



FOSTER WHEELER ENVIRONMENTAL CORPORATION

July 15, 1998
File #: 1284-0018-98-0332

Commanding Officer
Northern Division
Naval Facilities Engineering Command
10 Industrial Highway, Mail Stop #82
Lester, PA 19113
Attn.: Code 4023 (S. Lehman)

Subject: US NAVY CONTRACT NO. N62472-94-D-0398
DELIVERY ORDER NO. 0018-06, NAWC WARMINSTER, PA
May, 1998 GROUNDWATER PUMP & TREAT SYSTEM
MONTHLY REPORT

Dear Mr. Lehman:

This letter report provides the results of the May, 1998 sampling and the activities performed during the reporting period from May 1, 1998 through May 31, 1998. The groundwater treatment plant operated 96.3% of the reporting period.

As of May 31, 1998 (2400 hours) a total of 977,922 gallons of groundwater had been treated during the period from May 1, 1998 through May 31, 1998. This brings the total amount of water treated to 29,321,442 gallons (May 31, 1998). During May, 1998 the average effluent flowrate was 21.9 gpm.

The process water was sampled on May 21, 1998. The results of this sampling are presented in the attached table. This data shows that no discharge limits were exceeded during the May, 1998 reporting period.

During the reporting period the following system induced and operator induced shutdowns occurred:

System Induced Shutdown -

05/21/98 - 1625 to

1814 hours

Pump P19 overload alarm activated, and equalization tank high high level reached, as well as Area C transfer sump high high level reached.

05/31/98 - 2236 to
2400 hours Severe electrical storm damages analog sensor card in CMCS computer and causes treatment system to fail and shutdown.

Operator Induced Shutdown-

05/21/98 - 1335 to
1440 hours Microsoft excel software loaded onto CMCS

05/26/98 - 0820 to
1030 hours Air stripper de-misting screen removed, cleaned, re-rolled and reset into the air stripper.

05/26/98 - 1100 to
1200 hours First Aid software loaded on to CMCS computer.

05/26/98 - 1257 hours Files from CMCS computer hard drive backed up to Gateway computer via PC Anywhere.

05/27/98 - 0803 hours System restarted

Additional maintenance items performed:

1. Sand filter air injection tip pulled and cleaned. Re-set to manufacturers specifications.
2. Ran all chemical feed systems with water. (Chemicals are currently not being used in the treatment system).
3. Ran sludge transfer pumps.

The Tetrachloroethene concentration in the groundwater influent to the system was 11.3 ug/l (Area C influent), with a total of 0.089 pounds of Tetrachloroethene removed during the May, 1998 reporting period. The total amount of Tetrachloroethene removed through May 31, 1998 is 2.566 pounds.

Calculation:
Average PCE concentration = 11.3 ug/l
Average water flowrate for month of April, 1998 = 21.9 gpm
Pounds of PCE removed = (21.9 gpm)(42990min)(11.3 ug/l)(3.785 l/gal) (1 g / 1,000,000 ug)(1 lb / 454 g) = 0.089lbs PCE

The scheduled dates which Foster Wheeler Environmental's operator will be on-site during the month of July, 1998 are presented in the attached schedule.



If you should have any questions or comments regarding the May, 1998 reporting period, please feel free to contact either me at 215-702-4020 or Dave DiCesare at 215-702-4074.

Sincerely,



John F. Magee, P.E.
Project Manager



David J. DiCesare
Project Engineer

cc: L. Monaco (NORTHDIV)
T. Ames (CSO)
N. Crickman (PADEP)
M. Hunter (CSO)
E. Beatty (ROICC)
A. Flipse (PADEP)
D. Ostrauskas (USEPA)
A. Wills (Bucks Co. Dept. of Health)
D. Fennimore (Earth Data Inc.)
A. Holcomb (FWENC)
File



**Foster Wheeler Environmental Corporation
NAWC, Warminster Groundwater Pump and Treatment Plant
Operator Schedule for July, 1998**

**Thursday, July 2, 1998
Tuesday, July 7, 1998
Thursday, July 9, 1998
Tuesday, July 14, 1998
Thursday, July 16, 1998
Friday, July 17, 1998
Tuesday, July 21, 1998
Thursday, July 23, 1998
Tuesday, July 28, 1998
Thursday, July 30, 1998**



Foster Wheeler Environmental Corporation
NAWC, Warminster - Groundwater Pump and Treat Plant
May, 1998 - Sampling Results

FWENC - Sample ID		DO-0018-06-001	DO-0018-06-02	DO-0018-06-003	DO-0018-06-004	DO-0018-06-05	DO-0018-06-06	DO-0018-06-007	
Sample Location		Area C Influent	Equalization Tank Effluent	Inclined Plate Separator Effluent	Sand Filter Effluent	Air Stripper Effluent	Lead Carbon Unit Effluent	Treatment Plant Effluent	Discharge Limits
Sample Date	Method	21-May-98	21-May-98	21-May-98	21-May-98	21-May-98	21-May-98	21-May-98	Instantaneous Maximum
Total Discharge (gal.) thru 5/31/98									977,922
Average Discharge Flowrate (gpm) for May, 1998									21.9
pH	EPA 150.1	7	7.2	N/A	7.3	N/A	N/A	7.3	6.0-9.0
Total Suspended Solids (mg/l)	EPA 160.2	BDL	BDL	BDL	BDL	N/A	N/A	BDL	75 mg/l
Total Organic Carbon (mg/l)	415.1/EPA600	N/A	1.43	N/A	N/A	N/A	BDL	BDL	-
Carbon Tetrachloride	EPA 8260A	BDL	BDL	N/A	N/A	BDL	BDL	BDL	4.2 ug/l
Tetrachloroethene	EPA 8260A	11.3	8.3	N/A	N/A	BDL	BDL	BDL	10.0 ug/l
Trichloroethene	EPA 8260A	BDL	BDL	N/A	N/A	BDL	BDL	BDL	42.5 ug/l
Vinyl Chloride	EPA 8260A	BDL	BDL	N/A	N/A	BDL	BDL	BDL	0.27 ug/l
1,1-Dichloroethene	EPA 8260A	BDL	BDL	N/A	N/A	BDL	BDL	BDL	0.85 ug/l
Cadmium	SW846	N/A	BDL	N/A	BDL	N/A	N/A	BDL	4.0 ug/l
Copper	SW846	N/A	BDL	N/A	BDL	N/A	N/A	BDL	24.0 ug/l
Lead	SW846	N/A	BDL	N/A	BDL	N/A	N/A	BDL	11.0 ug/l
Zinc	SW846	N/A	33	N/A	BDL	N/A	N/A	53	157 ug/l
Arsenic	SW846	N/A	BDL	N/A	BDL	N/A	N/A	BDL	0.27 ug/l
Aluminum	SW846	N/A	BDL	N/A	BDL	N/A	N/A	BDL	1875 ug/l
Total Iron	SW846	N/A	BDL	N/A	BDL	N/A	N/A	BDL	3600 ug/l
Total Manganese	SW846	N/A	BDL	N/A	BDL	N/A	N/A	BDL	3750 ug/l
Mercury	SW846	N/A	BDL	N/A	BDL	N/A	N/A	BDL	0.045 ug/l
Total Cyanide (mg/l)	SW846 9010A	N/A	BDL	N/A	BDL	N/A	N/A	BDL	-
Chromium (+6) - (mg/l)	SW846 7196	N/A	BDL	N/A	BDL	N/A	N/A	BDL	23.2 ug/l

NOTES:

1 - All concentrations are in ug/l unless otherwise noted.
N/A - indicates compound was not analyzed for.
BDL - Below Detection Limits

Received: 05/22/98

06/04/98 13:33:29

REPORT FOSTER & WHEELER
TO 1 OXFORD VALLEY, SUITE 200
LANGHORNE, PA. 19047
215-702-4007 FAX: 4045

PREPARED TOXIKON CORPORATION
BY 15 WIGGINS AVE
BEDFORD, MA 01730

Paul Lezberg
CERTIFIED BY

ATTEN DAVE DICESARE

ATTEN PAUL LEZBERG

PHONE (617)275-3330

CONTACT CHUCKC

CLIENT FOSTER SAMPLES 8

COMPANY FOSTER & WHEELER

MA CERT # M-MA064: TRACE METALS, SULFATE, CYANIDE, RES. FREE

FACILITY 1 OXFORD VALLEY, SUITE 200
LANGHORNE, PA. 19047

CHLORINE, Ca, TOTAL ALK., TDS, pH, THMS, VOC, PEST., NUTRIENTS.

DEMAND. O&G, PHENOLICS, PCBs . CT DHS #PH-0563, NY #10778

FL HRS E87143, NJ DEP 59538, NC DNR286, SC 88002, NH 204091-C.

WORK ID NAWC WARMINSTER, PA

TAKEN 5/21/98

VERIFIED BY: *Douglas Sheeley*

TRANS _____

TYPE WATER

P.O. # _____

INVOICE under separate cover

SAMPLE IDENTIFICATION

TEST CODES and NAMES used on this workorder

- 01 DO-0018-06-001
- 02 DO-0018-06-002
- 02 DO-0018-06-002 DISSOLVED
- 03 DO-0018-06-003
- 04 DO-0018-06-004
- 04 DO-0018-06-004 DISSOLVED
- 05 DO-0018-06-005
- 06 DO-0018-06-006
- 07 DO-0018-06-007
- 07 DO-0018-06-007 DISSOLVED
- 08 DO-0018-06 FIELD BLANK
- 08 DO-0018-06 FIELD BLANK DIS

- AL ALUMINUM
- AS ARSENIC
- CD CADMIUM
- CN TOT CYANIDE TOTAL
- CR HEX CHROMIUM HEXAVALENT
- CU COPPER
- FE IRON
- GENERC GENERIC TEST METHOD
- HG MERCURY
- MEX DW METALS, DIS. EXT., WATER
- MEX HG METALS, EXT. FOR MERCURY
- MEX TW METALS, TOTAL EXT., WATER
- MN MANGANESE
- PB LEAD
- PH W PH - AQUEOUS
- TOC TOC
- TSS TOTAL SUSPENDEd SOLIDS
- TTOVOA PURGEABLE ORGANICS VOA
- ZN ZINC

Received: 05/22/98

Results by Sample

SAMPLE ID <u>DO-0018-06-001</u>	SAMPLE # <u>01</u> FRACTIONS: <u>A</u>
Date & Time Collected <u>05/21/98 13:23:00</u> Category <u>WATER</u>	
PH <u>W</u> <u>7.0</u> TSS <u>ND</u>	
PH UNITS	mg/L DL=4.0

SAMPLE ID DO-0018-06-001 FRACTION 01A TEST CODE TTOVOA NAME PURGEABLE ORGANICS VOA
 Date & Time Collected 05/21/98 13:23:00 Category WATER

PURGEABLE ORGANICS VOA

	RESULT	LIMIT		RESULT	LIMIT
Acrolein	ND	100	Trichloroethene	ND	2.0
Acrylonitrile	ND	10	Dibromochloromethane	ND	2.0
Chloromethane	ND	2.0	1,1,2-Trichloroethane	ND	2.0
Bromomethane	ND	2.0	Benzene	ND	2.0
Vinyl Chloride	ND	10	cis-1,3-Dichloropropene	ND	2.0
Chloroethane	ND	2.0	2-Chloroethylvinylether	ND	2.0
Methylene Chloride	ND	10	Bromoform	ND	2.0
Dichlorodifluoromethane	ND	5.0	Tetrachloroethene	11.3	2.0
1,1-Dichloroethene	ND	2.0	1,1,2,2-Tetrachloroethane	ND	2.0
Trichlorofluoromethane	ND	2.0	Toluene	ND	2.0
1,1-Dichloroethane	ND	2.0	Chlorobenzene	ND	2.0
Trans 1,2-Dichloroethene	ND	2.0	Ethyl Benzene	ND	2.0
Chloroform	ND	2.0	TOTAL TTO	11.3	
1,2-Dichloroethane	ND	2.0			
1,1,1-Trichloroethane	ND	2.0			
Carbon Tetrachloride	ND	2.0			
Bromodichloromethane	ND	2.0			
1,2-Dichloropropane	ND	2.0			

Notes and Definitions for this Report:

DATE RUN: 06/02/98
 ANALYST: JPM
 INSTRUMENT: D
 DIL. FACTOR: 1
 COMMENTS: _____
 UNITS: ug/L

ND = not detected at detection limit

SAMPLE ID <u>DO-0018-06-002</u>		SAMPLE # <u>02</u>		FRACTIONS: <u>A</u>							
		Date & Time Collected <u>05/21/98 13:18:00</u>		Category <u>WATER</u>							
<u>AL</u>	<u>ND</u>	<u>AS</u>	<u>ND</u>	<u>CD</u>	<u>ND</u>	<u>CN_TOT</u>	<u>ND</u>	<u>CR_HEX</u>	<u>ND</u>	<u>CU</u>	<u>ND</u>
mg/L	DL=0.200	mg/L	DL=0.100	mg/L	DL=0.005	mg/L	DL=0.01	mg/L	DL=0.05	mg/L	DL=0.010
<u>FE</u>	<u>ND</u>	<u>HG</u>	<u>ND</u>	<u>MN</u>	<u>ND</u>	<u>PB</u>	<u>ND</u>	<u>PH_W</u>	<u>7.2</u>	<u>TOC</u>	<u>1.43</u>
mg/L	DL=0.020	mg/L	DL=0.0005	mg/L	DL=0.010	mg/L	DL=0.050	PH UNITS		mg/L	DL=1.0
<u>TSS</u>	<u>ND</u>	<u>ZN</u>	<u>0.033</u>								
mg/L	DL=4.0	mg/L	DL=0.020								

SAMPLE ID DO-0018-06-002 FRACTION 02A TEST CODE TTOVOA NAME PURGEABLE ORGANICS VOA
 Date & Time Collected 05/21/98 13:18:00 Category WATER

PURGEABLE ORGANICS VOA

	RESULT	LIMIT		RESULT	LIMIT
Acrolein	ND	100	Trichloroethene	ND	2.0
Acrylonitrile	ND	10	Dibromochloromethane	ND	2.0
Chloromethane	ND	2.0	1,1,2-Trichloroethane	ND	2.0
Bromomethane	ND	2.0	Benzene	ND	2.0
Vinyl Chloride	ND	10	cis-1,3-Dichloropropene	ND	2.0
Chloroethane	ND	2.0	2-Chloroethylvinylether	ND	2.0
Methylene Chloride	ND	10	Bromoform	ND	2.0
Dichlorodifluoromethane	ND	5.0	Tetrachloroethene	8.3	2.0
1,1-Dichloroethene	ND	2.0	1,1,2,2-Tetrachloroethane	ND	2.0
Trichlorofluoromethane	ND	2.0	Toluene	ND	2.0
1,1-Dichloroethane	ND	2.0	Chlorobenzene	ND	2.0
Trans 1,2-Dichloroethene	ND	2.0	Ethyl Benzene	ND	2.0
Chloroform	ND	2.0	TOTAL TTO	8.3	
1,2-Dichloroethane	ND	2.0			
1,1,1-Trichloroethane	ND	2.0			
Carbon Tetrachloride	ND	2.0			
Bromodichloromethane	ND	2.0			
1,2-Dichloropropane	ND	2.0			

Notes and Definitions for this Report:

DATE RUN: 06/02/98
 ANALYST: JPM
 INSTRUMENT: D
 DIL. FACTOR: 1
 COMMENTS: _____
 UNITS: ug/L

ND = not detected at detection limit

SAMPLE ID DO-0018-06-002 DISSOLVED SAMPLE # 02 FRACTIONS: B
Date & Time Collected 05/21/98 13:18:00 Category WATER

FE ND
mg/L DL=0.020

SAMPLE ID DO-0018-06-003 SAMPLE # 03 FRACTIONS: A
Date & Time Collected 05/21/98 13:10:00 Category WATER

TSS ND
mg/L DL=4.0

SAMPLE ID DO-0018-06-004 SAMPLE # 04 FRACTIONS: A
Date & Time Collected 05/21/98 13:07:00 Category WATER

AL ND AS ND CD ND CN_TOT ND CR_HEX ND CU ND
mg/L DL=0.200 mg/L DL=0.100 mg/L DL=0.005 mg/L DL=0.01 mg/L DL=0.05 mg/L DL=0.010

FE ND HG ND MN ND PB ND PH_W 7.3 TSS ND
mg/L DL=0.020 mg/L DL=0.0005 mg/L DL=0.010 mg/L DL=0.050 PH UNITS mg/L DL=4.0

ZN ND
mg/L DL=0.020

SAMPLE ID DO-0018-06-004 DISSOLVED SAMPLE # 04 FRACTIONS: B
Date & Time Collected 05/21/98 13:07:00 Category WATER

FE ND
mg/L DL=0.020

Received: 05/22/98

Results by Sample

SAMPLE ID DO-0018-06-005FRACTION 05ATEST CODE TTOVOANAME PURGEABLE ORGANICS VOADate & Time Collected 05/21/98 13:03:00Category WATERPURGEABLE ORGANICS VOA

	RESULT	LIMIT		RESULT	LIMIT
Acrolein	ND	100	Trichloroethene	ND	2.0
Acrylonitrile	ND	10	Dibromochloromethane	ND	2.0
Chloromethane	ND	2.0	1,1,2-Trichloroethane	ND	2.0
Bromomethane	ND	2.0	Benzene	ND	2.0
Vinyl Chloride	ND	10	cis-1,3-Dichloropropene	ND	2.0
Chloroethane	ND	2.0	2-Chloroethylvinylether	ND	2.0
Methylene Chloride	ND	10	Bromoform	ND	2.0
Dichlorodifluoromethane	ND	5.0	Tetrachloroethene	ND	2.0
1,1-Dichloroethene	ND	2.0	1,1,2,2-Tetrachloroethane	ND	2.0
Trichlorofluoromethane	ND	2.0	Toluene	ND	2.0
1,1-Dichloroethane	ND	2.0	Chlorobenzene	ND	2.0
Trans 1,2-Dichloroethene	ND	2.0	Ethyl Benzene	ND	2.0
Chloroform	ND	2.0	TOTAL TTO	ND	
1,2-Dichloroethane	ND	2.0			
1,1,1-Trichloroethane	ND	2.0			
Carbon Tetrachloride	ND	2.0			
Bromodichloromethane	ND	2.0			
1,2-Dichloropropane	ND	2.0			

Notes and Definitions for this Report:

DATE RUN: 06/02/98ANALYST: JPMINSTRUMENT: DDIL. FACTOR: 1

COMMENTS: _____

UNITS: ug/L

ND = not detected at detection limit

Received: 05/22/98

Results by Sample

SAMPLE ID <u>DO-0018-06-006</u>	SAMPLE # <u>06</u> FRACTIONS: <u>A</u>
	Date & Time Collected <u>05/21/98 13:00:00</u> Category <u>WATER</u>
TOC <u>ND</u>	
mg/L DL=1.0	

SAMPLE ID DO-0018-06-006 FRACTION D6A TEST CODE GENERIC NAME GENERIC TEST METHOD
Date & Time Collected 05/21/98 13:00:00 Category WATER

SPECIAL TEST REPORT

ANALYTE	RESULT	REPORTING LIMIT
<u>CIS-1,2-DICHLOROETHENE</u>	<u>ND</u>	<u>2.0</u>
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Notes and definitions for this report:

EXTRACTED...
DATE RUN.... 06/02/98
ANALYST..... JPM
EPA METHOD.. 8260B
UNITS..... ug/L

ND = not detected at detection limits

Date extracted included when applicable.

Received: 05/22/98

Results by Sample

SAMPLE ID DO-0018-06-006FRACTION 06ATEST CODE TTOVOANAME PURGEABLE ORGANICS VOADate & Time Collected 05/21/98 13:00:00Category WATER**PURGEABLE ORGANICS VOA**

	RESULT	LIMIT		RESULT	LIMIT
Acrolein	ND	100	Trichloroethene	ND	2.0
Acrylonitrile	ND	10	Dibromochloromethane	ND	2.0
Chloromethane	ND	2.0	1,1,2-Trichloroethane	ND	2.0
Bromomethane	ND	2.0	Benzene	ND	2.0
Vinyl Chloride	ND	10	cis-1,3-Dichloropropene	ND	2.0
Chloroethane	ND	2.0	2-Chloroethylvinylether	ND	2.0
Methylene Chloride	ND	10	Bromoform	ND	2.0
Dichlorodifluoromethane	ND	5.0	Tetrachloroethene	ND	2.0
1,1-Dichloroethene	ND	2.0	1,1,2,2-Tetrachloroethane	ND	2.0
Trichlorofluoromethane	ND	2.0	Toluene	ND	2.0
1,1-Dichloroethane	ND	2.0	Chlorobenzene	ND	2.0
Trans 1,2-Dichloroethene	ND	2.0	Ethyl Benzene	ND	2.0
Chloroform	ND	2.0	TOTAL TTO	ND	
1,2-Dichloroethane	ND	2.0			
1,1,1-Trichloroethane	ND	2.0			
Carbon Tetrachloride	ND	2.0			
Bromodichloromethane	ND	2.0			
1,2-Dichloropropane	ND	2.0			

Notes and Definitions for this Report:

DATE RUN: 06/02/98ANALYST: JPMINSTRUMENT: DDIL. FACTOR: 1

COMMENTS: _____

UNITS: ug/L

ND = not detected at detection limit

Received: 05/22/98

Results by Sample

SAMPLE ID <u>DO-0018-06-007</u>		SAMPLE # <u>07</u>		FRACTIONS: <u>A</u>	
Date & Time Collected <u>05/21/98 12:48:00</u>				Category <u>WATER</u>	
AL	<u>ND</u>	AS	<u>ND</u>	CD	<u>ND</u>
mg/L	DL=0.200	mg/L	DL=0.100	mg/L	DL=0.005
CN_TOT	<u>ND</u>	CR_HEX	<u>ND</u>	CJ	<u>ND</u>
mg/L	DL=0.01	mg/L	DL=0.05	mg/L	DL=0.010
FE	<u>ND</u>	HG	<u>0.0007</u>	MN	<u>ND</u>
mg/L	DL=0.020	mg/L	DL=0.0005	mg/L	DL=0.010
PB	<u>ND</u>	PH_W	<u>7.3</u>	TOC	<u>ND</u>
mg/L	DL=0.050	PH UNITS		mg/L	DL=1.0
TSS	<u>ND</u>	ZN	<u>0.053</u>		
mg/L	DL=4.0	mg/L	DL=0.020		

SAMPLE ID DO-0018-06-007 FRACTION 07A TEST CODE TTOVOA NAME PURGEABLE ORGANICS VOA
 Date & Time Collected 05/21/98 12:48:00 Category WATER

PURGEABLE ORGANICS VOA

	RESULT	LIMIT		RESULT	LIMIT
Acrolein	ND	100	Trichloroethene	ND	2.0
Acrylonitrile	ND	10	Dibromochloromethane	ND	2.0
Chloromethane	ND	2.0	1,1,2-Trichloroethane	ND	2.0
Bromomethane	ND	2.0	Benzene	ND	2.0
Vinyl Chloride	ND	10	cis-1,3-Dichloropropene	ND	2.0
Chloroethane	ND	2.0	2-Chloroethylvinylether	ND	2.0
Methylene Chloride	ND	10	Bromoform	ND	2.0
Dichlorodifluoromethane	ND	5.0	Tetrachloroethene	ND	2.0
1,1-Dichloroethene	ND	2.0	1,1,2,2-Tetrachloroethane	ND	2.0
Trichlorofluoromethane	ND	2.0	Toluene	ND	2.0
1,1-Dichloroethane	ND	2.0	Chlorobenzene	ND	2.0
Trans 1,2-Dichloroethene	ND	2.0	Ethyl Benzene	ND	2.0
Chloroform	ND	2.0	TOTAL TTO	ND	
1,2-Dichloroethane	ND	2.0			
1,1,1-Trichloroethane	ND	2.0			
Carbon Tetrachloride	ND	2.0			
Bromodichloromethane	ND	2.0			
1,2-Dichloropropane	ND	2.0			

Notes and Definitions for this Report:

DATE RUN: 06/02/98
 ANALYST: JPM
 INSTRUMENT: D
 DIL. FACTOR: 1
 COMMENTS: _____
 UNITS: ug/L

ND = not detected at detection limit

Received: 05/22/98

Results by Sample

SAMPLE ID <u>DO-0018-06-007 DISSOLVED</u>	SAMPLE # <u>07</u> FRACTIONS: <u>B</u>
Date & Time Collected <u>05/21/98 12:48:00</u> Category <u>WATER</u>	

FE <u>ND</u>
mg/L DL=0.020

SAMPLE ID <u>DO-0018-06 FIELD BLANK</u>	SAMPLE # <u>08</u> FRACTIONS: <u>A</u>
Date & Time Collected <u>05/21/98 12:35:00</u> Category <u>WATER</u>	

AL <u>ND</u>	AS <u>ND</u>	CD <u>ND</u>	CN_TOT <u>ND</u>	CR_HEX <u>ND</u>	CU <u>0.013</u>
mg/L DL=0.200	mg/L DL=0.100	mg/L DL=0.005	mg/L DL=0.01	mg/L DL=0.05	mg/L DL=0.010

FE <u>ND</u>	HG <u>ND</u>	MN <u>ND</u>	PB <u>ND</u>	PH_W <u>7.0</u>	TOC <u>ND</u>
mg/L DL=0.020	mg/L DL=0.0005	mg/L DL=0.010	mg/L DL=0.050	PH UNITS	mg/L DL=1.0

TSS <u>ND</u>	ZN <u>0.080</u>
mg/L DL=4.0	mg/L DL=0.020

SAMPLE ID DO-0018-06 FIELD BLANK FRACTION O&A TEST CODE ITOVDA NAME PURGEABLE ORGANICS VOA
Date & Time Collected 05/21/98 12:35:00 Category WATER

PURGEABLE ORGANICS VOA

	RESULT	LIMIT		RESULT	LIMIT
Acrolein	ND	100	Trichloroethene	ND	2.0
Acrylonitrile	ND	10	Dibromochloromethane	ND	2.0
Chloromethane	ND	2.0	1,1,2-Trichloroethane	ND	2.0
Bromomethane	ND	2.0	Benzene	ND	2.0
Vinyl Chloride	ND	10	cis-1,3-Dichloropropene	ND	2.0
Chloroethane	ND	2.0	2-Chloroethylvinylether	ND	2.0
Methylene Chloride	ND	10	Bromoform	ND	2.0
Dichlorodifluoromethane	ND	5.0	Tetrachloroethene	ND	2.0
1,1-Dichloroethene	ND	2.0	1,1,2,2-Tetrachloroethane	ND	2.0
Trichlorofluoromethane	ND	2.0	Toluene	ND	2.0
1,1-Dichloroethane	ND	2.0	Chlorobenzene	ND	2.0
Trans 1,2-Dichloroethene	ND	2.0	Ethyl Benzene	ND	2.0
Chloroform	ND	2.0	TOTAL TIO	ND	
1,2-Dichloroethane	ND	2.0			
1,1,1-Trichloroethane	ND	2.0			
Carbon Tetrachloride	ND	2.0			
Bromodichloromethane	ND	2.0			
1,2-Dichloropropane	ND	2.0			

Notes and Definitions for this Report:

DATE RUN: 06/02/98
ANALYST: JPM
INSTRUMENT: D
DIL. FACTOR: 1
COMMENTS: _____
UNITS: ug/L

ND = not detected at detection limit

Received: 05/22/98

Results by Sample

SAMPLE ID <u>DO-0018-06 FIELD BLANK DIS</u>	SAMPLE # <u>08</u>	FRACTIONS: <u>B</u>
Date & Time Collected <u>05/21/98 12:35:00</u>		Category <u>WATER</u>
FE <u>ND</u>		
mg/L DL=0.020		

Received: 05/22/98

Test Methodology

TEST CODE CN TOT NAME CYANIDE TOTAL

EPA METHOD: 335.3 for water sample

Reference: Methods for Chemical Analysis of Water and Wastes.
EPA 600/4-79-020 (Revised, March 1983). EPA/EMSL.

EPA METHOD: 9010 for soil sample

Reference: Methods for Evaluating Solid Waste: Physical/Chemical Methods.
EPA SW-846 (Third Edition) 1986. Office of Solid Waste, USEPA.

TEST CODE CR HEX NAME CHROMIUM HEXAVALENT

EPA METHOD: 7196

Reference: Test Methods for Evaluating Solid Waste: Physical/Chemical Methods.
EPA SW-846 (Third Edition) 1986. Office of Solid Waste, USEPA.

Received: 05/22/98

Test Methodology

TEST CODE GENERC NAME GENERIC TEST METHOD

METHOD REFERENCES ARE CONTAINED ON THE DATA PAGE

TEST CODE MEX DW NAME METALS, DIS. EXT., WATER

REFERENCE:

EPA METHOD 3005. Acid Digestion of Waters for Total Recoverable or Dissolved Metals for Analysis by Flame Atomic Absorption Spectroscopy or Inductively Coupled Plasma Spectroscopy. Test Methods for Evaluating Physical/Chemical Methods. SW 846, 3rd Edition.

TEST CODE MEX HG NAME METALS, EXT. FOR MERCURY

REFERENCE:

EPA METHOD 245.1 Mercury. Methods for Chemical Analysis of Water and Wastes. EPA 600/4-79-020.

EPA METHOD 7470. Mercury in Liquid Waste.

or

EPA METHOD 7471. Mercury in Solid or Semisolid Waste.
Test Methods for Evaluating Solid Waste: Physical/Chemical Methods.
EPA SW-846 (Third Edition) 1986. Office of Solid Waste, USEPA>

TEST CODE MEX TW NAME METALS, TOTAL EXT., WATER

REFERENCE:

EPA METHOD 3005. Acid Digestion of Waters for Total Recoverable or Dissolved Metals for Analysis by Flame Atomic Absorption Spectroscopy or Inductively Coupled Plasma Spectroscopy. Test Methods for Evaluating Physical/Chemical Methods. SW 846, 3rd Edition.

Wastewater digestion

40CFR Part 136 Appendix C-Preparation for Inductively Coupled Plasma-Atomic Emission Spectrometric Method for Trace Element Analysis of Water and Wastes Method 200.7. Protection of Environment, 1991.

TEST CODE PH W NAME PH - AQUEOUS

EPA METHOD: 150.1

Reference: Methods for Chemical Analysis of Water and Wastes.
EPA 600/4-79-020 (Revised, March 1983). EPA/EMSL.

TEST CODE TOC NAME TOC

EPA Method: 415.1 Total Organic Carbon.

Reference: Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846 (Third Edition) 1986.
Office of Solid Waste, USEPA.

TEST CODE TSS NAME TOTAL SUSPENDED SOLIDS

EPA METHOD: 160.2

Reference: Methods for Chemical Analysis of Water and Wastes.
EPA 600/4-79-020 (Revised, March 1983). EPA/EMSL.

Received: 05/22/98

Test Methodology

TEST CODE TTOVOA NAME PURGEABLE ORGANICS VOA

EPA METHOD: 8260B: Gas Chromatography/Mass Spectrometry for Volatile Organics.

Reference: Test Methods for Evaluating Solid Wastes: Physical/Chemical Methods.
EPA SW-846 Final Update III, 1996. Office of Solid Waste, USEPA.

SOIL RESULTS ARE REPORTED ON A DRY WEIGHT BASIS.

TOXIKON

15 Wiggins Ave., Bedford, MA 01730
 Telephone: (781) 275-3330
 Fax: (781) 275-7478

CHAIN OF CUSTODY RECORD

WORK ORDER #: 98-05-499
 DUE DATE: 06-04-98

COMPANY: Foster Wheeler Environmental Corp.
 ADDRESS: 2300 Lincoln Highway East
Langhorne, PA 19047
 PHONE #: (215) 702-4076 FAX #: (215) 702-4045
 P.O. #: _____
 PROJECT MANAGER: Dave DeCesaro
 PROJECT ID/LOCATION: NAWC Warminster, PA

SAMPLE TYPE CONTAINER TYPE
 1. WASTEWATER P - PLASTIC
 2. SOIL G - GLASS
 3. SLUDGE V - VOA
 4. OIL
 5. DRINKING WATER
 6. WATER (GW/MW/SW)
 7. OTHER (SPECIFY)

ANALYSES

PRESERVATIVE	PH	TSS	TOC	CN	CR+G	METALS - Total Fe, Pb, Hg, Cd, Cu, Zn, Al, As, T, Mn, Ni	Dissolved Pb, Cr, Fe, Mn, Ni, Cu, Zn, Al, As, T, Mn, Ni	Other + Reserve #	TCL - VOA # 2660	INSTRUCTIONS/COMMENTS											
											1	2	3	4	5	6	7	8	9	10	

SAMPLED BY: [Signature]
 RELINQUISHED BY: _____
 RELINQUISHED BY: _____
 METHOD OF SHIPMENT _____

DATE: 5-21-98
 TIME: -12-35
 DATE: 5-21-98
 TIME: -15-50
 DATE: - -
 TIME: - -
 DATE: - -
 TIME: - -

QUOTATION #: _____
 RECEIVED BY: _____
 RECEIVED FOR LAB BY: A. Madar
 COOLER TEMPERATURE: R-7

DATE: - -
 TIME: - -
 DATE: 05-22-98
 TIME: 16-12-

RUSH BUSINESS DAY TURN AROUND
 ROUTINE
 Sample disposal information
 Are there any other known or suspected contaminants in these samples other than those listed above?
 Yes _____ No _____ If Yes, 1st Known _____

TOXIKON

QC SUMMARY - METALS

PROJECT : 9805499
MATRIX : WATER

DUP SAMPLE: 9805593.2
SPIKE SAMPLE: 9805593.1
HG SPIKE SAMPLE: 9805499.2

ANALYTE	METHOD BLANK	LCS (% REC)	MS (% REC)	DUPLICATE (% RPD)
Ag	ND	98	89	0
As	ND	97	91	2
Cd	0.0132	101	93	0
Cu	ND	105	100	0
Fe	ND	104	93	25
Mn	0.0922	106	103	130
Pb	ND	100	94	0
Zn	0.0173	101	INT	51
Hg	ND	84	99	0

ACCEPTANCE CRITERIA

ANALYTE	METHOD BLANK	MS (% REC)	LCS (% REC)	DUPLICATE (% RPD)
Ag	BDL	65 - 125	80 - 120	<25
Hg	BDL	75 - 125	80 - 120	<25
All Others	BDL	80 - 120	80 - 120	<25

TOXIKON

QC SUMMARY - METALS

PROJECT : 9804007
 MATRIX : WATER

SPIKE SAMPLE: 9805453.2
 HG SPIKE SAMPLE: 9805499.2

ANALYTE	METHOD BLANK	LCS (% REC)	MS (% REC)	DUPLICATE (% RPD)
Ag	ND	0	0	0
As	ND	100	79	0
Cd	ND	102	98	5
Cu	ND	102	75	90
Fe	ND	63	54	9
Mn	ND	103	99	10
Pb	ND	101	96	0
Zn	0.0442	108	98	5
Hg	ND	84	99	0

ACCEPTANCE CRITERIA

ANALYTE	METHOD BLANK	MS (% REC)	LCS (% REC)	DUPLICATE (% RPD)
Ag	BDL	65 - 125	80 - 120	<25
Hg	BDL	75 - 125	80 - 120	<25
All Others	BDL	80 - 120	80 - 120	<25

CASE NARRATIVE

Work Order: 9805499

All samples were analyzed within the method holding times.

No target compounds were detected in the method blanks.

TOXIKON CORP

VOLATILE MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

DATE RUN: Jun 03, 1998

METHOD: 8260

WORK ORDER#: 9805499

MATRIX: WATER

SAMPLE #: 9805499.06

UNITS: ug/L

DATA FILES: D2477
D2478

TOXIKON PROJECT#: 9805499

COMPOUND	CONC. SPIKE ADDED (ug)	SAMPLE RESULT	CONC. MS	CONC. MSD	%REC		RPD		QC LIMITS *			
									MS	MSD	OK	OK
1,1-Dichloroethene	50	0.00	40.66	43.90	81	OK	88	OK	8	OK	14	61 - 145
Benzene	50	0.00	40.22	43.07	80	OK	86	OK	7	OK	11	76 - 127
Trichloroethene	50	0.00	36.36	39.33	73	OK	79	OK	8	OK	14	71 - 120
Toluene	50	0.00	37.82	41.15	76	*	82	OK	8	OK	13	76 - 125
Chlorobenzene	50	0.00	38.30	40.89	77	OK	82	OK	7	OK	13	75 - 130

RPD: 0 out of 5 outside limits
Spike Recovery: 1 out of 10 outside limits

* = Values outside of QC limits

TOXIKON

QC SUMMARY - METALS

PROJECT : 9805499
 MATRIX : WATER

SPIKE SAMPLE: 9805474.1
 HG SPIKE SAMPLE: 9805499.2

ANALYTE	METHOD BLANK	LCS (% REC)	MS (% REC)	DUPLICATE (% RPD)
Ag	ND	95	90	0
As	ND	102	94	0
Cd	ND	106	97	0
Cu	ND	111	101	1
Fe	ND	101	95	11
Mn	ND	112	103	0
Pb	ND	105	97	0
Zn	0.0144	100	96	5
Hg	ND	84	99	0

ACCEPTANCE CRITERIA

ANALYTE	METHOD BLANK	MS (% REC)	LCS (% REC)	DUPLICATE (% RPD)
Ag	BDL	65 - 125	80 - 120	<25
Hg	BDL	75 - 125	80 - 120	<25
All Others	BDL	80 - 120	80 - 120	<25