. Additional services or equipment which PTSI provides will be at standard rates quoted to Koppers at or before the time such additional services or equipment are requested. Such additional services or equipment will be expressly approved by Koppers in writing prior to the incurrence of such charge, unless necessary emergency response actions do not permit. In the case of necessary emergency response action PTSI will provide applicable additional rates as soon as reasonably possible.

b. The pricing for any renewal term of this Agreement after the initial one year term of this Agreement shall be negotiated and agreed upon in good faith by the parties on a yearly basis, as provided herein. Pricing for any such renewal term shall be agreed upon by the parties no later than One Hundred Twenty (120) days prior to the anniversary date of this Agreement. Price increases for any single renewal term shall be capped at the greater of five percent (5%) over the existing rate or the net annual increase to PTSI for labor services under the applicable collective bargaining agreement. If the parties are unable to reach agreement on pricing for the renewal term within ninety days of the anniversary date of this Agreement, either party may terminate this Agreement in writing by giving the other party sixty days written notice prior to the end of the one year term. If neither party terminates this Agreement pursuant to the foregoing provision the prices then in effect shall continue in effect until the parties reach agreement upon a price adjustment or this Agreement is terminated pursuant to the foregoing provision.

c. Koppers will pay all invoices for work provided within 30 days after the invoice for such work is received. Any payment made after 30 days is subject to interest at eighteen percent (18%) per annum. PTSI has no obligation to perform any dock services for Koppers while any invoice is outstanding.

4. **The Term.** This Agreement is for an initial term of one (1) year from the date first above written, unless sooner terminated pursuant to this Agreement. Thereafter, unless terminated in writing within Ninety (90) days of the ending of the initial term, the Agreement shall continue for an additional one year. Such additional one-year term may be terminated at any time upon one-hundred and twenty (120) days written notice of termination by one party to the other party. Notwithstanding the foregoing, this Agreement may be terminated at any time in any of the following ways: (i) by either party immediately upon written notice at any time if there is a material breach or failure by the other party to perform the terms and conditions herein; (ii) by Koppers upon one-hundred and twenty (120) days written notice; (iii) by either party to the extent permitted in Section 3 or (iv) by either party immediately upon written notice if the other party is in dissolution or bankruptcy. In the event Koppers terminates this Agreement prior to the first anniversary, then it shall pay to PTSI a $10,000.00 cancellation fee as liquidated damages to PTSI.

5. **Governing Law.** This Agreement shall be construed, interpreted and enforced in accordance with the laws of the State of Oregon.

6. **Independent Contractor Status.**

a. In the performance of its duties, PTSI shall act solely as an independent contractor. Nothing herein contained shall at any time be construed as to create a relationship of employer/employee, partnership, principal and agent or joint venture as between PTSI and Koppers. PTSI shall not have any authority to bind Koppers in any relationship with third parties unless authorized in writing by an authorized official of Koppers. Similarly, Koppers shall have no authority to bind PTSI in any relationship with third parties unless specifically authorized in writing by an authorized official of PTSI.

b. Notwithstanding the foregoing, PTSI agrees to perform the services consistent with such reasonable standards as may be established by Koppers from time to time so long as in compliance with federal and state regulatory law, and consistently with prevailing industry standards.

7. **Indemnification of Koppers.** Koppers shall indemnify, defend and hold harmless PTSI from and against all claims, damages, lawsuits, liability, penalties, fines and expenses, (including attorney fees and costs), including from environmental contaminants or releases of environmental contaminants or liquid pitch shipment, caused by Koppers or any tanker vessel providing a Koppers' liquid pitch shipment to PTSI at the GASCO Portland Terminal except to the extent such claims are caused by or result from the actions or omissions of PTSI, its employees and/or agents.

8. **Indemnification of PTSI.** PTSI shall indemnify, defend and hold harmless Koppers from and against all claims, damages, lawsuits, liability, penalties, fines and expenses, (including attorney fees and costs), including from environmental contaminants or releases of environmental contaminants or liquid pitch shipments, caused by or resulting from the actions or omissions of PTSI, its employees and/or agents except to the extent such claims are caused by or result from the actions or omissions of Koppers, its employees and/or agents, or the tanker vessel providing the liquid pitch shipment at the GASCO Portland Terminal.

9. **Insurance - PTSI.** PTSI will maintain at all times the insurance coverage as set forth below:

a. Worker's compensation insurance as required by applicable laws and regulations for all persons performing services.

b. Employer's liability insurance protecting PTSI against common law liability for employee and/or agent bodily injury arising out of master-servant or principal-agent relationship.

c. Insurance required under the U.S. Longshoreman's and Harborworker's Compensation Act.

d. Pollution Legal Liability and Indemnity coverage resulting from release of contaminants or pollutants at or about GASCO Portland Terminal in at least $5 million

e. PTSI will name Koppers as an additional insured on all applicable policies and certify that Koppers will be given thirty (30) days written notice of any material change in or cancellation of such coverage.

10. **Insurance – Koppers.** Kopper's will maintain at all times during the term of this Agreement and be responsible for having the tanker vessel providing the liquid pitch to the GASCO Portland terminal provide the insurance coverage as set forth below:

a. Protection and Indemnity coverage for the vessel and dock with pollution liability endorsement.

b. Pollution Legal Liability coverage/resulting from release of pollutants at or about GASCO Portland Terminal.

c. Koppers will name PTSI as an additional insured on all applicable policies and certify that PTSI will be given thirty (30) days written notice of any material change in or cancellation of such coverage.

11. **Force Majeure.** Neither PTSI nor Koppers shall be liable for any delays in performance or nonperformance of a provision of this Agreement when such delay or

nonperformance is caused by any act of God or public enemy, or nonavailability of labor, riots, fires, storms, explosions, embargoes, interventions, longshoreman and labor strikes, provided, however, the parties shall act with reasonable diligence and with reasonable care in all such force majeure events and the party declaring force majeure event shall notify the other party in writing when such event commences and when it ends. In the event a force majeure condition is not cured within thirty (30) days, the party not invoking force majeure may terminate this Agreement immediately upon written notice.

12. **Notices.** All notices, demands, consents or other communications required or permitted hereunder shall be in writing and shall be deemed given when personally delivered or sent by registered or certified mail, return receipt requested, postage prepaid addressed as follows or at such other address as such party may give notice of:

TO KOPPERS:	Koppers Industries, Inc. Attn: Amos S. Kamerer 7540 N.W. St. Helens Road Portland, Oregon 97210
With a copy to:	Wayne F. Plovic Koppers Industries, Inc. 436 7th Avenue Koppers Building, 16th Floor Pittsburgh, PA 15219
TO PTSI:	Pacific Terminal Services, Inc. Attn: Vincent P. Godfrey 910 S.W. Spokane Street Seattle, Washington 98124-0005

13. **Unenforceability; Illegality.** If any provision or provisions of this Agreement shall be deemed invalid or unenforceable, either in whole or in part, this Agreement shall be deemed amended to delete or modify, as necessary, the offending provision or provisions and to alter the bounds thereof in order to render the Agreement valid and enforceable.

14. **Amendments, Waivers, etc.** No amendment of any provision of this Agreement, and no postponement or waiver of any such provision or of any default, misrepresentation, or breach of warranty or covenant hereunder, whether intentional or not, shall be valid unless such amendment, postponement, or waiver is in writing and signed by or on behalf of the party against whom enforcement of the amendment, waiver or postponement is sought. No such amendment, postponement or waiver shall be deemed to extend to any prior or subsequent matter, whether or not similar to the subject matter of such amendment, postponement or waiver. No failure to delay on the part of PTSI or Koppers in exercising any right, power or privilege under this Agreement shall operate as a waiver thereof, not shall any single or partial exercise of any right, power or privilege hereunder

preclude any other or further exercise thereof or the exercise of any other right, power or privilege.

15. Assignment and Third Parties. This Agreement and all of its provisions shall be binding on and shall inure to the benefit of the parties hereto and their respective heirs, legal representatives, successors and assigns. Notwithstanding the foregoing, PTSI may not assign any obligations or duties required under this Agreement, and any such purported assignment by PTSI shall be void, unless otherwise agreed in writing by Koppers in its sole discretion. The Agreement shall not confer any rights or remedies upon any person other than PTSI and Koppers and their respective heirs, successors and permitted assigns.

16. Interpretations. All captions and section headings of this Agreement are included only for reference and for convenience and shall not affect the meaning or interpretation of this Agreement, nor shall they constitute substantive provisions hereof.

17. Integration; Counterparts. This Agreement constitutes the entire agreement between the parties and supersedes any prior understandings, agreements or representations by or between the parties, written or oral, to the extent they relate to the subject matter hereof.

18. Arbitration.

a. Any dispute arising between the parties regarding the enforcement or application of this Agreement which cannot be amicably resolved shall be submitted by either party to binding arbitration pursuant to the rules of the American Arbitration Association (AAA), or any successor thereto. Such arbitration shall take place in Portland, Oregon. Each party shall bear their own fees and expenses in such arbitration.

b. Any decision of arbitration may be entered in as a judgment in any court of competent jurisdiction and may be enforced as such in accordance with the provisions of the award.

IN WITNESS WHEREOF the parties through their authorized representatives, have caused this Agreement to be executed on the date indicated on page one.

KOPPERS INDUSTRIES, INC.

By _____

Its: VICE PRESIDENT & GENERAL MANAGER

PACIFIC TERMINAL SERVICES, INC.

By _____

Its: President

KOPPERS

March 24, 2003

Koppers Inc.
Carbon Materials and Chemicals
7540 NW Saint Helens Road
Portland, OR 97210-3663
Tel 503 286 3681
Fax 503 285 2831
www.koppers.com

Troy Goodman, President
Pacific Terminal Services Inc.
7900 St. Helens Rd.
Portland, OR 97210

Re: Corporate Name Change

Dear Mr. Goodman,

Please be advised that, effective Feb. 24, 2003 Koppers Industries, Inc. changed its name to Koppers Inc. There is no change in the structure of the company or change or transfer of ownership of the stock or assets associated with the name change.

Koppers Inc. has filed the necessary documents with the State of Pennsylvania to effect this name change and expects to receive documentation confirming the name change from the State within two to three weeks. Thank you for your attention to this matter.

Very truly yours,

Amos S. Kamerer
Plant Manager

Cc:
Corporate Services Group, Koppers Inc.
File

KOPPERS

March 24, 2003

Koppers Inc.
Carbon Materials and Chemicals
7540 NW Saint Helens Road
Portland, OR 97210-3663
Tel 503 286 3681
Fax 503 285 2831
www.koppers.com

Tina Garrett, Terminal Manager
Pacific Terminal Services Inc.
7900 St. Helens Rd.
Portland, OR 97210

Re: Corporate Name Change

Dear Ms. Garrett,

Please be advised that, effective Feb. 24, 2003 Koppers Industries, Inc. changed its name to Koppers Inc. There is no change in the structure of the company or change or transfer of ownership of the stock or assets associated with the name change.

Koppers Inc. has filed the necessary documents with the State of Pennsylvania to effect this name change and expects to receive documentation confirming the name change from the State within two to three weeks. Thank you for your attention to this matter.

Very truly yours,

Amos S. Kamerer
Plant Manager

Cc:
Corporate Services Group, Koppers Inc.
File

KOPPERS INDUSTRIES

FAX TRANSMITTAL

7540 N.W. Saint Helens Rd.
Portland, Oregon 97210-3663
Phone: (503) 286-3681
Fax: (503) 285-2831
Web Page: www.koppers.com

TO: B. Meisinger, J. Stephenson, S. Kifer, J. Dietz DATE: 4/21/99

FROM: Amos TOTAL # OF PAGES: 2

Please review the attached and give me a call

IF THIS TRANSMITTAL IS IN ERROR, PLEASE CALL 503-286-3681 FAX # 503-285-2831

NW Natural
220 NW 2ND AVENUE
PORTLAND, OR 97209
TEL 503.226.4211
www.nwnatural.com

April 19, 1999

Mr. Amos Kamerer
Koppers Industries, Inc.
7540 N W St. Helens Road
Portland, Or 97210-3663

Re: N W Natural/Koppers Lease Agreement – October 1. 1998
Leasehold Improvements.

Dear Mr. Kamerer,

Section 5.3 of the lease agreement between N W Natural (landlord) and Koppers Industries, Inc (tenant) requires N W Natural's written consent to proposed leasehold improvements. You have requested that N W Natural provide consent for placement of a liquid or solid coal tar processing plant on the Kopper's lease area.

N W Natural has no objection to your installation of a liquid or solid coal tar processing plant on the property. However, Section 5.3.2 of the lease agreement requires that the improvements must be in compliance with all governmental regulations. As you know, the property is under environmental investigation through the Oregon Department of Environmental Quality (ODEQ) Voluntary Clean-up Program. Accordingly, the ODEQ must review and approve the installation of the proposed tank pilings before we can give our consent and installation can begin.

Thank you for delivering the tank drawings to me on April 6,1999. The drawings and related construction documents were sent to Michelle Schupe of the ODEQ on April 8, 1999. I suggest that Koppers and N W Natural meet with Ms. Schupe to explain the construction and the environmental condition of the area.

I will notify you as soon as I hear from Ms Schupe.

Please call me if you need any further information.

Sincerely,

Sandra K. Hart
Manager Risk Environment and Land

RECEIVED
APR 21 1999
KOPPERS INDS, INC.
PORTLAND OR

NW Natural
220 NW 2ND AVENUE
PORTLAND, OR 97209
TEL 503.226.4211
www.nwnatural.com

April 2, 1999

Mr. Amos K. Kamerer
Koppers Industries, Inc.
7540 N.W. St. Helens Road
Portland, Oregon 97210

Dear Mr. Kamerer:

I understand you are ready to proceed with construction of your planned business expansion.

As written approval, this letter satisfies the requirement of Section 5, Leasehold Improvements and Personal Property, 5.1-Existing Improvements.

Please le me know if you need anything further.

Very truly yours,

Sandra K. Hart

Sandra K. Hart, Manager
Risk Environment & Land

SKH:jd

Post-it® Fax Note 7671	Date 4/13/99	# of pages ▶ 1
To Steve Kifac	From Amos	
Co./Dept.	Co.	
Phone # Jack Stephensen	Phone #	
Fax #	Fax #	

5.3.1

RECEIVED
APR - 5 1999
KOPPERS INDS, INC.
PORTLAND OR

Author: AMOS KAMERER at PITT
Date: 5/3/99 4:23 PM
Priority: Normal
TO: Jim Dietz at PITT
CC: Kevin Fitzgerald at PITT
CC: BILL MEISINGER at TECHCTR
CC: Jack Stephenson at PITT
CC: Steve Kifer at PITT
Subject: ODEQ

---------- Message Contents ----------

Jim,

Well,after waiting all day, the ODEQ called Sandy about 2:30PM to say that they are sorry, but that the earliest that they can get all of the proper people together for our meeting, is Wednesday at 8:00AM.

I have all of my people set up for that time. I also called Eric Bliske, the site manager for this site with the ODEQ, to confirm that we expected to have a final resolution to matter at that meeting, and he said that was their plan as well.

I talked to Tom Howell, Harder Mech., regarding this delay. He said that their people had work on site through the end of the week, but that he would have to reconfirm with the pile driving contractor about their schedule, and would get back to me tomorrow.

There's nothing else that I can say about all of this, that has not already been said.

Amos

1150 – REAL ESTATE/BUSINESS ISSUES PORTLAND

Lease Agreement between Northwest Natural Gas Company & KII

10/1/98

Koppers000506

COPY

LEASE AGREEMENT

BETWEEN

NORTHWEST NATURAL GAS COMPANY,
dba NW Natural,
as Landlord

and

KOPPERS INDUSTRIES, INC.,
as Tenant

as of October 1, 1998

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Koppers000511

BASIC LEASE INFORMATION

Lease Date:	October 1, 1998
Landlord:	Northwest Natural Gas Company, dba NW Natural
Address of Landlord:	220 NW Second Avenue Portland, Oregon 97209 Attention: Manager: Risk, Environmental and Land
All Payments Made To:	220 NW Second Avenue Portland, Oregon 97209 Attention: Manager: Risk, Environmental and Land
Tenant:	Koppers Industries, Inc.
Address of Tenant:	7540 NW St. Helens Road Portland, Oregon 97210
Contact:	Amos Kamerer
Premises:	That section of the real property identified on Exhibit B to the Lease, and such portions of Landlord's Plant Property required for the Dock Improvements.
Lease Term:	Number of Months: 120 Scheduled Commencement Date: 10/01/1998 Expiration Date: 09/30/2008
Rent:	$9,900.00 per month for the initial term
Special Provisions:	Two five-year renewal terms; option to construct additional improvements and modify Landlord's existing docking facility.

LEASE AGREEMENT

THIS LEASE AGREEMENT (this "Lease") is made and entered into effective as of September 1, 1998, by and between NORTHWEST NATURAL GAS COMPANY (dba NW Natural), an Oregon corporation ("Landlord"), and KOPPERS INDUSTRIES, INC., a Pennsylvania corporation ("Tenant").

RECITALS

A. Landlord owns certain real property located in Portland, Multnomah County, Oregon, more particularly described in Exhibit A ("Landlord's Plant Property"), a portion of which is used by Landlord to conduct its liquid natural gas operations and a portion of which is currently leased to Tenant pursuant to the Prior Lease (as defined below). Portions of Landlord's Plant Property are also leased to other tenants from time to time.

B. Landlord desires to continue to lease to Tenant that portion of Landlord's Plant Property currently occupied by Tenant and such additional portions of the Landlord's Plant Property required for the Dock Improvements, and Tenant desires to lease the same from Landlord, on the terms and conditions set forth below.

AGREEMENT

Landlord and Tenant therefore agree as follows:

1. DEFINITIONS

As used in this Lease, the following terms shall have the following respective meanings:

"Dock Improvements" has the meaning specified in Section 5.2.

"Docking Facility" has the meaning specified in Section 5.2.

"Environmental Laws" means all state, federal and local statutes, regulations and ordinances relating to the protection of human health and the environment.

"Existing Environmental Liabilities" means the liability of Landlord, and Koppers Company, Inc. (now known as Beazer East, Inc. and the previous tenant under the Prior Lease) for certain environmental contamination of Landlord's Plant Property, as established and allocated pursuant to an agreement between Landlord and Beazer East, Inc..

"Existing Improvements" has the meaning specified in Section 5.1.

"Existing Mortgage" means the Mortgage and Deed of Trust dated July 1, 1946, and recorded in the Mortgage Records of Multnomah County, Oregon, on July 19, 1946 at Book 911, Page 203, as modified encumbering Landlord's Plant Property.

"Governmental Requirements" means any and all laws, statutes, ordinances, rules, orders, requirements, resolutions, policy statements and regulations of any federal, state or local governmental or quasi-governmental bodies or agencies having jurisdiction over the Landlord's Plant Property or the business and operations conducted by any party on any portion of Landlord's Plant Property.

"Hazardous Material" means any hazardous or toxic substance, material or waste, including, but not limited to, those substances, materials and wastes listed in the United States Department of Transportation Hazardous Materials Table (49 C.F.R. § 172.101) or by the United States Environmental Protection Agency as hazardous substances (40 C.F.R. pt. 302 and amendments thereto), petroleum products and their derivatives, and such other substances, materials and wastes as become regulated or subject to cleanup authority under any Environmental Laws.

"Landlord's Plant Property" has the meaning specified in Recital A.

"Lease Term" means the initial term of this Lease, as extended by any renewal terms.

"Real Property Taxes" means all taxes, assessments (general and special) and other charges that may be imposed on or against all or any portion of or in relation to the Premises, any leasehold estate in the Premises or measured by rent from the Premises. "Real Property Taxes" also includes any assessment, charge or tax (other than estate, inheritance, net income or franchise taxes) imposed by any authority having a direct or indirect power to tax or charge, including, without limitation, any city, county, state, federal or any improvement or other district.

"Premises" means that portion of Landlord's Plant Property consisting of all of Tax Lot 111 as more particularly described and depicted in Exhibit B and such portions of Landlord's Plant Property required for the Dock Improvements.

"Prior Lease" means the Lease dated August 17, 1965, between Landlord and Koppers Company, Inc. (now known as Beazer East, Inc.), recorded in the Records of Multnomah County, Oregon, on September 7, 1965 at Book 373, Page 271, the tenant's interests and obligations thereunder having been assigned to and assumed by Tenant by instrument dated March 13, 1989 and recorded in the Records of

Multnomah County, Oregon, at Book 2185, Page 289, as such Lease has been previously amended and as affected by the allocation of Existing Environmental Liabilities.

2. LEASE OF PREMISES; TERM

2.1 Premises; Demising Clause

Landlord hereby leases to Tenant, and Tenant hereby leases from Landlord, the Premises on the terms and conditions set forth in this Lease. Tenant acknowledges that other tenants of Landlord from time to time may use the loading and unloading facilities located along the southeasterly boundary of the Premises.

2.2 Initial Term of Lease

The initial ten (10) year term of this Lease shall commence on October 1, 1998, and shall end at 11:59 P.M. on September 30, 2008. The Prior Lease shall terminate on the commencement date of this Lease; provided, however, such termination shall not release or otherwise affect Tenant's obligations with respect to any environmental condition of Landlord's Plant Property caused by Tenant or Beazer East, Inc. under the Prior Lease in connection with operations on the Premises under this Lease or the Prior Lease or any party's obligations with respect to the Existing Environmental Liabilities. Tenant may terminate this Lease at any time during the initial term or any renewal term hereof upon giving twelve (12) months' prior written notice to Landlord. Any such termination shall not affect any amount of rent due and owing under this Lease up to the effective date of such termination or affect any liability of Tenant under Environmental Laws.

2.3 Renewal Terms

If there is no default under this Lease when each option is exercised or when the renewal term is to commence, then Tenant shall have the option to renew this Lease for two (2) successive terms of five (5) years each, as follows:

2.3.1 Each renewal term shall commence on the day following expiration of the immediately preceding term.

2.3.2 Tenant shall exercise the renewal option, if at all, by written notice to Landlord given not less than one hundred eighty (180) days before the applicable renewal term begins. Tenant may exercise its option to renew for the second renewal term if (a) Tenant timely exercises its renewal option, and (b) Tenant leased the Premises for the immediately preceding renewal term. If Tenant gives such

notice, then this Lease shall be binding for the applicable renewal term without further act of the parties.

2.3.3 The terms and conditions applicable to Tenant's leasing of the Premises for each renewal term shall be as set forth in this Lease with respect to the initial term, except for rent and except that Tenant may not renew this Lease for the renewal term that has been exercised. Rent for each renewal term shall be subject to adjustment as provided in Section 4.2 below.

3. USE

Tenant is authorized to use the Premises for purchasing, loading and unloading, storing, processing and selling coal tar, products derived from coal tar and petroleum pitch, and for other purposes incidental and directly related to such operations, including, but not limited to, incidental office space and parking for its employees and visitors. Tenant shall not use the Premises for any other purpose without the prior written consent of Landlord, which will not be unreasonably withheld. Tenant shall have the right to install signs on the Premises identifying its operations, to the extent permitted by law. Tenant shall coordinate its use of the Docking Facility with Landlord and other tenants of Landlord's Plant Property. Landlord may, in its sole discretion, resolve any dispute among tenants regarding the time, duration, and nature of the use of the Docking Facility. Tenant may not perform any excavating or digging operation of any type or kind on the Premises without prior written notice to Landlord and without Landlord's prior written consent, which will not be unreasonably withheld.

4. RENT

4.1 Basic Monthly Rent

Tenant shall pay as basic monthly rent to Landlord during the first five (5) years of the initial Lease Term the sum of $9,900.00 per month (subject to adjustment as provided in Section 4.2 for the second five (5) years of the initial Lease Term and for any renewal terms, and subject to adjustment as provided in Section 5.2 with respect to any Dock Improvements made by Tenant). Rent shall be paid in advance on the first day of each calendar month, at Landlord's address set forth in Section 22.4 below, or at such other place as Landlord may designate in writing from time to time. Rent due for any partial month shall be prorated. Except as may be specifically provided otherwise herein, all rent shall be paid without billing and without prior demand or notice and without any deduction or offset.

4.2 Rent During Second Five Years and During Renewal Terms

The basic monthly rent shall be adjusted in accordance with this Section 4.2 on the first day of the sixth (6th) year of the Lease Term and, if Tenant has exercised its renewal options with respect thereto on the first day of each renewal term of this Lease, the basic monthly rent shall be adjusted in accordance with this Section 4.2. Each such adjustment date is hereinafter referred to as a "Rent Adjustment Date". The base for computing such increases is the Consumer Price Index All Urban Consumers U.S. City Average (1982-84 = 100), published by the United States Department of Labor, Bureau of Labor Statistics ("Index"), in effect on November 1, 1997 ("Beginning Index"). The Index published and in effect on the date that is two (2) months prior to each Rent Adjustment Date ("Adjustment Index") is to be used in determining the amount of the increase on such Rent Adjustment Date. Beginning with the basic monthly rent due on and after the first Rent Adjustment Date, and on and after each subsequent Rent Adjustment Date, the basic monthly rent due shall be increased by an amount equal to the product achieved by multiplying the basic monthly rent in effect immediately preceding such Rent Adjustment Date by a fraction. On the first Rent Adjustment Date, the numerator of the fraction will be the Adjustment Index and the denominator will be the Beginning Index. On the second and each subsequent Rent Adjustment Date, the numerator of the fraction will be the current Adjustment Index and the denominator will be the Adjustment Index used to calculate the immediately preceding rental increase pursuant to this Section 4.2. In no event, however, shall any adjustments made under this Section 4.2 cause the basic monthly rent to be reduced below the basic monthly rent amount most recently in effect. If the Index is changed so that the base year index differs from that in effect on November 1, 1997, the Index shall be converted in accordance with the conversion factor published by the United States Department of Labor Bureau of Labor Statistics. If the Index is discontinued or revised during the Term, such other government index or computation with which it is replaced, as agreed to by both parties to this Lease, shall be used in order to obtain substantially the same result as would be obtained if the Index had not been discontinued or revised.

By way of example, but not by way of limitation, for the rental adjustment taking place on January 1, 2003, the Index in effect for November 2002 shall be compared to the Index in effect for the month of November 1997. For the adjustment taking place with respect to the first renewal term on January 1, 2008, the parties will compare the Index in effect for November 2007 to the Index for November 2002.

4.3 Additional Rent

All other costs, charges and reimbursements that Tenant is required elsewhere in this Lease to pay, and any other sum that Tenant is required to pay to Landlord or

third parties in connection with this Lease, shall constitute additional rent under this Lease. All delinquent rent shall bear interest at the rate of nine percent (9)% per annum from the date due until paid.

5. LEASEHOLD IMPROVEMENTS AND PERSONAL PROPERTY

5.1 Existing Improvements

Pursuant to the Prior Lease, Tenant constructed and is in possession of substantial improvements on the Premises (the "Existing Improvements"). Tenant shall accept possession under this Lease of the Existing Improvements and any other improvements located on the Premises as of the date of this Lease in their current, AS IS, WHERE IS condition, without representation or warranty as to condition, fitness for purpose or any other representation or warranty by Landlord whatsoever, express or implied. Tenant may relocate, modify, dismantle and remove, or replace any of the Existing Improvements without Landlord's consent and, with Landlord's prior written consent, any other improvements on the Premises as of the date of this Lease (save and except the fire walls surrounding the light oil tank farm), which consent shall not be unreasonably withheld.

5.2 Future Leasehold Improvements--Modification of Existing Marine Petroleum Terminal

Landlord acknowledges that Tenant intends to modify Tenant's operations at the Premises to use liquid coal tar pitch, in addition to or in place of solid coal tar pitch. As part of this change in Tenant's operations, Tenant wishes to construct additional improvements to Tenant's Existing Improvements and to modify Landlord's existing docking facility (consisting of a crane, a wharf, the dock, and any improvements, additions, or replacements thereto, together defined as the "Docking Facility") located on the northerly boundary of Landlord's Plant Property. The additional improvements contemplated by Tenant to the Docking Facility are referred to collectively as the "Dock Improvements." If the Dock Improvements are constructed, the basic monthly rent payable by Tenant to Landlord shall be increased by $100.00 per month as a result of Tenant's increased use of Landlord's Plant Property. Landlord shall cooperate with Tenant as reasonably necessary to allow Tenant to construct the Dock Improvements, at Tenant's sole cost and expense, subject to the following limitations:

5.2.1 Prior to any construction of the Dock Improvements by or for Tenant, Landlord and Tenant shall reach substantial written agreement regarding the scheduling and level of use of the Docking Facility by Tenant and Landlord, and any other tenant or subtenant of Landlord at Landlord's Plant Property; provided, however,

that the Docking Facility but not the Dock Improvements shall be deemed to be a common area and may be used by other tenants of Landlord in addition to Tenant.

5.2.2 Tenant shall construct the Dock Improvements, if at all, substantially as and where described in the U. S. Army Corps of Engineers Portland District Public Notice for Permit Application No. 97-903 issued July 30, 1997, a copy of which is attached hereto as Exhibit C;

5.2.3 Tenant shall, upon five (5) days' written request from Landlord, provide Landlord with the most current copies of any and all plans, specifications, and drawings for the Dock Improvements, including any "as-built" survey;

5.2.4 Construction of the Dock Improvements shall not interfere with Landlord's operations at Landlord's Plant Property; and

5.2.5 Construction of the Dock Improvements shall not interfere with the operations of any existing or future tenant of Landlord's Plant Property.

5.3 Leasehold Improvements--General Requirements

5.3.1 Tenant, at its sole cost and expense, may construct on the Premises such other improvements and structures Tenant may wish in connection with a liquid or solid coal tar processing plant, provided Tenant first obtains Landlord's prior written consent, which consent shall not be unreasonably withheld.

5.3.2 With regard to any such other improvements made by Tenant, and with regard to the Dock Improvements described in Section 5.2 above, Tenant hereby covenants that (1) all improvements and structures shall be constructed in a good and workmanlike manner and in compliance at all times with all applicable Governmental Requirements; (2) if any mechanic's liens shall be filed against any portion of Landlord's Plant Property or any building or improvement thereon, Tenant shall, at its own cost and expense, cause the same to be canceled and discharged within thirty (30) days after notice of the filing thereof; and (3) if Landlord is required to appear at any hearing or other proceeding, to take any action, or review any document related in anyway to improvements constructed by Tenant (including any appearance at any land use or other hearing), Tenant shall pay to Landlord all costs and expenses incurred by Landlord related to such appearance, action, or review, including, without limitation, Landlord's costs for Landlord's employees and contractors, and all attorney fees.

5.3.3 All improvements, including the Existing Improvements and the Dock Improvements (except the Docking Facility and the items owned by Landlord or any existing or future tenant at the Premises that are currently located on the Premises) shall be deemed to be personal property of Tenant and shall remain the

property of Tenant during the Lease Term. At the expiration or earlier termination of this Lease, Tenant shall remove all Dock Improvements and all improvements located on the Premises, regardless of when or where built. If Tenant does not remove all improvements within one hundred eighty (180) days of the date of Landlord's notice, all improvements remaining on the Premises shall become Landlord's property, and Landlord may, in Landlord's discretion, remove all or some of such improvements at Tenant's expense, or may retain all or some of the improvements.

6. COMPLIANCE WITH LAW; PERMITS

6.1 Compliance with Law

Tenant shall, at Tenant's expense, comply with all applicable Governmental Requirements, covenants and restrictions of record, and requirements in effect during the Lease Term or any part thereof.

6.2 Permits

Tenant shall obtain all approvals, consents, permits and licenses required under applicable Governmental Requirements for the conduct of Tenant's business on the Premises. Landlord will cooperate reasonably with Tenant's efforts to obtain the permits, but Tenant shall bear all costs of obtaining the permits.

7. LANDLORD'S ACCESS AND RESERVATION OF RIGHTS

Landlord, its agents and employees, may enter the Premises at reasonable times to inspect the same, maintain, repair and/or replace existing utility lines, conduct any environmental remediation and monitor such work, and perform Landlord's obligations under this Lease. Landlord reserves the right to install additional utility or other lines, so long as such additional lines do not materially interfere with Tenant's operations on the Premises.

8. TAXES, UTILITIES AND OTHER FEES

8.1 Real Property Taxes

8.1.1 Obligation to Pay

Tenant shall pay promptly to Landlord, before the same become delinquent, all Real Property Taxes due during the Lease Term against the Premises or by reason of the use or occupancy thereof, and the amount of any increase in Real Property Taxes payable by Landlord attributable to Tenant's Dock Improvements. Real Property Taxes attributable to any partial year in the Lease Term shall be prorated.

8.1.2 LID Assessments

Notwithstanding any contrary term in this Lease, for any special or local improvement district or similar tax or assessment levied or assessed on or against the Premises that can be paid in installments or that cover improvements with a useful life extending beyond the Lease Term, only the amount due and payable for the Lease year in question shall be included within "Real Property Taxes" for the Lease year.

8.1.3 Separate Tax Lot; Tax Bills

The Premises are taxed as a separate tax lot with their own tax lot number. Landlord shall pay all tax bills for all portions of the Premises, and shall thereafter forward a copy of such tax bill to Tenant. Tenant shall pay to Landlord the full amount of each such tax bill within thirty (30) days of receiving notice from Landlord of the amount due. If any tax bill is sent to Tenant and not directly to Landlord, Tenant shall promptly deliver copies of such tax bill to Landlord.

8.1.4 Contests

If Tenant in good faith believes any tax appraisal or assessment is excessive, and if there is a process for contesting or appealing such valuation, then Tenant may contest such appraisal or assessment and, to the extent possible, Landlord will cooperate with Tenant in such effort. Costs of the contest shall be borne by Tenant. The foregoing shall not limit Landlord's right to contest any such appraisal or assessment, at Landlord's own expense. Landlord and Tenant agree to cooperate in good faith with regard to any tax contest.

8.2 Personal Property Taxes

Tenant will promptly pay all personal property taxes assessed on or with respect to Tenant's trade fixtures, equipment, and other personal property.

8.3 Utilities

Tenant shall promptly pay for all utilities and services used in, on or from the Premises during the Lease Term. Tenant shall arrange and pay for its janitorial and trash removal services and other costs of operating and maintaining the Premises, it being understood that, except as expressly provided in this Lease, this Lease is a "net" lease and Tenant shall be responsible for all such expenses.

9. REPAIRS

9.1 Tenant's Obligation

Tenant shall maintain the Premises, all improvements, alterations and additions to the Premises, the Dock Improvements (if any), and all other personal property of Tenant located on or around the Premises or the Docking Facility in a good state of repair, and shall keep the same and all parts thereof in good, clean, healthful and safe order and condition, all in accordance with applicable Governmental Requirements. Except as provided in Section 9.2, Landlord shall not be required to make any improvement or repair of any kind for Tenant's benefit on the Premises or any other portion of Landlord's Plant Property. Subject to the Existing Environmental Liabilities, Tenant shall at all times keep the Premises and the Dock Improvements, if any, in compliance with all Legal Requirements and in accordance with all directions, rules and regulations of the health officer, fire marshal, building inspector or other proper officer of any governmental entity, at the sole cost and expense of Tenant.

9.2 Landlord's Obligation

Landlord shall maintain and repair the underground waterlines used for the fire suppression system serving the Premises up to and including the hydrants, including periodic testing of such fire suppression system not less than one (1) time per year the Lease Term.

9.3 Self-Help

If Tenant or Landlord fail to perform its obligations under this Section 9 after notice and a reasonable opportunity to cure (such period not to exceed twenty (20) days, unless (1) cure cannot reasonably be completed within twenty (20) days, and (2) cure is commenced within twenty (20) days and thereafter diligently and continuously pursued to completion), the other party may perform or cause such obligation to be performed. Any cost incurred shall be paid by the party required to perform such obligation and shall accrue interest at the rate of 9% per annum, from the date of expenditure until reimbursed. Notwithstanding the foregoing, if any condition on the Premises or Docking Facility poses an immediate risk of injury or harm, the parties may take such emergency action as may be reasonably necessary without providing an opportunity to cure to the other party, so long as the party taking such action promptly notifies the other party of the action taken.

10. INDEMNIFICATION AND INSURANCE

10.1 Indemnification

10.1.1 Tenant's Indemnification of Landlord

Except as limited in Section 10.1.3 and except as provided to the contrary in any agreement between the parties regarding or related to the Existing Environmental Liabilities, Tenant shall indemnify, defend and save Landlord, its directors, officers, agents, contractors and employees, harmless from all liabilities, claims, losses, demands and expenses (including reasonable fees of professionals) incurred or suffered by Landlord, its directors, officers, agents, contractors and employees, and relating to or resulting from the acts or omissions of Tenant, its officers, directors, agents, contractors and employees on or about the Premises or any other portions of Landlord's Plant Property.

10.1.2 Landlord's Indemnification of Tenant

Except as limited in Section 10.1.3 and except as provided to the contrary in any agreement between the parties regarding or related to the Existing Environmental Liabilities, Landlord shall indemnify, defend and save Tenant, its directors, officers, agents, contractors and employees, harmless from all liabilities, claims, losses, demands and expenses (including reasonable fees of professionals) incurred or suffered by Tenant, its directors, officers, agents, contractors and employees, and relating to or resulting from the acts or omissions of Landlord, its officers, directors, agents, contractors and employees on or about Landlord's Plant Property.

10.1.3 Limitation; Mutual Responsibility

No party shall be required to indemnify the other party or hold the other party harmless for any loss, damage, or claim due to the negligence or misconduct of such other party. In case of joint or concurrent negligence of the parties giving rise to a loss or claim against either or both of them, each party shall have full rights of contribution from the other.

10.1.4 Notice of Claims; Defense and Settlement

Any party entitled to indemnification under this Lease shall promptly notify the indemnifying party of the act, omission, or occurrence for which the indemnified party intends to seek indemnification. The party seeking indemnification will reasonably cooperate in providing information and testimony to assist in the defense of the matter, but all out-of-pocket costs of such cooperation shall be a part of the indemnified amounts for which the indemnifying party shall hold the party seeking

indemnification harmless. Control of the defense of the claims shall be the right and responsibility of the indemnifying party, which shall have authority to contest, compromise, or settle the matter in its reasonable discretion. If the indemnifying party fails to take reasonable and timely action to defend the party seeking indemnification, the party seeking indemnification may take reasonable action to defend itself, without limiting its right to seek indemnification and reimbursement from the indemnifying party.

10.2 Insurance

10.2.1 Liability Insurance

Tenant, at Tenant's expense, shall maintain, or cause to be maintained, a commercial general liability policy or policies (including fire and legal liability) with not less than a combined single limit of $10,000,000. Each policy shall be for the protection of Tenant and Landlord, and their directors, officers, agents, and employees, insuring Tenant and Landlord and naming Landlord as an additional insured against liability for damages because of personal injury, bodily injury, death, or damage to property, including loss of use thereof, and occurring on or in any way related to the Premises or Docking Facilities, Tenant's operations or activities on the Premises or Docking Facilities or occasioned by reason of the operations of Tenant. By written notice to Tenant, Landlord may increase the minimum limit requirement set forth above based on customary and commercially reasonable standards for insurance coverage limits, when changing market and coverage conditions and practices reasonably justify such increase.

10.2.2 Tenant's Casualty Insurance

Tenant, at Tenant's expense, shall keep the Premises, all improvements thereon, the Dock Improvements, and all of Tenant's trade fixtures, equipment, and other personal property owned by Tenant and located on or about the Premises or the Docking Facility, continuously insured against fire and other casualty with a reputable, solvent insurance underwriter(s). The policy(ies) shall be written on an all-risk form, in an amount equal to one hundred percent (100%) of the replacement value of the improvements, and in such amounts as may be elected by Tenant with respect to its personal property.

10.2.3 Docking Facility Insurance

Landlord shall keep the Docking Facility continuously insured against fire and other casualty with a reputable, solvent insurance underwriter. The policy shall be written on an all-risk form, in an amount equal to one hundred percent (100%) of the replacement value of the Dock (exclusive of Tenant's Dock Improvements, which

shall be insured by Tenant as provided in Section 10.2.2). Landlord and Tenant shall each bear any additional, special or excess premium attributable to special hazards or risks on the portions of the Plant Property controlled by each party. If Landlord, in its sole discretion, believes that Tenant's use of the Docking Facility has created a special hazard or risk, Landlord shall have the right to deliver written notice to Tenant describing the risk or hazard and requiring Tenant to provide proof to Landlord within ten (10) days that Tenant has insurance covering the additional hazard or risk. Tenant's failure to provide such proof of insurance within the time provided shall constitute a default under this Lease.

10.2.4 Workers' Compensation

Tenant shall maintain in force workers' compensation insurance, including coverage for employer's liability, and longshoremen's and harborworkers' coverage with respect to any operations of Tenant involving the Docking Facilities, as appropriate or required by law.

10.2.5 Certificates

Each party shall, upon full execution of this Lease, furnish to the other party a certificate(s) of insurance evidencing the date, amount, and type of insurance required by this Lease. All policies of insurance will provide for not less than thirty (30) days' written notice to Landlord and Tenant before such policies may be revised, nonrenewed, or canceled. Upon request, each party shall provide to the other a copy or copies of any insurance policy required to be carried by such party under this Lease.

10.3 Waiver of Liability and Subrogation

Neither Landlord nor Tenant shall be liable to the other for losses arising out of damage to or destruction of all or any part of the Premises or the Docking Facilities or for damage to other parties' properties or injuries to other persons, when such losses are caused by any of the perils that are insured against, to the extent of available insurance proceeds. Claims for any and all losses, however caused, hereby are waived, to the extent of available insurance proceeds. However, nothing in this Section 10.3 shall be deemed to exculpate a party from liability for such losses if such party fails to obtain and keep in effect insurance against such losses as required under this Lease, nor shall this section be deemed to exculpate any party for liability for such losses it such exculpation would void or nullify any insurance coverage for such loss that might otherwise exist for the benefit of the other party. All insurance policies to be procured under this Lease shall contain an express waiver of any right of subrogation by the insurer.

11. ENVIRONMENTAL COMPLIANCE

11.1 Definitions

For purposes of this Section 11, (1) "Applicable Premises" means the Premises defined and described in Section 1 and all land or interests in land appurtenant to such Premises or used by Tenant under the terms of this Lease, including, without limitation, the Docking Facilities, the bed, shores and waters of the Willamette River adjacent to the Docking Facilities, parking areas and any easements, and (2) "Tenant's Operations" shall mean all operations of Tenant in the conduct of Tenant's business described in Section 3, and/or all operations by any subtenant of Tenant, on or about the Applicable Premises or conducted off the Applicable Premises and related to operations conducted on or about the Applicable Premises.

11.2 Compliance with Environmental Laws

Tenant shall:

11.2.1 Cause all of Tenant's Operations on the Applicable Premises to comply with all Environmental Laws and orders of any governmental authorities having jurisdiction under any Environmental Laws;

11.2.2 Obtain, keep in effect and comply with all governmental permits and authorizations required by Environmental Laws with respect to the Applicable Premises or Tenant's Operations;

11.2.3 Furnish Landlord, upon request, with copies of all such permits and authorizations and any amendments or renewals thereof, and notify Landlord of any expiration or revocation of such permits or authorizations.

11.2.4 Limitation on Uses of Hazardous Materials

(a) Tenant shall not use, or allow any person to use, the Applicable Premises to generate, manufacture, refine, transport, treat, store, handle, recycle, release or dispose of any Hazardous Material, except for coal tar, products made from coal tar, petroleum pitch and materials reasonably necessary for Tenant's Operations.

(b) All Hazardous Material used, kept and stored on or about the Applicable Premises shall be handled, used, kept and stored in compliance with Environmental Laws and in a manner that minimizes the likelihood of any release.

11.3 Tenant's Obligation to Undertake Environmental Measures

Except for matters pertaining to Existing Environmental Liabilities, Tenant shall undertake any and all preventive, investigatory or remedial actions (including emergency response, removal, containment and other remedial actions) that are either (a) required by any applicable Environmental Laws or governmental authorities, or (b) necessary to prevent or minimize property damage (including damage to the Applicable Premises), personal injury or damage to the environment and natural resources, or the threat of any such damage or injury, in either case arising out of releases of or exposure to Hazardous Material in connection with the Tenant's Operations.

11.4 Notices

Except for matters pertaining to the Existing Environmental Liabilities, Tenant shall immediately notify Landlord in writing if Tenant becomes aware of any of the following:

(a) Any spill, release or disposal of any Hazardous Material, or imminent threat thereof, on, in, over, under or from the Applicable Premises or in connection with Tenant's Operations, unless a release or disposal is necessary and reasonable for Tenant's Operations, is permitted by governmental agency (or is authorized for release without permit) does not violate any Environmental Laws and poses no threat to human health or the environment;

(b) Any spill, release or disposal of any Hazardous Material, or imminent threat thereof, at any adjacent properties, which spill, release or disposal could migrate to, through, over or under the Applicable Premises;

(c) Any violation of Environmental Laws regarding the Applicable Premises or Tenant's Operations;

(d) Any administrative or judicial investigation or proceeding relating to Hazardous Material or Environmental Laws and to the Applicable Premises or Tenant's Operations;

(e) Any order, notice of violation, fine, penalty or other similar action relating to Hazardous Material or Environmental Laws and to the Applicable Premises or Tenant's Operations; and

(f) Any complaint or lawsuit filed or threatened to be filed by any person or other entity, including, without limitation, any governmental authority,

relating to Hazardous Material or Environmental Laws and to the Applicable Premises or Tenant's Operations.

11.5 Access to Environmental Records

At Landlord's request, Tenant will deliver to Landlord, at Tenant's expense, copies of any and all documents in its possession, or to which it has access, relating to Hazardous Material or Environmental Laws and (a) the physical conditions existing on or about the Applicable Premises, or (b) Tenant's Operations including, without limitation, (i) results of any laboratory analyses of samples, site assessments or studies, environmental audit reports, and/or other environmental studies or reports, and (ii) copies of all reports, manifests and identification numbers at the same time as they are required to be and/or are submitted to the appropriate governmental authorities. If requested by Tenant, Landlord will execute an agreement to maintain the confidentiality of any environmental record which Tenant delivers to Landlord, provided that Landlord shall have the right to notify appropriate governmental authorities of any violations of environmental laws disclosed by the environmental records if Landlord is required to make such notification by any applicable Environmental Law or if disclosure is required to avoid an immediate and substantial risk of harm to persons or property.

11.6 Environmental Audits and Site Assessments

If Landlord believes Tenant is not complying with all Environmental Laws or the requirements of this Lease, or that a material spill, release or disposal of a Hazardous Material has occurred on or about the Applicable Premises, then Landlord may require Tenant to furnish Landlord with an environmental audit or site assessment satisfactory to Landlord. The environmental audit or site assessment shall be performed at Tenant's expense by a qualified consultant approved by Landlord. If requested by Tenant, Landlord will execute an agreement to maintain the confidentiality of any environmental audit or site assessment conducted pursuant to this section, provided that Landlord shall have the right to notify appropriate governmental authorities of any violations of environmental laws disclosed by the environmental audit or site assessment if Landlord is required to make such notification by any applicable Environmental Law or if disclosure is required to avoid an immediate and substantial risk of harm to persons or property.

11.7 Landlord's Rights

11.7.1 Inspections

Landlord may conduct reasonable inspections and investigations of the Applicable Premises and Tenant's Operations at any time. Tenant shall cooperate fully

with Landlord during such inspections and investigations and Tenant shall have the right to observe any such inspections and investigations.

11.7.2 Preventive, Investigatory and Remedial Actions

If Tenant fails to perform any obligation under Section 11.3 (Tenant's Obligation to Undertake Environmental Measures), then Landlord may (but shall not be required to) perform such obligations at Tenant's expense. All costs and expenses incurred by Landlord under this Section shall be reimbursed by Tenant within thirty (30) days after demand with interest at the rate of eighteen percent (18%) per annum. In performing any of Tenant's obligations under this Section, Landlord shall be deemed to be Tenant's agent and shall not, by reason of such performance, be deemed to assume any responsibility or liability of Tenant or any subtenant under any Environmental Laws, to any governmental agency or to any other third party. Landlord is authorized to perform Tenant's obligations under Section 11.3 as Landlord deems necessary and appropriate.

11.8 Indemnification

Without limiting Tenant's obligations under Section 10.1.1, but subject to the allocations of liability for the Existing Environmental Liabilities, Tenant shall defend (with counsel approved by Landlord), fully indemnify and hold free and harmless Landlord from and against (i) all claims, judgments, damages, penalties, fines, costs, liabilities or losses (including, without limitation, diminution in value of the Applicable Premises, damages for the loss or restriction on the use of rentable or usable space or of any amenity of the Premises, damages arising from any adverse impact on marketing of space, sums paid in settlement of claims, attorneys' fees, consultant fees and expert fees) that arise during or after the Lease Term or that arose under the term of the Prior Lease, and (ii) are imposed on, or paid by or asserted against Landlord by reason or on account of, or in connection with, or arising out of (a) Tenant's use, generation, manufacture, refinement, transportation, treatment, storage, handling, recycling or disposal of Hazardous Material, or any release of Hazardous Material in connection with or as a result of Tenant's use or activities, or (b) the use or activities of Tenant's agents, contractors or subtenants relating to Hazardous Materials, or (c) any violation of any Environmental Law by Tenant or its agents, subcontractors or subtenants.

This indemnification of Landlord by Tenant includes, without limitation, costs incurred in connection with any of the following:

(a) any investigative or remedial action involving the presence of or releases of Hazardous Material on or about the Applicable Premises;

(b) any allegations made as to the violation of any Environmental Laws involving the Applicable Premises or Tenant's Operations; and/or

(c) any injury or harm of any type to any person or entity or damage to any property (including natural resources) arising out of, in connection with or in any way relating to (i) the use, generation, manufacture, refinement, transportation, treatment, storage, handling, recycling, disposal, release or other handling of Hazardous Material on or about the Applicable Premises or during Tenant's Operations, or (ii) the violation of any Environmental Laws, or (iii) the contamination of the Applicable Premises during the period of this Lease.

11.9 Pre-Termination Environmental Assessment

Within sixty (60) days before expiration of the Lease Term, or upon receiving notice of termination, Landlord may retain the services of an independent professional engineer licenses to practice in the State of Oregon to conduct an environmental assessment to establish the environmental condition of the Applicable Premises. On completion of the assessment, Landlord shall provide Tenant with an environmental report that describes the results of such efforts. The parties agree that there shall be a rebuttable presumption that the assessment establishes the environmental condition of the Applicable Premises as of the date this Lease expires or terminates.

11.10 Existing Environmental Liabilities; Disclaimer

Nothing contained in this Section 11 releases, modifies or otherwise affect any party's duties or obligations under any other agreement regarding the Existing Environmental Liabilities. Landlord shall have access to the Applicable Premises at all times to perform any remediation and monitoring activities required of Landlord under any agreement with any party addressing the Existing Environmental Liabilities, or any order of or agreement with a governmental agency. LANDLORD MAKES NO REPRESENTATIONS OR WARRANTIES REGARDING THE CONDITION OF THE APPLICABLE PREMISES, COMPLIANCE WITH ANY ENVIRONMENTAL LAWS, OR THE EXISTENCE OF OR COMPLIANCE WITH ANY REQUIRED PERMITS OF ANY GOVERNMENTAL AGENCY. TENANT ACKNOWLEDGES THAT TENANT IS AND HAS BEEN OCCUPIED THE PREMISES UNDER THE PRIOR LEASE AND IS NOT RELYING ON ANY STATEMENT MADE BY LANDLORD OR LANDLORD'S AGENTS REGARDING THE CONDITION OF THE APPLICABLE PREMISES.

11.12 Survival

The provisions of this Section 11 shall survive the expiration or earlier termination of this Lease.

12. TRANSFER OR SUBLEASE

12.1 General

Except as set forth in Section 12.2, Tenant may not assign this Lease, or sublet the Premises, or any part thereof, without the prior written consent of Landlord.

12.2 Permitted Transfers

The prohibitions of Section 12.1 shall not apply to any of the following ("Permitted Transfer"): (1) an assignment or sublease to an entity controlled by, controlling of, or under common control with Tenant; or (2) an assignment to a corporation with or into which Tenant has merged or consolidated. Landlord's consent will not be necessary to any such Permitted Transfer, but no transfer of this Lease shall be effective until Landlord receives written notice thereof and executed documents evidencing such transfer, including assumption by the transferee, if there is an assignment of the Lease. No Permitted Transfer shall release Tenant from any obligation under this Lease. A transferee under a Permitted Transfer shall be subject to all provisions of this Lease, including the limitations on transfer and assignment set forth in this Section 12.

13. DAMAGE OR DESTRUCTION OF IMPROVEMENTS

If any improvements on the Premises or any of the Dock Improvements are damaged or destroyed by fire or other casualty, then Tenant may either repair and restore the Premises or remove the damaged improvement(s) and clear Landlord's Plant Property of all related debris (including any Hazardous Material released as a result of such fire or casualty). Such election shall be made by Tenant and the restoration work or removal work, as the case may be, commenced within fourteen (14) days following the casualty event, except for damage to the Dock Improvements, which election and commencement of work shall be made and undertaken by Tenant within twenty-one (21) days after the casualty event. All work shall be prosecuted diligently and continuously to completion. If Tenant fails to commence repair or removal activities within the applicable time period, then all proceeds from insurance carried by Tenant covering the improvements and Dock Improvements shall be paid to Landlord for application to such repair and/or removal. All proceeds relating to Tenant's trade fixtures, equipment and other personal property shall be paid to and belong to Tenant.

14. LIENS

Tenant shall keep the Premises and all other portions of Landlord's Plant Property free from all liens of every kind and description caused, incurred, permitted

or suffered by any act or omission of Tenant, including, without limitation, any mechanic's, laborer's, suppliers' construction or any other liens; provided, Tenant shall not be in default under this Section if Tenant removes or adequately bonds (by posting a bond in accordance with applicable law) any such unpermitted lien within thirty (30) days of receipt of actual notice of the existence of any such lien.

15. EMINENT DOMAIN

15.1 Definitions

The term "takes by (or taken or taking by) eminent domain" includes the exercise of any power of condemnation, whether by public authority or private corporation and any purchase or other acquisition in lieu of condemnation. The expression "date of taking" means the date the order adjudicating public use becomes final or the date the authority exercising its right of "eminent domain" agrees in writing to the purchase price in lieu of condemnation, or, if earlier, takes title to the Premises.

15.2 Material Taking

If a condemning authority takes by eminent domain all of the Premises or a portion of the Premises that is, the reasonable judgment of Tenant, sufficient to prevent Tenant from using the remaining Premises to conduct its operations in a manner substantially equivalent to its operations as conducted immediately prior to the taking, then this Lease shall terminate as of the date of taking and all rental shall be paid up to that date. All condemnation proceeds shall belong to Landlord, except that Tenant shall be entitled to seek a separate award for any cost or loss incurred or expected to be incurred by Tenant in removing Tenant's trade fixtures, equipment and other personalty, and Tenant's relocation expenses. If, at any time after Tenant has constructed Dock Improvements and is using the Docking Facilities, a condemning authority takes all of the Docking Facilities or a portion of the Docking Facilities that is, in the reasonable judgment of Tenant, sufficient to prevent Tenant from using the Premises to conduct its operations in a manner substantially equivalent to its operations as conducted immediately prior to the taking, then such taking shall be subject to and covered by the provisions of this Section 15.2.

15.3 Partial Taking

If the portion of the Premises or Docking Facilities taken by eminent domain does not prevent Tenant from conducting its operations in a manner substantially equivalent to its operations as conducted immediately prior to the taking, then Tenant shall promptly restore the Premises to a condition comparable to their condition on the date of taking, less the portion lost in the taking, and this Lease shall continue in

effect. Tenant's obligation to restore shall be limited to the amount of condemnation proceeds made available to Tenant by Landlord. Landlord shall promptly restore the Docking Facilities to a condition comparable to its condition on the date of the taking, less the portion lost in the taking. Landlord's obligation to restore shall be limited to application of available condemnation proceeds.

16. DEFAULT BY TENANT

16.1 Default in Payment of Rent

Tenant's failure to pay any item of rent for a period of five (5) days after the receipt by Tenant of Landlord's notice of Tenant's failure to make such payment shall be a "Default" under this Lease. With respect to Tenant's obligation to pay basic monthly rental under Section 4.1, Landlord shall be required to provide only one (1) written notice of default in any calendar year. Landlord shall not be required to give additional notice of any subsequent payment default with respect to basic monthly rental as a prerequisite to the exercise of remedies and such subsequent default shall be an immediate "Default" under this Lease.

16.2 Other Defaults

Except with respect to the failure to pay rent as set forth in Section 16.1, Tenant shall not be considered in "Default" by reason of any act or omission in breach of any requirement hereof, until and unless Landlord gives Tenant notice of such act or omission, and Tenant fails to cure the same within twenty (20) days after the receipt by Tenant of such notice. As to any breach that cannot reasonably be cured within twenty (20) days, Tenant shall not be in "Default" if Tenant commences to cure such act or omission within such 20-day period, and thereafter diligently and continuously prosecutes such cure to completion. Tenant's failure to cure such breach within the applicable cure period shall be a "Default" under this Lease. Notwithstanding the foregoing, Tenant shall provide to Landlord a written plan and schedule for the repair of any improvement, alteration or addition on the Premises, any Dock Improvements or any personal property of Tenant, the condition of which poses an immediate risk of harm to persons or property, within five (5) days after such condition occurs. In addition to Landlord's rights under Section 9.3, Tenant's failure to provide such information to Landlord within such five (5) day period shall constitute a "Default" under this Lease.

16.3 Automatic Defaults

Tenant shall be in "Default" under this Lease if (1) Tenant vacates or abandons the Premises for a period in excess of thirty (30) consecutive days, or (2) Tenant becomes bankrupt or insolvent or files any debtor proceedings or has taken against it

in any court pursuant to state or federal statute, a petition in bankruptcy or insolvency, reorganization or appointment of a receiver or trustee; or Tenant petitions for or enters into any such arrangement; or suffers this Lease to be taken under a writ of execution.

17. REMEDIES

17.1 Remedies for Default by Tenant

If Tenant is in Default, Landlord may at any time thereafter pursue any and all of the following remedies, which shall be cumulative and non-exclusive to the maximum extent possible:

17.1.1 Declare this Lease terminated by giving written notice of the termination to Tenant.

17.1.2 Terminate Tenant's right to possession of the Premises by any lawful means, in which case Tenant shall immediately and peaceably surrender possession of the Premises to Landlord, and Landlord may recover from Tenant all damages incurred by Landlord by reason of Tenant's Default including, but not limited to, the cost of recovering possession of the Premises; expenses of reletting, including necessary renovation and alteration of the Premises; and reasonable attorney's fees.

17.1.3 Pursue any remedy provided in this Lease for breach of the provision specified in the remedy.

17.1.4 Pursue any other remedy now or hereafter available to Landlord under Oregon laws or judicial decisions.

17.2 Performance by Landlord of Tenant's Obligations

All covenants and agreements to be performed by Tenant under any of the terms of this Lease shall be performed by Tenant at Tenant's sole cost and expense. If Tenant fails to pay any sum owed to any party, other than Landlord, for which Tenant is liable hereunder, or if Tenant fails to perform any other act to be performed by Tenant hereunder or otherwise violate any term or provision of this Lease, then, after giving Tenant any required notice and opportunity to cure, Landlord may cure Tenant's default. Landlord shall not be obligated to cure any Tenant default, and any such cure will not waive any default or release Tenant from any obligation hereunder. All sums paid by Landlord and all necessary incidental costs, together with interest thereon from the date of such payment by Landlord at the rate of 18% per annum, shall be payable to Landlord on demand. Tenant covenants to pay any such sums.

18. QUIET ENJOYMENT; SUBORDINATION

18.1 Quiet Enjoyment

Landlord covenants that Tenant shall quietly and peaceably have, hold and enjoy the Premises in accordance with this Lease throughout the Lease Term, free and clear of any claim by, through or under Landlord, or having rights paramount to Landlord, subject to the rights of the holder of the Existing Mortgage and subject to easements and restrictions currently of record.

18.2 Subordination

This Lease is subject and subordinate to the Existing Mortgage. At Landlord's option, this Lease shall also be subordinate to any ground lease, mortgage, deed of trust, or any other hypothecation or security hereafter placed on Landlord's Plant Property, to any and all advances made on the security thereof, and to all renewals, modifications, consolidations, replacements and extensions thereof. Notwithstanding such future subordination, Tenant's right to quiet possession of the Premises shall not be disturbed if Tenant is not in default and if Tenant pays the rent and observes and performs all of the provisions of this Lease, unless this Lease is otherwise terminated pursuant to its terms if any mortgagee, trustee or ground Landlord shall elect to have this Lease prior to the lien of its mortgage, deed of trust or ground lease, and shall give written notice thereof to Tenant, this Lease shall be deemed prior to such mortgage, deed of trust, or ground lease, whether this Lease is dated prior or subsequent to the date of said mortgage, deed of trust or ground lease or the date of recording thereof. Tenant shall execute any documents required to effectuate an attornment, a subordination or to make this Lease prior to the lien of any mortgage, deed of trust or ground lease. If Tenant fails to execute such documents within ten (10) days after written demand, then Landlord shall either (a) declare such failure constitutes a Default by Tenant hereunder, or, (b) Landlord shall execute such documents on behalf of Tenant as Tenant's attorney-in-fact. Tenant hereby makes, constitutes and irrevocably appoints Landlord as Tenant's attorney-in-fact to execute such documents in accordance with this section.

19. SURRENDER OF PREMISES

Upon the expiration or earlier termination of the Lease Term, Tenant shall surrender the Premises in the same condition Tenant is required to maintain the Premises hereunder, with all improvements and items removed pursuant to Section 5.3.3, and any damage to the Premises or any other portions of Landlord's Plant Property caused by such removal restored by Tenant.

20. NO BROKERS

Landlord and Tenant each represent and warrant to the other that they have not engaged or had discussions with any broker or agent who would be entitled to any commission or fees in connection with the negotiation or execution of this Lease. Each party agrees to indemnify and hold the other harmless from all costs, expenses or liability for such commissions or other compensation or charges claimed by or awarded to any broker or agent on the basis of any assignments or agreements made or alleged to have been made by or on behalf of the indemnifying party.

21. RENT, VALUATION AND ACCOUNTING DISPUTES

21.1 General

As to any dispute concerning valuation, costs, proration of expenses or determination of rent, Landlord and Tenant shall seek in good faith to resolve their dispute. If the parties cannot resolve their dispute within thirty (30) days after the date that a party delivers to the other party a notice of the existence of the dispute (for example, by objecting in writing to a rent calculation), the matter shall be submitted to independent certified public accountants (or, as to fair market valuation of real property, a certified real estate appraiser). The parties shall jointly select a certified public accounting firm (or certified appraiser) that is not then employed by either party and that is familiar with the Tenant's type of business (or, as to fair market valuation of real property, familiar with the local market for the type of property involved). The determination of such accounting firm or appraiser shall bind on the parties as to the matter submitted for such determination. The fees of the accounting firm or appraiser shall be borne equally.

21.2 Arbitration

Any dispute or controversy relating to valuation, costs or determination of rent that is not settled under the previous subsection within ninety (90) days after a party delivers a written notice of dispute, shall, unless otherwise agreed, be settled by arbitration in accordance with the Commercial Arbitration Rules (or, as to fair market valuation of real property, the Real Estate Valuation Rules) of the American Arbitration Association. Judgment upon the award rendered by the arbitrator(s) may be entered in any court having jurisdiction. The cost of arbitration shall be allocated between the parties by the arbitrator(s) on the basis of the extent to which the position of one or the other party is adopted in the decision of the arbitrator(s). Any such arbitration proceeding shall be held in Portland, Oregon.

22. MISCELLANEOUS

22.1 Authority

Each party represents and warrants to the other that it has full power and authority to enter into and to perform its obligations under this Lease, and that the person executing this Lease on its behalf is authorized to do so.

22.2 No Partnership

The relationship created by this Lease is that of landlord and tenant only. The parties are not, shall not be considered to be, and shall not hold themselves out to be, partners or joint venturers.

22.3 Consent

Wherever in this Lease Landlord has the right to give or withhold its consent to a matter requested by Tenant, such consent may be withheld by Landlord in its sole and absolute discretion except as set forth to the contrary in any specific provision of this Lease.

22.4 Notices

All notices to be given under this Lease shall be in writing. Notices may be served by certified or registered mail or by facsimile to the party at the address shown below, unless the address has been changed by written notice. Mailed notices shall be deemed delivered five (5) days after mailing, properly addressed.

LANDLORD: NW NATURAL
220 NW Second Avenue
Portland, Oregon 97209
Attn: Manager: Risk, Environmental and Land
Facsimile No.: (503) 721-2516

TENANT: KOPPERS INDUSTRIES, INC.
7540 NW St. Helens Road
Portland, Oregon 97210
Attn: Amos Kamerer, Plant Manager
Facsimile No.: (503) 285-2831

With a copy to: Koppers Industries, Inc.
436 Seventh Avenue
Pittsburgh, PA 15219-1800
Attn: VP and Corporate Secretary
Facsimile No.: (412) 227-2333

22.5 Headings; Exhibits

The section headings in this Lease are included for convenience only; they do not give full notice of the terms of any portion of this Lease and are not relevant to the interpretation of any provision of this Lease. All exhibits referenced in this Lease are attached hereto and incorporated herein by this reference.

22.6 Governing Law

This Lease shall be governed by and construed in accordance with Oregon law.

22.7 Severability

To the fullest extent permitted by law, any provision of this Lease deemed invalid or unenforceable shall be ineffective to the extent of such invalidity or unenforceability, without rendering invalid or unenforceable the remaining provisions of this Lease.

22.8 Integration; Amendment

This Lease is the entire agreement of the parties relating to the subject matter hereof, and supersedes all prior communications, representations, or agreements, verbal or written, among the parties relating to the subject matter hereof. This Lease may not be amended except in writing executed by the parties.

22.9 Waiver

No provision of this Lease shall be deemed to have been waived unless such waiver is in writing signed by the waiving party. No failure by any party to insist upon the strict performance of any provision of this Lease, or to exercise any right or remedy consequent upon a breach thereof, shall constitute a waiver of any such breach, of such provision or of any other provision. No waiver of any provision of this Lease shall be deemed a waiver of any other provision of this Lease or a waiver of such provision with respect to any subsequent breach, unless expressly provided in writing.

22.10 Attorneys' Fees

22.10.1 No Suit or Action Filed

If, after good-faith attempts to settle the matter have failed, this Lease is placed in the hands of an attorney due to a default in the payment or performance of any of its terms, the defaulting party shall pay, immediately upon demand, the other party's attorney fees, collection costs, and any other fees or expenses incurred by the nondefaulting party, even though no suit or action is filed thereon..

22.10.2 Arbitration or Mediation; Trial and Appeal

If any arbitration, mediation, or other proceeding is brought in lieu of litigation, or if legal action is instituted to enforce or interpret any of the terms of this Lease, or if legal action is instituted in a Bankruptcy Court for a United States District Court to enforce or interpret any of the terms of this Lease, to seek relief from an automatic stay, to obtain adequate protection, or to otherwise assert the interest of Landlord in a bankruptcy proceeding, the party not prevailing shall pay the prevailing party's costs and disbursements, the fees and expenses of expert witnesses in determining reasonable attorney fees pursuant to ORCP 68, and such sums as the court may determine to be reasonable for the prevailing party's attorney fees connected with the trial and any appeal and by petition for review thereof.

22.11 Successors; No Third-Party Beneficiary Rights

This Lease shall be binding on and inure to the benefit of the parties and their successors and assigns, subject to the provisions of Section 12 above. No person not a party to this Lease is an intended beneficiary of this Lease, and no person not a party to this Lease shall have any right to enforce any term of this Lease; provided, the third parties referenced in Section 10.1 as indemnified parties shall have the indemnification rights described therein.

22.12 Further Assurances

Each party agrees, at the request of the other party, at any time after the date hereof, to promptly execute and deliver all further documents, and to promptly take and forbear from all such action, as may be reasonably necessary or appropriate to more effectively to confirm or carry out the provisions of this Lease.

22.13 Survival

Each provision of this Lease which may require the payment of money by, to or on behalf of Landlord or Tenant or third parties after the expiration of the Lease

Term or earlier termination of the Lease, or which requires the performance of some action on the Premises or other property covered by this Lease that is not performed at the time of such expiration or earlier termination, shall survive such expiration or earlier termination.

22.13 Counterparts

This Lease may be executed in any number of counterparts, each of which shall be deemed an original and all of which shall constitute one and the same instrument.

IN WITNESS WHEREOF, the parties have executed this Lease as of the date first set forth above.

LANDLORD:	TENANT:
NORTHWEST NATURAL GAS COMPANY (d/b/a Northwest Natural), an Oregon corporation	KOPPERS INDUSTRIES, INC., a Pennsylvania corporation
By: _____	By: _____
Typed Name: _____	Typed Name: Walter W. Turner
Title: _____	Title: President and Chief Executive Officer

Exhibits

A Description of Landlord's Plant Property
B Map of the Premises
C Copy of U.S. Army Corps of Engineers Portland District Public Notice for Permit Application No. 97-903, issued July 30, 1997

Term or earlier termination of the Lease, or which requires the performance of some action on the Premises or other property covered by this Lease that is not performed at the time of such expiration or earlier termination, shall survive such expiration or earlier termination.

22.13 Counterparts

This Lease may be executed in any number of counterparts, each of which shall be deemed an original and all of which shall constitute one and the same instrument.

IN WITNESS WHEREOF, the parties have executed this Lease as of the date first set forth above.

LANDLORD:	TENANT:
NORTHWEST NATURAL GAS COMPANY (d/b/a Northwest Natural), an Oregon corporation	KOPPERS INDUSTRIES, INC., a Pennsylvania corporation
By: Sandra K. Hart	By: _____
Typed Name: SANDRA K. HART	Typed Name: _____
Title: MANAGER, RISK ENVIRONMENT & LAND	Title: _____

Exhibits

A Description of Landlord's Plant Property
B Map of the Premises
C Copy of U.S. Army Corps of Engineers Portland District Public Notice for Permit Application No. 97-903, issued July 30, 1997

For Amos

Urgent ☐

Date 4/18 Time 11:53 am

While You Were Out

M Deanna Trail

Of NW Nat Gas

Phone

AREA CODE NUMBER EXTENSION

Telephoned	☒	Please Call	☐
Came To See You	☐	Will Call Again	☐
Returned Your Call	☐	Wants To See You	☐

Message Re: property tax appeal
@ end of 1993
has received notice from
County: value dropped
expecting refund
~1 June of $5000.00
Will forward check.

Signed KLR

ADAMS BUSINESS FORMS
9711

KOPPERS INDUSTRIES

Koppers Industries, Inc.
7540 N.W. Saint Helens Road
Portland, OR 97210-3663

Telephone: (503) 286-3681
FAX: (503) 285-2831

December 13, 1993

Mr. David L. Moreland
Senior Industrial Appraiser
Property Tax Division
Oregon Department of Revenue
955 Center Street NE
Salem, OR 97311

Dear Mr. Moreland:

As per your recent request, attached please find a list of the tanks in our lease with Northwest Natural Gas Company, including the capacities and the products currently stored in each.

Should you have any other questions, please give me a call at any time.

Sincerely,

Amos S. Kamerer
Plant Manager

12/30/93 - DEANNA TRAIL
moreland has completed his assessment
ORIGINAL - $ 498,000
NEW - $ 236,000
DEANNA will request a re-hrg thru the Appeal process - she will copy C. Thomas + myself

cc: Cheryl Thomas

TANK #	CAPACITY (GAL)	PRODUCT CONTAINED
3	99,000	Methyl-Solvent
4	99,000	Light Uncorrected Creosote
17	20,000	Heavy Creosote Oil
18	20,000	Empty
19	20,000	Priming & Refractory Oil
20	317,000	P1/P13 Creosote
23	20,000	Light Uncorrected Creosote
33	45,000	Heavy Creosote Oil
34	45,000	P1/P13 Creosote
39	20,000	P1/P13 Creosote
65	761,000	Coal Tar Pitch
66	180,000	Empty
67	100,000	P1/P13 Creosote
68	245,000	Coal Tar Pitch
99	201,000	Naphthalene Still Residue Oil
101	750,000	Empty
102	10,000	Naphthalene Still Residue Oil

Oregon

DEPARTMENT OF
REVENUE

November 30, 1993

Amos S. Kamerer
Koppers Industries, Inc.
7540 NW St. Helens Rd.
Portland, OR 97210-3663

I very much appreciated the tour of your facility on November 18, 1993. Your description of the products and process aspects of the plant was most helpful.

I have one additional request. Please send me a copy of a list of tanks which shows the capacities of each tank, the present usage of each tank (i.e. the product stored in the tank, whether the tank is
currently being used, etc.).

Please call if you have any questions regarding this request.

David L. Moreland
Senior Industrial Appraiser
Property Tax Division

Phone (503) 945-8252
Fax (503) 945-8737
TDD (503) 945-8617

955 Center Street NE
Salem, OR 97310
150-800-075 (Rev. 1-91)

KOPPERS

7540 N.W. St. Helens Rd.
Portland, Oregon 97210
(503) 286-3681

11/18/93

Plant visit by the attached —

Reason was to do a site appraisal of who owned what (KII vs NWNG)

After determining that we do not do any manufacturing, we are a terminal, that the County should be the taxing agent, not the state

(503) 226-4211 / EXT. 3421
FAX (503) 721-2516

DEANNA R. TRAIL
SR. CORPORATE TAX ANALYST

(503) 721-2441

R. L. HORDICHOK
SUPERVISOR
RISK AND LAND MANAGEMENT DEPARTMENT

NORTHWEST NATURAL GAS COMPANY
220 N.W. Second Avenue / Portland, Oregon 97209

David L. Moreland
Senior Utility Appraiser
Valuation Section

Oregon
DEPARTMENT OF
REVENUE

Property Tax Division
955 Center Street N.E.
Salem, Oregon 97310
(503) 945-8252
TDD (503) 945-8617
FAX (503) 378-6398

PACIFIC TERMINAL SERVICES, INC.
910 SW Spokane Street, Seattle, Washington 98134
P.O. Box 24005, Seattle, Washington 98124-0005
Tele. (206) 628-0051 Fax (206) 628-0293

FILE: PORTLAND - DOCK SERVICES

Wednesday, December 15, 1999

Mr. Stephen C. Kifer
Koppers Industries, Inc.
436 Seventh Avenue
Pittsburgh, PA 15219-1800

Re: Pacific Terminal Services, Inc., Dock Services Agreement

Dear Mr. Kifer:

Enclosed please find a fully executed copy of this agreement

Sincerely,

Vincent P. Godfrey
President

cc: With Agreement
Todd Prophet - Harley Marine Services, Inc.
Allan Sullivan - Fuel and Marine Marketing
Dave Bever - Carney, Badley, Smith & Spellman
Tina Garrett - Pacific Terminal Services, Inc.-Portland

12/16/99 CC: A. S. Kamerer
J. T. Dietz

DOCK SERVICE AGREEMENT

This Dock Service Agreement ("Agreement") is entered into and effective this ____ day of December, 1999, between KOPPERS INDUSTRIES, INC., a Pennsylvania corporation ("Koppers"), and PACIFIC TERMINAL SERVICES, INC., a Washington corporation ("PTSI").

RECITALS

A. PTSI is a terminal operator which provides dock services at the GASCO fuel oil tank farm terminal site in Portland, Oregon (the "GASCO Portland Terminal").

B. Koppers receives liquid pitch shipments from ocean going vessels discharging at the GASCO Portland Terminal in shipments of approximately Fifty Thousand (50,000) barrels each.

C. Koppers desires to use PTSI for dock services pertaining to liquid pitch shipments at the GASCO Portland Terminal dock on the terms and conditions set forth herein.

AGREEMENT

In consideration of the mutual promises set forth below, the adequacy of which is hereby acknowledged and intending to be legally bound, the parties hereby agree to the terms and conditions as set forth below:

1. Scope of Services. PTSI agrees to perform terminal operator services for the benefit of Koppers at the GASCO Portland Terminal. Services are to include: (a) receiving and letting go of vessel lines; (b) hooking up and unhooking hoses; (c) putting out and retrieving oil spill boom; (d) opening and closing dock valves upon instructions from Koppers' representative; (e) providing dock watch and constant surveillance of the operation; (f) participate in emergency response activities, including jointly conducted drills; (g) performing all securing, connection testing and drainage of products as required prior to and after vessel unloading; (h) participating in agency testing; and (i) such other services as are necessary or incidental the services described above. PTSI will provide two trained operating personnel per eight-hour shift, who are certified and licensed to operate the dock at the GASCO Portland Terminal and certified and licensed to operate all oil spill equipment. PTSI, its employees and agents shall comply with all federal, state, county and municipal laws, regulations, ordinances, standards, rules and orders existing or hereinafter promulgated or otherwise established in any manner applicable to the performance of the operating services performed hereunder. PTSI recognizes and agrees that its operating personnel will be made available for training from Koppers concerning the products being delivered and concerning Koppers' standards of safety, health and environmental performance; provided, however, that all such personnel are at all times acting solely as the agents of PTSI. PTSI

Koppers000548

and PTSI's operating personnel shall at all times operate and perform their responsibilities under this Agreement in accordance with any safety rules and other requirements of Koppers applicable to the GASCO Portland Terminal so long as in compliance with federal and state regulatory law and shall otherwise at all times perform their duties with due regard to the safety of all personnel.

2. **Parties' Responsibilities.** Koppers will provide all hoses and equipment needed to perform the services with the exception of the oil spill boom, which will be provided by PTSI. The maintenance, repair and testing of Koppers' hoses and equipment shall be the responsibility of Koppers. PTSI shall immediately notify Koppers of any leak or other problem with any hose or equipment observed or discovered. Koppers will provide PTSI with a minimum of fifteen (15) days notice of estimated tanker arrival with updated notice seventy-two (72) hours, forty-eight (48) hours and twenty-four (24) hours before estimated tanker arrival.

3. **Compensation and Payment.**

a. As compensation for all Services provided hereunder including training provided by Koppers as identified in Paragraph 1 above, Koppers will pay PTSI a service rate of fifty-four Dollars and 00/00 ($54.00) per hour, per dock operator, working eight (8) hour minimum shifts, and a fixed fee of Six Hundred Dollars and 00/100 ($600.00) per vessel for the oil spill boom plus any applicable state sales or use tax therefrom. PTSI shall provide documents and materials reasonably requested by Koppers regarding invoices and the provision of services hereunder. Additional services or equipment which PTSI provides will be at standard rates quoted to Koppers at or before the time such additional services or equipment are requested. Such additional services or equipment will be expressly approved by Koppers in writing prior to the incurrence of such charge, unless necessary emergency response actions do not permit. In the case of necessary emergency response action PTSI will provide applicable additional rates as soon as reasonably possible.

b. The pricing for any renewal term of this Agreement after the initial one year term of this Agreement shall be negotiated and agreed upon in good faith by the parties on a yearly basis, as provided herein. Pricing for any such renewal term shall be agreed upon by the parties no later than One Hundred Twenty (120) days prior to the anniversary date of this Agreement. Price increases for any single renewal term shall be capped at the greater of five percent (5%) over the existing rate or the net annual increase to PTSI for labor services under the applicable collective bargaining agreement. If the parties are unable to reach agreement on pricing for the renewal term within ninety days of the anniversary date of this Agreement, either party may terminate this Agreement in writing by giving the other party sixty days written notice prior to the end of the one year term. If neither party terminates this Agreement pursuant to the foregoing provision the prices then in effect shall continue in effect until the parties reach agreement upon a price adjustment or this Agreement is terminated pursuant to the foregoing provision.

c. Koppers will pay all invoices for work provided within 30 days after the invoice for such work is received. Any payment made after 30 days is subject to interest at eighteen percent (18%) per annum. PTSI has no obligation to perform any dock services for Koppers while any invoice is outstanding.

4. The Term. This Agreement is for an initial term of one (1) year from the date first above written, unless sooner terminated pursuant to this Agreement. Thereafter, unless terminated in writing within Ninety (90) days of the ending of the initial term, the Agreement shall continue for an additional one year. Such additional one-year term may be terminated at any time upon one-hundred and twenty (120) days written notice of termination by one party to the other party. Notwithstanding the foregoing, this Agreement may be terminated at any time in any of the following ways: (i) by either party immediately upon written notice at any time if there is a material breach or failure by the other party to perform the terms and conditions herein; (ii) by Koppers upon one-hundred and twenty (120) days written notice; (iii) by either party to the extent permitted in Section 3 or (iv) by either party immediately upon written notice if the other party is in dissolution or bankruptcy. In the event Koppers terminates this Agreement prior to the first anniversary, then it shall pay to PTSI a $10,000.00 cancellation fee as liquidated damages to PTSI.

5. Governing Law. This Agreement shall be construed, interpreted and enforced in accordance with the laws of the State of Oregon.

6. Independent Contractor Status.

a. In the performance of its duties, PTSI shall act solely as an independent contractor. Nothing herein contained shall at any time be construed as to create a relationship of employer/employee, partnership, principal and agent or joint venture as between PTSI and Koppers. PTSI shall not have any authority to bind Koppers in any relationship with third parties unless authorized in writing by an authorized official of Koppers. Similarly, Koppers shall have no authority to bind PTSI in any relationship with third parties unless specifically authorized in writing by an authorized official of PTSI.

b. Notwithstanding the foregoing, PTSI agrees to perform the services consistent with such reasonable standards as may be established by Koppers from time to time so long as in compliance with federal and state regulatory law, and consistently with prevailing industry standards.

7. Indemnification of Koppers. Koppers shall indemnify, defend and hold harmless PTSI from and against all claims, damages, lawsuits, liability, penalties, fines and expenses, (including attorney fees and costs), including from environmental contaminants or releases of environmental contaminants or liquid pitch shipment, caused by Koppers or any tanker vessel providing a Koppers' liquid pitch shipment to PTSI at the GASCO Portland Terminal except to the extent such claims are caused by or result from the actions or omissions of PTSI, its employees and/or agents.

8. **Indemnification of PTSI.** PTSI shall indemnify, defend and hold harmless Koppers from and against all claims, damages, lawsuits, liability, penalties, fines and expenses, (including attorney fees and costs), including from environmental contaminants or releases of environmental contaminants or liquid pitch shipments, caused by or resulting from the actions or omissions of PTSI, its employees and/or agents except to the extent such claims are caused by or result from the actions or omissions of Koppers, its employees and/or agents, or the tanker vessel providing the liquid pitch shipment at the GASCO Portland Terminal.

9. **Insurance - PTSI.** PTSI will maintain at all times the insurance coverage as set forth below:

a. Worker's compensation insurance as required by applicable laws and regulations for all persons performing services.

b. Employer's liability insurance protecting PTSI against common law liability for employee and/or agent bodily injury arising out of master-servant or principal-agent relationship.

c. Insurance required under the U.S. Longshoreman's and Harborworker's Compensation Act.

d. Pollution Legal Liability and Indemnity coverage resulting from release of contaminants or pollutants at or about GASCO Portland Terminal in at least $5 million

e. PTSI will name Koppers as an additional insured on all applicable policies and certify that Koppers will be given thirty (30) days written notice of any material change in or cancellation of such coverage.

10. **Insurance – Koppers.** Kopper's will maintain at all times during the term of this Agreement and be responsible for having the tanker vessel providing the liquid pitch to the GASCO Portland terminal provide the insurance coverage as set forth below:

a. Protection and Indemnity coverage for the vessel and dock with pollution liability endorsement.

b. Pollution Legal Liability coverage/resulting from release of pollutants at or about GASCO Portland Terminal.

c. Koppers will name PTSI as an additional insured on all applicable policies and certify that PTSI will be given thirty (30) days written notice of any material change in or cancellation of such coverage.

11. **Force Majeure.** Neither PTSI nor Koppers shall be liable for any delays in performance or nonperformance of a provision of this Agreement when such delay or

nonperformance is caused by any act of God or public enemy, or nonavailability of labor, riots, fires, storms, explosions, embargoes, interventions, longshoreman and labor strikes, provided, however, the parties shall act with reasonable diligence and with reasonable care in all such force majeure events and the party declaring force majeure event shall notify the other party in writing when such event commences and when it ends. In the event a force majeure condition is not cured within thirty (30) days, the party not invoking force majeure may terminate this Agreement immediately upon written notice.

12. **Notices.** All notices, demands, consents or other communications required or permitted hereunder shall be in writing and shall be deemed given when personally delivered or sent by registered or certified mail, return receipt requested, postage prepaid addressed as follows or at such other address as such party may give notice of:

TO KOPPERS:	Koppers Industries, Inc. Attn: Amos S. Kamerer 7540 N.W. St. Helens Road Portland, Oregon 97210
With a copy to:	Wayne F. Plovic Koppers Industries, Inc. 436 7th Avenue Koppers Building, 16th Floor Pittsburgh, PA 15219
TO PTSI:	Pacific Terminal Services, Inc. Attn: Vincent P. Godfrey 910 S.W. Spokane Street Seattle, Washington 98124-0005

13. **Unenforceability; Illegality.** If any provision or provisions of this Agreement shall be deemed invalid or unenforceable, either in whole or in part, this Agreement shall be deemed amended to delete or modify, as necessary, the offending provision or provisions and to alter the bounds thereof in order to render the Agreement valid and enforceable.

14. **Amendments, Waivers, etc.** No amendment of any provision of this Agreement, and no postponement or waiver of any such provision or of any default, misrepresentation, or breach of warranty or covenant hereunder, whether intentional or not, shall be valid unless such amendment, postponement, or waiver is in writing and signed by or on behalf of the party against whom enforcement of the amendment, waiver or postponement is sought. No such amendment, postponement or waiver shall be deemed to extend to any prior or subsequent matter, whether or not similar to the subject matter of such amendment, postponement or waiver. No failure to delay on the part of PTSI or Koppers in exercising any right, power or privilege under this Agreement shall operate as a waiver thereof, not shall any single or partial exercise of any right, power or privilege hereunder

preclude any other or further exercise thereof or the exercise of any other right, power or privilege.

15. Assignment and Third Parties. This Agreement and all of its provisions shall be binding on and shall inure to the benefit of the parties hereto and their respective heirs, legal representatives, successors and assigns. Notwithstanding the foregoing, PTSI may not assign any obligations or duties required under this Agreement, and any such purported assignment by PTSI shall be void, unless otherwise agreed in writing by Koppers in its sole discretion. The Agreement shall not confer any rights or remedies upon any person other than PTSI and Koppers and their respective heirs, successors and permitted assigns.

16. Interpretations. All captions and section headings of this Agreement are included only for reference and for convenience and shall not affect the meaning or interpretation of this Agreement, nor shall they constitute substantive provisions hereof.

17. Integration; Counterparts. This Agreement constitutes the entire agreement between the parties and supersedes any prior understandings, agreements or representations by or between the parties, written or oral, to the extent they relate to the subject matter hereof.

18. Arbitration.

a. Any dispute arising between the parties regarding the enforcement or application of this Agreement which cannot be amicably resolved shall be submitted by either party to binding arbitration pursuant to the rules of the American Arbitration Association (AAA), or any successor thereto. Such arbitration shall take place in Portland, Oregon. Each party shall bear their own fees and expenses in such arbitration.

b. Any decision of arbitration may be entered in as a judgment in any court of competent jurisdiction and may be enforced as such in accordance with the provisions of the award.

IN WITNESS WHEREOF the parties through their authorized representatives, have caused this Agreement to be executed on the date indicated on page one.

KOPPERS INDUSTRIES, INC.

By Kevin J. Fitzgerald

Its: Vice President & General Manager

PACIFIC TERMINAL SERVICES, INC.

By

Its: President

KOPPERS INDUSTRIES

Koppers Industries, Inc.
436 Seventh Avenue
Pittsburgh, PA 15219-1800

Stephen C. Kifer
Assistant General Counsel

Telephone: (412) 227-2421
Fax: (412) 227-2333
steve_kifer@koppers.com

December 14, 1999

VIA OVERNIGHT MAIL

Mr. Vincent P. Godfrey
PACIFIC TERMINAL SERVICES, INC.
910 S. W. Spokane Street
Seattle, WA 98124-0005

RE: PTSI Dock Service Agreement with Koppers

Dear Mr. Godfrey:

As per attorney David Bever's instructions, enclosed please find two sets of the Dock Service Agreement which has now been executed by Koppers. Please note that this reflects the final change to Recital B which was agreed upon by you and Amos Kamerer.

Please execute and date both sets and return one of the sets to me.

Should you have any questions concerning this matter, please do not hesitate to contact me.

I look forward to receiving the fully executed Agreement.

Very truly yours,

Stephen C. Kifer

SCK/rmh

Enclosures

cc: J. T. Dietz
A. S. Kamerer

DOCK SERVICE AGREEMENT

This Dock Service Agreement ("Agreement") is entered into and effective this ____ day of December, 1999, between KOPPERS INDUSTRIES, INC., a Pennsylvania corporation ("Koppers"), and PACIFIC TERMINAL SERVICES, INC., a Washington corporation ("PTSI").

RECITALS

A. PTSI is a terminal operator which provides dock services at the GASCO fuel oil tank farm terminal site in Portland, Oregon (the "GASCO Portland Terminal").

B. Koppers receives liquid pitch shipments from ocean going vessels discharging at the GASCO Portland Terminal in shipments of approximately Fifty Thousand (50,000) barrels each.

C. Koppers desires to use PTSI for dock services pertaining to liquid pitch shipments at the GASCO Portland Terminal dock on the terms and conditions set forth herein.

AGREEMENT

In consideration of the mutual promises set forth below, the adequacy of which is hereby acknowledged and intending to be legally bound, the parties hereby agree to the terms and conditions as set forth below:

1. **Scope of Services.** PTSI agrees to perform terminal operator services for the benefit of Koppers at the GASCO Portland Terminal. Services are to include: (a) receiving and letting go of vessel lines; (b) hooking up and unhooking hoses; (c) putting out and retrieving oil spill boom; (d) opening and closing dock valves upon instructions from Koppers' representative; (e) providing dock watch and constant surveillance of the operation; (f) participate in emergency response activities, including jointly conducted drills; (g) performing all securing, connection testing and drainage of products as required prior to and after vessel unloading; (h) participating in agency testing; and (i) such other services as are necessary or incidental the services described above. PTSI will provide two trained operating personnel per eight-hour shift, who are certified and licensed to operate the dock at the GASCO Portland Terminal and certified and licensed to operate all oil spill equipment. PTSI, its employees and agents shall comply with all federal, state, county and municipal laws, regulations, ordinances, standards, rules and orders existing or hereinafter promulgated or otherwise established in any manner applicable to the performance of the operating services performed hereunder. PTSI recognizes and agrees that its operating personnel will be made available for training from Koppers concerning the products being delivered and concerning Koppers' standards of safety, health and environmental performance; provided, however, that all such personnel are at all times acting solely as the agents of PTSI. PTSI

Koppers000555

and PTSI's operating personnel shall at all times operate and perform their responsibilities under this Agreement in accordance with any safety rules and other requirements of Koppers applicable to the GASCO Portland Terminal so long as in compliance with federal and state regulatory law and shall otherwise at all times perform their duties with due regard to the safety of all personnel.

2. **Parties' Responsibilities.** Koppers will provide all hoses and equipment needed to perform the services with the exception of the oil spill boom, which will be provided by PTSI. The maintenance, repair and testing of Koppers' hoses and equipment shall be the responsibility of Koppers. PTSI shall immediately notify Koppers of any leak or other problem with any hose or equipment observed or discovered. Koppers will provide PTSI with a minimum of fifteen (15) days notice of estimated tanker arrival with updated notice seventy-two (72) hours, forty-eight (48) hours and twenty-four (24) hours before estimated tanker arrival.

3. **Compensation and Payment.**

a. As compensation for all Services provided hereunder including training provided by Koppers as identified in Paragraph 1 above, Koppers will pay PTSI a service rate of fifty-four Dollars and 00/00 ($54.00) per hour, per dock operator, working eight (8) hour minimum shifts, and a fixed fee of Six Hundred Dollars and 00/100 ($600.00) per vessel for the oil spill boom plus any applicable state sales or use tax therefrom. PTSI shall provide documents and materials reasonably requested by Koppers regarding invoices and the provision of services hereunder. Additional services or equipment which PTSI provides will be at standard rates quoted to Koppers at or before the time such additional services or equipment are requested. Such additional services or equipment will be expressly approved by Koppers in writing prior to the incurrence of such charge, unless necessary emergency response actions do not permit. In the case of necessary emergency response action PTSI will provide applicable additional rates as soon as reasonably possible.

b. The pricing for any renewal term of this Agreement after the initial one year term of this Agreement shall be negotiated and agreed upon in good faith by the parties on a yearly basis, as provided herein. Pricing for any such renewal term shall be agreed upon by the parties no later than One Hundred Twenty (120) days prior to the anniversary date of this Agreement. Price increases for any single renewal term shall be capped at the greater of five percent (5%) over the existing rate or the net annual increase to PTSI for labor services under the applicable collective bargaining agreement. If the parties are unable to reach agreement on pricing for the renewal term within ninety days of the anniversary date of this Agreement, either party may terminate this Agreement in writing by giving the other party sixty days written notice prior to the end of the one year term. If neither party terminates this Agreement pursuant to the foregoing provision the prices then in effect shall continue in effect until the parties reach agreement upon a price adjustment or this Agreement is terminated pursuant to the foregoing provision.

c. Koppers will pay all invoices for work provided within 30 days after the invoice for such work is received. Any payment made after 30 days is subject to interest at eighteen percent (18%) per annum. PTSI has no obligation to perform any dock services for Koppers while any invoice is outstanding.

4. The Term. This Agreement is for an initial term of one (1) year from the date first above written, unless sooner terminated pursuant to this Agreement. Thereafter, unless terminated in writing within Ninety (90) days of the ending of the initial term, the Agreement shall continue for an additional one year. Such additional one-year term may be terminated at any time upon one-hundred and twenty (120) days written notice of termination by one party to the other party. Notwithstanding the foregoing, this Agreement may be terminated at any time in any of the following ways: (i) by either party immediately upon written notice at any time if there is a material breach or failure by the other party to perform the terms and conditions herein; (ii) by Koppers upon one-hundred and twenty (120) days written notice; (iii) by either party to the extent permitted in Section 3 or (iv) by either party immediately upon written notice if the other party is in dissolution or bankruptcy. In the event Koppers terminates this Agreement prior to the first anniversary, then it shall pay to PTSI a $10,000.00 cancellation fee as liquidated damages to PTSI.

5. Governing Law. This Agreement shall be construed, interpreted and enforced in accordance with the laws of the State of Oregon.

6. Independent Contractor Status.

a. In the performance of its duties, PTSI shall act solely as an independent contractor. Nothing herein contained shall at any time be construed as to create a relationship of employer/employee, partnership, principal and agent or joint venture as between PTSI and Koppers. PTSI shall not have any authority to bind Koppers in any relationship with third parties unless authorized in writing by an authorized official of Koppers. Similarly, Koppers shall have no authority to bind PTSI in any relationship with third parties unless specifically authorized in writing by an authorized official of PTSI.

b. Notwithstanding the foregoing, PTSI agrees to perform the services consistent with such reasonable standards as may be established by Koppers from time to time so long as in compliance with federal and state regulatory law, and consistently with prevailing industry standards.

7. Indemnification of Koppers. Koppers shall indemnify, defend and hold harmless PTSI from and against all claims, damages, lawsuits, liability, penalties, fines and expenses, (including attorney fees and costs), including from environmental contaminants or releases of environmental contaminants or liquid pitch shipment, caused by Koppers or any tanker vessel providing a Koppers' liquid pitch shipment to PTSI at the GASCO Portland Terminal except to the extent such claims are caused by or result from the actions or omissions of PTSI, its employees and/or agents.

8. **Indemnification of PTSI.** PTSI shall indemnify, defend and hold harmless Koppers from and against all claims, damages, lawsuits, liability, penalties, fines and expenses, (including attorney fees and costs), including from environmental contaminants or releases of environmental contaminants or liquid pitch shipments, caused by or resulting from the actions or omissions of PTSI, its employees and/or agents except to the extent such claims are caused by or result from the actions or omissions of Koppers, its employees and/or agents, or the tanker vessel providing the liquid pitch shipment at the GASCO Portland Terminal.

9. **Insurance - PTSI.** PTSI will maintain at all times the insurance coverage as set forth below:

a. Worker's compensation insurance as required by applicable laws and regulations for all persons performing services.

b. Employer's liability insurance protecting PTSI against common law liability for employee and/or agent bodily injury arising out of master-servant or principal-agent relationship.

c. Insurance required under the U.S. Longshoreman's and Harborworker's Compensation Act.

d. Pollution Legal Liability and Indemnity coverage resulting from release of contaminants or pollutants at or about GASCO Portland Terminal in at least $5 million

e. PTSI will name Koppers as an additional insured on all applicable policies and certify that Koppers will be given thirty (30) days written notice of any material change in or cancellation of such coverage.

10. **Insurance – Koppers.** Kopper's will maintain at all times during the term of this Agreement and be responsible for having the tanker vessel providing the liquid pitch to the GASCO Portland terminal provide the insurance coverage as set forth below:

a. Protection and Indemnity coverage for the vessel and dock with pollution liability endorsement.

b. Pollution Legal Liability coverage/resulting from release of pollutants at or about GASCO Portland Terminal.

c. Koppers will name PTSI as an additional insured on all applicable policies and certify that PTSI will be given thirty (30) days written notice of any material change in or cancellation of such coverage.

11. **Force Majeure.** Neither PTSI nor Koppers shall be liable for any delays in performance or nonperformance of a provision of this Agreement when such delay or

nonperformance is caused by any act of God or public enemy, or nonavailability of labor, riots, fires, storms, explosions, embargoes, interventions, longshoreman and labor strikes, provided, however, the parties shall act with reasonable diligence and with reasonable care in all such force majeure events and the party declaring force majeure event shall notify the other party in writing when such event commences and when it ends. In the event a force majeure condition is not cured within thirty (30) days, the party not invoking force majeure may terminate this Agreement immediately upon written notice.

12. **Notices.** All notices, demands, consents or other communications required or permitted hereunder shall be in writing and shall be deemed given when personally delivered or sent by registered or certified mail, return receipt requested, postage prepaid addressed as follows or at such other address as such party may give notice of:

TO KOPPERS:

Koppers Industries, Inc.
Attn: Amos S. Kamerer
7540 N.W. St. Helens Road
Portland, Oregon 97210

With a copy to:

Wayne F. Plovic
Koppers Industries, Inc.
436 7th Avenue
Koppers Building, 16th Floor
Pittsburgh, PA 15219

TO PTSI:

Pacific Terminal Services, Inc.
Attn: Vincent P. Godfrey
910 S.W. Spokane Street
Seattle, Washington 98124-0005

13. **Unenforceability; Illegality.** If any provision or provisions of this Agreement shall be deemed invalid or unenforceable, either in whole or in part, this Agreement shall be deemed amended to delete or modify, as necessary, the offending provision or provisions and to alter the bounds thereof in order to render the Agreement valid and enforceable.

14. **Amendments, Waivers, etc.** No amendment of any provision of this Agreement, and no postponement or waiver of any such provision or of any default, misrepresentation, or breach of warranty or covenant hereunder, whether intentional or not, shall be valid unless such amendment, postponement, or waiver is in writing and signed by or on behalf of the party against whom enforcement of the amendment, waiver or postponement is sought. No such amendment, postponement or waiver shall be deemed to extend to any prior or subsequent matter, whether or not similar to the subject matter of such amendment, postponement or waiver. No failure to delay on the part of PTSI or Koppers in exercising any right, power or privilege under this Agreement shall operate as a waiver thereof, not shall any single or partial exercise of any right, power or privilege hereunder

preclude any other or further exercise thereof or the exercise of any other right, power or privilege.

15. Assignment and Third Parties. This Agreement and all of its provisions shall be binding on and shall inure to the benefit of the parties hereto and their respective heirs, legal representatives, successors and assigns. Notwithstanding the foregoing, PTSI may not assign any obligations or duties required under this Agreement, and any such purported assignment by PTSI shall be void, unless otherwise agreed in writing by Koppers in its sole discretion. The Agreement shall not confer any rights or remedies upon any person other than PTSI and Koppers and their respective heirs, successors and permitted assigns.

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17. Integration; Counterparts. This Agreement constitutes the entire agreement between the parties and supersedes any prior understandings, agreements or representations by or between the parties, written or oral, to the extent they relate to the subject matter hereof.

18. Arbitration.

a. Any dispute arising between the parties regarding the enforcement or application of this Agreement which cannot be amicably resolved shall be submitted by either party to binding arbitration pursuant to the rules of the American Arbitration Association (AAA), or any successor thereto. Such arbitration shall take place in Portland, Oregon. Each party shall bear their own fees and expenses in such arbitration.

b. Any decision of arbitration may be entered in as a judgment in any court of competent jurisdiction and may be enforced as such in accordance with the provisions of the award.

IN WITNESS WHEREOF the parties through their authorized representatives, have caused this Agreement to be executed on the date indicated on page one.

KOPPERS INDUSTRIES, INC.	**PACIFIC TERMINAL SERVICES, INC.**
By Kevin J. Fitzgerald	By_____
Its: Vice President & General Manager	Its: _____

PORTLAND PLANT

PORTLAND, OREGON

CREOSOTE AND TAR PRODUCTS DISTRIBUTION TERMINAL

Plant Manager: Amos S. Kamerer
Office: (503) 286-3681
Home: (503) 246-8045

Plant Address: 7540 NW St. Helens Road, Portland, OR 97210-3663

Located in Multnomah county, City of Portland, the terminal is located on approx. 6.4 acres of leased property. The property is owned by Northwest Gas Company, 220 NW Second Ave., Portland, OR 97209. The property is bounded by Saint Helens Road (Oregon Route 30) on the south, Northwest Natural Gas Company property, extending to the shore of the Willamette River, on the north, the Northwest Gas Company Liquified Natural Gas Plant on the west, and a service road separating Koppers property from Wacker Siltronic Corporation to the east.

Normal operating hours are from 4:00pm Sunday to 4:00pm Friday each week. Generally, the plant is closed on the weekends between these times.

The Coal Tar based products that we handle are shipped into the terminal via tank cars from our 4 domestic production plants or via bulk cargo vessels for the material that we import. These products are stored at the terminal or are further remanufactured prior to their distribution to our customers. Outbound shipments are via tank cars, tank trucks, 55 gallon drums or 5 gallon pails.

The terminal has 10 full-time employees, with annual sales in the range of 11,000.00 and a local payroll in excess of $325,000 annually.

The best information we have shows Koppers came on this site in 1966. At the time, the existing facility consisted of the Northwest Natural Gas Company's coke and gas plant, which operated from the late 1890's until it was hut down in the 1950's. Koppers, with A.J. Zinda Construction Company, integrated into the existing facilities a tar distillation unit consisting of a small column and a reboiler loop. This unit made Coal Tar Pitch for Reynolds Aluminum in Longview, Washington. The Tar supplies used were received from Koppers Australia Pty. LTD., Colorado Fuel and Iron, and Kaiser Steel, in Fontana California. This unit was shut down permanently and partially dismantled in mid 1970's.

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In 1984, and again in 1992, bulk storage sheds were built to hold up to 11,000 tons of coal tar pencil pitch. This material is brought in by bulk cargo vessels through the Hall-Buck Marine handling facility at Terminal 4, Port of Portland. This pitch is then loaded into railroad hopper cars, for shipment directly to our customers, or is loaded into hopper trucks and brought directly to the Portland Plant for storage, and is used as the feed stock for our melter, where this solid pitch is melted into a liquid for shipment to our customers.

The Portland facility meets or exceeds all regulatory requirements as set forth by the City of Portland, Multnomah County, the DEQ of the State of Oregon and the federal EPA. This includes features such as a fume recovery system, spill containment at the tank car unloading location and an NPDES permit for our waste water disposal system, among others.

We are members of the Emergency Communications for Hazardous Operation (ECHO) organization here in the Northwest Industrial Area of Portland. We have semi-annual visits with the local Portland Fire Department for Plant and product familiarity. We are active with the Saint Johns/Cathedral Park Neighborhood Association.

Located within approximately a two-mile radius of the plant are the following schools and parks.

Holy Cross School, 5202 N Bowdoin Street, 97203
Astor School, 5601 N Yale Street, 97203
Clarendon School, 9325 N VanHouten Avenue, 97203
James John School, 7439 N Charleston Avenue, 97203
Sitton School, 9930 N Smith Street, 97203
Roosevelt School, 6941 N Central Street, 97203
George Middle School, 10000 N Burr avenue, 97203
University of Portland, 50000 N Willamette boulevard, 97203

Forest Park
Pier Park
Johnswood Park
John's Park
Cathedral Park
George Park
Northgate Park
Portsmouth Park
McKenna Park

There are no hospitals or nursing homes within a 2 mile radius of the plant.

There are two major newspaper serving the Portland metropolitan area as follows:

The Oregonian, 1320 SW Broadway, 97210
New Department: Telephone: (503) 221-8188, FAX (503) 227-5306
City Desk: Telephone: (503) 221-8189, FAX (503) 227-5306

The Columbian, 701 W 8th Street, Vancouver, WA 98660
Portland Phone Number: Telephone: (503) 224-0654, FAX (360) 699-6033

The major radio stations are as follows:

KXL New Radio, 1415 SE Ankeny, 97214, Tel.#: (503) 231-0750, FAX (503) 235-4446
KEX Radio 1190 AM, 4949 SW Macadam, 97201, Tel.#: (503) 225-1190, FAX (503) 224-3216
KBNP Business Radio, 1410 AM, 811 SW Front Ave, 97210, Tel.#: (503) 223-6789,
FAX (503) 223-4305
KKEY Talk Radio 1150, Telephone & FAX: (503) 222-1150

The major television stations are as follows:

KATU Channel 2, 2153 NE Sandy Blvd./P.O. Box 2, 97207, Tel.#: (503) 231-4222
FAX (503) 231-4263
KGW, Channel 8, 1501 SW Jefferson, 97201, Tel.#: (503) 226-5000, FAX (503) 226-4448
KOIN, Channel 2, 222 SW Columbia, 97201, Tel.#: (503) 464-0600, FAX (503) 464-0806
KPTV, Channel 12, 735 SW 20th Place, 97201, Tel.#: (503) 222-9921, FAX (503) 224-0101

The Mayor of Portland is Vera Katz, 1220 SW 5th, Room 303, 97201, Tel.#: (503) 823-4120
FAX (503) 823-3588

The City Council Clerk is Cay Kerschner, Tel.#: (503) 823-4085, FAX (503) 823-4157

The Director of Portland Chamber of Commerce is Donald McClave, 221 NW 2nd, 97209,
Tel.#: (503) 228-9411, FAX (503) 228-5126

Koppers000563

PORTLAND PLANT

PORTLAND, OREGON

CREOSOTE AND TAR PRODUCTS DISTRIBUTION TERMINAL

[Rev. 5/31/94]

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Normal operating hours are ~~8:00 a.m. to 4:30 p.m., Monday through Friday~~ from 4:00pm Sunday to 4:00pm Friday each week. ~~However, approximately every third week, we operate 24 hours a day from 4:00 p.m. on Sunday through 4:30 p.m. on Friday~~. Generally, the plant is shut down on weekends.

The Coal Tar based products that we handle ~~pitch and other related products~~ are shipped into the terminal via tank ~~rail~~ cars from our 4 domestic production plants or via bulk cargo vessels ~~ships~~ for material that we import. These products are stored ~~stored~~ at the terminal or are further remanufactured prior to their distribution to our customers. Outbound shipments are via tank cars or tank trucks, tank trucks, 55 gallon drums or 5 gallon pails.

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KEX Radio 1190 AM, 4949 SW Macadam, 97201, (503) 225-1190, FAX (503) 224-3216
KBNP Business Radio, 1410 AM, 811 SW Front Ave, 97201, (503) 223-6769, ~~or~~ (503) 223-4305 ~~fax~~ FAX (503) 223-4305
KKEY Talk Radio 1150, 222-1150 Telephone & FAX

The major television stations are as follows:

KATU Channel 2, 2153 NE Sandy Blvd./P.O. Box 2, 97207, (503) 231-4222, FAX (503) 231-4263
KGW, Channel 8, 1501 SW Jefferson, 97201, (503) 226-5000, FAX (503) 226-4448
KOIN, Channel 2, 222 SW Columbia, 97201, 464-0600, FAX (503) 464-0806
KPTV, Channel 12, 735 SW 20th Place, 97201, (503) ~~823-4120~~ 222-9921, FAX (503) 224-0101

The Mayor of Portland is Vera Katz, 1220 SW 5th, Room 303, 97201, (503) 823-4~~1~~20, FAX (503) 823-3588

The City Council Clerk is ~~Kay~~ Cay Kerschner, (503) 823-40~~2~~8~~5~~, FAX (503) 823-4157

The Director of the Portland Chamber of Commerce is Donald McClave, 221 NW 2nd, 97209, (503) 228-9411, FAX (503) 228-5126.

KOPPERS INDUSTRIES

Koppers Industries, Inc.
1005 William Pitt Way
Pittsburgh, PA 15238

Telephone: (412) 826-3970
FAX: (412) 826-3999

TO: Linda LOCATION:

COMPANY NAME: Portland

COMPANY TELEPHONE NUMBER:

FROM: Sue Simpson

NUMBER OF PAGES TO FOLLOW: 4

IF YOU DO NOT RECEIVE ALL MATERIAL TRANSMITTED, PLEASE CALL US ON: 412/826-3971

OUR PANAFAX NUMBER IS: 412/826-3999

SENT BY:

TIME:

DATE:

NOTES:

Linda,

Pls make up changes on this copy + fax back so I can change my disk.

Thanx
Sue

PORTLAND PLANT

PORTLAND, OREGON

CREOSOTE AND TAR PRODUCTS DISTRIBUTION TERMINAL

[Rev. 1/25/93]

Plant Manager: John A. Oxford
Office: (503) 286-3681
Home: (206) 576-0521

Located in Multnomah County, City of Portland. Terminal is located on approx. 6.4 acres of leased property. Property owner is the Northwest Gas Company. (Address: 7900 N.W. ST. Helens Road, Portland.) The portion of the property leased by Koppers = 5340 N.W. St. Helens Rd.

Administrative Facilities, steam generation facilities and tank storage facilities are located on South Eastern portion of the property. Property is bounded by St. Helens Road Oregon Route 30 on the South, the Northwest Natural Gas Company property extending to the shore of the Willamette River on the North, the Northwest Gas Company Liquified Natural Gas Plant on the West, a service road separates Koppers property from Wacker Siltronic Corporation, the Eastern Boundary.

The Terminal normally operates five days a week, Monday thru Friday, 8:00 a.m. - 4:30 p.m., and normally is shut down on weekends.

The Portland Terminal functions as a Product Distribution Terminal. Creosote, Refined Coal Tar and Coal Tar Pitch is shipped to Portland in Tank Rail Cars, and off-loaded usually into the storage tanks and reshipped to the customer by Tank Truck. In the case of

Refined Tars, that material is usually heated in the Tank Cars and transferred to the Tank Trucks for direct shipment to the customer. In the case of Coal Tar Roofing Pitch, the material is shipped into Portland by Tank Car and is then heated and pumped into 200 lb tubs, where the pitch cools and solidifies and is then shipped to the customer.

In 1988, a total of 2,063,856 gals of tar and creosote were processed through Portland. Total hourly wages for handling creosote and tar for calendar year 1988 were $119,640. Salaried, $94,745.

The creosote cars are heated by steam generated by the boilers. The tank cars and roofing pitch cars are heated electrically. The creosote storage tanks are heated with steam through internal heating coils inside the tanks.

Coal tar pencil pitch is shipped to Portland from China in dry bulk form and off-loaded at the Port of Portland. Some material is brought to the Terminal by dump truck and stored in bulk in our pitch building for reshipment to customers by either Koppers truck or bulk hopper rail cars.

Total hourly wages for calendar year 1988 for the handing of Coal Tar Pitch was $25,457.

The Portland Terminal has at present approximately 5.5 million gallons of tank storage space for tars and creosotes. The building that stores the Chinese Coal Tar has a capacity of approx. 5500 metric tons.

1988 sales = $1965 M
5 mo 1989 = $1291 M

1) Best information we have shows Koppers came on site in 1966. The part of the plant that Koppers built was built by A. J. Zinda construction, this construction was integrated into the existing N.W. natural gas coke and gas plant site which operated from the early 1900's until it was shut down in the 1950's. A tar still consisting of a small column and a reboiler loop was erected by Koppers and A. J. Zinda. This tar still during it's history made pitch for Reynolds Aluminum in Longview, Washington. Tar supplies were received from K.A.P. Australia, Colorado Fuel and Iron and Kaiser Steel, in Fontana California. The tar still shut down permanently and partially dismantled in mid 1970's. From this time to present the portland plant was a terminal that received coal tar creosote by rail and shipped to customers by truck. In 1984 we built a pitch storage shed to hold 5,000 tons of chinese pitch, this pitch is brought in by ship through the Hall Buck handling facility at terminal 4, port of Portland. The pitch is then loaded into railroad cars and shipped directly to customer or loaded into trucks and brought to the Portland Plant as backup storage. Now, with the onset of the pitch melter pitch is also brought in from Japan and blended with the chinese pitch to make a liquid product that will be on the market in the mid 1992's.

Creosote storage capacity 3.5. million gallons and as previously stated, at this time, pitch capacity is 5,000 metric tons. The total plant employment is 10 people at this time.

The Portland Plant is served by Burlington Northern Railroad on two spur tracks, the plant is equipped to receive by rail and truck and can return ship by the same two ways.

In 1988 the fume scrubber tank was installed in the lower tank farm. Connections are now being made to this system to bring under fume control all truck and reloading stations, the melter, the storage tank and connect to the existing fume scrubber line.

We have taken some steps to minimize the possibility of spills of hazardous material in the plant. All pumping stations now have protective concrete barriers around them, that are sealed against leakage. At the creosote tank car heat exchanger are we have installed asphalt paving which is sloped into a concrete emergency response pit which has two pumps inside, one pump runs water into the lower tank farm and one pump will pump creosote into a 20,000 gallon holding tank, should the tank handling system fail. Also emergency response boxes have been installed near all pumping stations, these boxes are kept stocked with pads, pillows, shovels and absorbent material to be used on spills should they occur.

Currently the mayor of Portland, Oregon is Bud Clark. In 1992 his office is up for election and the two candidates decided by the primary election are Vera Katz and Earl Blumenauher. The mayor is in charge of the city council, the city council has a presiding office which changes every four months. The president of the Portland chamber of commerce is Don McClane.

Hazmat functions in the state of Oregon are under the control of the state fire marshals office. We at Koppers in Portland belong to the echo safety group. This group consists of industry, fire control stations, D.E.Q. and medical as well as emergency response representative. At the present time echo safety group has over 300 members representing the city of Portland, Multnomah County and Vancouver WA. The head of the Portland Hazmat team is Bill Henle and he works through the Portland Fire Bureau. The presiding officer over the echo safety group is Lewis Wiedewitsch.

PLANT PROFILE QUESTIONNAIRE

ANSWERS

1) BEST INFORMATION WE HAVE SHOWS KOPPERS CAME ON SITE IN 1966. THE PART OF THE PLANT THAT KOPPERS BUILT WAS BUILT BY A. J. ZINDA CONSTRUCTION, THIS CONSTRUCTION WAS INTEGRATED INTO THE EXISTING N.W. NATURAL GAS COKE AND GAS PLANT SITE WHICH OPERATED FROM THE EARLY 1900'S UNTIL IT WAS SHUT DOWN IN THE 1950'S. A TAR STILL CONSISTING OF A SMALL COLUMN AND A REBOILER LOOP WAS ERECTED BY KOPPERS AND A.J. ZINDA. THIS TAR STILL DURING IT'S HISTORY MADE PITCH FOR REYNOLDS ALUMINUM IN LONGVIEW, WASHINGTON. TAR SUPPLIES WERE RECEIVED FROM K.A.P AUSTRALIA, COLORADO FUEL AND IRON AND KAISER STEEL, IN FONTANA CALIFORNIA. THE TAR STILL SHUT DOWN PERMANENTLY AND PARTIALLY DISMANTLED IN MID 1970'S. FROM THIS TIME TO PRESENT THE PORTLAND PLANT WAS A TERMINAL THAT RECEIVED COAL TAR CREOSOTE BY RAIL AND SHIPPED TO CUSTOMERS BY TRUCK. IN 1984 WE BUILT A PITCH STORAGE SHED TO HOLD 5,000 TONS OF CHINESE PITCH, THIS PITCH IS BROUGHT IN BY SHIP THROUGH THE HALL BUCK HANDLING FACILITY AT TERMINAL 4, PORT OF PORTLAND. THE PITCH IS THEN LOADED INTO RAILROAD CARS AND SHIPPED DIRECTLY TO CUSTOMER OR LOADED INTO TRUCKS AND BROUGHT TO THE PORTLAND PLANT AS BACKUP STORAGE. NOW, WITH THE ONSET OF THE PITCH MELTER PITCH IS ALSO BROUGHT IN FROM JAPAN AND BLENDED WITH THE CHINESE PITCH TO MAKE A LIQUID PRODUCT THAT WILL BE ON THE MARKET IN THE MID 1992'S.

CREOSOTE STORAGE CAPACITY 3.5 MILLION GALLONS AND AS PREVIOUSLY STATED, AT THIS TIME, PITCH CAPACITY IS 5,000 METRIC TONS. THE TOTAL PLANT EMPLOYMENT IS 10 PEOPLE AT THIS TIME.

THE PORTLAND PLANT IS SERVED BY BURLINGTON NORTHERN RAILROAD ON TWO SPUR TRACKS, THE PLANT IS EQUIPPED TO RECEIVE BY RAIL AND TRUCK AND CAN RETURN SHIP BY THE SAME TWO WAYS.

IN 1988 THE FUME SCRUBBER TANK WAS INSTALLED IN THE LOWER TANK FARM. CONNECTIONS ARE NOW BEING MADE TO THIS SYSTEM TO BRING UNDER FUME CONTROL ALL TRUCK AND RELOADING STATIONS, THE MELTER, THE STORAGE TANK AND CONNECT TO THE EXISTING FUME SCRUBBER LINE.

WE HAVE TAKEN SOME STEPS TO MINIMIZE THE POSSIBILITY OF SPILLS OF HAZARDOUS MATERIAL IN THE PLANT. ALL PUMPING STATIONS NOW HAVE PROTECTIVE CONCRETE BARRIERS AROUND THEM, THAT ARE SEALED AGAINST LEAKAGE. AT THE CREOSOTE TANK CAR HEAT EXCHANGER AREA WE HAVE INSTALLED ASPHALT PAVING WHICH IS SLOPED INTO A CONCRETE EMERGENCY RESPONSE PIT WHICH HAS TWO PUMPS INSIDE, ONE PUMP RUNS WATER INTO THE LOWER TANK FARM AND ONE PUMP WILL PUMP CREOSOTE INTO A 20,000 GALLON HOLDING TANK, SHOULD THE TANK HANDLING SYSTEM FAIL. ALSO EMERGENCY RESPONSE BOXES HAVE BEEN INSTALLED NEAR ALL PUMPING STATIONS, THESE BOXES ARE KEPT STOCKED WITH PADS, PILLOWS, SHOVELS AND ABSORBENT MATERIAL TO BE USED ON SPILLS SHOULD THEY OCCUR.

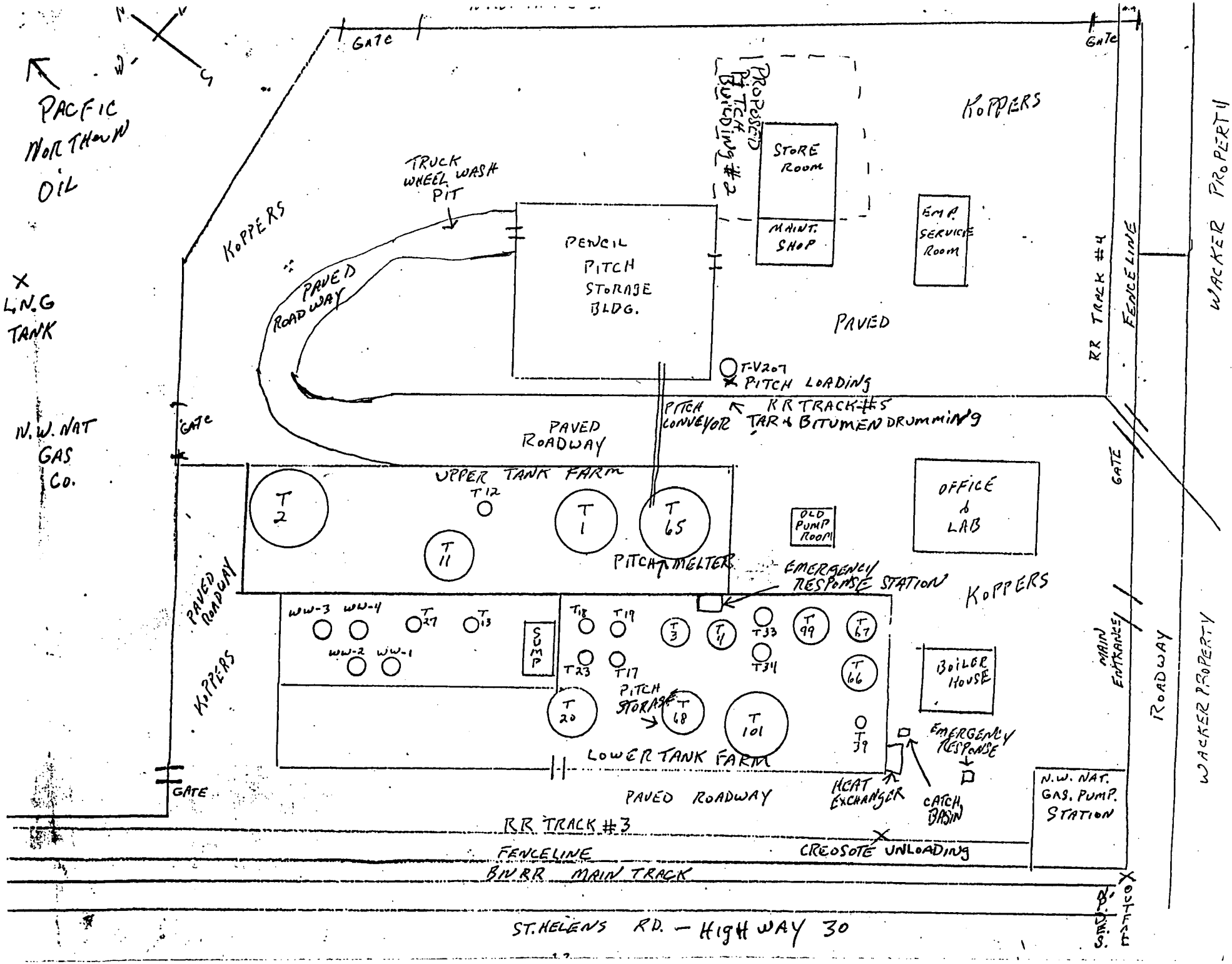
CURRENTLY THE MAYOR OF PORTLAND, OREGON IS BUD CLARK. IN 1992 HIS OFFICE IS UP FOR ELECTION AND THE TWO CANDIDATES DECIDED BY THE PRIMARY ELECTION ARE VERA KATZ AND EARL BLUMENAUHER. THE MAYOR IS IN CHARGE OF THE CITY COUNCIL, THE CITY COUNCIL HAS A PRESIDING OFFICE WHICH CHANGES EVERY FOUR MONTHS. THE PRESIDENT OF THE PORTLAND CHAMBER OF COMMERCE IS DON MCCLANE.

HAZMAT FUNCTIONS IN THE STATE OF OREGON ARE UNDER THE CONTROL OF THE STATE FIRE MARSHALLS OFFICE. WE AT KOPPERS IN PORTLAND BELONG TO THE ECHO SAFETY GROUP. THIS GROUP CONSISTS OF INDUSTRY, FIRE CONTROL STATIONS, D.E.Q. AND MEDICAL AS WELL AS EMERGENCY RESPONSE REPRESENTATIVES. AT THE PRESENT TIME ECHO SAFETY GROUP HAS OVER 300 MEMBERS REPRESENTING THE CITY OF PORTLAND, MULTNOMAH COUNTY AND VANCOUVER WA. THE HEAD OF THE PORTLAND HAZMAT TEAM IS BILL HENLE AND HE WORKS THROUGH THE PORTLAND FIRE BUREAU. THE PRESIDING OFFICER OVER THE ECHO SAFETY GROUP IS LEWIS WIEDEWITSCH.

ATTACHED IS A HAND DRAWN PLANT MAP SHOWING THE EMERGENCY RESPONSE AREAS IN THE PLANT FOR REFERENCE.

John A Oxford

JOHN A. OXFORD
PLANT MANAGER


PACFIC NORTHWN OIL
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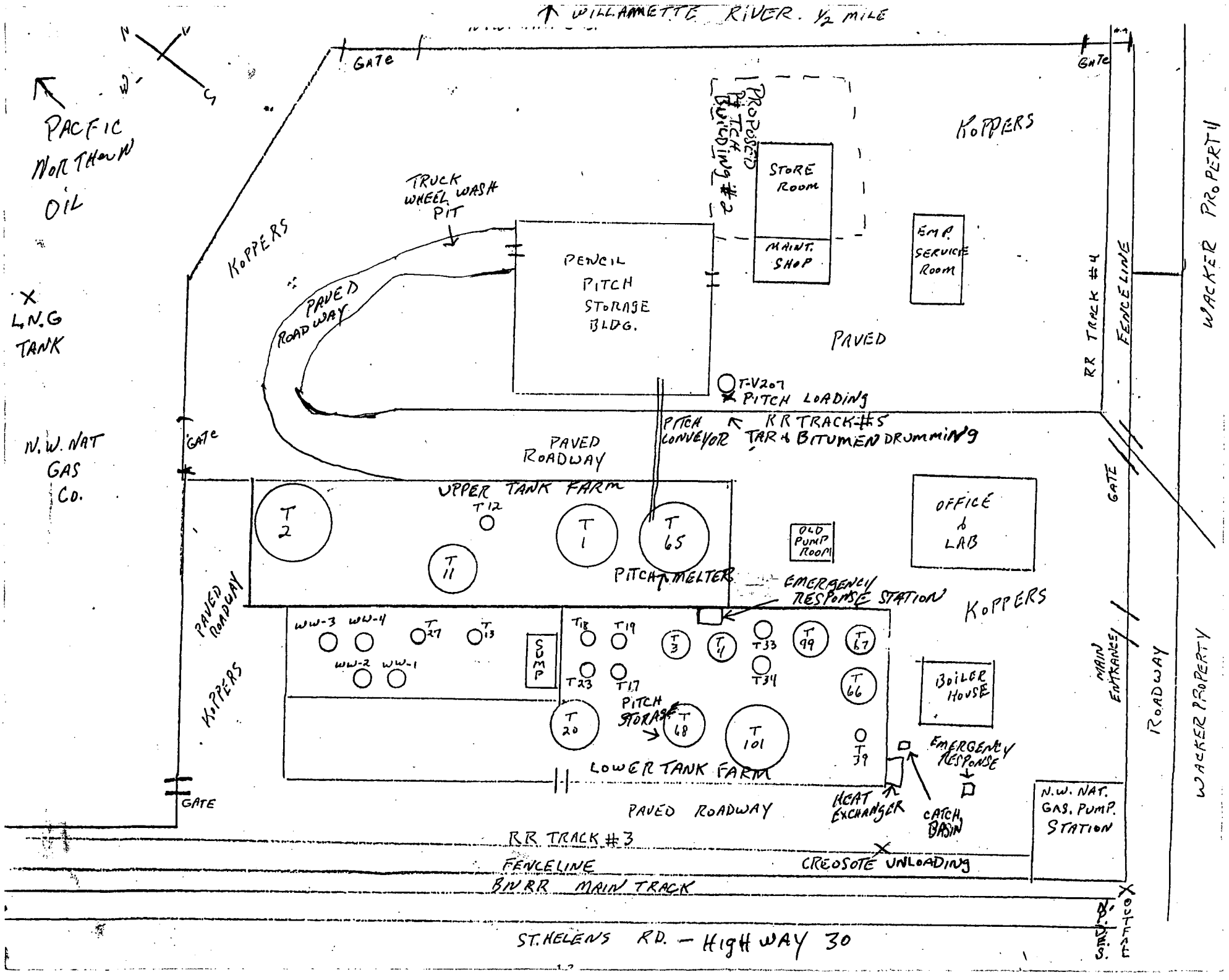
GATE
PROPOSED PITCH BUILDING #2
KOPPERS
STORE ROOM
MAINT. SHOP
EMP. SERVICE ROOM
TRUCK WHEEL WASH PIT
KOPPERS
PENCIL PITCH STORAGE BLDG.
PAVED ROADWAY
PAVED
RR TRACK #4
FENCE LINE
WACKER PROPERTY
LNG TANK
T-V207
PITCH LOADING
N.W. NAT GAS CO.
GATE
PITCH CONVEYOR
RR TRACK #5
TAR & BITUMEN DRUMMING
PAVED ROADWAY
UPPER TANK FARM
T 12
T 2
T 1
T 65
T 11
OFFICE & LAB
OLD PUMP ROOM
GATE
PITCH MELTER
EMERGENCY RESPONSE STATION
KOPPERS
PAVED ROADWAY
WW-3
WW-4
T 27
T 13
WW-2
WW-1
SUMP
T 18
T 19
T 3
T 4
T 33
T 99
T 67
T 23
T 17
T 34
T 66
BOILER HOUSE
MAIN ENTRANCE
KOPPERS
PITCH STORAGE
T 20
T 68
T 101
T 39
EMERGENCY RESPONSE
ROADWAY
WACKER PROPERTY
LOWER TANK FARM
GATE
PAVED ROADWAY
HEAT EXCHANGER
CATCH BASIN
N.W. NAT. GAS. PUMP. STATION
RR TRACK #3
FENCELINE
CREOSOTE UNLOADING
BNRR MAIN TRACK
ST. HELENS RD. — HIGHWAY 30
B.P.S.
OUTFALL


WILLAMETTE RIVER. 1/2 MILE
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GATE
PROPOSED PITCH BUILDING #2
KOPPERS
STORE ROOM
MAINT. SHOP
EMP. SERVICE ROOM
TRUCK WHEEL WASH PIT
KOPPERS
PENCIL PITCH STORAGE BLDG.
PAVED ROADWAY
PAVED
RR TRACK #4
FENCELINE
WACKER PROPERTY
LNG TANK
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PITCH LOADING
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TAR & BITUMEN DRUMMING
N.W. NAT GAS CO.
GATE
PAVED ROADWAY
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UPPER TANK FARM
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T 11
OLD PUMP ROOM
OFFICE & LAB
PITCH MELTER
EMERGENCY RESPONSE STATION
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PAVED ROADWAY
HEAT EXCHANGER
CATCH BASIN
N.W. NAT. GAS. PUMP STATION
RR TRACK #3
FENCELINE
CREOSOTE UNLOADING
BNRR MAIN TRACK
ST. HELENS RD. — HIGHWAY 30
B.P.A. OUTLET

HAHN AND ASSOCIATES, INC.
Environmental Management

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PHASE I REMEDIAL INVESTIGATION SUMMARY REPORT AND PRELIMINARY ANALYSIS OF SOIL DATA (As Appendix 1)

Volume 1

Northwest Natural - Gasco Facility
7900 NW St. Helens Road
Portland, Oregon

October 9, 1998

Prepared for:

Northwest Natural
Portland, Oregon

Prepared by:

Hahn and Associates, Inc.
Portland, Oregon

and

Decision Management Associates LLC
Portland, Oregon
(Appendix 1)

HAI Project No. 2708

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F Residual Product Maps

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- Sediment Quality Data Summary Tables and Chart

K Air Data
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- Ambient Air Quality Monitoring Report
- Dust Sample Evaluation Chart and Data

L Geophysical Evaluation of Former Tar Pond Area, GeoPotential, Inc.

M Geological Cross-Sections

Koppers000581

PHASE I REMEDIAL INVESTIGATION SUMMARY REPORT AND PRELIMINARY ANALYSIS OF SOIL DATA

Northwest Natural
Gasco Facility
7900 NW St. Helens Road
Portland, Oregon

October 9, 1998

1. PURPOSE

The purpose of this report is to provide a summary and analysis of existing data collected as part of Phase I Remedial Investigation (RI) activities at the Gasco site to assist in the understanding of the site, and to guide decisions regarding additional data acquisition.

As the overall goals of RI activities are to characterize site conditions, provide for an evaluation of the risks to human health and the environment posed by the site, and to provide the basis for the identification and implementation of appropriate remedial actions based on those risks, the following investigatory objectives exist:

- To confirm the contaminants of concern at the site
- To determine the affected media at the site
- To characterize the nature and extent of the contaminants of concern in the affected media at the site
- To identify and characterize migration pathways for contaminants of concern
- To assess the risks to human health and the environment posed by the presence of contaminants of concern in the affected media
- To obtain information that can be utilized in a feasibility study to select appropriate remedial actions(s).

2. SITE DESCRIPTION

The Gasco site comprises approximately 47 acres in the North Doane Lake area of Portland and is bounded by St. Helens Road to the southwest, the Willamette River to the northeast, and industrial properties to the northwest and southeast (Figures 1 and 2). The ground surface at the site slopes gradually northeastward towards the Willamette River with

surface elevations ranging from approximately 38 feet above mean sea level (msl-City of Portland datum) at the southwestern portion of the property to approximately 23 to 30 feet msl at the top of the river bank. The river bank, composed primarily of rip rap, slopes steeply to an elevation of approximately 5 to 8 feet msl, below which exists the shoreline with a more gradual slope. Average monthly river stages, as measured at the Portland Harbor from 1973 to 1990 and converted to the City of Portland datum, range from a low of approximately 6.3 feet msl during August and September, to a high of 10.9 feet msl during May and June (COE, 1991).

The Gasco site was the former location of the Portland Gas and Coke Company manufactured gas plant oil gasification facility from 1913 to 1956. Manufacturing processes at the site have involved the generation of town gas and pressed lampblack briquettes, aromatic generation and light oil recovery, tar recovery and refining, and the production of electrode grade coke and high Btu gas (Camp Dresser & McKee, Inc., 1987). Northwest Natural began construction of the liquefied natural gas (LNG) plant at the site in the late 1960's, at which time a majority of the old gasification plant facilities were demolished.

With regard to other uses of the property, Koppers operated a coal tar pitch manufacturing facility at the southern portion of the former gasification facility from 1966 to 1973. Koppers currently uses the facility as a terminal for the distribution of creosote oils.

Pacific Northern Oil (PNO) has operated a fuel storage and distribution facility at the northern portion of the site from the 1960's to the present.

The locations of former structures and features associated with the former manufactured gas plant, as well as current structures associated with the Northwest Natural, Koppers and PNO facilities, are shown on Figure 3.

3. EXISTING DATA AND DOCUMENTS

Northwest Natural and the Oregon Department of Environmental Quality (DEQ) entered into an Agreement for the completion of a Remedial Investigation/Feasibility Study (DEQ Agreement No. ECVC-WMCVC-NWR-94-13) for the Gasco site in 1994. RI activities were subsequently implemented by Northwest Natural at the Gasco site in September 1995, with investigatory activities being implemented by Hahn and Associates, Inc. (HAI) as provided within the approved RI Work Plan (HAI, 1995). RI activities conducted at the site to date are briefly summarized below.

3.1 Scope

The scope of work for the Phase I RI activities performed by Northwest Natural from September 1995 to the present include the following tasks (see Figure 4, Sample Location Map):

- Installation of 54 soil borings and well borings (B, G, GT, and MW-series), with the collection and analysis of soil samples
- Collection and analysis of groundwater samples from 7 temporary well point installations
- Installation of 18 groundwater monitoring wells with 8 rounds of sampling from the wells
- Twelve monthly groundwater level monitoring events and 7 subsequent quarterly events
- Installation of 11 vibra cores in the Willamette River with the collection and analysis of sediment samples
- Collection of 5 surface water and sediment samples from on-site ponds and a drainage ditch
- Collection of air and dust samples
- One 48-hour water level monitoring test
- Monitoring well slug test data collection and analysis
- Surface geophysical survey in area of former Tar Ponds with ground penetrating radar, magnetic, and electromagnetic methods

3.2 Previous Document Submittals

Results of Phase I RI activities at the Gasco site have been documented in numerous reports. The documents that provide the most comprehensive synthesis of available site data and data interpretation concerning RI investigatory results are as follows:

- Hahn and Associates, Inc., *Data Package for Remedial Investigation / Feasibility Study, Northwest Natural Gas Company, Gasco Facility,* July 22, 1996
- Hahn and Associates, Inc., *Geological and Hydrogeological Framework, Northwest Natural Gas Company, Gasco Facility,* May 13, 1997
- Hahn and Associates, Inc., *Monitoring Well Abandonment and Installation Activities, Northwest Natural Gas Company, Gasco Facility,* February 19, 1998

- Hahn and Associates, Inc., *Fourth Quarter 1997 Progress Report for Remedial Investigation / Feasibility Study Activities, Northwest Natural Gas Company, Gasco Facility,* February 23, 1998

- Hahn and Associates, Inc., *Second Quarter 1998 Progress Report for Remedial Investigation / Feasibility Study Activities, Northwest Natural Gas Company, Gasco Facility,* April 24, 1998

In addition to the above reports documenting Phase I RI results, the following are the primary documents that have been prepared to date in support of Risk Assessment activities for the Gasco site:

- Stoel Rives LLP, *Current and Reasonably Anticipated Future Land and Beneficial Water Uses in the Locality of the Facility, Northwest Natural Gas Gasco Facility*, April 1997

- Decision Management Associates and Montgomery Watson, *Data Summary and Exposure Pathway Analysis Technical Memorandum, Gasco Risk Assessment*, May 15, 1997

- Decision Management Associates and Montgomery Watson, *Comparison Between McCormick and Baxter Site and Gasco Site Technical Memorandum, Gasco Risk Assessment*, June 11, 1997

- Decision Management Associates and Montgomery Watson, *Exposure Assessment, Gasco Risk Assessment*, July 2, 1997

- Hahn and Associates, Inc., *Locality of Facility, Northwest Natural Gas Company, Gasco Facility,* August 1, 1997 (A Beneficial Use determination support document)

- Decision Management Associates and Montgomery Watson, *Toxicity Assessment, Gasco Risk Assessment*, December 16, 1997

3.3 Summary of Available Data

A general description of available RI data for the Gasco site, including identification of where this data may be found, is provided in the following Sections.

3.3.1 Soil Data

The majority of soil quality and lithologic data for the Site were collected from September 1995 to January 1996 during which time soil borings B-1 through B-35, MW-1 through MW-12, and M-11 were installed. More recently, soil quality data, geotechnical soil borings G-

Appendix H. Groundwater elevation data, hydrographs, and groundwater flow direction maps and hydrographs may be found within Appendix E. Monitoring well construction logs are provided in Appendix B.

3.3.4 On-Site Surface Water and Sediment Data

On-site surface water and sediment sampling activities were conducted at the Gasco site on January 30, 1996. These activities involved the collection of surface water samples at two locations within the on-site drainage ditch, as well as within each of the three on-site ponds. Additionally, a shallow sediment sample was collected from each of the three on-site ponds. A figure depicting sample locations, and tables summarizing the results of these activities, are included within Appendix I.

3.3.5 Air Quality Data

Sampling for airborne contaminants at the Gasco site has been conducted for chemical exposure monitoring during implementation of the early stages of RI investigatory activities (1995), as well as for ambient air quality monitoring (1996). All monitoring activities were conducted by Paul Carlson Associates, Inc. (PCA), a firm specializing in industrial hygiene issues and air monitoring.

In addition to the above described air monitoring activities, two samples of accumulated dust were collected from the site. A figure depicting air and dust sampling locations, and results of all air monitoring activities, are provided within Appendix K.

3.3.6 Geophysical Data

On November 22, 1995, a preliminary survey with ground penetrating radar (GPR), electromagnetic (EM), and magnetic geophysical methods was conducted in the vicinity of the former Settling Ponds / South Fill Area by GeoPotential of Gresham, Oregon. Three profiles were completed in an attempt to identify and map fill zones, tar zones, and lithologic changes. The results of this survey are included within Appendix L.

3.3.7 Aquifer Testing Data

In order to estimate hydraulic properties of the shallow and intermediate-depth water bearing zones at the Gasco site, rising head slug tests were conducted at a majority of the site wells in March 1996. The raw data summary of results of these testing activities was provided within RI Data Package Report (HAI, 1996). A summary of aquifer slug testing results is included within Appendix E (Table E-2).

4. SITE GEOLOGY

The geologic units of interest at the subject site can be subdivided as follows, from youngest to oldest:

- Surficial Fill Deposits
- Alluvial Deposits
  - Willamette River Deposits
  - Catastrophic Flood Deposits
- Columbia River Basalt Group

4.1 Columbia River Basalt Group

The oldest and lowermost geologic unit of interest at the site consists of the Columbia River Basalt Group. The Miocene-age Columbia River Basalt Group, composed of a series of individual lava flows, generally forms the base (bedrock) of the Portland Basin and outcrops immediately to the southwest of the Site in the Tualatin Mountains.

A bedrock surface elevation map, utilizing RI data as well as data obtained from historical boring logs from 19 geotechnical soil borings that were installed at the site in 1915 during the early stages of development activities, is included as Figure 5. As depicted on Figure 5, from the Tualatin Mountain outcropping, the basalt surface dips steeply to the northeast, with the top of the basalt lying at an elevation near mean sea level [a depth of approximately 36 feet below ground surface (bgs)] in the southern corner of the site (as observed at the MW-12-36 well location), to elevations deeper than -133 feet msl adjacent to the Willamette River (as observed at boring H-4). Based on the predicted slope of the bedrock surface as interpreted with available data, bedrock is likely the deepest beneath the eastern portion of the site, where based on the observed slope in bedrock surface, it is estimated that the bedrock surface could occur at an elevation deeper than -230 feet msl.

4.2 Alluvial Deposits

Overlying the eroded basalt surface at the site are Quaternary-Age alluvial deposits, composed of unconsolidated sands and silts, that range in thickness from approximately 30 feet near St. Helens Road, to an estimated thickness of greater than 200 feet adjacent to the Willamette River. These alluvial deposits have been differentiated by Geraghty & Miller (1991), into the Catastrophic Flood Deposits and Willamette River Deposits. Since these two units may be difficult to differentiate in places, the conceptual site model groups the two units together and refers to them as undifferentiated Alluvial Deposits. The uppermost unit of the undifferentiated Alluvial Deposits in the vicinity of the site has been

identified as a clayey silt by Camp Dresser (1987), while Geraghty & Miller (1991) identified both silt and clay facies associated with the upper zone of the Alluvial Deposits.

Borings installed by HAI at the Gasco site encountered a laterally extensive silt unit, with typically little to no clay content, at the upper portion of the undifferentiated Alluvial Deposits. This silt unit exhibits coloration ranging from olive gray to green, with some areas of orangish-brown mottling. Small sand lenses and rootlet zones are present within portions of the silt unit. Fine to medium-grained sands, silty sands, and relatively thin interbedded silts were encountered below the silt unit at intermediate depths within the undifferentiated Alluvial Deposits.

As depicted in Figure 6, the top of the silt unit was encountered at elevations ranging from 20 to 35 feet msl at the southwestern portion of the site, sloping to the northeast towards the Willamette River where it was encountered at elevations of approximately 5 to 10 feet msl. In general, the top of the silt unit appears to slope more steeply beneath the southwestern portion of the Site at the area of the former Light Oil Plant, Pitch Plant, and Tar Processing Area, with the slope becoming more gradual and even reversing slightly, beneath the central and northeastern portions of the site.

As depicted on Figure 6, the existence of a northwest-southeast trending depression in the top of the silt unit is apparent across the central portion of the site. Two low spots within this depression were identified at locations corresponding to wells MW-6 and MW-11, both locations where dense non-aqueous phase liquids (DNAPLs) have been detected. The depression appears to be oriented roughly parallel to the location of a former creek bed, thought to be a former drainage feature associated with Doane Lake, remnants of which are located to the southeast of the Gasco site (Cameron, 1995). The location of the former creek was identified on a detailed elevation survey map for the Gasco site that was prepared in 1906. The location of the former creek, as surveyed in 1906, is depicted on Figure 6. Of additional note concerning the 1906 survey, it is found that, in general, the pre-fill ground surface elevations at the Gasco site roughly correspond with the elevation of the top of the silt unit at the site, thereby supporting the hypothesis that the silt unit does adequately define the top of the Alluvial Deposits / base of the Surficial Fill Deposits across the site.

With regard to the thickness of the silt unit, based on boring log data and depicted on Figure 7, the thickness of the silt unit is greatest in the central-southeast portion of the site, where thicknesses of up to 35 feet have been identified (boring MW-11). The silt unit appears to thin in all directions from this area of the site, with observed thicknesses of 4.5 (B-14), 6.0 (MW-5), and 2.5 (B-3 and B-8) feet. Although the silt unit appears to be laterally continuous across a majority of the site, because sands and silty sands were encountered across the anticipated depth of the silt unit at borings B-9 (drilled to a depth of -3.4 feet msl), GT-1 (drilled to a depth of –16.9 feet msl) and GT-4 (drilled to a depth of –31.8 feet msl), it appears that a thin silt unit was either missed at these locations as an artifact of the selected soil sampling interval, or that the silt unit may be locally absent at these locations.

4.3 Surficial Fill Deposits

A review of the site history and historical aerial photographs indicates that much of the property, especially to the northeast adjacent to the river, has been extensively filled-in through time. In addition to the overall build-up of ground surface elevations, these filling activities have resulted in the removal of two site drainage features, the creek discussed in Section 4.2, and a drainage ditch formerly located southeast of the southern PNO tank farm, where surface water run-off and manufactured gas plant waste-products were apparently formerly discharged to the Willamette River. Based on review of historical aerial photographs of the site, it appears that this ditch was filled in some time between 1941 and 1961. The axis of this former drainage feature is shown on Figure 3.

Based on results of site investigatory activities, the surficial fill zone was found to overlay the alluvial silt unit with variations in thickness ranging from approximately 2 feet along the southwestern portion of the site near the former Light Oil Plant, to a maximum of 30 feet in the central portion of the site. Much of the fill encountered at the site consisted of poorly graded sands and silty sands that apparently consist of hydraulically placed river-dredge material. However, lampblack, spent oxide materials, quarry reject rock, building debris, and solidified tars were also encountered within the surficial fill unit at the site, especially within the area of the former Tar Ponds and the former Spent Oxide Storage area.

5. SITE HYDROGEOLOGY

Groundwater occurs in three principal hydrologic zones at the site including the unconfined Surficial Fill water-bearing zone (WBZ), the semi-confined Alluvial Sand WBZ, and the confined bedrock aquifers in the Columbia River Basalts. A laterally extensive low permeability silt unit separates the Surficial Fill WBZ from the Alluvial Sand WBZ across a majority of the site.

With respect to the overall regional groundwater flow regime in the vicinity of the Gasco site, it is anticipated that the Tualatin Mountains form a regional groundwater recharge boundary to the southwest of the site, while the Willamette River likely forms a regional groundwater discharge boundary to the northeast, acting as a hydraulic barrier to groundwater flow to the opposite side of the river.

A generalized hydrologic cross-section, depicting the conceptualized groundwater flow regime beneath the site, is provided as Figure 8. General descriptions of each of the three principal hydrologic zones beneath the site are provided below.

5.1 Surficial Fill Water-Bearing Zone

The water table, generally found to be perched within the Surficial Fill WBZ, above the upper alluvial silt unit, has been identified at depths that fluctuate seasonally from 3 to 12 feet bgs (34 to 25 feet msl) at the southwestern portion of the site (well MW-9), and from 9 to 27 feet bgs (25 to 7 feet msl) at the eastern portion of the site (well MW-4-35). Based on the observed seasonal fluctuations of the water table elevation, the overall saturated thickness of this WBZ may be expected to fluctuate from approximately 3 to 25 feet at the northeastern boundary of the site, located adjacent to the Willamette River. Groundwater elevation data for monitoring wells at the site are provided in Appendix E (Table E-1).

As depicted on groundwater elevation maps generated for the site (Appendix E, Figures E1-E18), the groundwater flow direction within the Surficial Fill WBZ is northeasterly towards the Willamette River, with an overall average hydraulic gradient of approximately 0.017. As measured since December 1995, the observed groundwater flow direction within this WBZ has remained relatively constant through time. The calculated hydraulic gradient within this WBZ has been found to fluctuate from a low of 0.010 in February 1996, to a high of 0.020 in September 1996, and February 1997.

As depicted on water level hydrographs for well pairs installed at the site (Appendix E), a downward vertical hydraulic gradient typically exists between the Surficial Fill WBZ and the Alluvial Sand WBZ. An exception to this overall downward hydraulic gradient was noted at the central portion of the site (MW-8 and MW-10 clusters) during the February 1996 Willamette River flooding event, when an upward gradient existed between these units at these locations. A vertical gradient reversal was also noted at the MW-10 location in February and June 1997, as well as in June 1998. These gradient reversals appear to result from rapid increases in river stage, with the Alluvial Sand WBZ directly responding to increases in river stage, while responses in the Surficial Fill WBZ occur more slowly and are less pronounced with increased distance from the river.

Based on slug testing that was conducted by HAI in March 1996, an overall average hydraulic conductivity of 3.9 feet per day (ft/day) was calculated for the fill WBZ, with the lowest calculated hydraulic conductivity identified at well MW-8-29 (0.0067 ft/day), and the highest calculated hydraulic conductivity identified at well MW-4-35 (26 ft/day) (Table E-2).

Based on the referenced hydraulic conductivities, a calculated average hydraulic gradient of 0.020, and an assumed effective porosity of 0.20, the average groundwater flow velocity within the Surficial Fill WBZ is estimated to be 0.4 ft/day, ranging from an estimated 0.0007 ft/day at the MW-8-26 location, to an estimated 2.6 ft/day at the MW-4-35 well location. Such high variability of calculated flow rates is anticipated within the Surficial Fill WBZ, due to the significant heterogeneaties identified within this zone, and the localized area of influence of each slug test.

5.2 Alluvial Sand Water-Bearing Zone

The Alluvial Sand WBZ, encountered below the silt unit at the site, extends to a total depth ranging from approximately 36 feet bgs (0 feet msl) at the southern portion of the site (MW-12-36), to greater than an estimated 265 feet bgs (-230 feet msl) adjacent to the Willamette River. Due to its great apparent thickness, the Alluvial Sand WBZ has been arbitrarily subdivided into intermediate and deep zones. Existing site monitoring wells installed in the Alluvial Sand WBZ are screened within the intermediate zone to depths of 36 to 61 feet bgs (-26 to –20 feet msl), while shallow zone monitoring wells are screened within the Surficial Fill WBZ.

As depicted in groundwater elevation maps generated for the site (Appendix E, Figures E19-E37), the groundwater flow direction within the Alluvial Sand WBZ is northeast towards the Willamette River, with an average hydraulic gradient of 0.016 (as measured between wells MW-10-61 and MW-3-56). As measured since December 1995, the observed groundwater flow direction within this WBZ has remained relatively constant through time. The calculated hydraulic gradient within this WBZ has been found to fluctuate from a low of 0.008 in February 1996, to a high of 0.022 in September 1996.

Based on slug testing that was conducted by HAI in March 1996, an overall average hydraulic conductivity of 0.79 ft/day was calculated for the Alluvial Sand WBZ, with the lowest calculated conductivity identified at well MW-8-56 (0.08 ft/day), and the highest calculated conductivity identified at well MW-6-61 (1.5 ft/day).

Based on the referenced hydraulic conductivities, a calculated average hydraulic gradient of 0.017, and an assumed effective porosity of 0.20, the average groundwater flow velocity within the alluvial WBZ is estimated to be 0.07 ft/day, ranging from an estimated 0.007 ft/day at the MW-8-56 location, to an estimated 0.13 ft/day at the MW-6-61 well location.

5.3 Basalt Unit / Bedrock Aquifer

A boring log for an abandoned bedrock zone industrial water supply well drilled on the southern portion of the Gasco site (exact location unknown) in 1948 indicated competent basalt bedrock to occur from a depth of approximately 61 feet bgs to a depth of 241 feet bgs, below which was an approximate 17 foot thick sand zone (corresponding to the zone of water production) that was underlain by fractured basalt to the total depth of the hole at 370 feet bgs. Notes provided on the boring log for this well indicate that pumping of the well at a rate greater than 140 gallons per minute (gpm) would result in the water level being dropped below the pump.

Boring logs for two 400-foot deep cathodic pipeline protection wells drilled on the southwestern portion of the Gasco site in 1976 and 1985 indicate alternating layers of broken rock with clay layers and competent basalt through the entire drilling interval, with a sandstone, perhaps equivalent to the water producing sand horizon identified within the well log for the supply well, being identified in one of the wells at a depth of 290 to 310 feet bgs. No information on the occurrence of water was provided for either of the cathodic

protection wells. As both wells contain sacrificial anodes and bedding material for the corrosion protection of pipelines at the site, information on water within the bedrock is unavailable at these locations. Boring logs for the former water supply well, and the cathodic protection wells, are included within Appendix D.

Based on the site conceptual model, it is anticipated that groundwater within the basalt unit flows to the northeast towards the Willamette River (a regional discharge zone). An upward hydraulic gradient within the basalt aquifer is likely to occur in the vicinity of the Gasco site and Willamette River, potentially resulting in localized discharge from the basalt aquifer unit upwards into the Alluvial Sand WBZ (Figure 8).

With regard to water use within the bedrock aquifer within the vicinity of the Gasco site, a water well survey conducted for Northwest Natural (Stoel Rives, 1997), identified the presence of twelve documented water wells located on the western side of the Willamette River within a one-mile radius of the Gasco site. Of these twelve wells, eleven were identified as providing an industrial water source, and one was identified as providing a domestic/irrigation water source. None of the eleven industrial wells are currently in service, as the owners have all switched to the use of City of Portland water. The domestic well, located significantly upgradient of the Gasco site within the Tualatin Mountains, is currently used. The well survey did not identify the presence of water wells withdrawing groundwater from either the Surficial Fill WBZ or the Alluvial Sand WBZ.

6. NATURE, EXTENT, AND TRANSPORT OF CONTAMINANANTS

Field observations as identified in soil boring logs (Appendices A and B) indicate that residual tar, oil tar, and lampblack are present within soils at the Gasco site. Oil tar and tar are primarily differentiated herein by their physical characteristics, especially color and viscosity. Specifically, when described herein, tar will refer to a black, viscous to semi-solid petroleum hydrocarbon, while oil tar will refer to a brown to black hydrocarbon that is significantly less viscous than the aforementioned tar and is potentially mobile in the subsurface soils. Additionally, the presence of oil tars in soils as referenced herein, refers to product being visible in a soil sample, and may not include soils that show some other evidence of contamination, such as sheen, odor, or elevated headspace. Lampblack is a term referring to a hydrophobic black powder or sandy material, consisting primarily of carbon, that may contain minor concentrations of petroleum hydrocarbons (Gas Research Institute, 1996).

Free product oil tars, herein referred to as free product DNAPL, or just DNAPL, have been identified in three areas of the site. Free product DNAPL is potentially mobile and recoverable product.

The constituents of primary concern in tars and oil tars are the aromatic hydrocarbons benzene, toluene, ethylbenzene and xylene (BTEX) and polynuclear aromatic hydrocarbon (PAH) compounds. Other contaminants of concern at manufactured gas plant sites include cyanide, phenols, and metals. A discussion on the nature and extent of residual

product, free product DNAPL, as well as identified soil and groundwater impacts is presented in the following sections.

6.1 Residual Product In Soil

Iso-contour maps depicting the distribution of residual oil tar and tar in soils at the Gasco site have been provided in Appendix F. Specifically, Figures F-1 and F-2 depict the depth to the top and the thickness of residual oil tar as observed at the Gasco site, while Figures F-3 and F-4 depict similar information with regard to the tar. These figures also depict the overall lateral extent of observed residual oil tar and tar within soils, as identified during the soil boring program at the site. Cross-sections provided in Appendix M depict the identified extent of observed oil tar and tar within soil borings installed at the site.

6.1.1 Residual Oil Tar

As depicted on Figures F-1 and F-2, residual oil tar has been identified in soil borings installed throughout the southeasterly and central portion of the site, primarily corresponding to the locations of the former Light Oil Plant, northeastward through the former Tar Ponds, and northwestward through the area of the former Retort Area. Additionally, two apparently small and isolated areas of residual oil contamination have also been identified in borings installed in the vicinity of the former Spent Oxide Storage area (MW-1 and B-1) and the PNO tank farm (GT-1).

With regard to the distribution of residual oil tar within soils across the site, it is apparent that several primary source areas for this product may be identified, including: 1) the former Light Oil Plant; 2) the former Retort Area; and 3) the former Tar Settling Ponds. Residual product found in the former Spent Oxide Storage area (MW-1 and B-1) was likely placed there as contaminated fill, while the minor diesel product found in the PNO tank farm area (GT-1) appears related to PNO tank operations.

6.1.1.1 Former Light Oil Plant / Retort Area

The depth to the surface of residual oil tar product (Figure F-1) at the Gasco site was found to be the shallowest (i.e., less than 5 feet bgs) in the immediate vicinity of the former Light Oil Plant (borings B-19 and B-22). In the vicinity of the former Retort Area, residual oil tar was found at a depth of 7.5 feet bgs at boring B-13. The depth to the top of the residual oil tar was typically found to increase with increasing distance from the former Light Oil Plant and Retort Area, with the residual oil tar surface generally corresponding with the top of the underlying silt unit. Based on the preceding, it appears likely that the former Light Oil Plant and the former Retort Area (including the adjacent railroad siding) are the two primary source areas for the oil tar observed throughout the current Northwest Natural LNG Plant and the Koppers Lease areas, with the oil tar subsequently having migrated from these source areas via gravity along the surface of the northeast sloping silt unit, with

a preferential pathway being created due to the permeability contrast between the surficial fill and the underlying silt unit.

With regard to the lateral extent of the oil tar originating from the former Retort Area/Light Oil Plant source areas, it is noted that the northwest-southeast trending depression in the surface of the silt unit (Figure 6), appears to have acted as a barrier to the lateral migration of the mobile oil tar product, generically referred to as DNAPL, to the northeast towards the Willamette River. Lows within this silt unit depression also appear to have acted as preferential areas of DNAPL accumulation. Further discussion of DNAPL is presented in Section 6.2. In addition, the silt unit within the western portion of the Gasco site appears to have acted as a vertical barrier to oil tar product migration, with no oil tar observed below the silt unit in this area.

Evidence to support the above-identified barrier / DNAPL accumulation hypothesis for the depression in the surface of the silt unit is provided by the observed presence of DNAPL within wells MW-6-36 and MW-11-32, located at the overall low points within the depression, and in well MW-10-25, located on the up-dip, source area, side of the depression, while no residual oil tar product or DNAPL has been identified at the B-7, B-10, or MW-13 boring locations, all of which were installed on the opposite side of the depression from the former Retort Area. Although residual oil tar is found on the opposite side of the depression in the southern portion of the site, this is thought to be due to a different source area (see Section 6.1.2).

With regard to the vertical extent of the oil tar product that has apparently been sourced within the Light Oil Plant / former Retort Area, it is noted that a lack of BTEX and PAH detections in groundwater at monitoring well MW-13-61, screened beneath the silt unit downgradient from the apparent product-bearing depression, and a lack of BTEX or significant PAH detections at the MW-10-61 location, installed through the shallow DNAPL and screened below the silt unit at a location down-dip of the suspected source areas, indicates that the silt unit at this portion of the site appears to have acted as an effective barrier to the vertical migration of the DNAPL into the underlying Alluvial Sand WBZ.

In order to verify the lack of DNAPL migration into the Alluvial Sand WBZ at the former Light Oil Plant/Retort source area, a deep Alluvial Sand WBZ well, to be constructed on top of bedrock, has been proposed (HAI, 1998a) for installation in the vicinity of the depression in the silt unit surface, down-dip of the former Light Oil Plant (i.e., near boring B-26).

6.1.1.2 Former Tar Pond Area / B-29 Area

The greatest depth at which residual oil tar in soils has been identified at the Gasco site is in the area of the former Tar Ponds. Specifically, the depth to residual oil tar product at this portion of the site has been found to range from 20 feet bgs (14 feet msl at B-35) to 60 feet bgs (-25 feet msl at B-33). Based on observations made during the installation of borings within the former Tar Pond area, it appears that the observed oil tars have likely been sourced as emulsions or degradation of the thick accumulations of tar that had been disposed of at this

portion of the site. Evidence for such a source is provided by boring logs that indicate the presence of viscous or hardened tar being underlain by vertical fingers of less viscous oil tar that were found to have migrated downward through rootlet casts within the underlying silt unit, and in some cases (B-29, B-32, B-33, B-34, and possibly MW-8), having extended into the upper portion of the underlying Alluvial Sand WBZ.

With regard to the vertical extent of the oil tar identified in the vicinity of the former Tar Ponds, it is noted that the depth to the bottom of the oil tar has been defined at virtually all borings installed at the Gasco site. In the Tar Pond area, the deepest that oil tar was found to extend was to a depth of 67 feet bgs (-32 feet msl) at the B-33 boring location.

Although it appears that the vertical extent of oil tar has been identified beneath the Tar Ponds, in order to more completely evaluate the potential that product may have migrated to greater depths in other areas of the former Tar Ponds, and to define the vertical extent of groundwater contamination at the site, the installation of two deep Alluvial Sand WBZ wells at locations down-gradient of the former Tar Ponds has been proposed (HAI, 1998a). Observations of soil and water quality at these locations will assist in determining the magnitude of deep oil tar impacts at, and down-gradient of, the former Tar Pond area.

Laterally, it is noted that oil tar was not found in soil borings located between the former Tar Ponds and the Willamette River (borings B-31, MW-4, and MW-5), however, oil tar was found to occur (below a thick zone of tar) from a depth of 27 to 39 feet bgs (4 to -8 feet msl) at the B-29 boring location, situated adjacent to the river in the area of the former discharge drainage feature. Although tar was identified in other borings (B-9 and MW-3) installed within drainage feature, no oil tar was found to be associated with the tars at these locations. It appears that the tars and oil tars present at B-9, B-29, and MW-3 are the result of placement during the filling of the drainage feature.

With regard to the lateral extent of oil tar to the south of the former Tar Ponds, based on the location of the former Tar Ponds adjacent to the southern property line, and based on knowledge that soils from the Gasco site were used as fill on the property to the south (i.e., Wacker Siltronic, Inc.), the potential exists that tar and associated oil tar impacts could extend to the Wacker Siltronic, Inc. property.

6.1.1.3 Spent Oxide Storage Area and Vicinity

Soil saturated with oil tar was identified in the vicinity of the former Spent Oxide Storage area at the MW-1 and B-1 boring locations in the northwest portion of the site. The zone of product saturation was found to consist of an interval approximately 5 feet thick located immediately above the silt unit at depths ranging from 16 to 22 feet bgs. Boring logs indicate that much debris had been deposited at this portion of the site as fill, including concrete, bricks, lampblack, and spent oxide. As borings B-2, B-3, B-4, B-5, and B-7, all of which did not show indications of soil impacts, are located between the area of observed oil tar and the primary oil tar source area (former Light Oil Plant / Retort Area at the site), it appears that the identified oil tar was likely directly deposited at this portion of the site as a component of the fill, and its presence is not a result of migration from other portions of the

site. With regard to the character of the observed product, it is noted that well MW-1 is screened directly across the zone of observed oil tar saturation, and that free product DNAPL has not been found within this well. Based on the preceding, it appears that the observed oil tar at the MW-1 / B-1 portion of the site is likely in the form of residual product as opposed to a potentially mobile DNAPL.

As indicated on the lithological log for boring GT-1, a boring installed within the north end of the southern PNO tank farm, petroleum contamination was found to occur from a depth of 8.5 to 11 feet bgs. This product had a diesel odor uncharacteristic of the oil tar encountered at the site, and was found at a depth that indicated it to be likely floating on the water table. Analysis of a soil sample from the zone of product saturation indicated total petroleum hydrocarbons within the diesel range of 13,400 ppm, with no carcinogenic PAHs identified. The preceding, as well as the location of the product being within the PNO tank farm, an area where petroleum products are actively managed, indicates the source of the diesel is likely related to tank farm operations, and is not due to historic manufactured gas plant activities. Finally, the extent of the apparent diesel product in the subsurface appears to be limited, as no such product was identified at adjacent boring locations B-8 or GT-2.

6.1.2 Tar

In addition to tar distillates (oil tar), an extremely viscous / semi-solid, black tar was identified during the investigation in a number of soil borings at the site. Specifically, as depicted on Figures F-3 and F-4, the tar has been identified in soil borings installed throughout the eastern portion of the site corresponding to the location of the Former Tar Ponds and the former drainage feature. Additionally, isolated areas of tar were identified at the location of the former Naphthalene Plant (MW-10), and in the PNO Lease Area at B-6.

Based on tar thicknesses and depths at the site, it appears that the main source area for the observed tars is the former Tar Settling Ponds, where, according to Camp Dresser & McKee (1987), approximately 4,600,000 gallons, or 23,000 cubic yards (dry content) of tar were discharged. At the former Tar Pond area, tar and tar mixed with lampblack were placed (filled) to depths of approximately 25 feet bgs. Directly beneath the tar ponds, tar has migrated vertically into the underlying silt unit, likely due to the mass and weight of the overlying tar. At one location (B-33), tar was found to extend into the Alluvial Sand WBZ, where the maximum depth of tar observed at the site (60 feet bgs) was encountered. Tarry soils typically were encountered within 5 feet of the ground surface in the eastern portion of the site (Figure F-3).

As evidenced by the tars identified at the MW-3, and B-9 and B-29 locations, it appears that tar may have been discharged to the former drainage ditch, and/or used to fill the ditch feature. As observed on historical aerial photographs, this ditch was located to the southeast of PNO's southern-most tank farm, where it discharged into the Willamette River. Elevated PAH concentrations in river sediments collected in the vicinity of the likely confluence of the former drainage ditch with the river, as discussed in Section 6.6 of this report, tends to support the potential that tarry wastes may have historically been

discharged to the river through this former ditch. As no tar was identified within borings GT-3 and GT-4, installed immediately to the northwest of the former ditch and within 50 feet of well MW-3, it appears that the tars are not migrating significantly from their apparent location of deposition within the former ditch feature.

Camp Dresser & McKee (1987) indicated that the drainage feature discussed above likely received the main waste discharges at the site up until 1941, at which time the tar ponds were brought on-line to act as a pollution abatement measure. With regard to the type of wastes discharged, Camp Dresser & McKee indicate that wastes discharged prior to 1925 would be characterized primarily as being wastewaters containing dissolved and suspended hydrocarbons, tar, and spent oxide. After 1925, the amount of tar within the waste stream would have been reduced such that it accounted for only a small amount of tar produced at the site, as tar refining operations were begun that year. Finally, with the start-up of the tar ponds beginning in 1941, the volumes of wastes discharged to the river would have been dramatically reduced at that time.

In summary, boring log data suggests that tars are present within the Fill Unit extending from the location of the former Tar Ponds at the eastern portion of the site, northwestward to the location of the former drainage ditch. Based on the thickness of residual tar in soils identified at the Former Tar Pond and drainage ditch areas, it is estimated that in excess of 250,000 cubic yards of tar and tar mixed with soils may be present in the subsurface at this portion of the site.

Approximately 9.5 feet of tarry soils were identified at the MW-10 location, situated at the area of the former Naphthalene Plant. With greater depth the tar at this location is found to become less viscous and more oil-like (oil tar). Although the oil tar extends throughout much of the former Light Oil Plant northward to the former Retort area (as discussed in Section 6.1.1), the tarry soils appear to be restricted to the general area of the former Naphthalene Plant at this portion of the site.

With regard to the tar identified in boring B-6 located near the former Oxide Building and Oxide Storage Area, because the tar was found mixed with sand and brick fragments and was of very limited vertical extent (up to 2.5 feet), it appears likely that the tar was present in fill placed at this portion of the site, and does not represent a source area of significance.

6.2 Free Product DNAPL

Free product DNAPL has been identified at three locations at the Gasco site, all located within the Surficial Fill WBZ and perched on top of the silt unit. Specifically, up to approximately 8 feet of DNAPL has been identified within the bottom of well MW-6-32, while up to 3.5 feet of DNAPL has been identified at the MW-10-26 location, and up to 2 feet of DNAPL has been identified at the MW-11-32 location. It is noted that the observed DNAPL thickness within the wells is apparent, and due to well hydraulics (i.e., a lower hydrostatic head within the well than in the surrounding formation) and screen placement (i.e., penetration below the surface of the impermeable barrier), DNAPL thickness within the wells may actually overestimate the DNAPL thickness that is present within the

formation (Huling and Weaver, 1991). With specific respect to the Gasco site for instance, although up to eight feet of DNAPL has been identified within well MW-6, only 2.5 feet of product saturated soils were identified during well installation, suggesting the preceding conditions may be applicable.

The source for the DNAPL at the MW-6 location is likely the former Retort area, while the source for the DNAPL at the MW-10 and MW-11 locations is likely the former Tar Processing area and/or the former Light Oil Plant area. The location of these wells relative to the predicted source areas, as well as variations in the color and odor of the DNAPL between the MW-6 and MW-10/MW-11 locations supports this hypothesis.

With regard to DNAPL transport, it is likely that the DNAPL migrated downward within the Surficial Fill WBZ at the source areas until encountering the silt unit, at which point the permeability contrast between the fill and the silt unit would have caused the DNAPL to migrate laterally via gravity along the top of the silt unit in a down-dip direction. Lows within the silt unit located along the area of the former creek bed (i.e., the silt unit depression) appear to have acted as preferential areas of DNAPL accumulation, and also appear to have prevented the continued migration of DNAPL towards the eastern portion of the site (as detailed in Section 6.1.1.1).

As no DNAPL has been identified in wells installed to the northeast of the silt unit depression, the presence of free product DNAPL (versus residual product contamination) at this portion of the site has not been verified. As discussed in Section 6.1.1.1, in order to more completely ascertain the potential for the occurrence of free product DNAPL at depth below the former Tar Ponds, the installation of two deep Alluvial Sand WBZ wells at locations down-gradient of the former Tar Ponds has been proposed (HAI, 1998a).

Additionally, with regard to the areas of known DNAPL occurrence (within and to the west of the silt unit depression), a pilot test has been proposed by Northwest Natural (HAI, 1998b) involving the extraction of the DNAPL from the wells in which it has been identified. The objective of the testing is to evaluate the pumpability and recoverability of the free product in order to ascertain the viability of such an action as a potential remedy at the site.

6.3 Soil Quality Impacts

Laboratory analyses of soils at the site (Appendix G), including those that contain the residual petroleum products identified above, indicate that soils at the site have primarily been impacted by PAHs, BTEX constituents, and cyanide. Additionally, as discussed below, an area of slightly elevated arsenic concentrations appears to exist at one portion of the site.

6.3.1 Polynuclear Aromatic Hydrocarbons and BTEX Compounds

In total, 136 soil samples from 48 locations have been analyzed for PAHs, while 58 soil samples at 31 locations have been analyzed for BTEX constituents at the site. Detectable

concentrations of total PAHs in soil at Gasco were found to range from less than 0.5 ppm to a maximum concentration 58,822 ppm (B-29 location), while detectable total carcinogenic PAHs in soil were found to range from 0.03 ppm to a maximum concentration of 5,214 ppm (B-29 location). Total BTEX concentrations were found to range from 1.0 ppm to a maximum concentration of 891 ppm (B-18 location), with detectable benzene concentrations ranging from 0.72 ppm to a maximum of 360 ppm (B-18 location). Maximum PAH concentrations tend to be associated with product saturated soils (oil tar and tar) identified in the former Tar Pond portion of the site, while the most significant BTEX contamination tends to be present in both product saturated soils (oil tar and tar) and in soils that bear a petroleum hydrocarbon sheen.

As depicted on the data tables and posting maps provided within Appendix G, the vertical extent of BTEX and PAH contamination within soil at the site has been well defined at most soil boring locations. The most significant impacts are generally restricted to the Surficial Fill Unit, with the exception of the former Tar Pond and drainage ditch areas, where residual tar and oil tar have been found to extend into the silt unit, and in some cases, into the upper Alluvial Sand Unit. At virtually all locations, including the Alluvial Sand Unit, it was found that PAH concentrations declined dramatically just a short distance below zones of observable residual product.

6.3.2 Phenols

In total, 25 soil samples from 20 locations have been analyzed for phenols at the site. Only one soil sample analyzed for phenols resulted in the identification of a phenolic compound. Specifically, pentachlorophenol was identified at the boring B-18 location at a concentration of 0.36 parts per million (ppm), a concentration only slightly above detection limits. The overall lack of phenolic impacts to soil is not unexpected as significant concentrations of phenolic compounds are typically restricted to manufactured gas plant sites that used a coal gasification process, not an oil gasification facility such as Gasco (Gas Research Institute, 1996).

6.3.3 Cyanide

Research conducted at manufactured gas plant sites indicates that cyanides typically exist in complexed forms, with iron complexes dominating (Gas Research Institute, 1996). These cyanide complexes would have been generated during the process of removing sulfur from the product gas, as cyanide within the gas, if any, would also be removed during this process. As oxides were used to remove the sulfur from the gas, the cyanide complexes would be associated with the spent oxide wastes. The iron complexed cyanide (ferrocyanide) within the spent oxide at manufactured gas plant sites may be recognizable by blue staining.

It is of note that the Gas Research Institute (1996) indicates that the most significant quantities of cyanide would be present at coal gasification plant sites, with the least (trace) amounts of cyanide being present at oil gasification sites (e.g., Gasco).

The toxicity of cyanide complexes pertains to the dissociation of free cyanide from the complexed cyanide. The availability of free cyanide is measured by a determination of cyanide that is amenable to chlorination (i.e. amenable cyanide). At the Gasco site, total cyanide data are available for soils, while both total and amenable cyanide data are available for groundwater.

In total, 46 soil samples from 25 locations have been analyzed for cyanide at the site. Detectable concentrations of total cyanide in soil at the Gasco site have been found to range from 0.17 ppm at the B-23 boring location to a maximum of 518 ppm at the MW-9 boring location (a sample of fill material with blue staining). A map depicting available cyanide data for soil at the site is provided in Appendix G (Figure G-4).

The presence of cyanide within soils at numerous locations throughout the site is not unexpected since spent oxide materials were included as fill materials for the site. As the EPA Region 9 Preliminary Remediation Goal (PRG) for free cyanide in industrial soils is 13,628 ppm, and because the free cyanide concentration cannot exceed the total cyanide concentration, it does not appear that the identified cyanide concentrations in soil at the Gasco site pose a significant risk with regard to an Industrial Land Use scenario. The soil to groundwater pathway for cyanide may require additional evaluation should concentrations in groundwater be deemed to pose an unacceptable risk.

6.3.4 Metals

Metals analyses at the Gasco site have primarily been conducted in the area of the former Spent Oxide Storage Area (borings B-1, B-2, and B-3) as the presence of trace metals within the spent oxide materials is deemed likely (Gas Research Institute, 1996). As such, the metals antimony, arsenic, beryllium, cadmium, chromium, copper, lead, mercury, nickel, selenium, silver, thallium, and zinc were all analyzed in soil samples collected from the former Spent Oxide Storage area, with five samples being analyzed at this portion of the site. As a follow-up to the preceding, arsenic was analyzed for in soils collected from borings GT-1, GT-2, GT-3, GT-4, and MW-13, with a total of 19 samples being analyzed at these five locations.

With regard to above-identified metals analyses, with the exception of arsenic, sampling at the Gasco site has not identified the presence of metals at concentrations in excess of EPA Region 9 PRGs for industrial soils or DEQ Industrial Maximum Allowable Soil Concentrations. With regard to arsenic, soil samples collected in the area of the former Spent Oxide Storage area (borings B-1, B-2, and B-3) indicated elevated concentrations relative to samples collected from other portions of the PNO Lease Area, with concentrations ranging from 4.9 ppm to 21 ppm being identified. Arsenic concentrations from soil borings installed elsewhere at the site (GT-1 through GT-4, and MW-13) were all found to be less than 3 ppm, which is consistent with typical naturally-occurring background concentrations in the area. Some of the samples collected within these borings did exceed the 2.38 ppm EPA Region 9 PRG for arsenic.

6.3.5 Soil Quality Data Analysis

A detailed presentation and analysis of soil contamination data, prepared by Decision Management Associates LLC, entitled "Preliminary Analysis of Soil Contamination Data, Northwest Natural - Gasco Facility", provided in Appendix 1, includes:

- Evaluation of sampling strategy, duplicate results, and mixes of PAH compounds.
- 3-d scatter plots, histograms, and other plots to help visualize the spatial distribution of contaminants.
- Statistical evidence for and against breaking the site into areas based on surface location and on depth. Several area breakdowns are considered, and depths considered are "surface" (0-0.2 feet), "shallow" (0.2-15 feet), and "deep" (>15 feet).
- Analysis of how concentrations are related to soil odor, sheen, and the presence of residual product (oil tar and tar).
- Analysis of bias in sub surface sampling.
- Evaluation of data gaps and examples of how concentration probability distributions can be constructed from site data for risk analyses.

Conclusions of the above described data analysis are as follows:

- There is substantial small-scale variability superimposed on site-scale trends. The variability is consistent with placement of fill, mixing of soils, and preferential transport of contaminants.
- There appear to be significant differences in concentrations and variability by area and depth. For PAHs, site scale trends include increasing contamination towards the eastern corner of the site, and lower and less variable concentrations at the surface. For benzene, concentrations differ by area and appear consistent with a shallow source spreading down-gradient and deeper.
- The mix of PAHs differs between surface soil and subsurface soil. For surface soils the PAH mix is fairly uniform across the site, while subsurface PAHs show a diversity in mix.
- PAH concentrations are related to soil description (odor, sheen, presence of product). Benzene concentrations tend to be elevated when there is oil or sheen, but the relationship is weaker.
- Surface samples were placed randomly and may be used directly. Sub-surface samples were collected in part based on soil appearance, and are therefore biased. An analysis of the bias indicates that it: 1) increases representation of high-concentration PAH samples by approximately 25%, and 2) has no measurable impact on benzene values.
- Seventeen (17) new soil data samples are identified that would be helpful to improve the completeness and uniformity of samples at the surface and in shallow soil. In particular: 1) 10 approximate locations for the collection of additional surface samples

for PAH analyses have been identified, primarily within the PNO and office areas; and 2) 7 approximate locations for the collection of shallow soil samples for PAH and benzene analyses have been identified.

- Constructing concentration/probability distributions requires agreement in selection of approach and in implementation. Examples are provided for three methods (smoothing of empirical data, fitting and use of family of parametric distributions, and manual piece-wise construction of a distribution.). Other data needs may become apparent with construction of the 8 concentration/probability distributions that are needed for assessing risk.

6.4 Groundwater Impacts

Eight rounds of groundwater monitoring events have been conducted since the initiation of RI activities at the Gasco site. The groundwater monitoring network currently consists of 17 monitoring wells, of which, 12 are screened within the Surficial Fill WBZ (shallow zone), and 5 are screened within the intermediate-depth zone of the Alluvial Sand WBZ. Groundwater quality data collected at the Gasco site to date (Appendix H) indicates that groundwater within the Surficial Fill WBZ and the Alluvial Sand WBZ has primarily been impacted by PAHs, BTEX compounds, and cyanide. Additionally, areas of slightly elevated concentrations of metals have been identified at several monitoring well locations. No halogenated volatile organic compounds (HVOCs) have been identified in groundwater at the site, other than 2.2 ppb of tetrachloroethene detected at well MW-11-32 in March 1996. Only low concentrations of phenols have been detected in the groundwater at the site, generally being restricted to those well locations where groundwater is found to have the highest PAH concentrations. Finally, styrene was identified at a low concentration in groundwater within the Surficial Fill WBZ at the MW-12 location.

Reference levels utilized as a screening tool to evaluate the presence of contaminant concentrations in groundwater that would merit additional evaluation in a risk assessment, include the following:

- EPA Maximum Contaminant Levels (MCLs) established for drinking water
- EPA Region 9 Preliminary Remediation Goals (PRGs) established for tap water
- Ambient Water Quality Criteria (AWQC) established under the Federal Clean Water Act, and adopted by DEQ for the protection of aquatic life in surface water.

Although significant dilution will occur upon discharge to the Willamette River, the AWQC were included herein as a screen for identifying contaminants of concern within groundwater since contaminated groundwater at the site ultimately discharges to the river, where AWQC may be applicable. Once groundwater flux to the river is evaluated,

an appropriate dilution factor will be applied to the identified groundwater concentrations to ascertain which contaminants may actually represent constituents of concern at the site.

Understanding that the current and likely future beneficial uses of the Willamette River are recreational, aquatic habitat, and aesthetic, the specific AWQC utilized as a screen herein were as follows: 1) For protection of aquatic life - freshwater acute criteria and freshwater chronic criteria, and 2) for protection of human health - fish consumption criteria were used. In utilizing the AWQC as a screen for groundwater quality, the specific AWQC guidance value with the lowest concentration was utilized. To reemphasize, due to the dilution that occurs when groundwater discharges to the Willamette River, the use of AWQC for screening groundwater contaminant concentrations is very conservative.

6.4.1 Polynuclear Aromatic Hydrocarbons

Maps depicting contoured total PAH concentrations within the Surficial Fill WBZ, as well as in the Alluvial Sand WBZ, during June 1998 are provided in Appendix H (Figures H-2 and H-3).

As sampled in June 1998, the maximum concentration of total PAHs in groundwater at the site was 32,376 parts per billion (ppb), as identified in Surficial Fill WBZ well MW-11-32. Well MW-11-32 contains several feet of free product DNAPL, is located down-gradient of the former Light Oil Plant, and is immediately up-gradient of the former Tar Ponds. Surficial Fill WBZ wells MW-6-32 (down-gradient of the former Retort Area) and MW-10-25 (down-gradient of the former Light Oil Plant and Tar Processing area at the location of the former Naphthalene Plant), also contain DNAPL, with total PAH concentrations in groundwater of 2,245 ppb and 12,162 ppb, respectively, as identified during the June 1998 sampling event.

In addition to the preceding, total PAH concentrations of 12,407 ppb and 17,720 ppb were identified in Surficial Fill WBZ well MW-8-29 and Alluvial Sand WBZ well MW-8-56, respectively, a well pair that has been constructed within the area of the former Tar Ponds. Down-gradient of the former Tar Ponds, at locations adjacent to the Willamette River, total PAH concentrations were found to range from 44 ppb and 95 ppb in Surficial Fill WBZ wells MW-4-35 and MW-5-32, respectively, to 2,299 ppb in Alluvial Sand WBZ well MW-4-57.

Elsewhere at the Gasco site, total PAH concentrations in groundwater typically range from non-detect (wells MW-9-29 and MW-13-61) to less than 1,200 ppb (MW-13-29).

As indicated on the total PAH concentration map for the Surficial Fill WBZ (Figure H-2), it is apparent that the most significant PAH impacts (i.e., greater than 1,000 ppb) within this unit correlate extremely well with that portion of the site where the presence of residual oil tar or free-product DNAPL are found to occur (see Figures F1 and F2), with total PAH concentrations attenuating rapidly down-gradient of the zone of residual product, likely due to the low solubility and mobility of PAH compounds in water.

To better identify a transport mechanism for PAHs in groundwater at the Gasco site, as indicated in the data tables within Appendix H, analyses were conducted in March 1996 for the dissolved fraction (i.e., less than 0.45 micron) of PAHs at well locations MW-6-32 (a DNAPL-bearing well), and MW5-32 (down-gradient of the former Tar Ponds). The results of these dissolved analyses showed that concentrations of total PAHs in groundwater dropped to non-detect at the MW-6 location (from 2,346 ppb), while total PAH concentrations dropped significantly (from 269 ppb to 45 ppb), and total carcinogenic PAH concentrations dropped to non-detect (from 30 ppb) at the MW-5-32 location. The preceding provides evidence that the primary mechanism for PAH transport in groundwater at the site is likely via advection of contaminants that are adsorbed to colloidal material. It is possible that some PAHs in the groundwater samples are the result of mobilizing colloidal material during purging of the wells for sampling.

As indicated on the total PAH concentration map for the intermediate depth zone of the Alluvial Sand WBZ (Figure H-3), the greatest total PAH concentration (17,720 ppb at MW-8) was found to correspond to the area of the former Tar Ponds, the area of the site where residual oil and/or oil tar were identified at the greatest depths and extending into the upper portions of the Alluvial Sand WBZ. Down-gradient of the former Tar Ponds at the MW-4-57 well location, relatively elevated concentrations of PAHs (2,299 ppb) are found to persist, indicating either a greater mobility of the PAH plume within the Alluvial Sand WBZ than there is within the Surficial Fill WBZ, or that their may be oil and/or tar product present within the Alluvial Sand WBZ in the vicinity of the MW-4-57 well location (as was observed at the adjacent B-29 boring location).

Of additional note with regard to the PAH contamination within the Alluvial Sand WBZ, is that although oil tar was found to exist within the Surficial Fill WBZ at the MW-10 (former Naphthalene Plant/ Tar Processing area) and MW-6 (former Retort Area) well locations, with free product DNAPL being identified immediately above the silt unit at these locations, total PAHs in the Alluvial Sand WBZ beneath the silt unit were found to be either non-detect (MW-13-61) or to occur at very low concentrations (6.2 ppb at MW-10-61), with BTEX constituents at both locations found to be non-detect, indicating that the vertical extent of groundwater contamination within the Alluvial Sand WBZ appears to have been adequately defined in the central portion of the site.

To summarize the preceding discussion, existing data indicates that the PAH contaminant plume within the Surficial Fill WBZ is primarily restricted to the portion of the site where residual tar or oil tar contamination has been identified, and that PAH concentrations attenuate rapidly down-gradient of these areas.

With regard to the Alluvial Sand WBZ, it appears that the PAH groundwater contaminant plume is primarily restricted to the eastern portion of the site, within and down-gradient of the former Tar Ponds. Across the central and southern portion of the site the confining nature of the silt unit is such that it appears to prevent the downward migration of contamination into the underlying Alluvial Sand WBZ.

As the screening criteria for numerous of the PAH constituents in groundwater have been exceeded, it appears that further evaluation of these constituents with regard to flux and potential impact to the Willamette River will be necessary.

6.4.2 BTEX Compounds

Maps depicting contoured total BTEX concentrations within the Surficial Fill WBZ, as well as within the Alluvial Sand WBZ, during June 1998 are provided in Appendix H (Figures H-4 and H-5).

As depicted on Figure H-4, the maximum total BTEX concentration identified at the site during the June 1998 groundwater sampling event was 129,270 ppb in Surficial Fill WBZ well MW-10-25, a well containing several feet of free product DNAPL. A temporary well point (BW-19) installed in 1995 adjacent to the former Light Oil Plant at an up-gradient location relative to well MW-10-25 identified the presence of 151,600 ppb total BTEX in the Surficial Fill WBZ, while a temporary well point (BW-21), installed immediately up-gradient of the former Light Oil Plant identified only 6.4 ppb total BTEX constituents. Based on decreasing concentrations of BTEX down- and cross-gradient of the former Light Oil Plant, dramatically decreasing concentrations immediately up-gradient of the plant, it appears likely that the former Light Oil Plant is the source for the bulk of the BTEX groundwater contaminant plume at Gasco. Additionally, based on soil sampling results of product-saturated soils, it appears that the residual oil tar may be a secondary, and ongoing, source for the BTEX contamination present in groundwater.

Down-gradient of the former Light Oil Plant, concentrations of total BTEX within the Surficial Fill WBZ are found to attenuate, with maximum concentrations of less than 100 ppb total BTEX common at the down-gradient limit of the site, adjacent to the Willamette River. In fact, during the June 1998 sampling event, groundwater samples collected from all Surficial Fill WBZ monitoring wells located adjacent to the river resulted in non-detect for BTEX constituents. As observed with the PAH groundwater contamination, and as discussed below, it appears that the primary migration pathway for BTEX-contaminated groundwater to the Willamette River is via the Alluvial Sand WBZ.

As depicted on Figure H-5, the maximum total BTEX concentration identified within the Alluvial Sand WBZ during June 1998 was 26,610 ppb, as detected at well MW-8-56. As previously stated, well MW-8-56 is installed within the area of the former Tar Ponds, the portion of the site where residual tar and oil tar have been found to extend to the greatest depths, having been identified in soils within and below the silt unit in the upper portion of the Alluvial Sand WBZ.

As indicated by the non-detection of BTEX constituents within the Alluvial Sand WBZ at well locations MW-13-61 and MW-10-61, and the relatively lesser concentrations of total BTEX constituents at the MW-3-56 well location (630 ppb) relative to the MW-4-57 location (10,868 ppb), it appears that the BTEX plume is likely migrating downward into the Alluvial Sand WBZ in the vicinity of the former Tar Ponds. Such a pathway would be similar to that described with regard to the PAH impacts identified in groundwater at this

portion of the site, with the exception that the BTEX constituents would be expected to dissolve into groundwater from the residual product much more readily than the PAHs would, due to higher solubility limits.

The preceding indicates that the BTEX groundwater contaminant plume within the Surficial Fill WBZ is primarily restricted to the portion of the site where residual tar or oil tar contamination has been identified, and that BTEX concentrations attenuate rapidly down-gradient of these areas.

With regard to the Alluvial Sand WBZ, it appears that the BTEX contaminant plume is primarily restricted to the area of, and down-gradient of, the former Tar Ponds at the Gasco site.

As the screening criteria for each of the BTEX constituents in groundwater have been exceeded, it appears that further evaluation of these constituents with regard to flux into, and potential impact to, the Willamette River will be necessary.

6.4.3 Cyanide

In general, concentrations of total cyanide have been identified at all well locations (Surficial Fill WBZ and Alluvial Sand WBZ) at the site with the exception wells MW-10-61 and MW-12-36. Maximum detectable concentrations of total cyanide in groundwater at the Gasco site have been identified within the Surficial Fill WBZ at the former Spent Oxide Storage area (wells MW-1-22 and well point B-1) and in the area of the former Tar Ponds (MW-8-29). Specifically, a site-wide maximum cyanide concentration of 11 ppm has been identified at the former Spent Oxide area (MW-1), while a maximum of 4.9 ppm total cyanide has been identified at the former Tar Pond location (MW-8-29). Cyanide concentrations at most other well locations at the site are all relatively uniform, and are typically found to be less than 1 ppm.

The relatively uniform total cyanide concentrations across the site are not suggestive of any one particular source area, but rather appear to be the likely result of the presence of spent oxide within the fill unit across the site, with the cyanide potentially having been leached and transported vertically into the Alluvial Sand WBZ with the tar and oil tar.

Amenable cyanide data has been collected over the previous two groundwater sampling events (February and June 1998), with a maximum concentration of 0.045 ppm being identified at well MW-1-22, located at the former Spent Oxide Storage area.

As summarized in Section 6.2.3, the toxicity of cyanide is primarily associated with the available, or amenable, cyanide fraction. It is of note that amenable cyanide has not been identified in groundwater at any monitoring well location at concentrations in excess of the 0.730 ppm Region 9 EPA PRG for amenable cyanide in tap water. However, as the Fresh Chronic AWQC for cyanide in surface water is 0.0052 ppm, it appears that further evaluation of this constituent with regard to its flux and potential impact to the Willamette River will be necessary.

6.4.4 Metals

Arsenic, chromium, copper, lead, nickel, and zinc concentrations above the screening criteria have been identified in groundwater at the Gasco site. Arsenic, chromium, copper, lead, nickel and zinc have been found to occur at the site. No other of the Priority Pollutant metals have been identified in groundwater at the site at concentrations in excess of the screening criteria. It should be noted that some of the screening criteria are well below analytical method detection limits.

Arsenic has been identified at the Gasco site at concentrations in excess of the AWQC screening level of 0.000017 ppm and EPA PRG of 0.00004 ppm at numerous well locations, both within the Surficial Fill WBZ and within the Alluvial Sand WBZ. Dissolved arsenic data are not available for groundwater at the Gasco site other than one sample with the maximum total arsenic concentration identified in groundwater at the site (0.058 ppm within Surficial Fill WBZ well MW-10-25, as sampled in February 1997), where 0.052 ppm of dissolved arsenic was detected. This information suggests that most of the arsenic is in the dissolved state, at least at the MW-10 location.

With respect to chromium, concentrations of total chromium slightly elevated above the AWQC screening levels (0.011 ppm for hexavalent chromium and 0.210 ppm for trivalent chromium) have been identified at numerous well locations, with the greatest dissolved concentrations (0.23 ppm) being identified within the Surficial Fill WBZ at the well MW-10-25 location, the only location where dissolved concentrations have exceeded the MCL or PRG for this constituent.

Copper has been identified at the Gasco site at concentrations in excess of the AWQC screening level of 0.012 ppm at 6 well locations, both within the Surficial Fill WBZ and within the Alluvial Sand WBZ. Copper has not been identified in groundwater at any location in excess of MCLs or PRGs. Dissolved copper data are not available for groundwater at the Gasco site; however, the maximum total copper concentration identified in groundwater at the site was 0.41 ppm within Surficial Fill WBZ well MW-3-26, as sampled in October 1996.

Total lead has been identified within groundwater at 6 well locations at concentrations in excess of the screening criteria. It is noted that dissolved lead was not identified at concentrations above method detection limits at locations where filtered samples were collected, suggesting that the lead is sorbed onto soils and that transport, if any, would be limited to advection via colloidal particles. The maximum detected concentration of lead at the site was 0.099 ppm at well MW-3-26, as sampled in August 1997.

With respect to nickel, elevated concentrations of this constituent, relative to MCLs and AWQC have been identified at Surficial Fill WBZ wells MW-3-26 and MW-10-25, with maximum detected dissolved concentrations of 0.40 ppm and 0.53 ppm, respectively. Dissolved nickel concentrations in excess of screening values have not been identified at other well locations at the site.

Zinc has been identified at the Gasco site at concentrations in excess of the AWQC screening level of 0.110 ppm at numerous well locations, primarily within the Surficial Fill WBZ. Zinc has not been identified in groundwater at any location in excess of MCLs or PRGs. Dissolved zinc data are not available for groundwater at the Gasco site. The maximum total zinc concentration identified in groundwater at the site was 3.0 ppm within Surficial Fill WBZ well MW-10-25, as sampled in August 1997.

In summary, arsenic, chromium, copper, lead, nickel, and zinc concentrations elevated above the screening criteria have been identified in groundwater at the site. An evaluation of the identified metals with regard to flux into, and potential impact to, the Willamette River, will be conducted. Because metals are naturally occurring in the environment, an evaluation with respect to natural background water quality will be conducted, if metals issues remain at the site subsequent to the completion of the flux evaluation.

6.5 On-Site Surface Water and Sediment Impacts

On-site surface water and sediment sampling activities were conducted at the Gasco site on January 30, 1996. These activities involved the collection of surface water samples at two locations within the on-site drainage ditch, as well as within each of the three on-site ponds. Additionally, a shallow sediment sample was collected from each of the three on-site ponds. A figure depicting sample locations and tables summarizing the results of these activities have been included within Appendix I.

Results of the surface water sampling indicate PAH and BTEX compounds were present in the pond water and the water that was flowing within the drainage ditch. As the outfall from the on-site ponds to the drainage ditch has been sealed, the source of the water located within the ditch would have been one or more of the following: 1) stormwater runoff from the site; 2) LNG plant process cooling water; and 3) stormwater/groundwater removed by PNO from their tank farm containment basins. As there are no influents into the on-site ponds, and these ponds have been observed to only contain water during the rainy season, the water within these ponds would have been stormwater runoff.

With regard to the PAHs identified within the surface water samples, it is noted that PAH concentrations within all water samples were relatively uniform, with total concentrations ranging from 4.7 ppb to 23.7 ppb, while total PAH concentrations in sediments at the surface water sampling locations (ponds only) were found to range from 1,935 ppm to 21,665 ppm. Based on the large differential between PAH concentrations found in sediment and those found in surface water, and the relatively low concentrations identified in surface water, it appears that due to their relatively low aqueous solubilities and high partitioning coefficients, the PAHs will tend to remain within the sorbed phase in sediments and will not readily transfer to the dissolved phase in surface water. The identified sediment concentrations for PAHs exceed sediment screening levels provided within COE Draft Dredged Material Evaluation Framework, Lower Columbia River Management Area, April 1998.

Although benzene was not identified in any of the on-site sediment samples collected during the referenced investigatory activities, benzene was identified in surface water samples collected from the on-site ponds at concentrations ranging from 0.92 ppb to 3.1 ppb, while benzene was identified within the drainage ditch at concentrations of 110 ppb near the head of the ditch, and at 6.2 ppb near the outfall of the ditch. The benzene concentration identified near the outfall of the ditch does not exceed AWQC for protection of aquatic life or fish consumption.

6.6 Willamette River and Sediment Impacts

With regard to sediment-related investigatory activities conducted in the vicinity of the Gasco site, the following data are available: 1) data collected by Northwest Natural as part of 1996 RI activities; 2) data collected as part of the 1997 EPA Site Inspection of a six-mile reach of the Willamette River (Weston, 1998), 3) data collected as part of the 1997 COE dredging material evaluation program (COE, 1998), and 4) data collected as part of COE sediment evaluations conducted at the U.S. Moorings Station, located immediately down-river of the Gasco site (Britton, 1990; Siipola and Britton 1994). All data point locations within the vicinity of the Gasco site (River Mile 6.0 to 7.0) are provided on Figures J-1 and J-2. It is noted that due to the close spacing of samples collected at the U.S. Moorings Station, it was not possible to depict these locations on the referenced figure. Instead, Figure J-3 provides a COE map that depicts the U.S. Moorings sediment sampling locations.

Figure J-4 provides a bar chart depicting total PAH concentrations for sediment data (Northwest Natural, EPA, and 1998 COE data), posted in relative sampling order from up-stream to down-stream across the Gasco site. Again, due to the large number of sampling points over a relatively small area, the COE U.S. Moorings data was not included on the referenced chart. A summary of sediment data collected by Northwest Natural is provided in Table J-1. A summary of all available sediment PAH data for river miles 6.0 to 7.0 (Northwest Natural, EPA, and all COE data) is provided in Table J-2. Sediment core logs depicting lithologic and contaminant conditions at borings installed as part of Northwest Natural's RI program are provided within Appendix C.

Sediment boring logs indicate that solid to semi-solid tar is present within the river sediments at locations adjacent to the former Tar Pond and former drainage ditch discharge areas, with field evidence (i.e., sheen and/or odor) of petroleum hydrocarbon impacts at other sampling locations adjacent to the site. Tar was found to be present within sediments both at the riverbed surface (SD-7) and extending to depths of at least 8 feet below the riverbed surface (SD-8). It is suspected that this tar is depositional in nature, that is, it was deposited as discharges from the Gasco site during manufactured gas plant operations, as opposed to migrating to the sediments via the subsurface soils.

In general, total PAH concentrations in surface sediments between river mile 6.0 and 7.0 were found to be the greatest at locations adjacent to the central portion of the Gasco site near the discharge point of the former drainage ditch, with impacts found to extend towards the center of the river at least as far as the main shipping channel (approximately 750 feet

from the shoreline), as observed at the WR-BC-22 sampling location. Specifically, total PAH concentrations in surface sediments adjacent to the Gasco site were found to range from 85 ppm at the SD-063 location, to 26,408 ppm at the SD-7 location (corresponding to a zone of tarry gravel), with a concentration of 1,418 ppm being identified at the WR-BC-22 location in the main shipping channel. Total PAH concentrations in sediments collected from depths of less than 6.5 feet at the U.S. Moorings Station, located immediately down-river of the Gasco site, were found to range from 89 to 142 ppm in 1989 (Britton, 1990), while total PAH concentrations in surface sediments were found to range from 8 to 59 ppm in 1994 (Siipola and Britton, 1994).

As depicted on Figure J-4, total PAH concentrations in sediment samples collected at upstream and downstream locations show a marked decline relative to those collected adjacent to the Gasco site. Also, sediment samples collected on the opposite side of the river from the Gasco site did not result in the identification of significant PAH impacts.

Vertically, as identified at the SD-8 boring location, elevated PAH concentrations were found to extend at least to 9 feet below the river bed surface, with tar being found at that location to a depth of 8 feet bgs.

With regard to the presence of tar within the river sediments adjacent to the Gasco site, it is known that discharges of waste waters to the river from manufactured gas plant operations and the Tar Ponds occurred via the former drainage feature during the operation of the manufactured gas plant at the site, and that such discharges may account for the presence of these tars. The tar identified in soil borings installed adjacent to the river (B-29, B-31) would not be expected to migrate to the river sediments due to the overall high viscosity/low mobility of this material.

As identified during monthly shoreline inspections conducted at the Gasco facility, an area of hardened tar balls, some with a viscous center, exists along the Gasco shoreline at a location downstream from the former drainage ditch. The zone of tar ball accumulation has been found to dissipate before the downstream property line is reached. The presence of these tar balls is indicative that tar is present within the river sediments, but that the tar, in hardened form, has not been significantly transported down-stream by river current.

With regard to oil tar, it is noted that a description matching that of oil tar was provided for shallow river sediments (upper 17 inches) at a location adjacent to the former Tar Ponds in sediment sample SD-067, collected as part of the EPA Portland Harbor Sediment Study Investigation (EPA, 1998). It is unclear whether the oil tar at this location is present as a result of former surface discharges to the river, is a result of separation from the tar known to be present within the river, or is actively being sourced from the upland portion of the Gasco site.

With regard to the ongoing upland source potential, sufficient data to resolve this issue with respect to the former Tar Pond area should exist once the proposed deep Alluvial Sand WBZ wells to be installed between the former Tar Ponds and the river are constructed (HAI, 1998a). Also, additional evaluation with regard to the oil tars identified at the B-29 boring location, within the former low-lying area adjacent to the former drainage ditch, appears necessary in order to completely evaluate the potential for an ongoing upland

source of oil tar into the river. Finally, it is noted that additional evaluation with regard to the extent, transport, and toxicity of impacted sediments adjacent to the Gasco site is necessary.

With regard to site impacts to surface water in the Willamette River, although surface water samples have not been collected from the river, it will be possible to ascertain potential impacts to the river from the site by evaluating the predicted flux of contaminated groundwater to the adjacent river, as well as by direct analysis of the river water and sediment porewater. An evaluation of flux to the river will be conducted subsequent to the installation of the proposed deep Alluvial Sand WBZ wells at this portion of the site (HAI, 1998a), which will provide necessary information regarding the vertical extent of groundwater impacts.

6.7 Air Impacts

Sampling for airborne contaminants at the Gasco site has been conducted for chemical exposure monitoring during implementation of the early stages of RI investigatory activities, as well as for ambient air quality monitoring. The objective of the chemical exposure monitoring was to ensure an adequate level of respiratory protection during the investigatory activities. The objective of the ambient air monitoring was to provide a general assessment of ambient air quality at a location downwind from the LNG containment basin, the Koppers lease area, and the former Tar Pond area. All monitoring activities were conducted by Paul Carlson Associates, Inc. (PCA), a firm specializing in industrial hygiene issues and air monitoring.

With regard to the chemical exposure monitoring, representative breathing zone concentrations of PAHs, BTEX, metals, cyanide, and total particulate were measured during soil boring installation activities carried out at the Former Light Oil Plant (borings B-18 and B-19), the Former Koppers Land Treatment Area (B-27), and the Former Spent Oxide Storage Area (B-1, B-2, and B-3). Results of the monitoring indicated the presence of PAHs, BTEX, and the metal titanium in certain of the air samples, with no other metals or cyanide being identified in the air samples. Concentrations of the identified constituents all fell below the Oregon Occupational Safety & Health Administration (OR-OSHA) Permissible Exposure Limits (PELs), designed to ensure the health of employees. The air monitoring data, and the summary report prepared by PCA, is included within Appendix K. Figure K-1 depicts the location of the air monitoring station.

With regard to the ambient air monitoring, this monitoring was conducted with a pump sampler over a period of approximately 6 hours on February 27, 1996 at the downwind (north) side of the LNG containment basin. The air sample was analyzed for the presence of particulates, PAHs, and BTEX constituents. Results of the monitoring event indicated that particulates (i.e., dust), PAHs, and BTEX constituents were all non-detect during the period of the referenced event. The air monitoring data and the summary report prepared by PCA are included within Appendix K.

In addition to the above described air monitoring activities, two samples of accumulated dust were collected from the site (Figure K-1). Specifically, one dust sample was collected from within the fire hose containment box located within the Northwest Natural LNG process area (near well MW-9), and one dust sample was collected from within the fire hose box located directly adjacent to the vehicle exit doorway to the Koppers pencil pitch warehouse. The doors on both fire hose boxes had been ajar, allowing dust to accumulate on the shelving within. The timing of the dust accumulation (i.e., deposition caused by certain climatic conditions and / or site operations) is unknown.

Based on the proximity to the pencil pitch warehouse, the presence of pencil pitch on the ground in the vicinity of the fire hose box, and the black nature of the dust sample, it appeared that the dust sample collected adjacent to the Koppers pencil pitch warehouse was very likely pencil pitch dust derived from the Koppers warehouse operations. The dust sample collected in the Northwest Natural LNG process area did not have the appearance of pencil pitch. Both dust samples were analyzed for PAHs.

Results of the dust sample analyses indicate the presence of 381 ppm total PAHs within the dust sample collected from the LNG process area fire hose box, while 26,919 ppm total PAHs were identified within the sample of pencil pitch dust collected adjacent to the Koppers pencil pitch storage warehouse. A comparison of individual PAH fractions to the total PAH concentration was conducted for both of the dust samples. The comparison indicates a very close match exists between the ratio of individual PAHs to the total PAHs between the two samples, suggesting a common source. In this case, the source appears to be the Koppers pencil pitch storage warehouse. Laboratory sheets for the two dust samples, as well as a chart comparing the PAH ratios between the two samples, are provided within Appendix K, with additional discussion of PAH mixes provided within Appendix 1 (Decision Management Associates Report).

6.8 Contaminants of Concern

6.8.1 Soil

As summarized on the data tables provided in Appendix G, based on investigatory activities conducted at the site to date, PAHs, benzene, toluene, ethylbenzene, and arsenic have been detected in soils at the site at concentrations exceeding screening criteria. Specifically, PAHs and BTEX concentrations have been found to exceed DEQ Cleanup Levels as identified in the ODEQ Soil Cleanup Table (OAR 340-122-045) and/or Region IX PRGs, while arsenic concentrations exceed DEQ Industrial Maximum Allowable Soil Concentrations (OAR 340-122-045).

Pentachlorophenol, cyanide, and the metals antimony, cadmium, chromium, copper, lead, nickel, thallium, and zinc have all been identified in soil samples collected at the site, but none of these constituents were identified at concentrations exceeding EPA Region 9 PRGs, DEQ Soil Cleanup Levels, and/or DEQ Industrial Maximum Allowable Soil Concentrations, where established.

With regard to amenable cyanide, because the amenable cyanide concentration cannot exceed the total cyanide concentration, and because the maximum identified total cyanide concentration in soil (518 ppm) is well below the 13,628 ppm EPA Region 9 PRG for amenable cyanide, it does not appear that amenable cyanide is a concern with respect to soil quality at the site. However, the soil leaching to groundwater pathway may need further evaluation for cyanide.

Based on the results of the RI activities conducted at the Gasco site to date, the contaminants of concern with respect to soil impacts at the site appear to be limited to the following:

- PAHs
- Volatile aromatic hydrocarbons (benzene, toluene, ethylbenzene)
- Arsenic
- Cyanide

6.8.2 Groundwater

As summarized on the data tables provided in Appendix H, with respect to groundwater quality, PAHs, BTEX compounds, 2,4-dimethylphenol, total cresols (2-, 3-, and 4-methylphenol), styrene, tetrachloroethene, arsenic, chromium, copper, lead, nickel, zinc, and cyanide, have all been detected at concentrations exceeding one or more of the following screening criteria: EPA MCLs established for drinking water, EPA Region 9 PRGs for tap water, and/or the federal AWQC established under the Clean Water Act for the protection of aquatic life and human health. The AWQC were included herein as a screen for identifying contaminants of concern within groundwater since contaminated groundwater at the site does discharge to the Willamette River, where the AWQC may be applicable.

With regard to 2,4-dimethylphenol and total cresols, it is noted that these constituents have been identified at concentrations in excess of the screening criteria at two well locations (i.e., wells MW-10-25 and MW-11-32), both of which are DNAPL-containing wells. Concentrations of these constituents have not been identified above the screening criteria at down-gradient well MW-4-57, the most highly contaminated well located adjacent to the river. As such, it does not appear that these constituents are mobile within the subsurface. Based on the preceding, and assuming that the use of groundwater at the site for a drinking water source would not be a potential beneficial use, then it does not appear that a receptor would exist for the phenol impacted groundwater, and as such, 2-4-dimethylphenol and total cresols do not appear to pose a concern with regard to groundwater quality at the site. All other phenols were identified at concentrations below the referenced screening criteria.

With regard to styrene, this constituent has been identified at the MW-12-36 well location at a maximum concentration of 170 ppb, with styrene having never been identified at

locations down-gradient from well MW-12 (i.e., wells MW-4-56, MW-5-32, MW-8-56, or MW-11-32). The drinking water MCL for styrene is 100 ppb, while the tap water PRG for this constituent is 1,641 ppb. No AWQC for this constituent has been developed. The lack of styrene detections down-gradient of well MW-12 indicates that this constituent does not appear to be migrating towards the river. Based on the preceding, and assuming that the use of groundwater at the site for a drinking water source would not be a potential beneficial use, then it does not appear that a receptor would exist for the styrene impacted groundwater, and as such, styrene does not appear to pose a concern with regard to groundwater quality at the site.

With regard to tetrachloroethene (PCE), this constituent was identified at the MW-11-32 well location in March 1996 at an estimated concentration of 2.2 ppb, below the 5 ppb MCL and 9 ppb AWQC screening values, but slightly above the 1.08 PRG for this constituent. Due to the low concentration identified, the lack of subsequent detections at the MW-11 location, as well as a lack of detection at the up-gradient and down-gradient well locations, it does not appear that PCE poses a concern with regard to groundwater quality at the Gasco site.

Based on the results of the RI activities conducted at the Gasco site to date, the contaminants of concern with respect to groundwater impacts at the site appear to be limited to the following:

- PAHs
- Volatile aromatic hydrocarbons (benzene, toluene, ethylbenzene, and xylenes)
- Cyanide
- Arsenic
- Chromium
- Copper
- Lead
- Nickel
- Zinc

7. CONCLUSIONS

The purpose of the data presentation and evaluation presented herein has been to provide a summary and analysis of existing data collected as part of Phase I RI activities at the Gasco site to assist in the understanding of the site, and to guide decisions regarding additional data acquisition. The conclusions presented below are based on the analysis of data presented herein.

7.1 Hydrogeological Conditions

- Groundwater occurs in three principal hydrologic zones at the site including the unconfined Surficial Fill WBZ, the semi-confined Alluvial Sand WBZ, and confined bedrock aquifers in the Columbia River Basalts.

- A silt unit, correlating to the depth of pre-fill ground surface elevations, separates the Surficial Fill WBZ from the Alluvial Sand WBZ across a majority of the site. A northwest-southeast trending depression in the surface of the silt unit exists across the center of the site, correlating with the location of a pre-fill creek bed.

- Groundwater within the Surficial Fill WBZ and the Alluvial Sand WBZ appears to be hydraulically connected to the Willamette River, with groundwater flow beneath the site being to the northeast towards, and discharging to, the river.

- A downward vertical hydraulic gradient between the Surficial Fill and the Alluvial Sand WBZ predominates, with reversals being identified at certain locations during times of high river stage.

9 Depth to bedrock across the site is estimated to range from 36 feet bgs at the southwestern portion of the site near NW. St. Helens Road, to more than 250 feet bgs at the southeastern portion of the site adjacent to the Willamette River.

7.2 Nature, Extent, and Transport of Contamination

Soil, sediment, and groundwater contamination has been found to be associated with the presence of residual manufactured gas plant wastes at the property, primarily tar and oil tar (PAHs and BTEX), and spent oxide materials (metals and cyanide).

7.2.1 Residual Tar, Oil Tar, and DNAPL

- Tar has been found to be primarily restricted to the southeastern portion of the site at the former Tar Pond area and the location of a former drainage feature, areas where tar-bearing wastes were discharged and/or mixed with fill.

- Residual oil tar has been identified throughout the southern, southeastern and west-central portions of the site, likely sourced from the former Light Oil Plant, former Retort area, former Tar Ponds, and a former drainage feature.

- The silt unit has likely prevented oil tar impacts derived from the Light Oil Plant/Retort Area from migrating vertically into the underlying Alluvial Sand WBZ, with oil tar having migrated from these areas via gravity along the surface of the northeast sloping silt unit. The northwest - southeast trending depression in the surface of the silt unit has acted as a barrier to the lateral migration of the mobile oil tar product to the northeast and towards the Willamette River.

- Oil tar has been found to extend through the silt unit and into the upper portions of the Alluvial Sand WBZ at several locations within the southeastern portion of the site (former Tar Ponds), correlating to areas with the greatest accumulations of tar.

- Oil tar was found within the Alluvial Sand WBZ within the former drainage feature, the only location where oil tar is found adjacent to the Willamette River.

- Soil boring data indicates that the lateral and vertical extent of tar and oil tar have been generally defined across the site. Laterally, tar and oil tar may likely extend across the southeastern property boundary, where placement of these materials as fill may have occurred.

- Three areas of free product DNAPL (oil tar) have been identified within the Surficial Fill WBZ at the site. Two areas of DNAPL occurrence are located on top of the silt at areas where the silt surface is depressed. The third is located up-slope of the depression, but down-slope of the identified oil tar source area.

7.2.2 Soil Quality Impacts

10 Based on the evaluation conducted to date, constituents of concern with regard to soils at the site are PAHs, benzene, toluene, ethylbenzene, and arsenic.

- BTEX and PAH concentrations above EPA Region 9 PRGs are found in the zones of tar and oil tar contamination.

- The vertical extent of BTEX and PAH contamination within soil has been well defined at most soil boring locations, with the most significant impacts being restricted to the surficial fill unit, except in the former Tar Pond area, where contaminants have extended into the alluvial sand unit.

- Cyanide was identified in soils throughout the site, likely as the result of spent oxide materials within fill materials. The maximum total cyanide detection in soil was 518 ppm, well below the 13,628 ppm EPA Region 9 PRG for free cyanide in industrial soils. However, cyanide in soil may be an issue at the site with regard to leaching to

groundwater, should it be determined that an unsatisfactory risk with regard to groundwater concentrations exists.

- Elevated concentrations of arsenic, relative to screening levels and to soils from other portions of the site, were identified within the former Spent Oxide Storage Area.

Statistical evaluation of the data, as conducted by Decision Management Associates LLC developed the following conclusions with respect to soil quality at the site:

- Data visualization and analysis show substantial small-scale variability superimposed on site-scale trends, with the variability consistent with fill placement, mixing, and preferential transport of contaminants.

- The primary site-scale trend for PAHs is for greater contamination towards the southeastern corner of the site.

- Significant differences in concentrations and variability exist by area and depth.

- PAH concentrations are related to field evidence of contamination (odor, sheen, presence of product), with a lesser relationship being identified with benzene.

- For Risk Assessment purposes, since surface samples were collected randomly this data may be used directly, while sub-surface samples were collected in part based on soil appearance, and are therefore biased. However, the bias in the sampling was found to: 1) increase representation of high-concentration PAH samples by about 25%, and 2) has no measurable impact on benzene values.

7.2.3 Groundwater Impacts

- Groundwater contamination, primarily PAH, BTEX, and cyanide related, has been identified within both the Surficial Fill WBZ and the Alluvial Sand WBZ.

- The former Light Oil Plant is the likely source for the bulk of the BTEX groundwater contaminant plume at Gasco, with the residual oil tar at the site being a secondary, and ongoing, source for the BTEX contamination present in groundwater.

- Oil tar and tar-saturated soils appear to be the source of the PAH impacts to groundwater at the site.

- With regard to the Surficial Fill WBZ, both the BTEX and PAH groundwater contaminant plumes tend to be primarily restricted to the portion of the site where residual tar or oil tar contamination has been identified, with concentrations attenuating rapidly down-gradient of these areas. However, the vertical extent of BTEX and PAH groundwater contamination down-gradient of the former Tar Ponds has not been defined.

- With regard to the Alluvial Sand WBZ, it has been found that the BTEX and PAH contaminant plume is primarily restricted to the eastern portion of the site, within and down-gradient of the former Tar Ponds.

- Areas of metals concentrations elevated above screening criteria have been identified in groundwater at the site. Specifically, arsenic, chromium, copper, lead, nickel and zinc have been found at concentrations above AWQC, a potential concern because of discharge to the Willamette River.

7.2.4 On-Site Surface Water Impacts

- Results of surface water sampling of the on-site pond water and within the water that was flowing within the on-site drainage ditch indicates that only benzene, at the head of the ditch, was found to exceed screening criteria (AWQC). The benzene concentration identified near the outfall of the ditch does not exceed AWQC for protection of aquatic life or fish consumption.

7.2.5 Sediment Impacts

- Sampling activities identified the presence of solid to semi-solid tar within Willamette River sediments at locations adjacent to the former Tar Pond and former drainage ditch discharge areas, with field evidence of petroleum hydrocarbon impacts at other sampling locations adjacent to the site. Tar was found to be present within sediments at the riverbed surface, extending to depths of at least 8 feet below the riverbed surface at one location.

- It is suspected that the tar identified in the sediments adjacent to the Gasco site is depositional in nature, having been deposited as discharges from the Gasco site during manufactured gas plant operations.

- An area of hardened tar balls exists along the Gasco shoreline at a location downstream from the former drainage ditch. The zone of tar ball accumulation has been found to dissipate before the downstream property line is reached. The presence of these tar balls is indicative that tar is present within the river sediments, but that the tar, in hardened form, has not been significantly transported down-stream by river current.

- Total PAH concentrations in surface sediments in the vicinity of Gasco were found to be the greatest at locations adjacent to the central portion of the site near the discharge point of the former drainage ditch, with impacts found to extend towards the center of the river at least as far as the main shipping channel (approximately 750 feet from the shoreline).

- Total PAH concentrations in surface sediments adjacent to the Gasco site were found to range from 85 ppm to 26,408 ppm (corresponding to a zone of tarry gravel), with a

concentration of 1,418 ppm being identified within the main shipping channel. Total PAH concentrations in sediment samples collected at upstream and downstream locations show a marked decline relative to those collected adjacent to the Gasco site.

- PAHs were identified within sediment samples collected from the three on-site ponds located at the southeastern portion of the site, with concentrations ranging from 1,935 ppm too 21,665 ppm being identified.

7.2.6 Air Quality

- Breathing zone monitoring conducted during drilling activities at the site indicated the presence of PAHs, BTEX, and the metal titanium in certain of the air samples. Concentrations of the identified constituents all fell below limits designed to ensure the health of employees.

- Ambient air monitoring conducted downwind of the LNG containment basin indicated that PAHs and BTEX constituents were all non-detect during the period of the referenced event.

- Analysis and evaluation two dust samples at the site indicate that Koppers pencil pitch may be a contributing factor with regard to PAHs identified in surface soils at the site.

7.3 Existing Data Needs

Based on the findings of RI activities conducted at the site to date, as evaluated herein, the following data needs have been identified such that the objectives of the RI may be satisfied:

7.3.1 Risk Assessment Data Needs

- Statistical data evaluation indicates a need for the collection of ten additional surface soil samples at the site, primarily within the northwest (former office area), and northeast (PNO lease area) portions of the site.

- Statistical data evaluation indicates a need for the collection of seven shallow (<15 feet) soil samples at the site.

7.3.2 Contaminant Nature, Extent and Transport Data Needs

- The vertical extent of groundwater contamination at the site is not defined. The installation of three deep (up to 160 feet bgs) Alluvial Sand WBZ wells, two down-gradient of the former Tar Ponds, and one down-gradient of the former Light Oil Plant area, have been proposed to satisfy this data need (HAI, 1998a).

- Verification should be obtained that the vertical extent of DNAPL (oil tar) migration has been adequately defined at the site. The installation of the referenced deep Alluvial Sand WBZ wells to be installed down-gradient of the former Tar Ponds, and the deep well to be installed down-gradient of the former Light Oil Plant have been proposed to satisfy this data need (HAI, 1998a).

- Conclusions with regard to the active migration of DNAPL to the Willamette River within the area of the former Tar Ponds and the former drainage feature (B-29 boring) are necessary. The two deep Alluvial Sand WBZ wells to be installed down-gradient of the former Tar Ponds will satisfy this data need with respect to former Tar Pond portion of the site. Additional evaluation appears necessary to satisfy the data need with respect to the B-29/former drainage feature area.

- The lateral extent of on-site groundwater contamination should be defined. The installation of an intermediate-depth (65 feet bgs) monitoring well to be installed within the PNO area at the northeastern portion of the site, and depth-discrete groundwater data to be collected from temporary well points installed at the eastern corner of the site (MW-5 location) will satisfy this data need (HAI, 1998a).

- The on-site lateral extent of residual tar and oil tar in soil should be defined to the northeast of the LNG containment basin.

- An evaluation of the physical and chemical make-up of the free product DNAPL (oil tar) should be conducted to assist in the feasibility study and to assess contaminant transport issues. Additionally, the recoverability of DNAPL from wells at the site should be evaluated. Activities necessary to satisfy these data needs have been proposed (HAI, 1998b).

- Additional evaluation with regard to the extent of contamination in Willamette River sediments is necessary. Such an evaluation may include toxicological studies, porewater and sediment sampling activities, as well as an evaluation of river dynamics with regard to contaminant transport.

- An evaluation of contaminated groundwater flux to the Willamette River should be conducted following the completion of groundwater quality-related data gaps described herein.

8. LIMITATIONS

The samples discussed in this report were collected, analyzed, and interpreted following the standards of care, skill, and diligence ordinarily provided by a professional in the performance of similar services as of the time the services were performed. This report and the conclusions and/or recommendations contained in it are based solely upon physical sampling and analytical activities that were conducted at the Client's request. The data presented in this report document only the concentrations of the target analytes in the particular sample and not the property as a whole.

(HAI 10/95)

9. REFERENCES

Britton, J. (1990). Results of 1989 U.S. Moorings Sediment Quality Evaluation, Prepared by the US Army Corps of Engineers, Portland District, Portland, Oregon.

Camp Dresser & McKee, Inc. (1987). North Doane's Lake Site Characterization Work Plan.

Cameron, K. (1995). Oregon Department of Environmental Quality, Rhone Poulenc/Gould Battery Internal Memorandum, December 15, 1995.

COE (1991). Portland-Vancouver Harbor Information Package, US Army Corps of Engineers, Portland District, Portland, Oregon.

COE (1998). Columbia River Channel Deepening Sediment Quality Evaluation. Presented by the US Army Corps of Engineers at the Environmental Roundtable, Portland, Oregon.

Gas Research Institute (1996). Management of Manufactured Gas Plant Sites, T. Hayes, D. Linz, D. Nakles, A. Leuschner, Editors, Amherst Scientific Publishers, Amherst, Massachusetts.

Geraghty & Miller, Inc. (1991). Hydrogeological Investigation of the Doane Lake Area, Portland, Oregon, Prepared by Geraghty & Miller, Inc., Bellevue, Washington for The Industrial Group, Portland, Oregon.

HAI (1995). Final Remedial Investigation/Feasibility Study Work Plan, Northwest Natural Gas Company Gasco Facility, Portland, Oregon, Prepared by Hahn and Associates, Inc. for Northwest Natural, Portland, Oregon.

HAI (1996). Data Package for Remedial Investigation/Feasibility Study, Northwest Natural Gas Company Gasco Facility, Portland, Oregon, Prepared by Hahn and Associates, Inc. for Northwest Natural, Portland, Oregon.

HAI (1998a). Addendum No. 1 to Final Remedial Investigation Work Plan, Northwest Natural – Gasco Facility, Portland, Oregon, Prepared by Hahn and Associates, Inc. for Northwest Natural, Portland, Oregon.

HAI (1998b). Work Plan for Product Recovery Pilot-Scale Testing and Alternatives Analysis, Northwest Natural – Gasco Facility, Portland, Oregon, Prepared by Hahn and Associates, Inc. for Northwest Natural, Portland, Oregon.

Huling, S. and Weaver, J. (1991). Dense Nonaqueous Phase Liquids, Groundwater Issue Paper, U.S. Environmental Protection Agency Groundwater Issue Paper EPA/540/4-91-002, Ada, Oklahoma.

Siipola M., and Britton, J. (1994). Results of U.S. Moorings Sediment Study, Prepared by the US Army Corps of Engineers, Portland District, Portland, Oregon.

Stoel Rives LLP (1997). Current and Reasonably Anticipated Future Land and Beneficial Water Uses in the Locality of the Facility, Prepared for Northwest Natural, Portland, Oregon

Weston. (1998). Portland Harbor Sediment Investigation Report, Multnomah County, Oregon. Prepared by Weston, Seattle Washington for EPA Region X, Seattle, Washington.

10. GLOSSARY OF ABBREVIATIONS

AWQC	Ambient Water Quality Criteria
bgs	below ground surface
BTEX	benzene, toluene, ethylbenzene, and xylenes
DEQ	Oregon Department of Environmental Quality
DNAPL	dense non-aqueous phase liquid
EM	electromagnetic
EPA	U.S. Environmental Protection Agency
gpm	gallon per minute
GPR	ground penetrating radar
HAI	Hahn and Associates, Inc.
HVOCs	halogenated volatile organic compounds
LNG	liquefied natural gas
MCL	Maximum Contaminant Level
msl	mean sea level
OAR	Oregon Administrative Rule
OR-OSHA	Oregon Occupational Safety and Health Agency
PAHs	polynuclear aromatic hydrocarbons
PCA	Paul Carlson Associates, Inc.
PEL	permissible exposure level
PNO	Pacific Northern Oil
ppb	parts per billion
ppm	parts per million
PRGs	Preliminary Remediation Goals
ppb	parts per billion
RI	remedial investigation
SI	Site Inspection
WBZ	water-bearing zone

Any questions regarding the information presented in this report are welcome and should be referred to the undersigned. Thank you for the opportunity to be of service to Northwest Natural in this manner.

Hahn and Associates, Inc.

Prepared by:

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Sr. Project Manager

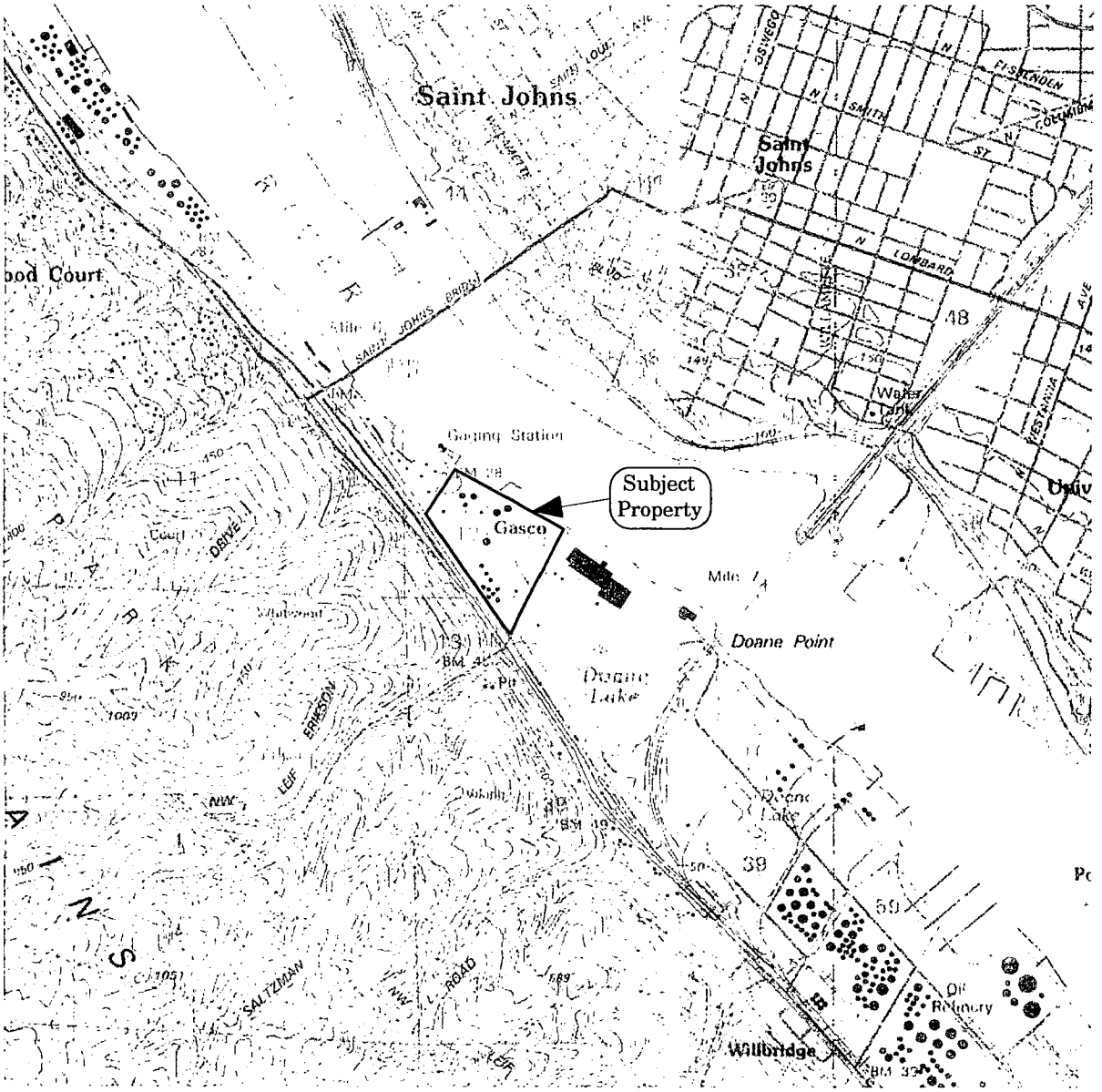
Reviewed by:

Roger E. Brown, R.G.
Principal

Date 10/9/98

FIGURES

Koppers000625



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Scale in Feet
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Note: Base Map from Linnton (1990) and Portland (1990), Oregon, USGS 7.5 Minute Quadrangles

Project No. 2708	**HAHN AND ASSOCIATES** INCORPORATE	**LOCATION MAP**	**FIGURE**
September 1998	ENVIRONMENTAL MANAGEMENT 434 NW SIXTH AVENUE, SUITE 203 PORTLAND, OREGON 97209 (503) 796-0717	Northwest Natural Gasco Facility 7900 NW St. Helens Road Portland, Oregon	1

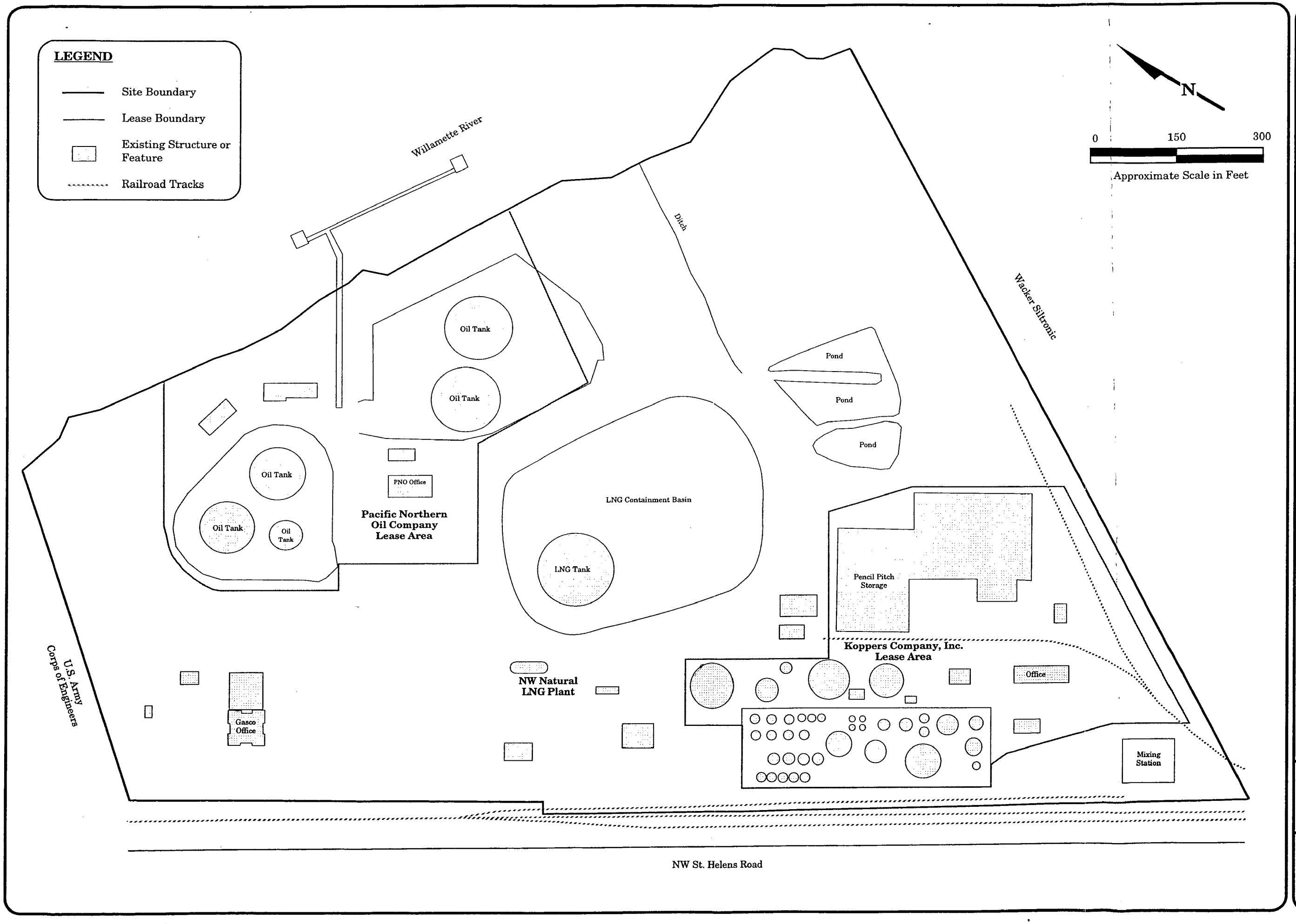

Figure 2

Site Map

Remedial Investigation
Northwest Natural – Gasco Facility
7900 NW St. Helens Road
Portland, Oregon

HAHN & ASSOCIATES
INCORPORATED
ENVIRONMENTAL MANAGEMENT
434 NW SIXTH AVENUE, SUITE 203
PORTLAND, OREGON 97209
503/796-0717

September 1998

Project No. 2708

Koppers000627

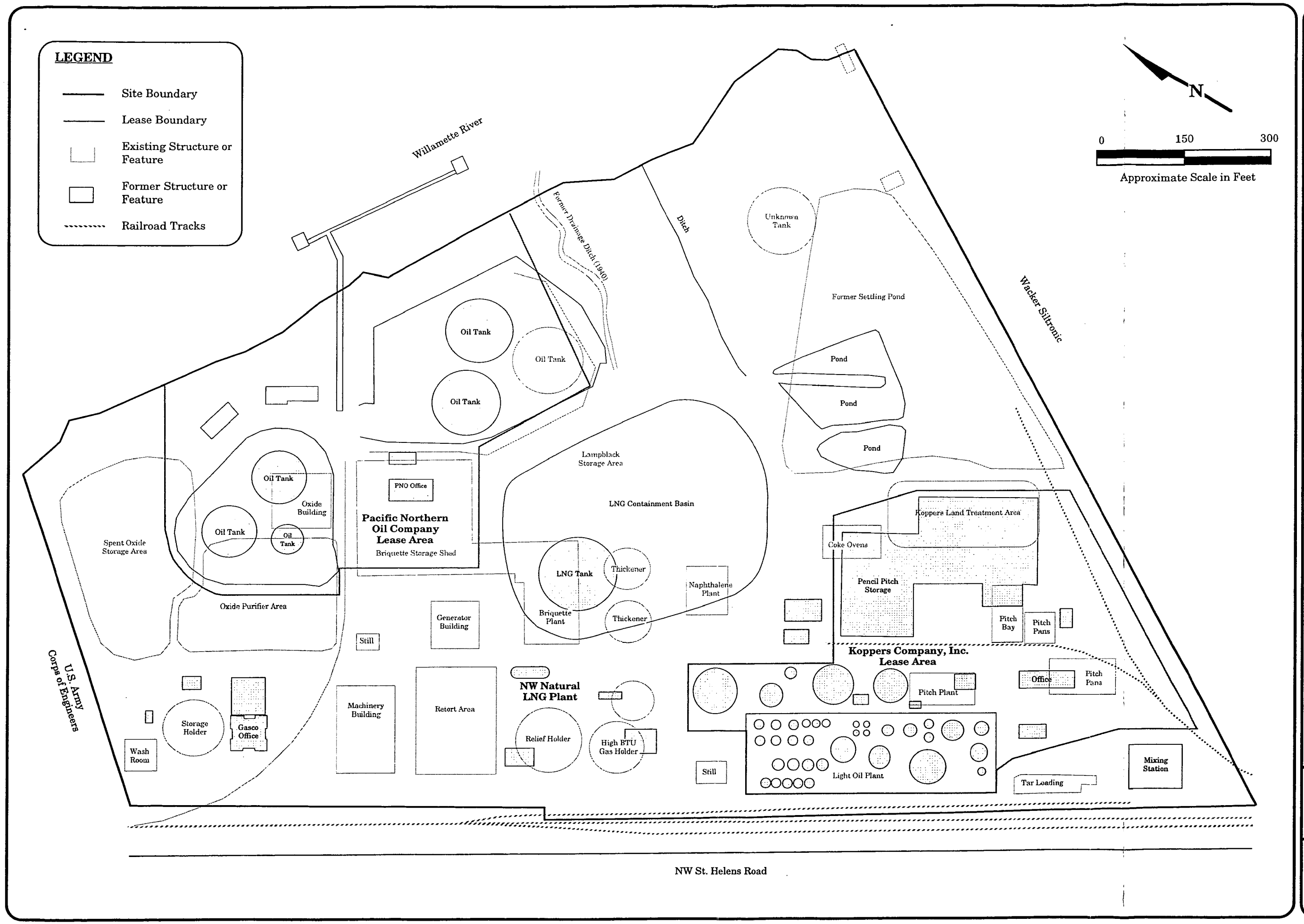

Figure 3

Historical Features Map

Remedial Investigation
Northwest Natural – Gasco Facility
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September 1998

Project No. 2708

Koppers000628

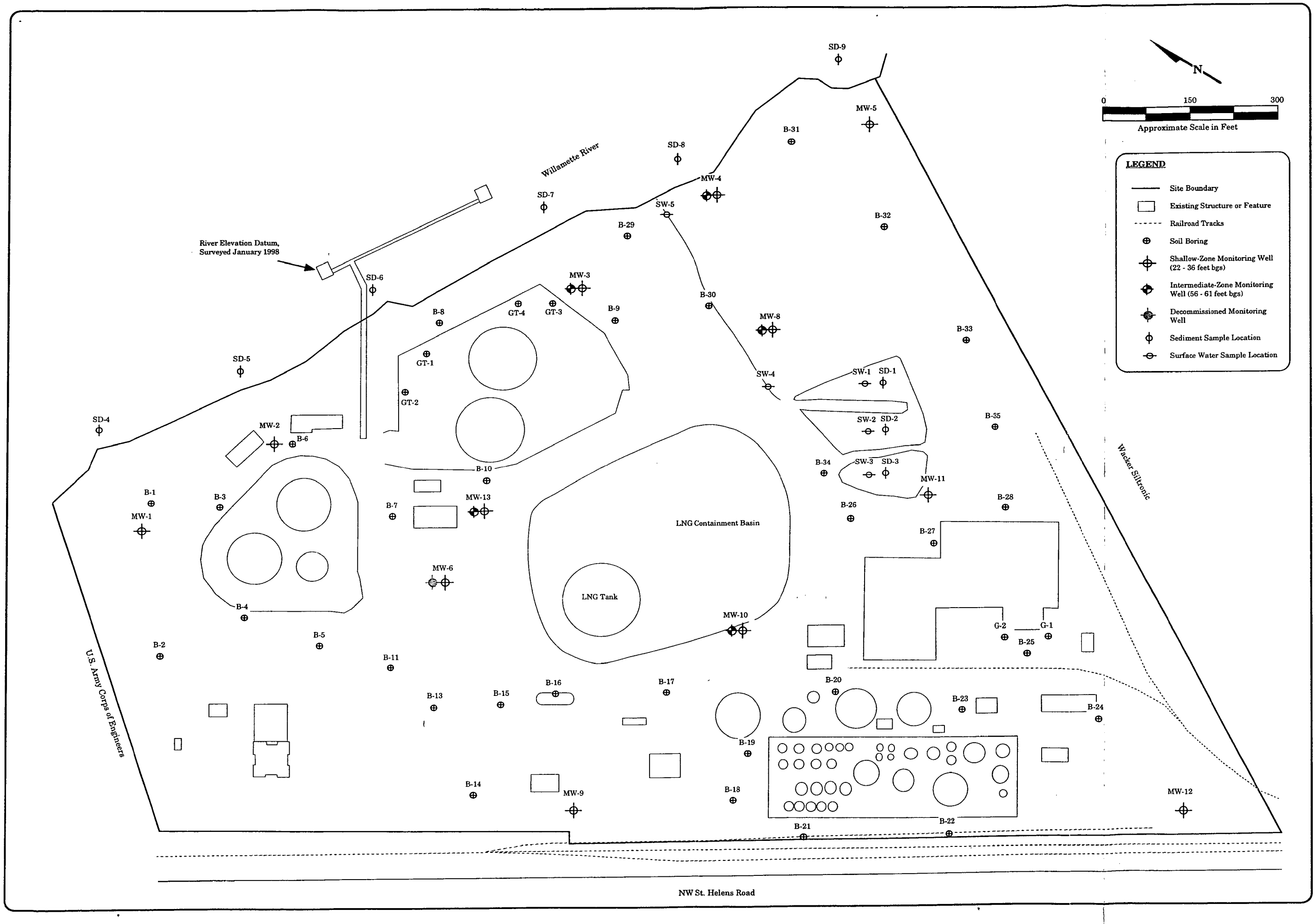

Figure 4

Sample Location Map

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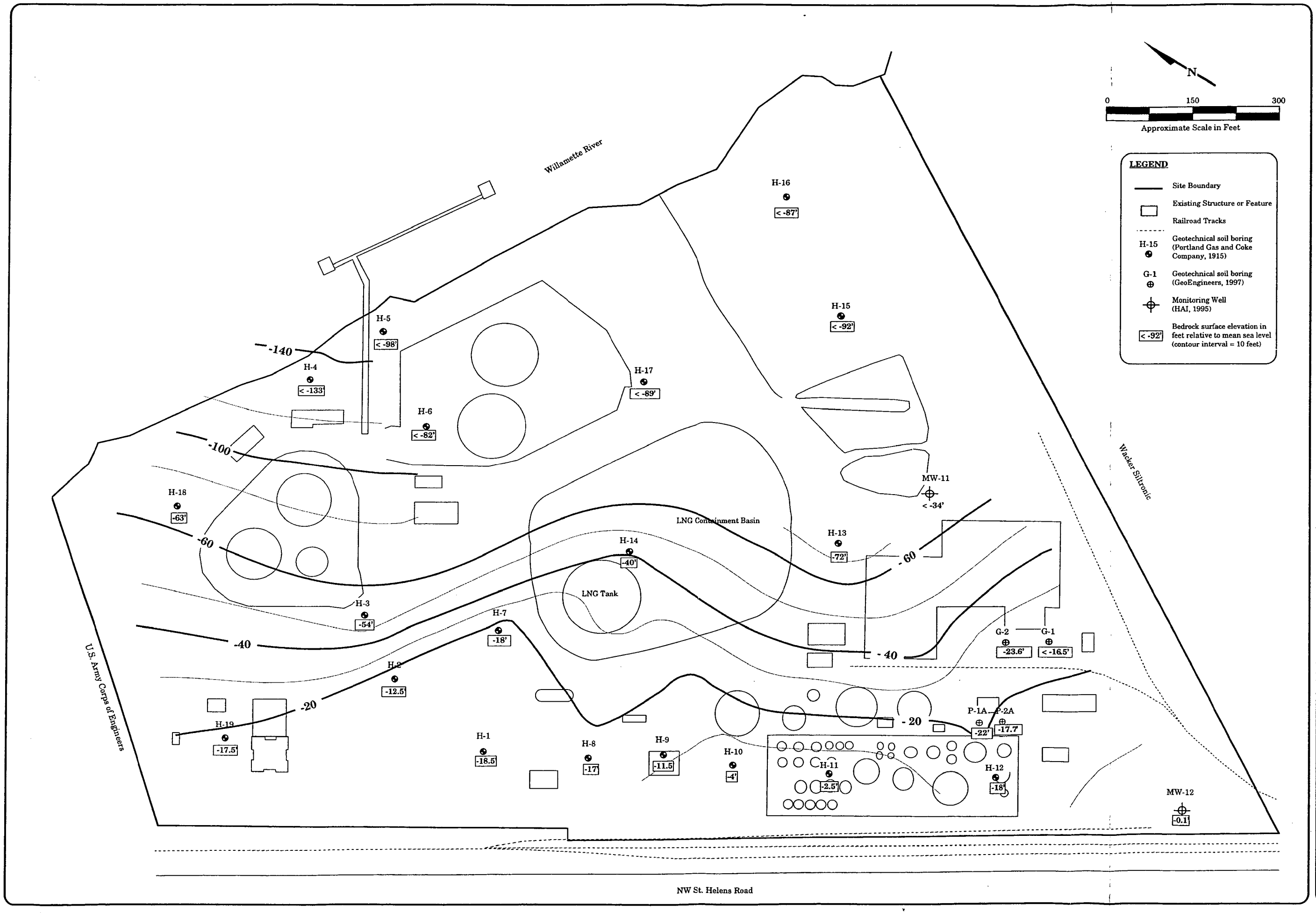

Figure 5

Bedrock Surface Elevation Map

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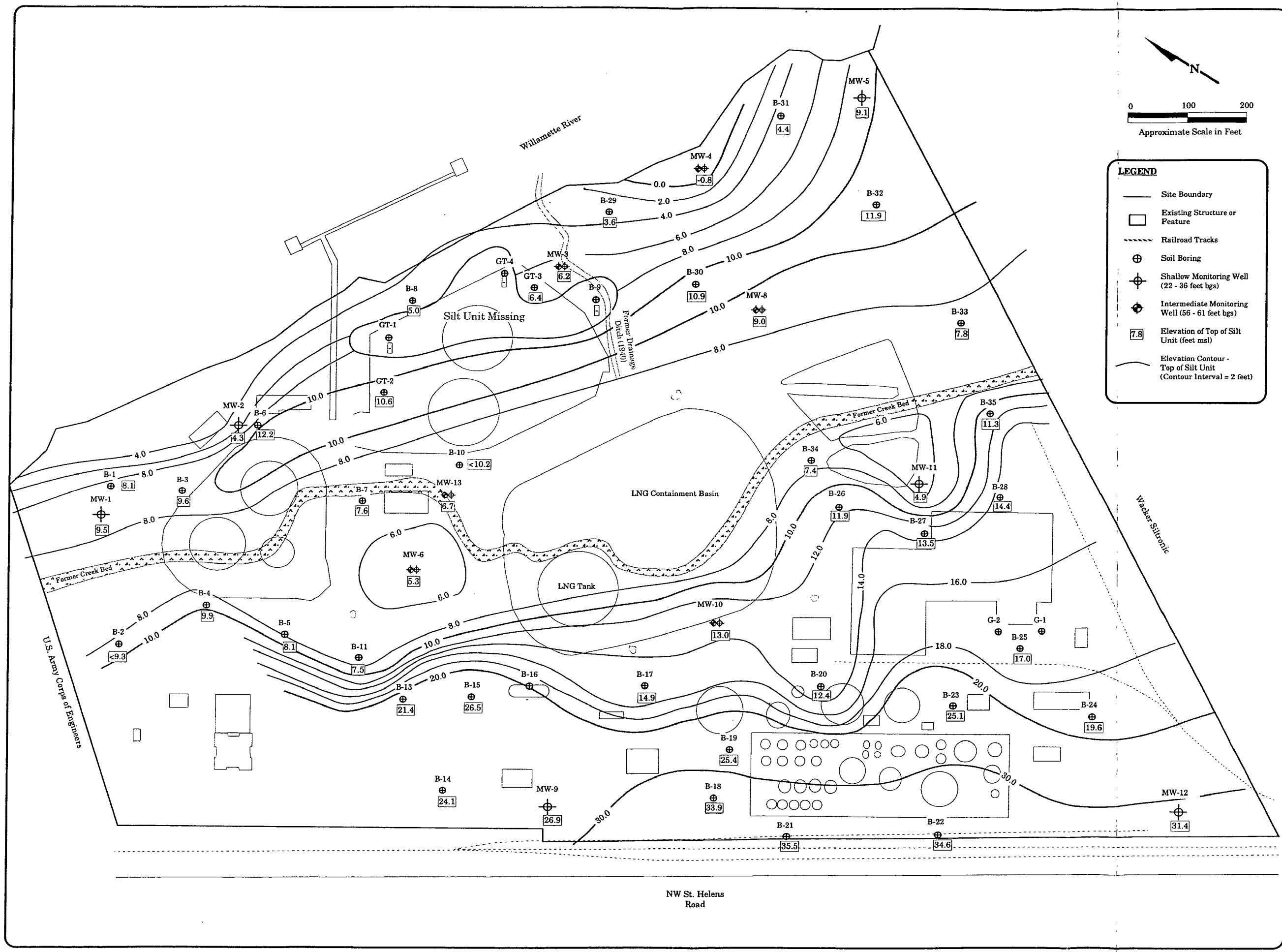

Figure 6

Elevation Map: Top of Silt Unit

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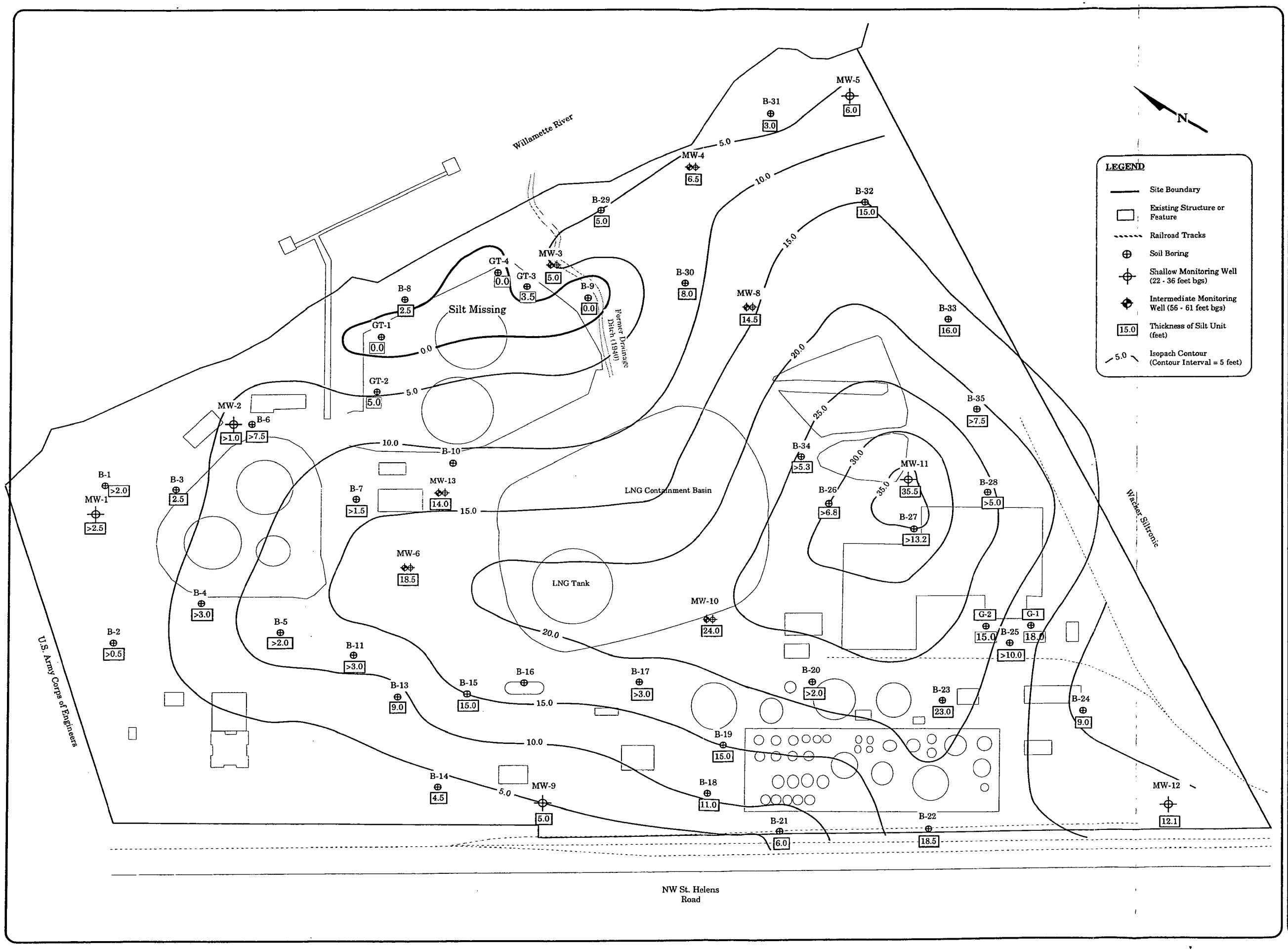

Figure 7

Isopach Map: Silt Unit

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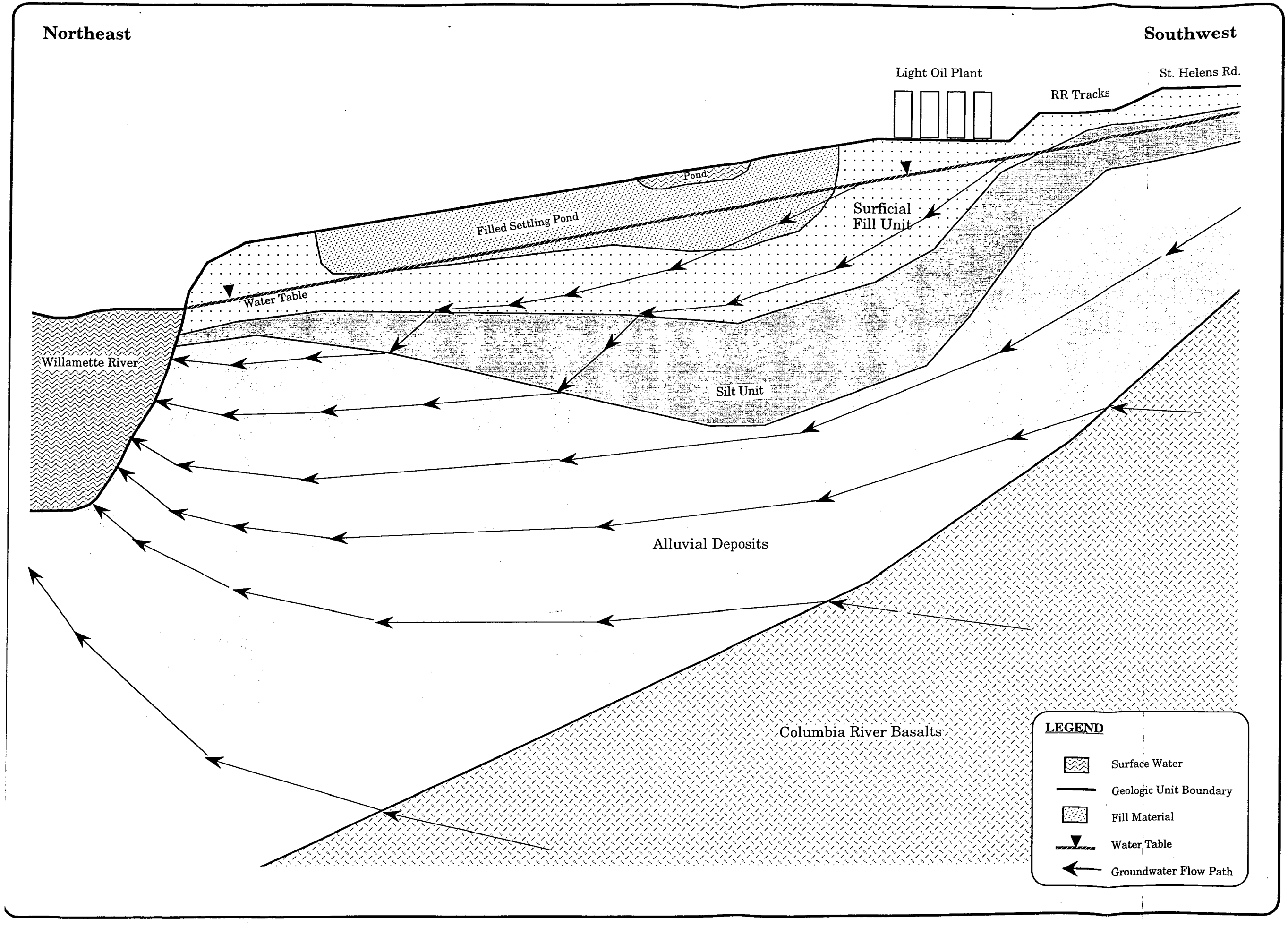

Figure 8

Hydrogeologic Conceptual Model

Northwest Natural Gas Company
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September 1998

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APPENDICES

Koppers000634

Preliminary Analysis
Of Soil Contamination Data

Northwest Natural - Gasco Facility
7900 NW St. Helens Road
Portland, Oregon

October 9, 1998

Prepared for:

Northwest Natural, Inc.
Portland, Oregon

Prepared by:

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1. Introduction

The purpose of this section is to further our understanding of site contamination by plotting and analyzing soil data and descriptions. The goals are to get a better idea of contaminant location, how reliably we can predict exposures that may lead to risk, and what additional data will be most helpful.

The Data Package (1996) includes both qualitative and quantitative information. Qualitative information includes soil boring logs and cross sections (Data Package Appendices A, B and L) that are helpful in understanding the distribution of contaminants. The RI Summary Report uses such qualitative information and rough ranges of concentrations to provide insights and estimated boundaries and contours of product locations.

In this appendix we focus on the quantitative contamination data, that is the roughly 5,000 data values collected at about 165 locations and depths. The plots and analyses in this appendix are intended to provide a variety of windows into the data to help detect and understand patterns and trends. Specifically, we:

1. Evaluate sampling, duplicate results, and mixes of PAH compounds.
2. Plot concentrations in 3-d scatter plots, histograms, and other plots to help see the spatial distribution of samples with elevated concentrations.
3. Consider statistical evidence for and against breaking the site into areas based on surface location and on depth. Depths considered are "surface" (0-0.2 feet), "shallow" (0.2-15 feet), and "deep" (>15 feet).
4. Consider how concentrations are related to soil odor, sheen, and the presence of product.
5. Provide examples of how concentration probability distributions can be constructed from site data for risk analyses.
6. Summarize findings.

We consider the contaminants:

Carcinogenic PAHs (CPAHs)
Total PAHs (TPAHs)
Benzene
Arsenic

Generally broken down into the following 3 depths:

- Surface (up to 0.2 feet deep; potential source of dust, exposure during surface activities)
- Shallow (between 0.2 and 15 feet; likely to include soil encountered during future trenching and sub-surface work at site)
- Deep (greater than 15 feet; important to understanding site and to groundwater, but not as direct exposure pathway)

CPAHs and benzene are expected to be leading sources of risk among chemicals identified at the site. Total PAHs were considered due to correlation with CPAHs. PAHs are of interest since they are present site wide. Benzene is evaluated since it is the most toxic and prevalent of the BTEX (benzene, toluene, ethylbenzene and xylene) compounds at the site.

Helpful comments to drafts of this memorandum were provided by David Ruppert, Professor of Statistical Science, Cornell University; Rob Ede, Hahn and Associates; and Steve Sonnen, Montgomery and Watson.

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2. Sampling And Data

2.1. Data

The data for this analysis were taken from the Data Package (Hahn, 1996), from samples taken at monitoring well 13 (MW-13), and from the four geotechnical borings taken near the river in the area of B-8 (GT-1, GT-2, GT-3, GT-4). The preceding represents all available soil quality data for the site (see Data Summary document to which this is attached).

2.2. Sampling Strategy

Surface sampling was done essentially at random to roughly cover the site. Thus evaluation of surface samples as random samples is valid for the purposes of statistical analysis.

Sub-surface sampling locations, however, were selected to (1) investigate areas in which historic operations were thought to create contamination potential, and (2) to roughly cover the site. The first of these goals creates a non-random sampling strategy, due to targeting of expected sources. The second introduces a random-grid element into the locations across the site. The laboratory analyses run on samples were generally not selected based on sample appearance, so this did not introduce bias.

Another source of bias in sub-surface samples is that samples were taken in part based on soil appearance and apparent contamination. Typically, samples were taken above, in, and below what appeared to be contaminated soils. At monitoring wells, samples were primarily guided by identifying the lower limits of contamination. See the Final Work Plan, August 4, 1995, for a further description of sampling activities. Such potentially biased data is useful for characterizing contamination, but must be used with caution for statistical analysis (e.g., see Section 1.3, EPA, 1996).

To investigate this bias we consider the relationship between soil appearance and contaminant concentrations later in this document. We find that sub-surface PAH concentrations are modestly biased upward by use of visual inspection, but benzene concentrations are probably not significantly biased.

2.3. Duplicates

Figure 1 shows the ratios of concentrations found in duplicates. If samples were uniform and tests were perfect, all values would be 1.0. In fact, for those duplicates in which significant concentrations of contaminants were found the two duplicates have rather different results, with most varying by about 50%, and sample B-01 varying by a factor of 4. Since the PAHs in these samples were fairly low (about 10 ppm) the differences are large percentages but low quantities. Ranges in precision for PAH analyses in a range from 30-150% of true values, depending on the constituent, are considered acceptable by lab QA/QC standards. Lab QA/QC tests indicated that they were operating within these standards. Therefore it is likely that the differences represent normal test imprecision for all samples except for B-01. For B-01 heterogeneous contamination on the scale of a few inches (the space between samples taken in two 4-9 oz. sample jars) is the likely explanation. However, in analyzing results the significant potential imprecision of testing should be kept in mind.

3. Visual Examination Of Data And Evaluation Of Differences By Area

In the following paragraphs we present several ways to plot and view data.

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3.1. PAH Compound Mix

3.1.1. Relation between CPAHs and TPAHs.

Figure 2 shows TPAHs versus CPAHs by depth on a log-log scale. A linear relation with zero intercept indicates that the relationship between TPAHs and CPAHs is proportional. The two chemical groups are strikingly well correlated for surface soils. Explanations include that surface PAHs are from a single source or that weathering has left them uniform in nature (more discussion below). The two groups of chemicals are roughly correlated for deeper soils, suggesting variety in the nature of sub-surface PAH contamination. This may be associated with diverse sources, differential weathering and/or differing rates of migration. In a number of samples TPAHs were detected at low concentrations while CPAHs were not detected (values of -3 in the figures represent no detects).

3.1.2. PAH Fingerprints.

Beyond the above breakdown into total and carcinogenic, the relative concentrations of the sixteen different PAH compounds analyzed can be considered a "fingerprint" for a PAH mix.

Figure 3 displays the PAH fingerprint of all surface soil samples by constituent. Each sample is shown as one of the thin bars above each constituent. In this figure the right-most thin bar above each constituent is a sample we believe is Koppers pencil pitch dust (see discussion in Data Summary). The fact that for surface soils the thin bars tend to be similar (e.g. most are high for Pyrene and low for Napthalene) indicates similar PAH fingerprints among surface samples. Further, it appears that PAHs in surface samples are generally quite similar to dust collected at Koppers.

Figures 4 and 5 show similar comparisons for shallow and deep soils, respectively. PAHs in shallow and deep soils are more diverse. They are generally dissimilar to surface PAHs and somewhat similar to each other. Part of this the distinction between surface and deeper samples is due to weathering, for example with naphthalene volatilizing near the surface. Similarity of surface samples may also reflect a common source. The differences between surface and deeper PAHs should be addressed in assessing the potency of CPAHs.

3.2. 3-D Concentration Scatter Plots of Concentrations

Figures 6-13 show 3-dimensional scatter plots of the contaminants:

- TPAHs
- CPAHs
- Benzene

In each plot the site is shown from a south-southwest vantage point, with approximate site borders and river locations shown. The north and east coordinates are in feet, and are those used in records of borings and wells at the site. These plots are primarily intended to clarify the extent to which elevated concentrations occur in various areas and at various depths. Sample locations are provided for points with highest concentrations[1].

TPAHs and CPAHs are distributed very similarly, with elevated concentrations of each occurring at the same points. Elevated surface concentrations of CPAHs are about 10% of the concentrations elevated shallow and deep soil concentrations. Elevated concentrations of PAHs occur within each of these

[1] Note that while concentrations of contaminants in deep soil have been carried throughout this analysis, they are not directly important in the evaluation of human health risks due to the lack of a viable route of exposure (DEQ letter to S. Hart, August 23, 1996).

depth intervals towards the eastern corner of the site (former tar pond area, near Wacker and the river), an area with residual tar product in the soil. A few other samples showing elevated concentrations are scattered across the site, with high variability by both depth and location.

Benzene concentrations in shallow soil are elevated primarily in the central part of the site near the southwest boundary, near the former light oil plant. In deep soil the elevated concentrations are about 50% as high and are farther down-gradient of the light oil plant, with another spike at MW-6. Elevated benzene concentrations do not perfectly coincide with observed product, with the highest concentration occurring in a sample at B18 that had no obvious product.

3.3. Site Breakdown and Histograms

The site could be divided in a number of ways for the purpose of statistical analysis. One reason for breaking the site down is variability of human activity, and thus exposure parameters, by area (e.g. the 3-area breakdown below). Another reason is variability in the nature and extent of contamination (e.g. 2 and 4-area breakdowns below). We consider the site as a whole and using 3 breakdowns as shown in Figures 14 and 14a and described below.

The 2-Area breakdown was used to investigate the apparently higher concentrations occurring in the eastern corner of the site (see scatter plots, above), with the eastern corner being nearly identical to the Former Tar Pond area of the 4-area breakdown.

The 3-Area breakdown follows approximate boundaries of current usage, with the NWN area including all but the northeastern area (PNO) and the southwestern corner (Koppers). This breakdown is likely to be useful to the extent that exposure parameters vary by current lease areas.

The 4-Area breakdown was suggested by DEQ in the memo of June 27, 1997 "Data Summary and Exposure Pathway Analysis-Technical Memorandum, Former GASCO Site." The proposed breakdown included a small fifth area in the northeast corner of the site near the abandoned office building called "Office Area." No data have been taken in that area, as broken out, so it is not included in the analysis. The memo showed the LNG containment basin as an excluded area. The assignment of sampling locations to areas for each breakdown is shown in Table 1 below.

Table 1. Assignment of Sampling Locations to Areas

Area Breakdowns	Borings and Wells by Area			
2-Area	*East Corner* Borings: 9, 29-35 Wells: 3-5, 8	*Main Area* All other samples		
3-Area	*NWN* Borings: 2, 5, 9, 11-17, 26, 29-35 Wells: 3-5, 8-11	*Koppers* Borings: 18-25, 27, 28 Wells: 12	*PNO* Borings: 1, 3, 4, 6-8,10 Wells: 1, 2, 6, 13 Geotech: 1-4	
4-Area	*Tar Pond Area* Borings: 9, 26, 28-35 Wells: 3-5, 8,11	*Retorts/Koppers* Borings: 11, 13-25, 27 Wells: 6, 9,10,12	*PNO* Borings: 7, 8, 10 Wells: 13 Geotech: 1-4	*Oxide Area* Borings: 1-6 Wells: 1-2

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Figures 15-22 are histograms of the frequency with which concentrations of TPAHs, CPAHs, and benzene were found by area and depth, on a log scale. The left-hand columns, at 10^{-3}, indicate non-detects. With the high variability found, mean values primarily reflect the several highest concentrations found. Because of the log scale even fairly subtle differences in the appearance of histograms, particularly in the right-hand most columns, reflect significant differences in the highest and mean concentrations. In cases where a single sample of elevated concentration has a dramatic impact on the mean, the mean is also shown without that sample included in the data set.

In studying these histograms some patterns appear:

- The 4-Area breakdown provides the best resolution of concentrations, most clearly showing lower PAH concentrations in the PNO area and higher concentrations in the eastern corner (near the river and Wacker).
- The 3- and 4-Area sets of histograms both show lower surface concentrations in the northern part of the site (PNO and Oxide areas) relative to other areas.
- Shallow soil has fewer non-detects and higher concentrations than deep soil.
- All 3 sets of histograms show great variability in PAH concentrations in shallow and deep soils (7 orders of magnitude), and somewhat less variability in surface soils (3 orders of magnitude). This reinforces other observations suggesting that surface PAHs differ in distribution and nature from sub-surface PAHs.

Figure 23 shows arsenic concentrations found in the PNO and Oxide areas of the 4-Area break down. Samples have not been taken in other areas. Concentrations are consistently higher in the Oxide area, with no arsenic concentrations in the PNO area exceeding 3 ppm and no arsenic concentrations in the Oxide area below 3 ppm.

4. Statistical Analysis of Concentration Differences by Area and Depth

We can use statistical tools to further evaluate the significance of differences by depth and by the areas defined above. As noted below, however, these statistical results are best used with caution and as supplemental to visual examination of the data, due to method and data limitations.

The Mann-Whitney U test (also known as Wilcoxon Rank Sum test, e.g. EPA, 1996 section 3.3.3) was used to test for significant differences between groups when concentration data were grouped by depth and area. The Mann-Whitney test considers the hypothesis that two populations (e.g., concentrations in two areas or depths) are shifted relative to each other. When assumptions and limitations are not violated, this is the most powerful non-parametric test for this purpose[2]. For information on this test

[2] This test does not assume any distribution shape (i.e., is "nonparametric"), but does assume that the distributions to be compared have the same shape and dispersion. The histograms suggest that this assumption is met to varying degrees across comparisons. Extreme values have limited impact with a ranking statistic. The benefit is that the statistic will not be greatly affected by one or two extreme values, but the caution is that where very high values are considered representative, their importance may be underestimated. Substantial numbers of identical data values in the two sample sets being compared (e.g. non-detects with same assumed values) can lead to underestimates of the confidence that the sets are different - i.e. differences in populations will tend to be greater than indicated by p-values. Our data (like most real data) violates these assumptions to some degree, so results should be viewed as suggestive, not as "proofs."

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Devore 1995, or other statistics texts. The calculations were done in the software Statistica (1998 release 5.1 M, StatSoft Inc.).

The reported p-value is the probability of error in rejecting the null hypothesis that the two samples are from the same population. That is, the test is looking for evidence that the samples are from different populations. The p-value is the probability of error in the statement "the two populations from which samples are drawn are different." Exact two-tailed p-values are used here, since we do not know a-priori which area or depth would have higher concentrations, should they be different. A value of 0.05 indicates a one-in-twenty (5%) chance of such an error, and this is often considered a marginally significant result. P-values closer to .01 are fairly strong statements regarding likely differences.

Applied to arsenic in the PNO versus Oxide areas, the concentrations are significantly different with a p-value of <0.001 when subjected to the Mann-Whitney U Test. The remainder of statistical analyses will be devoted primarily to PAHs.

Mean values for PAHs and benzene (and mean values calculated without extreme values[3]) and number of samples for each area and depth are provided in Table 2.

Detailed results of the Mann-Whitney test for the significance of differences by area and depth are attached in Appendix 1. The following is a summary of the results.

- 2-Area breakdown: PAHs are significantly higher in the eastern corner of the site than the remainder of the site ("Main Area") for shallow and deep soils.
- 3-Area breakdown
  - PNO appears to have lower concentrations than the other two areas. The elevated PNO samples at B6 (shallow) and MW6 (deep) are exceptions to this trend.
  - Mean concentrations at NWN are substantially higher than at Koppers, but the difference is not statistically significant. This lack of significance most likely reflects the limited impact of extreme values on the test..

[3] Extreme values were arbitrarily selected by inspecting data for single samples that accounted for over about ½ of the mean. These extreme values were associated with samples from B6, B13, and B18 in shallow soil; and B6, B27, and MW6 in deep soils.

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Table 2. Mean Concentrations† and Number of Data Points for Each Area Breakdown and Depth.

Area Division	Depth	Area	CPAHs		TPAHs		Benzene	
			Mean (ppm)	N	Mean (ppm)	N	Mean (ppm)	N
1-Area	All Depths	All Areas	285	136	2290	136	21.1	58
	Surface	All Areas	104	23	197	23	0.15	5
	Shallow	All Areas	531	36	3469	36	29.5	21
	Deep	All Areas	223	77	2364	77	18.8	32
2-Area	Surface	Main Area	57	13	129	13	0.15	3
		East Corner	166	10	286	10	0.15	2
	Shallow	Main Area	325	30	1604 (624 w/o B13)	30 (29)	30.9	18
		East Corner	1560	6	12793	6	21.7	3
	Deep	Main Area	52 (24 w/o MW6)	50 (49)	815	50	16.7	26
		East Corner	541	27	5232	27	28.2	6
3-Area	Surface	PNO	10	4	21	4	0.15	1
		NWN	123	15	212	15	0.15	2
		KOP	125	4	318	4	0.15	2
	Shallow	PNO	311 (35 w/o B6)	16 (15)	889 (108 w/o B6)	16 (15)	0.03	10
		NWN	1115	12	8945	12	15.6	6
		KOP	91	8	415	8	105.3	5
	Deep	PNO	65 (1.9 w/o MW6)	22 (21)	941 (4.3 w/o MW6)	22 (21)	4.6	15
		NWN	391	40	3982	40	42.2	9
		KOP	9	15	137 (54 w/o B27)	15 (14)	19.2	8
4-Area	Surface	Oxide	10	4	21	4	0.15	1
		PNO		0		0		0
		Former Tar Pond	132	14	228	14	0.15	3
		Koppers	102	5	251	5	0.15	1
	Shallow	Oxide	956 (73 w/o B6)	5 (4)	2765 (268 w/o B6)	5 (4)	0.15	1
		PNO	21	10	39	10	0.01	9
		Former Tar Pond	1361	7	11053	7	17.7	4
		Koppers	327 (47 w/o B13)	14 (13)	2378 (279 w/o B13)	14 (13)	78.5 (27 w/o B18)	7 (6)
	Deep	Oxide	8.4 (0.4 w/o B6)	5 (4)	19 (2.0 w/o B6)	5 (4)		0
		PNO	0	15	0	15	0.12	13
		Former Tar Pond	484	32	4901	32	41.3	8
		Koppers	67 (11 w/o MW6)	25 (24)	1005 (180 w/o MW6)	25 (24)	24.6	11

†For values in which a single data point has a dramatic impact on the calculated mean, the mean value calculated without that data point has also been calculated and is shown in parenthesis. This is intended to show the impact of extreme values on the mean.

- 4-Area breakdown
  - All depths: PNO has significantly lower concentrations than other areas in nearly all comparisons.
    - Surface PAHs: The Former Tar Pond and Koppers areas have similar concentrations and both have higher surface PAH concentrations than the Oxide area.
    - Shallow PAHs: The Former Tar Pond area has significantly higher concentrations than all other areas except the Oxide area. If sample B6 is removed from the Oxide area (B6 accounts for about 90% of PAHs found in Oxide area samples) then the Oxide area too has concentrations significantly less than the Pond area ($p < 0.05$ for both TPAHs and CPAHs).
    - Deep PAHs: While the Former Tar Pond shows elevated levels in histograms and means, the difference is not statistically significant in deep soil. As mentioned above, the test may under-estimate significance when extreme values and duplicates are present.

The overall picture from statistical tests is that the PNO area has lower concentrations of PAHs than other areas of the site, and the Former Tar Pond area has higher concentrations of PAHs. The 4-area breakdown shows greatest resolution.

Variations in distribution shapes, substantial numbers of identical values in different groups (non-detects), and extreme values limit test power and reliability. Generally we suggest that test results be considered only supplemental to visual analysis of the data presented in plots and tables.

5. Another Way to View Relation Between Proximity and Concentration – Variograms

Figures 24-27 show scatter plots relating the straight-line distances (x,y,z) between samples and the differences in contaminant concentrations found in those two samples. Thus every possible pair of points is shown as a point with the corresponding difference in concentrations and distance between those points. Such plots, called "variograms" in geo-statistics, are used to examine spatial relations between concentrations. Variograms are shown for the full site (up to 1,600 feet between samples, on x-axis) and for samples within 300 feet. If concentrations change in a continuous fashion across the site then concentration differences will increase with distance between the samples.

For PAHs below the surface the variograms show differences in concentration even for points that are very close together (points spread along or close to the y-axis). This is evidence for what is referred to as "pure nugget" or small clumps with different concentrations than surroundings. For deep PAHs and benzene there no visible "ranges" (a distance over which there seems to be a relation between concentration and distance). This indicates a lack of smooth concentration gradients in deep soil. PAHs in surface and shallow soils show less variation in concentrations for points within about 100 feet, which is consistent with a tendency for concentrations to vary more smoothly.

The nuggets and limited distance/concentrations ranges are consistent with the observed presence of distinct zones and "fingers" of oil tar and tar product (especially the tar) having been incorporated within fill at the site. PAH concentrations beyond the limit of tar or oil product tend to display a sharp decline in contamination. Given the placement of product at numerous portions of the site as fill the presence of gradually declining concentrations from a "source" is not anticipated, but rather the highly heterogeneous patterns displayed by the variograms would be expected.

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6. Relationships Between Shallow Soil Description And Concentrations

Soil odor, sheen, and the presence of product were recorded in boring logs while collecting samples. These descriptions were used in the body of the Summary Report to develop an idea of product location and contour plots showing product location. In this section we look at how soil descriptions are related to concentrations for shallow soils. As described later, we can use these relationships to estimate the degree of bias in the sub-surface sampling.

6.1. Are Contaminant Concentrations Related to Soil Descriptions?

Table 3 below shows, for shallow soils, the number of data points and mean contaminant concentrations when samples are grouped by clean/sheen/odor and by the presence of observed product. There appear to be substantial differences in mean concentrations depending on whether there is sheen, odor, or product. We examine these apparent relationships in more detail below for PAHs and benzene.

Table 3. Shallow Soil Mean Concentrations and Number of Samples by Soil Description and Observed Product

	Carcinogenic PAHs		Total PAHs		Benzene	
Soil Description Observed Product	Means (ppm)	N	Means (ppm)	N	Means (ppm)	N
Clean	13	16	10	16	0.01	8
None	13	16	10	16	0.01	8
Lampblack		0		0		0
Tar		0		0		0
Oil		0		0		0
Odor	861	4	7331	4	0.15	2
None	79	1	163	1	0.15	1
Lampblack	1121	3	9720	3	0.15	1
Tar		0		0		0
Oil		0		0		0
Sheen & Odor	966	16	5962	16	56	11
None	2.2	4	271	4	120	3
Lampblack	638	2	4028	2	18	1
Tar	1961	5	10951	5	24	2
Oil	873	5	6301	5	39	5
All Groups	531	36	3469	36	30	21

6.1.1. PAHs

Soil with no odor, sheen, or product (i.e., looks clean) tends to have low PAH concentrations; soil with odor or sheen but no product tends to have intermediate concentrations, and soil with visible product tends to have the highest concentrations. However, there is significant variation within each category. Details follow.

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Figures 28 and 29 show histograms of the occurrence of PAHs in soil for each combination of soil description, with number of points (N) and mean values shown (Note that the figures show data compiled for all depths, not just shallow depths as in the table above). Samples with no visible product and no odor or sheen have low concentrations and 42% (73 of 174) are non-detects. Soil with visible product usually has a sheen (48 of 54 samples, or 89%) and otherwise has an odor, and these points have elevated concentrations. There is no clear difference between samples with odor versus sheen. The samples with sheen or odor but no product have low to intermediate concentrations.

Based on the above analysis, three soil categories present themselves for evaluation:

- Soil with no odor sheen nor product;
- Soil with odor or sheen but without product
- Soil with product

The data sets associated with each of these categories can be compared to each of the other categories to determine if a statistically significant difference exists between the data categories. Tables 4 and 5 display the statistical difference between data sets associated with the soil categories listed above. The low p-values produced via the Mann-Whitney u-test for the comparison of these data sets indicates that each of the soil categories presented above displays a statistically significant difference from the others for CPAHs and TPAHs. To further illustrate this point, box plots of concentrations in each of the 3 categories used in the above tables, for shallow soil, are shown in Figures 30 and 31 (note the log scale).

Table 4. TPAH Concentrations by Soil Description

Soil Category 1	Soil Category 2	P-value of difference (Mann-Whitney u-test)
No Odor, Sheen, nor Product (N=87, mean =57 ppm TPAH)	Product	<0.001
Odor or Sheen without Product (N=22, mean=369 ppm TPAH)	No Odor, Sheen, or Product	0.001
Product (N=27, mean=11,050 ppm TPAH)	Odor or Sheen without product	<0.001

Table 5. CPAH Concentrations by Soil Description

Soil Category 1	Soil Category 2	P-value of difference (Mann-Whitney u-test)
No Odor, Sheen, or Product (N=87, mean =31 ppm CPAH)	Product	<0.001
Odor or Sheen without visible product (N=22, mean=88 ppm CPAH)	No Odor, Sheen, or Product	0.05
Product (N=27, mean=1263 ppm CPAH)	Odor or Sheen without product	<0.001

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We cannot generally relate the nature of the product (oil versus tar versus lampblack) to concentrations, given the amount and variability of the data. We did find, however, that PAH concentrations in oily soil are higher in the tar pond area than in the Koppers area, suggesting variation in types and sources of oil[4].

6.1.2. Benzene

The relation between soil description categories and concentration is less clear for benzene, with the presence of sheen or oil being the best indicators of benzene. Figure 35 shows the occurrence of benzene concentrations in soil for each combination of soil category. Soil with no visible product and no odor or sheen has lower concentrations. Soil with visible product nearly always has a sheen (16 of 18 samples, or 89%). The two points with product and no sheen have low benzene, and the 7 points with no product but sheen include the point with the highest concentration (B18, 12 ft deep) and 2 other points with significant concentrations. This suggests sheen is a better indicator of benzene concentration than the presence of product.

Figure 36 shows box plots of the log of benzene concentrations with samples either sorted by presence of product or odor and sheen. If we do not exclude the high sample at B18 then there is no difference in mean concentrations based on the presence of lampblack or tar, but samples with oil have elevated concentrations. Using the appearance of odor and sheen seems to give a bit more consistent, although still rough, predictor of benzene concentration.

Based on these graphs of the data, the following two alternative sets of soil categories suggest themselves:

- Clean soil
- Soil with an odor
- Soil with a sheen

and

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[4] While oil was found in soil samples in both the Koppers and tar pond areas, PAH concentrations are higher in the pond area. Thus we investigated whether oily samples in the various areas are comparable. Table 6 below summarizes the concentrations of PAHs in oily soil samples in the Pond and Koppers areas, with the significance of the difference shown in the bottom row. This data is also shown in a box-whisker plot in Figure 32-34.

Table 6. Shallow soil (0.2-15 feet) with Visible Oil, Concentrations of PAHs and Benzene.

	CPAHs		TPAHs		Benzene	
	Mean (ppm)	N	Mean (ppm)	N	Mean (ppm)	N
Former Tar Pond	1997	6	23087	6	79	4
Koppers	727	8	6881	8	52	7
P-value significance of difference (Mann-Whitney)	0.23		0.34		0.53	

The difference is not statistically significant, but concentrations of PAHs in oily soils appear to be higher in the pond area than in the Koppers area. This difference could be due to a differing source for the oil in the former tar pond area than that identified in the Koppers area, with the oils in the former tar pond area perhaps more closely related to, or derived from, the tars, while no tars were present in the Koppers area.

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- No product
- Lampblack
- Tar
- Oil

Table 7 shows the statistical significance of differences in soil categories the first set of categories (i.e., clean, odor and sheen).

Table 7. Benzene Concentrations by Soil Description

Soil Category 1	Soil Category 2	P-value of difference (Mann-Whitney u-test)
Clean (N=20, mean=0.85 ppm benzene)	Sheen	<0.001
Odor (N=4, mean=12.5 ppm benzene)	Clean	0.13
Sheen (N=25, mean=47.8 ppm benzene)	Odor	0.50

Table 7 indicates that soil categorized as clean differs in a statistically significant manner from soil categorized as having a sheen. The other category combinations do not show a strong statistical difference, but there are only 4 samples with just odor.

Table 8 shows the statistical significance of differences in soil categories the second set of categories (i.e., no product, lampblack, oil and tar).

Table 8. Benzene Concentrations by Soil Description

Soil Category 1	Soil Category 2	P-value of difference (Mann-Whitney u-test)
No Product (N=40, mean=11.6 ppm benzene)	Lampblack	0.07
No Product	Oil	<0.001
No Product	Tar	.11
Lampblack (N=3, mean =10 ppm benzene)	Tar	.8
Oil (N=11, mean=62 ppm benzene)	Lampblack	.37
Tar (N=4, mean=12 ppm benzene)	Oil	.28

Table 8 indicates that soil categorized as having no product differs in a statistically significant manner from soil categorized as having oil present. The other category combinations do not show a strong statistical difference, although there are only 3 samples with lampblack and 4 with tar.

In summary, the relationship between soil description categories and concentration for benzene is weaker than the relationship for PAHs. The presence of sheen or oil being the best indicators for the presence of benzene.

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6.2. Estimating Average Concentrations Using Soil Descriptions

We found above that, particularly for PAHs, contaminant concentrations vary significantly with soil description. This confirms the common-sense expectation that the visible presence of contamination is related to the concentrations of contaminants.

It also confirms that sampling preferentially according to soil appearance is likely to result in a biased data set, i.e., the average concentration of such samples is unlikely to be the same as the average of randomly collected samples. This is important in that it could suggest that analyzed samples may be an imperfect indication of what a worker in a trench at a random location would encounter.

However, we can develop an estimated distribution of shallow soil concentrations based on soil categories. We can do this by first associating a distribution of concentrations with each soil category[5]. We can then examine each boring log to determine what fraction of shallow depth soil falls in each category (i.e., soil with no odor sheen nor product; soil with odor or sheen without product; soil with product for PAHs). This information can be determined from the cross-section figures of the Data Package Hahn, 1996, appendix L. Based on this information, we can estimate the distribution of concentrations that would be found if random samples had been collected.

We ran a simulation of 10,000 draws that estimated sample concentrations based on (a) likelihood of encountering each soil category, (b) concentration distribution for the soil category encountered, and (c) uncertainty in the measurement of concentration[6]. This produced distributions for concentrations intended to be representative for the site.

These distributions are shown together with the distributions for sample data in Figure 37. The simulated distributions based on the amount of soil of various descriptions are very similar in shape to those of the samples. However, the distributions based on soil description show about 30% fewer of the highest values of PAHs[7]. The reason for this difference is a bias towards sampling soil with visible product. As shown in Figure 38, about 30% of all soil encountered in boring was product contaminated, but about 40% of samples were taken from such soil. This is consistent with the sampling strategy, which was in part to characterize the worst contamination.

A comparison of average concentrations in shallow soil is shown in Table 9. A site-wide average is of limited use, given site area differences highlighted in other sections. However, averages do provide an idea of the difference in total contamination based sampling that was done versus results which might have been generated by random sampling in shallow soil. It appears that PAH contamination is overestimated by about 25% relative to random samples, while benzene is not overestimated. This is consistent with the results of the previous section – recall that the presence of benzene could not be well predicted on the basis of visual examination. Hence, if sampling preferentially based on soil appearance, benzene data would tend to be relatively unbiased. PAH concentrations, however, would

[5] There a number of alternatives for developing distributions, as discussed later in the report. One approach would be to find the best-fitting parametric distribution. The fit for any distribution will be coarse, given histograms of concentrations. A second approach is to use the existing data as the distribution ("empirical distribution"). The testing error offers some smoothing of this distribution (see footnote below and later in text). As a comparison, a set of parametric distributions were fit (maximum likelihood) and the simulation was run with both these and empirical distributions. The results were nearly identical, with results using the empirical distributions shown.

[6] We multiplied each concentration by a value selected from a normal distribution with mean 1 and standard deviation 0.25 to simulate the random error of sample analysis.

[7] The average values for values shown as "More" on histograms are virtually identical for simulation and samples.

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have a greater tendency to be biased toward high-end concentrations due to the stronger correlation between appearance and concentration.

Table 9. Shallow Soil Average Contaminant Concentrations, Site-wide in Shallow Soil

Contaminant	Average of Sample Concentrations (ppm)	Estimated Average Concentrations for Random Samples, Based on Amount of Soil with Sheen, Odor, Product (ppm)	Percent by Which Sample Average Exceeds Est. Random Samples
CPAHs	531	425	25%
TPAHs	3469	2804	24%
Benzene	29.5	29.7	-1%

To summarize, a comparison of sample concentrations with expected concentrations that would occur with random sampling suggests that sample concentrations are very similar to those that would be collected randomly, but likely overestimates the occurrence of the highest PAH concentrations.

7. Developing Distributions for Contaminant Concentrations

One purpose for concentration data is in assessing possible health risks. A probabilistic risk assessment requires probability distributions for chemical concentrations, so an important criterion for data is whether it is sufficient to construct or select distributions that adequately describe concentrations. The process of constructing distributions will generally help reveal whether data is adequate or inadequate for this purpose.

Unfortunately, there is no single right way to build a probability distribution based on empirical data. Depending on the amount of data, nature of the data, judgement, and available tools, methods include:

- Using data itself as the distribution (simple empirical distribution)
- Selecting the best-fitting parametric distribution
- Creating smoothed distribution from the data (smoothed empirical distribution)
- Selecting a distribution to maximize uncertainty consistent with data (maximum entropy)
- Using Bayesian updating to develop posterior distributions from priors (e.g. Roeder and Wasserman, 1997)
- Bootstrapping a smoothed distribution
- Manually creating a piece-wise combination of simple distributions

NWN and DEQ will need to work together to select and apply approaches that are mutually satisfactory. In this section we first examine existing data for obvious gaps and then provide examples of how distributions may be constructed using GASCO data[8].

[8] For useful general background information see ODEQ 1998 and it's appendix, EPA 1997.

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7.1. Locations and Depths for Risk Assessment

Exposure scenarios and parameters dictate the appropriate area and depth breakdowns for purposes of risk assessment. In terms of area, there are three populations that are active on the lease areas: NWN, Koppers, and PNO. In terms of depth, we are concerned about exposure to surface soils, directly and via dust inhalation, and trenching and other activities that may bring people into contact with sub-surface soil up to 15 feet in depth. CPAHs and benzene appear to pose potential risks. Therefore we ultimately will need 9 soil concentration distributions: CPAH distributions for each of the below six location/depth combinations and benzene for each location at the shallow depth:

1. NWN Surface
2. NWN Shallow
3. PNO Surface
4. PNO Shallow
5. Koppers Surface
6. Koppers Shallow

7.2. Screen for Data Adequacy: Sample Number and Locations

During construction of the distributions we expect to learn about the adequacy of data. However, we can conduct a screening of it's adequacy by first simply considering how many samples are available in each location/depth combination, and how well they are distributed.

Regarding the number of data points, there is no hard and fast number that is either too few or plenty (although we will develop a better idea when constructing distributions). However, our judgement is that a minimum of 4 or 5 samples should be available in each area at each depth.

Regarding location, we do not currently have information indicating that surface or shallow soil exposures will occur more frequently in one area versus another within each of the 3 areas. Thus, as an approximation, we assume that the likelihood of exposures is essentially uniform within each of the 3 areas. This suggests that we would like roughly evenly spaced samples in each area. To the degree that samples are not uniform, we would like to see more samples in areas more likely to be visited.

Reviewing Table 2 we see that we indeed have at least 4 data points for each combination, although only 4 for surface CPAHs at PNO and Koppers. However, the points are not spread evenly. Surface sample locations are shown in Figure 39. This is a "Voronoi Tessellation", which draws lines that are equidistant between points, so the area surrounding each point is closest to that point. This provides an idea of the coarseness and uniformity of sampling locations. The southeastern portion of the site is well sampled, but there are few samples in the PNO and Koppers areas, and few in the area of the LNG yard, where surface activity is common. The 10 x's on the figure indicate proposed approximate sampling locations to provide more uniform and complete coverage.

Figure 40 shows that shallow PAH samples are fairly uniform, except that (a) geotechnical borings near the river are clumped and thus over-represent that area, (b) there are no samples in the office area of NWN, and (c) the south eastern corner is slightly under-represented, and since this corner has highest concentrations, this is not conservative. To address these issues we would recommend (a) leaving out 2 geotechnical boring samples (which have low concentrations) and adding 3 samples at the approximate locations shown with x's in the figure.

Figure 41 shows that shallow benzene samples provide fair coverage, but 8 x's indicate locations for new points that would result in more complete and uniform coverage. The sample in the eastern corner can be collected with installation of a new well planned near MW-5, and 3 of the other points are in

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roughly the same locations as those recommended above for shallow PAHs. Thus about 7 shallow samples appear useful for PAHs and benzene, in addition to samples taken during well installation.

We will learn more about possible data gaps while building distributions, but have identified 10 surface and 7 shallow soil samples that appear desirable based on the number and location of existing points.

7.3. Examples of Constructing Distributions

We will illustrate two approaches in surface CPAHs in the NWN area:

1. Fitting of parametric distribution
2. Smoothed empirical distribution

7.3.1. Parametric Fit for Surface CPAHs in the NWN Area.

Figure 42 shows a histogram surface carcinogenic PAH data for the NWN area. We do not know what distribution is appropriate a-prior, but the histogram appears similar to the overlaid lognormal distribution[9]. We will now consider measures of the lognormal fit.

A probability-probability plot for a lognormal fit is shown, suggesting a fairly good fit (points lie close to diagonal line). Table 10 summarizes numerical tests of fit for a lognormal distribution. The Shapiro-Wilks W test of the normality does not reject the hypothesis of normality of the log transformed data[10]. The fit measure most sensitive to tails (Anderson-Darling) is also consistent with a good fit. However, the lognormal distribution that is fit, by selecting parameters to maximize the likelihood of observed values, has a mean of 176, versus the actual mean of 123 for data points. As discussed below, this results from fitting a distribution with a tail extending to infinitely high concentrations, and can be addressed by truncating the tail at a point well beyond the highest observed values.

Given the visual comparison (perhaps most important, e.g. EPA 1997) and numerical results, aside from the infinite tail, the lognormal distribution appears to be a fairly good representation for surface CPAHs in the NWN area.

Table 10. Lognormal Fit (mean 176, SD 664) to Surface CPAHs in NWN Area.

Measure of Fit	Fit Parameter Value	Common threshold for "good" fit
Shapiro-Wilks W test of normality (on log-transformed data), p-value	p=0.71 W=.96	p>0.05
Chi-squared	Undefined	p>0.5
Anderson-Darling	0.22	<1.5
Kolmogorov-Smirnov	0.10	<0.03

[9] This is somewhat appealing in that dilution and degradation processes can be viewed as yielding concentrations that are the product of random numbers, yielding a lognormal distribution. However many data sets from the site do not appear to fit any parametric distribution.

[10] The Shapiro-Wilk test is considered one of the best methods for testing for normality, and is sensitive to departures from normality in the tails of distributions. When the statistic is significant (e.g. $p<0.05$) normality can be rejected and when insignificant normality can be accepted.

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With a small data set, even if we accept that the distribution is lognormal, there is uncertainty regarding the true mean and standard deviations of the distribution. Thus using the best fitting distribution directly is not sufficiently conservative. We can address this by using a tiered simulation approach in which (a) we estimate distributions for parameters (mean and sd), (b) sample from these parameter distributions to construct a family of distributions, and (c) sample from this family of concentration distributions for estimating risk. This procedure reflects both uncertainty in the population distribution parameters (mean, sd) and variability in what an individual might encounter at the site. We carried this out and the ultimate result is also a lognormal distribution, but with a slightly increased uncertainty relative to the best-fit distribution (sd increased from 664 to 783).

Finally, we note that the tail length and shape for the fit is an artifact of the choice of distributions, and does not reflect information in the data. For example, a tail extending to infinity, as does the lognormal, is not realistic. We also note that the mean of the data is the best unbiased estimate of the population mean, so we would like the fit to have similar mean to the data. Further, we would like the fit distribution to have a SD at least similar to the data. In this case we find that truncating the tail at 3.5 times the highest data value (i.e. at 2,012 ppm, which is at 98.8% for the distribution) yields a distribution with mean 125 and SD 241, which are similar to these parameter values for the data.

7.3.2. Smoothed Empirical Distribution for CPAHs in Surface NWN Soil.

Another approach to obtaining a distribution from empirical data is to simply sample from the data itself. While this is simple and seemingly avoids assumptions, it has two primary weaknesses. First, the population distribution (i.e. real distribution) is in fact continuos - we could undoubtedly find some soil sample with virtually any concentration between zero and our highest value. Using our few discrete points in place of a continuous distribution could introduce unrealistic patterns into results.

Second, and more importantly, it makes no provision for the likelihood that there are in fact concentrations that are higher than we found - i.e., that there is a tail beyond our highest value. One way to address this issue is through the use of non-parametric tolerance limits, which estimate the certainty with which our highest value exceeds a given percentage of all values. For example, Montgomery (1996) provides a method for calculating tolerance limits for nonparametric distributions. Using this approach, we find that with 16 samples we can say with 75% certainty that our highest value exceeds 92% of all values. Thus if we place 8% of the probability density beyond our highest value we have a 75% chance that we have over, rather than under, represented the number of samples beyond our highest value. However, there is no magic way to guess where those last 8% should be, so we would need to select some shape for the tail we are adding[11].

An alternative approach that uses empirical data, but avoids both of the above problems, is to smooth the data (e.g. Silverman, 1986). This is commonly done by replacing each empirical data point with a probability distribution ("kernel") scaled down to have the probability of that point (1/n). Since the distributions overlap and extend beyond the highest point, the combined distribution is smoothed and extends beyond the highest point. Various kernel distributions are used, including some with tails extending to infinity ("infinite support") such as the normal distributions, and others with finite support. The primary impact of kernel choice for our application will be tail shape and length. In this example we will use the normal distribution, keeping in mind that we will want to truncate the tail, as we did above for the lognormal parametric fit.

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[11] In any case it is difficult to estimate rare events, or the tail of a distribution, without very large data sets. If we select a parametric distribution we sidestep the issue by taking the particular tail of that distribution. But as noted above, these tails are often unrealistic - e.g. extending to infinity - so require truncation or other adjustment.

Having selected a kernel, the challenges become selecting the broadness, or "bandwidth" of the kernel, and then correcting for the known increase in variance resulting from smoothing. A systematic way of selecting bandwidth that has theoretical appeal is called "cross validation." This is done by calculating the likelihood of each observation, given that kernels of a particular bandwidth replace other observations. Bandwidth is then adjusted to maximize the product of these likelihoods. To correct for variance added to the data by the smoothing the distribution is "shrunk." Finally, we will truncate the infinite tail for realism and to obtain a mean equal to the data mean[12].

To summarize, empirical smoothing is a method for selecting a nonparametric distribution that maximizes the probability of existing data. Assumptions include (a) the kernel does not introduce un-correctable bias and provides a reasonable tail shape, (b) bandwidth should be uniform across kernels, and (c) the maximum likelihood selection of bandwidth is appropriate.

In our case we performed the smoothing on the log-transformed data, reflecting our expectation that the general shape will be asymmetric, will not extend below zero, and will have a significant tail. For fitting the surface CPAHs in the NWN area we found that truncating the tail at 2 times the highest value (beyond 96.4%) gives a mean of 124 and SD of 190, which closely match our data.

Figure 43 shows the best fitting smoothed empirical distribution with a solid line and the lognormal parametric fit (previous subsection) with a dotted line. The distributions have very similar shape, but with the smoothed empirical distribution being slightly more uniform versus the parametric fit having slightly more emphasis on the lowest and highest values.

Table 11. Comparison of Distribution Fits to Surface PAHs in NWN Area (approximate values, based on 10,000 trial simulation).

Distribution Parameter	Data	Fit Developed from Lognormal Parametric	Fit of Smoothed, Empirical Distribution
Mean	123	125	124
Standard Deviation (SD)	171	241	190

In this example the reasonable visual fits and close similarity of fits from two different methods gives us some confidence that we have been able to construct reasonable distributions from available data. This may not be the case with other needed distributions for which less data exists. By constructing all of the needed distributions we will discover more about where further data is needed.

[12] Fitting a kernel to data is known to increase the variance by the variance of the kernel (i.e., the bandwidth squared). To correct for this the distance between the mean and the mean of each kernel is shrunk by multiplication by the correction p=((Vd/(Vd+BW^2))^0.5 to keep the mean and variance of the smoothed distribution equal to those values for the original distribution. We apply this shrinking factor to the log-transformed data, to which we fit our kernels. We still get an uncorrected increase in variance when exponentiating back to our final distribution. This bias, and the infinite tail length, are addressed by truncating the tail.

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8. Summary and Conclusions

Conclusions of this preliminary analysis of available soil data include:

- There is substantial small-scale variability superimposed on site-scale trends. The variability is consistent with placement of fill, mixing of soils, and preferential transport of contaminants in rootlets and other channels. This variability is likely to continue to be large for future sampling.
- There appear to be significant differences in concentrations and variability by area and depth. For PAHs site-scale trends include increasing contamination towards the eastern corner of the site and lower and less variable concentrations at the surface. For benzene, concentrations differ by area and appear consistent with a shallow source spreading down gradient and deeper.
- The mix of PAHs differs between surface soil and subsurface soil. For surface soils the PAH mix is fairly constant across the site, while subsurface PAHs show diversity in mix.
- PAH concentrations are related to soil description (odor, sheen, and presence of product). Benzene concentrations tend to be elevated when there is oil or sheen, but the relationship is weaker.
- Surface samples were placed essentially randomly. Sub-surface samples were collected in part based on soil appearance, and are therefore biased. We analyze this bias and estimate that it (1) increases representation of high-concentration PAH samples by about 25%, and (2) has no measurable impact on benzene values.
- 17 new soil data samples are identified that would improve the completeness and uniformity of samples. 10 approximate locations for additional surface samples for PAHs are identified, primarily in the PNO and office areas. 7 approximate locations for shallow soil samples for CPAHs and benzene are identified.
- Constructing concentration probability distributions requires agreement in selection of approach and in implementation. Examples are provided for two methods (fitting parametric distributions and smoothing of empirical) of fitting distributions to concentrations of CPAHs in surface soil on the NWN lease area. Other data needs may become apparent with similar construction of the additional 8 concentration probability distributions that are needed for assessing risk.

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9. Appendix 1. Detailed Results of Mann-Whitney U Tests for Difference Between Groups

Detailed results are shown for pair-wise comparisons of areas for:

- all depths together
- surface (<0.2 feet deep)
- shallow(0.2-15 feet deep), and
- deep soil (>15ft)

The areas breakdowns considered are, as defined in text and Table 1:

- 2-Area
- 3-Area
- 4-Area

3-Area Pair-wise Comparison by Area, All Depths:

Chemical	Group 1 N PNO	Group 2 N NWN	p value
Carc. PAHs	42	67	<.001
Total PAHs	42	67	<.001
Benzene	26	17	<.001

Chemical	N, Group 1 PNO	Group 2 N KOP	p value
Carc. PAHs	42	27	.01
Total PAHs	42	27	<.001
Benzene	26	15	<.001

Chemical	Group 1 N NWN	Group 2 N KOP	p value
Carc. PAHs	67	27	.29
Total PAHs	67	27	.98
Benzene	17	15	.94

3-Area Pair-wise Comparison by Area, Surface Samples (< 0.2 feet),:

Chemical	Group 1 N PNO	Group 2 N NWN	p value
Carc. PAHs	4	15	.05
Total PAHs	4	15	.05
Benzene	1	2	--

Chemical	Group 1 N PNO	Group 2 N KOP	p value
Carc. PAHs	4	4	.03
Total PAHs	4	4	.03
Benzene	1	2	--

Chemical	Group 1 N NWN	Group 2 N KOP	p value
Carc. PAHs	15	4	.47
Total PAHs	15	4	.36
Benzene	2	2	--

3-Area Pair-wise Comparison by Area, Shallow Depth Samples (Between 0.2 and 15 feet):

Chemical	Group 1 N PNO	Group 2 N NWN	p value
Carc. PAHs	16	12	.007
Total PAHs	16	12	.005
Benzene	10	6	.001

Chemical	Group 1 N PNO	Group 2 N KOP	p value
Carc. PAHs	16	8	.11
Total PAHs	16	8	.03
Benzene	10	5	<.001

Chemical	Group 1 N NWN	Group 2 N KOP	p value
Carc. PAHs	12	8	.21
Total PAHs	12	8	.27
Benzene	6	5	.25

3-Area Pair-wise Comparison by Area, Deep Samples (more than 15 feet):

Chemical	Group 1 N PNO	Group 2 N NWN	p value
Carc. PAHs	22	40	.005
Total PAHs	22	40	<.001
Benzene	15	9	.001

Chemical	Group 1 N PNO	Group 2 N KOP	p value
Carc. PAHs	22	15	.06
Total PAHs	22	15	.007
Benzene	15	8	.004

Chemical	Group 1 N NWN	Group 2 N KOP	p value
Carc. PAHs	40	15	.43
Total PAHs	40	15	.93
Benzene	9	8	.54

4-Area Pair-wise Comparison by Area, All Depths:

Chemical	Group 1 N Oxide	Group 2 N PNO	p value
Carc. PAHs	14	25	<.001
Total PAHs	14	25	<.001
Benzene	2	22	.04

Chemical	Group 1 N Oxide	Group 2 N Pond	p value
Carc. PAHs	14	53	.55
Total PAHs	14	53	.32
Benzene	2	15	.24

Chemical	Group 1 N Oxide	Group 2 N Koppers	p value
Carc. PAHs	14	44	.39
Total PAHs	14	44	.84
Benzene	2	19	.24

Chemical	Group 1 N PNO	Group 2 N Pond	p value
Carc. PAHs	25	53	<.001
Total PAHs	25	53	<.001
Benzene	22	15	<.001

Chemical	Group 1 N PNO	Group 2 N Koppers	p value
Carc. PAHs	25	44	<.001
Total PAHs	25	44	<.001
Benzene	22	19	<.001

Chemical	Group 1 N Pond	Group 2 N Koppers	p value
Carc. PAHs	53	44	.03
Total PAHs	53	44	.25
Benzene	15	19	.66

4-Area Pair-wise Comparison by Area, Surface (<0.2 feet):

Chemical	Group 1 N Oxide	Group 2 N PNO	p value
Carc. PAHs	4	0	--
Total PAHs	4	0	--
Benzene	0	0	--

Chemical	Group 1 N Oxide	Group 2 N Pond	p value
Carc. PAHs	4	14	.05
Total PAHs	4	14	.05
Benzene	1	3	.66

Chemical	Group 1 N Oxide	Group 2 N Koppers	p value
Carc. PAHs	4	5	.03
Total PAHs	4	5	.03
Benzene	1	1	--

Chemical	Group 1 N PNO	Group 2 N Pond	p value
Carc. PAHs	0	14	--
Total PAHs	0	14	--
Benzene	0	3	--

Chemical	Group 1 N PNO	Group 2 N Koppers	p value
Carc. PAHs	0	5	--
Total PAHs	0	5	--
Benzene	0	0	--

Chemical	Group 1 N Pond	Group 2 N Koppers	p value
Carc. PAHs	14	5	.89
Total PAHs	14	5	1.0
Benzene	3	1	--

4-Area Pair-wise Comparison by Area, Shallow (0.2 to 15 feet):

Chemical	Group 1 N Oxide	Group 2 N PNO	p value
Carc. PAHs	5	10	.05
Total PAHs	5	10	.10
Benzene	1	9	--

Chemical	Group 1 N Oxide	Group 2 N Pond	p value
Carc. PAHs	5	7	.20
Total PAHs	5	7	.11
Benzene	1	4	--

Chemical	Group 1 N Oxide	Group 2 N Koppers	p value
Carc. PAHs	5	14	.44
Total PAHs	5	14	.82
Benzene	1	7	--

Chemical	Group 1 N PNO	Group 2 N Pond	p value
Carc. PAHs	10	7	<.001
Total PAHs	10	7	<.001
Benzene	9	4	<.001

Chemical	Group 1 N PNO	Group 2 N Koppers	p value
Carc. PAHs	10	14	.03
Total PAHs	10	14	.015
Benzene	9	7	<.001

Chemical	Group 1 N Pond	Group 2 N Koppers	p value
Carc. PAHs	7	14	.003
Total PAHs	7	14	.02
Benzene	4	7	.79

4-Area Pair-wise Comparison by Area, Deep (>15 feet):

Chemical	Group 1 N Oxide	Group 2 N PNO	p value
Carc. PAHs	5	15	.01
Total PAHs	5	15	<.001

Benzene	0	13	--

Chemical	Group 1 N Oxide	Group 2 N Pond	p value
Carc. PAHs	5	32	.91
Total PAHs	5	32	.62
Benzene	0	8	--

Chemical	Group 1 N Oxide	Group 2 N Koppers	p value
Carc. PAHs	5	25	.52
Total PAHs	5	25	1.0
Benzene	0	11	--

Chemical	Group 1 N PNO	Group 2 N Pond	p value
Carc. PAHs	15	32	<.001
Total PAHs	15	32	<.001
Benzene	13	8	<.001

Chemical	Group 1 N PNO	Group 2 N Koppers	p value
Carc. PAHs	15	25	.008
Total PAHs	15	25	<.001
Benzene	13	11	<.001

Chemical	Group 1 N Pond	Group 2 N Koppers	p value
Carc. PAHs	32	25	.26
Total PAHs	32	25	.52
Benzene	8	11	.97

2-Area Pair-wise Comparison by Area, All Depths:

Chemical	Group 1 N Main Area	Group 2 N East Corner	p value
Carc. PAHs	93	43	.003
Total PAHs	93	43	.009
Benzene	47	11	.05

2-Area Pair-wise Comparison by Area, Surface:

Chemical	Group 1 N Main Area	Group 2 N East Corner	p value
Carc. PAHs	13	10	.21
Total PAHs	13	10	.21
Benzene	3	2	--

2-Area Pair-wise Comparison by Area, Shallow:

Chemical	Group 1 N Main Area	Group 2 N East Corner	p value
Carc. PAHs	30	6	<.001
Total PAHs	30	6	<.002
Benzene	18	3	.18

2-Area Pair-wise Comparison by Area, Deep:

Chemical	Group 1 N Main Area	Group 2 N East Corner	p value
Carc. PAHs	50	27	.05
Total PAHs	50	27	.07
Benzene	26	6	.21

10. References

Crystal Ball simulation software, Version 4.0 for Windows, Decisioneering Inc, Aurora Colorado.

Davison, A.C., and D.B. Hinkley. Bootstrap Methods and their Applications. Cambridge University Press, 1997.

Devore, 1995. Probability and Statistics for Engineering and the Sciences. Duxbury Press, Wadsworth Inc., Division of Thomson Publishing, USA.

EPA, July 1996. Guidance for Data Quality Assessment. EPAQA/G-9, QA96 Version, EPA/600/R-96/084

EPA, March 1997, Guiding Principles for Monte Carlo Analysis. EPA/630/R-97/001

Hahn and Associates, August 4,1995. Final Remedial Investigation/Feasibility Study Work Plan, Northwest Natural Gas Company Gasco Facility.

Hahn and Associates, July 22, 1996. Data Package for Remedial Investigation/Feasibility Study.

Montgomery, D.C., 1996, "Introduction to Statistical Quality Control," John Wiley and Sons Inc.

Oregon Dept. of Env. Quality, January, 1998. Guidance for use of Probabilistic Analysis in Human Health Risk Assessments. Interim Final.

Roeder, Kathryn and Larry Wasserman, Sept. 1997,"Practical Bayesian Density Estimation Using Mixtures of Normals," J Amer Statistical Assoc, 92(439):894-902

Silverman, B.W., 1986, "Density estimation for statistics and data," Chapman and Hall.

Statistica statistical analysis software, Release 5.1 M, 1998. StatSoft Inc., Tulsa OK.

Koppers000660

11. Figures

Koppers000661

Figure 1.

Comparison of Duplicate Results for Three Compounds

(B-31 & MW-03 samples were all ND or very low)

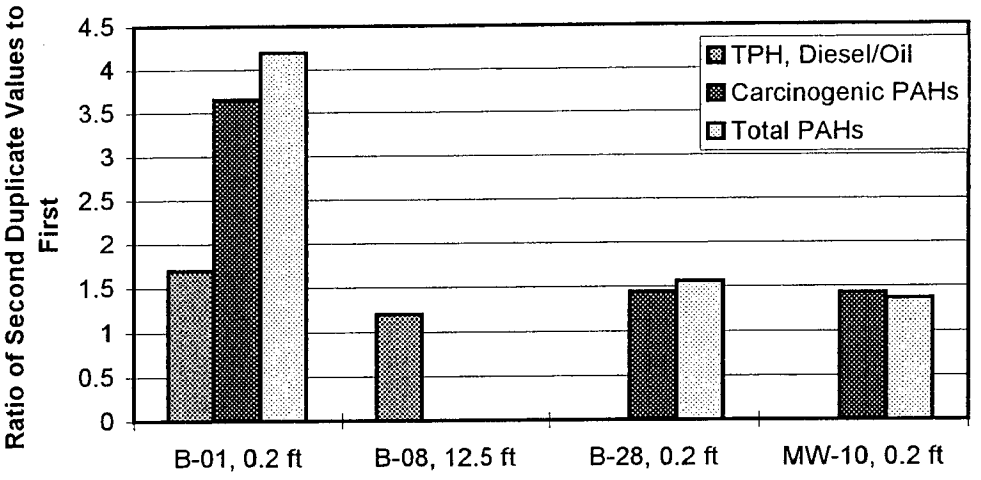


Figure 2.

Total vs. Carcinogenic PAHs by Depth (Log-Log)

DEPTH: Surface y=-0.252+0.994*x+eps

DEPTH: Shallow y=-0.628+0.913*x+eps

DEPTH: Deep y=-1.047+0.849*x+eps

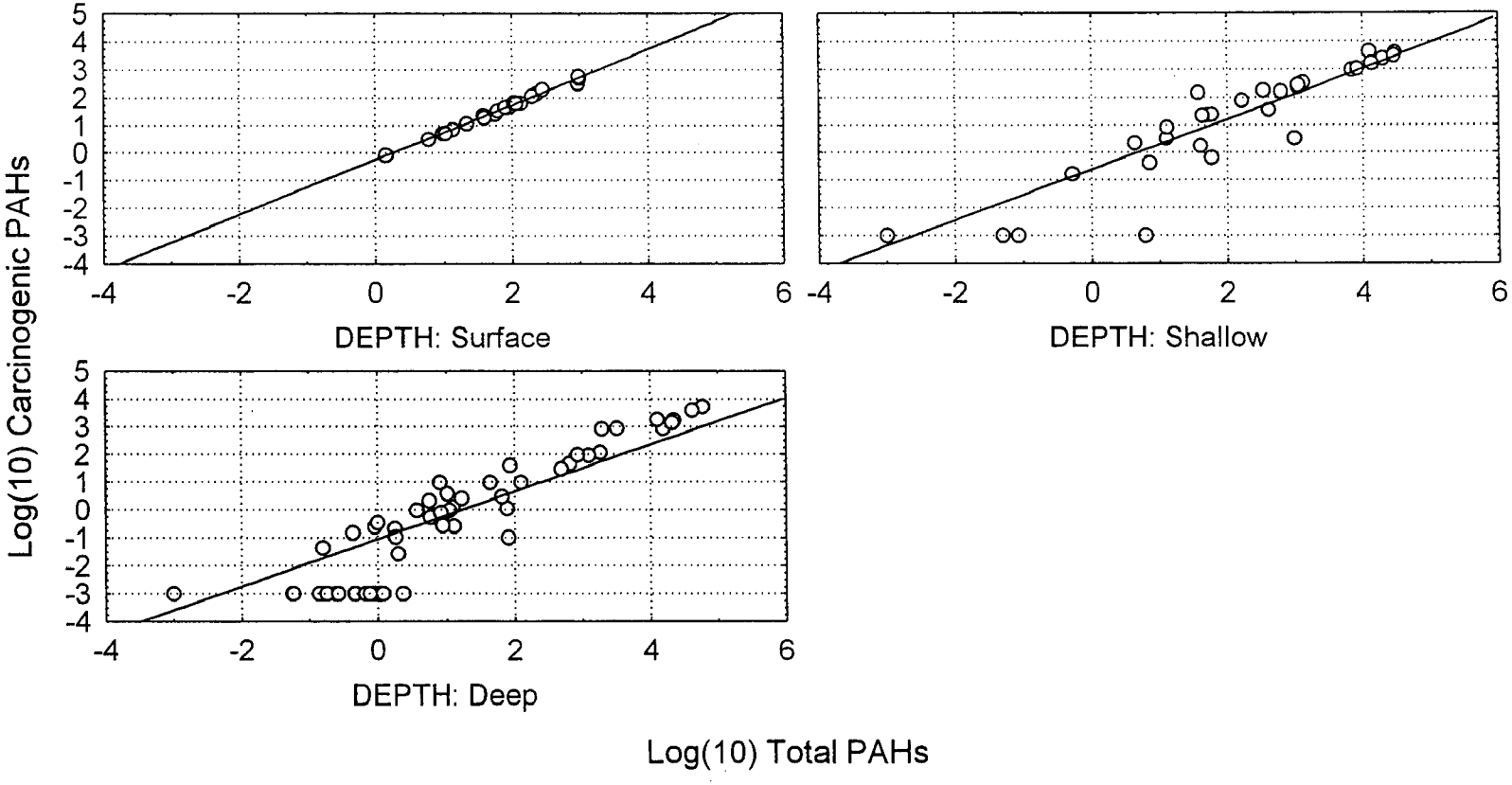
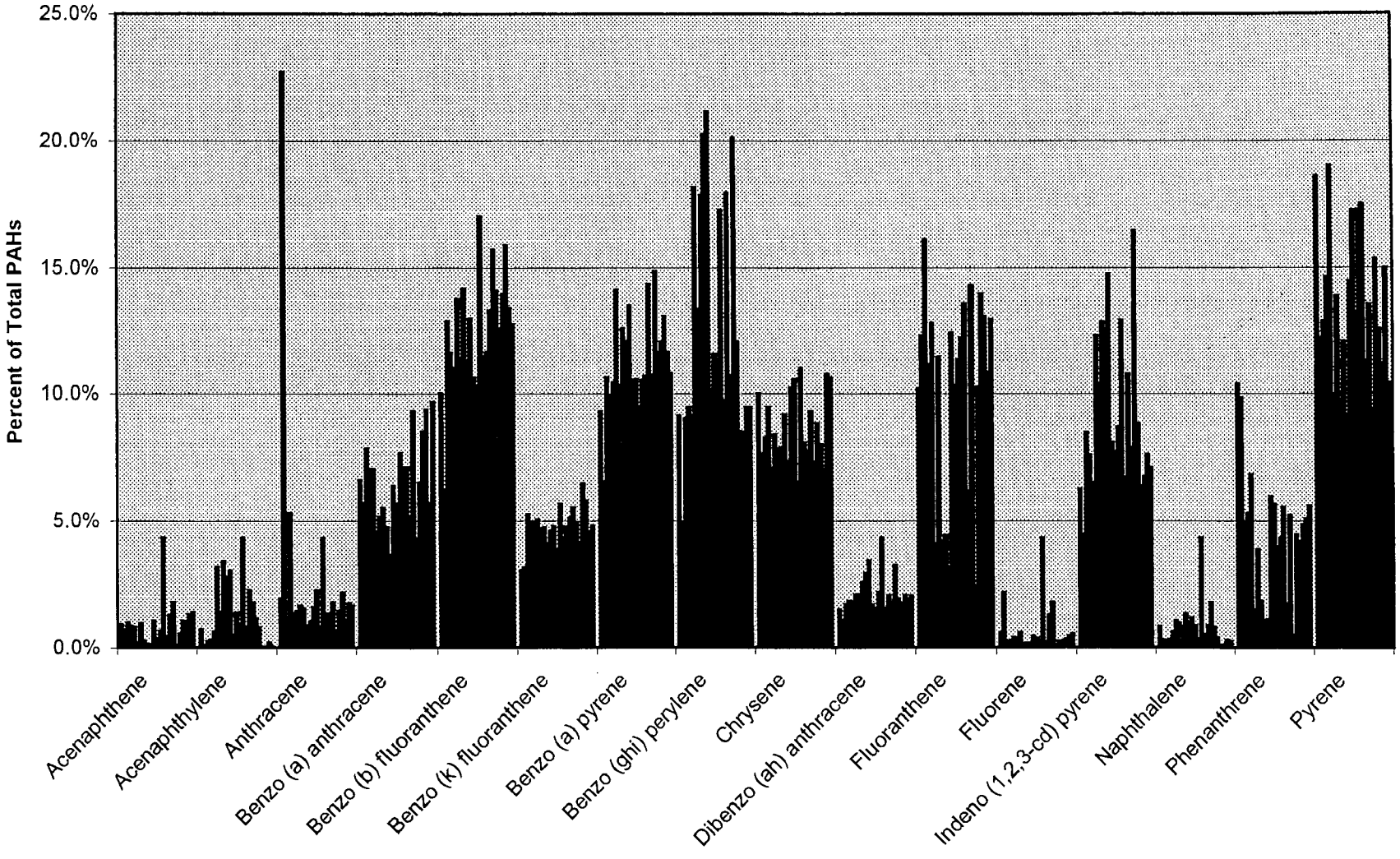


Figure 3.

Comparison of PAH Compound Mix in Surface Soil Samples



Koppers000664

Figure 4.

Comparison of PAH Compouind Mix in Shallow Soil Samples

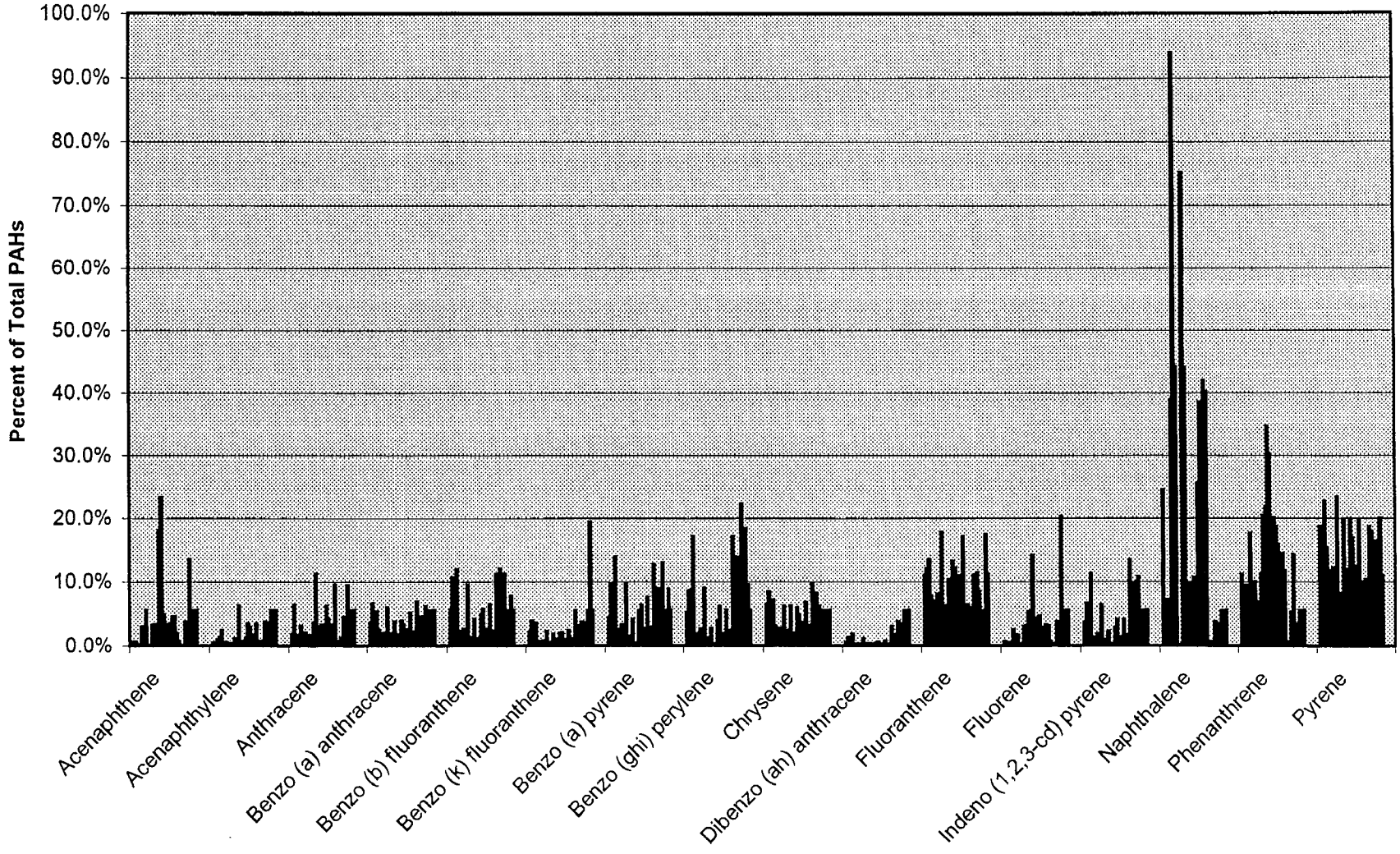
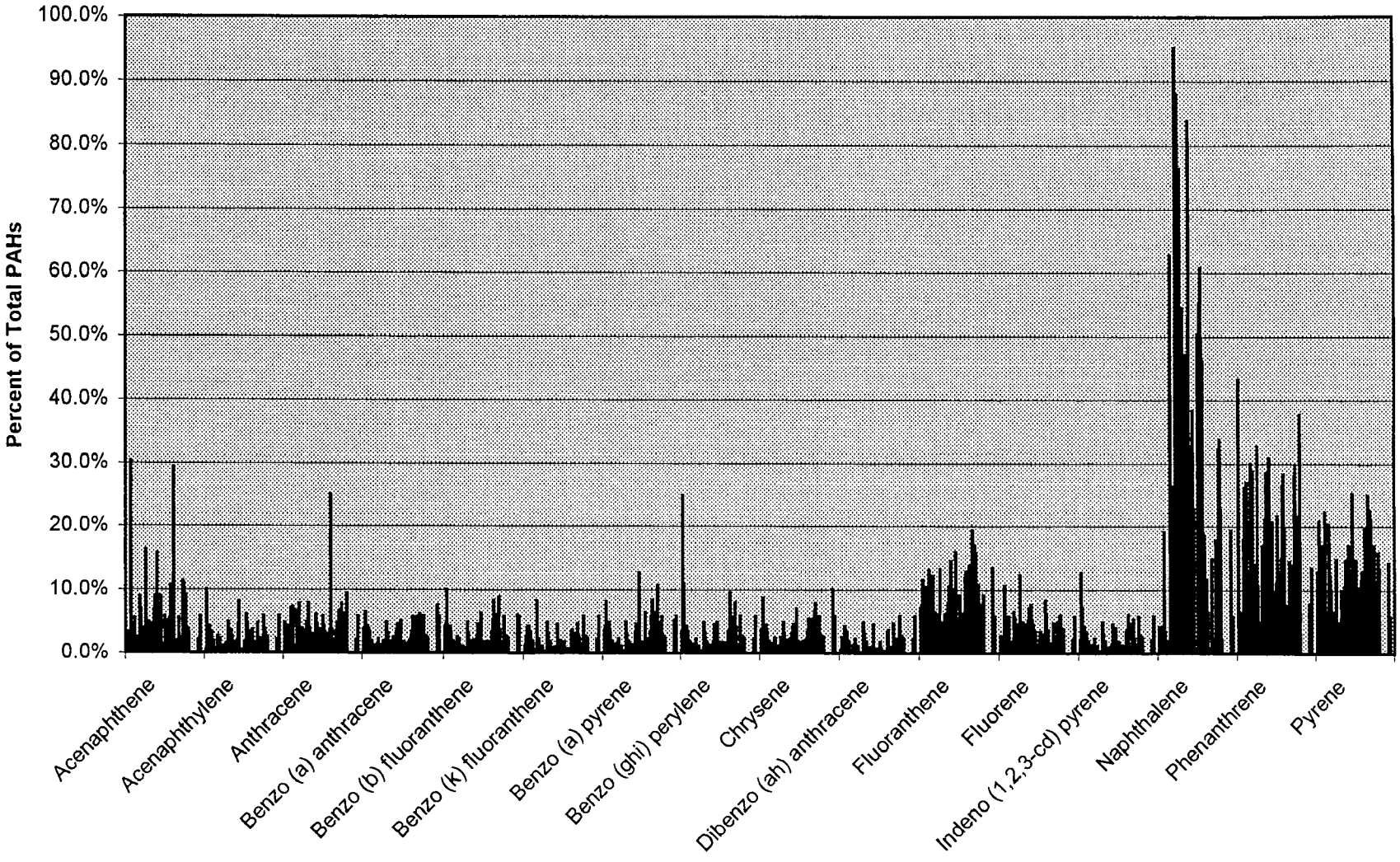


Figure 5.

Comparision of PAH Compound Mix in Deep Soil Samples



Koppers000666

Figure 6.

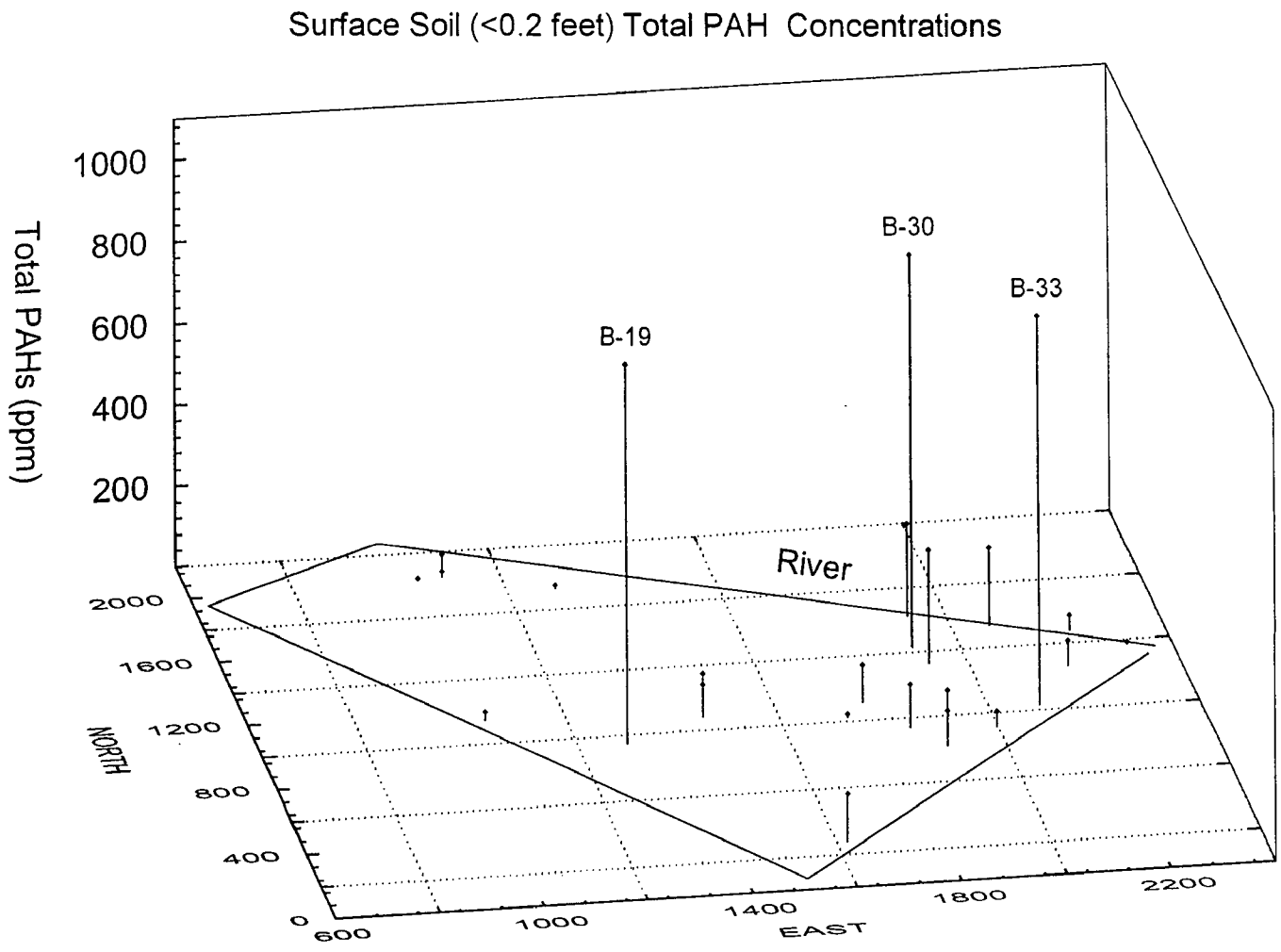

Surface Soil (<0.2 feet) Total PAH Concentrations
Total PAHs (ppm)
1000
800
600
400
200
B-19
B-30
B-33
River
NORTH
2000
1600
1200
800
400
0
600
1000
1400
1800
2200
EAST

Figure 7.

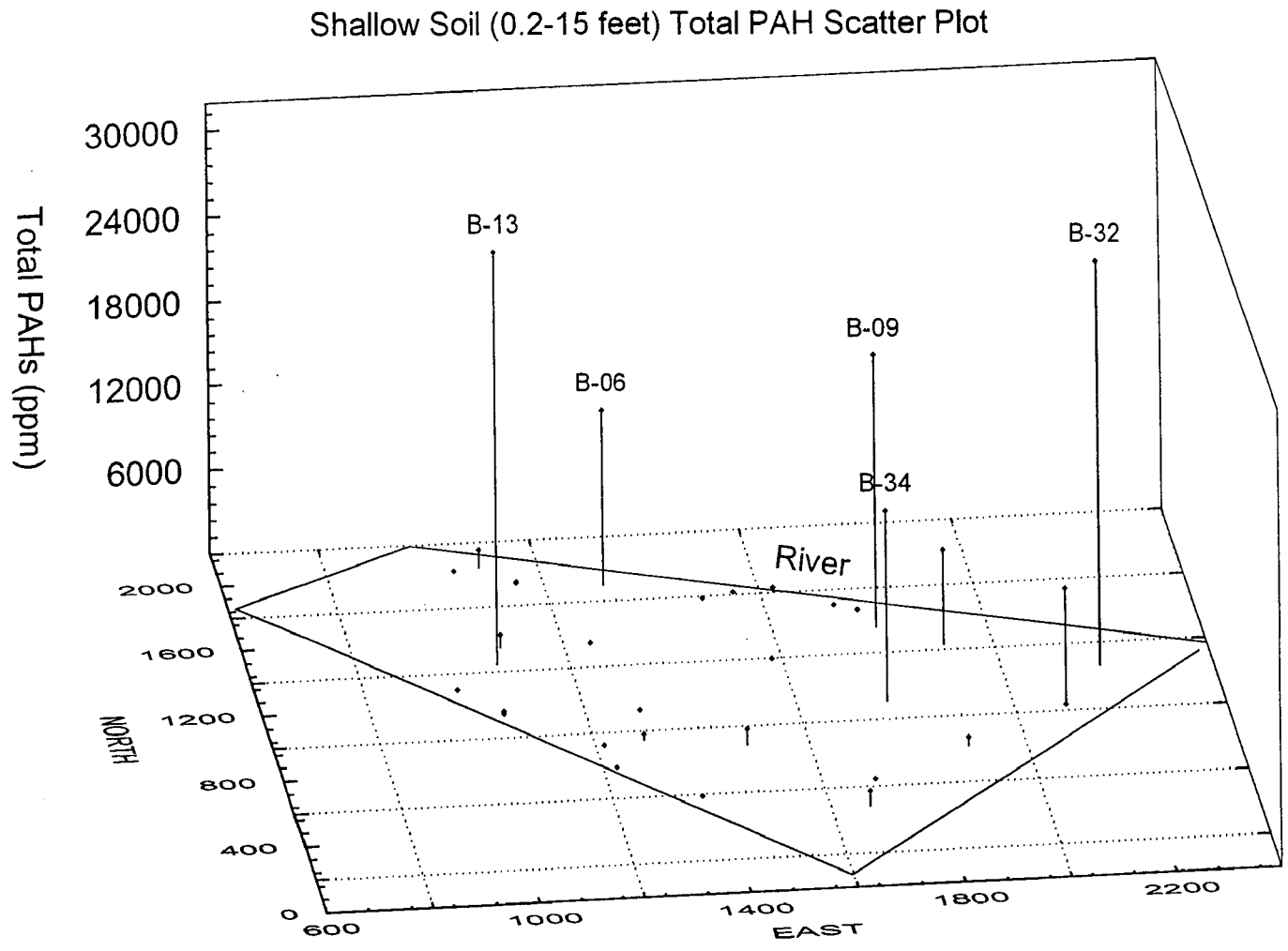

Shallow Soil (0.2-15 feet) Total PAH Scatter Plot
Total PAHs (ppm)
30000
24000
18000
12000
6000
B-13
B-06
B-09
B-34
B-32
River
NORTH
2000
1600
1200
800
400
0
600
1000
1400
1800
2200
EAST

Figure 8.

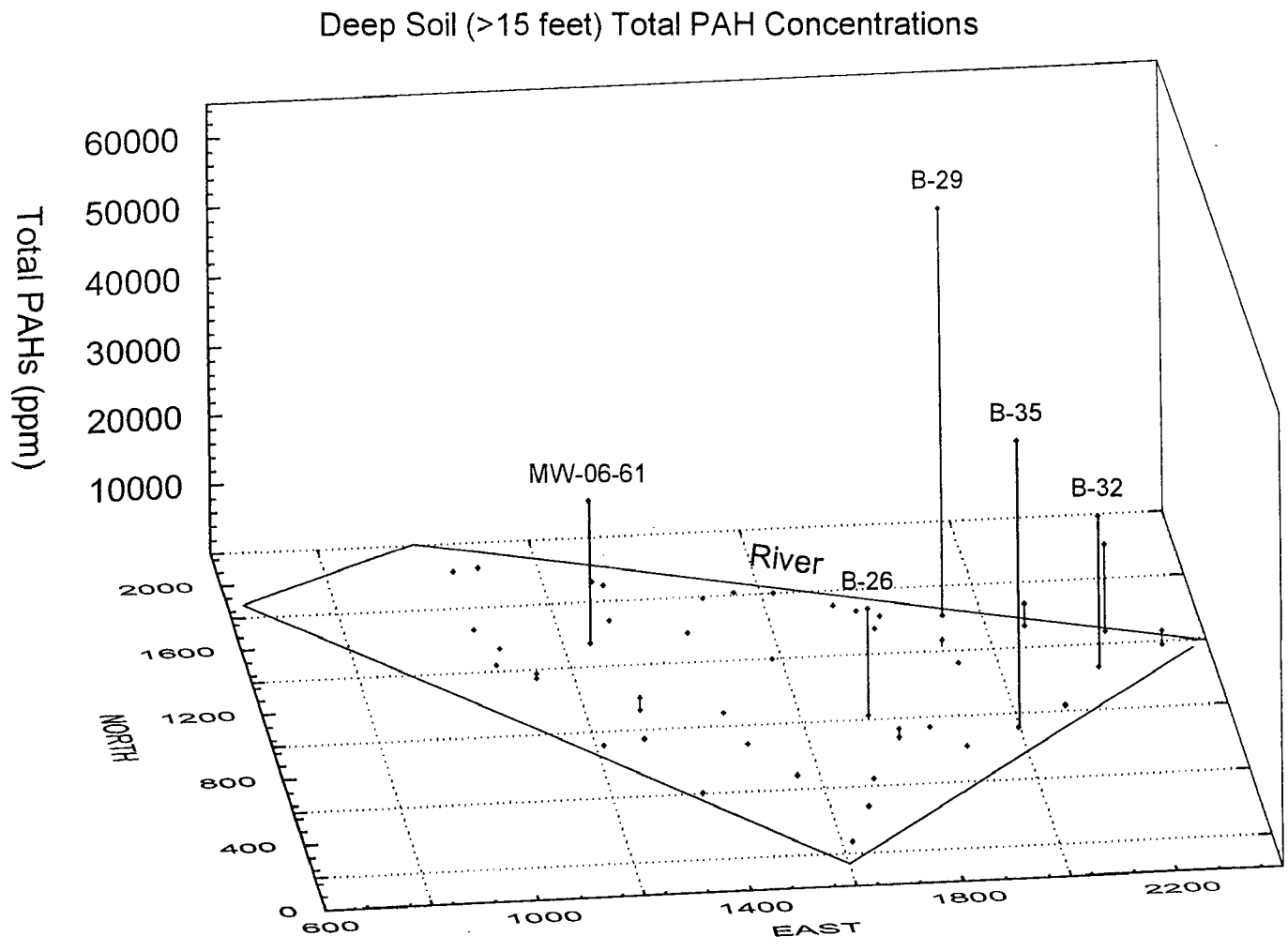

Deep Soil (>15 feet) Total PAH Concentrations
Total PAHs (ppm)
60000
50000
40000
30000
20000
10000
B-29
B-35
B-32
MW-06-61
River
B-26
2000
1600
1200
800
400
0
NORTH
600
1000
1400
1800
2200
EAST

Figure 9.

Surface Soil Concentrations of Carcinogenic PAHs

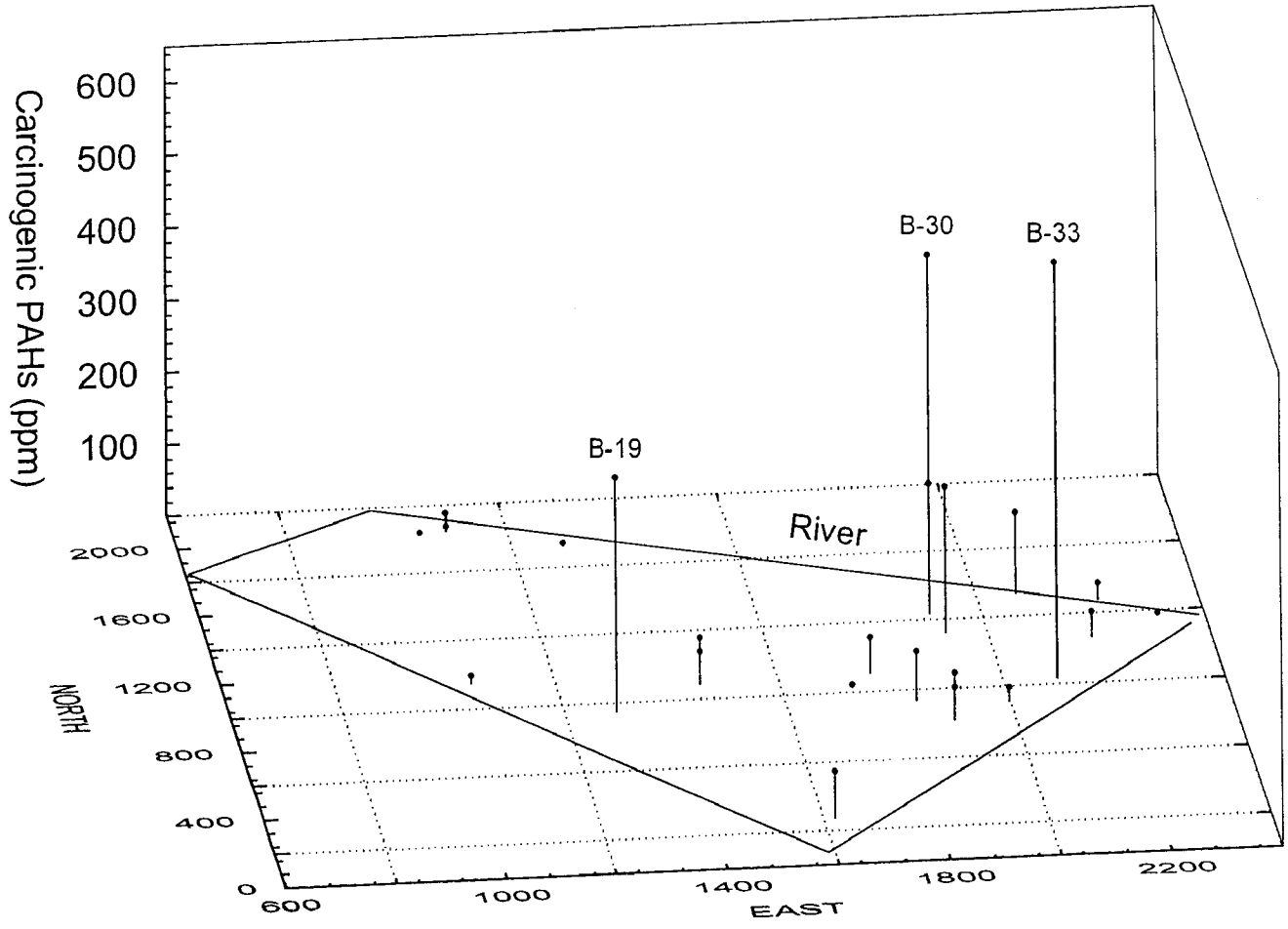


Figure 10.

Shallow Soil (0.2-15 feet) Carcinogenic PAH Concentrations

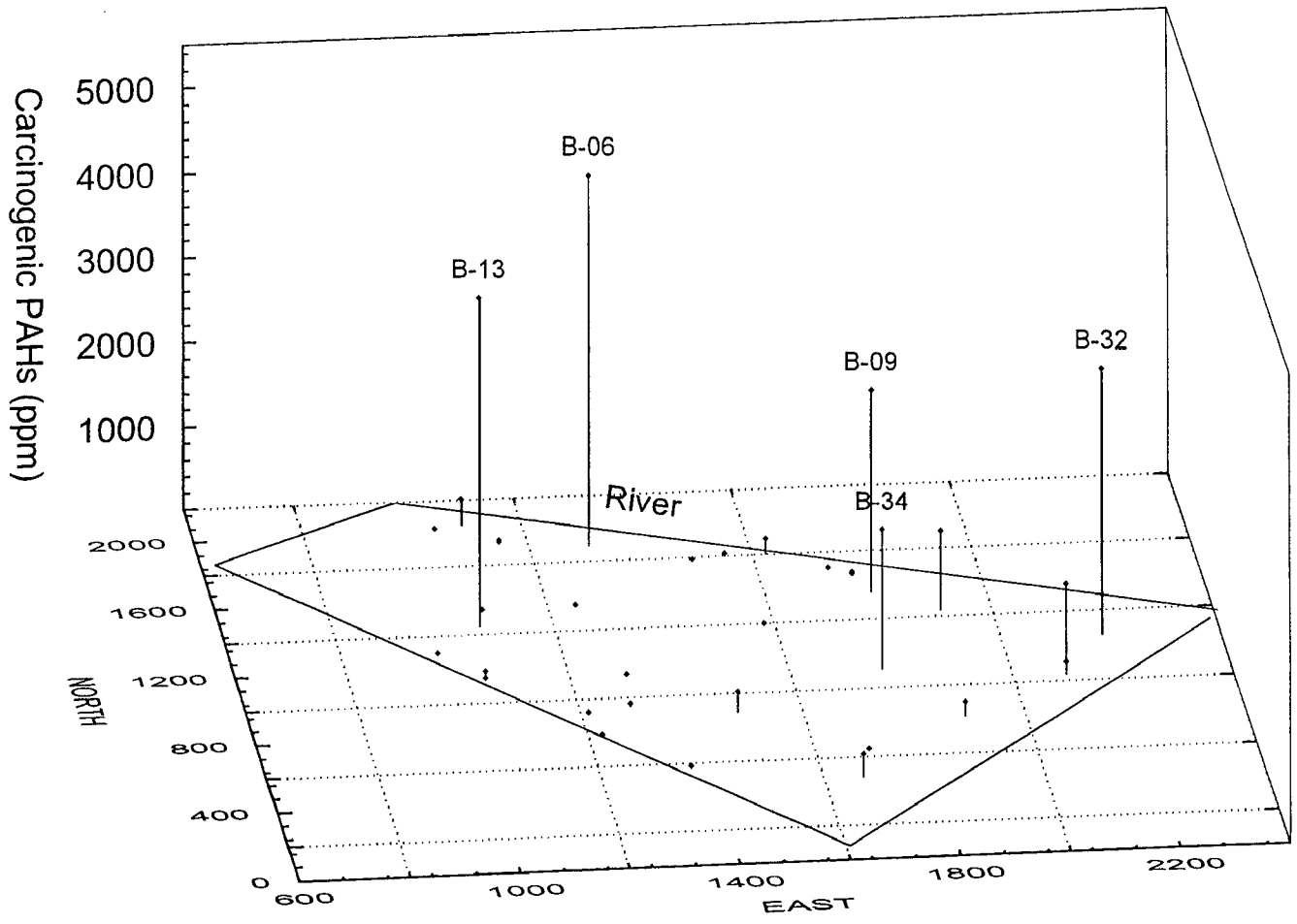


Figure 11.

Deep Soil (>15 feet) Carcinogenic PAH Concentrations

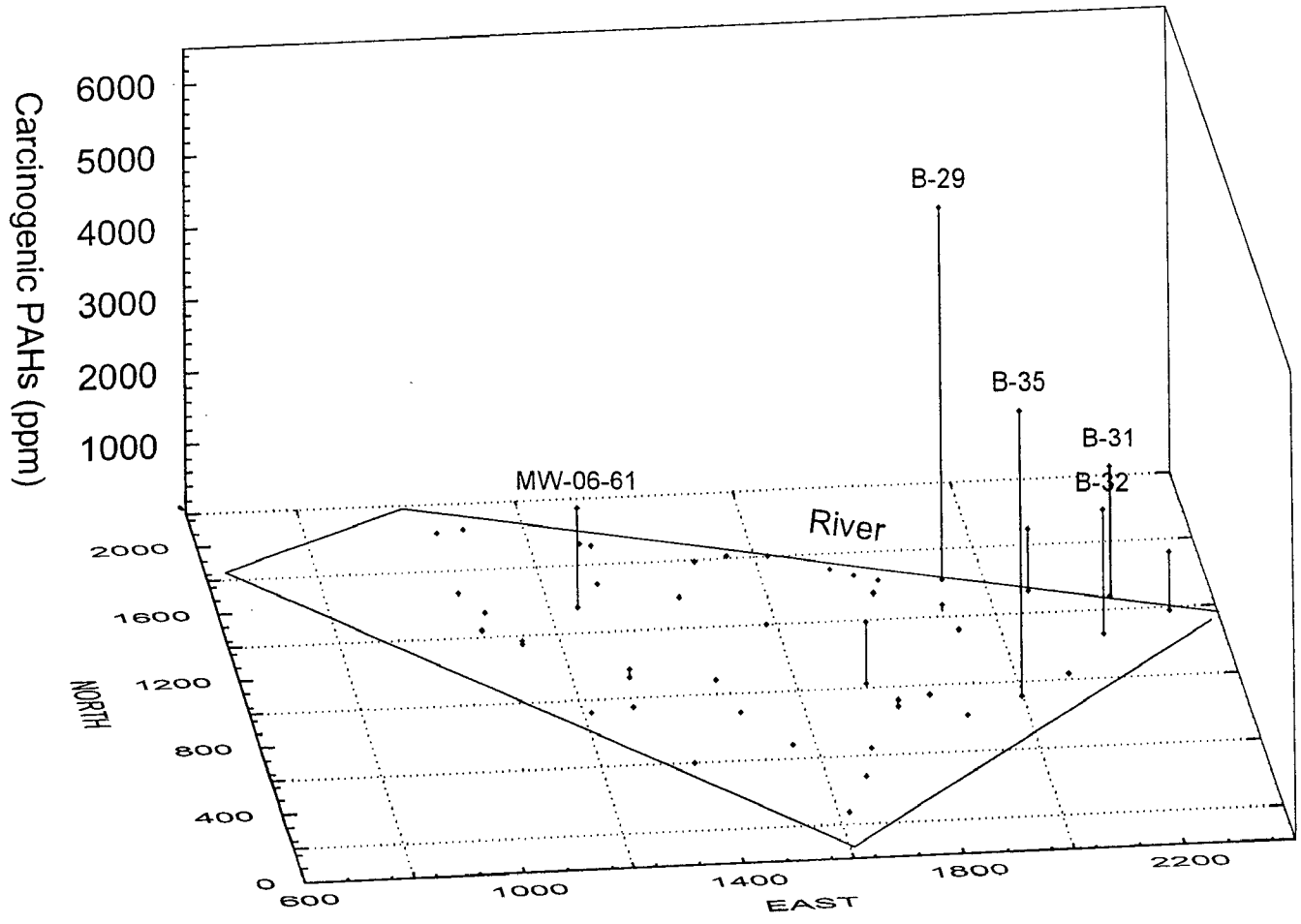


Figure 12.

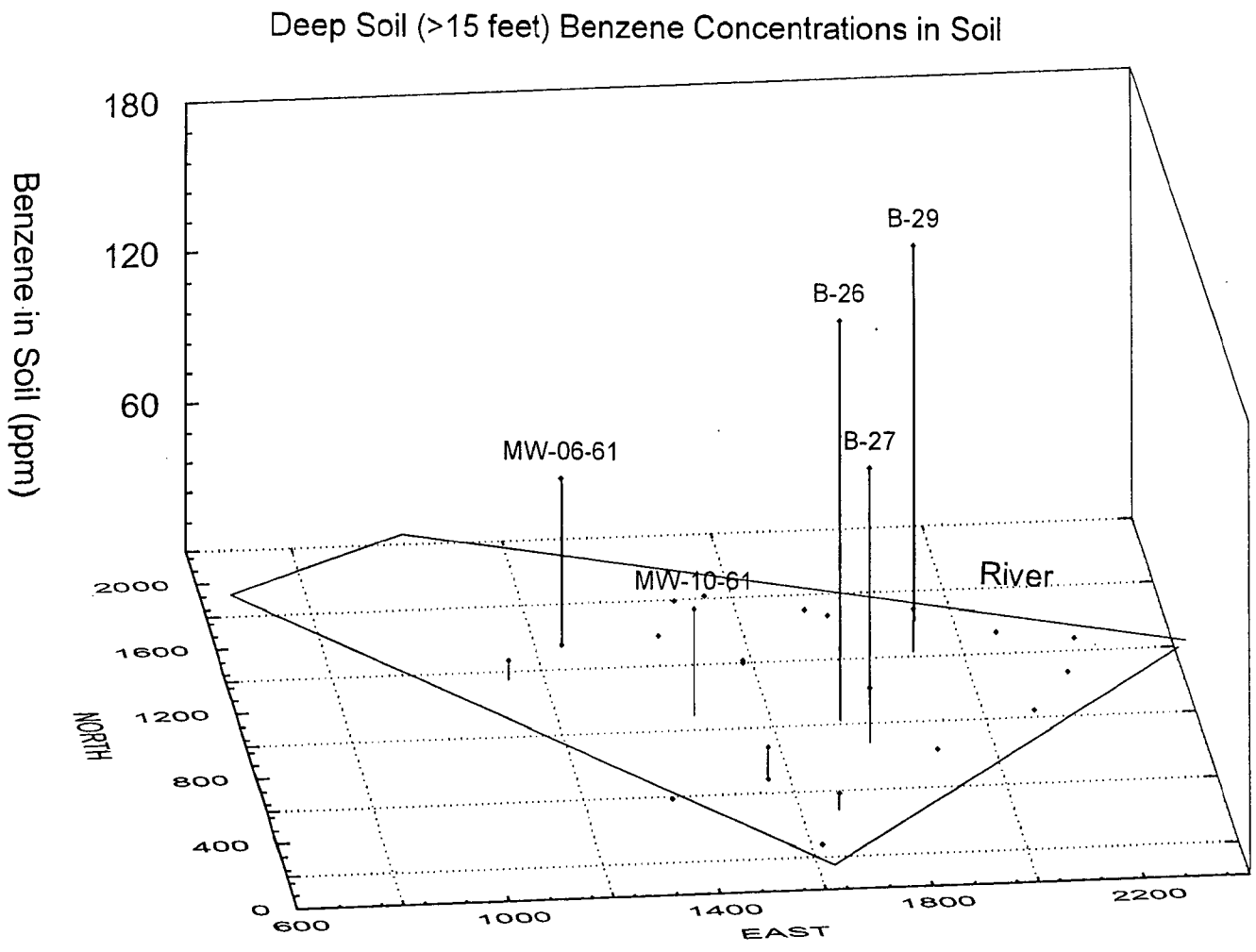
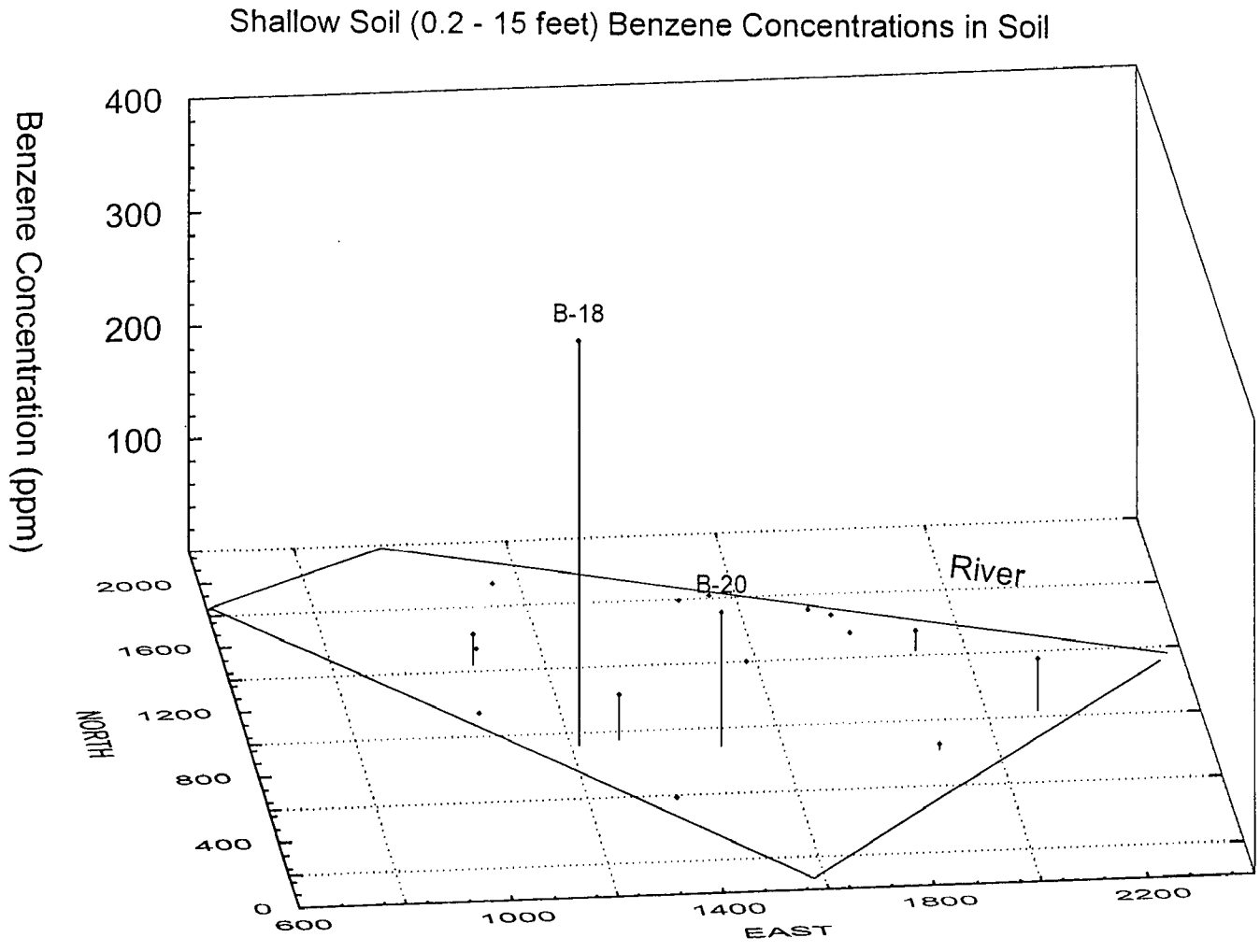

Deep Soil (>15 feet) Benzene Concentrations in Soil
Benzene in Soil (ppm)
180
120
60
0
B-29
B-26
B-27
MW-06-61
MW-10-61
River
NORTH
2000
1600
1200
800
400
0
600
1000
1400
1800
2200
EAST

Figure 13.


Shallow Soil (0.2 - 15 feet) Benzene Concentrations in Soil
Benzene Concentration (ppm)
400
300
200
100
B-18
B-20
River
NORTH
2000
1600
1200
800
400
0
600
1000
1400
1800
2200
EAST

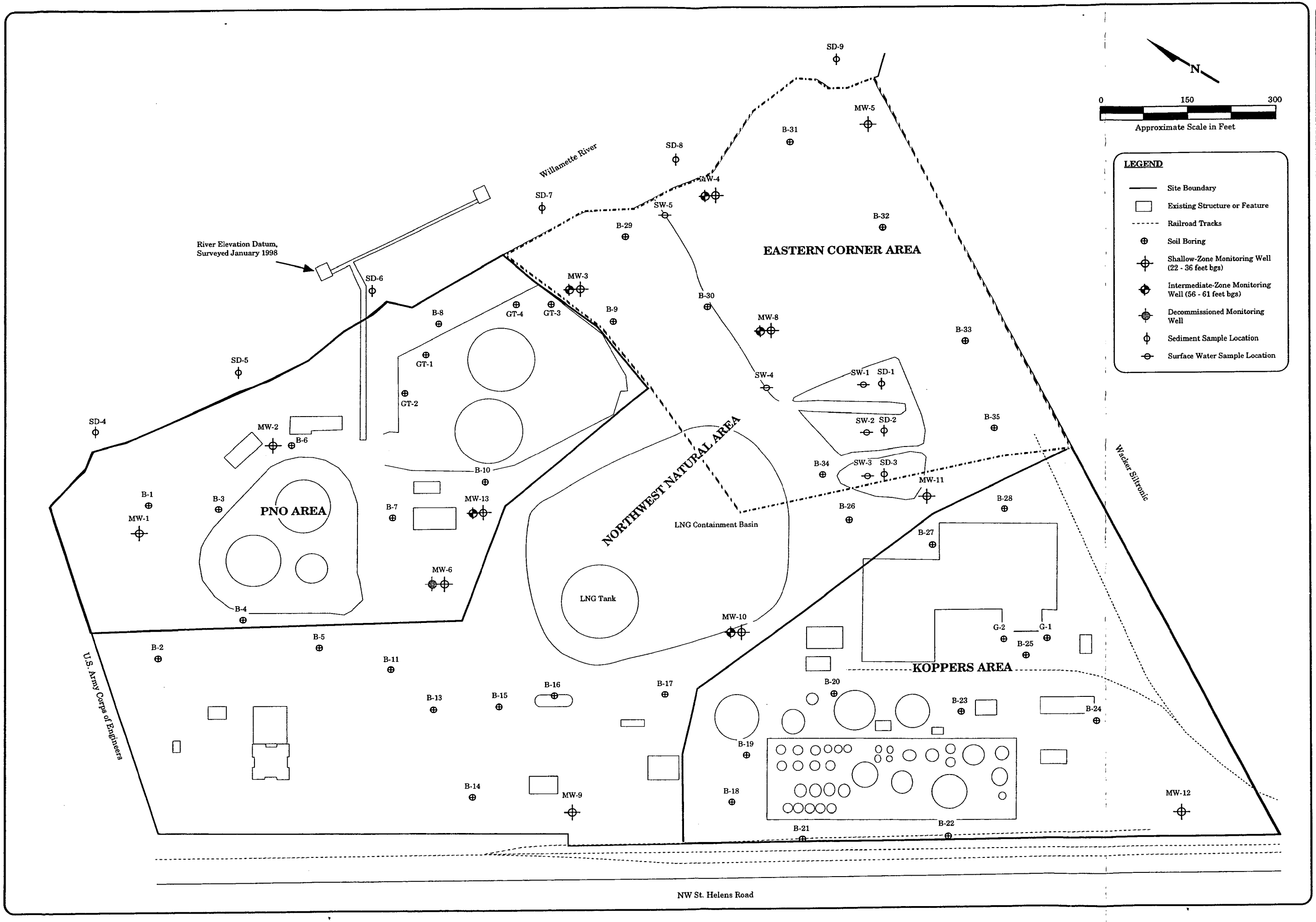


Figure 14

Site Area Breakdown Map

Remedial Investigation
Northwest Natural - Gasco Facility
7900 NW St. Helens Road
Portland, Oregon

HAHN & ASSOCIATES, INC.

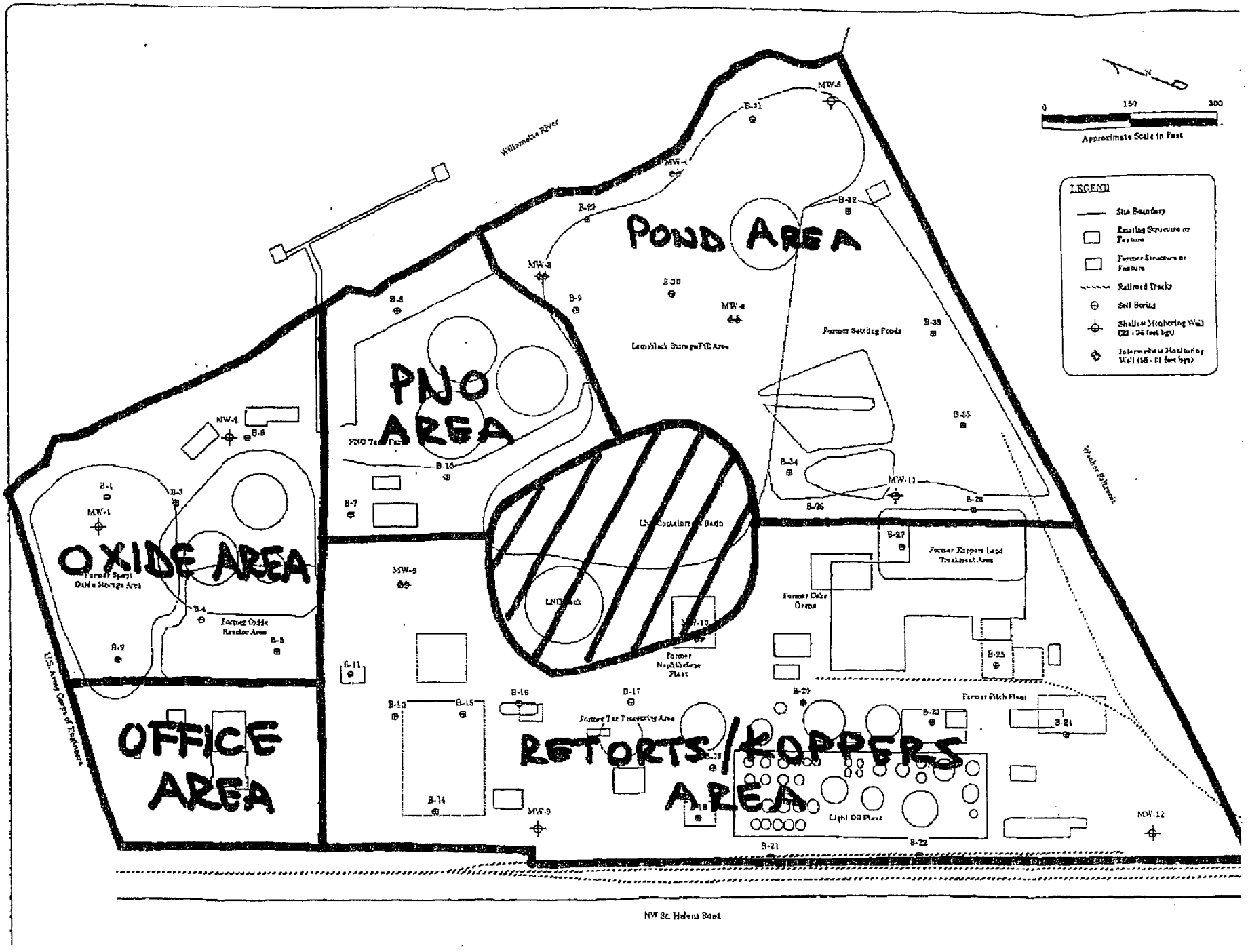
ENVIRONMENTAL MANAGEMENT
434 NW SIXTH AVENUE, SUITE 203
PORTLAND, OREGON 97209
503/796-0717

September 1998

Project #2708

Koppers000675

Figure 14B



Koppers000676

Figure 15.

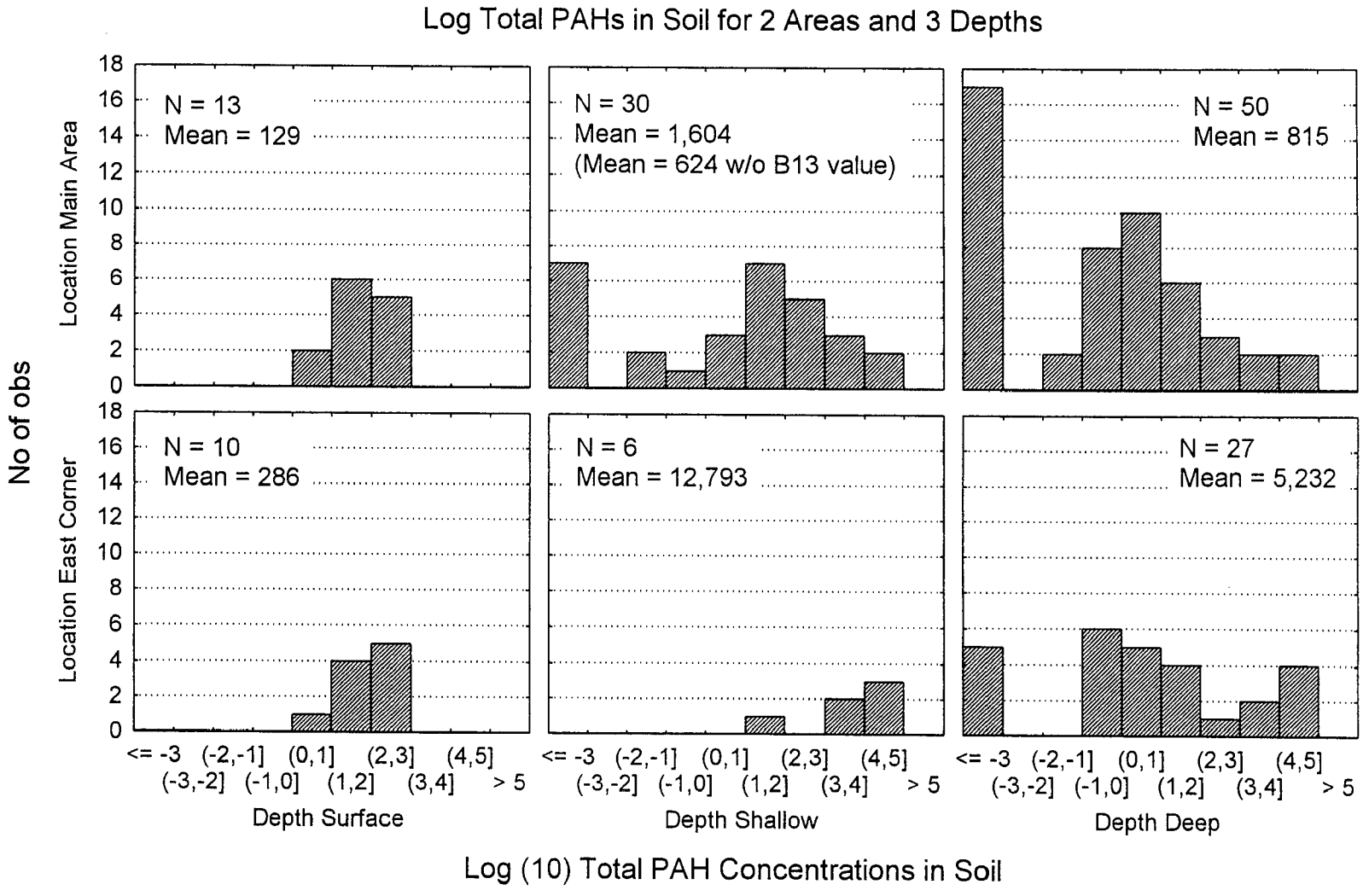

Log Total PAHs in Soil for 2 Areas and 3 Depths
No of obs
Location Main Area
Location East Corner
N = 13
Mean = 129
N = 30
Mean = 1,604
(Mean = 624 w/o B13 value)
N = 50
Mean = 815
N = 10
Mean = 286
N = 6
Mean = 12,793
N = 27
Mean = 5,232
0
2
4
6
8
10
12
14
16
18
<= -3
(-3,-2]
(-2,-1]
(-1,0]
(0,1]
(1,2]
(2,3]
(3,4]
(4,5]
> 5
Depth Surface
Depth Shallow
Depth Deep
Log (10) Total PAH Concentrations in Soil

Figure 16.

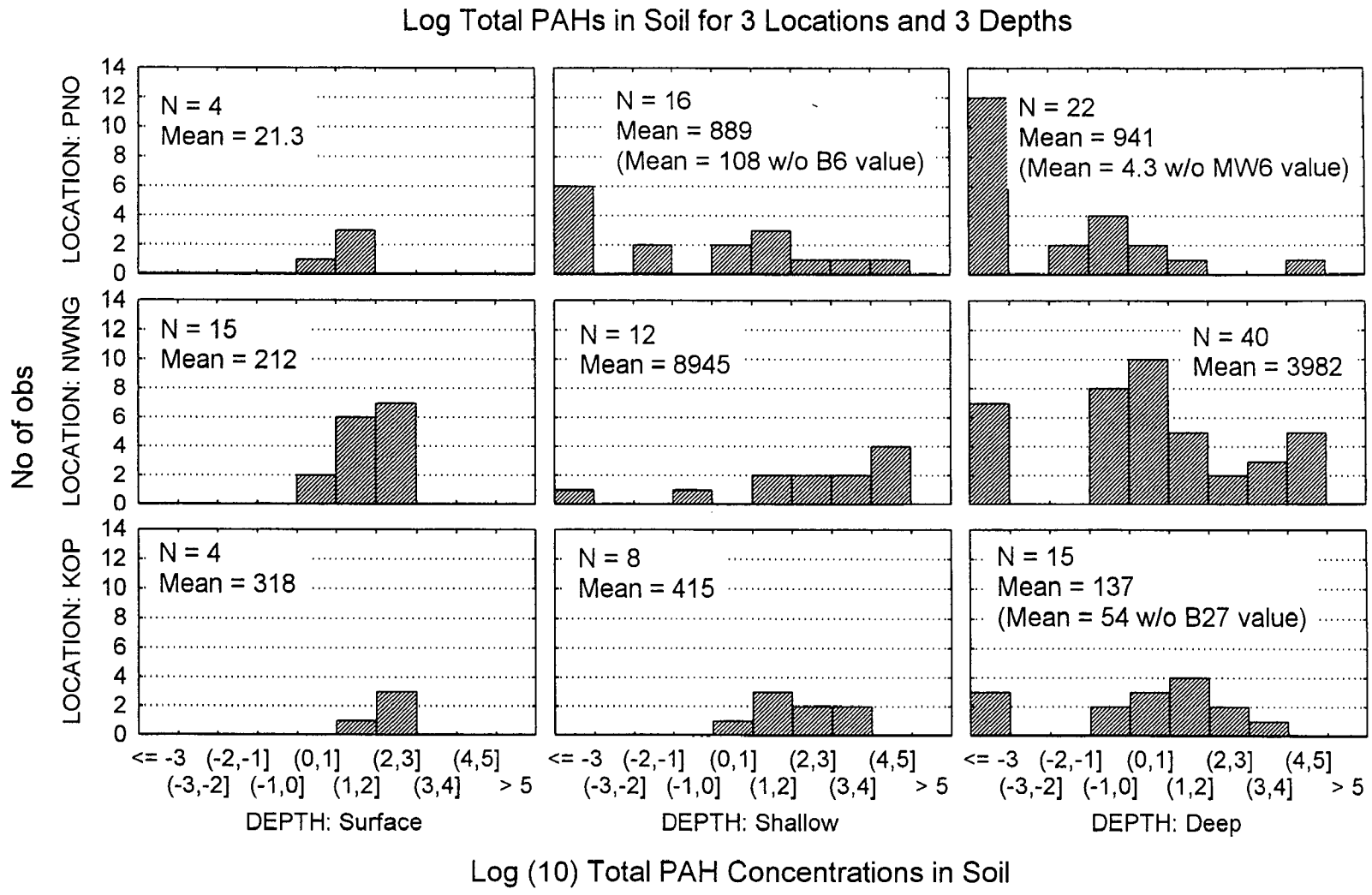

Log Total PAHs in Soil for 3 Locations and 3 Depths
No of obs
LOCATION: PNO
LOCATION: NWNG
LOCATION: KOP
N = 4
Mean = 21.3
N = 16
Mean = 889
(Mean = 108 w/o B6 value)
N = 22
Mean = 941
(Mean = 4.3 w/o MW6 value)
N = 15
Mean = 212
N = 12
Mean = 8945
N = 40
Mean = 3982
N = 4
Mean = 318
N = 8
Mean = 415
N = 15
Mean = 137
(Mean = 54 w/o B27 value)
0 2 4 6 8 10 12 14
<= -3 (-3,-2] (-2,-1] (-1,0] (0,1] (1,2] (2,3] (3,4] (4,5] > 5
DEPTH: Surface
DEPTH: Shallow
DEPTH: Deep
Log (10) Total PAH Concentrations in Soil

Figure 17.

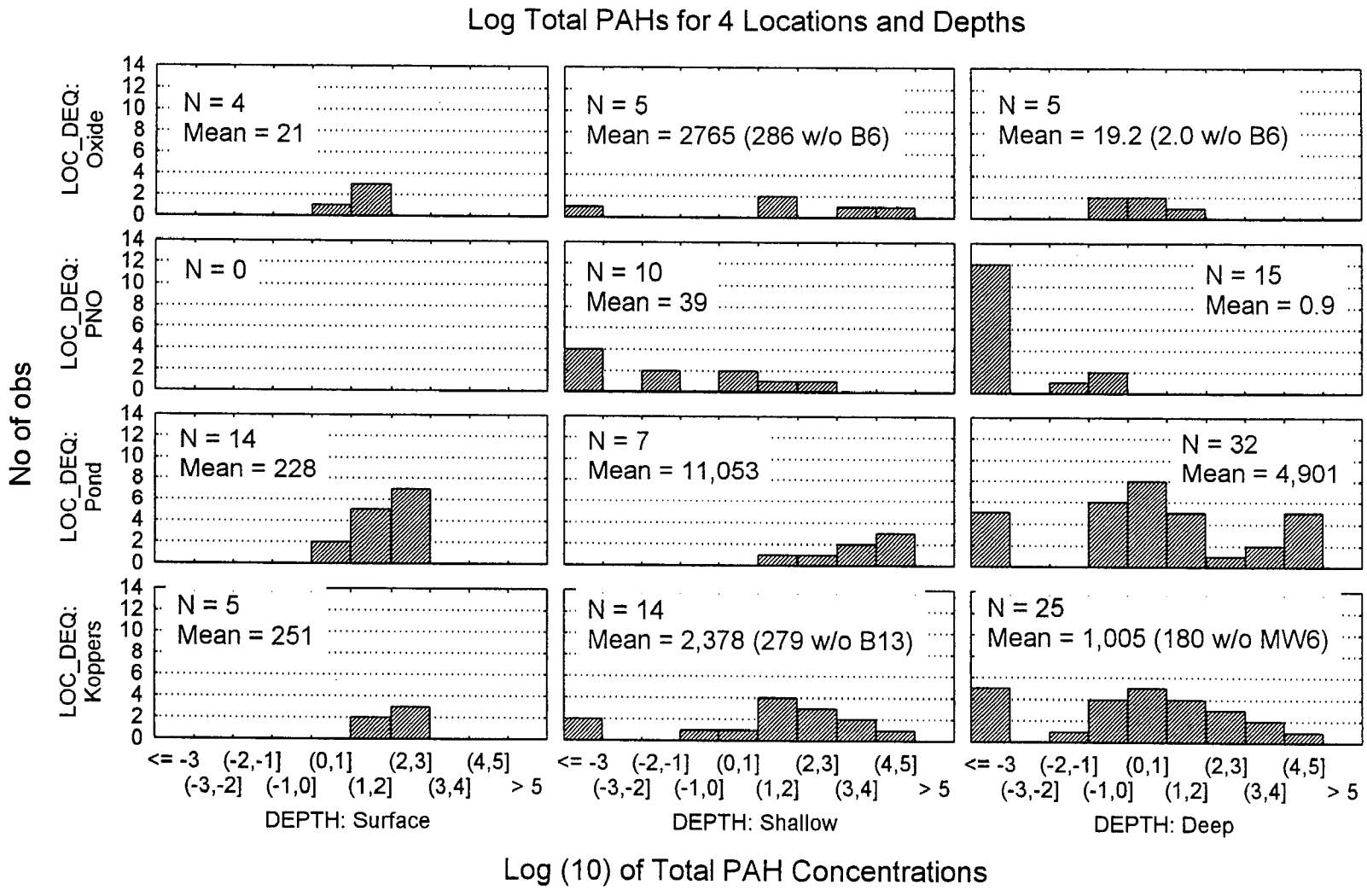

Log Total PAHs for 4 Locations and Depths
No of obs
LOC_DEQ: Oxide
LOC_DEQ: PNO
LOC_DEQ: Pond
LOC_DEQ: Koppers
N = 4
Mean = 21
N = 5
Mean = 2765 (286 w/o B6)
N = 5
Mean = 19.2 (2.0 w/o B6)
N = 0
N = 10
Mean = 39
N = 15
Mean = 0.9
N = 14
Mean = 228
N = 7
Mean = 11,053
N = 32
Mean = 4,901
N = 5
Mean = 251
N = 14
Mean = 2,378 (279 w/o B13)
N = 25
Mean = 1,005 (180 w/o MW6)
<= -3
(-3,-2]
(-2,-1]
(-1,0]
(0,1]
(1,2]
(2,3]
(3,4]
(4,5]
> 5
DEPTH: Surface
DEPTH: Shallow
DEPTH: Deep
Log (10) of Total PAH Concentrations

Figure 18.

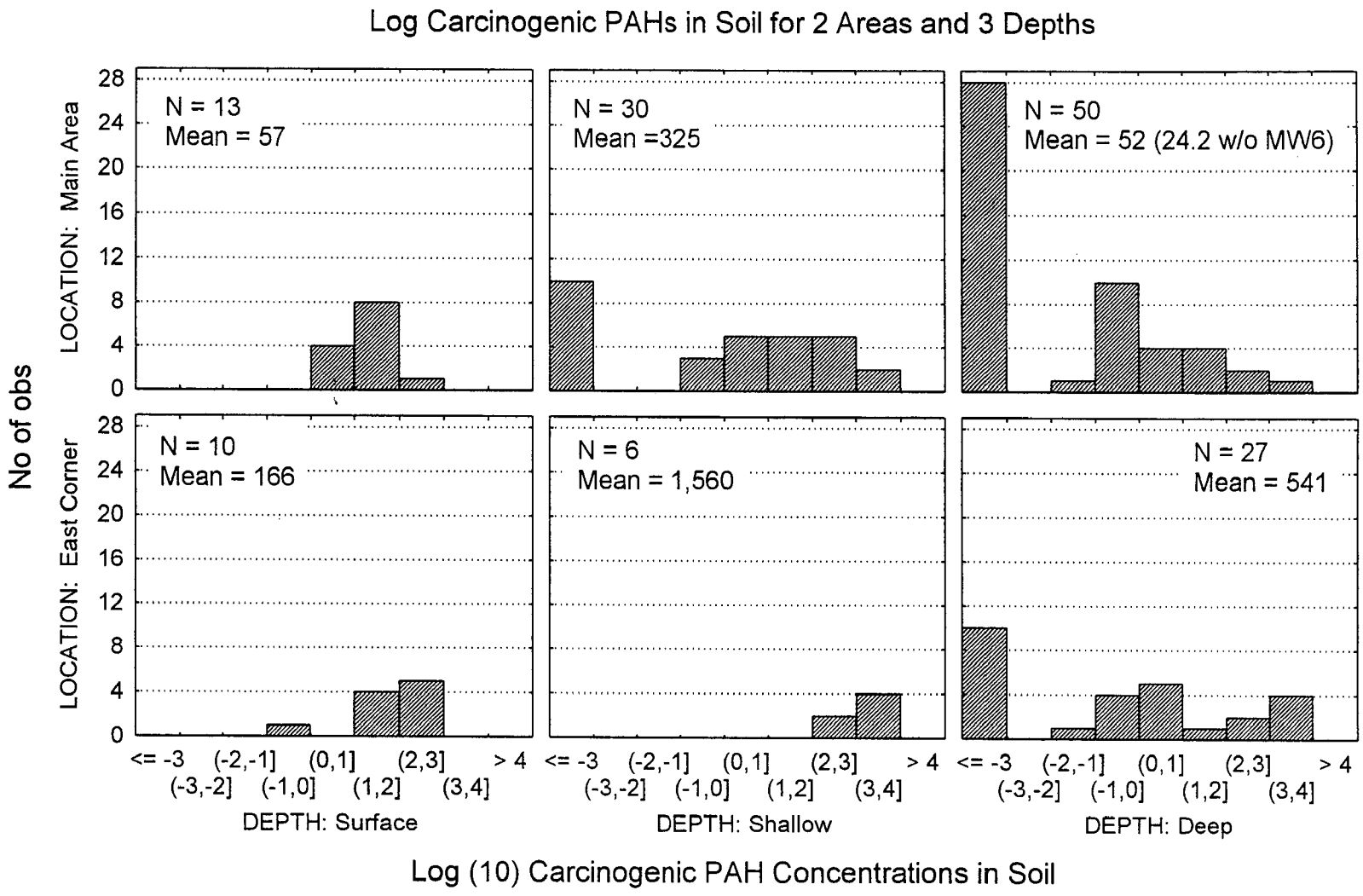

Log Carcinogenic PAHs in Soil for 2 Areas and 3 Depths
No of obs
LOCATION: Main Area
LOCATION: East Corner
N = 13
Mean = 57
N = 30
Mean =325
N = 50
Mean = 52 (24.2 w/o MW6)
N = 10
Mean = 166
N = 6
Mean = 1,560
N = 27
Mean = 541
0
4
8
12
16
20
24
28
<= -3
(-3,-2]
(-2,-1]
(-1,0]
(0,1]
(1,2]
(2,3]
(3,4]
> 4
DEPTH: Surface
DEPTH: Shallow
DEPTH: Deep
Log (10) Carcinogenic PAH Concentrations in Soil

Figure 19.

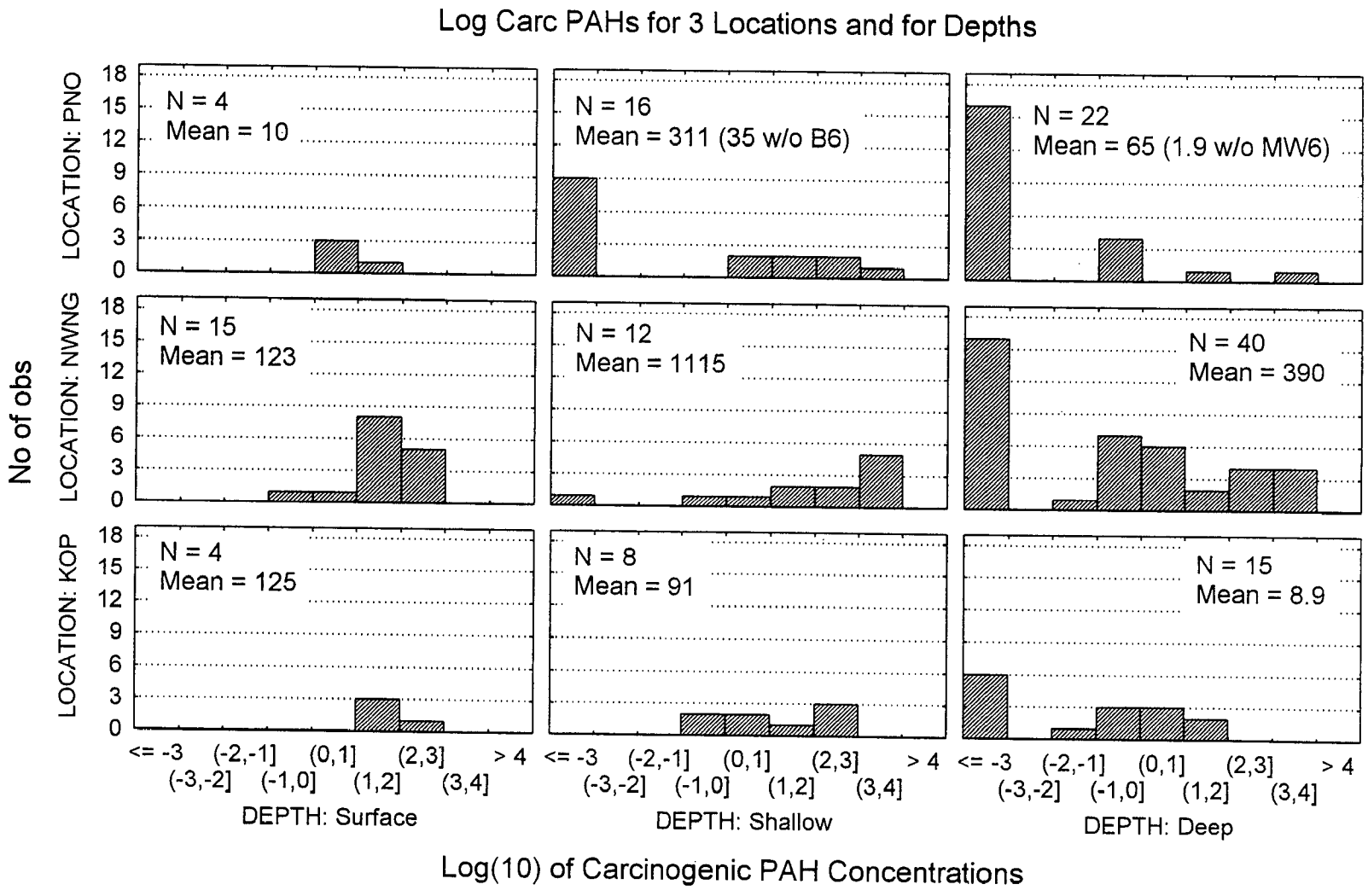

Log Carc PAHs for 3 Locations and for Depths
No of obs
LOCATION: PNO
LOCATION: NWNG
LOCATION: KOP
N = 4
Mean = 10
N = 16
Mean = 311 (35 w/o B6)
N = 22
Mean = 65 (1.9 w/o MW6)
N = 15
Mean = 123
N = 12
Mean = 1115
N = 40
Mean = 390
N = 4
Mean = 125
N = 8
Mean = 91
N = 15
Mean = 8.9
0 3 6 9 12 15 18
<= -3 (-3,-2] (-2,-1] (-1,0] (0,1] (1,2] (2,3] (3,4] > 4
DEPTH: Surface
DEPTH: Shallow
DEPTH: Deep
Log(10) of Carcinogenic PAH Concentrations

Figure 20.

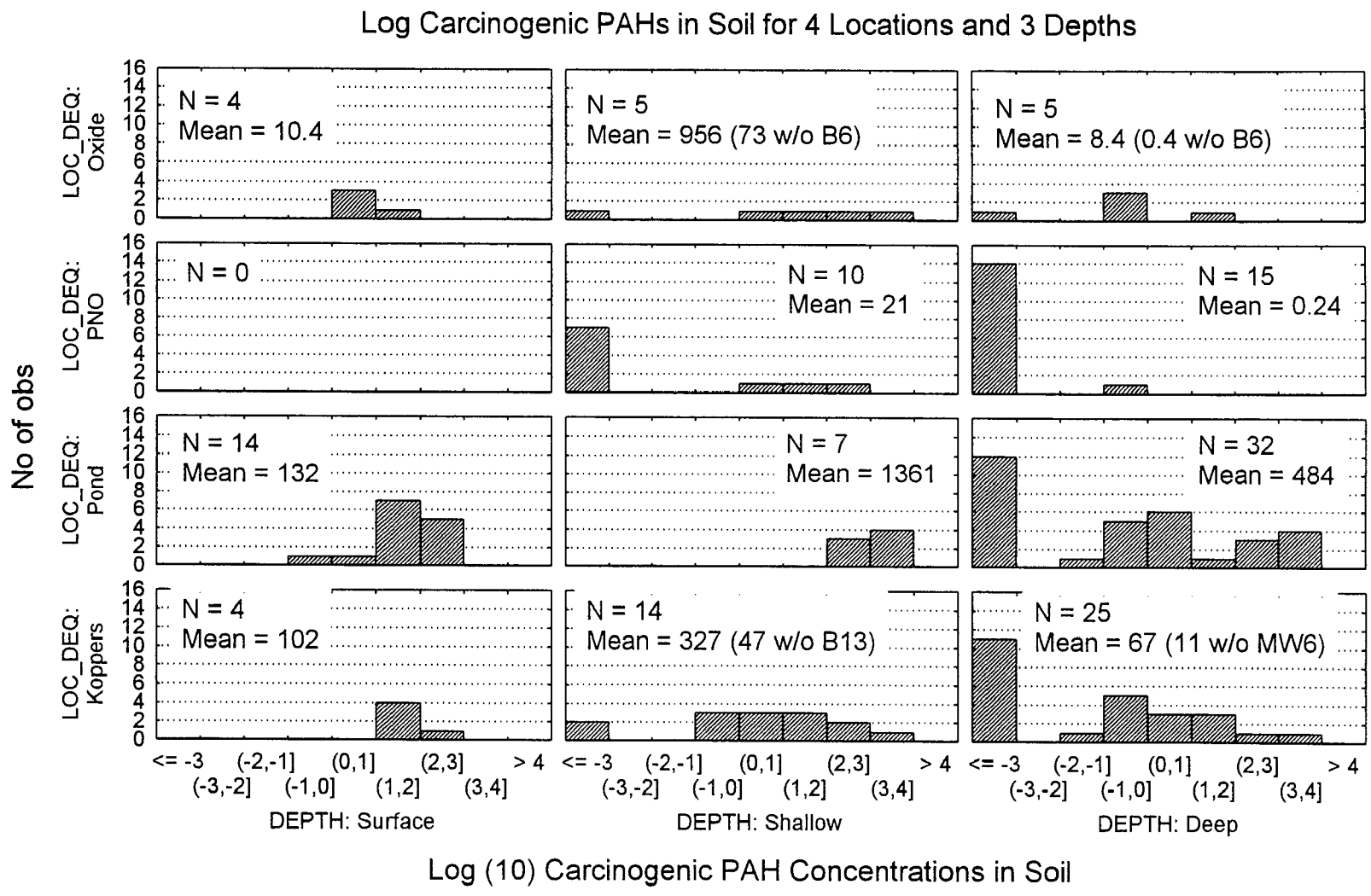

Log Carcinogenic PAHs in Soil for 4 Locations and 3 Depths
No of obs
LOC_DEQ: Oxide
LOC_DEQ: PNO
LOC_DEQ: Pond
LOC_DEQ: Koppers
N = 4
Mean = 10.4
N = 5
Mean = 956 (73 w/o B6)
N = 5
Mean = 8.4 (0.4 w/o B6)
N = 0
N = 10
Mean = 21
N = 15
Mean = 0.24
N = 14
Mean = 132
N = 7
Mean = 1361
N = 32
Mean = 484
N = 4
Mean = 102
N = 14
Mean = 327 (47 w/o B13)
N = 25
Mean = 67 (11 w/o MW6)
<= -3
(-3,-2]
(-2,-1]
(-1,0]
(0,1]
(1,2]
(2,3]
(3,4]
> 4
DEPTH: Surface
DEPTH: Shallow
DEPTH: Deep
Log (10) Carcinogenic PAH Concentrations in Soil

Figure 21.

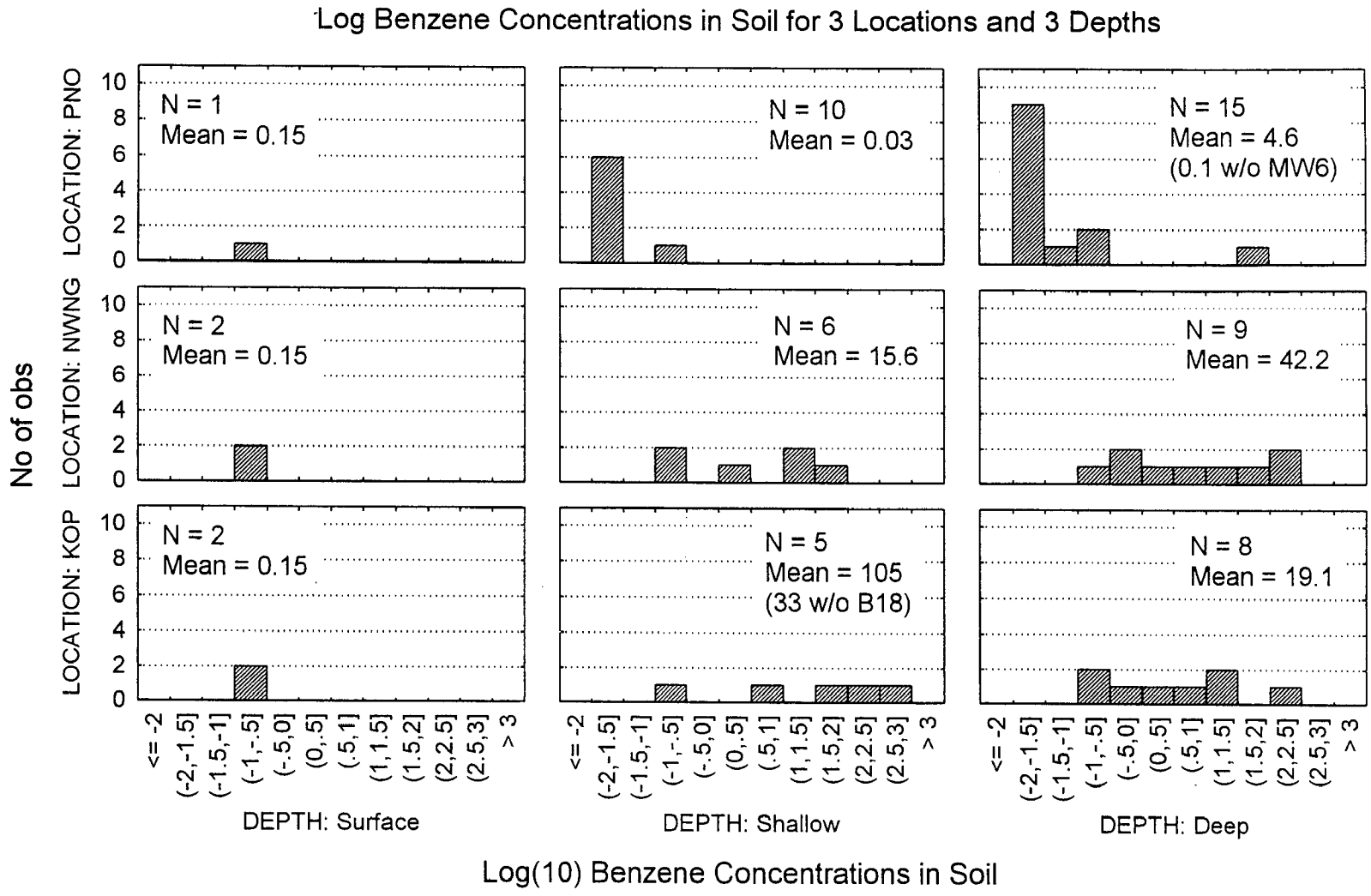

Log Benzene Concentrations in Soil for 3 Locations and 3 Depths
No of obs
LOCATION: PNO
LOCATION: NWNG
LOCATION: KOP
N = 1
Mean = 0.15
N = 10
Mean = 0.03
N = 15
Mean = 4.6
(0.1 w/o MW6)
N = 2
Mean = 0.15
N = 6
Mean = 15.6
N = 9
Mean = 42.2
N = 2
Mean = 0.15
N = 5
Mean = 105
(33 w/o B18)
N = 8
Mean = 19.1
0
2
4
6
8
10
<= -2
(-2,-1.5]
(-1.5,-1]
(-1,-.5]
(-.5,0]
(0,.5]
(.5,1]
(1,1.5]
(1.5,2]
(2,2.5]
(2.5,3]
> 3
DEPTH: Surface
DEPTH: Shallow
DEPTH: Deep
Log(10) Benzene Concentrations in Soil

Figure 22.

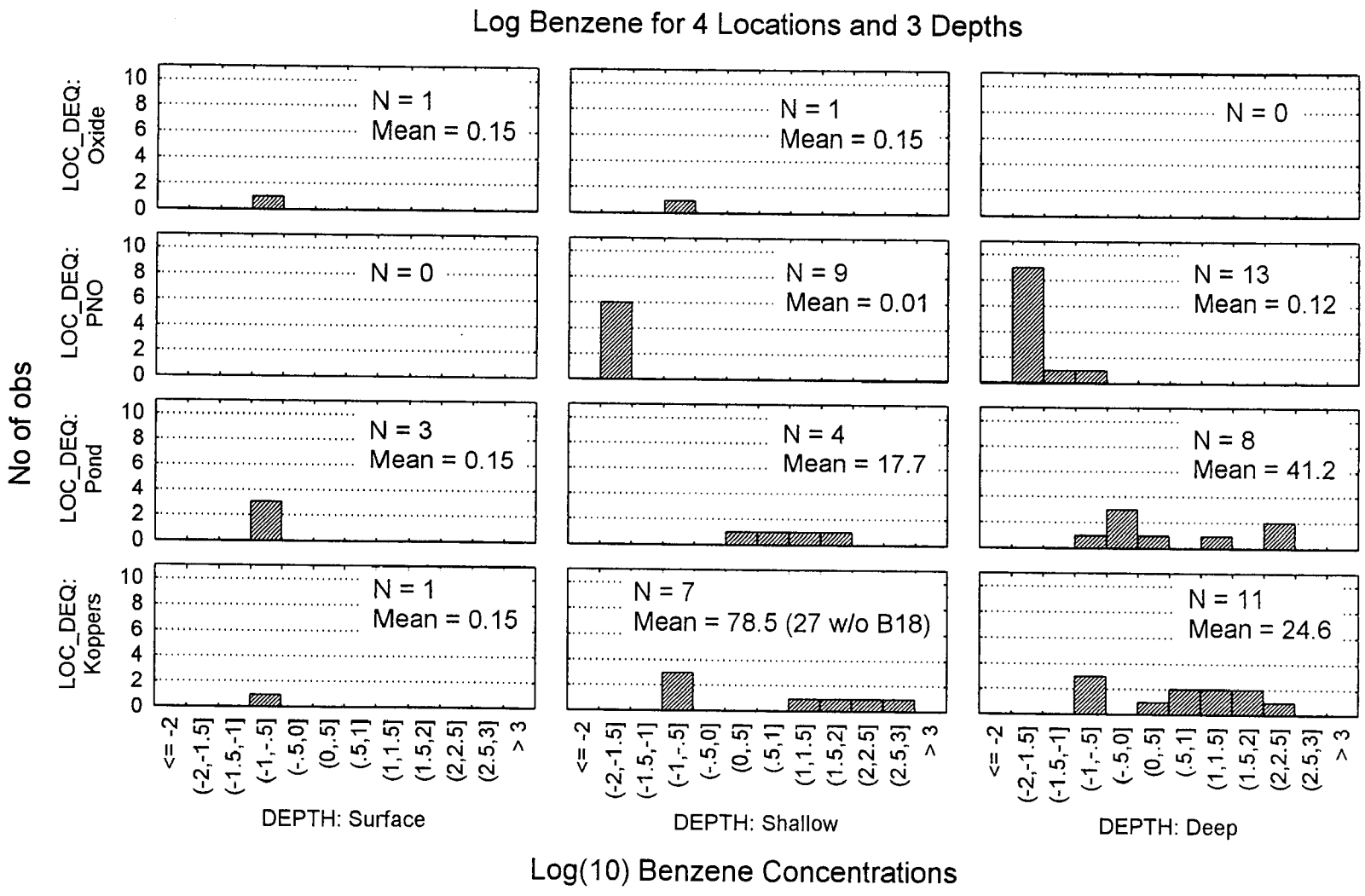

Log Benzene for 4 Locations and 3 Depths
No of obs
LOC_DEQ: Oxide
LOC_DEQ: PNO
LOC_DEQ: Pond
LOC_DEQ: Koppers
N = 1
Mean = 0.15
N = 1
Mean = 0.15
N = 0
N = 0
N = 9
Mean = 0.01
N = 13
Mean = 0.12
N = 3
Mean = 0.15
N = 4
Mean = 17.7
N = 8
Mean = 41.2
N = 1
Mean = 0.15
N = 7
Mean = 78.5 (27 w/o B18)
N = 11
Mean = 24.6
<= -2
(-2,-1.5]
(-1.5,-1]
(-1,-.5]
(-.5,0]
(0,.5]
(.5,1]
(1,1.5]
(1.5,2]
(2,2.5]
(2.5,3]
> 3
DEPTH: Surface
DEPTH: Shallow
DEPTH: Deep
Log(10) Benzene Concentrations

Figure 23.

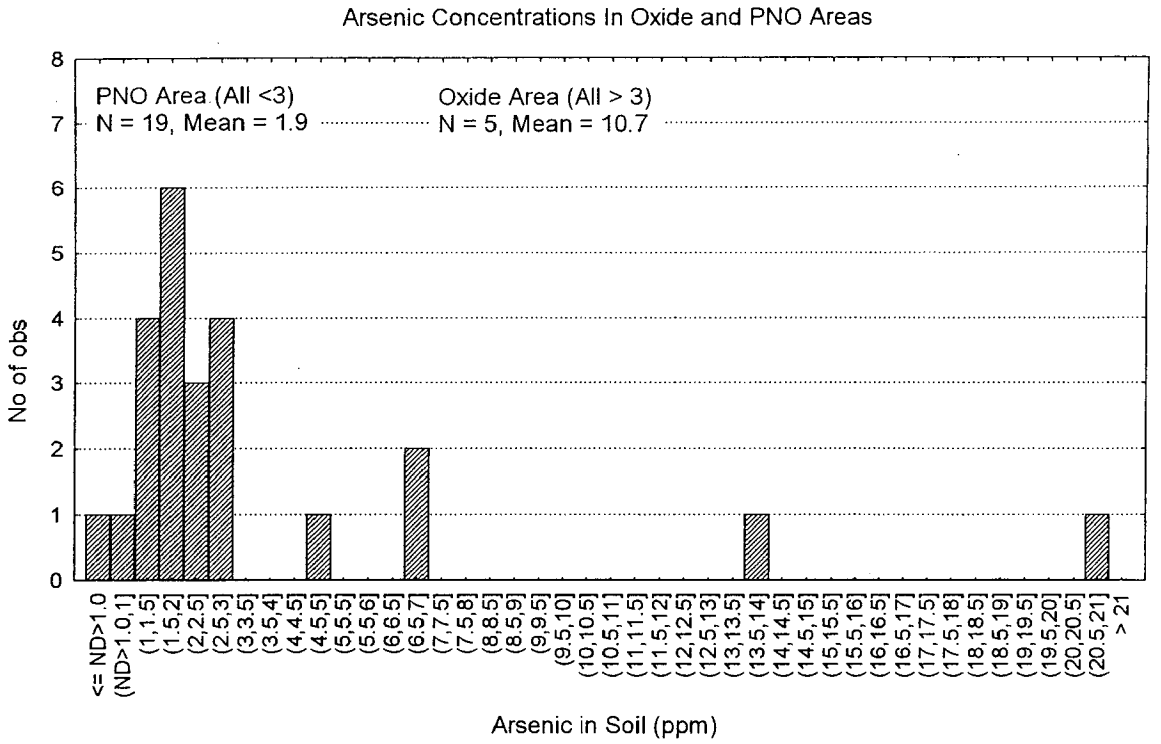
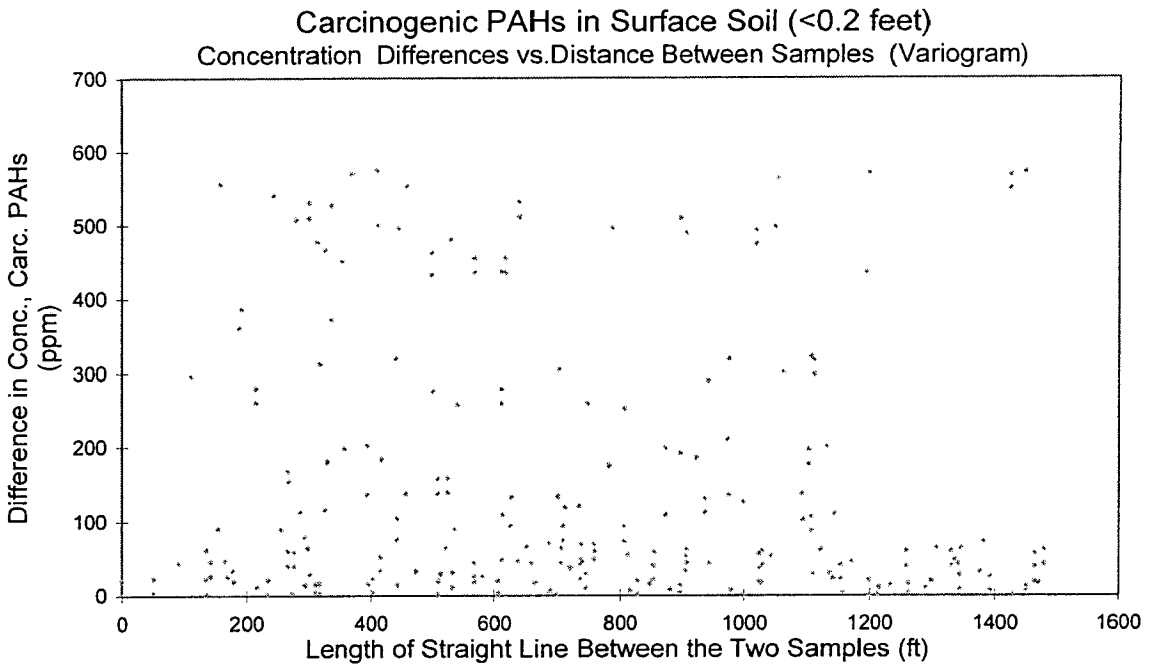
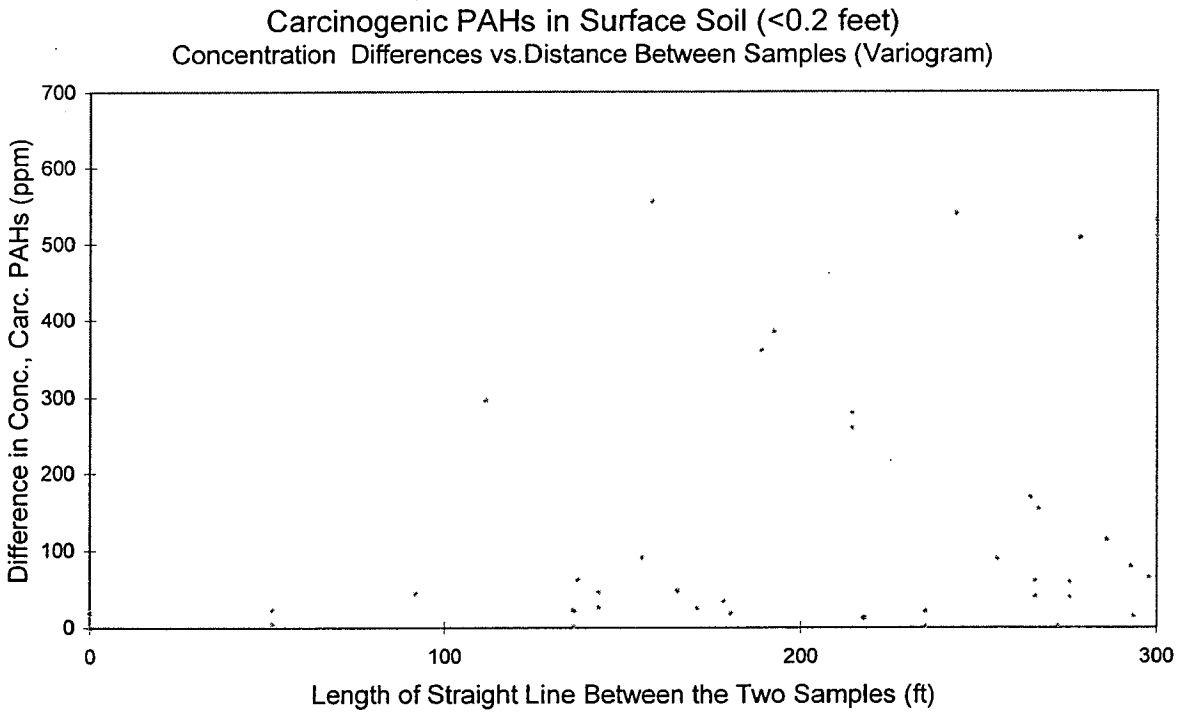

Arsenic Concentrations In Oxide and PNO Areas
PNO Area (All <3)
N = 19, Mean = 1.9
Oxide Area (All > 3)
N = 5, Mean = 10.7
No of obs
0
1
2
3
4
5
6
7
8
<= ND>1.0
(ND>1.0,1]
(1,1.5]
(1.5,2]
(2,2.5]
(2.5,3]
(3,3.5]
(3.5,4]
(4,4.5]
(4.5,5]
(5,5.5]
(5.5,6]
(6,6.5]
(6.5,7]
(7,7.5]
(7.5,8]
(8,8.5]
(8.5,9]
(9,9.5]
(9.5,10]
(10,10.5]
(10.5,11]
(11,11.5]
(11.5,12]
(12,12.5]
(12.5,13]
(13,13.5]
(13.5,14]
(14,14.5]
(14.5,15]
(15,15.5]
(15.5,16]
(16,16.5]
(16.5,17]
(17,17.5]
(17.5,18]
(18,18.5]
(18.5,19]
(19,19.5]
(19.5,20]
(20,20.5]
(20.5,21]
> 21
Arsenic in Soil (ppm)

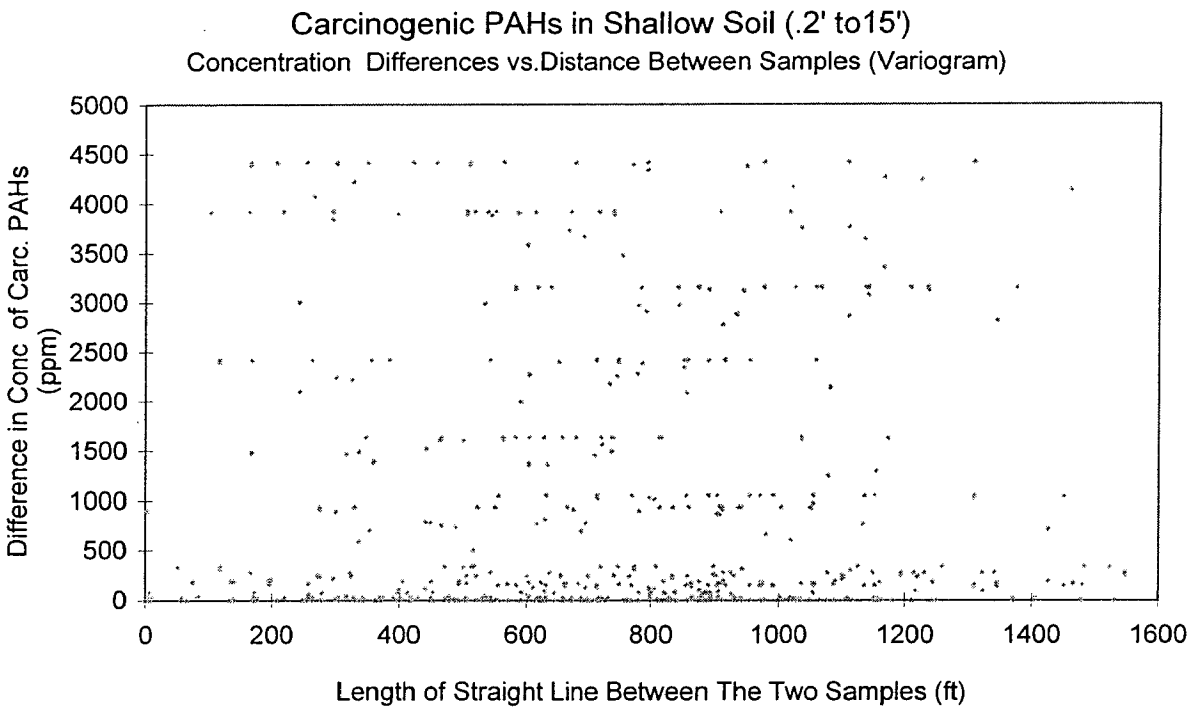
Figure 24.

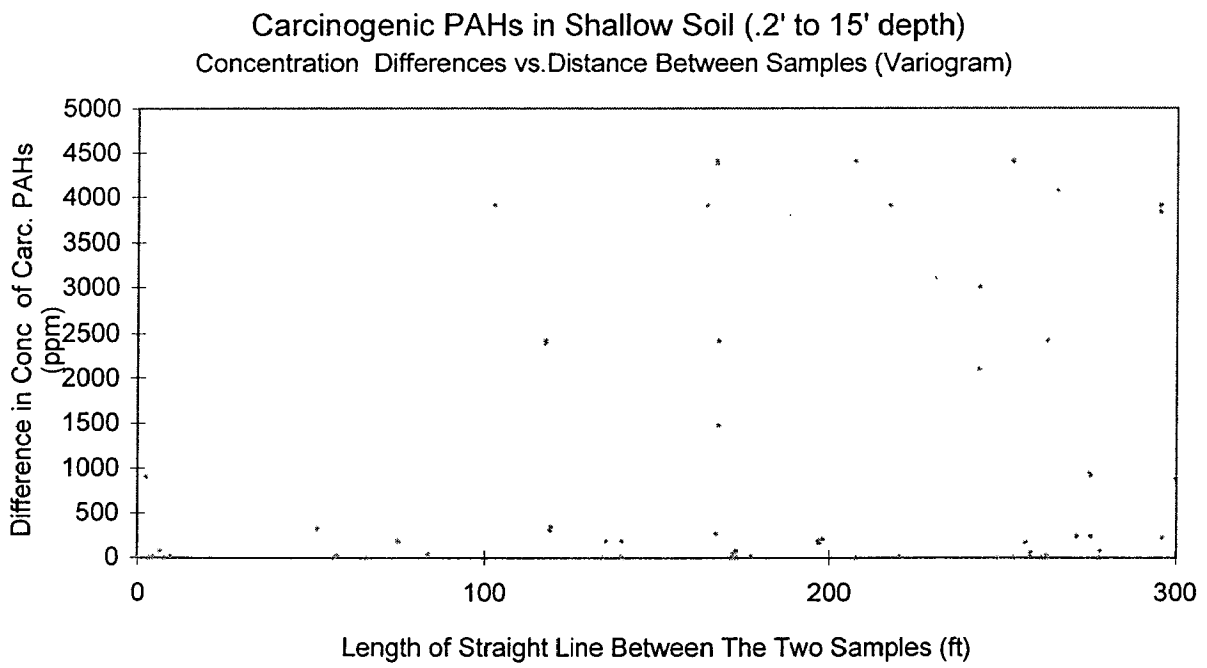




concs and variogram 98.xls

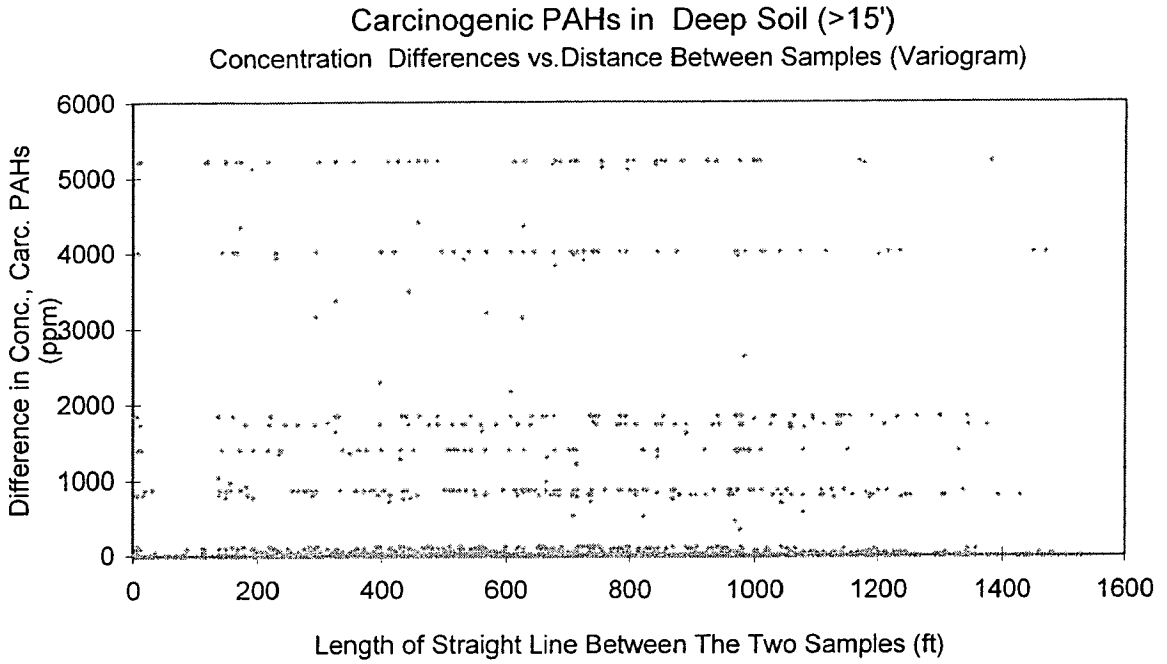
Figure 25.

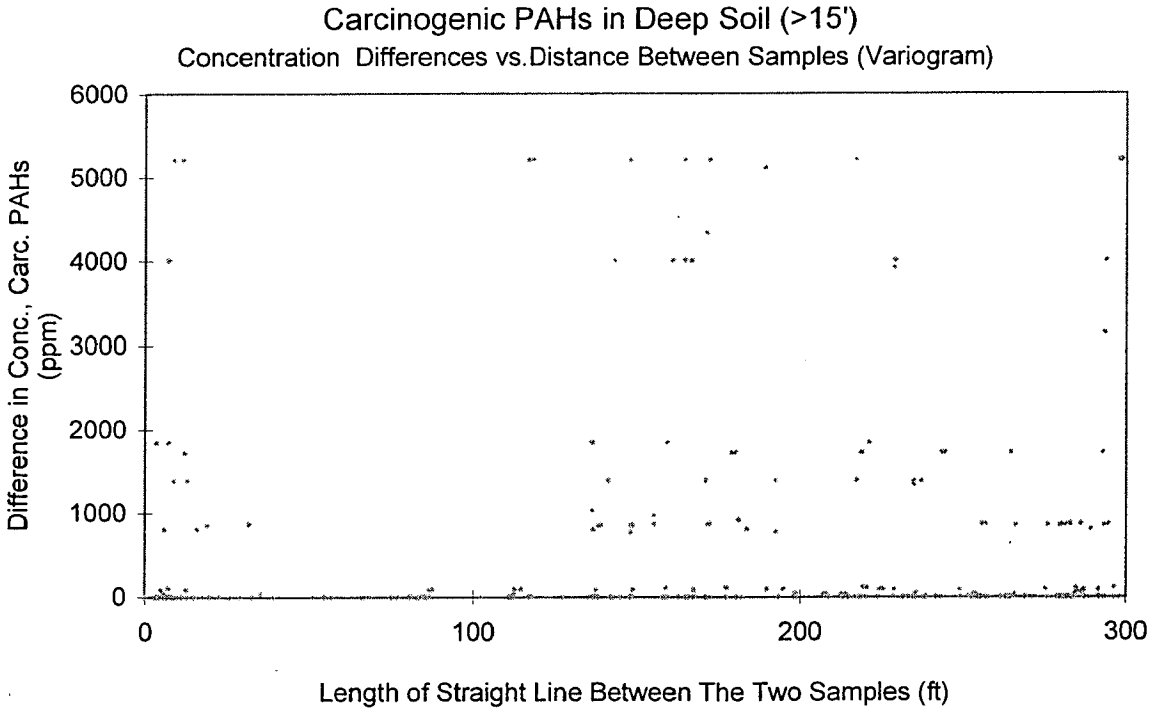




concs and variogram 98.xls

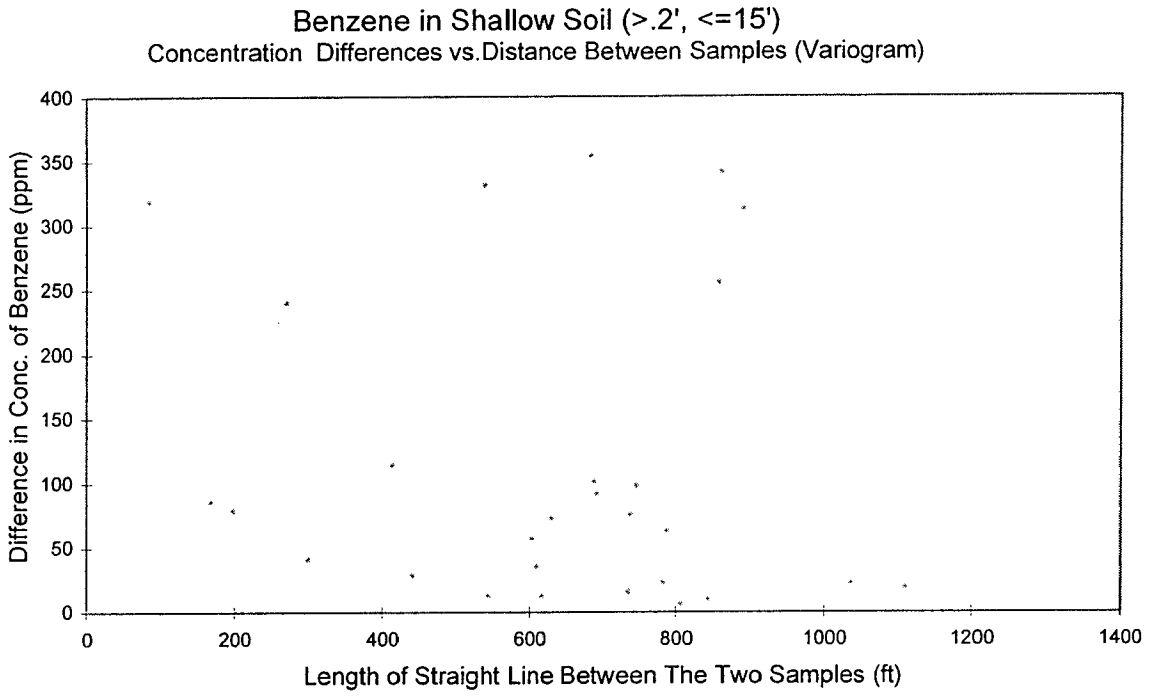
Figure 26.

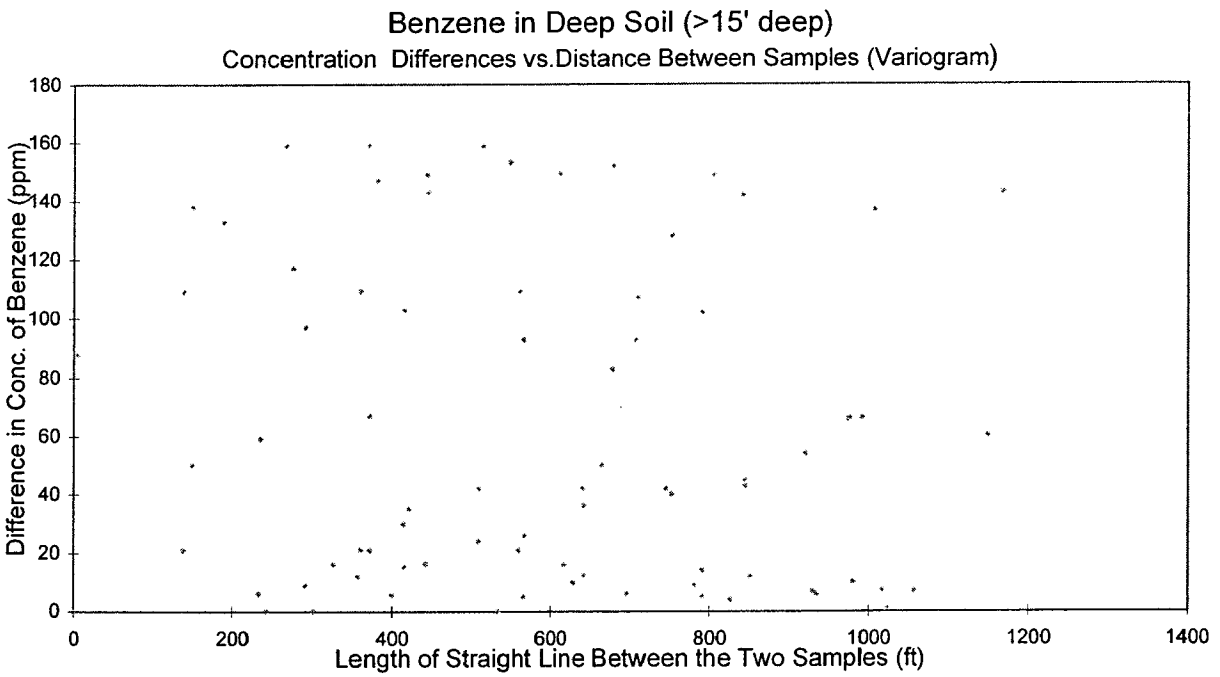




concs and variogram 98.xls

Figure 27.





concs and variogram 98.xls

Figure 28.

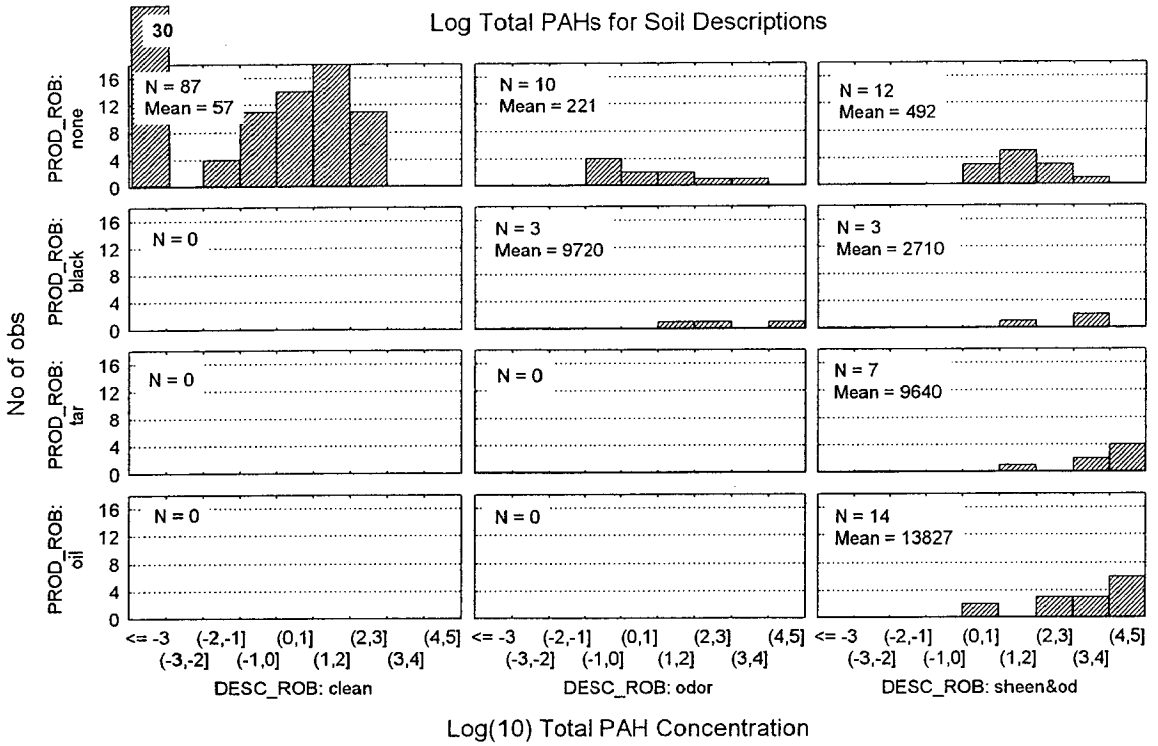

Log Total PAHs for Soil Descriptions
30
N = 87
Mean = 57
N = 10
Mean = 221
N = 12
Mean = 492
N = 0
N = 3
Mean = 9720
N = 3
Mean = 2710
N = 0
N = 0
N = 7
Mean = 9640
N = 0
N = 0
N = 14
Mean = 13827
PROD_ROB: none
PROD_ROB: black
PROD_ROB: tar
PROD_ROB: oil
No of obs
0
4
8
12
16
<= -3
(-3,-2]
(-2,-1]
(-1,0]
(0,1]
(1,2]
(2,3]
(3,4]
(4,5]
DESC_ROB: clean
DESC_ROB: odor
DESC_ROB: sheen&od
Log(10) Total PAH Concentration

Figure 29.

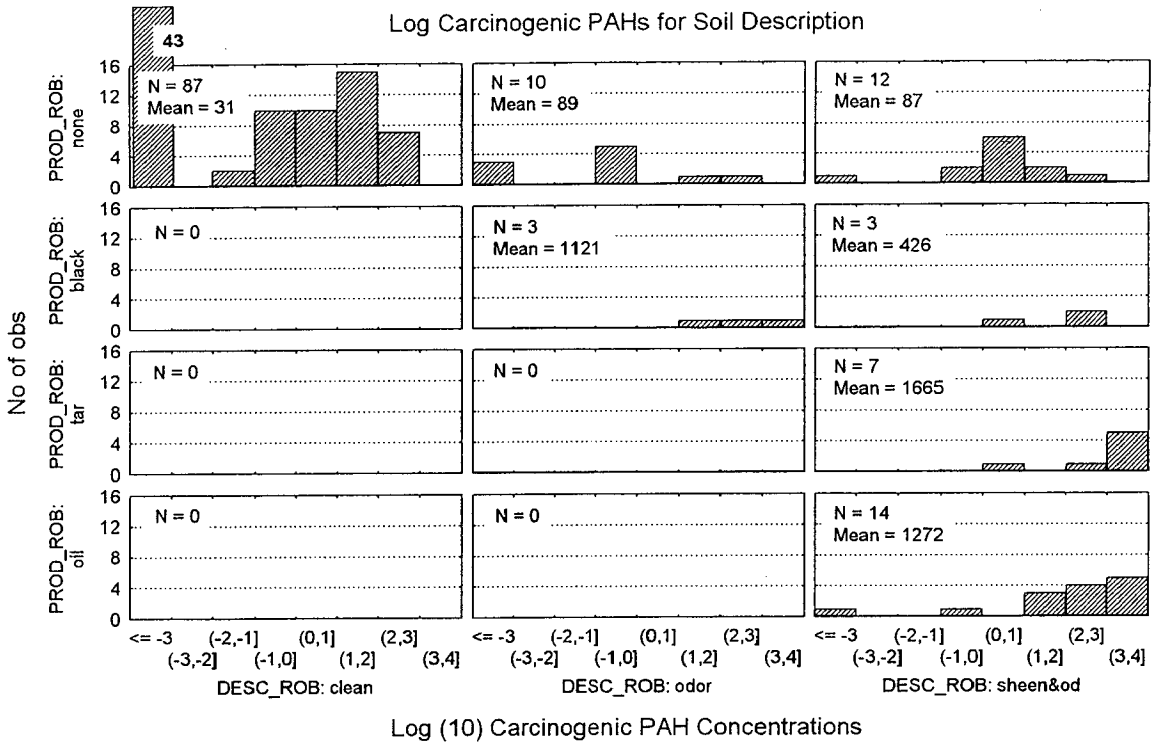

Log Carcinogenic PAHs for Soil Description
43
N = 87
Mean = 31
N = 10
Mean = 89
N = 12
Mean = 87
N = 0
N = 3
Mean = 1121
N = 3
Mean = 426
N = 0
N = 0
N = 7
Mean = 1665
N = 0
N = 0
N = 14
Mean = 1272
PROD_ROB: none
PROD_ROB: black
PROD_ROB: tar
PROD_ROB: oil
No of obs
0
4
8
12
16
<= -3
(-3,-2]
(-2,-1]
(-1,0]
(0,1]
(1,2]
(2,3]
(3,4]
DESC_ROB: clean
DESC_ROB: odor
DESC_ROB: sheen&od
Log (10) Carcinogenic PAH Concentrations

Figure 30.

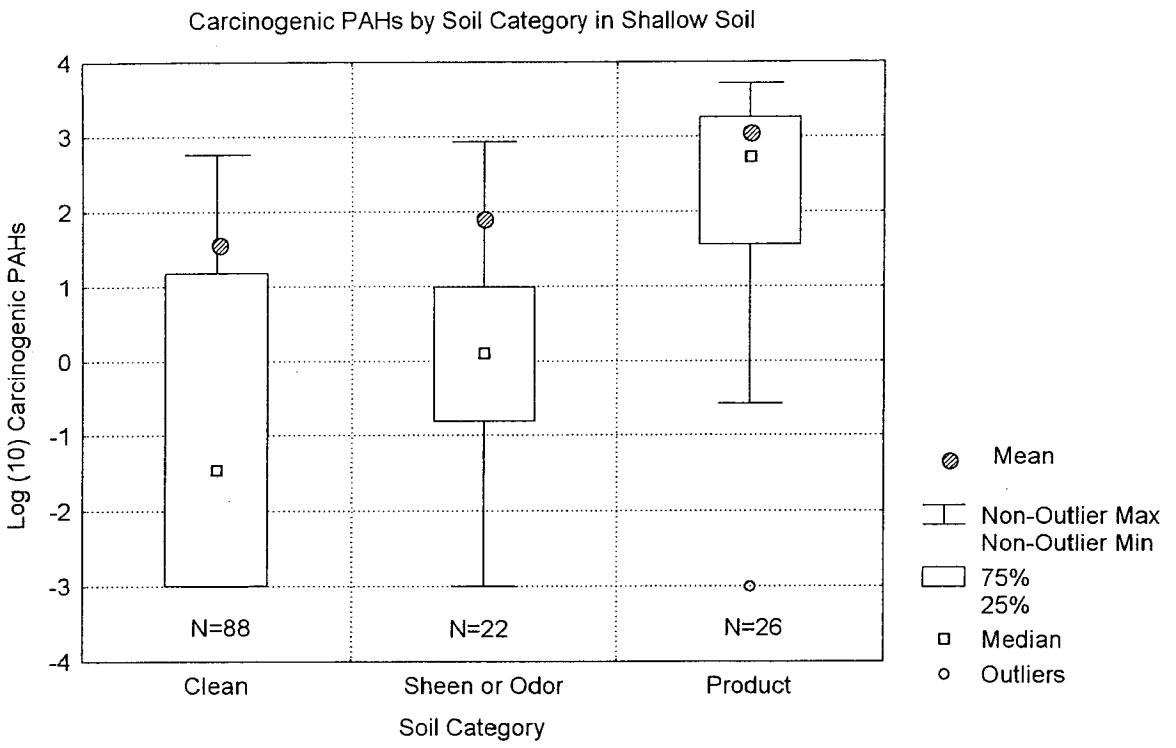

Carcinogenic PAHs by Soil Category in Shallow Soil
Log (10) Carcinogenic PAHs
4
3
2
1
0
-1
-2
-3
-4
N=88
N=22
N=26
Clean
Sheen or Odor
Product
Soil Category
Mean
Non-Outlier Max
Non-Outlier Min
75%
25%
Median
Outliers

Figure 31.

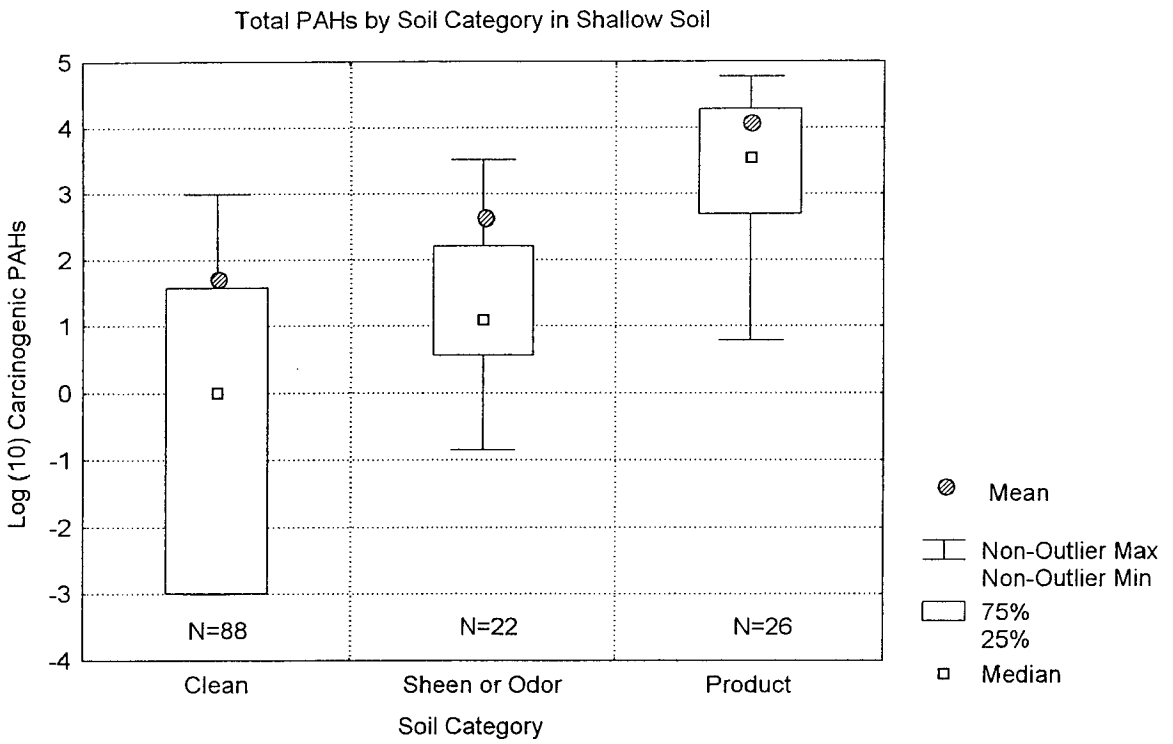

Total PAHs by Soil Category in Shallow Soil
Log (10) Carcinogenic PAHs
5
4
3
2
1
0
-1
-2
-3
-4
N=88
N=22
N=26
Clean
Sheen or Odor
Product
Soil Category
Mean
Non-Outlier Max
Non-Outlier Min
75%
25%
Median

Figure 32.

Shallow Soil with Oil in Pond and Koppers Areas, Total PAHs•

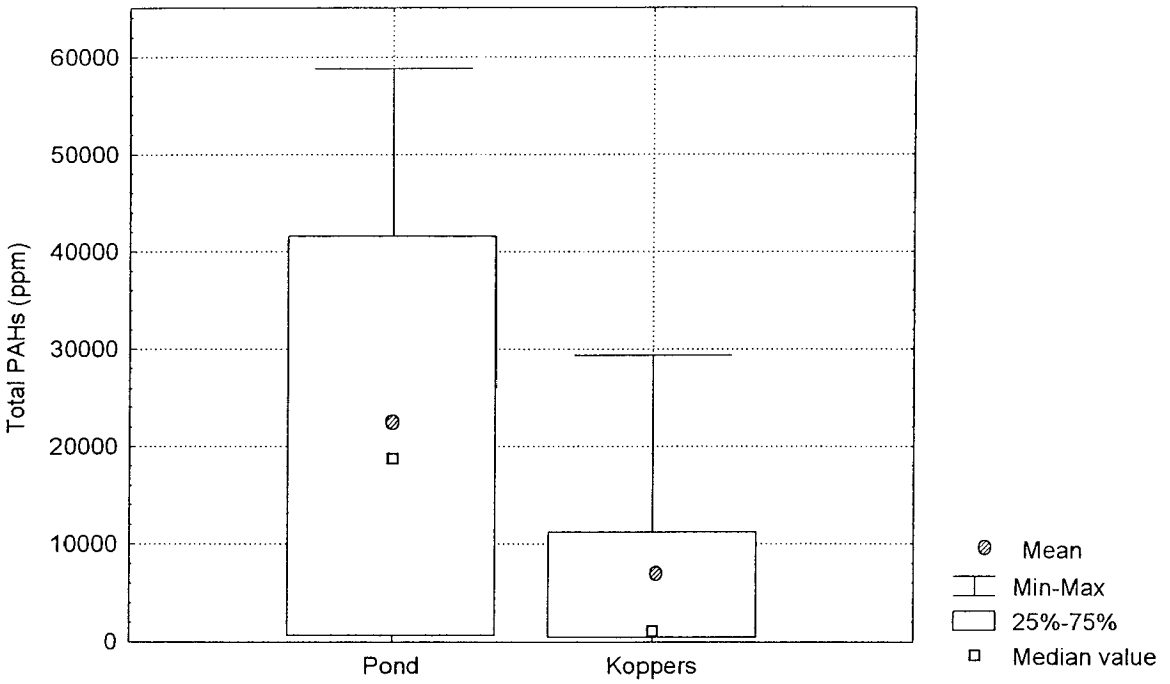


Figure 33.

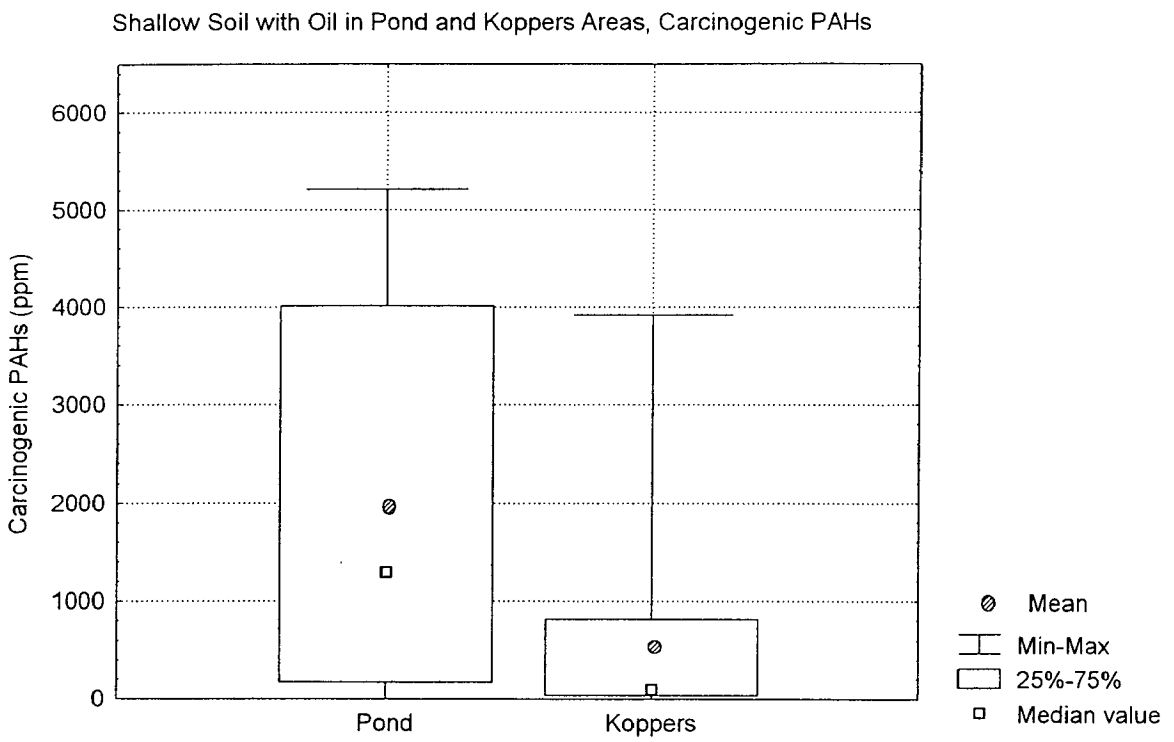

Shallow Soil with Oil in Pond and Koppers Areas, Carcinogenic PAHs
Carcinogenic PAHs (ppm)
6000
5000
4000
3000
2000
1000
0
Pond
Koppers
Mean
Min-Max
25%-75%
Median value

Figure 34.

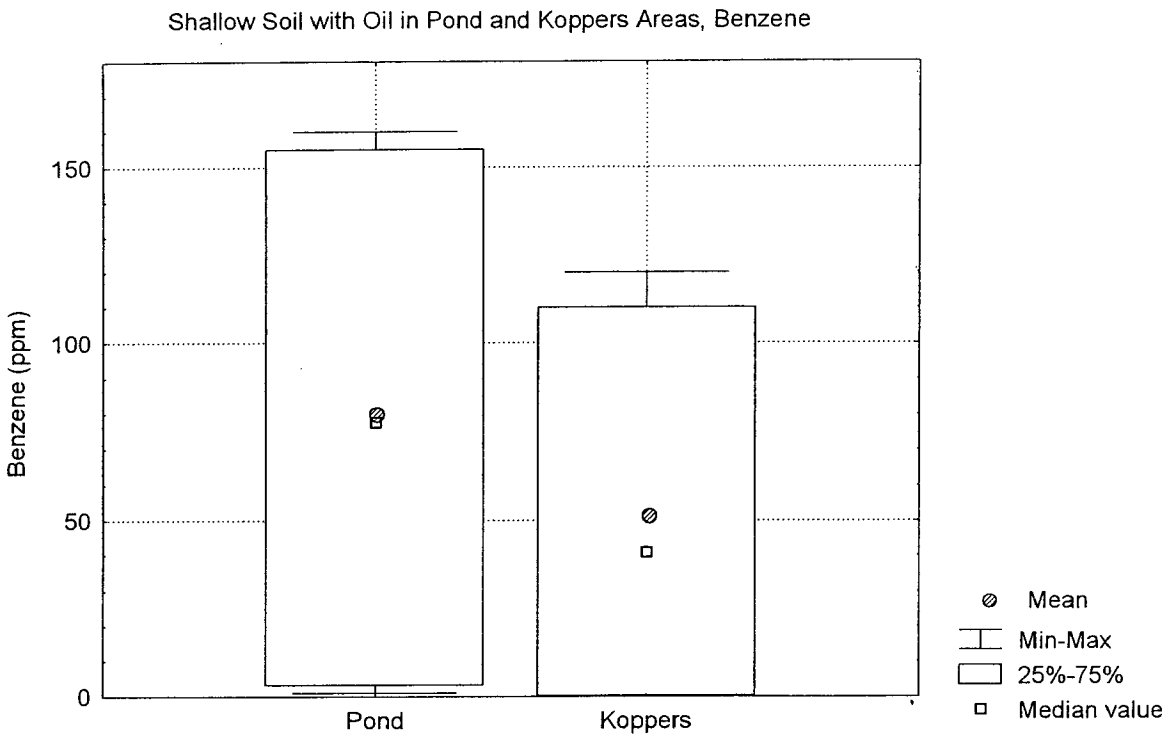

Shallow Soil with Oil in Pond and Koppers Areas, Benzene
Benzene (ppm)
150
100
50
0
Pond
Koppers
Mean
Min-Max
25%-75%
Median value

Figure 35.

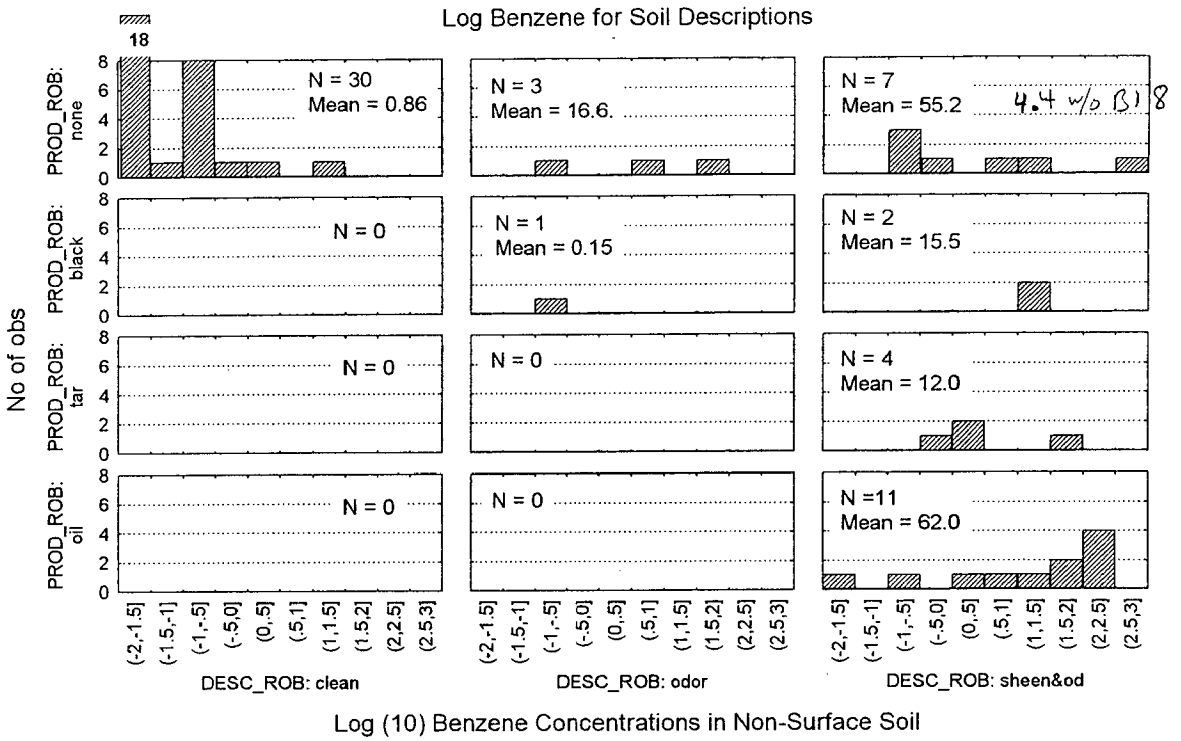

Log Benzene for Soil Descriptions
18
PROD_ROB: none
PROD_ROB: black
PROD_ROB: tar
PROD_ROB: oil
No of obs
N = 30
Mean = 0.86
N = 3
Mean = 16.6.
N = 7
Mean = 55.2
4.4 w/o B1
8
N = 0
N = 1
Mean = 0.15
N = 2
Mean = 15.5
N = 0
N = 0
N = 4
Mean = 12.0
N = 0
N = 0
N =11
Mean = 62.0
(-2,-1.5]
(-1.5,-1]
(-1,-.5]
(-.5,0]
(0,.5]
(.5,1]
(1,1.5]
(1.5,2]
(2,2.5]
(2.5,3]
DESC_ROB: clean
DESC_ROB: odor
DESC_ROB: sheen&od
Log (10) Benzene Concentrations in Non-Surface Soil

Figure 36.

Benzene Concentrations by Soil Description, Shallow and Deep Soil

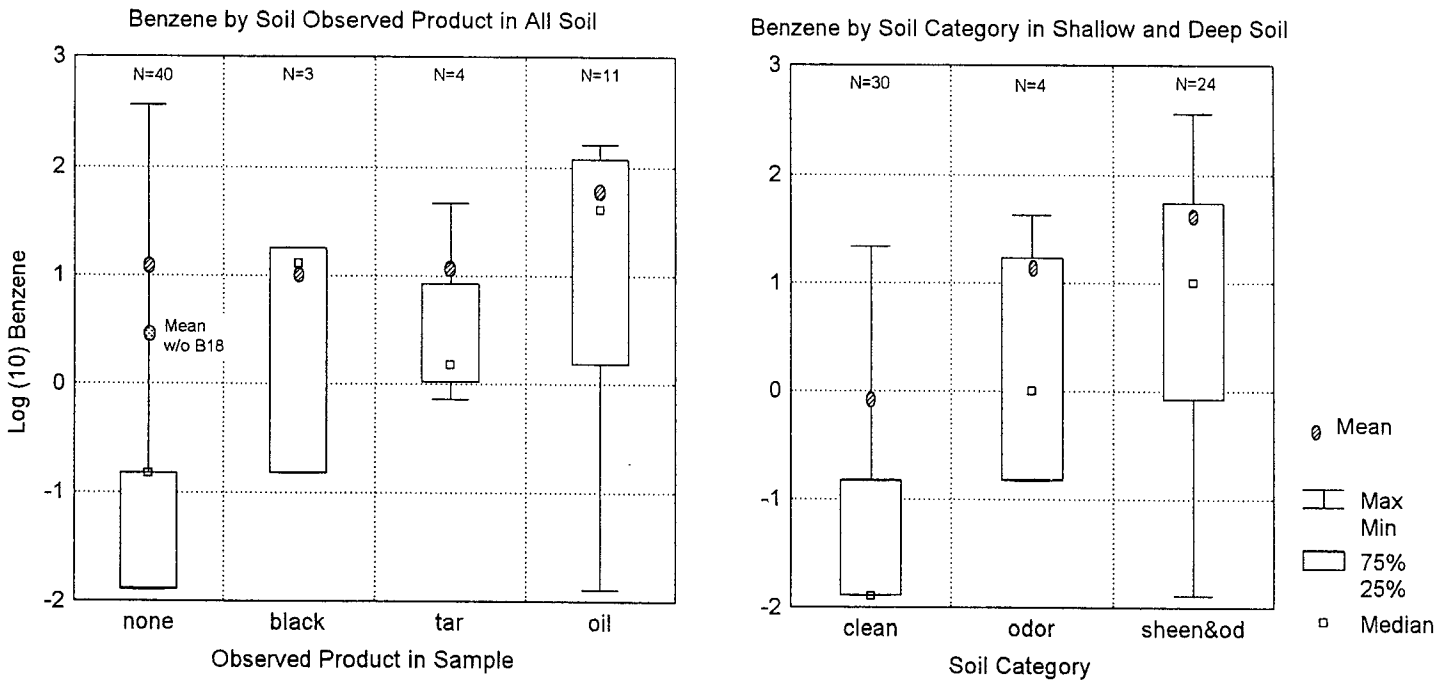
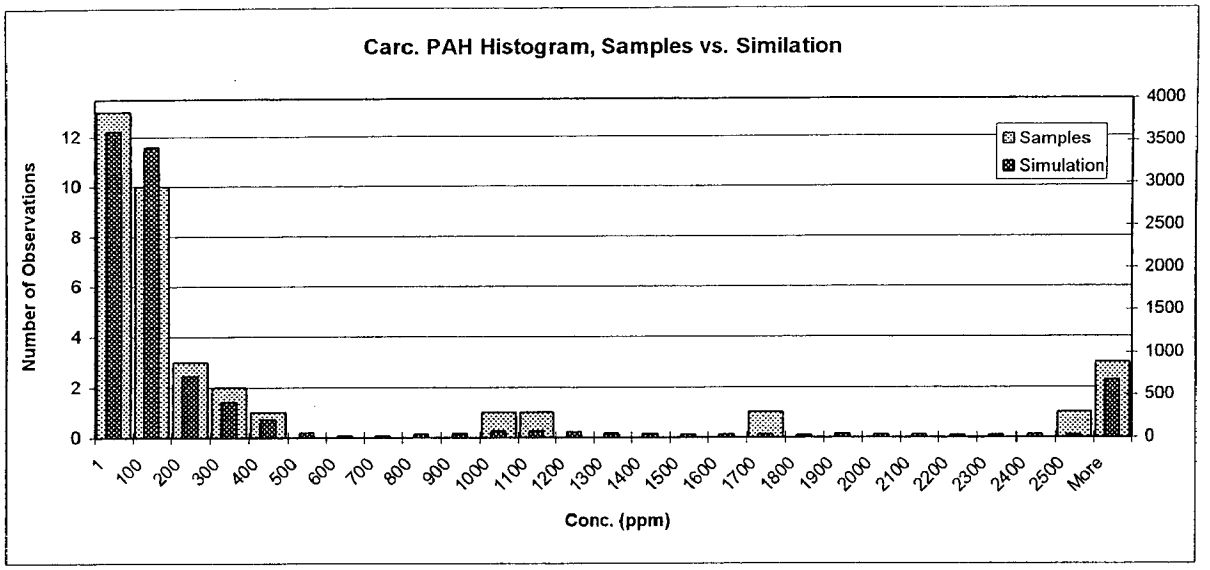
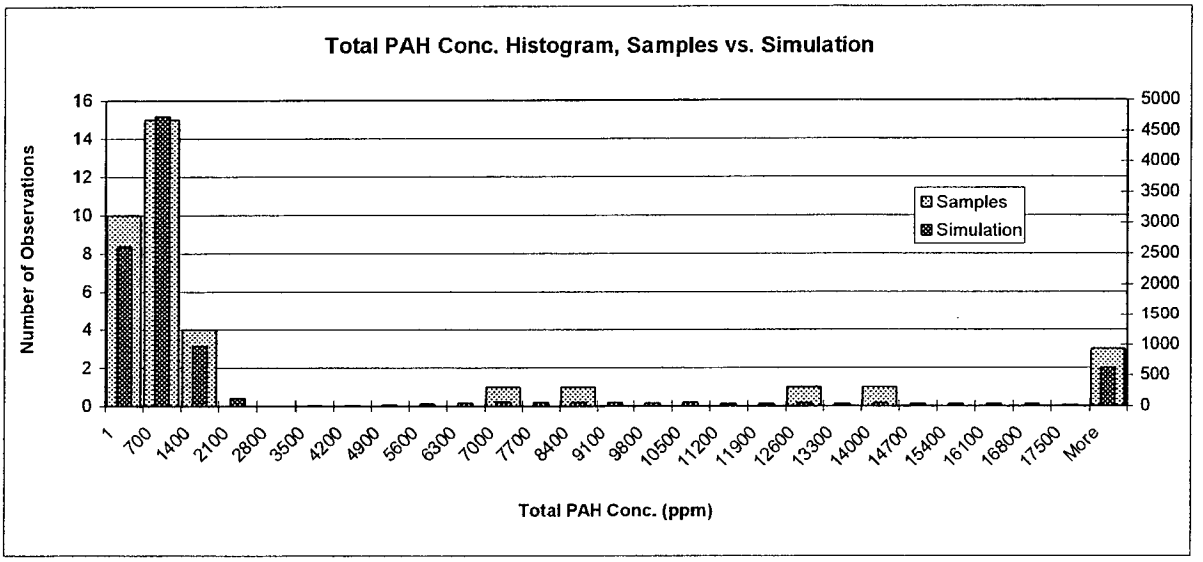


Figure 37.


Carc. PAH Histogram, Samples vs. Similation
Number of Observations
Samples
Simulation
Conc. (ppm)


Total PAH Conc. Histogram, Samples vs. Simulation
Number of Observations
Samples
Simulation
Total PAH Conc. (ppm)

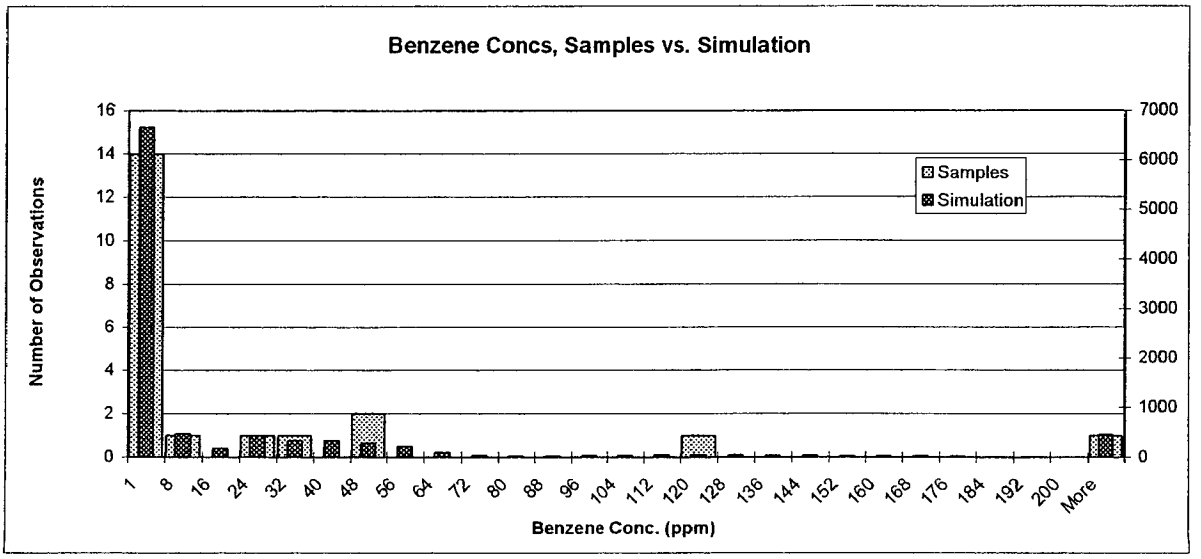

Benzene Concs, Samples vs. Simulation
Number of Observations
Samples
Simulation
Benzene Conc. (ppm)

Figure 38.

Frequency of Samples by Soil Description and Total Amount of Soil in Each Description

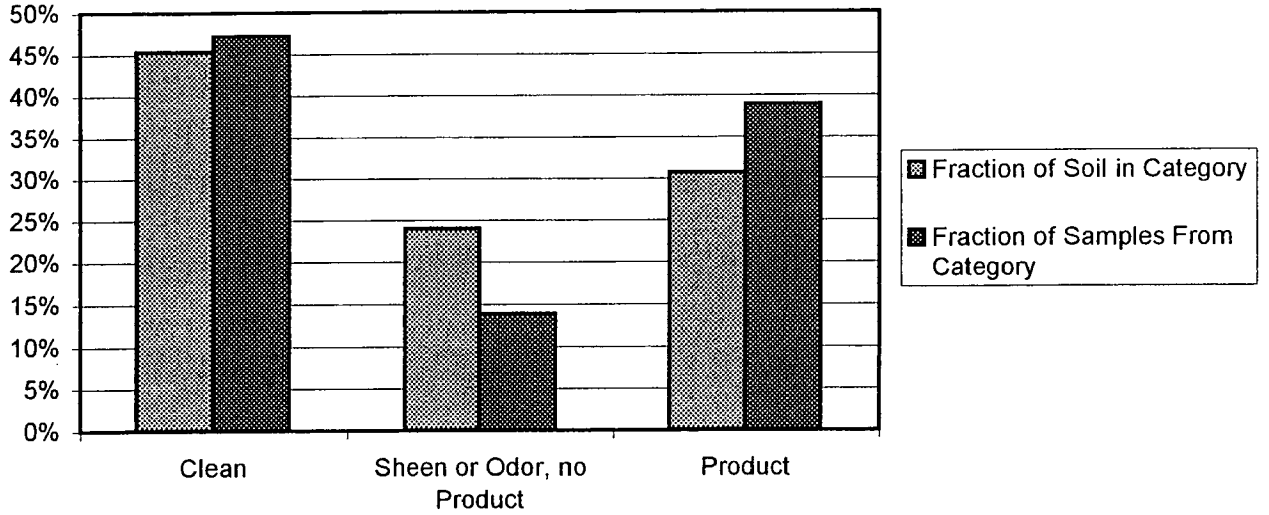


Figure 39.

Locations of Surface Carcinogenic PAH Samples
Voronoi Tesselation Showing Areas Closest to Each Point

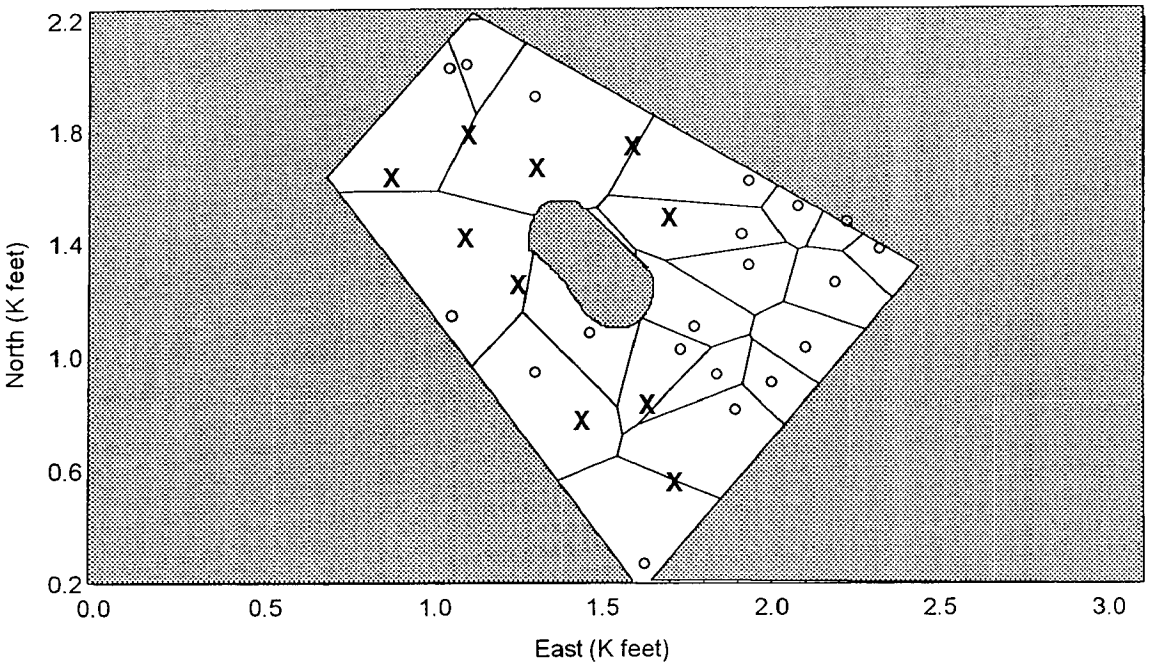


Figure 40.

Locations of Shallow Carcinogenic PAH Samples
Voronoi Tesselation Showing Areas Closest to Each Point

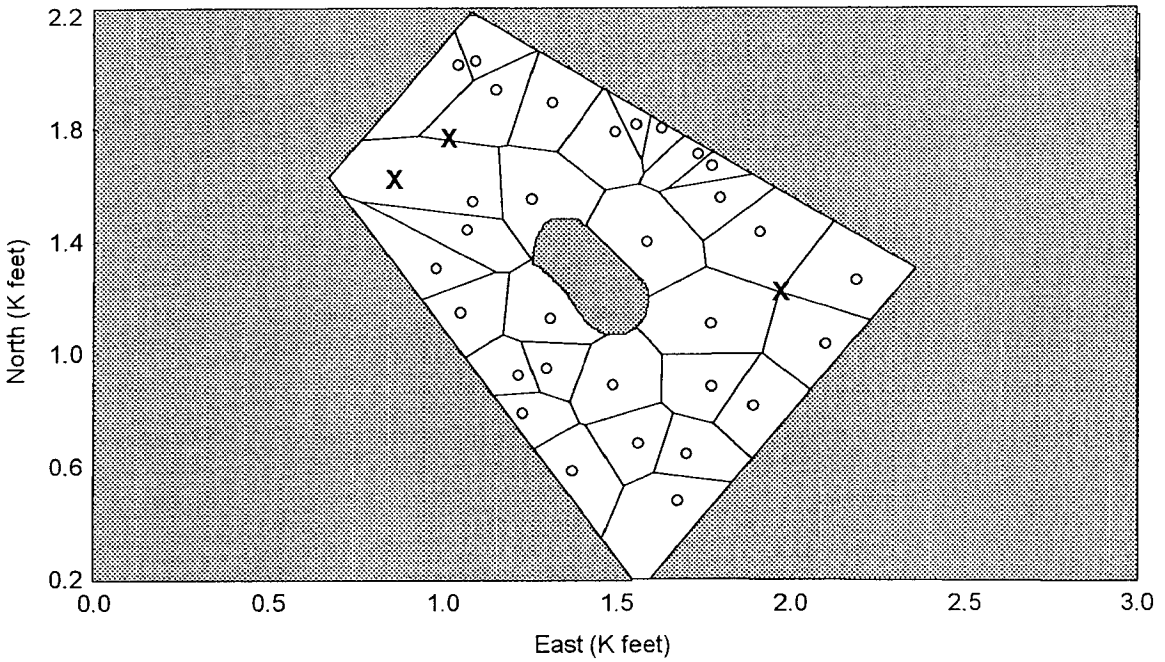


Figure 41.

Locations of Shallow Benzene Samples
Voronoi Tesselation Showing Areas Closest to Each Point

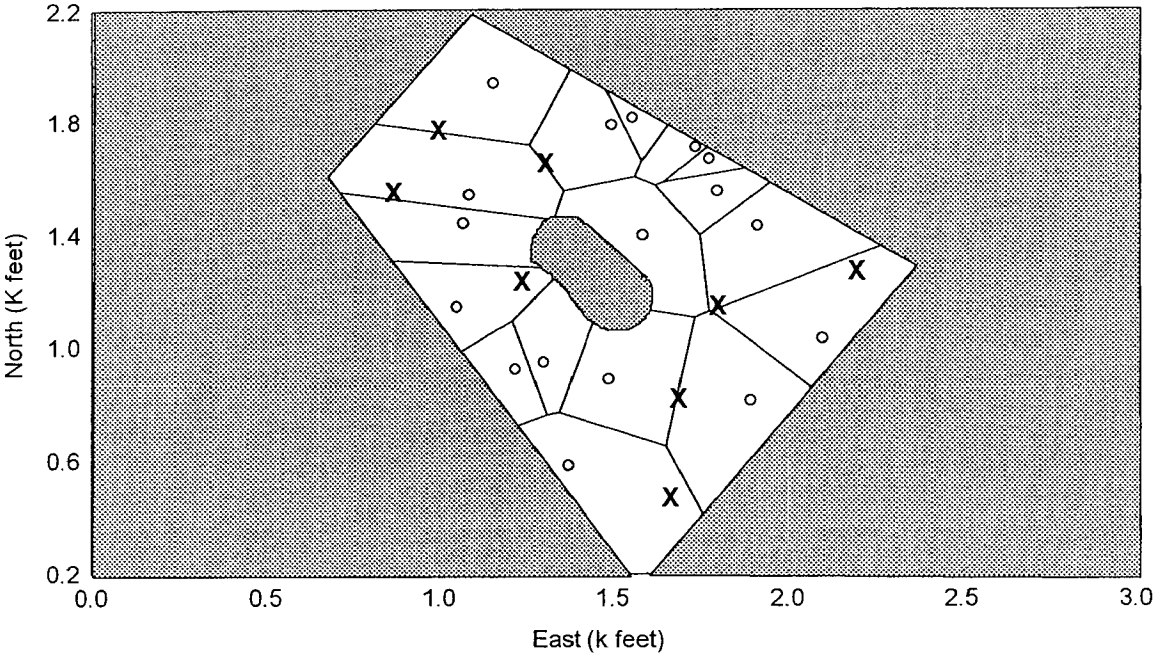
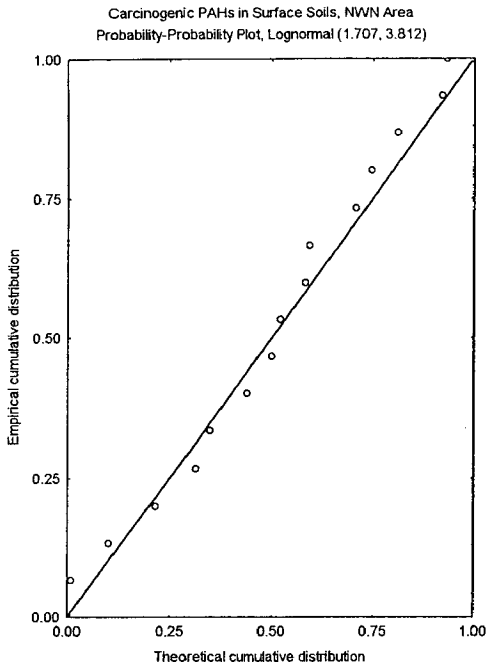


Figure 42.


Carcinogenic PAHs in Surface Soils, NWN Area
Probability-Probability Plot, Lognormal (1.707, 3.812)
Empirical cumulative distribution
Theoretical cumulative distribution
0.00
0.25
0.50
0.75
1.00

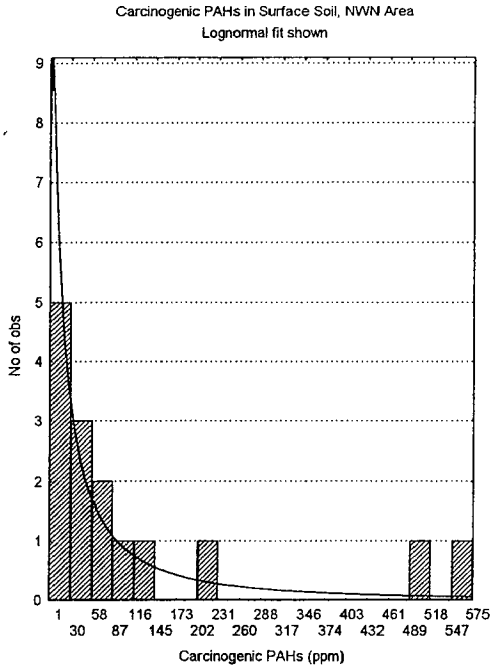
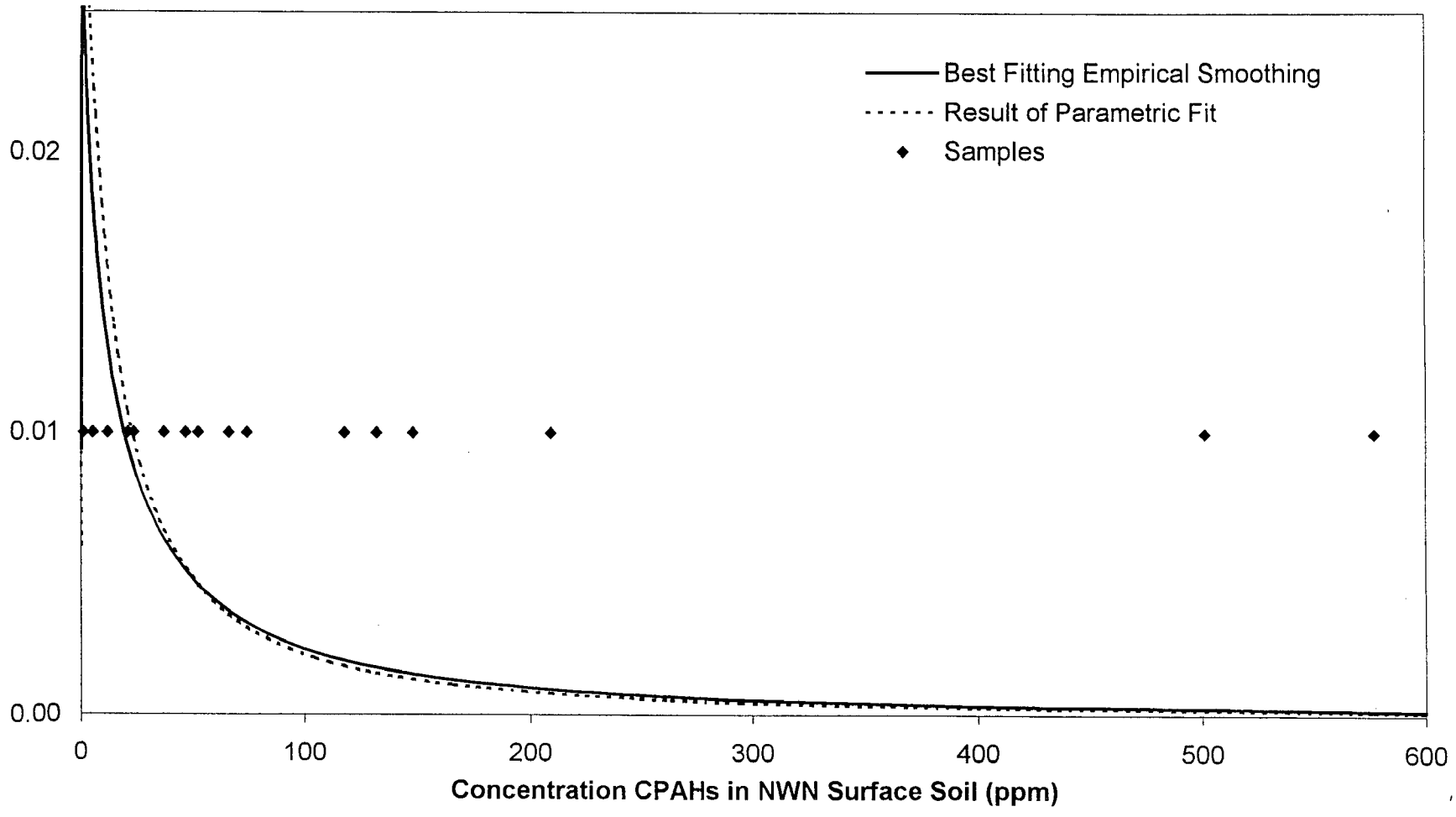

Carcinogenic PAHs in Surface Soil, NWN Area
Lognormal fit shown
No of obs
Carcinogenic PAHs (ppm)
0
1
2
3
4
5
6
7
8
9
1 58 116 173 231 288 346 403 461 518 575
30 87 145 202 260 317 374 432 489 547

Figure 43.

Probability Distribution Fits for Surface CPAHs in NWN Area

Best Fits Using Empirical Smoothing (solid) and Parametric (dotted)



A

APPENDIX A

Soil Boring Logs

KEY TO BORING LOGS

Soil classification in this report is based upon visual and manual field observations which include moisture, consistency, plasticity and grading estimates and should not be construed to imply field or laboratory testing unless presented herein. Soils are classified in accordance with the Unified Soil Classification System. Stratigraphic boundaries are approximate representations only. No warranty is provided as to the continuity of soil strata between borings.

UNIFIED SOIL CLASSIFICATION SYSTEM (USCS)

MAJOR DIVISIONS			GROUP SYMBOLS	TYPICAL NAMES
COURSE GRAINED SOILS More Than Half is Larger Than #200 Sieve	GRAVELS More Than Half the Course Fraction is Larger Than No. 4 Sieve Size	Clean Gravels With Little or No Fines	GW	Well Graded Gravels, Gravel-Sand Mixtures
			GP	Poorly Graded Gravels, Gravel-Sand Mixtures
		Gravels With Over 12% Fines	GM	Silty Gravels, Poorly Graded Gravel-Sand-Silt Mixtures
			GC	Clayey Gravels, Poorly Graded Gravel-Sand-Clay Mixtures
	SANDS More Than Half the Course Fraction is Smaller Than No. 4 Sieve Size	Clean Sands With Little or No Fines	SW	Well Graded Sands, Gravelly Sands
			SP	Poorly Graded Sands, Gravelly Sands
		Sands With Over 12% Fines	SM	Silty Sands, Poorly Graded Sand-Silt Mixtures
			SC	Clayey Sands, Poorly Graded Sand-Clay Mixtures
FINE GRAINED SOILS More Than Half is Smaller Than #200 Sieve	SILTS AND CLAYS Liquid Limit Less Than 50%		ML	Inorganic Silts and Very Fine Sands, Rock Flour, Silty or Clayey Fine Sands, or Clayey Silts with Slight Plasticity
			CL	Inorganic Clays of Low to Medium Plasticity, Gravelly Clays, Sandy Clays, Silty Clays, Lean Clays
			OL	Organic Clays and Organic Silty Clays of Low Plasticity
	SILTS AND CLAYS Liquid Limit Greater Than 50%		MH	Inorganic Silts, Micaceous or Diatomaceous Fine Sandy or Silty Soils, Elastic Silts
			CH	Inorganic Clays of High Plasticity, Fat Clays
			OH	Organic Clays of Medium to High Plasticity, Organic Silts
HIGHLY ORGANIC SOILS			Pt	Peat and Other Highly Organic Soils

LEGEND FOR BORING LOGS

- Blank Casing
- Slotted Screen
- Cement Grout
- Concrete
- Bentonite
- Sand Pack
- Fill Material

ABBREVIATIONS

NA	Not Applicable
ND	Not Detected Above Detection Limit
NS	Not Sampled
PAH	Polynuclear Aromatic Hydrocarbons
ppm	Parts Per Million
SPT	Standard Penetration Test
▽	Measured Static Water Level in Well
▼	Estimated Water Level During Drilling

Updated: 7/2/98 RBE
File: Boring Log Key

HAHN AND ASSOCIATES, INC.

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**SOIL BORING NUMBER**	**B-1**		
PROJECT: Northwest Natural Gas Co. Gasco Facility Portland, Oregon	HAI LOGGER:	Rob Ede	DRILL START	DRILL FINISH
	SAMPLING METHOD:	3" OD Split Spoon/4" OD Core Barrel	Time:	Time:
	DRILLING METHOD:	4 1/4-inch ID Hollow Stem Auger	13:55	15:35
	EQUIPMENT TYPE	B-59 Mobile Drill		
	DRILLER:	Brad James	Date:	Date:
PROJECT #: 2708	DRILLING CONTRACTOR:	Geo-Tech Explorations, Inc.	9/21/95	9/21/95

BORING DIAMETER:	8-inch
CASING DIAMETER:	Not Applicable
SURFACE ELEVATION:	30.1 feet msl
TOP OF CASING ELEVATION:	Not Applicable

ABANDONMENT DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHs (ppm)	SPT (blows/6 in) or Core Interval	RECOVERY or INTERVAL	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
3/4" Bentonite Chips	B1-01	13:45	5.6	13					SM	Silty SAND with some Gravel - brown, dry (surface sample)
	B1-02 Dup	13:50	Dup	56			1			
					50/5"	90	2		GP	Sandy GRAVEL - brown, dry, very dense
							3			
							4			
	B1-03	14:05	8.2	-	21	100				
					10	10	5		ML	Sandy SILT - brown to yellow, moist, very stiff, slightly plastic, no hydrocarbon odor, no sheen
					14	0				
							6			
					9	100	7			Sandy SILT - brown to yellow, moist, stiff, slightly plastic, slight hydrocarbon odor, no sheen
	B1-04	14:10		-	6	100				
			4.7		5	60	8			
							9	9/21/95		Concrete encountered at 8.5 to 10 feet bgs.
							10			
					2	100			SM	Silty SAND with Gravel - wet, medium dense, very strong hydrocarbon odor, sheen, hard black material (lampblack?) from 11 to 11.5 feet bgs
	B1-05	14:30		1,280	27	100	11			
			44.6		38	50				
					2	100	12			
	B1-06	14:35		-	6	100				Silty GRAVEL - olive gray, wet, dense, strong hydrocarbon odor, no sheen
			26.5		28	100	13			
							14		GM	
					16	0				
					22	0	15			
					25	0				
							16			
					4	100	17			
	B1-07	14:50	16.8	-	40	60				SAND - black, wet, medium dense, poorly graded, strong hydrocarbon odor, no sheen, appears to be saturated with oily substance
					4	0	18		SP	
							19			
					6	100				
	B1-08	14:57	22.3	-	6	100	20			

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**SOIL BORING NUMBER**	**B-1**		
PROJECT:	HAI LOGGER:	Rob Ede	DRILL START	DRILL FINISH
Northwest Natural Gas Co.	SAMPLING METHOD:	3" OD Split Spoon/4" OD Core Barrel	Time:	Time:
Gasco Facility	DRILLING METHOD:	4 1/4-inch ID Hollow Stem Auger	13:55	15:35
Portland, Oregon	EQUIPMENT TYPE	B-59 Mobile Drill	Date:	Date:
PROJECT #: 2708	DRILLER:	Brad James	9/21/95	9/21/95
	DRILLING CONTRACTOR:	Geo-Tech Explorations, Inc.		

BORING DIAMETER:	8-inch
CASING DIAMETER:	Not Applicable
SURFACE ELEVATION:	30.1 feet msl
TOP OF CASING ELEVATION:	Not Applicable

ABANDONMENT DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHs (ppm)	SPT (blows/6 in) or Core Interval	RECOVERY or INTERVAL	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
3/4" Bentonite Chips					6	40	21		SP	SAND - black, wet, dense, strong hydrocarbon odor, wood fragments present at sand-silt boundary
	B1-09	15:20		21						
			24.6				22			Continuous core barrel sampling device used to collect soil samples from 20.5 to 24.5 feet bgs
							23		ML	
	B1-10	15:30	20.6	-			24			SILT with some Sand - olive gray, wet, slightly plastic, mild petroleum hydrocarbon odor, no sheen
							25			
							26			Installed a 2-inch diameter 0.010-inch slotted stainless steel well screen at 20 to 23 feet bgs. Purged twelve gallons of water using a peristaltic pump prior to groundwater sampling. GROUNDWATER SAMPLE (2708-950921-BW1-01) collected at 17:30 hrs, 9/21/95. Well point was removed prior to abandonment.
							27			
							28			
							29			Drilled to 25 feet bgs Sampled to 24.5 feet bgs
							30			* Sample Number Prefix is 2708-950921-
							31			
							32			
							33			
							34			
							35			
							36			
							37			
							38			
							39			
							40			

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**SOIL BORING NUMBER**		**B-2**		
PROJECT:	HAI LOGGER:	Rob Ede		DRILL START	DRILL FINISH
Northwest Natural Gas Co.	SAMPLING METHOD:	4" OD Core Barrel		Time:	Time:
Gasco Facility	DRILLING METHOD:	4 1/4-inch ID Hollow Stem Auger		8:50	10:15
Portland, Oregon	EQUIPMENT TYPE	B-59 Mobile Drill		Date:	Date:
PROJECT #: 2708	DRILLER:	Brad James		9/27/95	9/27/95
	DRILLING CONTRACTOR:	Geo-Tech Explorations, Inc.			

BORING DIAMETER:	8-inch
CASING DIAMETER:	Not Applicable
SURFACE ELEVATION:	36.3 feet msl
TOP OF CASING ELEVATION:	Not Applicable

ABANDONMENT DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHs (ppm)	CORE INTERVAL	SAMPLE RECOVERY	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
3/4" Bentonite Chips	B2-01	8:50	4.7	-			1		SM	Silty SAND with Gravel - brown, moist, organic matter (surface sample)
							2			
							3			
							4			Silty SAND with some Gravel - green to gray, moist, no sheen, organic matter (pieces of wood)
	B2-02	9:05	5.5	-			5			
							6			Silty SAND with some Gravel - green to gray, mottled, slight hydrocarbon odor, slight sheen, tar (pieces of asphalt)
	B2-03	9:10	3.9	-			7		SM	
							8			
							9			
							10			
							11		GM	Sandy GRAVEL with Silt - moist, no sheen, large pieces of brick, possible pieces of lampblack (hydrophobic material)
							12			
							13			
							14			
	B2-04	9:25	2.5	-			15		SP	SAND - brown, moist, poorly graded, medium grained, moderate hydrocarbon odor, no sheen
							16			SAND - black, moist, moderate hydrocarbon odor, no sheen, hydrophobic black powder is present, thin layer of silt at 15.5 feet bgs (15-17 feet bgs)
	B2-05	9:35	2.2	-						
	B2-06	9:38	2.7	-			17			
							18	9/27/95	SP	SAND - gray to green, moist, no sheen, black powder is no longer present in sample (17-17.5 feet bgs)
							19			
							20			

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**SOIL BORING NUMBER**	**B-2**		
PROJECT: Northwest Natural Gas Co. Gasco Facility Portland, Oregon	HAI LOGGER:	Rob Ede	DRILL START	DRILL FINISH
	SAMPLING METHOD:	4" OD Core Barrel	Time:	Time:
	DRILLING METHOD:	4 1/4-inch ID Hollow Stem Auger	8:50	10:15
	EQUIPMENT TYPE	B-59 Mobile Drill		
	DRILLER:	Brad James	Date:	Date:
PROJECT #: 2708	DRILLING CONTRACTOR:	Geo-Tech Explorations, Inc.	9/27/95	9/27/95

BORING DIAMETER:	8-inch
CASING DIAMETER:	Not Applicable
SURFACE ELEVATION:	36.3 feet msl
TOP OF CASING ELEVATION:	Not Applicable

ABANDONMENT DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHs (ppm)	CORE INTERVAL	SAMPLE RECOVERY	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
3/4" Bentonite Chips										
	B2-07	9:42		-			21			SAND - gray to green, wet, poorly graded, medium grained, strong hydrocarbon odor, no sheen, (20-22 feet bgs)
			5.9						SP	
							22			
							23			SAND - as above, no hydrocarbon odor, no sheen (22-24 feet bgs)
	B2-08	9:50		-						
			3.1				24			
							25			Heaving sands encountered at 25 feet bgs - re-drill out hole to remove.
									SP	
							26			
	B2-09	10:10		-						SAND - gray to green, wet, poorly graded, medium grained, no hydrocarbon odor, no sheen
			3.2				27			
							28			
							29			Drilled to 27.5 feet bgs Sampled to 27 feet bgs
							30			
							31			
							32			
							33			
							34			
							35			
							36			
							37			
							38			
							39			
							40			

* Sample Number Prefix is 2708-950927-

HAHN & ASSOCIATES, INC.
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Portland, Oregon
(503) 796-0717

PROJECT:
Northwest Natural Gas Co.
Gasco Facility
Portland, Oregon
PROJECT #: 2708

SOIL BORING NUMBER B-3

HAI LOGGER:	Rob Ede	DRILL START	DRILL FINISH
SAMPLING METHOD:	Split Spoon	Time:	Time:
DRILLING METHOD:	4 1/4-inch ID Hollow Stem Auger	10:30	12:30
EQUIPMENT TYPE	B-59 Mobile Drill	Date:	Date:
DRILLER:	Brad James	9/21/95	9/21/95
DRILLING CONTRACTOR:	Geo-Tech Explorations, Inc.		

BORING DIAMETER: 8-inch
CASING DIAMETER: Not Applicable
SURFACE ELEVATION: 34.1 feet msl
TOP OF CASING ELEVATION: Not Applicable

ABANDONMENT DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHs (ppm)	SPT (blows/0.5 feet)	RECOVERY (%)	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
3/4" Bentonite Chips	B3-01	10:30		-					GP	Sandy GRAVEL - dry, road fill (surface sample)
			2.4				1			
							2		SP	
					10	100				SAND with some Gravel - brown, moist, medium dense, poorly graded, fine to medium grained, no hydrocarbon odor, no sheen
	B3-02	10:35		-	12	100	3			
			7.0		17	100				
							4			
					9	100	5			
	B3-03	10:40	7.4	-	10	70				SAND with some Gravel - brown, moist, medium dense, poorly graded, slight hydrocarbon odor, no sheen
					17	0	6			
							7		SP	
					10	100				SAND - brown with gray mottling, moist, medium dense, slight hydrocarbon odor, no sheen
	B3-04	10:45		-	18	100	8			
					18	0				
							9			
					12	100	10			
					21	100				SAND - brown, moist, medium dense, fine grained black sand at lower 4 inches of sample, black material has hydrocarbon odor and is hydrophobic (lampblack)
	B3-05	11:00	8.3	49	34	60	11			
							12		SP	
	B3-06	11:10	4.0	-	44	60				SAND - brown, moist, dense, large piece of wood stained black stuck in end of spoon - sands directly surrounding wood are coated black, slight hydrocarbon odor, no sheen
					27	0	13			
					34	0				
							14			
					13	100	15			
	B3-07	11:20		ND	16	100				SAND - brown, dry, medium dense, poorly graded, no hydrocarbon odor, no sheen
			8.0		13	100	16			
							17		SP	
					4	100				SAND - green to gray, moist to wet, stiff, poorly graded, moderate hydrocarbon odor, no sheen
	B3-08	11:30		-	9	100	18	9/21/95		
			5.3		9	100				
							19			
					14	100	20			

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**SOIL BORING NUMBER**		**B-3**	
PROJECT:	HAI LOGGER:	Rob Ede	DRILL START	DRILL FINISH
Northwest Natural Gas Co.	SAMPLING METHOD:	Split Spoon	Time:	Time:
Gasco Facility	DRILLING METHOD:	4 1/4-inch ID Hollow Stem Auger	10:30	12:30
Portland, Oregon	EQUIPMENT TYPE	B-59 Mobile Drill	Date:	Date:
PROJECT #: 2708	DRILLER:	Brad James	9/21/95	9/21/95
	DRILLING CONTRACTOR:	Geo-Tech Explorations, Inc.		

BORING DIAMETER:	8-inch
CASING DIAMETER:	Not Applicable
SURFACE ELEVATION:	34.1 feet msl
TOP OF CASING ELEVATION:	Not Applicable

ABANDONMENT DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHs (ppm)	SPT (blows/0.5 feet)	RECOVERY (%)	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
3/4" Bentonite Chips	B3-09	11:40		-	17	100				SAND - green to gray, wet, medium dense, poorly graded, strong hydrocarbon odor, no sheen
			2.0		17	50	21			
							22		SP	
					3	100				SAND - green to gray, wet, medium dense, poorly graded, strong hydrocarbon odor, no sheen, Clayey SILT in bottom 6 inches of core
	B3-10	12:00		-	12	100	23			
			22.0		14	100				
							24			
					4	100	25			
	B3-11	12:05		-	6	100				Clayey SILT, green to gray, wet, loose, plastic, strong hydrocarbon odor, no sheen
			29.1		10	100	26		ML	
							27			
					4	100				SAND - green to gray, wet, stiff, poorly graded, fine grained, slight hydrocarbon odor, no sheen
	B3-12	12:24		-	5	100	28		SP	
			4.5		5	100				
							29			
							30			
							31			Drilled to 28.5 feet bgs Sampled to 28.5 feet bgs
							32			* Sample Number Prefix is 2708-950921-
							33			
							34			
							35			
							36			
							37			
							38			
							39			
							40			

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**SOIL BORING NUMBER**	**B-4**		
PROJECT: Northwest Natural Gas Co. Gasco Facility Portland, Oregon	HAI LOGGER:	Rob Ede	DRILL START	DRILL FINISH
	SAMPLING METHOD:	4" OD Core Barrel	Time: 8:20	Time: 9:40
	DRILLING METHOD:	4 1/4-inch ID Hollow Stem Auger		
	EQUIPMENT TYPE	B-59 Mobile Drill		
	DRILLER:	Brad James	Date: 9/21/95	Date: 9/21/95
PROJECT #: 2708	DRILLING CONTRACTOR:	Geo-Tech Explorations, Inc.		

BORING DIAMETER:	8-inch
CASING DIAMETER:	Not Applicable
SURFACE ELEVATION:	36.9 feet msl
TOP OF CASING ELEVATION:	Not Applicable

ABANDONMENT DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHs (ppm)	CORE INTERVAL	SAMPLE RECOVERY	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
3/4" Bentonite Chips	B4-01	8:15	0.3	-			1		GP	Sandy GRAVEL - dry, roadbed material (surface sample)
							2		SP	
							3			
	B4-02	8:30		-			4			SAND with some Gravel - brown, dry, non-plastic, poorly graded, no hydrocarbon odor, no sheen
			8.9				5			
							6			
							7			
	B4-03	8:40		-						SAND with some Gravel - as above
			7.1				8			
							9		SP	
							10			
							11			
	B4-04	8:55		-			12			SAND with some Gravel - as above, moist
			7.7				13			
							14		SP	
							15			
							16			
	B4-05	9:05		-			17			SAND with some Gravel - as above
			15.0				18			
							19	9/21/95	SP	
							20			

HAHN & ASSOCIATES, INC.
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(503) 796-0717

PROJECT:
Northwest Natural Gas Co.
Gasco Facility
Portland, Oregon
PROJECT #: 2708

SOIL BORING NUMBER B-4

HAI LOGGER:	Rob Ede	DRILL START	DRILL FINISH
SAMPLING METHOD:	4" OD Core Barrel		
DRILLING METHOD:	4 1/4-inch ID Hollow Stem Auger	Time:	Time:
EQUIPMENT TYPE	B-59 Mobile Drill	8:20	9:40
DRILLER:	Brad James	Date:	Date:
DRILLING CONTRACTOR:	Geo-Tech Explorations, Inc.	9/21/95	9/21/95

BORING DIAMETER:	8-inch
CASING DIAMETER:	Not Applicable
SURFACE ELEVATION:	36.9 feet msl
TOP OF CASING ELEVATION:	Not Applicable

ABANDONMENT DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHs (ppm)	CORE INTERVAL	SAMPLE RECOVERY	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
3/4" Bentonite Chips										
	B4-06	9:15		-			21		SP	SAND with some Gravel - as above, moist to wet
			5.3							
							22			
							23			
							24		SP	
							25			
							26			
	B4-07	9:25		-			27			SAND with some Gravel - as above, green to gray, wet, (25-27 feet bgs)
			2.5							
							28		ML	
	B4-08	9:30		-			29			Clayey SILT - gray, moist, stiff, plastic, no hydrocarbon odor, no sheen (27-30 feet bgs)
			2.0							
							30			
							31			
							32			Drilled to 30 feet bgs Sampled to 29.5 feet bgs
							33			* Sample Number Prefix is 2708-950921-
							34			
							35			
							36			
							37			
							38			
							39			
							40			

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**SOIL BORING NUMBER**	**B-5**		
PROJECT: Northwest Natural Gas Co. Gasco Facility Portland, Oregon	HAI LOGGER:	Rob Ede	DRILL START Time: 13:35	DRILL FINISH Time: 14:50
	SAMPLING METHOD:	4" OD Core Barrel		
	DRILLING METHOD:	4 1/4-inch ID Hollow Stem Auger		
	EQUIPMENT TYPE	B-59 Mobile Drill		
	DRILLER:	Brad James	Date: 9/28/95	Date: 9/28/95
PROJECT #: 2708	DRILLING CONTRACTOR:	Geo-Tech Explorations, Inc.		

BORING DIAMETER:	8-inch
CASING DIAMETER:	Not Applicable
SURFACE ELEVATION:	36.1 feet msl
TOP OF CASING ELEVATION:	Not Applicable

ABANDONMENT DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHS (ppm)	CORE INTERVAL	SAMPLE RECOVERY	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
3/4" Bentonite Chips	B5-01	13:30		-						Silty SAND with some Gravel - brown, wet, no hydrocarbon odor, no sheen, (surface)
			1.4				1			
							2			
							3		SP	
	B5-02	13:40		-						SAND with some Gravel - brown, slightly moist, loose, non-plastic, poorly graded, medium grained, no hydrocarbon odor, no sheen
			3.9				4			
							5			
							6			
	B5-03	13:50		-			7			SAND with some Gravel - as above, moist
			3.3				8			
							9		SP	
							10			
							11			
							12			
	B5-04	14:00		-						SAND with some Gravel - as above, moist
			3.8				13			
							14		SP	
							15			
	B5-05	14:08		3.6			16			SAND with some Gravel - as above, hydrocarbon odor, (15-17 feet bgs)
			4.3				17			
	B5-06	14:10		-					ML	SILT - green to gray, moist, hydrocarbon odor, sheen, wood fragments, (17-17.5 feet bgs)
			4.9				18			
	B5-07	14:12		-			19	9/28/95	SP	SAND - green to gray, moist, loose, slight hydrocarbon odor, no sheen, (17.5-19 feet bgs)
			3.6				20			

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	SOIL BORING NUMBER B-5			
PROJECT: Northwest Natural Gas Co. Gasco Facility Portland, Oregon	HAI LOGGER:	Rob Ede	DRILL START Time: 13:35	DRILL FINISH Time: 14:50
	SAMPLING METHOD:	4" OD Core Barrel		
	DRILLING METHOD:	4 1/4-inch ID Hollow Stem Auger		
	EQUIPMENT TYPE	B-59 Mobile Drill		
	DRILLER:	Brad James	Date: 9/28/95	Date: 9/28/95
PROJECT #: 2708	DRILLING CONTRACTOR:	Geo-Tech Explorations, Inc.		

BORING DIAMETER:	8-inch
CASING DIAMETER:	Not Applicable
SURFACE ELEVATION:	36.1 feet msl
TOP OF CASING ELEVATION:	Not Applicable

ABANDONMENT DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHS (ppm)	CORE INTERVAL	SAMPLE RECOVERY	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
3/4" Bentonite Chips							21		SP	
							22			
	B5-08	14:15		-						SAND - green to gray, wet, loose, medium grained, no hydrocarbon odor, no sheen
			3.5				23			
							24			
							25			Installed a 2-inch diameter 0.010-inch slotted stainless steel well screen at 25 to 28 feet bgs. Purged 5 gallons of water using a peristaltic pump prior to groundwater sampling. GROUNDWATER SAMPLE (2708-950929-BW5-01) collected at 8:00 hrs, 9/28/95. Well point was removed prior to abandonment.
							26		SP	
							27			
	B5-09	14:35		-			28			SAND - as above, alternating thin sand and silt beds in 4 inch layer above massive silt
			3.5				29		ML	
	B5-10	14:40		-						SILT with some Clay - green to gray, moist, stiff, plastic, no hydrocarbon odor, no sheen
			3.1				30			
							31			
							32			Drilled to 30 feet bgs Sampled to 30 feet bgs
							33			
							34			* Sample Number Prefix is 2708-950928-
							35			
							36			
							37			
							38			
							39			
							40			

HAHN & ASSOCIATES, INC.
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Portland, Oregon
(503) 796-0717

PROJECT:
Northwest Natural Gas Co.
Gasco Facility
Portland, Oregon
PROJECT #: 2708

SOIL BORING NUMBER B-6

HAI LOGGER:	Rob Ede	DRILL START	DRILL FINISH
SAMPLING METHOD:	3"OD Split Spoon/4" OD Core Barrel	Time: 11:15	Time: 12:35
DRILLING METHOD:	4 1/4-inch ID Hollow Stem Auger	Date: 9/27/95	Date: 9/27/95
EQUIPMENT TYPE	B-59 Mobile Drill		
DRILLER:	Brad James		
DRILLING CONTRACTOR:	Geo-Tech Explorations, Inc.		

BORING DIAMETER: 8-inch
CASING DIAMETER: Not Applicable
SURFACE ELEVATION: 34.7 feet msl
TOP OF CASING ELEVATION: Not Applicable

ABANDONMENT DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHS (ppm)	SPT (blows/6 in) or Core Interval	Recovery (%) or Sample Interval	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
Concrete							1		GP	GRAVEL - old pavement at surface
							2		SP	SAND - brown, slightly moist, medium dense, poorly graded, fine to medium grained, no hydrocarbon odor, no sheen, (2.5-3 feet bgs)
					15	100	3			
	B6-01	11:20		-	30	100				Sandy GRAVEL - black, dense, pieces of lampblack (hydrophobic in water), no hydrocarbon odor, no sheen, (3-4 feet bgs)
			4.8		24	50	4			
							5		GP	
					9	10				
					4	0	6			Sandy GRAVEL - gray, moist, loose, no hydrocarbon odor, no sheen
					2	0				
							7			
									SP	
					13	100	8			SAND with Gravel and Brick - black, moist, medium dense, grains stuck together by tarry substance, strong hydrocarbon odor, strong sheen
	B6-02	11:30	38.5	12,487	12	50				
					10	0	9			
3/4" Bentonite Chips							10			
					7	10				
					11	0	11			Large Rock in end of sampler - blue matrix, concoidal fracture, specimen retained
					13	0				
							12		SP	
					5	50	13			Weathered Brick in end of tube - moist, stiff, no hydrocarbon odor, no sheen
					5	0				
					5	0	14			
							15			
					6	100				
	B6-03	12:00		87	16	100	16			SAND - brown, slightly moist, loose, fine to medium grained, gravels from 16-16.5 feet bgs, no hydrocarbon odor, no sheen
			8.0		9	80				
							17		SP	
							18			
	B6-04	12:10		-						SAND - as above, no gravel
			7.2				19	9/27/95		
							20			

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**SOIL BORING NUMBER**	**B-6**		
PROJECT:	HAI LOGGER:	Rob Ede	DRILL START	DRILL FINISH
Northwest Natural Gas Co.	SAMPLING METHOD:	3"OD Split Spoon/4" OD Core Barrel	Time:	Time:
Gasco Facility	DRILLING METHOD:	4 1/4-inch ID Hollow Stem Auger	11:15	12:35
Portland, Oregon	EQUIPMENT TYPE	B-59 Mobile Drill	Date:	Date:
PROJECT #: 2708	DRILLER:	Brad James	9/27/95	9/27/95
	DRILLING CONTRACTOR:	Geo-Tech Explorations, Inc.		

BORING DIAMETER:	8-inch
CASING DIAMETER:	Not Applicable
SURFACE ELEVATION:	34.7 feet msl
TOP OF CASING ELEVATION:	Not Applicable

ABANDONMENT DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHS (ppm)	SPT (blows/6 in) or Core Interval	Recovery (%) or Sample Interval	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
3/4" Bentonite Chips							21		SP	
	B6-05	12:20		-			22			SAND - green to gray, wet, poorly graded, fine to medium graded, no hydrocarbon odor, no sheen
			9.4							
							23		ML	Sandy SILT - green to gray, stiff, slightly plastic, slight organic odor (anaerobic degradation), no sheen, sand content decreasing with depth
	B6-06	12:25		-						
			8.3				24			
							25			
							26			
	B6-07	12:30		-						
			9.2				27		ML	Sandy SILT - green to gray, wet, slightly plastic, no hydrocarbon odor, no sheen
							28			
	B6-08	12:35		-			29			
			9.8				30			
							31			Drilled to 30 feet bgs Sampled to 29.5 feet bgs
							32			* Sample Number Prefix is 2708-950927-
							33			
							34			
							35			
							36			
							37			
							38			
							39			
							40			

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**SOIL BORING NUMBER**	**B-7**		
PROJECT: Northwest Natural Gas Co. Gasco Facility Portland, Oregon	HAI LOGGER:	Rob Ede	DRILL START	DRILL FINISH
	SAMPLING METHOD:	3" OD Split Spoon/4"OD Core Barrel	Time:	Time:
	DRILLING METHOD:	4 1/4-inch ID Hollow Stem Auger	13:30	14:30
	EQUIPMENT TYPE	B-59 Mobile Drill		
	DRILLER:	Brad James	Date:	Date:
PROJECT #: 2708	DRILLING CONTRACTOR:	Geo-Tech Explorations, Inc.	9/27/95	9/27/95

BORING DIAMETER:	8-inch
CASING DIAMETER:	Not Applicable
SURFACE ELEVATION:	36.1 feet msl
TOP OF CASING ELEVATION:	Not Applicable

ABANDONMENT DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHS (ppm)	SPT(blows/6 in) or Core Interval	RECOVERY (%) or INTERVAL	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
Concrete									Concrete	
							1			
							2		SP	
					4	100	3			
	B7-01	13:35		-	6	100				SAND - brown, slightly moist, loose, poorly graded, fine to medium grained, no hydrocarbon odor, no sheen
			3.9		5	100	4			
							5			
					5	100				
	B7-02	13:45		-	5	100	6			SAND - as above
			5.0		5	100				
							7			
							8		SP	
	B7-03	13:50								SAND - as above, some pebbles, moist, no hydrocarbon odor, slight sheen
			4.6				9			
							10			
							11			
							12			
	B7-04	13:55		-						SAND - as above, moist, no hydrocarbon odor, slight sheen
			6.0				13			
							14			
							15			
							16			
							17		SP	
	B7-05	14:02		ND						SAND - as above, moist, no hydrocarbon odor, no sheen
			7.7				18			
							19			
							20			

3/4" Bentonite Chips

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**SOIL BORING NUMBER**	**B-7**		
PROJECT: Northwest Natural Gas Co. Gasco Facility Portland, Oregon	HAI LOGGER:	Rob Ede	DRILL START	DRILL FINISH
	SAMPLING METHOD:	3" OD Split Spoon/4"OD Core Barrel	Time: 13:30	Time: 14:30
	DRILLING METHOD:	4 1/4-inch ID Hollow Stem Auger		
	EQUIPMENT TYPE	B-59 Mobile Drill		
	DRILLER:	Brad James	Date: 9/27/95	Date: 9/27/95
PROJECT #: 2708	DRILLING CONTRACTOR:	Geo-Tech Explorations, Inc.		

BORING DIAMETER:	8-inch
CASING DIAMETER:	Not Applicable
SURFACE ELEVATION:	36.1 feet msl
TOP OF CASING ELEVATION:	Not Applicable

ABANDONMENT DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHS (ppm)	SPT(blows/6 in) or Core Interval	RECOVERY (%) or INTERVAL	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
3/4" Bentonite Chips								9/27/95		
	B7-06	14:10		-			21		SP	SAND - brown, wet, poorly graded, medium grained, slight hydrocarbon odor, no sheen, (20-21 feet bgs)
			8.4							
							22			
	B7-07	14:12		-			23			SAND - green to gray, wet, poorly graded, medium grained, no hydrocarbon odor, no sheen, (21-25 feet bgs)
			6.6							
							24			
							25			
							26		SP	
							27			
	B7-08	14:20		-			28			SAND - as above
			5.2							
							29		ML	SILT - green to gray, moist, stiff, plastic, no hydrocarbon odor, no sheen, some brown organic matter
	B7-09	14:30	6.4	-			30			
							31			
							32			Drilled to 30 feet bgs Sampled to 29.5 feet bgs
							33			* Sample Number Prefix is 2708-950927-
							34			
							35			
							36			
							37			
							38			
							39			
							40			

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**SOIL BORING NUMBER**	**B-8**		
PROJECT:	HAI LOGGER:	Rob Ede	DRILL	DRILL
Northwest Natural Gas Co.	SAMPLING METHOD:	1.5" / 3" OD Split Spoon	START	FINISH
Gasco Facility	DRILLING METHOD:	4 1/4-inch ID Hollow Stem Auger	Time:	Time:
Portland, Oregon	EQUIPMENT TYPE	B-59 Mobile Drill	9:30	12:10
	DRILLER:	Brad James	Date:	Date:
PROJECT #: 2708	DRILLING CONTRACTOR:	Geo-Tech Explorations, Inc.	9/18/95	9/18/95

BORING DIAMETER:	8-inch
CASING DIAMETER:	Not Applicable
SURFACE ELEVATION:	23.0
TOP OF CASING ELEVATION:	Not Applicable

ABANDONMENT DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHS (ppm)	SPT (blows/0.5 feet)	RECOVERY (%)	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
							1			
							2			
									GM	
					5	100	3			Silty GRAVEL - brown, moist, loose, non-plastic, slightly graded, no hydrocarbon odor or discoloration, spotty sheen
	B8-01	9:35	9.3	-	6	50				
					8	0	4			
							5			
	B8-02	9:42		-	4	100				
			-		7	0	6			Silty GRAVEL - brown, dry, loose, non-plastic, slightly graded, no hydrocarbon odor or discoloration, spotty sheen
					9	0			GM	
							7			
	B8-03	9:44	-	-	9	70	8			Silty GRAVEL - as above, wet, medium dense
					18	0				
					23	0	9			
							10			
3/4" Bentonite Chips	B8-04	9:50		338	17	100			GM	Sandy GRAVEL - brown, moist, medium dense, non-plastic, poorly graded, no hydrocarbon odor, no sheen, large pieces of slag in sampling tube
			7.5		23	20	11			
					17	0		9/18/95		
							12			
	B8-05	10:00	8.0	-	11	100	13	▼		
	B8-06 Dup	10:02			10	20				SAND - gray, wet, medium dense, non-plastic, poorly graded, fine grained, mild hydrocarbon odor, no sheen
					8	0	14			
							15			Note: Change to 1.5" Split Spoon sampling device
					3	100			SP	
	B8-07	10:05		-	4	100	16			SAND - gray, wet, loose, non-plastic, poorly graded, medium grained, mild hydrocarbon odor, no sheen
			7.3		6	50				
							17			
					3	100	18			Sandy SILT - gray, wet, soft, slightly plastic, no hydrocarbon odor, no sheen
	B8-08	10:15		0.24	3	100				
			6.5		3	100	19		ML	
							20			

HAHN & ASSOCIATES, INC.
434 NW Sixth Avenue
Portland, Oregon
(503) 796-0717

PROJECT:
Northwest Natural Gas Co.
Gasco Facility
Portland, Oregon
PROJECT #: 2708

SOIL BORING NUMBER B-8

HAI LOGGER:	Rob Ede	DRILL START	DRILL FINISH
SAMPLING METHOD:	1.5" / 3" OD Split Spoon		
DRILLING METHOD:	4 1/4-inch ID Hollow Stem Auger	Time: 9:30	Time: 12:10
EQUIPMENT TYPE	B-59 Mobile Drill		
DRILLER:	Brad James	Date: 9/18/95	Date: 9/18/95
DRILLING CONTRACTOR:	Geo-Tech Explorations, Inc.		

BORING DIAMETER:	8-inch
CASING DIAMETER:	Not Applicable
SURFACE ELEVATION:	23.0
TOP OF CASING ELEVATION:	Not Applicable

ABANDONMENT DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHS (ppm)	SPT (blows/0.5 feet)	RECOVERY (%)	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
3/4" Bentonite Chips					1	100				SAND - gray, wet, very loose, non-plastic, poorly graded, moderate petroleum hydrocarbon odor, slight sheen
	B8-09	10:20		-	1	100	21			
			6.1		2	100			SP	
							22			
					2	100	23			
					2	100				Silty SAND - dark gray, wet, very loose, non-plastic, poorly graded, fine grained, mild petroleum hydrocarbon odor
	B8-10	11:45	5.1	-	4	100	24		SM	
							25			
					1	100				
					2	100	26			Silty SAND - as above
	B8-11	12:00	4.1	-	3	100				
							27			
							28			Installed a 2-inch diameter 0.010-inch slotted stainless steel well screen at 20.5 to 23.5 feet bgs. Purged two gallons of water using a peristaltic pump prior to groundwater sampling. GROUNDWATER SAMPLE (2708-950918-BW8-01) collected at 11:30 hrs, 9/18/95. Well point was removed prior to abandonment.
							29			
							30			
							31			Drilled to 26.5 feet bgs Sampled to 26.5 feet bgs
							32			* Sample Number Prefix is 2708-950918-
							33			
							34			
							35			
							36			
							37			
							38			
							39			
							40			

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**SOIL BORING NUMBER**	**B-9**		
PROJECT: Northwest Natural Gas Co. Gasco Facility Portland, Oregon	HAI LOGGER:	Rob Ede	DRILL START Time: 14:50	DRILL FINISH Time: 16:40
	SAMPLING METHOD:	1.5" OD Split Spoon/4" OD Core Barrel		
	DRILLING METHOD:	4 1/4-inch ID Hollow Stem Auger		
	EQUIPMENT TYPE	B-59 Mobile Drill		
	DRILLER:	Brad James	Date: 9/18/95	Date: 9/18/95
PROJECT #: 2708	DRILLING CONTRACTOR:	Geo-Tech Explorations, Inc.		

BORING DIAMETER:	8-inch
CASING DIAMETER:	Not Applicable
SURFACE ELEVATION:	31.6 feet msl
TOP OF CASING ELEVATION:	Not Applicable

ABANDONMENT DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHS (ppm)	SPT (blows/6 in) or Core Interval	RECOVERY (%) or INTERVAL	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
							1			
							2		SP	
							3			See boring log B-9A for 0 to 5 foot soil description.
							4			
							5			
	B9-01	14:50		-	8	100				SAND with some Gravel - black, dry, medium dense, very strong petroleum hydrocarbon odor, all pores filled with tar-like substance throughout
			8:10		10	20	6			
					11	0				
							7			
					18	10	8			SAND with some Gravel - as above, dense, large piece of gravel in end of sampler
					33	0				
					21	0	9		SP	
3/4" Bentonite Chips							10			
	B9-02	15:00	897	19,438	18	100				SAND with some Gravel - as above, moist, dense
					13	0	11			
					23	0				
							12			
	B9-03	15:10	278.0	-	16	100	13			Silty SAND with some Gravel - brown, moist, medium dense, poorly graded, strong petroleum hydrocarbon odor, some tar-like blebs
					6	0				
					17	0	14			
							15		SM	
	B9-04	15:20	118	-	4	100				Silty SAND with Gravel - brown with black mottles, dry, medium dense, tar-like substance mottled throughout, strong petroleum hydrocarbon odor
					7	0	16			
					11	0				
							17			
	B9-05	15:30	211	-	13	100	18			SAND with some Gravel - black, very dense, possible lampblack
					50?3"	5		9/18/95	SP	
							19			
	B9-06	15:40	363	-	3	100	20	▼		

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**SOIL BORING NUMBER**	**B-9**		
PROJECT:	HAI LOGGER:	Rob Ede	DRILL START	DRILL FINISH
Northwest Natural Gas Co.	SAMPLING METHOD:	1.5" OD Split Spoon/4" OD Core Barrel	Time:	Time:
Gasco Facility	DRILLING METHOD:	4 1/4-inch ID Hollow Stem Auger	14:50	16:40
Portland, Oregon	EQUIPMENT TYPE	B-59 Mobile Drill	Date:	Date:
PROJECT #: 2708	DRILLER:	Brad James	9/18/95	9/18/95
	DRILLING CONTRACTOR:	Geo-Tech Explorations, Inc.		

BORING DIAMETER:	8-inch
CASING DIAMETER:	Not Applicable
SURFACE ELEVATION:	31.6 feet msl
TOP OF CASING ELEVATION:	Not Applicable

ABANDONMENT DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHS (ppm)	SPT (blows/6 in) or Core Interval	RECOVERY (%) or INTERVAL	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
3/4" Bentonite Chips					4	0			SP	SAND - black, wet, very loose, poorly graded, fine to medium grained, slight petroleum hydrocarbon odor
					4	0	21			
							22			
					2	100				SAND with some Gravel - black, wet, very loose, slightly graded, medium grained, strong petroleum hydrocarbon odor, strong sheen
	B9-07	1	100	-	3	100	23			
					6	100				
							24			
							25			
							26			
							27			
							28			
	B9-08	16:10	504	-					SM	Silty SAND - gray to black, wet, mild petroleum hydrocarbon odor, sheen
							29			
							30			
	B9-09	16:20	33.1	43.5			31			Silty SAND - dark gray, wet, poorly sorted, petroleum hydrocarbon odor, slight sheen
							32			
							33			
							34		SP	
	B9-10	16:21	9.1	0.46			35			SAND - green to gray, wet, poorly graded, fine grained, no petroleum hydrocarbon odor, no sheen
							36			
							37			Drilled to 35 feet bgs Sampled to 35 feet bgs
							38			* Sample Number Prefix is 2708-950918-
							39			
							40			

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**SOIL BORING NUMBER**	**B-9A**		
PROJECT: Northwest Natural Gas Co. Gasco Facility Portland, Oregon	HAI LOGGER:	Rob Ede	DRILL START Time: 14:00 Date: 9/18/95	DRILL FINISH Time: 14:20 Date: 9/18/95
	SAMPLING METHOD:	4" OD Core Barrel		
	DRILLING METHOD:	4 1/4-inch ID Hollow Stem Auger		
	EQUIPMENT TYPE	B-59 Mobile Drill		
	DRILLER:	Brad James		
PROJECT #: 2708	DRILLING CONTRACTOR:	Geo-Tech Explorations, Inc.		

BORING DIAMETER:	8-inch
CASING DIAMETER:	Not Applicable
SURFACE ELEVATION:	31.6 feet msl
TOP OF CASING ELEVATION:	Not Applicable

ABANDONMENT DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHS (ppm)	CORE INTERVAL	RECOVERY INTERVAL	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
Bentonite Chips							1		SP	Gravelly SAND - black, dry, strong petroleum hydrocarbon odor, saturated with tar-like substance throughout
	B9A-01	14:00		-						
	B9A-02	14:02	614	-			2			
	B9A-03	14:05	274	-			3			
							4			Note: Stopped drilling at 14:20 due to lack of soil recovery from 5 to 15 feet bgs. Relocate to boring B-9.
							5			
							6			
							7			Drilled to 15 feet bgs Sampled to 3 feet bgs
							8			*Sample prefix is 2708-950918-
							9			
							10			
							11			
							12			
							13			
							14			
							15			
							16			
							17			
							18			
							19			
							20			

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	SOIL BORING NUMBER B-10			
PROJECT: Northwest Natural Gas Co. Gasco Facility Portland, Oregon	HAI LOGGER:	Rob Ede	DRILL START Time: 11:50 Date: 9/25/95	DRILL FINISH Time: 12:50 Date: 9/25/95
	SAMPLING METHOD:	4" OD Core Barrel		
	DRILLING METHOD:	4 1/4-inch ID Hollow Stem Auger		
	EQUIPMENT TYPE	B-59 Mobile Drill		
	DRILLER:	Brad James		
PROJECT #: 2708	DRILLING CONTRACTOR:	Geo-Tech Explorations, Inc.		

BORING DIAMETER:	8-inch
CASING DIAMETER:	Not Applicable
SURFACE ELEVATION:	35.2 feet msl
TOP OF CASING ELEVATION:	Not Applicable

ABANDONMENT DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHS (ppm)	CORE INTERVAL	SAMPLE RECOVERY	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
3/4" Bentonite Chips							1			
							2		SP	
							3			
	B10-01	12:10		-			4			SAND - brown, dry, poorly graded, medium grained, no hydrocarbon odor, no sheen
			102.0				5			
							6			
							7			
	B10-02	12:20		-						SAND with some Pebbles - brown, moist, poorly graded, medium grained, no hydrocarbon odor, no sheen
			164.0				8		SP	
							9			
							10			
							11			
							12			
	B10-03	12:30		-						SAND - brown, slightly moist, poorly graded, medium grained, no hydrocarbon odor, no sheen, slight froth via sheen test
			165.0				13		SP	
							14			
							15			
							16			
							17			SAND - brown, moist, poorly graded, medium grained, no hydrocarbon odor, no sheen
	B10-04	12:40		ND			18			
			127.0						SP	
							19			
							20			

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**SOIL BORING NUMBER**	**B-10**		
PROJECT: Northwest Natural Gas Co. Gasco Facility Portland, Oregon	HAI LOGGER:	Rob Ede	DRILL START	DRILL FINISH
	SAMPLING METHOD:	4" OD Core Barrel	Time: 11:50	Time: 12:50
	DRILLING METHOD:	4 1/4-inch ID Hollow Stem Auger		
	EQUIPMENT TYPE	B-59 Mobile Drill		
	DRILLER:	Brad James	Date: 9/25/95	Date: 9/25/95
PROJECT #: 2708	DRILLING CONTRACTOR:	Geo-Tech Explorations, Inc.		

BORING DIAMETER:	8-inch
CASING DIAMETER:	Not Applicable
SURFACE ELEVATION:	35.2 feet msl
TOP OF CASING ELEVATION:	Not Applicable

ABANDONMENT DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHS (ppm)	CORE INTERVAL	SAMPLE RECOVERY	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
3/4" Bentonite Chips							21	9/25/95	SP	
							22			
	B10-05	12:50		-			23			SAND - green to gray, wet, poorly graded, medium grained, no hydrocarbon odor, no sheen
			167.0							
							24			
							25			
							26			Drilled to 25 feet bgs Sampled to 24 feet bgs
							27			* Sample Number Prefix is 2708-950925-
							28			
							29			
							30			
							31			
							32			
							33			
							34			
							35			
							36			
							37			
							38			
							39			
							40			

HAHN & ASSOCIATES, INC.
434 NW Sixth Avenue
Portland, Oregon
(503) 796-0717

PROJECT:
Northwest Natural Gas Co.
Gasco Facility
Portland, Oregon
PROJECT #: 2708

SOIL BORING NUMBER B-11

HAI LOGGER:	Rob Ede	DRILL START	DRILL FINISH
SAMPLING METHOD:	3" OD Split Spoon/4" OD Core Barrel		
DRILLING METHOD:	4 1/4-inch ID Hollow Stem Auger	Time: 10:30	Time: 11:40
EQUIPMENT TYPE	B-59 Mobile Drill		
DRILLER:	Brad James	Date: 9/28/95	Date: 9/28/95
DRILLING CONTRACTOR:	Geo-Tech Explorations, Inc.		

BORING DIAMETER:	8-inch
CASING DIAMETER:	Not Applicable
SURFACE ELEVATION:	36.5 feet MSL
TOP OF CASING ELEVATION:	Not Applicable

ABANDONMENT DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHS (ppm)	SPT (blows/6 in) or Core Interval	RECOVERY or INTERVAL	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
3/4" Bentonite Chips	B11-01	10:30		-						Silty SAND with Gravel - brown, moist, no hydrocarbon odor, no sheen
			9.2				1			
							2		SP	
							3			
					8	100				
	B11-01	10:40		-	15	100				SAND - brown, slightly moist, medium dense, poorly graded, medium grained, no hydrocarbon odor, no sheen
			7.2		18	70	4			
							5			
					8	100				
	B11-03	10:42		-	13	100	6			SAND - dark gray, moist, medium dense, poorly graded, medium grained, hydrocarbon odor, sheen
			20		13	95				
							7		SP	
	B11-04	10:45		-			8			SAND - dark gray, moist, loose, poorly graded, medium grained, hydrocarbon odor, sheen
			21.6							
							9			
	B11-05	10:48		-						SAND - as above, gray to black, strong hydrocarbon odor, strong sheen
			119				10			
							11			
							12		SP	
	B11-06	10:55		973			13			SAND - as above, strong hydrocarbon odor, strong sheen
			260							
							14			
							15			
							16			
							17		SP	
							18			
	B11-07	11:00		-						SAND - as above, moist to wet, strong hydrocarbon odor, strong sheen, brown product and froth formed when water was added to sample
			97				19	9/28/95		
							20			

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**SOIL BORING NUMBER**		**B-11**	
PROJECT: Northwest Natural Gas Co. Gasco Facility Portland, Oregon	HAI LOGGER:	Rob Ede	DRILL START Time: 10:30	DRILL FINISH Time: 11:40
	SAMPLING METHOD:	3" OD Split Spoon/4" OD Core Barrel		
	DRILLING METHOD:	4 1/4-inch ID Hollow Stem Auger		
	EQUIPMENT TYPE	B-59 Mobile Drill		
	DRILLER:	Brad James	Date: 9/28/95	Date: 9/28/95
PROJECT #: 2708	DRILLING CONTRACTOR:	Geo-Tech Explorations, Inc.		

BORING DIAMETER:	8-inch
CASING DIAMETER:	Not Applicable
SURFACE ELEVATION:	36.5 feet MSL
TOP OF CASING ELEVATION:	Not Applicable

ABANDONMENT DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHS (ppm)	SPT (blows/6 in) or Core Interval	RECOVERY or INTERVAL	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
3/4" Bentonite Chips							21		SP	
	B11-08	11:10		-						SAND - as above, wet, (froth no longer present)
			17.1				22			
							23			
	B11-09	11:15		1.1						SAND - as above, no hydrocarbon odor, no sheen
			2.1				24			
							25			
							26		SP	
	B11-10	11:20		-						SAND - as above, hydrocarbon odor and sheen from 25' to 27' bgs
			0.4				27			
							28			
	B11-11	11:25		-			29			SAND - as above, no hydrocarbon odor, no sheen
			0.7							
	B11-12	11:30		-			30			SILT - green to gray, moist, stiff, no hydrocarbon odor, no sheen
			0.5						ML	
							31			
	B11-13	11:40		-						SILT - as above
			0				32			
							33			
							34			Drilled to 32 feet bgs Sampled to 32 feet bgs
							35			* Sample Number Prefix is 2708-950921-
							36			
							37			
							38			
							39			
							40			

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**SOIL BORING NUMBER**	**B-13**		
PROJECT: Northwest Natural Gas Co. Gasco Facility Portland, Oregon	HAI LOGGER:	Rob Ede	DRILL START	DRILL FINISH
	SAMPLING METHOD:	4" OD Core Barrel	Time: 12:10	Time: 13:00
	DRILLING METHOD:	4 1/4-inch ID Hollow Stem Auger		
	EQUIPMENT TYPE	B-59 Mobile Drill		
	DRILLER:	Brad James	Date: 10/6/95	Date: 10/6/95
PROJECT #: 2708	DRILLING CONTRACTOR:	Geo-Tech Explorations, Inc.		

BORING DIAMETER:	8-inch
CASING DIAMETER:	Not Applicable
SURFACE ELEVATION:	36.4 feet msl
TOP OF CASING ELEVATION:	Not Applicable

ABANDONMENT DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHS (ppm)	CORE INTERVAL	SAMPLE RECOVERY	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
3/4" Bentonite Chips							1			
							2			
							3		SP	
	B13-01	12:15		-						SAND - brown, moist, loose, poorly graded, medium grained, no hydrocarbon odor, no sheen
			285.0				4			
							5			
							6			
							7			
							8		SP	
							9			
	B13-02	12:27		-						SAND - olive gray, moist to wet, saturated with hydrocarbon product, strong sheen throughout core
			300.0				10			
	B13-03	12:33		29,378			11			SAND - black, wet, loose, saturated with hydrocarbon product, wood fragments at sand/silt interface
			368.0						ML	
							12			Sandy SILT - olive gray, moist, hydrocarbon odor, slight sheen, roots present, (11-11.5 feet bgs)
	B13-04	12:37	226.0	-						
	B13-05 Dup	12:39	203.0	-			13			SAND - olive gray, moist, loose, poorly graded, medium grained, no hydrocarbon odor, no sheen
							14		SP	
							15			
							16			
	B13-06	12:44	552.0	-						SILT - green with brown mottling, orange spots present throughout, stiff, black oily tar fingering through via root zones
							17		ML	
							18			
	B13-07	12:50		ND			19			SILT - as above, black tar fingers not present, no sheen
			124.0				20			

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	SOIL BORING NUMBER	B-13		
PROJECT: Northwest Natural Gas Co. Gasco Facility Portland, Oregon	HAI LOGGER:	Rob Ede	DRILL START	DRILL FINISH
	SAMPLING METHOD:	4" OD Core Barrel	Time: 12:10	Time: 13:00
	DRILLING METHOD:	4 1/4-inch ID Hollow Stem Auger		
	EQUIPMENT TYPE	B-59 Mobile Drill		
	DRILLER:	Brad James	Date: 10/6/95	Date: 10/6/95
PROJECT #: 2708	DRILLING CONTRACTOR:	Geo-Tech Explorations, Inc.		

BORING DIAMETER:	8-inch
CASING DIAMETER:	Not Applicable
SURFACE ELEVATION:	36.4 feet msl
TOP OF CASING ELEVATION:	Not Applicable

ABANDONMENT DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHS (ppm)	CORE INTERVAL	SAMPLE RECOVERY	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
3/4" Bentonite Chips							21	10/6/95	ML	SILT - brown, moist, stiff, slightly plastic, no hydrocarbon odor, no sheen
							22		SP	SAND - brown, wet, poorly graded, no hydrocarbon odor, no sheen
							23		ML	SILT - brown, moist, stiff, slightly plastic, no hydrocarbon odor, no sheen
	B13-08	12:55	124.0	-			24			
	B13-09 Dup	12:58	98.1	-						
	B13-10	13:00	112.0	ND			25		SP	SAND - brown, wet, loose, poorly graded, fine grained, ho hydrocarbon odor, no sheen
							26			
							27			Drilled to 25 feet bgs Sampled to 24.5 feet bgs
							28			* Sample Number Prefix is 2708-951006-
							29			
							30			
							31			
							32			
							33			
							34			
							35			
							36			
							37			
							38			
							39			
							40			

HAHN & ASSOCIATES, INC.
434 NW Sixth Avenue
Portland, Oregon
(503) 796-0717

PROJECT:
Northwest Natural Gas Co.
Gasco Facility
Portland, Oregon
PROJECT #: 2708

SOIL BORING NUMBER B-14

HAI LOGGER:	Rob Ede	DRILL START	DRILL FINISH
SAMPLING METHOD:	3" OD Split Spoon/4" OD Core Barrel	Time: 8:25	Time: 9:30
DRILLING METHOD:	4 1/4-inch ID Hollow Stem Auger	Date: 9/28/95	Date: 9/28/95
EQUIPMENT TYPE	B-59 Mobile Drill		
DRILLER:	Brad James		
DRILLING CONTRACTOR:	Geo-Tech Explorations, Inc.		

BORING DIAMETER: 8-inch
CASING DIAMETER: Not Applicable
SURFACE ELEVATION: 36.1 feet msl
TOP OF CASING ELEVATION: Not Applicable

ABANDONMENT DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHS (ppm)	SPT (blows/6 in) or Core Interval	RECOVERY or INTERVAL	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
3/4" Bentonite Chips	B14-01	8:20	4.6	-			1		SM	Silty SAND with Gravel - brown, moist (surface sample)
							2			
					11	100				
	B14-02	8:30		-	23	100	3		SP	Silty SAND with Gravel - olive gray, moist, dense, hydrocarbon odor, sheen
			8.4		35	90	4			
					5	100	5		ML	Sandy SILT - brown, moist, stiff, slightly plastic, no hydrocarbon odor, no sheen
	B14-03	8:35		ND	8	100				
			3.0		13	95	6			
							7			
					6	100			SP	SAND - olive gray, moist, loose, poorly graded, fine grained, no hydrocarbon odor, no sheen
	B14-04	8:40		-	6	100	8			
			3.4		7	90	9			
							10			
										SAND - as above, (10-11 feet bgs)
	B14-05	9:00		-			11		ML	SILT - brown, moist, stiff, slightly plastic, no hydrocarbon odor, no sheen, (11-12 feet bgs)
			4.1				12		SP	SAND - olive gray, moist, medium dense, poorly graded, fine grained, no hydrocarbon odor, no sheen, (12-13 feet bgs)
							13			
	B14-06	9:05		-					ML	SILT - brown, moist, very stiff, slightly plastic, no hydrocarbon odor, no sheen
			4.6				14			
							15			
								9/28/95		
	B14-07	9:20		-			16			Sandy SILT - brown and tan mottled, moist, no hydrocarbon odor, no sheen, (piece of bark present)
			3.7				17		SP	SAND with some Silt - brown, wet, medium dense, poorly graded, fine grained, no hydrocarbon odor, no sheen (16.5-17.5 feet bgs)
	B14-08	9:25		-					ML	SILT - brown, moist, stiff, no hydrocarbon odor, no sheen, (17.5-18 feet bgs)
			4.8				18		SP	SAND - brown, wet, poorly graded, fine grained, no hydrocarbon odor, no sheen, (18-19 feet bgs)
	B14-09	9:30		-						
			4.9				19			
							20			

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	SOIL BORING NUMBER B-14			
PROJECT:	HAI LOGGER:	Rob Ede	DRILL START	DRILL FINISH
Northwest Natural Gas Co.	SAMPLING METHOD:	3" OD Split Spoon/4" OD Core Barrel		
Gasco Facility	DRILLING METHOD:	4 1/4-inch ID Hollow Stem Auger	Time:	Time:
Portland, Oregon	EQUIPMENT TYPE	B-59 Mobile Drill	8:25	9:30
PROJECT #: 2708	DRILLER:	Brad James	Date:	Date:
	DRILLING CONTRACTOR:	Geo-Tech Explorations, Inc.	9/28/95	9/28/95

BORING DIAMETER:	8-inch
CASING DIAMETER:	Not Applicable
SURFACE ELEVATION:	36.1 feet msl
TOP OF CASING ELEVATION:	Not Applicable

ABANDONMENT DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHS (ppm)	SPT (blows/6 in) or Core Interval	RECOVERY or INTERVAL	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
							21			Drilled to 20 feet bgs Sampled to 19 feet bgs * Sample Number Prefix is 2708-950928-
							22			
							23			
							24			
							25			
							26			
							27			
							28			
							29			
							30			
							31			
							32			
							33			
							34			
							35			
							36			
							37			
							38			
							39			
							40			

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**SOIL BORING NUMBER**		**B-15**	
PROJECT:	HAI LOGGER:	Rob Ede	DRILL START	DRILL FINISH
Northwest Natural Gas Co.	SAMPLING METHOD:	4" OD Core Barrel	Time:	Time:
Gasco Facility	DRILLING METHOD:	4 1/4-inch ID Hollow Stem Auger	13:45	15:05
Portland, Oregon	EQUIPMENT TYPE	B-59 Mobile Drill	Date:	Date:
PROJECT #: 2708	DRILLER:	Brad James	10/6/95	10/6/95
	DRILLING CONTRACTOR:	Geo-Tech Explorations, Inc.		

BORING DIAMETER:	8-inch
CASING DIAMETER:	Not Applicable
SURFACE ELEVATION:	35.5 feet msl
TOP OF CASING ELEVATION:	Not Applicable

ABANDONMENT DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHS (ppm)	CORE INTERVAL	SAMPLE RECOVERY	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
3/4" Bentonite Chips							1		SP	
							2			
							3		SP	
							4			SAND - brown, moist, loose, poorly graded, medium grained, no hydrocarbon odor, no sheen, (2.5-5 feet bgs)
	B15-01	13:57		-						
			97.0				5			
							6			Silty SAND with Gravel - olive gray, moist, hydrocarbon odor, sheen, (5-6 feet bgs - brick in end of sampler)
							7			(Switch to 1.5" OD Split Spoon sampling device)
					50/5"	60	8		SM	Silty SAND - olive gray, moist, hydrocarbon odor, sheen, (7.5-8 feet bgs - wood fragment in end of sampler)
							9			
							10			(Switch back to 4" OD Core Barrel sampling device)
							11			
	B15-02	14:17		-						SILT - green, moist, firm, no hydrocarbon odor, no sheen, rootlets throughout, (10-15 feet bgs)
			21.1				12			
							13			
	B15-03	14:20		-			14		ML	
			59.9				15			
							16	10/6/95		SILT - as above (15-15.5 feet bgs)
							17			Sandy SILT - green with black patches of hydrocarbon product, moist, hydrocarbon odor, sheen, (15.5-17.5 feet bgs)
	B15-04	14:25		-			18		ML	SILT - wet, soft, saturated with product (17.5-18.5 feet bgs)
			83.1				19			SILT - green, hydrocarbon odor, sheen, (18.5-20 feet bgs)
							20			

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**SOIL BORING NUMBER**	**B-15**		
PROJECT:	HAI LOGGER:	Rob Ede	DRILL START	DRILL FINISH
Northwest Natural Gas Co.	SAMPLING METHOD:	4" OD Core Barrel		
Gasco Facility	DRILLING METHOD:	4 1/4-inch ID Hollow Stem Auger	Time: 13:45	Time: 15:05
Portland, Oregon	EQUIPMENT TYPE	B-59 Mobile Drill		
	DRILLER:	Brad James	Date: 10/6/95	Date: 10/6/95
PROJECT #: 2708	DRILLING CONTRACTOR:	Geo-Tech Explorations, Inc.		

BORING DIAMETER:	8-inch
CASING DIAMETER:	Not Applicable
SURFACE ELEVATION:	35.5 feet msl
TOP OF CASING ELEVATION:	Not Applicable

ABANDONMENT DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHS (ppm)	CORE INTERVAL	SAMPLE RECOVERY	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
3/4" Bentonite Chips							21		ML	SILT - green, moist, firm, hydrocarbon odor, no sheen, (20-21 feet bgs
	B15-05	14:33		638					SM	Silty SAND - olive gray, wet, poorly graded, fine grained, hydrocarbon odor, sheen, (21-21.5 feet bgs)
			97.6				22			
							23		ML	SILT - brown and olive mottled, fingers of black oily substance in rootlet zones, (21.5-25 feet bgs)
							24			
	B15-06	14:38		-						
			-				25			SAND - olive gray, wet, loose, no hydrocarbon odor, no sheen, (25-27 feet bgs)
							26		SM	Sandy SILT - olive gray, moist, stiff, hydrocarbon odor, no sheen, (27-27.5 feet bgs)
	B15-07	14:57		-						
			15.8				27			SAND - olive gray, wet, loose, fine grained, no hydrocarbon odor, no sheen, (27.5-29 feet bgs)
	B15-08	15:00		1.8					ML	
			13.6				28		SP	SILT - brown, moist no hydrocarbon odor, no sheen, (29-29.5 feet bgs)
							29			SAND - brown, wet, loose, fine grained, no hydrocarbon odor, no sheen, (29.5-30 feet bgs)
	B15-09	15:04		-					ML	
			31.3				30		SP	
							31			
							32			
							33			Drilled to 30 feet bgs Sampled to 30 feet bgs
							34			* Sample Number Prefix is 2708-951006-
							35			
							36			
							37			
							38			
							39			
							40			

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**SOIL BORING NUMBER**		**B-17**	
PROJECT:	HAI LOGGER:	Rob Ede	DRILL START	DRILL FINISH
Northwest Natural Gas Co.	SAMPLING METHOD:	1.5" OD Split Spoon/4" OD Core Barrel	Time:	Time:
Gasco Facility	DRILLING METHOD:	4 1/4-inch ID Hollow Stem Auger	9:55	10:40
Portland, Oregon	EQUIPMENT TYPE	B-59 Mobile Drill	Date:	Date:
PROJECT #: 2708	DRILLER:	Brad James	9/29/95	9/29/95
	DRILLING CONTRACTOR:	Geo-Tech Explorations, Inc.		

BORING DIAMETER:	8-inch
CASING DIAMETER:	Not Applicable
SURFACE ELEVATION:	36.9 feet msl
TOP OF CASING ELEVATION:	Not Applicable

ABANDONMENT DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHS (ppm)	SPT (blows/6 in) or Core Interval	RECOVERY or INTERVAL	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
3/4" Bentonite Chips							1			Surface - GRAVEL fill (surface)
							2		SM	
					2	100	3			Silty SAND - brown, moist, no sheen
	B17-01	10:00		59	2	100				
			421		2	90	4			
							5		ML	
							6			Sandy SILT - olive gray, moist, firm, no sheen
	B17-02	10:10		-						
			603				7			
							8			
	B17-03	10:12		-			9			SAND - olive gray, moist, poorly graded, medium grained, no sheen
			213				10			
							11		SP	SAND - olive gray, poorly graded, strong sheen, brown product and froth when water added to sample, some wood fragments
	B17-04	10:20		-						
			1409				12			
							13			
							14			
							15			
							16		SP	
	B17-05	10:30		1,814			17			SAND - as above, wet, saturated with brown, oily product
			1478				18			
							19	9/29/95		
							20			

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**SOIL BORING NUMBER**	**B-17**		
PROJECT:	HAI LOGGER:	Rob Ede	DRILL START	DRILL FINISH
Northwest Natural Gas Co.	SAMPLING METHOD:	1.5" OD Split Spoon/4" OD Core Barrel	Time:	Time:
Gasco Facility	DRILLING METHOD:	4 1/4-inch ID Hollow Stem Auger	9:55	10:40
Portland, Oregon	EQUIPMENT TYPE	B-59 Mobile Drill	Date:	Date:
PROJECT #: 2708	DRILLER:	Brad James	9/29/95	9/29/95
	DRILLING CONTRACTOR:	Geo-Tech Explorations, Inc.		

BORING DIAMETER:	8-inch
CASING DIAMETER:	Not Applicable
SURFACE ELEVATION:	36.9 feet msl
TOP OF CASING ELEVATION:	Not Applicable

ABANDONMENT DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHS (ppm)	SPT (blows/6 in) or Core Interval	RECOVERY or INTERVAL	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
3/4" Bentonite Chips							21		SP	SAND - as above, wet, contains brown product, strong sheen, many roots at sand/silt interface
	B17-06	10:35		-			22			
			145				23		ML	SILT - olive gray, moist, very stiff, no hydrocarbon odor, no sheen, some brown root casts
	B17-07	10:40		0.89			24			
			65.8				25			
							26			Drilled to 25 feet bgs Sampled to 24 feet bgs
							27			
							28			* Sample Number Prefix is 2708-950929-
							29			
							30			
							31			
							32			
							33			
							34			
							35			
							36			
							37			
							38			
							39			
							40			

HAHN & ASSOCIATES, INC.
434 NW Sixth Avenue
Portland, Oregon
(503) 796-0717

SOIL BORING NUMBER B-18

PROJECT:
Northwest Natural Gas Co.
Gasco Facility
Portland, Oregon
PROJECT #: 2708

		DRILL START	DRILL FINISH
HAI LOGGER:	Rob Ede		
SAMPLING METHOD:	Split Spoon		
DRILLING METHOD:	4 1/4-inch ID Hollow Stem Auger	Time:	Time:
EQUIPMENT TYPE	B-59 Mobile Drill	10:05	11:45
DRILLER:	Brad James	Date:	Date:
DRILLING CONTRACTOR:	Geo-Tech Explorations, Inc.	9/19/95	9/19/95

BORING DIAMETER:	8-inch
CASING DIAMETER:	Not Applicable
SURFACE ELEVATION:	36.4 feet MSL
TOP OF CASING ELEVATION:	Not Applicable

ABANDONMENT DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHS (ppm)	SPT (blows/0.5 feet)	RECOVERY (%)	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
3/4" Bentonite Chips							1			Sandy GRAVEL - dry, road fill (surface)
							2			
	B18-01	10:15	74	-	50/5"	80	3		ML	Sandy SILT - brown and olive gray, moist, hard, slightly plastic, slight sheen
							4			
	B18-02	10:20	1772	-	8 11	100 100	5			SILT - brown, gray mottling, moist, stiff, plastic, no sheen
					14	100	6			
	B18-03	10:30	2500	-	4 7 8	100 100 50	7 8		SM	Silty SAND with Clay - brown, moist, loose, plastic, slight sheen
							9			
	B18-04	10:35	2500+	-	4 4 6	100 100 100	10 11		ML	Sandy SILT with some Clay - brown, moist, medium stiff, poorly graded, slightly plastic, slight sheen
	B18-05	10:40	2500+	59.3	2 5 6	100 100 100	12 13			Sandy SILT - as above
							14	9/19/95		
	B18-06	10:50	2500+	-	2 2 4	100 100 100	15 16		SP	SAND - brown, wet, very loose, poorly graded, fine grained, sheen observed on surface of core
	B18-07	11:00	2500+	-	4 5 5	100 100 100	17 18			SAND - as above
	B18-08	11:05		-	4 6	100 100	19 20			SAND - olive gray, wet, loose, poorly graded, slight sheen on core

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**SOIL BORING NUMBER**	**B-18**		
PROJECT: Northwest Natural Gas Co. Gasco Facility Portland, Oregon	HAI LOGGER:	Rob Ede	DRILL START	DRILL FINISH
	SAMPLING METHOD:	Split Spoon	Time: 10:05	Time: 11:45
	DRILLING METHOD:	4 1/4-inch ID Hollow Stem Auger		
	EQUIPMENT TYPE	B-59 Mobile Drill		
	DRILLER:	Brad James	Date: 9/19/95	Date: 9/19/95
PROJECT #: 2708	DRILLING CONTRACTOR:	Geo-Tech Explorations, Inc.		

BORING DIAMETER:	8-inch
CASING DIAMETER:	Not Applicable
SURFACE ELEVATION:	36.4 feet MSL
TOP OF CASING ELEVATION:	Not Applicable

ABANDONMENT DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHS (ppm)	SPT (blows/0.5 feet)	RECOVERY (%)	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
3/4" Bentonite Chips			224		7	100				
							21			
									SP	
					3	100	22			SAND - as above, no sheen
	B18-09	11:10		-	8	100				
			2500+		12	100	23			
							24			
					7	100				SAND - as above
	B18-10	11:30		ND	17	100	25			
			14.4		14	100				
							26		SP	
					12	100	27			SAND - as above
	B18-11	11:40			21	100				
			24.0		16	100	28			
							29			
							30			Drilled to 28 feet bgs Sampled to 28 feet bgs
							31			* Sample Number Prefix is 2708-950919-
							32			
							33			
							34			
							35			
							36			
							37			
							38			
							39			
							40			

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**SOIL BORING NUMBER**	**B-19**		
	HAI LOGGER:	Rob Ede	DRILL START	DRILL FINISH
PROJECT:	SAMPLING METHOD:	4" OD Core Barrel		
Northwest Natural Gas Co.	DRILLING METHOD:	4 1/4-inch ID Hollow Stem Auger	Time:	Time:
Gasco Facility	EQUIPMENT TYPE	B-59 Mobile Drill	13:30	9:30
Portland, Oregon	DRILLER:	Brad James	Date:	Date:
PROJECT #: 2708	DRILLING CONTRACTOR:	Geo-Tech Explorations, Inc.	9/19/95	9/20/95

BORING DIAMETER:	8-inch
CASING DIAMETER:	Not Applicable
SURFACE ELEVATION:	35.4
TOP OF CASING ELEVATION:	Not Applicable

ABANDONMENT DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHs (ppm)	CORE INTERVAL	SAMPLE RECOVERY	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
3/4" Bentonite Chips	B19-01	13:10	34.0	933			1		ML	Sandy SILT - brown, dry, (surface - just below sod root zone)
							2		SP	
							3			
							4			SAND - black, moist, well graded, fine grained, grains appear to be coated with oily substance, sheen evident
	B19-02	13:40	382.0	-			5			
							6			
	B19-03	13:55	623.0	408			7			SAND - as above
							8		SP	
							9			Installed a 2-inch diameter 0.010-inch slotted stainless steel well screen at 10 to 13 feet bgs. Purged zero gallons of water prior to groundwater sampling. GROUNDWATER SAMPLE (2708-950920-BW19-01) collected at 8:15 hrs, 9/20/95. Well point was removed and drilling was resumed.
							10			
							11	9/20/95	ML	Clayey SILT - brown, dry, very stiff, slight sheen
							12			
	B19-04	14:10	2500+	-			13		SP	SAND - black, moist to wet, poorly graded, sheen
							14			
	B19-05	14:20	2500+	-			15			
							16			SILT - brown, dry, stiff, no sheen
	B19-06	14:30	2500+	-			17		ML	
							18			
	B19-07	8:50	2500+	80			19			Sandy SILT - olive gray, moist, poorly graded, fine grained, no sheen
							20			

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	SOIL BORING NUMBER B-19			
	HAI LOGGER:	Rob Ede	DRILL START	DRILL FINISH
PROJECT:	SAMPLING METHOD:	4" OD Core Barrel		
Northwest Natural Gas Co.	DRILLING METHOD:	4 1/4-inch ID Hollow Stem Auger	Time:	Time:
Gasco Facility	EQUIPMENT TYPE	B-59 Mobile Drill	13:30	9:30
Portland, Oregon	DRILLER:	Brad James	Date:	Date:
PROJECT #: 2708	DRILLING CONTRACTOR:	Geo-Tech Explorations, Inc.	9/19/95	9/20/95

BORING DIAMETER:	8-inch
CASING DIAMETER:	Not Applicable
SURFACE ELEVATION:	35.4
TOP OF CASING ELEVATION:	Not Applicable

ABANDONMENT DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHs (ppm)	CORE INTERVAL	SAMPLE RECOVERY	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
3/4" Bentonite Chips							21		ML	
							22			Sandy SILT - as above, wet
							23			
							24			
							25			Installed a 2-inch diameter 0.010-inch slotted stainless steel well screen at 25 to 28 feet bgs. Purged eight gallons of water using a peristaltic pump prior to groundwater sampling. GROUNDWATER SAMPLE (2708-950920-BW19-02) collected at 12:05 hrs, 9/20/95. Well point was removed prior to abandonment.
							26		SP	
							27			
	B19-08	9:22	717.0	2.0			28			Silty SAND - brown, wet, poorly graded, fine grained, coarsening downward
							29			
							30			
							31			Drilled to 29 feet bgs Sampled to 29 feet bgs
							32			
							33			* Sample Number Prefix is 2708-950919- for samples B19-01 to B19-06. Sample Number Prefix is 2708-950920- for samples B19-07 and B19-08.
							34			
							35			
							36			
							37			
							38			
							39			
							40			

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	SOIL BORING NUMBER B-20			
PROJECT: Northwest Natural Gas Co. Gasco Facility Portland, Oregon	HAI LOGGER:	Rob Ede	DRILL START Time: 14:00	DRILL FINISH Time: 15:00
	SAMPLING METHOD:	1.5" OD Split Spoon/4" OD Core Barrel		
	DRILLING METHOD:	4 1/4-inch ID Hollow Stem Auger		
	EQUIPMENT TYPE	B-59 Mobile Drill		
	DRILLER:	Brad James	Date: 9/29/95	Date: 9/29/95
PROJECT #: 2708	DRILLING CONTRACTOR:	Geo-Tech Explorations, Inc.		

BORING DIAMETER:	8-inch
CASING DIAMETER:	Not Applicable
SURFACE ELEVATION:	35.4 feet msl
TOP OF CASING ELEVATION:	Not Applicable

ABANDONMENT DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHS (ppm)	SPT (blows/6 in) or Core Interval	RECOVERY or INTERVAL	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
Asphalt									Asphalt	Asphalt (surface)
							1			
							2		SP	
					5	100	3			
	B20-01	14:05		-	5	100				SAND - brown, moist, loose, poorly graded, no sheen
			355		5	50	4			
							5			
							6			
							7			SAND - as above, large rock in sand at depth of 7.5 feet bgs
	B20-02	14:10		-			8		SP	
			1166				9			SAND - olive gray, moist, poorly graded, medium grained, no sheen
3/4" Bentonite Chips							10			
	B20-03	14:15		1,093			11			SAND - gray, wet, poorly graded, saturated with hydrocarbon product, metallic sheen, (10-11 feet bgs)
			2500+				12			SAND - brown, moist, poorly graded, fine grained, no product saturation, sheen is present, (11-13 feet bgs)
	B20-04	14:20		-						
			2500+				13			
							14			
							15			
							16			
							17	9/29/95	SP	SAND - olive gray, moist to wet, sheen
	B20-05	14:25		-			18			
			1270				19			
							20			

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**SOIL BORING NUMBER**	**B-20**		
PROJECT:	HAI LOGGER:	Rob Ede	DRILL	DRILL
Northwest Natural Gas Co.	SAMPLING METHOD:	1.5" OD Split Spoon/4" OD Core Barrel	START	FINISH
Gasco Facility	DRILLING METHOD:	4 1/4-inch ID Hollow Stem Auger	Time:	Time:
Portland, Oregon	EQUIPMENT TYPE	B-59 Mobile Drill	14:00	15:00
PROJECT #: 2708	DRILLER:	Brad James	Date:	Date:
	DRILLING CONTRACTOR:	Geo-Tech Explorations, Inc.	9/29/95	9/29/95

BORING DIAMETER:	8-inch
CASING DIAMETER:	Not Applicable
SURFACE ELEVATION:	35.4 feet msl
TOP OF CASING ELEVATION:	Not Applicable

ABANDONMENT DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHS (ppm)	SPT (blows/6 in) or Core Interval	RECOVERY or INTERVAL	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
3/4" Bentonite Chips							21			
							22		SP	SAND - brown to metallic gray, wet, strong sheen
	B20-06	14:30		-			23			
			2500+						ML	SILT - brown, very stiff, brown pockets of organic material
	B20-07	14:35		13			24			
			1010				25			
							26			
							27			Drilled to 25 feet bgs Sampled to 24 feet bgs
							28			* Sample Number Prefix is 2708-950929-
							29			
							30			
							31			
							32			
							33			
							34			
							35			
							36			
							37			
							38			
							39			
							40			

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**SOIL BORING NUMBER**	**B-21**		
PROJECT: Northwest Natural Gas Co. Gasco Facility Portland, Oregon	HAI LOGGER:	Rob Ede	DRILL START	DRILL FINISH
	SAMPLING METHOD:	4" OD Core Barrel	Time:	Time:
	DRILLING METHOD:	4 1/4-inch ID Hollow Stem Auger	8:50	9:40
	EQUIPMENT TYPE	B-59 Mobile Drill		
	DRILLER:	Brad James	Date:	Date:
PROJECT #: 2708	DRILLING CONTRACTOR:	Geo-Tech Explorations, Inc.	10/3/95	10/3/95

BORING DIAMETER:	8-inch
CASING DIAMETER:	Not Applicable
SURFACE ELEVATION:	38.0
TOP OF CASING ELEVATION:	Not Applicable

ABANDONMENT DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHS (ppm)	CORE INTERVAL	SAMPLE RECOVERY	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
3/4" Bentonite Chips							1			
							2			
							3		ML	SILT - brown and green mottled, slightly moist, stiff, roots present, slight sheen
	B21-01	9:00		-						
			3.4				4			
							5			
							6			
	B21-02	9:05		-						SILT - as above, moist
			2.3				7			
							8			
							9		SP	Silty SAND -brown, moist to wet, medium dense, poorly graded, fine grained, no sheen
	B21-03	9:10		-						
			1.7				10			
							11	10/3/95	ML	Sandy SILT - brown with olive gray mottling, moist, firm, slight sheen
	B21-04	9:15		-			12			
			34.2						SP	SAND - brown, wet, loose, poorly graded, fine grained, no sheen
	B21-05	9:20		-			13			
			23.2							
							14		SM	Silty SAND - brown, moist, medium dense, fine grained, no sheen
							15			
	B21-06	9:30		-			16			SAND - brown, wet, loose, poorly graded, fine grained, no sheen
			1.5							
							17			
	B21-07	9:35		-			18		SP	Installed a 2-inch diameter 0.010-inch slotted stainless steel well screen from 15.5 to 19.5 feet bgs. Purged five gallons of water using a peristaltic pump prior to groundwater sampling. GROUNDWATER SAMPLE (2708-951003-BW21-01) collected at 10:48 hrs, 10/3/95. Well point was removed prior to abandonment.
			1.5							
							19			
							20			

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**SOIL BORING NUMBER**	**B-21**		
PROJECT:	HAI LOGGER:	Rob Ede	DRILL START	DRILL FINISH
Northwest Natural Gas Co.	SAMPLING METHOD:	4" OD Core Barrel		
Gasco Facility	DRILLING METHOD:	4 1/4-inch ID Hollow Stem Auger	Time:	Time:
Portland, Oregon	EQUIPMENT TYPE	B-59 Mobile Drill	8:50	9:40
	DRILLER:	Brad James	Date:	Date:
PROJECT #: 2708	DRILLING CONTRACTOR:	Geo-Tech Explorations, Inc.	10/3/95	10/3/95

BORING DIAMETER:	8-inch
CASING DIAMETER:	Not Applicable
SURFACE ELEVATION:	38.0
TOP OF CASING ELEVATION:	Not Applicable

ABANDONMENT DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHS (ppm)	CORE INTERVAL	SAMPLE RECOVERY	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
							21			Drilled to 30 feet bgs Sampled to 29.5 feet bgs * Sample Number Prefix is 2708-951003-
							22			
							23			
							24			
							25			
							26			
							27			
							28			
							29			
							30			
							31			
							32			
							33			
							34			
							35			
							36			
							37			
							38			
							39			
							40			

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**SOIL BORING NUMBER**		**B-22**		
PROJECT:	HAI LOGGER:	Rob Ede		DRILL	DRILL
Northwest Natural Gas Co.	SAMPLING METHOD:	4" OD Core Barrel		START	FINISH
Gasco Facility	DRILLING METHOD:	4 1/4-inch ID Hollow Stem Auger		Time:	Time:
Portland, Oregon	EQUIPMENT TYPE	B-59 Mobile Drill		12:00	13:00
	DRILLER:	Brad James		Date:	Date:
PROJECT #: 2708	DRILLING CONTRACTOR:	Geo-Tech Explorations, Inc.		10/3/95	10/3/95

BORING DIAMETER:	8-inch
CASING DIAMETER:	Not Applicable
SURFACE ELEVATION:	37.1 feet msl
TOP OF CASING ELEVATION:	Not Applicable

ABANDONMENT DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHS (ppm)	CORE INTERVAL	SAMPLE RECOVERY	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
3/4" Bentonite Chips							1			
							2			
							3		ML	SILT with Sand and Gravel - moist to wet, oily substance present, strong sheen, metal wire present
	B22-01	12:05		-						
			81.8				4			
							5			
	B22-02	12:12		-			6			
			212.0				7			SILT - green with brown mottling, stiff, strong sheen
							8			
	B23-03	12:15		-						
			253.0				9		ML	
							10			
							11			
	B22-04	12:25		-						Sandy SILT - brown, moist, stiff, strong sheen
			18.6				12			
							13	10/3/95		
	B22-05	12:30		40			14			Sandy SILT - olive gray to green, moist to wet, stiff, strong sheen
			18.4				15			
	B22-06	12:35		-					ML	
			15.8				16			
							17			SILT - olive gray, moist, stiff, strong sheen, black oily product throughout core)
							18			
	B22-07	12:40		-						
			4.8				19			
							20			

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**SOIL BORING NUMBER**		**B-22**	
PROJECT: Northwest Natural Gas Co. Gasco Facility Portland, Oregon	HAI LOGGER:	Rob Ede	DRILL START Time: 12:00	DRILL FINISH Time: 13:00
	SAMPLING METHOD:	4" OD Core Barrel		
	DRILLING METHOD:	4 1/4-inch ID Hollow Stem Auger		
	EQUIPMENT TYPE	B-59 Mobile Drill		
	DRILLER:	Brad James	Date: 10/3/95	Date: 10/3/95
PROJECT #: 2708	DRILLING CONTRACTOR:	Geo-Tech Explorations, Inc.		

BORING DIAMETER:	8-inch
CASING DIAMETER:	Not Applicable
SURFACE ELEVATION:	37.1 feet msl
TOP OF CASING ELEVATION:	Not Applicable

ABANDONMENT DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHS (ppm)	CORE INTERVAL	SAMPLE RECOVERY	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
3/4" Bentonite Chips	B22-08	12:45		-			21		ML	SILT - as above, moist to wet, pockets of brown product within core
			53.2				22		SP	
							23			
							24			SAND - olive gray, wet, fine grained, black product at 24-25 feet bgs, (see photo 14)
	B22-09	12:50		485						
			16.0				25			
							26		ML	Sandy SILT - brown, moist, stiff, no sheen
	B22-10	12:55		-						
			8.7				27		SP	SAND - brown, wet, loose, poorly graded, fine grained, muscovite present, no sheen
							28			
	B22-11	1:00		-			29			
			8.4				30			Drilled to 30 feet bgs Sampled to 29.5 feet bgs
							31			
							32			* Sample Number Prefix is 2708-951003-
							33			
							34			
							35			
							36			
							37			
							38			
							39			
							40			

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**SOIL BORING NUMBER**	**B-23**		
	HAI LOGGER:	Rob Ede	DRILL START	DRILL FINISH
PROJECT:	SAMPLING METHOD:	4" OD Core Barrel		
Northwest Natural Gas Co.	DRILLING METHOD:	4 1/4-inch ID Hollow Stem Auger	Time:	Time:
Gasco Facility	EQUIPMENT TYPE	B-59 Mobile Drill	14:17	15:40
Portland, Oregon	DRILLER:	Brad James	Date:	Date:
PROJECT #: 2708	DRILLING CONTRACTOR:	Geo-Tech Explorations, Inc.	10/3/95	10/3/95

BORING DIAMETER:	8-inch
CASING DIAMETER:	Not Applicable
SURFACE ELEVATION:	35.1 feet msl
TOP OF CASING ELEVATION:	Not Applicable

ABANDONMENT DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHs (ppm)	CORE INTERVAL	SAMPLE RECOVERY	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
Asphalt							1		Asphalt	Asphalt
							2		Concrete	
							3			Concrete
							4			
							5			
							6			
	B23-01	14:38								SAND - brown, moist, loose, poorly graded, medium grained, slight sheen
			190.0	-			7		SP	
							8			
3/4" Bentonite Chips							9			
							10			
	B23-02	14:47	2500+	-			11			
							12	10/3/95		Sandy SILT - green with brown mottling, moist to wet, stiff, lower 6 inches of core is saturated with product, strong sheen
	B23-03	14:50	1439	-			13		ML	
							14			
							15			
							16			
	B23-04	14:57		-						
			9.7				17			Sandy SILT - green with brown mottling, stiff, roots present, saturated with product 15-17 feet bgs, strong sheen
							18			
	B23-05	15:00		-					ML	
			589.0				19			
							20			

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**SOIL BORING NUMBER**	**B-23**		
PROJECT:	HAI LOGGER:	Rob Ede	DRILL START	DRILL FINISH
Northwest Natural Gas Co.	SAMPLING METHOD:	4" OD Core Barrel	Time:	Time:
Gasco Facility	DRILLING METHOD:	4 1/4-inch ID Hollow Stem Auger	14:17	15:40
Portland, Oregon	EQUIPMENT TYPE	B-59 Mobile Drill	Date:	Date:
PROJECT #: 2708	DRILLER:	Brad James	10/3/95	10/3/95
	DRILLING CONTRACTOR:	Geo-Tech Explorations, Inc.		

BORING DIAMETER:	8-inch
CASING DIAMETER:	Not Applicable
SURFACE ELEVATION:	35.1 feet msl
TOP OF CASING ELEVATION:	Not Applicable

ABANDONMENT DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHs (ppm)	CORE INTERVAL	SAMPLE RECOVERY	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
3/4" Bentonite Chips	B23-06	15:05		-			21			
			2500+							
							22			SILT - brown with orange spots, moist, very stiff, sheen
							23		ML	
							24			
	B23-07	15:10	682.0	-						
							25			
							26			
	B23-08	15:20		77			27		SP	SAND with some Silt - wet, fine grained, brown oily product present, sheen
			2500+							
							28			
							29		ML	
	B23-09	15:25		-						
			822.0				30			Sandy SILT - brown, moist, stiff, strong sheen
							31			
	B23-10	15:30		-			32			
			108.0							
							33			
									SP	SAND - olive gray, wet, loose, fine grained, no sheen
	B23-11	15:35		-			34			
			292.0						ML	SILT - brown, moist, stiff, no sheen
	B23-12	15:38		ND			35			
							36			Drilled to 35 feet bgs Sampled to 35 feet bgs
							37			* Sample Number Prefix is 2708-951003-
							38			
							39			
							40			

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**SOIL BORING NUMBER**	**B-24**		
PROJECT:	HAI LOGGER:	Rob Ede	DRILL START	DRILL FINISH
Northwest Natural Gas Co.	SAMPLING METHOD:	4" OD Core Barrel	Time:	Time:
Gasco Facility	DRILLING METHOD:	4 1/4-inch ID Hollow Stem Auger	9:15	10:15
Portland, Oregon	EQUIPMENT TYPE	B-59 Mobile Drill	Date:	Date:
PROJECT #: 2708	DRILLER:	Brad James	10/2/95	10/2/95
	DRILLING CONTRACTOR:	Geo-Tech Explorations, Inc.		

BORING DIAMETER:	8-inch
CASING DIAMETER:	Not Applicable
SURFACE ELEVATION:	34.5 feet msl
TOP OF CASING ELEVATION:	Not Applicable

ABANDONMENT DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHs (ppm)	CORE INTERVAL	SAMPLE RECOVERY	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
									Concrete	Sidewalk at surface.
							1			
							2			
									SP	Lampblack - black, dry, hydrophobic, no sheen (2.5-3.0 feet bgs)
					9	100	3			
	B24-01	9:23	211.0	-	7	100				SAND - brown, dry, loose, poorly graded, medium grained, no sheen, (3-4 feet bgs)
					9	100	4			
							5			
							6			
	B24-02	9:30		-						
			40.0				7			SAND - as above, some pebbles, moist, no sheen, (5-10 feet bgs)
							8			
							9		SP	
							10			
	B24-03	9:40		1,092			11			SAND - olive gray, moist, loose, black droplets of tar-like substance at base of sand, wood chips present (10-11.5 feet bgs)
			1406				12			
	B24-04	9:45		-			13			Sandy SILT - olive gray, moist, slightly plastic, slight sheen, (11.5-15 feet bgs)
			71.1				14	10/2/95		
							15			
							16		ML	
	B24-05	9:50		-			17			Sandy SILT - olive gray to green, moist, stiff, strong sheen, (15-20 feet bgs)
			636.0				18			
							19			
	B24-06	9:53		-						
			796				20			

3/4" Bentonite Chips

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**SOIL BORING NUMBER**	**B-24**		
PROJECT:	HAI LOGGER:	Rob Ede	DRILL START	DRILL FINISH
Northwest Natural Gas Co.	SAMPLING METHOD:	4" OD Core Barrel	Time:	Time:
Gasco Facility	DRILLING METHOD:	4 1/4-inch ID Hollow Stem Auger	9:15	10:15
Portland, Oregon	EQUIPMENT TYPE	B-59 Mobile Drill	Date:	Date:
PROJECT #: 2708	DRILLER:	Brad James	10/2/95	10/2/95
	DRILLING CONTRACTOR:	Geo-Tech Explorations, Inc.		

BORING DIAMETER:	8-inch
CASING DIAMETER:	Not Applicable
SURFACE ELEVATION:	34.5 feet msl
TOP OF CASING ELEVATION:	Not Applicable

ABANDONMENT DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHs (ppm)	CORE INTERVAL	SAMPLE RECOVERY	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
3/4" Bentonite Chips							21		ML	Sandy SILT - brown with green mottles, moist, sheen on core - smeared from above, (20-22 feet bgs)
	B24-07	10:00		-						
			390				22			
							23		SP	SAND - brown, wet, loose, poorly graded, fine grained, no sheen (22-23 feet bgs)
	B24-08	10:03		-			24		ML	Sandy SILT -brown with green mottles, moist, no sheen (23-24 feet bgs)
			907				25			
							26			
	B24-09	10:05		-						
			1654				27		SP	SAND - brown, wet, loose, poorly graded, no sheen (24-30 feet bgs), 2 inch Silt zone at 27 feet bgs
							28			
							29			
	B24-10	10:10	834	0.14			30			Drilled to 30 feet bgs Sampled to 29.5 feet bgs
							31			* Sample Number Prefix is 2708-951002-
							32			
							33			
							34			
							35			
							36			
							37			
							38			
							39			
							40			

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**SOIL BORING NUMBER**		**B-25**	
PROJECT:	HAI LOGGER:	Rob Ede	DRILL START	DRILL FINISH
Northwest Natural Gas Co.	SAMPLING METHOD:	4" OD Core Barrel	Time:	Time:
Gasco Facility	DRILLING METHOD:	4 1/4-inch ID Hollow Stem Auger	12:05	12:45
Portland, Oregon	EQUIPMENT TYPE	B-59 Mobile Drill	Date:	Date:
PROJECT #: 2708	DRILLER:	Brad James	10/2/95	10/2/95
	DRILLING CONTRACTOR:	Geo-Tech Explorations, Inc.		

BORING DIAMETER:	8-inch
CASING DIAMETER:	Not Applicable
SURFACE ELEVATION:	35.0 feet msl
TOP OF CASING ELEVATION:	Not Applicable

ABANDONMENT DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHs (ppm)	CORE INTERVAL	SAMPLE RECOVERY	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
3/4" Bentonite Chips							1		Asphalt	Asphalt at surface.
							2			
							3		SP	
	B25-01	12:15		-						SAND - brown to gray, moist, loose, poorly graded, medium grained, slight sheen, (2-5 feet bgs)
			262				4			
							5			
							6			
	B25-02	12:20		-			7			SAND - as above, moist, large piece of decayed wood in end of sampler, slight sheen, (5-10 feet bgs)
			85.2				8			
							9		SP	
							10			
							11			
							12	10/2/95		
	B25-03	12:30		12.5			13			SAND - as above, wet at 14 feet bgs, strong sheen, brown froth appears via sheen test, (10-15 feet bgs)
			90.6				14			
							15			
							16			
							17			SAND - as above, wet, strong sheen and froth to depth of 17 feet bgs, no sheen from 17-18.5 feet bgs
							18			
	B25-04	12:35		-						
			92.7				19		ML	SILT - olive gray, moist, no sheen (18-20 feet bgs)
							20			

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**SOIL BORING NUMBER**	**B-25**		
PROJECT: Northwest Natural Gas Co. Gasco Facility Portland, Oregon	HAI LOGGER:	Rob Ede	DRILL START Time: 12:05	DRILL FINISH Time: 12:45
	SAMPLING METHOD:	4" OD Core Barrel		
	DRILLING METHOD:	4 1/4-inch ID Hollow Stem Auger		
	EQUIPMENT TYPE	B-59 Mobile Drill		
	DRILLER:	Brad James	Date: 10/2/95	Date: 10/2/95
PROJECT #: 2708	DRILLING CONTRACTOR:	Geo-Tech Explorations, Inc.		

BORING DIAMETER:	8-inch
CASING DIAMETER:	Not Applicable
SURFACE ELEVATION:	35.0 feet msl
TOP OF CASING ELEVATION:	Not Applicable

ABANDONMENT DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHs (ppm)	CORE INTERVAL	SAMPLE RECOVERY	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
3/4" Bentonite Chips	B25-05	12:40		0.45						
			191				21		ML	Sandy SILT - olive gray, wet, slightly stiff, slightly plastic, no sheen, (20-22 feet bgs)
							22			
							23			
	B25-06	12:43		-						
			24.4				24		ML	SILT - olive gray with brown/orange spots, moist, stiff, plastic, no sheen, (22-25 feet bgs)
							25			
							26			
							27			
							28			
							29			
							30			Drilled to 25 feet bgs Sampled to 24 feet bgs
							31			* Sample Number Prefix is 2708-951002-
							32			
							33			
							34			
							35			
							36			
							37			
							38			
							39			
							40			

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**SOIL BORING NUMBER**	**B-26**		
PROJECT:	HAI LOGGER:	Rob Ede	DRILL START	DRILL FINISH
Northwest Natural Gas Co.	SAMPLING METHOD:	4" OD Core Barrel	Time:	Time:
Gasco Facility	DRILLING METHOD:	4 1/4-inch ID Hollow Stem Auger	8:20	10:20
Portland, Oregon	EQUIPMENT TYPE	B-59 Mobile Drill	Date:	Date:
PROJECT #: 2708	DRILLER:	Brad James	10/4/95	10/4/95
	DRILLING CONTRACTOR:	Geo-Tech Explorations, Inc.		

BORING DIAMETER:	8-inch
CASING DIAMETER:	Not Applicable
SURFACE ELEVATION:	34.9 feet MSL
TOP OF CASING ELEVATION:	Not Applicable

ABANDONMENT DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHs (ppm)	CORE INTERVAL	SAMPLE RECOVERY	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
3/4" Bentonite Chips	B26-01	8:15	753	9.3			1		SM	Silty SAND with Gravel - brown, moist, no hydrocarbon odor
							2			
							3		SP	Lampblack - black, hydrophobic, slight sheen, slight hydrocarbon odor
	B26-02	8:30	1191	-			4			
							5			
					33	10	6			Brick in end of sampler, also pieces of hardened tar
					34	0				
					19	0	7			
							8			
	B26-03	8:45		-					SP	SAND - olive gray, moist, loose, medium grained, strong hydrocarbon odor, sheen
			771				9			
							10			
							11			
	B26-04	8:55		-			12			
			997				13			SAND - olive gray, moist, loose, medium grained, strong sheen, brown froth via sheen test, hydrocarbon odor
							14	10/4/95		
							15			
							16			
	B26-05	9:08		-			17		SP	SAND - olive gray, wet, loose, poorly graded, medium grained, saturated with product, strong sheen on sampler
			1611				18			
							19			
							20			

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**SOIL BORING NUMBER**	**B-26**		
PROJECT: Northwest Natural Gas Co. Gasco Facility Portland, Oregon	HAI LOGGER:	Rob Ede	DRILL START Time: 8:20	DRILL FINISH Time: 10:20
	SAMPLING METHOD:	4" OD Core Barrel		
	DRILLING METHOD:	4 1/4-inch ID Hollow Stem Auger		
	EQUIPMENT TYPE	B-59 Mobile Drill		
	DRILLER:	Brad James	Date: 10/4/95	Date: 10/4/95
PROJECT #: 2708	DRILLING CONTRACTOR:	Geo-Tech Explorations, Inc.		

BORING DIAMETER:	8-inch
CASING DIAMETER:	Not Applicable
SURFACE ELEVATION:	34.9 feet MSL
TOP OF CASING ELEVATION:	Not Applicable

ABANDONMENT DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHs (ppm)	CORE INTERVAL	SAMPLE RECOVERY	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
3/4" Bentonite Chips	B26-06	9:15		15,530			21		SP	SAND - olive gray, wet, loose, poorly graded, medium grained, strong sheen, much brown product, (20-23 feet bgs)
			2500+				22			
							23			
	B26-07	9:18		-					ML	SILT - brown with dark gray mottling, moist, contains wood fragments, (23-24 feet bgs)
			2500+				24			
							25			
	B26-08	9:30		-			26			SILT - brown, moist, stiff, strong sheen on sampler, root zones present, black, oily product appears to be migrating through root zones
			959				27			
							28			
	B26-09	9:45		-						
			2500+				29			
							30			
	B26-10	10:05		-			31			
			2500+				32		ML	Sandy SILT - olive gray to green, medium stiff, large amount of black staining appears to be migrating through root zones
							33			
	B26-11	10:10		-			34			
			2500+				35			
							36			
	B26-12	10:15		-						Sandy SILT - olive gray to green, medium stiff, sheen from 35-37 feet bgs, no sheen from 37-40 feet bgs
			2500+				37			
							38		ML	
							39			Drilled to 40 feet bgs Sampled to 40 feet bgs
	B26-13	10:20		1.1						* Sample Number Prefix is 2708-951002-
			771				40			

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**SOIL BORING NUMBER**		**B-27**	
PROJECT: Northwest Natural Gas Co. Gasco Facility Portland, Oregon PROJECT #: 2708	HAI LOGGER:	Rob Ede	DRILL START Time: 12:40 Date: 9/20/95	DRILL FINISH Time: 13:30 Date: 9/20/95
	SAMPLING METHOD:	Split Spoon		
	DRILLING METHOD:	4 1/4-inch ID Hollow Stem Auger		
	EQUIPMENT TYPE	B-59 Mobile Drill		
	DRILLER:	Brad James		
	DRILLING CONTRACTOR:	Geo-Tech Explorations, Inc.		

BORING DIAMETER:	8-inch
CASING DIAMETER:	Not Applicable
SURFACE ELEVATION:	37.0 feet msl
TOP OF CASING ELEVATION:	Not Applicable

ABANDONMENT DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHs (ppm)	SPT (blows/0.5 feet)	RECOVERY (%)	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
3/4" Bentonite Chips	B27-01	12:15		-			1		GP	Sandy GRAVEL - brown, dry, fill (surface)
							2			
	B27-02	12:50		-	13	100	3		SM	Silty SAND - brown, dry, dense, pieces of coal? present, no petroleum odor, no sheen
			7.6		17	0				
					18	0	4			
							5			
					16	100			SP	SAND - brown, dry, medium dense, poorly graded, fine grained, some coal in upper 6 inches, no sheen, black colored hydrophobic particulates float via sheen test (lampblack?)
	B27-03	12:55		-	16	100	6			
			6.5		20	50				
							7			
					10	100	8			
	B27-04	13:00		-	10	100				SAND - black, moist, medium dense, poorly graded, fine grained, strong petroleum hydrocarbon odor, sheen via sheen test
			21.5		12	50	9			
							10			
					4	100				SAND - as above, loose, strong petroleum hydrocarbon odor, sheen via sheen test
	B27-05	13:03		-	8	70	11			
					8	0			SP	
							12			
					6	100	13			
	B27-06	13:05		-	10	100		9/20/95		SAND - as above, strong petroleum hydrocarbon odor, sheen via sheen test
			36.4		13	50	14			
							15			
					4	100				SAND - olive gray to black, wet, loose, petroleum hydrocarbon odor, slight sheen via sheen test
	B27-07	13:10		-	6	100	16			
			13.2		8	60			SP	
							17			
					2	100	18			
	B27-08	13:15		-	4	100				SAND - as above, slight petroleum hydrocarbon odor, no sheen via sheen test
			35.2		7	100	19			
							20			

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**SOIL BORING NUMBER**	**B-27**		
PROJECT: Northwest Natural Gas Co. Gasco Facility Portland, Oregon	HAI LOGGER:	Rob Ede	DRILL START	DRILL FINISH
	SAMPLING METHOD:	Split Spoon	Time: 12:40	Time: 13:30
	DRILLING METHOD:	4 1/4-inch ID Hollow Stem Auger		
	EQUIPMENT TYPE	B-59 Mobile Drill		
	DRILLER:	Brad James	Date: 9/20/95	Date: 9/20/95
PROJECT #: 2708	DRILLING CONTRACTOR:	Geo-Tech Explorations, Inc.		

BORING DIAMETER:	8-inch
CASING DIAMETER:	Not Applicable
SURFACE ELEVATION:	37.0 feet msl
TOP OF CASING ELEVATION:	Not Applicable

ABANDONMENT DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHs (ppm)	SPT (blows/0.5 feet)	RECOVERY (%)	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
3/4" Bentonite Chips					11	100			SP	
	B27-09	13:30		-	24	100	21			SAND - black, wet, dense, sheen on core, sheen via sheen test
			2031		16	100				
							22			
					2	100	23			SAND - black, wet, loose, saturated with oily substance, (22.5-23.5 feet bgs)
	B27-10	13:40		1,243	3	100				
			2500+		3	100	24		ML	SILT - brown, wet, medium stiff, plastic, sheen via sheen test, (23.5-24 feet bgs)
							25			
					2	100			SP	SAND with some Silt - black, wet, loose, sheen on sampler, (25-25.5 feet bgs)
	B27-11	13:45		-	2	100	26			
			392		2	50				SILT with some Clay - brown, wet, soft, plastic, sheen via sheen test, (25.5-26.5 feet bgs)
							27			
					4	100	28		ML	Clayey SILT - brown, moist, medium stiff, plastic, no sheen via sheen test
	B27-12	13:55		125	5	100				
			120		5	70	29			
							30			
					3	100				
	B27-13	14:05		-	3	100	31			Clayey SILT - as above, slight sheen via sheen test, (outside of core smeared with petroleum product from shallower depths)
			861		5	100				
							32			
					3	100	33		ML	
	B27-14	14:15		-	4	100				Clayey SILT - olive gray, moist, soft, sheen via sheen test, (outside of core smeared with petroleum product from shallower depths)
			714		5	10	34			
							35			
					3	100				
	B27-15	14:40		12.2	3	80	36			SILT - olive gray, moist, soft, no petroleum hydrocarbon odor, no sheen via sheen test
			254		3	0				
							37			
							38			
										Drilled to 36.5 feet bgs Sampled to 36.5 feet bgs
							39			
										* Sample Number Prefix is 2708-950920-
							40			

HAHN & ASSOCIATES, INC.
434 NW Sixth Avenue
Portland, Oregon
(503) 796-0717

SOIL BORING NUMBER B-28

HAI LOGGER:	Rob Ede	DRILL START	DRILL FINISH
SAMPLING METHOD:	4" OD Core Barrel		
DRILLING METHOD:	4 1/4-inch ID Hollow Stem Auger	Time: 14:00	Time: 15:00
EQUIPMENT TYPE	B-59 Mobile Drill		
DRILLER:	Brad James	Date: 10/2/95	Date: 10/2/95
DRILLING CONTRACTOR:	Geo-Tech Explorations, Inc.		

PROJECT:
Northwest Natural Gas Co.
Gasco Facility
Portland, Oregon
PROJECT #: 2708

BORING DIAMETER:	8-inch
CASING DIAMETER:	Not Applicable
SURFACE ELEVATION:	34.4 feet msl
TOP OF CASING ELEVATION:	Not Applicable

ABANDONMENT DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHs (ppm)	CORE INTERVAL	SAMPLE RECOVERY	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
3/4" Bentonite Chips	B28-01	13:45	614	87						Silty SAND with Gravel - brown, moist, fine grained, non plastic, no hydrocarbon odor, no sheen via sheen test (surface)
	B28-02	13:47	105	135			1			
							2			
							3		SP	
	B28-03	14:10	95.4	-			4			SAND with some Gravel and Lampblack - (black, very solid/hard pieces that are hydrophobic), slight hydrocarbon odor, no sheen via sheen test, (2.5-5 feet bgs)
							5			
							6			GRAVEL with Lampblack - black, dry, lampblack is hydrophobic, no hydrocarbon odor, no sheen via sheen test, (5-10 feet bgs)
	B28-04	14:15	111	-			7			
							8			
							9		GM	
							10			
	B28-05	14:20	36.2	-			11			GRAVEL with Lampblack - sticky, tar-like pieces present, hard, with sheen on surface, strong hydrocarbon odor (10-12 feet bgs)
							12			
	B28-06	14:25	71.4	-			13			
							14	10/2/95	SP	SAND - olive gray, moist, loose, poorly graded, strong hydrocarbon odor, sheen via sheen test, (12-15 feet bgs)
							15			
	B28-07	14:30	372	612			16		SM / ML	SAND with some SILT - olive gray, wet, saturated with product, metallic sheen, (15-15.5 feet bgs) Sandy SILT - brown, moist, no sheen, (15.5-16 feet bgs)
							17			
							18		SP	SAND - olive gray, wet, loose, poorly graded, medium grained, no sheen via sheen test, (16-20 feet bgs)
	B28-08	14:35	53.7	-			19			
							20			

Updated: 9/1/98 RBS
File: 2708 B-28

Project #2708
HAHN AND ASSOCIATES, INC.

Koppers000760

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**SOIL BORING NUMBER**	**B-28**		
PROJECT:	HAI LOGGER:	Rob Ede	DRILL START	DRILL FINISH
Northwest Natural Gas Co.	SAMPLING METHOD:	4" OD Core Barrel	Time:	Time:
Gasco Facility	DRILLING METHOD:	4 1/4-inch ID Hollow Stem Auger	14:00	15:00
Portland, Oregon	EQUIPMENT TYPE	B-59 Mobile Drill	Date:	Date:
PROJECT #: 2708	DRILLER:	Brad James	10/2/95	10/2/95
	DRILLING CONTRACTOR:	Geo-Tech Explorations, Inc.		

BORING DIAMETER:	8-inch
CASING DIAMETER:	Not Applicable
SURFACE ELEVATION:	34.4 feet msl
TOP OF CASING ELEVATION:	Not Applicable

ABANDONMENT DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHs (ppm)	CORE INTERVAL	SAMPLE RECOVERY	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
3/4" Bentonite Chips	B28-09	14:45	236	-			21		ML	Sandy SILT - olive gray with brown, metallic luster, saturated with product, strong sheen via sheen test (20-22 feet bgs)
							22			
	B28-10	14:50	462	-			23			Sandy SILT - as above, brown with brown/orange blebs, no sheen via sheen test, (22-23.5 feet bgs)
							24			
	B28-11	14:53	261	2.3			25			Sandy SILT - as above, olive gray, wet (23.5-25 feet bgs)
							26			
							27			
							28			Drilled to 25 feet bgs Sampled to 24.5 feet bgs * Sample Number Prefix is 2708-951002-
							29			
							30			
							31			
							32			
							33			
							34			
							35			
							36			
							37			
							38			
							39			
							40			

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**SOIL BORING NUMBER**	**B-29**		
PROJECT: Northwest Natural Gas Co. Gasco Facility Portland, Oregon PROJECT #: 2708	HAI LOGGER:	Roger Brown	DRILL START Time: 14:15 Date: 9/22/95	DRILL FINISH Time: 9:30 Date: 9/25/95
	SAMPLING METHOD:	Split Spoon		
	DRILLING METHOD:	4 1/4-inch ID Hollow Stem Auger		
	EQUIPMENT TYPE	B-59 Mobile Drill		
	DRILLER:	Brad James		
	DRILLING CONTRACTOR:	Geo-Tech Explorations, Inc.		

BORING DIAMETER:	8-inch
CASING DIAMETER:	Not Applicable
SURFACE ELEVATION:	31.1 feet msl
TOP OF CASING ELEVATION:	Not Applicable

ABANDONMENT DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHs (ppm)	SPT (blows/0.5 feet)	RECOVERY (%)	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
3/4" Bentonite Chips	B29-01	14:08	-	230	-	-	1			Silty GRAVEL - brown, dry, fill, no sheen via sheen test (surface)
							2			
					27	100	3			
	B29-02	14:18			27	100			GM	Sandy Silty GRAVEL - gray/brown, damp, dense, non-plastic, well graded, no hydrocarbon odor, no sheen via sheen test
					32	0	4			
							5			
	B29-03				6	100				Sandy Silty GRAVEL - as above, no hydrocarbon odor, no sheen via sheen test
		14:22			9	0	6			
					5	0				
							7			
					11	100	8			
	B29-04	14:26			5	60			GW	Sandy GRAVEL with Silt - dark gray, moist to wet, medium dense, non-plastic, well graded, possible petroleum hydrocarbon odor, no sheen via sheen test
					11	0	9			
							10			
	B29-05				3	100				Silty Sandy GRAVEL - brown, wet, dense, slightly plastic, well graded, no petroleum hydrocarbon odor, no sheen via sheen test
		14:30			13	20	11			
					20	0			GM	
							12			
	B29-06	14:35			11	100	13			Silty Sandy GRAVEL - as above, slight naphthalene odor, turning to dark gray at 13.2 feet, no sheen via sheen test
					14	20				
					30	0	14			
							15			
					5	100				SILT with some Sand and Gravel - brown, moist, stiff, slightly plastic, possible petroleum hydrocarbon odor, no sheen via sheen test
	B29-07	15:05			8	100	16			
					12	100				
							17		ML	
					6	100	18			SILT with some Sand and Gravel - as above, more Gravel, brown with slight odor to 18.25 feet bgs, dark gray with distinct odor to 19 feet bgs with wood fragments and occasional tar globs, no sheen via sheen test
	B29-08	15:11			12	100				
					15	100	19			
							20			

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**SOIL BORING NUMBER**	**B-29**		
PROJECT: Northwest Natural Gas Co. Gasco Facility Portland, Oregon	HAI LOGGER:	Roger Brown	DRILL START	DRILL FINISH
	SAMPLING METHOD:	Split Spoon	Time:	Time:
	DRILLING METHOD:	4 1/4-inch ID Hollow Stem Auger	14:15	9:30
	EQUIPMENT TYPE	B-59 Mobile Drill		
	DRILLER:	Brad James	Date:	Date:
PROJECT #: 2708	DRILLING CONTRACTOR:	Geo-Tech Explorations, Inc.	9/22/95	9/25/95

BORING DIAMETER:	8-inch
CASING DIAMETER:	Not Applicable
SURFACE ELEVATION:	31.1 feet msl
TOP OF CASING ELEVATION:	Not Applicable

ABANDONMENT DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHs (ppm)	SPT (blows/0.5 feet)	RECOVERY (%)	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
3/4" Bentonite Chips					12	100			ML	Gravelly SILT - gray/brown with gray mottling, moist, very stiff, slightly plastic, slight petroleum hydrocarbon odor, no sheen via sheen test, tip of core is black
	B29-09	15:17			13	100	21			
					15	100				
							22		ML + tar	Gravelly SILT - black, moist, strong hydrocarbon odor, sheen via sheen test, tarry globs (22.5-22.75 feet bgs)
	B29-10A				-	100	23			SILT - gray with red-brown mottling, non-plastic, slight hydrocarbon odor (22.75-23 feet bgs)
		15:23			-	100				
	B29-10				-	100	24		SP	SAND - dark gray, moist to wet, poorly graded (23-24 feet bgs)
							25			
					3	100			tar	SILT and SAND - as above , tarry (25-25.25 feet bgs)
	B29-11	15:30			9	100	26		ML	SILT - gray, as above (25.25-26.25 feet bgs)
					12	100			tar	SILT and SAND - black, tarry, hydrocarbon odor, sheen via sheen test (26.25-27 feet bgs)
							27			
									ML	
					3	100	28			
	B29-12	15:40			5	100		9/22/95		SILT - olive-gray with red-brown mottling, medium stiff, organic matter or root zones with brown product in them, petroleum hydrocarbon odor, sheen via sheen test, brown product present (27.5-29 feet bgs)
					6	100	29			
							30			
					3	100			SM	Silty SAND with occasional Silt zones - olive-gray, loose, non-plastic, rootlets present, strong hydrocarbon odor, brown product via sheen test (30-31.5 feet bgs)
	B29-13	15:50			2	100	31			
					5	100				
							32			
					9	100	33		SP	SAND - black, wet, medium dense, poorly graded, entire core covered with brown product (32.5-34 feet bgs)
	B29-14	16:00			7	100				
					9	100	34			
							35			
					4	100				SAND - as above, product saturated throughout core (35-36.5 feet bgs)
	B29-15	16:08		58,822	9	100	36			
					12	100				Drilling resumes at 8:40, 9/25/95
							37			
							38			SAND - black, wet, saturated with product to 39 feet bgs, less staining from 39-40 feet bgs, some brown bedding or zones of oxidation, sheen throughout (36.5-40 feet bgs)
	B29-16	9:00								
							39			
							40			

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**SOIL BORING NUMBER**	**B-29**		
PROJECT:	HAI LOGGER:	Roger Brown	DRILL START	DRILL FINISH
Northwest Natural Gas Co.	SAMPLING METHOD:	Split Spoon	Time:	Time:
Gasco Facility	DRILLING METHOD:	4 1/4-inch ID Hollow Stem Auger	14:15	9:30
Portland, Oregon	EQUIPMENT TYPE	B-59 Mobile Drill	Date:	Date:
PROJECT #: 2708	DRILLER:	Brad James	9/22/95	9/25/95
	DRILLING CONTRACTOR:	Geo-Tech Explorations, Inc.		

BORING DIAMETER:	8-inch
CASING DIAMETER:	Not Applicable
SURFACE ELEVATION:	31.1 feet msl
TOP OF CASING ELEVATION:	Not Applicable

ABANDONMENT DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHs (ppm)	SPT (blows/0.5 feet)	RECOVERY (%)	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
3/4" Bentonite Chips							41			
							42			SAND - olive-gray, wet, sheen via sheen test, strong sheen on drill stem (40-44 feet bgs)
							43		SP	
							44			
	B29-17	9:10		16.5						SAND with some Silt - gray, moist, no sheen via sheen test, no sheen on drill stem (44-45 feet bgs)
			69.0				45			
							46			
							47		SP	SAND with some Silt - moist to wet, poorly graded, fine to medium grained, no sheen via sheen test, no sheen on core (45-50 feet bgs)
	B29-18	9:25		0.18						
			28.1				48			
							49			
							50			
							51			Drilled to 50 feet bgs Sampled to 48 feet bgs * Sample Number Prefix is 2708-950922-
							52			
							53			
							54			
							55			
							56			
							57			
							58			
							59			
							60			

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**SOIL BORING NUMBER**		**B-30**	
PROJECT:	HAI LOGGER:	Hans Feige	DRILL START	DRILL FINISH
Northwest Natural Gas Co.	SAMPLING METHOD:	4" OD Core Barrel	Time:	Time:
Gasco Facility	DRILLING METHOD:	4 1/4-inch ID Hollow Stem Auger	10:15	12:40
Portland, Oregon	EQUIPMENT TYPE	B-59 Mobile Drill	Date:	Date:
PROJECT #: 2708	DRILLER:	Brad James	9/22/95	9/22/95
	DRILLING CONTRACTOR:	Geo-Tech Explorations, Inc.		

BORING DIAMETER:	6-inch
CASING DIAMETER:	Not Applicable
SURFACE ELEVATION:	33.9 feet msl
TOP OF CASING ELEVATION:	Not Applicable

ABANDONMENT DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TPH-G/418.1 M (ppm)	CORE INTERVAL	SAMPLE RECOVERY	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
3/4" Bentonite Chips							1			
							2		GM	
							3			
							4			
							5			
							6			Silty GRAVEL with Sand - black, moist, some wet zones, plastic, hydrocarbon odor, sheen via sheen test
	B30-04	10:20	345	-			7			
							8		GM	
							9			Silty GRAVEL with Sand - as above, hydrocarbon odor, sheen via sheen test
	B30-05	10:25	28.4	-			10			
							11			Silty GRAVEL with Sand - black, wet, plastic, slight sheen
	B30-06	10:35	52.4	6,776			12	9/22/9		
							13			
	B30-07	10:45	9.0	-			14			Silty GRAVEL with Sand - brown, wet, plastic, no sheen via sheen test
							15			
							16		GM	Silty GRAVEL sith Sand - brown, wet, stiff, plastic, hydrocarbon odor
							17			
	B30-08	10:55	17.6	-			18			
							19			Silty GRAVEL with Sand - as above, hydrocarbon odor
	B30-09	11:20	24.2	-			20			

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	SOIL BORING NUMBER B-30			
PROJECT: Northwest Natural Gas Co. Gasco Facility Portland, Oregon	HAI LOGGER:	Hans Feige	DRILL START Time: 10:15 Date: 9/22/95	DRILL FINISH Time: 12:40 Date: 9/22/95
	SAMPLING METHOD:	4" OD Core Barrel		
	DRILLING METHOD:	4 1/4-inch ID Hollow Stem Auger		
	EQUIPMENT TYPE	B-59 Mobile Drill		
	DRILLER:	Brad James		
PROJECT #: 2708	DRILLING CONTRACTOR:	Geo-Tech Explorations, Inc.		

BORING DIAMETER:	6-inch
CASING DIAMETER:	Not Applicable
SURFACE ELEVATION:	33.9 feet msl
TOP OF CASING ELEVATION:	Not Applicable

ABANDONMENT DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TPH-G/418.1 M (ppm)	CORE INTERVAL	SAMPLE RECOVERY	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
3/4" Bentonite Chips	B30-10	11:30	35.1	-			21		GM	Silty GRAVEL with Sand - as above, hydrocarbon odor, no sheen via sheen test
							22			
							23		SP	SAND - gray/black, wet, dense, non-plastic, sheen via sheen test
	B30-11	11:40	337	-			24		ML	SILT - gray, wet, stiff, plactic, hydrocarbon odor
							25			
							26			SILT - gray, wet, stiff, slight plastic odor
							27			
							28			
	B30-12	11:50	202	853			29		ML	Sandy SILT - as above, strong sheen via sheen test
							30			
							31			
							32			
							33		SM	Silty SAND - brown, wet, dense, slightly plastic, hydrocarbon odor, no sheen via sheen test
	B30-13	12:20	184	-			34			
							35			
							36			Boring terminated at 35 feet bgs Sample to 34 feet bgs
							37			* Sample Number Prefix is 2708-950922-
							38			
							39			
							40			

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**SOIL BORING NUMBER**	**B-30-A**		
	HAI LOGGER:	Hans Feige	DRILL START	DRILL FINISH
PROJECT:	SAMPLING METHOD:	4" OD Core Barrel		
Northwest Natural Gas Co.	DRILLING METHOD:	4 1/4-inch ID Hollow Stem Auger	Time:	Time:
Gasco Facility	EQUIPMENT TYPE	B-59 Mobile Drill	9:00	9:40
Portland, Oregon	DRILLER:	Brad James	Date:	Date:
PROJECT #: 2708	DRILLING CONTRACTOR:	Geo-Tech Explorations, Inc.	9/22/95	9/22/95

BORING DIAMETER:	6-inch
CASING DIAMETER:	Not Applicable
SURFACE ELEVATION:	33.9 feet msl
TOP OF CASING ELEVATION:	Not Applicable

ABANDONMENT DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHS (ppm)	CORE INTERVAL	SAMPLE RECOVERY	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
3/4" Bentonite Chips	B30-01	8:55	20.6	965			1		ML	Surface sample
							2			
							3			
							4			Sandy SILT - black, moist, tarry, hydrocarbon odor
	B30-02	9:20	304	-			5			
							6		GP	
							7			Fill material, low recovery in sampler
							8			
							9			
	B30-03	9:30	155	-			10			
							11			
							12			Fill material - as above, little gravels, moist to wet, tarry, hydrocarbon odor
							13			
							14			
							15			
							16			Boring terminated at 15 feet bgs due to lack of recovery in sample barrels.
							17			
							18			* Sample Number Prefix is 2708-950922-
							19			
							20			

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**SOIL BORING NUMBER**	**B-31**		
PROJECT:	HAI LOGGER:	Rob Ede	DRILL START	DRILL FINISH
Northwest Natural Gas Co.	SAMPLING METHOD:	4" OD Core Barrel	Time:	Time:
Gasco Facility	DRILLING METHOD:	4 1/4-inch ID Hollow Stem Auger	14:20	15:45
Portland, Oregon	EQUIPMENT TYPE	B-59 Mobile Drill	Date:	Date:
PROJECT #: 2708	DRILLER:	Brad James	9/25/95	9/25/95
	DRILLING CONTRACTOR:	Geo-Tech Explorations, Inc.		

BORING DIAMETER:	8-inch
CASING DIAMETER:	Not Applicable
SURFACE ELEVATION:	25.4 feet msl
TOP OF CASING ELEVATION:	Not Applicable

ABANDONMENT DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHS (ppm)	CORE INTERVAL	SAMPLE RECOVERY	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
3/4" Bentonite Chips	B31-01	13:50		38			1		GM	Silty SAND and GRAVEL - brown, dry, well graded, no hydrocarbon odor (surface sample)
							2			
							3		ML	SILT with Gravel - brownish-yellow, moist, slightly plastic, no hydrocarbon odor, no sheen via sheen test (2-5 feet bgs)
	B31-02	14:30		-			4			
			57.5				5			
							6			
	B31-03	14:35		-			7			SILT with Gravel - as above, no hydrocarbon odor, no sheen via sheen test (5-10 feet bgs)
			41.2				8			
							9			
							10			
							11		GM	Sandy GRAVEL with Silt - gray, moist
	B31-04	14:50		-			12			
			117				13			
							14			
							15			
							16			
							17			
							18		SP	SAND with Gravel - olive-gray, moist to wet (17-18 feet bgs)
	B31-05	15:10		-			19			Black, hard material (lampblack), coal-like, with slight petroleum hydrocarbon odor and slight sheen at 18-19.5 feet bgs
			135				20			

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**SOIL BORING NUMBER**		**B-31**	
PROJECT:	HAI LOGGER:	Rob Ede	DRILL START	DRILL FINISH
Northwest Natural Gas Co.	SAMPLING METHOD:	4" OD Core Barrel	Time:	Time:
Gasco Facility	DRILLING METHOD:	4 1/4-inch ID Hollow Stem Auger	14:20	15:45
Portland, Oregon	EQUIPMENT TYPE	B-59 Mobile Drill	Date:	Date:
PROJECT #: 2708	DRILLER:	Brad James	9/25/95	9/25/95
	DRILLING CONTRACTOR:	Geo-Tech Explorations, Inc.		

BORING DIAMETER:	8-inch
CASING DIAMETER:	Not Applicable
SURFACE ELEVATION:	25.4 feet msl
TOP OF CASING ELEVATION:	Not Applicable

ABANDONMENT DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHS (ppm)	CORE INTERVAL	SAMPLE RECOVERY	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
3/4" Bentonite Chips	B31-06	15:20		12,666			21	9/25/9	SP	SAND - black, moist, tarry, poorly graded, hydrophobic, sheen via sheen test (20-21 feet bgs)
			697.0				22		ML	Sandy SILT - brown, moist, stiff, plastic, some organic matter, no hydrocarbon odor, no sheen via sheen test (21-24 feet bgs)
	B31-07	15:25		-			23			
			175				24			
	B31-08	15:30		5.5			25		SP	SAND with some Silt - olive-gray, poorly graded, no hydrocarbon odor, no sheen via sheen test (24-25 feet bgs)
			207				26			
	B31-09	15:35								SAND - brown, wet, poorly graded, fine grained, slight hydrocarbon odor (25-28 feet bgs)
			61.1				27			
	B31-10	15:40		ND			28			
	B31-11	15:45	59.2	ND					ML	Clayey SILT with some Sand - olive-gray, slightly plastic, no hydrocarbon odor, no sheen via sheen test (28-28.25 feet bgs)
							29		SP	SAND - olive-gray, wet, poorly graded, fine to medium grained, no hydrocarbon odor, no sheen via sheen test (28.25-30 feet bgs)
							30			
							31			Installed a 2-inch diameter 0.010-inch slotted stainless steel well screen from 26 to 29 feet bgs. Purged twenty five gallons of water using a peristaltic pump prior to groundwater sampling. GROUNDWATER SAMPLE (2708-950925-BW31-01) collected at 17:20 hrs, 9/25/95. Well point was removed prior to abandonment.
							32			
							33			
							34			
							35			Boring terminated at 30 feet bgs Sample to 29 feet bgs
							36			* Sample Number Prefix is 2708-950925-
							37			
							38			
							39			
							40			

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**SOIL BORING NUMBER**	**B-32**		
PROJECT: Northwest Natural Gas Co. Gasco Facility Portland, Oregon	HAI LOGGER:	Rob Ede	DRILL START Time: 11:50 Date: 10/4/95	DRILL FINISH Time: 15:40 Date: 10/4/95
	SAMPLING METHOD:	Core Barrel		
	DRILLING METHOD:	4 1/4-inch ID Hollow Stem Auger		
	EQUIPMENT TYPE	B-59 Mobile Drill		
	DRILLER:	Brad James		
PROJECT #: 2708	DRILLING CONTRACTOR:	Geo-Tech Explorations, Inc.		

BORING DIAMETER:	8-inch
CASING DIAMETER:	Not Applicable
SURFACE ELEVATION:	36.9 feet msl
TOP OF CASING ELEVATION:	Not Applicable

ABANDONMENT DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHs (ppm)	SPT (blows/0.5 feet)	RECOVERY (%)	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
3/4" Bentonite Chips	B32-01	11:45	1067	61			1		GM	Silty SAND with Gravel - brown, moist, no hydrocarbon odor, no sheen via sheen test (surface)
							2			
					17	0	3			
					18	0				
					15	0	4			
							5			
					7	0			ML	Sandy SILT and GRAVEL - black, moist, slightly plastic, hydrocarbon odor, sheen via shen test (5-6.5 feet bgs)
					8	0	6			
					4	10				
							7			
	B32-02	12:08		-					SM	Silty SAND with Gravel - olive-gray to black, moist, hydrocarbon odor (6.5-10 feet bgs)
			296				8			
							9	10/4/95		
							10			
							11		GP	Sandy GRAVEL - brown, wet, no sheen via sheen test (10-11.5 feet bgs)
	B32-03	12:15	785	28,772			12			
	B32-04	12:18	-				13			SAND and GRAVEL with some Silt - black, matrix is tar material, highly viscous, strong sheen via sheen test (11.5-15 feet bgs)
							14			
							15			
							16			SAND and GRAVEL with some Silt - black, wet, matrix is tar material, highly viscous, strong sheen on sampling core (15-17 feet bgs)
	B32-05	12:25		-			17			Gravelly SILT - brown, wet, little tar (17-17.5 feet bgs)
			809				18		GP	
							19			
							20			

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**SOIL BORING NUMBER**	**B-32**		
PROJECT:	HAI LOGGER:	Rob Ede	DRILL START	DRILL FINISH
Northwest Natural Gas Co.	SAMPLING METHOD:	Core Barrel	Time:	Time:
Gasco Facility	DRILLING METHOD:	4 1/4-inch ID Hollow Stem Auger	11:50	15:40
Portland, Oregon	EQUIPMENT TYPE	B-59 Mobile Drill	Date:	Date:
PROJECT #: 2708	DRILLER:	Brad James	10/4/95	10/4/95
	DRILLING CONTRACTOR:	Geo-Tech Explorations, Inc.		

BORING DIAMETER:	8-inch
CASING DIAMETER:	Not Applicable
SURFACE ELEVATION:	36.9 feet msl
TOP OF CASING ELEVATION:	Not Applicable

ABANDONMENT DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHs (ppm)	SPT (blows/0.5 feet)	RECOVERY (%)	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
							21		ML + tar	
	B32-06	12:32	1072	-			22			SILT and TAR - black, moist, plastic, smooth texture, highly viscous (20-25 feet bgs)
	B32-07	12:34	-	-			23			
							24		ML + tar	
							25			
							26			Sandy SILT - black, wet, poorly graded, matrix is tar material, highly viscous, roots present (25-26 feet bgs)
							27			
							28		ML	Sandy SILT - olive-gray, moist, tar seams present - preferential in areas of roots, cracks (26-30 feet bgs)
3/4" Bentonite Chips	B32-08	12:46		-						
			1321				29			
							30			
							31			
	B32-09	13:15		-						Sandy SILT - olive-gray to green, moist, firm, slightly plastic, pockets of brown product - lighter in color and less viscous than above, brown froth via sheen test (30-35 feet bgs)
			1219				32			
							33			
	B32-10	13:20		-						
			1355				34		ML	
							35			
							36			Sandy SILT - brown with orange pockets, saturated with oily, black product (35-37.5 feet bgs)
	B32-11	13:29		-						
			499				37			
	B32-12	13:33		-			38		SP	SAND - black, wet, poorly graded, fine grained, saturated with product, sheen via sheen test (35-37.5 feet bgs)
			745.0				39		ML	Sandy SILT - brown with orange pockets, saturated with oily, black product, sheen via sheen test (38-40 feet bgs)
	B32-13	13:36	1041	-			40			

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**SOIL BORING NUMBER**	**B-32**		
	HAI LOGGER:	Rob Ede	DRILL START	DRILL FINISH
PROJECT:	SAMPLING METHOD:	Core Barrel		
Northwest Natural Gas Co.	DRILLING METHOD:	4 1/4-inch ID Hollow Stem Auger	Time:	Time:
Gasco Facility	EQUIPMENT TYPE	B-59 Mobile Drill	11:50	15:40
Portland, Oregon	DRILLER:	Brad James	Date:	Date:
PROJECT #: 2708	DRILLING CONTRACTOR:	Geo-Tech Explorations, Inc.	10/4/95	10/4/95

BORING DIAMETER:	8-inch
CASING DIAMETER:	Not Applicable
SURFACE ELEVATION:	36.9 feet msl
TOP OF CASING ELEVATION:	Not Applicable

ABANDONMENT DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHs (ppm)	SPT (blows/0.5 feet)	RECOVERY (%)	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
3/4" Bentonite Chips							41		SM	Silty SAND - olive-gray, wet, firm, fine grained, strong sheen via sheen test (40-42.5 feet bgs)
							42			
							43		SP	SAND - olive-gray, wet, poorly graded, fine grained, saturated with oily product (42.5-43 feet bgs)
	B32-14	13:45		-			44		ML	Sandy SILT - olive-gray, wet, wood fragments present, saturated with oily product (43-44.5 feet bgs)
			287				45			
							46		SP	
	B32-15	14:26	1230	21,961			47			
							48			SAND - olive-gray, wet, poorly graded, fine grained, saturated with oily product (44.5-50.5 feet bgs)
							49			
							50			
							51			SAND with lenses of Silt - as above, saturated with oily product (50.5-52.5 feet bgs)
	B32-16	14:47		-						
			562				52		SP	
							53			SAND - olive-gray, wet, poorly graded, fine grained, saturated with oily product (52.5-54 feet bgs)
							54			
							55		SM	Silty SAND - olive-gray, moist, sheen via sheen test (54-55 feet bgs)
							56		SP	SAND - olive-gray, wet, saturated with product (55-56 feet bgs)
	B32-17	15:04		-						
			461				57		SM	Silty SAND - olive-gray, moist, no sheen via sheen test (56-57.5 feet bgs)
							58		SP	SAND - olive-gray, wet, loose, poorly graded, fine grained, slight sheen on core (57.5-59 feet bgs)
	B32-18	15:29	954	1.2			59			
							60			

* Sample Number Prefix is 2708-951004-

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**SOIL BORING NUMBER**		**B-33**	
PROJECT:	HAI LOGGER:	Rob Ede	DRILL START	DRILL FINISH
Northwest Natural Gas Co.	SAMPLING METHOD:	Core Barrel	Time:	Time:
Gasco Facility	DRILLING METHOD:	4 1/4-inch ID Hollow Stem Auger	13:50	9:10
Portland, Oregon	EQUIPMENT TYPE	B-59 Mobile Drill	Date:	Date:
PROJECT #: 2708	DRILLER:	Brad James	10/5/95	10/6/96
	DRILLING CONTRACTOR:	Geo-Tech Explorations, Inc.		

BORING DIAMETER:	8-inch
CASING DIAMETER:	Not Applicable
SURFACE ELEVATION:	34.8 feet msl
TOP OF CASING ELEVATION:	Not Applicable

ABANDONMENT DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS Total PAHs (ppm)	SPT (blows/0.5 feet)	RECOVERY (%)	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
3/4" Bentonite Chips	B33-01	13:15	-	955			1		GM	Silty SAND with Gravel - brown, moist, no hydrocarbon odor, no sheen, no hydrocarbon odor (surface)
							2			
	B33-02	14:00		38	3	100	3			Sandy SILT and GRAVEL - olive grey, moist, loose, no sheen
			97		5	50				
					18	0	4			
							5			
					15	100			SM + tar	Tarry Silty SAND with Gravel - black, wet, medium dense, viscous tar seeps from cracks
	B33-03	14:03		8,238	15	100	6			
			219		16	50				
							7			
					50/5"	5	8			Rock in end of sampler - no recovery
							9			
							10			
							11			
	B33-04	14:28		-	12	100				
			318		11	50	12			Tarry Silty SAND with Gravel - black, moist, medium dense
					9	0			SM +tar	
							13			
					2	100	14			Tarry Silty SAND with Gravel - as above, loose
	B33-05	14:30	624	-	5	50				
					7	0	15			
							16			Tarry Gravels with Sand and Silt - black, moist, viscous tar zone at 16.5 feet bgs
	B33-06	14:42		-			17			
			646				18		GM + tar	
							19			
							20			

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**SOIL BORING NUMBER**	**B-33**		
PROJECT:	HAI LOGGER:	Rob Ede	DRILL	DRILL
Northwest Natural Gas Co.	SAMPLING METHOD:	Core Barrel	START	FINISH
Gasco Facility	DRILLING METHOD:	4 1/4-inch ID Hollow Stem Auger	Time:	Time:
Portland, Oregon	EQUIPMENT TYPE	B-59 Mobile Drill	13:50	9:10
PROJECT #: 2708	DRILLER:	Brad James	Date:	Date:
	DRILLING CONTRACTOR:	Geo-Tech Explorations, Inc.	10/5/95	10/6/96

BORING DIAMETER:	8-inch
CASING DIAMETER:	Not Applicable
SURFACE ELEVATION:	34.8 feet msl
TOP OF CASING ELEVATION:	Not Applicable

ABANDONMENT DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS Total PAHs (ppm)	SPT (blows/0.5 feet)	RECOVERY (%)	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
3/4" Bentonite Chips							21		tar	TAR - some gravel and wood fragments at 21.5 feet bgs
							22			
	B33-07	14:50		-						
			701				23			
							24			
							25			
							26		SM	Silty SAND -black, moist,many rootlets and wood fragments, tar im matrix, strong sheen (25-27 feet bgs)
	B33-08	15:00		-						
			2500+				27			
							28		ML	Sandy SILT - brown with green mottling, moist, stiff, rootlets and cracks contain wet, viscous tar (27-30 feet bgs)
	B33-09	15:03		-			29			
			1475				30			
							31			Sandy SILT - brown with orange oxidation spots, moist, tar seams present - preferential in areas of rootlets and cracks
							32			
							33			
	B33-10	15:34		-						
			1383				34			
							35			
							36		ML	Sandy SILT - green, moist, stiff, black tarry patches throughout core, tarry sand seam at 38.5 feet bgs
							37			
							38			
	B33-11	15:45		-			39			
			2500+				40			

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**SOIL BORING NUMBER**	**B-33**		
PROJECT:	HAI LOGGER:	Rob Ede	DRILL START	DRILL FINISH
Northwest Natural Gas Co.	SAMPLING METHOD:	Core Barrel	Time:	Time:
Gasco Facility	DRILLING METHOD:	4 1/4-inch ID Hollow Stem Auger	13:50	9:10
Portland, Oregon	EQUIPMENT TYPE	B-59 Mobile Drill	Date:	Date:
PROJECT #: 2708	DRILLER:	Brad James	10/5/95	10/6/96
	DRILLING CONTRACTOR:	Geo-Tech Explorations, Inc.		

BORING DIAMETER:	8-inch
CASING DIAMETER:	Not Applicable
SURFACE ELEVATION:	34.8 feet msl
TOP OF CASING ELEVATION:	Not Applicable

ABANDONMENT DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS Total PAHs (ppm)	SPT (blows/0.5 feet)	RECOVERY (%)	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
3/4" Bentonite Chips							41		ML	Sandy SILT - as above, moist, fingers of tar throughout core (40 - 43 feet bgs)
							42			
							43			
							44		SP	SAND - olive gray and green mottled, moist, medium dense, fine grained, strong sheen (43 - 45 feet bgs)
	B33-12	15:55		-						
			819.0				45			
							46			SAND with some Silt- olive gray, moist, medium dense, fingers of tar throughout core, sheen
							47			
							48			
							49			
	B33-13	16:05		-						
			692				50			
							51		SM	Silty SAND - olive gray, moist, medium dense, fine grained, fingers of tar throughout core, sheen
							52			
							53			
							54			
	B33-14	16:25		65						
			793				55			
							56		ML	Sandy SILT - olive gray, moist, thin fine grained sand lenses, roots at 57 feet bgs, less product than above
							57			
	B33-15	8:27		-			58			
			2500+				59			
							60			

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**SOIL BORING NUMBER**		**B-33**	
PROJECT:	HAI LOGGER:	Rob Ede	DRILL START	DRILL FINISH
Northwest Natural Gas Co.	SAMPLING METHOD:	Core Barrel	Time:	Time:
Gasco Facility	DRILLING METHOD:	4 1/4-inch ID Hollow Stem Auger	13:50	9:10
Portland, Oregon	EQUIPMENT TYPE	B-59 Mobile Drill	Date:	Date:
PROJECT #: 2708	DRILLER:	Brad James	10/5/95	10/6/96
	DRILLING CONTRACTOR:	Geo-Tech Explorations, Inc.		

BORING DIAMETER:	8-inch
CASING DIAMETER:	Not Applicable
SURFACE ELEVATION:	34.8 feet msl
TOP OF CASING ELEVATION:	Not Applicable

ABANDONMENT DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS Total PAHs (ppm)	SPT (blows/0.5 feet)	RECOVERY (%)	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
							61		ML	Sandy SILT - as above, black oily product within rootlet zones (60-62 feet bgs)
							62			
	B33-16	8:40		-					SP	SAND - olive gray to black, wet, saturated with black, oily product (62 - 63 feet bgs)
			2500+				63			
							64		ML	Sandy SILT - green, moist, stiff, many rootlets present, product within rootlet zones (63 - 65 feet bgs)
							65			
							66		SM	Silty SAND - olive gray and green mottled, wet, fine grained, saturated with brown/black product, sand lens at 67 feet bgs is saturated with product (65 - 67 feet bgs)
	B33-17	8:55		-						
			407				67			
							68		ML	SILT - olive gray, moist, stiff, bark and rootlets present, no product, no sheen (67 - 70 feet bgs)
							69			
	B33-18	9:00		5.7						
			133				70			
							71			Drilled to 70 feet bgs Sampled to 70 feet bgs
							72			* Sample Number Prefix is 2708-951005-
							73			
							74			
							75			
							76			
							77			
							78			
							79			
							80			

HAHN & ASSOCIATES, INC.
434 NW Sixth Avenue
Portland, Oregon
(503) 796-0717

PROJECT:
Northwest Natural Gas Co.
Gasco Facility
Portland, Oregon
PROJECT #: 2708

SOIL BORING NUMBER B-34

HAI LOGGER:	Rob Ede	DRILL START	DRILL FINISH
SAMPLING METHOD:	4" OD Core Barrel	Time:	Time:
DRILLING METHOD:	10 1/4-inch ID Hollow Stem Auger	9:45	13:15
EQUIPMENT TYPE	B-59 Mobile Drill		
DRILLER:	Brad James	Date:	Date:
DRILLING CONTRACTOR:	Geo-Tech Explorations, Inc.	9/26/95	9/26/95

BORING DIAMETER:	12-inch
CASING DIAMETER:	Not Applicable
SURFACE ELEVATION:	34.9 feet msl
TOP OF CASING ELEVATION:	Not Applicable

ABANDONMENT DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHs (ppm)	CORE INTERVAL	SAMPLE RECOVERY	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
3/4" Bentonite Chips	B34-01	8:45	-	94					SM	Silty SAND with Gravel - brown, moist, no hydrocarbon odor (surface)
	B34-02 (dup)	8:50	-				1			
							2			
							3		GM	No Recovery-Gravels and Cobbles (0 to 5 feet bgs)
							4			
							5			
	B34-03	10:00	-	-			6			Silty Sany GRAVEL with Cobbles, olive grey, moist, wood fragmernts, sheen
							7			
							8			Silty Sandy GRAVEL with Cobbles, as above, brown, sheen, cobble fragment in end of sampler
	B34-04	10:20		-			9		GP + tar	Tarry Sandy GRAVEL - black, hard, sheen, large brick or slag at 9 feet bgs
			1344				10			
							11			Tarry Sandy GRAVEL - black, less hard than above, tar oozing from sand, large brick at 12.5 feet bgs
	B34-05	10:30		13,499			12			
			2,500+				13			
							14			
							15			
							16			Tarry Sandy with GRAVEL - black, moist, tar content less than above, aluminum strips from 17 to 17.5 feet bgs.
	B34-06	10:45		-						
			260				17			
							18		GP + tar	
							19	9/26/95		
							20			

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**SOIL BORING NUMBER**		**B-34**	
PROJECT:	HAI LOGGER:	Rob Ede	DRILL START	DRILL FINISH
Northwest Natural Gas Co.	SAMPLING METHOD:	4" OD Core Barrel	Time:	Time:
Gasco Facility	DRILLING METHOD:	10 1/4-inch ID Hollow Stem Auger	9:45	13:15
Portland, Oregon	EQUIPMENT TYPE	B-59 Mobile Drill	Date:	Date:
PROJECT #: 2708	DRILLER:	Brad James	9/26/95	9/26/95
	DRILLING CONTRACTOR:	Geo-Tech Explorations, Inc.		

BORING DIAMETER:	12-inch
CASING DIAMETER:	Not Applicable
SURFACE ELEVATION:	34.9 feet msl
TOP OF CASING ELEVATION:	Not Applicable

ABANDONMENT DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHs (ppm)	CORE INTERVAL	SAMPLE RECOVERY	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
3/4" Bentonite Chips							21		SP	SAND - black, wet, loose, medium grained, poorly graded, sheen throughout, brick at 20.5 feet bgs.
							22			
	B34-07	11:35		-						
			1,107				23			
							24			
							25			
	B34-08	12:00		-			26			SAND - black to olive gray, wet, loose, wood fragments, sheen throughout (25 - 27.5 feet bgs)
			1,422				27			
							28		ML	Sandy SILT - light brown, moist, organic matter and oxidized zones, thin tarry beds throughout core (27.5 - 30 feet bgs)
	B34-09	12:05		-			29			
			2,500+				30			
							31		SM	Silty SAND - olive gray, wet, fine to medium grained, wood fragments, patches of black oil throughout
	B34-10	12:30		-			32			
			2,500+				33			
	B34-11	12:35		-			34			
			2,500+				35			
							36		ML	SILT - green and gray mottled with brown oily pockets, sheen, product is more oil-like and less tar-like at this depth
	B34-12	13:00		-			37			
			2,500+				38			Drilled to 37 feet bgs Sampled to 37 feet bgs
							39			* Sample Number Prefix is 2708-950926-
							40			

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**SOIL BORING NUMBER**	**B-35**		
PROJECT: Northwest Natural Gas Co. Gasco Facility Portland, Oregon	HAI LOGGER:	Rob Ede	DRILL START Time: 10:20	DRILL FINISH Time: 12:05
	SAMPLING METHOD:	4" OD Core Barrel		
	DRILLING METHOD:	4 1/4-inch ID Hollow Stem Auger		
	EQUIPMENT TYPE	B-59 Mobile Drill		
	DRILLER:	Brad James	Date: 10/5/95	Date: 10/5/95
PROJECT #: 2708	DRILLING CONTRACTOR:	Geo-Tech Explorations, Inc.		

BORING DIAMETER:	8-inch
CASING DIAMETER:	Not Applicable
SURFACE ELEVATION:	33.8 feet msl
TOP OF CASING ELEVATION:	Not Applicable

ABANDONMENT DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHs (ppm)	CORE INTERVAL	SAMPLE RECOVERY	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
3/4" Bentonite Chips	B35-01	10:20	38	39			1		GM	Sandy GRAVEL with Silt - brown, moist, no hydrocarbon odor (surface)
							2			
	B35-02	10:35	235	-	5	90	3			Sandy GRAVEL with Silt, brown, wet, hardened tar in end of sampler, no sheen
					5	0				
					7	0	4			
							5			
					31	5				No Recovery - Rock blocking end of sampler
					34	0	6			
							7			
	B35-03	10:44		-	7	100	8			
			520		5	10			SP + tar	Tarry SAND with Gravel and Silt, moist, black, tar throughout matrix, sheen
					8	0	9			
							10			
	B35-04	10:50		-			11			Tarry SAND with Gravel and Silt, as above
			715				12			
							13			
							14			
							15			
							16			No Recovery - rock blocking end of sampler
							17			
							18		SP + tar	
							19	9/26/95		
							20			

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**SOIL BORING NUMBER**	**B-35**		
PROJECT: Northwest Natural Gas Co. Gasco Facility Portland, Oregon	HAI LOGGER:	Rob Ede	DRILL START	DRILL FINISH
	SAMPLING METHOD:	4" OD Core Barrel	Time: 10:20	Time: 12:05
	DRILLING METHOD:	4 1/4-inch ID Hollow Stem Auger		
	EQUIPMENT TYPE	B-59 Mobile Drill		
	DRILLER:	Brad James	Date: 10/5/95	Date: 10/5/95
PROJECT #: 2708	DRILLING CONTRACTOR:	Geo-Tech Explorations, Inc.		

BORING DIAMETER:	8-inch
CASING DIAMETER:	Not Applicable
SURFACE ELEVATION:	33.8 feet msl
TOP OF CASING ELEVATION:	Not Applicable

ABANDONMENT DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHs (ppm)	CORE INTERVAL	SAMPLE RECOVERY	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
3/4" Bentonite Chips					4	100			GP+ oil	Gravelly SILT with Sand, black, moist, many roots and wood fragments, saturated with black oily product
					6	100	21			
	B35-05	11:10	936	-	7	80				
							22		SP + oil	SAND - black, wet, medium grained, saturated with black oily product (21.5 - 22.5 feet bgs)
	B35-06	11:16		41,602						
			2,255				23			
										SILT - olive gray to green, upper 6-inches is tarry, no tar below (22.5-24 feet bgs)
	B35-07	11:20	499	-			24			
							25		ML	
										SILT - olive gray with orange oxidation spots, moist, medium stiff, some root zones present, no product, no sheen
	B35-08	11:32	98	-			26			
	B35-09	11:56		-			27			
			335							
							28			
							29			
	B35-10	12:02		9.3						
			299				30			
							31			
							32			
							33			
							34			
							35			
							36			
							37			
							38			
							39			
							40			

Drilled to 30 feet bgs
Sampled to 30 feet bgs

* Sample Number Prefix is 2708-951005-

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**SOIL BORING NUMBER**	**GT-1**		
PROJECT:	HAI LOGGER:	Rob Ede	DRILL START	DRILL FINISH
Northwest Natural - Gasco Facility	SAMPLING METHOD:	2" OD Split Spoon	Time:	Time:
7900 NW St. Helens Road	DRILLING METHOD:	4 1/4-inch OD Mud Rotary	9:30	12:30
Portland, Oregon	EQUIPMENT TYPE	B-61 Mobile Drill	Date:	Date:
PROJECT #: 2708	DRILLER:	Jim Clark	11/17/97	11/17/97
	DRILLING CONTRACTOR:	Subterranean, Inc.		

BORING DIAMETER:	4 1/4-inch
CASING DIAMETER:	Not Applicable
SURFACE ELEVATION:	20.67 feet MSL
TOP OF CASING ELEVATION:	Not Applicable

ABANDONMENT DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHS (ppm)	SPT (blows/0.5 feet)	RECOVERY (%)	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
Bentonite / Cement Grout							1		GM	Silty GRAVEL - as indicated from drill cuttings and drilling conditions.
							2			
					4	100	3		ML	Sandy SILT- brown, moist, soft, no hydrocarbon odor or discoloration, no sheen.
	001	10:20	2.3	4.3	7	50				
					10	0	4			SAND - brown, slightly moist, fine grained, medium dense, no hydrocarbon odor or discoloration, no sheen.
							5			
					7	100				SAND - as above, no hydrocarbon odor or discoloration, no sheen.
	002	10:30	3.7	-	7	100	6			
					7	0			SP	
							7			
					5	100	8			SAND - as above, hydrocarbon odor, sheen, liquid non-viscous black oily product from 8'4" to 8'6".
	003	10:39	16.2	-	5	100				
					5	0	9			
							10	▼		
					5	100				SAND - as above, wet, loose, saturated with oil-like product, petroleum odor, brown product obseved via sheen test.
	004	10:45	7.0	6.2	4	75	11			
					1	0				
							12			
					1	100	13			Silty SAND - olive grey, moist, very loose, non-plastic, no product, no sheen, petroleum odor exists.
	005	10:54	5.0	-	1	75				
					0	0	14			
							15			
					1	100			SM	Silty SAND - as above, no sheen, hydrocarbon odor exists.
					1	100	16			
	006	11:00	7.4	ND	3	50				
							17			
					1	100	18			Silty SAND - grey to olive grey, loose, wood fragment at 18' 6", no sheen, hydrocarbon odor exists.
	007	11:05		-	1	100				
			6.6		3	50	19			
							20			

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**SOIL BORING NUMBER**	**GT-1**		
PROJECT: Northwest Natural - Gasco Facility 7900 NW St. Helens Road Portland, Oregon	HAI LOGGER:	Rob Ede	DRILL START	DRILL FINISH
	SAMPLING METHOD:	2" OD Split Spoon	Time: 9:30	Time: 12:30
	DRILLING METHOD:	4 1/4-inch OD Mud Rotary		
	EQUIPMENT TYPE	B-61 Mobile Drill		
	DRILLER:	Jim Clark	Date: 11/17/97	Date: 11/17/97
PROJECT #: 2708	DRILLING CONTRACTOR:	Subterranean, Inc.		

BORING DIAMETER:	4 1/4-inch
CASING DIAMETER:	Not Applicable
SURFACE ELEVATION:	20.67 feet MSL
TOP OF CASING ELEVATION:	Not Applicable

ABANDONMENT DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHS (ppm)	SPT (blows/0.5 feet)	RECOVERY (%)	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
Bentonite / Cement Grout					3	100			SP	SAND - grey with some brown to orange oxidation zones, wet, medium dense, fine grained, no sheen, no hydrocarbon odor.
	008	11:12	2.6	ND	7	100	21			
					7	0	22			
							23			
							24			
							25			
					3	100				SAND - as above, brown to 26', grey below 26', muscovite present in gray sand, slight sheen and hydrocarbon odor below 26'
					8	100	26			
	009	11:20	1.5	-	12	50	27			
							28			
							29			
							30			
					3	100				SAND - as above, grey, loose, fine grained, no sheen, slight reducing odor.
	010	11:28	1.6	-	4	100	31			
					4	0	32		SP	
							33			
							34			
							35			
					6	100				SAND -as above, medium dense, no sheen, no hydrocarbon odor.
	011	11:35	1.4	ND	6	100	36			
					11	0	37			
							38			Drilled to 35.0 feet bgs Sampled to 36.5 feet bgs
							39			* Sample Number Prefix is 2708-971117-
							40			

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**SOIL BORING NUMBER**	**GT-2**		
PROJECT: Northwest Natural - Gasco Facility 7900 NW St. Helens Road Portland, Oregon	HAI LOGGER:	Rob Ede	DRILL START Time: 14:30 Date: 11/17/97	DRILL FINISH Time: 16:00 Date: 11/17/97
	SAMPLING METHOD:	2" OD Split Spoon		
	DRILLING METHOD:	4 1/4-inch OD Mud Rotary		
	EQUIPMENT TYPE	B-61 Mobile Drill		
	DRILLER:	Jim Clark		
PROJECT #: 2708	DRILLING CONTRACTOR:	Subterranean, Inc.		

BORING DIAMETER:	4 1/4-inch
CASING DIAMETER:	Not Applicable
SURFACE ELEVATION:	20.68 feet MSL
TOP OF CASING ELEVATION:	Not Applicable

ABANDONMENT DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHS (ppm)	SPT (blows/0.5 feet)	RECOVERY (%)	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
Bentonite / Cement Grout							1		GM	Silty GRAVEL - as indicated from drill cuttings and drilling conditions.
							2			
					3	100	3		SP	SAND - brown, moist, loose, fine grained, poorly graded, no hydrocarbon odor or discoloration, no sheen.
					4	100				
	012	1439	1.9	0.08	5	50	4			
							5			SAND - as above, no hydrocarbon odor or discoloration, no sheen.
					2	100				
					3	100	6			
	013	1442	2.7	-	4	50				
							7			
	014	1453	2.1	-	5	75	8			SAND - as above, grey, no sheen, slight organic odor.
					5	0				
					2	0	9			
							10	▼		
					1	100			ML	Sandy SILT - olive grey, moist to wet, very soft, slightly plastic, no hydrocarbon odor, no sheen.
					0	100	11			
	015	1500	2.5	-	1	100				
							12			
					1	100	13			Sandy SILT - as above, wet, no hydrocarbon odor, no sheen, some mica.
	016	1505		-	0	100				
			2.4		0	25	14			
							15			
					1	100			SP	SAND - grey, wet, very loose, fine grained, no hydrocarbon odor, no sheen, slight organic decay odor.
	017	1510		ND	1	100	16			
			2.9		2	25				
							17			
							18			
							19			
							20			

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**SOIL BORING NUMBER**		**GT-2**	
PROJECT: Northwest Natural - Gasco Facility 7900 NW St. Helens Road Portland, Oregon	HAI LOGGER:	Rob Ede	DRILL START Time: 14:30 Date: 11/17/97	DRILL FINISH Time: 16:00 Date: 11/17/97
	SAMPLING METHOD:	2" OD Split Spoon		
	DRILLING METHOD:	4 1/4-inch OD Mud Rotary		
	EQUIPMENT TYPE	B-61 Mobile Drill		
	DRILLER:	Jim Clark		
PROJECT #: 2708	DRILLING CONTRACTOR:	Subterranean, Inc.		

BORING DIAMETER:	4 1/4-inch
CASING DIAMETER:	Not Applicable
SURFACE ELEVATION:	20.68 feet MSL
TOP OF CASING ELEVATION:	Not Applicable

ABANDONMENT DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHS (ppm)	SPT (blows/0.5 feet)	RECOVERY (%)	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
Bentonite / Cement Grout					4	100				
					5	100	21			SAND - as above, medium dense, no hydrocarbon odor, no sheen, slight organic decay odor.
	018	1515	3.6	-	6	50				
							22			
							23		SP	
							24			
							25			
					4	100				
					4	100	26			SAND - as above, grey, few thin grey silt lenses, no sheen, slight organic decay odor.
	019	1521	3.6	-	7	50				
							27			
							28			
							29			
							30			
					2	100				
	020	1529		-	1	100	31			SAND - as above, many thin grey silt lenses, no hydrocarbon odor, no sheen.
			2.2		7	25				
							32			
					7	100	33		SP	SAND - as above, no hydrocarbon odor, no sheen.
	021	1534		ND	8	100				
			2.6		9	25	34			
							35			
					5	100				SAND - as above, no hydrocarbon odor, no sheen.
					10	100	36			
	022	1540	2.7	-	6	50				
							37			
							38			Drilled to 35.0 feet bgs Sampled to 36.5 feet bgs
							39			* Sample Number Prefix is 2708-971117-
							40			

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**SOIL BORING NUMBER**	**GT-3**	
PROJECT: Northwest Natural - Gasco Facility 7900 NW St. Helens Road Portland, Oregon	HAI LOGGER: Rob Ede SAMPLING METHOD: 2" OD Split Spoon DRILLING METHOD: 4 1/4-inch OD Mud Rotary EQUIPMENT TYPE B-61 Mobile Drill DRILLER: Jim Clark	DRILL START Time: 8:20 Date: 11/18/97	DRILL FINISH Time: 12:00 Date: 11/18/97
PROJECT #: 2708	DRILLING CONTRACTOR: Subterranean, Inc.		

BORING DIAMETER: 4 1/4-inch
CASING DIAMETER: Not Applicable
SURFACE ELEVATION: 19.44 feet MSL
TOP OF CASING ELEVATION: Not Applicable

ABANDONMENT DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHS (ppm)	SPT (blows/0.5 feet)	RECOVERY (%)	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
Bentonite / Cement Grout							1		GM	Silty GRAVEL - as indicated from drill cuttings and drilling conditions.
							2			
					2	100	3		ML	SILT with fine Sand and Gravel - olive grey with some brown, moist, stiff, non-plastic, no hydrocarbon odor, no sheen, some wood fragments.
	023	847		43.1	3	100				
			0		7	25	4			
							5			
	024	850	0	-	4	50				SILT with fine Sand and Gravel - as above, brown, no hydrocarbon, no sheen.
					5	0	6			
					16	0				
							7			
					3	100	8			SILT with fine Sand and Gravel - as above, no hydrocarbon odor, no sheen, some wood fragments.
					8	100				
	025	859	0	-	11	50	9			
							10			
					3	20				SILT with fine sand and gravel - as above, no hydrocarbon odor, no sheen, some wood fragments.
					2	0	11			
					1	0				
					1	100	12		SM	Silty SAND - grey with brown oxidation spots, moist, fine grained, very loose, no hydrocarbon odor, no sheen.
					1	100				
	026	911	0	0.05	1	100	13			
					1	10			ML	Sandy SILT - grey, moist, very soft, non-plastic, no hydrocarbon odor, no sheen.
					1	0	14			
					1	0				
							15			
							16			
					3	100	17			
					6	100			SP	SAND - grey, moist, very loose, fine grained, non-plastic, no hydrocarbon odor, no sheen.
	027	922	0	-	6	75	18			
							19			
							20			

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**SOIL BORING NUMBER**	**GT-3**		
PROJECT:	HAI LOGGER:	Rob Ede	DRILL START	DRILL FINISH
Northwest Natural - Gasco Facility	SAMPLING METHOD:	2" OD Split Spoon	Time:	Time:
7900 NW St. Helens Road	DRILLING METHOD:	4 1/4-inch OD Mud Rotary	8:20	12:00
Portland, Oregon	EQUIPMENT TYPE	B-61 Mobile Drill	Date:	Date:
PROJECT #: 2708	DRILLER:	Jim Clark	11/18/97	11/18/97
	DRILLING CONTRACTOR:	Subterranean, Inc.		

BORING DIAMETER:	4 1/4-inch
CASING DIAMETER:	Not Applicable
SURFACE ELEVATION:	19.44 feet MSL
TOP OF CASING ELEVATION:	Not Applicable

ABANDONMENT DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHS (ppm)	SPT (blows/0.5 feet)	RECOVERY (%)	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
Bentonite / Cement Grout					6	100				
					7	100	21			SAND - as above, no hydrocarbon odor, slight organic decay odor, no sheen.
	028	928	0	-	8	75			SP	
							22			
					1	100	23			SAND - as above, moist to wet, no hydrocarbon odor, no sheen.
					6	100				
	029	935	0	-	7	50	24			
							25			
					2	100				SAND - as above, grey, moist to wet, no hydrocarbon odor, no sheen, fine grained, some grey silt lenses with rootlets.
					2	100	26			
	030	943	0	-	2	75				
							27			
							28			
							29			
							30			
					2	100				
	031	953		-	1	100	31			SAND - as above, many silt lenses, no hydrocarbon odor, no sheen, fine grained.
			0		3	75				
							32		SP	
							33			
							34			
							35			
					8	100				
					10	100	36			SAND -as above, wet, no sheen, no hydrocarbon odor.
	032	1000	0	ND	10	100				
							37			
							38			Drilled to 35.0 feet bgs Sampled to 36.5 feet bgs
							39			* Sample Number Prefix is 2708-971118-
							40			

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**SOIL BORING NUMBER**	**GT-4**		
PROJECT: Northwest Natural - Gasco Facility 7900 NW St. Helens Road Portland, Oregon	HAI LOGGER:	Rob Ede	DRILL START Time: 12:45	DRILL FINISH Time: 16:00
	SAMPLING METHOD:	2" OD Split Spoon		
	DRILLING METHOD:	4 1/4-inch OD Mud Rotary		
	EQUIPMENT TYPE	B-61 Mobile Drill		
	DRILLER:	Jim Clark	Date: 11/18/97	Date: 11/18/97
PROJECT #: 2708	DRILLING CONTRACTOR:	Subterranean, Inc.		

BORING DIAMETER:	4 1/4-inch
CASING DIAMETER:	Not Applicable
SURFACE ELEVATION:	19.64 feet MSL
TOP OF CASING ELEVATION:	Not Applicable

ABANDONMENT DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHS (ppm)	SPT (blows/0.5 feet)	RECOVERY (%)	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
Bentonite / Cement Grout							1		GM	
							2			
	-				8	10	3			Silty GRAVEL with brick fragments - no sheen, driller lost mud at 4.0 feet (voids in fill).
					5	0				
					7	0	4			
							5			
	-				8	10				Silty GRAVEL with brick fragments - no hydrocarbon odor, no sheen.
					12	0	6			
					9	0				
							7			
	-				7	20	8			Silty GRAVEL with brick fragments - grey and green silt, no hydrocarbon odor, no sheen.
					14	0				
					16	0	9			
							10		GM	
					15	100				Sandy GRAVEL with brick - grey, fine grained sand, organic decay odor, no sheen.
					30	100	11			
	033	1341	0	-	18	50				Driller indicates smoother drilling below 11.5 feet
							12			
					1	100	13			SAND with silt lenses - grey, fine grained, no hydrocarbon odor, organic decay odor, no sheen, fine grained.
					1	100				
	034	1350	0	ND	1	50	14			
							15			
							16		SP	
	-				2	0	17			No Recovery.
					1	0				
					1	0	18			
							19			
							20			

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**SOIL BORING NUMBER**	**GT-4**	
PROJECT: Northwest Natural - Gasco Facility 7900 NW St. Helens Road Portland, Oregon	HAI LOGGER: Rob Ede SAMPLING METHOD: 2" OD Split Spoon DRILLING METHOD: 4 1/4-inch OD Mud Rotary EQUIPMENT TYPE B-61 Mobile Drill DRILLER: Jim Clark	DRILL START Time: 12:45 Date: 11/18/97	DRILL FINISH Time: 16:00 Date: 11/18/97
PROJECT #: 2708	DRILLING CONTRACTOR: Subterranean, Inc.		

BORING DIAMETER:	4 1/4-inch
CASING DIAMETER:	Not Applicable
SURFACE ELEVATION:	19.64 feet MSL
TOP OF CASING ELEVATION:	Not Applicable

ABANDONMENT DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHS (ppm)	SPT (blows/0.5 feet)	RECOVERY (%)	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
Bentonite / Cement Grout	-		0		4	20				SAND - brown, fine grained, medium dense, no hydrocarbon odor, no sheen, appears to be oxidized.
					5	0	21			
					7	0			SP	
							22			
							23			
					6	0				No Recovery.
					12	0	24			
					12	0				
							25			
	035	1417		-	5	100				SAND - as above, grey, no hydrocarbon odor, no sheen, fine grained, appears to be oxidized.
			0		8	25	26			
					7	0				
							27			
							28			
							29			
							30			
					4	100				SAND - grey, organic decay odor, no hydrocarbon odor, no sheen, fine grained, appears to be oxidized.
	036	1427		-	5	100	31			
			0		7	25				
							32		SP	
							33			
							34			
							35			
					5	100				SAND - as above, no hydrocarbon odor, no sheen.
	037	1439		-	5	100	36			
			0		7	25				
							37			
							38			
							39			
							40			

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**SOIL BORING NUMBER**	**GT-4**		
PROJECT: Northwest Natural - Gasco Facility 7900 NW St. Helens Road Portland, Oregon	HAI LOGGER:	Rob Ede	DRILL START Time: 12:45 Date: 11/18/97	DRILL FINISH Time: 16:00 Date: 11/18/97
	SAMPLING METHOD:	2" OD Split Spoon		
	DRILLING METHOD:	4 1/4-inch OD Mud Rotary		
	EQUIPMENT TYPE	B-61 Mobile Drill		
	DRILLER:	Jim Clark		
PROJECT #: 2708	DRILLING CONTRACTOR:	Subterranean, Inc.		

BORING DIAMETER:	4 1/4-inch
CASING DIAMETER:	Not Applicable
SURFACE ELEVATION:	19.64 feet MSL
TOP OF CASING ELEVATION:	Not Applicable

ABANDONMENT DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHS (ppm)	SPT (blows/0.5 feet)	RECOVERY (%)	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
Bentonite / Cement Grout					8	100			SP	
	038	1517		ND	15	100	41			SAND - as above, dense, no hydrocarbon odor, no sheen.
			0		17	25				
							42			
							43			
							44			
							45			
	039	1525		-	7	100				SAND - grey, fine grained, medium dense, some shell fragments, no hydrocarbon odor, no sheen.
			0		7	100	46			
					11	25				
							47			
							48			
							49		SP	
							50			
					8	100				SAND - as above, no hydrocarbon odor, no sheen.
					8	100	51			
					8	0				
							52			
							53			Drilled to 50.0 feet bgs Sampled to 51.5 feet bgs
							54			
							55			* Sample Number Prefix is 2708-971118-
							56			
							57			
							58			
							59			
							60			

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**SOIL BORING NUMBER**	**M-11**		
PROJECT: Northwest Natural Gas Co. Gasco Facility Portland, Oregon	HAI LOGGER:	Rob Ede	DRILL START Time: 13:17	DRILL FINISH Time: 10:30
	SAMPLING METHOD:	3-inch Split Spoon/4-inch OD Core Barrel		
	DRILLING METHOD:	6 1/4-inch ID Hollow Stem Auger		
	EQUIPMENT TYPE	B-59 Mobile Drill		
	DRILLER:	Brad James	Date: 2-Nov-95	Date: 3-Nov-95
PROJECT #: 2708	DRILLING CONTRACTOR:	Geo-Tech Explorations, Inc.		

BORING DIAMETER:	10-inch
CASING DIAMETER:	Not Applicable
SURFACE ELEVATION:	35.4 feet MSL
TOP OF CASING ELEVATION:	Not Applicable

ABANDONMENT DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHs (ppm)	CORE INTERVAL	RECOVERY INTERVAL	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
	M11-01	1315	-	106			1		GP	Surface: Sandy Silty GRAVEL - brown, slightly moist, grass covered area.
Bentonite Chips							2			
							3			
					18	100	4		SP	SAND with gravel (3.5-4.0 Feet bgs) - brown, loose, moist, coarse grained, pieces of brick
	M11-02	1330		-	27	100				SAND with lampblack (4.0-5.0 feet bgs) - black, loose, hydrophobic, hydrocarbon odor, no sheen.
			11.5		21	70	5			
					14	100			GP	Sandy GRAVEL (5.0-6.5 feet bgs) - black (Lampblack), no sheen, pieces of brick, large pieces of slag looking material .
					8	100	6			
					7	30	7			
					8	100	8		SP	SAND with gravel (7.5-9.0 feet bgs) - black (Lampblack), pieces of brick, slag looking material (blue coloration), black, moist, hydrocarbon odor, no sheen.
20 % Solids Bentonite Grout	M11-03	1335		-	5	100				
			194		6	30	9			
							10			SAND (10.0-10.5 feet bgs) - Lampblack
							11			SAND (10.5-11.0 feet bgs) - brown, moist to wet, medium grained, loose, poorly graded, slight sheen.
							12			
							13			SAND (11.0-15.0 feet bgs) - black/metallic, moist to wet, strong hydrocarbon odor, sheen, brown froth via sheen test saturated with product, silt layers encountered at 12.5 and 13.5 feet bgs approximately 1 inch thick.
	M11-04	1350		-						
			2500+				14			
							15			
							16			SAND (15.0-20.0 feet bgs) - saturated with black oily product, wet, medium grained, loose, 2 inches of moist silt, olive grey with orange oxidation spots at 18.5 feet bgs.
	M11-05	1400		-			17			
			2500+				18		SP	
							19			
							20			

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**SOIL BORING NUMBER**	**M-11**		
PROJECT: Northwest Natural Gas Co. Gasco Facility Portland, Oregon	HAI LOGGER:	Rob Ede	DRILL START	DRILL FINISH
	SAMPLING METHOD:	3-inch Split Spoon/4-inch OD Core Barrel	Time:	Time:
	DRILLING METHOD:	6 1/4-inch ID Hollow Stem Auger	13:17	10:30
	EQUIPMENT TYPE	B-59 Mobile Drill	Date:	Date:
	DRILLER:	Brad James	2-Nov-95	3-Nov-95
PROJECT #: 2708	DRILLING CONTRACTOR:	Geo-Tech Explorations, Inc.		

BORING DIAMETER:	10-inch
CASING DIAMETER:	Not Applicable
SURFACE ELEVATION:	35.4 feet MSL
TOP OF CASING ELEVATION:	Not Applicable

ABANDONMENT DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHs (ppm)	CORE INTERVAL	RECOVERY INTERVAL	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
20 % Solids Bentonite Grout							21		SP	SAND (20.0-23.0 feet bgs) - wet, loose, medium grained, poorly graded, sheen on core, saturated with oily product.
							22			
	M11-06	1415		-						
			642				23		ML	SILT (23.0-25.0 feet bgs) - olive grey, moist, root zones, soft black viscous tarry material, some sand from 24-25 feet bgs.
							24			
							25			
							26		SP	SAND (25.0-30.0 feet bgs) - wet, medium-grained, poorly graded, loose, product saturated, froth via sheen test, saturated with product to 30.5 feet bgs.
							27			
							28			
	M11-07	1425		-						
			1511				29			
							30			
							31		ML	SILT (30.5-35.0 feet bgs) - green to grey, brown, moist, stiff, plastic (some clay content), oily product migrations through root zones/fractures.
							32			
	M11-08	1435		-			33			
			996				34			
							35			
							36		ML	SILT (35.0-40.0 feet bgs) - green, moist, stiff, plastic (some clay content), no product observed within core, root zones clean, slight sheen.
							37			
							38			
							39			
	M11-09	1450		7.9						
			29.3				40			

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**SOIL BORING NUMBER**	**M-11**		
PROJECT: Northwest Natural Gas Co. Gasco Facility Portland, Oregon	HAI LOGGER:	Rob Ede	DRILL START Time: 13:17 Date: 2-Nov-95	DRILL FINISH Time: 10:30 Date: 3-Nov-95
	SAMPLING METHOD:	3-inch Split Spoon/4-inch OD Core Barrel		
	DRILLING METHOD:	6 1/4-inch ID Hollow Stem Auger		
	EQUIPMENT TYPE	B-59 Mobile Drill		
	DRILLER:	Brad James		
PROJECT #: 2708	DRILLING CONTRACTOR:	Geo-Tech Explorations, Inc.		

BORING DIAMETER:	10-inch
CASING DIAMETER:	Not Applicable
SURFACE ELEVATION:	35.4 feet MSL
TOP OF CASING ELEVATION:	Not Applicable

ABANDONMENT DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHs (ppm)	CORE INTERVAL	RECOVERY INTERVAL	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
20 % Solids Bentonite Grout							41		ML	SILT (40.0-45.0 feet bgs) - olive grey, moist, stiff, root zones present, no product observed, no sheen via sheen test.
							42			
							43			
	M11-10	1500		10.9			44			
			23.1				45			
							46			SILT (45.0-49.0 feet bgs) - olive grey, moist, stiff, root zones present, no product, no sheen, large 6-inch tree limb/trunk at 45 feet bgs.
							47			
							48			
							49			
	M11-11	1513		-			50			Sandy SILT (49.0-50.0 feet bgs) - as above.
			-				51			Sandy SILT (50.0-51.0 feet bgs) - olive grey, soft, moist to wet, sheen?.
							52			SILT (51.0-53.0 feet bgs) - olive grey, moist, stiff, root zones, wood fragments.
							53			SILT (53.0-55.0 feet bgs) - green, slightly moist, stiff, no sheen.
							54			1540 - stop for day 11/3/95 - start drilling at 0825.
	M11-12	1524		-			55			
			-				56		ML	SILT (55.0-60.0 feet bgs) - green, slightly moist, stiff, no sheen, no product, 6-inch sandy silt zone at 58 feet bgs.
							57			
							58			
	M11-13	840		-			59			
			3.8				60			

HAHN & ASSOCIATES, INC.
434 NW Sixth Avenue
Portland, Oregon
(503) 796-0717

PROJECT:
Northwest Natural Gas Co.
Gasco Facility
Portland, Oregon
PROJECT #: 2708

SOIL BORING NUMBER M-11

HAI LOGGER:	Rob Ede	DRILL START	DRILL FINISH
SAMPLING METHOD:	3-inch Split Spoon/4-inch OD Core Barrel	Time:	Time:
DRILLING METHOD:	6 1/4-inch ID Hollow Stem Auger	13:17	10:30
EQUIPMENT TYPE	B-59 Mobile Drill	Date:	Date:
DRILLER:	Brad James	2-Nov-95	3-Nov-95
DRILLING CONTRACTOR:	Geo-Tech Explorations, Inc.		

BORING DIAMETER:	10-inch
CASING DIAMETER:	Not Applicable
SURFACE ELEVATION:	35.4 feet MSL
TOP OF CASING ELEVATION:	Not Applicable

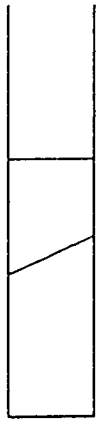
ABANDONMENT DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHs (ppm)	CORE INTERVAL	RECOVERY INTERVAL	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
20 % Solids Bentonite Grout							61		ML	Sandy SILT (60.0-65.0 feet bgs) - olive grey, moist, stiff, sheen on outside of core from water in hole, no sheen inside core.
							62			
							63			
							64			Sandy SILT (65.0-67.5 feet bgs) - olive grey, moist, stiff, sheen on outside of core from water in hole, no sheen inside core, approximately 1/4-inch of sand in end of core.
							65			
							66			Silty SAND (66.0-66.5 feet bgs) - olive grey,wet, moderately dense, no sheen.
	M11-14	1020		-					SM	
			7.8				67		ML	
							68		SM	SAND (67.5-68.5 feet bgs) - brown, wet, moderately dense, no sheen, fine grained.
							69		SP	SAND (68.5-70.0 feet bgs) - brown, wet, loose, poorly graded, no sheen, fine grained.
	M11-15	1030		-						
			2.3				70			
							71			Boring terminated at 70.0 feet bgs.
							72			*Sample prefix is 2708-951102-
							73			
							74			
							75			
							76			
							77			
							78			
							79			
							80			

G:\ACAD\DETAILS\GTKBR300

LABORATORY TESTS:

AL	Atterberg limits
CP	Compaction
CS	Consolidation
DS	Direct Sheer
GS	Grain – size
%F	Percent fines
HA	Hydrometer analysis
SK	Permeability
SM	Moisture content
MD	Moisture and density
SP	Swelling pressure
TX	Triaxial compression
UC	Unconfiend compression
CA	Chemical analysis

SOIL GRAPH:



SM Soil Group Symbol (See Note 2)

Distinct Contact Between Soil Strata

Gradual or Approximate Location of Change Between Soil Strata

Water Level

Bottom of Boring

BLOW-COUNT/SAMPLE DATA:

Blows required to drive a 2.4–inch I.D. split–barrel sampler 12 inches or other indicated distances using a 300–pound hammer falling 30 inches.

- 22 Location of relatively undisturbed sample
- 12 Location of disturbed sample
- 17 Location of sampling attempt with no recovery

Blows required to drive a 1.5–inch I.D. (SPT) split–barrel sampler 12 inches or other indicated distances using a 140–pound hammer falling 30 inches.

- 10 Location of sample obtained in general accordance with Standard Penetration Test (ASTM D 1586) procedures
- 26 Location of SPT sampling attempt with no recovery

"P" indicates sampler pushed with weight of hammer or against weight of drill rig.

- P Location of relatively undisturbed sample obtained using a 3–inch–diameter thin–wall sample tube. Sample obtained in general accordance with ASTM D 1587.
- Location of grab sample

NOTES:

1. The reader must refer to the discussion in the report text, the Key to Boring Log Symbols and the exploration logs for a proper understanding of subsurface conditions.
2. Soil classification system is summarized in Figure 3.

GEI 121–90

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KEY TO BORING LOG SYMBOLS

FIGURE 4

TEST DATA

BORING G-1

Depth (ft)	Lab Tests	Moisture Content (%)	Dry Density (pcf)	Blow Count	Samples	Group Symbol	DESCRIPTION
0						AC	3 to 4 inches asphalt concrete
						GP	1 1/2-inch-minus gravel (dense, moist) (fill)
						SM	Black silty fine sand with occasional gravel (loose, moist)
				8			(petroleum-like odor, field screening: moderate sheen, TLV = 400 ppm)
						SP	Gray-black fine sand with trace silt (loose, moist)
5	MD	9	90	9			(petroleum-like odor)
				5			Grades to wet (field screening: heavy sheen, TLV = 250 ppm)
10	MD	19	88	6			Soil saturated with heavy petroleum-like material
15				6			(field screening: heavy sheen, TLV = 1,800 ppm)
20				2		ML	Dark gray silt with trace to no fine sand and trace clay (soft, moist) (petroleum-like odor)
25				6			Grades to medium stiff and gray with brown mottling (no petroleum-like odor, field screening: slight sheen, TLV = 160 ppm)
				P			
30	MD, CS	39	82	5		ML	Brown with gray mottled silt with trace clay and fine sand (medium stiff, moist)
35				4			(field screening: no sheen, TLV = 180 ppm)
40						SM	Brown silty fine sand with trace clay (loose, wet)

DEPTH IN FEET

Note: See Figure 2 for explanation of symbols

Geo Engineers

LOG OF BORING

FIGURE 5

5823-001-43-2130 DLT:WMB:MLN 6/6/97

TEST DATA

BORING G-1
(Continued)

Depth (ft)	Lab Tests	Moisture Content (%)	Dry Density (pcf)	Blow Count	Samples	Group Symbol	DESCRIPTION
40	MD	41	82	3			
45				2		ML	(field screening: no sheen, TLV = 100 pm) Brown silt with trace fine sand and clay (soft to medium stiff, moist)
50	MD	44	77	7			Grades to medium stiff Increasing sand content at depth Boring completed at 51.5 feet on 04/11/97

DEPTH IN FEET

Note: See Figure 2 for explanation of symbols

Geo Engineers

LOG OF BORING

FIGURE 5

TEST DATA

BORING G-2

Depth (feet)	Lab Tests	Moisture Content (%)	Dry Density (pcf)	Blow Count	Samples	Group Symbol	DESCRIPTION
0						AC	1 inch asphalt concrete
						GP	1 1/2-inch-minus gravel (dense, moist) (fill)
						SP	Gray-black fine sand with trace to no silt (medium dense, moist)
	MD	9	95	14			(no petroleum-like odor)
5				10			(field screening: slight sheen, TLV = 60 ppm)
	MD	19	96	7			Grades to loose, wet Soil saturated with petroleum-like product
10				3			(field screening: moderate sheen, TLV = 110 ppm)
15	MD	22	90	2			
20				3		ML	Dark gray silt with fine sand (soft, moist) (field screening: slight sheen, TLV = 1,600 ppm)
25	MD	22	96	3			Grades to gray
30				6		ML	Brown with gray mottled silt with trace clay and fine sand (medium stiff, moist) (field screening: slight sheen, TLV = 100 ppm)
35	MD	45	76	1		SM	Brown silty fine sand with trace clay (loose, moist to wet)
				5			
40							

DEPTH IN FEET

Note: See Figure 2 for explanation of symbols

GeoEngineers

LOG OF BORING

FIGURE 6

Koppers000797

TEST DATA

BORING G-2
(Continued)

Lab Tests	Moisture Content (%)	Dry Density (pcf)	Blow Count	Samples	Group Symbol	DESCRIPTION
						(field screening: no sheen, TLV = 100 ppm)
			9			
			15			(field screening: slight sheen, TLV = 100 ppm)
SM	32		28		SP	Gray-brown fine sand with silt (medium dense, wet) (field screening: no sheen, TLV = 40 ppm)
			50/1"		GM	Dark gray silty fine gravel (weathered bedrock) (very dense, wet) Boring completed at 58.6 feet on 04/12/97 because of refusal

DEPTH IN FEET

40 45 50 55 60 65 70 75 80

Note: See Figure 2 for explanation of symbols

Geo Engineers

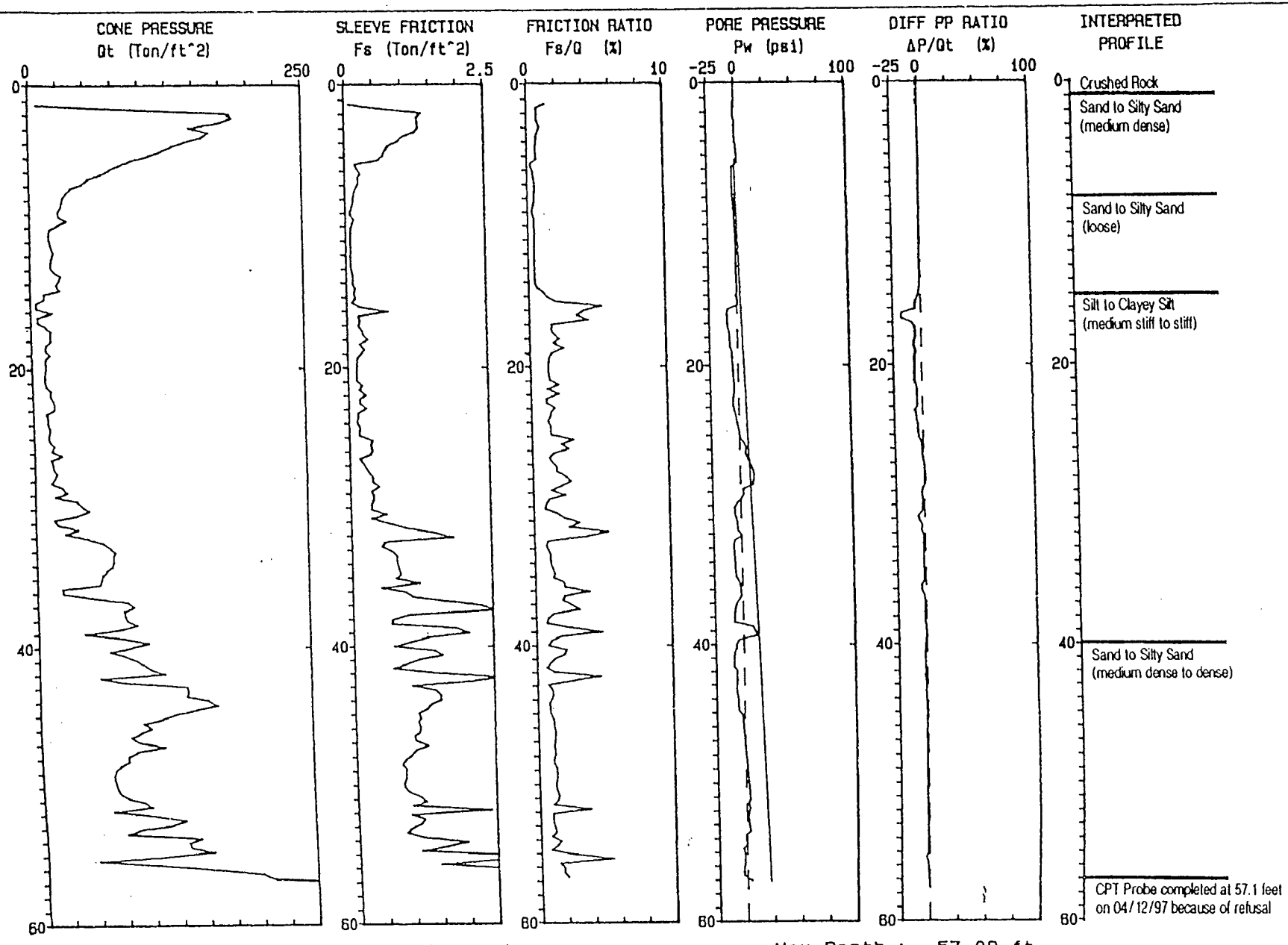
LOG OF BORING

FIGURE 6

Vandehey Soil Ex LLC

Operator : S.VAN/S.MES/W.MC CPT Date : 04-12-97 11:01 Sounding : SND433 Pg 1 / 1

Location : P1/KOPPERS PORT Client : GEO ENGINEERS Job No. : 5827



Depth Increment : .1 m Max Depth : 57.09 ft

FIGURE 7

Koppers000799

Vandehey Soil Ex LLC

Operator : S.VAN/S.MES/W.MC CPT Date : 04-12-97 14:59 Sounding : SND434 Pg 1 / 1

Location : P2/KOPPERS PORT Client : GEO ENGINEERS Job No. : 5823-001-43

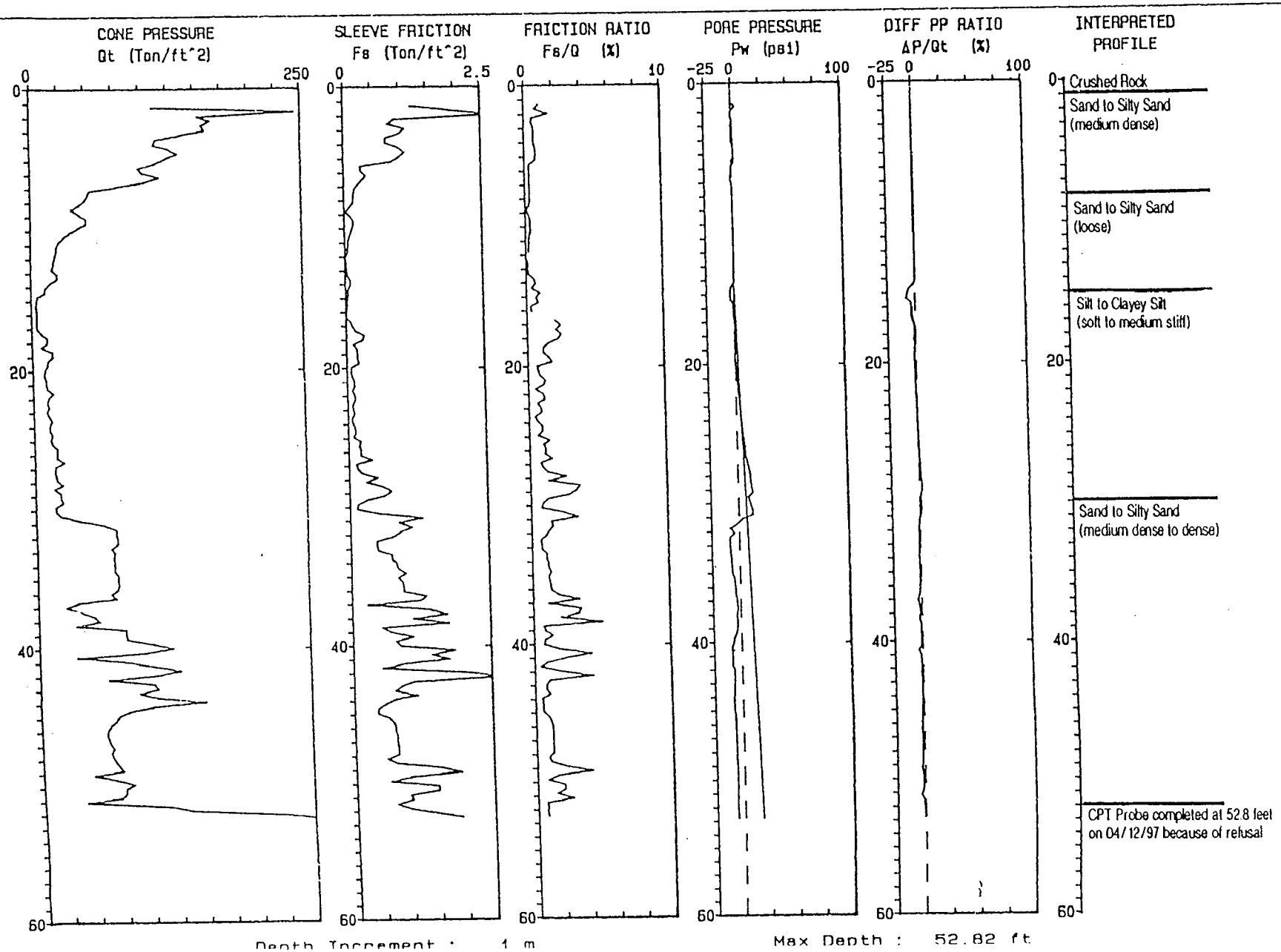


FIGURE 8

Koppers000800

B

APPENDIX B

Monitoring Well Construction Summary

Monitoring Well Logs

TABLE B1 - Monitoring Well Construction Summary

Remedial Investigation
Northwest Natural - Gasco Facility
7900 NW St. Helens Road
Portland, Oregon

Project #2708

Well Number	Date Installed	Date Decom-missioned	Installation Method	Monument Type	Screen Type	Slot Size	Sand Pack	Well Diam.	Ground Surface	Top of Casing		Boring Depth		Top Screen		Base Screen		Water Level 1-Jun-98		Top Silt Unit	
						(inches)	(Colorado)	(inches)	(feet msl)	(feet msl)	(feet bgs)	(feet bgs)	(feet msl)	(feet bgs)	(feet msl)	(feet bgs)	(feet msl)	(feet btc)	(feet msl)	(feet bgs)	(feet msl)
MW-1-22	24-Oct-95	-	Hollow-Stem Auger	Above-grade	Slotted PVC	0.020	10-20	2	32.0	34.75	(2.8)	22.0	10.0	11.0	21.0	21.0	11.0	14.49	20.26	22.5	9.5
MW-2-32	6-Nov-95	-	Hollow-Stem Auger	Flush	Slotted PVC	0.020	10-20	2	35.8	34.46	1.3	32.5	3.3	21.5	14.3	31.5	4.3	16.97	17.49	31.5	4.3
MW-3-26	1-Nov-95	-	Hollow-Stem Auger	Above-grade	Continuous wrap stainless steel	0.020	10-20	2	31.2	34.11	(2.9)	26.0	5.2	15.0	16.2	25.0	6.2	16.61	17.50	25.0	6.2
MW-3-56	1-Nov-95	-	Hollow-Stem Auger	Above-grade	Continuous wrap stainless steel	0.020	10-20	2	31.2	34.07	(2.9)	56.0	-24.8	45.0	-13.8	55.0	-23.8	16.51	17.56	25.0	6.2
MW-4-35	31-Oct-95	-	Hollow-Stem Auger	Above-grade	Continuous wrap stainless steel	0.020	10-20	2	31.7	34.54	(2.8)	35.0	-3.3	24.0	7.7	34.0	-2.3	16.90	17.64	25.0	6.7
MW-4-57	30-Oct-95	-	Hollow-Stem Auger	Above-grade	Continuous wrap stainless steel	0.020	10-20	2	31.7	34.53	(2.8)	57.0	-25.3	46.0	-14.3	56.0	-24.3	17.00	17.53	25.0	6.7
MW-5-32	27-Oct-95	-	Hollow-Stem Auger	Above-grade	Slotted PVC	0.020	10-20	2	25.1	27.83	(2.7)	32.0	-6.9	21.0	4.1	31.0	-5.9	10.33	17.50	16.0	9.1
MW-6-32	9-Nov-95	-	Hollow-Stem Auger	Flush	Continuous wrap stainless steel	0.020	10-20	2	35.8	35.51	0.3	32.0	3.8	21.0	14.8	31.0	4.8	15.75	19.76	30.5	5.3
MW-6-61	7-Nov-95	22-Dec-97	Hollow-Stem Auger	Flush	Continuous wrap stainless steel	0.020	10-20	2	35.8	34.50	1.3	61.0	-25.2	50.0	-14.2	60.0	-24.2	-	-	30.5	5.3
MW-8-29	26-Oct-95	-	Hollow-Stem Auger	Above-grade	Continuous wrap stainless steel	0.020	10-20	2	36.5	39.09	(2.6)	29.0	7.5	18.0	18.5	28.0	8.5	20.05	19.04	27.5	9.0
MW-8-56	25-Oct-95	-	Hollow-Stem Auger	Above-grade	Continuous wrap stainless steel	0.020	10-20	2	36.5	39.13	(2.6)	56.0	-19.5	45.0	-8.5	55.0	-18.5	21.63	17.50	27.5	9.0
MW-9-29	23-Oct-95	-	Hollow-Stem Auger	Flush	Slotted PVC	0.020	10-20	2	37.9	37.65	0.3	29.0	8.9	18.0	19.9	28.0	9.9	7.25	30.40	11.0	26.9
MW-10-25	9-Nov-95	-	Hollow-Stem Auger	Above-grade	Continuous wrap stainless steel	0.020	10-20	2	36.5	39.22	(2.7)	25.0	11.5	14.0	22.5	24.0	12.5	14.63	24.59	23.5	13.0
MW-10-61	8-Nov-95	-	Hollow-Stem Auger	Above-grade	Continuous wrap stainless steel	0.020	10-20	2	36.5	39.33	(2.8)	61.0	-24.5	50.0	-13.5	60.0	-23.5	14.36	24.97	23.5	13.0
MW-11-32	3-Nov-95	-	Hollow-Stem Auger	Above-grade	Continuous wrap stainless steel	0.020	10-20	2	35.4	38.39	(3.0)	32.0	3.4	21.0	14.4	31.0	4.4	12.85	25.54	30.5	4.9
MW-12-36	23-Oct-95	-	Hollow-Stem Auger	Above-grade	Slotted PVC	0.020	10-20	2	35.9	38.69	(2.8)	36.0	-0.1	25.0	10.9	35.0	0.9	9.83	28.86	4.5	31.4
MW-13-30	19-Dec-97	-	Hollow-Stem Auger	Flush	Continuous wrap stainless steel	0.020	10-20	2	35.2	34.86	0.4	30.0	5.2	19.0	16.2	29.0	6.2	15.69	19.17	28.5	6.7
MW-13-61	18-Dec-97	-	Hollow-Stem Auger	Flush	Continuous wrap stainless steel	0.020	10-20	2	35.2	34.78	0.4	61.0	-25.8	50.0	-14.8	60.0	-24.8	17.11	17.67	28.5	6.7

Note: bgs = below ground surface btc = below top of casing msl = mean sea level PVC = polyvinyl chloride

Updated: 9/24/98 REB
File: 2708 MW Const. Summary

Koppers000803

KEY TO BORING LOGS

Soil classification in this report is based upon visual and manual field observations which include moisture, consistency, plasticity and grading estimates and should not be construed to imply field or laboratory testing unless presented herein. Soils are classified in accordance with the Unified Soil Classification System. Stratigraphic boundaries are approximate representations only. No warranty is provided as to the continuity of soil strata between borings.

UNIFIED SOIL CLASSIFICATION SYSTEM (USCS)

MAJOR DIVISIONS			GROUP SYMBOLS	TYPICAL NAMES
COURSE GRAINED SOILS More Than Half is Larger Than #200 Sieve	GRAVELS More Than Half the Course Fraction is Larger Than No. 4 Sieve Size	Clean Gravels With Little or No Fines	GW	Well Graded Gravels, Gravel-Sand Mixtures
			GP	Poorly Graded Gravels, Gravel-Sand Mixtures
		Gravels With Over 12% Fines	GM	Silty Gravels, Poorly Graded Gravel-Sand-Silt Mixtures
			GC	Clayey Gravels, Poorly Graded Gravel-Sand-Clay Mixtures
	SANDS More Than Half the Course Fraction is Smaller Than No. 4 Sieve Size	Clean Sands With Little or No Fines	SW	Well Graded Sands, Gravelly Sands
			SP	Poorly Graded Sands, Gravelly Sands
		Sands With Over 12% Fines	SM	Silty Sands, Poorly Graded Sand-Silt Mixtures
			SC	Clayey Sands, Poorly Graded Sand-Clay Mixtures
FINE GRAINED SOILS More Than Half is Smaller Than #200 Sieve	SILTS AND CLAYS Liquid Limit Less Than 50%		ML	Inorganic Silts and Very Fine Sands, Rock Flour, Silty or Clayey Fine Sands, or Clayey Silts with Slight Plasticity
			CL	Inorganic Clays of Low to Medium Plasticity, Gravelly Clays, Sandy Clays, Silty Clays, Lean Clays
			OL	Organic Clays and Organic Silty Clays of Low Plasticity
	SILTS AND CLAYS Liquid Limit Greater Than 50%		MH	Inorganic Silts, Micaceous or Diatomaceous Fine Sandy or Silty Soils, Elastic Silts
			CH	Inorganic Clays of High Plasticity, Fat Clays
			OH	Organic Clays of Medium to High Plasticity, Organic Silts
HIGHLY ORGANIC SOILS			Pt	Peat and Other Highly Organic Soils

LEGEND FOR BORING LOGS

- Blank Casing
- Slotted Screen
- Cement Grout
- Concrete
- Bentonite
- Sand Pack
- Fill Material

ABBREVIATIONS

NA	Not Applicable
ND	Not Detected Above Detection Limit
NS	Not Sampled
PAH	Polynuclear Aromatic Hydrocarbons
ppm	Parts Per Million
SPT	Standard Penetration Test
▽	Measured Static Water Level in Well
▼	Estimated Water Level During Drilling

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**MONITORING WELL NUMBER** **MW-1-22** OWRD #			
PROJECT:	HAI LOGGER:	Rob Ede	DRILL START	DRILL FINISH
Northwest Natural Gas Co.	SAMPLING METHOD:	Core Barrel	Time:	Time:
Gasco Facility	DRILLING METHOD:	6 1/4-inch ID Hollow Stem Auger	11:30	13:10
Portland, Oregon	EQUIPMENT TYPE	B-59 Mobile Drill	Date:	Date:
PROJECT: 2708	DRILLER:	Brad James	24-Oct-95	24-Oct-95
	DRILLING CONTRACTOR:	Geo-Tech Explorations		

BORING DIAMETER:	10-inch
CASING DIAMETER:	2-inch ID
SURFACE ELEVATION:	32.0 Feet MSL
TOP OF CASING ELEVATION:	34.75 feet MSL

WELL CONSTRUCTION DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS Total PAHs (ppm)	SPT (blows/0.5 feet)	RECOVERY (%)	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
Steel Monument							-3			
							-2			
							-1			Ground surface
Concrete	M1-01	1135	0.9	5.8						Surface: Sandy, Silty, GRAVEL - brown, moist, pieces of brick.
							1			
							2			
							3			
3/8-inch Bentonite						3"				Sandy GRAVEL (3.0-3.5 feet bgs) - brown, moist.
2-inch ID PVC Casing	M1-02	1150		12.8			4			Sandy GRAVEL with silt (3.5-5.0 feet bgs) - brown, moist, no hydrocarbon odor, no sheen, lampblack at 4.0-4.5 feet bgs.
			1.1				5		GP	
							6			Sandy GRAVEL with small cobbles and bricks (5.0-10.0 feet bgs) - olive grey, moist to wet, no hydrocarbon odor, no sheen, lampblack from 5.0-5.4 feet bgs.
	M1-03	1158		-						
			4.1				7			
							8			
							9			
							10			
							11			Gravelly SAND with silt and pieces of brick (10.0-12.5 feet bgs) - moist, hydrocarbon odor, no sheen, wood fragments.
	M1-04	1205	-	-			12			
							13			Gravelly SAND with silt and pieces of brick (10.0-12.5 feet bgs) - olive grey with blue staining, moist to wet, hydrocarbon odor, no sheen.
							14	10/24/95		
Colorado 10-20Sand Pack							15		SP	Silty SAND with gravel (15.0-16.0 feet bgs) - brown with turquoise blue staining,wet, strong hydrocarbon odor.
2-inch ID 0.010-inch PVC Slotted Screen							16			
							17			SAND (16.0-20.0 feet bgs) - olive grey, wet, fine grained, strong metallic sheen on core, black staining.
	M1-05	1220		-						
			1.4				18			
							19			
							20			

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**MONITORING WELL NUMBER** **MW-1-22** OWRD #			
PROJECT:	HAI LOGGER:	Rob Ede	DRILL START	DRILL FINISH
Northwest Natural Gas Co.	SAMPLING METHOD:	Core Barrel	Time:	Time:
Gasco Facility	DRILLING METHOD:	6 1/4-inch ID Hollow Stem Auger	11:30	13:10
Portland, Oregon	EQUIPMENT TYPE	B-59 Mobile Drill	Date:	Date:
PROJECT: 2708	DRILLER:	Brad James	24-Oct-95	24-Oct-95
	DRILLING CONTRACTOR:	Geo-Tech Explorations		

BORING DIAMETER:	10-inch
CASING DIAMETER:	2-inch ID
SURFACE ELEVATION:	32.0 Feet MSL
TOP OF CASING ELEVATION:	34.75 feet MSL

WELL CONSTRUCTION DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS Total PAHs (ppm)	SPT (blows/0.5 feet)	RECOVERY (%)	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
10-20 Sand					21					
					9		21		SP	SAND (20.0-21.4 feet bgs) - black, wet, loose, poorly graded, fine grained, oily product coated, wood fragments. SILT (21.4-21.5 feet bgs) - moist, slight sheen?, wood fragments.
Cap					20					
							22			
							23			SILT (21.5-25.0 feet bgs) - olive grey, moist, slightly plastic, no sheen, mild hydrocarbon odor
3/8-inch Bentonite									ML	
	M1-06	1252		0.46			24			
			0.7							
							25			
							26			Boring terminated at 20.0 feet bgs Boring sampled to 20.5 feet Monitoring well installed to 20.0 feet bgs
							27			Materials: 10 feet 2-inch diameter, 0.010-inch PVC slotted screen 15 feet 2-inch diameter PVC blank casing 14 50# bags 10/20 sand 6 50# bags bentonite chips 1 end cap 1 locking cap above-grade steel monument 3 guard posts
							28			
							29			
							30			Well depth is 25.0 feet below top of casing
							31			
							32			* Sample Prefix Number is 2708-951024
							33			
							34			
							35			
							36			
							37			
							38			
							39			
							40			

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**MONITORING WELL NUMBER**		**MW-2-32**	
	OWRD # 84235			
PROJECT:	HAI LOGGER:	Rob Ede	DRILL START	DRILL FINISH
Northwest Natural Gas Co.	SAMPLING METHOD:	3-inch Split Spoon/4-inch Core Barrel	Time:	Time:
Gasco Facility	DRILLING METHOD:	6 1/4-inch ID Hollow Stem Auger	11:20	13:00
Portland, Oregon	EQUIPMENT TYPE	B-59 Mobile Drill	Date:	Date:
PROJECT: 2708	DRILLER:	Brad James	6-Nov-95	6-Nov-95
	DRILLING CONTRACTOR:	Geo-Tech Explorations, Inc.		

BORING DIAMETER:	10-inch
CASING DIAMETER:	2-inch
SURFACE ELEVATION:	35.8 feet MSL
TOP OF CASING ELEVATION:	34.46 feet MSL

WELL CONSTRUCTION DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS Total PAHs (ppm)	SPT (blows/0.5 feet)	RECOVERY (%)	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
Flush Monument										Ground surface
Concrete	M2-01	1115	9.3	10.3			1		GM	Surface: Sandy, Silty, GRAVEL - moist, brown, well graded, stone for parking lot.
							2			
							3			SAND (1.5-4.0 feet bgs) - brown, slightly moist, loose, poorly graded, fine/medium grained, no hydrocarbon odor, slight sheen?.
	M2-02	1125	40.4	-			4			
							5		SP	
					9	60				SAND with gravel (5.0-6.5 feet bgs) - brown, slightly moist, loose, poorly graded, fine/medium grained, no hydrocarbon odor, slight sheen, lampblack in end of sampler.
					7	0	6			
					7	0				
	M2-03	1135	43.7	-			7			Sandy, Silty, GRAVEL (6.5-7.5 feet bgs) - lampblack, pieces of brick, concrete.
							8			Driller notes large concrete pieces at 8.5 feet bgs.
							9			
							10		GM	
					7	50				Sandy, Silty, GRAVEL (10.0-11.5 feet bgs) - as above, some lampblack, hydrocarbon odor, slight sheen.
					9	0	11			
					9	0				
							12			
					5	50	13			Sandy GRAVEL (12.5-14.0 feet bgs) - olive grey, moist, loose, hydrocarbon odor, sheen, brick in end of sampler.
					9	0				
					6	0	14			
							15		GP	
					6					Sandy GRAVEL (15.0-16.5 feet bgs) - large pieces of brick material, loose, hydrocarbon odor, sheen.
					9		16			
					50/5"					
							17			
	M2-04	1200	25.9	-	7	70	18			Gravelly Sand (17.5-19.0 feet bgs) - yellow/brown, moist, poorly graded, fine grained, no hycdrocarbon odor, no sheen, minor olive grey silt lenses.
					11	0				
					15	0	19		SP	
							20			

Bentonite Chips

2-inch ID Blank PVC Casing

Updated: 7/2/98 RAH
File2708 MW-02-32

Koppers000807

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**MONITORING WELL NUMBER**	**MW-2-32**	
	OWRD # 84235		
	HAI LOGGER:	Rob Ede	DRILL START
PROJECT:	SAMPLING METHOD:	3-inch Split Spoon/4-inch Core Barrel	DRILL FINISH
Northwest Natural Gas Co.	DRILLING METHOD:	6 1/4-inch ID Hollow Stem Auger	Time: 11:20
Gasco Facility	EQUIPMENT TYPE	B-59 Mobile Drill	Time: 13:00
Portland, Oregon	DRILLER:	Brad James	Date: 6-Nov-95
PROJECT: 2708	DRILLING CONTRACTOR:	Geo-Tech Explorations, Inc.	Date: 6-Nov-95

BORING DIAMETER:	10-inch
CASING DIAMETER:	2-inch
SURFACE ELEVATION:	35.8 feet MSL
TOP OF CASING ELEVATION:	34.46 feet MSL

WELL CONSTRUCTION DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS Total PAHs (ppm)	SPT (blows/0.5 feet)	RECOVERY (%)	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
PVC					10	100				
	M2-05	1210	24.7	-	8	100	21	11/6/95		SAND (20.0-21.5 feet bgs) - orange/brown, moist, loose, poorly graded, medium grained, no hycdrocarbon odor, no sheen.
					9	0				
							22		SP	
										SAND (22.5-23.0 feet bgs) - as above, wet, no hydrocarbon odor, no sheen.
					7	100	23			
					8	100				SAND (23.0-24.0 feet bgs) - olive grey, wet, loose, fine grained, no hydrocarbon odor, no sheen.
					6	90	24			
2-inch ID 0.020-inch PVC Slotted Screen	M2-06	1223	25.4	0.43			25			Silty SAND (24.0-25.0 feet bgs) - wet, slightly dense, hydrocarbon odor?, no sheen, olive grey silt lenses.
							26		SM	Silty SAND (25.0-27.5 feet bgs) - wet, slightly dense, fine grained, slight hydrocarbon odor?, no sheen.
	M2-07	1240		-			27			
			17.8				28		SP	Silty SAND (27.5-28.5 feet bgs) - olive grey, wet, loose, fine grained, no hydrocarbon odor, no sheen.
	M2-08	1250		-			29			Sandy SILT (31.5-32.5 feet bgs) - olive grey, orange oxidation spots, no hydrocarbon odor, no sheen, thin lenses of fine grained sand.
			23.1				30		SM	
							31			
Cap	M2-09	1255		-			32		ML	Boring terminated at 32.5 feet bgs Boring sampled to 32.5 feet Monitoring well installed to 31.5feet bgs Well depth is 31.5 feet below top of casing
			25.7				33			
							34			
							35			Materials: 10 feet 2-inch diameter, 0.020-inch PVC slotted screen 21.5 feet 2-inch diameter PVC blank casing 12 50# bags 10/20 sand 13 50# bags bentonite chips 1 end cap 1 locking cap Flush steel monument
							36			
							37			
							38			
							39			* Sample Prefix Number is 2708-951106-
							40			

Colorado 10/20 Sand Pack

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**MONITORING WELL NUMBER** **MW-3-26** **OWRD # 84232**			
PROJECT: Northwest Natural Gas Co. Gasco Facility Portland, Oregon	HAI LOGGER:	Rob Ede	DRILL START	DRILL FINISH
	SAMPLING METHOD:	Not Sampled	Time: 15:10	Time: 9:00
	DRILLING METHOD:	6 1/4-inch ID Hollow Stem Auger		
	EQUIPMENT TYPE	B-59 Mobile Drill		
	DRILLER:	Brad James	Date: 1-Nov-95	Date: 2-Nov-95
PROJECT: 2708	DRILLING CONTRACTOR:	Geo-Tech Explorations		

BORING DIAMETER:	10-inch
CASING DIAMETER:	2-inch ID
SURFACE ELEVATION:	31.20 feet MSL
TOP OF CASING ELEVATION:	34.11 feet MSL

WELL CONSTRUCTION DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHs (ppm)	SPT (blows/0.5 feet)	RECOVERY (%)	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
	Steel Monument						-3			
							-2			
							-1			Ground surface
Concrete										
2-inch ID Blank PVC Casing							1			See boring log for well MW-3-56 for soil description.
							2			
							3			
							4			
							5			
Bentonite Chips							6			
							7			
2-inch ID Stainless Steel Casing							8			
							9			
							10			
							11			
							12			
							13			
							14			
							15			
Colorado 10-20 Sand Pack							16	11/2/95		
Stainless Steel Continuous Slot Screen							17			
							18			
							19			
							20			

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**MONITORING WELL NUMBER** **MW-3-26** **OWRD # 84232**			
PROJECT: Northwest Natural Gas Co. Gasco Facility Portland, Oregon	HAI LOGGER:	Rob Ede	DRILL START	DRILL FINISH
	SAMPLING METHOD:	Not Sampled	Time:	Time:
	DRILLING METHOD:	6 1/4-inch ID Hollow Stem Auger	15:10	9:00
	EQUIPMENT TYPE	B-59 Mobile Drill	Date:	Date:
	DRILLER:	Brad James	1-Nov-95	2-Nov-95
PROJECT: 2708	DRILLING CONTRACTOR:	Geo-Tech Explorations		

BORING DIAMETER:	10-inch
CASING DIAMETER:	2-inch ID
SURFACE ELEVATION:	31.20 feet MSL
TOP OF CASING ELEVATION:	34.11 feet MSL

WELL CONSTRUCTION DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHs (ppm)	SPT (blows/0.5 feet)	RECOVERY (%)	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
Colorado 10-20 Sand Pack	2-inch 20 Slot Stainless Screen						21			
							22			
							23			
							24			
							25			
	Cap						26			Boring terminated at 26.0 feet bgs Monitoring well installed to 26.0 feet bgs Materials: 15 feet 2-inch diameter, 0.010-inch stainless steel slotted screen 10 feet 2-inch diameter stainless steel blank casing 5 feet 2-inch diameter PVC blank casing 12 50# bags 10/20 sand 7 50# bags bentonite chips 1 end cap 1 locking cap above-grade steel monument 3 guard posts
							27			
							28			
							29			
							30			
							31			
							32			
							33			
							34			
							35			
							36			
							37			
							38			
							39			
							40			

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**MONITORING WELL NUMBER** **MW-3-56** **OWRD # 84231**		
PROJECT: Northwest Natural Gas Co. Gasco Facility Portland, Oregon	HAI LOGGER: Rob Ede SAMPLING METHOD: Core Barrel DRILLING METHOD: 6 1/4-inch ID Hollow Stem Auger EQUIPMENT TYPE B-59 Mobile Drill DRILLER: Brad James	DRILL START Time: 8:00 Date: 1-Nov-95	DRILL FINISH Time: 11:00 Date: 1-Nov-95
PROJECT: 2708	DRILLING CONTRACTOR: Geo-Tech Explorations		

BORING DIAMETER: 10-inch
CASING DIAMETER: 2-inch ID
SURFACE ELEVATION: 31.20 feet MSL
TOP OF CASING ELEVATION: 34.07 feet MSL

WELL CONSTRUCTION DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHs (ppm)	SPT (blows/0.5 feet)	RECOVERY (%)	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
Steel Monument							-3			
							-2			
							-1			Ground surface
Concrete	M3-01	758	1.7				1			Surface - Sandy Silty Gravel - brown, moist, no hydrocarbon odor, no sheen, grassy area.
							2		GM	
Bentonite Chips					11	0	3			No Recovery (2.5-4.0 feet bgs).
2-inch ID Blank PVC Casing					12	0				
					15	0	4			
							5			
	M3-02	810	251		16	100				Sandy Silty GRAVEL (5.0-6.5 feet bgs) - brown with black tarry staining, moist, hydrocarbon odor, sheen, pockets of moist tar.
	M3-03	812	282		17	70	6			
					14	0				
							7			
	M3-04	817			9	100	8			Sandy Silty GRAVEL (7.5-9.0 feet bgs) - black and tarry, moist, hydrocarbon odor, sheen.
			247		11	100				
					17	50	9			
							10			
							11			
					50/3"	0				Large Gravels.
							12			
					50/3"	0	13			
							14			
							15			
Bentonite Grout	M3-05	840			16	100				Sandy GRAVEL with silt (15.0-16.5 feet bgs) - black, slightly moist, loose, hydrocarbon odor, sheen, brick and wood fragments.
			59.7		38	100	16			
2-inch ID Blank Stainless Steel Casing					50/3"	0		11/1/95	GM	
							17			
	M3-06	850			12	100	18			Sandy GRAVEL (17.5-19.0 feet bgs) - olive grey,wet, loose, slight hydrocarbon odor, slight sheen, brick and wood fragments.
			15.9		7	30				
					4	0	19		GP	Sandy Gravel (19.0-20.5 feet bgs) - as above, hydrocarbon odor, sheen.
					17	100				
	M3-07	9:00			18	100	20			

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**MONITORING WELL NUMBER** **MW-3-56** **OWRD # 84231**			
PROJECT: Northwest Natural Gas Co. Gasco Facility Portland, Oregon	HAI LOGGER:	Rob Ede	DRILL START	DRILL FINISH
	SAMPLING METHOD:	Core Barrel	Time: 8:00	Time: 11:00
	DRILLING METHOD:	6 1/4-inch ID Hollow Stem Auger		
	EQUIPMENT TYPE	B-59 Mobile Drill		
	DRILLER:	Brad James	Date: 1-Nov-95	Date: 1-Nov-95
PROJECT: 2708	DRILLING CONTRACTOR:	Geo-Tech Explorations		

BORING DIAMETER:	10-inch
CASING DIAMETER:	2-inch ID
SURFACE ELEVATION:	31.20 feet MSL
TOP OF CASING ELEVATION:	34.07 feet MSL

WELL CONSTRUCTION DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHs (ppm)	SPT (blows/0.5 feet)	RECOVERY (%)	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
Bentonite Grout; 2-inch ID Blank Stainless Steel Casing			7.9		20	100				SILT with some gravel (20.5-21.0 feet bgs) - brown, moist, stiff, slight hydrocarbon odor, sheen.
					8	20	21			
							22		ML	SILT with gravel (21.0-25.0 feet bgs) - black tarry substance, moist to wet, hydrocarbon odor, sheen, 22.5-23.0 feet bgs is wet and tarry.
	M3-08	910								
			45.7				23		GP	
							24			
							25			
							26		ML	Sandy SILT (25.0-29.9 feet bgs) - olive grey with orange oxidized zones, moist, no hydrocarbon odor, no sheen, sand lens at 25.5 feet bgs.
							27			
	M3-09	915					28			
			5.8				29			
							30			
							31		SP	SAND (29.9-34.0 feet bgs) - olive grey, wet, loose, medium grained, slight hydrocarbon odor, slight sheen, sand lens at 25.5 feet bgs.
	M3-10	925								
			9.8				32			
							33			
							34			
	M3-11	930								SAND (34.0-35.0 feet bgs) - brown, wet, loose, fine grained, no hydrocarbon odor, no sheen, thin silt lenses present.
			2.8				35			
							36			SAND (35.0-37.5 feet bgs) - olive grey, wet, loose, poorly graded, fine grained, no hydrocarbon odor, no sheen.
	M3-12	955								
			9.8				37			
							38			SAND (37.5-39.0 feet bgs) - brown, wet, medium dense, fine grained, no hydrocarbon odor, no sheen, silt layers
	M3-13	1000								
Bent.			5.9				39			
							40		SM	Silty SAND (39.0-40.0 feet bgs) - brown, moist to wet, dense, fine grained, no hydrocarbon odor, no sheen.

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**MONITORING WELL NUMBER** **MW-3-56** **OWRD # 84231**			
PROJECT:	HAI LOGGER:	Rob Ede	DRILL START	DRILL FINISH
Northwest Natural Gas Co.	SAMPLING METHOD:	Core Barrel	Time:	Time:
Gasco Facility	DRILLING METHOD:	6 1/4-inch ID Hollow Stem Auger	8:00	11:00
Portland, Oregon	EQUIPMENT TYPE	B-59 Mobile Drill	Date:	Date:
PROJECT: 2708	DRILLER:	Brad James	1-Nov-95	1-Nov-95
	DRILLING CONTRACTOR:	Geo-Tech Explorations		

BORING DIAMETER:	10-inch
CASING DIAMETER:	2-inch ID
SURFACE ELEVATION:	31.20 feet MSL
TOP OF CASING ELEVATION:	34.07 feet MSL

WELL CONSTRUCTION DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHs (ppm)	SPT (blows/0.5 feet)	RECOVERY (%)	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
Bent. Chips							41		SP	SAND (40.0-41.5 feet bgs) - olive grey, wet, loose, medium grained, no hydrocarbon odor, no sheen.
2-inch Blank Stainless Steel Casing	M3-14	1010								
			19.0				42			SAND (41.5-45.0 feet bgs) - olive grey, wet, fine grained, silt layers.
							43			
	M3-15	1015					44			
			3.1				45			
Colorado 10-20Sand Pack							46			SAND (45.0-49.0 feet bgs) - olive grey, wet, loose, poorly graded, medium grained, no hydrocarbon odor, no sheen.
							47			
2-inch ID 0.020-inch Stainless Steel Slotted Screen							48			
	M3-16	1025					49			SAND (49.0-50.0 feet bgs) - as above, silt layers, no hydrocarbon odor, no sheen.
			6.7				50			SAND (50.0-55.0 feet bgs) - olive grey, wet, loose, poorly graded, medium grained, no hydrocarbon odor, no sheen, olive grey silt layers. Heaving sands reported by driller.
							51			
							52			Boring terminated at 56.5 feet bgs Boring sampled to 56.5 feet Monitoring well installed to 55 feet bgs
							53			
	M3-17	1048	-				54		SP	Materials: 10 feet 2-inch diameter, 0.010-inch PVC slotted screen 6.5 feet 2-inch diameter PVC blank casing 39.5 feet 2-inch diameter stainless steel blank casing 12 50# bags 10/20 sand 3 50# bags bentonite chips 4 bags bentonite grout 1 end cap 1 locking cap above-grade steel monument 3 guard posts
	M3-18	1050	-				55			
Cap					3	100				
					5	100	56			
					16	100				
							57			
							58			
							59			* Sample Prefix Number is 2708-951101-
							60			

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**MONITORING WELL NUMBER** **MW-4-35** **OWRD # 84230**			
PROJECT: Northwest Natural Gas Co. Gasco Facility Portland, Oregon	HAI LOGGER:	Rob Ede	DRILL START	DRILL FINISH
	SAMPLING METHOD:	Not Sampled	Time:	Time:
	DRILLING METHOD:	6 1/4-inch ID Hollow Stem Auger	10:30	13:17
	EQUIPMENT TYPE	B-59 Mobile Drill	Date:	Date:
	DRILLER:	Brad James	31-Oct-95	31-Oct-95
PROJECT: 2708	DRILLING CONTRACTOR:	Geo-Tech Explorations		

BORING DIAMETER:	10-inch
CASING DIAMETER:	2-inch ID
SURFACE ELEVATION:	31.70 feet MSL
TOP OF CASING ELEVATION:	34.54 feet MSL

WELL CONSTRUCTION DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHs (ppm)	SPT (blows/0.5 feet)	RECOVERY (%)	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
	Steel Monument						-3			
							-2			
							-1			Ground surface
Concrete										
							1			See boring log for well MW-4-57 for soil description.
							2			
							3			
							4			
2-inch ID PVC Casing							5			
							6			
							7			
Bentonite Chips							8			
							9			
							10			
							11			
							12			
2-inch ID Stainless Steel Casing							13			
							14			
							15			
							16			
							17			
							18			
							19			
							20			

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**MONITORING WELL NUMBER** **MW-4-35** **OWRD # 84230**			
PROJECT:	HAI LOGGER:	Rob Ede	DRILL START	DRILL FINISH
Northwest Natural Gas Co.	SAMPLING METHOD:	Not Sampled	Time:	Time:
Gasco Facility	DRILLING METHOD:	6 1/4-inch ID Hollow Stem Auger	10:30	13:17
Portland, Oregon	EQUIPMENT TYPE	B-59 Mobile Drill	Date:	Date:
PROJECT: 2708	DRILLER:	Brad James	31-Oct-95	31-Oct-95
	DRILLING CONTRACTOR:	Geo-Tech Explorations		

BORING DIAMETER:	10-inch
CASING DIAMETER:	2-inch ID
SURFACE ELEVATION:	31.70 feet MSL
TOP OF CASING ELEVATION:	34.54 feet MSL

WELL CONSTRUCTION DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHs (ppm)	SPT (blows/0.5 feet)	RECOVERY (%)	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
Bentonite										
Blank Stainless Steel Casing							21			
							22			
							23			
							24	10/31/95		
							25	▽		Boring terminated at 35.0 feet bgs Monitoring well installed to 35.0 feet bgs
Colorado 10-20 Sand Pack 2-inch ID 0.020-inch Stainless Steel Continuous Slot Screen							26			Materials: 10 feet 2-inch diameter, 0.010-inch stainless steel slotted screen 14 feet 2-inch diameter stainless steel blank casing 8 feet 2-inch diameter PVC blank casing 11 50# bags 10/20 sand 14 50# bags bentonite chips 1 end cap 1 locking cap above-grade steel monument 3 guard posts
							27			
							28			
							29			
							30			
							31			* Sample Prefix Number is 2708-951031-
							32			
							33			
							34			
Cap							35			
							36			
							37			
							38			
							39			
							40			

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**MONITORING WELL NUMBER** **MW-4-57** **OWRD # 84229**			
PROJECT:	HAI LOGGER:	Rob Ede	DRILL START	DRILL FINISH
Northwest Natural Gas Co.	SAMPLING METHOD:	3-inch Split Spoon/Core Barrel	Time:	Time:
Gasco Facility	DRILLING METHOD:	6 1/4-inch ID Hollow Stem Auger	10:15	13:15
Portland, Oregon	EQUIPMENT TYPE	B-59 Mobile Drill	Date:	Date:
PROJECT: 2708	DRILLER:	Brad James	30-Oct-95	30-Oct-95
	DRILLING CONTRACTOR:	Geo-Tech Explorations		

BORING DIAMETER:	10-inch
CASING DIAMETER:	2-inch ID
SURFACE ELEVATION:	31.7 feet MSL
TOP OF CASING ELEVATION:	34.53 feet MSL

WELL CONSTRUCTION DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHs (ppm)	SPT (blows/0.5 feet)	RECOVERY (%)	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
Steel Monument							-3			
							-2			
							-1			Ground surface
Concrete	M4-01	1005	1.9	195						Surface: Silty SAND with gravel - brown, moist, pieces of brick, grass covered area, no hydrocarbon odor, no sheen.
							1			
									SM	
							2			
Bentonite; 2-inch ID Blank PVC Casing					50/5.5"	60	3			Silty Sandy GRAVEL (2.5 feet bgs) - brown, moist, well graded, no hydrocarbon odor, no sheen.
							4		GM	
							5			
					23	70				Sandy GRAVEL (5.0-6.5 feet bgs) - dry, loose, poorly graded, no hydrocarbon odor, no sheen.
					27	0	6			
					27	0			GP	
							7			
										Silty GRAVEL with sand (7.5-8.5 feet bgs) - brown, moist, well graded, no hydrocarbon odor, no sheen.
	M4-02	1035		-	4	100	8		GM	
			2.8		50/5.5"	50				
							9			Concrete (8.5-9.5 feet bgs)
					38	0	10			
									GM	
							11			
							12			
Bentonite Slurry; 2-inch ID Blank Stainless Steel Casing										No recovery (12.5-14.5 feet bgs)
					7	0	13			
					6	0				
					6	0	14			
					5	0				
							15			
	M4-03	1104	-	-	2	100				Silty GRAVEL with sand (15.0-16.5 feet bgs) - olive grey with some black staining, wet, well graded, slight hydrocarbon odor, slight sheen.
					4	0	16			
					5	0				
							17			Silty GRAVEL with sand (16.5-20 feet bgs) - as above, moist, hydrocarbon odor, slight sheen, pieces of brick, switch to core barrel sampler.
							18			
	M4-04	1110		-						
			10.2				19		GM	
							20			

HAHN & ASSOCIATES, INC.	MONITORING WELL NUMBER	MW-4-57	
434 NW Sixth Avenue	OWRD # 84229		
Portland, Oregon			
(503) 796-0717	HAI LOGGER:	Rob Ede	DRILL START / DRILL FINISH
PROJECT:	SAMPLING METHOD:	3-inch Split Spoon/Core Barrel	
Northwest Natural Gas Co.	DRILLING METHOD:	6 1/4-inch ID Hollow Stem Auger	Time: 10:15 / Time: 13:15
Gasco Facility	EQUIPMENT TYPE	B-59 Mobile Drill	
Portland, Oregon	DRILLER:	Brad James	Date: 30-Oct-95 / Date: 30-Oct-95
PROJECT: 2708	DRILLING CONTRACTOR:	Geo-Tech Explorations	

BORING DIAMETER:	10-inch
CASING DIAMETER:	2-inch ID
SURFACE ELEVATION:	31.7 feet MSL
TOP OF CASING ELEVATION:	34.53 feet MSL

WELL CONSTRUCTION DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHs (ppm)	SPT (blows/0.5 feet)	RECOVERY (%)	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
Bentonite Slurry; 2-inch ID Blank Stainless Steel Casing	M4-05	1115		-			21		ML	SILT with sand and gravel (20.0-25.0 feet bgs) - brown, moist, slightly plastic, no hydrocarbon odor, no sheen.
			7.0				22			
							23			
							24			
							25			
	M4-06	1135		3,261			26		SM	Silty SAND (25.0-27.0 feet bgs) - olive grey, moist to wet, wood fragments, hydrocarbon odor, sheen.
			10.2				27			
							28		ML	Sandy SILT (27.0-28.0 feet bgs) - olive grey with brown and orange oxidation spots, root zones, no hydrocarbon odor, no sheen.
	M4-07	1140		-				10/30/95		
			2.1				29		SM	Silty SAND (28.0-30.0 feet bgs) - olive grey with brown mottling, moist to wet, fine grained, root zones, no hydrocarbon odor, no sheen.
							30			
	M4-08	1150		-			31		SP	SAND (30.0-32.5 feet bgs) - olive grey, wet, loose, poorly graded, fine grained, root zones, hydrocarbon odor, sheen.
			2.4				32			
							33		ML	SILT (32.5-33.0 feet bgs) - brown with orange oxidized zones, moist, slightly plastic, no hydrocarbon odor, no sheen.
	M4-09	1155		-					SM	Silty SAND (33.0-33.5 feet bgs) - brown with bright orange oxidized zones, moist to wet, dense, fine grained.
			2.6				34		ML	SILT (33.5-35.0 feet bgs) - olive grey, moist, stiff, no hydrocarbon odor, no sheen.
							35			
							36			
							37			SILT with fine sand (35.0-39.0 feet bgs) - olive grey, moist, stiff, root zones, no hydrocarbon odor, no sheen.
							38			
							39			
	M4-10	1210	-	-			40		SP	SAND (39.0-40.0 feet bgs) - olive grey, wet, loose, medium grained, no hydrocarbon odor, no sheen.

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**MONITORING WELL NUMBER** **MW-4-57** **OWRD # 84229**			
PROJECT:	HAI LOGGER:	Rob Ede	DRILL START	DRILL FINISH
Northwest Natural Gas Co.	SAMPLING METHOD:	3-inch Split Spoon/Core Barrel	Time:	Time:
Gasco Facility	DRILLING METHOD:	6 1/4-inch ID Hollow Stem Auger	10:15	13:15
Portland, Oregon	EQUIPMENT TYPE	B-59 Mobile Drill	Date:	Date:
PROJECT: 2708	DRILLER:	Brad James	30-Oct-95	30-Oct-95
	DRILLING CONTRACTOR:	Geo-Tech Explorations		

BORING DIAMETER:	10-inch
CASING DIAMETER:	2-inch ID
SURFACE ELEVATION:	31.7 feet MSL
TOP OF CASING ELEVATION:	34.53 feet MSL

WELL CONSTRUCTION DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHs (ppm)	SPT (blows/0.5 feet)	RECOVERY (%)	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
Bentonite Chip Seal							41		SP	SAND (40.0-44.0feet bgs) - as above, no hydrocarbon odor, no sheen.
							42			
							43			
20/40	M4-11	1220		-						
2-inch ID Blank Stainless Steel Casing			8.7				44			
									ML	Sandy SILT (44.0-45.0 feet bgs) - olive grey, moist, stiff, slightly plastic, no hydrocarbon odor, no sheen.
	M4-12	1225	-	-			45			
							46		SP	SAND (45.0-49.0 feet bgs) - olive grey, wet, loose, medium grained, no hydrocarbon odor, no sheen, thin silt layers from 49.0-50.0 feet bgs.
							47			
	M4-13	1238		-			48			
			31.9				49			
Colorado 10-20 Sand Pack							50			
2-inch ID 0.020-inch Stainless Steel Slotted Screen							51			SAND (50.0-55.0 feet bgs) - as above, no hydrocarbon odor, no sheen.
							52			
							53			
							54			
	M4-14	1245		-						
			178				55			
							56			SAND (55.0-58.0 feet bgs) - as above, no hydrocarbon odor, no sheen.
Cap							57		SP	
	M4-15	1312		0.26						
			17.5				58			
							59			
							60			

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**MONITORING WELL NUMBER** **MW-4-57** **OWRD # 84229**			
PROJECT:	HAI LOGGER:	Rob Ede	DRILL START	DRILL FINISH
Northwest Natural Gas Co.	SAMPLING METHOD:	3-inch Split Spoon/Core Barrel	Time:	Time:
Gasco Facility	DRILLING METHOD:	6 1/4-inch ID Hollow Stem Auger	10:15	13:15
Portland, Oregon	EQUIPMENT TYPE	B-59 Mobile Drill	Date:	Date:
PROJECT: 2708	DRILLER:	Brad James	30-Oct-95	30-Oct-95
	DRILLING CONTRACTOR:	Geo-Tech Explorations		

BORING DIAMETER:	10-inch
CASING DIAMETER:	2-inch ID
SURFACE ELEVATION:	31.7 feet MSL
TOP OF CASING ELEVATION:	34.53 feet MSL

WELL CONSTRUCTION DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHs (ppm)	SPT (blows/0.5 feet)	RECOVERY (%)	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
							61			Boring terminated at 58.0 feet bgs Boring sampled to 58.0 feet Monitoring well installed to 58.0 feet bgs Materials: 10 feet 2-inch diameter, 0.010-inch stainless steel slotted screen 40.5 feet 2-inch diameter stainless steel blank casing 5.5 feet 2-inch diameter PVC blank casing 13 50# bags 10/20 sand 5 50# bags bentonite chips 1 end cap 1 locking cap above-grade steel monument 3 guard posts * Sample Prefix Number is 2708-951030-
							62			
							63			
							64			
							65			
							66			
							67			
							68			
							69			
							70			
							71			
							72			
							73			
							74			
							75			
							76			
							77			
							78			
							79			
							80			

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**MONITORING WELL NUMBER** **MW-5-32** **OWRD # 84228**			
PROJECT:	HAI LOGGER:	Rob Ede	DRILL START	DRILL FINISH
Northwest Natural Gas Co.	SAMPLING METHOD:	Split Spoon/Core Barrel	Time:	Time:
Gasco Facility	DRILLING METHOD:	6 1/4-inch ID Hollow Stem Auger	13:03	15:00
Portland, Oregon	EQUIPMENT TYPE	B-59 Mobile Drill	Date:	Date:
PROJECT: 2708	DRILLER:	Brad James	27-Oct-95	27-Oct-95
	DRILLING CONTRACTOR:	Geo-Tech Explorations		

BORING DIAMETER:	10-inch
CASING DIAMETER:	2-inch ID
SURFACE ELEVATION:	25.1 feet MSL
TOP OF CASING ELEVATION:	28.05 feet MSL

WELL CONSTRUCTION DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHs (ppm)	SPT (blows/0.5 feet)	RECOVERY (%)	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
Steel Monument							-3			
							-2			
							-1			Ground surface
Concrete	M5-01	1306		1.4						Surface: Silty GRAVEL - brown, moist, well graded, no hydrocarbon odor, no sheen.
			1107				1			
							2			
									GP	
					50/5"	50	3			GRAVEL (2.5-3.0 feet bgs) - grey, damp, loose, poorly graded, no hydrocarbon odor, no sheen.
							4			
							5			
	M5-02	1320		-	10	100				
			874		6	0	6			Silty GRAVEL (5.0-6.0 feet bgs) - brown, moist, well graded, no hydrocarbon odor, no sheen.
					26	0		10/27/95	GM	
							7			
							8			GRAVEL (7.5-9.0 feet bgs) - brown, wet, loose, well graded, no hydrocarbon odor, no sheen.
					10	30				
					15	0	9			
					19	0				
3/8-inch Bentonite Chips							10			
2-inch ID Blank PVC Casing	M5-03	1330		-	8	100			GP	
			279		5	0	11			GRAVEL with coarse sand and silt (10.0-13.0 feet bgs) - brown, wet, no hydrocarbon odor, no sheen.
					5	0				Switch to core barrel sampler.
							12			
							13			
	M5-04	1340		-						
			383				14			SAND with lampblack (13.0-15.0 feet bgs) - black, dry, hard, fine grained, hydrophobic, hydrocarbon odor.
							15			
	M5-05	1350		1,942			16		SP	SAND (15.0-20.0 feet bgs) - dark grey, moist, medium dense, poorly graded, fine grained, pieces of bark, hydrocarbon odor?, olive grey sandy silt on core bottom.
			81.1				17			
							18			
							19			
							20			

Updated: 7/2/98 RAH
File: 2708 MW-05-32

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HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**MONITORING WELL NUMBER** **MW-5-32** OWRD # 84228			
PROJECT:	HAI LOGGER:	Rob Ede	DRILL START	DRILL FINISH
Northwest Natural Gas Co.	SAMPLING METHOD:	Split Spoon/Core Barrel	Time:	Time:
Gasco Facility	DRILLING METHOD:	6 1/4-inch ID Hollow Stem Auger	13:03	15:00
Portland, Oregon	EQUIPMENT TYPE	B-59 Mobile Drill	Date:	Date:
PROJECT: 2708	DRILLER:	Brad James	27-Oct-95	27-Oct-95
	DRILLING CONTRACTOR:	Geo-Tech Explorations		

BORING DIAMETER:	10-inch
CASING DIAMETER:	2-inch ID
SURFACE ELEVATION:	25.1 feet MSL
TOP OF CASING ELEVATION:	28.05 feet MSL

WELL CONSTRUCTION DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHs (ppm)	SPT (blows/0.5 feet)	RECOVERY (%)	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
Colorado 10-20 Sand Pack	M5-06	1357		-						Sandy SILT (20.0-22.0 feet bgs) - brown with orange mottling, moist, non-plastic, no hydrocarbon odor, no sheen, some root zones.
			117				21		ML	
	M5-07	1400	18.1	0.91			22			SAND (22.5-22.5 feet bgs) - brown, wet, fine grained, no hydrocarbon odor, no sheen.
							23			SAND (22.5-23.5 feet bgs) - as above, no hydrocarbon odor, no sheen.
2-inch ID 0.020-inch PVC Slotted Screen							24			Silty SAND (23.5-25.0 feet bgs) - brown with orange oxidation spots, wet, loose, no hydrocarbon odor, no sheen.
	M5-08	1406		-						
			62.1				25		SP	SAND (25.0-26.5 feet bgs) - brown with orange oxidation spots, wet, loose, fine grained, some thin silt layers no hydrocarbon odor, no sheen.
							26			
							27			SAND (26.5-27.5 feet bgs) - olive grey, wet, loose, poorly graded, some thin silt layers, no hydrocarbon odor, no sheen.
							28			SAND with thin silt layers (27.5-30.0 feet bgs) - olive grey, wet, loose, no hydrocarbon odor, no sheen.
	M5-09	1425		-			29			
			177				30			
					1	100				SAND with thin silt (30.0-32.0 feet bgs) - olive grey, wet, loose, poorly graded, fine grained, no hydrocarbon odor, no sheen.
					3	100	31			
Cap					4	100				
	M5-10	1448		ND	4	70	32			
			29.4				33			Boring terminated at 32.0 feet bgs Boring sampled to 32.0 feet Monitoring well installed to 32.0 feet bgs
							34			Materials: 10 feet 2-inch diameter, 0.020-inch PVC slotted screen 21 feet 2-inch diameter PVC blank casing 12.5 50# bags 10/20 sand 10 50# bags 3/8-inch bentonite chips 1 end cap 1 locking cap above-grade steel monument 3 guard posts
							35			
							36			
							37			
							38			* Sample Prefix Number is 2708-951027-
							39			
							40			

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**MONITORING WELL NUMBER**		**MW-6-32**	
	OWRD # 84239			
	HAI LOGGER:	Rob Ede	DRILL START	DRILL FINISH
PROJECT:	SAMPLING METHOD:	Not Sampled		
Northwest Natural Gas Co.	DRILLING METHOD:	6 1/4-inch ID Hollow Stem Auger	Time:	Time:
Gasco Facility	EQUIPMENT TYPE	B-59 Mobile Drill	11:40	14:00
Portland, Oregon	DRILLER:	Brad James	Date:	Date:
PROJECT: 2708	DRILLING CONTRACTOR:	Geo-Tech Explorations	9-Nov-95	9-Nov-95

BORING DIAMETER:	10-inch
CASING DIAMETER:	2-inch ID
SURFACE ELEVATION:	35.8 feet MSL
TOP OF CASING ELEVATION:	35.51 feet MSL

WELL CONSTRUCTION DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHs (mm)	SPT (blows/0.5 feet)	RECOVERY (%)	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
Flush Monument										Ground surface
Concrete										
							1			See boring log for well MW-6-61 for soil description.
							2			
							3			
							4			
							5			
							6			
							7			
2-inch ID Blank PVC Casing							8			
							9			
							10			
							11			
3/8-inch Bentonite Chips							12			
							13			
							14			
							15			
							16			
Stainless Steel Casing							17			
							18			
							19			
10-20							20			

HAHN & ASSOCIATES, INC.	MONITORING WELL NUMBER	MW-6-32	
434 NW Sixth Avenue	OWRD # 84239		
Portland, Oregon			
(503) 796-0717	HAI LOGGER: Rob Ede	DRILL START	DRILL FINISH
PROJECT:	SAMPLING METHOD: Not Sampled		
Northwest Natural Gas Co.	DRILLING METHOD: 6 1/4-inch ID Hollow Stem Auger	Time:	Time:
Gasco Facility	EQUIPMENT TYPE B-59 Mobile Drill	11:40	14:00
Portland, Oregon	DRILLER: Brad James	Date:	Date:
PROJECT: 2708	DRILLING CONTRACTOR: Geo-Tech Explorations	9-Nov-95	9-Nov-95

BORING DIAMETER:	10-inch
CASING DIAMETER:	2-inch ID
SURFACE ELEVATION:	35.8 feet MSL
TOP OF CASING ELEVATION:	35.51 feet MSL

WELL CONSTRUCTION DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	~~LAB RESULTS~~ TOTAL PAHs (ppm)	SPT (blows/0.5 feet)	RECOVERY (%)	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
Colorado 10-20 Sand Pack							21			
							22			
2-inch ID 0.020 Stainless Steel Continuous Slotted Screen							23			
							24			
							25			
							26			
							27			Boring terminated at 32.0 feet bgs Monitoring well installed to 32.0 feet bgs Materials: 15 feet 2-inch diameter, 0.020-inch stainless steel slotted screen 5 feet 2-inch diameter stainless steel blank casing 16 feet 2-inch diameter PVC blank casing 9.5 50# bags 10/20 sand 12 50# bags bentonite chips 1 end cap 1 locking cap flush steel monument 3 guard posts
							28			
							29			
							30			
							31			
Cap							32			
							33			
							34			
							35			
							36			
							37			
							38			
							39			
							40			

HAHN & ASSOCIATES, INC.	MONITORING WELL NUMBER	MW-6-61	
434 NW Sixth Avenue	OWRD # 84236	(ABANDONED)	
Portland, Oregon			
(503) 796-0717	HAI LOGGER: Rob Ede	DRILL START	DRILL FINISH
PROJECT:	SAMPLING METHOD: 4-inch Core Barrel		
Northwest Natural Gas Co.	DRILLING METHOD: 6 1/4-inch ID Hollow Stem Auger	Time:	Time:
Gasco Facility	EQUIPMENT TYPE B-59 Mobil Drill	8:50	11:45
Portland, Oregon	DRILLER: Brad James	Date:	Date:
PROJECT: 2708	DRILLING CONTRACTOR: Geo-Tech Explorations	7-Nov-95	7-Nov-95

BORING DIAMETER:	10-inch
CASING DIAMETER:	2-inch ID
SURFACE ELEVATION:	35.8 feet MSL
TOP OF CASING ELEVATION:	34.50 feet MSL

WELL CONSTRUCTION DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHs (ppm)	CORE INTERVAL	RECOVERY (%)	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
Flush Monument										Ground surface
Concrete							1			Surface: concrete.
							2			SAND (1.0-5.0 feet bgs) - brown, slightly moist, loose, poorly graded, medium grained, no hydrocarbon odor, slight sheen?.
Bentonite Chips	M6-01	905		ND			3		SP	
			16.9				4			
							5			
							6			SAND (5.0-10.0 feet bgs) - as above, no hydrocarbon odor, slight sheen?.
2-inch ID Blank PVC Casing	M6-02	910		-			7			
			17.0				8			
							9			
							10			
							11			SAND (10.0-16.5 feet bgs) - as above, no hydrocarbon odor, slight sheen?.
	M6-03	920		-						
			17.5				12			
							13			
							14			
							15			
Bentonite Slurry	M6-04	930		-			16			
			15.1				17			
Blank Stainless Steel Casing							18		SP	SAND (17.5-20.0 feet bgs) - as above, moist to wet, no hydrocarbon odor, no sheen, dark grey sand at 19.5 feet bgs.
							19	11/7/95		
	M6-05	940	11.0	-			20			

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**MONITORING WELL NUMBER**		**MW-6-61**	
	OWRD # 84236		(ABANDONED)	
	HAI LOGGER:	Rob Ede	DRILL START	DRILL FINISH
PROJECT:	SAMPLING METHOD:	4-inch Core Barrel		
Northwest Natural Gas Co.	DRILLING METHOD:	6 1/4-inch ID Hollow Stem Auger	Time:	Time:
Gasco Facility	EQUIPMENT TYPE	B-59 Mobil Drill	8:50	11:45
Portland, Oregon	DRILLER:	Brad James	Date:	Date:
PROJECT: 2708	DRILLING CONTRACTOR:	Geo-Tech Explorations	7-Nov-95	7-Nov-95

BORING DIAMETER:	10-inch
CASING DIAMETER:	2-inch ID
SURFACE ELEVATION:	35.8 feet MSL
TOP OF CASING ELEVATION:	34.50 feet MSL

WELL CONSTRUCTION DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHs (ppm)	CORE INTERVAL	RECOVERY (%)	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
Bentonite Slurry; 2-inch ID Blank Stainless Steel Casing							21		SP	SAND (20.0-24.0 feet bgs) - as above, wet, hydrocarbon odor, no sheen.
							22			
	M6-06	945		-			23			
			9.1				24			
							25			SAND (25.0-30.5 feet bgs) - as above, wet, hydrocarbon odor, brown product saturated from 28-30.5 feet bgs, also thin silt layers.
							26			
							27			
							28			
	M6-07	1000		-						
			115				29			
							30			
	M6-08	1015		20,614						
			634				31		ML	SILT (30.5-34.0 feet bgs) - green, stiff, root zones, no product, wood fragments, slight sheen?.
							32			
	M6-09	1020		-			33			
			23.9				34			
							35			
							36			SILT (35.0-38.0 feet bgs) - green with brown motting (35.0-36.0 feet bgs), olive grey (36.0-38.0 feet bgs), moist, stiff, root zones, no sheen, no product.
							37			
							38			
										Sandy SILT (38.0-39.0 feet bgs) - olive grey, stiff, no sheen.
	M6-10	1040		1.5			39			Sandy SILT (39.0-40.0 feet bgs) - olive grey, wet, stiff.
			14.8				40			

HAHN & ASSOCIATES, INC.	MONITORING WELL NUMBER	MW-6-61	
434 NW Sixth Avenue	OWRD # 84236	(ABANDONED)	
Portland, Oregon			
(503) 796-0717	HAI LOGGER: Rob Ede	DRILL START	DRILL FINISH
PROJECT:	SAMPLING METHOD: 4-inch Core Barrel		
Northwest Natural Gas Co.	DRILLING METHOD: 6 1/4-inch ID Hollow Stem Auger	Time: 8:50	Time: 11:45
Gasco Facility	EQUIPMENT TYPE B-59 Mobil Drill		
Portland, Oregon	DRILLER: Brad James	Date: 7-Nov-95	Date: 7-Nov-95
PROJECT: 2708	DRILLING CONTRACTOR: Geo-Tech Explorations		

BORING DIAMETER:	10-inch
CASING DIAMETER:	2-inch ID
SURFACE ELEVATION:	35.8 feet MSL
TOP OF CASING ELEVATION:	34.50 feet MSL

WELL CONSTRUCTION DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHs (ppm)	CORE INTERVAL	RECOVERY (%)	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
Bentonite Slurry; Bentonite Chip Seal; 2-inch ID Blank Stainless Steel Casing							41		ML	SILT (40.0-49.0 feet bgs) - olive grey, moist, medium stiff, fine grained sand lenses, no sheen.
							42			
							43			
	M6-11	1050		0.06						
			14.8				44			
							45			
							46			
							47			
20/40 Sand							48			
	M6-12	1100		-			49			
			12.8				50			SAND (49.0-52.0 feet bgs) - olive grey, wet, loose, poorly graded, fine grained, no sheen.
Colorado 10-20 Sand Pack; 2-inch ID 0.020-inch Stainless Steel Slotted Screen							51			
							52			
							53			SAND (52.0-55.0 feet bgs) - as above, thin, brown silt layers, no sheen.
	M6-13	1120		-						
			8.4				54		SP	
							55			
							56			SAND (55.0-60.0 feet bgs) - as above, thin olive grey silt layers, no sheen
							57			
	M6-14	1140		-			58			
			7.8				59			
							60			

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**MONITORING WELL NUMBER**		**MW-6-61**	
	OWRD # 84236		(ABANDONED)	
	HAI LOGGER:	Rob Ede	DRILL START	DRILL FINISH
PROJECT:	SAMPLING METHOD:	4-inch Core Barrel		
Northwest Natural Gas Co.	DRILLING METHOD:	6 1/4-inch ID Hollow Stem Auger	Time:	Time:
Gasco Facility	EQUIPMENT TYPE	B-59 Mobil Drill	8:50	11:45
Portland, Oregon	DRILLER:	Brad James	Date:	Date:
PROJECT: 2708	DRILLING CONTRACTOR:	Geo-Tech Explorations	7-Nov-95	7-Nov-95

BORING DIAMETER:	10-inch
CASING DIAMETER:	2-inch ID
SURFACE ELEVATION:	35.8 feet MSL
TOP OF CASING ELEVATION:	34.50 feet MSL

WELL CONSTRUCTION DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHs (ppm)	CORE INTERVAL	RECOVERY (%)	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
Sand	Cap						61			
							62			Boring terminated at 61.0 feet bgs Boring sampled to 60.0 feet Monitoring well installed to 61.0 feet bgs Well depth is 61.0 feet below top of casing
							63			
							64			Materials: 10 feet 2-inch diameter, 0.010-inch stainless steel slotted screen 35 feet 2-inch diameter stainless steel blank casing 15 feet 2-inch diameter PVC casing 1 50# bags 20/40 sand 11 50# bags 10/20 sand 5 50# bags bentonite chips 5 bags bentonite grout 1 end cap 1 locking cap Flush steel monument
							65			
							66			
							67			
							68			
							69			
							70			* Sample Prefix Number is 2708-951107-
							71			
							72			
							73			
							74			
							75			
							76			
							77			
							78			
							79			
							80			

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**MONITORING WELL NUMBER** **MW-8-29** **OWRD # 84226**			
PROJECT:	HAI LOGGER:	Rob Ede	DRILL START	DRILL FINISH
Northwest Natural Gas Co.	SAMPLING METHOD:	Not Sampled	Time:	Time:
Gasco Facility	DRILLING METHOD:	6 1/4-inch ID Hollow Stem Auger	8:30	11:15
Portland, Oregon	EQUIPMENT TYPE	B-59 Mobile Drill	Date:	Date:
PROJECT: 2708	DRILLER:	Brad James	26-Oct-95	26-Oct-95
	DRILLING CONTRACTOR:	Geo-Tech Explorations		

BORING DIAMETER:	10-inch
CASING DIAMETER:	2-inch ID
SURFACE ELEVATION:	36.5 feet MSL
TOP OF CASING ELEVATION:	39.09 feet MSL

WELL CONSTRUCTION DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHs (ppm)	SPT (blows/0.5 feet)	RECOVERY (%)	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
	Steel Monument						-3			
							-2			
							-1			Ground surface
Concrete										
2-inch ID Blank PVC Casing							1			See boring log for well MW-8-56 for soi description.
							2			
							3			
							4			
							5			
3/8-inch Bentonite Chips							6			
							7			
2-inch ID Blank Stainless Steel Casing							8			
							9			
							10			
							11			
							12			
							13			
							14			
							15			
							16			
							17			
							18			
Colorado 10-20 Sand Pack							19			
							20			

Updated: 7/2/98 RAH
File: 2708 MW-08-29

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HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**MONITORING WELL NUMBER** **MW-8-29** **OWRD # 84226**			
PROJECT:	HAI LOGGER:	Rob Ede	DRILL START	DRILL FINISH
Northwest Natural Gas Co.	SAMPLING METHOD:	Not Sampled	Time:	Time:
Gasco Facility	DRILLING METHOD:	6 1/4-inch ID Hollow Stem Auger	8:30	11:15
Portland, Oregon	EQUIPMENT TYPE	B-59 Mobile Drill	Date:	Date:
PROJECT: 2708	DRILLER:	Brad James	26-Oct-95	26-Oct-95
	DRILLING CONTRACTOR:	Geo-Tech Explorations		

BORING DIAMETER:	10-inch
CASING DIAMETER:	2-inch ID
SURFACE ELEVATION:	36.5 feet MSL
TOP OF CASING ELEVATION:	39.09 feet MSL

WELL CONSTRUCTION DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHs (ppm)	SPT (blows/0.5 feet)	RECOVERY (%)	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
Colorado 10-20 Sand Pack; 2-inch ID 0.020-inch Stainless Steel Slotted Screen; Cap							21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40			Boring terminated at 29.0 feet bgs Monitoring well installed to 29.0 feet bgs Materials: 10 feet 2-inch diameter, 0.010-inch stainless steel slotted screen 13 feet stainless steel blank casing 3 feet 2-inch diameter PVC blank casing 12 50# bags 10/20 sand 13 50# bags 3/8-inch bentonite chips 1 end cap 1 locking cap above-grade steel monument 3 guard posts

HAHN & ASSOCIATES, INC.	MONITORING WELL NUMBER	MW-8-56		
434 NW Sixth Avenue	OWRD # 84226			
Portland, Oregon				
(503) 796-0717	HAI LOGGER:	Rob Ede	DRILL START	DRILL FINISH
PROJECT:	SAMPLING METHOD:	3-inch Split Spoon/Core Barrel		
Northwest Natural Gas Co.	DRILLING METHOD:	6 1/4-inch ID Hollow Stem Auger	Time:	Time:
Gasco Facility	EQUIPMENT TYPE	B-59 Mobil Drill	905	1410
Portland, Oregon	DRILLER:	Brad James	Date:	Date:
PROJECT: 2708	DRILLING CONTRACTOR:	Geo-Tech Explorations	25-Oct-95	25-Oct-95

BORING DIAMETER:	10-inch
CASING DIAMETER:	2-inch ID
SURFACE ELEVATION:	36.5 feet MSL
TOP OF CASING ELEVATION:	39.13 feet MSL

WELL CONSTRUCTION DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHs (ppm)	SPT (blows/0.5 feet)	RECOVERY (%)	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
Steel Monument							-3			
							-2			
							-1			Ground surface
Concrete	M8-01	900	5.9	281						
							1		SM	Surface: Silty SAND with gravel - brown, moist, no hydrocarbon odor, no sheen.
							2			
2-inch ID Blank PVC Casing										
					6	100	3			Tarry GRAVEL - black, moist, strong hydrocarbon odor, liquied-viscous tar from 5-6.5 feet bgs, sand and silt mix from 8.5-10.5 feet bgs.
					15	0				
					29	0	4			
							5			
	M8-02	915		-	6	100				
			84.8		7	20	6			
					12	0			GP	
							7			
2-inch ID Blank Stainless Steel Casing										
							8			
	M8-03	945	-	-	5	100	9			
					9	10				
					10	0	10			
					8	100				
					15	100	11			
					13	0				Silty GRAVEL (10.5-11.5 feet bgs) - brown and tan mottled, some black staining, moist, hydrocarbon odor.
							12			
							13			Silty GRAVEL (12.5-13.0 feet bgs) - olive grey, moist, slight hydrocarbon odor, no sheen.
	M8-04	1002	-	-	10	100				Silty GRAVEL (13.0-14.0 feet bgs) - loose, pieces of brick, moist, slight hydrocarbon odor, no sheen.
					11	100	14			
					13	50				
							15		GM	
						0				No Recovery (15.0-16.0 feet bgs).
						0	16	10/25/95		
					11					Silty GRAVEL (16.0-17.0 feet bgs) - black, hydrophobic, lampblack?, poor recovery.
					50/1"		17			
							18			Silty GRAVEL (17.5-20.0 feet bgs) - brown, wet, no hydrocarbon odor, no sheen, brick and wood fragments.
	M8-05	1025	-	-			19			
3/4-inch Bentonite Chips							20			

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**MONITORING WELL NUMBER** **MW-8-56** **OWRD # 84226**			
PROJECT:	HAI LOGGER:	Rob Ede	DRILL START	DRILL FINISH
Northwest Natural Gas Co.	SAMPLING METHOD:	3-inch Split Spoon/Core Barrel	Time:	Time:
Gasco Facility	DRILLING METHOD:	6 1/4-inch ID Hollow Stem Auger	905	1410
Portland, Oregon	EQUIPMENT TYPE	B-59 Mobil Drill	Date:	Date:
PROJECT: 2708	DRILLER:	Brad James	25-Oct-95	25-Oct-95
	DRILLING CONTRACTOR:	Geo-Tech Explorations		

BORING DIAMETER:	10-inch
CASING DIAMETER:	2-inch ID
SURFACE ELEVATION:	36.5 feet MSL
TOP OF CASING ELEVATION:	39.13 feet MSL

WELL CONSTRUCTION DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHs (ppm)	SPT (blows/0.5 feet)	RECOVERY (%)	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
3/4-inch Bentonite Chips; 2-inch ID Blank Stainless Steel Casing							21		GM	Silty GRAVEL (20.0-22.0 feet bgs) - brown, wet, brick and wood fragments, no hydrocarbon odor, no sheen.
	M8-06	1034		-			22			
			5.0						SP	SAND (22.0-25.0 feet bgs) - black, wet, loose, coarse grained, lampblack throughout, hydrocarbon odor, sheen, becoming solid and brittle with a slight sheen from 23.0-23.3 feet bgs.
	M8-07	1044		-	9	100	23			
			13.3		50/3"	100				
							24		lampblack	
							25			
							26		ML	Tarry SILT (25.0-27.5 feet bgs) - black, wet, stiff, mostly tar, strong sheen, vegetation throughout sample.
	M8-08	1115		-						
			225				27			
							28			SILT (27.5-30.0 feet bgs) - olive grey, moist, stiff, vegetation, tar within root zones, sheen.
							29			
							30			
							31			SILT (30.0-35.0 feet bgs) - olive grey, moist, stiff, semi-viscous tar within root zones.
							32			
							33			
							34			
	M8-09	1134		-						
			81.5				35			
3/4-inch Bentonite Chips; 2-inch ID Blank Stainless Steel Casing							36			Sandy SILT (35.0-40.0 feet bgs) - brown, orange-mottled, moist, stiff, tar within root zones.
							37			
							38		ML	
	M8-10	1152	-	-			39			
							40			

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**MONITORING WELL NUMBER** **MW-8-56** **OWRD # 84226**			
PROJECT:	HAI LOGGER:	Rob Ede	DRILL START	DRILL FINISH
Northwest Natural Gas Co.	SAMPLING METHOD:	3-inch Split Spoon/Core Barrel	Time:	Time:
Gasco Facility	DRILLING METHOD:	6 1/4-inch ID Hollow Stem Auger	905	1410
Portland, Oregon	EQUIPMENT TYPE	B-59 Mobil Drill	Date:	Date:
PROJECT: 2708	DRILLER:	Brad James	25-Oct-95	25-Oct-95
	DRILLING CONTRACTOR:	Geo-Tech Explorations		

BORING DIAMETER:	10-inch
CASING DIAMETER:	2-inch ID
SURFACE ELEVATION:	36.5 feet MSL
TOP OF CASING ELEVATION:	39.13 feet MSL

WELL CONSTRUCTION DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHs (ppm)	SPT (blows/0.5 feet)	RECOVERY (%)	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
3/4-inch Bentonite Chips							41		ML	Sandy SILT (40.0-42.0 feet bgs) - as above.
							42		SP	SAND (42-42.3 feet bgs) - olive grey, medium grained, black product saturated, less viscous than tar.
							43		ML	SILT (42.3-42.8 feet bgs) - olive grey, medium grained, black product saturated.
2-inch ID Blank Stainless Steel Casing							44			
	M8-11	1202	112	8.1			45		SP	SAND (42.8-45 feet bgs) - olive grey, wet, loose, poorly graded, medium grained, no product, slight sheen.
							46			SAND (45.0-47.5 feet bgs) - olive grey, wet, loose, poorly graded, medium grained, no sheen.
	M8-12	1245		-			47			
			43.7				48			SAND (47.5-50.0 feet bgs) - olive grey, wet, loose, poorly graded, medium grained, some thin silt layers, no sheen.
							49			
	M8-13	1314	-	-			50			
							51			SAND (50.0-54.0 feet bgs) - as above, no hydrocarbon odor, no sheen.
Colorado 10-20 Sand Pack	M8-14	1320	-	-			52			
2-inch ID 0.020-inch Stainless Steel Slotted Screen							53			
							54			
							55		SP	SAND (54.0-56.0 feet bgs) - as above, no hydrocarbon odor, no sheen.
Cap	M8-15	1400	-	0.64			56			
							57			
							58			
							59			
							60			

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**MONITORING WELL NUMBER** **MW-8-56** **OWRD # 84226**			
PROJECT:	HAI LOGGER:	Rob Ede	DRILL START	DRILL FINISH
Northwest Natural Gas Co.	SAMPLING METHOD:	3-inch Split Spoon/Core Barrel		
Gasco Facility	DRILLING METHOD:	6 1/4-inch ID Hollow Stem Auger	Time:	Time:
Portland, Oregon	EQUIPMENT TYPE	B-59 Mobil Drill	905	1410
PROJECT: 2708	DRILLER:	Brad James	Date:	Date:
	DRILLING CONTRACTOR:	Geo-Tech Explorations	25-Oct-95	25-Oct-95

BORING DIAMETER:	10-inch
CASING DIAMETER:	2-inch ID
SURFACE ELEVATION:	36.5 feet MSL
TOP OF CASING ELEVATION:	39.13 feet MSL

WELL CONSTRUCTION DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHs (ppm)	SPT (blows/0.5 feet)	RECOVERY (%)	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
							61			Boring terminated at 56.0 feet bgs Boring sampled to 56.0 feet Monitoring well installed to 56.0 feet bgs Materials: 10 feet 2-inch diameter, 0.020-inch stainless steel slotted screen 40.5 feet 2-inch diameter stainless steel blank casing 4.5 feet 2-inch diameter PVC blank casing 11 50# bags 10/20 sand 26 50# bags bentonite chips 1 end cap 1 locking cap above-grade steel monument 3 guard posts * Sample Prefix Number is 2708-951025-
							62			
							63			
							64			
							65			
							66			
							67			
							68			
							69			
							70			
							71			
							72			
							73			
							74			
							75			
							76			
							77			
							78			
							79			
							80			

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**MONITORING WELL NUMBER**		**MW-9-29**	
	OWRD # 84223			
	HAI LOGGER:	Rob Ede	DRILL START	DRILL FINISH
PROJECT:	SAMPLING METHOD:	3-inch Split Spoon		
Northwest Natural Gas Co.	DRILLING METHOD:	6 1/4-inch ID Hollow Stem Auger	Time:	Time:
Gasco Facility	EQUIPMENT TYPE	B-59 Mobile Drill	9:30	12:30
Portland, Oregons	DRILLER:	Brad James	Date:	Date:
PROJECT: 2708	DRILLING CONTRACTOR:	Geo-Tech Explorations	23-Oct-95	23-Oct-95

BORING DIAMETER:	10-inch OD
CASING DIAMETER:	2-inch
SURFACE ELEVATION:	37.9 feet MSL
TOP OF CASING ELEVATION:	37.65 MSL

WELL CONSTRUCTION DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHs (ppm)	SPT (blows/0.5 feet)	RECOVERY (%)	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
Flush Monument										Ground surface
Concrete	M9-01	855	0.4	21.5			1		GW	Surface: Sandy GRAVEL - grey gravel, olive grey sand, moist, non-plastic, well graded, no hydrocarbon odor, no sheen.
							2			
					9	100			GM	Sandy, Silty GRAVEL (2.0-3.0 feet bgs) - brown, moist, loose, non-plastic, well graded, slight hydrocarbon odor, slight sheen.
	M9-02	935	5.5	-	15	100	3			
					14	50			SP	SAND (3.0-3.5 feet bgs) - brown, moist, loose, poorly graded, fine grained.
					2	100	4		ML	Gravelly SILT (3.5-4.5 feet bgs) - brown, moist, stiff, poorly graded, wire present, no hydrocarbon odor, no sheen.
	M9-03	940	0.7	-	5	100				SAND (4.5-5.0 feet bgs) - brown, moist, loose, poorly graded, fine grained, no hydrocarbon odor, no sheen.
					7	70	5		SP	
	M9-04	950	1.3	163	2	100				Sandy SILT (5.0-6.5 feet bgs) - orange/brown with black and blue/grey staining, moist, slight hydrocarbon odor?, sheen is blue/green in color.
					5	0	6		ML	
					50/2"	0				
							7			
							8			CONCRETE
							9			
							10			
							11			Sandy SILT (11.5-13.0 feet bgs) - brown, moist to wet, slightly plastic, very fine sand, no hydrocarbon odor, no sheen.
	M9-05	1045		0.52	13	100	12			
			6.7		8	30				SILT (13.0-15.0 feet bgs) - brown, moist to wet, stiff, slightly plastic, no hydrocarbon odor, no sheen.
					5	0	13			
					3	100			ML	SILT (15.0-15.5 feet bgs) - as above, no hydrocarbon odor, no sheen.
	M9-06	1055		-	3	100	14			
			8.8		4	100		10/23/95		Sandy SILT (15.5-16.0 feet bgs) - brown, moist to wet, slightly stiff, no hydrocarbon odor, no sheen.
					8	50	15			
					2	0				
20-40					2	100	16			
	M9-07	1120		-	3	100				SAND with muscovite (16.0-17.0 feet bgs) - brown, wet, no hydrocarbon odor, no sheen.
			20.9		6	100	17			
					2	100			SP	SAND (17.0-18.5 feet bgs) - as above, no hydrocarbon odor, no sheen.
					3	100	18			
					5	100				
					2	100	19			SILT (18.5-20.0 feet bgs) - brown, moist to wet, stiff, no hydrocarbon odor, no sheen.
					4	100			ML	
					8	100	20			

Bentonite Chips

2-inch ID Blank PVC Casing

Colorado 10-20 Sand Pack

Updated: 7/2/98 RAH
File: 2708 MW-09-29

Koppers000834

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**MONITORING WELL NUMBER**		**MW-9-29**	
	OWRD # 84223			
	HAI LOGGER:	Rob Ede	DRILL START	DRILL FINISH
PROJECT:	SAMPLING METHOD:	3-inch Split Spoon		
Northwest Natural Gas Co.	DRILLING METHOD:	6 1/4-inch ID Hollow Stem Auger	Time:	Time:
Gasco Facility	EQUIPMENT TYPE	B-59 Mobile Drill	9:30	12:30
Portland, Oregons	DRILLER:	Brad James	Date:	Date:
PROJECT: 2708	DRILLING CONTRACTOR:	Geo-Tech Explorations	23-Oct-95	23-Oct-95

BORING DIAMETER:	10-inch OD
CASING DIAMETER:	2-inch
SURFACE ELEVATION:	37.9 feet MSL
TOP OF CASING ELEVATION:	37.65 MSL

WELL CONSTRUCTION DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHs (ppm)	SPT (blows/0.5 feet)	RECOVERY (%)	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
Colorado 10-20 Sand Pack					2	100				
					3	100	21			SAND (20.0-24.0 feet bgs) - brown, wet, stiff, fine grained, muscovite present 20.0-21.5 feet bgs, no hydrocarbon odor, no sheen.
2-inch ID 0.010-inch PVC Slotted Screen	M9-08	1140		-	3	100				
			9.5		2	100	22		SP	
					2	100				
					9	90	23			
					3	100				
					6	100	24			
	M9-09	1200	-	-	16	100			ML	Sandy SILT (24.0-25.0 feet bgs) - brown, moist to wet, stiff, no hydrocarbon odor, no sheen.
					25	90	25			
					5	100			SP	SAND (25.0-26.0 feet bgs) - olive grey, wet, loose, fine grained, no hydrocarbon odor, no sheen.
					8	100	26			
					12	70			ML	Sandy SILT (26.0-26.5 feet bgs) - brown, wet, stiff, slighlty plastic, no hydrocarbon odor, no sheen.
					3	100	27		SP	SAND (26.7-27.5 feet bgs) - brown, wet, loose, poorly graded, medium grained, no hydrocarbon odor, no sheen.
	M9-10	1210		-	5	100				
			2.0		12	80	28		ML	SILT (27.5-28.0 feet bgs) - brown, moist to wet, stiff, no hydrocarbon odor, no sheen.
Cap							29			
							30			
							31			Boring terminated at 29.0 feet bgs Boring sampled to 28.0 feet Monitoring well installed to 29.0 feet bgs
							32			
							33			Materials: 10 feet 2-inch diameter, 0.010-inch PVC slotted screen 18 feet 2-inch diameter PVC blank casing 1 50# bags 20/40 sand 12 50# bags 10/20 sand 10 50# bags bentonite chips 1 end cap 1 locking cap Flush steel monument
							34			
							35			
							36			* Sample Prefix Number is 2708-961023-
							37			
							38			
							39			
							40			

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**MONITORING WELL NUMBER** **MW-10-25** **OWRD # 84238**			
PROJECT:	HAI LOGGER:	Rob Ede	DRILL START	DRILL FINISH
Northwest Natural Gas Co.	SAMPLING METHOD:	Not Sampled	Time:	Time:
Gasco Facility	DRILLING METHOD:	6 1/4-inch ID Hollow Stem Auger	9:00	10:00
Portland, Oregon	EQUIPMENT TYPE	B-59 Mobil Drill	Date:	Date:
PROJECT: 2708	DRILLER:	Brad James	9-Nov-95	9-Nov-95
	DRILLING CONTRACTOR:	Geo-Tech Explorations		

BORING DIAMETER:	10-inch
CASING DIAMETER:	2-inch ID
SURFACE ELEVATION:	36.5 feet MSL
TOP OF CASING ELEVATION:	39.22 feet MSL

WELL CONSTRUCTION DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHs (ppm)	SPT (blows/0.5 feet)	RECOVERY (%)	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
	Steel Monument						-3			
							-2			
							-1			Ground surface
Concrete										See boring log for well MW-10-61 for soi description.
2-inch ID Blank PVC Casing							1			
							2			
							3			
							4			
							5			
Bentonite Chips										
2-inch ID Blank Stainless Steel Casing							6			
							7			
							8			
							9			
							10			
							11			
							12			
							13			
							14			
							15			
Colorado 10-20 Sand Pack							16			
							17			
							18			
							19			
20-Slot Stainless Steel Continuous Screen							20			

Updated: 7/2/98 RAH
File: 2708 MW-10-25

Koppers000836

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**MONITORING WELL NUMBER** **MW-10-25** **OWRD # 84238**			
PROJECT:	HAI LOGGER:	Rob Ede	DRILL START	DRILL FINISH
Northwest Natural Gas Co.	SAMPLING METHOD:	Not Sampled	Time:	Time:
Gasco Facility	DRILLING METHOD:	6 1/4-inch ID Hollow Stem Auger	9:00	10:00
Portland, Oregon	EQUIPMENT TYPE	B-59 Mobil Drill	Date:	Date:
PROJECT: 2708	DRILLER:	Brad James	9-Nov-95	9-Nov-95
	DRILLING CONTRACTOR:	Geo-Tech Explorations		

BORING DIAMETER:	10-inch
CASING DIAMETER:	2-inch ID
SURFACE ELEVATION:	36.5 feet MSL
TOP OF CASING ELEVATION:	39.22 feet MSL

WELL CONSTRUCTION DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHs (ppm)	SPT (blows/0.5 feet)	RECOVERY (%)	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
Colorado 10-20 Sand Pack; 20-Slot Stainless Steel Screen							21			
							22			
							23			
							24			
Cap							25			Boring terminated at 25.0 feet bgs Monitoring well installed to 25.0 feet bgs
							26			Materials: 10 feet 2-inch diameter, 0.020-inch stainless steel slotted screen 5 feet 2-inch diameter PVC blank casing 9 feet stainless steel blank casing 11 bags 10/20 sand 6 50# bags bentonite chips 1 end cap 1 locking cap above-grade steel monument 3 guard posts
							27			
							28			
							29			
							30			
							31			* Sample Prefix Number is 2708-951109-
							32			
							33			
							34			
							35			
							36			
							37			
							38			
							39			
							40			

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**MONITORING WELL NUMBER** **MW-10-61** **OWRD # 84237**			
PROJECT:	HAI LOGGER:	Rob Ede	DRILL START	DRILL FINISH
Northwest Natural Gas Co.	SAMPLING METHOD:	4-inch Core Barrel	Time:	Time:
Gasco Facility	DRILLING METHOD:	6 1/4-inch ID Hollow Stem Auger	9:00	12:30
Portland, Oregon	EQUIPMENT TYPE	B-59 Mobil Drill	Date:	Date:
PROJECT: 2708	DRILLER:	Brad James	8-Nov-95	8-Nov-95
	DRILLING CONTRACTOR:	Geo-Tech Explorations		

BORING DIAMETER:	10-inch
CASING DIAMETER:	2-inch ID
SURFACE ELEVATION:	36.5 feet MSL
TOP OF CASING ELEVATION:	39.33 feet MSL

WELL CONSTRUCTION DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHs (ppm)	SPT (blows/0.5 feet)	RECOVERY (%)	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
Steel Monument							-3			
							-2			
							-1			Ground surface
Concrete	M10-01	850	26.2	78.7						Silty Sandy GRAVEL - grey/brown, wet.
2-inch ID Blank PVC Casing	M10-02	855	57.1	107			1			
							2		GM	
							3			SAND (2.5-3.0 feet bgs) - brown, moist, poorly graded, loose, medium grained.
	M10-03	905		-			4		SP	SAND (3.0-4.0 feet bgs) - black, poorly graded, loose, medium grained, hydrocarbon odor, sheen.
			102				5			
Bentonite Grout Slurry							6			SAND with gravel (5.0-10.0 feet bgs) - black, moist, moderately dense, hydrocarbon odor, strong sheen, tar from 7-8 foot depth, lampblack present?, brick at 8 feet bgs.
	M10-04	920		-			7			
			566				8			
							9			
2-inch ID Blank Stainless Steel Casing							10			
							11			Tarry SAND with gravel (10.0-15.0 feet bgs) - wet oozing tar saturated sand and gravel from 10-12 feet bgs,very hard tar matrix from 12-15 feet bgs.
	M10-05	930		-						
			241				12		SP	
							13			
							14			
							15			
Bentonite Grout Slurry							16		ML	Tarry SILT with gravel (15.0-16.5 feet bgs) - black, moist, oozing tar, silts are saturated with oily tar, silts repel water.
							17			SAND (17.0-20.0 feet bgs) - olive grey, moist to wet, fine grained, product saturated (brown), froth via sheen, large piece of wood in end of sampling core.
							18		SP	
							19	11/8/95		
	M10-06	950		-						
			2500+				20	▽		

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**MONITORING WELL NUMBER** **MW-10-61** **OWRD # 84237**			
PROJECT:	HAI LOGGER:	Rob Ede	DRILL START	DRILL FINISH
Northwest Natural Gas Co.	SAMPLING METHOD:	4-inch Core Barrel	Time:	Time:
Gasco Facility	DRILLING METHOD:	6 1/4-inch ID Hollow Stem Auger	9:00	12:30
Portland, Oregon	EQUIPMENT TYPE	B-59 Mobil Drill	Date:	Date:
PROJECT: 2708	DRILLER:	Brad James	8-Nov-95	8-Nov-95
	DRILLING CONTRACTOR:	Geo-Tech Explorations		

BORING DIAMETER:	10-inch
CASING DIAMETER:	2-inch ID
SURFACE ELEVATION:	36.5 feet MSL
TOP OF CASING ELEVATION:	39.33 feet MSL

WELL CONSTRUCTION DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHs (ppm)	SPT (blows/0.5 feet)	RECOVERY (%)	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
Bentonite Grout Slurry; 2-inch ID Blank Stainless Steel Casing							21		SP	SAND (20.0-23.5 feet bgs) - brown, wet, loose, poorly graded, medium grained, product saturated (oozes out of pore spaces)
	M10-07	1005		-			22			
			2500+				23			
							24		ML	SILT (23.5-25.0 feet bgs) - brown, moist, stiff, root zones, no product, no sheen.
	M10-08	1010		-						
			1204				25			SILT (25.0-30.0 feet bgs) - brown, moist, stiff, root zones, some black and brown spots (organic looking), no obvious product.
							26			
							27			
							28			
	M10-09	1018		0.76						
			943				29			
							30			
							31			SILT (30.0-35.0 feet bgs) - olive grey with orange spots, , root zones, no product, no sheen, poor sample recovery.
	M10-10	1025	-	-						
							32			
							33			
							34			
							35			
							36			SILT (35.0-40.0 feet bgs) - olive grey to green, root zones, small piece of bark, no sheen.
	M10-11	1035	65.3	-						
	M10-12	1040	68.3	-			37			
							38		ML	
							39			
							40			

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**MONITORING WELL NUMBER** **MW-10-61** **OWRD # 84237**			
PROJECT:	HAI LOGGER:	Rob Ede	DRILL START	DRILL FINISH
Northwest Natural Gas Co.	SAMPLING METHOD:	4-inch Core Barrel	Time:	Time:
Gasco Facility	DRILLING METHOD:	6 1/4-inch ID Hollow Stem Auger	9:00	12:30
Portland, Oregon	EQUIPMENT TYPE	B-59 Mobil Drill	Date:	Date:
PROJECT: 2708	DRILLER:	Brad James	8-Nov-95	8-Nov-95
	DRILLING CONTRACTOR:	Geo-Tech Explorations		

BORING DIAMETER:	10-inch
CASING DIAMETER:	2-inch ID
SURFACE ELEVATION:	36.5 feet MSL
TOP OF CASING ELEVATION:	39.33 feet MSL

WELL CONSTRUCTION DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHs (ppm)	SPT (blows/0.5 feet)	RECOVERY (%)	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
Bentonite Grout Slurry; Bentonite Chip Seal; 20-40; 2-inch ID Blank Stainless Steel Casing; Colorado 10-20 Sand Pack; 2-inch ID 0.020-inch Stainless Steel Continous Slotted Screen							41		ML	SILT (40.0-45.0 feet bgs) - olive grey to green (transition to green with depth), moist, stiff, non-plastic, slightly brittle from 44-45 feet bgs, root zones, bark, sandy silt from 43.5-44 feet bgs.
							42			
							43			
	M10-13	1050		-			44			
			220				45			
							46			SILT (45.0-47.5 feet bgs) - olive green to 46.5 feet bgs, tan to 47.5 feet bgs, moist, hard/slightly brittle, no sheen.
							47			
	M10-14	1115		-			48		SP	SAND (47.5-53.0 feet bgs) - tan, wet, loose, poorly graded, fine grained, no sheen, some muscovite from 50-53 feet bgs.
			61.3				49			
							50			
							51			
	M10-15	1145		-			52			
			62.3				53			
							54		ML	Sandy SILT (53.0-57.5 feet bgs) - tan, moist, medium stiff, interbedded with fine grained sands from 55.0-57.5 feet bgs.
							55			
							56			
	M10-16	1200		-						
			47.6				57			Tree trunk at 57.5 feet bgs surrounded by olive grey sands.
							58		SM	Silty SAND (57.5-60.0 feet bgs).
	M10-17	1210		-			59			
							60			

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**MONITORING WELL NUMBER** **MW-10-61** **OWRD # 84237**			
PROJECT:	HAI LOGGER:	Rob Ede	DRILL START	DRILL FINISH
Northwest Natural Gas Co.	SAMPLING METHOD:	4-inch Core Barrel	Time:	Time:
Gasco Facility	DRILLING METHOD:	6 1/4-inch ID Hollow Stem Auger	9:00	12:30
Portland, Oregon	EQUIPMENT TYPE	B-59 Mobil Drill	Date:	Date:
PROJECT: 2708	DRILLER:	Brad James	8-Nov-95	8-Nov-95
	DRILLING CONTRACTOR:	Geo-Tech Explorations		

BORING DIAMETER:	10-inch
CASING DIAMETER:	2-inch ID
SURFACE ELEVATION:	36.5 feet MSL
TOP OF CASING ELEVATION:	39.33 feet MSL

WELL CONSTRUCTION DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHs (ppm)	SPT (blows/0.5 feet)	RECOVERY (%)	DEPTH (feet)	GROUNDWATER	STRATA (USCS)
Cap							61		
							62		
							63		
							64		
							65		
							66		
							67		
							68		
							69		
							70		
							71		
							72		
							73		
							74		
							75		
							76		
							77		
							78		
							79		
							80		

SOIL DESCRIPTION

Boring terminated at 61.0 feet bgs
Boring sampled to 60.0 feet
Monitoring well installed to 61.0 feet bgs

Materials:
10 feet 2-inch diameter, 0.010-inch stainless steel slotted screen
5 feet 2-inch diameter PVC blank casing
45 feet stainless steel blank casing
1 50# bags 20/40 sand
11 bags 10/20 sand
2 50# bags bentonite chips
5 bags bentonite grout
1 end cap
1 locking cap
above-grade steel monument
3 guard posts

* Sample Prefix Number is 2708-951108-

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**MONITORING WELL NUMBER MW-11-32** **OWRD # 84232**			
PROJECT:	HAI LOGGER:	Rob Ede	DRILL START	DRILL FINISH
Northwest Natural Gas Co.	SAMPLING METHOD:	Not Sampled	Time:	Time:
Gasco Facility	DRILLING METHOD:	6 1/4-inch ID Hollow Stem Auger	1350	1430
Portland, Oregon	EQUIPMENT TYPE	B-59 Mobil Drill	Date:	Date:
PROJECT: 2708	DRILLER:	Brad James	3-Nov-95	3-Nov-95
	DRILLING CONTRACTOR:	Geo-Tech Explorations		

BORING DIAMETER:	10-inch
CASING DIAMETER:	2-inch ID
SURFACE ELEVATION:	35.4 feet MSL
TOP OF CASING ELEVATION:	38.39 feet MSL

WELL CONSTRUCTION DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHs (ppm)	SPT (blows/0.5 feet)	RECOVERY (%)	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
	Steel Monument						-3			
							-2			
							-1			Ground surface
Concrete										
							1			See boring log for boring M-11 for soil description.
2-inch ID Blank PVC Casing							2			
							3			
Bentonite Chips							4			
							5			
							6			
							7			
							8			
							9			
							10			
							11			
Stainless Steel Casing							12			
							13			
							14			
							15			
Bentonite Chips							16			
							17			
							18			
							19			
							20			

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**MONITORING WELL NUMBER MW-11-32** **OWRD # 84232**			
PROJECT: Northwest Natural Gas Co. Gasco Facility Portland, Oregon	HAI LOGGER:	Rob Ede	DRILL START	DRILL FINISH
	SAMPLING METHOD:	Not Sampled	Time: 1350	Time: 1430
	DRILLING METHOD:	6 1/4-inch ID Hollow Stem Auger		
	EQUIPMENT TYPE	B-59 Mobil Drill		
	DRILLER:	Brad James	Date: 3-Nov-95	Date: 3-Nov-95
PROJECT: 2708	DRILLING CONTRACTOR:	Geo-Tech Explorations		

BORING DIAMETER:	10-inch
CASING DIAMETER:	2-inch ID
SURFACE ELEVATION:	35.4 feet MSL
TOP OF CASING ELEVATION:	38.39 feet MSL

WELL CONSTRUCTION DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHs (ppm)	SPT (blows/0.5 feet)	RECOVERY (%)	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
Colorado 10-20 Sand Pack							21			
							22			
2-inch ID 0.020-inch Stainless Steel Continuous Slotted Screen							23			
							24			
							25			
							26			
							27			
							28			
							29			
							30			
Cap							31			Boring terminated at 32.0 feet bgs Monitoring well installed to 32.0 feet bgs
							32			Materials: 10 feet 2-inch diameter, 0.020-inch stainless steel slotted screen 15 feet stainless steel casing 6 feet 2-inch diameter PVC blank casing 13 50# bags 10/20 sand 12 50# bags bentonite chips 1 end cap 1 locking cap above-grade steel monument 3 guard posts
							33			
							34			
							35			
							36			
							37			
							38			
							39			
							40			

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**MONITORING WELL NUMBER MW-12-36** **OWRD # 84224**			
PROJECT:	HAI LOGGER:	Rob Ede	DRILL START	DRILL FINISH
Northwest Natural Gas Co.	SAMPLING METHOD:	4-inch OD Core Barrel	Time:	Time:
Gasco Facility	DRILLING METHOD:	6 1/4-inch ID Hollow Stem Auger	1410	1550
Portland, Oregon	EQUIPMENT TYPE	B-59 Mobil Drill	Date:	Date:
PROJECT: 2708	DRILLER:	Brad James	23-Oct-95	23-Oct-95
	DRILLING CONTRACTOR:	Geo-Tech Explorations		

BORING DIAMETER:	10-inch
CASING DIAMETER:	2-inch ID
SURFACE ELEVATION:	35.9 feet MSL
TOP OF CASING ELEVATION:	38.69 feet MSL

WELL CONSTRUCTION DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHs (ppm)	SPT (blows/0.5 feet)	RECOVERY (%)	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
Steel Monument							-3, -2, -1			Ground surface
Concrete	M12-01	1415	0.1	116			1, 2		GP	Surface: Sandy GRAVEL, (placed for ground cover) - moist, no hydrocarbon odor, no sheen.
	M12-02	1420	0.5	-			3, 4		SP	SAND (2.0-4.5 feet bgs) - brown, moist, fine grained, loose, some thin silty zones present, no hydrocarbon odor, slight sheen.
2-inch ID Blank PVC Casing	M12-03	1428	3.9	-			5, 6, 7, 8, 9		ML	SILT (4.5-9.5 feet bgs) - moist to wet, olive grey, very soft, strong hydrocarbon odor, strong sheen.
Bentonite Chips	M12-04	1440	46.3	-			10, 11, 12, 13, 14, 15	10/23/95	ML	SILT (9.5-14.5 feet bgs) - olive grey/green mottled with orange spots (oxidized zones), moist, stiff, strong hydrocarbon odor, sheen, brown oil-like substance in upper 2 feet of core.
2-inch ID Blank PVC Casing	M12-05	1450	69.6	-			16, 17, 18, 19, 20		SP ML SP	SILT (14.5-15 feet bgs) - olive grey, brown mottled, stiff, strong hydrocarbon odor, sheen via sheen test. SAND (15-16.5 feet bgs) - brown, wet, fine grained, poorly graded, strong hydrocarbon odor, sheen. SILT (16.5-19.5 feet bgs) - olive grey and brown mottled, stiff, strong hydrocarbon odor, sheen via sheen test, stained soil from 16.5-17.5 feet bgs.
Bentonite Chips										

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**MONITORING WELL NUMBER MW-12-36** OWRD # 84224			
	HAI LOGGER:	Rob Ede	DRILL START	DRILL FINISH
PROJECT:	SAMPLING METHOD:	4-inch OD Core Barrel		
Northwest Natural Gas Co.	DRILLING METHOD:	6 1/4-inch ID Hollow Stem Auger	Time:	Time:
Gasco Facility	EQUIPMENT TYPE	B-59 Mobil Drill	1410	1550
Portland, Oregon	DRILLER:	Brad James	Date:	Date:
PROJECT: 2708	DRILLING CONTRACTOR:	Geo-Tech Explorations	23-Oct-95	23-Oct-95

BORING DIAMETER:	10-inch
CASING DIAMETER:	2-inch ID
SURFACE ELEVATION:	35.9 feet MSL
TOP OF CASING ELEVATION:	38.69 feet MSL

WELL CONSTRUCTION DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHs (ppm)	SPT (blows/0.5 feet)	RECOVERY (%)	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
Bentonite							21		SP	SAND (19.5-24.5 feet bgs) - olive grey, wet, fine grained, sheen on core, hydrocarbon odor, loose, 1-inch silt layer encountered at 21.0 feet bgs, some product staining on silts.
2-inch ID Blank PVC Casing							22			
	M12-06	1458		8.6						
			72.4				23			
							24			
							25			SAND (24.5-29.5 feet bgs) - olive grey changing to brown with depth, wet, fine grained, loose, muscovite present, no hydrocarbon odor, no sheen.
							26			
	M12-07	1510		ND			27			
			1.0				28			
Colorado 10-20 Sand Pack							29			
2-inch ID 0.010-inch PVC Slotted Screen							30			SAND (30.0-34.5 feet bgs) - brown, wet, fine to medium grained, loose, no hydrocarbon odor, no sheen, muscovite present.
							31			
							32			
	M12-08	1530		-						
			0.7				33		SP	
							34			
							35			SAND (34.5-36.0 feet bgs) - brown, wet, medium grained, loose, no hydrocarbon odor, no sheen, muscovite present.
Cap	M12-09	1550	0.9	-			36			Bedrock encountered at 36 feet bgs (augers grinding on hard surface).
							37			
							38			
							39			
							40			

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**MONITORING WELL NUMBER MW-12-36** OWRD # 84224			
PROJECT:	HAI LOGGER:	Rob Ede	DRILL START	DRILL FINISH
Northwest Natural Gas Co.	SAMPLING METHOD:	4-inch OD Core Barrel	Time:	Time:
Gasco Facility	DRILLING METHOD:	6 1/4-inch ID Hollow Stem Auger	1410	1550
Portland, Oregon	EQUIPMENT TYPE	B-59 Mobil Drill	Date:	Date:
PROJECT: 2708	DRILLER:	Brad James	23-Oct-95	23-Oct-95
	DRILLING CONTRACTOR:	Geo-Tech Explorations		

BORING DIAMETER:	10-inch
CASING DIAMETER:	2-inch ID
SURFACE ELEVATION:	35.9 feet MSL
TOP OF CASING ELEVATION:	38.69 feet MSL

WELL CONSTRUCTION DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHs (ppm)	SPT (blows/0.5 feet)	RECOVERY (%)	DEPTH (feet)	GROUNDWATER	STRATA (USCS)
							41		
							42		
							43		
							44		
							45		
							46		
							47		
							48		
							49		
							50		
							51		
							52		
							53		
							54		
							55		
							56		
							57		
							58		
							59		
							60		

SOIL DESCRIPTION

Boring terminated at 36.0 feet bgs
Boring sampled to 36.0 feet
Monitoring well installed to 36.0 feet bgs

Materials:
10 feet 2-inch diameter, 0.010-inch PVC slotted screen
10 feet 2-inch diameter PVC blank casing
16 50# bags 10/20 sand
14 50# bags bentonite chips
1 end cap
1 locking cap
above-grade steel monument
3 guard posts

* Sample Prefix Number is 2708-951023-

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**MONITORING WELL NUMBER**		**MW-13-30**	
	OWRD # 100685			
	HAI LOGGER:	Rob Ede	DRILL START	DRILL FINISH
PROJECT:	SAMPLING METHOD:	Not Sampled		
Northwest Natural	DRILLING METHOD:	6 1/4-inch ID Hollow Stem Auger	Time:	Time:
Gasco Facility	EQUIPMENT TYPE	B-59 Mobile Drill	8:36	10:00
Portland, Oregon	DRILLER:	Brad James	Date:	Date:
PROJECT: 2708	DRILLING CONTRACTOR:	Geo-Tech Explorations	19-Dec-97	19-Dec-97

BORING DIAMETER:	10-inch
CASING DIAMETER:	2-inch ID
SURFACE ELEVATION:	35.23 feet MSL
TOP OF CASING ELEVATION:	34.86 feet MSL

WELL CONSTRUCTION DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHs (ppm)	SPT (blows/0.5 feet)	RECOVERY (%)	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
Flush Monument										Ground surface
Concrete							1		Concrete	See boring log for well MW-13-61 for soil description.
2-inch ID Blank PVC Casing							2			
							3			
							4			
							5		SP	
							6			
							7			
							8			
							9			
							10			
3/8-inch Bentonite Chips							11			
Stainless Steel Casing							12			
							13			
							14			
							15			
							16			
							17			
							18		SP	
							19			
10-20							20			

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**MONITORING WELL NUMBER**	**MW-13-30**	
	OWRD # 100685		
	HAI LOGGER: Rob Ede	DRILL START	DRILL FINISH
PROJECT:	SAMPLING METHOD: Not Sampled		
Northwest Natural	DRILLING METHOD: 6 1/4-inch ID Hollow Stem Auger	Time: 8:36	Time: 10:00
Gasco Facility	EQUIPMENT TYPE B-59 Mobile Drill		
Portland, Oregon	DRILLER: Brad James	Date: 19-Dec-97	Date: 19-Dec-97
PROJECT: 2708	DRILLING CONTRACTOR: Geo-Tech Explorations		

BORING DIAMETER:	10-inch
CASING DIAMETER:	2-inch ID
SURFACE ELEVATION:	35.23 feet MSL
TOP OF CASING ELEVATION:	34.86 feet MSL

WELL CONSTRUCTION DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHs (ppm)	SPT (blows/0.5 feet)	RECOVERY (%)	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
Colorado 10-20 Sand Pack; 2-inch ID 0.020 Stainless Steel Continuous Slotted Screen							21			
							22			
							23			
							24		SP	
							25			
							26			
							27			Boring terminated at 30.0 feet bgs Monitoring well installed to 30.0 feet bgs
							28			Materials: 1 foot stainless steel sump/well cap 10 feet 2-inch diameter, 0.020-inch stainless steel slotted screen 10 feet 2-inch diameter stainless steel blank casing 9 feet 2-inch diameter PVC blank casing 9.5 50# bags 10/20 sand 12 50# bags bentonite chips 1 end cap 1 locking cap flush steel monument
							29		ML	
Cap							30			
							31			
							32			
							33			
							34			
							35			
							36			
							37			
							38			
							39			
							40			

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**MONITORING WELL NUMBER**		**MW-13-61**	
	OWRD # 100684			
PROJECT: Northwest Natural Gasco Facility Portland, Oregon	HAI LOGGER:	Rob Ede	DRILL START	DRILL FINISH
	SAMPLING METHOD:	4-inch Core Barrel		
	DRILLING METHOD:	6 1/4-inch ID Hollow Stem Auger	Time: 9:30	Time: 14:40
	EQUIPMENT TYPE	B-59 Mobil Drill		
	DRILLER:	Brad James	Date: 18-Dec-97	Date: 18-Dec-97
PROJECT: 2708	DRILLING CONTRACTOR:	Geo-Tech Explorations		

BORING DIAMETER:	10-inch
CASING DIAMETER:	2-inch ID
SURFACE ELEVATION:	35.23 feet MSL
TOP OF CASING ELEVATION:	34.78 feet MSL

WELL CONSTRUCTION DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHs (ppm)	CORE INTERVAL	RECOVERY (%)	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
Flush Monument										Ground surface
Concrete									Concrete	Surface: concrete.
							1			
							2			
							3			
	M13-01	10:04		-			4			SAND (3.5-5.5 feet bgs) - light brown, dry to slightly moist, fine grained, few rounded gravels, no hydrocarbon odor, no sheen (fill).
			6.4				5		SP	
2-inch ID Blank PVC Casing							6			SAND (5.5-8.0 feet bgs) - light to rust brown, slightly moist, fine grained, poorly graded, no gravels, no hydrocarbon odor, no sheen (fill).
	M13-02	10:08		ND						
			5.0				7			
							8			
							9			SAND (8.0-11.5 feet bgs) - as above, no hydrocarbon odor, no sheen (fill).
							10			
	M13-03	10:20		ND						
			5.5				11			
							12			SAND (11.5-15.0 feet bgs) - as above, no hydrocarbon odor, no sheen (fill).
							13			
Blank Stainless Steel Casing	M13-04	10:27	5.2	ND			14			
							15			SAND (15.0-19.0 feet bgs) - as above, wet below 18.0 feet bgs, no hydrocarbon odor, no sheen (fill).
							16			
							17	12/18/97		
							18		SP	
	M13-05	10:38	8.1	1.0						
							19			SAND (19.0-21.0 feet bgs) - as above, wet, dark grey with organic reducing (decay) odor below 20.5 feet bgs, no hydrocarbon odor, no sheen (fill).
Bentonite Grout							20			

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**MONITORING WELL NUMBER**		**MW-13-61**	
	OWRD # 100684			
	HAI LOGGER:	Rob Ede	DRILL START	DRILL FINISH
PROJECT: Northwest Natural Gasco Facility Portland, Oregon	SAMPLING METHOD:	4-inch Core Barrel	Time: 9:30	Time: 14:40
	DRILLING METHOD:	6 1/4-inch ID Hollow Stem Auger		
	EQUIPMENT TYPE	B-59 Mobil Drill		
	DRILLER:	Brad James	Date: 18-Dec-97	Date: 18-Dec-97
PROJECT: 2708	DRILLING CONTRACTOR:	Geo-Tech Explorations		

BORING DIAMETER:	10-inch
CASING DIAMETER:	2-inch ID
SURFACE ELEVATION:	35.23 feet MSL
TOP OF CASING ELEVATION:	34.78 feet MSL

WELL CONSTRUCTION DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHs (ppm)	CORE INTERVAL	RECOVERY (%)	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
Bentonite Grout; 2-inch ID Blank Stainless Steel Casing	M13-06	10:47	12.1	-			21		SP	SAND (21.0-23.0 feet bgs) - dark grey, fine grained with few shell fragments, potential hydrocarbon odor, no sheen (fill).
							22			
	M13-07	11:00	14.4	-			23			
							24			
	M13-08	11:10	15.6	ND			25			
	M13-09	11:14	(Dup)	-						SAND (23.0-28.0 feet bgs) - as above but with no shell fragments, potential hydrocarbon odor, no sheen (fill).
							26			
							27			
							28			SAND (28.0-28.5 feet bgs) - as above, no hydrocarbon odor, no sheen (fill).
	M13-10	11:30	20	0.058			29		ML	SILT (28.5-29.0 feet bgs) - greenish grey, moist, preferentially parts along several thin dark grey layers in upper 4-inches of silt, stiff, no hydrocarbon odor, no sheen.
							30			
							31			Clayey SILT (29.0-32.5 feet bgs) - olive grey becoming yellowish orange and grey mottled below 31.0 feet bgs, moist, stiff, plastic, no hydrocarbon odor, no sheen.
	M13-11	11:38		ND						
			2.1				32			
							33			Sandy SILT (32.5-39.0 feet bgs) - light grey and light brown mottling, becoming dark grey below 36.0 feet bgs, moist, oxidation spots and some fine grained muscovite present, stiff, no hydrocarbon odor, no sheen.
							34			
							35			
	M13-12	11:56		-						
			2.7				36			
							37			
							38			
							39			
	M13-13	12:20		-					SM	Silty SAND (39.0-42.5 feet bgs) - dark grey with olive grey silt lenses, wet, root fragments, no hydrocarbon odor, no sheen.
			4.8				40			

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**MONITORING WELL NUMBER**		**MW-13-61**	
	OWRD # 100684			
	HAI LOGGER:	Rob Ede	DRILL START	DRILL FINISH
PROJECT: Northwest Natural Gasco Facility Portland, Oregon	SAMPLING METHOD:	4-inch Core Barrel		
	DRILLING METHOD:	6 1/4-inch ID Hollow Stem Auger	Time:	Time:
	EQUIPMENT TYPE	B-59 Mobil Drill	9:30	14:40
	DRILLER:	Brad James	Date:	Date:
PROJECT: 2708	DRILLING CONTRACTOR:	Geo-Tech Explorations	18-Dec-97	18-Dec-97

BORING DIAMETER:	10-inch
CASING DIAMETER:	2-inch ID
SURFACE ELEVATION:	35.23 feet MSL
TOP OF CASING ELEVATION:	34.78 feet MSL

WELL CONSTRUCTION DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHs (ppm)	CORE INTERVAL	RECOVERY (%)	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
Bentonite Grout							41		SM	
							42			
2-inch ID Blank Stainless Steel Casing							43		SP	SAND (42.5-44.0 feet bgs) - dark grey, wet, fine grained, shell fragments, rootlets, no hydrocarbon odor, no sheen.
							44			
Bentonite Chip Plug							45		ML	Sandy SILT (44.0-47.5 feet bgs) - grey, slightly moist, few thin clayey silt lenses, shell fragments and rootlets, no hydrocarbon odor, no sheen.
	M13-14	12:27		-						
			18.3				46			
							47			
							48		SM	Silty SAND (47.5-51.0 feet bgs) - with olive grey silt lenses and dark grey fine sand lenses throughout, wet, shell fragments and rootlets, no hydrocarbon odor, no sheen.
							49			
							50			
							51			
	M13-15	13:45	4.4	-					SP	SAND (51.0-51.5.0 feet bgs) - grey, wet, fine grained, no hydrocarbon odor, no sheen.
							52		SM	Silty SAND (51.5-55.5 feet bgs) - dark grey, moist to wet, few silt lenses throughout and a 3-inch fine sand lens at 47.5 feet bgs, shell fragments, root fragments, no hydrocarbon odor, no sheen.
							53			
Colorado 10-20 Sand Pack							54			
	M13-16	14:00		-						
			12.4				55			
2-inch ID 0.020-inch Stainless Steel Slotted Screen							56		SP	SAND (55.5-61.0 feet bgs) - dark grey, wet, fine grained, few silt lenses, slight reducing odor within silt lenses, no hydrocarbon odor, no sheen.
							57			
	M13-17	14:18		ND						
			4.7				58			
							59			
	M13-18	14:30	-	-			60			

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**MONITORING WELL NUMBER**		**MW-13-61**	
	OWRD # 100684			
	HAI LOGGER:	Rob Ede	DRILL START	DRILL FINISH
PROJECT:	SAMPLING METHOD:	4-inch Core Barrel		
Northwest Natural	DRILLING METHOD:	6 1/4-inch ID Hollow Stem Auger	Time:	Time:
Gasco Facility	EQUIPMENT TYPE	B-59 Mobil Drill	9:30	14:40
Portland, Oregon	DRILLER:	Brad James	Date:	Date:
PROJECT: 2708	DRILLING CONTRACTOR:	Geo-Tech Explorations	18-Dec-97	18-Dec-97

BORING DIAMETER:	10-inch
CASING DIAMETER:	2-inch ID
SURFACE ELEVATION:	35.23 feet MSL
TOP OF CASING ELEVATION:	34.78 feet MSL

WELL CONSTRUCTION DETAILS	SAMPLE NUMBER*	TIME	HEADSPACE (ppm)	LAB RESULTS TOTAL PAHs (ppm)	CORE INTERVAL	RECOVERY (%)	DEPTH (feet)	GROUNDWATER	STRATA (USCS)	SOIL DESCRIPTION
Sand / Cap							61		SP	
							62			Boring terminated at 61.0 feet bgs Boring sampled to 61.0 feet Monitoring well installed to 61.0 feet bgs
							63			
							64			Materials: 1 foot stainless steel sump/end cap 10 feet 2-inch diameter, 0.010-inch stainless steel slotted screen 40 feet 2-inch diameter stainless steel blank casing 10 feet 2-inch diameter PVC casing 12 50# bags 10/20 Colorado sand 5 50# bags bentonite chips 5 bags bentonite grout 3 centralizers 1 locking cap Flush steel monument
							65			
							66			
							67			
							68			
							69			
							70			* Sample Prefix Number is 2708-971218-
							71			
							72			
							73			
							74			
							75			
							76			
							77			
							78			
							79			
							80			

APPENDIX C

Sediment Core Logs

KEY TO BORING LOGS

Soil classification in this report is based upon visual and manual field observations which include moisture, consistency, plasticity and grading estimates and should not be construed to imply field or laboratory testing unless presented herein. Soils are classified in accordance with the Unified Soil Classification System. Stratigraphic boundaries are approximate representations only. No warranty is provided as to the continuity of soil strata between borings.

UNIFIED SOIL CLASSIFICATION SYSTEM (USCS)

MAJOR DIVISIONS			GROUP SYMBOLS	TYPICAL NAMES
COURSE GRAINED SOILS More Than Half is Larger Than #200 Sieve	GRAVELS More Than Half the Course Fraction is Larger Than No. 4 Sieve Size	Clean Gravels With Little or No Fines	GW	Well Graded Gravels, Gravel-Sand Mixtures
			GP	Poorly Graded Gravels, Gravel-Sand Mixtures
		Gravels With Over 12% Fines	GM	Silty Gravels, Poorly Graded Gravel-Sand-Silt Mixtures
			GC	Clayey Gravels, Poorly Graded Gravel-Sand-Clay Mixtures
	SANDS More Than Half the Course Fraction is Smaller Than No. 4 Sieve Size	Clean Sands With Little or No Fines	SW	Well Graded Sands, Gravelly Sands
			SP	Poorly Graded Sands, Gravelly Sands
		Sands With Over 12% Fines	SM	Silty Sands, Poorly Graded Sand-Silt Mixtures
			SC	Clayey Sands, Poorly Graded Sand-Clay Mixtures
FINE GRAINED SOILS More Than Half is Smaller Than #200 Sieve	SILTS AND CLAYS Liquid Limit Less Than 50%		ML	Inorganic Silts and Very Fine Sands, Rock Flour, Silty or Clayey Fine Sands, or Clayey Silts with Slight Plasticity
			CL	Inorganic Clays of Low to Medium Plasticity, Gravelly Clays, Sandy Clays, Silty Clays, Lean Clays
			OL	Organic Clays and Organic Silty Clays of Low Plasticity
	SILTS AND CLAYS Liquid Limit Greater Than 50%		MH	Inorganic Silts, Micaceous or Diatomaceous Fine Sandy or Silty Soils, Elastic Silts
			CH	Inorganic Clays of High Plasticity, Fat Clays
			OH	Organic Clays of Medium to High Plasticity, Organic Silts
HIGHLY ORGANIC SOILS			Pt	Peat and Other Highly Organic Soils

LEGEND FOR BORING LOGS

- Blank Casing
- Slotted Screen
- Cement Grout
- Concrete
- Bentonite
- Sand Pack
- Fill Material

ABBREVIATIONS

NA	Not Applicable
ND	Not Detected Above Detection Limit
NS	Not Sampled
PAH	Polynuclear Aromatic Hydrocarbons
ppm	Parts Per Million
SPT	Standard Penetration Test
▽	Measured Static Water Level in Well
▼	Estimated Water Level During Drilling

Updated: 7/2/98 RBE
File: Boring Log Key

HAHN AND ASSOCIATES, INC.

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**SOIL BORING NUMBER**	**SD-4**		
PROJECT: Northwest Natural Gas Co. Gasco Facility Portland, Oregon	HAI LOGGER:	Rob Ede	DRILL START	DRILL FINISH
	SAMPLING METHOD:	3.75"OD Disposable Core Barrel	Time:	Time:
	DRILLING METHOD:	Vibration/Push	9:33	9:50
	EQUIPMENT TYPE	VibraCore attached to barge		
	DRILLER:	Bill Jaworski	Date:	Date:
PROJECT #: 2708	DRILLING CONTRACTOR:	Marine Sampling Systems	1/23/96	1/23/96

BORING DIAMETER:	3.75-inch
CASING DIAMETER:	3.75-inch
SURFACE ELEVATION:	Not Surveyed
TOP OF CASING ELEVATION:	Not Applicable

SAMPLE NUMBER*	TIME (1/25/96)	HEADSPACE (ppm)	LAB RESULTS total PAHs/total BTEX(ppm)	Core Interval	RECOVERY INTERVAL	DEPTH (feet)	STRATA (USCS)	SOIL DESCRIPTION
SD-4-01	12:25	2.3	165/ND				ML	SILT-brown, wet, very soft, roots, sheen, hydrocarbon odor (0"-6")
SD-4-02	12:30	4.0	-			1		
SD-4-03	12:36	9.5	-			2		Sandy SILT-grey, wet, soft, roots, sheen, hydrocarbon odor (6"-3')
SD-4-04	12:47	13.6	-			3		Sandy SILT with gravel and wood chips-brown, wet, sheen, hydrocarbon odor (3'-4')
SD-4-05	12:54	24.3	-			4		
SD-4-06	13:00	23.4	-			5		Sandy SILT with fine grained sand seams-grey, moist, rootlets throughout, much vegetative material from 4' to 5', sheen within sand seams only, hydrocarbon odor (4'-6')
SD-4-07	13:30	16.7	-			6		
SD-4-08	13:32	15.6	-			7	SM	Silty SAND-grey, moist, fine grained, root fragments, no sheen, hydrocarbon odor (6'-7')
SD-4-09	13:36	13.9	-			8		Silty SAND-as above, many root fragments, no sheen, hydrocarbon odor (7'-9.5')
SD-4-10	13:38	12.3	-			9		
SD-4-11	13:40	11.6	0.15/ND			10		
						11		
						12		
						13		
						14		
						15		
						16		
						17		
						18		
						19		
						20		

* Sample Number Prefix is 2708-960123-

Core collected and sealed 1/23/96
Core opened and sampled 1/25/96

BTEX = benzene, toluene, ethyl benzene, xylene
PAHs = polynuclear aromatic hydrocarbons
ppm = parts per million
ND = non-detect

HAHN & ASSOCIATES, INC.	SOIL BORING NUMBER SD-5			
434 NW Sixth Avenue Portland, Oregon (503) 796-0717	HAI LOGGER:	Rob Ede	DRILL START	DRILL FINISH
PROJECT:	SAMPLING METHOD:	3.75"OD Disposable Core Barrel	Time:	Time:
Northwest Natural Gas Co. Gasco Facility Portland, Oregon	DRILLING METHOD:	Vibration/Push	10:23	10:40
	EQUIPMENT TYPE	VibraCore attached to barge		
	DRILLER:	Bill Jaworski	Date:	Date:
PROJECT #: 2708	DRILLING CONTRACTOR:	Marine Sampling Systems	1/23/96	1/23/96

BORING DIAMETER:	3.75-inch
CASING DIAMETER:	3.75-inch
SURFACE ELEVATION:	Not Surveyed
TOP OF CASING ELEVATION:	Not Applicable

SAMPLE NUMBER*	TIME (1/25/96)	HEADSPACE (ppm)	LAB RESULTS total PAHs/total BTEX(ppm)	Core Interval	RECOVERY INTERVAL	DEPTH (feet)	STRATA (USCS)	SOIL DESCRIPTION
SD-5-01	14:30	4.7	118/ND				SM	Silty SAND-brown, wet, loose,very fine grained, sheen (0"-6")
SD-5-02	14:33	4.4	-			1		SILT with silty sand lenses-brown, wet, medium stiff, roots, strong sheen (6"-2')
SD-5-03	14:35	3.5	-			2	ML	SILT-olive grey, wet, very soft, wood chips at 2', slight sheen (2'-3')
SD-5-04	14:40	3.7	-			3		
SD-5-05	14:45	3.4	-			4		Sandy SILT-dark brown, moist, medium stiff, rootlets, many wood fragments and dark grey to black discoloration from 6' to 8', sheen (3'-8')
SD-5-06	14:50	9.6	-			5		
SD-5-07	15:00	9.4	-			6		
SD-5-08	15:05	19.0	-			7		
SD-5-09	15:10	17.4	1,154/ND			8	ML	
						9		
						10		
						11		
						12		
						13		
						14		
						15		
						16		
						17		
						18		
						19		
						20		

* Sample Number Prefix is 2708-960123-

Core collected and sealed 1/23/96
Core opened and sampled 1/25/96

BTEX = benzene, toluene, ethyl benzene, xylene
PAHs = polynuclear aromatic hydrocarbons
ppm = parts per million
ND = non-detect

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**SOIL BORING NUMBER**		**SD-6**	
PROJECT:	HAI LOGGER:	Rob Ede	DRILL START	DRILL FINISH
Northwest Natural Gas Co.	SAMPLING METHOD:	3.75"OD Disposable Core Barrel	Time:	Time:
Gasco Facility	DRILLING METHOD:	Vibration/Push	11:02	11:20
Portland, Oregon	EQUIPMENT TYPE	VibraCore attached to barge	Date:	Date:
PROJECT #: 2708	DRILLER:	Bill Jaworski	1/23/96	1/23/96
	DRILLING CONTRACTOR:	Marine Sampling Systems		

BORING DIAMETER:	3.75-inch
CASING DIAMETER:	3.75-inch
SURFACE ELEVATION:	Not Surveyed
TOP OF CASING ELEVATION:	Not Applicable

SAMPLE NUMBER*	TIME (1/25/96)	HEADSPACE (ppm)	LAB RESULTS total PAHs/total BTEX(ppm)	Core Interval	RECOVERY INTERVAL	DEPTH (feet)	STRATA (USCS)	SOIL DESCRIPTION
SD-6-01	15:46	6.5	101/ND					
SD-6-02	15:48	14.6	-			1		SAND-brown, wet, loose, medium grained, wood fragments, slight sheen (0"-1')
SD-6-03	15:50	12.0	-			2	SP	SAND-as above, moist to wet, many wood fragments from 2' to 2.5' with an associated strong sheen (1'-4')
SD-6-04	15:52	6.8	-			3		
SD-6-05	15:55	2.6	-			4		
SD-6-06	16:05	4.0	-			5	SM	Silty SAND-brown, moist to wet, loose, much root material, increasing silt content with depth, sheen (4'-5')
SD-6-07	16:10	9.1	-			6		SAND with interbedded Silts-grey, moist to wet, loose, silts are dark grey, moist, soft, root material and sheen in sands only(5'-8')
SD-6-08	16:13	5.3	-			7	SP	
SD-6-09	16:15	3.1	2.2/ND			8		
						9		
						10		* Sample Number Prefix is 2708-960123- Core collected and sealed 1/23/96 Core opened and sampled 1/25/96
						11		
						12		
						13		
						14		
						15		
						16		BTEX = benzene, toluene, ethyl benzene, xylene PAHs = polynuclear aromatic hydrocarbons ppm = parts per million ND = non-detect
						17		
						18		
						19		
						20		

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**SOIL BORING NUMBER**		**SD-7**	
PROJECT: Northwest Natural Gas Co. Gasco Facility Portland, Oregon	HAI LOGGER:	Rob Ede	DRILL START	DRILL FINISH
	SAMPLING METHOD:	3.75"OD Disposable Core Barrel	Time:	Time:
	DRILLING METHOD:	Vibration/Push	9:33	9:50
	EQUIPMENT TYPE	VibraCore attached to barge		
	DRILLER:	Bill Jaworski	Date:	Date:
PROJECT #: 2708	DRILLING CONTRACTOR:	Marine Sampling Systems	1/23/96	1/23/96

BORING DIAMETER:	3.75-inch
CASING DIAMETER:	3.75-inch
SURFACE ELEVATION:	Not Surveyed
TOP OF CASING ELEVATION:	Not Applicable

SAMPLE NUMBER*	TIME (1/26/96)	HEADSPACE (ppm)	LAB RESULTS total PAHs/total BTEX(ppm)	Core Interval	RECOVERY INTERVAL	DEPTH (feet)	STRATA (USCS)	SOIL DESCRIPTION
SD-7-01	8:32	55.8	26,408/54				ML	SILT-brown, wet, very soft, no sheen (0"-2")
SD-7-02	8:35	318	-			1	GP	Tarry, Sandy GRAVEL, black, tar is hard to slightly plastic, much vegetation, rootlets, decreasing tar content with depth, sheen (2"-1')
SD-7-03	8:37	5.5	-			2	SP	SAND, dark grey, medium grained, loose, some tar in matrix, sheen (1'-2')
SD-7-04	8:40	4.6	-			3	ML	Sandy SILT with fine grained sand seams-grey, moist, slightly stiff, rootlets and wood fragments, no sheen (2'-4')
SD-7-05	9:00	4.1	-			4		
SD-7-06	9:04	1.8	-			5		Silty SAND-grey, moist, fine grained, bedded brown vetetative material, no sheen (4'-6.5')
SD-7-07	9:08	2.1	-			6	SM	
SD-7-08	9:18	1.5	-			7		
SD-7-09	9:23	1.2	-			8	ML	Sandy SILT-grey, moist, medium stiff, shell material, root fragments, no sheen (6.5'-9')
SD-7-10	9:25	1.2'	10.9/ND			9		
						10		
						11		
						12		
						13		
						14		
						15		
						16		
						17		
						18		
						19		
						20		

* Sample Number Prefix is 2708-960123-

Core collected and sealed 1/23/96
Core opened and sampled 1/26/96

BTEX = benzene, toluene, ethyl benzene, xylene
PAHs = polynuclear aromatic hydrocarbons
ppm = parts per million
ND = non-detect

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**SOIL BORING NUMBER**	**SD-8**		
PROJECT:	HAI LOGGER:	Rob Ede	DRILL	DRILL
Northwest Natural Gas Co.	SAMPLING METHOD:	3.75"OD Disposable Core Barrel	START	FINISH
Gasco Facility	DRILLING METHOD:	Vibration/Push	Time:	Time:
Portland, Oregon	EQUIPMENT TYPE	VibraCore attached to barge	9:33	9:50
	DRILLER:	Bill Jaworski	Date:	Date:
PROJECT #: 2708	DRILLING CONTRACTOR:	Marine Sampling Systems	1/23/96	1/23/96

BORING DIAMETER:	3.75-inch
CASING DIAMETER:	3.75-inch
SURFACE ELEVATION:	Not Surveyed
TOP OF CASING ELEVATION:	Not Applicable

SAMPLE NUMBER*	TIME (1/26/96)	HEADSPACE (ppm)	LAB RESULTS total PAHs/total BTEX(ppm)	Core Interval	RECOVERY INTERVAL	DEPTH (feet)	STRATA (USCS)	SOIL DESCRIPTION
SD-8-01	9:50	14.3	875/ND				ML	Sandy SILT-brown, wet, very soft, some medium grained sand lenses, root material, no sheen (0-2')
SD-8-02	9:52	12.9	-			1		
SD-8-03	9:56	12.1	-			2		Sandy SILT-as above, some gravel, slight sheen (2'-4')
SD-8-04	10:00	11.9	-			3		
SD-8-05	10:03	12.3	-			4		Sandy SILT with fine grained sand seams-olive grey, moist, medium stiff, rootlets throughout, much vegetative material, slight sheen (4'-5')
SD-8-06	10:15	13.0	-			5		
SD-8-07	10:18	13.3	-			6	SP	SAND-grey, moist, medium grained, loose, wood fragments, strong sheen (5'-7')
SD-8-08	10:23	30.4	-			7		
SD-8-09	10:30	172.0	-			8	ML	Tarry Sandy SILT-olive grey, moist, stiff, seams of black viscous tar and hardened tar (7'-8')
SD-8-10	10:32	59.7	3,254/2.6			9		Sandy SILT-as above, no tar, strong sheen (8'-9')
						10		
						11		
						12		* Sample Number Prefix is 2708-960123-
						13		Core collected and sealed 1/23/96 Core opened and sampled 1/26/96
						14		
						15		
						16		
						17		BTEX = benzene, toluene, ethyl benzene, xylene PAHs = polynuclear aromatic hydrocarbons ppm = parts per million ND = non-detect
						18		
						19		
						20		

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**SOIL BORING NUMBER**		**SD-9**	
PROJECT:	HAI LOGGER:	Rob Ede	DRILL START	DRILL FINISH
Northwest Natural Gas Co.	SAMPLING METHOD:	3.75"OD Disposable Core Barrel	Time:	Time:
Gasco Facility	DRILLING METHOD:	Vibration/Push	13:25	14:00
Portland, Oregon	EQUIPMENT TYPE	VibraCore attached to barge	Date:	Date:
PROJECT #: 2708	DRILLER:	Bill Jaworski	1/24/96	1/24/96
	DRILLING CONTRACTOR:	Marine Sampling Systems		

BORING DIAMETER:	3.75-inch
CASING DIAMETER:	3.75-inch
SURFACE ELEVATION:	Not Surveyed
TOP OF CASING ELEVATION:	Not Applicable

SAMPLE NUMBER*	TIME (1/26/96)	HEADSPACE (ppm)	LAB RESULTS total PAHs/total BTEX(ppm)	Core Interval	RECOVERY INTERVAL	DEPTH (feet)	STRATA (USCS)	SOIL DESCRIPTION
SD-9-01	10:50	15.8	125/ND					
SD-9-2 (dup)	10:55	13.8	94/ND			1	ML	Sandy SILT-brown, wet, very soft, some medium grained sand lenses, root material , no sheen (0-2')
SD-9-03	10:58	13.0	-			2		
SD-9-04	11:00	13.4	-			3	GP	Gravel-wet, loose, angular, no sheen (2'-3'.5)
SD-9-05	11:02	17.3	-			4	SM	Silty SAND-wet, loose, medium grained, root fragments, strong metallic sheen (3.5'-4')
SD-9-06	11:06	110	5,471/14			5	SP	Tarry SAND-wet, medium grained, root fragments, bits of solidified tar, sheen (4'-5')
						6		
						7		
						8		
						9		
						10		
						11		
						12		
						13		
						14		
						15		
						16		
						17		
						18		
						19		
						20		

* Sample Number Prefix is 2708-960124-

Core collected and sealed 1/24/96
Core opened and sampled 1/26/96

BTEX = benzene, toluene, ethyl benzene, xylene
PAHs = polynuclear aromatic hydrocarbons
ppm = parts per million
ND = non-detect

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**SOIL BORING NUMBER**		**SD-10**	
PROJECT:	HAI LOGGER:	Steve Johnson (FES)	DRILL START	DRILL FINISH
Northwest Natural Gas Co.	SAMPLING METHOD:	3.75"OD Disposable Core Barrel		
Gasco Facility	DRILLING METHOD:	Vibration/Push	Time:	Time:
Portland, Oregon	EQUIPMENT TYPE	VibraCore attached to barge	15:04	15:30
PROJECT #: 2708	DRILLER:	Bill Jaworski	Date:	Date:
	DRILLING CONTRACTOR:	Marine Sampling Systems	1/23/96	1/23/96

BORING DIAMETER:	3.75-inch
CASING DIAMETER:	3.75-inch
SURFACE ELEVATION:	Not Surveyed
TOP OF CASING ELEVATION:	Not Applicable

SAMPLE NUMBER*	TIME (1/26/96)	HEADSPACE (ppm)	LAB RESULTS total PAHs/total BTEX(ppm)	Core Interval	RECOVERY INTERVAL	DEPTH (feet)	STRATA (USCS)	SOIL DESCRIPTION
SD-10-01	12:50	2.5	ND/283					
SD-10-02	12:55	2.4	-			1	ML	SILT-dark brown, wet, soft, some medium grained sand lenses, some plant material and wood chips, slight hydrocarbon odor and sheen from 0 to 0.5 feet (0-2')
SD-10-03	13:00	4.4	-			2		
SD-10-04	13:05	7.1	-			3		SAND-wet, loose, medium grained, wood chips, no hydrocarbon odor or sheen (2'-3')
SD-10-05	13:08	3.6	-			4		SAND-as above, some gravel, no hydrocarbon odor or sheen (3'-5')
SD-10-06	13:25	3	-			5	SP	
SD-10-07	13:28	2.3	-			6		SAND- dark brown, loose, medium grained, some silt, wood chips, slight hydrocarbon odor, no sheen (5'-7.5')
SD-10-08	13:22	0.6	-			7		
SD-10-09	13:30	3.2	ND/9.6			8		
						9		
						10		
						11		
						12		
						13		
						14		
						15		
						16		
						17		
						18		
						19		
						20		

* Sample Number Prefix is 2708-960123-

Core collected and sealed 1/23/96
Core opened and sampled 1/26/96

BTEX = benzene, toluene, ethyl benzene, xylene
PAHs = polynuclear aromatic hydrocarbons
ppm = parts per million
ND = non-detect

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**SOIL BORING NUMBER**	**SD-11**		
PROJECT: Northwest Natural Gas Co. Gasco Facility Portland, Oregon	HAI LOGGER:	Steve Johnson (FES)	DRILL START	DRILL FINISH
	SAMPLING METHOD:	3.75"OD Disposable Core Barrel	Time: 16:00	Time: 16:25
	DRILLING METHOD:	Vibration/Push		
	EQUIPMENT TYPE	VibraCore attached to barge		
	DRILLER:	Bill Jaworski	Date: 1/23/96	Date: 1/23/96
PROJECT #: 2708	DRILLING CONTRACTOR:	Marine Sampling Systems		

BORING DIAMETER:	3.75-inch
CASING DIAMETER:	3.75-inch
SURFACE ELEVATION:	Not Surveyed
TOP OF CASING ELEVATION:	Not Applicable

SAMPLE NUMBER*	TIME (1/26/96)	HEADSPACE (ppm)	LAB RESULTS total PAHs/total BTEX(ppm)	Core Interval	RECOVERY INTERVAL	DEPTH (feet)	STRATA (USCS)	SOIL DESCRIPTION
SD-11-01	13:53	366	5.6/ND				SP	SAND-brown, wet, loose, medium grained, wood chips on surface, hydrocarbon odor, sheen (0'-1')
SD-11-02	13:55	34.2	-			1		
SD-11-03	14:00	13.3	569/ND			2	ML	SILT-dark brown, stiff, medium grained sand lenses, strong hydrocarbon odor and sheen (1'-2')
SD-11-04	14:03	7.8	-			3		SAND-dark brown, loose, medium grained, some silt, wood chips, hydrocarbon odor and sheen (2'-3')
SD-11-05	14:11	6.3	-			4	SP	SAND- as above, no wood chips, brick fragments from 5' to 5.5', slight hydrocarbon odor, no sheen, (3'-6')
SD-11-06	14:14	12.6	-			5		
SD-11-07	14:16	6.3	-			6		
						7		
						8		
						9		
						10		
						11		
						12		
						13		
						14		
						15		
						16		
						17		
						18		
						19		
						20		

* Sample Number Prefix is 2708-960123-

Core collected and sealed 1/23/96
Core opened ans sampled 1/26/96

BTEX = benzene, toluene, ethyl benzene, xylene
PAHs = polynuclear aromatic hydrocarbons
ppm = parts per million
ND = non-detect

HAHN & ASSOCIATES, INC. 434 NW Sixth Avenue Portland, Oregon (503) 796-0717	**SOIL BORING NUMBER SD-12**			
PROJECT: Northwest Natural Gas Co. Gasco Facility Portland, Oregon	HAI LOGGER:	Steve Johnson (FES)	DRILL START Time: 9:01 Date: 1/24/96	DRILL FINISH Time: 9:30 Date: 1/24/96
	SAMPLING METHOD:	3.75"OD Disposable Core Barrel		
	DRILLING METHOD:	Vibration/Push		
	EQUIPMENT TYPE	VibraCore attached to barge		
	DRILLER:	Bill Jaworski		
PROJECT #: 2708	DRILLING CONTRACTOR:	Marine Sampling Systems		

BORING DIAMETER:	3.75-inch
CASING DIAMETER:	3.75-inch
SURFACE ELEVATION:	Not Surveyed
TOP OF CASING ELEVATION:	Not Applicable

SAMPLE NUMBER*	TIME (1/26/96)	HEADSPACE (ppm)	LAB RESULTS total PAHs/total BTEX(ppm)	Core Interval	RECOVERY INTERVAL	DEPTH (feet)	STRATA (USCS)	SOIL DESCRIPTION
SD-12-01	10:40	0.0	0.72/ND			1	SM	Silty SAND-gray, wet, loose, fine grained, no hydrocarbon odor, no sheen (0'-1')
SD-12-02	10:45	0.0	-			2		Silty SAND-as above, wet, wood chips from 2' to 3', slight hydrocarbon odor, no sheen (1'-4')
SD-12-03	10:50	0.3	-			3		
SD-12-04	11:00	0.1	8.4/ND			4		
SD-12-05	11:05	0.0	-			5	CL	Clay, greenish gray, moist, some silt, plastic, no hydrocarbon odor, no sheen (4'-5.5')
SD-12-06	11:08	0.0	-			6	ML	Sandy SILT- light brown, moist, no hydrocarbon odor, no sheen (5.5'-8')
SD-12-07	11:25	0.0	-			7		
SD-12-08	11:28	0.3	-			8		
SD-12-09	11:41	0.6	-			9	SP	SAND, light brown, moist, fine grained,no hydrocarbon odor, no sheen, (8.'-10')
SD-12-10	11:45	0.9	-					
SD-12-11	11:50	3.0	-			10		
						11		
						12		
						13		
						14		
						15		
						16		
						17		
						18		
						19		
						20		

* Sample Number Prefix is 2708-960124-

Core collected and sealed 1/24/96
Core opened and sampled 1/26/96

BTEX = benzene, toluene, ethyl benzene, xylene
PAHs = polynuclear aromatic hydrocarbons
ppm = parts per million
ND = non-detect

HAHN & ASSOCIATES, INC.
434 NW Sixth Avenue
Portland, Oregon
(503) 796-0717

PROJECT:
Northwest Natural Gas Co.
Gasco Facility
Portland, Oregon
PROJECT #: 2708

SOIL BORING NUMBER SD-13

HAI LOGGER:	Steve Johnson (FES)	DRILL START	DRILL FINISH
SAMPLING METHOD:	3.75"OD Disposable Core Barrel	Time: 9:43	Time: 10:15
DRILLING METHOD:	Vibration/Push	Date: 1/24/96	Date: 1/24/96
EQUIPMENT TYPE	VibraCore attached to barge		
DRILLER:	Bill Jaworski		
DRILLING CONTRACTOR:	Marine Sampling Systems		

BORING DIAMETER:	3.75-inch
CASING DIAMETER:	3.75-inch
SURFACE ELEVATION:	Not Surveyed
TOP OF CASING ELEVATION:	Not Applicable

SAMPLE NUMBER*	TIME (1/26/96)	HEADSPACE (ppm)	LAB RESULTS total PAHs/total BTEX(ppm)	Core Interval	RECOVERY INTERVAL	DEPTH (feet)	STRATA (USCS)	SOIL DESCRIPTION
SD-13-01	10:10	0.7	1.4/ND			1	SM	Silty SAND-dark brown to gray, wet, loose, fine grained, no hydrocarbon odor, no sheen (0'-1')
SD-13-02	10:15	2.4	-			2	ML	sandy SILT-dark brown to gray, roots from 1' to 2, large wood chips from 1' to 3', slight hydrocarbon odor from 2' to 3', no sheen (1'-3')
SD-13-03	10:20	4.5	-			3		
SD-13-04	10:25	5.8	-			4	SP	SAND-dark gray, medium grained, hydrocarbon odor, no sheen (3'-3.5')
						5		
						6		
						7		
						8		
						9		
						10		
						11		
						12		
						13		
						14		
						15		
						16		
						17		
						18		
						19		
						20		

* Sample Number Prefix is 2708-960124-

Core collected and sealed 1/24/96
Core opened and sampled 1/26/96

BTEX = benzene, toluene, ethyl benzene, xylene
PAHs = polynuclear aromatic hydrocarbons
ppm = parts per million
ND = non-detect

HAHN & ASSOCIATES, INC.
434 NW Sixth Avenue
Portland, Oregon
(503) 796-0717

SOIL BORING NUMBER SD-14

PROJECT:
Northwest Natural Gas Co.
Gasco Facility
Portland, Oregon
PROJECT #: 2708

HAI LOGGER:	Steve Johnson (FES)	DRILL START	DRILL FINISH
SAMPLING METHOD:	3.75"OD Disposable Core Barrel		
DRILLING METHOD:	Vibration/Push	Time: 12:16	Time: 12:25
EQUIPMENT TYPE	VibraCore attached to barge		
DRILLER:	Bill Jaworski	Date: 1/24/96	Date: 1/24/96
DRILLING CONTRACTOR:	Marine Sampling Systems		

BORING DIAMETER:	3.75-inch
CASING DIAMETER:	3.75-inch
SURFACE ELEVATION:	Not Surveyed
TOP OF CASING ELEVATION:	Not Applicable

SAMPLE NUMBER*	TIME (1/25/96)	HEADSPACE (ppm)	LAB RESULTS total PAHs/total BTEX(ppm)	Core Interval	RECOVERY INTERVAL	DEPTH (feet)	STRATA (USCS)	SOIL DESCRIPTION
SD-14-01	9:00	0.1	0.15/ND			1	ML	SILT-dark brown, wet, root material, no hydrocarbon odor, no sheen (0'-1')
SD-14-02	9:10	1.5	-			2		SILT-as above, some fine grained sand lenses,no hydrocarbon odor, no sheen (1'-2')
SD-14-03	9:20	1.8	-			3	SM	Silty SAND-medium grained, large wood chips, no hydrocarbon odor, no sheen (2'-3.5')
SD-14-04	9:25	2.4				4		Silty SAND-fine grained, small wood chips, no hydrocarbon odor, no sheen (3.5'-4')
SD-14-05	9:35	-	-			5	ML	SILT- light brown, moist, painted wood fragment at 4.5', small wood fragments from 5' to 6', shell fragments from 6' to 7', decaying wood odor, no hydrocarbon odor, no sheen (4'-7.5')
SD-14-06	9:40	0.5	-			6		
SD-14-07	9:50	0.2	-			7		
SD-14-08	9:55	0.4	-			8	SP	SAND, light brown, moist, medium grained, no hydrocarbon odor, no sheen, (7.5.'-8.5')
SD-14-09	10:00	5.8	181/ND			9		
						10		
						11		
						12		
						13		
						14		
						15		
						16		
						17		
						18		
						19		
						20		

* Sample Number Prefix is 2708-960124-

Core collected and sealed 1/24/96
Core opened and sampled 1/25/96

BTEX = benzene, toluene, ethyl benzene, xylene
PAHs = polynuclear aromatic hydrocarbons
ppm = parts per million
ND = non-detect

D

APPENDIX D

Water Well Logs and Cathodic Protection Well Logs

9-189
(Oct. 1939)

NOTEBOOK SHEET

Name ..... Date .....

Port. Gen. & Elec.
under St. Johns bridge.
basalt at
at 60 ft.
400 ft. deep.
12" casing
Screen 4"S Mar 1954
Pumps 159 gpm at 200 ft.
Flowed when drilled 1941
made 400 gpm.

U. S. GOVERNMENT PRINTING OFFICE 16—12406-1

9-185
(August 1949)

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

WELL SCHEDULE

Date 1 April, 1954 Field No.
Record by J.M.N. Office No.
Source of data Mr. Wright, Engineer

1. *Location:* State Oregon County Mult.
Map Hillsboro
..... ¼ ..... ¼ sec. ..... T ..... N/S R .....
2. *Owner:* Portland Gas & Coke Address 2900 NW
Tenant ..... Address .....
Driller A.M. Jansen Address Redmond
3. *Topography* Valley plain
4. *Elevation* 30 ft. above/below S.L. Map
5. *Type:* Dug, drilled, driven, bored, jetted 19 48
6. *Depth:* Rept. 382' ft. Meas. ..... ft.
7. *Casing:* Diam. 12 in., to 8 in., Type Iron
Depth 63'-12", Finish 140'-8" Perf.
8. *Chief Aquifer* Sand? From 241 ft. to
Others .....
9. *Water level* ..... ft. rept./meas. ..... 19..... above/below
..... which is ..... ft.
10. *Pump:* Type ..... Capacity ..... G.M.
Power: Kind ..... Horsepower .....
11. *Yield:* Flow ..... G. M., Pump 140 G. M., Meas. Rept.
Drawdown ..... ft. after ..... hours pumping .....
12. *Use:* Dom., Stock, PS., RR., Ind., Irr., Obs. Cooling
Adequacy, permanence Not adequate
13. *Quality* ok Temp .....
Taste, odor, color ..... Sample Y/N
Unfit for .....
14. *Remarks:* (Log, Analyses, etc.) Well lost about 1/2 of production soon after beginning. Well was dynamited twice a day ago

U. S. GOVERNMENT PRINTING OFFICE 10—59355-1

(over)

Koppers000869

HAI Map ID Number
2

increase in production was noticed. Any production over 140 gpm will cause present pump set at 180 ft. to break suction.

Skelton log:

0-61. sand (12" casing to 63')
61-241 Rock (basalt?; not cased)
241-246 Sand and broken rock
246-258 Sand
253?-370 Basalt, broken, soft.
382' bottom of well

Mr Wright promised to send complete log. R.A.Ly. 1 Apr. 1954

St. Helens Rd

Log on Ground Information

Material	Depth
Grey clay-dirt	0 - 4
Brown-black sand	4 - 9
Brown clay	9 - 43
Broken black rock-decomposed in places	43 - 102
Broken black rock w/brown clay layers	102 - 114
Black rock	114 - 128
Broken black rock w/layers black lava rock	128 - 162
Black rock	162 - 189
Grey rock	189 - 199
Black lava rock w/thin layer grey clay	199 - 212
Black rock, broken in places	212 - 281
Broken black rock-grey sandy clay	281 - 305
Black lava rock	305 - 344
Black ~~lava~~ rock/layers grey clay	344 - 350
Black rock-broken in pâaces	350 - 400

Rect. #226
Portland

Log on Ground Information

Material	Depth
14 anodes 17ft. center 164' to 392	
Coke at 140' , gravel to 80ft.	
Cement to 50 ft. gravel to 0	
Gravel	0 - 1
Clay	1 - 2
Sand	2 - 10
Brown clay	10 - 40
Sand	40 - 50
Broken rock	50 - 78
Black basalt hard some broken lava rock layers	78 - 290
Broken multi colored rock & sandstone, little clay	290 - 310
Black basalt hard	310 - 370
Broken rock sandy clay	370 - 390
Black basalt Hard	390 - 400

2

NOTICE TO WATER WELL CONTRACTOR
The original and first copy of this report are to be filed with the STATE ENGINEER, SALEM, OREGON 97310 within 30 days from the date of well completion.

WATER WELL REPORT
STATE OF OREGON
(Please type or print)

State Well No. 1N/1W-12N

State Permit No.

(1) OWNER:
Name Portland Gas & Coke Company

Address

(2) LOCATION OF WELL:
County Multnomah Driller's well number

SW ¼ SW ¼ Section 12 T. 1N R. 1W W.M.

Bearing and distance from section or subdivision corner

(3) TYPE OF WORK (check):
New Well ☐ Deepening ☐ Reconditioning ☐ Abandon ☐

If abandonment, describe material and procedure in Item 12.

(4) PROPOSED USE (check):
Domestic ☐ Industrial ☐ Municipal ☒
Irrigation ☐ Test Well ☐ Other ☐

(5) TYPE OF WELL:
Rotary ☐ Driven ☐
Cable ☐ Jetted ☐
Dug ☐ Bored ☐

(6) CASING INSTALLED:
Threaded ☐ Welded ☐

12" Diam. from 0 ft. to 63 ft. Gage
8" Diam. from ft. to ft. Gage
" Diam. from ft. to ft. Gage

(7) PERFORATIONS:
Perforated? ☐ Yes ☐ No

Type of perforator used

Size of perforations in. by in.

perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

(8) SCREENS:
Well screen installed? ☐ Yes ☐ No

Manufacturer's Name

Type Model No.

Diam. Slot size Set from ft. to ft.
Diam. Slot size Set from ft. to ft.

(9) CONSTRUCTION:
Well seal—Material used in seal

Depth of seal ft. Was a packer used?

Diameter of well bore to bottom of seal in.

Were any loose strata cemented off? ☐ Yes ☐ No Depth

Was a drive shoe used? ☐ Yes ☐ No

Was well gravel packed? ☐ Yes ☐ No Size of gravel:

Gravel placed from ft. to ft.

Did any strata contain unusable water? ☐ Yes ☐ No

Type of water? depth of strata

Method of sealing strata off

(10) WATER LEVELS:
Static level 48 ft. below land surface Date 1954

Artesian pressure lbs. per square inch Date

(USE ADDITIONAL SHEETS IF NECESSARY)

(11) WELL TESTS:
Drawdown is amount water level is lowered below static level

Was a pump test made? ☐ Yes ☐ No If yes, by whom?

Yield: 140 gal./min. with ft. drawdown after hrs.
" 150 " with drawdown to 200 feet
" " " "

Bailer test gal./min. with ft. drawdown after hrs.

Artesian flow g.p.m. Date

Temperature of water Was a chemical analysis made? ☐ Yes ☐ No

(12) WELL LOG:
Diameter of well below casing

Depth drilled ft. Depth of completed well 382 ft.

Formation: *Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.*

MATERIAL	FROM	TO
Sand	0	61
Rock (basalt)	61	241
Sand and broken rock	241	246
Sand	246	258
Basalt, broken, soft	258	370

Data from USGS

Work started 19 Completed 1948

Date well drilling machine moved off of well 19

(13) PUMP:
Manufacturer's Name

Type: H.P.

Water Well Contractor's Certification:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME A. M. Jannsen (Person, firm or corporation) (Type or print)

Address

Drilling Machine Operator's License No.

[Signed] (Water Well Contractor)

Contractor's License No. Date 19

10

Koppers000872

6711 N. E. 58th Ave.
Vancouver, Wash. 98661
Phone: 694-6242
834-3370

HANSEN DRILLING CO., Inc.

LOG

Name Northwest Natural Gas

Address Gasco Regulator Station St-Helens Rd.

Date Started 11-23-76 Date Finished 12-10-76

DESCRIPTION:

(a) Well Depth 400 ft. Diameter 10"

(b) Depth from ground surface to water level before pumping _____ ft. Bailer tested _____ GPM

(c) Drawdown of water level is _____ feet. (pumping level minus static water level)

(d) Casing - screen - perforation - shoe - etc.

10" casing from 0 - 20'
1" pipe from 0 - 400'
4 sks. cement 37 sks. mud

Time:
67 hrs...Drilling time
7 hrs....Down time
10 hrs...Set up & clean up
6½ hrs...Circulate anodes, coke, etc..

Desmet
Rotary

PIONEER PTG. IN

Sec. 12 T1N R1W wm

6711 N. E. 58th Ave.
Vancouver, Wash. 98661
Phone: 694-6242

HANSEN DRILLING CO., Inc.

LOG

Name Northwest Natural Gas Co. Rect. # 226

Address Gasco Reg. Station Portland

Date Started 10-16-85 Date Finished 10-22-85

DESCRIPTION:

(a) Well Depth 400 ft. Diameter 8 3/4

(b) Depth from ground surface to water level before pumping Ø ft. Bailer tested Ø GPM

(c) Drawdown of water level is Ø feet. (pumping level minus static water level)

(d) Casing - screen - perforation - shoe - etc.

10" casing 0 - 20
19 sks. cment 100 sks. 50# coke 99
35 sks. gel (mud) 18 sks. 50# #496
400 ft. 1" pipe 2 yds. gravel
100 ft. 2" sche. 40 vent pipe
30 ft. 2" monitor pipe

7 Hrs. Mob.,demob.,clean-up & surface seal
24 Hrs. Drillong & chasing
5 Hrs. extra time cementing & setting vent tube & monitor pipe
7 Hrs. anodes, circulate, coke, graphite & gravel

PIONEER PTG. IN

260/ Hansen

over

STATE OF OREGON
WATER WELL REPORT
(as required by ORS 537.765)

NOV 1 1985
WATER RESOURCES DEPARTMENT
SALEM, OREGON

006108

PLEASE TYPE or PRINT IN INK

1N/1W-12
(for official use only)

(1) OWNER:
Name: Northwest Natural Gas Co. Rect. #226
Address: 220 NW, Second Ave.
City: Portland State: Oregon

(2) TYPE OF WORK (check): Cathodic Protection Ground bed
New Well ☒ Deepening ☐ Reconditioning ☐ Abandon ☐
If abandonment, describe material and procedure in Item 12.

NOT A WATER WELL

(3) TYPE OF WELL: Rotary Air ☐ Driven ☐ Rotary Mud ☒ Dug ☐ Cable ☐ Bored ☐

(4) PROPOSED USE (check): Domestic ☐ Industrial ☐ Municipal ☐ Irrigation ☐ Thermal: Withdrawal ☐ Reinjection ☐ Other: Piezometric ☐ Grounding ☐ Test ☒

(5) CASING INSTALLED: Steel Threaded ☒ Plastic Welded ☒
10" Diam. from 0 ft. to 20 ft. Gauge .250
2" Diam. from 0 ft. to 100 ft. Gauge sche. 40

LINER INSTALLED: Steel Threaded ☐ Plastic Welded ☐
" Diam. from ft. to ft. Gauge

(6) PERFORATIONS: Perforated? ☐ Yes ☐ No
Size of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

NOT A WATER WELL

(7) SCREENS: Well screen installed? ☐ Yes ☐ No
Manufacturer's Name
Type Model No.
Diam. Slot Size Set from ft. to ft.
Diam. Slot Size Set from ft. to ft.

(8) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? ☐ Yes ☐ No If yes, by whom?
Yield: gal./min. with ft. drawdown after hrs.
Air test gal./min. with drill stem at ft. hrs.
Bailer test gal./min. with ft. drawdown after hrs.
Artesian flow g.p.m.
Temperature of water Depth artesian flow encountered ft.

(9) CONSTRUCTION: Special standards: Yes ☐ No ☐
Well seal—Material used: Cement
Well sealed from land surface to: 20 / 50'-80' ft.
Diameter of well bore to bottom of seal: 14 / 83/4 in.
Diameter of well bore below seal: 8 3/4 in.
Amount of sealing material: 19 sacks ☐ pounds ☐
How was cement grout placed? Pumped

NOT A WATER WELL

Was pump installed? Type HP Depth ft.
Was a drive shoe used? ☐ Yes ☐ No Plugs Size: location ft.
Did any strata contain unusable water? ☐ Yes ☐ No
Type of Water? depth of strata
Method of sealing strata off
Was well gravel packed? ☐ Yes ☐ No Size of gravel:
Gravel placed from ft. to ft.

(10) LOCATION OF WELL by legal description:
County: Multnomah ¼ ¼ of Section 12 of
Township: 1 N (Township is North or South) Range: 1 W (Range is East or West) WM.
Tax Lot Lot Block Subdivision
MAILING ADDRESS OF WELL (or nearest address): Gasco Reg. Station St Helen Rd.

NOT A WATER WELL

(11) WATER LEVEL of COMPLETED WELL:
Depth at which water was first found ft.
Static level ft. below land surface. Date
Artesian pressure lbs. per square inch. Date

(12) WELL LOG: Diameter of well below casing 8 3/4
Depth drilled 400 ft. Depth of completed well 0 ft.
Formation: Describe color, texture, grain size and structure of materials; and show thickness and nature of each stratum and aquifer penetrated, with at least one entry for each change of formation. Report each change in position of Static Water Level and indicate principal water-bearing strata.

MATERIAL	From	To	SWL
Gravel	0	1	GL
Clay	1	2	CC
Sand	2	10	SL
Brown clay	10	40	CC
Sand	40	50	SL
Broken rock	50	78	RC
Black basalt hard some broken lava rock layers	78	290	RC
Broken multi colored clay & sandstone little clay	290	310	SS
Black basalt hard	310	370	RC
Broken rock sandy clay	370	390	SC
Black basalt hard	390	400	RC

NOT A WATER WELL

Date work started Oct. 16, 1985 completed Oct. 22, 1985
Date well drilling machine moved off of well Oct. 22, 1985 19

(unbonded) Water Well Constructor Certification (if applicable):
This well was constructed under my direct supervision. Materials used and information reported above are true to my best knowledge and belief.
Signed Date , 19

(bonded) Water Well Constructor Certification:
Bond 63-0130-11384-87-1 (number) Issued by: UFS&G (Surety Company Name)
On behalf of Jim Hansen / Hansen Drilling Co. Inc. (type or print name of Water Well Constructor)

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief:
(Signed) Jim Hansen (Water Well Constructor)
(Dated) Oct. 23, 1985

NOTICE TO WATER WELL CONSTRUCTOR WATER RESOURCES DEPARTMENT, SALEM, OREGON SP*46866

Koppers000874

Beazer Materials and Services, Inc.
A Member of THE BEAZER GROUP
Law Department
436 Seventh Avenue, Pittsburgh, PA 15219
Phone: 412-227-2430 Fax: 412-227-2042

Jill M. Blundon
General Counsel
Thomas Burgunder
Thomas F. Reid
George Carroll
Mary Dombrowski Wright
Billie Schrecker Nolan
William F. Giarla
Babette Magee
James B. Springfield
Real Estate Manager

June 2, 1989

Fred Hansen
Director
Department of Environmental Quality
811 SW Sixth Ave.
Portland, OR 97204-1390

Jay F. Young
NL Industries, Inc.
P. O. Box 1090
Hightstown, NJ 08520

RE: Doane Lake

Gentlemen:

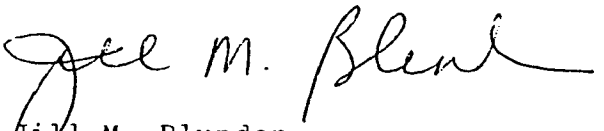
Please be advised that as a result of the December 28, 1988 sale of the former Koppers Company, Inc. (now known as Beazer Materials and Services, Inc. ("BM&S")) tar terminal located in Portland, Oregon ("plant") to Koppers Industries, Inc. ("KII"), BM&S has assumed liability, if any, arising out of environmental contamination at the plant, if any, occurring before December 28, 1988. Accordingly, with respect to the Doane Lake site, if any liability is determined to arise from activities at the plant before December 28, 1988, that liability will be BM&S', not KII's. As you know, BM&S continues to take the position that no such liability exists.

Therefore, all future communications with respect to the Doane Lake site should be directed to Billie Nolan, Beazer Materials and Services, Inc., 1400 Koppers Building, Pittsburgh, PA 15219 and not to the plant or to anyone else at KII.

Writer's Direct Dial Number 412/227-2414

Thank you for your assistance in this regard.

Very truly yours,



Jill M. Blundon
Vice President and
General Counsel

cc: J. Batchelder
L. Flaherty
J. Oxford - KII Portland

Summary of Revised Article VII to Beazer / Koppers Asset Purchase Agreement
Dated July 15, 2004

Section	Summary of Agreement	Requirements for Plants
Survival of APA	• Only Article VII is amended, rest of APA unchanged.	•
Date of Amendment	• July 15, 2004	•
BEI Indemnity 7.02(a)	• BEI defends & indemnifies KI from: o Environmental Cleanup Liability arising from: ▪ Conditions existing prior to 12/28/88 ▪ Investigation, remediation and closure costs associated with those conditions ▪ Results of remedial activities associated with those claims o Environmental Claims (personal injuries, property damages & NRD) arising from conditions existing prior to 12/28/88. o Fines and penalties resulting from: ▪ Beazer remedial activity ▪ Violations of law arising from conditions existing prior to 12/28/88 • Conditions: o To preserve indemnity, claims must be tendered to BEI by 7/23/2019 o Indemnity is triggered by a notice from one party to the other o BEI does not indemnify KI from liabilities arising as a result of a change in site use unrelated to the business	•
KI Indemnity 7.03(a)	• KI defends & indemnifies BEI from: o Environmental Cleanup Liabilities or Claims (personal injury, property damage, NRD) resulting from KI actions after 12/28/88 o Fines and penalties resulting from violations of law that arise due to acts or omissions of KI o Fines and penalties arising from the operations of the facilities after 12/28/88 o Any Cleanup Liability or Claim arising after 7/23/2019	•
Permits 7.02(b)	• BEI retains responsibility to comply with financial responsibility requirements • BEI will use reasonable efforts to become the primary and exclusive signatory to any consent orders, decrees, settlements and permits associated with remediation . Koppers will sign where required by law o BEI will provide reasonable notice in those situations. • If KI is a signatory, they shall be included in discussions regarding those issues which may impose obligations on KI.	•
Acceleration 7.02(c)	• KI agrees that it will not take any action to accelerate the timing or increase the costs of BEI's obligations – except as necessary for the operation of the business.	• Plants can communicate with agencies regarding remediation under limited circumstances – check with CSG before communicating
T&D 7.02(d)	• KI pays T&D for soils from structural area of any expansion, maintenance, renovation or consolidation of facilities.	•

Summary of Revised Article VII to Beazer / Koppers Asset Purchase Agreement Dated July 15, 2004

	• BEI pays T&D for soils managed during a remediation project
	• KI will agree to on-site disposal of soils if:
	  o Cost effective,
	  o Complies with applicable laws, and
	  o No unreasonable interference with business.	

Notices 7.05	• Each party must promptly notify the other of a Claim • KI must provide an annual summary of spills requiring notification of the NRC or that present a reasonable potential for exacerbation of contamination. Includes any pictures of such spills. • BEI will keep this info confidential.	• Reporting of all spills is important – CSG will determine which spills are reported to BEI. If you have pictures, send them with the spill report.

Soil Management Plans
7.06(k)
	• BEI's option to develop SMP
	• Parties work in good faith to:
	  o Not unreasonably interfere with operations
	  o Limit the size of the SMP
	• KI responsible for implementing SMP
		• It is likely that all former Beazer plants will have SMPs
		• Plants must maintain the plan and understand its requirements
		• We recommend a procedure on soils excavation which outlines the areas covered by the SMP and attaches the SMP
		• We recommend each plant have a HAZWOPER trained individual on site

Conducting Risk Assessments 7.06(l)	• BEI will follow applicable regs and guidance • BEI directs and controls all discussions and negotiations • BEI will notify KI when an RA is conducted or modified	•
Remedies Due to Changed Use 7.06(m)	• BEI assumes current use = future use • If KI relocates operations or changes work practices, KI may conduct an RA (consistent with BEI RA methodology) to demonstrate an excess risk to workers due to the relocation/change. At that point, BEI must address that risk. -	• When a plant is considering relocating an operation or establishing a new operation, they must notify CSG. • If a plant changes work practices (hours at a specific operation, change in PPE, etc), notify CSG. • CSG will coordinate with BEI.

Risk Assessment Assumptions
7.06(n)
	• BEI will use default RA assumptions regarding KI workers
	• Any site specific assumptions require KI approval. KI will not withhold approval unreasonably, but KI not required to approve assumptions that :
	  o Require work practices beyond those KI must otherwise comply with
	  o Unreasonably impair work related activities
	  o Unreasonably interfere with planned changes to the site
	• KI must notify BEI of planned changes as soon as change is authorized
	  o KI will cooperate with BEI to mitigate the costs to
		• Plants should not discuss risk assessment assumptions with BEI representatives until the plant has discussed this with CSG.
		• Plants must notify CSG early in the planning process if they are constructing, dismantling, or relocating any equipment, structure or operation.
		• Build this notification into

Summary of Revised Article VII to Beazer / Koppers Asset Purchase Agreement Dated July 15, 2004

	BEI of the planned changes • Subject to KI's risk management policies, KI will allow BEI (and contractor) access to plants	change management procedures.
Technical Assumptions 7.06(o)	• BEI uses sole reasonable judgment in determining technical assumptions (absorption / adjustment factors, etc) • BEI indemnifies KI from any action resulting from these assumptions	•
Final RA 7.06(p)	• So long as BEI complies with 7.06(n), BEI alone will contact / communicate with agencies regarding the RA.	•

Communication 7.07(a) & (b)	• Where either party incurs liability, that party has a right to participate in meetings
	• Prior to initiating a proceeding adverse to the other party, each party will notify that party.
	• If BEI controlling the liability, only BEI may communicate with regulators (unless law require otherwise).
	• If KI determines that it is required to communicate, must confer in good faith, then arbitrate if disagree. (law firm handles arbitration)
	  o If law firm decides that communication is required, parties will communicate quickly and in manner designed to not increase or accelerate costs.
	  o If law firm says no communication required, then neither party will communicate.
	  o Parties will also follow law firm's advice as to the substance of the communication.
	• Neither party will discuss the other party's responsibility, liability, obligation or operations with an agency without consent
		• If a plant has an issue with something BEI is doing, tell CSG. Do not talk to regulators.

Quarterly meetings 7.08(b)	• Parties shall meet quarterly to discuss:
	  o Changes in plant operations that may involve excavation of soil
	  o Changes at plants that involve changed usage patterns
	  o Expectation by BEI that a deed restriction greater than "General Industrial" may be required
	  o Expectation by BEI that a soil management plan may be required
	  o Plans by KI to discontinue operation of WWTPs
	  o BEI observations at KI plants affecting indemnity obligations
	  o New BEI activity planned at any site
	  o Reports submitted to gov't agencies
	  o Discuss of site-specific RA assumptions
	  o Summary of BEI activities and discussions with agencies
	  o Material recycling issues
	  o Any consent order, settlement or permit that BEI believes KI may be required to sign
	  o Stormwater issues
		• Plants must notify CSG of the following as soon as they are aware:
		  o Changes in plant operations that may involve excavation of soil
		  o Changes at plants that involve changed usage patterns
		  o Plans by KI to discontinue operation of WWTPs
		  o Any other issue they have with BEI operations

Recycling/Reuse of Materials 7.08(c)	• Parties will cooperate to create recycle/reuse strategies for BEI's materials, subject to: o Extent permitted by law (KI has no intent to be a TSDF)	• Plants may be required to accept DNAPL for reuse • Coordinate with CSG before agreeing to anything with

Summary of Revised Article VII to Beazer / Koppers Asset Purchase Agreement
Dated July 15, 2004

	○ Capacity limitations of KI equipment ○ Specs provided by KI ○ BEI to maintain documentation on all material KI accepts ○ BEI will obtain all authorizations/permits ○ KI has right to inspect and refuse non-conforming material • BEI pays incremental costs • BEI indemnifies KI for any result not caused by KI negligence	BEI • Plant will: ○ provide a "spec" for material acceptance. ○ provide a procedure for acceptance (site access issues, unloading requirements, etc) ○ invoice BEI for any incremental costs associated with recycling (manpower, power, etc)
Groundwater 7.08(d)	• KI will treat BEI's groundwater, subject to: ○ KI has first priority on capacity ○ Treatment of permitted under KI permits ○ Treatment does not substantially increase KI SH&E liability ○ Treatment does not interfere with operations • Groundwater generated at any BEI site • No cost to BEI • BEI indemnifies KI from any loss caused by such treatment	• Plants will accept BEI groundwater for treatment in WWTP. • Coordinate with CSG prior to acceptance to ensure we address any issues of quality, capacity, permitting, etc
Additional water treatment capacity 7.08(e)	• Where BEI requests KI add capacity: ○ BEI will pay for capital costs of modification ○ BEI will obtain necessary permits ○ BEI will reimburse KI for incremental costs ○ KI not obligated to operate or modify a WWTP that is not needed by KI	•
Stormwater 7.08(f)	• BEI is responsible for stormwater generated from construction, operation, maintenance and redress of remediation projects • If KI has WWTP capacity and BEI requests, KI will treat BEI's stormwater • BEI responsible for conveying water to WWTP • BEI will provide data on the stormwater to allow KI to make the determination of treatability • BEI indemnifies KI from any damage or expense of such treatment, unless caused by KI negligence	• Plants will accept BEI stormwater for treatment in WWTP. • Coordinate with CSG prior to acceptance to ensure we address any issues of quality, capacity, permitting, etc
Institutional Controls 7.08(g), (h) & (i)	• KI will allow "general industrial use; no groundwater used for potable water" deed restriction without compensation • KI and BEI will work in good faith to limit the extent and terms of any additional restrictions (including defining the process area as KI defines it), but KI cannot refuse restrictions required by agencies • BEI responsible for auditing, monitoring and oversight of institutional controls • Compensation for restrictions above "general industrial use" will be negotiated or arbitrated	•
Remedial components 7.08(j) & (k)	• BEI may use KI property to implement remedies, so long as they do not substantially interfere with KI's ordinary conduct of business	•

Summary of Revised Article VII to Beazer / Koppers Asset Purchase Agreement
Dated July 15, 2004

	• BEI and KI will work together to site the component so it does not interfere • BEI will notify in advance of proposing such a remedy and will act in good faith to not substantially interfere with conduct of business. • If KI and BEI cannot agree on whether a component substantially interferes, they will submit the issue to arbitration • Either party may submit the issue of compensation to arbitration	
Temporary Discontinuance of water treatment 7.08(l)	• KI may discontinue treatment of BEI's groundwater or stormwater if KI has reasonable concerns for its compliance obligations • Discontinuance continues until issue is resolved to agencies' satisfaction • KI will provide as much advance notice as possible (BEI understands advance notice is not always possible) • KI will not discontinue unless reasonably necessary	• Before discontinuing treatment of BEI water, discuss issues with CSG. In an emergency, contact CSG as soon as possible after discontinuance.
Disposal of WWTP 7.08(m)	• KI can permanently close any wastewater treatment plant if decision is reasonable. • KI will provide as much advance notice as possible • Parties may engage in negations for BEI's purchase of WWTP before KI dismantles	•
Recordkeeping 7.09	• BEI responsible for maintaining all records, permits, authorizations and other materials associated with remediation • BEI may contract with KI for services, at KI's cost	• Plants must provide BEI with space to store files and access to those files. • Before agreeing to provide services to BEI, contact CSG.

KOPPERS INDUSTRIES

Koppers Industries, Inc.
436 Seventh Avenue
Pittsburgh, PA 15219

Phone: (412) 227-2000
FAX: 412-227-2022

News Release

Contact Gerald B. Wellner

Release Immediate

KOPPERS TAR, WOOD TREATING AND COKE BUSINESS
PURCHASED BY MANAGEMENT AND INVESTORS

Koppers Industries, Inc. -- a new company formed by managers of Koppers Company's Tar and Wood Products Sector and outside investors -- has purchased three of Koppers traditional businesses from Koppers Company, Inc., an affiliate of Beazer PLC. The businesses include tar processing, wood preservation and furnace and foundry coke operations.

The purchase price was substantially in excess of $200 million and represents the largest single divestiture of Koppers assets by the Beazer organization.

Robert K. Wagner, 57, will be president and chief executive officer of Koppers Industries. Mr. Wagner was vice president and general manager of Koppers Tar and Wood Products Sector.

With projected annual revenues above $400 million in 1989, Koppers Industries will own 20 plants in the U.S., and have equity interests in similar businesses in Australia and Denmark.

Koppers Industries retains the Koppers name and has agreed to remain headquartered in Pittsburgh for at least 10 years. The company has signed a five-year lease for space in the Koppers Building. Total employment will be about 1900 people, including 135 in the Pittsburgh office.

-more-

Approximately 100 management investors will own a total of about 34% of the voting stock. The remainder will be shared equally by Beazer PLC and Koppers Australia Pty. Limited, an Australian company owned by Koppers Industries, The Broken Hill Proprietary Company Limited (Australia's largest company) and Hickson International PLC.

Goldman, Sachs & Co. acted as financial advisor to the management investors, with Wachtell, Lipton, Rosen & Katz, and Dickie, McCamey & Chilcote acting as legal advisors to management. Mellon Bank NA underwrote the senior debt financing; Reed Smith Shaw & McClay acted as counsel for Mellon.

Directors of Koppers Industries include Mr. Wagner; Brian C. Beazer, chairman and CEO, Beazer PLC; Brooks C. Wilson, managing director, Koppers Australia Pty. Limited; and Clayton A. Sweeney Esq., managing director, Dickie, McCamey & Chilcote, a Pittsburgh law firm. A fifth director will be added in the near future.

In addition to Mr. Wagner, the senior managers of the new company, all currently employed by Koppers, include:

- Earl A. Clendaniel (57), executive vice president, Marketing and Sales.
- John C. Youts (47), vice president, chief financial officer.
- Lawrence F. Flaherty (52), vice president and manager, Tar Operations.
- Raymond S. Ohlis, Jr. (53), vice president and manager, Treated Wood Operations.
- Donald N. Sweet, Jr. (41), vice president and general manager, Coke and By-Product Operations.
- James R. Batchelder (53), vice president and manager, Environmental and Technical.
- Joseph E. Boan (41), vice president, Human Resources.
- Donald E. Davis (32), treasurer of the company
- Randall D. Collins (36), secretary of the company.

# # # # #

12/30/88

Koppers000884

Pumps For Industry Repair Center

No. 3913

Mailing Address:
1502 N. Ainsworth
Portland, Oregon 97217
(503) 283-1481
Fax (503) 283-1485

INVOICE

SOLD TO:
Koppers Industries Inc.
7540 NW St Helens Rd
Portland OR 97210

SHIP TO:
Koppers Industries Inc.
7540 NW St Helens Rd
Portland OR 97210

CUSTOMER PURCHASE ORDER
NUMBER- ~~XXXXX~~ 93-42
ORDERED BY- T.J.
DATE: 10/26/93

INVOICE DATE:	TERMS:	
1/14/94	NETT 15 DAYS	23836

SHIPPED VIA:	DATE SHIPPED	COLL	PPC & BILL	PPC FFA	PARTIAL SHIPMENT --	F.O.B.
CF FREIGHT/DELIVERED	1/14/94		XX		☐Yes ☒No	Factory

QUANTITY ORDERED	QUANTITY SHIPPED	BACK ORDERED	DESCRIPTION	PRICE (EACH)	EXTENSION	AMOUNT
1	1	0	Weinman Sump Pump Model 336 MG-VS 7.5 - 14 7½ HP Motor TEFC 480 VAC 3Ø	$2786.00		$2786.00
			Factory Freight			157.74
			Total Amount Due			$2943.74
			WE APPRECIATE YOUR BUSINESS			

WE HEREBY CERTIFY THAT THESE GOODS WERE PRODUCED IN COMPLIANCE WITH ALL APPLICABLE REQUIREMENT OF SECTION 6, 7 AND 12 OF THE FAIR LABOR STANDARDS ACT, AS AMENDED AND OF REGULATIONS AND ORDERS OF THE UNITED STATES DEPARTMENT OF LABOR ISSUED UNDER SECTION 14 THEREOF.

TERMS; NET 30 DAYS ON APPROVAL OF CREDIT OR TERMS SUBJECT TO PRIOR WRITTEN AGREEMENT. INTEREST WILL BE CHARGED MONTHLY AT THE RATE OF 18% PER ANNUM ON ALL SUMS NOT PAID WHEN DUE. SHOULD THAT RATE EXCEED MAXIMUM PERMISSIBLE UNDER APPLICABLE STATE LAW, INTEREST SHALL BE PAYABLE AT THE MAXIMUM RATE PERMISSIBLE UNDER APPLICABLE STATE LAW.

WHITE-CUSTOMER BLUE-PACKING LIST GREEN-PACKING LIST CANARY-ACCOUNTING PINK-ACCOUNTING GOLD-FILE

K 370 REV.2 2M 6/90

GIL	DET	S-DET	LOC	DEPT	TAX	EMP #	MOVE # PO #	AMOUNT
7210			9670	27	0362			2944.20

OK TO PAY

IMPORTANT: CIRCLE TERMS ON INVOICE

GROSS AMOUNT 2943.74
DISCOUNT
NET $

CIRCLE TERMS ON INVOICE

INV. 3913 DATE 11/4/94

A/P DEPARTMENT USE ONLY

VENDOR NUMBER 01-0932-2040-12

TERMS CODE 016 DUE DATE

DIVISION 165 MONTH 02 AUDIT NUMBER 94000887

Pumps For Industry Repair Center

No. 3913

Mailing Address:
1502 N. Ainsworth
Portland, Oregon 97217
(503) 283-1481
Fax (503) 283-1485

INVOICE

SOLD TO:
Koppers Industries Inc.
7540 NW St Helens Rd
Portland OR 97210

SHIP TO:
Koppers Industries Inc.
7540 NW St Helens Rd
Portland OR 97210

CUSTOMER PURCHASE ORDER
NUMBER- ~~XXXXX~~ 93-42
ORDERED BY- T.J.
DATE: 10/26/93

INVOICE DATE:	TERMS:	
1/14/94	NETT 15 DAYS	23836

SHIPPED VIA:	DATE SHIPPED	COLL	PPC & BILL	PPC FFA	PARTIAL SHIPMENT —	F.O.B.
CF FREIGHT/DELIVERED	1/14/94		XX		☐Yes ☒No	Factory

QUANTITY ORDERED	QUANTITY SHIPPED	BACK ORDERED	DESCRIPTION	PRICE (EACH)	EXTENSION	AMOUNT
1	1	0	Weinman Sump Pump Model 336 MG-VS 7.2 - 14 7½ HP Motor TEFC 480 VAC 3Ø	$2786.00		$2786.00
			Factory Freight			157.74
			Total Amount Due			$2943.74

cop

WE APPRECIATE YOUR BUSINESS

WE HEREBY CERTIFY THAT THESE GOODS WERE PRODUCED IN COMPLIANCE WITH ALL APPLICABLE REQUIREMENT OF SECTION 6, 7 AND 12 OF THE FAIR LABOR STANDARDS ACT, AS AMENDED AND OF REGULATIONS AND ORDERS OF THE UNITED STATES DEPARTMENT OF LABOR ISSUED UNDER SECTION 14 THEREOF.

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WHITE-CUSTOMER BLUE-PACKING LIST GREEN-PACKING LIST CANARY-ACCOUNTING PINK-ACCOUNTING GOLD-FILE

RECEIVED

JAN 19 1994

KOPPERS INDS., INC.
PORTLAND, OR

CUSTOMER/VENDOR NUMBER REQUESTS

TO: Terry Shilling/Tootie Stetter

LOCATION: Rm. 1950, FAX 2159

SUBJECT: CVN Request

FROM: Karen

LOCATION: Portland

DATE: 1/20/94

****

Please circle one of the following:

TYPE OF REQUEST: Vendor

CATEGORY: General Customer Government Employee Railroad Utility

NAME FOR REQUEST: Pumps for Industry Repair Center

SOLD TO ADDRESS:

REMIT TO ADDRESS: 1502 N Ainsworth
Portland, OR 97217

LOCATION NO: 9270

DIVISION NO: 483

ASSIGNED NO: 010222002

DATE IN SYSTEM: 1/31/94

new vendor ☺

Pumps For Industry Repair Center

No.

Mailing Address:
1502 N. Ainsworth
Portland, Oregon 97217
(503) 283-1481
Fax (503) 283-1485

INVOICE

SOLD TO:
Koppers Industries Inc.
7540 NW St Helens Rd
Portland OR 97210

SHIP TO:
Koppers Industries Inc.
7540 NW St Helens Rd
Portland OR 97210

CUSTOMER PURCHASE ORDER
NUMBER- ~~XXXXX~~ 93-42
ORDERED BY- T.J.
DATE: 10/26/93

INVOICE DATE:
TERMS: NETT 15 DAYS
23836

SHIPPED VIA: CF FREIGHT/DELIVERED 1/14/94
DATE SHIPPED
COLL
PPC & BILL: XX
PPC-FFA
PARTIAL SHIPMENT — ☐Yes ☒No
F.O.B. Factory

QUANTITY ORDERED	QUANTITY SHIPPED	BACK ORDERED	DESCRIPTION	PRICE (EACH)	EXTENSION	AMOUNT
1	1	0	Weinman Sump Pump Model 336 MG-VS 7.8 - 14 7½ HP Motor TEFC 480 VAC 3Ø			

Cap #27

WE APPRECIATE YOUR BUSINESS

WE HEREBY CERTIFY THAT THESE GOODS WERE PRODUCED IN COMPLIANCE WITH ALL APPLICABLE REQUIREMENT OF SECTION 6, 7 AND 12 OF THE FAIR LABOR STANDARDS ACT, AS AMENDED AND OF REGULATIONS AND ORDERS OF THE UNITED STATES DEPARTMENT OF LABOR ISSUED UNDER SECTION 14 THEREOF.

TERMS; NET 30 DAYS ON APPROVAL OF CREDIT OR TERMS SUBJECT TO PRIOR WRITTEN AGREEMENT. INTEREST WILL BE CHARGED MONTHLY AT THE RATE OF 18% PER ANNUM ON ALL SUMS NOT PAID WHEN DUE. SHOULD THAT RATE EXCEED MAXIMUM PERMISSIBLE UNDER APPLICABLE STATE LAW, INTEREST SHALL BE PAYABLE AT THE MAXIMUM RATE PERMISSIBLE UNDER APPLICABLE STATE LAW.

WHITE-CUSTOMER BLUE-PACKING LIST GREEN-PACKING LIST CANARY-ACCOUNTING PINK-ACCOUNTING GOLD-FILE

CAPITAL EXPENDITURE #9270-27
Sump Pump

Koppers000890

KOPPERS

Koppers Industries, Inc.

CAPITAL EXPENDITURE REQUEST

Request No.	9270-27
Request Date	10 / 27 / 93

Division	Tar Products	Location	Portland, OR
Request Initiated By	A.S. Kamerer	Approved By	

Title: Install larger sump pump from pitch storage building to the tank farm

Amount of Request	$ 4,000	Depreciation Life	10 YRS	Estimated Life	10 YRS	Approval Date	MO.	19 YEAR			
Class of Expenditure	See Reverse	1 B	Depreciation Acct. No.	305	969	X	9270	925			

Specification & Description:

1 Weinman Sump Pump
Model #336 MG - US 7.5 - 14
7 1/2 H.P., 1750 RPM, 480 VAC 30
TEFC motor
including Liquid level control switch

Copy

Summary of Justification:

This will increase the pitch storage building sump pump capacity by more than 3 times and will eliminate the plant flooding in that area, during heavy rain storms.

ENGINEERING: By Local Approval _____

ESTIMATE: By A. Kamerer Approval _____

COSTS: Cash Expenditure (1) $4,000
Trade-In or Salvage (2) _____
Amt. of Requests(1) + (3) $4,000

Type of Investment	Building	%	Equipment	100%	Land	%	Type of Equipment	New	X	Used		Age		For Use On	Owned Property	X	Leased Property

EARNINGS OR COST: *(5 Yrs. Average)*

Division Income Before Interest & Taxes _____
% Return On Net Investment _____
Added Working Capital Required If Any _____

RETIREMENTS: *(PDA) Attached*

Total Original Value _____
Years Acquired _____
Total Book Value _____

CONSTRUCTION BY:

Est. Schedule of Expense Dec 1993
Est. Start - Up Date _____
Est. Close to Property _____
Referral to Insurance _____

APPROVAL:

Production Manager _____ DATE
Capital Planning _____ DATE
Environmental & Safety _____ DATE
Engineering _____ DATE
Division Controller _____ DATE
Group Controller _____ DATE
Other _____ DATE

KI - 405 Rev. 5

Koppers Company, Inc.
Chemical and Allied Products
Pittsburgh, Pa. 15219

KOPPERS

Local Purchase Requisition

Location PORTLAND, OR

To Vendor

PUMPS FOR INDUSTRY REPAIR CENTER
1502 N AINSWORTH
PORTLAND, OR 97217

Ship To
KOPPER INDUSTRIES INC.
7540 NW ST. HELENS RD.
PORTLAND, OR 97210

Koppers requests that Seller furnish the goods and/or services listed below, subject to the terms on the reverse side of this order.

Invoice To:
PUMPS FOR INDUSTRY REPAIR CENTER

Date Ordered	Date Required	Requisition No.	Order Number
10/29/93	11/19/93	N/A	93-42

Please Invoice in Triplicate

Quantity	Description	Price	Discount•Terms•F.O.B.	Account Number
1	WEINMAN SUMP PUMP	$2786.00	NET/PLUS FRT	
	MODEL #336 MG - US 7.5 - 14			
	7 1/2 H.P., 1750 RPM, 480 VAC 30			
	TEFC MOTOR			
	INCLUDING LIQUID LEVEL CONTROL SWITCH			

Approvals

Invoice Date	Invoice Number	Audit Number	Date Trans to Pgh.	Ordered By
				T.J. TURNER
				Approved By:
				A.S. KAMERER
				Received By / Date Received

Distribution ☐ Vendor ☐ Originating Location ☐ Originator ☐ Buyer or

T-75 Rev. 925M 2/88
Printed in U.S.A.

ORIGINATOR

KOPPERS

Koppers Industries, Inc.

CAPITAL EXPENDITURE REQUEST

				Request No.	9270-27
Division	Tar Products	Location	Portland, OR	Request Date	10 / 27 / 93
Request Initiated By	A. S. Kamenen	Approved By	[signature]		
Title	INSTALL Wanger sump pump from pitch storage building to the tank farm				

Amount of Request	$ 4,000	Depreciation Life	10 YRS	Estimated Life	10 YRS	Approval Date	MO.	19 YEAR			
Class of Expenditure	See Reverse	1	B	Depreciation Acct. No.	305	969	X	9270	925		

Specification & Description:

1 Weinman sump pump
Model # 336 motor VS 7.5-14
7½ H.P., 1750 RPM, 480 VAC 3Ø
TEFC motor

Summary of Justification:

This will increase the pitch storage building sump pump capability by more than 3 times and will eliminate the plant flooding in that area, during heavy rain storms.

ENGINEERING: By Locke Approval _____ COSTS: Cash Expenditure (1) 4,000.

Trade-In or Salvage (2) _____

ESTIMATE: By A. Kamenen Approval _____ Amt. of Requests (1) + (3) 4,000.

Type of Investment	Building	%	Equipment	100%	Land	%	Type of Equipment	New	X	Used		Age		For Use On	Owned Property	X	Leased Property

EARNINGS OR COST: (5 Yrs. Average)

Division Income Before Interest & Taxes _____

% Return On Net Investment _____

Added Working Capital Required If Any _____

RETIREMENTS: (PDA) Attached

Total Original Value _____

Years Acquired _____

Total Book Value _____

CONSTRUCTION BY:

Est. Schedule of Expense Dec 1993

Est. Start - Up Date _____

Est. Close to Property _____

Referral to Insurance _____

APPROVAL:

Production Manager		DATE
Capital Planning		DATE
Environmental & Safety		DATE
Engineering		DATE
Division Controller	[signature] 10/28/93	DATE
Group Controller		DATE
Other		DATE

Pumps For Industry Repair Center

1502 N Ainsworth • Portland, Oregon 97217 • (503) 283-1481 • Fax (503) 283-1485

DATE: 10-25-93

FACSIMILE COVER SHEET

TO: T.J.

PAGE 1 of 9 FROM: DICK PIERCE

T.J.

WEINMAN SUMP PUMP
MODEL 336 MG-VS 7.5-14
7½ H.P. 1750 RPM 480 VAC 3Ø
TEFC MOTOR.

PRICE $2786.00
Freight - 400-500
TBC

FOB: FACTORY
DELIVERY: 2-4 WKS

IF YOU HAVE ANY QUESTIONS
PLEASE CALL (283-1481)

THANKS
Dick

CASCADE MACHINERY
& EL"CTRIC, INC.
P.O. BOX 84533 * SE E, WA 98124
PHONE# 206-762-0 # 206-767-5122

QUOTATION

1-12851

SOLD TO: CASH OR COD SEATTLE SALES
., WA -

SHIP TO: KOPPERS INDUSTRIAL
-----, OR 00000

2 times
10-26-93
12:06pm

CUSTOMER# 5710 PHONE# 503-286-3681 Order by: T.J.

CUSTOMER P.O.#	TERMS	SHIP VIA	FREIGHT TERMS	ORDER DATE	TAKEN BY
	CASH/ COD	WILL CALL	PP&ADD	10-26-93	RON P.

LINE NO.	QUANTITY ORDERED	ITEM NUMBER AND DESCRIPTION	UNIT PRICE	EXTENDED TOTAL
1	1	SWABY 3B-5-1910XA * SWABY PUMP W/7.5HP,TEFC MOTOR 3" DISCHARGE	2,320.00	2,320.00
2	1	SWABY NEMA 3 LIQUID LEVEL CONTROL * PEDISTAL MOUNTED FLOAT SS ROD, & BRASS FLOAT	275.00	275.00
		JD: COLUMN TYPE SUMP PUMP FOR 5' DEEP SUMP SWABY PUMP 3B-5-1910XA CASCADE SERIES VERTICAL WET PIT HEAVY DUTY SUMP PUMP. 200GPM AT 56'TDH AT 1750RPM. DESIGNED FOR 5' SUMP DEPTH. 3" DISCHARGE PUMP IS ALL IRON W/CARBON STEEL SHAFT & BRONZE BEARING. FOB FACTORY 460LBS 5-6 WEEKS ESTIMATE TO SHIP. QUOTE DOESN'T INCLUDE CONTROL PANEL. FAX# 503-285-2831		

This quotation is valid for 30 days, expiring on 11-25-93.
Please call Ron P. with any questions, phone# 206-762-0500.
Thank you.

Merchandise-total	2,595.00
Freight in	0.00
Freight out	0.00
Tax	212.79
TOTAL ▶	2,807.79

A MONTHLY SERVICE CHARGE OF 1.5% (18% PER ANNUM) WILL BE APPLIED TO PAST DUE ACCOUNTS.

ALL CLAIMS MUST BE MADE WITHIN 10 DAYS OF RECEIPT OF SHIPMENT.

LaserForms™ by Progressive Systems Incorporated 206/454-6800

CHANDLER ELECTRIC, INC.

P.O. BOX 80696
PORTLAND, OR. 97280-1696
PH: 503-245-7774 FAX: 503-244-4804

Invoice

DATE	INVOICE NO.
4/4/97	6250

BILL TO	JOB ADDRESS/DESCRIPTION
KOPPERS INDUSTRIES 7540 NW ST HELENS ROAD PORTLAND, OR. 97210 Attn: T.J.	KOPPERS INDUSTRIES 7540 NW ST HELENS ROAD PORTLAND, OR. 97210

P.O. NO.	TERMS	DUE DATE	REP	SVC DATE	PROJECT	QUOTE AMT
TJ	UPON RECEIPT	4/4/97	EKE	4/4/97	IS7906 INSTALL ...	T & M

ITEM	DESCRIPTION	QTY	RATE	AMOUNT
	POWER AND CONTROL WIRING FOR WASTE WATER SUMP PUMPING SYSTEM.			
ITEM	MATERIAL & LABOR	1	5,641.00	5,641.00

RECEIVED
JUN - 5 1997
KOPPERS INDS., INC.
PORTLAND, OR

THANK YOU FOR YOUR BUSINESS

Total $5,641.00

KI 37W REV 2 6M 6/90

CIRCLE TERMS ON INVOICE

GIL	DET.	S-DET.	LOC.	DEPT.	TAX	EMP #	MOVE # PO #	AMOUNT
4210			9270	13	0362			5641 -

INV # 6250 DATE 4/4 97

A/P DEPARTMENT USE ONLY

VENDOR NUMBER 0 0 7 9 6 1 0 2 9

TERMS CODE: 045 DUE DATE: / /

OK TO PAY

GROSS AMOUNT 5641 -

DISCOUNT $

NET $

IMPORTANT: CIRCLE TERMS ON INVOICE

DIVISION	MONTH	AUDIT NUMBER
485	6	92700361

Koppers Industries, Inc.
Pittsburgh, Pa. 15219

KOPPERS INDUSTRIES

Local Purchase Requisition

Location 9270

To Vendor
CHANDLER ELECTRIC
3521 SW CARSON ST
PORTLAND, OR 97219

Ship To
KOPPERS IND. INC
7540 NW ST HELENS RD
PORTLAND, OR 97210

Koppers requests that Seller furnish the goods and/or services listed below, subject to the terms on the reverse side of this order.

Invoice To:
SHIP TO

Date Ordered	Date Required	Requisition No.	Order Number	
4-7-97		9270-43	97-21	**Please Invoice in Triplicate**

Quantity	Description	Price	Discount•Terms•F.O.B.	Account Number
	CAPITAL EXPENSE -SEE ATTACHED			
	WIRING	$5641.00		

Approvals

Invoice Date	Invoice Number	Audit Number	Date Trans to Pgh.	
				Ordered By
				Approved By
				Received By / Date Received

Distribution ☐ Vendor ☐ Originating Location ☐ Originator ☐ Buyer or

KI-75 Rev. 1 15M 7/89

VENDOR

Koppers000897

This Order shall be Subject to the Following Terms and Conditions:

1. This order must be acknowledged promptly on the enclosed acceptance copy, giving the information requested.

2. Seller's acknowledgement of, or fullfillment of this order, shall constitute Seller's acceptance of all the terms hereof or terms specifically incorporated by reference herein, which shall control, if they conflict with the terms of Seller's quotation.

3. The Seller agrees to defend and save harmless Koppers from all costs, expenses and damages occasioned by any alleged infringement of patents by any articles covered by this order.

4. The goods and/or services covered by this order are guaranteed to be free of defects in material and workmanship. The cost of repair or replacement of defective or non-conforming parts, including labor and freight, shall be borne by Seller.

5. In connection with any castings, machinery, apparatus, etc. of Koppers design covered by this order, Seller shall not in any manner cast, inscribe or placard such castings, machinery, apparatus, etc. with its trademark or name.

6. Koppers shall have the right to inspect the work covered by this order at any time during its progress. Any inspection by Koppers does not relieve the Seller of its responsibility for correctness in fabrication, the quality or workmanship in accordance with the specifications and/or drawings.

7. The Seller agrees to accept exclusive liability for the payment of any payroll taxes or contributions for unemployment insurance or old age pensions or annuities which are measured by the wages, salaries, or other renumeration paid to the employees of the Seller; to reimburse Koppers for any of the aforesaid taxes or contributions which by law, Koppers may be required to pay; and to comply with valid administrative regulations respecting the assumption of liability for the aforesaid contributions by subcontractors.

8. Seller warrants that in the production of goods and services purchased hereunder, he has complied and will comply with all applicable statutes of the United States and lawful regulations issued thereunder, including, but not by way of limitation thereof, the following: Fair Labor Standards Act of 1938, as amended, Davis-Bacon Act, as amended, the Walsh-Healy Act, as amended, and the Occupational Safety and Health Act of 1970, as amended. Seller further warrants that he has complied and will comply with all statutes and regulations of any state, territory or other duly constituted public authority or political subdivision thereof wherein the work hereunder shall be performed.

9. Bills of lading, express receipts, invoices, shipping lists, etc. must be sent forward the day shipment is made with order number indicated on all papers. All shipments must be made in name of firm with whom order is placed and all shipping and invoice requirements must be complied with in every particular.

10. All barrels, boxes, bags, crates or other packages must be labeled with tag (linen tag preferred) securely fastened to packages showing shipper's name and Koppers order number. If impossible to attach tags, information must be painted on packages.

11. Koppers shall not be responsible for any drayage, blocking or packaging and no reels, drums or packages shall be returned to Seller, except as set out on the reverse side of this sheet.

12. Net invoices for goods and/or services shall be paid 30 days following the date of the invoices.

13. Cash Discount Invoices - Cash discount shall be deducted at expiration of grace period dating from date of receipt of invoices.

14. NET invoices and CASH discount invoices received without supporting papers complete shall not be paid until complete as specified. The date of receipt of final supporting papers complete shall, in all cases, govern dates of payment.

15. It shall be strictly understood and agreed that this order shall be treated confidentially in every respect, and that the Seller shall refrain from any publicity or advertising concerning the sale of articles herein.

16. In no event shall Koppers be liable to Seller, regardless of the form of action, whether in contract or in tort or otherwise, for any incidental or consequential damages of any nature whatsoever, including without limitiation, lost profits.

17. Koppers is entitled to all remedies, without limitation, available pursuant to the Uniform Commerical Code.

18. Seller shall defend, indemnify and save Koppers harmless from and against any and all claims, demands, cause of action, suits and all other liabilities whatsoever, including without limitation reasonable attorney fees, incurred by Koppers on account of, or by reason of, or arising out of personal injuries or death to Seller, or a subcontractor of Seller, Koppers, or any other third party, or the employee(s) thereof, or property damage suffered by Seller, a subcontractor of Seller, Koppers or any other third party of the employee(s) thereof, it being the intent of this provision to absolve and protect Koppers from any and all loss or liability arising out of the performance of this purchase order or the goods and/or services provided hereunder.

19. Seller's or Koppers waiver of any breach, or failure to enforce any of the terms and conditions of this contract, at any time, shall not, in any way affect, limit or waive Seller's or Koppers rights thereafter to enforce and compel strict compliance with every term and condition hereof.

20. Seller shall not assign, transfer, convey, subcontract or authorize disposition of this agreement or its right, title or interest in or to the same or any part thereof without the previous consent in writing of Koppers.

21. This order constitutes the entire agreement, and no additions or changes are to be made without written authority from Koppers Purchasing Department.

22. During the performance of this purchase order, for amounts exceeding $10,000 unless exempt, the Seller agrees as follows:

(a) The Seller will not discriminate against any employee or applicant for employment because of race, color, religion, sex, or national origin. The Seller will take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, color, religion, sex, or national origin. Such action shall include, but not be limited to the following: employment, upgrading, demotion or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training; including apprenticeship. The Seller agrees to post, in conspicuous places, available to employees and applicants for employment, notices to be provided by the government contracting office setting forth the provisions of this nondiscrimination clause.

(b) The Seller will, in all solicitations or advertisements for employees placed by or on behalf of the Seller, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, or national origin.

(c) The Seller will send to each labor union or representative of workers with which he has a collective bargaining agreement or other contract or understanding, a notice to be provided by the agency contracting officer, advising the labor union or workers' representative of the Seller's commitments under Section 202 of Executive Order 11246 of September 24, 1965 and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

(d) The Seller will comply with all provisions of Executive Order 11246 of September 24, 1965 and of the rules, regulations, and relevant orders of the Secretary of Labor.

(e) The Seller will furnish all information and reports required by Executive Order 11246 of September 24, 1965 and by the rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to his books, records and accounts by the contracting agency and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.

(f) In the event of the Seller's noncompliance with the nondiscrimination clauses of this contract or with any of the said rules, regulations, or orders, this contract may be cancelled, terminated or suspended in whole or in part and the Seller may be declared ineligible for further Government contracts in accordance with procedures authorized in Executive Order 11246 of September 24, 1965 and such other sanctions may be imposed and remedies invoked as provided in Executive Order 11246 of September 24, 1965 or by rule, regulation or order of the Secretary of Labor, or as otherwise provided by law.

(g) The Seller will include the provisions of paragraphs (a) through (g) in every subcontract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to Section 204 of Executive Order 11246 of September 24, 1965, so that such provisions will be binding upon each subcontractor or vendor. The Seller will take such action with respect to any subcontract or purchase order as the contracting agency may direct as a means of enforcing such provisions, including sanctions for noncompliance; provided, however, that in the event the Seller becomes involved in, or is threatened with litigation with a subcontractor or vendor as a result of such direction by the contracting agency, the Seller may request the United States to enter into such litigation to protect the interest of the United States.

(h) Seller certifies, in the form prescribed in 41 CFR, Chapter 1, Section 1-12, 803-10, regarding non-segregated facilities.

(i) Seller agrees to file with the appropriate federal agency a complete and accurate report of Standard Form 100 (EEO-1) within 30-days after the signing of this agreement or the award of any such purchase order, as the case may be (unless such a report has been filed in the last 12 months, or unless Seller does not meet the 100-employee test set forth in Section 701 (b) of Title VII of the Civil Rights Act of 1964), and agrees to continue to file such reports annually, on or before March 31.

23. All Federal Equal Opportunity and Affirmative Action requirements in regard to race, sex, religion, national origin, handicap and Vietnam veteran or disabled veteran status, as found in 41 CFR 60-1.4, 41 CFR 60-250.3, and 41 CFR 741.3, are herein incorporated by reference.

KOPPERS

Koppers Industries, Inc.

CAPITAL EXPENDITURE REQUEST

				Request No.	9270 - 43
Division	Carbon Materials & Chemicals	Location	Portland, Or	Request Date	09 / 05 / 96
Request Initiated By	A. S. Kamerer	Approved By			
Title	Storm Water Dishcharge System				

Amount of Request	$ 45,000.00	Depreciation Life	10 YRS	Estimated Life	15 YRS	Approval Date	MO.	19 YEAR			
Class of Expenditure	See Reverse	1 B	Depreciation Acct. No.	305	969	x	9270	910			

Specification & Description: Replace the entire storm water discharge system from the existing storm water collection tanks. Includes new 8" PVC suction side piping from the tanks to the pump; new 6"x6" pump, rated @ 800 GPM; new 6" schedule 40 pipe from the pump to the outfill (approx. 800 L.F.); a new secondary sump in the low end of the tank farm; grading and rock-work; new electrical panel; treated wood walking; and plant labor for construction.

Summary of Justification: To replace the existing 30 plus year old system with the above, that will increase the discharge rate by some 500%. In the process, will elimate the tank farm standing water problem that we have had for the last 4 years or so. This standing water problem has become a safety issue for the men and we have started to experience a corrosion problem on our creosote storage tank, that will only get worse if not remedied. Last, this up grade should eliminate the major flooding condition, similar to the one that we experienced this past February, and thus should eliminate the possiblility of any future business or shipping interruptions.

ENGINEERING: By J.T. Dietz Approval _____

ESTIMATE: By A.S. Kamerer Approval _____

COSTS: Cash Expenditure (1) 45,000.
Trade-In or Salvage (2) _____
Amt. of Requests(1) + (3) 45,000.

Type of Investment	Building	%	Equipment	% 100	Land	%	Type of Equipment	New	x	Used		Age		For Use On	Owned Property		Leased Property	x

EARNINGS OR COST: *(5 Yrs. Average)*
Division Income Before Interest & Taxes _____
% Return On Net Investment _____
Added Working Capital Required If Any _____

RETIREMENTS: *(PDA) Attached*
Total Original Value _____
Years Acquired _____
Total Book Value _____

CONSTRUCTION BY:
Est. Schedule of Expense Oct.-Dec.1996
Est. Start - Up Date Sept. 1996
Est. Close to Property _____
Referral to Insurance _____

APPROVAL:

Production Manager		
Capital Planning		DATE
Environmental & Safety		DATE
Engineering		DATE
Division Controller		DATE
Group Controller		DATE
Other		DATE

KI - 405 Rev. 5

Interoffice Memo # 9270-43

To:	J.W. Kunkle	From:	Amos S. Kamerer
Location:	K-1650	Location:	Portland, OR.
Subject:	Capital Request Stormwater Discharge System	Date:	September 6, 1996

My thoughts re the justification for this project are as follows:

1. At the time of our flood in February we expensed some $2,855. for items such as:

   PVC pipe and valves, short term electrical repairs, pump rentals, and the corresponding labor to do the repairs.

   Additionally, we lost the discharge pump and the electrical panel servicing that system. These two items have not been replaced because they are a part of this capital, however if we had replaced them, we would have spent an additional $4,700. Thus, I would consider the total flood loss at $7,555. with the old system, we could potentially experience this kind of flooding problem at least once a year.

2. With the addition of 3 new sumps in the plant over the last 4 years that feed into the tank farm, we have far more storm water going through the system than it was designed to handle, as a result we have a constant standing water situation in lower end of the tank farm (northeast corner). At this time, 2 tanks have started to corrode. One of these is out of service, the other is our creosote storage and shipping tank. Jim Dietz advises that if this condition is not corrected we could experience a corrosion related leak, and a possible reportable spill incident, in as few as 5 years.

3. The standing water condition in the tank farm has created a safety concern for our employee's. The low area that I mentioned above is virtually muddy all the time, in fact there is about 3" of mud today and we had zero rain fall during the months of July and August. During our rainy season, this area has 8" or more of mud on the surface and when we only have one employee on duty for the night shifts, who has to do periodic inspections of that area, this condition has become a serious safety issue.

4. In the past, some 5 or so times last year, when flooding conditions developed of say 10" or more water in the tank farm, we would have to disconnect the electrical service to that area. Because we were loading tank cars directly from the melter, no interruption of shipment to our customers occurred. Now with truck deliveries, we use a special tank in the tank farm for shipping purposes. Without this upgrade, we would have shipment interruptions to our customers. I do not think we would actually loose any business as a result, however we would certainly effect customer satisfaction by doing so.

Amos

Amos S. Kamerer

cc: W.W. Turner
F.J. Fitzgerald

KOPPERS

Koppers Industries, Inc.

CAPITAL EXPENDITURE REQUEST

				Request No.	9270 -
Division	Carbon Materials & Chemicals	Location	Portland, Or	Request Date	09 / 05 / 96
Request Initiated By	A. S. Kamerer	Approved By			
Title	Storm Water Dishcharge System				

Amount of Request	$ 45,000.00	Depreciation Life	10 YRS	Estimated Life	15 YRS	Approval Date	MO.	19 YEAR			
Class of Expenditure	See Reverse	1	B	Depreciation Acct. No.	305	969	x	9270	910		

Specification & Description: Replace the entire storm water discharge system from the existing storm water collection tanks. Includes new 8" PVC suction side piping from the tanks to the pump; new 6"x6" pump, rated @ 800 GPM; new 6" schedule 40 pipe from the pump to the outfill (approx. 800 L.F.); a new secondary sump in the low end of the tank farm; grading and rock-work; new electrical panel; treated wood walking; and plant labor for construction.

Summary of Justification: To replace the existing 30 plus year old system with the above, that will increase the discharge rate by some 500%. In the process, will elimate the tank farm standing water problem that we have had for the last 4 years or so. This standing water problem has become a safety issue for the men and we have started to experience a corrosion problem on our creosote storage tank, that will only get worse if not remedied. Last, this up grade should eliminate the major flooding condition, similar to the one that we experienced this past February, and thus should eliminate the possiblility of any future business or shipping interruptions.

ENGINEERING: By J.T. Dietz Approval _____

ESTIMATE: By A.S. Kamerer Approval _____

COSTS: Cash Expenditure (1) 45,000.
Trade-In or Salvage (2) _____
Amt. of Requests(1) + (3) 45,000.

Type of Investment	Building	%	Equipment	%	Land	%	Type of Equipment	New	x	Used		Age		For Use On	Owned Property		Leased Property	x
				100														

EARNINGS OR COST: *(5 Yrs. Average)*

Division Income Before Interest & Taxes _____
% Return On Net Investment _____
Added Working Capital Required If Any _____

RETIREMENTS: *(PDA) Attached*

Total Original Value _____
Years Acquired _____
Total Book Value _____

CONSTRUCTION BY:

Est. Schedule of Expense Oct.-Dec.1996
Est. Start - Up Date Sept. 1996
Est. Close to Property _____
Referral to Insurance _____

APPROVAL:

Production Manager _____
Capital Planning _____ DATE
Environmental & Safety _____ DATE
Engineering _____ DATE
Division Controller _____ DATE
Group Controller _____ DATE
Other _____ DATE

KI - 405 Rev. 5

KOPPERS INDUSTRIES

RECEIVED
AUG 15 1996
KOPPERS INDS., INC.
PORTLAND, OR

INTEROFFICE CORRESPONDENCE

To:	Amos Kamerer	From:	J. T. Dietz x 3966
Location:	Portland Terminal	Location:	Harmarville Tech Center
Subject:	Stormwater System - Proposed Upgrades	Date:	August 9, 1996

I have reviewed your proposed changes to your stormwater system as outlined in your letter to Walt Turner of May 15, 1996, attached.

Basically I am in agreement with your plans to increase the storage tank pump out rate to 800 GPM. This increase will allow you to prevent flooding situations by pumping directly from the separator to the outfall, by-passing the storage tanks. As you explained, you are permitted to by-pass the storage tanks and indicate this on your monthly water reports.

I takes about one foot of water around the pitch pump area to result in line freezing and a shipping interruption. I understand that although no shipments have been delayed to date, you have had this flooding at least once per year and it lasts about two days. Access to and operation of the equipment when the area is flooded is hazardous to the workers and they have complained about the conditions.

The proposed upgrades do not, however, alleviate the standing water in the southeast corner by #67 tank. This area is where your surface water from the paved area in front of the office, new pitch shed roof gutters, and boiler house discharges. This corner is a low area and holds deep mud even during dry spells. This has not only presented a slipping hazard to your workers, the base ring of #67 creosote storage tank is continually wet.

My brief inspection of #67 tank under the insulation of the wet area indicated that corrosion has started above the bottom weld seam. If we leave this area wet, I believe we will see corrosion leakage in the five to ten year time frame. This area cannot be graded or trenched to the separator because of the elevation of the drain pipe below the pitch pump area.

The best solution to drying this area is to install a small sump and pump (75 GPM) in the corner and pump it directly to the separator. If you remove the

existing 3" stormwater discharge line from service then you can connect the pump and resuse the line back to the separator.

To this end, I believe the cost of this work should be $45,000 instead of the $37,100 that you originally estimated. This adds money to provide 8" suction piping (instead of 6" which is too small), better pipe supports along the concrete wall, and the corner sump with pump. You can also capitalize the replacement boiler house sump pump that you previously expensed.

If we do not spend this capital, then I believe that you must replace the existing discharge pump and electrical controls which you estimated at $12,500. You also have to replace the boiler house sump pump at $2,800 and possibly spend $5,000 to install a treated wood walkway to prevent slipping in the muddy area at #67 tank. This total of $20,300 provides no relief from flooding.

I suggest you prepare a capital for $45,000 noting the cost of two days lost shipment and worker complaints in the justification. As a final note, I would like to thank you and T.J. for putting together a good plan and detailed estimate prior to my visit. This certainly helps us to efficiently evaluate and discuss the project.

Jim

Jim Dietz

cc:	T. J. Turner -	Portland
	Walt Turner -	K-1600
	Bill Swearingen -	K-1800
	Lee Allison -	Harmarville
	Kevin F itzgerald -	Stickney

INTEROFFICE

To: W.W. Turner

From: Amos S. Kamerer

Location: K-1600

Location: Portland, OR

Subject: Storm Water Discharge System

Date: May 15, 1996

Our storm water discharge system is in need of some major repairs. This system was part of the old GASCO operations and we really do not know how old it is, other than to say that it predates Koppers arrival on site in 1968.

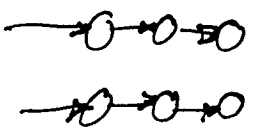
We have just lost the discharge pump and blown out the electrical panel assembly that services the system and are now discharging via gravity from the storage tanks. These failures are primarily due to age, but were aided by the flood we had in February. As an immediate fix to this situation we are looking at the following expenses:

Electrical panel assembly, installed	$4,700.
4" x 4" pump, rated at 200 GPM	4,300.
Suction side repairs (PVC piping & valves)	1,700.
Plant Labor to do the work (100 man hours)	1,800.
Total	$12,500.

~~$2800~~ 2x2 PUMP · ~~$5000~~ ACCESS = ~~$20,300~~

However, in light of the condition of the entire system, I suggest we look at a complete up grade, that would also include the discharge side.

First, let me explain how the whole system works. We have a total of 6 storage tanks, 2 of which were just added last year, with a total capacity of 220,000 gallons. We have these set up with 3 tanks in each of two series. When one series is full, we start filling the second series. We then sample the first series for testing by an independent laboratory to meet our N.P.D.E.S. permit discharge requirements, which takes from 24 to 36 hours to get the results, we then pump the first series to the out fall and start the process all over again with the second series.



4x45,000
2x20,000
TANK FARM, NEW PITCH BLDG,

This has worked fine up to 1991, however when the new pitch storage building was constructed the city required that all of the storm water be collected and pumped into the tank farm for discharge through our N.P.D.E.S. approved system. Also, in that same time frame through the advise of Bill, we added 2 more sump systems to collect storm water, that also feeds into the same system. The point is that we are now dealing with 3 to 4 times the volume of storm water through this system than what it was designed for, back some 30 plus years ago.

The water table in the tank farm is almost always at a level of 2" or so higher than the tank foundations in the farm. Only once in the last 3 summers have we had dry enough conditions for the tank farm to dry out. As we discussed when you were here a few weeks ago, this water table matter and the resulting mire has been raised by the employee's as a safety issue. Also, and I have no way to determine how serious this is, but the tanks have to be rusting, at their bases, when constantly being in water at these levels.

Over these last few years, since the addition of all the new sumps, we have had to declare emergency conditions numerous times. What this means is that when we have heavy rains, our tanks now fill so fast that we cannot get quick enough turn around time from the testing laboratory to permit timely discharge, so the tank farm starts flooding. Rather than risking the loss of electrical motors and pumps that service the tanks in the tank farm, we discharge directly to the out fall without the test results and we then put a letter into our monthly reporting file that this occurred. We have already had to do this 4 times this year. So far, this has not been questioned when the D.E.Q. comes to do their annual plant inspections and do a review of our paper work. So I don't know if this procedure presents any kind of a problem at some time in the future, when and if they notice that we have been doing this, but the possiblility exists that this practice could be become an issue with them.

As a result of all of this, and the near disaster that we had in February with the flood that we had in the tank farm, I decided to look at a complete upgrade of the total system, including the discharge side.

The existing discharge side is 3" schedule 40 pipe, traveling some 800 linear feet from the discharge pump to the out fall. The way this was built, with many bends and elevation changes, the discharge system is estimated to pump at a rate of 160 GPM. We are looking at upgrading this to a 6" schedule 40 pipe line that will permit a discharge rate of 800 GPM, which would permit us to avoid ever having a similar flooding situation like we just had in February, when the 160 GPM discharge rate was not adequate.

The cost components of this system are as follows:

Electrical panel assembly, installed	$4,700.	$2600
6" x 6" pump, rated at 800 GPM	5,600.	
Suction side repairs (PVC piping & valves)	~~1,700.~~ $2500	
6" schedule 40 pipe, elbows, flanges & expansion joints	5,500.	
Piping structural support materials	~~3,100~~ $4500	
Plant labor to do the work (915 man hours)	16,500.	
Total	$37,100.	
	$39,300 - $45,000	

We could down size this to 4" schedule 40 pipe, that would be rated at 420 GPM, which would reflect a $3,300. reduction from the 6" system above. It's my feeling that for this difference, we should go ahead with the 6" system, if we decide to do the total upgrade.

The bottom line is that were looking at a $12,500. expense to fix the existing system, or a $37,100 expense to upgrade the total system, that again would avoid any flooding problems in the future, for an additional $24,600.

Please advise your thoughts so I can prepare a capital expenditure request, accordingly.

Amos

Amos S. Kamerer

cc: W.E. Swearingen

Interoffice Correspondence

Koppers Industries, Inc.
Carbon Materials and Chemicals Division

To:	Amos Kamerer	From:	Walter W. Turner
Location:	Portland	Location:	Pittsburgh K-1600
Subject:	STORM WATER DISCHARGE SYSTEM	Date:	May 16, 1996

I received your memo and agree we must act on improving the system.

Before we do either option, please review with engineering to see if the upgraded system is the long-term solution. We will then decide on when the job should proceed.

Thanks.

Walt

Walter W. Turner

T/k

Copy:

J. T. Dietz-Harmarville/with attachment

c:\turner\plants\portland\stwater.sys

INTEROFFICE

To:	W.W. Turner	From:	Amos S. Kamerer
Location:	K-1600	Location:	Portland, OR
Subject:	Storm Water Discharge System	Date:	May 15, 1996

Our storm water discharge system is in need of some major repairs. This system was part of the old GASCO operations and we really do not know how old it is, other than to say that it predates Koppers arrival on site in 1968.

We have just lost the discharge pump and blown out the electrical panel assembly that services the system and are now discharging via gravity from the storage tanks. These failures are primarily due to age, but were aided by the flood we had in February. As an immediate fix to this situation we are looking at the following expenses:

Electrical panel assembly, installed	$4,700.
4" x 4" pump, rated at 200 GPM	4,300.
Suction side repairs (PVC piping & valves)	1,700.
Plant Labor to do the work (100 man hours)	1,800.
Total	$12,500.

However, in light of the condition of the entire system, I suggest we look at a complete up grade, that would also include the discharge side.

First, let me explain how the whole system works. We have a total of 6 storage tanks, 2 of which were just added last year, with a total capacity of 220,000 gallons. We have these set up with 3 tanks in each of two series. When one series is full, we start filling the second series. We then sample the first series for testing by an independent laboratory to meet our N.P.D.E.S. permit discharge requirements, which takes from 24 to 36 hours to get the results, we then pump the first series to the out fall and start the process all over again with the second series.

This has worked fine up to 1991, however when the new pitch storage building was constructed the city required that all of the storm water be collected and pumped into the tank farm for discharge through our N.P.D.E.S. approved system. Also, in that same time frame through the advise of Bill, we added 2 more sump systems to collect storm water, that also feeds into the same system. The point is that we are now dealing with 3 to 4 times the volume of storm water through this system than what it was designed for, back some 30 plus years ago.

The water table in the tank farm is almost always at a level of 2" or so higher than the tank foundations in the farm. Only once in the last 3 summers have we had dry enough conditions for the tank farm to dry out. As we discussed when you were here a few weeks ago, this water table matter and the resulting mire has been raised by the employee's as a safety issue. Also, and I have no way to determine how serious this is, but the tanks have to be rusting, at their bases, when constantly being in water at these levels.

Over these last few years, since the addition of all the new sumps, we have had to declare emergency conditions numerous times. What this means is that when we have heavy rains, our tanks now fill so fast that we cannot get quick enough turn around time from the testing laboratory to permit timely discharge, so the tank farm starts flooding. Rather than risking the loss of electrical motors and pumps that service the tanks in the tank farm, we discharge directly to the out fall without the test results and we then put a letter into our monthly reporting file that this occurred. We have already had to do this 4 times this year. So far, this has not been questioned when the D.E.Q. comes to do their annual plant inspections and do a review of our paper work. So I don't know if this procedure presents any kind of a problem at some time in the future, when and if they notice that we have been doing this, but the possiblility exists that this practice could be become an issue with them.

As a result of all of this, and the near disaster that we had in February with the flood that we had in the tank farm, I decided to look at a complete upgrade of the total system, including the discharge side.

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The cost components of this system are as follows:

Electrical panel assembly, installed	$4,700.	
6" x 6" pump, rated at 800 GPM	5,600.	
Suction side repairs (PVC piping & valves)	1,700.	
6" schedule 40 pipe, elbows, flanges & expansion joints	5,500.	
Piping structural support materials	3,100.	@ $4,500
Plant labor to do the work (915 man hours)	16,500.	
Total	$37,100.	

We could down size this to 4" schedule 40 pipe, that would be rated at 420 GPM, which would reflect a $3,300. reduction from the 6" system above. It's my feeling that for this difference, we should go ahead with the 6" system, if we decide to do the total upgrade.

The bottom line is that were looking at a $12,500. expense to fix the existing system, or a $37,100 expense to upgrade the total system, that again would avoid any flooding problems in the future, for an additional $24,600.

Please advise your thoughts so I can prepare a capital expenditure request, accordingly.

Amos

Amos S. Kamerer

cc: W.E. Swearingen

Waste Water System

Discharge System 6"

800 ft	6" Schedule 40 pipe	$5.71 ft	$4,568.00
8	6" Slip On Flange	$15.60	$124.80
8	6" 90 Elbow	$19.65	$157.20
2	6" Expansion Joints	$255.00	$510.00
6	6" 45 Elbow	$17.00	$102.00
		Total	$5,462.00

1	6" x 6" Pump 800 GPM		$5,565.00
~~1~~	~~2" x 2" Sump Pump 65 GPM~~		~~$2,380.00~~
1	Electric Pump Panel Assembly Installed		$4,633.00
	Material Only		-$2,500.00
			2,133

10,1988

$15,660

Discharge System 4 "

800 ft	4" Schedule 40 Pipe	$3.50 ft	$2,800.00
8	4" Slip On Flange	$9.60 ea	$76.80
8	4" 90 Elbow	$8.10 ea	$64.80
2	4" Expansion Joints	$215.00	$430.00
6	4" 45 Elbow	$7.99	$47.94
		Total	$3,419.54

1	4" x 4" Pump 420 GPM		$4,299.00
~~1~~	~~2" x 2" Pump Sump~~		~~$2,380.00~~
1	Electrical Pump Panel Assembly Installed		$4,633.00
	Material Only		-$2,200.00
			2133

8,932

$12,348

Est. Labor 800 - 1000 hrs.

Water table, always wet

Labor @ $18 x 800 = $14,400
1000 = $18,000
Avg - $16,500

4" $ 17,042
16,500
33,542

6" 20,354
16,500
36,854

Sandy Hart
Smearinger

WASTE WATER SYSTEM

The waste water system is listed in three sub systems:

1. Supply Suction
2. Structural Support and Misc.
3. Pump and Discharge

Sub system 1 & 2 will relatively remain the same in cost and construction structure. Sub system 3 will vary in cost and construction time depending on which size, 4" or 6" is selected.

Waste Water System

Supply Suction System

Quantity	Material	Price	Total
140 ft.	6" PVC Schedule 40	$1.90 ft	$266.00
6	Tees PVC 6"	$37.66 ea	$225.96
2	90 elbow PVC 6"	$14.65	$29.30
8	6" to 4" Bushing Reducer	$11.33	$90.64
2	4" PVC Ball Valves	$260.91	$521.82
120 ft	4" PVC Schedule 40	$1.22 ft	$146.40
6	Tees PVC Schedule 40 4"	11.18 ea	$67.08
6	Flanges PVC 4"	$9.59 ea	$58.14
6	4" to 1" Bushing Reducers	$4.57	$27.42
12	1" Brass Ball Valves	$19.00	$228.00
			$1,658.76

Structural & Misc.

1	Pump Foundation		$500.00
20	Supports Pipe	$20.00	$400.00
12	Angle Iron Structural 4"x4"	$32.90	$394.80
4	Angle Iron Structural 3"x6"	$38.90	$155.60
70	Suspension Brackets	$2.84	$198.80
10	All Thread 3/4" 12ft	$1.19 ft	$142.80
	Welder Rental	$248.00 mo	$744.00
	Misc.		$500.00
			$3,036.00

4,695

Sump pump 6

Jim Dietz

320' = 16 Joints

- Forget piping the 6" line down in the tank farm as you and T.J. discussed
- there will be 15 to 16 - 21' straight sections & joints weigh over 400 # each.
  - need to browse down & push through other piping & lift up & then support while connecting the brackets
  - will be doing this in the mud soon
- come up over the concrete wall at the sump
  - support, with similar brackets, on the the inside of the upper-outer side of wall
  - go east to the hot oil area and then cross over to the top of the wall, to the east end of the tank farm
  - then go up and south to the AR tracks and then back east to the out fall
- my est. is that we could do it this way with about 1/3 of the labor cost of the other way.
- I can start this work, at the same time we are doing the excavation, filter cloth, rock & new sump work
- I think we have to go mechanical joints, to save time
  - our new est. of material costs is $35,000
    leaves (for labor) (525 man hrs) 10,000
    $45,000

"Strenights"

Waste Water System

Discharge System 6"

800 ft	6" Schedule 40 pipe	$5.71 ft	$4,568.00
8	6" Slip On Flange	$15.60	$124.80
8	6" 90 Elbow	$19.65	$157.20
2	6" Expansion Joints	$255.00	$510.00 $71 60 (F)
6	6" 45 Elbow	$17.00	$102.00 $)
		Total	$5,462.00 63 L7 00 (EV)
1	6" x 6" Pump 800 GPM		$5,565.00 + Fright
1	2" x 2" Sump Pump 65 GPM		— $2,380.00
1	Electric Pump Panel Assembly Installed		$4,633.00
	Material Only		-$2,500.00

Discharge System 4 "

800 ft	4" Schedule 40 Pipe	$3.50 ft	$2,800.00
8	4" Slip On Flange	$9.60 ea	$76.80
8	4" 90 Elbow	$8.10 ea	$64.80
2	4" Expansion Joints	$215.00	$430.00
6	4" 45 Elbow	$7.99	$47.94
		Total	$3,419.54
1	4" x 4" Pump 420 GPM		$4,299.00
1	2" x 2" Pump Sump		$2,380.00
1	Electrical Pump Panel Assembly Installed		$4,633.00
	Material Only		-$2,200.00

Valves	1000
PVC	1721
Structual	5,716
Pipe	6,367
Pump	5,565
Elect.	4633
	$ 25002
+ (sump)	5,628
+ (2x2 pump)	2,380
	33,010

+ 5 1650

$ 34,660

$ 10,000 Labor

÷ 19 = 525 hr.

WASTE WATER SYSTEM

The waste water system is listed in three sub systems:

1. Supply Suction
2. Structural Support and Misc.
3. Pump and Discharge

Sub system 1 & 2 will relatively remain the same in cost and construction structure. Sub system 3 will vary in cost and construction time depending on which size, 4" or 6" is selected.

Waste Water System

Supply Suction System

Quantity	Material	Price	Total
140 ft.	~~6~~ 8" PVC Schedule 40	$1.90 ft	$266.00
6	Tees PVC ~~6"~~ 8"	$37.66 ea	$225.96
2	90 elbow PVC ~~6"~~ 8"	$14.65	$29.30
8	8" ~~6"~~ to 4" Bushing Reducer	$11.33	$90.64
2	4" PVC Ball Valves	$260.91	$521.82
120 ft	4" PVC Schedule 40	$1.22 ft	$146.40
6	Tees PVC Schedule 40 4"	11.18 ea	$67.08
6	Flanges PVC 4"	$9.59 ea	$58.14
6	4" to 1" Bushing Reducers	$4.57	$27.42
12	1" Brass Ball Valves	$19.00	~~$228.00~~
			~~$1,658.76~~

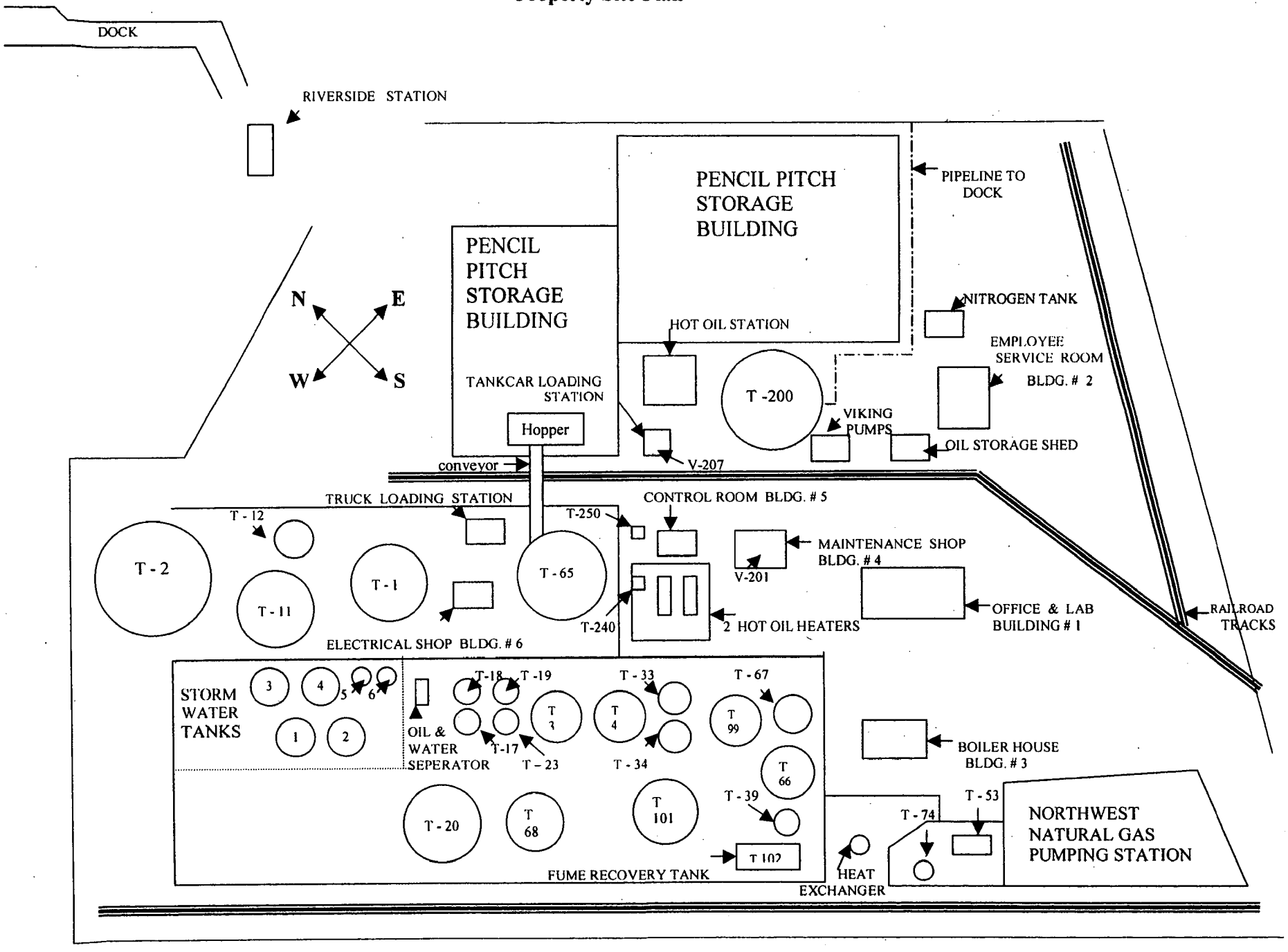
$1721.00 (F)
DR
2125 00 (IV)

Structural & Misc.

1	Pump Foundation		~~$500.00~~ 750 00
20	Supports Pipe	$20.00	$400.00
12	Angle Iron Structural 4"x4"	$32.90	$394.80
4	Angle Iron Structural 3"x6"	$38.90	$155.60
70	Suspension Brackets	$2.84	~~$198.80~~ 308 00
10	All Thread 3/4" 12ft	~~$1.19 ft~~	~~$142.80~~ 259 00
	Welder Rental	$248.00 mo	$744.00
	Misc.		$500.00
			~~$3,036.00~~

Hardware 162 00
Bracket Fabricate 2043.00
~~$~~5,716 00

Property Site Plan



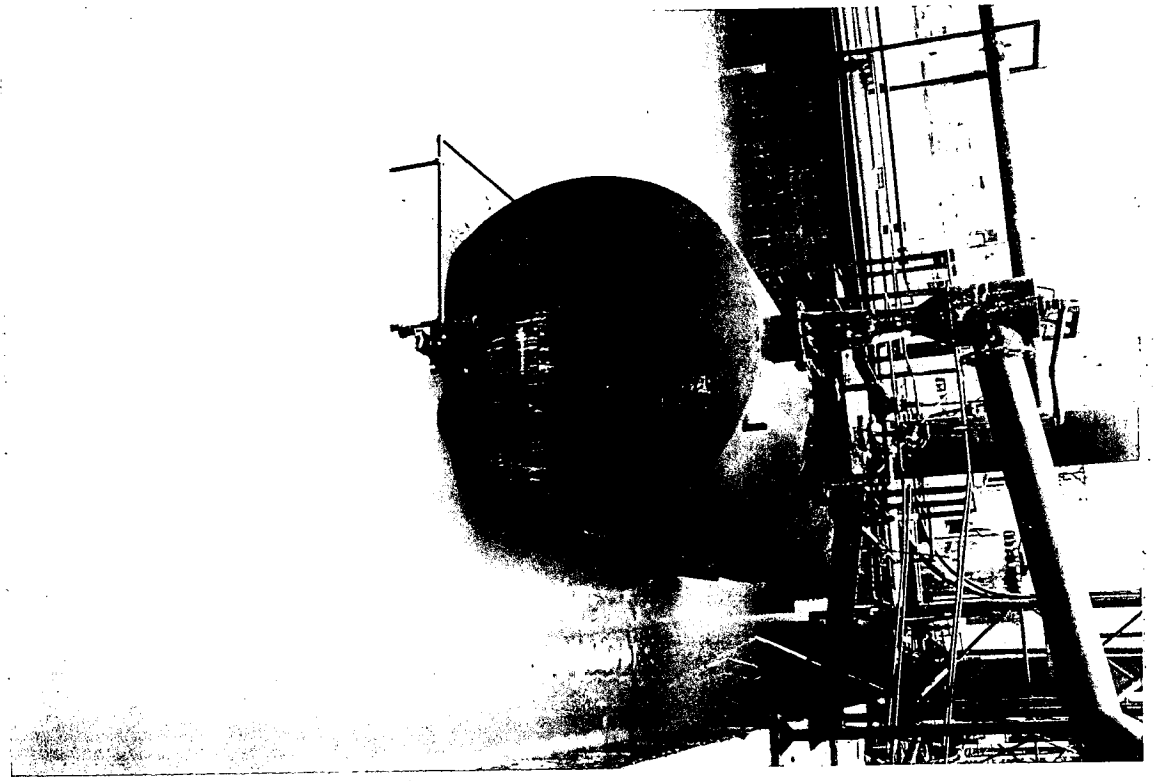
Flood of 1996

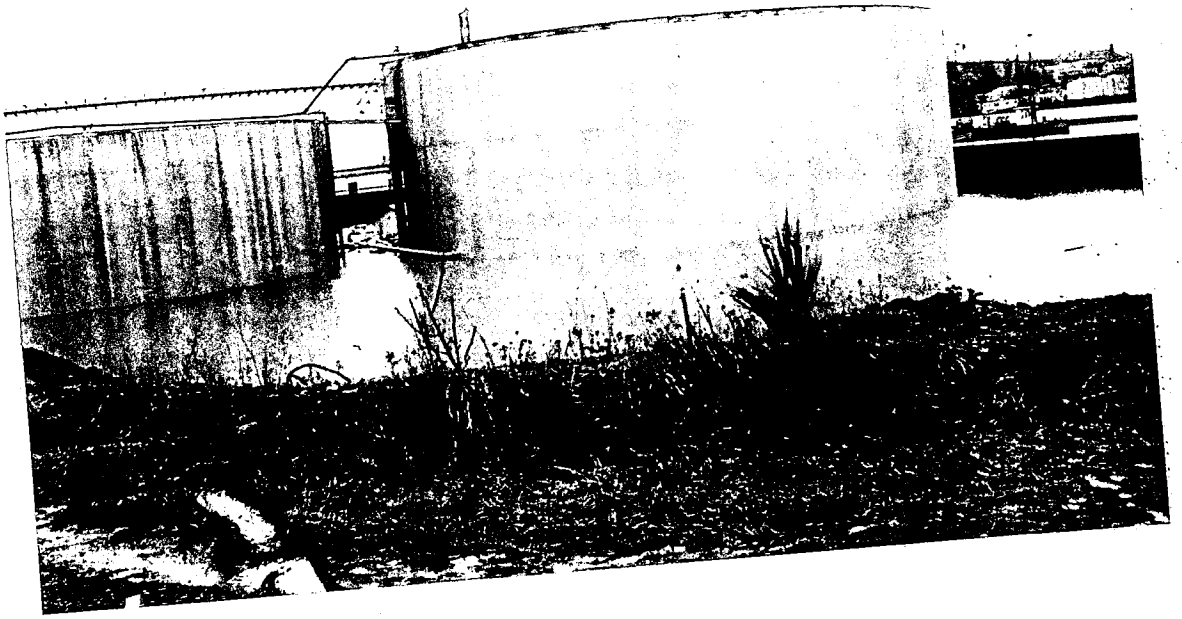
Date 2/14-15-16/94

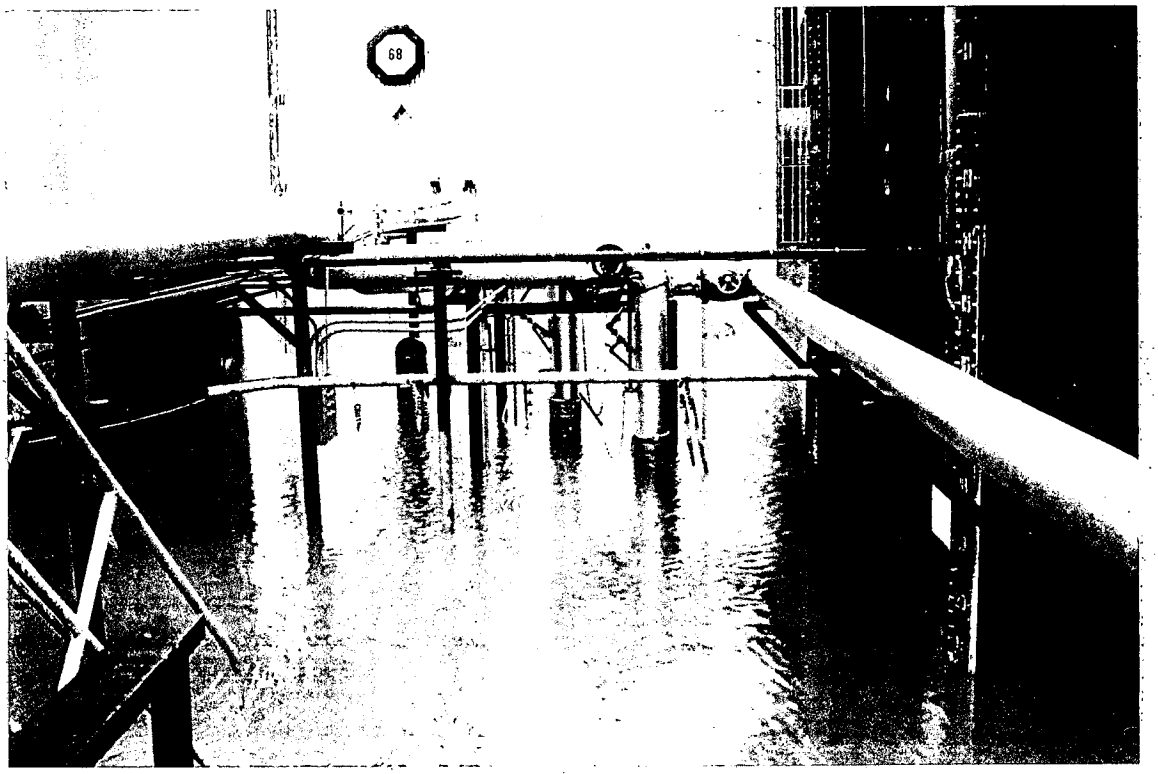
Subject Flood Pictures

SHARE YOUR MEMORIES
WITH

PHOTOS



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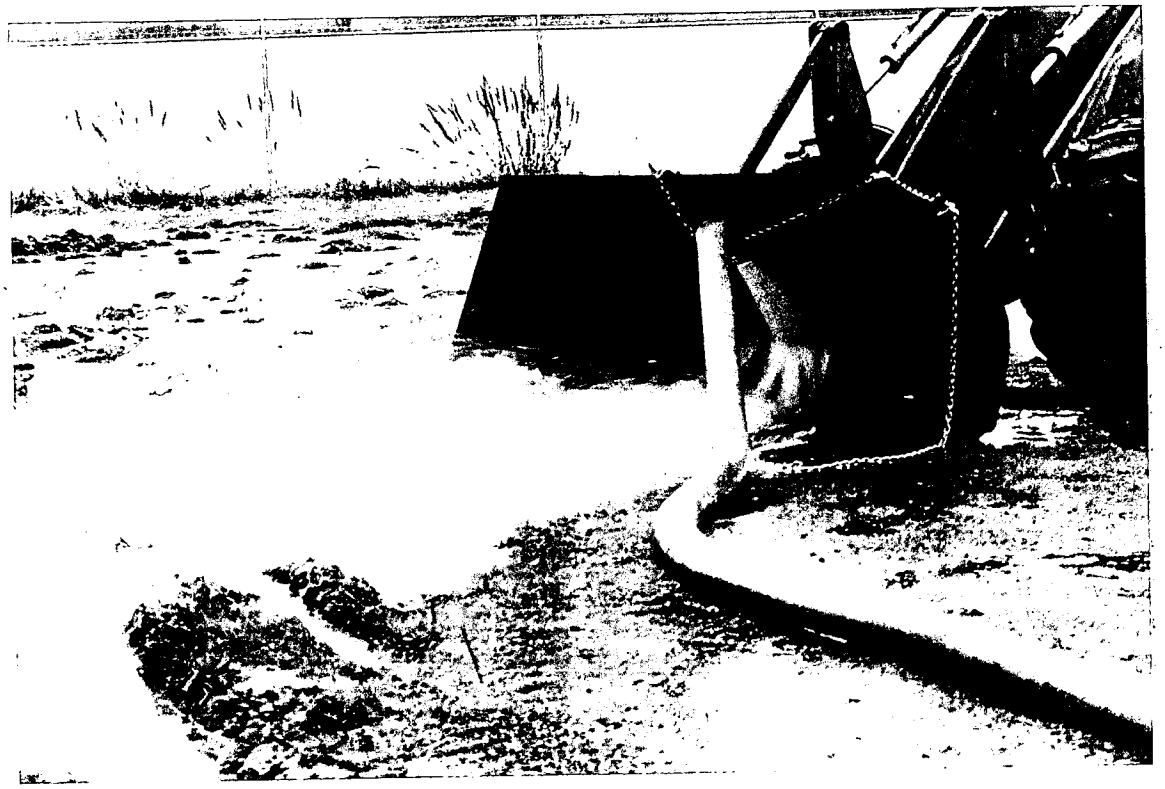
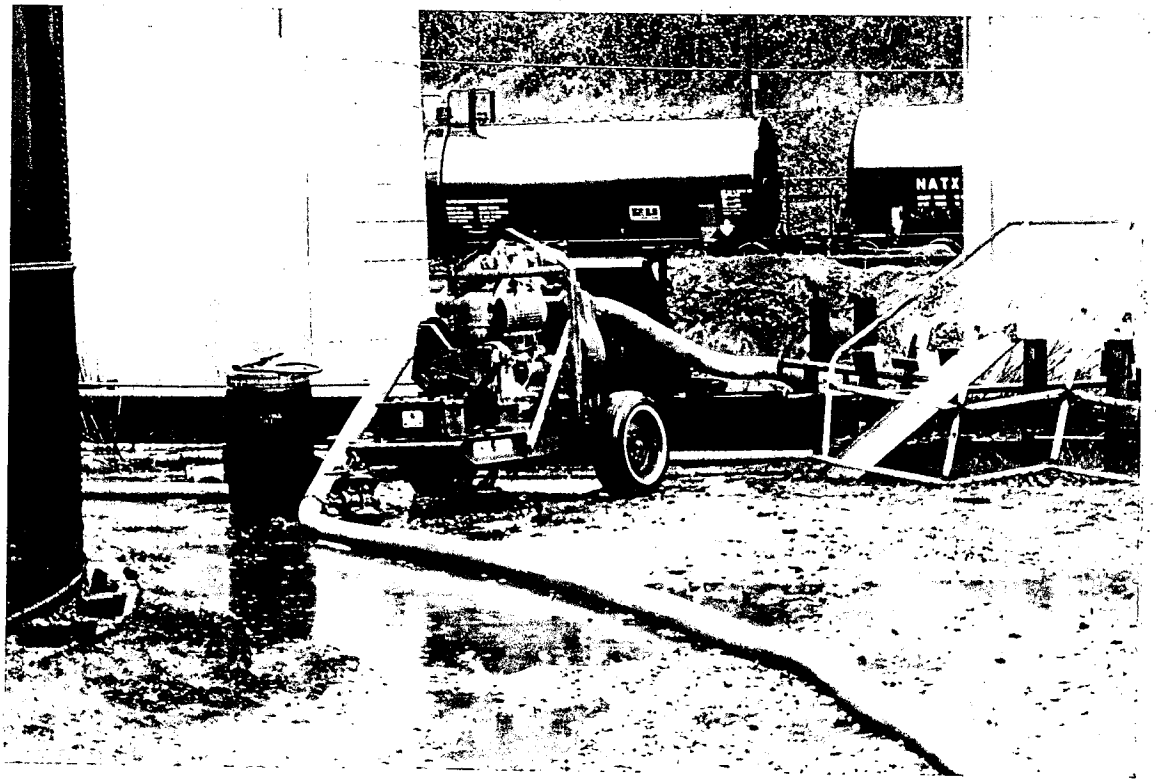
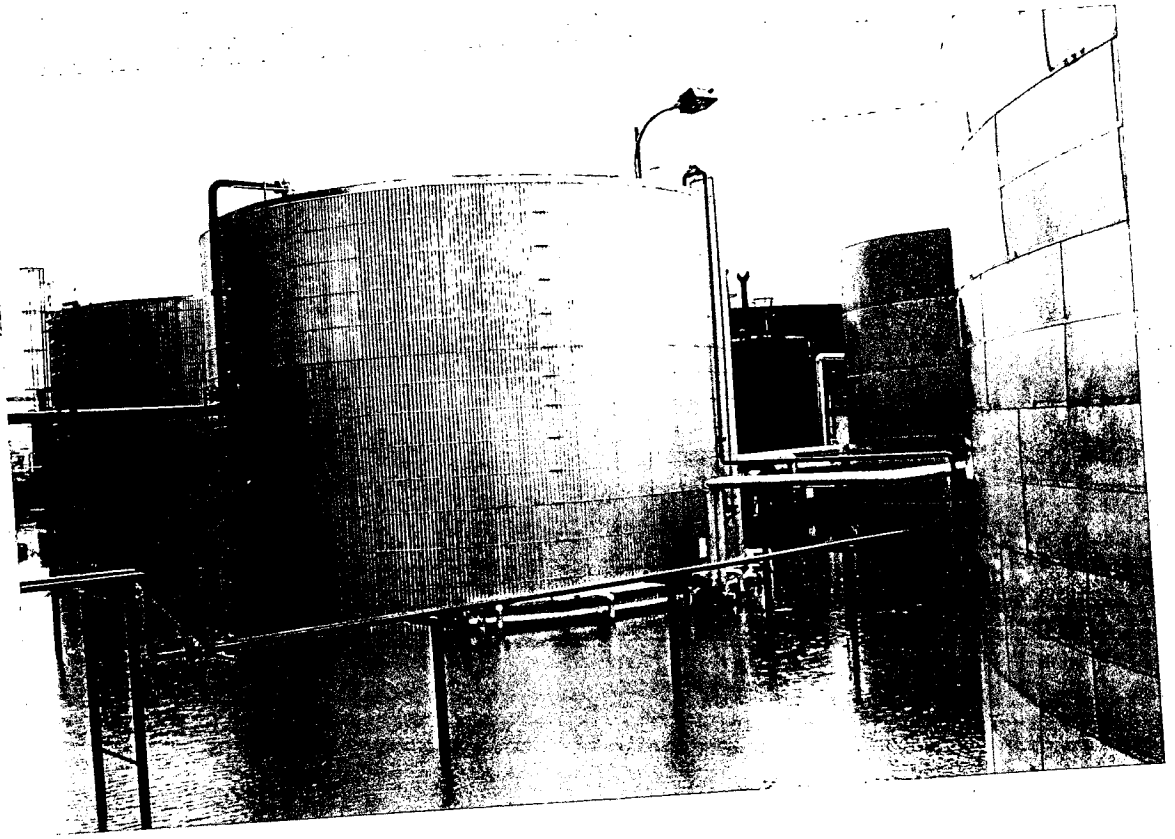
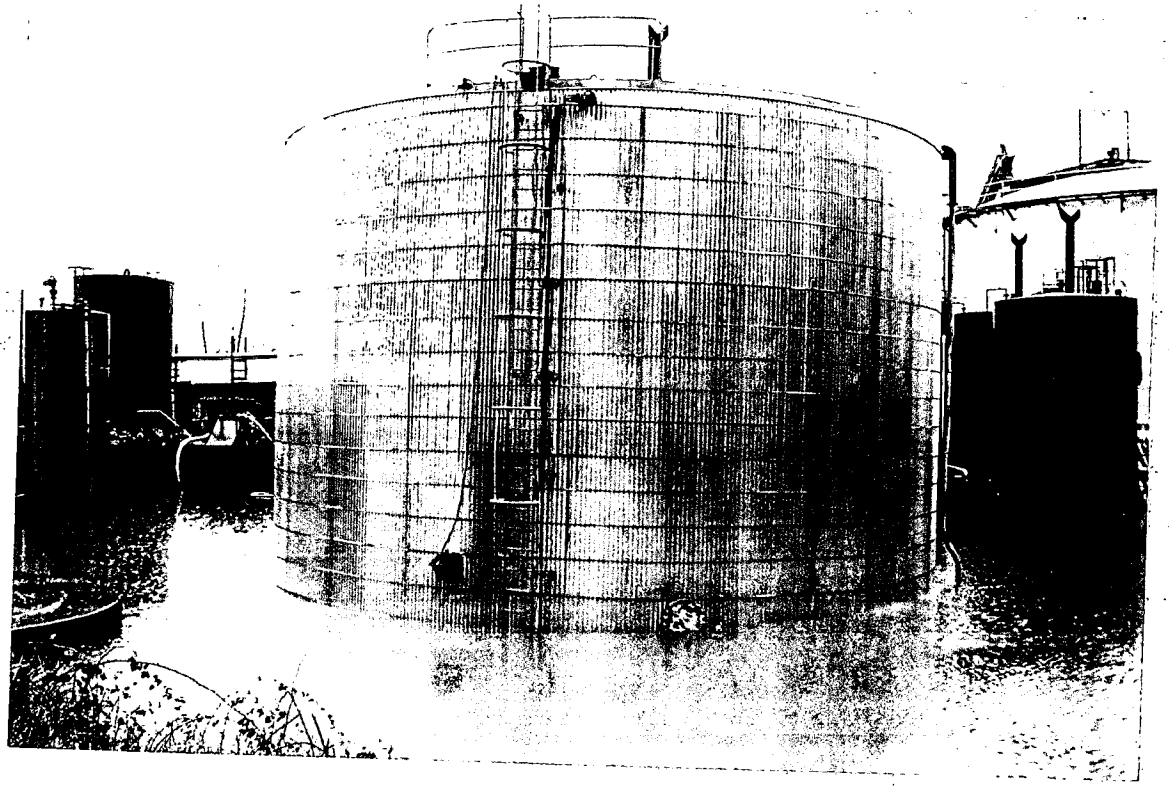
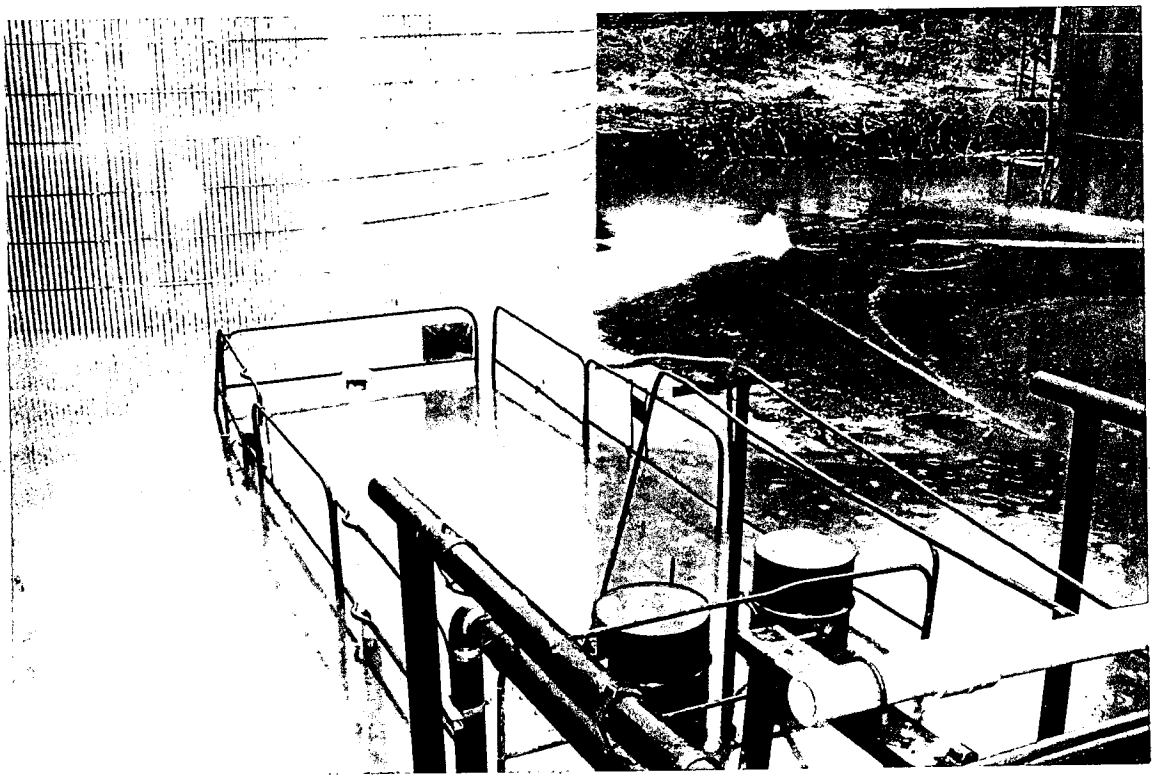


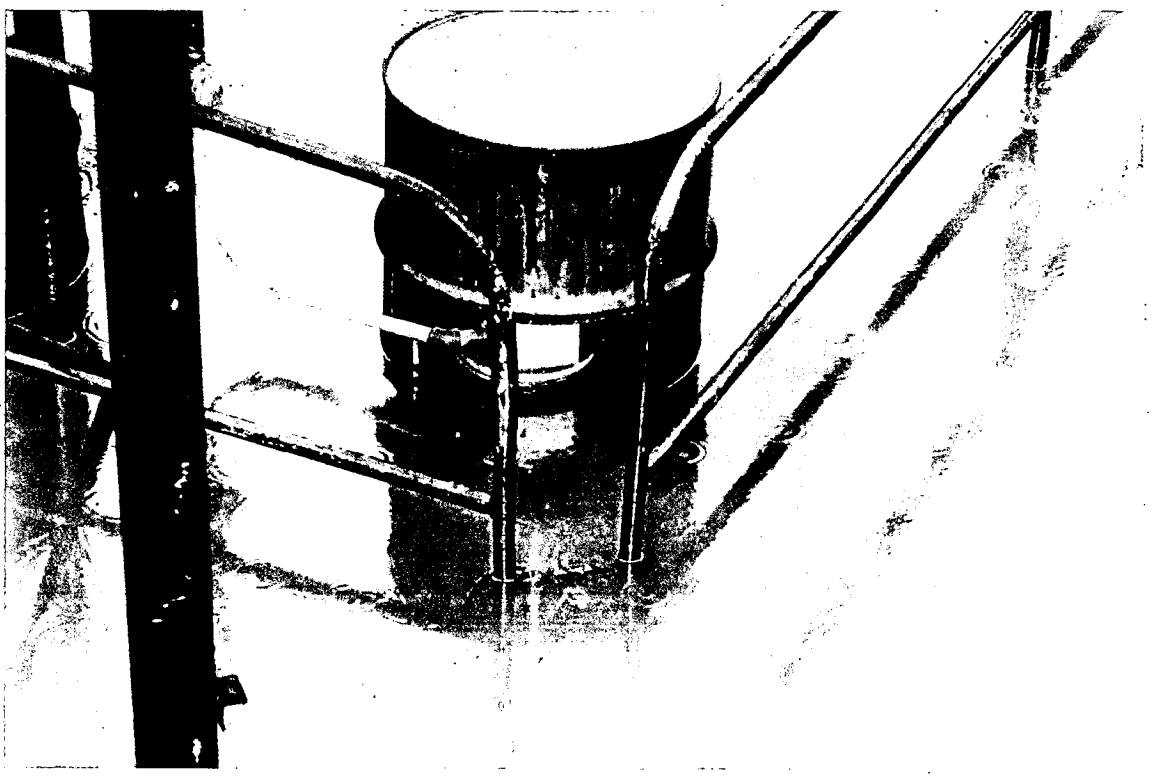
NATX

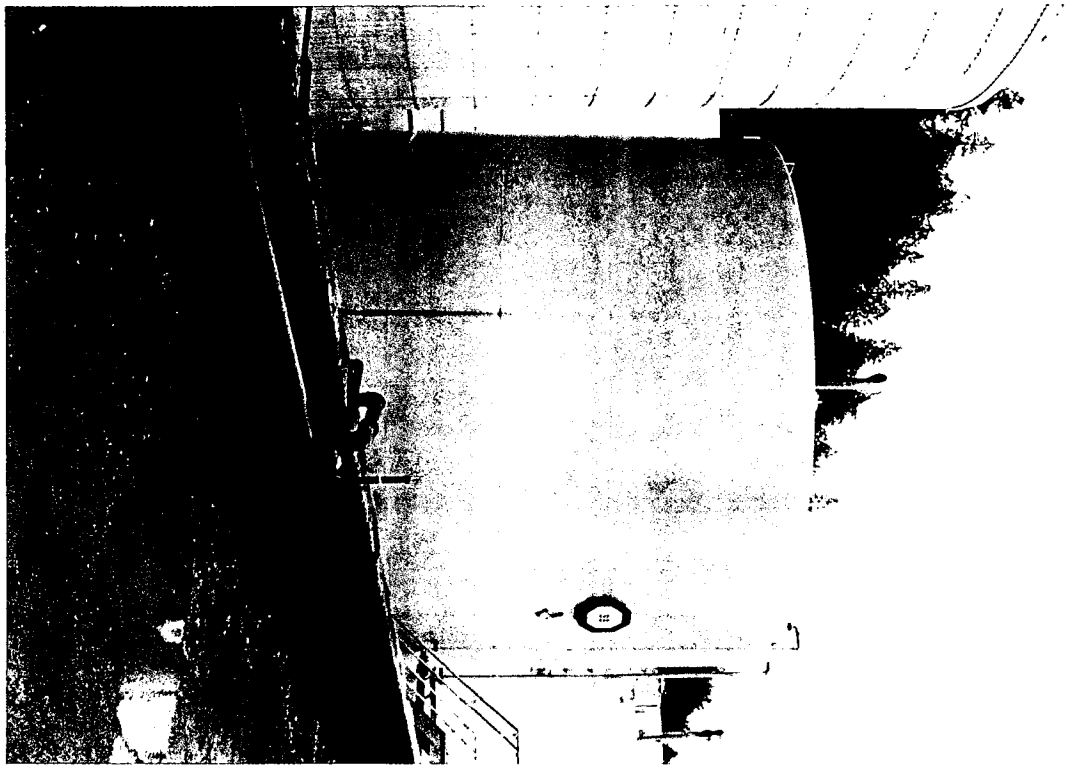

NATX

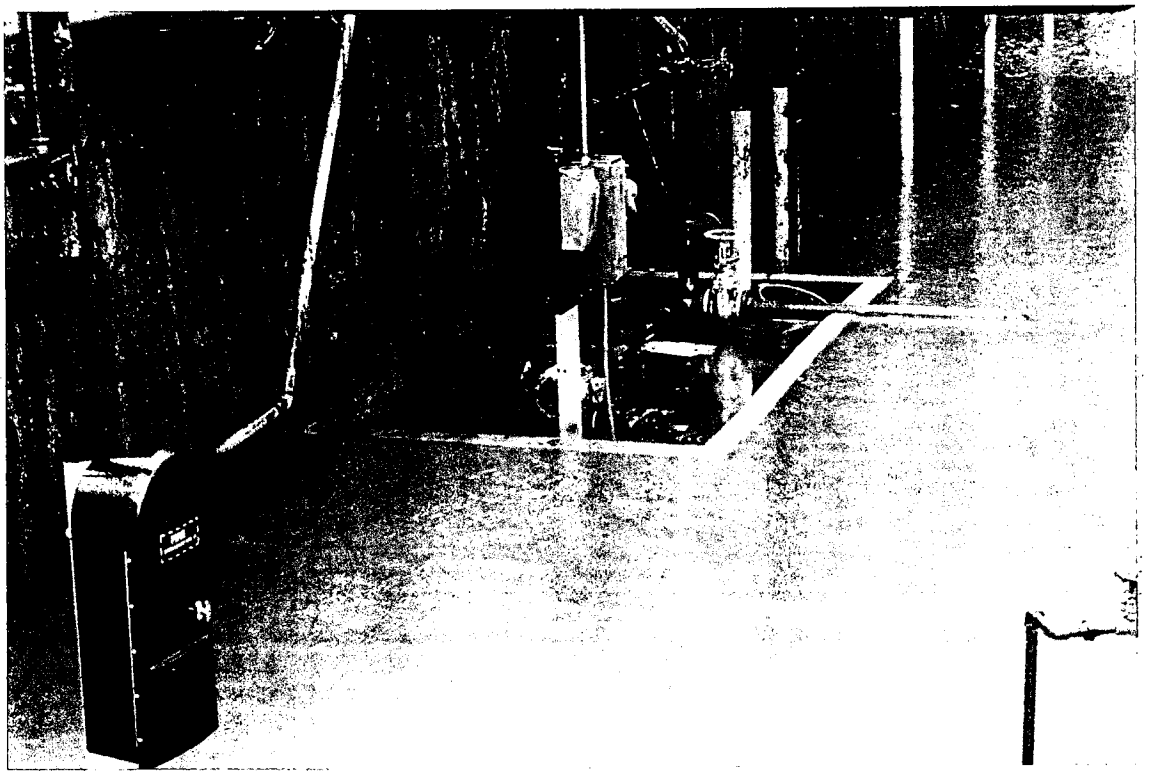


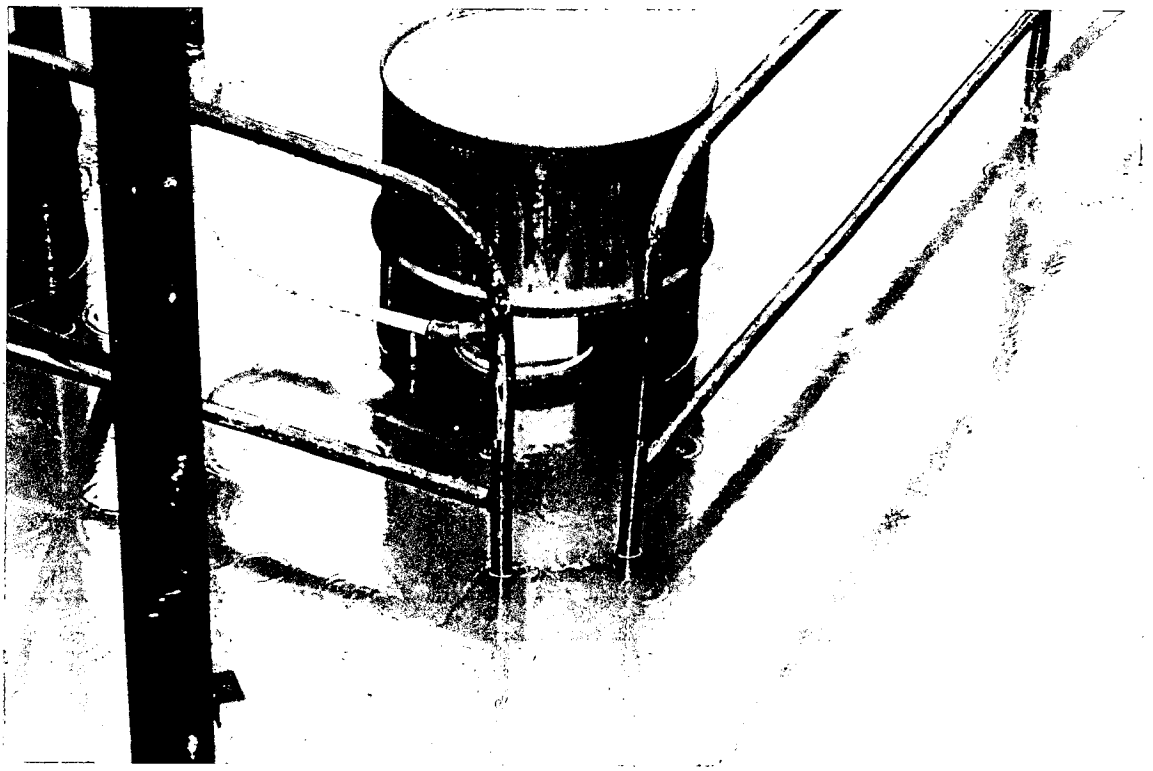


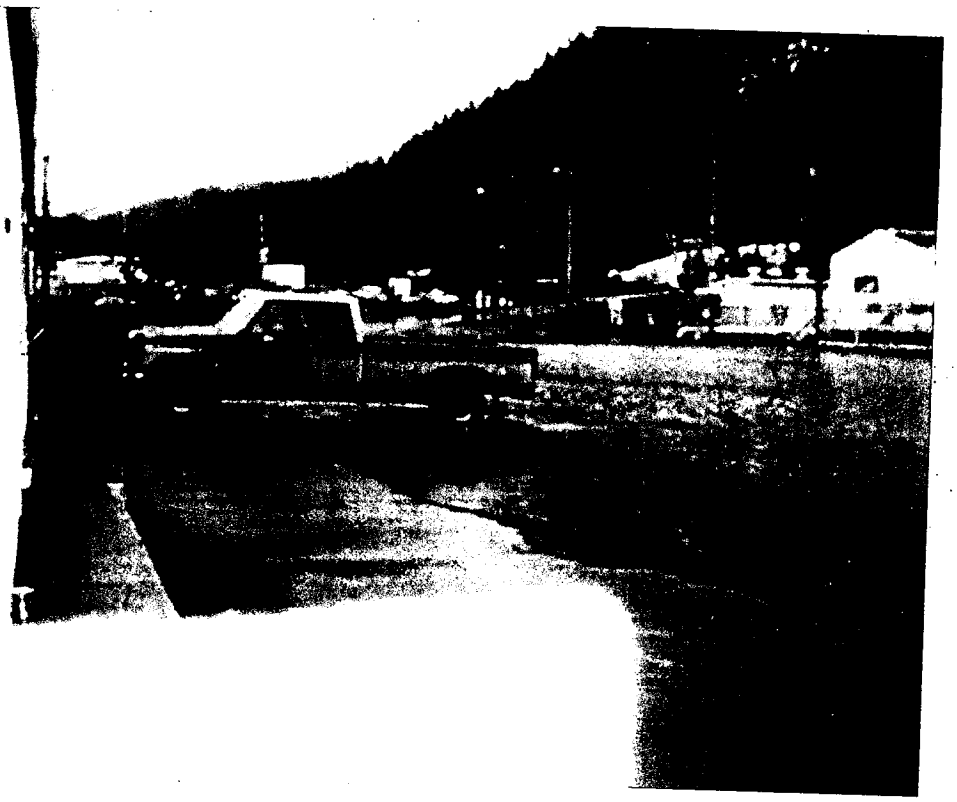


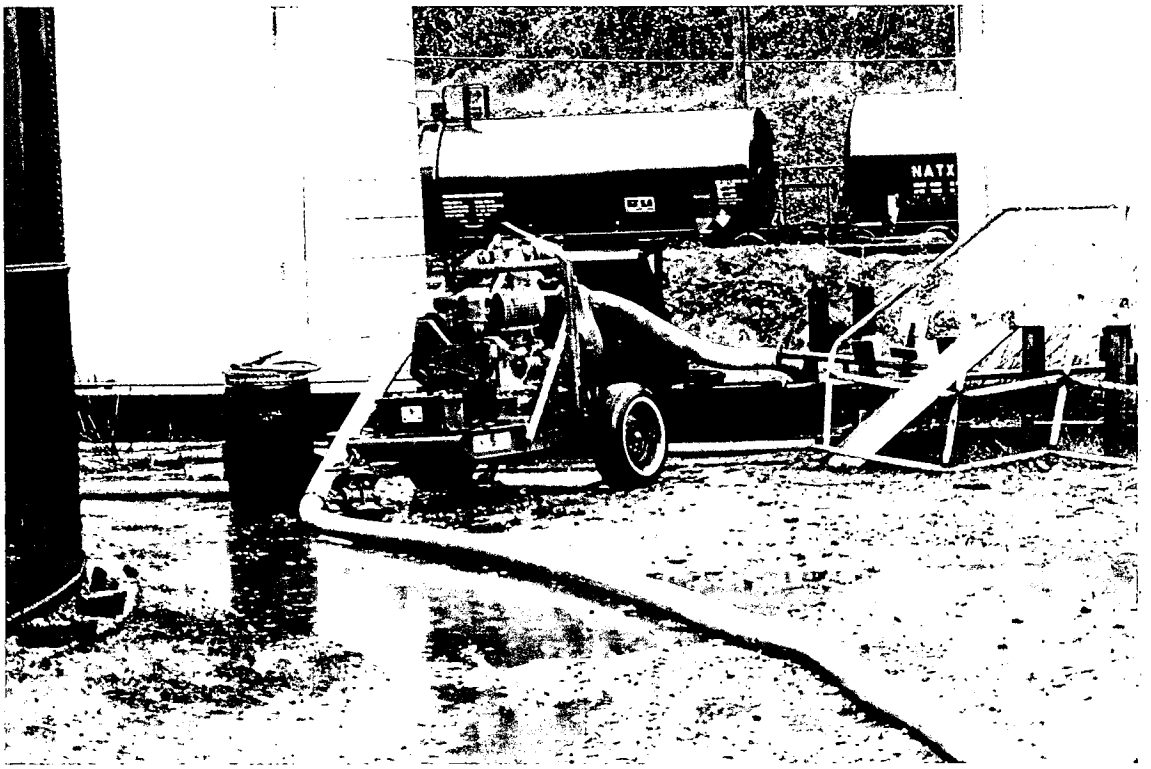






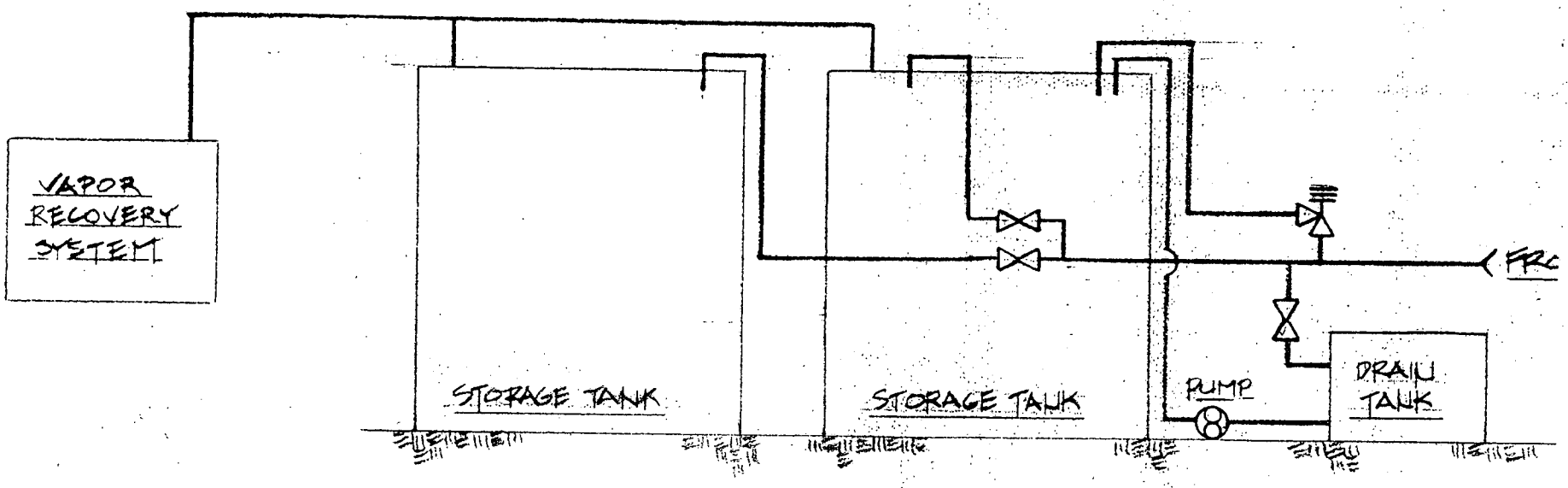




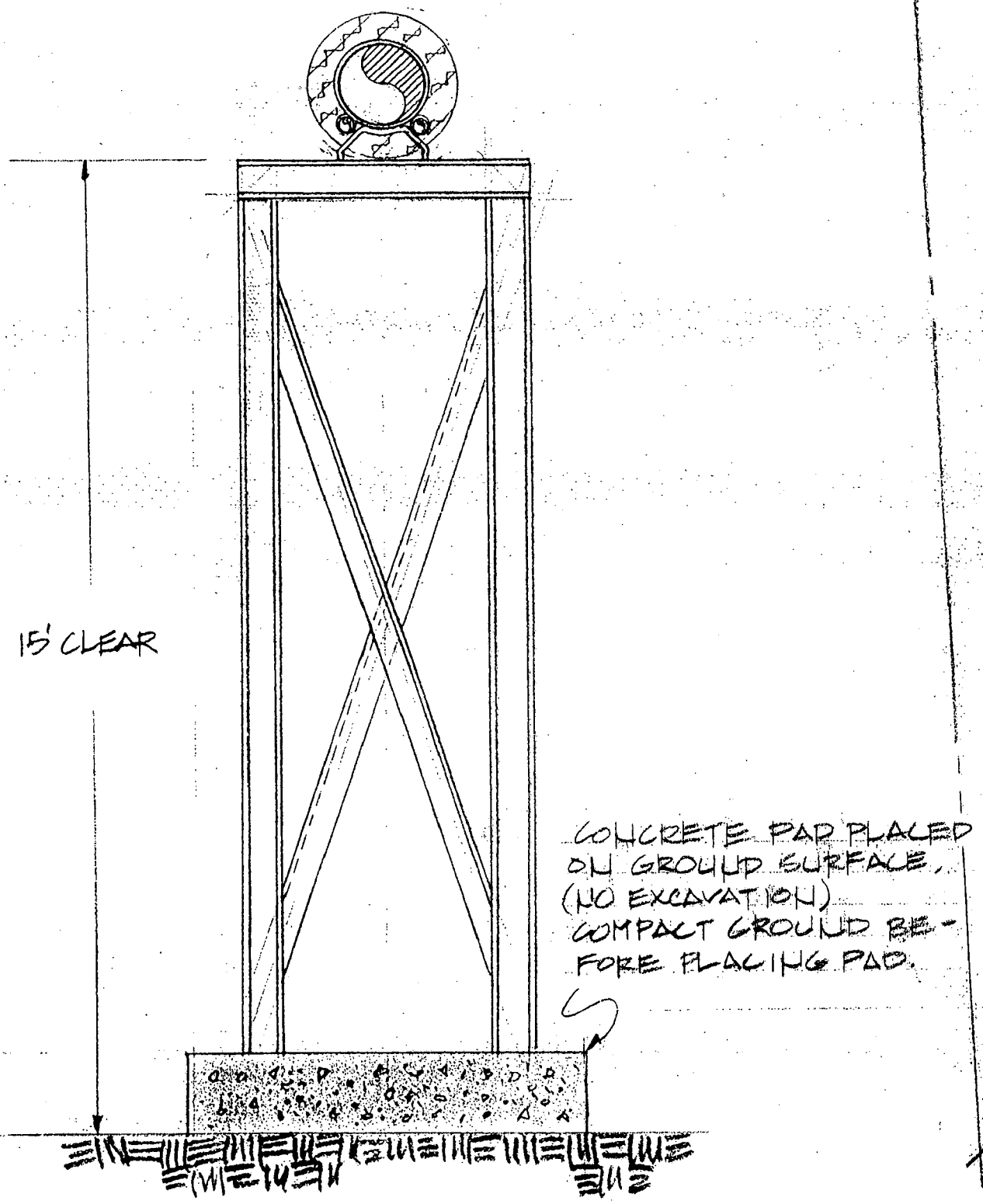


Portland Plant
Storm/Flood Pictures
February 6 & 7, 1996

Picture #	Comments
1	Front parking lot, water came to within 3" of the front door.
2	Drain from front parking lot feeding into tank farm, early stages
3	T-67 creo pumps, early stages
4	Fume tank, early stages
5	Sump and the sump pumps, early stages
6	T-68 pitch pumps, early stages
7	Same area the next morning (2/7/96)
8	T-68 from the opposite side the next morning
9	T-99 floating
10	T-20 listing - note insulation bands
11	The rented 6" trasher pump with fire hose discharge line
12	Fire hose from tank farm towards the river
13	Fire hose to the bucket of the front end loader
14	Fire hose in the bucket to diffuse the water and reduce the soil erosion.
15	Pacific Northern Oils tank farm, early stages. Eventually the river was with in 1' of the top of the retaining wall and the water level in side was within 2' of the top. The pump house between the 2 tanks was totally under water.

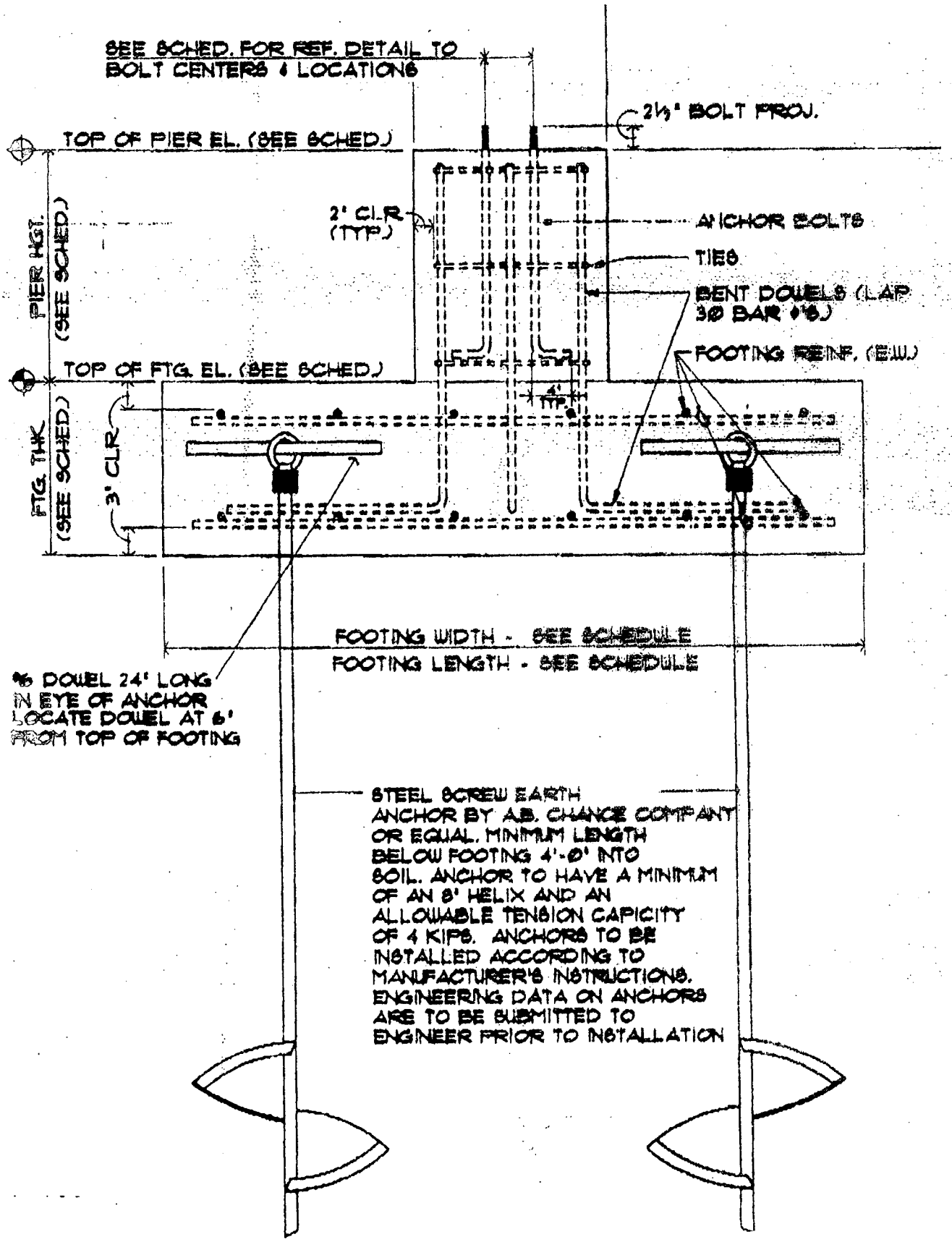


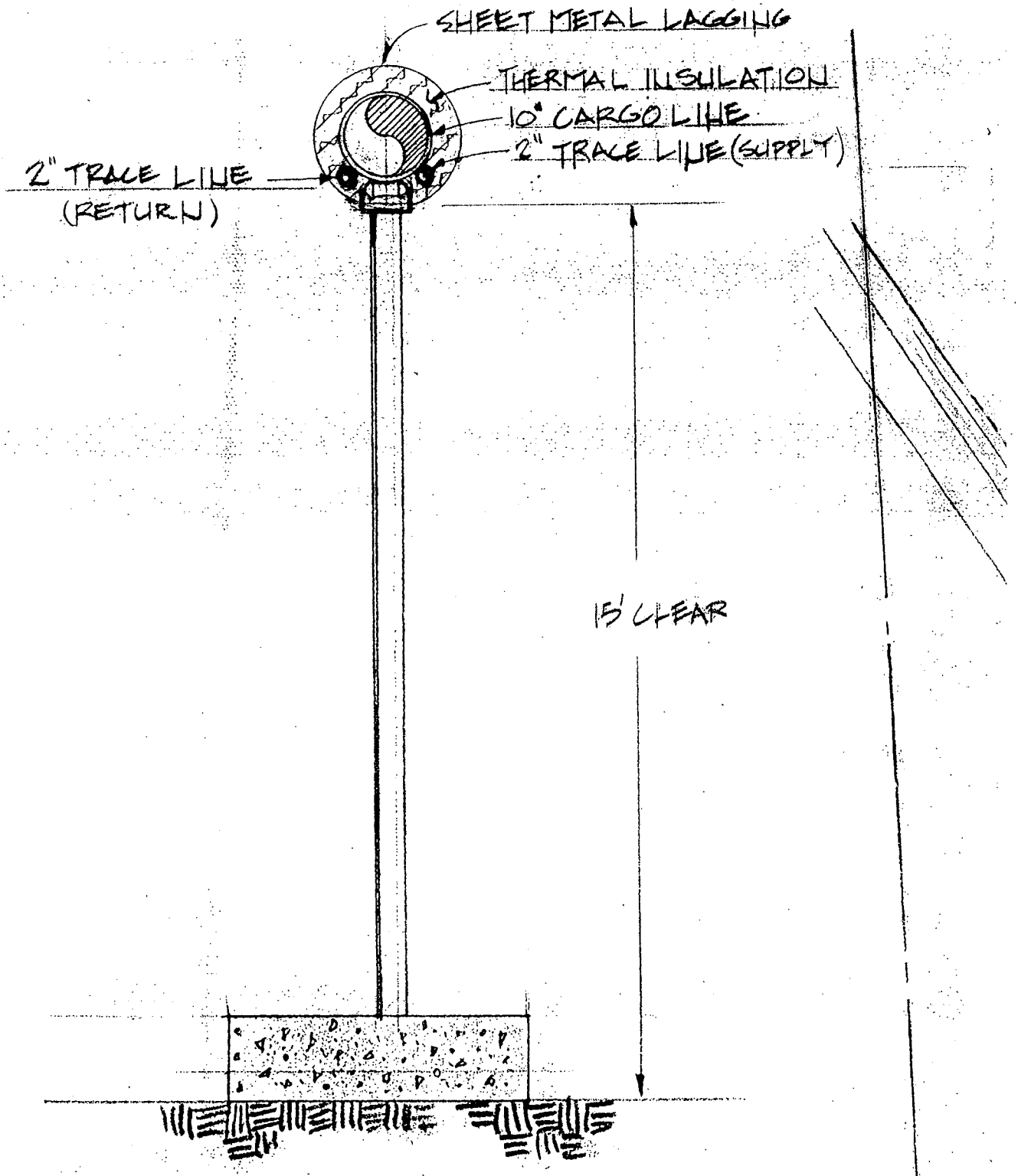
FACILITY PIPING SCHEMATIC



ANCHOR PIPE SUPPORT

6 TO 8 REQUIRED

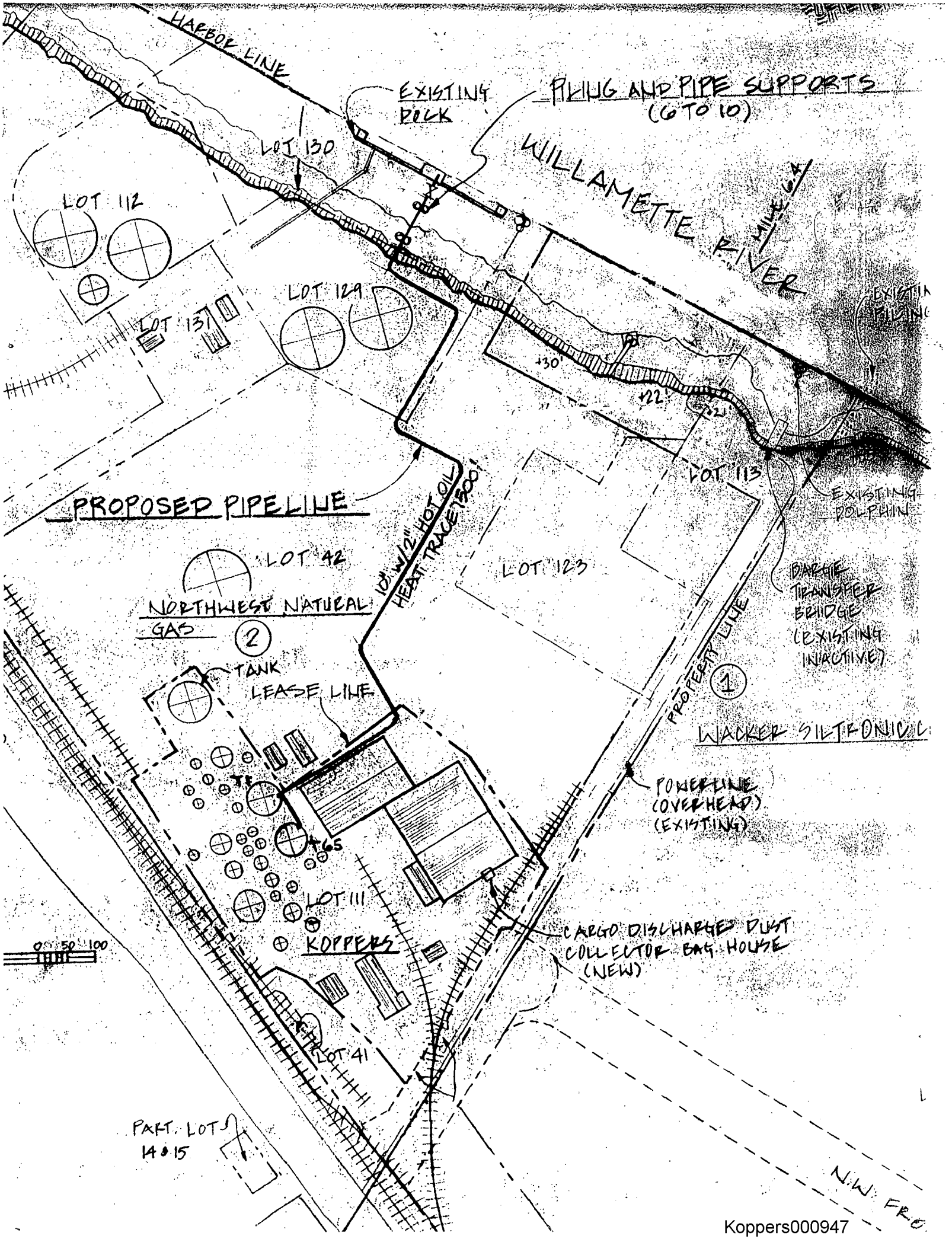

SEE SCHED. FOR REF. DETAIL TO BOLT CENTERS & LOCATIONS
2½" BOLT PROJ.
TOP OF PIER EL. (SEE SCHED.)
PIER HGT. (SEE SCHED.)
2' CLR (TYP.)
ANCHOR BOLTS
TIES
BENT DOWELS (LAP 30Ø BAR #6)
FOOTING REINF. (E.W.)
TOP OF FTG. EL. (SEE SCHED.)
4' TYP.
FTG. THK (SEE SCHED.)
3' CLR
FOOTING WIDTH - SEE SCHEDULE
FOOTING LENGTH - SEE SCHEDULE
#6 DOWEL 24" LONG IN EYE OF ANCHOR LOCATE DOWEL AT 6' FROM TOP OF FOOTING
STEEL SCREW EARTH ANCHOR BY A.B. CHANCE COMPANY OR EQUAL. MINIMUM LENGTH BELOW FOOTING 4'-0" INTO SOIL. ANCHOR TO HAVE A MINIMUM OF AN 8" HELIX AND AN ALLOWABLE TENSION CAPICITY OF 4 KIPS. ANCHORS TO BE INSTALLED ACCORDING TO MANUFACTURER'S INSTRUCTIONS. ENGINEERING DATA ON ANCHORS ARE TO BE SUBMITTED TO ENGINEER PRIOR TO INSTALLATION

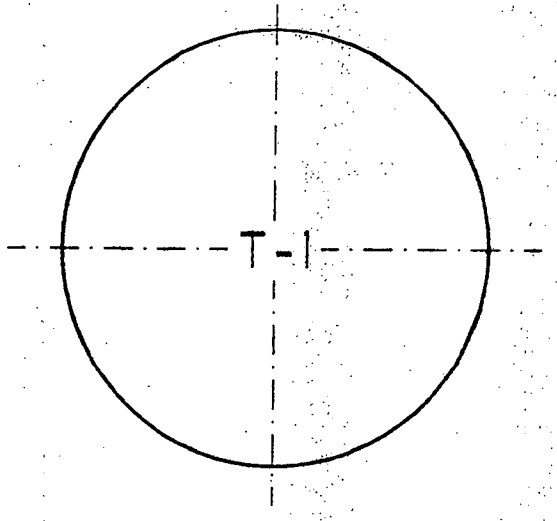


INTERMEDIATE PIPE SUPPORT

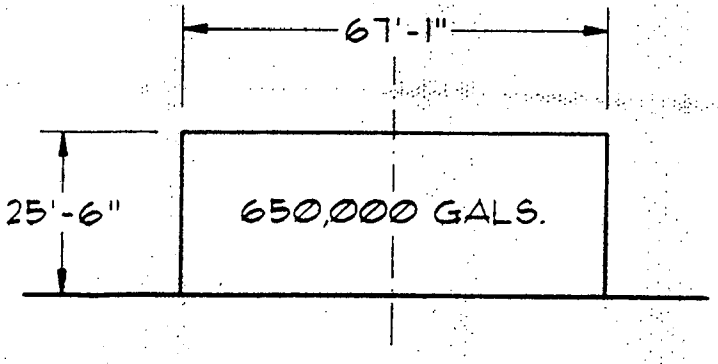
~100 REQUIRED

WICKERSHAM: FILE 84-59
(NORTHWEST PACIFIC OIL CO.)
PACIFIC NORTHERN GAS CO.
PLAT
1" = 100'
WILLAMETTE STREET
N
TOP OF BANK
POND WATER
MISSOULA
SERVICE
WILE
PIPE LINES
BRIDGE
DOLPHIN
WOODSIDE
HARBOR LINE
DOLPHIN
WOOD
DETACHED
HARBOR LINE
DOLPHIN
WOOD
HARBOR
DOLPHIN
WOOD
DOLPHIN
WOOD
DOLPHIN
WOOD

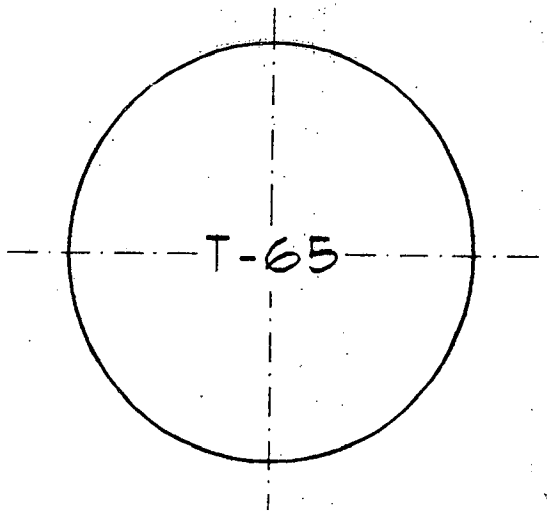

HARBOR LINE
EXISTING ROCK
PILING AND PIPE SUPPORTS (6 TO 10)
WILLAMETTE RIVER
MILE 6.4
LOT 130
LOT 112
LOT 129
LOT 137
+30'
+22'
+21'
LOT 113
EXISTING DOLPHIN
BARGE TRANSFER BRIDGE (EXISTING INACTIVE)
PROPOSED PIPELINE
10" W/2" HOT OIL HEAT TRACE 1500'
LOT 42
LOT 123
NORTHWEST NATURAL GAS
2
TANK
LEASE LINE
PROPERTY LINE
1
WACKER SILTRONIC
POWERLINE (OVERHEAD) (EXISTING)
+65
LOT 111
KOPPERS
CARGO DISCHARGE DUST COLLECTOR BAG HOUSE (NEW)
0 50 100
LOT 41
PART. LOT 14 & 15
N.W. FRO



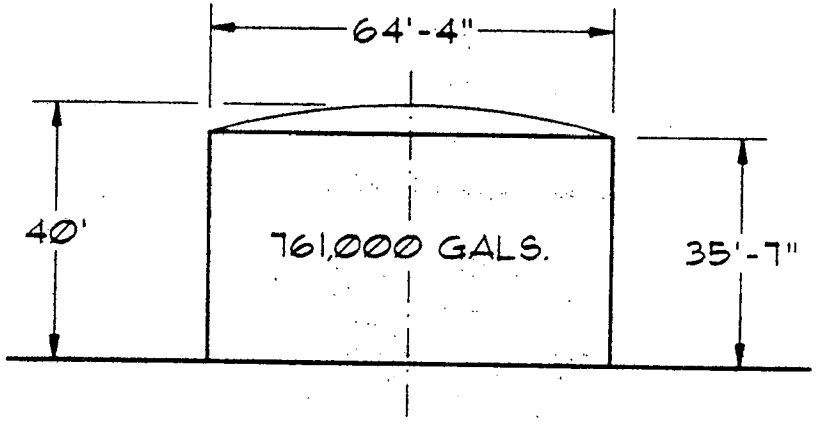
PLAN



ELEVATION



PLAN



ELEVATION

P94-26
SCALE: 1" = 30'

Koppers000948

4th overhead
-This is a detail of the anchor pipe supports. There would be about 7 of these required or approximately 1 every 200 feet.

5th overhead
-This is a general arrangement of the overall facility piping schematic showing the piping from the dock into our storage tanks and the Vapor or Fume Recovery System.

6th overhead
-This is another general arrangement of the two major storage tanks that will be used to store the liquid pitch that will be received off the ships

-The ships will have their own pumps that will discharge the pitch at the rate of 300 metric tons per hour. Total discharge will take about 24 hours after docking. Thus, scheduling coordination with Pacific Northern Oil will be required. We will be able to provide at least 2 weeks advance notice of the vessel's ETA's and based on my understanding of their business, I don't see this as a problem to them, with this amount of lead time.

-Any questions?

ship pictures

-Thank you for taking the time to meet with us today.

-As you know, we are just completing the second year of our current 5 year lease extension.

-In the last year or 2 we have told you about the environmental problems that have developed at the Port of Portland, over the unloading of the solid pencil pitch and our resulting desire to build our own environmentally safe unloading facility, on the Willamette River, to the north of our current site.

-Unfortunately, the EPA/DEQ site assessment process that is underway, has delayed this project for the near future.

-Combined with some conversations that I have had with Ron about the possible co-use of the Pacific Northern Oil dock and the recent developments by our foreign associates, who have built and are now using hot oil heated tankers for the hauling of liquid pitchs, we have now decided to proceed with a liquid approach for our future needs. And in the process,we will be eliminating all of the environmental concerns associated with the handling of solid pitch.

-Today we want to review with you the conceptual layouts that we have developed on such a project and to discuss our thoughts about the Aluminum Industry, particularly here in the Northwest and how we see our presence in this market as an indication to you of our plan's to be a tenant for many years to come.

-I have several overheads that I would like to show you now, to explain this liquid project, and of course I will be glad to answer any questions that might develop. Walt Turner will then follow with the Koppers and industry overview.

1st overhead

-This is an overview of the entire area. As you can see the pipeline will be 10" diameter pipe, with 2" diameter hot oil tracer lines and will run some 1500 linear feet from the existing dock to our storage tanks, We will utilize our existing hot oil heater and fume recovery systems. Only the pipeline represents new construction.

2nd overhead

-This shows the existing dock, which is more than capable of handling the 6000 to 7000 metric ton size vessel's that we plan to bring in. The only problem with this facility is the fact that the existing bridge, also supports the existing pipelines and would not have any additional capacity for our piping. Thus, we will have to bring our own pipeline from the riverbank to center service platform, which would require the driving of some 6 pipe piling clusters in the river for supports.

3rd overhead

-This is a detail of the intermediate pipe supports. There would be about 100 of these required or approximately 1 every 15 feet.

Date: 12/5/00 12:33 AM
Sender: "Troy Goodman" <SMTP:TroyG@fammpnw.com>
To: Amos Kamerer
Priority: Normal
Subject: Pacific Terminal Services

Amos:

I would like to thank you for the opportunity to discuss our Portland Operations and for the tour of your facility. I believe that combining our two facilities can result in significant reduction in Koppers operating costs. In addition, you have a number of assets, tanks and dry bulk storage, available for third party use that Pacific Terminals is familiar with marketing and operating. Placing these assets in service can generate additional revenue.

Combining our operations can result in the following benefits for Koppers:

- Reduced operating cost of $85,000 to $175,000 annually plus revenue generation with available assets.
- Combined work force capable of 24/7 operations resulting in, improved safety, security, flexibility, and productivity.
- Access to Pacific Terminals marketing capability to put available assets into revenue generating service.
- Larger pool of qualified operators, less risk of delays, etc.
- Reduced operations liability for Koppers.
- Frees your time to focus on sales, marketing, and business growth critical to success.
- Local emergency response organization.

Thank you for the information on ECHO and Phoenix Safety. I look forward to reviewing the information on your tanks to see if there is some immediate business Pacific Terminals can develop.

Our proposal for the operations of the Koppers Portland Terminal outlined a mutually agreed fee approach; however, Pacific Terminals is willing to discuss other contract methods that may be acceptable to you. I would like to call you in the next week to schedule a follow up meeting to discuss a path forward. Thank you for your consideration.

Regards,

Troy

-----Original Message-----
From: amos_kamerer@mail.koppers.com
[mailto:amos_kamerer@mail.koppers.com
<mailto:amos_kamerer@mail.koppers.com>]
Sent: Wednesday, November 15, 2000 7:13 AM
To: troyg@fammpnw.com
Subject: ECHO & Charlie Morecroft

Troy,

I hope dinner went well and the view of the city was probably just great.

I have a busy scheduled today, so, I will try to get you the info on the tanks
tomorrow.

Regarding the 2 other things I promised to forward, see below;

ECHO, Emergency Communications for Hazardous Operations
C/O Van Waters and Rogers
3950 NW Yeon Ave.
Portland, Or. 97210
Russ Palmer

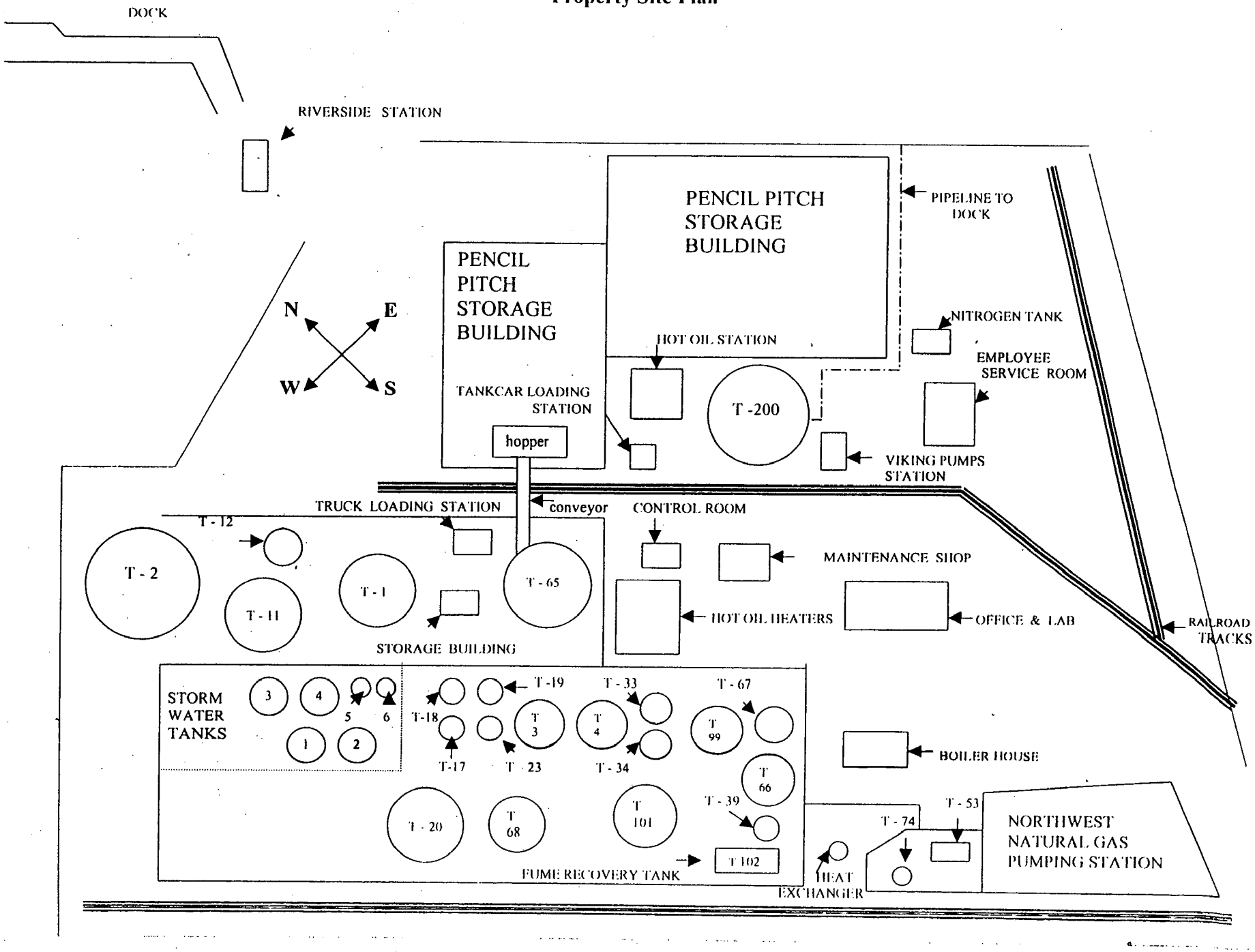
They meet the 2nd Thursday of the month, September through May at Fire Station #
6, 3600 NW Front Ave.

Charlie Morecroft is Phoenix Safety Management at # 800-783-0796. I don't have
an address.

Regards,

Amos

Property Site Plan



Koppers000953

To: troyg@fammpnw.com
Priority: Normal
Subject: ECHO & Charlie Morecroft

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They meet the 2nd Thursday of the month, September through May at Fire Station # 6, 3600 NW Front Ave.

Charlie Morecroft is Phoenix Safety Management at # 800-783-0796. I don't have an address.

Regards,

Amos

Kamerer Amos

From: Dietz Jim
Sent: Wednesday, January 10, 2001 9:21 AM
To: Kamerer Amos
Subject: RE: Pacific Terminals Information Request

Amos,

I want us to make any operating changes befroe we talk with them further. Tell them you are still looking at this year's business and will contact them early February. Don't meet with them on site in any case.

Have you worked up your contingency plan?

Jim

-----Original Message-----
From: Kamerer Amos
Sent: Tuesday, January 09, 2001 6:53 PM
To: Dietz Jim
Subject: FW: Pacific Terminals Information Request

Jim,

Call me, so we can discuss the attached.

Amos
-----Original Message-----
From: Troy Goodman [mailto:TroyG@fammpnw.com]
Sent: Tuesday, January 09, 2001 2:03 PM
To: Amos Kamerer
Cc: Vince Godfrey
Subject: Pacific Terminals Information Request

Amos,

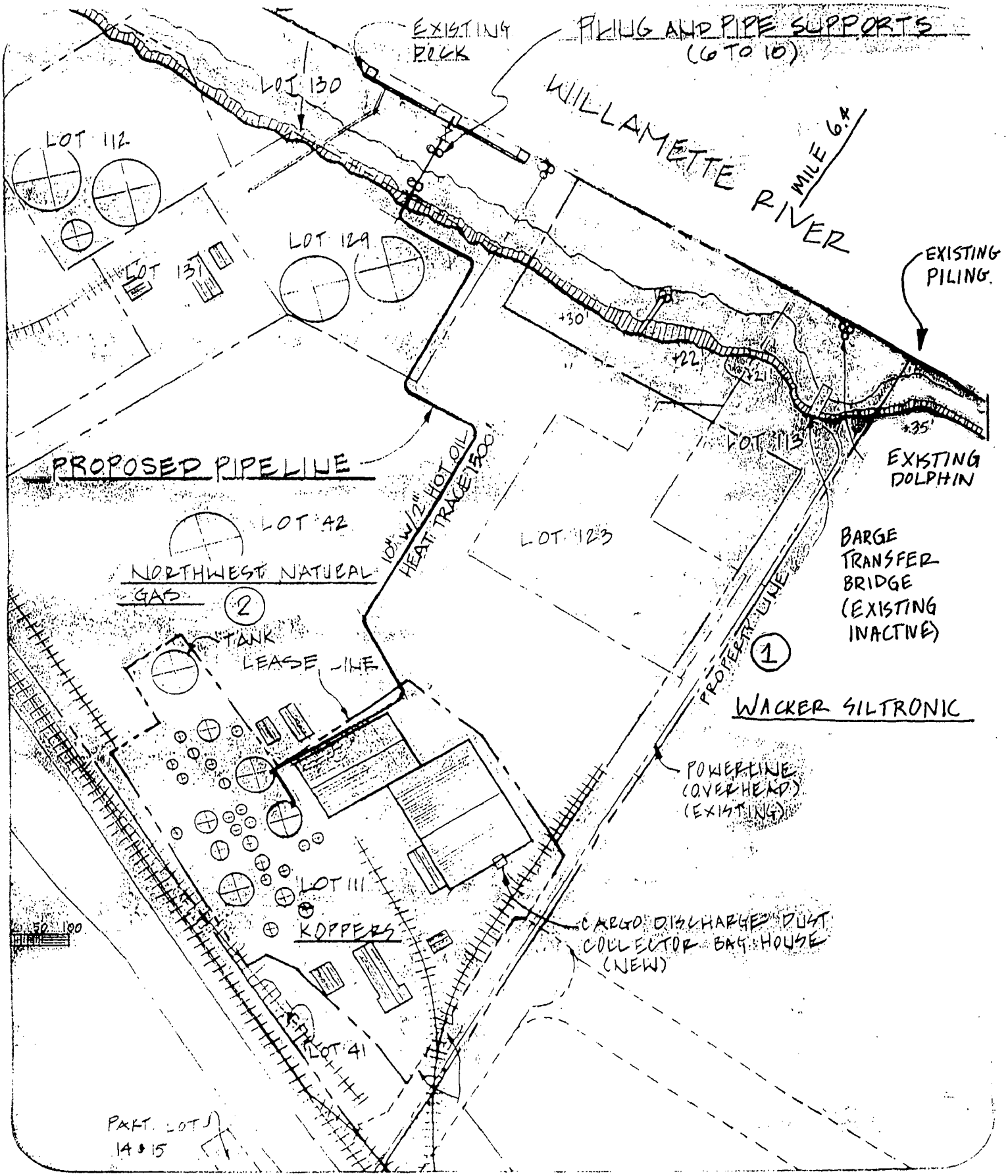
I look forward to discussing the operations with you Friday, January 12, at 1400.

Regards,

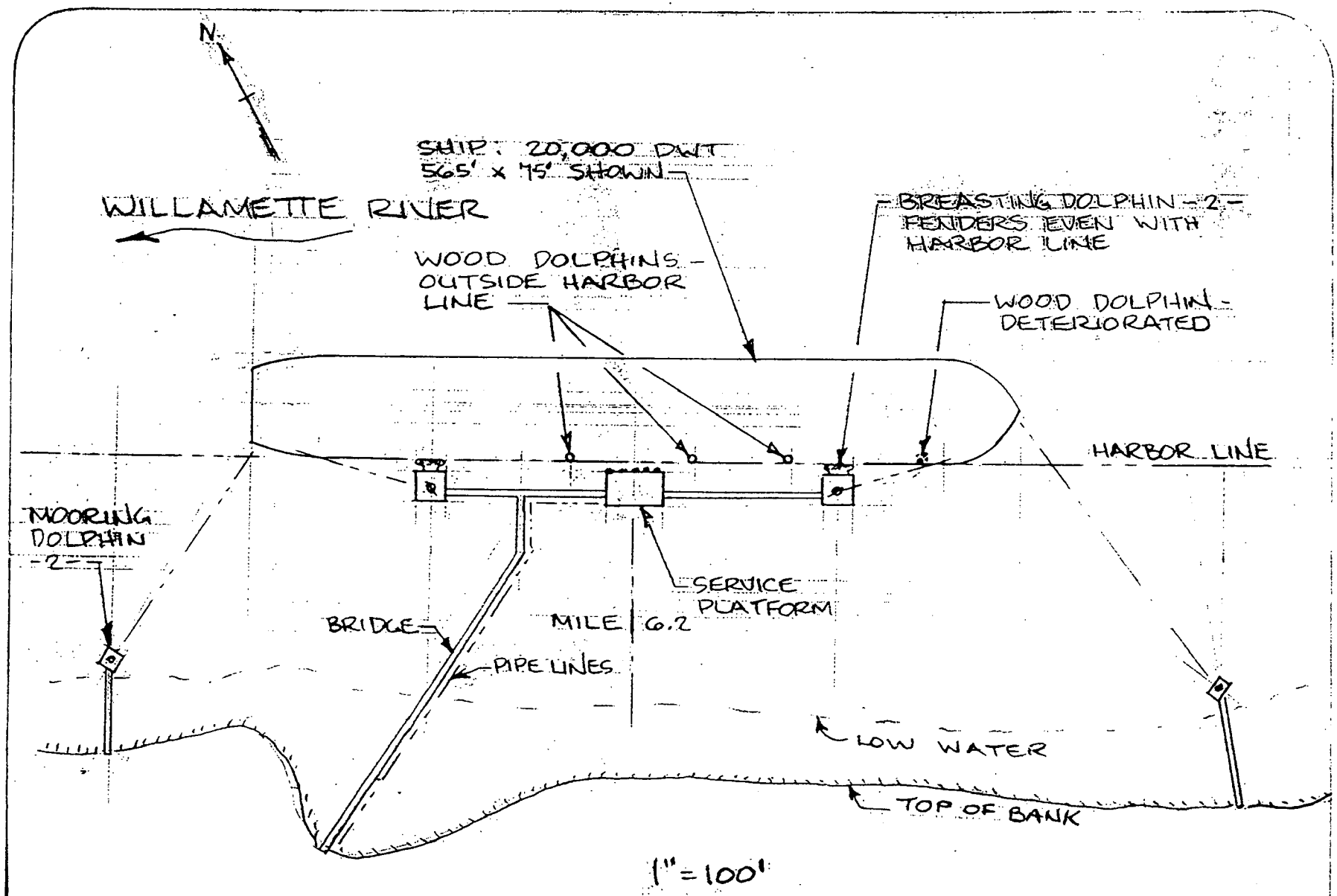
Troy

<<Koppers Letter.doc>>

A


EXISTING DOCK
PILING AND PIPE SUPPORTS (6 TO 10)
LOT 130
WILLAMETTE RIVER
MILE 6.4
LOT 112
LOT 129
LOT 131
EXISTING PILING
+30'
+22
+21
+35'
LOT 113
EXISTING DOLPHIN
PROPOSED PIPELINE
10" W/2" HOT OIL HEAT TRACE 1500'
LOT 42
LOT 123
BARGE TRANSFER BRIDGE (EXISTING INACTIVE)
NORTHWEST NATURAL GAS
2
TANK
LEASE LINE
PROPERTY LINE
1
WACKER SILTRONIC
POWERLINE (OVERHEAD) (EXISTING)
LOT 111
KOPPERS
CARGO DISCHARGE DUST COLLECTOR BAG HOUSE (NEW)
50 100
LOT 41
PART LOT 14 & 15

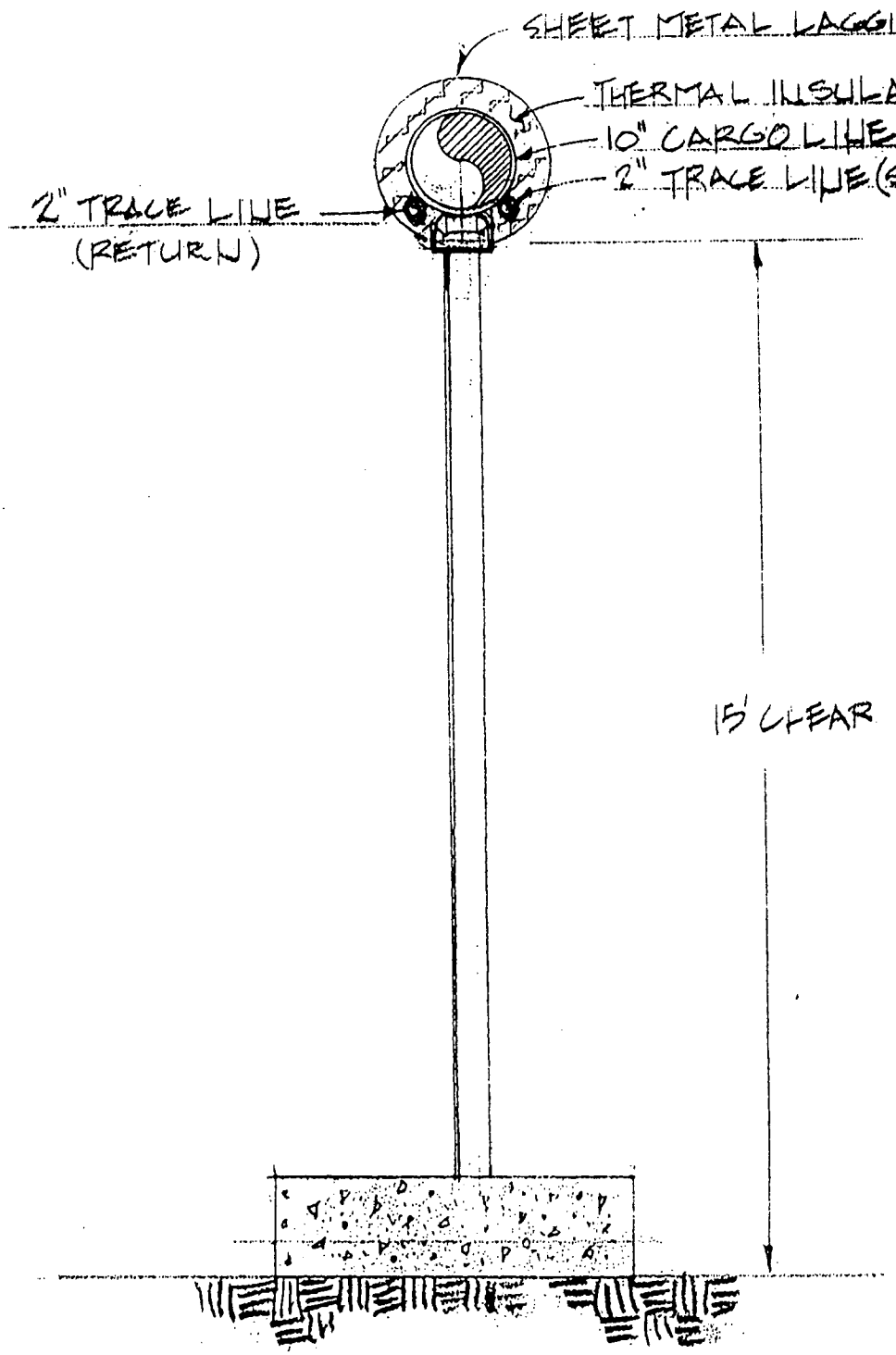
B



PACIFIC NORTHERN OIL CO. PIER
(NORTHWEST NATURAL GAS CO.)
McKERNAN FILE P94-26

Koppers000957

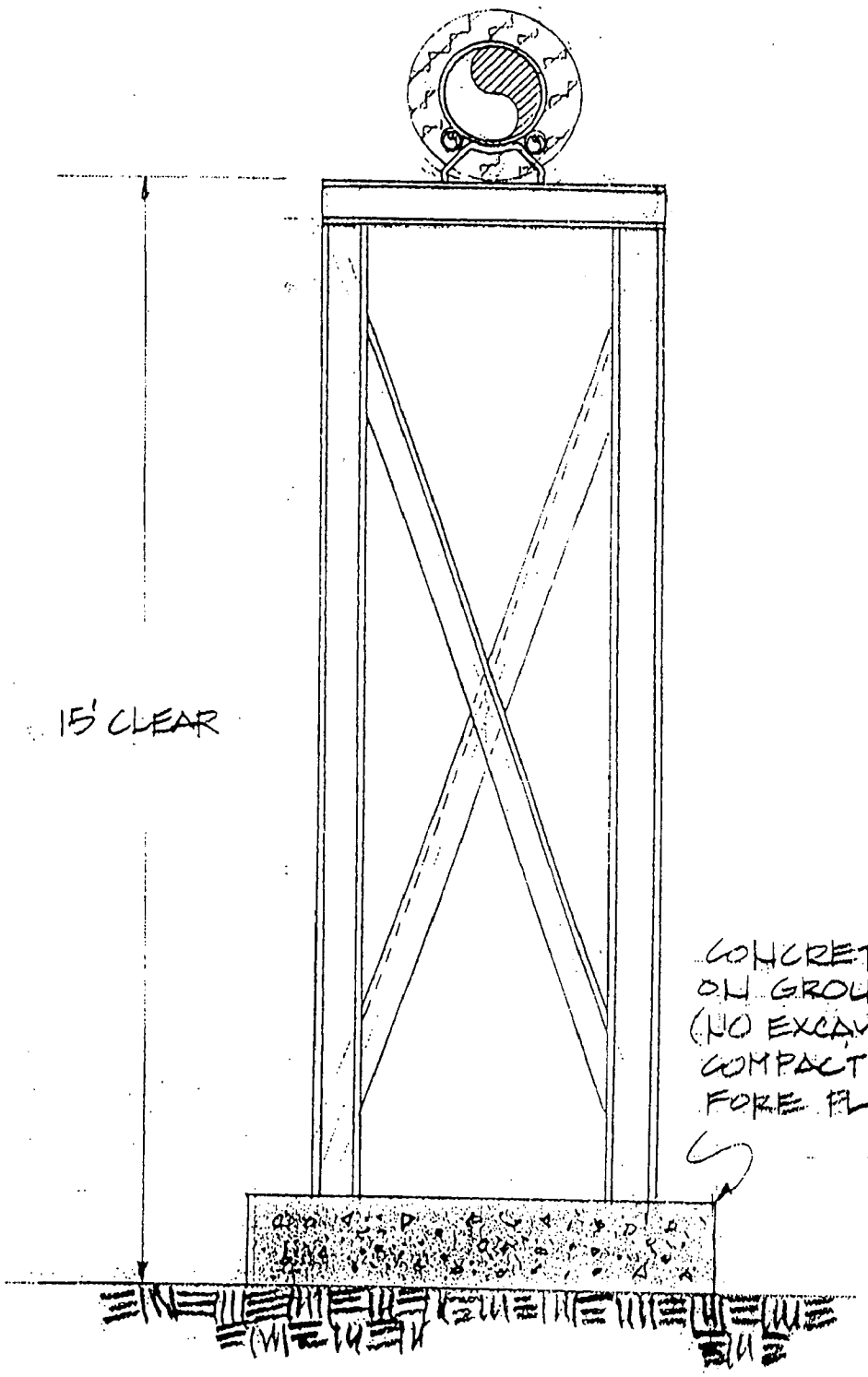
C



INTERMEDIATE PIPE SUPPORT
~100 REQUIRED

D

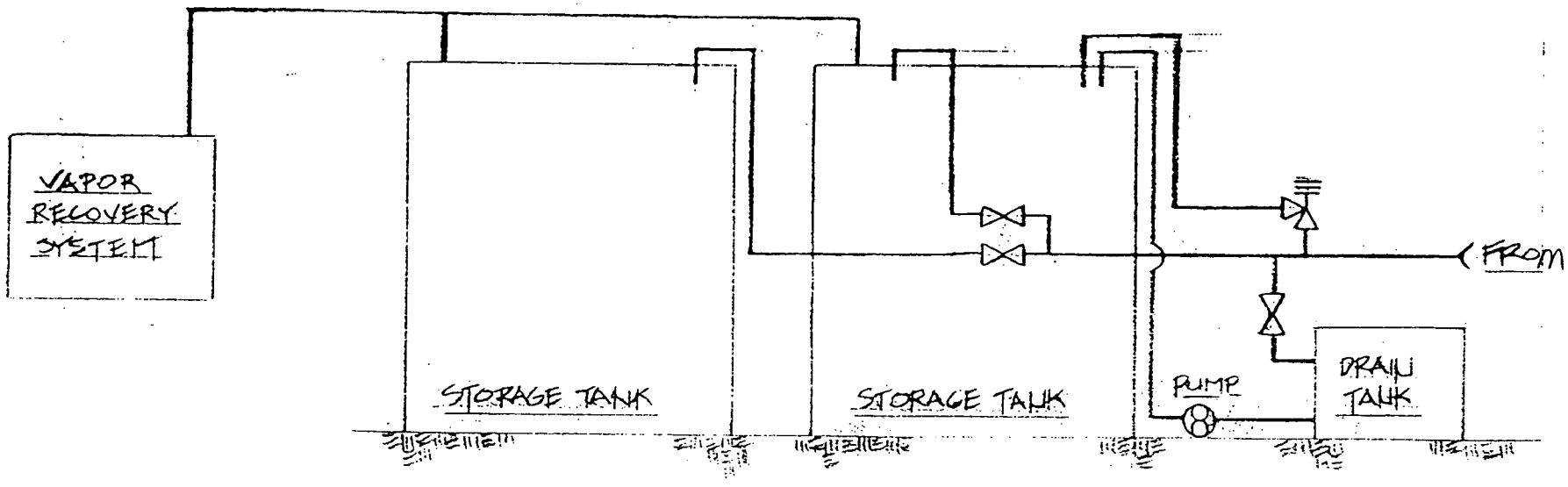
14 13



ANCHOR PIPE SUPPORT

6 TO 8 REQUIRED

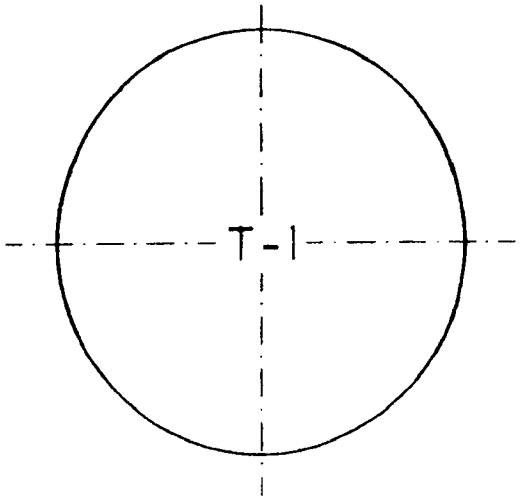
E



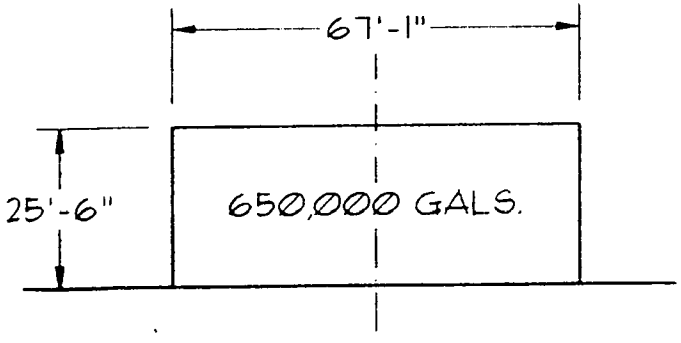
FACILITY PIPING SCHEMATIC

Koppers000960

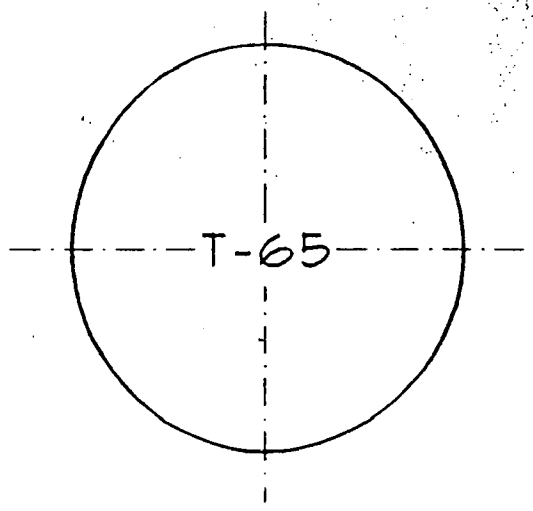
F



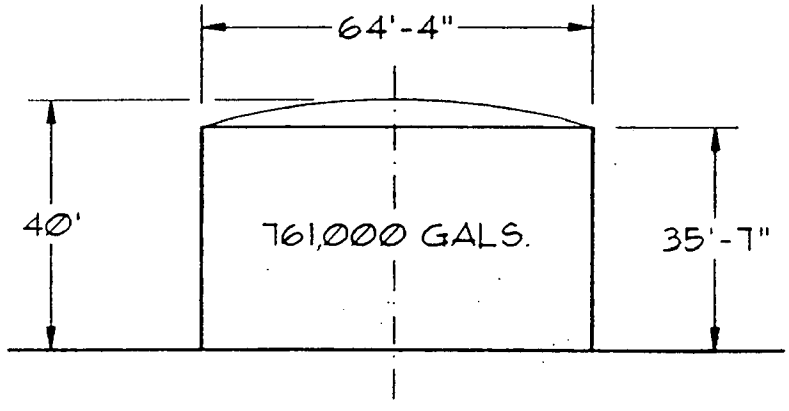
PLAN



ELEVATION



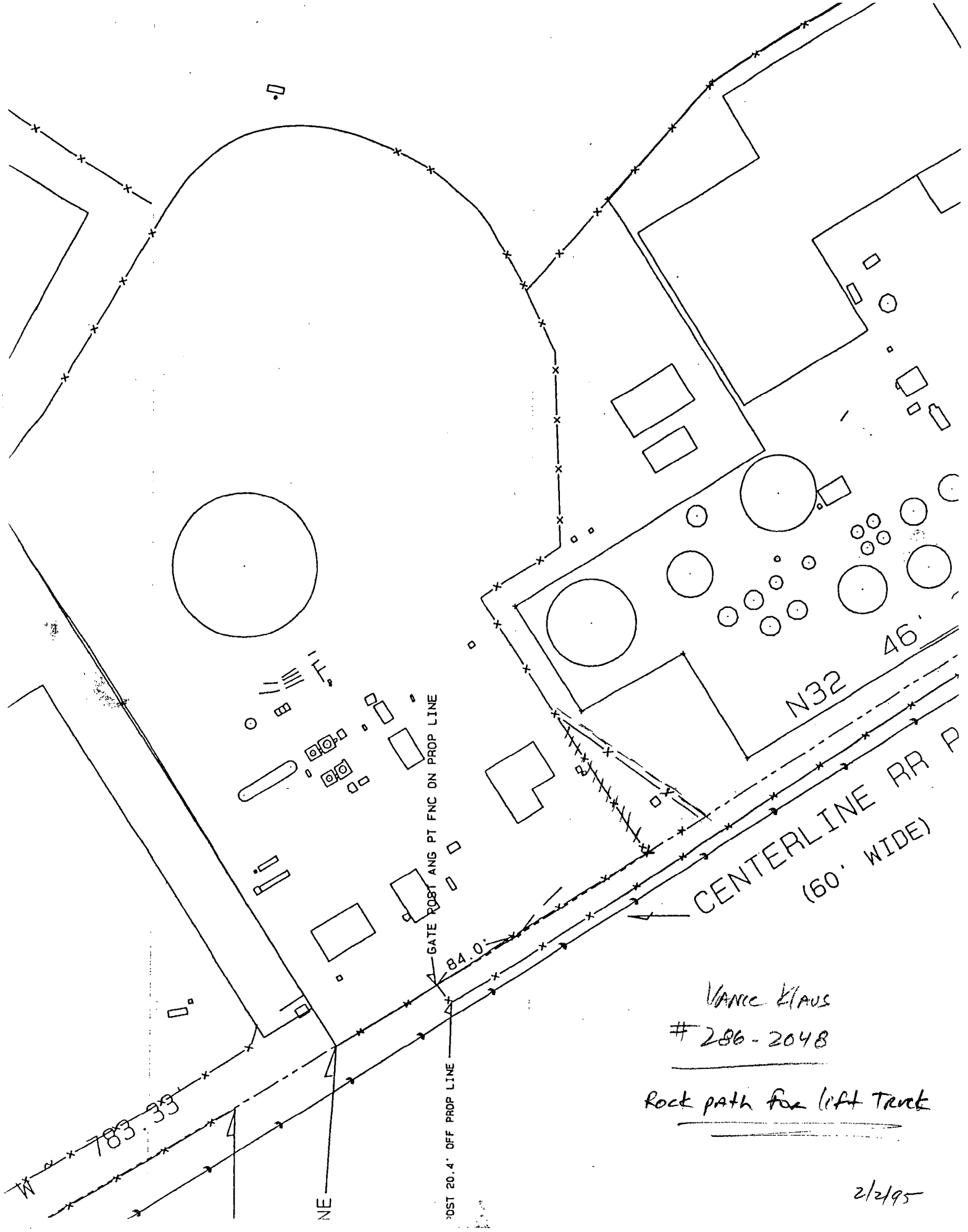
PLAN



ELEVATION

P94-26
SCALE: 1" = 30'

Koppers000961


N32
46'
CENTERLINE RR P
(60' WIDE)
GATE POST ANG PT FNC ON PROP LINE
84.0'
POST 20.4' OFF PROP LINE
NE
W
783.33'
Vance Klaus
286-2048
Rock path for lift Truck
2/2/95

PURCHASE INVOICE

Purchase Invoice Number: 5612138

Purchase Invoice Date: 12/21/06

Page: 1

Pay
To: COLUMBIA INSPECTION INC
COLUMBIA INSPECTIO
ST JOHNS STATION
PO BOX 83569
PORTLAND, OR 97283-0569

Ship
To: PORTLAND TERMINAL
7540 NW Saint Helens Road
Portland, OR 97210

Ship Via
Receive By 12/27/06
Terms Net 30 Days from Ship Date
Vendor ID 014327008

Confirm To
Buyer
P.O. Number
P.O. Date 12/27/06

Item No.	Description	Unit	Quantity	Unit Price	Total Price
	ENVIRONMENTAL EXPENSE		1	109.50	109.50

Subtotal:	109.50
Invoice Discount:	0.00
Total Sales Tax:	0.00
Total:	109.50

COLUMBIA INSPECTION, INC.

U.S Customs & Border Protection Approved Gaugers
Petroleum and Environmental Laboratory
Tank Calibrations

INVOICE

Invoice Number: 5612138 **Invoice Date:** 12/21/06

071
TO: T.J. Turner
Koppers Industries, Inc.
7540 NW St. Helens Road
Portland, OR 97210-3663

Received
12/20/06

Client
Koppers Industries, Inc.

Project
Stormwater Tanks

Work Order(s)
6122001

Project Number
[none]

PO Number
NA

Comments

QUANTITY	ANALYSIS/DESCRIPTION	MATRIX	UNIT COST	EXTENDED COST
1	O & G, TOTAL (HEM) [1 day]	Water	$102.00	$102.00
1	SAMPLE PICKUP FEE [1 day]	Water	$7.50	$7.50
			Invoice Total:	**$109.50**

DEC 27 2006

PPI92700000 240
PZ 16284

ORIGINAL

COLUMBIA INSPECTION, INC 7133 N. Lombard, Portland, OR 97203 Phone:(503) 286-9464 Fax:(503) 286-5355 E-mail:lab@ColumbiaInspection.

All work performed is subject to the terms and conditions of our current schedule of rates. Liability is limited to the amount of this invoice

Terms - Net 15 Days

Thank you for doing business with Columbia Inspection

Please state invoice number and remit to:
Columbia Inspection, Inc.
PO Box 83569, St. Johns Station
Portland, OR 97283

PURCHASE INVOICE

Purchase Invoice Number: 5612077

Purchase Invoice Date: 12/13/06

Page: 1

Pay
To: COLUMBIA INSPECTION INC
COLUMBIA INSPECTIO
ST JOHNS STATION
PO BOX 83569
PORTLAND, OR 97283-0569

Ship
To: PORTLAND TERMINAL
7540 NW Saint Helens Road
Portland, OR 97210

Ship Via		Confirm To	
Receive By	12/20/06	Buyer	
Terms	Net 30 Days from Ship Date	P.O. Number	
Vendor ID	014327008	P.O. Date	12/20/06

Item No.	Description	Unit	Quantity	Unit Price	Total Price
	ENVIRONMENTAL EXPENSE		1	300.75	300.75

Subtotal:	300.75
Invoice Discount:	0.00
Total Sales Tax:	0.00
Total:	300.75

COLUMBIA INSPECTION, INC.

U.S Customs & Border Protection Approved Gaugers
Petroleum and Environmental Laboratory
Tank Calibrations

INVOICE

Invoice Number: 5612077 **Invoice Date:** 12/13/06

071
TO: T.J. Turner
Koppers Industries, Inc.
7540 NW St. Helens Road
Portland, OR 97210-3663

Received
12/12/06

Client
Koppers Industries, Inc.

Project
Stormwater Tanks

Work Order(s)
6121201

Project Number
[none]

PO Number
NA

Comments

QUANTITY	ANALYSIS/DESCRIPTION	MATRIX	UNIT COST	EXTENDED COST
1	O & G, TOTAL (HEM) [0 day]	Water	$153.00	$153.00
1	PHENOLS, TOTAL [0 day]	Water	$140.25	$140.25
1	SAMPLE PICKUP FEE [0 day]	Water	$7.50	$7.50
			Invoice Total:	**$300.75**

PZ 15873
PPI9270000- 233

DEC 18 2006

ORIGINAL

COLUMBIA INSPECTION, INC 7133 N. Lombard, Portland, OR 97203 Phone:(503) 286-9464 Fax:(503) 286-5355 E-mail:lab@ColumbiaInspection.

All work performed is subject to the terms and conditions of our current schedule of rates. Liability is limited to the amount of this invoice

Terms - Net 15 Days

Thank you for doing business with Columbia Inspection

Please state invoice number and remit to:
Columbia Inspection, Inc.
PO Box 83569, St. Johns Station
Portland, OR 97283

COLUMBIA INSPECTION, INC.

U.S Customs & Border Protection Approved Gaugers
Petroleum and Environmental Laboratory
Tank Calibrations

Invoice Number: 5612077

Client
Koppers Industries, Inc.

Work Order(s)
6121201

Project Number
[none]

PO Number
NA

071

DEC 18 2006

TO: T.J. Turner
Koppers Industries, Inc.
7540 NW St. Helens Road
Portland, OR 97210-3663

<< WELCOME TO THE WORLD OF LOW COST, EFFICIENT FAXING. >>

THIS FEATURE CAN ONLY BE USED BY THOSE WHO APPLY TO THE NETMOVES SERVICE.

IQ-FAX CAN SAVE YOU TIME AND MONEY.
- SEND FAXES VIA THE INTERNET.
- COST EFFICIENT.
- AUTOMATICALLY RESEND YOUR FAX IF THE RECEIVING FAX IS NOT AVAILABLE.
- SEND TO ANY FAX MACHINE IN THE WORLD.
- USES THE MOST EFFICIENT ROUTE.

IN ORDER TO USE THIS FEATURE , YOU MUST SEND AN APPLICATION TO NETMOVES.
AN APPLICATION WAS INCLUDED WITH THE OPERATING INSTRUCTIONS.
WHEN NETMOVES PROCESSES THE APPLICATION, THEY WILL SEND YOU A WELCOME FAX.

AFTER YOU HAVE RECEIVED THE WELCOME FAX FROM NETMOVES, TURN IQ-FAX ON.
SIMPLY PRESS 'MENU','#75','START/[SET]' AND USE THE ARROW KEYS TO SELECT "ON"
THEN PRESS 'START/[SET]'. TO EXIT, PRESS 'MENU'.

TO SEND A FAX WITH IQ-FAX,
1. SET THE DOCUMENT IN THE DOCUMENT ENTRANCE.
2. PRESS 'IQ-FAX'.
3. DIAL THE NUMBER YOU WISH TO SEND TO.
4. PRESS 'START/[SET]'.

IF YOU NEED AN APPLICATION FORM,
CALL TOLL-FREE 1-888-332-9728. (USE THE JOG DIAL TO CALL "IQ-FAX-CS .)

PURCHASE INVOICE

Purchase Invoice Number: 5608123

Purchase Invoice Date: 08/29/06

Page: 1

Pay
To: COLUMBIA INSPECTION INC
COLUMBIA INSPECTIO
ST JOHNS STATION
PO BOX 83569
PORTLAND, OR 97283-0569

Ship
To: PORTLAND TERMINAL
7540 NW Saint Helens Road
Portland, OR 97210

Ship Via		Confirm To	
Receive By	09/13/06	Buyer	
Terms	Net 30 Days from Ship Date	P.O. Number	
Vendor ID	014327008	P.O. Date	09/13/06

Item No.	Description	Unit	Quantity	Unit Price	Total Price
	ENVIRONMENTAL EXPENSE		1	527.00	527.00

Subtotal:	527.00
Invoice Discount:	0.00
Total Sales Tax:	0.00
Total:	527.00

COLUMBIA INSPECTION, INC.

U.S Customs & Border Protection Approved Gaugers
Petroleum and Environmental Laboratory
Tank Calibrations

INVOICE

Invoice Number: 5608123 **Invoice Date:** 08/29/06

071
TO: T.J. Turner
Koppers Industries, Inc.
7540 NW St. Helens Road
Portland, OR 97210-3663

Received
08/23/06

Client
Koppers Industries, Inc.

Project
Stormwater Tanks

Work Order(s)
6082306

Project Number
[none]

PO Number
NA

Comments

QUANTITY	ANALYSIS/DESCRIPTION	MATRIX	UNIT COST	EXTENDED COST
1	O & G, TOTAL (HEM) [1 day]	Water	$102.00	$102.00
1	PHENOLS, TOTAL [1 day]	Water	$93.50	$93.50
1	PNAH 625 [1 day]	Water	$331.50	$331.50
			Invoice Total:	**$527.00**

PI 9835
PPI9270000
116

ORIGINAL

COLUMBIA INSPECTION, INC 7133 N. Lombard, Portland, OR 97203 Phone:(503) 286-9464 Fax:(503) 286-5355 E-mail:lab@ColumbiaInspection.

All work performed is subject to the terms and conditions of our current schedule of rates. Liability is limited to the amount of this invoice

Terms - Net 15 Days

Thank you for doing business with Columbia Inspection

Please state invoice number and remit to:
Columbia Inspection, Inc.
PO Box 83569, St. Johns Station
Portland, OR 97283

COLUMBIA INSPECTION, INC.

U.S Customs & Border Protection Approved Gaugers
Petroleum and Environmental Laboratory
Tank Calibrations

INVOICE

Invoice Number: 5608123 **Invoice Date:** 08/29/06

071
TO: T.J. Turner
Koppers Industries, Inc.
7540 NW St. Helens Road
Portland, OR 97210-3663

Received
08/23/06

Client
Koppers Industries, Inc.

Project
Stormwater Tanks

Work Order(s)
6082306

Project Number
[none]

PO Number
NA

Comments

QUANTITY	ANALYSIS/DESCRIPTION	MATRIX	UNIT COST	EXTENDED COST
1	O & G, TOTAL (HEM) [1 day]	Water	$102.00	$102.00
1	PHENOLS, TOTAL [1 day]	Water	$93.50	$93.50
1	PNAH 625 [1 day]	Water	$331.50	$331.50
			Invoice Total:	**$527.00**

COPY

COLUMBIA INSPECTION, INC 7133 N. Lombard, Portland, OR 97203 Phone:(503) 286-9464 Fax:(503) 286-5355 E-mail:lab@ColumbiaInspection.

All work performed is subject to the terms and conditions of our current schedule of rates. Liability is limited to the amount of this invoice

Terms - Net 15 Days

Thank you for doing business with Columbia Inspection

Please state invoice number and remit to:
Columbia Inspection, Inc.
PO Box 83569, St. Johns Station
Portland, OR 97283

CERTIFICATE OF ANALYSIS

CLIENT: Koppers Industries, Inc.
ATTN: T.J. Turner
7540 NW St. Helens Road
Portland OR, 97210-3663

PHONE: (503) 286-3681
FAX: (503) 285-2831

PROJECT NAME: Stormwater Tanks

SUBMITTED: 08/23/06 11:45

REPORT DATE: 08/28/06 09:56 **REPORT NUMBER:** 6082306

CI SAMPLE	CLIENTS ID#	DATE	TIME	MATRIX
6082306-01	Storm Water Tanks	08/23/2006	1100	Water
6082306-02	Storm Water Tanks	08/23/2006	1100	Water
6082306-03	Storm Water Tanks	08/23/2006	1100	Water

SAMPLE/ ANALYSIS	METHOD	PARAMETER	RESULTS	UNITS	DETECTION LIMIT	TECH	DATE/TIME
6082306-01	**SAMPLE ID: Storm Water Tanks**						
General Bench Analysis							
PHENOLS, TOTAL	EPA 420.1	TOTAL RECOVERABLE PHENOLICS	ND	mg/L	0.050	DAU	08/24/2006 14:17
6082306-02	**SAMPLE ID: Storm Water Tanks**						
Semi-Volatile Organics by Gas Chromatography/Mass Spectroscopy							
PNAH 625	EPA 625 (SIM)	ACENAPHTHENE	ND	ug/L	0.05	DM	08/25/2006 15:16
		ACENAPHTHYLENE	2.5	ug/L	0.05		
		ANTHRACENE	10.1	ug/L	0.05		
		BENZO(a)ANTHRACENE	0.7	ug/L	0.05		
		BENZO(a)PYRENE	0.2	ug/L	0.05		
		BENZO(b)FLUORANTHENE	ND	ug/L	0.05		
		BENZO(g,h,i)PERYLENE	ND	ug/L	0.05		
		BENZO(k)FLUORANTHENE	ND	ug/L	0.05		
		CHRYSENE	0.7	ug/L	0.05		
		DIBENZO(a,h)ANTHRACENE	ND	ug/L	0.05		
		FLUORANTHENE	7.7	ug/L	0.05		
		FLUORENE	5.6	ug/L	0.05		
		INDENO(1,2,3-cd)PYRENE	ND	ug/L	0.05		
		NAPHTHALENE	ND	ug/L	0.05		
		PHENANTHRENE	ND	ug/L	0.05		
		PYRENE	5.7	ug/L	0.05		
		Surrogate: 2-Fluorobiphenyl	149 %	%RECOVERY	50-150		
		Surrogate: Nitrobenzene-D5	90.9 %	%RECOVERY	50-150		
		Surrogate: p-terphenyl-D14	142 %	%RECOVERY	50-150		
6082306-03	**SAMPLE ID: Storm Water Tanks**						
General Bench Analysis							
O & G, TOTAL (HEM)	EPA 1664	TOTAL OIL AND GREASE	ND	mg/L	2.0	JRW	08/25/2006 14:28

ORIGINAL

This report may not be reproduced except in full.

Authorized for Release By: Richard D. Reid - Laboratory Director

COLUMBIA INSPECTION, INC 7133 N. Lombard, Portland, OR 97203 Ph:(503) 286-9464 Fax:(503) 286-5355 E-mail:cilabqa@ColumbiaInspection.com

CERTIFICATE OF ANALYSIS

CI

CLIENT: Koppers Industries, Inc.
ATTN: T.J. Turner
7540 NW St. Helens Road
Portland OR, 97210-3663

PHONE: (503) 286-3681
FAX: (503) 285-2831

PROJECT NAME: Stormwater Tanks

SUBMITTED: 08/23/06 11:45

REPORT DATE: 08/28/06 09:56 **REPORT NUMBER:** 6082306

CI SAMPLE	CLIENTS ID#	DATE	TIME	MATRIX
6082306-01	Storm Water Tanks	08/23/2006	1100	Water
6082306-02	Storm Water Tanks	08/23/2006	1100	Water
6082306-03	Storm Water Tanks	08/23/2006	1100	Water

SAMPLE/ ANALYSIS	METHOD	PARAMETER	RESULTS	UNITS	DETECTION LIMIT	TECH	DATE/TIME
6082306-01	**SAMPLE ID: Storm Water Tanks**						
General Bench Analysis							
PHENOLS, TOTAL	EPA 420.1	TOTAL RECOVERABLE PHENOLICS	ND	mg/L	0.050	DAU	08/24/2006 14:17
6082306-02	**SAMPLE ID: Storm Water Tanks**						
Semi-Volatile Organics by Gas Chromatography/Mass Spectroscopy							
PNAH 625	EPA 625 (SIM)	ACENAPHTHENE	ND	ug/L	0.05	DM	08/25/2006 15:16
		ACENAPHTHYLENE	2.5	ug/L	0.05		
		ANTHRACENE	10.1	ug/L	0.05		
		BENZO(a)ANTHRACENE	0.7	ug/L	0.05		
		BENZO(a)PYRENE	0.2	ug/L	0.05		
		BENZO(b)FLUORANTHENE	ND	ug/L	0.05		
		BENZO(g,h,i)PERYLENE	ND	ug/L	0.05		
		BENZO(k)FLUORANTHENE	ND	ug/L	0.05		
		CHRYSENE	0.7	ug/L	0.05		
		DIBENZO(a,h)ANTHRACENE	ND	ug/L	0.05		
		FLUORANTHENE	7.7	ug/L	0.05		
		FLUORENE	5.6	ug/L	0.05		
		INDENO(1,2,3-cd)PYRENE	ND	ug/L	0.05		
		NAPHTHALENE	ND	ug/L	0.05		
		PHENANTHRENE	ND	ug/L	0.05		
		PYRENE	5.7	ug/L	0.05		
		Surrogate: 2-Fluorobiphenyl	149 %	%RECOVERY	50-150		
		Surrogate: Nitrobenzene-D5	90.9 %	%RECOVERY	50-150		
		Surrogate: p-terphenyl-D14	142 %	%RECOVERY	50-150		
6082306-03	**SAMPLE ID: Storm Water Tanks**						
General Bench Analysis							
O & G, TOTAL (HEM)	EPA 1664	TOTAL OIL AND GREASE	ND	mg/L	2.0	JRW	08/25/2006 14:28

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Authorized for Release By: Richard D. Reid - Laboratory Director

COLUMBIA INSPECTION, INC.

U.S Customs & Border Protection Approved Gaugers
Petroleum and Environmental Laboratory
Tank Calibrations

Invoice Number: 5608123

Client
Koppers Industries, Inc.

Work Order(s)
6082306

Project Number
[none]

PO Number
NA

071

TO: T.J. Turner
Koppers Industries, Inc.
7540 NW St. Helens Road
Portland, OR 97210-3663

AUG 3 1 2006

Columbia Inspection, Inc.

P.O. Box 83569
7133 N. Lombard
Portland, OR 97283

Nov 30, 2006

Statement

Customer No: 071

Any Questions or Concerns
Please call Kit at:
Phone: (503) 286-9464
or
Fax: (503) 285-7831

NOV 29 2006

TO: Koppers Industries, Inc.
7540 NW St. Helens Road
Portland, OR 97210-3663

Amount Enclosed
$ _____

Thank You !

Date	Item No.	Due Date	Order No/P.O. No.	Amount
11/7/06	5611029	11/22/06		798.00
11/9/06	5611050	11/24/06		153.00

Total 951.00

CURRENT	0 To 30 Days	30 to 60 Days	*VERY OLD !*
951.00	0.00	0.00	0.00

Thank You For Doing Business With CI !!

PURCHASE INVOICE

Purchase Invoice Number: 5611154

Purchase Invoice Date: 11/27/06

Page: 1

Pay
To: COLUMBIA INSPECTION INC
COLUMBIA INSPECTIO
ST JOHNS STATION
PO BOX 83569
PORTLAND, OR 97283-0569

Ship
To: PORTLAND TERMINAL
7540 NW Saint Helens Road
Portland, OR 97210

Ship Via		Confirm To	
Receive By	11/30/06	Buyer	
Terms	Net 30 Days from Ship Date	P.O. Number	
Vendor ID	014327008	P.O. Date	11/30/06

Item No.	Description	Unit	Quantity	Unit Price	Total Price
	ENVIRONMENTAL EXPENSE		1	109.50	109.50

Subtotal:	109.50
Invoice Discount:	0.00
Total Sales Tax:	0.00
Total:	109.50

COLUMBIA INSPECTION, INC.

U.S Customs & Border Protection Approved Gaugers
Petroleum and Environmental Laboratory
Tank Calibrations

Invoice Number: 5611154

Client
Koppers Industries, Inc.

Work Order(s)
6112104

Project Number
[none]

PO Number
NA

PI 14861
PPI9270000-
210

071

TO: T.J. Turner
Koppers Industries, Inc.
7540 NW St. Helens Road
Portland, OR 97210-3663

COLUMBIA INSPECTION, INC.

U.S Customs & Border Protection Approved Gaugers
Petroleum and Environmental Laboratory
Tank Calibrations

INVOICE

Invoice Number: 5611154 **Invoice Date:** 11/27/06

071
TO: T.J. Turner
Koppers Industries, Inc.
7540 NW St. Helens Road
Portland, OR 97210-3663

Received
11/21/06

NOV 29 2006

Client
Koppers Industries, Inc.

Project
Stormwater Tanks

Work Order(s)
6112104

Project Number
[none]

PO Number
NA

Comments

QUANTITY	ANALYSIS/DESCRIPTION	MATRIX	UNIT COST	EXTENDED COST
1	O & G, TOTAL (HEM) [1 day]	Water	$102.00	$102.00
1	SAMPLE PICKUP FEE [1 day]	Water	$7.50	$7.50
			Invoice Total:	**$109.50**

ORIGINAL

COLUMBIA INSPECTION, INC 7133 N. Lombard, Portland, OR 97203 Phone:(503) 286-9464 Fax:(503) 286-5355 E-mail:lab@ColumbiaInspection.

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PO Box 83569, St. Johns Station
Portland, OR 97283

CERTIFICATE OF ANALYSIS

CLIENT: Koppers Industries, Inc.
ATTN: T.J. Turner
7540 NW St. Helens Road
Portland OR, 97210-3663

PHONE: (503) 286-3681
FAX: (503) 285-2831

PROJECT NAME: Stormwater Tanks

NOV 29 2006

SUBMITTED: 11/21/06 08:51

REPORT DATE: 11/22/06 09:40 REPORT NUMBER: 6112104 PAGE: 1 OF 1

CI SAMPLE	CLIENTS ID#	DATE	TIME	MATRIX
6112104-01	Stormwater Tanks	11/21/2006	0700	Water

SAMPLE/ ANALYSIS	METHOD	PARAMETER	RESULTS	UNITS	DETECTION LIMIT	TECH	DATE/TIME
6112104-01	**SAMPLE ID: Stormwater Tanks**						
General Bench Analysis							
O & G, TOTAL (HEM)	EPA 1664	TOTAL OIL AND GREASE	3.0	mg/L	2.0	JRW	11/21/2006 14:27

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Authorized for Release By: Charles Morrow
Charles Morrow - Laboratory Director

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PURCHASE INVOICE

Purchase Invoice Number: 5611050

Purchase Invoice Date: 11/09/06

Page: 1

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PO BOX 83569
PORTLAND, OR 97283-0569

Ship
To: PORTLAND TERMINAL
7540 NW Saint Helens Road
Portland, OR 97210

Ship Via		Confirm To	
Receive By	11/16/06	Buyer	
Terms	Net 30 Days from Ship Date	P.O. Number	
Vendor ID	014327008	P.O. Date	11/16/06

Item No.	Description	Unit	Quantity	Unit Price	Total Price
	ENVIRONMENTAL EXPENSE		1	153.00	153.00

Subtotal:	153.00
Invoice Discount:	0.00
Total Sales Tax:	0.00
Total:	153.00

COLUMBIA INSPECTION, INC.

U.S Customs & Border Protection Approved Gaugers
Petroleum and Environmental Laboratory
Tank Calibrations

INVOICE

Invoice Number: 5611050 **Invoice Date:** 11/09/06

071
TO: T.J. Turner
Koppers Industries, Inc.
7540 NW St. Helens Road
Portland, OR 97210-3663

Received
11/07/06

Client
Koppers Industries, Inc.

Project
Stormwater Tanks

Work Order(s)
6110704

Project Number
[none]

PO Number
NA

Comments

QUANTITY	ANALYSIS/DESCRIPTION	MATRIX	UNIT COST	EXTENDED COST
1	O & G, TOTAL (HEM) [0 day]	Water	$153.00	$153.00
			Invoice Total:	**$153.00**

PPI9270000-13912
200

ORIGINAL

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Portland, OR 97283

CI CERTIFICATE OF ANALYSIS

CLIENT: Koppers Industries, Inc.
ATTN: T.J. Turner
7540 NW St. Helens Road
Portland OR, 97210-3663

PHONE: (503) 286-3681
FAX: (503) 285-2831

PROJECT NAME: Stormwater Tanks

SUBMITTED: 11/07/06 11:15

REPORT DATE: 11/07/06 16:41 REPORT NUMBER: 6110704

CI SAMPLE	CLIENTS ID#	DATE	TIME	MATRIX
6110704-01	Stormwater Tanks	11/06/2006	1500	Water

SAMPLE/ ANALYSIS	METHOD	PARAMETER	RESULTS	UNITS	DETECTION LIMIT	TECH	DATE/TIME
6110704-01	**SAMPLE ID: Stormwater Tanks**						
General Bench Analysis							
O & G, TOTAL (HEM)	EPA 1664	TOTAL OIL AND GREASE	ND	mg/L	2.0	JRW	11/07/2006 13:59

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Authorized for Release By:
Richard D. Reid - Laboratory Director

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PURCHASE INVOICE

Purchase Invoice Number: 5611029

Purchase Invoice Date: 11/07/06

Page: 1

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7540 NW Saint Helens Road
Portland, OR 97210

Ship Via		Confirm To	
Receive By	11/16/06	Buyer	
Terms	Net 30 Days from Ship Date	P.O. Number	
Vendor ID	014327008	P.O. Date	11/16/06

Item No.	Description	Unit	Quantity	Unit Price	Total Price
	ENVIRONMENTAL EXPENSE		1	798.00	798.00

Subtotal:	798.00
Invoice Discount:	0.00
Total Sales Tax:	0.00
Total:	798.00

COLUMBIA INSPECTION, INC.

U.S Customs & Border Protection Approved Gaugers
Petroleum and Environmental Laboratory
Tank Calibrations

INVOICE

Invoice Number: 5611029 **Invoice Date:** 11/07/06

071
TO: T.J. Turner
Koppers Industries, Inc.
7540 NW St. Helens Road
Portland, OR 97210-3663

Received
11/03/06

Client
Koppers Industries, Inc.

Project
Stormwater Tanks

Work Order(s)
6110301

Comments

13914
PPI9270000-
201

Project Number
[none]

PO Number
NA

QUANTITY	ANALYSIS/DESCRIPTION	MATRIX	UNIT COST	EXTENDED COST
1	O & G, TOTAL (HEM) [0 day]	Water	$153.00	$153.00
1	PHENOLS, TOTAL [0 day]	Water	$140.25	$140.25
1	PNAH 625 [0 day]	Water	$497.25	$497.25
1	SAMPLE PICKUP FEE [0 day]	Water	$7.50	$7.50
			Invoice Total:	**$798.00**

NOV - 9 2006

ORIGINAL

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Portland, OR 97283

CI CERTIFICATE OF ANALYSIS

CLIENT: Koppers Industries, Inc.
ATTN: T.J. Turner
7540 NW St. Helens Road
Portland OR, 97210-3663

Inv.

PHONE: (503) 286-3681
FAX: (503) 285-2831

PROJECT NAME: Stormwater Tanks

SUBMITTED: 11/03/06 08:15

REPORT DATE: 11/08/06 14:08 **REPORT NUMBER:** 6110301

CI SAMPLE	CLIENTS ID#	DATE	TIME	MATRIX
6110301-01 ?	Stormwater Tank	11/03/2006	0745	Water

SAMPLE/ ANALYSIS	METHOD	PARAMETER	RESULTS	UNITS	DETECTION LIMIT	TECH	DATE/TIME
6110301-01	**SAMPLE ID: Stormwater Tank**						
General Bench Analysis							
O & G, TOTAL (HEM)	EPA 1684	TOTAL OIL AND GREASE	ND	mg/L	2.0	JRW	11/03/2006 16:24
PHENOLS, TOTAL	EPA 420.1	TOTAL RECOVERABLE PHENOLICS	ND	mg/L	0.050	DAU	11/03/2006 14:02
Semi-Volatile Organics by Gas Chromatography/Mass Spectroscopy							
PNAH 625	EPA 625 (SIM)	ACENAPHTHENE	ND	ug/L	0.04	DM	11/03/2006 17:28
		ACENAPHTHYLENE	0.09	ug/L	0.04		
		ANTHRACENE	3.5	ug/L	0.04		
		BENZO(a)ANTHRACENE	1.4	ug/L	0.04		
		BENZO(a)PYRENE	3.9	ug/L	0.04		
		BENZO(b)FLUORANTHENE	2.8	ug/L	0.04		
		BENZO(g,h,i)PERYLENE	3.0	ug/L	0.04		
		BENZO(k)FLUORANTHENE	3.0	ug/L	0.04		
		CHRYSENE	2.0	ug/L	0.04		
		DIBENZO(a,h)ANTHRACENE	0.5	ug/L	0.04		
		FLUORANTHENE	3.5	ug/L	0.04		
		FLUORENE	0.4	ug/L	0.04		
		INDENO(1,2,3-cd)PYRENE	2.3	ug/L	0.04		
		NAPHTHALENE	0.7	ug/L	0.04		
		PHENANTHRENE	1.7	ug/L	0.04		
		PYRENE	3.0	ug/L	0.04		
		Surrogate: 2-Fluorobiphenyl	84.8 %	%RECOVERY	50-150		
		Surrogate: Nitrobenzene-D5	56.4 %	%RECOVERY	50-150		
		Surrogate: p-terphenyl-D14	89.2 %	%RECOVERY	50-150		

Comments:

Verbal results for all tests were given to the client on 11/03/2006 at 1710-hours. A final report was generated by the laboratory on 11/6/06

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Authorized for Release By:

Richard D. Reid - Laboratory Director

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Fife, WA 98424	Benicia, CA 94510	San Pedro, CA 90
(253) 922-8781	(707) 748-7587	(310) 833-1557
FAX(253) 922-8957	FAX (707) 748-7764	FAX (310) 833-1

DATE: **11/08/2006**

TO: **Koppers Industries, Inc.**
T.J. Turner
7540 NW St. Helens Road
Portland OR, 97210-3663

MAY 26 2006

COLUMBIA INSPECTION, INC.

U.S Customs & Border Protection Approved Gaugers
Petroleum and Environmental Laboratory
Tank Calibrations

INVOICE

Invoice Number: 5605113 **Invoice Date:** 05/25/06

071

TO: T.J. Turner
Koppers Industries, Inc.
7540 NW St. Helens Road
Portland, OR 97210-3663

Received
05/24/06
Work Order(s)
6052404
PO Number
NA

Client
Koppers Industries, Inc.
Project
Stormwater Tanks
Project Number
[none]

Comments

QUANTITY	ANALYSIS/DESCRIPTION	MATRIX	UNIT COST	EXTENDED COST
1	O & G, TOTAL (HEM) [1 day]	Water	$102.00	$102.00
1	PHENOLS, TOTAL [1 day]	Water	$93.50	$93.50

Invoice Total: **$195.50**

PPE 927000043

ORIGINAL

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Portland, OR 97283

CERTIFICATE OF ANALYSIS

CLIENT: Koppers Industries, Inc.
ATTN: T.J. Turner
7540 NW St. Helens Road
Portland OR, 97210-3663

PHONE: (503) 286-3681
FAX: (503) 285-2831

PROJECT NAME: Stormwater Tanks

SUBMITTED: 05/24/06 08:40

REPORT DATE: 05/25/06 07:33 REPORT NUMBER: 6052404

CI SAMPLE	CLIENTS ID#	DATE	TIME	MATRIX
6052404-01	Stormwater Tanks	05/24/2006	0840	Water

SAMPLE/ ANALYSIS	METHOD	PARAMETER	RESULTS	UNITS	DETECTION LIMIT	TECH	DATE/TIME
6052404-01	**SAMPLE ID: Stormwater Tanks**						
General Bench Analysis							
O & G, TOTAL (HEM)	EPA 1664	TOTAL OIL AND GREASE	ND	mg/L	2.0	JRW	05/24/2006 13:52
PHENOLS, TOTAL	EPA 420.1	TOTAL RECOVERABLE PHENOLICS	ND	mg/L	0.050	DAU	05/24/2006 13:08

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Richard D. Reid - Laboratory Director

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Purchase Invoice Number: 5605113

Purchase Invoice Date: 05/25/06

Page: 1

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PORTLAND, OR 97283-0569

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7540 NW Saint Helens Road
Portland, OR 97210

Ship Via		Confirm To	
Receive By	06/07/06	Buyer	
Terms	Net 30 Days from Ship Date	P.O. Number	
Vendor ID	014327008	P.O. Date	06/07/06

Item No.	Description	Unit	Quantity	Unit Price	Total Price
	ENVIRONMENTAL EXPENSE	Each	1	195.50	195.50

Subtotal:	195.50
Invoice Discount:	0.00
Tax:	0.00
Total:	195.50

APR 18 2006

COLUMBIA INSPECTION, INC.

U.S Customs & Border Protection Approved Gaugers
Petroleum and Environmental Laboratory
Tank Calibrations

INVOICE

Invoice Number: 5604054 **Invoice Date:** 04/14/06

071

TO: Amos Kamerer
Koppers Industries, Inc.
7540 NW St. Helens Road
Portland, OR 97210-3663

Received 04/11/06
Work Order(s) 6041102
PO Number NA

Client Koppers Industries, Inc.
Project Quarterly Stormwater Test
Project Number quarterly stormwater

Comments

QUANTITY	ANALYSIS/DESCRIPTION	MATRIX	UNIT COST	EXTENDED COST
1	O & G, TOTAL (HEM) [1 day]	Water	$120.00	$120.00
1	PHENOLS, TOTAL [1 day]	Water	$110.00	$110.00
1	PNAH 625 [1 day]	Water	$390.00	$390.00
1	SAMPLE PICKUP FEE [1 day]	Water	$7.50	$7.50

Invoice Total: **$627.50**

VTN - 014327008

Act - 030539 1 → (807)

PPI 9270000 12

ORIGINAL

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PO Box 83569, St. Johns Station
Portland, OR 97283

CI CERTIFICATE OF ANALYSIS

CLIENT: Koppers Industries, Inc.
ATTN: T.J. Turner
7540 NW St. Helens Road
Portland OR, 97210-3663

PHONE: (503) 286-3681
FAX: (503) 285-2831

PROJECT NAME: Quarterly Stormwater Test

PROJECT NUMBER: quarterly stormwater

SUBMITTED: 04/11/06 09:40

REPORT DATE: 04/13/06 11:13 REPORT NUMBER: 6041102

CI SAMPLE	CLIENTS ID#	DATE	TIME	MATRIX
6041102-01	Stormwater Tanks	04/11/2006	0800	Water

SAMPLE/ ANALYSIS	METHOD	PARAMETER	RESULTS	UNITS	DETECTION LIMIT	TECH	DATE/TIME
6041102-01	**SAMPLE ID: Stormwater Tanks**						
General Bench Analysis							
O & G, TOTAL (HEM)	EPA 1664	TOTAL OIL AND GREASE	ND	mg/L	2.0	JRW	04/11/2006 14:27
PHENOLS, TOTAL	EPA 420.1	TOTAL RECOVERABLE PHENOLICS	ND	mg/L	0.050	DAU	04/12/2006 11:53
Semi-Volatile Organics by Gas Chromatography/Mass Spectroscopy							
PNAH 625	EPA 625 (SIM)	ACENAPHTHENE	2.1	ug/L	0.05	DM	04/11/2006 23:27
		ACENAPHTHYLENE	0.2	ug/L	0.05		
		ANTHRACENE	0.4	ug/L	0.05		
		BENZO(a)ANTHRACENE	0.5	ug/L	0.05		
		BENZO(a)PYRENE	0.6	ug/L	0.05		
		BENZO(b)FLUORANTHENE	0.7	ug/L	0.05		
		BENZO(g,h,i)PERYLENE	0.5	ug/L	0.05		
		BENZO(k)FLUORANTHENE	0.5	ug/L	0.05		
		CHRYSENE	0.7	ug/L	0.05		
		DIBENZO(a,h)ANTHRACENE	0.2	ug/L	0.05		
		FLUORANTHENE	2.8	ug/L	0.05		
		FLUORENE	0.3	ug/L	0.05		
		INDENO(1,2,3-cd)PYRENE	0.4	ug/L	0.05		
		NAPHTHALENE	0.05	ug/L	0.05		
		PHENANTHRENE	0.3	ug/L	0.05		
		PYRENE	1.6	ug/L	0.05		
		Surrogate: 2-Fluorobiphenyl	66.2 %	%RECOVERY	50-150		
		Surrogate: Nitrobenzene-D5	74.9 %	%RECOVERY	50-150		
		Surrogate: p-terphenyl-D14	89.9 %	%RECOVERY	50-150		

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Purchase Invoice Date: 04/14/06

Page: 1

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Portland, OR 97210

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Terms Net 30 Days from Ship Date
Vendor ID 014327008

Confirm To
Buyer
P.O. Number
P.O. Date 04/19/06

Item No.	Description	Unit	Quantity	Unit Price	Total Price
	ENVIRONMENTAL EXPENSE	Each	1	627.50	627.50

Subtotal:	627.50
Invoice Discount:	0.00
Tax:	0.00
Total:	627.50

MAR 3 1 2006

COLUMBIA INSPECTION, INC.

U.S Customs & Border Protection Approved Gaugers
Petroleum and Environmental Laboratory
Tank Calibrations

INVOICE

Invoice Number: 5603168 **Invoice Date:** 03/29/06

071
TO: T.J. Turner
Koppers Industries, Inc.
7540 NW St. Helens Road
Portland, OR 97210-3663

Received
03/27/06

Client
Koppers Industries, Inc.

Project
Stormwater Tanks

Work Order(s)
6032706

Comments

Project Number
[none]

PO Number
NA

QUANTITY	ANALYSIS/DESCRIPTION	MATRIX	UNIT COST	EXTENDED COST
1	O & G, TOTAL (HEM) [1 day]	Water	$102.00	$102.00
1	SAMPLE PICKUP FEE [1 day]	Water	$7.50	$7.50

Invoice Total: **$109.50**

IBN # 014327008
Detail # 030503 91 (807) ENV.
PPI927000006

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Portland, OR 97283

CI CERTIFICATE OF ANALYSIS

CLIENT: Koppers Industries, Inc.
ATTN: T.J. Turner
7540 NW St. Helens Road
Portland OR, 97210-3663

PHONE: (503) 286-3681
FAX: (503) 285-2831

PROJECT NAME: Stormwater Tanks

SUBMITTED: 03/27/06 13:00

REPORT DATE: 03/28/06 15:37 REPORT NUMBER: 6032706 PAGE: 1 OF 1

CI SAMPLE	CLIENTS ID#	DATE	TIME	MATRIX
6032706-01	Stormwater Tanks	03/27/2006	1000	Water

SAMPLE/ ANALYSIS	METHOD	PARAMETER	RESULTS	UNITS	DETECTION LIMIT	TECH	DATE/TIME
6032706-01	SAMPLE ID: Stormwater Tanks						
General Bench Analysis							
O & G, TOTAL (HEM)	EPA 1664	TOTAL OIL AND GREASE	4.3	mg/L	2.0	JRW	03/28/2006 12:59

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Richard D. Reid - Laboratory Director

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Purchase Invoice Date: 03/29/06

Page: 1

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Portland, OR 97210

Ship Via		Confirm To	
Receive By	04/12/06	Buyer	
Terms	Net 30 Days from Ship Date	P.O. Number	
Vendor ID	014327008	P.O. Date	04/12/06

Item No.	Description	Unit	Quantity	Unit Price	Total Price
	ENVIRONMENTAL EXPENSE	Each	1	109.50	109.50

Subtotal:	109.50
Invoice Discount:	0.00
Tax:	0.00
Total:	109.50

Vendor Name Columbia Inspection

G/L	Detail	Subdetail	Location	Department	Tax	Emp No.	Move No./ PO No.	Amount	Inv No.	Date
305	807		9270	925	0362			$110	5603069	3/20/2006
									Vendor Number	
									014327008	
									Net 30 days	
				Gross Amount				$109.50	Terms	Due
				Discount					Code	Date
Authorization				Net				$109.50	055	4/20/2006
								Division 483	3	92706030014

MAR 23 2006

COLUMBIA INSPECTION, INC.

U.S Customs & Border Protection Approved Gaugers
Petroleum and Environmental Laboratory
Tank Calibrations

INVOICE

Invoice Number: 5603069 **Invoice Date:** 03/20/06

071

TO: T.J. Turner
Koppers Industries, Inc.
7540 NW St. Helens Road
Portland, OR 97210-3663

Received 03/14/06
Client Koppers Industries, Inc.
Work Order(s) 6031404
Project Stormwater Tanks
PO Number NA
Project Number [none]

Comments

QUANTITY	ANALYSIS/DESCRIPTION	MATRIX	UNIT COST	EXTENDED COST
1	O & G, TOTAL (HEM) [1 day]	Water	$102.00	$102.00
1	SAMPLE PICKUP FEE [1 day]	Water	$7.50	$7.50

Invoice Total: **$109.50**

ORIGINAL

COLUMBIA INSPECTION, INC 7133 N. Lombard, Portland, OR 97203 Phone:(503) 286-9464 Fax:(503) 286-5355 E-mail:lab@ColumbiaInspection.

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Please state invoice number and remit to:
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PO Box 83569, St. Johns Station
Portland, OR 97283

CI CERTIFICATE OF ANALYSIS

CLIENT: Koppers Industries, Inc.
ATTN: T.J. Turner
7540 NW St. Helens Road
Portland OR, 97210-3663

PHONE: (503) 286-3681
FAX: (503) 285-2831

PROJECT NAME: Stormwater Tanks

SUBMITTED: 03/14/06 13:05

REPORT DATE: 03/17/06 16:37 REPORT NUMBER: 6031404

CI SAMPLE	CLIENTS ID#	DATE	TIME	MATRIX
6031404-01	Stormwater Tanks	03/14/2006	0745	Water

SAMPLE/ ANALYSIS	METHOD	PARAMETER	RESULTS	UNITS	DETECTION LIMIT	TECH	DATE/TIME
6031404-01	**SAMPLE ID: Stormwater Tanks**						
General Bench Analysis							
O & G, TOTAL (HEM)	EPA 1664	TOTAL OIL AND GREASE	ND	mg/L	2.0	JRW	03/16/2006 11:29

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Authorized for Release By:
Richard D. Reid - Laboratory Director

COLUMBIA INSPECTION, INC 7133 N. Lombard, Portland, OR 97203 Ph:(503) 286-9464 Fax:(503) 286-5355 E-mail:cilabqa@ColumbiaInspection.com

Vendor Name Columbia Inspection

G/L	Detail	Subdetail	Location	Department	Tax	Emp No.	Move No./ PO No.	Amount	Inv No.	Date
305	807		9270	925	0362			$154	5603030	3/7/2006
									Vendor Number	
									014327008	
									Net 30 days	
Authorization				Gross Amount				$154.13	Terms	Due
				Discount					Code	Date
				Net				$154.13	055	4/7/2006
								Division 483	3	92706030010

COLUMBIA INSPECTION, INC.

MAR 9 2006

U.S Customs & Border Protection Approved Gaugers
Petroleum and Environmental Laboratory
Tank Calibrations

INVOICE

Invoice Number: 5603030 **Invoice Date:** 03/07/06

071

TO: T.J. Turner
Koppers Industries, Inc.
7540 NW St. Helens Road
Portland, OR 97210-3663

Received 03/06/06
Client Koppers Industries, Inc.
Work Order(s) 6030601
Project Stormwater Tanks
PO Number NA
Project Number [none]

Comments

QUANTITY	ANALYSIS/DESCRIPTION	MATRIX	UNIT COST	EXTENDED COST
1	O & G, TOTAL (HEM) [1 day]	Water	$76.50	$76.50
1	PHENOLS, TOTAL [1 day]	Water	$70.13	$70.13
1	SAMPLE PICKUP FEE [1 day]	Water	$7.50	$7.50

Invoice Total: **$154.13**

ORIGINAL

COLUMBIA INSPECTION, INC 7133 N. Lombard, Portland, OR 97203 Phone:(503) 286-9464 Fax:(503) 286-5355 E-mail:lab@ColumbiaInspection.

All work performed is subject to the terms and conditions of our current schedule of rates. Liability is limited to the amount of this invoice.

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Thank you for doing business with Columbia Inspection

Please state invoice number and remit to:
Columbia Inspection, Inc.
PO Box 83569, St. Johns Station
Portland, OR 97283

CI CERTIFICATE OF ANALYSIS

CLIENT: Koppers Industries, Inc.
ATTN: T.J. Turner
7540 NW St. Helens Road
Portland OR, 97210-3663

PHONE: (503) 286-3681
FAX: (503) 285-2831

PROJECT NAME: Stormwater Tanks

SUBMITTED: 03/06/06 09:27

REPORT DATE: 03/07/06 09:49 **REPORT NUMBER:** 6030601

CI SAMPLE	CLIENTS ID#	DATE	TIME	MATRIX
6030601-01	Stormwater Tanks	03/06/2006	0800	Water

SAMPLE/ ANALYSIS	METHOD	PARAMETER	RESULTS	UNITS	DETECTION LIMIT	TECH	DATE/TIME
6030601-01	**SAMPLE ID: Stormwater Tanks**						
General Bench Analysis							
O & G, TOTAL (HEM)	EPA 1664	TOTAL OIL AND GREASE	ND	mg/L	2.0	JRW	03/07/2006 09:52
PHENOLS, TOTAL	EPA 420.1	TOTAL RECOVERABLE PHENOLICS	0.16	mg/L	0.050	DAU	03/06/2006 15:44

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