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RFWAI
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RFWAI
...ject No. 83148
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Total Depth ...
Depth to ... Point ...
Depth to Competent ...
SWL (Date) 16.65' (1/27/84)
Screened Interval 7.0' - 17.0'
Hole Diameter 5 5/8"
Monitoring Tube 6" Steel Screen
Elev., Ground Surface 301.71

Well No. ...
Driller ... Engineer
Logged by ...
Drilling ...
Drilling ... Completed
Well Const. ...
Development ...
Elev., T.O.C. ... No

Blows/ft	RQD ft/ft	Recovery ft/ft	Sample No. Int. ft.	Sample Description (USCS), GRN Size, Color, Shape texture, moistness, etc.	% Grn. Size G	S	Sil	Cr
8 12 12	NA	2.0 / 2.0	11.0	Same as above but not as coarse.				
5 5 9	NA	2.0 / 2.0	13.0	Same as above. Very loose. Material not as coarse.				
9 12 31 53	NA	1.8 / 2.0		Upper 1.5 feet is same as above. Remainder is a light to medium brown, medium to coarse grained, gravelly sand to sand and gravel. Some fine sand. Sand mostly quartz. Very loose. Gravel is subround to round and not very coarse. Saturated.		tr	60	40
21 40 41 40	NA	1.0 / 2.0		Mixture of slag/fill and sand and gravel. Small layers of dark brown highly silty sand are also present. Strong sooty odor. Trace of clay. Material is fairly tough. Saturated	tr	30	40	30
6 9 ...	NA	1.0 / 2.0		Highly weathered, reddish brown to grayish brown, silty, ... sand. Some slag/ash. ... evident. Some areas fairly ... others are loose. ...				

AR301020

[illegible]risburg [In]ternational [Ai]rport [illegible] [illegible] RFWAI [Pro]ject No. 83142 [illegible]	Total Depth [illegible] Depth to [illegible] Bedrock [illegible] Depth to [illegible] Bedrock [illegible] SWL (Date) [illegible] (1/27/84) Screened Interval [illegible] Hole Diameter 5 5/8" Monitoring Tube 6" Steel Screen Elev., Ground Surface 301.[illegible]	Well No. MW2 Driller Engin[illegible] Logged by CST Drilling Began 12/7/83 Drilling Completed 12/8/83 Well Const. Completed 12/8/83 Development Completed 12/8/83 Elev., T.O.C. not measured

[illegible]	Blows/6"	RQD ft/ft	Recovery ft/ft	Sample No.	Sample Description (USCS), GRN Size, Color, Shape, texture, moistness, etc.	% Grn. Size C	S	Sd	Gr	Other Notes	Graphics: Lith.	Well	[illegible]
	RB	NA	NA		Same as above. Sandstone is harder to drill.								
[illegible]0	RB	NA	NA		Same as above but becoming more of a silty, sandy shale from 47 to 50 feet. Softer. Some dark colored minerals are present. BOTTOM OF WELL					No Chemical Odor Soft at 48'			
50					Estimated Blown Yield: 5 - 10 gpm Well sampled 1/6/84 WBZ's: Primarily gravel.								

AR301021

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Total Depth 50.0'
Depth to S.S. Interval 34.3'
Depth to Shallowest Water 25.0'
SWL (Date) 17.83' (1 27 84)
Screened Interval 7.0' - 37.0'
Hole Diameter 5 5/8"
Monitoring Tube 6" Steel Screen
Elev., Ground Surface 301.37'

Well No. MW3
Driller Engineering
Logged by CSF
Drilling Began 12/15/83
Drilling Completed 12/19/83
Well Const. Completed 12/19/83
Development Completed 12/19/83
Elev., T.O.C. not measured

Depth	Blows/ft	PID (ppm)	Recovery (ft/ft)	Sample No. Int. No.	Sample Description (USCS), GRN Size, Color, Shape, texture, moistness, etc.	% Grn. Size C	S	Sd	Gr	Other Notes	Graphic Log Lith.	Well
0	8				Upper 1.5 feet is a medium brown to reddish brown, slightly clayey, Sandy silt. Sand is fine to medium grained. Trace gravel. Damp. Remainder is gray to white slag/ash. Pumicy in appearance. Fill material. Sooty odor. Very tough and hard. Dry.	tr	85	15	tr	No Chemical Odor		
	15	NA	2.0									
	32		2.0									
	32											
	30				Dark to light whitish gray slag/ash. Size of fragments varies from sand size to very coarse. Many white color spotches present. Blue stains very prominant also. Small brown silt layers also present. Material very hard and pumicy looking. Dry.					No Chemical Odor		
	52	NA	2.0									
	32		2.0									
	49											
	12				Same as above except some areas appear wet. Strong sooty odor. Not quite as coarse as above.					No Chemical Odor		
	19	NA	1.4									
	12		2.0									
	20											
	24				Same as above except material here is wet.					No Chemical Odor		
	18	NA	1.6									
	22		2.0									
	28											
	10				Same as above with very much blue staining evident.					No Chemical Odor		
	14	NA	[illegible]									
	19		[illegible]									
	11											

AR301022

...risburg International ...rport ... ...PORT RFWAI ...ject No. 83148 ... 1 B ... of 1 D	Total Depth [illegible] Depth to B.S. Bedrock [illegible] Depth to Competent [illegible] SWL (Date) 16.65' (1/27/84) Screened Interval 7.0' - 27.0' Hole Diameter 5 5/8" Monitoring Tube 6" Steel Screen Elev., Ground Surface 301.71'	Well No. [illegible] Driller Engineering [illegible] Logged By [illegible] Drilling Began 12/7/83 Drilling Completed 12/8/83 Well Const. Completed 12/8/83 Development Completed 12/8/83 Elev., T.O.C. Not measured

Depth	Blows/6"	RQD (%)	Recovery ft/ft	Sample No. / Box No.	Sample Description (USCS), Grn. Size, Color, Shape, texture, moisture, etc.	% Grn. Size C	S	Sd	Gr	Other Notes	Graph Lith.	Well
11.0	8 12 20 12	NA	2.0/2.0		Same as above but not as coarse.					No Chemical Odor		
13.0	5 5 5 9	NA	2.0/2.0		Same as above. Very loose. Material not as coarse.					No Chemical Odor		
[illegible].0	9 12 31 53	NA	1.5/2.0		Upper 1.5 feet is same as above. Remainder is a light to medium brown, medium to coarse grained, gravelly sand to sand and gravel. Some fine sand. Sand mostly quartz. Very loose. Gravel is subround to round and not very coarse. Saturated.		tr	60	40	No Chemical Odor		
[illegible].0	21 40 41 40	NA	1.0/2.0		Mixture of slag/fill and sand and gravel. Small layers of dark brown highly silty sand are also present. Strong sooty odor. Trace of clay. Material is fairly tough. Saturated	tr	30	40	30	No Chemical Odor		
[illegible]	6 9 1[illegible]	NA	1.3/2.0		Highly weathered, reddish brown to grayish brown, silty, gravelly [illegible] sand. Some slag[illegible]. [illegible] evident. Some [illegible] others are loose. [illegible]	[illegible]	[illegible]		[illegible]	Possible Slight Chemical [illegible]		

AR301023

[illegible]isburg [illegible]ternational [illegible]rport [illegible] [illegible] FFWAI [illegible] No. 83148 [illegible] C [illegible] 1 D	Total Depth 50.0' Depth to [illegible] [illegible] Depth to [illegible] Rock 25.[illegible] SWL (Date) [illegible] (1/27/84) Screened Interval [illegible] - [illegible] Hole Diameter 5 5 8" Monitoring Tube [illegible]" Steel Screen Elev., Ground Surface 331.71'	Well No. [illegible] Driller [illegible] Logged By [illegible] Drilling Began 12/7/83 Drilling Completed 12/8/83 Well Const. Completed 12/8/83 Development Completed 12/8/83 Elev., T. [illegible] not measured

[illegible]	Blows/[illegible]	RQD [illegible]	Recovery [illegible]	Sample No. [illegible]	Sample Description (USCS), Grn Size, Color, Shape texture, moisture, etc.	% Grn. Size C	S	Si	Cl	Other Notes	Graphic Lith.	Well
	22 38 31 23	NA	1.0/2.0		Medium to dark brown sand and gravel. Sand is mostly medium to coarse grained with some fine. Mostly subangular to subround quartz. Gravel is well rounded, pea-size to a few inches and consist mainly of quartzite. Trace silt.		tr	55	45	No Chemical Odor		
	22 14 10 12	NA	1.8/2.0		Same as above with some small coal fragments. Slight layering is noticeable. Saturated		tr	50	50	No Chemical Odor		
	80 100/.1 RB	NA	.6/.6		Upper .5 feet is same as above. Remainder is highly weathered, reddish brown, silty sandstone and mudstone. Soft. Upper weathered rock zone. "Sapprolitic."		tr	50	50	No Chemical Odor Bedrock at 25.0'		
	RB	NA	NA		(NOTE SCALE CHANGE) Reddish brown, silty, medium grained sandstone and mudstone. Not very hard. Blocky fracture. Micaceous. Fairly weathered. Some highly weathered quartz. A few small siltstone layers present.					No Chemical Odor		
	RB	NA	NA		Interbedded, reddish brown, medium grained sandstone, siltstone and mudstone. [illegible] and has a [illegible]. Bedding is [illegible] [illegible] [illegible]					[illegible] Soft at [illegible]		

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..risburg ..ternational ..rport ..LD OPERATIONS REPORT RFWAI ..ject No. 83148 .. 1 A of 1 D	Total Depth 50.0' Depth to S.S. Refusal 25.2' Depth to Competent Bedrock 25.[illegible] SWL (Date) 16.17' (1/27/84) Screened Interval 7.0' - 27.0 Hole Diameter 5 5/8" Monitoring Tube 6" Steel Screen Elev., Ground Surface 302.52'	Well No. MW4 Driller Engineering [illegible] Logged by JST Drilling Began 12/1/83 Drilling Completed 12/6/83 Well Const. Completed 12/6/83 Development Completed 12/6/83 Elev., T.O.C. not measured

Depth	Blows/6"	RQD (%)	Recovery (ft/ft)	Sample No.	Sample Description (USCS), GRN Size, Color, Shape texture, Moisture, etc.	% Grn. Size C	S	Sd	Gr	Other Notes
1.0	10 23 30 45	NA	2.0/2.0		Upper 10 inches, dark brown to red brown silt to sandy silt. Trace of clay and gravel. Fairly tight. Moist. Remainder is gray to white slag/ash. Fill. Particles are sand size to very coarse gravel. Sooty odor. Damp.	tr	85	15	tr	No Chemical Odor
3.0	24 100 .4 RB RB	NA	.8/.9		Gray to white slag/ash. Fill. Pumicy in appearance. Many white and bluish stains. Small brown silt pockets present. Some areas appear slightly wet but overall is dry. Sooty odor.					No Chemical Odor
	24 32 11 7	NA	2.0/2.0		Same as above.					No Chemical Odor
	4 2 2 1	NA	1.5/2.0		Upper few inches same as above. Remainder becoming a medium brown clayey silt to silty clay. Fairly plastic. Tough. Sooty odor. Moist. Slight layered appearance. Trace very fine sand.	40	60	tr		No Chemical Odor
	4 5 5	NA	1.5/2.[illegible]		Medium brown clayey silt to silty clay. (Varies throughout sample). Very tough. In some spots almost a pure clay. No layering. Sooty odor. W[illegible]	40	60	tr		No Chemical Odor

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RFWAI 83148
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Total Depth 50.0'
Depth to S.S. Terminal 24.0'
Depth to Competent Bedrock 35.0'
SWL (Date) 17.83' (1/27/84)
Screened Interval 7.0'-27.0'
Hole Diameter 5 5/8"
Monitoring Tube 6" Steel Screen
Elev., Ground Surface 301.37'

Well No. MW3
Driller ...
Logged by JST
Drilling Began 12/15/83
Drilling Completed 12/19/83
Well Const. Completed 12/19/83
Development Completed 12/19/83
Elev., T.O.C. not measured

...t ft	Blows/6"	RQD ft/ft	Recovery ft/ft	Sample No. Lab No.	Sample Description (USCS), GRN Size, Color, Shape, texture, moistness, etc.	% Grn. Size C	S	Sd	Gr	Other Notes	Graphics Lith.	Well Const.
0	RB	NA	NA		Same as above.					No Chemical Odor Small Break at 48'		
50	RB	NA	NA		Same as above except very shaly from 45 - 46 feet. BOTTOM OF WELL							

Estimated Blown Yield: 10gpm
Well Sampled on 1/6/84
WBZ's: Gravel and rock.

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Total Depth 30.2'
Depth to S.S. Interval ...5.2'
Depth to Competent B. Rock ...
SWL (Date) 16.12' (1/27/84)
Screened Interval 7.0' - 27.0'
Hole Diameter 5 5/8"
Monitoring Tube 6" Steel Screen
Elev., Ground Surface 302.52'

Well No. ...
Driller ...
Logged By ...
Drilling Began ...83
Drilling Completed 12/6/83
Well Const. Completed 12/6/83
Development Completed 12/6/83
Elev., T.O.C. Not measured

Depth	Blows/6"	RQD ft/ft	Recovery ft/ft	Sample No. Lith.	Sample Description (USCS), GRN Size, Color, Shape, Texture, Moistness, etc.	% Grn. Size G	S	Sd	Cr	Other Notes	Lith.	Well
21.0	21											
	13	NA	2.0		Same as above except some gravel is very large and the material is saturated.	tr	tr	50	50	Possible Slight Odor (Oily or Chemical)		
	12		2.0									
	15											
23.0	7											
	30	NA	.5		Slightly silty, sandy gravel. Gravel is well rounded and oblong. Some gravel is as big as a fist. Small pockets of gray clayey silt are present.	tr	5	5	90	No Chemical Odor		
	78		2.0									
	100/.2											
25.0												
	12											
	49	NA	1.2		Reddish brown, tightly compacted silt, sand and rock fragments. Highly weathered. Moist. "Till-like." Becoming harder at 25.5 feet.	tr	40	35	25	No Chemical Odor Bedrock at 25.5'		
	100/.2		1.2									
26.2	RB											
					(NOTE SCALE CHANGE)							
	RB	NA	NA		Reddish brown, fine to medium grained sandstone with small amounts of interbedded siltstone and shale. Slightly conglomeritic around 28 feet. Sandstone is somewhat micaceous. Blocky to hackly fracture pattern. Appears highly weathered.					No Chemical Odor Small Break at 26'		
30.0												
	RB	NA	NA		Mostly fine grained, reddish brown sandstone. Some siltstone and mudstone also present. Weathered quartz present in sample. Some fragments have a black mineral staining covering their surfaces. [illegible]					No Chemical Odor		

...isburg ...ternational ...rport ... ...FWAI ...ect No. 83148 ... 1 of 2	Total Depth 50.0' Depth to S.S. Bedrock 25.2' Depth to Competent Bedrock 25.5' SWL (Date) 16.17' (1/27/84) Screened Interval 7.0' - 27.0' Hole Diameter 5 5/8" Monitoring Tube 6" Steel Screen Elev., Ground Surface 302.52'	Well No. MW4 Driller Engineering ... Logged by CST Drilling Began 12/1/83 Drilling Completed 12/6/83 Well Const. Completed 12/6/83 Development Completed 12/6/83 Elev., T.O.C. Not measured

Depth	Blows/6"	RQD ft/ft	Recovery ft/ft	Sample No.	Sample Description (USCS), Grn Size, Color, Shape texture, moistness, etc.	% Grn. Size C	S	Sd	Gr	Other Notes
10	2, 4, 6, 8	NA	2.0/2.0		Medium brown, slightly clayey, silt. Trace of fine sand. Very tight. Slightly layered appearance imparted by small black streaks. Moist.	5	95	tr		No Chemical Odor
	11, 17, 21, 25	NA	2.0/2.0		From 12' to 13' - same as above. From 13' to 14' - medium brown, sand and gravel. Sand is mostly medium to coarse grained quartz. Subangular. Gravel is well rounded, pea sized to 2 inches quartzite. Wet.	5	95 10	tr 60	30	No Chemical Odor
	24, 18, 17, 17	NA	1.5/2.0		Light to medium brown, gravelly, medium to coarse grained sand. Sand is mostly quartz. Some coal fragments are also present. Gravel is subround to round quartzite. Layering evident. Poorly sorted. Wet.		tr	65	35	No Chemical Odor
	17, 11, 13, 15	NA	1.8/2.0		Medium brown, slightly silty, gravelly sand. Sand is fine to coarse grained. Gravel is well rounded. Material is much looser than above samples. Poorly sorted.		10	60	30	No Chemical Odor
	7, 22, 23, ...	NA	1.3/2.3		Grayish brown sand and gravel. Sand is medium to very coarse grained, subangular to angular, quartz. Gravel is well rounded quartzite. Pea sized to a couple inches. Trace of silt and clay.	tr	tr	50	50	Possible Slight ... Odor

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REPORT

RFWAI
...ject No. 83146
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Total Depth 50.0'
Depth to S.S. Retrieval
Depth to Competent Bedrock
SWL (Date) 16.60' (1...)
Screened Interval 8.0' - 28.0'
Hole Diameter 6 5/8"
Monitoring Tube 6" Steel Screen
Elev., Ground Surface 303.26'

Well No. ...5
Driller ...
Logged By ...
Drilling Began 12/28/83
Drilling Completed 12/29/83
Well Const. Completed ...
Development Completed ...
Elev., T.O.C. Not measured

Blows/0.5'	RQD ft/ft	Recovery (ft/ft)	Sample No. Number	Sample Description (USCS), GRN Size, Color, Shape, Texture, Moistness, etc.	% Grn. Size: C	S	Sd	Gr	Other Notes	Lith.	Well Const.
11 / 49 / 58 / 84	NA	2.0 / 2.0		Upper 1.75 feet is a medium brown to red brown silt to sandy silt. Sand is fine to medium grained. Trace of clay. Wet. Remainder is whitish gray to dark gray slag/ash. Fill material. Pumicy in appearance. Sooty odor. Wet.	tr	70	30	tr	No Chemical Odor		
66 / 37 / 72 / 100 / 0	NA	1.0 / 1.5		Gray slag/ash. Pumicy in appearance. Many bluish stains present on various slag fragments. Very hard material. Some areas appear to have a dark colored saturation. Fragments range in size from fine to very coarse.					Strong Odor Present (Oily)		
48 / 52 / 26 / 23	NA	1.2 / 2.0		Same as above but not as dense or hard. Dark colored saturation still present .					Slight Odor Present		
12 / 16 / 21 / 31	NA	1.7 / 2.0		Same as above but even less dense. Coarse to fine slag. Highly weathered. Sooty odor. Wet.					No Chemical Odor		
11 / 12 / 8	NA	1.7 / 2.0		Same as above except less dense.					No Chemical Odor		

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Total Depth 30.0'
Depth to N.S. Material 25.5'
Depth to Competent Bedrock 25.5'
SWL (Date) 16.17' (1/27/84)
Screened Interval 7.0' - 27.0'
Hole Diameter 5 5/8"
Monitoring Tube 6" Steel Screen
Elev., Ground Surface 302.52'

Well No. MW-
Driller ...
Logged by ...
Drilling Began 12/1/83
Drilling Completed 12/6/83
Well Const. Completed 12/6/83
Development Completed 12/6/83
Elev., T.O.C. Not measured

Blows/6"	RQD ft/ft	Recovery (ft/ft	Sample No.	Sample Description (USCS), GRN Size, Color, Shape, texture, moistness, etc.	% Grn. Size C	S	Sd	Gr	Other Notes	Graphic Lith.	Well Const.
				Same as above.					No Chemical Odor Break at 36' possible water from here. Possible break at 38'		
RB	NA	NA		Same as above with a little more interbedded orangish to reddish brown shale.					Break at 41.5' with some possible water. Rough at 42' Small break at 46.5' and 47.5' No Chemical Odor		
				BOTTOM OF WELL							
				Estimated blown yield: 5-10gpm Well Sampled 1/6/84 WBZ's: Gravel and rock.							

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REPORT

REWAI
...ject No. 83148
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Total Depth 50.0'
Depth to S.S. Retrieval 24.5'
Depth to Competent Bedrock 24.4'
SWL (Date) 16.60' (1/27/84)
Screened Interval 5.0' - 25.0'
Hole Diameter 6 5/8"
Monitoring Tube 6" Steel Screen
Elev., Ground Surface 393.36'

Well No. MW5
Driller ...
Logged by ...
Drilling Began 12/22/83
Drilling Completed 12/29/83
Well Const. Completed 12/29/83
Development Completed 12/29/83
Elev., T.O.C. not measured

...	Blows/6"	RQD ft/ft	Recovery (ft/ft)	Sample No. Type	Sample Description (USCS), GRN Size, Color, Shape texture, moistness, etc.	% Grn. Size C	S	Sd	Gr	Other Notes	Graphic Log Lith.	Well Const.
21.0	8 8 6 5	NA	2.0 2.0		Same as above except becoming sandier towards 22 feet. Material has a spotted appearance. Mottled. Fairly tight. Saturated.	15	75	10	tr	No Chemical Odor		
23.0	13 13 17 23	NA	2.0 2.0		Light to medium brown and red brown sand and gravel. Silty. Sand is fine to coarse grained quartz. Gravel is pea sized to a couple inches, well rounded quartzite. Material is very loose and saturated. Red brown sandstone in bottom of spoon.		5	50	45	No Chemical Odor		
...0	100 .3 RB RB RB	NA	.1 .3		Reddish brown, silty shale and siltstone. Very soft and highly weathered.. Becoming sandier towards 26 feet. Some mudstone.					No Chemical Odor Bedrock at 24.4'		
					(Note Scale Change)							
	RB	NA	NA		Interbedded, reddish brown, silty shale, siltstone and fine to medium grained sandstone. Highly weathered. Blocky to hackly fracture pattern. Rock is harder in the sandier portions.					No Chemical Odor		
	RB	NA	NA		Same as above but becoming mostly fine to medium grained, silty sandstone. Some ... quartz ...					No Chemical Odor		

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...REWAI
...ject No. [illegible]
...1 B of 1D

Total Depth [illegible]
Depth to ...S. Initial [illegible]
Depth to Competent Bedrock [illegible]
SWL (Date) [illegible]
Screened Interval [illegible]
Hole Diameter 5 5/8"
Monitoring Tube 6" Steel Screen
Elev., Ground Surface [illegible]

Well No. MW5
Driller [illegible]
Logged by JST
Drilling Began 12/22/83
Drilling Completed 12/29/83
Well Const. Completed 12/29/83
Development Completed 12/29/83
Elev., T.O.C. Not measured

Blows/6"	RQD ft/ft	Recovery ft/ft	Sample No., PID, BZ	Sample Description (USCS), GRN Size, Color, Shape texture, moistness, etc.	Grn. Size C	S	Sd	Gr	Other Notes	Graphic Log Lith.	Well Const.
6 6 9 10	NA	2.0 2.0		Same as above.					No Chemical Odor		
11 18 17 9	NA	1.5 2.0		Same as above.					No Chemical Odor		
8 5 5 5	NA	.2 2.0		Same as above.					No Chemical Odor		
4 6 9 13	NA	2.0 2.0		Light to medium brown, slightly clayey silt. Mottled gray. Tough. Material fairly tight. Trace of fine to medium sand. Some coal fragments. Damp.	10	85	5		No Chemical Odor		
10 13 15 [illegible]	NA	2.0 2.0		Light to medium yellowish brown clayey silt. Fairly tight. Slight layering is evident. Small gray clay pockets are present. Mottled. Saturated.	15	SC	5		No Odor		

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Total Depth 50.2'
Depth to S.S. Retrieval [illegible]
Depth to Competent Bedrock 26.0
SWL (Date) 16.04' (1/27/84)
Screened Interval 8.0' - 28.0'
Hole Diameter 5 5/8"
Monitoring Tube 6" Steel Screen
Elev., Ground Surface 301.35'

Well No. MW6
Driller Engineering Drilling
Logged by JSP
Drilling Began 1/3/84
Drilling Completed 1/5/84
Well Const. Completed 1/5/84
Development Completed 1/5/84
Elev., T.O.C. Not measured

Depth (ft)	Blows/6"	RQD ft/ft	Recovery (ft/ft)	Sample No. (Run No.)	Sample Description (USCS), GRN Size, Color, Shape texture, Moistness, etc.	% Grn. Size: G	S	Sil	Cl	Other Notes	Graphics: Lith.	Well Const.
0	14 66 66 41	NA	2.0/2.0		Upper .5 feet is medium brown to red brown sandy silt. Trace of clay and gravel. Frozen. Remainder is gray slag/ash. Fill material. Very coarse and hard. Many blue and white color stains. Pumicy in appearance. Frozen.	tr	80	20	tr	No Chemical Odor		
5.0	11 11 9 13	NA	1.0/2.0		Dark to medium brown, sandy, gravelly silt. Trace of clay. Sand is fine medium grained. Gravel is pea sized to 1 inch. Gravel is well rounded. Material is fairly tight. Trace of slag in top of spoon. Damp. Some of gravel is slag. Could be fill.	tr	55	25	20	No Chemical Odor		
10.0	9 10 13 12	NA	1.0/2.0		Same as above except the lower .5 feet has a black color to it. Looks like coal dust or oily. Highly weathered. Still could be fill.	tr	55	25	20	Slight Odor Noticed		
15.0	4 7 10 11	NA	.9/3.0		Becoming a medium brown sandy silt to silty fine grained sand. Tight. Trace of clay and gravel. Damp.	tr	55	45	tr	No Chemical Odor		
	4 4	NA	[illegible]		Same as above but more clay and gravel. Also saturated.	10	50	35	5	No Chemical Odor		

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Total Depth [illegible]
Depth to S.S. Interval [illegible]
Depth to Competent Bedrock 24.4'
SWL (Date) [illegible]
Screened Interval 8.0' - 28.0'
Hole Diameter 5 5/8"
Monitoring Tube 6" Steel Screen
Elev., Ground Surface 303.26'

Well No. [illegible]MW5
Driller [illegible]
Logged by [illegible]
Drilling Began 12/22/83
Drilling Completed 12/29/83
Well Const. Completed 12/29/83
Development Completed 12/29/83
Elev., T.O.C. Not measured

Depth	Blows/6"	RQD ft/ft	Recovery ft/ft	Sample No., Run No.	Sample Description (USCS), GRN Size, Color, Shape texture, moistness, etc.	% Grn. Size C	S	Sd	Gr	Other Notes	Graph. Lith.	Well Const.
40.0	RB	NA	NA		Same as above but more shale and siltstone.					No Chemical Odor Very Soft From 38' to 39'		
45.0	RB	NA	NA		Reddish brown, silty, fine to medium grained sandstone with a small amount of thin interbedded shale. Rock is harder than above. Fairly weathered in spots. BOTTOM OF WELL					No Chemical Odor Small Break at 41'. Small Break at 42.5' with some possible water. Possible Break at 47.5'.		
					Estimated Blown Yield: 5-10 gpm Well Sampled 1/6/84 WBZ's: Gravel and rock.							

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Total Depth 50.0'
Depth to S.S. Potential 25.0'
Depth to Competent Bedrock 26.0'
SWL (Date) 10.04' (1/27/84)
Screened Interval 18.0' - 28.0'
Hole Diameter 5 5/8"
Monitoring Tube 6" Steel Screen
Elev., Ground Surface 301.35'

Well No. MW6
Driller [redacted]
Logged by [redacted]
Drilling Began 1/3/84
Drilling Completed 1/5/84
Well Const. Completed 1/5/84
Development Completed 1/5/84
Elev., T.O.C. Not measured

Blows/6"	RQD ft/ft	Recovery (ft/ft)	Sample No. (and Run No.)	Sample Description (USCS), GRN Size, Color, Shape, texture, moistness, etc.	% Grn. Size C	S	Sd	Gr	Other Notes	Graphic Log Lith.	Well Const.
11 17 14 15	NA	1.0/2.0		Medium brown sand and gravel. Sand is mostly medium to coarse grained, quartz and rock fragments. Gravel is well rounded, pea sized to several inches and consists of quartzite. Material is very loose. Trace silt. Saturated		5	45	50	No Chemical Odor		
3 10 11 13	NA	1.0/2.0		Same as above but a little more silt is present. Trace of clay.	tr	10	45	45	No Chemical Odor		
10 25 41 100/.2	NA	1.7/1.7		Upper 1.0 ft same as above. Remainder is highly weathered, reddish brown, silty sandstone. "Sapprolitic." Planar parting plane present at roughly 45°.	tr	10	45	45	No Chemical Odor Bedrock at 26'		
RB	NA	NA		(NOTE SCALE CHANGE) Mostly reddish brown, silty, fine to medium grained sandstone. Some coarser. Some appears slightly conglomeritic. Small interbeds of shale and mudstone also present. Sandstone is thin to thick bedded. Also somewhat micocious. Highly weathered in spots.					No Chemical Odor		
	NA	NA		Same as above.					No Chemical Odor		

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Total Depth [illegible]
Depth to S.S. Retrieval 25.7'
Depth to Competent Bedrock 26.0'
SWL (Date) 16.04' (1/27/84)
Screened Interval 8.0' - 28.0'
Hole Diameter 5 5/8"
Monitoring Tube 6" Steel Screen
Elev., Ground Surface 301.35'

Well No. MW6
Driller Engineering Drilling
Logged by JST
Drilling Began 1/3/84
Drilling Completed 1/5/84
Well Const. Completed 1/5/84
Development Completed 1/5/84
Elev., T.O.C. Not measured

Blows/6"	RQD ft/ft	Recovery ft/ft	Sample No. Run No.	Sample Description (USCS), GRN Size, Color, Shape, texture, moistness, etc.	Grn. Size C	S	Sd	Gr	Other Notes	Graph. Litho.	Well Const.
4 4 5 4	NA	1.5 2.0		Medium to dark brown, gravelly, clayey, sandy silt. Fairly tight. Gravel is pea sized to 2 inches and well rounded. Sand is fine to medium grained. Slightly layered. Trace of coal. Moist.	15	55	15	15	No Chemical Odor		
3 7 3 4	NA	2.0 2.0		Same as above but only a trace of clay. Material is not as tough.	tr	50	20	30	No Chemical Odor		
2 3 10 13	NA	1.5 2.0		Light to medium orangish brown, clayey silt. Trace of fine sand. Mushy. Saturated.	15	85	tr		No Chemical Odor		
9 7 7 13	NA	2.0 2.0		Medium brown, slightly sandy, clayey silt. Sand is very fine grained. Mottled. Small gray and light brown spots. Fairly tight. Tough. Saturated.	15	80	5		No Chemical Odor		
7 [illegible]	NA	[illegible]		Light to medium grayish brown, slightly clayey, silty, fine to medium grained sand. Appears layered. Saturated.	5	20	75		No Chemical Odor		

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Total Depth 30.0'
Depth to S.S. Retreat 21.8'
Depth to Competent Bedrock 23.0'
SWL (Date) 15.35' (1/27/84)
Screened Interval 15'-25'
Hole Diameter 5 5/8"
Monitoring Tube 6" PVC
Elev., Ground Surface 303.33'

Well No. HIA-MW7
Driller [illegible]
Logged by JST
Drilling Began 11/21/83
Drilling Completed 11/29/83
Well Const. Completed 11/23/83
Development Completed 11/29/83
Elev., T.O.C. Not Measured

Blows/6"	RQD ft/ft	Recovery ft/ft	Sample No. Run No.	Sample Description (USCS), GRN Size, Color, Shape, Texture, Moistness, etc.	% Grn. Size C	S	Sd	Gr	Other Notes	Graph. Lith.	Well Const.
0 3 9 13	NA	2.0/2.0		Dark brown, slightly silty, sandy gravel. Sand is mostly medium to coarse grained. Gravel is well rounded quartzite (various colors) and varies in size from ¼ inch to 2 inches. Weathered. Wet. Material is loose.		5	25	70	No Odor		
7 11 9 8	NA	2.0/2.0		Medium to dark brown, sandy gravel. Sand is mostly medium to coarse grained with a little fine. Gravel is subround to well rounded quartzite. Size is the same as above. Wet. Material is very loose.		tr	15	85	No Odor		
8 7 11 8	NA	0/2.0		(Spoon pushed a cobble through this interval and no sample was acquired). Sample probably same as above. Hole is not staying open, so we'll have to use casing.					No Odor		
7 5 6 6	NA	1.8/2.0		Dark brown to vari-colored, slightly sandy gravel. Sand is fine to coarse grained. Gravel is well rounded quartzite. Size varies from ¼ inch to 5 inches. Material is very loose.		tr	5	95	No Odor		
6 [illegible] 4 [illegible]	NA	1.0/2.0		Same as above.		tr	5	95	No Odor		

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Total Depth 50.0'
Depth to S.S. Retrieval 25.7'
Depth to Competent Bedrock 26.0
SWL (Date) 16.04' (1/27/84)
Screened Interval 8.0' - 28.0'
Hole Diameter 5 5/8"
Monitoring Tube 6" Steel Screen
Elev., Ground Surface 301.35'

Well No. MW6
Driller Engineering Drilling
Logged by JST
Drilling Began 1/3/84
Drilling Completed 1/5/84
Well Const. Completed 1/5/84
Development Completed 1/5/84
Elev., T.O.C. Not measured

Blows/6"	RQD ft/ft	Recovery (ft/ft	Sample No. (Depth ft)	Sample Description (USCS), GRN Size, Color, Shape texture, Moistness, etc.	% Grn. Size C	S	Sd	Gr	Other Notes	Graphic Lith.	Well Const.
RB	NA	NA		Same as above except a little more shaly.					No Chemical Odor		
RB	NA	NA		Interbedded, reddish brown, silty shale, mudstone and fine to coarse grained sandstone. Very hard in sandstone intervals.					No Chemical Odor		
				BOTTOM OF WELL							
				Estimated Blown Yield: 5gpm. Well Sampled 1/6/84 WBZ's: Gravel & Rock							

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Total Depth 51.0'
Depth to S.S. Returned 21.8'
Depth to Competent Bedrock 22.0'
SWL (Date) 15.35' (1/27/84)
Screened Interval 15'-25'
Hole Diameter 5 5/8"
Monitoring Tube 6" PVC
Elev., Ground Surface 303.33'

Well No. MW-15
Driller ...
Logged by JST
Drilling Began 11/21/83
Drilling Completed 11/29/83
Well Const. Completed 11/23/83
Development Completed 11/29/83
Elev., T.O.C. not measured

Blows/6"	RQD ft/ft	Recovery ft/ft	Sample No. Run No.	Sample Description (USCS), GRN Size, Color, Shape texture, moistness, etc.	Grn. Size C	S	Sd	Gr	Other Notes	Graphic Lith.	Well Const.
41 76 32 100 .3	NA	1.8/1.8		Reddish brown, slightly clayey, slightly silty, sand and gravel. Sand mostly medium to coarse. Some fine. Highly weathered. Saturated. Gravel subround to round. (Becoming more angular towards 22'). Sticky.	tr	10	30	60	No Odor		
100 .5 RB 3 RB	NA	.5/.5		Reddish brown, silty, fine to medium grained sandstone with small interlayered shale and siltstone. Soft. Quartz, feldspor and mica are major minerals. Some appears highly weathered. Some white quartz.					Bedrock at 22' No Odor.		
RB RB RB RB				Same as above.							
RB RB RB RB				Same as above.							
RB 2 RB RB				Same as above.							

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Total Depth 50.0'
Depth to S.S. Retrieval ...5'
Depth to Competent Bedrock 22.
SWL (Date) 15.35' (1/27/84)
Screened Interval 15' - 25'
Hole Diameter 5 5/8"
Monitoring Tube 6" PVC
Elev., Ground Surface 303.33'

Well No. ...
Driller ...
Logged by JST
Drilling Began 11-21-83
Drilling Completed 11/29/83
Well Const. Completed 11/23/83
Development Completed 11/29/83
Elev., T.O.C. Not measured

Blows/6"	RQD ft/ft	Recovery (ft/ft)	Sample No. (Run No.)	Sample Description (USCS), GRN Size, Color, Shape, texture, moistness, etc.	% Grn. Size C	S	Sd	Gr	Other Notes	Graphic Log Lith.	Well Const.
4 4 3 3	NA	2.0 2.0		Upper .5' is gravel - the same as above. Lower 1.5' is dark brown, fine to medium grained, silty sand. Material is somewhat tight. Appears layered because of subtle color changes. Sand is wet. Trace of gravel towards 12.0'.		15	85	tr	No Odor		
5 5 8 7	NA	1.6 2.0		Various colored (red brown, tan, white, green gray, brown), quartzite gravel. Well rounded river gravel. Pea-sized to cobble-sized. Very loose material. Probably has some water associated with it.			5	95	No Odor		
8 14 100 .5 RB	NA	1.0 1.5		Alternating layers of well rounded quartzite gravel and fine to medium grained silty sand. Material appears to have some water in it. Very loose.		5	15	80	Spoon Refusal at 15.5' No Odor		
16 9 16 70	NA	1.5 2.0		Mostly various shades of brown quartzite gravel with some fine to medium grained silty sand. Gravel is from pea sized to cobble sized. Very loose. Probably some water in gravel. Can see a slight layering.		5	10	85	No Odor		
5 10 32	NA	.7 1.8		Reddish brown sandy silty gravel. Some may be weathered bedrock. Large cobble in bottom of spoon.		10	20	70	No Odor		

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Total Depth 50.0'
Depth to S.S. Retrieval [illegible]
Depth to Competent Bedrock [illegible]
SWL (Date) 15.35' (1/27/84)
Screened Interval 15' - 25'
Hole Diameter 5 5/8"
Monitoring Tube 6"PVC
Elev., Ground Surface 303.33'

Well No. HIA-MW7
Driller Engineering Drilling
Logged by [illegible]
Drilling Began 11/21/83
Drilling Completed 11/29/83
Well Const. Completed 11/23/83
Development Completed 11/29/83
Elev., T.O.C. Not measured

Blows/6"	RQD ft/ft	Recovery ft/ft	Sample No. (Run ft)	Sample Description (USCS), GRN Size, Color, Shape Texture, moistness, etc.	Grn. Size: C	S	Sd	Gr	Other Notes	Graphic: Lith.	Well Const.
ROLLER BIT				Reddish brown, silty, fine to medium grained sandstone with some small siltstone and shale layers. Soft. Appears highly weathered in spots. Tan sandstone layer (couple inches) around 40'. Very soft. Rock is becoming harder with depth.					No Odor		
ROLLER BIT				Estimated Q = 30 - 40 gpm 5 gallon/8 sec. WBZ's gravel, 41', 45' TOTAL DEPTH = 50'					Break 41' Break 45' (Losing drilling water)		

AR301041

APPENDIX E

CHAIN OF CUSTODY DOCUMENTATION

UNIFORM HAZARDOUS WASTE
PA DER MANIFEST FOR DRUMS
REMOVED FROM MEADE HEIGHTS FILL AREA

PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL RESOURCES
Division of Hazardous Waste Management
P. O. Box 2063
Harrisburg, PA 17120

ER-aWM-51:Rev.5/84 Please print or type. (Form designed for use on elite (12-pitch) typewriter.) Form Approved. OMB No. 2000-0404. Expires 7-31-86

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. N/A | Manifest Document No. | 2. Page 1 of | Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
U.S. AIRFORCE
OLD OLMSTEAD AIR FORCE BASE
MEADVILLE, PA
4. Generator's Phone (302) 787-5078

A. State Manifest Document Number PAB 00426414
B. State Gen. ID N/A

5. Transporter 1 Company Name DELAWARE CONTAINER Co. | 6. US EPA ID Number PA.D.0.6.4.3.7.5.4.7.0 | C. State Trans. ID PA-AH 0032

7. Transporter 2 Company Name | 8. US EPA ID Number | D. Transporter's Phone (215) 387-6600

E. State Trans. ID PA-AH

9. Designated Facility Name and Site Address
DELAWARE CONTAINER Co.
WITH AVE & VALLEY RD
COATESVILLE, PA 19320
10. US EPA ID Number PA.D.0.6.4.3.7.5.4.7.0

F. Transporter's Phone ( )
G. State Facility's ID Not Required
H. Facility's Phone (215) 383-6600

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a. NON-HAZARDOUS WASTE NON-REGULATED	010	DM	08000	P	N/A
b.					
c.					
d.					

GENERATOR

J. Additional Descriptions for Materials Listed Above (Include physical state and hazard code)
a. | c.
b. | d.

K. Handling Codes for Wastes Listed Above
a. T01 | c.
b. | d.

15. Special Handling Instructions and Additional Information
5 empty drums.
ATTN LT. Col. Lumbard
HQ - USAF - SGES
Bolling AFB - DC 20332

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 governmental regulations, and all applicable State laws/regulations.

Printed/Typed Name	Signature	Date (Month Day Year)
FOR GENERATOR		10 7 85

TRANSPORTER

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Date (Month Day Year)
CHAS. J. KUEWILK		10 7 85

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Date (Month Day Year)

FACILITY

19. Discrepancy Indication Space

Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19. AR3011044

Printed/Typed Name	Signature	Date (Month Day Year)
Bill Ross	Bill Ross	10 7 85

PAB UU426414

Form 8700-22 (3-84) COPY 3 - Generator - Mailed by TSD Facility

WESTON LABORATORY
SAMPLE BOTTLE REQUEST AND PREPARATION FORMS

SAMPLE BOTTLE REQUEST & PREPARATION FORM

E[JESTED BY: Marian Dziuzy — SHIP BOTTLES TO:
A[E OF REQUEST: 12/13/84
A[E BOTTLES NEEDED: 12/17/84
L[ENT I.D.: OLMSTEAD AFB
.E.W. TO DO ANALYSIS: yes
A[PLING & HANDLING PLAN PREPARED: NO — BOTTLES WILL BE PICKED UP BY: Marian Dziuzy
RICE QUOTED: ?
MATRIX: Water

(TO BE COMPLETED WHEN BOTTLES PREPARED)

O. SAMPLES OR EACH A[AMETER	PARAMETERS REQUESTED	NO. BOTTLES PREPARED FOR THIS PARAMETER	BOTTLE SIZE & TYPE	PRESERVATIVE ADDED	DATE BOTTLES PREPARED
[illegible]	TOC	(6)	60 ml. amber glass with septum top	H_2SO_4	
[illegible]	VOA by GC, CO_2	(6)	40 ml. vials	Cool	
6	O+G/IR	(6)	1000 ml. glass	H_2SO_4	
QA/QC					
1	TOC - DUP	(1)	60 ml. amber glass with septum top	H_2SO_4	
1	VOA - DUP	(1)	40 ml. vial	Cool	
1	O/G by IR DUP.	(1)	~~1000 ml. glass~~ 1000 ml. glass	H_2SO_4	
1	VOA Trip Blank	(1)	~~60 ml.~~ 40 ml. vial	Cool	

BO[ES PREPARED BY: Mase
DATE: 12/17/84

PREPARED BOTTLES RECEIVED BY: Thomas A. Dyer
DATE: 12-17-84

SAMPLE BOTTLE REQUEST & PREPARATION FORM

QUESTED BY: MARIAN DZEDZY — SHIP BOTTLES TO:

TE OF REQUEST: 12/13/84

TE BOTTLES NEEDED: 12/17/84

IENT I.D.: OLMSTEAD A.F.B.

F.W. TO DO ANALYSIS: yes — BOTTLES WILL BE PICKED UP BY:

MPLING & HANDLING PLAN PREPARED: _____ MARIAN DZADZY

ICE QUOTED: NO — CALL WHEN READY

MATRIX: Soil/sediment

(TO BE COMPLETED WHEN BOTTLES PREPARED)

SAMPLES EACH AMETER	PARAMETERS REQUESTED	NO. BOTTLES PREPARED FOR THIS PARAMETER	BOTTLE SIZE & TYPE	PRESERVATIVE ADDED	DATE BOTTLES PREPARED
D	VOA, 601-602	(10) ✓	40 ml. vials	NONE-COOL	
	OIL & GREASE by IR	10 ✓	1000 ml. GLASS.	NONE-COOL	
QA/QC					
1	VOA (DUP)	0 ✓	40 ml. vials	NONE-COOL	
1	OIL & GREASE by IR (DUPLICATE)	✓	1000 ml. GLASS	NONE-COOL	
1	VOA Trip Blank	(1) ✓	40 ml. vial	NONE-COOL	

LES PREPARED BY: Marc — PREPARED BOTTLES RECEIVED BY: T. AR301047

DATE: 12/17/84 — DATE: 12-17-84

SAMPLE BOTTLE REQUEST & PREPARATION FORM

REQUESTED BY: MARIAN-DZEDZY
DATE OF REQUEST: 12/13/84
DATE BOTTLES NEEDED: 12/17/84
CLIENT I.D.: OLM3 TEAD AIR FORCE BASE
P.W. TO DO ANALYSIS: YES
SAMPLING & HANDLING PLAN PREPARED: _____
PRICE QUOTED: NO

SHIP BOTTLES TO:

BOTTLES WILL BE PICKED UP BY:
MARIAN DZEDZY
CALL WHEN READY

MATRIX: SLUDGE FROM DRUMS

(TO BE COMPLETED WHEN BOTTLES PREPARED)

# SAMPLES FOR EACH PARAMETER	PARAMETERS REQUESTED	NO. BOTTLES PREPARED FOR THIS PARAMETER	BOTTLE SIZE & TYPE	PRESERVATIVE ADDED	DATE BOTTLES PREPARED
25	EP TOXICITY	(25)	~~250 ml~~ 4-150 ml WIDE-MOUTHED JARS - GLASS	COOL	
	IGNITIBILITY	(25)			
25	CORROSIVITY	(25)			

BOTTLES PREPARED BY: Marian
DATE: 12/17/84

PREPARED BOTTLES RECEIVED BY: Thomas A. Orr
DATE: ~~12-17-84~~ AR301048

SAMPLE BOTTLE REQUEST & PREPARATION FORM

REQUESTED BY: Judy Jordan
DATE OF REQUEST: 7/17/85
DATE BOTTLES NEEDED: 7/25/85
CLIENT I.D.: OLMSTEAD A.F.B.
R.F.W. TO DO ANALYSIS: YES
SAMPLING & HANDLING PLAN PREPARED: YES
PRICE QUOTED: YES

SHIP BOTTLES TO:

BOTTLES WILL BE PICKED UP BY:
JUDY JORDAN
X 475
(CALL WHEN READY)

MATRIX: WATER

(TO BE COMPLETED WHEN BOTTLES PREPARED)

NO. SAMPLES FOR EACH PARAMETER	PARAMETERS REQUESTED	NO. BOTTLES PREPARED FOR THIS PARAMETER	BOTTLE SIZE & TYPE	PRESERVATIVE ADDED	DATE BOTTLES PREPARED
4	TOTAL METALS (As, Ba, Cd, ~~Cr, Pb, Hg, Se,~~ Ag, Na)	4	1000 ml. plastic	HNO_3 ✓	
4	F⁻ TURBIDITY	4 (white label)	1000 ml. plastic	COOL ✓	
4	NO_3-NO_2	4	250 ml. plastic	H_2SO_4 ✓	
4	BACT	4	250 ml. plastic	$Na_2S_2O_3$	
4	D.W. PESTS	4 8	1000 ml. amberglass	COOL ✓	
4	D.W. HERBS	4 8	1000 ml. amberglass	COOL ✓	

BOTTLES PREPARED BY: Mark
DATE: 7/19/85

PREPARED BOTTLES RECEIVED BY
DATE:

CHARGE ½ BOTTLE TO ACCOUNT

SAMPLE BOTTLE REQUEST & PREPARATION FORM

REQUESTED BY: Judy Jordan
DATE OF REQUEST: ~~7/16/85~~ 7/17/85
DATE BOTTLES NEEDED: 7/25/85
CLIENT I.D.: OLMSTEAD A.F.B.
R.F.W. TO DO ANALYSIS: YES
SAMPLING & HANDLING PLAN PREPARED: YES
PRICE QUOTED: YES

SHIP BOTTLES TO:

BOTTLES WILL BE PICKED UP BY:
JUDY JORDAN
x 475

MATRIX: WATER

(TO BE COMPLETED WHEN BOTTLES PREPARED)

NO. SAMPLES FOR EACH PARAMETER	PARAMETERS REQUESTED	NO. BOTTLES PREPARED FOR THIS PARAMETER	BOTTLE SIZE & TYPE	PRESERVATIVE ADDED	DATE BOTTLES PREPARED
~~60~~ 54	TOC	~~60~~ 60	60 ml. amber glass	H_2SO_4 / SEPTUM LIDS	✓
58	VOA	132	40 ml. vial	COOL	✓
58	O/G	63	1000 ml. amber glass	H_2SO_4	✓

BOTTLES PREPARED BY: MAK
DATE: 7/22/85

PREPARED BOTTLES RECEIVED BY:
DATE:

SAMPLE BOTTLE REQUEST & PREPARATION FORM

REQUESTED BY: MARIA D'ALOIA

DATE OF REQUEST: 9-26-85

DATE BOTTLES NEEDED: 9-26-85

CLIENT I.D.: OLMSTED

R.F.W. TO DO ANALYSIS: YES

SAMPLING & HANDLING PLAN PREPARED: YES

PRICE QUOTED: YES

SHIP BOTTLES TO:

BOTTLES WILL BE PICKED UP BY:

MATRIX: WATER

(TO BE COMPLETED WHEN BOTTLES PREPARED)

NO. SAMPLES FOR EACH PARAMETER	PARAMETERS REQUESTED	NO. BOTTLES PREPARED FOR THIS PARAMETER	BOTTLE SIZE & TYPE	PRESERVATIVE ADDED	DATE BOTTLES PREPARED
2	TOC	2	40 ml. amber glass Septum lid	H_2SO_4	

TLES PREPARED BY: [signature]

DATE: 9/26/85

PREPARED BOTTLES RECEIVED BY:

DATE:

AR301051

DOCUMENTATION FOR
SAMPLES SENT TO
WESTON'S WEST CHESTER
ANALYTICAL LABORATORY

TO WESTON LAB

WESTON ENGINEERS CONSULTANTS

CHAIN OF CUSTODY RECORD

SAMPLERS: (Signature) Marian R. Dziedzy

Phone: 215-692-3030 x412

SHIP TO:
Roy F. Weston Lab
Lionville PA

ATTENTION: Judy Porta/John Heemer

Phone No.

SHIPPING INFORMATION

Location Olmstead AFB WO# 0628-05-5C

Shipper Marian Dziedzy

Address

Date Shipped

Shipment Service

Airbill No.

Cooler No. 1 of 2

Relinquished by: (Signature)	Received by: (Signature)	Date/Time
Marian R. Dziedzy		
Relinquished by: (Signature)	Received by: (Signature)	Date/Time
Relinquished by: (Signature)	Received by: (Signature)	Date/Time
Relinquished by: (Signature)	Received for laboratory by: (Signature)	Date/Time

Analysis laboratory should complete "sample cond. upon receipt" section below, sign and return copy to Shipper

Sample Number	No. Of Cont.	Site Identification	Date Sampled	Analysis Requested	Sample Cond. Upon Receipt
	1	D-1	12-18-84	EP Toxicity, Corrosivity, Ignitability	
	1	D-7	12-18-84	EP Toxicity, Corrosivity, Ignitibility	
	1	D-8	12-18-84	EP Toxicity, Corrosivity, Ignitibility	
	5	SW-1	12-18-84	Oil+grease, VOA, TOC	
	5	SW-2	12-18-84	Oil+grease, VOA, TOC	
	2	Sediment #1	12-18-84	Oil+grease, VOA	
	3	Field Blank	12-18-84	Oil+grease, VOA	

AR301053

Remarks:
Please return paint cans + coolers to Eric Brown.

White - Sampler | Canary - Return Copy to Shipper | Pink - Lab Copy

CLIENT US Air Force PRIORITY/HAZARD Drum Contents I

WO#/PO# 0628-05-50 (Olmstead AFB) SUBMITTED BY Marian Dzedzy

DATE RECEIVED _____ MISC: Cooler #1

RFW#	SAMPLE DESCRIPTION	DATE COLLECTED	PA	PA	PA	PA	PA	PA	PA
1.	D-1	12-18-84	Toxicity	Corr-Sivity	Ignit-ability		0 to grease		
2.	D-7	"	X	X	X				
3.	D-8	"	X	X	X				
4.	SW-1	"					X		
5.	SW-2	"					X		
6.									
7.									
8.									
9.									
10.	SW-1		TOC	VOA					
11.	SW-2		X	X					
12.	Sediment #1			X			X		
13.	Field Blank			X			X		
14.									
15.									
16.									
17.									
18.									
19.									
20.									
21.									
22.									
23.									
24.									
25.									

AR301054

CHAIN OF CUSTODY

1. RFW # _____

2. No. of bottles on this sheet:

40 ml	9
100 ml	2
250 ml	
500 ml	
1000 ml	1
Total	12

3. Sampled by: Marion Dzedzy

4. Samples preserved and prepared according to S.O.P.: _____ Initials

Relinquished	Received by	Time	Date	Reason for Change of Custody
Marion Dzedzy				

COMMENTS: _____

AR301055

WESTON DESIGNERS CONSULTANTS

CHAIN OF CUSTODY RECORD

ERS: *(Signature)* _____

Phone: _____

SHIP TO:

_____

_____

_____

_____

ATTENTION: _____

Phone No. _____

SHIPPING INFORMATION

Location _____

Shipper _____

Address _____

_____

Date Shipped _____

Shipment Service _____

Airbill No. _____

Cooler No. _____

Relinquished by: *(Signature)*	Received by: *(Signature)* JC Heiser	Date/Time
Relinquished by: *(Signature)*	Received by: *(Signature)*	Date/Time
Relinquished by: *(Signature)*	Received by: *(Signature)*	Date/Time
Relinquished by: *(Signature)*	Received for laboratory by: *(Signature)*	Date/Time

Analysis laboratory should complete "sample cond. upon receipt" section below, sign and return copy to Shipper

Sample No.	No. Of Cont.	Site Identification	Date Sampled	Analysis Requested	Sample Cond. Upon Receipt
					✓
					✓
					✓
				✓ ✓ ✓	
				✓ ✓ ✓	
				✓ ✓	
				✓ ✓	

AR301056

Remarks:

White - Sampler | Canary - Return Copy to Shipper | Pink - Lab Copy

TO WESTON LAB

WESTON ENGINEERS CONSULTANTS

CHAIN OF CUSTODY RECORD

SAMPLERS: (Signature) Marian R. Dzedzy

Phone: 315-692-3030 X412

SHIP TO:
Roy F. Weston Laboratory

ATTENTION: Judy Porta / John Heemer

Phone No.

SHIPPING INFORMATION

Location Olmstead AFB WO #0628-05-5C

Shipper Marian Dzedzy

Address

Date Shipped

Shipment Service

Airbill No.

Cooler No. 2 of 2

Relinquished by: (Signature)	Received by: (Signature)	Date/Time
Marian R. Dzedzy		
Relinquished by: (Signature)	Received by: (Signature)	Date/Time
Relinquished by: (Signature)	Received by: (Signature)	Date/Time
Relinquished by: (Signature)	Received for laboratory by: (Signature)	Date/Time

Analysis laboratory should complete "sample cond. upon receipt" section below, sign and return copy to Shipper

Sample Number	No. Of Cont.	Site Identification	Date Sampled	Analysis Requested	Sample Cond. Upon Receipt
	1	D-2	12-18-84	EP Toxicity, Corrosivity, Ignitibility	
	1	D-5	12-18-84	EP Toxicity, Corrosivity, Ignitibility	
	1	D-6	12-18-84	EP Toxicity, Corrosivity, Ignitibility	
	1	D-3	12-19-84	EP Toxicity, Corrosivity, Ignitibility	
	1	D-4	12-19-84	EP Toxicity, Corrosivity, Ignitibility	
	1	D-9	12-19-84	EP Toxicity, Corrosivity, Ignitibility	
	1	Soil Beneath Drums	12-19-84	EP Toxicity, Corrosivity, Ignitibility	
	1	Test Pit Excavation	12-19-84	EP Toxicity, Corrosivity, Ignitibility	

AR301057

Remarks:

Return cans + coolers to Eric Brown.

White - Sampler | Canary - Return Copy to Shipper | Pink - Lab Copy

CLIENT USAF - Olmstead AFB

PRIORITY/HAZARD drum contents *

PWSPO# C628-05-50

SUBMITTED BY M. Dzadzy

DATE RECEIVED

MISC:

REF#	SAMPLE DESCRIPTION	DATE COLLECTED	PA	PA	PA	PA	PA	PA	PA
1.	D-2	12-18-84	[illegible]	[illegible]	[illegible]				
2.	D-5	12-18-84	X		X				
3.	D-6	12-18-84	X	X	X				
4.	D-3	12-19-84	X	X	X				
5.	D-4	12-19-84	X	X	X				
6.	D-9	12-19-84	X	X	X				
7.	[redacted]				[redacted]				
8.	Soil Beneath Drums	12-19-84	X	X	X				
9.	Test Pit Freuhauf lot	12-19-84	X	X	X				
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									
19.									
20.									
21.									
23.									
24.									
25.									

AR301058

CHAIN OF CUSTODY

1. RFW # _____

2. No. of bottles on this sheet:

40 ml	
100 ml	
250 ml	
500 ml	
1000 ml	8
Total	8

3. Sampled by: M. Dzedzy

4. Samples preserved and prepared according to S.O.P.: _____ Initials

Relinquished	Received by	Time	Date	Reason for Change of Custody
Marvin Dzedzy				

COMMENTS: * Drums had been punctured + drained. They contained only water when we removed them. This is what we sampled. There was also a tarry residue in some of the drums. Pieces of this were chipped off and are also in the bottles

AR301059

WESTON DESIGNERS CONSULTANTS

CHAIN OF CUSTODY RECORD

ERS: *(Signature)* _____

Phone: _____

SHIP TO:

_____

_____

_____

_____

ATTENTION: _____

Phone No. _____

SHIPPING INFORMATION

Location _____

Shipper _____

Address _____

_____

Date Shipped _____

Shipment Service _____

Airbill No. _____

Cooler No. _____

Relinquished by: *(Signature)*	Received by: *(Signature)*	Date/Time
Relinquished by: *(Signature)*	Received by: *(Signature)*	Date/Time
Relinquished by: *(Signature)*	Received by: *(Signature)*	Date/Time
Relinquished by: *(Signature)*	Received for laboratory by: *(Signature)*	Date/Time

Analysis laboratory should complete "sample cond. upon receipt" section below, sign and return copy to Shipper

Sample No.	No. Of Cont.	Site Identification	Date Sampled	Analysis Requested	Sample Cond. Upon Receipt
					OK
					small sample size
					OK
					small samp size
					"
					"
					OK
					OK

AR301060

Remarks:

White - Sampler | Canary - Return Copy to Shipper | Pink - Lab Copy

WESTON 008

5508-77

Custody Transfer Record / Lab Work Request

Received By VK Dondero Client [illegible]
Date 8/2/85 Client Contact [illegible]
Assigned to Phone
RFW Contact J. Pinta
Date Due 8/23/85
Project Number 0628-05-50

SAMPLE IDENTIFICATION | ANALYSES REQUESTED

Sample No.	Client ID No.	Description	Date Collected	Container/Preservative	VOA	TOC	OG					
0010		Production Wells 17	8/1/85	50ml cool (2)	✓							
20		" 18	8/1/85	↓	✓							
30		Stream sed. sample	8/1/85		✓							
40		RFW well 3	8/2/85		✓							
50		4	8/2/85		✓							
60		5	8/2/85		✓							
0010		Production well 17	8/1/85	60ml H_2SO_4		✓						
20		" 18	8/1/85	↓		✓						
40		~~Stream~~ RFW well 3	8/2/85			✓						
50		4	↓			✓						
60		5				✓						
0010		Production well 17	8/1/85	1000ml amber H_2SO_4			✓					
20		" 18	8/1/85	↓			✓					
30		Stream sed. sample	8/1/85				✓					
40		RFW well 3	8/2/85				✓					
50		4	↓				✓					
60		5					✓					
70		Field Blank	8/2/85		X	X	X					
80		RFW-18 DUP	8/1/85		X	X	X					
90		Production Well 9	8/2/85		X	X	X					

SPECIAL INSTRUCTIONS:

Items/Reason	Relinquished By	Received By	Date	Time	Items/Reason	Relinquished By	Received By	Date	Time
All	Judith [illegible]	VK Dondero	8/2/85	1855					

AR30 1061

Work Request

Received By: [illegible]
Date: 8/2/85
Assigned to:
8308 = 185

Client: USAF
Client C: el
Phone:

RFW Contact: [illegible]
Date Due: 8/23/85
Project Number: 0628-05-50
EXT 412

Sample No.	Client ID No.	Description	Date Collected	Container/Preservative	VOA	OIL + GREASE	TOC					
0010		WRT-1	7-30-85		✓	✓	✓					
20		WRT-2	7-30-85		✓	✓	✓					
30		WRT-3	7-30-85		✓	✓	✓					
40		WRT-4	7-30-85		✓	✓	✓					
50		WRT-5	7-31-85		✓	✓	✓					
60		WRT-6	7-31-85		✓	✓	✓					
70		WRT-7	7-31-85		✓	✓	✓					
80		WRT-6 DUP	7-31-85		✓	✓	✓					
90		FIELD BLANK	7-31-85		✓	✓	✓					
100		RFW-6	7-31-85		✓	✓	✓					
110		RFW-7	7-30-85		✓	✓	✓					
120		RFW-1	8-1-85		✓	✓	✓					
130		RFW-2	8-1-85		✓	✓	✓					
140		LISA LAKE #28	8-1-85		✓	✓	✓					
150		LISA LAKE #124	8-1-85		✓	✓	✓					
160		WELL #13	8-1-85		✓	✓	✓					
170		WELL #11	8-1-85		✓	✓	✓					

SPECIAL INSTRUCTIONS:

CONTAINERS - VOA 2-40 ML GLASS
OIL + GREASE 1 L. AMBER / H_2SO_4
TOC AMBER / H_2SO_4

Items/Reason	Relinquished By	Received By	Date	Time	Items/Reason	Relinquished By	Received By	Date	Time
Samples	Thomas A. Drew	[illegible signature]	8/2/85	1000					

AR30106

Assigned to _____ Client _____ Client Contact _____ Phone _____ RFW Contact WAKIAN Date Due _____ Project Number 0628-05-50

SAMPLE IDENTIFICATION / **ANALYSES REQUESTED**

Sample No.	Client ID No.	Description	Date Collected	Container/Preservative	ANALYSES REQUESTED
0420		LISA LAKE #28	8-1-85	}	SOLUBLE As, Ba, Cd, Cr, Pb, Hg, Se, Ag
150		LISA LAKE #124	8-1-85	}	NO_3-NO_2, FLUORIDE, PESTICIDES, HERBICIDES, COLIFORM BACTERIA, TURBIDITY (DRINKING WATER DETECTION LIMITS) on Pesticides, Herbicides & Metals

SPECIAL INSTRUCTIONS: DRINKING WATER DETECTION LIMITS

CONTAINERS: SOL. METALS - 1ℓ. PLASTIC/HNO_3
NO_3-NO_2 250 mL PLASTIC/H_2SO_4
PESTICIDES 2-1ℓ. AMBER
HERBICIDES 2-1ℓ. AMBER
BACTERIA 250mL PLASTIC
FL, TURB. 1ℓ. PLASTIC

Items/Reason	Relinquished By	Received By	Date	Time	Items/Reason	Relinquished By	Received By	Date	Time
Samples	Thomas Dunlop		8/6/85	1000					

WESTON — Custody Transfer Rec[illegible] / Lab Work Request

Received By: _____ Client: _____ RFW Contact: _____

Date: 7/27/92 Client Contact: _____ Date Due: _____

Assigned to: _____ Phone: _____ Project Number: _____

SAMPLE IDENTIFICATION — ANALYSES REQUESTED

Sample No.	Client No.	Description	Date Collected	Container/Preservative	VOA 10						

SPECIAL INSTRUCTIONS:

AR301064

Items/Qty	Relinquished By	Received By	Date	Time	Items/Reason	Relinquished By	Received By	Date	Time

RFW 10/23 2/86

DOCUMENTATION FOR
DUPLICATE SAMPLES
SENT TO USAF OEHL/SA
BROOKS AFB, TX

TO USAF

CHAIN OF CUSTODY RECORD

SAMPLERS: (Signature) Marian R. Dzedzy
Phone: 215-692-3030 x412

SHIP TO:
USAF OEHL / SA
Bldg 140
Brooks AFB TX 78235

ATTENTION:
Phone No.

SHIPPING INFORMATION

Location: Olmstead AFB, Harrisburg PA
Shipper: Marian Dzedzy
Address: Roy F. Weston Inc
West Chester PA 19350
Date Shipped: 12-21-84
Shipment Service:
Airbill No.:
Cooler No.: 1 of 3

Relinquished by: (Signature)	Received by: (Signature)	Date/Time
Marian R. Dzedzy		
Relinquished by: (Signature)	Received by: (Signature)	Date/Time
Relinquished by: (Signature)	Received by: (Signature)	Date/Time
Relinquished by: (Signature)	Received for laboratory by: (Signature)	Date/Time

Analysis laboratory should complete "sample cond. upon receipt" section below, sign and return copy to Shipper

Sample Number	No. Of Cont.	Site Identification	Date Sampled	Analysis Requested	Sample Cond. Upon Recei
001	1	D-1	12-18-84	EP Toxicity Corrosivity Ignitibility	
002	1	D-8	12-18-84	EP Toxicity Corrosivity Ignitibility	
003	4	SW-1	12-18-84	Oil+grease, VOA, TOC	
004	4	SW-2	12-18-84	Oil+grease, VOA, TOC	
005	2	Sediment #1	12-18-84	Oil+grease, VOA	

AR301066

Remarks:
Please return paint cans + coolers to Eric Brown at Weston.

White - Sampler Canary - Return Copy to Shipper Pink - Lab Copy

TO USAF

CHAIN OF CUSTODY RECORD

IS: (Signature) Marian R. Dzedzy
one: 215-692-3030 x412

IP TO:
USAF OEHL / SA
Bldg 140
Brooks AFB TX 78235

TENTION:
one No.

SHIPPING INFORMATION

Location Olmstead AFB, Harrisburg PA
Shipper Marian Dzedzy
Address Roy F. Weston Inc
West Chester PA 19350
Date Shipped 12-21-84
Shipment Service
Airbill No.
Cooler No. 1 of 3

linquished by: (Signature)	Received by: (Signature)	Date/Time
Marian R. Dzedzy		
linquished by: (Signature)	Received by: (Signature)	Date/Time
linquished by: (Signature)	Received by: (Signature)	Date/Time
linquished by: (Signature)	Received for laboratory by: (Signature)	Date/Time

Analysis laboratory should complete "sample cond. upon receipt" section below, sign and return copy to Shipper

	No. Of Cont.	Site Identification	Date Sampled	Analysis Requested	Sample Cond. Upon Receipt
201	1	D-1	12-18-84	EP Toxicity Corrosivity Ignitibility	
202	1	D-8	12-18-84	EP Toxicity Corrosivity Ignitibility	
203	4	SW-1	12-18-84	Oil+grease, VOA, TOC	
204	4	SW-2	12-18-84	Oil+grease, VOA, TOC	
205	2	Sediment #1	12-18-84	Oil+grease, VOA	

AR301067

emarks:
Please return paint cans + coolers to Eric Brown at Weston.

White - Sampler | Canary - Return Copy to Shipper | Pink - Lab Copy

ENVIRONMENTAL SAMPLING DATA

(Use this space for mechanical imprint)

CHEM. ABB ONLY

SAMPLING SITE IDENTIFIER (APR 19-7): 002

BASE WHERE SAMPLE COLLECTED: Olmstead AFB

SAMPLING SITE DESCRIPTION: Meade Heights - Drum 8

DATE COLLECTION BEGAN (YYMMDD): 18 4 1 1 2 1 8

TIME COLLECTION BEGAN (24 hour clock):

COLLECTION METHOD: [X] GRAB [ ] COMPOSITE _____ HOURS

MAIL REPORTS TO (circle if changed)
- ORIGINAL: Lt. Col. R. Lombard, HQ USAF/SGES, Bolling AFB DC 20332
- COPY 1: WESTON, Weston Way West Chester PA 19380 attn Fred Bopp
- COPY 2:

SAMPLE COLLECTED BY (Name, Grade, AFSC): Marian Dzedzy (WESTON)

SIGNATURE: Marian R. Dzedzy

AUTOVON:

REASON FOR SUBMISSION: D

A-ACCIDENT/INCIDENT R-ROUTINE/PERIODIC C-COMPLAINT N-NPDES F-FOLLOWUP/CLEANUP O-OTHER (specify) IRP Phase II

BASE SAMPLE NUMBER: GC84D002

CHEM. NO.

ANALYSES REQUESTED (check appropriate blocks)

GROUP A		Hardness	00900	Residue, Settleable	50086	GROUP T	
Ammonia	00610	Iron	01045	Residue, Volatile	00505	Bromoform	32104
Chemical Oxygen Demand	00340	Lead	01051	Silica	00955	Bromodichloromethane	32101
Kjeldahl Nitrogen	00625	Magnesium	00927	Specific Conductance	00095	Carbon Tetrachloride	32102
Nitrate	00620	Manganese	01055	Sulfate	00945	Chloroform	32106
Nitrite	00615	Mercury	71900	Sulfite	00740	Chloromethane	34418
Oil & Grease	00560	Nickel	01067	Surfactants -MBAS	38260	Dibromochloromethane	32105
Organic Carbon	00680	Potassium	00937	Turbidity	00076	Methylene Chloride	34423
Orthophosphate	00671	Selenium	01147			Tetrachloroethylene	34475
Phosphorus, Total	00665	Silver	01077			1,1,1-Trichloroethane	34506
		Sodium	00929	GROUP H		Trichloroethylene	39180
GROUP D		Thallium	01059	BHC Isomers	39340	Trihalomethanes	82080
Cyanide, Total	00720	Zinc	01092	Chlordane	39350	PCBs	39516
Cyanide, Free	00722			DDT Isomers	39370	X EP Toxicity	
				Dieldrin	39380	X Corrosivity	
GROUP E		GROUP G		Endrin	39390	X Ignitability	
Phenols	32730	Acidity, Total	70508	Heptachlor	39410		
		Alkalinity, Total	00410	Heptachlor Epoxide	39420		
GROUP F		Alkalinity, Bicarbonate	00425	Lindane	39782		
Antimony	01097	Bromide	71870	Methoxychlor	39480		
Arsenic	01002	Carbon Dioxide	00405	Toxaphene	39400		
Barium	01007	Chloride	00940	2,4-D	39730	ON SITE ANALYSES	
Beryllium	01012	Color	00080	2,4,5-TP-Silvex	39760	Parameter	Value
Boron	01022	Fluoride	00951	2,4,5-T	39740	Flow 50050	mgd
Cadmium	01027	Iodide	71865			Chlorine, Total 50060	mg/l
Calcium	00916	Odor	00086			Dissolved Oxygen 00300	mg/l
Chromium, Total	01034	Residue, Total	00500			pH 00400	units
Chromium VI	01032	Residue, Filterable (TDS)	70300	GROUP J		Temperature 00010	°C
Copper	01042	Residue, Nonfilterable	00530	Sulfides	00745		

COMMENTS

AR301068

AF FORM JAN 81 2752

ENVIRONMENTAL SAMPLING DATA

(Use this space for mechanical imprint)

CONTRACTOR ONLY

SAMPLING SITE IDENTIFIER (AFR 19-7): 003

BASE WHERE SAMPLE COLLECTED: Olmstead AFB

SAMPLING SITE DESCRIPTION: Meade Heights - Surface Water Location 1

DATE COLLECTION BEGAN (YYMMDD): 18 04 12 18

TIME COLLECTION BEGAN (24 hour clock):

COLLECTION METHOD: [X] GRAB [ ] COMPOSITE _____ HOURS

MAIL REPORTS TO (circle if changed)
- ORIGINAL: Lt Col R Lombard HQ USAF/SGES Bolling AFB DC 20332
- COPY 1: Weston, Weston Way West Chester PA 19380 Attn Fred Boppe
- COPY 2:

SAMPLE COLLECTED BY (Name, Grade, AFSC): Marian Dzedzy (WESTON)

SIGNATURE: Marian R. Dzedzy

AUTOVON:

REASON FOR SUBMISSION: C

A-ACCIDENT/INCIDENT R-ROUTINE/PERIODIC C-COMPLAINT N-NPDES F-FOLLOWUP/CLEANUP O-OTHER (specify): IRP Phase II

BASE SAMPLE NUMBER: G N 84 0003

ORIG. PTD.

ANALYSES REQUESTED (check appropriate blocks)

GROUP A						GROUP T	
Ammonia	00610	Hardness	00900	Residue, Settleable	50086	Bromoform	32104
Chemical Oxygen Demand	00340	Iron	01045	Residue, Volatile	00505	Bromodichloromethane	32101
Kjeldahl Nitrogen	00625	Lead	01051	Silica	00955	Carbon Tetrachloride	32102
Nitrate	00620	Magnesium	00927	Specific Conductance	00095	Chloroform	32106
Nitrite	00615	Manganese	01055	Sulfate	00945	Chloromethane	34418
X Oil & Grease	00560	Mercury	71900	Sulfite	00740	Dibromochloromethane	32105
ganic Carbon	00680	Nickel	01067	Surfactants -MBAS	38260	Methylene Chloride	34423
Orthophosphate	00671	Potassium	00937	Turbidity	00076	Tetrachloroethylene	34475
Phosphorus, Total	00665	Selenium	01147			1,1,1-Trichloroethane	34506
		Silver	01077			Trichloroethylene	39180
GROUP D		Sodium	00929	GROUP H		Trihalomethanes	82080
Cyanide, Total	00720	Thallium	01059	BHC Isomers	39340	PCBs	39516
Cyanide, Free	00722	Zinc	01092	Chlordane	39350	X Volatile Organic Compounds	
				DDT Isomers	39370		
GROUP E		GROUP G		Dieldrin	39380		
Phenols	32730	Acidity, Total	70508	Endrin	39390		
		Alkalinity, Total	00410	Heptachlor	39410		
GROUP F		Alkalinity, Bicarbonate	00425	Heptachlor Epoxide	39420		
Antimony	01097	Bromide	71870	Lindane	39782		
Arsenic	01002	Carbon Dioxide	00405	Methoxychlor	39480		
Barium	01007	Chloride	00940	Toxaphene	39400		
Beryllium	01012	Color	00080	2,4-D	39730	ON SITE ANALYSES	
Boron	01022	Fluoride	00951	2,4,5-TP-Silvex	39760	Parameter / Value	
Cadmium	01027	Iodide	71865	2,4,5-T	39740	Flow 50050	mgd
Calcium	00916	Odor	00086			Chlorine, Total 50060	mg/l
Chromium, Total	01034	Residue, Total	00500			Dissolved Oxygen 00300	mg/l
Chromium VI	01032	Residue, Filterable (TDS)	70300	GROUP J		pH 00400	units
pper	01042	Residue, Nonfilterable	00530	Sulfides	00745	Temperature 00010	°C

MENTS

AF FORM JAN 81 2752

AR301069

ENVIRONMENTAL SAMPLING DATA

Use this space for mechanical imprint

OPNL USE ONLY

SAMPLING SITE IDENTIFIER (AFR 19-7): 004

BASE WHERE SAMPLE COLLECTED: Olmstead AFB

SAMPLING SITE DESCRIPTION: Meade Heights - Surface Water Location 2

DATE COLLECTION BEGAN (YYMMDD): 8 4 1 2 1 8

TIME COLLECTION BEGAN (24 hour clock):

COLLECTION METHOD: ☒ GRAB ☐ COMPOSITE _____ HOURS

MAIL REPORTS TO (circle if changed)
ORIGINAL: Lt. Col. R. Lombard. HQ USAF/SGE3 Bolling AFB DC 20332
COPY 1: WESTON, Weston Way, West Chester PA 19380 attn Fred Bapp
COPY 2:

SAMPLE COLLECTED BY (Name, Grade, AFSC): M. Dzedzy (WESTON)

SIGNATURE: Maria R. Dzedzy

AUTOVON:

REASON FOR SUBMISSION: O
A-ACCIDENT/INCIDENT R-ROUTINE/PERIODIC C-COMPLAINT N-NPDES F-FOLLOWUP/CLEANUP O-OTHER (specify) Phase II (IRP)

BASE SAMPLE NUMBER: GN84 0004

OPNL PID:

ANALYSES REQUESTED (check appropriate blocks)

GROUP A		Hardness	00900	Residue, Settleable	50086	GROUP T	
Ammonia	00610	Iron	01045	Residue, Volatile	00505	Bromoform	32104
Chemical Oxygen Demand	00340	Lead	01051	Silica	00955	Bromodichloromethane	32101
Kjeldahl Nitrogen	00625	Magnesium	00927	Specific Conductance	00095	Carbon Tetrachloride	32102
Nitrate	00620	Manganese	01055	Sulfate	00945	Chloroform	32106
Nitrite	00615	Mercury	71900	Sulfite	00740	Chloromethane	34418
Oil & Grease	00560	Nickel	01067	Surfactants -MBAS	38260	Dibromochloromethane	32105
Organic Carbon	00680	Potassium	00937	Turbidity	00076	Methylene Chloride	34423
Orthophosphate	00671	Selenium	01147			Tetrachloroethylene	34475
Phosphorus, Total	00665	Silver	01077			1,1,1-Trichloroethane	34506
		Sodium	00929	GROUP H		Trichloroethylene	39180
GROUP D		Thallium	01059	BHC Isomers	39340	Trihalomethanes	82080
Cyanide, Total	00720	Zinc	01092	Chlordane	39350	PCBs	39516
Cyanide, Free	00722			DDT Isomers	39370	X Volatile Organic Compounds	
				Dieldrin	39380		
GROUP E		GROUP G		Endrin	39390		
Phenols	32730	Acidity, Total	70508	Heptachlor	39410		
		Alkalinity, Total	00410	Heptachlor Epoxide	39420		
GROUP F		Alkalinity, Bicarbonate	00425	Lindane	39782		
Antimony	01097	Bromide	71870	Methoxychlor	39480		
Arsenic	01002	Carbon Dioxide	00405	Toxaphene	39400		
Barium	01007	Chloride	00940	2,4-D	39730	ON SITE ANALYSES	
Beryllium	01012	Color	00080	2,4,5-TP-Silvex	39760	Parameter	Value
Boron	01022	Fluoride	00951	2,4,5-T	39740	Flow 50050	mgd
Cadmium	01027	Iodide	71865			Chlorine, Total 50060	mg/l
Calcium	00916	Odor	00086			Dissolved Oxygen 00300	mg/l
Chromium, Total	01034	Residue, Total	00500			pH 00400	units
Chromium VI	01032	Residue, Filterable (TDS)	70300	GROUP J		Temperature 00010	°C
Copper	01042	Residue, Nonfilterable	00530	Sulfides	00745		

COMMENTS

AR301070

AF FORM JAN 81 2752

TO USAF

WESTON ENVIRONMENTAL CONSULTANTS

CHAIN OF CUSTODY RECORD

..ERS: (Signature) Marian R. Dzedzy

Phone: 215-692-3030 X412

SHIP TO:
USAF OEHL/SA
Bldg 140
Brooks AFB TX 78235

ATTENTION:

Phone No.

SHIPPING INFORMATION

Location Olmstead AFB, Harrisburg PA

Shipper Marian Dzedzy

Address Roy F. Weston Inc.
West Chester PA 19350

Date Shipped 12-21-84

Shipment Service

Airbill No.

Cooler No. 2 of 3

Relinquished by: (Signature)	Received by: (Signature)	Date/Time
Marian R. Dzedzy		
Relinquished by: (Signature)	Received by: (Signature)	Date/Time
...nquished by: (Signature)	Received by: (Signature)	Date/Time
Relinquished by: (Signature)	Received for laboratory by: (Signature)	Date/Time

Analysis laboratory should complete "sample cond. upon receipt" section below, sign and return copy to Shipper

...le ...er	No. Of Cont.	Site Identification	Date Sampled	Analysis Requested	Sample Cond. Upon Receipt
006	1	D-2	12-18-84	EP Toxicity, Corrosivity, Ignitibility	
007	1	D-5	12-18-84		
008	1	D-6	12-18-84		
009	1	D-3	12-19-84		
010	1	D-4	12-19-84		
011	1	D-9	12-19-84		

AR301071

Remarks:

Please return paint cans + coolers to Eric Brown at Weston.

White - Sampler Canary - Return Copy to Shipper Pink - Lab Copy

ENVIRONMENTAL SAMPLING DATA

(Use this space for mechanical imprint)

SAMPLING SITE IDENTIFIER (AFR 19-7): 005

BASE WHERE SAMPLE COLLECTED: Olmstead AFB

SAMPLING SITE DESCRIPTION: Meade Heights - Sediment Location 1

DATE COLLECTION BEGAN (YYMMDD): 18 41 12 1 8

TIME COLLECTION BEGAN (24 hour clock):

COLLECTION METHOD: [X] GRAB [ ] COMPOSITE _____ HOURS

MAIL REPORTS TO (circle if changed)
- ORIGINAL: Lt. Col. K. Lombard HQ USAF/SGES Bolling AFB DC 20332
- COPY 1: WESTON, Weston Way, West Chester PA 19380 attn F. Boyle
- COPY 2:

SAMPLE COLLECTED BY (Name, Grade, AFSC): M. Dzedzy

SIGNATURE: Marian R. Dzedzy

AUTOVON:

REASON FOR SUBMISSION: O

A-ACCIDENT/INCIDENT R-ROUTINE/PERIODIC C-COMPLAINT N-NPDES F-FOLLOWUP/CLEANUP O-OTHER (specify) IRP Phase II

BASE SAMPLE NUMBER: GS 84 0005

ANALYSES REQUESTED (check appropriate blocks)

GROUP A		GROUP A		GROUP A		GROUP T	
Ammonia	00610	Hardness	00900	Residue, Settleable	50086	Bromoform	32104
Chemical Oxygen Demand	00340	Iron	01045	Residue, Volatile	00505	Bromodichloromethane	32101
Kjeldahl Nitrogen	00625	Lead	01051	Silica	00955	Carbon Tetrachloride	32102
Nitrate	00620	Magnesium	00927	Specific Conductance	00095	Chloroform	32106
Nitrite	00615	Manganese	01055	Sulfate	00945	Chloromethane	34418
Oil & Grease	00560	Mercury	71900	Sulfite	00740	Dibromochloromethane	32105
Organic Carbon	00680	Nickel	01067	Surfactants -MBAS	38260	Methylene Chloride	34423
Orthophosphate	00671	Potassium	00937	Turbidity	00076	Tetrachloroethylene	34475
Phosphorus, Total	00665	Selenium	01147			1,1,1-Trichloroethane	34506
		Silver	01077			Trichloroethylene	39180
GROUP D		Sodium	00929	GROUP H		Trihalomethanes	82080
Cyanide, Total	00720	Thallium	01059	BHC Isomers	39340	PCBs	39516
Cyanide, Free	00722	Zinc	01092	Chlordane	39350	X Volatile Organics Compounds	
				DDT Isomers	39370		
GROUP E		GROUP G		Dieldrin	39380		
Phenols	32730	Acidity, Total	70508	Endrin	39390		
		Alkalinity, Total	00410	Heptachlor	39410		
GROUP F		Alkalinity, Bicarbonate	00425	Heptachlor Epoxide	39420		
Antimony	01097	Bromide	71870	Lindane	39782		
Arsenic	01002	Carbon Dioxide	00405	Methoxychlor	39480		
Barium	01007	Chloride	00940	Toxaphene	39400		
Beryllium	01012	Color	00080	2,4-D	39730	ON SITE ANALYSES	
Boron	01022	Fluoride	00951	2,4,5-TP-Silvex	39760	Parameter	Value
Cadmium	01027	Iodide	71865	2,4,5-T	39740	Flow 50050	mgd
Calcium	00916	Odor	00086			Chlorine, Total 50060	mg/l
Chromium, Total	01034	Residue, Total	00500			Dissolved Oxygen 00300	mg/l
Chromium VI	01032	Residue, Filterable (TDS)	70300	GROUP J		pH 00400	units
	01042	Residue, Nonfilterable	00530	Sulfides	00745	Temperature 00010	°C

MOST AMENTS

AR301072

AF FORM JAN 81 2752

ENVIRONMENTAL SAMPLING DATA

(Use this space for mechanical imprint)

SAMPLING SITE IDENTIFIER (AFR 19-7): 007

BASE WHERE SAMPLE COLLECTED: Olmstead AFB

SAMPLING SITE DESCRIPTION: Meade Heights - Drum 5

DATE COLLECTION BEGAN (YYMMDD): 8,4,1,2,1,8

TIME COLLECTION BEGAN (24 hour clock):

COLLECTION METHOD: [X] GRAB [ ] COMPOSITE _____ HOURS

MAIL REPORTS TO (circle if changed)
- ORIGINAL: Lt. Col R. Lombard, HQ USAF/SGES, Bolling AFB DC 20332
- COPY 1: WESTON, Weston Way, West Chester PA 19380 attn Fred Bopp
- COPY 2:

SAMPLE COLLECTED BY (Name, Grade, AFSC): M. Dreadzy (WESTON)

SIGNATURE: Marvin R. Dreadzy

AUTOVON:

REASON FOR SUBMISSION: O

A-ACCIDENT/INCIDENT R-ROUTINE/PERIODIC C-COMPLAINT N-NPDES F-FOLLOWUP/CLEANUP O-OTHER (specify): IRP Phase II

BASE SAMPLE NUMBER: GC84 0007

ANALYSES REQUESTED (check appropriate blocks)

GROUP A		GROUP B		GROUP C		GROUP T	
Ammonia	00610	Hardness	00900	Residue, Settleable	50086	Bromoform	32104
Chemical Oxygen Demand	00340	Iron	01045	Residue, Volatile	00505	Bromodichloromethane	32101
Kjeldahl Nitrogen	00625	Lead	01051	Silica	00955	Carbon Tetrachloride	32102
Nitrate	00620	Magnesium	00927	Specific Conductance	00095	Chloroform	32106
Nitrite	00615	Manganese	01055	Sulfate	00945	Chloromethane	34418
Oil & Grease	00560	Mercury	71900	Sulfite	00740	Dibromochloromethane	32105
Organic Carbon	00680	Nickel	01067	Surfactants -MBAS	38260	Methylene Chloride	34423
Orthophosphate	00671	Potassium	00937	Turbidity	00076	Tetrachloroethylene	34475
Phosphorus, Total	00665	Selenium	01147			1,1,1-Trichloroethane	34506
		Silver	01077			Trichloroethylene	39180
GROUP D		Sodium	00929	GROUP H		Trihalomethanes	82080
Cyanide, Total	00720	Thallium	01059	BHC Isomers	39340	PCBs	39516
Cyanide, Free	00722	Zinc	01092	Chlordane	39350	X EP Toxicity	
				DDT Isomers	39370	X Corrosivity	
GROUP E		GROUP G		Dieldrin	39380	X Ignitibility	
Phenols	32730	Acidity, Total	70508	Endrin	39390		
		Alkalinity, Total	00410	Heptachlor	39410		
GROUP F		Alkalinity, Bicarbonate	00425	Heptachlor Epoxide	39420		
Antimony	01097	Bromide	71870	Lindane	39782		
Arsenic	01002	Carbon Dioxide	00405	Methoxychlor	39480		
Barium	01007	Chloride	00940	Toxaphene	39400		
Beryllium	01012	Color	00080	2,4-D	39730	ON SITE ANALYSES	
Boron	01022	Fluoride	00951	2,4,5-TP-Silvex	39760	Parameter	Value
Cadmium	01027	Iodide	71865	2,4,5-T	39740	Flow 50050	mgd
Calcium	00916	Odor	00086			Chlorine, Total 50060	mg/l
Chromium, Total	01034	Residue, Total	00500			Dissolved Oxygen 00300	mg/l
Chromium VI	01032	Residue, Filterable (TDS)	70300	GROUP J		pH 00400	units
Copper	01042	Residue, Nonfilterable	00530	Sulfides	00745	Temperature 00010	°C

COMMENTS

AR301073

AF FORM JAN 81 2752

ENVIRONMENTAL SAMPLING DATA

(Use this space for mechanical imprint)

CHECK HERE ONLY IF

SAMPLING SITE IDENTIFIER (AFR 19-7): 996

BASE WHERE SAMPLE COLLECTED: Olmstead AFB

SAMPLING SITE DESCRIPTION: Meade Heights - Drum 2

DATE COLLECTION BEGAN (YYMMDD): 18.4 11 2 1, 8

TIME COLLECTION BEGAN (24 hour clock):

COLLECTION METHOD: [X] GRAB [ ] COMPOSITE _____ HOURS

MAIL REPORTS TO (circle if changed)
- ORIGINAL: Lt. Col. R. Lombard, HQ USAF/SGES, Bolling AFB DC 20332
- COPY 1: WESTON, Weston Way, West Chester PA 19380 attn F. Bopp
- COPY 2:

SAMPLE COLLECTED BY (Name, Grade, AFSC): M. Dzedzy (WESTON)

SIGNATURE: Marian R. Dzedzy

AUTOVON:

REASON FOR SUBMISSION: [X] C — A-ACCIDENT/INCIDENT, R-ROUTINE/PERIODIC, C-COMPLAINT, N-NPDES, F-FOLLOWUP/CLEANUP, O-OTHER (specify) IRP Phase II

BASE SAMPLE NUMBER: GS 84 0006

OEHL PID:

ANALYSES REQUESTED (check appropriate blocks)

GROUP A		Hardness	00900	Residue, Settleable	50086	GROUP T	
Ammonia	00610	Iron	01045	Residue, Volatile	00505	Bromoform	32104
Chemical Oxygen Demand	00340	Lead	01051	Silica	00955	Bromodichloromethane	32101
Kjeldahl Nitrogen	00625	Magnesium	00927	Specific Conductance	00095	Carbon Tetrachloride	32102
Nitrate	00620	Manganese	01055	Sulfate	00945	Chloroform	32106
Nitrite	00615	Mercury	71900	Sulfite	00740	Chloromethane	34418
Oil & Grease	00560	Nickel	01067	Surfactants -MBAS	38260	Dibromochloromethane	32105
Organic Carbon	00680	Potassium	00937	Turbidity	00076	Methylene Chloride	34423
Orthophosphate	00671	Selenium	01147			Tetrachloroethylene	34475
Phosphorus, Total	00665	Silver	01077			1,1,1-Trichloroethane	34506
		Sodium	00929	GROUP H		Trichloroethylene	39180
GROUP D		Thallium	01059	BHC Isomers	39340	Trihalomethanes	82080
Cyanide, Total	00720	Zinc	01092	Chlordane	39350	PCBs	39516
Cyanide, Free	00722			DDT Isomers	39370	[X] EP Toxicity	
				Dieldrin	39380	[X] Corrosivity	
GROUP E		GROUP G		Endrin	39390	[X] Ignitability	
Phenols	32730	Acidity, Total	70508	Heptachlor	39410		
		Alkalinity, Total	00410	Heptachlor Epoxide	39420		
GROUP F		Alkalinity, Bicarbonate	00425	Lindane	39782		
Antimony	01097	Bromide	71870	Methoxychlor	39480		
Arsenic	01002	Carbon Dioxide	00405	Toxaphene	39400		
Barium	01007	Chloride	00940	2,4-D	39730	ON SITE ANALYSES	
Beryllium	01012	Color	00080	2,4,5-TP-Silvex	39760	Parameter	Value
Boron	01022	Fluoride	00951	2,4,5-T	39740	Flow 50050	mgd
Cadmium	01027	Iodide	71865			Chlorine, Total 50060	mg/l
Calcium	00916	Odor	00086			Dissolved Oxygen 00300	mg/l
Chromium, Total	01034	Residue, Total	00500			pH 00400	units
Chromium VI	01032	Residue, Filterable (TDS)	70300	GROUP J		Temperature 00010	°C
Copper	01042	Residue, Nonfilterable	00530	Sulfides	00745		

COMMENTS

AR301074

AF FORM JAN 81 2752

ENVIRONMENTAL SAMPLING DATA

(Use this space for mechanical imprint)

SAMPLING SITE IDENTIFIER (AFR 19-7): dd9

BASE WHERE SAMPLE COLLECTED: Olmstead AFB

SAMPLING SITE DESCRIPTION: Meade Heights - Drum 3

DATE COLLECTION BEGAN (YYMMDD): 18 | 11 | 2 | 1 | 9 |

TIME COLLECTION BEGAN (24 hour clock):

COLLECTION METHOD: [X] GRAB [ ] COMPOSITE _____ HOURS

MAIL REPORTS TO (circle if changed)
- ORIGINAL: Lt.Col R. Lombard, HQ USAF/SGES Bolling AFB DC 20332
- COPY 1: WESTON, Weston Way West Chester PA 19380 attn Fred Boyo
- COPY 2:

SAMPLE COLLECTED BY (Name, Grade, AFSC): M. Dzedzy (WESTON)

SIGNATURE: Marian R. Dzedzy

AUTOVON:

REASON FOR SUBMISSION: C

A-ACCIDENT/INCIDENT R-ROUTINE/PERIODIC C-COMPLAINT N-NPDES F-FOLLOWUP/CLEANUP O-OTHER (specify): IRP Phase II

BASE SAMPLE NUMBER: G J 8 4 0009

OEHL USE ONLY

ANALYSES REQUESTED (check appropriate blocks)

GROUP A		Hardness	00900	Residue, Settleable	50086	GROUP T	
Ammonia	00610	Iron	01045	Residue, Volatile	00505	Bromoform	32104
Chemical Oxygen Demand	00340	Lead	01051	Silica	00955	Bromodichloromethane	32101
Kjeldahl Nitrogen	00625	Magnesium	00927	Specific Conductance	00095	Carbon Tetrachloride	32102
Nitrate	00620	Manganese	01055	Sulfate	00945	Chloroform	32106
Nitrite	00615	Mercury	71900	Sulfite	00740	Chloromethane	34418
Oil & Grease	00560	Nickel	01067	Surfactants -MBAS	38260	Dibromochloromethane	32105
rganic Carbon	00680	Potassium	00937	Turbidity	00076	Methylene Chloride	34423
Orthophosphate	00671	Selenium	01147			Tetrachloroethylene	34475
Phosphorus, Total	00665	Silver	01077			1,1,1-Trichloroethane	34506
		Sodium	00929	GROUP H		Trichloroethylene	39180
GROUP D		Thallium	01059	BHC Isomers	39340	Trihalomethanes	82080
Cyanide, Total	00720	Zinc	01092	Chlordane	39350	PCBs	39516
Cyanide, Free	00722			DDT Isomers	39370	X EP Toxicity	
				Dieldrin	39380	X Corrosivity	
GROUP E		GROUP G		Endrin	39390	X Ignitibility	
Phenols	32730	Acidity, Total	70508	Heptachlor	39410		
		Alkalinity, Total	00410	Heptachlor Epoxide	39420		
GROUP F		Alkalinity, Bicarbonate	00425	Lindane	39782		
Antimony	01097	Bromide	71870	Methoxychlor	39480		
Arsenic	01002	Carbon Dioxide	00405	Toxaphene	39400		
Barium	01007	Chloride	00940	2,4-D	39730	ON SITE ANALYSES	
Beryllium	01012	Color	00080	2,4,5-TP-Silvex	39760	Parameter	Value
Boron	01022	Fluoride	00951	2,4,5-T	39740	Flow 50050	mgd
Cadmium	01027	Iodide	71865			Chlorine, Total 50060	mg/l
Calcium	00916	Odor	00086			Dissolved Oxygen 00300	mg/l
Chromium, Total	01034	Residue, Total	00500			pH 00400	units
Chromium VI	01032	Residue, Filterable (TDS)	70300	GROUP J		Temperature 00010	°C
Copper	01042	Residue, Nonfilterable	00530	Sulfides	00745		

COMMENTS

AR301075

AF FORM JAN 81 2752

ENVIRONMENTAL SAMPLING DATA

(Use this space for mechanical imprint)

CHECK HERE ONLY IF CORRECTING ERROR

SAMPLING SITE IDENTIFIER (AFR 19-7): 008

BASE WHERE SAMPLE COLLECTED: Olmstead AFB

SAMPLING SITE DESCRIPTION: Meade Heights - Drum 6

DATE COLLECTION BEGAN (YYMMDD): 18 41 12 18

TIME COLLECTION BEGAN (24 hour clock):

COLLECTION METHOD: [X] GRAB [ ] COMPOSITE _____ HOURS

MAIL REPORTS TO (circle if changed)
- ORIGINAL: Lt. Col. R. Lombard, HQ USAF/SGES, Bolling AFB DC 20332
- COPY 1: WESTON, Weston Way, West Chester PA 19380 attn Fred Borp
- COPY 2:

SAMPLE COLLECTED BY (Name, Grade, AFSC): M. Dredzun (WESTON)

SIGNATURE: Marian R. Dredzun

AUTOVON:

REASON FOR SUBMISSION: C

A-ACCIDENT/INCIDENT R-ROUTINE/PERIODIC C-COMPLAINT N-NPDES F-FOLLOWUP/CLEANUP O-OTHER (specify) IRP Phase II

BASE SAMPLE NUMBER: GC 84 0008

OEHL FID:

ANALYSES REQUESTED (check appropriate blocks)

GROUP A		GROUP A		GROUP A		GROUP T	
Ammonia	00610	Hardness	00900	Residue, Settleable	50086	Bromoform	32104
Chemical Oxygen Demand	00340	Iron	01045	Residue, Volatile	00505	Bromodichloromethane	32101
Kjeldahl Nitrogen	00625	Lead	01051	Silica	00955	Carbon Tetrachloride	32102
Nitrate	00620	Magnesium	00927	Specific Conductance	00095	Chloroform	32106
Nitrite	00615	Manganese	01055	Sulfate	00945	Chloromethane	34418
Oil & Grease	00560	Mercury	71900	Sulfite	00740	Dibromochloromethane	32105
Organic Carbon	00680	Nickel	01067	Surfactants -MBAS	38260	Methylene Chloride	34423
Orthophosphate	00671	Potassium	00937	Turbidity	00076	Tetrachloroethylene	34475
Phosphorus, Total	00665	Selenium	01147			1,1,1-Trichloroethane	34506
		Silver	01077			Trichloroethylene	39180
GROUP D		Sodium	00929	GROUP H		Trihalomethanes	82080
Cyanide, Total	00720	Thallium	01059	BHC Isomers	39340	PCBs	39516
Cyanide, Free	00722	Zinc	01092	Chlordane	39350	X EP Toxicity	
				DDT Isomers	39370	X Corrosivity	
GROUP E		GROUP G		Dieldrin	39380	X Ignitability	
Phenols	32730	Acidity, Total	70508	Endrin	39390		
		Alkalinity, Total	00410	Heptachlor	39410		
GROUP F		Alkalinity, Bicarbonate	00425	Heptachlor Epoxide	39420		
Antimony	01097	Bromide	71870	Lindane	39782		
Arsenic	01002	Carbon Dioxide	00405	Methoxychlor	39480		
Barium	01007	Chloride	00940	Toxaphene	39400		
Beryllium	01012	Color	00080	2,4-D	39730	ON SITE ANALYSES	
Boron	01022	Fluoride	00951	2,4,5-TP-Silvex	39760	Parameter	Value
Cadmium	01027	Iodide	71865	2,4,5-T	39740	Flow 50050	mgd
Calcium	00916	Odor	00086			Chlorine, Total 50060	mg/l
Chromium, Total	01034	Residue, Total	00500			Dissolved Oxygen 00300	mg/l
Chromium VI	01032	Residue, Filterable (TDS)	70300	GROUP J		pH 00400	units
Copper	01042	Residue, Nonfilterable	00530	Sulfides	00745	Temperature 00010	°C

COMMENTS

AR301078

AF FORM JAN 81 2752

ENVIRONMENTAL SAMPLING DATA

(Use this space for mechanical imprint)

OEHL USE ONLY

SAMPLING SITE IDENTIFIER (AFR 19-7): 911

BASE WHERE SAMPLE COLLECTED: Olmstead AFB

SAMPLING SITE DESCRIPTION: Meade Heights - Drum 9

DATE COLLECTION BEGAN (YYMMDD): 840129

TIME COLLECTION BEGAN (24 hour clock):

COLLECTION METHOD: [X] GRAB [ ] COMPOSITE _____ HOURS

MAIL REPORTS TO (circle if changed)
ORIGINAL: Lt Col R. Lambard, HQ USAF/SGCS, Bolling AFB DC 20332
COPY 1: WESTON, Weston Way West Chester PA 19380 attn Fred Bapp
COPY 2:

SAMPLE COLLECTED BY (Name, Grade, AFSC): M. Dzedzy (WESTON)

SIGNATURE: Marian R. Dzedzy

AUTOVON:

REASON FOR SUBMISSION: C
A-ACCIDENT/INCIDENT R-ROUTINE/PERIODIC C-COMPLAINT N-NPDES F-FOLLOWUP/CLEANUP O-OTHER (specify): IRP Phase II

BASE SAMPLE NUMBER: GG84 0911C

OEHL PID:

ANALYSES REQUESTED (check appropriate blocks)

GROUP A		Hardness 00900		Residue, Settleable 50086		GROUP T	
Ammonia	00610	Iron	01045	Residue, Volatile	00505	Bromoform	32104
Chemical Oxygen Demand	00340	Lead	01051	Silica	00955	Bromodichloromethane	32101
Kjeldahl Nitrogen	00625	Magnesium	00927	Specific Conductance	00095	Carbon Tetrachloride	32102
Nitrate	00620	Manganese	01055	Sulfate	00945	Chloroform	32106
Nitrite	00615	Mercury	71900	Sulfite	00740	Chloromethane	34418
Oil & Grease	00560	Nickel	01067	Surfactants -MBAS	38260	Dibromochloromethane	32105
rganic Carbon	00680	Potassium	00937	Turbidity	00076	Methylene Chloride	34423
Orthophosphate	00671	Selenium	01147			Tetrachloroethylene	34475
Phosphorus, Total	00665	Silver	01077			1,1,1-Trichloroethane	34506
		Sodium	00929	GROUP H		Trichloroethylene	39180
GROUP D		Thallium	01059	BHC Isomers	39340	Trihalomethanes	82080
Cyanide, Total	00720	Zinc	01092	Chlordane	39350	PCBs	39516
Cyanide, Free	00722			DDT Isomers	39370	[X] EP Toxicity	
				Dieldrin	39380	[X] Corrosivity	
GROUP E		GROUP G		Endrin	39390	[X] Ignitability	
Phenols	32730	Acidity, Total	70508	Heptachlor	39410		
		Alkalinity, Total	00410	Heptachlor Epoxide	39420		
GROUP F		Alkalinity, Bicarbonate	00425	Lindane	39782		
Antimony	01097	Bromide	71870	Methoxychlor	39480		
Arsenic	01002	Carbon Dioxide	00405	Toxaphene	39400		
Barium	01007	Chloride	00940	2,4-D	39730	ON SITE ANALYSES	
Beryllium	01012	Color	00080	2,4,5-TP-Silvex	39760	Parameter	Value
Boron	01022	Fluoride	00951	2,4,5-T	39740	Flow 50050	mgd
Cadmium	01027	Iodide	71865			Chlorine, Total 50060	mg/l
Calcium	00916	Odor	00086			Dissolved Oxygen 00300	mg/l
Chromium, Total	01034	Residue, Total	00500			pH 00400	units
Chromium VI	01032	Residue, Filterable (TDS)	70300	GROUP J		Temperature 00010	°C
Copper	01042	Residue, Nonfilterable	00530	Sulfides	00745		

COMMENTS

AR301077

AF FORM JAN 81 2752

ENVIRONMENTAL SAMPLING DATA

(Use this space for mechanical imprint)

SAMPLING SITE IDENTIFIER (AFR 19-7): 010

BASE WHERE SAMPLE COLLECTED: Olmstead AFB

SAMPLING SITE DESCRIPTION: Meade Heights - Drum 4

DATE COLLECTION BEGAN (YYMMDD): 18,4,1,2,1,9

TIME COLLECTION BEGAN (24 hour clock):

COLLECTION METHOD: ☒ GRAB ☐ COMPOSITE _____ HOURS

MAIL REPORTS TO (circle if changed)
- ORIGINAL: Lt. Col. R. Lombard, HQ USAF/SGES, Bolling AFB DC 20332
- COPY 1: WESTON, Weston Way, West Chester PA 19380 attn Fred Sopp
- COPY 2:

SAMPLE COLLECTED BY (Name, Grade, AFSC): M. Dzedzy (WESTON)

SIGNATURE: Marian R. Dzedzy

AUTOVON:

REASON FOR SUBMISSION: C — A-ACCIDENT/INCIDENT, R-ROUTINE/PERIODIC, C-COMPLAINT, N-NPDES, F-FOLLOWUP/CLEANUP, O-OTHER (specify) IRP Phase II

BASE SAMPLE NUMBER: GC84 0010

ANALYSES REQUESTED (check appropriate blocks)

GROUP A		GROUP B		GROUP C		GROUP T	
Ammonia	00610	Hardness	00900	Residue, Settleable	50086	Bromoform	32104
Chemical Oxygen Demand	00340	Iron	01045	Residue, Volatile	00505	Bromodichloromethane	32101
Kjeldahl Nitrogen	00625	Lead	01051	Silica	00955	Carbon Tetrachloride	32102
Nitrate	00620	Magnesium	00927	Specific Conductance	00095	Chloroform	32106
Nitrite	00615	Manganese	01055	Sulfate	00945	Chloromethane	34418
Oil & Grease	00560	Mercury	71900	Sulfite	00740	Dibromochloromethane	32105
Organic Carbon	00680	Nickel	01067	Surfactants -MBAS	38260	Methylene Chloride	34423
Orthophosphate	00671	Potassium	00937	Turbidity	00076	Tetrachloroethylene	34475
Phosphorus, Total	00665	Selenium	01147			1,1,1-Trichloroethane	34506
		Silver	01077			Trichloroethylene	39180
GROUP D		Sodium	00929	GROUP H		Trihalomethanes	82080
Cyanide, Total	00720	Thallium	01059	BHC Isomers	39340	PCBs	39516
Cyanide, Free	00722	Zinc	01092	Chlordane	39350		
				DDT Isomers	39370	X EP Toxicity	
				Dieldrin	39380	X Corrosivity	
GROUP E		GROUP G		Endrin	39390	X Ignitability	
Phenols	32730	Acidity, Total	70508	Heptachlor	39410		
		Alkalinity, Total	00410	Heptachlor Epoxide	39420		
GROUP F		Alkalinity, Bicarbonate	00425	Lindane	39782		
Antimony	01097	Bromide	71870	Methoxychlor	39480		
Arsenic	01002	Carbon Dioxide	00405	Toxaphene	39400		
Barium	01007	Chloride	00940	2,4-D	39730	ON SITE ANALYSES	
Beryllium	01012	Color	00080	2,4,5-TP-Silvex	39760	Parameter	Value
Boron	01022	Fluoride	00951	2,4,5-T	39740	Flow 50050	mgd
Cadmium	01027	Iodide	71865			Chlorine, Total 50060	mg/l
Calcium	00916	Odor	00086			Dissolved Oxygen 00300	mg/l
Chromium, Total	01034	Residue, Total	00500			pH 00400	units
Chromium VI	01032	Residue, Filterable (TDS)	70300	GROUP J		Temperature 00010	°C
Copper	01042	Residue, Nonfilterable	00530	Sulfides	00745		

COMMENTS

AR301078

AF FORM JAN 81 2752

ENVIRONMENTAL SAMPLING DATA

(Use this space for mechanical imprint)

SAMPLING SITE IDENTIFIER (AFR 19-7): 012

BASE WHERE SAMPLE COLLECTED: Olmstead AFB

SAMPLING SITE DESCRIPTION: Meade Heights - Soil beneath drums

DATE COLLECTION BEGAN (YYMMDD): 891121

TIME COLLECTION BEGAN (24 hour clock): 1019

COLLECTION METHOD: [X] GRAB [ ] COMPOSITE _____ HOURS

MAIL REPORTS TO (circle if changed)
ORIGINAL: Lt. Col. R. Lombard HQ USAF/SGES Bolling AFB DC 20332
COPY 1: WESTON, Weston Way, West Chester PA 19380 attn F. Zapp
COPY 2:

SAMPLE COLLECTED BY (Name, Grade, AFSC): M. Dzelny (WESTON)

SIGNATURE: Marian R. Dzelny

AUTOVON:

REASON FOR SUBMISSION: C

A-ACCIDENT/INCIDENT R-ROUTINE/PERIODIC C-COMPLAINT N-NPDES F-FOLLOWUP/CLEANUP O-OTHER (specify): IRP Phase II

BASE SAMPLE NUMBER: GS 84 0012

ANALYSES REQUESTED (check appropriate blocks)

GROUP A		Hardness 00900		Residue, Settleable 50086	GROUP T
Ammonia 00610		Iron 01045		Residue, Volatile 00505	Bromoform 32104
Chemical Oxygen Demand 00340		Lead 01051		Silica 00955	Bromodichloromethane 32101
Kjeldahl Nitrogen 00625		Magnesium 00927		Specific Conductance 00095	Carbon Tetrachloride 32102
Nitrate 00620		Manganese 01055		Sulfate 00945	Chloroform 32106
Nitrite 00615		Mercury 71900		Sulfite 00740	Chloromethane 34418
Oil & Grease 00560		Nickel 01067		Surfactants -MBAS 38260	Dibromochloromethane 32105
Organic Carbon 00680		Potassium 00937		Turbidity 00076	Methylene Chloride 34423
Orthophosphate 00671		Selenium 01147			Tetrachloroethylene 34475
Phosphorus, Total 00665		Silver 01077			1,1,1-Trichloroethane 34506
		Sodium 00929	GROUP H		Trichloroethylene 39180
GROUP D		Thallium 01059		BHC Isomers 39340	Trihalomethanes 82080
Cyanide, Total 00720		Zinc 01092		Chlordane 39350	PCBs 39516
Cyanide, Free 00722				DDT Isomers 39370	X EP Toxicity
				Dieldrin 39380	X Corrosivity
GROUP E		GROUP G		Endrin 39390	X Ignitibility
Phenols 32730		Acidity, Total 70508		Heptachlor 39410	
		Alkalinity, Total 00410		Heptachlor Epoxide 39420	
GROUP F		Alkalinity, Bicarbonate 00425		Lindane 39782	
Antimony 01097		Bromide 71870		Methoxychlor 39480	
Arsenic 01002		Carbon Dioxide 00405		Toxaphene 39400	
Barium 01007		Chloride 00940		2,4-D 39730	ON SITE ANALYSES
Beryllium 01012		Color 00080		2,4,5-TP-Silvex 39760	Parameter / Value
Boron 01022		Fluoride 00951		2,4,5-T 39740	Flow 50050 mgd
Cadmium 01027		Iodide 71865			Chlorine, Total 50060 mg/l
Calcium 00916		Odor 00086			Dissolved Oxygen 00300 mg/l
Chromium, Total 01034		Residue, Total 00500			pH 00400 units
Chromium VI 01032		Residue, Filterable (TDS) 70300	GROUP J		Temperature 00010 °C
Copper 01042		Residue, Nonfilterable 00530		Sulfides 00745	

COMMENTS

AR301079

AF FORM JAN 81 2752

TO USAF

WESTON DESIGNERS & CONSULTANTS

CHAIN OF CUSTODY RECORD

SAMPLERS: (Signature) Marian R. Dzedzy

Phone: 315-692-3030 x412

SHIP TO:
USAF OEHL/SA
Bldg 140
Brooks AFB TX 78235

ATTENTION:

Phone No.:

SHIPPING INFORMATION

Location Olmstead AFB, Harrisburg PA

Shipper Marian Dzedzy

Address Roy F. Weston Inc
West Chester PA 19380

Date Shipped 12-21-84

Shipment Service

Airbill No.

Cooler No. 3 of 3

Relinquished by: (Signature)	Received by: (Signature)	Date/Time
Marian R. Dzedzy		
Relinquished by: (Signature)	Received by: (Signature)	Date/Time
Relinquished by: (Signature)	Received by: (Signature)	Date/Time
Relinquished by: (Signature)	Received for laboratory by: (Signature)	Date/Time

Analysis laboratory should complete "sample cond. upon receipt" section below, sign and return copy to Shipper

Sample No.	No. Of Cont.	Site Identification	Date Sampled	Analysis Requested	Sample Cond. Upon Receipt
C12	1	Soil beneath drums	12-19-84	EP Toxicity, Corrosivity, Ignitability	
C13	1	Freehaul test pit composite	12-19-84	EP Toxicity, Corrosivity, Ignitability	

AR301080

Remarks:

Please return paint cans + coolers to Eric Brown at Weston.

White - Sampler | Canary - Return Copy to Shipper | Pink - Lab Copy

ENVIRONMENTAL SAMPLING DATA

(Use this space for mechanical imprint)

OEHL USE ONLY

SAMPLING SITE IDENTIFIER (AFR 19-7): PG 014

BASE WHERE SAMPLE COLLECTED: Wurtsmith AFB

SAMPLING SITE DESCRIPTION: WRT-1

DATE COLLECTION BEGAN (YYMMDD): 850117

TIME COLLECTION BEGAN (24 hour clock): 1300

COLLECTION METHOD: [X] GRAB [ ] COMPOSITE _____ HOURS

MAIL REPORTS TO (circle if changed)
- ORIGINAL: Lt.Col K. Lombard, HQ USAF/SGES Bolling AFB DC 20332
- COPY 1: RFI Team, Weston Way, West Chester PA 19380 Attn: Fred Roth
- COPY 2:

SAMPLE COLLECTED BY (Name, Grade, AFSC): T. Tedani

SIGNATURE: [signature]

AUTOVON:

REASON FOR SUBMISSION: F — A-ACCIDENT/INCIDENT, R-ROUTINE/PERIODIC, C-COMPLAINT, N-NPDES, F-FOLLOWUP/CLEANUP, O-OTHER (specify) IRP Phase II

BASE SAMPLE NUMBER: GP 85 0014

OEHL PID:

ANALYSES REQUESTED (check appropriate blocks)

GROUP A		Hardness	00900
Ammonia	00610	Iron	01045
Chemical Oxygen Demand	00340	Lead	01051
Kjeldahl Nitrogen	00625	Magnesium	00927
Nitrate	00620	Manganese	01055
Nitrite	00615	Mercury	71900
X Oil & Grease	00560	Nickel	01067
Organic Carbon	00680	Potassium	00937
Orthophosphate	00671	Selenium	01147
Phosphorus, Total	00665	Silver	01077
		Sodium	00929
GROUP D		Thallium	01059
Cyanide, Total	00720	Zinc	01092
Cyanide, Free	00722		
GROUP E		GROUP G	
Phenols	32730	Acidity, Total	70508
		Alkalinity, Total	00410
GROUP F		Alkalinity, Bicarbonate	00425
Antimony	01097	Bromide	71870
Arsenic	01002	Carbon Dioxide	00405
Barium	01007	Chloride	00940
Beryllium	01012	Color	00080
Boron	01022	Fluoride	00951
Cadmium	01027	Iodide	71865
Calcium	00916	Odor	00086
Chromium, Total	01034	Residue, Total	00500
Chromium VI	01032	Residue, Filterable (TDS)	70300
Copper	01042	Residue, Nonfilterable	00530

		Residue, Settleable	50086
		Residue, Volatile	00505
		Silica	00955
		Specific Conductance	00095
		Sulfate	00945
		Sulfite	00740
		Surfactants -MBAS	38260
		Turbidity	00076
GROUP H			
BHC Isomers	39340		
Chlordane	39350		
DDT Isomers	39370		
Dieldrin	39380		
Endrin	39390		
Heptachlor	39410		
Heptachlor Epoxide	39420		
Lindane	39782		
Methoxychlor	39480		
Toxaphene	39400		
2,4-D	39730		
2,4,5-TP-Silvex	39760		
2,4,5-T	39740		
GROUP J			
Sulfides	00745		

GROUP T	
Bromoform	32104
Bromodichloromethane	32101
Carbon Tetrachloride	32102
Chloroform	32106
Chloromethane	34418
Dibromochloromethane	32105
Methylene Chloride	34423
Tetrachloroethylene	34475
1,1,1-Trichloroethane	34506
Trichloroethylene	39180
Trihalomethanes	82080
PCBs	39516
X Volatile Organics (EPA list 624)	

ON SITE ANALYSES

Parameter		Value
Flow	50050	mgd
Chlorine, Total	50060	mg/l
Dissolved Oxygen	00300	mg/l
pH	00400	5.75 units
Temperature	00010	1.0 °C

See Continuation Sheet

COMMENTS

AR300408

AF FORM 2752 JAN 81

ENVIRONMENTAL SAMPLING DATA

(Use this space for mechanical imprint)

SAMPLING SITE IDENTIFIER (AFR 19-7): 013

BASE WHERE SAMPLE COLLECTED: Olmstead AFB

SAMPLING SITE DESCRIPTION: North Base Landfill Freshwater truck lot test pit composite

DATE COLLECTION BEGAN (YYMMDD): 18 11 12 1 9

TIME COLLECTION BEGAN (24 hour clock):

COLLECTION METHOD: [X] GRAB [ ] COMPOSITE _____ HOURS

MAIL REPORTS TO (circle if changed)
ORIGINAL: Lt. Col. R. Lombard HQUSAF/SGES Bolling AFB DC 20332
COPY 1: WESTON, Weston Way West Chester, PA 19380 attn Fred Boyd
COPY 2:

SAMPLE COLLECTED BY (Name, Grade, AFSC): M. Dzedzy (WESTON)

SIGNATURE: Marian R. Dzedzy

AUTOVON:

REASON FOR SUBMISSION: O

A-ACCIDENT/INCIDENT R-ROUTINE/PERIODIC C-COMPLAINT N-NPDES F-FOLLOWUP/CLEANUP O-OTHER (specify) IRP Phase II

BASE SAMPLE NUMBER: GS84 0013

DSDL PID:

ANALYSES REQUESTED (check appropriate blocks)

GROUP A		GROUP D		GROUP E		GROUP F		GROUP G		GROUP H		GROUP J		GROUP T.	
Ammonia	00610	Cyanide, Total	00720	Phenols	32730	Antimony	01097	Acidity, Total	70508	BHC Isomers	39340	Sulfides	00745	Bromoform	32104
Chemical Oxygen Demand	00340	Cyanide, Free	00722			Arsenic	01002	Alkalinity, Total	00410	Chlordane	39350			Bromodichloromethane	32101
Kjeldahl Nitrogen	00625					Barium	01007	Alkalinity, Bicarbonate	00425	DDT Isomers	39370			Carbon Tetrachloride	32102
Nitrate	00620					Beryllium	01012	Bromide	71870	Dieldrin	39380			Chloroform	32106
Nitrite	00615					Boron	01022	Carbon Dioxide	00405	Endrin	39390			Chloromethane	34418
Oil & Grease	00560					Cadmium	01027	Chloride	00940	Heptachlor	39410			Dibromochloromethane	32105
rganic Carbon	00680					Calcium	00916	Color	00080	Heptachlor Epoxide	39420			Methylene Chloride	34423
Orthophosphate	00671					Chromium, Total	01034	Fluoride	00951	Lindane	39782			Tetrachloroethylene	34475
Phosphorus, Total	00665					Chromium VI	01032	Iodide	71865	Methoxychlor	39480			1,1,1-Trichloroethane	34506
						Copper	01042	Odor	00086	Toxaphene	39400			Trichloroethylene	39180
								Residue, Total	00500	2,4-D	39730			Trihalomethanes	82080
								Residue, Filterable (TDS)	70300	2,4,5-TP-Silvex	39760			PCBs	39516
								Residue, Nonfilterable	00530	2,4,5-T	39740			X EP Toxicity	
														X Corrosivity	
														X Ignitibility	

ON SITE ANALYSES

Parameter		Value
Flow	50050	mgd
Chlorine, Total	50060	mg/l
Dissolved Oxygen	00300	mg/l
pH	00400	units
Temperature	00010	°C

COMMENTS

AR301082

AF FORM JAN 81 2752

U.S. GOVERNMENT PRINTING OFFICE: 1982—366-677

ENVIRONMENTAL SAMPLING DATA

OEHL USE ONLY

(Use this space for mechanical imprint)

SAMPLING SITE IDENTIFIER (AFR 19-7): 8 6 0 1 6

BASE WHERE SAMPLE COLLECTED: OLMSTED AFB

SAMPLING SITE DESCRIPTION: Well WRT-3

DATE COLLECTION BEGAN (YYMMDD): 8 5 0 1 7

TIME COLLECTION BEGAN (24 hour clock): 1 3 0

COLLECTION METHOD: [X] GRAB [ ] COMPOSITE _____ HOURS

MAIL REPORTS TO (circle if changed)
ORIGINAL: Lt. Col. R. Lombard HQ USAF/SGES, Bolling AFB DC 20332
COPY 1: R.F. Weston, Weston Way, West Chester, PA 19380 Attn: Fred Bopp
COPY 2:

SAMPLE COLLECTED BY (Name, Grade, AFSC): T. Terrell

SIGNATURE: Judith M. Terrell

AUTOVON:

REASON FOR SUBMISSION: A-ACCIDENT/INCIDENT R-ROUTINE/PERIODIC C-COMPLAINT N-NPDES F-FOLLOWUP/CLEANUP O-OTHER (specify) IRP PHASE II

BASE SAMPLE NUMBER: 6 P 8 5 0 0 1 6

OEHL PID:

ANALYSES REQUESTED (check appropriate blocks)

	GROUP A							GROUP T
	Ammonia	00610	Hardness	00900	Residue, Settleable	50086		Bromoform 32104
	Chemical Oxygen Demand	00340	Iron	01045	Residue, Volatile	00505		Bromodichloromethane 32101
	Kjeldahl Nitrogen	00625	Lead	01051	Silica	00955		Carbon Tetrachloride 32102
	Nitrate	00620	Magnesium	00927	Specific Conductance	00095		Chloroform 32106
	Nitrite	00615	Manganese	01055	Sulfate	00945		Chloromethane 34418
X	Oil & Grease	00560	Mercury	71900	Sulfite	00740		Dibromochloromethane 32105
X	Organic Carbon	00680	Nickel	01067	Surfactants -MBAS	38260		Methylene Chloride 34423
	Orthophosphate	00671	Potassium	00937	Turbidity	00076		Tetrachloroethylene 34475
	Phosphorus, Total	00665	Selenium	01147				1,1,1-Trichloroethane 34506
			Silver	01077				Trichloroethylene 39180
	GROUP D		Sodium	00929	GROUP H			Trihalomethanes 82080
	Cyanide, Total	00720	Thallium	01059	BHC Isomers	39340		PCBs 39516
	Cyanide, Free	00722	Zinc	01092	Chlordane	39350	X	Volatile Organic Analysis (EPA 601, 602)
					DDT Isomers	39370		
	GROUP E		GROUP G		Dieldrin	39380		
	Phenols	32730	Acidity, Total	70508	Endrin	39390		
			Alkalinity, Total	00410	Heptachlor	39410		
	GROUP F		Alkalinity, Bicarbonate	00425	Heptachlor Epoxide	39420		
	Antimony	01097	Bromide	71870	Lindane	39782		
	Arsenic	01002	Carbon Dioxide	00405	Methoxychlor	39480		
	Barium	01007	Chloride	00940	Toxaphene	39400		
	Beryllium	01012	Color	00080	2,4-D	39730		
	Boron	01022	Fluoride	00951	2,4,5-TP-Silvex	39760		
	Cadmium	01027	Iodide	71865	2,4,5-T	39740		
	Calcium	00916	Odor	00086				
	Chromium, Total	01034	Residue, Total	00500				
	Chromium VI	01032	Residue, Filterable (TDS)	70300	GROUP J			
	Copper	01042	Residue, Nonfilterable	00530	Sulfides	00745		

ON SITE ANALYSES

Parameter		Value
Flow	50050	mgd
Chlorine, Total	50060	mg/l
Dissolved Oxygen	00300	mg/l
pH	00400	5.9 units
Temperature	00010	14 °C
Specific Conductance		916 umhos

COMMENTS

AR300083

U.S. GOVERNMENT PRINTING OFFICE: 1982—366-677

ENVIRONMENTAL SAMPLING DATA

GEMS USE ONLY

(Use this space for mechanical imprint)

SAMPLING SITE IDENTIFIER (APR 19-7): P6 015

BASE WHERE SAMPLE COLLECTED: QUONSET AFB

SAMPLING SITE DESCRIPTION: Well WRT-2

DATE COLLECTION BEGAN (YYMMDD): 850703

TIME COLLECTION BEGAN (24 hour clock): 1430

COLLECTION METHOD: [X] GRAB [ ] COMPOSITE _____ HOURS

MAIL REPORTS TO (circle if changed)
ORIGINAL: Lt. Col. R. Lombard HQ USAF/SGES, Bolling AFB DC 20332
COPY 1: RE Weston, Weston Way, West Chester, PA 19380 Attn Fred Bagg
COPY 2:

SAMPLE COLLECTED BY (Name, Grade, AFSC): T. Jerome

SIGNATURE:

AUTOVON:

REASON FOR SUBMISSION: A-ACCIDENT/INCIDENT R-ROUTINE/PERIODIC C-COMPLAINT N-NPDES F-FOLLOWUP/CLEANUP O-OTHER (specify) TRP PHASE II

BASE SAMPLE NUMBER: GP 85 0015

GEMS PID:

ANALYSES REQUESTED (check appropriate blocks)

	GROUP A		GROUP D		GROUP E		GROUP F		GROUP G		GROUP H		GROUP J		GROUP T
	Ammonia 00610		Cyanide, Total 00720		Phenols 32730		Antimony 01097		Acidity, Total 70508		BHC Isomers 39340		Residue, Settleable 50086		Bromoform 32104
	Chemical Oxygen Demand 00340		Cyanide, Free 00722				Arsenic 01002		Alkalinity, Total 00410		Chlordane 39350		Residue, Volatile 00505		Bromodichloromethane 32101
	Kjeidahl Nitrogen 00625						Barium 01007		Alkalinity, Bicarbonate 00425		DDT Isomers 39370		Silica 00955		Carbon Tetrachloride 32102
	Nitrate 00620						Beryllium 01012		Bromide 71870		Dieldrin 39380		Specific Conductance 00095		Chloroform 32106
	Nitrite 00615						Boron 01022		Carbon Dioxide 00405		Endrin 39390		Sulfate 00945		Chloromethane 34418
X	Oil & Grease 00560						Cadmium 01027		Chloride 00940		Heptachlor 39410		Sulfite 00740		Dibromochloromethane 32105
X	Organic Carbon 00680						Calcium 00916		Color 00080		Heptachlor Epoxide 39420		Surfactants -MBAS 38260		Methylene Chloride 34423
	Orthophosphate 00671						Chromium, Total 01034		Fluoride 00951		Lindane 39782		Turbidity 00076		Tetrachloroethylene 34475
	Phosphorus, Total 00665						Chromium VI 01032		Iodide 71865		Methoxychlor 39480				1,1,1-Trichloroethane 34506
							Copper 01042		Odor 00086		Toxaphene 39400				Trichloroethylene 39180
									Residue, Total 00500		2,4-D 39730				Trihalomethanes 82080
									Residue, Filterable (TDS) 70300		2,4,5-TP-Silvex 39760				PCBs 39516
									Residue, Nonfilterable 00530		2,4,5-T 39740				X Volatile Organic Analysis (EPA 601, 602)

ON SITE ANALYSES

Parameter		Value
Flow	50050	mgd
Chlorine, Total	50060	mg/l
Dissolved Oxygen	00300	mg/l
pH	00400	5.3 units
Temperature	00010	12 °C
Spec. Conductance		144 umhos

COMMENTS

AR301084

U.S. GOVERNMENT PRINTING OFFICE: 1982—366-677

ENVIRONMENTAL SAMPLING DATA

OEHL USE ONLY

(Use this space for mechanical imprint)

SAMPLING SITE IDENTIFIER (AFR 19-7): P G 0 1 8

BASE WHERE SAMPLE COLLECTED: OLMSTED AFB

SAMPLING SITE DESCRIPTION: Well MLT-5

DATE COLLECTION BEGAN (YYMMDD): 8 5 0 7 3 1

TIME COLLECTION BEGAN (24 hour clock):

COLLECTION METHOD: [X] GRAB [ ] COMPOSITE _____ HOURS

MAIL REPORTS TO (circle if changed)
ORIGINAL: Lt. Col. R. Lenhard HQ USAFE/SGES, Bolling AFB DC 20332
COPY 1: RE Johnston, Western Way West Chester, PA 19380 Attn Fred Bagg
COPY 2:

SAMPLE COLLECTED BY (Name, Grade, AFSC): J. Jerman

SIGNATURE:

AUTOVON:

REASON FOR SUBMISSION: A-ACCIDENT/INCIDENT R-ROUTINE/PERIODIC C-COMPLAINT N-NPDES F-FOLLOWUP/CLEANUP X-OTHER (specify) TRP PHASE II

BASE SAMPLE NUMBER: G P 8 5 0 0 1 8

OEHL PID:

ANALYSES REQUESTED (check appropriate blocks)

	GROUP A		GROUP D		GROUP E		GROUP F		GROUP G		GROUP H		GROUP J		GROUP T
	Ammonia 00610		Cyanide, Total 00720		Phenols 32730		Antimony 01097		Acidity, Total 70508		BHC Isomers 39340		Residue, Settleable 50086		Bromoform 32104
	Chemical Oxygen Demand 00340		Cyanide, Free 00719				Arsenic 01002		Alkalinity, Total 00410		Chlordane 39350		Residue, Volatile 00505		Bromodichloromethane 32101
	Kjeldahl Nitrogen 00625						Barium 01007		Alkalinity, Bicarbonate 00425		DDT Isomers 39370		Silica 00955		Carbon Tetrachloride 32102
	Nitrate 00620						Beryllium 01012		Bromide 71870		Dieldrin 39380		Specific Conductance 00095		Chloroform 32106
	Nitrite 00615						Boron 01022		Carbon Dioxide 00405		Endrin 39390		Sulfate 00945		Chloromethane 34418
X	Oil & Grease 00560						Cadmium 01027		Chloride 00940		Heptachlor 39410		Sulfite 00740		Dibromochloromethane 32105
X	Organic Carbon 00680						Calcium 00916		Color 00080		Heptachlor Epoxide 39420		Surfactants -MBAS 38260		Methylene Chloride 34423
	Orthophosphate 00671						Chromium, Total 01034		Fluoride 00951		Lindane 39782		Turbidity 00076		Tetrachloroethylene 34475
	Phosphorus, Total 00665						Chromium VI 01032		Iodide 71865		Methoxychlor 39480				1,1,1-Trichloroethane 34506
							Copper 01042		Odor 00086		Toxaphene 39400				Trichloroethylene 39180
									Residue, Total 00500		2,4-D 39730				Trihalomethanes 82080
									Residue, Filterable (TDS) 70300		2,4,5-TP-Silvex 39760				PCBs 39516
									Residue, Nonfilterable 00530		2,4,5-T 39740				X Volatile Organic Analysis (EPA 601, 602)

ON SITE ANALYSES

Parameter		Value
Flow	50050	mgd
Chlorine, Total	50060	mg/l
Dissolved Oxygen	00300	mg/l
pH	00400	5.32 units
Temperature	00010	8 °C
Spec. Cond.		76 umhos

COMMENTS

AR301085

AR301085

U.S. GOVERNMENT PRINTING OFFICE: 1982—366-677

ENVIRONMENTAL SAMPLING DATA

(Use this space for mechanical imprint)

SAMPLING SITE IDENTIFIER (AFR 19-7): P 6 0 1 7

BASE WHERE SAMPLE COLLECTED: OLMSTED AFB

SAMPLING SITE DESCRIPTION: Well WRT-4

DATE COLLECTION BEGAN (YYMMDD): 8 5 0 7 3 0

TIME COLLECTION BEGAN (24 hour clock):

COLLECTION METHOD: [X] GRAB [ ] COMPOSITE _____ HOURS

MAIL REPORTS TO (circle if changed)
ORIGINAL: Lt. Col. R. Lombard HQ USAF/SGES, Bolling AFB DC 20332
COPY 1: RE Weston, Weston Way, West Chester, PA 19380 Attn Fred Bagg
COPY 2:

SAMPLE COLLECTED BY (Name, Grade, AFSC): J. Jarosz

SIGNATURE:

AUTOVON:

REASON FOR SUBMISSION: A-ACCIDENT/INCIDENT R-ROUTINE/PERIODIC C-COMPLAINT N-NPDES F-FOLLOWUP/CLEANUP O-OTHER (specify) IRP PHASE II

BASE SAMPLE NUMBER: G P 8 5 0 0 1 7

OEHL P/D:

ANALYSES REQUESTED (check appropriate blocks)

	GROUP A		Hardness	00900		Residue, Settleable	50086		GROUP T	
	Ammonia	00610	Iron	01045		Residue, Volatile	00505		Bromoform	32104
	Chemical Oxygen Demand	00340	Lead	01051		Silica	00955		Bromodichloromethane	32101
	Kjeldahl Nitrogen	00625	Magnesium	00927		Specific Conductance	00095		Carbon Tetrachloride	32102
	Nitrate	00620	Manganese	01055		Sulfate	00945		Chloroform	32106
	Nitrite	00615	Mercury	71900		Sulfite	00740		Chloromethane	34418
X	Oil & Grease	00560	Nickel	01067		Surfactants -MBAS	38260		Dibromochloromethane	32105
X	Organic Carbon	00680	Potassium	00937		Turbidity	00076		Methylene Chloride	34423
	Orthophosphate	00671	Selenium	01147					Tetrachloroethylene	34475
	Phosphorus, Total	00665	Silver	01077					1,1,1-Trichloroethane	34506
			Sodium	00929		GROUP H			Trichloroethylene	39180
	GROUP D		Thallium	01059		BHC Isomers	39340		Trihalomethanes	82080
	Cyanide, Total	00720	Zinc	01092		Chlordane	39350		PCBs	39516
	Cyanide, Free	00722				DDT Isomers	39370	X	Volatile Organic Analysis (EPA 601, 602)	
						Dieldrin	39380			
	GROUP E		GROUP G			Endrin	39390			
	Phenols	32730	Acidity, Total	70508		Heptachlor	39410			
			Alkalinity, Total	00410		Heptachlor Epoxide	39420			
	GROUP F		Alkalinity, Bicarbonate	00425		Lindane	39782			
	Antimony	01097	Bromide	71870		Methoxychlor	39480			
	Arsenic	01002	Carbon Dioxide	00405		Toxaphene	39400			
	Barium	01007	Chloride	00940		2,4-D	39730		ON SITE ANALYSES	
	Beryllium	01012	Color	00080		2,4,5-TP-Silvex	39760		Parameter	Value
	Boron	01022	Fluoride	00951		2,4,5-T	39740		Flow 50050	mgd
	Cadmium	01027	Iodide	71865					Chlorine, Total 50060	mg/l
	Calcium	00916	Odor	00086					Dissolved Oxygen 00300	mg/l
	Chromium, Total	01034	Residue, Total	00500					pH 00400	5.4 units
	Chromium VI	01032	Residue, Filterable (TDS)	70300		GROUP J			Temperature 00010	12 °C
	Copper	01042	Residue, Nonfilterable	00530		Sulfides	00745		Specific Conductance Tot umhos	

COMMENTS

AR301086

AR301086

U.S. GOVERNMENT PRINTING OFFICE: 1982—366-677

ENVIRONMENTAL SAMPLING DATA

(Use this space for mechanical imprint)

GEN. USE ONLY

SAMPLING SITE IDENTIFIER (AFR 19-7): P6 0 20

BASE WHERE SAMPLE COLLECTED: OLMSTED AFB

SAMPLING SITE DESCRIPTION: Well WRT-7

DATE COLLECTION BEGAN (YYMMDD): 8 5 0 7 3 1

TIME COLLECTION BEGAN (24 hour clock):

COLLECTION METHOD: [X] GRAB [ ] COMPOSITE _____ HOURS

MAIL REPORTS TO (circle if changed)
ORIGINAL: Lt. Col. R. Lenard HQ USAF/SGES, Bolling AFB DC 20332
COPY 1: RF Weston, Western Way West Chester, PA 19380 Attn Fred Bopp
COPY 2:

SAMPLE COLLECTED BY (Name, Grade, AFSC): J. Jones

SIGNATURE:

AUTOVON:

REASON FOR SUBMISSION: [X] A-ACCIDENT/INCIDENT R-ROUTINE/PERIODIC C-COMPLAINT N-NPDES F-FOLLOWUP/CLEANUP O-OTHER (specify) IRP PHASE II

BASE SAMPLE NUMBER: GP 85 0020

GEN. USE

ANALYSES REQUESTED (check appropriate blocks)

	GROUP A		Hardness	00900		Residue, Settleable	50086		GROUP T
	Ammonia	00610	Iron	01045		Residue, Volatile	00505		Bromoform 32104
	Chemical Oxygen Demand	00340	Lead	01051		Silica	00955		Bromodichloromethane 32101
	Kjeldahl Nitrogen	00625	Magnesium	00927		Specific Conductance	00095		Carbon Tetrachloride 32102
	Nitrate	00620	Manganese	01055		Sulfate	00945		Chloroform 32106
	Nitrite	00615	Mercury	71900		Sulfite	00740		Chloromethane 34418
X	Oil & Grease	00560	Nickel	01067		Surfactants -MBAS	38260		Dibromochloromethane 32105
X	Organic Carbon	00680	Potassium	00937		Turbidity	00076		Methylene Chloride 34423
	Orthophosphate	00671	Selenium	01147					Tetrachloroethylene 34475
	Phosphorus, Total	00665	Silver	01077					1,1,1-Trichloroethane 34506
			Sodium	00929		GROUP H			Trichloroethylene 39180
	GROUP D		Thallium	01059		BHC Isomers	39340		Trihalomethanes 82080
	Cyanide, Total	00720	Zinc	01092		Chlordane	39350		PCBs 39516
	Cyanide, Free	00722				DDT Isomers	39370	X	Volatile Organic Analysis (EPA 601, 602)
						Dieldrin	39380		
	GROUP E		GROUP G			Endrin	39390		
	Phenols	32730	Acidity, Total	70508		Heptachlor	39410		
			Alkalinity, Total	00410		Heptachlor Epoxide	39420		
	GROUP F		Alkalinity, Bicarbonate	00425		Lindane	39782		
	Antimony	01097	Bromide	71870		Methoxychlor	39480		
	Arsenic	01002	Carbon Dioxide	00405		Toxaphene	39400		
	Barium	01007	Chloride	00940		2,4-D	39730		ON SITE ANALYSES
	Beryllium	01012	Color	00080		2,4,5-TP-Silvex	39760		Parameter / Value
	Boron	01022	Fluoride	00951		2,4,5-T	39740		Flow 50050 mgd
	Cadmium	01027	Iodide	71865					Chlorine, Total 50060 mg/l
	Calcium	00916	Odor	00086					Dissolved Oxygen 00300 mg/l
	Chromium, Total	01034	Residue, Total	00500					pH 00400 5.3 units
	Chromium VI	01032	Residue, Filterable (TDS)	70300		GROUP J			Temperature 00010 8 oC
	Copper	01042	Residue, Nonfilterable	00530		Sulfides	00745		Spec. Cond. Tmanhos

COMMENTS

8800108?

U.S. GOVERNMENT PRINTING OFFICE: 1982-366-677

ENVIRONMENTAL SAMPLING DATA

(Use this space for mechanical imprint)

OEHL USE ONLY

SAMPLING SITE IDENTIFIER (AFR 19-7): P6 019

BASE WHERE SAMPLE COLLECTED: OLMSTED AFB

SAMPLING SITE DESCRIPTION: Well WRT-6

DATE COLLECTION BEGAN (YYMMDD): 850731

TIME COLLECTION BEGAN (24 hour clock):

COLLECTION METHOD: [X] GRAB [ ] COMPOSITE _____ HOURS

MAIL REPORTS TO (circle if changed)
ORIGINAL: Lt. Col. R. Loveland HQ USAFSSEES, Bolling AFB DC 20332
COPY 1: RE Weston, Weston Way, West Chester, PA 19380 Attn Fred Bopp
COPY 2:

SAMPLE COLLECTED BY (Name, Grade, AFSC): J. Jerome

SIGNATURE:

AUTOVON:

REASON FOR SUBMISSION: A-ACCIDENT/INCIDENT R-ROUTINE/PERIODIC C-COMPLAINT N-NPDES F-FOLLOWUP/CLEANUP O-OTHER (specify) IRP PHASE II

BASE SAMPLE NUMBER: GP 85 0019

OEHL FID:

ANALYSES REQUESTED (check appropriate blocks)

	GROUP A		GROUP D		GROUP E		GROUP F
	Ammonia 00610		Cyanide, Total 00720		Phenols 32730		Antimony 01097
	Chemical Oxygen Demand 00340		Cyanide, Free 00722				Arsenic 01002
	Kjeldahl Nitrogen 00625						Barium 01007
	Nitrate 00620						Beryllium 01012
	Nitrite 00615						Boron 01022
X	Oil & Grease 00560						Cadmium 01027
X	Organic Carbon 00680						Calcium 00916
	Orthophosphate 00671						Chromium, Total 01034
	Phosphorus, Total 00665						Chromium VI 01032
							Copper 01042

			GROUP G		GROUP H		GROUP J
	Hardness 00900		Acidity, Total 70508		BHC Isomers 39340		Sulfides 00745
	Iron 01045		Alkalinity, Total 00410		Chlordane 39350		
	Lead 01051		Alkalinity, Bicarbonate 00425		DDT Isomers 39370		
	Magnesium 00927		Bromide 71870		Dieldrin 39380		
	Manganese 01055		Carbon Dioxide 00405		Endrin 39390		
	Mercury 71900		Chloride 00940		Heptachlor 39410		
	Nickel 01067		Color 00080		Heptachlor Epoxide 39420		
	Potassium 00937		Fluoride 00951		Lindane 39782		
	Selenium 01147		Iodide 71865		Methoxychlor 39480		
	Silver 01077		Odor 00086		Toxaphene 39400		
	Sodium 00929		Residue, Total 00500		2,4-D 39730		
	Thallium 01059		Residue, Filterable (TDS) 70300		2,4,5-TP-Silvex 39760		
	Zinc 01092		Residue, Nonfilterable 00530		2,4,5-T 39740		

				GROUP T
	Residue, Settleable 50086			Bromoform 32104
	Residue, Volatile 00505			Bromodichloromethane 32101
	Silica 00955			Carbon Tetrachloride 32102
	Specific Conductance 00095			Chloroform 32106
	Sulfate 00945			Chloromethane 34418
	Sulfite 00740			Dibromochloromethane 32105
	Surfactants -MBAS 38260			Methylene Chloride 34423
	Turbidity 00076			Tetrachloroethylene 34475
				1,1,1-Trichloroethane 34506
				Trichloroethylene 39180
				Trihalomethanes 82080
				PCBs 39516
X				Volatile Organic Analysis (EPA 601, 602)

ON SITE ANALYSES		
Parameter		Value
Flow	50050	mgd
Chlorine (Total)	50060	mg/l
Chlorine (Residual)	50070	mg/l
Dissolved Oxygen	00300	— mg/l
pH	00400	5.3 units
Temperature	00010	11 °C
Spec. Cond.		58 µmhos

COMMENTS

AR301088

U.S. GOVERNMENT PRINTING OFFICE: 1982-366-677

ENVIRONMENTAL SAMPLING DATA

OEHL USE ONLY

(Use this space for mechanical imprint)

SAMPLING SITE IDENTIFIER (AFR 19-7): P 6 02 4

BASE WHERE SAMPLE COLLECTED: Olmsted AFB

SAMPLING SITE DESCRIPTION: Well RFW-4

DATE COLLECTION BEGAN (YYMMDD): 8 5 0 8 0 2

TIME COLLECTION BEGAN (24 hour clock):

COLLECTION METHOD: [X] GRAB [ ] COMPOSITE _____ HOURS

MAIL REPORTS TO (circle if changed)
ORIGINAL: Lt. Col. R. Lombard HQ USAF/SGES, Bolling AFB DC 20332
COPY 1: RE Weston, Western Way West Chester, PA 19380 Attn Fred Epp
COPY 2:

SAMPLE COLLECTED BY (Name, Grade, AFSC): T. Terrell

SIGNATURE:

AUTOVON:

REASON FOR SUBMISSION: [X] A-ACCIDENT/INCIDENT R-ROUTINE/PERIODIC C-COMPLAINT N-NPDES F-FOLLOWUP/CLEANUP O-OTHER (specify) TRP PHASE II

BASE SAMPLE NUMBER: GP 85 0024

OEHL PID:

ANALYSES REQUESTED (check appropriate blocks)

	GROUP A		Hardness	00900	Residue, Settleable	50086		GROUP T	
	Ammonia	00610	Iron	01045	Residue, Volatile	00505		Bromoform	32104
	Chemical Oxygen Demand	00340	Lead	01051	Silica	00955		Bromodichloromethane	32101
	Kjeldahl Nitrogen	00625	Magnesium	00927	Specific Conductance	00095		Carbon Tetrachloride	32102
	Nitrate	00620	Manganese	01055	Sulfate	00945		Chloroform	32106
	Nitrite	00615	Mercury	71900	Sulfite	00740		Chloromethane	34418
X	Oil & Grease	00560	Nickel	01067	Surfactants -MBAS	38260		Dibromochloromethane	32105
X	Organic Carbon	00680	Potassium	00937	Turbidity	00076		Methylene Chloride	34423
	Orthophosphate	00671	Selenium	01147				Tetrachloroethylene	34475
	Phosphorus, Total	00665	Silver	01077				1,1,1-Trichloroethane	34506
			Sodium	00929	GROUP H			Trichloroethylene	39180
	GROUP D		Thallium	01059	BHC Isomers	39340		Trihalomethanes	82080
	Cyanide, Total	00720	Zinc	01092	Chlordane	39350		PCBs	39516
	Cyanide, Free	00722			DDT Isomers	39370	X	Volatile Organic Analysis (EPA 601, 602)	
					Dieldrin	39380			
	GROUP E		GROUP G		Endrin	39390			
	Phenols	32730	Acidity, Total	70508	Heptachlor	39410			
			Alkalinity, Total	00410	Heptachlor Epoxide	39420			
	GROUP F		Alkalinity, Bicarbonate	00425	Lindane	39782			
	Antimony	01097	Bromide	71870	Methoxychlor	39480			
	Arsenic	01002	Carbon Dioxide	00405	Toxaphene	39400			
	Barium	01007	Chloride	00940	2,4-D	39730		ON SITE ANALYSES	
	Beryllium	01012	Color	00080	2,4,5-TP-Silvex	39760		Parameter	Value
	Boron	01022	Fluoride	00951	2,4,5-T	39740		Flow 50050	mgd
	Cadmium	01027	Iodide	71865				Chlorine, Total 50060	mg/l
	Calcium	00916	Odor	00086				Dissolved Oxygen 00300	mg
	Chromium, Total	01034	Residue, Total	00500				pH 00400	7.2 units
	Chromium VI	01032	Residue, Filterable (TDS)	70300	GROUP J			Temperature 00010	14 °C
	Copper	01042	Residue, Nonfilterable	00530	Sulfides	00745		See Cod.	813 umhos

COMMENTS

AR301089

U.S. GOVERNMENT PRINTING OFFICE: 1982—366-677

ENVIRONMENTAL SAMPLING DATA

OEHL USE ONLY

(Use this space for mechanical imprint)

SAMPLING SITE IDENTIFIER (AFR 19-7): P6 023

BASE WHERE SAMPLE COLLECTED: OLMSTED AFB

SAMPLING SITE DESCRIPTION: WELL RFW-3

DATE COLLECTION BEGAN (YYMMDD): 8 5 0 8 0 2

TIME COLLECTION BEGAN (24 hour clock):

COLLECTION METHOD: [X] GRAB [ ] COMPOSITE _____ HOURS

MAIL REPORTS TO (circle if changed): ORIGINAL / COPY 1 / COPY 2

ORIGINAL: Lt. Col. R. Lambert, HQ USAF/SGES, Bolling AFB DC 20332

COPY 1: RE Weston, Western Way, West Chester, PA 19380 Attn Fred Boyd

SAMPLE COLLECTED BY (Name, Grade, AFSC): J. Jerome

SIGNATURE:

AUTOVON:

REASON FOR SUBMISSION: A-ACCIDENT/INCIDENT R-ROUTINE/PERIODIC C-COMPLAINT N-NPDES F-FOLLOWUP/CLEANUP O-OTHER (specify) IRP PHASE II

BASE SAMPLE NUMBER: G P 8 5 0 0 2 3

OEHL PID:

ANALYSES REQUESTED (check appropriate blocks)

	GROUP A		Hardness	00900		Residue, Settleable	50086		GROUP T
	Ammonia	00610	Iron	01045		Residue, Volatile	00505		Bromoform 32104
	Chemical Oxygen Demand	00340	Lead	01051		Silica	00955		Bromodichloromethane 32101
	Kjeldahl Nitrogen	00625	Magnesium	00927		Specific Conductance	00095		Carbon Tetrachloride 32102
	Nitrate	00620	Manganese	01055		Sulfate	00945		Chloroform 32106
	Nitrite	00615	Mercury	71900		Sulfite	00740		Chloromethane 34418
X	Oil & Grease	00560	Nickel	01067		Surfactants -MBAS	38260		Dibromochloromethane 32105
X	Organic Carbon	00680	Potassium	00937		Turbidity	00076		Methylene Chloride 34423
	Orthophosphate	00671	Selenium	01147					Tetrachloroethylene 34475
	Phosphorus, Total	00665	Silver	01077					1,1,1-Trichloroethane 34506
			Sodium	00929		GROUP H			Trichloroethylene 39180
	GROUP D		Thallium	01059		BHC Isomers	39340		Trihalomethanes 82080
	Cyanide, Total	00720	Zinc	01092		Chlordane	39350		PCBs 39516
	Cyanide, Free	00722				DDT Isomers	39370	X	Volatile Organic Analysis (EPA 601, 602)
						Dieldrin	39380		
	GROUP E		GROUP G			Endrin	39390		
	Phenols	32730	Acidity, Total	70508		Heptachlor	39410		
			Alkalinity, Total	00410		Heptachlor Epoxide	39420		
	GROUP F		Alkalinity, Bicarbonate	00425		Lindane	39782		
	Antimony	01097	Bromide	71870		Methoxychlor	39480		
	Arsenic	01002	Carbon Dioxide	00405		Toxaphene	39400		
	Barium	01007	Chloride	00940		2,4-D	39730		ON SITE ANALYSES
	Beryllium	01012	Color	00080		2,4,5-TP-Silvex	39760		Parameter / Value
	Boron	01022	Fluoride	00951		2,4,5-T	39740		Flow 50050 mgd
	Cadmium	01027	Iodide	71865					Chlorine, Total 50060 mg/l
	Calcium	00916	Odor	00086					Dissolved Oxygen 00300 mg/l
	Chromium, Total	01034	Residue, Total	00500					pH 00400 5.7 units
	Chromium VI	01032	Residue, Filterable (TDS)	70300		GROUP J			Temperature 00010 1/a °C
	Copper	01042	Residue, Nonfilterable	00530		Sulfides	00745		Spec. Cond. 662 umhos

AR301090

COMMENTS

ENVIRONMENTAL SAMPLING DATA

(Use this space for mechanical imprint)

OEHL USE ONLY

SAMPLING SITE IDENTIFIER (AFR 19-7): P S 0 2 6

BASE WHERE SAMPLE COLLECTED: OLMSTED AFB

SAMPLING SITE DESCRIPTION: Middle Kiln

DATE COLLECTION BEGAN (YYMMDD): 8 5 0 7 1 3

TIME COLLECTION BEGAN (24 hour clock): 0

COLLECTION METHOD: [X] GRAB [ ] COMPOSITE _____ HOURS

MAIL REPORTS TO (circle if changed)
ORIGINAL: Lt. Col. R. Lombard HQ USAF/SGES, Bolling AFB DC 20332
COPY 1: RF Webster, Webster Way West Chester, PA 19380 Attn Fred Bagg
COPY 2:

SAMPLE COLLECTED BY (Name, Grade, AFSC): T. Torsaw

SIGNATURE:

AUTOVON:

REASON FOR SUBMISSION: [ ] A-ACCIDENT/INCIDENT R-ROUTINE/PERIODIC C-COMPLAINT N-NPDES F-FOLLOWUP/CLEANUP O-OTHER (specify) TRP PHASE II

BASE SAMPLE NUMBER: G P 8 5 0 0 2 6

OEHL PID:

ANALYSES REQUESTED (check appropriate blocks)

	GROUP A		Hardness	00900	Residue, Settleable	50086		GROUP T	
	Ammonia	00610	Iron	01045	Residue, Volatile	00505		Bromoform	32104
	Chemical Oxygen Demand	00340	Lead	01051	Silica	00955		Bromodichloromethane	32101
	Kjeldahl Nitrogen	00625	Magnesium	00927	Specific Conductance	00095		Carbon Tetrachloride	32102
	Nitrate	00620	Manganese	01055	Sulfate	00945		Chloroform	32106
	Nitrite	00615	Mercury	71900	Sulfite	00740		Chloromethane	34418
X	Oil & Grease	00560	Nickel	01067	Surfactants -MBAS	38260		Dibromochloromethane	32105
	Organic Carbon	00680	Potassium	00937	Turbidity	00076		Methylene Chloride	34423
	Orthophosphate	00671	Selenium	01147				Tetrachloroethylene	34475
	Phosphorus, Total	00665	Silver	01077				1,1,1-Trichloroethane	34506
			Sodium	00929	GROUP H			Trichloroethylene	39180
	GROUP D		Thallium	01059	BHC Isomers	39340		Trihalomethanes	82080
	Cyanide, Total	00720	Zinc	01092	Chlordane	39350		PCBs	39516
	Cyanide, Free	00722			DDT Isomers	39370	X	Volatile Organic Analysis (EPA 601, 602)	
					Dieldrin	39380			
	GROUP E		GROUP G		Endrin	39390			
	Phenols	32730	Acidity, Total	70508	Heptachlor	39410			
			Alkalinity, Total	00410	Heptachlor Epoxide	39420			
	GROUP F		Alkalinity, Bicarbonate	00425	Lindane	39782			
	Antimony	01097	Bromide	71870	Methoxychlor	39480			
	Arsenic	01002	Carbon Dioxide	00405	Toxaphene	39400			
	Barium	01007	Chloride	00940	2,4-D	39730		ON SITE ANALYSES	
	Beryllium	01012	Color	00080	2,4,5-TP-Silvex	39760		Parameter	Value
	Boron	01022	Fluoride	00951	2,4,5-T	39740		Flow 50050	mgd
	Cadmium	01027	Iodide	71865				Chlorine, Total 50060	mg/l
	Calcium	00916	Odor	00086				Dissolved Oxygen 00300	mg/l
	Chromium, Total	01034	Residue, Total	00500				pH 00400	0.9 units
	Chromium VI	01032	Residue, Filterable (TDS)	70300	GROUP J			Temperature 00010	11 °C
	Copper	01042	Residue, Nonfilterable	00530	Sulfides	00745		Specific Conductance	500 µmhos

COMMENTS

AR30 091

AF FORM JAN 81 2752

U.S. GOVERNMENT PRINTING OFFICE: 1982—366-677

ENVIRONMENTAL SAMPLING DATA

OEHL USE ONLY:

(Use this space for mechanical imprint)

SAMPLING SITE IDENTIFIER (AFR 19-7): P 6 0 2 5

BASE WHERE SAMPLE COLLECTED: OLMSTED AFB

SAMPLING SITE DESCRIPTION: Well RFW-5

DATE COLLECTION BEGAN (YYMMDD): 850821

TIME COLLECTION BEGAN (24 hour clock):

COLLECTION METHOD: [X] GRAB [ ] COMPOSITE _____ HOURS

MAIL REPORTS TO (circle if changed)
ORIGINAL: Lt. Col. R. Lombard HQ USAF/SGES, Bolling AFB DC 20332
COPY 1: RE Ickes, Western Way West Chester, PA 19380 Attn Fred Bagg
COPY 2:

SAMPLE COLLECTED BY (Name, Grade, AFSC): T. Jerow

SIGNATURE:

AUTOVON:

REASON FOR SUBMISSION: A-ACCIDENT/INCIDENT C-COMPLAINT F-FOLLOWUP/CLEANUP R-ROUTINE/PERIODIC N-NPDES O-OTHER (specify) TRP PHASE II

BASE SAMPLE NUMBER: GP 85 0025

OEHL PID:

ANALYSES REQUESTED (check appropriate blocks)

	GROUP A		Hardness	00900		Residue, Settleable	50086		GROUP T
	Ammonia	00610	Iron	01045		Residue, Volatile	00505		Bromoform 32104
	Chemical Oxygen Demand	00340	Lead	01051		Silica	00955		Bromodichloromethane 32101
	Kjeldahl Nitrogen	00625	Magnesium	00927		Specific Conductance	00095		Carbon Tetrachloride 32102
	Nitrate	00620	Manganese	01055		Sulfate	00945		Chloroform 32106
	Nitrite	00615	Mercury	71900		Sulfite	00740		Chloromethane 34418
X	Oil & Grease	00560	Nickel	01067		Surfactants -MBAS	38260		Dibromochloromethane 32105
X	Organic Carbon	00680	Potassium	00937		Turbidity	00076		Methylene Chloride 34423
	Orthophosphate	00671	Selenium	01147					Tetrachloroethylene 34475
	Phosphorus, Total	00665	Silver	01077					1,1,1-Trichloroethane 34506
			Sodium	00929		GROUP H			Trichloroethylene 39180
	GROUP D		Thallium	01059		BHC Isomers	39340		Trihalomethanes 82080
	Cyanide, Total	00720	Zinc	01092		Chlordane	39350		PCBs 39516
	Cyanide, Free	00722				DDT Isomers	39370	X	Volatile Organic Analysis (EPA 601, 602)
						Dieldrin	39380		
	GROUP E		GROUP G			Endrin	39390		
	Phenols	32730	Acidity, Total	70508		Heptachlor	39410		
			Alkalinity, Total	00410		Heptachlor Epoxide	39420		
	GROUP F		Alkalinity, Bicarbonate	00425		Lindane	39782		
	Antimony	01097	Bromide	71870		Methoxychlor	39480		
	Arsenic	01002	Carbon Dioxide	00405		Toxaphene	39400		
	Barium	01007	Chloride	00940		2,4-D	39730		
	Beryllium	01012	Color	00080		2,4,5-TP-Silvex	39760		
	Boron	01022	Fluoride	00951		2,4,5-T	39740		
	Cadmium	01027	Iodide	71865					
	Calcium	00916	Odor	00086					
	Chromium, Total	01034	Residue, Total	00500					
	Chromium VI	01032	Residue, Filterable (TDS)	70300		GROUP J			
	Copper	01042	Residue, Nonfilterable	00530		Sulfides	00745		

ON SITE ANALYSES

Parameter		Value
Flow	50050	mgd
Chlorine (Total)	50060	mg/l
Dissolved Oxygen	00300	mg/l
pH	00400	6.48 units
Temperature	00010	24 °C
Spec. Cond		514 umhos

AB90 1092

COMMENTS

☆U. S. GOVERNMENT PRINTING OFFICE : 1982—360-877

ENVIRONMENTAL SAMPLING DATA

OEHL USE ONLY

(Use this space for mechanical imprint)

SAMPLING SITE IDENTIFIER (AFR 19-7): P6 032

BASE WHERE SAMPLE COLLECTED: QUASTED AFB

SAMPLING SITE DESCRIPTION: Prod. Well 9

DATE COLLECTION BEGAN (YYMMDD): 850102

TIME COLLECTION BEGAN (24 hour clock):

COLLECTION METHOD: ☒ GRAB ☐ COMPOSITE _____ HOURS

MAIL REPORTS TO (circle if changed): ORIGINAL, COPY 1, COPY 2

Lt. Col. R. Loveland HQ USAF/SGES, Bolling AFB DC 20332
RE Ipston, Weston Way, West Chester, PA 19380 Attn Fred Boyd

SAMPLE COLLECTED BY (Name, Grade, AFSC): J. Trew

SIGNATURE: Judith M. Lindsay

AUTOVON

REASON FOR SUBMISSION: A-ACCIDENT/INCIDENT R-ROUTINE/PERIODIC C-COMPLAINT N-NPDES F-FOLLOWUP/CLEANUP O-OTHER (specify) TRP PHASE II

BASE SAMPLE NUMBER: GP 85 0032

OEHL PID:

ANALYSES REQUESTED (check appropriate blocks)

GROUP A		Hardness	00900	Residue, Settleable	50086	GROUP T	
Ammonia	00610	Iron	01045	Residue, Volatile	00505	Bromoform	32104
Chemical Oxygen Demand	00340	Lead	01051	Silica	00955	Bromodichloromethane	32101
Kjeldahl Nitrogen	00625	Magnesium	00927	Specific Conductance	00095	Carbon Tetrachloride	32102
Nitrate	00620	Manganese	01055	Sulfate	00945	Chloroform	32106
Nitrite	00615	Mercury	71900	Sulfite	00740	Chloromethane	34418
X Oil & Grease	00560	Nickel	01067	Surfactants -MBAS	38260	Dibromochloromethane	32105
X Organic Carbon	00680	Potassium	00937	Turbidity	00076	Methylene Chloride	34423
Orthophosphate	00671	Selenium	01147			Tetrachloroethylene	34475
Phosphorus, Total	00665	Silver	01077			1,1,1-Trichloroethane	34506
		Sodium	00929	GROUP H		Trichloroethylene	39180
GROUP D		Thallium	01059	BHC Isomers	39340	Trihalomethanes	82080
Cyanide, Total	00720	Zinc	01092	Chlordane	39350	PCBs	39516
Cyanide, Free	00722			DDT Isomers	39370	X Volatile Organic Analysis (EPA 601, 602)	
				Dieldrin	39380		
GROUP E		GROUP G		Endrin	39390		
Phenols	32730	Acidity, Total	70508	Heptachlor	39410		
		Alkalinity, Total	00410	Heptachlor Epoxide	39420		
GROUP F		Alkalinity, Bicarbonate	00425	Lindane	39782		
Antimony	01097	Bromide	71870	Methoxychlor	39480		
Arsenic	01002	Carbon Dioxide	00405	Toxaphene	39400		
Barium	01007	Chloride	00940	2,4-D	39730	ON SITE ANALYSES	
Beryllium	01012	Color	00080	2,4,5-TP-Silvex	39760	Parameter	Value
Boron	01022	Fluoride	00951	2,4,5-T	39740	Flow 00060	0.93 mgd
Cadmium	01027	Iodide	71865			Chlorine, Total 50060	
Calcium	00916	Odor	00086			Dissolved Oxygen 00300	mg/l
Chromium, Total	01034	Residue, Total	00500			pH 00400	6.31 units
Chromium VI	01032	Residue, Filterable (TDS)	70300	GROUP J		Temperature 00010	14 °C
Copper	01042	Residue, Nonfilterable	00530	Sulfides	00745	Spec. Cond.	70 Umhos

COMMENTS

U.S. GOVERNMENT PRINTING OFFICE: 1982—366-677

ENVIRONMENTAL SAMPLING DATA

OEHL USE ONLY

(Use this space for mechanical imprint)

SAMPLING SITE IDENTIFIER (AFR 19-7): P6 027

BASE WHERE SAMPLE COLLECTED: OLMSTED AFB

SAMPLING SITE DESCRIPTION: Well RFW-7

DATE COLLECTION BEGAN (YYMMDD): 850730

TIME COLLECTION BEGAN (24 hour clock):

COLLECTION METHOD: [X] GRAB [ ] COMPOSITE _____ HOURS

MAIL REPORTS TO (circle if changed)
ORIGINAL: Lt. Col. R. Crawford HQ USAF/SGES, Bolling AFB DC 20332
COPY 1: RF Weston, Weston Way West Chester, PA 19380 Attn: Fred Bagg
COPY 2:

SAMPLE COLLECTED BY (Name, Grade, AFSC): T. Jordan

SIGNATURE:

AUTOVON:

REASON FOR SUBMISSION: A-ACCIDENT/INCIDENT R-ROUTINE/PERIODIC C-COMPLAINT N-NPDES F-FOLLOWUP/CLEANUP O-OTHER (specify) TRP PHASE II

BASE SAMPLE NUMBER: GP 85 0027

OEHL FID:

ANALYSES REQUESTED (check appropriate blocks)

	GROUP A		Hardness	00900		Residue, Settleable	50086		GROUP T
	Ammonia	00610	Iron	01045		Residue, Volatile	00505		Bromoform 32104
	Chemical Oxygen Demand	00340	Lead	01051		Silica	00955		Bromodichloromethane 32101
	Kjeldahl Nitrogen	00625	Magnesium	00927		Specific Conductance	00095		Carbon Tetrachloride 32102
	Nitrate	00620	Manganese	01055		Sulfate	00945		Chloroform 32106
	Nitrite	00615	Mercury	71900		Sulfite	00740		Chloromethane 34418
X	Oil & Grease	00560	Nickel	01067		Surfactants -MBAS	38260		Dibromochloromethane 32105
X	Organic Carbon	00680	Potassium	00937		Turbidity	00076		Methylene Chloride 34423
	Orthophosphate	00671	Selenium	01147					Tetrachloroethylene 34475
	Phosphorus, Total	00665	Silver	01077					1,1,1-Trichloroethane 34506
			Sodium	00929		GROUP H			Trichloroethylene 39180
	GROUP D		Thallium	01059		BHC Isomers	39340		Trihalomethanes 82080
	Cyanide, Total	00720	Zinc	01092		Chlordane	39350		PCBs 39516
	Cyanide, Free	00722				DDT Isomers	39370	X	Volatile Organic Analysis (EPA 601, 602)
						Dieldrin	39380		
	GROUP E		GROUP G			Endrin	39390		
	Phenols	32730	Acidity, Total	70508		Heptachlor	39410		
			Alkalinity, Total	00410		Heptachlor Epoxide	39420		
	GROUP F		Alkalinity, Bicarbonate	00425		Lindane	39782		
	Antimony	01097	Bromide	71870		Methoxychlor	39480		
	Arsenic	01002	Carbon Dioxide	00405		Toxaphene	39400		
	Barium	01007	Chloride	00940		2,4-D	39730		ON SITE ANALYSES
	Beryllium	01012	Color	00080		2,4,5-TP-Silvex	39760		Parameter / Value
	Boron	01022	Fluoride	00951		2,4,5-T	39740		Flow 50050 mgd
	Cadmium	01027	Iodide	71865					Chlorine, Total 50060 mg/l
	Calcium	00916	Odor	00086					Dissolved Oxygen 00300 mg/l
	Chromium, Total	01034	Residue, Total	00500					pH 00400 6.95 units
	Chromium VI	01032	Residue, Filterable (TDS)	70300		GROUP J			Temperature 00010 14 °C
	Copper	01042	Residue, Nonfilterable	00530		Sulfides	00745		Spec. Conductance 244 µmhos

COMMENTS

AR300109

U.S. GOVERNMENT PRINTING OFFICE: 1982-386-677

ENVIRONMENTAL SAMPLING DATA

OEHL USE ONLY

(Use this space for mechanical imprint)

SAMPLING SITE IDENTIFIER (AFR 19-7): P6 0029

BASE WHERE SAMPLE COLLECTED: OLMSTED AFB

SAMPLING SITE DESCRIPTION: Prod. Well 13

DATE COLLECTION BEGAN (YYMMDD): 850801

TIME COLLECTION BEGAN (24 hour clock):

COLLECTION METHOD: [X] GRAB [ ] COMPOSITE _____ HOURS

MAIL REPORTS TO (circle if changed)
ORIGINAL: Lt. Col. R. Lombard HQ USAF/SGES, Bolling AFB DC 20332
COPY 1: RF Weston, Weston Way West Chester, PA 19380 Attn Fred Bye
COPY 2:

SAMPLE COLLECTED BY (Name, Grade, AFSC): T. Jarrell

SIGNATURE:

AUTOVON:

REASON FOR SUBMISSION: A-ACCIDENT/INCIDENT R-ROUTINE/PERIODIC C-COMPLAINT N-NPDES F-FOLLOWUP/CLEANUP O-OTHER (specify) TRP PHASE II

BASE SAMPLE NUMBER: 6P85 0029

OEHL PID:

ANALYSES REQUESTED (check appropriate blocks)

	GROUP A		Hardness	00900		Residue, Settleable	50086		GROUP T
	Ammonia	00610	Iron	01045		Residue, Volatile	00505		Bromoform 32104
	Chemical Oxygen Demand	00340	Lead	01051		Silica	00955		Bromodichloromethane 32101
	Kjeldahl Nitrogen	00625	Magnesium	00927		Specific Conductance	00095		Carbon Tetrachloride 32102
	Nitrate	00620	Manganese	01055		Sulfate	00945		Chloroform 32106
	Nitrite	00615	Mercury	71900		Sulfite	00740		Chloromethane 34418
X	Oil & Grease	00560	Nickel	01067		Surfactants -MBAS	38260		Dibromochloromethane 32105
X	Organic Carbon	00680	Potassium	00937		Turbidity	00076		Methylene Chloride 34423
	Orthophosphate	00671	Selenium	01147					Tetrachloroethylene 34475
	Phosphorus, Total	00665	Silver	01077					1,1,1-Trichloroethane 34506
			Sodium	00929		GROUP H			Trichloroethylene 39180
	GROUP D		Thallium	01059		BHC Isomers	39340		Trihalomethanes 82080
	Cyanide, Total	00720	Zinc	01092		Chlordane	39350		PCBs 39516
	Cyanide, Free	00722				DDT Isomers	39370	X	Volatile Organic Analysis (EPA 601, 602)
						Dieldrin	39380		
	GROUP E		GROUP G			Endrin	39390		
	Phenols	32730	Acidity, Total	70508		Heptachlor	39410		
			Alkalinity, Total	00410		Heptachlor Epoxide	39420		
	GROUP F		Alkalinity, Bicarbonate	00425		Lindane	39782		
	Antimony	01097	Bromide	71870		Methoxychlor	39480		
	Arsenic	01002	Carbon Dioxide	00405		Toxaphene	39400		
	Barium	01007	Chloride	00940		2,4-D	39730		ON SITE ANALYSES
	Beryllium	01012	Color	00080		2,4,5-TP-Silvex	39760		Parameter / Value
	Boron	01022	Fluoride	00951		2,4,5-T	39740		Flow 50050 mgd
	Cadmium	01027	Iodide	71865					Chlorine 50060 mg/l
	Calcium	00916	Odor	00086					Dissolved Oxygen 00300 mg/l
	Chromium, Total	01034	Residue, Total	00500					pH 00400 5.99 units
	Chromium VI	01032	Residue, Filterable (TDS)	70300		GROUP J			Temperature 00010 20 °C
	Copper	01042	Residue, Nonfilterable	00530		Sulfides	00745		Spec. Cond. 725 μmhos

COMMENTS

AR 001095

U.S. GOVERNMENT PRINTING OFFICE: 1982—366-677

ENVIRONMENTAL SAMPLING DATA

(Use this space for mechanical imprint)

OEHL USE ONLY

SAMPLING SITE IDENTIFIER (AFR 19-7): P 6 0 2 8

BASE WHERE SAMPLE COLLECTED: OLMSTED AFB

SAMPLING SITE DESCRIPTION: Prod. Well 11

DATE COLLECTION BEGAN (CYMMDD): 8 5 0 8 0 1

TIME COLLECTION BEGAN (24 hour clock):

COLLECTION METHOD: [X] GRAB [ ] COMPOSITE _____ HOURS

MAIL REPORTS TO (circle if changed)
ORIGINAL: Lt. Col. R. Lombard, HQ USAF/SGES, Bolling AFB DC 20332
COPY-1: RF Weston, Weston Way, West Chester, PA 19380 Attn: Fred Boger
COPY 2:

SAMPLE COLLECTED BY (Name,Grade,AFSC): T. Jordan

SIGNATURE:

AUTOVON:

REASON FOR SUBMISSION: A-ACCIDENT/INCIDENT R-ROUTINE/PERIODIC C-COMPLAINT N-NPDES F-FOLLOWUP/CLEANUP O-OTHER (specify) IRP PHASE II

BASE SAMPLE NUMBER: G P 8 5 0 0 2 8

OEHL FID:

ANALYSES REQUESTED (check appropriate blocks)

	GROUP A		GROUP D		GROUP E		GROUP F		GROUP G
	Ammonia 00610		Cyanide, Total 00720		Phenols 32730		Antimony 01097		Acidity, Total 70508
	Chemical Oxygen Demand 00340		Cyanide, Free 00722				Arsenic 01002		Alkalinity, Total 00410
	Kjeldahl Nitrogen 00625						Barium 01007		Alkalinity, Bicarbonate 00425
	Nitrate 00620						Beryllium 01012		Bromide 71870
	Nitrite 00615						Boron 01022		Carbon Dioxide 00405
X	Oil & Grease 00560						Cadmium 01027		Chloride 00940
X	Organic Carbon 00680						Calcium 00916		Color 00080
	Orthophosphate 00671						Chromium, Total 01034		Fluoride 00951
	Phosphorus, Total 00665						Chromium VI 01032		Iodide 71865
							Copper 01042		Odor 00086
									Residue, Total 00500
									Residue, Filterable (TDS) 70300
									Residue, Nonfilterable 00530

	Hardness 00900	Residue, Settleable 50086	GROUP T
	Iron 01045	Residue, Volatile 00505	Bromoform 32104
	Lead 01051	Silica 00955	Bromodichloromethane 32101
	Magnesium 00927	Specific Conductance 00095	Carbon Tetrachloride 32102
	Manganese 01055	Sulfate 00945	Chloroform 32106
	Mercury 71900	Sulfite 00740	Chloromethane 34418
	Nickel 01067	Surfactants -MBAS 38260	Dibromochloromethane 32105
	Potassium 00937	Turbidity 00076	Methylene Chloride 34423
	Selenium 01147		Tetrachloroethylene 34475
	Silver 01077		1,1,1-Trichloroethane 34506
	Sodium 00929	GROUP H	Trichloroethylene 39180
	Thallium 01059	BHC Isomers 39340	Trihalomethanes 82080
	Zinc 01092	Chlordane 39350	PCBs 39516
		DDT Isomers 39370	X Volatile Organic Analysis (EPA 601, 602)
		Dieldrin 39380	
		Endrin 39390	
		Heptachlor 39410	
		Heptachlor Epoxide 39420	
		Lindane 39782	
		Methoxychlor 39480	
		Toxaphene 39400	
		2,4-D 39730	
		2,4,5-TP-Silvex 39760	
		2,4,5-T 39740	
			GROUP J
			Sulfides 00745

ON SITE ANALYSES

Parameter		Value
Flow	50050	mgd
Chlorine, Total	50060	mg/l
Dissolved Oxygen	00300	mg/l
pH	00400	6.34 units
Temperature	00010	19 °C
Sp. Cond.		304 umhos

AR304096

COMMENTS

U.S. GOVERNMENT PRINTING OFFICE: 1982—366-877

ENVIRONMENTAL SAMPLING DATA

OEHL USE ONLY

(Use this space for mechanical imprint)

SAMPLING SITE IDENTIFIER (AFR 19-7): P G 0 3 1

BASE WHERE SAMPLE COLLECTED: OLMSTED AFB

SAMPLING SITE DESCRIPTION: Prod. Well 18

DATE COLLECTION BEGAN (YYMMDD): 8 5 0 8 0 1

TIME COLLECTION BEGAN (24 hour clock):

COLLECTION METHOD: [X] GRAB [ ] COMPOSITE _____ HOURS

MAIL REPORTS TO (circle if changed)
ORIGINAL: Lt. Col. R. Lowland HQ USAF/SGES, Bolling AFB DC 20332
COPY 1: RE Ickes, Weston Way West Chester, PA 19380 Attn Fred Legg
COPY 2:

SAMPLE COLLECTED BY (Name, Grade, AFSC): J. Jerome

SIGNATURE:

AUTOVON:

REASON FOR SUBMISSION: A-ACCIDENT/INCIDENT R-ROUTINE/PERIODIC C-COMPLAINT N-NPDES F-FOLLOWUP/CLEANUP O-OTHER (specify) IRP PHASE II

BASE SAMPLE NUMBER: G P 8 5 0 0 3 1

OEHL PID:

ANALYSES REQUESTED (check appropriate blocks)

GROUP A						GROUP T	
Ammonia	00610	Hardness	00900	Residue, Settleable	50086	Bromoform	32104
Chemical Oxygen Demand	00340	Iron	01045	Residue, Volatile	00505	Bromodichloromethane	32101
Kjeldahl Nitrogen	00625	Lead	01051	Silica	00955	Carbon Tetrachloride	32102
Nitrate	00620	Magnesium	00927	Specific Conductance	00095	Chloroform	32106
Nitrite	00615	Manganese	01055	Sulfate	00945	Chloromethane	34418
[X] Oil & Grease	00560	Mercury	71900	Sulfite	00740	Dibromochloromethane	32105
[X] Organic Carbon	00680	Nickel	01067	Surfactants -MBAS	38260	Methylene Chloride	34423
Orthophosphate	00671	Potassium	00937	Turbidity	00076	Tetrachloroethylene	34475
Phosphorus, Total	00665	Selenium	01147			1,1,1-Trichloroethane	34506
		Silver	01077			Trichloroethylene	39180
GROUP D		Sodium	00929	GROUP H		Trihalomethanes	82080
Cyanide, Total	00720	Thallium	01059	BHC Isomers	39340	PCBs	39516
Cyanide, Free	00722	Zinc	01092	Chlordane	39350	[X] Volatile Organic Analysis (EPA 601, 602)	
				DDT Isomers	39370		
GROUP E		GROUP G		Dieldrin	39380		
Phenols	32730	Acidity, Total	70508	Endrin	39390		
		Alkalinity, Total	00410	Heptachlor	39410		
GROUP F		Alkalinity, Bicarbonate	00425	Heptachlor Epoxide	39420		
Antimony	01097	Bromide	71870	Lindane	39782		
Arsenic	01002	Carbon Dioxide	00405	Methoxychlor	39480		
Barium	01007	Chloride	00940	Toxaphene	39400		
Beryllium	01012	Color	00080	2,4-D	39730	ON SITE ANALYSES	
Boron	01022	Fluoride	00951	2,4,5-TP-Silvex	39760	Parameter	Value
Cadmium	01027	Iodide	71865	2,4,5-T	39740	Flow 50050	
Calcium	00916	Odor	00086			Chlorine, Total 50060	mg/l
Chromium, Total	01034	Residue, Total	00500			Dissolved Oxygen 00300	mg/l
Chromium VI	01032	Residue, Filterable (TDS)	70300	GROUP J		pH 00400	6.49 units
Copper	01042	Residue, Nonfilterable	00530	Sulfides	00745	Temperature 00010	13 °C
						Sp. Cond	183 umhos

COMMENTS

AR301097

U.S. GOVERNMENT PRINTING OFFICE: 1982-366-877

ENVIRONMENTAL SAMPLING DATA

OEHL USE ONLY

(Use this space for mechanical imprint)

SAMPLING SITE IDENTIFIER (AFR 19-7): P6 0030

BASE WHERE SAMPLE COLLECTED: Olmsted AFB

SAMPLING SITE DESCRIPTION: Prod. Well 17

DATE COLLECTION BEGAN (YYMMDD): 850108

TIME COLLECTION BEGAN (24 hour clock):

COLLECTION METHOD: [X] GRAB [ ] COMPOSITE _____ HOURS

MAIL REPORTS TO (circle if changed)
ORIGINAL: Lt. Col. R. Lenard HQ USAF/SGES, Bolling AFB DC 20332
COPY 1: RE Weston, Western Way West Chester, PA 19380 Attn Fred Lyle
COPY 2:

SAMPLE COLLECTED BY (Name, Grade, AFSC): J. Jarosh

SIGNATURE: [signature]

AUTOVON:

REASON FOR SUBMISSION: A-ACCIDENT/INCIDENT R-ROUTINE/PERIODIC C-COMPLAINT N-NPDES F-FOLLOWUP/CLEANUP O-OTHER (specify) TRP PHASE II

BASE SAMPLE NUMBER: 6P 85 0030

OEHL PID:

ANALYSES REQUESTED (check appropriate blocks)

	GROUP A		Hardness	00900		Residue, Settleable	50086		GROUP T
	Ammonia	00610	Iron	01045		Residue, Volatile	00505		Bromoform 32104
	Chemical Oxygen Demand	00340	Lead	01051		Silica	00955		Bromodichloromethane 32101
	Kjeldahl Nitrogen	00625	Magnesium	00927		Specific Conductance	00095		Carbon Tetrachloride 32102
	Nitrate	00620	Manganese	01055		Sulfate	00945		Chloroform 32106
	Nitrite	00615	Mercury	71900		Sulfite	00740		Chloromethane 34418
X	Oil & Grease	00560	Nickel	01067		Surfactants -MBAS	38260		Dibromochloromethane 32105
X	Organic Carbon	00680	Potassium	00937		Turbidity	00076		Methylene Chloride 34423
	Orthophosphate	00671	Selenium	01147					Tetrachloroethylene 34475
	Phosphorus, Total	00665	Silver	01077					1,1,1-Trichloroethane 34506
			Sodium	00929		GROUP H			Trichloroethylene 39180
	GROUP D		Thallium	01059		BHC Isomers	39340		Trihalomethanes 82080
	Cyanide, Total	00720	Zinc	01092		Chlordane	39350		PCBs 39516
	Cyanide, Free	00722				DDT Isomers	39370	X	Volatile Organic Analysis (EPA 601, 602)
						Dieldrin	39380		
	GROUP E		GROUP G			Endrin	39390		
	Phenols	32730	Acidity, Total	70508		Heptachlor	39410		
			Alkalinity, Total	00410		Heptachlor Epoxide	39420		
	GROUP F		Alkalinity, Bicarbonate	00425		Lindane	39782		
	Antimony	01097	Bromide	71870		Methoxychlor	39480		
	Arsenic	01002	Carbon Dioxide	00405		Toxaphene	39400		
	Barium	01007	Chloride	00940		2,4-D	39730		ON SITE ANALYSES
	Beryllium	01012	Color	00080		2,4,5-TP-Silvex	39760		Parameter / Value
	Boron	01022	Fluoride	00951		2,4,5-T	39740		Flow 50050 AR301098 mgd
	Cadmium	01027	Iodide	71865					Chlorine, Total 50060 ___ mg/l
	Calcium	00916	Odor	00086					Dissolved Oxygen 00300 ___ mg/l
	Chromium, Total	01034	Residue, Total	00500					pH 00400 6.19 units
	Chromium VI	01032	Residue, Filterable (TDS)	70300		GROUP J			Temperature 00010 16 °C
	Copper	01042	Residue, Nonfilterable	00530		Sulfides	00745		Sp. Cond. 993 umhos

COMMENTS

☆U.S. GOVERNMENT PRINTING OFFICE: 1987-388-677

ENVIRONMENTAL SAMPLING DATA

OEHL USE ONLY

(Use this space for mechanical imprint)

SAMPLING SITE IDENTIFIER (AFR 19-7): P6 036

BASE WHERE SAMPLE COLLECTED: OLMSTED AFB

SAMPLING SITE DESCRIPTION: Field Blank

DATE COLLECTION BEGAN (YYMMDD): 850102

TIME COLLECTION BEGAN (24 hour clock):

COLLECTION METHOD: [X] GRAB [ ] COMPOSITE _____ HOURS

MAIL REPORTS TO (circle if changed)
ORIGINAL: Lt. Col. R. Lombard HQ USAF/SGES, Bolling AFB DC 20332
COPY 1: RE Ipleton, Western Way West Chester, PA 19380 Attn Fred Epp
COPY 2:

SAMPLE COLLECTED BY (Name, Grade, AFSC): T. Jones

SIGNATURE:

AUTOVON:

REASON FOR SUBMISSION: [ ]
A-ACCIDENT/INCIDENT
R-ROUTINE/PERIODIC
C-COMPLAINT
N-NPDES
F-FOLLOWUP/CLEANUP
O-OTHER (specify) TRP PHASE II

BASE SAMPLE NUMBER: GP 85 0036

OEHL PID:

ANALYSES REQUESTED (check appropriate blocks)

	GROUP A		Hardness 00900		Residue, Settleable 50086		GROUP T
	Ammonia	00610	Iron	01045	Residue, Volatile	00505	Bromoform 32104
	Chemical Oxygen Demand	00340	Lead	01051	Silica	00955	Bromodichloromethane 32
	Kjeldahl Nitrogen	00625	Magnesium	00927	Specific Conductance	00095	Carbon Tetrachloride 32102
	Nitrate	00620	Manganese	01055	Sulfate	00945	Chloroform 32106
	Nitrite	00615	Mercury	71900	Sulfite	00740	Chloromethane 34418
X	Oil & Grease	00560	Nickel	01067	Surfactants -MBAS	38260	Dibromochloromethane 32105
X	Organic Carbon	00680	Potassium	00937	Turbidity	00076	Methylene Chloride 34423
	Orthophosphate	00671	Selenium	01147			Tetrachloroethylene 34475
	Phosphorus, Total	00665	Silver	01077			1,1,1-Trichloroethane 34506
			Sodium	00929	GROUP H		Trichloroethylene 39180
	GROUP D		Thallium	01059	BHC Isomers	39340	Trihalomethanes 82080
	Cyanide, Total	00720	Zinc	01092	Chlordane	39350	PCBs 39516
	Cyanide, Free	00722			DDT Isomers	39370	X Volatile Organic Analysis (EPA 601, 602)
					Dieldrin	39380	
	GROUP E		GROUP G		Endrin	39390	
	Phenols	32730	Acidity, Total	70508	Heptachlor	39410	
			Alkalinity, Total	00410	Heptachlor Epoxide	39420	
	GROUP F		Alkalinity, Bicarbonate	00425	Lindane	39782	
	Antimony	01097	Bromide	71870	Methoxychlor	39480	
	Arsenic	01002	Carbon Dioxide	00405	Toxaphene	39400	
	Barium	01007	Chloride	00940	2,4-D	39730	ON SITE ANALYSES
	Beryllium	01012	Color	00080	2,4,5-TP-Silvex	39760	Parameter / Value
	Boron	01022	Fluoride	00951	2,4,5-T	39740	Flow 50050
	Cadmium	01027	Iodide	71865			Chlorine, Total 50060 mg/l
	Calcium	00916	Odor	00086			Dissolved Oxygen 00300 mg/l
	Chromium, Total	01034	Residue, Total	00500			pH 00400 units
	Chromium VI	01032	Residue, Filterable (TDS)	70300	GROUP J		Temperature 00010 °C
	Copper	01042	Residue, Nonfilterable	00530	Sulfides	00745	

COMMENTS

AR301099

U. S. GOVERNMENT PRINTING OFFICE: 1982—366-677

ENVIRONMENTAL SAMPLING DATA

(Use this space for mechanical imprint)

GEMS USE ONLY

SAMPLING SITE IDENTIFIER (AFR 19-7): 50 033

BASE WHERE SAMPLE COLLECTED: OLMSTED AFB

SAMPLING SITE DESCRIPTION: [redacted] Stream Sediment

DATE COLLECTION BEGAN (YYMMDD): 850801

TIME COLLECTION BEGAN (24 hour clock):

COLLECTION METHOD: [X] GRAB [ ] COMPOSITE _____ HOURS

MAIL REPORTS TO (circle if changed)
ORIGINAL: Lt. Col. R. Lombard HQ USAF/SGES, Bolling AFB DC 20332
COPY 1: RF Weston, Western Way West Chester, PA 19380 Attn Fred Boyd
COPY 2:

SAMPLE COLLECTED BY (Name, Grade, AFSC): T. Toroni

SIGNATURE:

AUTOVON:

REASON FOR SUBMISSION: [ ] A-ACCIDENT/INCIDENT R-ROUTINE/PERIODIC C-COMPLAINT N-NPDES F-FOLLOWUP/CLEANUP O-OTHER (specify) TRP PHASE II

BASE SAMPLE NUMBER: 6S 85 0033

GEMS PID:

ANALYSES REQUESTED (check appropriate blocks)

GROUP A		Hardness	00900	Residue, Settleable	50086	GROUP T	
	Ammonia 00610	Iron	01045	Residue, Volatile	00505	Bromoform	32104
	Chemical Oxygen Demand 00340	Lead	01051	Silica	00955	Bromodichloromethane	32101
	Kjeldahl Nitrogen 00625	Magnesium	00927	Specific Conductance	00095	Carbon Tetrachloride	32102
	Nitrate 00620	Manganese	01055	Sulfate	00945	Chloroform	32106
	Nitrite 00615	Mercury	71900	Sulfite	00740	Chloromethane	34418
X	Oil & Grease 00560	Nickel	01067	Surfactants -MBAS	38260	Dibromochloromethane	32105
	[redacted] 00680	Potassium	00937	Turbidity	00076	Methylene Chloride	34423
	Orthophosphate 00671	Selenium	01147			Tetrachloroethylene	34475
	Phosphorus, Total 00665	Silver	01077			1,1,1-Trichloroethane	34506
		Sodium	00929	GROUP H		Trichloroethylene	39180
GROUP D		Thallium	01059	BHC Isomers	39340	Trihalomethanes	82080
	Cyanide, Total 00720	Zinc	01092	Chlordane	39350	PCBs	39516
	Cyanide, Free 00722			DDT Isomers	39370	X Volatile Organic Analysis (EPA 601, 602)	
				Dieldrin	39380		
GROUP E		GROUP G		Endrin	39390		
	Phenols 32730	Acidity, Total	70508	Heptachlor	39410		
		Alkalinity, Total	00410	Heptachlor Epoxide	39420		
GROUP F		Alkalinity, Bicarbonate	00425	Lindane	39782		
	Antimony 01097	Bromide	71870	Methoxychlor	39480		
	Arsenic 01002	Carbon Dioxide	00405	Toxaphene	39400		
	Barium 01007	Chloride	00940	2,4-D	39730	ON SITE ANALYSES	
	Beryllium 01012	Color	00080	2,4,5-TP-Silvex	39760	Parameter	Value
	Boron 01022	Fluoride	00951	2,4,5-T	39740	Flow 50050	mgd
	Cadmium 01027	Iodide	71865			Chlorine, Total 50060	mg/l
	Calcium 00916	Odor	00086			Dissolved Oxygen 00300	mg/l
	Chromium, Total 01034	Residue, Total	00500			pH 00400	units
	Chromium VI 01032	Residue, Filterable (TDS)	70300	GROUP J		Temperature 00010	°C
	Copper 01042	Residue, Nonfilterable	00530	Sulfides	00745		

COMMENTS

AB30 1160

U.S. GOVERNMENT PRINTING OFFICE: 1982—366-677

ENVIRONMENTAL SAMPLING DATA

(Use this space for mechanical imprint)

OEHL USE ONLY

SAMPLING SITE IDENTIFIER (AFR 19-7): P6 0038

BASE WHERE SAMPLE COLLECTED: OLMSTED AFB

SAMPLING SITE DESCRIPTION: DUPLICATE

DATE COLLECTION BEGAN (YYMMDD): 850731

TIME COLLECTION BEGAN (24 hour clock):

COLLECTION METHOD: [X] GRAB [ ] COMPOSITE _____ HOURS

MAIL REPORTS TO (circle if changed)
ORIGINAL: *Lt. Col. R. Lambird HQ USAF/SGES, Bolling AFB DC 20332
COPY 1: RE Jukton, Western Way West Chester, PA 19380 Attn Fred Bagg
COPY 2:

SAMPLE COLLECTED BY (Name, Grade, AFSC): T. Tarnay

/SIGNATURE:

AUTOVON:

REASON FOR SUBMISSION: A-ACCIDENT/INCIDENT R-ROUTINE/PERIODIC C-COMPLAINT N-NPDES F-FOLLOWUP/CLEANUP O-OTHER (specify) TRP PHASE II

BASE SAMPLE NUMBER: 6P 85 0038

OEHL PID:

ANALYSES REQUESTED (check appropriate blocks)

	GROUP A		Hardness	00900		Residue, Settleable	50086		GROUP T
	Ammonia	00610	Iron	01045		Residue, Volatile	00505		Bromoform 32104
	Chemical Oxygen Demand	00340	Lead	01051		Silica	00955		Bromodichloromethane 32101
	Kjeldahl Nitrogen	00625	Magnesium	00927		Specific Conductance	00095		Carbon Tetrachloride 32102
	Nitrate	00620	Manganese	01055		Sulfate	00945		Chloroform 32106
	Nitrite	00615	Mercury	71900		Sulfite	00740		Chloromethane 34418
X	Oil & Grease	00560	Nickel	01067		Surfactants -MBAS	38260		Dibromochloromethane 32105
X	Organic Carbon	00680	Potassium	00937		Turbidity	00076		Methylene Chloride 34423
	Orthophosphate	00671	Selenium	01147					Tetrachloroethylene 34475
	Phosphorus, Total	00665	Silver	01077					1,1,1-Trichloroethane 34506
			Sodium	00929		GROUP H			Trichloroethylene 39180
	GROUP D		Thallium	01059		BHC Isomers	39340		Trihalomethanes 82080
	Cyanide, Total	00720	Zinc	01092		Chlordane	39350		PCBs 39516
	Cyanide, Free	00722				DDT Isomers	39370	X	Volatile Organic Analysis (EPA 601, 602)
						Dieldrin	39380		
	GROUP E		GROUP G			Endrin	39390		
	Phenols	32730	Acidity, Total	70508		Heptachlor	39410		
			Alkalinity, Total	00410		Heptachlor Epoxide	39420		
	GROUP F		Alkalinity, Bicarbonate	00425		Lindane	39782		
	Antimony	01097	Bromide	71870		Methoxychlor	39480		
	Arsenic	01002	Carbon Dioxide	00405		Toxaphene	39400		
	Barium	01007	Chloride	00940		2,4-D	39730		ON SITE ANALYSES
	Beryllium	01012	Color	00080		2,4,5-TP-Silvex	39760		Parameter / Value
	Boron	01022	Fluoride	00951		2,4,5-T	39740		Flow 50050 mgd
	Cadmium	01027	Iodide	71865					Chlorine Residual 50060 mg/l
	Calcium	00916	Odor	00086					Dissolved Oxygen 00300 mg/l
	Chromium, Total	01034	Residue, Total	00500					pH 00400 units
	Chromium VI	01032	Residue, Filterable (TDS)	70300		GROUP J			Temperature 00010 °C
	Copper	01042	Residue, Nonfilterable	00530		Sulfides	00745		

COMMENTS

AR301101

U.S. GOVERNMENT PRINTING OFFICE: 1987-366-677

ENVIRONMENTAL SAMPLING DATA

OEHL USE ONLY

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SAMPLING SITE IDENTIFIER (AFR 19-7): P6 0037

BASE WHERE SAMPLE COLLECTED: OLMSTED AFB

SAMPLING SITE DESCRIPTION: DUPLICATE

DATE COLLECTION BEGAN (YYMMDD): 18,5,10,8,10,21

TIME COLLECTION BEGAN (24 hour clock):

COLLECTION METHOD: [X] GRAB [ ] COMPOSITE _____ HOURS

MAIL REPORTS TO (circle if changed)
ORIGINAL: Lt. Col. R. Lovelace HQ USAF/SGES, Bolling AFB DC 20332
COPY 1: RF Weston, Western Way West Chester, PA 19380 Attn Fred Bell
COPY 2:

SAMPLE COLLECTED BY (Name, Grade, AFSC): T. TERRELL

SIGNATURE:

AUTOVON:

REASON FOR SUBMISSION: [ ] A-ACCIDENT/INCIDENT [ ] R-ROUTINE/PERIODIC [ ] C-COMPLAINT [ ] N-NPDES [ ] F-FOLLOWUP/CLEANUP [ ] O-OTHER (specify) TRP PHASE II

BASE SAMPLE NUMBER: 6P 85 0037

OEHL PID:

ANALYSES REQUESTED (check appropriate blocks)

	GROUP A		Hardness 00900		Residue, Settleable 50086		GROUP T
	Ammonia 00610		Iron 01045		Residue, Volatile 00505		Bromoform 32104
	Chemical Oxygen Demand 00340		Lead 01051		Silica 00955		Bromodichloromethane 32101
	Kjeldahl Nitrogen 00625		Magnesium 00927		Specific Conductance 00095		Carbon Tetrachloride 32102
	Nitrate 00620		Manganese 01055		Sulfate 00945		Chloroform 32106
	Nitrite 00615		Mercury 71900		Sulfite 00740		Chloromethane 34418
X	Oil & Grease 00560		Nickel 01067		Surfactants -MBAS 38260		Dibromochloromethane 32105
X	Organic Carbon 00680		Potassium 00937		Turbidity 00076		Methylene Chloride 34423
	Orthophosphate 00671		Selenium 01147				Tetrachloroethylene 34475
	Phosphorus, Total 00665		Silver 01077				1,1,1-Trichloroethane 34506
			Sodium 00929		GROUP H		Trichloroethylene 39180
	GROUP D		Thallium 01059		BHC Isomers 39340		Trihalomethanes 82080
	Cyanide, Total 00720		Zinc 01092		Chlordane 39350		PCBs 39516
	Cyanide, Free 00722				DDT Isomers 39370	X	Volatile Organic Analysis (EPA 601, 602)
					Dieldrin 39380		
	GROUP E		GROUP G		Endrin 39390		
	Phenols 32730		Acidity, Total 70508		Heptachlor 39410		
			Alkalinity, Total 00410		Heptachlor Epoxide 39420		
	GROUP F		Alkalinity, Bicarbonate 00425		Lindane 39782		
	Antimony 01097		Bromide 71870		Methoxychlor 39480		
	Arsenic 01002		Carbon Dioxide 00405		Toxaphene 39400		
	Barium 01007		Chloride 00940		2,4-D 39730		ON SITE ANALYSES
	Beryllium 01012		Color 00080		2,4,5-TP-Silvex 39760		Parameter / Value
	Boron 01022		Fluoride 00951		2,4,5-T 39740		Flow 50050 mgd
	Cadmium 01027		Iodide 71865				Chlorine, Total 50060 mg/l
	Calcium 00916		Odor 00086				Dissolved Oxygen 00300 mg/l
	Chromium, Total 01034		Residue, Total 00500				pH 00400 units
	Chromium VI 01032		Residue, Filterable (TDS) 70300		GROUP J		Temperature 00010 °C
	Copper 01042		Residue, Nonfilterable 00530		Sulfides 00745		

COMMENTS

AR301102

APPENDIX F

DRILLING LOGS AND WELL COMPLETION SUMMARIES

U. S. GOVERNMENT PRINTING OFFICE: 1982—366-677

ENVIRONMENTAL SAMPLING DATA

OEHL USE ONLY

(Use this space for mechanical imprint)

SAMPLING SITE IDENTIFIER (AFR 19-7): P G 0 3 9

BASE WHERE SAMPLE COLLECTED: OLMSTED AFB

SAMPLING SITE DESCRIPTION: FIELD BLANK

DATE COLLECTION BEGAN (YYMMDD): 8 5 0 7 3 0

TIME COLLECTION BEGAN (24 hour clock):

COLLECTION METHOD: [X] GRAB [ ] COMPOSITE _____ HOURS

MAIL REPORTS TO (circle if changed)
ORIGINAL: Lt. Col. R. Lombard HQ USAFSGES, Bolling AFB DC 20332
COPY 1: RE Johnston, Webster Way West Chester, PA 19380 Attn Fred Boyd
COPY 2:

SAMPLE COLLECTED BY (Name, Grade, AFSC): J. Jarosh

SIGNATURE:

AUTOVON:

REASON FOR SUBMISSION: A-ACCIDENT/INCIDENT R-ROUTINE/PERIODIC C-COMPLAINT N-NPDES F-FOLLOWUP/CLEANUP O-OTHER (specify) TRP PHASE II

BASE SAMPLE NUMBER: G P 8 5 1 0 3 9

OEHL PID:

ANALYSES REQUESTED (check appropriate blocks)

GROUP A		GROUP D		GROUP E		GROUP F	
Ammonia	00610	Cyanide, Total	00720	Phenols	32730	Antimony	01097
Chemical Oxygen Demand	00340	Cyanide, Free	00722			Arsenic	01002
Jeidahl Nitrogen	00625					Barium	01007
Nitrate	00620					Beryllium	01012
Nitrite	00615					Boron	01022
[X] Oil & Grease	00560					Cadmium	01027
[X] Organic Carbon	00680					Calcium	00916
Orthophosphate	00671					Chromium, Total	01034
Phosphorus, Total	00665					Chromium VI	01032
						Copper	01042

GROUP G		GROUP H		GROUP J	
Acidity, Total	70508	BHC Isomers	39340	Sulfides	00745
Alkalinity, Total	00410	Chlordane	39350		
Alkalinity, Bicarbonate	00425	DDT Isomers	39370		
Bromide	71870	Dieldrin	39380		
Carbon Dioxide	00405	Endrin	39390		
Chloride	00940	Heptachlor	39410		
Color	00080	Heptachlor Epoxide	39420		
Fluoride	00951	Lindane	39782		
Iodide	71865	Methoxychlor	39480		
Odor	00086	Toxaphene	39400		
Residue, Total	00500	2,4-D	39730		
Residue, Filterable (TDS)	70300	2,4,5-TP-Silvex	39760		
Residue, Nonfilterable	00530	2,4,5-T	39740		

GROUP T	
Bromoform	32104
Bromodichloromethane	32101
Carbon Tetrachloride	32102
Chloroform	32106
Chloromethane	34418
Dibromochloromethane	32105
Methylene Chloride	34423
Tetrachloroethylene	34475
1,1,1-Trichloroethane	34506
Trichloroethylene	39180
Trihalomethanes	82080
PCBs	39516
[X] Volatile Organic Analysis (EPA 601, 602)	

Residue, Settleable	50086
Residue, Volatile	00505
Silica	00955
Specific Conductance	00095
Sulfate	00945
Sulfite	00740
Surfactants -MBAS	38260
Turbidity	00076

ON SITE ANALYSES

Parameter		Value
Flow	50050	mgd
Chlorine, Total	50060	mg/l
Dissolved Oxygen	00300	mg/l
pH	00400	units
Temperature	00010	°C

COMMENTS

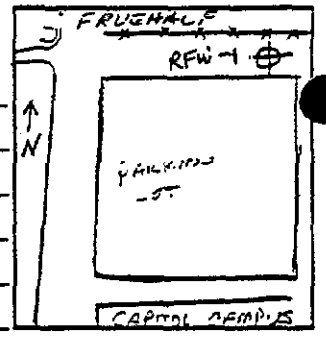
AF30110

WESTON

WELL LOG

Page 1 of 2

Location



Well No. RFW-1 Drill Company DUNCAN BROS. Log By M. DZEDZY

Client WIE - Olmsted Driller MIKE Field Book No.

Job No. 0628-05-50 Date Began 11/14/84 End Log Date

Drilling Method AIR ROTARY Rig DAVEY M-7

Sampling Method SPLIT SPOON/CUTTINGS No Samples

Casing Size and Type 8" STEEL 0-10' 6" STAINLESS STEEL 0-20' Screen Size NONE Joint Type WELD Pipe Length 20'

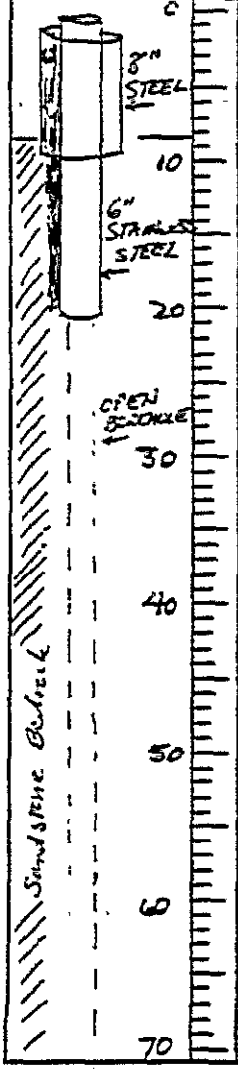
Type of Pack NONE Type of Sea QUICKSET CEMENT, PORTLAND CEMENT

Emplacement Method NA Emplacement Method P

Interval NA Interval 0-20'

Development Method AIR PRESSURE Gallons Removed

Comments TOTAL DEPTH = 104'; NO SCREEN SINCE BEDROCK MATERIAL IS OPEN HOLE, 20-104'

Lithology and Well Construction	Depth	Sample No.	Interval	Recovery	Blow Counts	Description	Remarks
			0-.5' .5-6' 6' 6-8' 8' 8-30' 30-37' 37-59' 60-71'			Topsoil. Dark red (10YR 3/3) SILT w/f. sand & tr. c. sand, dry. Rock ledge - tr. water. Dark red CLAY, silty, moist. Auger refusal. Limestone chunk. Dark red micaceous SANDSTONE, dry. Same as above, mixed w/ frags of gray, qtzitic sandstone, slight increase in moisture. Same as above, dry. Red SANDSTONE, moist.	

AR301105

WESTON DESIGNERS CONSULTANTS

WELL LOG

Page 1 of 1

Well No. REW-2 Drill Company Bowser Morner Log By M. DEEDY

Client USAF-Olmsted Driller DAN HOOPE Field Book No.

Job No. 06.28-CS-SC Date Began 11/13/85 End 11/13/85 Log Date

Drilling Method Hollow Stem Auger Rig

Sampling Method Split Spoon / Cuttings No Samples

Casing Size and Type 4" Stainless Steel Screen Size 0.020 inch Joint Type Screen Pipe Length

Type of Pack Natural Sand and Gravel Type of Seal Bentonite Pellets ; Portland Type I Cement

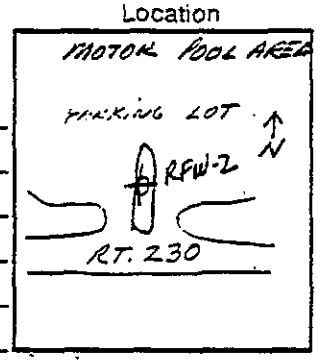
Emplacement Method Collapse, Pour Emplacement Method Pour ; Pour

Interval 8-30' Interval 6-8' ; 0-6'

Development Method Pump Gallons Removed

Comments TOTAL DEPTH = 30'

Location



Lithology and Well Construction	Depth	Sample No.	Interval	Recovery	Blow Counts	Description	Remarks
	0					0-1' Topsoil.	
	5					1-5' Reddish brown (10yr 4/4) SILT, trace v.f. SAND, dry.	
	7.5					5-7.5' Reddish brown (7.5yr 6/4) SILT, clayey.	
	12					7.5-12' Black brown (10yr 4/1) CLAY, silty, dry.	
	17	▽				12-17' Reddish brown (10yr 4/3) SILT, little f SAND, tr. gryl & cobbles	WET @ 17'
	20	#1		1.0	16-32-34		
	25					18.5-25' SAND.	
	30	SS #2			12/9/14	25.5-28.5 - Black brown SILT, clayey. w/ little f-med SAND, WET	
	35					28.5-28.8 Red brown (5yr 3/2) SAND, silty, WET.	
	40					29-42.5 Black brown CLAY, silty, trace sand.	
	45					42.5 REFUSAL.	

AR301106

WESTON

WELL LOG

Well No. RFW-1 Client USAF Job No. 0628-05-50 Log By M. DEDAY

Lithology and Well Construction	Depth	Sample No.	Interval	Recovery	Blow Counts	Description	Remarks
	70		72'			Red sandstone, increasing in moisture	
			73'			Wet dark reddish brown sandstone, medium to coarse, micaceous.	
	80						
			87'			Thin seam of fine grained red sandstone.	
	90		88'			Coarse sandstone with quartzitic pieces.	
	100						
	104					BOTTOM OF BORING	

WESTON ENGINEERS CONSULTANTS

Location

WELL LOG

Page 1 of 1

Well No. REW-4 Drill Company DUNCAN BROS/ BOWSER-MORNER Log By Ray SCHEINFELD

Client USAF-Olmsted Driller MIKE/D. MOORE Field Book No.

Job No. 0628-05-50 Date Began 11/14/84 End Log Date

Drilling Method AUGER / AIR ROTARY (AUGER SET WELL) Rig MOBILE B-50

Sampling Method Split Spoon / CUTTINGS No Samples

Casing Size and Type 4" STAINLESS STEEL Screen Size Joint Type SCREW Pipe Length

Type of Pack SAND Type of Seal BENTONITE PELLETS ; CEMENT GROUT

Emplacement Method POUR Emplacement Method POUR; POUR

Interval 8' - 29.2' Interval 6-8' ; 0-6'

Development Method PUMP Gallons Removed

Comments TOTAL DEPTH = 29.2' SCREENED FROM 9-29.2'

Lithology and Well Construction	Depth	Sample No.	Interval	Recovery	Blow Counts	Description	Remarks
			0-2.5'			Brown SILT, little f. SAND, some med. grvl., dry.	OVA (ppm) 0
			2.5-4'			Dark brown med-f. sandy SILT, some med. grvl.	0
	5		4-5'			Light brown SILT, little f. SAND, dry.	0
			5-12.5'			Dark brown med-c. gravelly SILT, some f-med, poorly sorted SAND. Grvl. well rounded.	
	10		12.5'			Same as above. Moist.	0
	15		18'			Brown/black med-c. SILT, gravelly & sandy. Some med. SAND.	
		SS-1	19-19.5'	3"	100/11/10	Red SANDSTONE, micaceous, weathered.	
	20		19-27.5			Red SANDSTONE, dry.	0 OVA READING 1" INSIDE AUGERS 50ppm @ 10:11 hrs. 10:18 20ppm 10:29 0 ppm
	30					Refusal	3 TELEDYNE EXPLOSIMETER.

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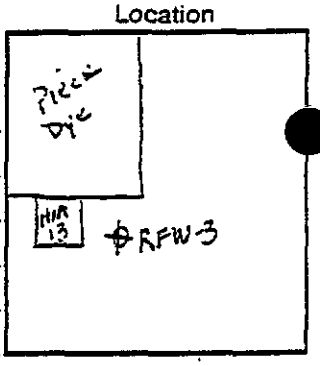
WESTON

WELL LOG

Page 1 of

Location



Well No. RFW-3 Drill Company BOUSCHER MCKINNER Log By D. HOOP

Client USAF Driller D. HOOP Field Book No.

Job No. 0628-05-50 Date Began End Log Date

Drilling Method HOLLOW STEM AUGER Rig MOBILE B-150

Sampling Method SPLIT SPOON No Samples

Casing Size and Type 4" STAINLESS STEEL Screen Size 0.010 inch Joint Type SCREW Pipe Length

Type of Pack SAND Type of Seal BENTONITE PELLETS/CEMENT GROUT

Emplacement Method POUR Emplacement Method POUR

Interval 3-25' Interval 1-3' ; 0-1'

Development Method PUMP Gallons Removed

Comments TOTAL DEPTH = 25'

Lithology and Well Construction	Depth	Sample No.	Interval	Recovery	Blow Counts	Description	Remarks
	0					Topsoil Brown silt, some clay and gravel, trace sand and cobbles Moist at 6'.	
	6						
	10					Brown sand and gravel, some silt and cobbles, wet.	
	11						
	20					Cobbles	
	26					Auger refusal.	

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WESTON DESIGNERS CONSULTANTS

Location: NEXT TO WRIGHT MW-6 ON AMMUNITION AREA

WELL LOG

Page 1 of 1

Well No. RFW-6 Drill Company DUNCAN BROS. Log By M. DZEDZY

Client USAF - District Driller MIKE Field Book No.

Job No. 0628-05-50 Date Began 5/21/85 End 5/24/85 Log Date

Drilling Method Air Rotary Rig DAVEY M-7

Sampling Method SPLIT SPOON / CUTTINGS No Samples

Casing Size and Type 8" STEEL 0-40, 6" STAINLESS 0-50 Screen Size NONE Joint Type WELD Pipe Length 50'

Type of Pack NONE Type of Seal QUICKSET CEMENT, PORTLAND CEMENT

Emplacement Method NA Emplacement Method POUR

Interval NA Interval 0-50

Development Method AIR PRESSURE Gallons Removed

Comments TOTAL DEPTH = 123'; NO SCREEN SINCE BEDROCK INTERVAL IS OPEN HOLE, 50-123'

Lithology and Well Construction	Depth	Sample No.	Interval	Recovery	Blow Counts	Description	Remarks
	10		0-22'			Dark brown sandy CLAY. Large grvl. and cobbles, wet	
	20						
	30						
	38					SHALE.	
	40						
	47					Red SANDSTONE, med., w/ small pebbles.	
	50						
	58					Red SANDSTONE, dry.	
	61					Red SANDSTONE, f, micaceous, moist.	
	69					Same red sandstone, dry.	
sandstone bedrock							
	103					Same red sandstone, little water.	
	123						

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WESTON

Location

WELL LOG

Page 1 of 1

Well No. RFW-5 Drill Company BOWSER-MORNER Log By

Client USAF-Olmsted Driller DAN HOOP Field Book No.

Job No. 0628-05-50 Date Began 5/30/85 End 5/31/85 Log Date

Drilling Method AUGER Rig MOBILE B-150

Sampling Method SPLIT SPOON / CUTTINGS No.Samples

Casing Size and Type 4" STAINLESS STEEL Screen Size Joint Type SCREW Pipe Length

Type of Pack NATURAL SAND AND GRAVEL Type of Seal 2' BENTONITE PELLET; CEMENT

Emplacement Method COLLAPSE / POUR Emplacement Method POUR; POUR

Interval 18-29.8' Interval 16-18'; 0-16'

Development Method PUMP Gallons Removed

Comments TOTAL DEPTH = 29.8'

Lithology and Well Construction	Depth	Sample No.	Interval	Recovery	Blow Counts	Description	Remarks
Cement	0		0-1.5'			Reddish brown topsoil.	
			1.5-			Dark brown COBBLES w.r. rounded, and f-med SAND.	
	10	SS-1	10-11.5	12"	37,27,50/4	Dark brown, red, black-organic SAND, med. and grvl, some angular, some rounded.	
Bent						COBBLES.	No cuttings returned.
Sand	20						
	30			0	100/1"	AUGER REFUSAL	

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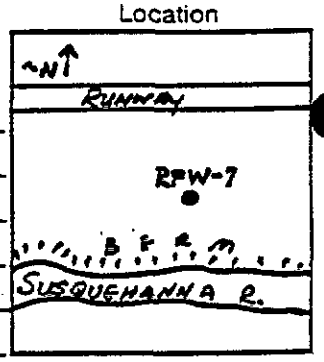
APPENDIX G

SAMPLING AND QUALITY ASSURANCE PLANS

WESTON

WELL LOG

Location



Well No. RFW-7 Drill Company BOWSER-MORNER Log By J. JORDAN

Client USAF-OLMSTED Driller DAN HOOP Field Book No.

Job No. Date Began 5/20/85 End 5/20/85 Log Date

Drilling Method HOLLOW STEM AUGER Rig

Sampling Method SPLITSPOON / CUTTINGS No Samples

Casing Size and Type 4" SEAMLESS STEEL Screen Size .20" LONG; .20 SLOT Joint Type SCREW Pipe Length 14'10"

Type of Pack SAND Type of Seal BENTONITE PELLETS ; PORTLAND TYPE I CEMENT

Emplacement Method POUR Emplacement Method POUR ; POUR

Interval 14'4" TO 24'10" Interval 11'10" TO 14'4" ; 11'10" TO SURFACE

Development Method PUMP Gallons Removed

Comments TOTAL DEPTH = 24'10"

Lithology and Well Construction	Depth	Sample No.	Interval	Recovery	Blow Counts	Description	Remarks OVA (ppm)
CEMENT / BENT. / SAND	5'	S-1	0-2'			TOPSOIL.	
			2-4'	10"/12"		FILL, dark gray SLAG, (angular).	0
		S-2	4-6'			Same as 2-4', moist.	
			6-8'			" " " "	
		S-3	8-10'			" " " "	
	10'	S-4		10"	3-40-45		
	15'						0
	20'	S-5	20-22'		45-40-45	Same as above, WET.	0
		S-6			100/3"		
			24-25.5			Reddish brown SAND, med, sub-rounded, WET.	
	25'						

ALL JOINTS ARE WELDED.

C CEMENT
S SAND
B BENTONITE

APPENDIX G

SAMPLING AND QA/QC PLANS

G-1.1 MONITOR WELL PURGING AND EQUIPMENT DECONTAMINATION

Monitor wells RFW-1 and RFW-6 were developed using air pressure, and had stabilized for at least two weeks prior to sampling. Monitor wells RFW-2, 3, 4, 5 and 7 were pumped until the water cleared and was free of sediment before sampling. All monitor wells were purged before sampling by pumping a minimum of three volumes of water standing in the well using either a submersible pump or a surface centrifuge pump. This procedure ensured that a sample representative of the groundwater in the aquifer would be collected. The field procedures used for monitor well purging included the following:

1. Prior to commencing sampling activities on 29 July, all sampling equipment was scrubbed with Alconox (detergent) solution, and rinsed with deionized water.

2. Before purging, the depth to water from the referenced measuring point on the top of the well casing was measured and recorded.

3. The volume of water to be purged was calculated, based on the amount of water standing in the well.

4. The well was purged by pumping or bailing, and at least three times the calculated well volume was removed. The two inactive production wells, HIA-17 and HIA-18, were pumped for one hour each prior to sampling.

5. The pump was removed from the well and rinsed with clean water between wells.

6. The protective caps were secured.

Prior to the sampling of production wells HIA-9, 11 and 13 and the active residential well at Lisa Lake, the wells were allowed to pump for at least 10 minutes. At the end of this time, the sampling tap was run long enough to clear standing water and begin sampling.

- Primary Drinking Water Pesticides: 1000 ml amber glass bottles.
- Primary Drinking Water Herbicides: 1000 ml amber glass bottles.
- TOC: 60 ml septum seal glass vials preserved with sulfuric acid.
- VOA: 40 ml septum seal glass vials
- Oil and Grease: 1 liter amber glass bottles, preserved with sulfuric acid.

All glass containers have Telfon-lined caps.

3. The appropriate identification labels were affixed to every sample container. The sample containers were wrapped in packing material and placed in a thermal chest, packed with enough ice to ensure cooling to 4°C.

4. Grab samples were taken and immediately analyzed in the field for pH, temperature, and specific conductance.

G-1.4 QUALITY ASSURANCE PLAN

WESTON Analytical Services enforces a rigid QA/QC program toward maintenance of validity and reliability of all analytical data. The Laboratory QA/QC Manual outlines the specifics of the QA/QC plan. This plan is patterned after the EPA Handbook for Analytical Quality Control in Water and Wastewater Laboratories (EPA-600/4-79-019, March 1979), All methods and procedures followed by WESTON are either USEPA or ASTM-approved. Any variations from such procedures, regardless of cause, are documented by the responsible analyst(s) and are documentable, and, literature-traceable. A general review of this QA/QC plan is in the following paragraphs.

Although specific QA/QC measures for each method are designated in WESTON's Laboratory Quality Assurance Manual, the general QA/QC program normally includes:

- EPA-acceptable sample preparation and analytical methods.
- Instrument calibration via use of Standard Analytical Reference Materials (SARMS).
- Regular equipment maintenance and servicing.

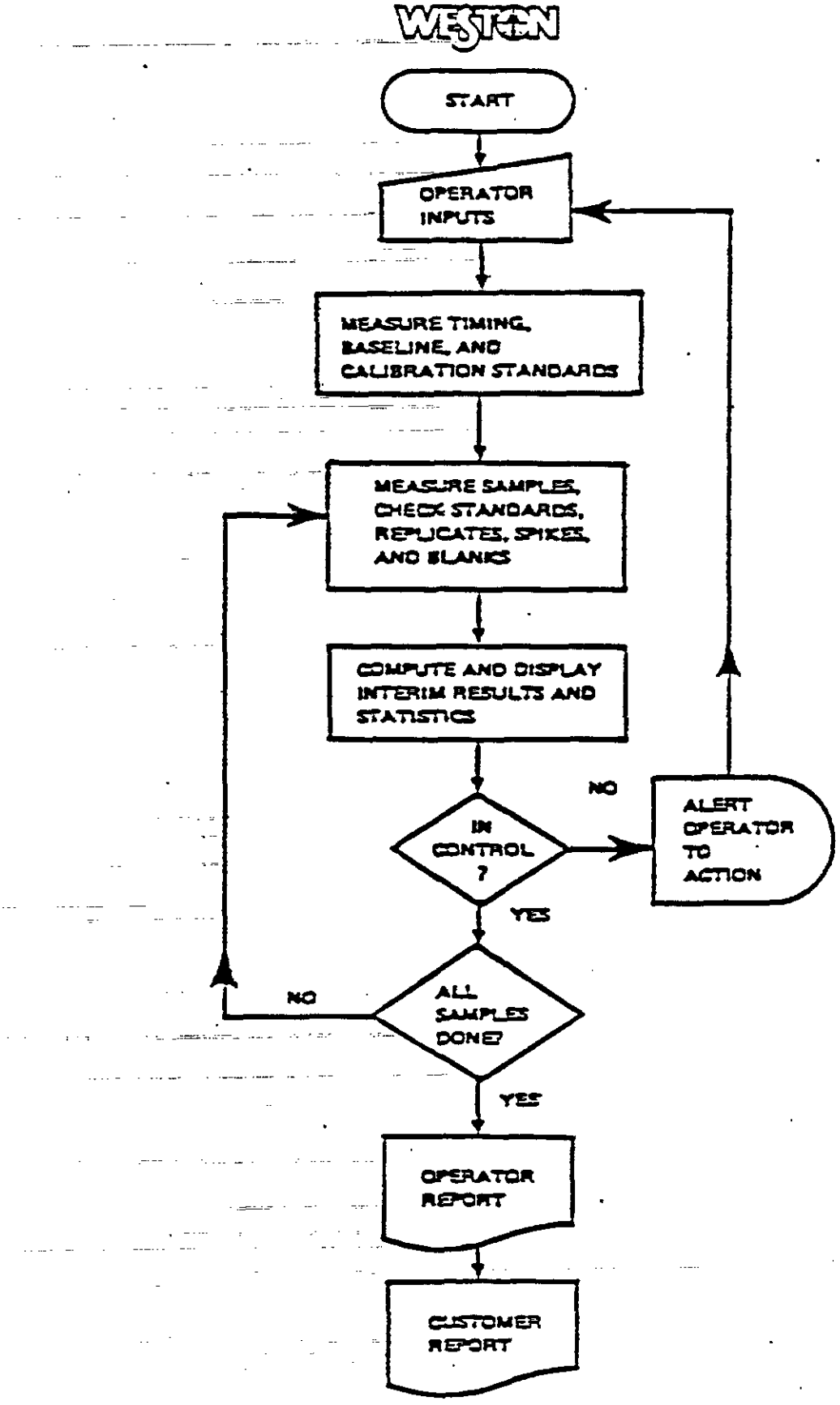


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Figure G-1 Flow Chart of the Sequence of Events during a Controlled Series of Laboratory Measurements.

Groundwater sampling was directed toward the detection of:

1. Nitrate
2. Fluoride
3. Primary Drinking Water Metals
4. Turbidity
5. Total Coliform
6. Primary Drinking Water Pesticides
7. Primary Drinking Water Herbicides
8. Total Organic Carbon (TOC)
9. Volatile Organic Compounds (VOA)
10. Oil and Grease

Table 1-2 presents an outline of the Phase II sampling program. All required sample containers were prepared by WESTON's laboratory in accordance with Standard EPA procedures and protocols.

After the wells were purged, sampling consisted of the following steps:

1. Sample containers for inorganic parameters were filled from the pump line. Samples for organic parameters were bailed from the well using a Teflon bailer. Ground water samples from the HIA production wells were collected from a sampling spigot. The sample from the active residential well at Lisa Lake was collected directly from the hand pump discharge.

2. Appropriate containers were filled according to the analytical parameter. The containers used were:

   - o Nitrate: 250 liter plastic bottles preserved with sulfuric acid.
   - o Fluoride: 1000 ml plastic bottles
   - o Primary Drinking Water Metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium, silver): The water sample was collected in a clear plastic bottle, filtered through an 0.45 micron filter, then poured into a 1 liter plastic bottle preserved with nitric acid.
   - o Turbidity: 1000 ml plastic bottle
   - o Total Coliform: 250 ml plastic bottle preserved with sodium thiosulfate to remove residual chlorine.

- o Comparability - Is the report self-consistent in format, units, and standardization of methods used to generate it? QA/QC shall ensure this.

Additionally, statistical methods outlined in the QA/QC program have been applicable to data evaluation.

The Laboratory Supervisor and the Laboratory QA/QC Officer have been responsible for the evaluation of the above criteria and for enforcement of analytical protocols that will necessarily lead to acceptable data quality. The signature of the Supervisor and QA/QC Officer accompany each laboratory analytical report and serve to ensure the overall validity of the reported data.

G.1.8 SAMPLE PLAN/LOG

Normal protocol demands client-and /or site-specific logging of all sample batches delivered to WESTON. Basic information, such as client name, address, etc.; client phone number; reporting/invoicing instructions; site descriptions; and parameter-specifications and total requirements is initiated here. Additionally, sample storage/disposal instructions as well as turnaround requirements and sample collection requirements are addressed at this point.

The appropriate number of method blanks is also logged at this point, and in-house chain-of-custody documentation is initiated here.

G.1.9 SAMPLE RESULTS

WESTON's analytical protocols generally require five-point calibration curve plus a reagent blank which is the basis for quantification analytes from a linear calibration curve. (A three-point plus blank curve vs. the original five point one is acceptable if it falls within the QA/QC requirements of ±3 standard deviation of the original curve.) Linear

- Use of SARMS and QA/QC samples (spikes, laboratory blanks, replicates, and splits) to ascertain overall precision.
- Statistical evaluation of data to delineate acceptable limits.
- Documentation of system/operator performance.
- Suitable chain-of-custody procedures.
- Maintenance and archiving of all records, charts, and logs generated in the above.
- Proper reporting.

Acceptable analyses at WESTON's Analytical Laboratory Services include, but are not limited to, the above.

In general, WESTON's QA/QC sequence follows the following diagram (Figure G-1). Documentation (as available from instrument recordings and technicians' notebooks) is sufficient to validate each step in the sequence.

G.1.5 CONTAINER PREPARATION

Another consideration in this, or any, analytical project is that of sample container preparation. Accordingly, all appropriate sample bottles shall be cleaned in a manner mandated by the U.S. EPA to insure maximal cleanliness (and minimal contamination) before the containers go to the field. Sufficient bottles to accommodate both laboratory and field blank requirements will be preferred in a single batch mode for each sampling requirement.

G.1.6 VERIFICATION/VALIDATION

In the laboratory, the analytical scheme begins with initial verification, which is comprised of:

- Lab Blanks - To insure that no background level of specific analytes is introduced by laboratory procedures.

(refrigerators, extraction areas, analytical areas, etc.) within the laboratory. Each transaction for each sample is accompanied by a specific reason for transfer.

G.1.11 QA/QC OFFICER

Toward maintenance of a rigid, credible QA/QC regimen, WESTON Analytical Services maintains a full-time, in-house QA/QC officer who retains independent authority to declare out-of-control situations, thereby precluding reporting of unacceptable data. The QA/QC officer has been available, as needed, on the project.

- Standard Analytical Reference Materials (SARMS) - To determine the accuracy and precision of procedures.

- Spikes - To determine the percent recovery of analyte(s).

If the laboratory QA/QC program is extended to the field, it includes a fifth item:

- Field Blanks - To provide a check on contamination of containers and/or preservatives and to establish "practical" detection limits.

WESTON has used all of the above in this project. Additional field blanks and duplicate samples were collected for the purpose of validating field and analytical procedures. Duplicates were collected as separate samples, not splits of a single sample. The sample collection methods and equipment used were identical to those used in actual sample collection.

G.1.7 DATA HANDLING - LABORATORY

Use of any analytical data should be preceded by an assessment of its quality. The assessment should be based on accuracy, precision, completeness, representativeness, and comparability. These criteria are, in turn, assessed as follows:

- Accuracy - Is it acceptable for the planned use? QA/QC shall measure the accuracy of all data.

- Precision - Is it acceptable for the planned use? QA/QC shall reflect the reproducibility of the measurements.

- Completeness - Are the data sufficient for the planned use? QA/QC shall identify the quantity of data needed to match the goals.

- Representativeness -Do the data accurately reflect actual site conditions, sampling procedures, and analytical method? QA/QC shall ensure this.

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APPENDIX H

STANDARD LABORATORY ANALYTICAL PROTOCOLS

regression analysis is then performed. Method- and detection limit-specific data are accessed for quantitation and report-writing from each such data set. For reporting accuracy, the algorithm

$$\frac{\text{Linear-Regressed Raw Concentration from Calibration Curve} \times \text{Solid Sample Extract Volume If Solid}}{\text{Solid Sample Mass If Solid} \times \text{Fraction Solids If Solid}} \times \text{Concentration or Dilution Factor} = \text{Final Concentration}$$

is used for all quantitations. (All such algorithm input data are archived for long-term storage.) Detection limits for solids are generated on a per-sample basis and calculated by replacing "LINEAR-REGRESSED RAW CONCENTRATION FROM CALIBRATION CURVE" with "DETECTION LIMIT OF ANALYTE IN LIQUID MATRIX" in the above equation.

G.1.10 SAMPLE SHIPPING AND DOCUMENTATION

Since they document the history of samples, chain-of-custody procedures are a crucial part of a sampling/analysis program. Chain-of-custody documentation enables identification and tracking of a sample from collection to analysis to reporting.

WESTON's chain-of-custody program necessitates the use of approved sample labels, secure custody, and attendant recordkeeping.

In essence, WESTON considers a sample in custody if it: is in a WESTON employee's physical possession; it is in view of that WESTON employee; is secured by that WESTON employee to prevent tampering; or is secured by that WESTON employee in an area that is restricted to authorized personnel.

All the sampling chests shipped or transported personally to the laboratory were accompanied by completed chain-of-custody forms. In addition, all samples shipped to OEHL were accompanied by a completed Form AF-2752.

Each time a sample is relinquished from one analyst to another or from one major location to another, WESTON's personnel are required to make appropriate entries. Personnel-specific initials are used as identifiers of analysts, as are location codes for various locations

ORGANIC CARBON, TOTAL

Method 415.1 (Combustion or Oxidation)

STORET NO. Total 00680
Dissolved 00681

1. Scope and Application
   1.1 This method includes the measurement of organic carbon in drinking, surface and saline waters, domestic and industrial wastes. Exclusions are noted under Definitions and Interferences.
   1.2 The method is most applicable to measurement of organic carbon above 1 mg/l.
2. Summary of Method
   2.1 Organic carbon in a sample is converted to carbon dioxide (CO_2) by catalytic combustion or wet chemical oxidation. The CO_2 formed can be measured directly by an infrared detector or converted to methane (CH_4) and measured by a flame ionization detector. The amount of CO_2 or CH_4 is directly proportional to the concentration of carbonaceous material in the sample.
3. Definitions
   3.1 The carbonaceous analyzer measures all of the carbon in a sample. Because of various properties of carbon-containing compounds in liquid samples, preliminary treatment of the sample prior to analysis dictates the definition of the carbon as it is measured. Forms of carbon that are measured by the method are:
      A) soluble, nonvolatile organic carbon; for instance, natural sugars.
      B) soluble, volatile organic carbon; for instance, mercaptans.
      C) insoluble, partially volatile carbon; for instance, oils.
      D) insoluble, particulate carbonaceous materials, for instance; cellulose fibers.
      E) soluble or insoluble carbonaceous materials adsorbed or entrapped on insoluble inorganic suspended matter; for instance, oily matter adsorbed on silt particles.
   3.2 The final usefulness of the carbon measurement is in assessing the potential oxygen-demanding load of organic material on a receiving stream. This statement applies whether the carbon measurement is made on a sewage plant effluent, industrial waste, or on water taken directly from the stream. In this light, carbonate and bicarbonate carbon are not a part of the oxygen demand in the stream and therefore should be discounted in the final calculation or removed prior to analysis. The manner of preliminary treatment of the sample and instrument settings defines the types of carbon which are measured. Instrument manufacturer's instructions should be followed.

Approved for NPDES
Issued 1971
Editorial revision 1974

7.5 Carbonate-bicarbonate, standard solution: Prepare a series of standards similar to step 7.3.

NOTE 3: This standard is not required by some instruments.

7.6 Blank solution: Use the same distilled water (or similar quality water) used for the preparation of the standard solutions.

8. Procedure

8.1 Follow instrument manufacturer's instructions for calibration, procedure, and calculations.

8.2 For calibration of the instrument, it is recommended that a series of standards encompassing the expected concentration range of the samples be used.

9. Precision and Accuracy

9.1 Twenty-eight analysts in twenty-one laboratories analyzed distilled water solutions containing exact increments of oxidizable organic compounds, with the following result:

Increment as TOC mg/liter	Precision as Standard Deviation TOC, mg/liter	Accuracy as Bias, %	Accuracy as Bias, mg/liter
4.9	3.93	+15.27	+0.75
107	8.32	+ 1.01	+1.08

(FWPCA Method Study 3, Demand Analyses)

Bibliography

1. Annual Book of ASTM Standards, Part 31, "Water", Standard D 2574–79, p 469 (1976).
2. Standard Methods for the Examination of Water and Wastewater, 14th Edition, p 532, Method 505, (1975).

WESTON

OIL AND GREASE METHOD

The method used by the WESTON Laboratory for U.S. Air Force contract analyses through 13 September 1985 is described in the following pages.

Scope

This method is applicable to the determination of oil and grease in water samples.

Summary of Method

Oil and grease is extracted from water with 1,1,2-trichloro-1,2,2-trifluoroethane. The extract is analyzed by infrared at 2930 cm^{-1}.

Apparatus

1. Infrared spectrophotometer
2. 50 mm liquid IR cell
3. Magnetic Stirrer
4. 25 ml pipet

Reagents

1. 1,1,2-trichloro-1,2,2-trifluoroethane (freon)
2. Paraffin oil, NF

Procedure

1. 25 ml of 1,1,2-trichloro-1,2,2-trifluoroethane are added directly to the 1 liter sample container with a teflon-coated magnetic stirring bar.
2. The mixture is stirred at least one hour.
3. The mixture is allowed to settle, and the freon is withdrawn with a pipet.
4. The freon is placed in the IR cell and the absorbance is read.

AR300127

4. Sample Handling and Preservation

4.1 Sampling and storage of samples in glass bottles is preferable. Sampling and storage in plastic bottles such as conventional polyethylene and cubitainers is permissible if it is established that the containers do not contribute contaminating organics to the samples.
NOTE 1: A brief study performed in the EPA Laboratory indicated that distilled water stored in new, one quart cubitainers did not show any increase in organic carbon after two weeks exposure.

4.2 Because of the possibility of oxidation or bacterial decomposition of some components of aqueous samples, the lapse of time between collection of samples and start of analysis should be kept to a minimum. Also, samples should be kept cool (4°C) and protected from sunlight and atmospheric oxygen.

4.3 In instances where analysis cannot be performed within two hours (2 hours) from time of sampling, the sample is acidified ($pH \leq 2$) with HCl or H_2SO_4.

5. Interferences

5.1 Carbonate and bicarbonate carbon represent an interference under the terms of this test and must be removed or accounted for in the final calculation.

5.2 This procedure is applicable only to homogeneous samples which can be injected into the apparatus reproducibly by means of a microliter type syringe or pipette. The openings of the syringe or pipette limit the maximum size of particles which may be included in the sample.

6. Apparatus

6.1 Apparatus for blending or homogenizing samples: Generally, a Waring-type blender is satisfactory.

6.2 Apparatus for total and dissolved organic carbon:

6.2.1 A number of companies manufacture systems for measuring carbonaceous material in liquid samples. Considerations should be made as to the types of samples to be analyzed, the expected concentration range, and forms of carbon to be measured.

6.2.2 No specific analyzer is recommended as superior.

7. Reagents

7.1 Distilled water used in preparation of standards and for dilution of samples should be ultra pure to reduce the carbon concentration of the blank. Carbon dioxide-free, double distilled water is recommended. Ion exchanged waters are not recommended because of the possibilities of contamination with organic materials from the resins.

7.2 Potassium hydrogen phthalate, stock solution, 1000 mg carbon/liter: Dissolve 0.2128 g of potassium hydrogen phthalate (Primary Standard Grade) in distilled water and dilute to 100.0 ml.
NOTE 2: Sodium oxalate and acetic acid are not recommended as stock solutions.

7.3 Potassium hydrogen phthalate, standard solutions: Prepare standard solutions from the stock solution by dilution with distilled water.

7.4 Carbonate-bicarbonate, stock solution, 1000 mg carbon/liter: Weigh 0.3500 g of sodium bicarbonate and 0.4418 g of sodium carbonate and transfer both to the same 100 ml volumetric flask. Dissolve with distilled water.

United States
Environmental Protection
Agency

Environmental Monitoring and
Support Laboratory
Cincinnati OH 45268

Research and Development

EPA

Test Method

Purgeable Halocarbons—Method 601

1. Scope and Application

1.1 This method covers the determination of 29 purgeable halocarbons. The following parameters may be determined by this method:

Parameter	STORET No.	CAS No.
Bromodichloromethane	32101	75-27-4
Bromoform	32104	75-25-2
Bromomethane	34413	74-83-9
Carbon tetrachloride	32102	56-23-5
Chlorobenzene	34301	108-90-7
Chloroethane	34311	75-00-3
2-Chloroethylvinyl ether	34576	100-75-8
Chloroform	32106	67-66-3
Chloromethane	34418	74-87-3
Dibromochloromethane	32105	124-48-1
1,2-Dichlorobenzene	34536	95-50-1
1,3-Dichlorobenzene	34566	541-73-1
1,4-Dichlorobenzene	34571	106-46-7
Dichlorodifluoromethane	34668	75-71-8
1,1-Dichloroethane	34496	75-34-3
1,2-Dichloroethane	34531	107-06-2
1,1-Dichloroethene	34501	75-35-4
trans-1,2-Dichloroethene	34546	156-60-5
1,2-Dichloropropane	34541	78-87-5
cis-1,3-Dichloropropene	34704	10061-01-5
trans-1,3-Dichloropropene	34699	10061-02-6
Methylene chloride	34423	75-09-2
1,1,2,2-Tetrachloroethane	34516	79-34-5
Tetrachloroethene	34475	127-18-4
1,1,1-Trichloroethane	34506	71-55-6
1,1,2-Trichloroethane	34511	79-00-5
Trichloroethene	39180	79-01-6
Trichlorofluoromethane	34488	75-69-4
Vinyl chloride	39175	75-01-4

1.2 This is a purge and trap gas chromatographic method applicable to the determination of the compounds listed above in municipal and industrial discharges as provided under 40 CFR 136.1. When this method is used to analyze unfamiliar samples for any or all of the compounds above, compound identification should be supported by at least one additional qualitative

not be heated higher than 180 °C and the remaining sections should not exceed 220 °C. The desorber design, illustrated in Figure 2, meets these criteria.

5.2.4 The purge and trap device may be assembled as a separate unit or be coupled to a gas chromatograph as illustrated in Figures 3 and 4.

5.3 Gas chromatograph—An analytical system complete with a temperature programmable gas chromatograph suitable for on-column injection and all required accessories including syringes, analytical columns, gases, detector, and strip-chart recorder. A data system is recommended for measuring peak areas.

5.3.1 Column 1—8 ft long × 0.1 in ID stainless steel or glass, packed with 1% SP-1000 on Carbopack B (60/80 mesh) or equivalent. This column was used to develop the method performance statements in Section 12. Guidelines for the use of alternate column packings are provided in Section 10.1.

5.3.2 Column 2—6 ft long × 0.1 in ID stainless steel or glass, packed with chemically bonded n-octane on Porasil-C (100/120) mesh or equivalent.

5.3.3 Detector—Electrolytic conductivity or microcoulometric. These types of detectors have proven effective in the analysis of wastewaters for the parameters listed in the scope. The electrolytic conductivity detector was used to develop the method performance statements and MDL listed in Tables 1 and 2. Guidelines for the use of alternate detectors are provided in Section 10.1.

5.4 Syringes—5-mL glass hypodermic with Luerlok tip (two each), if applicable to the purging device.

5.5 Micro syringes—25 μL, 0.006 in ID needle.

5.6 Syringe valve—2-way, with Luer ends (three each).

5.7 Syringe—5-mL, gas-tight with shut-off valve.

5.8 Bottle—15-mL, screw cap, with Teflon cap liner.

5.9 Balance—Analytical, capable of accurately weighing 0.0001 g.

6. Reagents

6.1 Reagent water—Reagent water is defined as a water in which an interferent is not observed at the MDL of the parameters of interest.

6.1.1 Reagent water can be generated by passing tap water through a carbon filter bed containing about 1 lb of activated carbon (Filtrasorb-300 or equivalent (Calgon Corp.)).

6.1.2 A water purification system (Millipore Super-Q or equivalent) may be used to generate reagent water.

6.1.3 Reagent water may also be prepared by boiling water for 15 minutes. Subsequently, while maintaining the temperature at 90 °C, bubble a contaminant-free inert gas through the water for one hour. While still hot, transfer the water to a narrow mouth screw-cap bottle and seal with a Teflon-lined septum and cap.

6.2 Sodium thiosulfate—(ACS) Granular.

6.3 Trap Materials

6.3.1 Coconut charcoal (6/10 mesh sieved to 26 mesh). (Barnaby Chaney, CA-580-26 lot # M-2649 or equivalent).

6.3.2 2,6-Diphenylene oxide polymer—Tenax, (60/80 mesh), chromatographic grade or equivalent.

6.3.3 Methyl silicone packing—3% OV-1 on 60/80 mesh Chromosorb-W or equivalent.

6.3.4 Silica gel—35/60 mesh, Davison, grade-15 or equivalent.

6.4 Methyl Alcohol—Pesticide quality or equivalent.

6.5 Stock standard solutions—Stock standard solutions may be prepared from pure standard materials or purchased as certified solutions. Prepare stock standard solutions in methyl alcohol using assayed liquids or gas cylinders as appropriate. Because of the toxicity of some of the organohalides, primary dilutions of these materials should be prepared in a hood. A NIOSH/MESA approved toxic gas respirator should be used when the analyst handles high concentrations of such materials.

6.5.1 Place about 9.8 mL of methyl alcohol into a 10-mL ground glass stoppered volumetric flask. Allow the flask to stand, unstoppered, for about 10 minutes or until all alcohol wetted surfaces have dried. Weigh the flask to the nearest 0.1 mg.

6.5.2 Add the assayed reference material:

6.5.2.1 Liquids—Using a 100-μL syringe, immediately add two or more drops of assayed reference material to the flask, then reweigh. Be sure that the drops fall directly into the alcohol without contacting the neck of the flask.

6.5.2.2 Gases—To prepare standards for any of the six halocarbons that boil below 30 °C (bromomethane, chloroethane, chloromethane, dichlorodifluoromethane, trichlorofluoromethane, vinyl chloride), fill a 5-mL valved gas-tight syringe with the reference standard to the 5.0-mL mark. Lower the needle to 5 mm above the methyl alcohol meniscus. Slowly introduce the reference standard above the surface of the liquid (the heavy gas will rapidly dissolve into the methyl alcohol).

6.5.3 Reweigh, dilute to volume, stopper, then mix by inverting the flask several times. Calculate the concentration in micrograms per microliter from the net gain in weight. When compound purity is assayed to be 96% or greater, the weight can be used without correction to calculate the concentration of the stock standard. Commercially prepared stock standards can be used at any concentration if they are certified by the manufacturer or by an independent source.

6.5.4 Transfer the stock standard solution into a Teflon-sealed screw-cap bottle. Store, with minimal headspace, at −10 to −20 °C and protect from light.

6.5.5 Prepare fresh standards weekly for the six gases and 2-chloroethylvinyl ether. All other standards must be replaced after one month, or sooner if comparison with check standards indicate a problem.

6.6 Secondary dilution standards—Using stock standard solutions, prepare secondary dilution standards in methyl alcohol that contain the compounds of interest, either singly or mixed together. The secondary dilution standards should be prepared at concentrations such that the aqueous calibration standards prepared in Sections 7.3.1 or 7.4.1 will bracket the working range of the analytical system. Secondary dilution standards should be stored with minimal headspace and should be checked frequently for signs of degradation or evaporation, especially just prior to preparing calibration standards from them. Quality check standards that can be used to determine the accuracy of calibration standards will be available from the U.S. Environmental Protection Agency Environmental Monitoring and Support Laboratory, in Cincinnati, Ohio.

water may be used in place of the reagent water, but one or more additional aliquots must be analyzed to determine background levels, and the spike level must exceed twice the background level for the test to be valid. Analyze the aliquots according to the method beginning in Section 10.

8.2.3 Calculate the average percent recovery, (R), and the standard deviation of the percent recovery (s), for the results. Wastewater background corrections must be made before R and s calculations are performed.

8.2.4 Using Table 2, note the average recovery (X) and standard deviation (p) expected for each method parameter. Compare these to the calculated values for R and s. If $s \geq 2p$ or $|X - R| \geq 2p$, review potential problem areas and repeat the test.

8.3 The analyst must calculate method performance criteria and define the performance of the laboratory for each spike concentration and parameter being measured.

8.3.1 The U.S. Environmental Protection Agency plans to establish performance criteria for R and s based upon the results of interlaboratory testing. When they become available, these criteria must be met before any samples may be analyzed.

8.3.1 Calculate upper and lower control limits for method performance:

Upper Control Limit (UCL) = R + 3s
Lower Control Limit (LCL) = R − 3s

where R and s are calculated as in Section 8.2.3. The UCL and LCL can be used to construct control charts[7] that are useful in observing trends in performance. The control limits above must be replaced by method performance criteria as they become available from the U.S. Environmental Protection Agency.

8.3.2 The laboratory must develop and maintain separate accuracy statements of laboratory performance for wastewater samples. An accuracy statement for the method is defined as R ± s. The accuracy statement should be developed by the analysis of four aliquots of wastewater as described in Section 8.2.2, followed by the calculation of R and s. Alternately, the analyst may use four wastewater data points gathered through the requirement for continuing quality control in Section 8.4. The accuracy statements should be updated regularly.[7]

8.4 The laboratory is required to collect a portion of their samples in duplicate to monitor spike recoveries. The frequency of spiked sample analysis must be at least 10% of all samples or one sample per month, whichever is greater. One aliquot of the sample must be spiked and analyzed as described in Section 8.2. If the recovery for a particular parameter does not fall within the control limits for method performance, the results reported for that parameter in all samples processed as part of the same set must be qualified as described in Section 11.3. The laboratory should monitor the frequency of data so qualified to ensure that it remains at or below 5%.

8.5 Each day, the analyst must demonstrate through the analysis of reagent water, that interferences from the analytical system are under control.

8.6 It is recommended that the laboratory adopt additional quality assurance practices for use with this method. The specific practices that are most productive depend upon the needs of the laboratory and the nature of the samples. Field duplicates may be analyzed to monitor the precision of the sampling technique. When doubt exists over the identification of a peak on the chromatogram, confirmatory techniques such as gas chromatography with a dissimilar column, specific element detector, or mass spectrometer must be used. Whenever possible, the laboratory should perform analysis of standard reference materials and participate in relevant performance evaluation studies.

8.7 The analyst should maintain constant surveillance of both the performance of the analytical system and the effectiveness of the method in dealing with each sample matrix by spiking each sample, standard and blank with surrogate halocarbons. A combination of bromochloromethane, 2-bromo-1-chloropropane, and 1,4-dichlorobutane is recommended to encompass the range of the temperature program used in this method. From stock standard solutions prepared as above, add a volume to give 7500 μg of each surrogate to 45 mL of reagent water contained in a 50-mL volumetric flask, mix and dilute to volume.(15 ng/μL). If the internal standard calibration procedure is being used, the surrogate compounds may be added directly to the internal standard spiking solution (Section 7.4.2). Add 10 μL of this surrogate spiking solution directly into the 5-mL syringe with every sample and reference standard analyzed. Prepare a fresh surrogate spiking solution on a weekly basis.

9. Sample Collection, Preservation, and Handling

9.1 All samples must be iced or refrigerated from the time of collection until extraction. If the sample contains free or combined chlorine, add sodium thiosulfate preservative (10 mg/40 mL is sufficient for up to 5 ppm Cl_2) to the empty sample bottle just prior to shipping to the sampling site. USEPA methods 330.4 and 330.5 may be used for measurement of residual chlorine.[8] Field test kits are available for this purpose.

9.2 Grab samples must be collected in glass containers having a total volume of at least 25 mL. Fill the sample bottle just to overflowing in such a manner that no air bubbles pass through the sample as the bottle is being filled. Seal the bottle so that no air bubbles are entrapped in it. If preservative has been added, shake vigorously for one minute. Maintain the hermetic seal on the sample bottle until time of analysis.

9.3 All samples must be analyzed within 14 days of collection.

10. Sample Extraction and Gas Chromatography

10.1 Table 1 summarizes the recommended operating conditions for the gas chromatograph. Included in this Table are estimated retention times and method detection limits that can be achieved by this method. An example of the separations achieved by Column 1 is shown in Figure 5. Other packed columns, chromatographic conditions, or detectors may be used if the requirements of Section 8.2 are met.

10.2 Calibrate the system daily as described in Section 7.

10.3 Adjust the purge gas (nitrogen or helium) flow rate to 40 mL/min. Attach the trap inlet to the purging device, and set the device to purge. Open the syringe valve located on the purging device sample introduction needle.

10.4 Allow sample to come to ambient temperature prior to introducing it to the syringe. Remove the plunger from a 5-mL syringe and attach a closed syringe valve. Open the sample bottle (or standard) and carefully pour the sample into the syringe barrel to just short of overflowing. Replace the

Calibration

1. Prepare calibration standards from 4 to 40 mg/l by weighing paraffin oil into freon.
2. Obtain absorbances at 2930 cm^{-1} for each of the calibration standards.
3. Plot absorbances vs. concentration.

Calculations

1. Determine the extract concentrations directly from the calibration curve.
2. Calculate sample concentrations from:

$$\text{conc. (mg/l)} = \frac{A \times B}{C}$$

where:

A = Concentration of extract determined from calibration curve, in mg/l

B = ml of freon used to extract

C = Volume of water sample extracted, in ml

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...79.
"Method Validation Study 23. ...1 (Purgeable Halocarbons)." ... EPA Contract 68-03-2856 ...ration).

Table 1. Chromatographic Conditions and Method Detection Limits

Parameter	Retention Time (min.) Column 1	Retention Time (min.) Column 2	Method Detection Limit µg/L
Chloromethane	1.50	5.28	0.08
Bromomethane	2.17	7.05	1.18
Dichlorodifluoromethane	2.62	nd	1.81
Vinyl chloride	2.67	5.28	0.18
Chloroethane	3.33	8.68	0.52
Methylene chloride	5.25	10.1	0.25
Trichlorofluoromethane	7.18	nd	nd
1,1-Dichloroethene	7.93	7.72	0.13
1,1-Dichloroethane	9.30	12.6	0.07
trans-1,2-Dichloroethene	10.1	9.38	0.10
Chloroform	10.7	12.1	0.05
1,2-Dichloroethane	11.4	15.4	0.03
1,1,1-Trichloroethane	12.6	13.1	0.03
Carbon tetrachloride	13.0	14.4	0.12
Bromodichloromethane	13.7	14.6	0.10
1,2-Dichloropropane	14.9	16.6	0.04
trans-1,3-Dichloropropene	15.2	16.6	0.34
Trichloroethene	15.8	13.1	0.12
Dibromochloromethane	16.5	16.6	0.09
1,1,2-Trichloroethane	16.5	18.1	0.02
cis-1,3-Dichloropropene	16.5	18.0	0.20
2-Chloroethylvinyl ether	18.0	nd	0.13
Bromoform	19.2	19.2	0.20
1,1,2,2-Tetrachloroethane	21.6	nd	0.03
Tetrachloroethene	21.7	15.0	0.03
Chlorobenzene	24.2	18.8	0.25
1,3-Dichlorobenzene	34.0	22.4	0.32
1,2-Dichlorobenzene	34.9	23.5	0.15
1,4-Dichlorobenzene	35.4	22.3	0.24

nd = not determined

Column 1 conditions: Carbopack B 60/80 mesh coated with 1% SP-1000 packed in an 8 ft × 0.1 in ID stainless steel or glass column with helium carrier gas at 40 mL/min flow rate. Column temperature held at 45°C for 3 min. then programmed at 8°C/min. to 220° and held for 15 min.

Column 2 conditions: Porasil-C 100/120 mesh coated with n-octane packed in a 6 ft × 0.1 in ID stainless steel or glass column with helium carrier gas at 40 mL/min flow rate. Column temperature held at 50°C for 3 min then programmed at 6°C/min to 170° and held for 4 min.

technique. This method describes analytical conditions for a second gas chromatographic column that can be used to confirm measurements made with the primary column. Method 624 provides gas chromatograph/mass spectrometer (GC/MS) conditions appropriate for the qualitative and quantitative confirmation of results for most of the parameters listed above.

1.3 The method detection limit (MDL, defined in Section 12.1)[1] for each parameter is listed in Table 1. The MDL for a specific wastewater may differ from those listed, depending upon the nature of interferences in the sample matrix.

1.4 Any modification of this method, beyond those expressly permitted, shall be considered as major modifications subject to application and approval of alternate test procedures under 40 CFR 136.4 and 136.5.

1.5 This method is restricted to use by or under the supervision of analysts experienced in the operation of a purge and trap system and a gas chromatograph and in the interpretation of chromatograms. Each analyst must demonstrate the ability to generate acceptable results with this method using the procedure described in Section 8.2.

2. Summary of Method

2.1 An inert gas is bubbled through a 5-mL water sample contained in a specially-designed purging chamber at ambient temperature. The halocarbons are efficiently transferred from the aqueous phase to the vapor phase. The vapor is swept through a sorbent trap where the halocarbons are trapped. After purging is completed, the trap is heated and backflushed with the inert gas to desorb the halocarbons onto a gas chromatographic column. The gas chromatograph is temperature programmed to separate the halocarbons which are then detected with a halide-specific detector.[2,3]

2.2 The method provides an optional gas chromatographic column that may be helpful in resolving the compounds of interest from interferences that may occur.

3. Interferences

3.1 Impurities in the purge gas and organic compounds out-gassing from the plumbing ahead of the trap account for the majority of contamination problems. The analytical system must be demonstrated to be free from contamination under the conditions of the analysis by running laboratory reagent blanks as described in Section 8.5. The use of non-TFE plastic tubing, non-TFE thread sealants, or flow controllers with rubber components in the purging device should be avoided.

3.2 Samples can be contaminated by diffusion of volatile organics (particularly fluorocarbons and methylene chloride) through the septum seal into the sample during shipment and storage. A field reagent blank prepared from reagent water and carried through the sampling and handling protocol can serve as a check on such contamination.

3.3 Contamination by carry-over can occur whenever high level and low level samples are sequentially analyzed. To reduce carry-over, the purging device and sample syringe must be rinsed with reagent water between sample analyses. Whenever an unusually concentrated sample is encountered, it should be followed by an analysis of reagent water to check for cross contamination. For samples containing large amounts of water-soluble materials, suspended solids, high boiling compounds or high organohalide levels, it may be necessary to wash out the purging device with a detergent solution, rinse it with distilled water, and then dry it in a 105 °C oven between analyses. The trap and other parts of the system are also subject to contamination; therefore, frequent bakeout and purging of the entire system may be required.

4. Safety

4.1 The toxicity or carcinogenicity of each reagent used in this method has not been precisely defined; however, each chemical compound should be treated as a potential health hazard. From this viewpoint, exposure to these chemicals must be reduced to the lowest possible level by whatever means available. The laboratory is responsible for maintaining a current awareness file of OSHA regulations regarding the safe handling of the chemicals specified in this method. A reference file of material data handling sheets should also be made available to all personnel involved in the chemical analysis. Additional references to laboratory safety are available and have been identified[4-6] for the information of the analyst.

4.2 The following parameters covered by this method have been tentatively classified as known or suspected, human or mammalian carcinogens: carbon tetrachloride, chloroform, 1,4-dichlorobenzene, and vinyl chloride. Primary standards of these toxic compounds should be prepared in a hood. A NIOSH/MESA approved toxic gas respirator should be worn when the analyst handles high concentrations of these toxic compounds.

5. Apparatus and Materials

5.1 Sampling equipment, for discrete sampling.

5.1.1 Vial—25-mL capacity or larger, equipped with a screw cap with hole in center (Pierce #13075 or equivalent). Detergent wash, rinse cap with tap and distilled water, and dry at 105 °C before use.

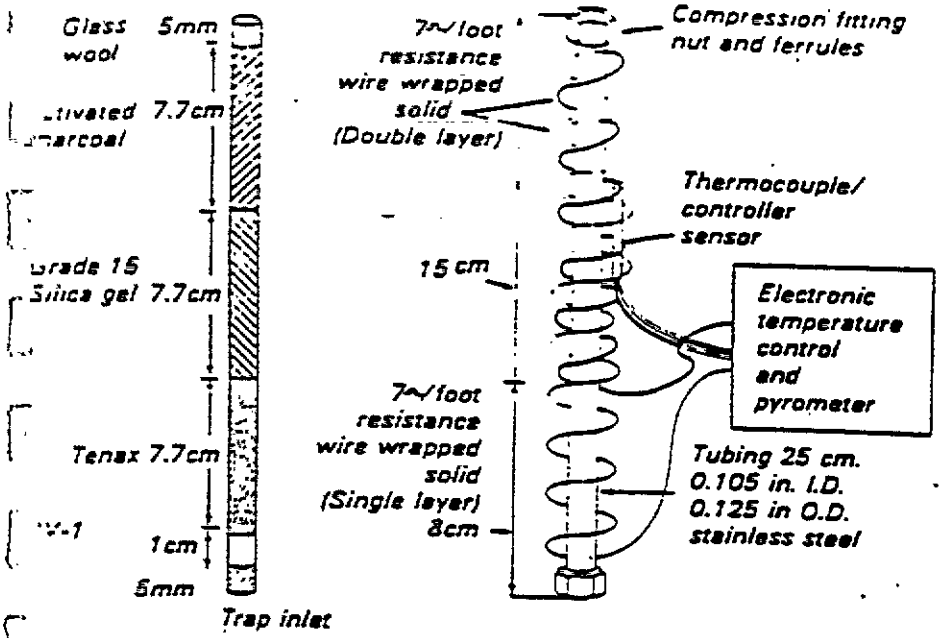
5.1.2 Septum—Teflon-faced silicone (Pierce #12722 or equivalent). Detergent wash, rinse with tap and distilled water, and dry at 105 °C for one hour before use.

5.2 Purge and trap device—The purge and trap device consists of three separate pieces of equipment: the sample purger, trap, and the desorber. Several complete devices are now commercially available.

5.2.1 The sample purger must be designed to accept 5-mL samples with a water column at least 3 cm deep. The gaseous head space between the water column and the trap must have a total volume of less than 15-mL. The purge gas must pass through the water column as finely divided bubbles with a diameter of less than 3 mm at the origin. The purge gas must be introduced no more than 5 mm from the base of the water column. The sample purger, illustrated in Figure 1, meets these design criteria.

5.2.2 The trap must be at least 25 cm long and have an inside diameter of at least 0.105 inch. The trap must be packed to contain the following minimum lengths of adsorbents: 1.0 cm of methyl silicone coated backing (Section 6.3.3), 7.7 cm of 2,6-diphenylene oxide polymer (Section 6.3.2), 7.7 cm of silica gel, 7.7 cm of coconut charcoal (Section 6.3.1). If it is not necessary to analyze for dichlorodifluoromethane, the charcoal can be eliminated, and the polymer section lengthened to 15 cm. The minimum specifications for the trap are illustrated in Figure 2.

5.2.3 The desorber must be capable of rapidly heating the trap to 180 °C. The polymer section of the trap should



2. *Trap packings and construction to include desorb capability*

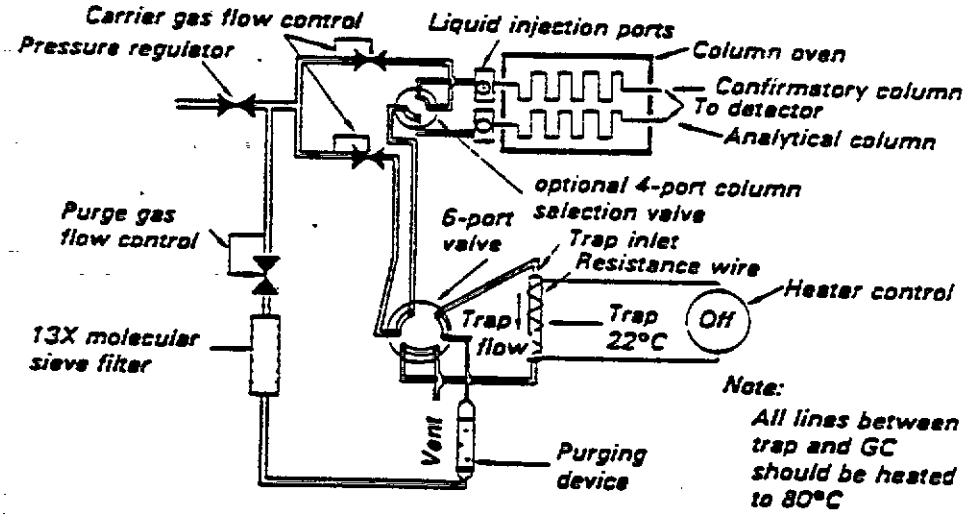


Figure 3. *Schematic of purge and trap device — purge mode*

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7. Calibration

7.1 Assemble a purge and trap device that meets the specifications in Section 5.2. Condition the trap overnight at 180 °C by backflushing with an inert gas flow of at least 20 mL/min. Prior to use, daily condition traps 10 minutes while backflushing at 180 °C.

7.2 Connect the purge and trap device to a gas chromatograph. The gas chromatograph must be operated using temperature and flow rate parameters equivalent to those in Table 1. Calibrate the purge and trap-gas chromatographic system using either the external standard technique (Section 7.3) or the internal standard technique (Section 7.4).

7.3 External standard calibration procedure:

7.3.1 Prepare calibration standards at a minimum of three concentration levels for each parameter by carefully adding 20.0 µL of one or more secondary dilution standards to 100, 500, or 1000 mL of reagent water. A 25-µL syringe with a 0.006 inch ID needle should be used for this operation. One of the external standards should be at a concentration near, but above, the method detection limit (See Table 1) and the other concentrations should correspond to the expected range of concentrations found in real samples or should define the working range of the detector. These aqueous standards can be stored up to 24 hours, if held in sealed vials with zero headspace as described in Section 9.2. If not so stored, they must be discarded after one hour.

7.3.2 Analyze each calibration standard according to Section 10, and tabulate peak height or area responses versus the concentration in the standard. The results can be used to prepare a calibration curve for each compound. Alternatively, if the ratio of response to concentration (calibration factor) is a constant over the working range (≤10% relative standard deviation, RSD), linearity through the origin can be assumed and the average ratio or calibration factor can be used in place of a calibration curve.

7.3.3 The working calibration curve or calibration factor must be verified on each working day by the measurement of one or more calibration standards. If the response for any parameter varies from the predicted response by more than ± 10%, the test must be repeated using a fresh calibration standard. Alternatively, a new calibration curve or calibration factor must be prepared for that parameter.

7.4 Internal standard calibration procedure. To use this approach, the analyst must select one or more internal standards that are similar in analytical behavior to the compounds of interest. The analyst must further demonstrate that the measurement of the internal standard is not affected by method or matrix interferences. Because of these limitations, no internal standard can be suggested that is applicable to all samples. The compounds recommended for use as surrogate spikes in Section 8.7 have been used successfully as internal standards, because of their generally unique retention times.

7.4.1 Prepare calibration standards at a minimum of three concentration levels for each parameter of interest as described in Section 7.3.1.

7.4.2 Prepare a spiking solution containing each of the internal standards using the procedures described in Sections 6.5 and 6.6. It is recommended that the secondary dilution standard be prepared at a concentration of 15 µg/mL of each internal standard compound. The addition of 10 µL of this standard to 5.0 mL of sample or calibration standard would be equivalent to 30 µg/L.

7.4.3 Analyze each calibration standard, according to Section 10, adding 10 µL of internal standard spiking solution directly to the syringe (Section 10.4). Tabulate peak height or area responses against concentration for each compound and internal standard, and calculate response factors (RF) for each compound using equation 1.

$$\text{Eq. 1 } RF = (A_s C_{is})/(A_{is} C_s)$$

where:

A_s = Response for the parameter to be measured.
A_{is} = Response for the internal standard.
C_{is} = Concentration of the internal standard.
C_s = Concentration of the parameter to be measured.

If the RF value over the working range is a constant (≤10% RSD), the RF can be assumed to be invariant and the average RF can be used for calculations. Alternatively, the results can be used to plot a calibration curve of response ratios, A_s/A_{is}, vs. RF.

7.4.4 The working calibration curve or RF must be verified on each working day by the measurement of one or more calibration standards. If the response for any parameter varies from the predicted response by more than ± 10%, the test must be repeated using a fresh calibration standard. Alternatively, a new calibration curve must be prepared for that compound.

8. Quality Control

8.1 Each laboratory that uses this method is required to operate a formal quality control program. The minimum requirements of this program consist of an initial demonstration of laboratory capability and the analysis of spiked samples as a continuing check on performance. The laboratory is required to maintain performance records to define the quality of data that is generated. Ongoing performance checks must be compared with established performance criteria to determine if the results of analyses are within accuracy and precision limits expected of the method.

8.1.1 Before performing any analyses, the analyst must demonstrate the ability to generate acceptable accuracy and precision with this method. This ability is established as described in Section 8.2.

8.1.2 In recognition of the rapid advances that are occurring in chromatography, the analyst is permitted certain options to improve the separations or lower the cost of measurements. Each time such modifications are made to the method, the analyst is required to repeat the procedure in Section 8.2.

8.1.3 The laboratory must spike and analyze a minimum of 10% of all samples to monitor continuing laboratory performance. This procedure is described in Section 8.4.

8.2 To establish the ability to generate acceptable accuracy and precision, the analyst must perform the following operations.

8.2.1 Select a representative spike concentration for each compound to be measured. Using stock standards, prepare a quality control check sample concentrate in methyl alcohol 500 times more concentrated than the selected concentrations. Quality control check sample concentrates, appropriate for use with this method, will be available from the U.S. Environmental Protection Agency, Environmental Monitoring and Support Laboratory, Cincinnati, Ohio 45268.

8.2.2 Using a syringe, add 10 µL of the check sample concentrate to each of a minimum of four 5-mL aliquots of reagent water. A representative waste-

syringe plu and compress the sample. Open the syringe valve ... vent any residual air while adj... sample volume to 5.0 mL. Since this ... cess of taking an aliquot destroys validity of the sample for future analysis, the analyst should fill a second syringe at this time to protect against possible loss of data. Add 10.0 μL of the surrogate spiking solution (8.7) and 10.0 μL of the internal standard spiking solution (Section 7.4.2), if applicable, through the valve bore, then close the valve.

10.5 Attach the syringe-syringe valve assembly to the syringe valve on the purging device. Open the syringe valves and inject the sample into the purging chamber.

10.6 Close both valves and purge the sample for 11.0 ± .1 minutes at ambient temperature.

10.7 After the 11-minute purge time, attach the trap to the chromatograph, adjust the device to the desorb mode, and begin to temperature program the gas chromatograph. Introduce the trapped materials to the GC column by rapidly heating the trap to 180 °C while backflushing the trap with an inert gas between 20 and 60 mL/min for four minutes. If rapid heating of the ... cannot be achieved, the gas ... romatographic column must be used as a secondary trap by cooling it to 30 °C (subambient temperature, if poor peak geometry or random retention time problems persist) instead of the initial program temperature of 45 °C.

10.8 While the trap is being desorbed into the gas chromatograph, empty the purging chamber using the sample introduction syringe. Wash the chamber with two 5-mL flushes of reagent water.

10.9 After desorbing the sample for four minutes recondition the trap by returning the purge and trap device to the purge mode. Wait 15 seconds then close the syringe valve on the purging device to begin gas flow through the trap. The trap temperature should be maintained at 180 °C. After approximately seven minutes turn off the trap heater and open the syringe valve to stop the gas flow through the trap. When cool the trap is ready for the next sample.

10.10 The width of the retention ... window used to make identifications should be based upon measurements of actual retention time variations of standards over the course of a day. Three times the standard deviation of a retention time for a compound can be used to calculate a suggested window size, however, the experience of the analyst should weigh heavily in the interpretation of chromatograms.

10.11 If the response for the peak exceeds the working range of the system, prepare a dilution of the sample with reagent water from the aliquot in the second syringe and reanalyze.

11. Calculations

11.1 Determine the concentration of individual compounds in the sample.

11.1.1 If the external standard calibration procedure is used, calculate the concentration of material from the peak response using the calibration curve or calibration factor determined in Section 7.3.2.

11.1.2 If the internal standard calibration procedure was used, calculate the concentration in the sample using the response factor (RF) determined in Section 7.4.3 and equation 2.

Eq. 2.

Concentration $\mu g/L = (A_s C_{is})/(A_{is})(RF)$

where:

A_s = Response for the parameter to be measured.

A_{is} = Response for the internal standard.

C_s = Concentration of the internal standard.

11.2 Report results in micrograms per liter. When duplicate and spiked samples are analyzed, report all data obtained with the sample results.

11.3 For samples processed as part of a set where the spiked sample recovery falls outside of the control limits which were established according to Section 8.3, data for the affected parameters must be labeled as suspect.

12. Method Performance

12.1 The method detection limit (MDL) is defined as the minimum concentration of a substance that can be measured and reported with 99% confidence that the value is above zero.[1] The MDL concentrations listed in Table 1 were obtained using reagent water.[9] Similar results were achieved using representative wastewaters. The MDL actually achieved in a given analysis will vary depending on instrument sensitivity and matrix effects.

12.2 This method is recommended for use in the concentration range from the MDL up to 1000 × MDL. Direct aqueous injection techniques should be used to measure concentration levels above 1000 × MDL.

12.3 In a single laboratory (Monsanto Research), using reagent water and wastewaters spiked at or near background levels, the average recoveries presented in Table 2 were obtained.[9] The standard deviation of the measurement in percent recovery is also included in Table 2[9].

12.4 The U.S. Environmental Protection Agency is in the process of conducting an interlaboratory method study to fully define the performance of this method.

References

1 See Appendix A.

2. Bellar, T.A., and Lichtenberg, J.J. *Journal American Water Works Association, 66,* 739, (1974).

3. Bellar, T.A., and Lichtenberg, J.J. "Semi-Automated Headspace Analysis of Drinking Waters and Industrial Waters for Purgeable Volatile Organic Compounds," Proceedings from Symposium on Measurement of Organic Pollutants in Water and Wastewater, American Society for Testing and Materials, STP 686, C.E. Van Hall, editor, 1978.

4. "Carcinogens—Working With Carcinogens," Department of Health, Education, and Welfare, Public Health Service, Center for Disease Control, National Institute for Occupational Safety and Health, Publication No. 77-206, Aug. 1977.

5. "OSHA Safety and Health Standards, General Industry," (29 CFR 1910), Occupational Safety and Health Administration, OSHA 2206, (Revised, January 1976).

6. "Safety in Academic Chemistry Laboratories," American Chemical Society Publication, Committee on Chemical Safety, 3rd Edition, 1979.

7. "Handbook for Analytical Quality Control in Water and Wastewater Laboratories," EPA-600/4-79-019, U.S. Environmental Protection Agency, Environmental Monitoring and Support Laboratory—Cincinnati, Ohio 45268, March 1979.

8. "Methods 330.4 (Titrimetric, DPD-FAS) and 330.5 (Spectrophotometric, DPD) for Chlorine, Total Residual," Methods for Chemical Analysis of Water and Wastes, EPA 600/4-79-020, U.S. Environmental Protection Agency.

Single Operator Accuracy and Precision

	Average Percent Recovery	Standard Deviation %	Spike Range (ug/L)	Number of Analyses	Matrix Types
[illegible]ichloromethane	100.9	5.0	0.43-46.7	21	3
[illegible]orm	89.5	9.0	1.45-50	20	3
[illegible]omethane	105.0	17.3	3.39-49.2	21	3
[illegible]n tetrachloride	82.5	25.6	0.55-50	19	3
[illegible]benzene	93.9	8.9	2.21-50	20	3
[illegible]ethane	91.5	22.4	3.95-50	21	3
[illegible]roethylvinyl ether	96.3	9.9	4.39-133	20	3
[illegible]orm	101.7	20.6	0.44-50	20	3
[illegible]omethane	91.4	13.4	0.55-23.9	21	3
[illegible]ochloromethane	98.3	6.5	0.75-93.0	21	3
[illegible]chlorobenzene	10.20	2.0	4.89-154	21	3
[illegible]chlorobenzene	91.6	4.3	2.94-46.7	21	3
[illegible]chlorobenzene	97.5	9.3	2.99-51.6	21	3
[illegible]rodifluoromethane	87.8	18.0	2.18-43.4	21	3
[illegible]chloroethane	102.3	5.5	0.44-46.7	21	3
[illegible]chloroethane	97.8	4.8	0.44-46.7	21	3
[illegible]chloroethene	101.1	21.7	0.37-50	19	3
[illegible]2-Dichloroethene	91.0	19.3	0.44-98.0	20	3
[illegible]chloropropane	97.7	8.8	0.29-39.0	21	3
[illegible]3-Dichloropropene	86.7	6.0	0.44-46.7	21	3
[illegible]3-Dichloropropene	73.5	17.2	0.43-50	20	3
[illegible]ylene chloride	97.9	2.6	0.73-46.7	21	3
[illegible]2-Tetrachloroethane	91.9	15.0	0.46-46.7	21	3
[illegible]nloroethene	94.1	18.1	0.50-35.0	21	3
[illegible]Trichloroethane	75.1	12.5	0.37-29.0	21	3
[illegible]Trichloroethane	91.0	25.1	0.45-50	21	3
[illegible]oroethene	106.1	7.4	0.38-46.7	21	3
[illegible]rofluoromethane	89.3	13.9	149	14	2
[illegible]nloride	101.9	11.4	0.82-32.3	21	3

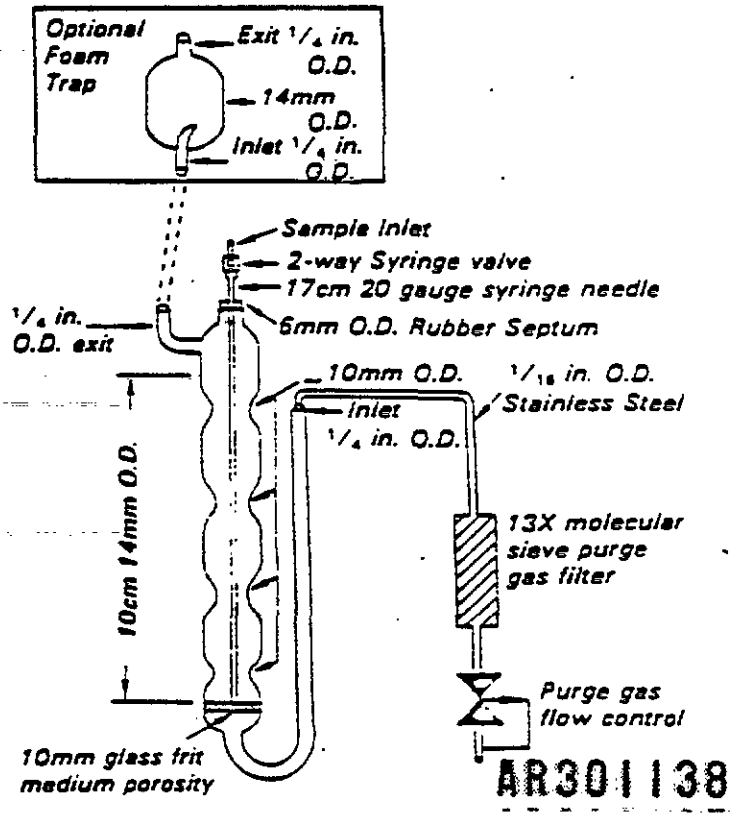

Figure 1. Purging device

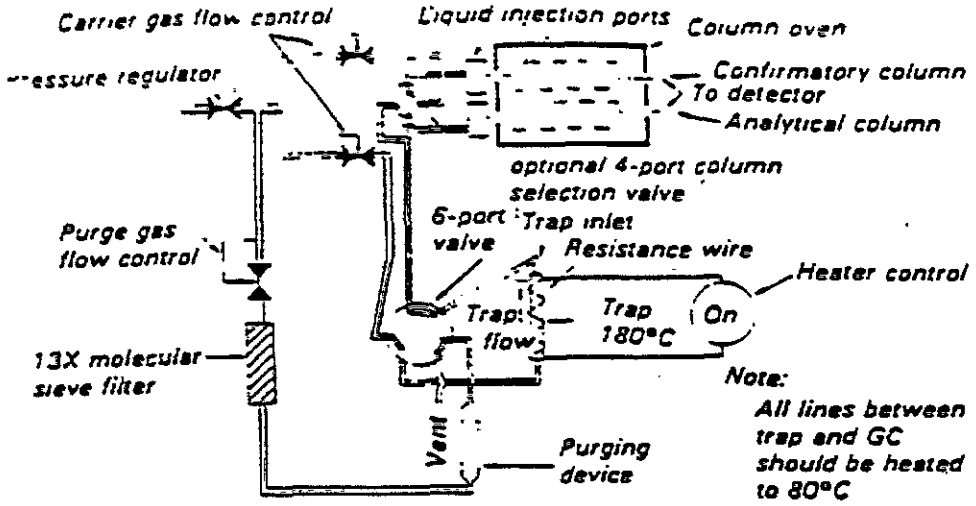

Figure 4. *Schematic of purge and trap device — desorb mode*

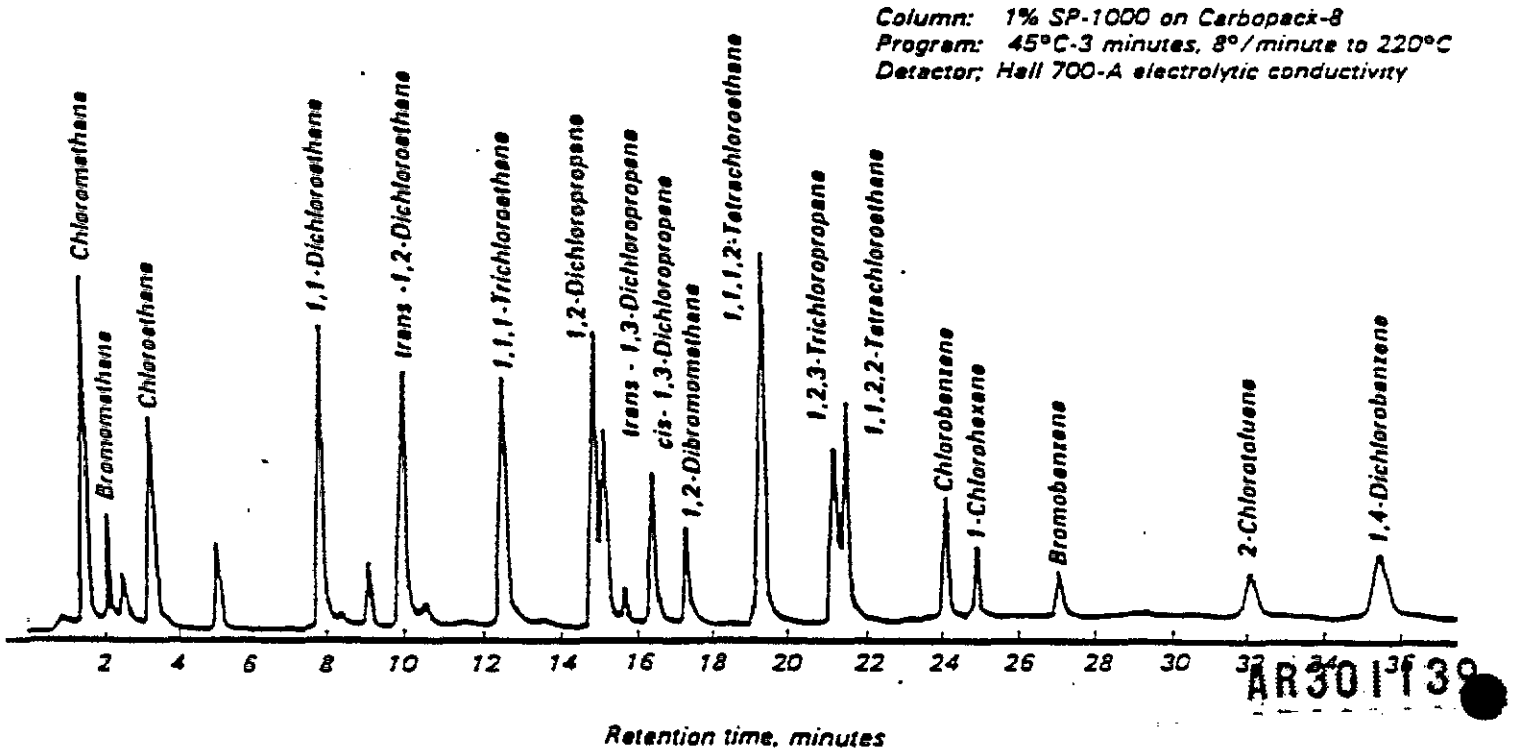

Figure 5. *Gas chromatogram of purgeable halocarbons*

United State
Environment rotection
Agency

Environmental Monitoring and
Support Laboratory
Cincinnati OH 45268

Research and Development

EPA

Test Method

Purgeable Aromatics—Method 602

1. Scope and Application

1.1 This method covers the determination of various purgeable aromatics. The following parameters may be determined by this method:

Parameter	STORET No.	CAS No.
Benzene	34030	71-43-2
Chlorobenzene	34301	108-90-7
1,2-Dichlorobenzene	34536	95-50-1
1,3-Dichlorobenzene	34566	541-73-1
1,4-Dichlorobenzene	34571	106-46-7
Ethylbenzene	34371	100-41-4
Toluene	34010	108-88-3

1.2 This is a purge and trap gas chromatographic method applicable to the determination of the compounds listed above in municipal and industrial discharges as provided under 40 CFR 136.1. When this method is used to analyze unfamiliar samples for any or all of the compounds above, compound identifications should be supported by at least one additional qualitative technique. This method describes analytical conditions for a second gas chromatographic column that can be used to confirm measurements made with the primary column. Method 624 provides gas chromatograph/mass spectrometer (GC/MS) conditions appropriate for the qualitative and quantitative confirmation of results for all of the parameters listed above.

1.3 The method detection limit (MDL, defined in Section 12.1[1]) for each parameter is listed in Table 1. The MDL for a specific wastewater may differ from these listed depending upon the nature of interferences in the sample matrix.

1.4 Any modification of this method, beyond those expressly permitted, shall be considered as major modifications subject to application and approval for alternate test procedures under 40 CFR 136.4 and 136.5

1.5 This method is restricted to use by or under the supervision of analysts experienced in the operation of a purge and trap system and a gas chromatograph and in the interpretation of chromatograms. Each analyst must demonstrate the ability to generate acceptable results with this method using the procedure described in Section 8.2.

2. Summary of Method

2.1 An inert gas is bubbled through a 5-mL water sample contained in a specially-designed purging chamber at ambient temperature. The aromatics are efficiently transferred from the aqueous phase to the vapor phase. The vapor is swept through a sorbent trap where the aromatics are trapped. After

...ng is com...ete. The trap is heated ... back-flushed with the inert gas to ... the aromatics onto a gas ...omatographic column. The gas ...omatograph is temperature pro...mmed to separate the aromatics ...ich are then detected with a photo...ionization detector[2,3].

...2 The method provides an optional ... chromatographic column that may ...e helpful in resolving the compounds ... interest from interferences that may ...cur.

Interferences

1 Impurities in the purge gas and ...rganic compounds out-gassing from ...e plumbing ahead of the trap account ... the majority of contamination ...roblems. The analytical system must ... demonstrated to be free from ...contamination under the conditions of ... the analysis by running laboratory ...reagent blanks as described in Section ...5. The use of non-TFE plastic tubing, ...on-TFE thread sealants, or flow ...controllers with rubber components in ... the purging device should be avoided.

...2 Samples can be contaminated by ... diffusion of volatile organics through ... the septum seal into the sample during ...orage and storage. A field reagent ...blank prepared from reagent water and ...carried through the sampling and ...handling protocol can serve as a check ... on such contamination.

...3 Contamination by carry-over can ...occur whenever high level and low level samples are sequentially analyzed. To reduce carry-over, the purging device and sample syringe must be rinsed with reagent water between sample analyses. Whenever an unusually concentrated sample is encountered, it should be followed by an analysis of reagent water to check for cross contamination. For samples containing large amounts of water-soluble materials, suspended solids, high boiling compounds or high aromatic levels, it may be necessary to wash out the purging device with a detergent solution, rinse it with distilled water, and then dry it in an oven at 105 °C between analyses. The trap and other parts of the system are also subject to contamination; therefore, frequent bakeout and purging of the entire system may be required.

4. Safety

4.1 The toxicity or carcinogenicity of each reagent used in this method has not been precisely defined; however, each chemical compound should be treated as a potential health hazard. From this viewpoint, exposure to these chemicals must be reduced to the lowest possible level by whatever means available. The laboratory is responsible for maintaining a current awareness file of OSHA regulations regarding the safe handling of the chemicals specified in this method. A reference file of material data handling sheets should also be made available to all personnel involved in the chemical analysis. Additional references to laboratory safety are available and have been identified[4-6] for the information of the analyst.

4.2 The following parameters covered by this method have been tentatively classified as known or suspected, human or mammalian carcinogens: benzene and 1,4-dichlorobenzene. Primary standards of these toxic compounds should be prepared in a hood. An NIOSH/MESA approved toxic gas respirator should be worn when the analyst handles high concentrations of these toxic compounds.

5. Apparatus and Materials

5.1 Sampling equipment, for discrete sampling.

5.1.1 Vial—25-mL capacity or larger, equipped with a screw cap with hole in center (Pierce #13075 or equivalent). Detergent wash, rinse with tap and distilled water, and dry at 105 °C before use.

5.1.2 Septum—Teflon-faced silicone (Pierce #12722 or equivalent). Detergent wash, rinse with tap and distilled water, and dry at 105 °C for one hour before use.

5.2 Purge and trap device—The purge and trap device consists of three separate pieces of equipment: the sample purger, trap, and the desorber. Several complete devices are now commercially available.

5.2.1 The sample purger must be designed to accept 5-mL samples with a water column at least 3 cm deep. The gaseous head space between the water column and the trap must have a total volume of less than 15 mL. The purge gas must pass through the water column as finely divided bubbles with a diameter of less than 3 mm at the origin. The purge gas must be introduced no more than 5 mm from the base of the water column. The sample purger, illustrated in Figure 1, meets these design criteria.

5.2.2 The trap must be at least 25 cm long and have an inside diameter of at least 0.105 inch.

5.2.2.1 The trap is packed with 1 cm of methyl silicone and 23 cm 2,6-diphenylene oxide polymer as shown in Figure 2. This trap was used to develop the method performance statements in Section 12.

5.2.2.2 Alternatively, either of the two traps described in Method 601 may be used, although water vapor will preclude the measurement of low concentrations of benzene.

5.2.3 The desorber must be capable of rapidly heating the trap to 180 °C. The polymer section of the trap should not be heated higher than 180 °C and the remaining sections should not exceed 200 °C. The desorber design, illustrated in Figure 2, meets these criteria.

5.2.4 The purge and trap device may be assembled as a separate unit or be coupled to a gas chromatograph as illustrated in Figures 3, 4, and 5.

5.3 Gas chromatograph—Analytical system complete with a temperature programmable gas chromatograph suitable for on-column injection and all required accessories including syringes, analytical columns, gases, detector, and stripchart recorder. A data system is recommended for measuring peak areas.

5.3.1 Column 1—6 ft long × 0.082 in ID stainless steel or glass, packed with 5% SP-1200 and 1.75% Bentone-34 on Supelcoport (100/120 mesh) or equivalent. This column was used to develop the method performance statements and the MDLs listed in Tables 1 and 2. Guidelines for the use of alternate column packings are provided in Section 10.1.

5.3.2 Column 2—8 ft long × 0.1 in ID stainless steel or glass, packed with 5% 1,2,3-Tris(2-cyanoethoxy)propane on Chromosorb W-AW (60/80 mesh) or equivalent.

5.3.3 Detector—Photoionization detector (h-nu Systems, Inc. Model PI-51-02 or equivalent). This type of detector has been proven effective in the analysis of wastewaters for the parameters listed in the scope, and was used to develop the performance statements in Section 12. Guidelines for the use of alternate detectors are provided in Section 10.1.

5.4 Syringes—5-mL glass, hypodermic with Luerlok tip (two each), if applicable to the purge device.

5 Micro syringes—25 μL, 0.006 in needle.

5.6 Syringe valve—2-way, with Luer ends (three each).

5.7 Bottle—15-mL screw-cap with Teflon cap liner.

5.8 Balance—Analytical, capable of accurately weighing 0.0001 g.

6. Reagents

6.1 Reagent water—Reagent water is defined as a water in which an interferent is not observed at the MDL of the parameters of interest.

6.1.1 Reagent water can be generated by passing tap water through a carbon filter bed containing about 1 lb. of activated carbon. (Filtrasorb-300 or equivalent (Calgon Corp.)).

6.1.2 A water purification system (Millipore Super-Q or equivalent) may be used to generate reagent water.

6.1.3 Reagent water may also be prepared by boiling water for 15 minutes. Subsequently, while maintaining the temperature at 90 °C, bubble a contaminant-free inert gas through the water for one hour. While still hot, transfer the water to a narrow mouth screw-cap bottle and seal with a Teflon-lined septum and cap.

6.2 Sodium thiosulfate—(ACS) Granular.

6.3 Hydrochloric acid (1 + 1)—Add 50 mL of concentrated HCl to 50 mL of reagent water.

6.4 Trap Materials

6.4.1 2,6-Diphenylene oxide polymer-Tenax, (60/80 mesh) chromatographic grade or equivalent.

6.4.2 Methyl silicone—3% OV-1 on Chromosorb-W (60/80 mesh) or equivalent.

6.5 Methyl alcohol—Pesticide quality or equivalent.

6.6 Stock standard solutions—Stock standard solutions may be prepared from pure standard materials or purchased as certified solutions. Prepare stock standard solutions in methyl alcohol using assayed liquids. Because benzene and 1,4-dichlorobenzene are suspected carcinogens, primary dilutions of these materials should be prepared in a hood.

6.6.1 Place about 9.8 mL of methyl alcohol into a 10-mL ground glass stoppered volumetric flask. Allow the flask to stand, unstoppered, for about 10 minutes or until all alcohol wetted surfaces have dried. Weigh the flask to the nearest 0.1 mg.

6.6.2 Using a 100-μL syringe, immediately add two or more drops of assayed reference material to the flask, then reweigh. Be sure that the drops fall directly into the alcohol without contacting the neck of the flask.

6.6.3 Reweigh, dilute to volume, stopper, then mix by inverting the flask several times. Calculate the concentration in micrograms per microliter from the net gain in weight. When compound purity is certified at 96% or greater, the weight can be used without correction to calculate the concentration of the stock standard. Commercially prepared stock standards can be used, at any concentration, if they are certified by the manufacturer or by an independent source.

6.6.4 Transfer the stock standard solution into a Teflon-sealed screw-cap bottle. Store at 4 °C and protect from light.

6.6.5 All standards must be replaced after one month, or sooner if comparison with check standards indicate a problem.

6.7 Secondary dilution standards—Using stock standard solutions, prepare secondary dilution standards in methyl alcohol that contain the compounds of interest, either singly or mixed together. The secondary dilution standards should be prepared at concentrations such that the aqueous calibration standards prepared in Sections 7.3.1 or 7.4.1 will bracket the working range of the analytical system. Secondary solution standards must be stored with zero headspace and should be checked frequently for signs of degradation or evaporation, especially just prior to preparing calibration standards from them. Quality control check standards that can be used to determine the accuracy of calibration standards will be available from the U.S. Environmental Protection Agency, Environmental Monitoring and Support Laboratory, in Cincinnati, Ohio.

7. Calibration

7.1 Assemble a purge and trap device that meets the specifications in Section 5.2. Condition the trap overnight at 180 °C by backflushing with an inert gas flow of at least 20 mL/min. Prior to use, daily condition traps 10 minutes while backflushing at 180 °C.

7.2 Connect the purge and trap device to a gas chromatograph. The gas chromatograph must be operated using temperature and flow rate parameters equivalent to those in Table 1. Calibrate the purge and trap-gas chromatographic system using either the external standard technique (Section 7.3) or the internal standard technique (Section 7.4.).

7.3 External standard calibration procedure:

7.3.1 Prepare calibration standards at a minimum of three concentration levels for each parameter by carefully adding 20.0 μL of one or more secondary dilution standards to 100, 500, or 1000 mL of reagent water. A 25-μL syringe with a 0.006 inch ID needle should be used for this operation. One of the external standards should be at a concentration near, but above, the MDL (see Table 1) and the other concentrations should correspond to the expected range of concentrations found in real samples or should define the working range of the detector. These aqueous standards must be prepared fresh daily.

7.3.2 Analyze each calibration standard according to Section 10, and tabulate peak height or area responses versus the concentration in the standard. The results can be used to prepare a calibration curve for each compound. Alternatively, if the ratio of response to concentration (calibration factor) is a constant over the working range (≤10% relative standard deviation, RSD), linearity through the origin can be assumed and the average ratio or calibration factor can be used in place of a calibration curve.

7.3.3 The working calibration curve or calibration factor must be verified on each working day by the measurement of one or more calibration standards. If the response for any parameter varies from the predicted response by more than ±10%, the test must be repeated using a fresh calibration standard. Alternatively, a new calibration curve or calibration factor must be prepared for that parameter.

7.4 Internal standard calibration procedure. To use this approach, the analyst must select one or more internal standards that are similar in analytical behavior to the compounds of interest. The analyst must further demonstrate that the measurement of the internal standard is not affected by method or matrix interferences. Because of these limitations, no internal standard can be suggested tha

is applicable to all samples. The compound, α,α,α-trifluorotoluene, recommended as a surrogate spiking compound in Section 8.7 has been used successfully as an internal standard.

7.4.1 Prepare calibration standards at a minimum of three concentration levels for each parameter of interest as described in Section 7.3.1.

7.4.2 Prepare a spiking solution containing each of the internal standards using the procedures described in Sections 6.6 and 6.7. It is recommended that the secondary dilution standard be prepared at a concentration of 15 μg/mL of each internal standard compound. The addition of 10 μL of this standard to 5.0 mL of sample or calibration standard would be equivalent to 30 μg/L.

7.4.3 Analyze each calibration standard, according to Section 10, adding 10 μL of internal standard spiking solution directly to the syringe as indicated in Section 10.4. Tabulate peak height or area responses against concentration for each compound and internal standard, and calculate response factors (RF) for each compound using equation 1.

$$\text{Eq. 1} \quad RF = (A_s C_{is})/(A_{is} C_s)$$

where:

A_s = Response for the parameter to be measured.
A_{is} = Response for the internal standard.
C_{is} = Concentration of the internal standard.
C_s = Concentration of the parameter to be measured.

If the RF value over the working range is a constant (≤10% RSD), the RF can be assumed to be invariant and the average RF can be used for calculations. Alternatively, the results can be used to plot a calibration curve of response ratios, A_s/A_{is}, vs. RF.

7.4.4 The working calibration curve or RF must be verified on each working day by the measurement of one or more calibration standards. If the response for any parameter varies from the predicted response by more than ±10%, the test must be repeated using a fresh calibration standard. Alternatively, a new calibration curve must be prepared for that compound.

8. Quality Control

8.1 Each laboratory that uses this method is required to operate a formal quality control program. The minimum requirements of this program consist of an initial demonstration of laboratory capability and the analysis of spiked samples as a continuing check on performance. The laboratory is required to maintain performance records to define the quality of data that is generated. Ongoing performance checks must be compared with established performance criteria to determine if the results of analyses are within accuracy and precision limits expected of the method.

8.1.1 Before performing any analyses, the analyst must demonstrate the ability to generate acceptable accuracy and precision with this method. This ability is established as described in Section 8.2.

8.1.2 In recognition of the rapid advances that are occurring in chromatography, the analyst is permitted certain options to improve the separations or lower the cost of measurements. Each time such modifications are made to the method, the analyst is required to repeat the procedure in Section 8.2.

8.1.3 The laboratory must spike and analyze a minimum of 10% of all samples to monitor continuing laboratory performance. This procedure is described in Section 8.4.

8.2 To establish the ability to generate acceptable accuracy and precision, the analyst must perform the following operations.

8.2.1 Select a representative spike concentration for each compound to be measured. Using stock standards, prepare a quality control check sample concentrate in methyl alcohol 500 times more concentrated than the selected concentrations. Quality control check sample concentrates, appropriate for use with this method, will be available from the U.S. Environmental Protection Agency, Environmental Monitoring and Support Laboratory, Cincinnati, Ohio 45268.

8.2.2 Using a syringe, add 10 μL of the check sample concentrate to each of a minimum of four 5-mL aliquots of reagent water. A representative wastewater may be used in place of the reagent water, but one or more additional aliquots must be analyzed to determine background levels, and the spike level must exceed twice the background level for the test to be valid. Analyze the aliquots according to the method beginning in Section 10.

8.2.3 Calculate the average percent recovery, (R), and the standard deviation of the percent recovery (s), for the results. Wastewater background corrections must be made before R and s calculations are performed.

8.2.4 Using Table 2, note the average recovery (X) and standard deviation (p) expected for each method parameter. Compare these to the calculated values for R and s. If $s \geq 2p$ or $|X - R| \geq 2p$, review potential problem areas and repeat the test.

8.2.5 The U.S. Environmental Protection Agency plans to establish performance criteria for R and s based upon the results of interlaboratory testing. When they become available, these criteria must be met before any samples may be analyzed.

8.3 The analyst must calculate method performance criteria and define the performance of the laboratory for each spike concentration and parameter being measured.

8.3.1 Calculate upper and lower control limits for method performance:

Upper Control Limit (UCL) = R + 3s
Lower Control Limit (LCL) = R − 3s

where R and s are calculated as in Section 8.2.3.

The UCL and LCL can be used to construct control charts[7] that are useful in observing trends in performance. The control limits above must be replaced by method performance criteria as they become available from the U.S. Environmental Protection Agency.

8.3.2 The laboratory must develop and maintain separate accuracy statements of laboratory performance for wastewater samples. An accuracy statement for the method is defined as R ± s. The accuracy statement should be developed by the analysis of four aliquots of wastewater as described in Section 8.2.2, followed by the calculation of R and s. Alternately, the analyst may use four wastewater data points gathered through the requirement for continuing quality control in Section 8.4. The accuracy statements should be updated regularly[7].

8.4 The laboratory is required to collect a portion of their samples in duplicate to monitor spike recoveries. The frequency of spiked sample analysis must be at least 10% of all samples or one sample per month, whichever is greater. One aliquot of the sample must be spiked and analyzed as described in Section 8.2.2 If the recovery for a particular parameter does not fall within the control limits for method performance, the results

reported for that parameter in all samples processed as part of the same set must be qualified as described in Section 11.3. The laboratory should monitor the frequency of data so qualified to ensure that it remains at or below 5%.

8.5 Each day, the analyst must demonstrate through the analysis of reagent water, that interferences from the analytical system are under control.

8.6 It is recommended that the laboratory adopt additional quality assurance practices for use with this method. The specific practices that are most productive depend upon the needs of the laboratory and the nature of the samples. Field duplicates may be analyzed to monitor the precision of the sampling technique. When doubt exists over the identification of a peak on the chromatogram, confirmatory techniques such as gas chromatography with a dissimilar column, specific element detector, or mass spectrometer must be used. Whenever possible, the laboratory should perform analysis of standard reference materials and participate in relevant performance evaluation studies.

8.7 The analyst should maintain constant surveillance of both the performance of the analytical system and the effectiveness of the method in dealing with each sample matrix by spiking each sample, standard and blank with surrogate compounds (e.g. α,α,α-trifluorotoluene). From stock standard solutions prepared as above, add a volume to give 7500 μg of each surrogate to 45 mL of organic-free water contained in a 50-mL volumetric flask, mix and dilute to volume (15 ng/μL). If the internal standard calibration procedure is being used, the surrogate compounds may be added directly to the internal standard spiking solution (Section 7.4.2). Dose 10 μL of this surrogate spiking solution directly into the 5-mL syringe with every sample and reference standard analyzed. Prepare a fresh surrogate spiking solution on a weekly basis.

9. Sample Collection, Preservation, and Handling

9.1 The samples must be iced or refrigerated from the time of collection until extraction. If the sample contains free or combined chlorine, add sodium thiosulfate preservative (10 mg/40 mL is sufficient for up to 5 ppm Cl_2) to the empty sample bottles just prior to shipping to the sampling site. USEPA Methods 330.4 or 330.5 may be used to measure residual chlorine.[2] Field Test Kits are available for this purpose.

9.2 Collect about 500 mL sample in a clean container. Adjust the pH of the sample to about 2 by adding 1 + 1 HCl while stirring gently. Fill the sample bottle in such a manner that no air bubbles pass through the sample as the bottle is being filled. Seal the bottle so that no air bubbles are entrapped in it. Maintain the hermetic seal on the sample bottle until time of analysis.

9.3 All samples must be analyzed within 14 days of collection.[3]

10. Sample Extraction and Gas Chromatography

10.1 Table 1 summarizes the recommended operating conditions for the gas chromatograph. Included in this table are estimated retention times and method detection limits that can be achieved by this method. An example of the separations achieved by Column 1 is shown in Figure 6. Other packed columns, chromatographic conditions, or detectors may be used if the requirements of Section 8.2 are met.

10.2 Calibrate the system daily as described in Section 7.

10.3 Adjust the purge gas (nitrogen or helium) flow rate to 40 mL/min. Attach the trap inlet to the purging device, and set the device to purge. Open the syringe valve located on the purging device sample introduction needle.

10.4 Allow sample to come to ambient temperature prior to introducing it into the syringe. Remove the plunger from a 5-mL syringe and attach a closed syringe valve. Open the sample bottle (or standard) and carefully pour the sample into the syringe barrel to just short of overflowing. Replace the syringe plunger and compress the sample. Open the syringe valve and vent any residual air while adjusting the sample volume to 5.0 mL. Since this process of taking an aliquot destroys the validity of the sample for future analysis, the analyst should fill a second syringe at this time to protect against possible loss of data. Add 10.0 μL of the surrogate spiking solution (Section 8.7) and 10.0 μL of the internal standard spiking solution (Section 7.4.2), if applicable, through the valve bore, then close the valve.

10.5 Attach the syringe-syringe valve assembly to the syringe valve on the purging device. Open the syringe valves and inject the sample into the purging chamber.

10.6 Close both valves and purge the sample for 12.0 ± 0.1 minutes at ambient temperature.

10.7 After the 12-minute purge time, disconnect the purge chamber from the trap. Dry the trap by maintaining a flow of 40 mL/min of dry purge gas through it for six minutes. See Figure 4. A dry purger should be inserted into the device to minimize moisture in the gas. Attach the trap to the chromatograph, adjust the device to the desorb mode, and begin to temperature program the gas chromatograph. Introduce the trapped materials to the GC column by rapidly heating the trap to 180 °C while backflushing the trap with an inert gas between 20 and 60 mL/min for four minutes. If rapid heating cannot be achieved, the gas chromatographic column must be used as a secondary trap by cooling it to 30 °C (subambient temperature, if poor peak geometry and random retention time problems persist) instead of the initial program temperature of 50 °C.

10.8 While the trap is being desorbed onto the GC column, empty the purging chamber using the sample introduction syringe. Wash the chamber with two 5-mL flushes of reagent water.

10.9 After desorbing the sample for four minutes, recondition the trap by returning the purge and trap device to the purge mode. Wait 15 seconds then close the syringe valve on the purging device to begin gas flow through the trap. The trap temperature should be maintained at 180 °C. After approximately seven minutes, turn off the trap heater and open the syringe valve to stop the gas flow through the trap. When cool, the trap is ready for the next sample.

10.10 The width of the retention time window used to make identifications should be based upon measurements of actual retention time variation of standards over the course of a day. Three times the standard deviation of retention time for a compound can be used to calculate a suggested window size; however, the experience of the analyst should weigh heavily in the interpretation of chromatograms.

10.11 If the response for the peak exceeds the working range of the system, prepare a dilution of the sample with reagent water from the aliquot in the second syringe and reanalyze.

11. Calculations

11.1 Determine the concentration of individual compounds in the sample.

11.1.1 If the external standard calibration procedure is used, calculate the concentration of material from the peak response using the calibration curve or calibration factor determined in Section 7.3.2.

11.1.2 If the internal standard calibration procedure was used, calculate the concentration in the sample using the response factor (RF) determined in Section 7.4.3 and equation 2.

Eq. 2.
Concentration $\mu g/L = (A_s C_{is})/(A_{is})(RF)$
where:

A_s = Response for the parameter to be measured.
A_{is} = Response for the internal standard.
C_{is} = Concentration of the internal standard.

11.2 Report results in micrograms per liter. When duplicate and spiked samples are analyzed, report all data obtained with the sample results.

11.3 For samples processed as part of a set where the spiked sample recovery falls outside of the control limits which were described in Section 8.3, data for the affected parameters must be labeled as suspect.

12. Method Performance

12.1 The method detection limit (MDL) is defined as the minimum concentration of a substance that can be measured and reported with 99% confidence that the value is above zero[1]. The MDL concentrations listed in Table 1 were obtained using reagent water[9]. Similar results were achieved using representative wastewaters.

12.2 This method has been demonstrated to be applicable for the concentration range from the MDL up to 1000 x MDL[9]. Direct aqueous injection techniques should be used to measure concentration levels above 1000 x MDL.

12.3 In a single laboratory (Monsanto Research), using reagent water and wastewaters spiked at or near background levels, the average recoveries presented in Table 2 were obtained[9]. The standard deviation of the measurement in percent recovery is also included in Table 2.

12.4 The Environmental Protection Agency is in the process of conducting an interlaboratory method study to fully define the performance of this method.

References

1. See Appendix A
2. Bellar, T.A., and Lichtenberg, J.J. *Journal American Water Works Association, 66*, 739, (1974).
3. Bellar, T.A., and Lichtenberg, J.J. "Semi-Automated Headspace Analysis of Drinking Waters and Industrial Waters for Purgeable Volatile Organic Compunds." Proceedings of Symposium on Measurement of Organic Pollutants in Water and Wastewater. American Society for Testing and Materials, STP 686, C.E. Van Hall, editor, 1978.
4. "Carcinogens—Working with Carcinogens," Department of Health, Education, and Welfare, Public Health Service, Center for Disease Control, National Institute for Occupational Safety and Health. Publication No. 77-206, August 1977.
5. "OSHA Safety and Health Standards, General Industry," (29 CFR 1910), Occupational Safety and Health Administration, OSHA 2206, (Revised January 1976).
6. "Safety in Academic Chemistry Laboratories," American Chemical Society Publication, Committee on Safety, 3rd Edition, 1979.
7. "Handbook for Analytical Quality Control in Water and Wastewater Laboratories," EPA-600/4-79-019, U.S. Environmental Protection Agency, Office of Research and Development, Environmental Monitoring and Support Laboratory, Cincinnati, Ohio 45268. March 1979.
8. "Methods 330.4 (Titrimetric, DPD-FAS) and 330.5 (Spectrophotometric, DPD) for Chlorine, Total Residual," Methods for Chemical Analysis of Water and Wastes, EPA 600/4-79-020. U.S. Environmental Protection Agency, Office of Research and Development, Environmental Monitoring and Support Laboratory, Cincinnati, Ohio 45268. March 1979.
9. "EPA Method Validation Study 24, Method 602 (Purgeable Aromatics)," Report for EPA Contract 68-03-2856 (In preparation).

Table 1. Chromatographic Conditions and Method Detection Limits

Parameter	Retention Time (min.) Column 1	Retention Time (min.) Column 2	Method Detection Limit µg/L
Benzene	3.33	2.75	0.2
Toluene	5.75	4.25	0.2
Ethylbenzene	8.25	6.25	0.2
Chlorobenzene	9.17	8.02	0.2
1,4-Dichlorobenzene	16.8	16.2	0.3
1,3-Dichlorobenzene	18.2	15.0	0.4
1,2-Dichlorobenzene	25.9	19.4	0.4

Column 1 conditions: Supelcoport 100/120 mesh coated with 5% SP-1200 and 1.75% Bentone-34 packed in a 6 ft. × 0.085 in ID stainless steel column with helium carrier gas at 36 cc/min flow rate. Column temperature held at 50°C for 2 min. then programmed at 6°C/min to 90°C for a final hold.

Column 2 conditions: Chromosorb W-AW 60/80 mesh coated with 5% 1,2,3-Tris(2-cyanoethyoxy)propane packed in a 6 ft. × 0.085 in ID stainless steel column with helium carrier gas at 30 cc/min flow rate. Column temperature held at 40°C for 2 min then programmed at 2°C/min to 100°C for a final hold.

Table 2. Single Operator Accuracy and Precision

Parameter	Average Percent Recovery	Standard Deviation %	Spike Range (µg/L)	Number of Analyses	Matrix Types
Benzene	91	10.0	0.5-9.7	21	3
Chlorobenzene	97	9.4	0.5-100	21	3
1,2-Dichlorobenzene	104	27.7	0.5-10.0	21	3
1,3-Dichlorobenzene	97	20.0	0.5-4.8	21	3
1,4-Dichlorobenzene	120	20.4	0.5-10.0	21	3
Ethylbenzene	98	12.4	0.5-9.9	21	3
Toluene	77	12.1	0.5-100	21	3

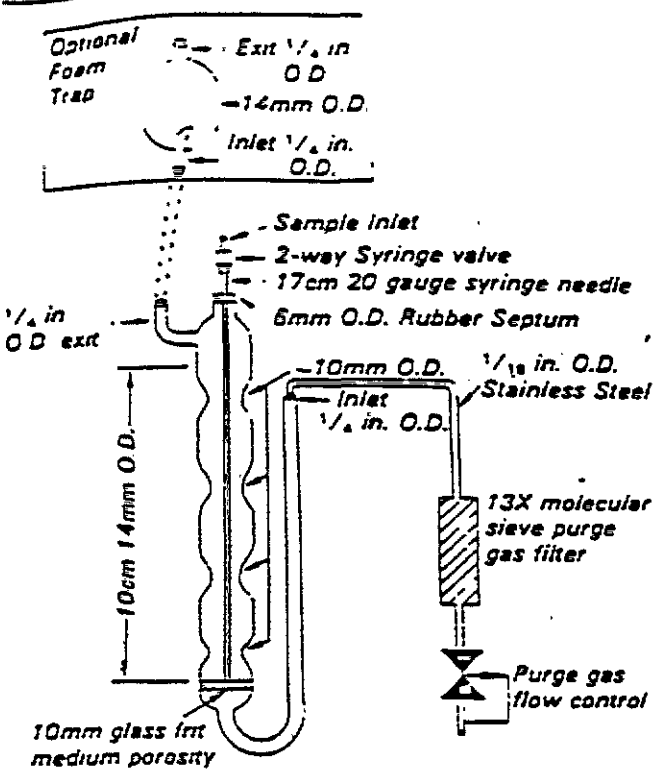

Figure 1. *Purging device*

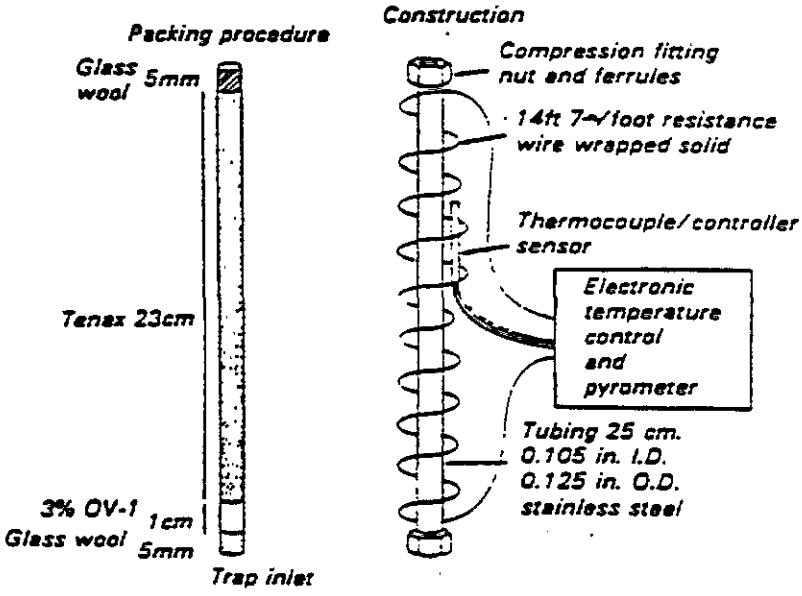

Figure 2. *Trap packings and construction to include desorb capability*

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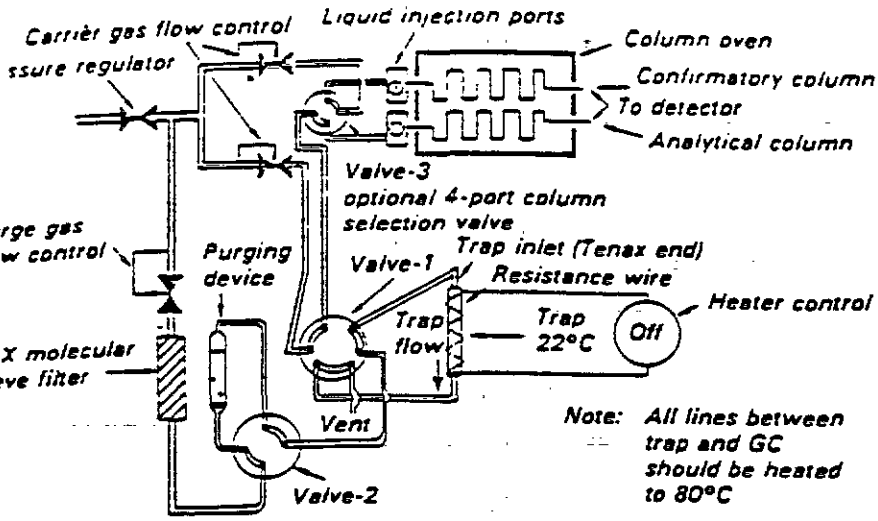

Figure 3. *Purge-trap system (Purge-sorb Mode)*

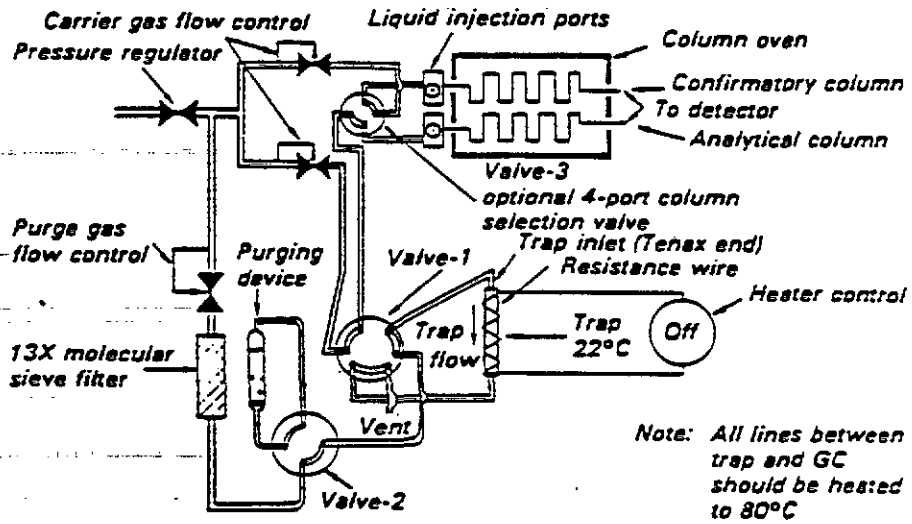

Figure 4. *Purge-trap system (Trap-dry Mode).*

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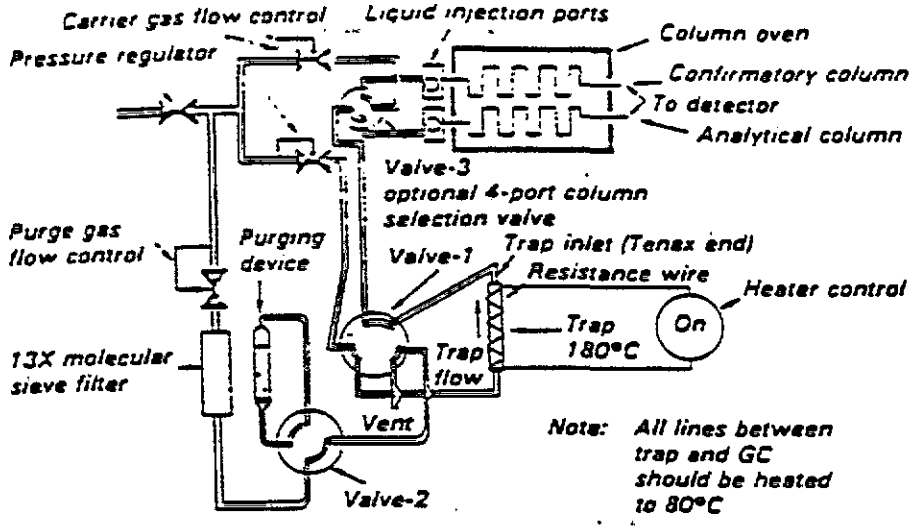


Figure 5. *Purge-trap system (Desorb Mode).*

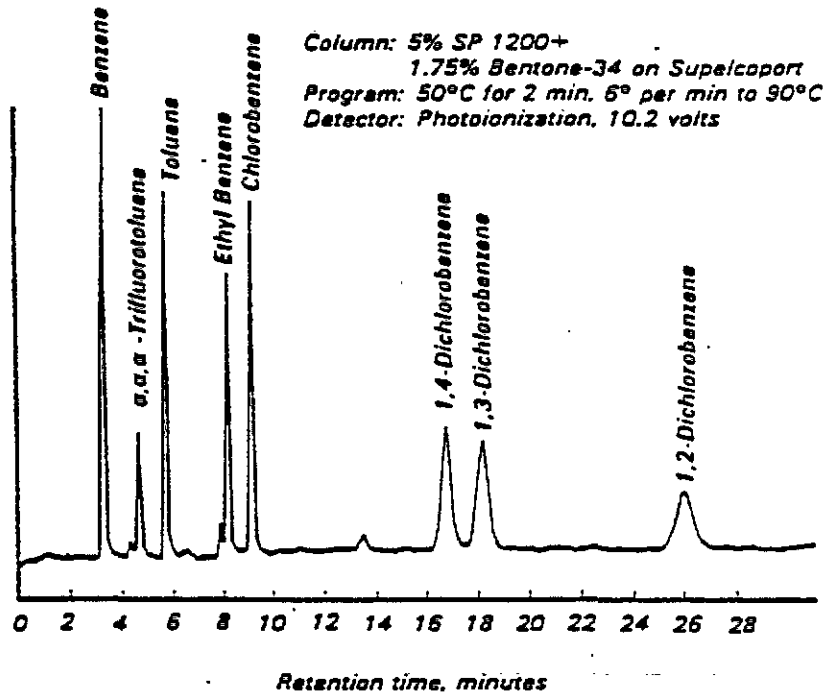


Figure 6. *Gas chromatogram of purgeable aromatics.*

Appendix IV.—Inductively Coupled Plasma Optical Emission Spectrometric Method (ICP) for Trace Element Analysis of Water and Wastes

Inductively Coupled Plasma (ICP) Optical Emission Spectrometric Method for Trace Element Analysis of Water and Wastes

Interim

U.S. Environmental Protection Agency, Environmental Monitoring and Support Laboratory, Cincinnati, Ohio 45268

October 1979.

Foreword

This method has been prepared by the staff of the Environmental Monitoring and Support Laboratory—Cincinnati, with the cooperation of the EPA–ICP Users Group. Their cooperation and support is gratefully acknowledged.

This method represents the current state-of-the-art, but as time progresses, improvements are anticipated. Users are encouraged to identify problems and assist in updating the method by contacting the Environmental Monitoring and Support Laboratory, Cincinnati, Ohio 45268.

Inductively Coupled Plasma (ICP) Optical Emission Spectrometric Method for Trace Element Analysis of Water and Wastes

1. Scope and Application.

1.1 This method may be used for the determination of dissolved, suspended, or total elements in surface water, drinking water, and domestic and industrial wastewaters.

1.2 Dissolved elements are determined in filtered and acidified samples. Appropriate steps must be taken to ensure that potential interference are taken into account when dissolved solids exceed 1500 mg/l. (See 4.2)

1.3 Total elements are determined after appropriate digestion procedures are performed. Since digestion techniques increase the dissolved solids content of the samples, appropriate steps *must* be taken to correct for potential interference effects.

1.4 Table 1 lists elements for which this method applies along with recommended wavelengths and typical estimated instrumental detection limits. Actual working detection limits are sample dependent and as the sample matrix varies, these concentrations may also vary. In time, other elements may be added as more information becomes available.

1.5 Because of the differences between various makes and models of satisfactory instruments, no detailed instrumental operating instructions can be provided. Instead, the analyst is referred to the instructions provided by the manufacturer of the particular instrument.

Table 1—*Recommended Wavelengths* [1] and Estimated Instrumental Detection Limits

Element	Wavelength, nm	Estimated detection limit, µg/l [2]
Aluminum	308.2	45
Arsenic	193.7	53
Barium	455.5	2
Beryllium	313.0	0.3
Boron	249.8	5
Cadmium	226.5	4
Calcium	317.9	10
Chromium	267.7	7
Cobalt	228.6	7
Copper	324.7	8
Iron	259.9	7
Lead	220.3	42
Lithium	670.7	4
Magnesium	279.1	30
Manganese	257.6	2
Molybdenum	202.0	8
Nickel	231.6	15
Potassium	766.4	see [3]
Selenium	196.0	75
Silica (SiO_2)	288.1	27
Silver	328.0	7
Sodium	589.0	29
Strontium	407.7	0.3
Vanadium	292.4	8
Zinc	213.8	2

[1] The wavelengths listed are recommended because their sensitivity and overall acceptance. Other wavelengths may be substituted if they can provide the needed sensitivity and are treated with the same corrective techniques for spectral interference. (See 4.1.1).

[2] The estimated instrumental detection limits as shown in this table are taken from "Inductively Coupled Plasma-Atomic Emission Spectroscopy Prominent Lines," EPA-600/4-79-017. These detection limits are sample dependent and as the sample matrix varies, these concentration values may also vary.

[3] Highly dependent on operating conditions and plasma stability.

2. Summary of Method.

2.1 The method describes a technique for the simultaneous or sequential multielement determination of trace elements in solution. The basis of the method is the measurement of atomic emission by an optical spectroscopic technique. Samples are nebulized and the aerosol that is produced is transported to the plasma torch where excitation occurs. Characteristic atomic-line emission spectra are produced by a radio-frequency inductively coupled plasma (ICP). The spectra are dispersed by a grating spectrometer and the intensities of the lines are monitored by photomultiplier tubes. The photocurrents from the photomultiplier tubes are processed and controled by computer system. A background correction technique is required to compensate for variable background contribution to the determination of trace elements. Background must be measured adjacent to analyte lines on samples during analysis. Additional interferences named in 4.1 shoud also be recognized and appropriate corrections made.

3. Definitions.

3.1 *Dissolved*—Those elements which will pass through a 0.45 µm membrane filter.

3.2 *Suspended*—Those elements which are retained by a 0.45 µm membrane filter.

3.3 *Total*—The concentration determined on an unfiltered sample following vigorous digestion (Section 8.3), or the sum of the dissolved plus suspended concentrations (Section 8.1 plus 8.2).

3.4 *Total recoverable*—The concentration determined on an

unfiltered sample following treatment ith hot, dilute mineral acid (Section ..4).

3.5 *Instrumental detection limit*—The concentration equivalent to a signal, due to the analyte, which is equal to three times the standard deviation of a series of ten replicate measurements of a reagent blank signal at the same wavelength.

3.6 *Sensitivity*—The slope of the analytical curve, i.e. funtional relationship between emission intensity and concentration.

3.7 *Instrument check standard*—A multielement standard of known concentrations prepared by the analyst. Should be included in the analytical scheme with a frequency of 10%. (See 6.6.1.)

3.8 *Reference standard*—A solution obtained from an outside source having known, verified values. Must be used initially to verify the calibration standards and analyzed thereafter as a blind sample on a weekly frequency. (See 6.6.2.)

3.9 *Calibration standards*—A series of known standard solutions used by the analyst for calibration of the instrument (i.e., preparation of the analytical curve). (See 6.4.)

3.10 *Linear dynamic range*—The ncentration range over which the analytical curve remains linear.

3.11 *Reagent blank*—A volume of deionized, distilled water containing the same acid matrix as the calibration standards carried through the entire analytical scheme. (See 6.5.2.)

3.12 *Calibration blank*—A volume of deionized, distilled water acidified with HNO_3 and HCl. (See 6.5.1.)

3.13 *Method of standard addition*—The standard addition technique involves the use of the unknown and the unknown plus a known amount of standard. (See 9.6.1.)

4. Interferences.

4.1 Several types of interference effects may contribute to inaccuracies in the determination of trace elements. They can be summarized as follows:

4.1.1 *Spectral interferences* can be categorized as (1) overlap of a spectral line from another element; (2) unresolved overlap of molecular band spectra; (3) background contribution from continuous or recombination phenomena; and (4) background contribution from stray light from the line emission of high concentration elements. The first of these effects can be compensated by utilizing a computer rrection of the raw data, requiring .easurement of the interfering element. The second effect may require selection of an alternate wavelength. The third and fourth effects can usually be compensated by a background correction adjacent to the analyte line.

4.1.2 *Physical interferences* are generally considered to be effects associated with the sample nebulization and transport processes. Such properties as change in viscosity and surface tension can cause significant inaccuracies especially in samples which may contain high dissolved solids and/or acid concentrations. (See Note 1.) If these types of interferences are operative, they must be reduced by dilution of the sample and/or utilization of standard addition techniques.

Note 1.—The use of a peristaltic pump may lessen these interferences.

4.1.3 *Chemical interferences* are characterized by molecular compound formation, ionization effects and solute vaporization effects. Normally these effects are not pronounced with the ICP technique, however, if observed they can be minimized by careful selection of operating conditions (that is, incident power, observation position, and so forth), by buffering of the sample, by matrix matching, and by standard addition procedures. These types of interferences can be highly dependent on matrix type and the specific analyte element.

4.2 It is recommended that whenever a new or unusual sample matrix is encountered, a series of tests be performed prior to reporting concentration data for analyte elements. These tests, as outlined in 4.2.1 through 4.2.4, will ensure the analyst that neither positive nor negative interference effects are operative on any of the analyte elements thereby distorting the accuracy of the reported values.

4.2.1 *Serial dilution*—If the analyte concentration is sufficiently high (minimally a factor of 10 above the instrumental detection limit after dilution), an analysis of a dilution should agree within 5 percent of the original determination (or within some acceptable control limit (13.3) that has been established for that matrix). If not, a chemical or physical interference effect should be suspected.

4.2.2 *Spike addition*—The recovery of a spike addition added at a minimum level of 10X the instrumental detection limit (maximum 100X) to the original determination should be recovered to within 90 to 110 percent or within the established control limit for that matrix. If not, a matrix effect should be suspected. The use of a standard addition analysis procedure can usually compensate for this effect.

Caution.—The standard addition technique does not detect coincident spectral overlap. If suspected, use of an alternate wavelength or comparison with an alternate method recommended (See 4.2.3).

4.2.3 *Comparison with alternate method of analysis*—When investigating a new sample matrix, comparison tests may be performed with other analytical techniques such as atomic absorption spectrometry, or other approved methodology.

4.2.4 *Wavelength scanning of analyte line region*—If the appropriate equipment is available, wavelength scanning can be performed to detect potential spectral interferences.

5. Apparatus.

5.1 Inductively Coupled Plasma (ICP) Optical Emission Spectrometer.

5.1.1 Computer controlled atomic emission spectrometer with background correction.

5.1.2 Radiofrequency generator.

5.1.3 Argon gas supply, welding grade or better.

5.2 Operating conditions—Because of the differences between various makes and models of satisfactory instruments, no detailed operating instructions can be provided. Instead, the analyst should follow the instructions provided by the manufacturer of the particular instrument. Sensitivity, instrumental detection limit, precision, linear dynamic range, and interference effects must be investigated and established for each individual analyte line on that particular instrument.

6. Reagents and standards.

6.1 Acids used in the preparation of standards and for sample processing must be ultra-high purity grade or equivalent. Redistilled acids are acceptable.

6.1.1 *Acetic acid*, conc. (sp gr 1.06).

6.1.2 *Aqua regia*: Mix cautiously: 3 parts conc. HCl (sp gr 1.19) and 1 part conc. HNO_3 (sp gr 1.41) just before use.

6.1.3 *Hydrochloric acid*, conc. (sp gr 1.19).

6.1.4 *Hydrochloric acid*, (1+1): Add 500 ml conc. HCl (sp gr 1.19) to 400 ml deionized, distilled water and dilute to 1 liter.

6.1.5 *Nitric acid*, conc. (sp gr 1.41).

6.1.6 *Nitric acid*, (1+1): Add 500 ml conc. HNO_3 (sp gr 1.41) to 400 ml deionized, distilled water and dilute to 1 liter.

6.2 *Deionized, distilled water*: Prepare by passing distilled water through a mixed bed of cation and anion exchange resins. Use deionized, distilled water for the preparation of all reagents, calibration standards, and dilutions of water.

6.3 *Standard stock solutions* may be purchased or prepared from ultra high purity grade chemicals or metals

lution: See Note 2). All salts must be ...ed for 1 h at 105° C unless otherwise specified.

Note 2.—Many metal salts are extremely toxic and may be fatal if swallowed. Wash hands thoroughly after handling.

Typical stock solution preparation procedures follow:

6.3.1 *Aluminum solution, stock.* 1 ml = 100 μg Al: Dissolve 0.100 g of aluminum metal in an acid mixture of 4 ml of (1+1) HCl and 1 ml of conc. HNO_3 in a beaker. Warm gently to effect solution. When solution is complete, transfer quantitatively to a liter flask, add an additional 10 ml of (1+1) HCl and dilute to 1.000 ml with deionized, distilled water.

6.3.2 *Arsenic solution, stock.* 1 ml = 100 μg As: Dissolve 0.1320 g of As_2O_3 in 100 ml of deionized, distilled water containing 0.4 g NaOH. Acidify the solution with 2 ml conc. NHO_3 and dilute to 1.000 ml with deionized, distilled water.

6.3.3 *Barium solution, stock.* 1 ml = 100 μg Ba: Dissolve 0.1516 g $BaCl_2$ in 10 ml deionized, distilled water with 1 ml (1+1) HCl. Add 10.0 ml (1+1) HCl and dilute to 1.000 ml with deionized, distilled water.

6.3.4 *Beryllium solution, stock.* 1 ml = 100 μg Be: Dissolve 1.127 g $Be_4O(C_2H_3O_2)_6$, beryllium acetate basic, in a minimum amount of conc. acetic acid. Add 10.0 ml conc. HNO_3 and dilute to 1.000 ml with deionized, distilled water.

6.3.5 *Boron solution, stock.* 1 ml = 100 μg B: Dissolve 0.5716 g anhydrous H_3BO_3 in deionized, distilled water and dilute to 1.000 ml. Because H_3BO_3 loses weight on drying at 105° C, use a reagent meeting ACS specifications and keep the bottle tightly stoppered to prevent the entrance of atmospheric moisture.

6.3.6 *Cadmium solution, stock.* 1 ml = 100 μg Cd: Dissolve 0.1142 g CdO in a minimum amount of (1+1) HNO_3. Heat to increase rate of dissolution. Add 10.0 ml conc. HNO_3 and dilute to 1.000 ml with deionized, distilled water.

6.3.7 *Calcium solution, stock.* 1 ml = 100 μg Ca: Suspend 0.2498 g $CaCO_3$ dried at 180° C for 1 h before weighing in deionized, distilled water and dissolve cautiously with a minimum amount of (1+1) HNO_3. Add 10.0 ml conc. HNO_3 and dilute to 1.000 ml with deionized, distilled water.

6.3.8 *Chromium solution, stock.* 1 ml = 100 μg Cr: Dissolve 0.1923 g of CrO_3 in deionized, distilled water. When ...olution is complete, acidify with 10 ml conc. HNO_3 and dilute to 1.000 ml with deionized, distilled water.

6.3.9 *Cobalt solution, stock.* 1 ml = 100 μg Co: Dissolve 0.1407 g Co_3O_4 in a minimum amount of (1+1) HNO_3. Add 10.0 ml conc. HNO_3 and dilute to 1.000 ml with deionized, distilled water.

6.3.10 *Copper solution, stock.* 1 ml = 100 μg Cu: Dissolve 0.1252 g CuO in a minimum amount of (1+1) HNO_3. Add 10.0 ml conc. HNO_3 and dilute to 1.000 ml with deionized, distilled water.

6.3.11 *Iron solution, stock.* 1 ml = 100 μg Fe: Dissolve 0.1430 g Fe_2O_3 in 10 ml deionized, distilled water with 1 ml (1+1) HCl. Add 10.0 ml conc. HNO_3 and dilute to 1.000 ml with deionized, distilled water.

6.3.12 *Lead solution, stock.* 1 ml = 100 μg Pb: Dissolve 0.1599 g $Pb(NO_3)_2$ in a minimum amount of (1+1) HNO_3. Add 10.0 ml conc. HNO_3 and dilute to 1.000 ml with deionized, distilled water.

6.3.13 *Lithium solution, stock.* 1 ml = 100 μg Li: Dissolve 0.5323 g Li_2CO_3 slowly in a minimum amount of (1+1) HNO_3. Add 10.0 ml conc. HNO_3 and dilute to 1.000 ml with deionized, distilled water.

6.3.14 *Magnesium solution, stock.* 1 ml = 100 μg Mg: Dissolve 0.1658 g MgO in a minimum amount of (1+1) HNO_3. Add 10.0 ml conc. HNO_3 and dilute to 1.000 ml with deionized, distilled water.

6.3.15 *Manganese solution, stock.* 1 ml = 100 μg Mn: Dissolve 0.5225 g $Mn(NO_3)_2 \cdot 6H_2O$ (do not dry) in deionized, distilled water. Add 10.0 ml conc. HNO_3 and dilute to 1.000 ml with deionized, distilled water.

6.3.16 *Molybdenum solution, stock.* 1 ml = 100 μg Mo: Dissolve 0.2043 g $(NH_4)_2MoO_4$ in deionized, distilled water and dilute to 1.000 ml.

6.3.17 *Nickel solution, stock.* 1 ml = 100 μg Ni: Dissolve 0.4953 g $Ni(NO_3)_2 \cdot 6H_2O$ in deionized, distilled water. Add 10 ml of conc. HNO_3 and dilute to 1.000 ml with deionized, distilled water.

6.3.18 *Potassium solution, stock.* 1 ml = 100 μg K: Dissolve 0.1907 g KCl, dried at 110° C, in deionized, distilled water dilute to 1.000 ml.

6.3.19 *Selenium solution, stock.* 1 ml = 100 μg Se: Dissolve 0.1727 g H_2SeO_3 in deionized, distilled water and dilute to 1.000 ml.

6.3.20 *Silica solution, stock.* 1 ml = 100 μg SiO_2: *Do not dry.* Dissolve 0.4730 g $Na_2SiO_3 \cdot 9H_2O$ in deionized, distilled water. Add 10.0 ml conc. HNO_3 and dilute to 1.000 ml with deionized, distilled water.

6.3.21 *Silver solution, stock.* 1 ml = 1 μg Ag: Dissolve 0.1575 g $AgNO_3$ in 100 ml of deionized, distilled water and 10 ml conc. HNO_3. Dilute to 1.000 ml with deionized, distilled water.

6.3.22 *Sodium solution, stock.* 1 ml = 100 μg Na: Dissolve 0.2542 g NaCl in deionized, distilled water. Add 10.0 ml conc. HNO_3 and dilute to 1.000 ml with deionized, distilled water.

6.3.23 *Strontium solution, stock.* 1 ml = 100 μg Sr: Dissolve 0.2416 g $Sr(NO_3)_2$ in deionized, distilled water. Add 10.0 ml conc. HNO_3 and dilute to 1.00 ml with deionized, distilled water.

6.3.24 *Vanadium solution, stock.* 1 m... = 100 μg V: Dissolve 0.2297 NH_4VO_3 in a minimum amount of conc. HNO_3. Heat to increase rate of dissolution. Add 10.0 ml conc. HNO_3 and dilute to 1.00 ml with deionized, distilled water.

6.3.25 *Zinc solution, stock.* 1 ml = 100 μg Zn: Dissolve 0.1245 g ZnO in a minimum amount of dilute HNO_3. Add 10.0 ml conc. HNO_3 and dilute to 1.000 ml with deionized, distilled water.

6.4 *Mixed calibration standard solutions*—Prepared mixed calibration standard solutions by combining appropriate volumes of the stock solutions in volumetric flasks. (See 6.4.1 thru 6.4.6) Add 2 ml of (1+1) HNO_3 and 2 ml of (1+1) HCl and dilute to 100 ml with deionized, distilled water. Prior to preparing the mixed standards, each stock solution should be analyzed separately to determine possible spectral interference. Care should be taken when preparing the mixed standards that the elements are compatible and stable. Transfer the mixed standard solutions to a FEP fluorocarbon bottle for storage. Fresh mixed standards should be prepared weekly. Some typical combinations follow:

6.4.1 *Mixed standard solution I*—Iron, manganese, cadmium, lead, and zinc.

6.4.2 *Mixed standard solution II*—Beryllium, copper, strontium, vanadium, and cobalt.

6.4.3 *Mixed standard solution III*—Molybdenum, silica, lithium, and barium.

6.4.4 *Mixed standard solution IV*—Calcium, magnesium, sodium, and potassium.

6.4.5 *Mixed standard solution V*—Aluminum, arsenic, boron, chromium, nickel, and selenium.

6.4.6 *Mixed standard solution VI*—Silver.

6.5 Two types of blanks are require for the analysis. The calibration blank (3.12) is used in establishing the analytical curve while the reagent blank (3.11) is used to correct for possible contamination resulting from varying amounts of the acids used in the sample processing.

6.5.1 *The calibration blank* is prepared by diluting 2 ml of (1 + 1) HNO_3 and 2 ml of (1 + 1) HCl to 100 ml with deionized, distilled water. Prepare a sufficient quantity to be used to flush the system between standards and samples.

6.5.2 *The reagent blank* must contain all the reagents and in the same volumes as used in the processing of the samples. The reagent blank must be carried through the complete procedure and contain the same acid concentration in the final solution as the sample solution used for analysis.

6.6 In addition to the calibration standards, an instrument check standard (3.7) and a reference standard (3.8) are also required for the analyses.

6.6.1 *The instrument check standard* is prepared by the analyst by combining compatible elements at a concentration equivalent to the midpoint of their respective calibration curves. This standard should be included in the analytical scheme with a frequency of 10%.

6.6.2 *The reference standard* should be prepared according to the instructions provided by the supplier. Following initial verification of the calibration standards, analyze weekly.

7. Sample handling and preservation.

7.1 For the determination of trace elements, contamination and loss are of prime concern. Dust in the laboratory environment, impurities in reagents and impurities on laboratory apparatus which the sample contacts are all sources of potential contamination. Sample containers can introduce either positive or negative errors in the measurement of trace elements by (a) contributing contaminants through leaching or surface desorption and (b) by depleting concentrations through adsorption. Thus the collection and treatment of the sample prior to analysis requires particular attention. Laboratory glassware including the sample bottle (whether linear polyethylene, polypropylene or TFE-fluorocarbon) should be thoroughly washed with detergent and tap water; rinsed with (1+1) nitric acid, tap water, (1+1) hydrochloric acid, tap and finally deionized, distilled water in that order. (See Notes 3 and 4).

Note 3.—*Chromic acid may be useful to remove organic deposits from glassware; however, the analyst should be cautioned that the glassware must be thoroughly rinsed with water to remove the last traces of chromium. This is especially important if chromium is to be included in the analytical scheme. A commercial product, NOCHROMIX, available from Godax Laboratories, 6 Varick St., New York, NY 10013, may be used in place of chromic acid. Chromic acid should not be used with plastic bottles.*

Note 4.—If it can be documented through an active analytical quality control program using spiked samples and reagent blanks, *that certain steps in the cleaning procedure* are not required for routine samples, those steps may be eliminated from the procedure

7.2 Before collection of the sample a decision must be made as to the type of data desired, that is dissolved, suspended or total, so that the appropriate preservation and pretreatment steps may be accomplished. Filtration, acid preservation, etc., are to be performed at the time the sample is collected or as soon as possible thereafter.

7.2.1 For the determination of dissolved elements the sample must be *filtered through a 0.45-μm membrane* filter as soon as practical after collection. (Glass or plastic filtering apparatus is recommended to avoid possible contamination.) Use the first 50–100 ml to rinse the filter flask. Discard this portion and collect the required volume of filtrate. Acidify the filtrate with (1+1) HNO_3 to a pH of 2 or less. Normally, 3 ml of (1+1) acid per *liter should be sufficient to preserve the* sample.

7.2.2 For the determination of suspended elements a measured volume of unpreserved sample must be filtered through a 0.45-μm membrane filter as soon as practical after collection. The filter plus suspended material should be transferred to a suitable container for storage and/or shipment. No preservative is required.

7.2.3 For the determination of total or total recoverable elements, the sample is acidified with 5 ml conc. HNO_3 per liter (pH 2) as soon as possible, preferably at the time of collection. The sample is not filtered before processing.

8. Sample Preparation.

8.1 For the determinations of dissolved elements, the filtered, preserved sample may often be analyzed as received. The acid matrix and concentration of the samples and calibration standards must be the same. If a precipitate formed upon acidification of the sample or during transit or storage, it must be redissolved before the analysis by adding additional acid and/or by heat as described in 8.3.

8.2 For the determinaton of suspended elements, transfer the membrane filter containing the insoluble material to a 250-ml Griffin beaker and add 3 ml conc. HNO_3. Cover the beaker with a watch glass and heat gently. The warm acid will soon dissolve the membrane. Increase the temperature of the hot plate and digest the material. When the acid has nearly evaporated, cool the beaker and watch glass and add another 3 ml of conc. HNO_3. Cover and continue heating until the digestion is complete, generally indicated by a light colored digestate. Evaporate to near dryness (DO NOT BAKE), cool, add 2 ml of (1+1) HNO_3 and 2 ml HCl (1+1) per 100 ml dilution and warm the beaker gently to dissolve any soluble material. Wash down the watch glass and beaker walls with deionized distilled water and filter the sample to remove insoluble material that could clog the nebulizer. Adjust the volume based on the expected concentrations of elements present. This volume will vary depending on the elements to be determined. The sample is now ready for analysis. Concentrations so determined shall be reported as "suspended."

8.3 For the determination of total elements, choose a measured volume of the well mixed acid preserved sample appropriate for the expected level of elements and transfer to a Griffin beaker. (See Note 5.) Add 3 ml of conc. HNO_3. Place the beaker on a hot plate and evaporate to near dryness cautiously, making certain that the *sample does not boil. (DO NOT BAKE.)* Cool the beaker and add another 3 ml portion of conc. HNO_3. Cover the beaker with a watch glass and return to the hot plate. Increase the temperature of the hot plate so that a gentle reflux action occurs. Continue heating, adding additional acid as necessary, until the digestion is complete (generally indicated when the digestate is light in *color or does not change in appearance* with continued refluxing.) Again, evaporate to near dryness and cool the beaker. Add 2 ml of 1+1 HNO_3 and 2 ml of 1+1 HCl per 100 ml of final solution and warm the beaker to dissolve any precipitate or residue resulting from evaporation. Wash down the beaker walls and watch glass with deionized distilled water and filter the sample to remove insoluble material that could clog the nebulizer. Adjust the volume based on the expected concentrations of elements present. The sample is now ready for analysis. Concentrations so determined shall be reported as "total."

Note 5.—If low determinations of boron are critical, quartz glassware should be used.

8.4 For the determination of total recoverable elements, choose a measured volume of a well mixed, acid preserved sample appropriate for the expected level of elements and transfer to a Griffin beaker. (See Note 5.) Add 1 ml of HNO_3 (1+1) and 2 ml of HCl (1+1) to the sample and heat on a steam bath or hot plate until the volume has been reduced to 15–20 ml making certain the sample does not boil. After this treatment the sample is filtered to *remove insoluble material that could* clog the nebulizer, and the volume adjusted to 100 ml. The sample is now ready for analysis. Concentrations so determined shall be reported as "total."

9. Procedure.

9.1 Set up instrument with proper operating parameters established in section 5.2. Instrument must be allowed to stabilize for at least 30 min prior to operations.

9.2 Initiate appropriate operating configuration of computer.

9.3 Profile and calibrate instrument according to instrument manufacturer's recommended procedures, using the typical mixed calibration standard solutions described in Section 6.4. Flush the system with the calibration blank (6.5.1) between each standard. (See note 6.) (The use of the average intensity of multiple exposures for both standardization and sample analysis has been found to reduce random error.)

NOTE 6.—For boron concentrations greater than 500 μg/l extended flush times of 1 to 2 minutes may be required.

9.4 Before beginning the sample run, reanalyze the highest mixed calibration standard as if it were a sample. Concentration values obtained should not deviate from the actual values by more than 2 percent (or the established control limits). If they do, follow the recommendations of the instrument manufacturer to correct for this condition.

9.5 Begin the sample run flushing the system with the calibration blank (6.5.1) between each sample. (See Note 6.) Analyze an instrument check standard (6.8.1) each 10 samples.

9.6 If it has been found that methods of standard addition are required, the following procedure is recommended.

9.6.1 The standard addition technique (13.2) involves preparing new standards in the sample matrix by adding known amounts of standard to one or more aliquots of the processed sample solution. This technique compensates for a sample constituent that enhances or depresses the analyte signal thus producing a different slope from that of the calibration standards. It will not correct for additive interference which causes a baseline shift. The simplest version of this technique is the single-addition method. The procedure is as follows. Two identical aliquots of the sample solution, each of volume V_s, are taken. To the first (labeled A) is added a small volume V_s of a standard analyte solution of concentration c_s. To the second (labeled B) is added the same volume V_s of the solvent. The analytical signals of A and B are measured and corrected for nonanalyte signals. The unknown sample concentration c_x is calculated:

$$C_x = \frac{S_B V_s c_s}{(S_A - S_B) V_s}$$

where S_A and S_B are the analytical signals (corrected for the blank) of solutions A and B, respectively. V_s and c_s should be chosen so that S_A is roughly twice S_B on the average. It is best if V_s is made much less than V_s, and thus c_s is much greater than c_x, to avoid excess dilution of the sample matrix. If a separation or concentration step is used, the additions are best made first and carried through the entire procedure. For the results from this technique to be valid, the following limitations must be taken into consideration:

1. The analytical curve must be linear.

2. The chemical form of the analyte added must respond the same as the analyte in the sample.

3. The interference effect must be constant over the working range of concern.

4. The signal must be corrected for any additive interference.

10. Calculation.

10.1 Reagent blanks (6.5.2) should be subtracted from all samples. This is particularly important for digested samples requiring large quantities of acids to complete the digestion.

10.2 If dilutions were performed, the appropriate factor must be applied to sample values.

10.3 Results should be reported to the nearest μg/L up to three significant figures, except calcium, magnesium, sodium, and potassium which are reported to the nearest 0.1 mg/L.

11. Quality Control (Instrumental).

11.1 Check the instrument standardization by analyzing appropriate quality control check standards as follow:

11.1.1 Analyze the instrument check standard (6.6.1) made up of all the elements of interest at a frequency of 10%. This check standard is used to determine instrument drift. If agreement is not within ± 2% of the expected values or within the established control limits, the analysis is out of control.

11.1.2 For the purpose of verifying interelement and/or background correction factors, analyze a second check standard, prepared in the following manner. Select a representative sample which contains minimal concentrations of the elements of interest. Spike this sample with the analytes of interest at or near 20 μg/L. (For effluent samples of expected high concentrations, spike at an appropriate level.) Values should fall within the established control levels of 1 times the standard deviation of the mean value of the check standard. If not, repeat the standardization.

11.1.3 A reference standard (6.6.2) from an outside source, but having known concentration values, should be analyzed as a blind sample once a week frequency. Values should be within the established quality control limits. If not, prepare new stock standards.

12. *Precision and Accuracy.*

12.1 In an EPA round phase I study seven laboratories applied the ICP technique to acid-distilled water matrices that had been dosed with various metal concentrates. Table II lists the true value, the mean reported value, and the mean % relative standard deviation.

Table II.—*ICP Precision and Accuracy Data*

Element	Sample No. 1			Sample No. 2			Sample No. 3		
	True value μg/l	Mean reported value μg/l	Mean percent RSD	True value μg/l	Mean reported value μg/l	Mean percent RSD	True value μg/l	Mean reported value μg/l	Mean percent RSD
Be	750	723	8.2	20	20	9.8	160	171	
Mn	350	345	2.7	15	15	6.7	100	96	
V	750	749	1.8	70	69	2.9	170	169	
As	200	208	7.5	22	19	23	60	63	1
Cr	150	149	3.8	10	10	10	50	50	
Cu	250	225	5.1	11	11	40	70	67	
Fe	600	584	3.0	20	19	15	180	175	
Al	700	686	5.6	60	62	33	160	161	1
Cd	30	48	12	2.5	2.9	16	14	12	1
Co	500	512	10	20	20	4.1	120	108	2
Ni	250	245	5.5	30	28	11	60	53	1
Pb	250	238	16	24	30	32	80	85	1
Zn	200	201	5.6	16	19	45	80	87	
Se	40	32	21.8	6	8.5	42	10	8.1	

Not all elements were analyzed by all laboratories.

13 References.

13.1 Winge, R. K., V. J. Peterson, and V. A. Fassel. "Inductively Coupled Plasma-Optical Emission Spectroscopy. Prominent Lines. EPA-600/4-79-017.

13.2 Winefordner, J. D. "Trace Analysis. Spectroscopic Methods for Elements." *Chemical Analysis*, Vol. 46, pp. 41-42.

13.3 Handbook for Analytical Quality Control in Water and Wastewater Laboratories. EPA-600/4-79-019.

13.4 Carbanna, J. R. and Taylor, H. E. "An Inductively-Coupled Plasma Optical Emission Spectrometric Method for Routine Water Quality Testing." Applied Spectroscopy 32, No. 3 [1978].

13.5 "Methods for Chemical Analysis of Water and Wastes." EPA-600/4-79-020.

to being used, re-used, recycled or reclaimed is subject to the following requirements with respect to such transportation or storage:

(1) Notification requirements under Section 3010 RCRA.

(2) Part 262 of this Chapter.

(3) Part 263 of this Chapter.

(4) Subparts A, B, C, D and E of Part 264 of this Chapter.

(5) Subparts A, B, C, D, E, G, H, I, J and L of Part 265 of this Chapter.

(6) Parts 122 and 124 of this Chapter, with respect to storage facilities.

Subpart B—Criteria for Identifying the Characteristics of Hazardous Waste and for Listing Hazardous Waste

§ 261.10 Criteria for identifying the characteristics of hazardous waste.

(a) The Administrator shall identify and define a characteristic of hazardous waste in Subpart C only upon determining that:

(1) A solid waste that exhibits the characteristic may:

(i) Cause, or significantly contribute to, an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness; or

(ii) Pose a substantial present or potential hazard to human health or the environment when it is improperly treated, stored, transported, disposed of or otherwise managed; and

(2) The characteristic can be:

(i) Measured by an available standardized test method which is reasonably within the capability of generators of solid waste or private sector laboratories that are available to serve generators of solid waste; or

(ii) Reasonably detected by generators of solid waste through their knowledge of their waste.

§ 261.11 Criteria for listing hazardous waste.

(a) The Administrator shall list a solid waste as a hazardous waste only upon determining that the solid waste meets one of the following criteria:

(1) It exhibits any of the characteristics of hazardous waste identified in Subpart C.

(2) It has been found to be fatal to humans in low doses or, in the absence of data on human toxicity, it has been shown in studies to have an oral LD 50 toxicity (rat) of less than 50 milligrams per kilogram, an inhalation LC 50 toxicity (rat) of less than 2 milligrams per liter, or a dermal LD 50 toxicity (rabbit) of less than 200 milligrams per kilogram or is otherwise capable of causing or significantly contributing to an increase in serious irreversible, or incapacitating reversible, illness. (Waste listed in accordance with these criteria will be designated Acute Hazardous Waste.)

(3) It contains any of the toxic constituents listed in Appendix VIII unless, after considering any of the following factors, the Administrator concludes that the waste is not capable of posing a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported or disposed of, or otherwise managed:

(i) The nature of the toxicity presented by the constituent.

(ii) The concentration of the constituent in the waste.

(iii) The potential of the constituent or any toxic degradation product of the constituent to migrate from the waste into the environment under the types of improper management considered in paragraph (a)(3)(vii) of this section.

(iv) The persistence of the constituent or any toxic degradation product of the constituent.

(v) The potential for the constituent or any toxic degradation product of the constituent to degrade into non-harmful constituents and the rate of degradation.

(vi) The degree to which the constituent or any degradation product of the constituent bioaccumulates in ecosystems.

(vii) The plausible types of improper management to which the waste could be subjected.

(viii) The quantities of the waste generated at individual generation sites or on a regional or national basis.

(ix) The nature and severity of the human health and environmental damage that has occurred as a result of the improper management of wastes containing the constituent.

(x) Action taken by other governmental agencies or regulatory programs based on the health or environmental hazard posed by the waste or waste constituent.

(xi) Such other factors as may be appropriate.

Substances will be listed on Appendix VIII only if they have been shown in scientific studies to have toxic, carcinogenic, mutagenic or teratogenic effects on humans or other life forms.

(Wastes listed in accordance with these criteria will be designated Toxic wastes.)

(b) The Administrator may list classes or types of solid waste as hazardous waste if he has reason to believe that individual wastes, within the class or type of waste, typically or frequently are hazardous under the definition of hazardous waste found in Section 1004(5) of the Act.

(c) The Administrator will use the criteria for listing specified in this section to establish the exclusion limits referred to in § 261.5(c).

Subpart C—Characteristics of Hazardous Waste

§ 261.20 General.

(a) A solid waste, as defined in § 261.2, which is not excluded from regulation as a hazardous waste under § 261.4(b), is a hazardous waste if it exhibits any of the characteristics identified in this Subpart.

[Comment: § 262.11 of this Chapter sets forth the generator's responsibility to determine whether his waste exhibits one or more of the characteristics identified in this Subpart]

(b) A hazardous waste which is identified by a characteristic in this subpart, but is not listed as a hazardous waste in Subpart D, is assigned the EPA Hazardous Waste Number set forth in the respective characteristic in this Subpart. This number must be used in complying with the notification requirements of Section 3010 of the Act and certain recordkeeping and reporting requirements under Parts 262 through 265 and Part 122 of this Chapter.

(c) For purposes of this Subpart, the Administrator will consider a sample obtained using any of the applicable sampling methods specified in Appendix I to be a representative sample within the meaning of Part 260 of this Chapter.

[Comment: Since the Appendix I sampling methods are not being formally adopted by the Administrator, a person who desires to employ an alternative sampling method is not required to demonstrate the equivalency of his method under the procedures set forth in §§ 260.20 and 260.21.]

§ 261.21 Characteristic of ignitability.

(a) A solid waste exhibits the characteristic of ignitability if a representative sample of the waste has any of the following properties:

(1) It is a liquid, other than an aqueous solution containing less than 24 percent alcohol by volume, and has a flash point less than 60°C (140°F), as determined by a Pensky-Martens Closed Cup Tester, using the test method specified in ASTM Standard D-93-79, or a Setaflash Closed Cup Tester, using the test method specified in ASTM standard D-3278-78, or as determined by an equivalent test method approved by the Administrator under the procedures set forth in §§ 260.20 and 260.21.[1]

[1] ASTM Standards are available from ASTM, 1916 Race Street, Philadelphia, PA 19103.

(2) It is not a liquid and is capable, under standard temperature and pressure, of causing fire through friction, absorption of moisture or spontaneous chemical changes and, when ignited, burns so vigorously and persistently that is creates a hazard.

(3) It is an ignitable compressed gas as defined in 49 CFR 173.300 and as determined by the test methods described in that regulation or equivalent test methods approved by the Administrator under §§ 260.20 and 260.21.

(4) It is an oxidizer as defined in 49 CFR 173.151.

(b) A solid waste that exhibits the characteristic of ignitability, but is not listed as a hazardous waste in Subpart D, has the EPA Hazardous Waste Number of D001.

§ 261.22 Characteristic of corrosivity.

(a) A solid waste exhibits the characteristic of corrosivity if a representative sample of the waste has either of the following properties:

(1) It is aqueous and has a pH less than or equal to 2 or greater than or equal to 12.5, as determined by a pH meter using either the test method specified in the "Test Methods for the Evaluation of Solid Waste, Physical/Chemical Methods" [2] (also described in "Methods for Analysis of Water and Wastes" EPA 600/4–79–020, March 1979), or an equivalent test method approved by the Administrator under the procedures set forth in §§ 260.20 and 260.21.

(2) It is a liquid and corrodes steel (SAE 1020) at a rate greater than 6.35 mm (0.250 inch) per year at a test temperature of 55°C (130°F) as determined by the test method specified in NACE (National Association of Corrosion Engineers) Standard TM–01–69 [3] as standardized in "Test Methods for the Evaluation of Solid Waste, Physical/Chemical Methods," or an equivalent test method approved by the Administrator under the procedures set forth in §§ 260.20 and 260.21.

(b) A solid waste that exhibits the characteristic of corrosivity, but is not listed as a hazardous waste in Subpart D, has the EPA Hazardous Waste Number of D002.

[2] This document is available from Solid Waste Information, U.S. Environmental Protection Agency, 26 W. St. Clair Street, Cincinnati, Ohio 45268.

[3] The NACE Standard is available from the National Association of Corrosion Engineers, P.O. Box 986, Katy, Texas 77450.

§ 261.23 Characteristic of reactivity.

(a) A solid waste exhibits the characteristic of reactivity if a representative sample of the waste has *any* of the following properties:

(1) It is normally unstable and readily undergoes violent change without detonating.

(2) It reacts violently with water.

(3) It forms potentially explosive mixtures with water.

(4) When mixed with water, it generates toxic gases, vapors or fumes in a quantity sufficient to present a danger to human health or the environment.

(5) It is a cyanide or sulfide bearing waste which, when exposed to pH conditions between 2 and 12.5, can generate toxic gases, vapors or fumes in a quantity sufficient to present a danger to human health or the environment.

(6) It is capable of detonation or explosive reaction if it is subjected to a strong initiating source or if heated under confinement.

(7) It is readily capable of detonation or explosive decomposition or reaction at standard temperature and pressure.

(8) It is a forbidden explosive as defined in 49 CFR 173.51, or a Class A explosive as defined in 49 CFR 173.53 or a Class B explosive as defined in 49 CFR 173.88.

(b) A solid waste that exhibits the characteristic of reactivity, but is not listed as a hazardous waste in Subpart D, has the EPA Hazardous Waste Number of D003.

§ 261.24 Characteristic of EP Toxicity.

(a) A solid waste exhibits the characteristic of EP toxicity if, using the test methods described in Appendix II or equivalent methods approved by the Administrator under the procedures set forth in §§ 260.20 and 260.21, the extract from a representative sample of the waste contains any of the contaminants listed in Table I at a concentration equal to or greater than the respective value given in that Table. Where the waste contains less than 0.5 percent filterable solids, the waste itself, after filtering, is considered to be the extract for the purposes of this section.

(b) A solid waste that exhibits the characteristic of EP toxicity, but is not listed as a hazardous waste in Subpart D, has the EPA Hazardous Waste Number specified in Table I which corresponds to the toxic contaminant causing it to be hazardous.

Table I—Maximum Concentration of Contaminants for Characteristic of EP Toxicity—Continued

EPA hazardous waste number	Contaminant	Maximum concentration (milligrams per liter)
D004	Arsenic	5.0
D005	Barium	100.0
D006	Cadmium	1.0
D007	Chromium	5.0
D008	Lead	5.0
D009	Mercury	0.2
D010	Selenium	1.0
D011	Silver	5.0
D012	Endrin (1,2,3,4,10,10-hexachloro-1,7-epoxy-1,4,4a,5,6,7,8,8a-octahydro-1,4-endo, endo-5,8-dimethano naphthalene.	0.02
D013	Lindane (1,2,3,4,5,6-hexachlorocyclohexane, gamma isomer.	0.4
D014	Methoxychlor (1,1,1-Trichloro-2,2-bis (p-methoxyphenyl)ethane).	10.0
D015	Toxaphene ($C_{10}H_{10}Cl_8$, Technical chlorinated camphene, 67–68 percent chlorine).	0.5
D016	2,4-D, (2,4-Dichlorophenoxyacetic acid).	10.0
D017	2,4,5-TP Silvex (2,4,5-Trichlorophenoxypropionic acid).	1.0

Subpart D—Lists of Hazardous Wastes

§ 261.30 General.

(a) A solid waste is a hazardous waste if it is listed in this Subpart, unless it has been excluded from this list under §§ 260.20 and 260.22.

(b) The Administrator will indicate his basis for listing the classes or types of wastes listed in this Subpart by employing one or more of the following Hazard Codes:

Ignitable Waste	(I)
Corrosive Waste	(C)
Reactive Waste	(R)
EP Toxic Waste	(E)
Acute Hazardous Waste	(H)
Toxic Waste	(T)

Appendix VII identifies the constituent which caused the Administrator to list the waste as an EP Toxic Waste (E) or Toxic Waste (T) in §§ 261.31 and 261.32.

(c) Each hazardous waste listed in this Subpart is assigned an EPA Hazardous Waste Number which precedes the name of the waste. This number must be used in complying with the notification requirements of Section 3010 of the Act and certain recordkeeping and reporting requirements under Parts 262 through 265 and Part 122 of this Chapter.

(d) Certain of the hazardous wastes listed in § 261.31 or § 261.32 have exclusion limits that refer to § 261.5(c)(5).

APPENDIX I

LABORATORY ANALYTICAL DATA

MEADE HEIGHTS

- 9 Drums
- Soil Beneath Drums
- Surface Water Samples, Upgradient and Downgradient
- Sediment Sample Downgradient

NORTH BASE LANDFILL (Freuhauf Truck Lot)

- Test Pit Excavation Composite Soil Sample

AR301159

WESTON

DATE OF REPORT: APRIL 1, 1985

OLMSTEAD A.F.B.
W.O. NO. 0628-05-50
SUMMARY REPORT
FOR
SAMPLES COLLECTED-DECEMBER 18-19, 1984

I. EPA TOXICITY PROCEDURE AND ANALYSIS OF LEACHATE FOR E.P. TOX METALS, HERBICIDES AND PESTICIDES

a) Three liquid samples identified as "drum contents" D-1, D-7, and D-8 were received by the laboratory on December 21, 1984 for EP TOXICITY PROCEDURE 40 CFR 261.24(a). One additional liquid "drum contents" sample identified as D-9 was received on December 26, 1984. Seven additional samples identified as D-2, D-5, D-6, D-3, D-4, soil beneath drums, and Test Pit-Freuhauf lot were also received on December 26, 1984. An EP TOXICITY PROCEDURE was completed on these samples by February 18, 1985. Analysis of the leachate for EP TOX metals was completed by March 6, 1985, for pesticides by March 26, 1985 and for herbicides by March 22, 1985. There are no tabulated recommended holding times for samples subjected to an EPA TOXICITY procedure. Sample concentrations follow:
(NOTE: Drinking water detection limits)

b) METALS ANALYSIS ON EP TOXICITY LEACHATE

		TOTAL							
W.O. NO.	SAMPLE DESCRIPTION	As µg/L	Ba µg/L	Cd µg/L	Cr µg/L	Pb µg/L	Hg µg/L	Se µg/L	Ag µg/L
3412-991-0010	D-1	<10	200	<2.5	260	<10	<0.5	<10	<2.5
-0020	D-7	<10	540	<2.5	180	<10	<0.5	<10	<2.5
-0030	D-8	<10	420	<2.5	140	<10	<0.5	<10	<2.5
3412-991-0080	D-2	<10	280	<2.5	110	<10	<0.5	<10	<2.5
-0090	D-5	<10	150	<2.5	90	18	<0.5	<10	<2.5
-0100	D-6	<10	160	<2.5	70	<10	<0.5	<10	<2.5
-0110	D-3	<10	450	<2.5	130	22	<0.5	<10	<2.5
-0120	D-4	<10	470	<2.5	70	17	<0.5	<10	<2.5
-0130	D-9	<10	430	<2.5	60	<10	<0.5	<10	<2.5
-0140	SOIL BENEATH DRUMS	<10	220	<2.5	<50	<10	<0.5	<10	<2.5
-0150	TEST PIT FREUHAUF	<10	170	<2.5	<50	<10	<0.5	<10	<2.5

WESTON

OLMSTEAD A.F.B. (con't.) PG. 2 DATE OF REPORT: APRIL 1, 1985

I. c) HERBICIDE ANALYSIS ON EP TOXICITY LEACHATE

R.F.W. NO.	SAMPLE DESCRIPTION	2,4-D µg/L	2,4,5-TP µg/L
8412-991-0010	D-1	<0.4	<0.4
-0020	D-7	<0.4	<0.4
-0030	D-8	<0.4	<0.4
8412-991-0080	D-2	<0.4	<0.4
-0090	D-5	<0.4	<0.4
-0100	D-6	<0.4	<0.4
-0110	D-3	<2.0	<2.0
-0120	D-4	<0.4	<0.4
-0130	D-9	<0.4	<0.4
-0140	SOIL BENEATH DRUMS	<0.4	<0.4
-0150	TEST PIT-FREUHAUF LOT	<0.4	<0.4
8412-991/BLANK	LAB BLANK	<0.4	<0.4
8412-991/LAB SPIKE	LAB BLANK SPIKE	83% RECOVERY	<0.4

DATE OF REPORT: 11 March 1986

ROY F. WESTON
REVISED ORGANIC ANALYSIS DATA SUMMARY
FOR
Olmsted A.F.B.
LEACHATE-PESTICIDE SUMMARY REPORT

.F.W. NO.: 8412-991	0010	0020	0030	0080	0090	0100	0110
PLE DESCRIPTION:	D-1	D-7	D-8	D-2	D-5	D-6	D-3
E COLLECTED:	12-18-84	12-18-84	12-18-84	12-18-84	12-18-84	12-18-84	12-18-84
ATE EXTRACTED:	3-6-85	3-6-85	3-6-85	3-6-85	3-6-85	3-6-85	3-6-85
ATE ANALYZED:	3-26-85	3-26-85	3-26-85	3-26-85	3-26-85	3-26-85	3-26-85
AMETER, ug/L							
lpha-BHC	NR	NR	NR	NR	NR	NR	NR
eta-BHC	"	"	"	"	"	"	"
elta-BHC	"	"	"	"	"	"	"
amma-BHC(Lindane)	ND<1.1	ND<1.1	ND<1.1	ND<1.1	ND<1.1	ND<1.1	ND<2.8
Heptachlor	NR	NR	NR	NR	NR	NR	NR
drin	"	"	"	"	"	"	"
eptachlor Epoxide	"	"	"	"	"	"	"
Endosulfan I	"	"	"	"	"	"	"
ieldrin	"	"	"	"	"	"	"
DDE	"	"	"	"	"	"	"
rin	ND<1.6	ND<1.6	ND<1.6	ND<1.6	ND<1.6	ND<1.6	ND<4.0
Endosulfan II	NR	NR	NR	NR	NR	NR	NR
,4-DDD	"	"	"	"	"	"	"
ndrin Aldenyde	"	"	"	"	"	"	"
Endosulfan Sulfate	"	"	"	"	"	"	"
,4-DDT	"	"	"	"	"	"	"
ethoxychlor	ND<5.3	ND<5.3	ND<5.3	ND<5.3	ND<5.3	ND<5.3	ND<13
Endrin Ketone	NR	NR	NR	NR	NR	NR	NR
hlordane	NR	NR	NR	NR	NR	NR	NR
oxaphene	ND<61	ND<61	ND<61	ND<61	ND<61	ND<61	ND<150
roclor-1016	NR	NR	NR	NR	NR	NR	NR
Aroclor-1221	"	"	"	"	"	"	"
roclor-1232	"	"	"	"	"	"	"
roclor-1242	"	"	"	"	"	"	"
Aroclor-1248	"	"	"	"	"	"	"
roclor-1254	"	"	"	"	"	"	"
roclor-1260	"	"	"	"	"	"	"

.S. = Not Spiked
R = Not Required

N.D. = Not Detected < detection limit

Approved By: [signature]

Earl M. Hansen, Ph.D.
Manager
WESTON Analytical Laboratories

DATE OF REPORT: 11 March 1986

ROY F. WESTON
REVISED ORGANIC ANALYSIS DATA SUMMARY
FOR
Olmsted A.F.B.
LEACHATE-PESTICIDE SUMMARY REPORT

R.F.W. NO.:8412-991	0120	0130	0140	0150	Blank	Blank Spike	Blank Spike Duplicate
SAMPLE DESCRIPTION:	D-4	D-9	Soil	Test Pit	---	---	---
DATE COLLECTED:	12-18-84	12-18-84	12-18-84	12-18-84	---	---	---
DATE EXTRACTED:	3-6-85	3-6-85	3-6-85	3-6-85	3-6-85	3-6-85	3-6-85
DATE ANALYZED:	3-26-85	3-26-85	3-26-85	3-26-85	3-6-85	3-26-85	3-26-85
PARAMETER, ug/L						% Recovery	% Recovery
Alpha-BHC	NR	NR	NR	NR	NR	---	---
Beta-BHC						NS	NS
Delta-BHC						NS	NS
Gamma-BHC(Lindane)	ND<1.1	ND<1.1	ND<1.1	ND<1.1	ND<0.5	91	94
Heptachlor	NR	NR	NR	NR	NR	46	51
Aldrin						33	46
Heptachlor Epoxide						NS	NS
Endosulfan I						NS	NS
Dieldrin						85	90
4,4-DDE						NS	NS
Endrin	ND<1.6	ND<1.6	ND<1.6	ND<1.6	ND<1.6	NS	NS
Endosulfan II	NR	NR	NR	NR	NR		
4,4-DDD							
Endrin Aldenyde							
Endosulfan Sulfate							
4,4-DDT						110	120
Methoxychlor	ND<5.3	ND<5.3	ND<5.3	ND<5.3	ND<5.3	NS	NS
Endrin Ketone	NR	NR	NR	NR	NR		
Chlordane	NR	NR	NR	NR	NR		
Toxaphene	ND<61	ND<61	ND<61	ND<61	ND<61		
Aroclor-1016	NR	NR	NR	NR	NR	NR	NR
Aroclor-1221							
Aroclor-1232							
Aroclor-1242							
Aroclor-1248							
Aroclor-1254							
Aroclor-1260							

N.S. = Not Spiked
NR = Not Required

N.D. = Not Detected < detection limit

Approved By: _____

Earl M. Hansen, P
Manager
WESTON Analytical Laboratories

II. OIL AND GREASE ANALYSIS

a) Four samples identified as SW-1, SW-2, Sediment #1, and Field Blank were received by the laboratory on December 21, 1984. Analysis by EPA METHOD 413.2 was completed by January 23, 1985. The EPA recommended holding time of 28 days was exceeded by 16 days. Sample concentrations follow:

b)

R.F.W. NO.	SAMPLE DESCRIPTION	OIL & GREASE, mg/L
8412-991-0040	SW-1	0.53
-0050	SW-2	0.35
-0070	FIELD BLANK	<0.10
		OIL & GREASE, mg/Kg
8412-991-0060	SEDIMENT #1	214

III. TOC ANALYSIS

a) Two samples identified as SW-1 and SW-2 were received by the laboratory on December 21, 1984. Analysis by EPA METHOD 415.2 using a Dohrmann Model DC80 carbon analyzer were completed by January 18, 1985. The EPA recommended holding time of 28 days was exceeded by three days. Sample concentrations follow:

b)

R.F.W. NO.	SAMPLE DESCRIPTION	TOC, ug/L
8412-991-0040	SW-1	4
-0050	SW-2	4

IV. VOA ANALYSIS

a) Three water samples and one sediment sample for VOA analysis were received by the laboratory on December 21, 1984. Analysis by EPA METHOD 601,602 was completed by January 28, 1985. The EPA recommended holding time of 14 days

IV. a) (con't.)

between date of collection (December 18, 1985) and date of analysis was exceeded by 27 days for samples SW-1, SW-2, and the field blank. There are no tabulated recommended holding times for sediment samples. The results of analysis are attached.

V. IGNITABILITY AND CORROSIVITY:

Originally all drum samples (D-1 through D-9), a sample identified as "Soil Beneath Drums", and a sample identified as "Test Pit-Freuhauf Lot" carried a request for Ignitability and Corrosivity analysis. Due to lack of sufficient sample volume, only the drum sample identified as D-1 (R.F.W. NO. 8412-991-0010), and the two samples identified as "Soil Beneath Drums" and "Test Pit-Freuhauf Lot" respectively (R.F.W. NO. 8412-991-0140 and 0150), were analyzed for these parameters. The results are attached to this report.

APPROVED BY:

EARL M. HANSEN, Ph.D.
Manager
WESTON Analytical Laboratories

AR301165

DATE SAMPLES COLLECTED: December 10, 1984

DATE SAMPLES RECEIVED: December 21, 1984

DATE ANALYZED: January 28, 1985

CLIENT: OLMSTEAD AIR FORCE BASE

EPA METHOD 601 REPORT W.O. NO.: 0628-05-50-00

	8412-	8412-	8412-		8412-					
R.F.W. SAMPLE NO.	991-0040	991-0050	991-0070	UNIT	991-0060	UNIT				
CLIENT I.D.	SW-1	SW-2	Field Blank	µg/L	Sediment #1	µg/Kg				
CHLOROFORM	< 5	< 5	< 5	µg/L	< 5	µg/Kg				
DICHLOROBROMOMETHANE	< 5	< 5	< 5	µg/L	< 5	µg/Kg				
DIBROMOCHLOROMETHANE	<20	<20	<20	µg/L	<20	µg/Kg				
BROMOFORM	<30	<30	<30	µg/L	<30	µg/Kg				
1,1-DICHLOROETHANE	< 5	< 5	< 5	µg/L	< 5	µg/Kg				
1,2-DICHLOROETHANE	< 5	< 5	< 5	µg/L	< 5	µg/Kg				
1,1,1-TRICHLOROETHANE	< 5	< 5	< 5	µg/L	< 5	µg/Kg				
1,1,2-TRICHLOROETHANE	< 5	< 5	< 5	µg/L	< 5	µg/Kg				
2-CHLOROETHYLVINYL ETHER	<10	<10	<10	µg/L	<10	µg/Kg				
TETRACHLOROETHYLENE	< 5	< 5	< 5	µg/L	< 5	µg/Kg				
CHLOROBENZENE	< 5	< 5	< 5	µg/L	< 5	µg/Kg				
1,1-DICHLOROETHYLENE	< 5	< 5	< 5	µg/L	< 5	µg/Kg				
CARBON TETRACHLORIDE	< 5	< 5	< 5	µg/L	< 5	µg/Kg				
1,2-DICHLOROPROPANE	< 5	< 5	< 5	µg/L	< 5	µg/Kg				
TRICHLOROETHYLENE	24	14	23	µg/L	< 5	µg/Kg				
1,1,2,2-TETRACHLOROETHANE	< 5	< 5	< 5	µg/L	< 5	µg/Kg				
TRANS-1,3-DICHLOROPROPANE	< 5	< 5	< 5	µg/L	< 5	µg/Kg				
CIS-1,3-DICHLOROPROPANE	< 5	< 5	< 5	µg/L	< 5	µg/Kg				
TRANS-1,2-DICHLOROETHYLENE	< 5	< 5	< 5	µg/L	< 5	µg/Kg				

DETECTION LIMITS ARE INDICATED BY "LESS THAN" SIGNS

APPROVED BY: Earl M. Hansen

Earl M. Hansen, Ph.D.
Director, Analytical Laboratory

1-29-85

Date of Final Report: February 11, 1985

WESTON

OLMSTEAD AIR FORCE BASE
EPA 602 SUMMARY REPORT

DATE SAMPLES COLLECTED: December 18, 1984

DATE SAMPLES RECEIVED: December 21, 1984

DATE ANALYZED: January 31, 1985

R.F.W. NO.	SAMPLE DESCRIPTION	BENZENE ug/L	TOLUENE ug/L	ETHYLBENZENE ug/L	TOTAL XYLENE ug/L
8412-991-0040	SW-1	<4	20	<4	<4
-0050	SW-2	<4	<4	<4	<4
-0070	Trip Blank	<4	<4	<4	<4

R.F.W. NO.	SAMPLE DESCRIPTION	BENZENE ug/Kg	TOLUENE ug/Kg	ETHYLBENZENE ug/Kg	TOTAL XYLENE ug/Kg
8412-991-0060	Sediment #1	<8	25	<8	<8

APPROVED BY: Earl M. Hansen

Earl M. Hansen, Ph.D.
Director
Analytical Laboratory

AR301163

Spotts, Stevens and McCoy, Inc.

CONSULTING ENGINEERS

CERTIFICATE OF ANALYSIS

LABORATORY NO: 38844 SAMPLED: 12/18/84 RECEIVED: 3/7/85 REPORTED: 3/22/85

CLIENT: Roy F. Weston, Inc, 256 Welsh Pool Rd.
Lionville, PA 19343

SAMPLE DESCRIPTION: Water Analysis
#8412-991-0010

D-1

- - - - - - -

FLASH POINT (PM)	°F	*
CORROSIVITY		**

* No flash - sample boiled over at 210°F

** The sample was not corrosive according to the EPA's definition of corrosivity for a solid waste. A Slurry of the sample in water had a pH of 5.5

Respectfully submitted,

J. M. Meholick, Chemist
Chemistry Laboratory

MAH

cc: Judy Porta (2)

AR301168

REPLY TO: ○ HOME OFFICE • 345 North Wyomissing Boulevard, P.O. Box 6307, Reading, Pennsylvania 19610-0307 • (215) 376-6581
○ FRANKHOUSER ASSOCIATES OFFICE • 607 Washington Street, Reading, Pennsylvania 19601-3503 • (215) 376-6405
○ LEHIGH VALLEY OFFICE • R.D. #6, Box 347, Blakeslee Boulevard, Lehighton, Pennsylvania 18325 • (215) 377-5250
○ BALTIMORE OFFICE • 5509 York Road, Baltimore, Maryland 21212-3897 • (301) 435-3400

FORM #173

Spotts, Stevens and McCoy, Inc.

CONSULTING ENGINEERS

CERTIFICATE OF ANALYSIS

LABORATORY NO: 38845 SAMPLED: 12/19/84 RECEIVED: 3/7/85 REPORTED: 3/22/85

CLIENT: Roy F. Weston, Inc, 236 Welsh Pool Rd.
Lionville, PA 19343

SAMPLE DESCRIPTION: #8412-991-0140

I. Ignitability

A. Physical Description

The sample was a reddish-brown moist solid with a soil-like odor. The sample consisted of irregularly shaped pieces ranging in size from a quarter to a half inch in diameter. The sample was homogeneous.

B. Exposure to an Open Flame at Ambient

The sample was exposed to an open flame at room temperature. The sample did not ignite or show any signs of combustibility.

C. Exposure to an Open Flame at 60°C

The sample was exposed to an open flame at 60°C. The sample again did not ignite or show any signs of combustibility.

D. Gradual Heating to 400°C

The sample was heated gradually in an electric muffle furnace to 400°C. The sample began to lose its moisture at about 50°C. This drying-out continued slowly as the temperature climbed. The sample had lost all of its moisture as the temperature reached 200°C. This was the only physical change the sample underwent over the temperature range.

II. Corrosivity

The sample was not corrosive according to the EPA's definition of corrosivity for a solid waste. A slurry of the sample in water had a pH of 6.9.

Respectfully submitted,

J. M. Meholick, Chemist
Chemistry Laboratory

MAH
cc: Judy Porta (2)

4R301169

REGIONAL HOME OFFICE • 345 North Wyomissing Boulevard, P.O. Box 6307, Reading, Pennsylvania 19610-0307 • (215) 376-6581
FRANKHOUSER ASSOCIATES OFFICE • 607 Washington Street, Reading, Pennsylvania 19601-3503 • (215) 376-6405
LEHIGH VALLEY OFFICE • R.D. #6, Box 347, Blakeslee Boulevard, Lenighton, Pennsylvania 18325 • (215) 377-5230
BALTIMORE OFFICE • 5509 York Road, Baltimore, Maryland 21212-3897 • (301) 435-3400

FORM #173

Spotts, Stevens and McCoy, Inc.

CONSULTING ENGINEERS

CERTIFICATE OF ANALYSIS

LABORATORY NO: 38846 SAMPLED: 12/19/84 RECEIVED: 3/7/85 REPORTED: 3/22/85

CLIENT: Roy F. Weston, Inc, 236 Welsh Pool Rd.
Lionville, PA 19343

SAMPLE DESCRIPTION: #8412-991-0150

I. Ignitability

A. Physical Description

The sample was a chocolate brown moist solid with a soil-like odor. The sample consisted of irregularly shaped pieces ranging in size from a half inch in diameter down to a fine grain. The sample was homogeneous.

B. Exposure to an Open Flame at Ambient

The sample was exposed to an open flame at room temperature. The sample did not ignite or show any signs of combustibility.

C. Exposure to an Open Flame at 60°C

The sample was exposed to an open flame at 60°C. The sample again did not ignite or show any signs of combustibility.

D. Gradual Heating to 400°C

The sample was heated gradually to 400°C in an electric muffle furnace. The sample began to dry out slightly as the temperature reached 75°C. This continued slowly as the temperature went to 175°C where the sample appeared to have lost all its moisture. No other physical changes were noticed over the temperature range.

II. Corrosivity

The sample was not corrosive according to the EPA's definition of corrosivity for a solid waste. A slurry of the sample in water had a pH of 8.8.

Respectfully submitted,

J. M. Meholick, Chemist
Chemistry Laboratory

MAH
cc: Judy Porta (2)

AR301170

REPLY TO: ○ HOME OFFICE • 345 North Wyomissing Boulevard, P.O. Box 6307, Reading, Pennsylvania 19610-0307 • (215) 376-6581
○ FRANKHOUSER ASSOCIATES OFFICE • 607 Washington Street, Reading, Pennsylvania 19601-3503 • (215) 376-6405
○ LEHIGH VALLEY OFFICE • R.D. #6, Box 347, Blakeslee Boulevard, Lehighton, Pennsylvania 18325 • (215) 377-6210
○ BALTIMORE OFFICE • 5509 York Road, Baltimore, Maryland 21212-3897 • (301) 435-3400

WESTON

DATE OF REPORT: October 30, 1985

OLMSTEAD A.F.B.
TOC SUMMARY REPORT
FOR
SAMPLES REC'D SEPTEMBER 27, 1985
W.O. NO. 0628-05-50

R.F.W. NO.	SAMPLE DESCRIPTION	TOC DATE COLLECTED	TOC DATE ANALYZED	TOC CONC. mg/L
8509-027-0010	MEAD HTS - UPSTREAM	9-26-85	10-4-85	2.3
8509-027-0020	MEAD HTS - DOWNSTREAM	9-26-85	10-4-85	3.3

DETECTION LIMIT: 0.5

EPA METHOD: 415.2

NOTE: VOA REPORT ATTACHED

COMPILED BY: Stephanie Dobbs
Stephanie Dobbs
Data Manager
WESTON Analytical Laboratories

APPROVED BY: Earl M. Hansen
Earl M. Hansen, Ph.D.
Manager
WESTON Analytical Laboratories

AR301171

DATE OF REPORT: October 30, 1985

SUMMARY FOR: OLMSTEAD A.F.B.

TE SAMPLE COLLECTED: September 26, 1985 DATE RECEIVED: September 27, 1985

DATE ANALYZED: October 4, 1985

RFW NO.: 8509-027-0010

MPLE DESCRIPTION: MEAD HTS - UPSTREAM

GC ANALYSIS
VOLATILE COMPOUNDS
EPA METHOD 601, 602

REPORTING UNITS: ug/L

ROMOMETHANE	< 4.0	1,3-TRANS DICHLOROPROPENE	< 6.0
BROMOFORM	< 8.0	1,3-CIS DICHLOROPROPENE	< 2.0
ARBON TETRACHLORIDE	< 2.0	METHYLENE CHLORIDE	< 3.0
CHLOROBENZENE	< 2.0	1,1,2,2 TETRACHLOROETHANE	< 2.0
HLORODIBROMOMETHANE	< 2.0	TETRACHLOROETHYLENE	< 2.0
CHLOROETHANE	< 2.0	1,2 TRANS DICHLOROETHYLENE	< 2.0
-CHLOROETHYLVINYL ETHER	< 2.0	1,1,1 TRICHLOROETHANE	< 2.0
OROFORM	< 2.0	1,1,2 TRICHLORDETHANE	< 2.0
ICHLOROBROMOMETHANE	< 2.0	TRICHLOROETHYLENE	< 2.0
ICHLORODIFLUOROMETHANE	< 4.0	TRICHLOROFLUOROMETHANE	< 3.0
1,2-DICHLOROBENZENE	< 3.0	VINYL CHLORIDE	< 4.0
1,3-DICHLOROBENZENE	< 3.0		
1,4-DICHLOROBENZENE	< 3.0	BENZENE	< 2
1,1-DICHLOROETHANE	< 2.0	TOLUENE	< 2
1,2-DICHLOROETHANE	< 2.0	ETHYL BENZENE	< 2
1,1-DICHLOROETHYLENE	< 2.0	OTHER	
1,2-DICHLOROPROPANE	< 2.0		
CHLOROMETHANE	< 4.0		

DETECTION LIMITS ARE INDICATED BY "LESS THAN" SIGNS

Approved By: Earl M. Hansen

Earl M. Hansen, Ph.D.
Manager
WESTON Analytical Laboratorie

DATE OF REPORT: October 30, 1985

ATA SUMMARY FOR: OLMSTEAD A.F.B.

DATE SAMPLE COLLECTED: September 26, 1985

DATE RECEIVED: September 27, 1985

DATE ANALYZED: October 4, 1985

RFW NO.: 8509-027-0020

SAMPLE DESCRIPTION: MEAD HTS - DOWNSTREAM

GC ANALYSIS
VOLATILE COMPOUNDS
EPA METHOD 601, 602

REPORTING UNITS: ug/L

BROMOMETHANE	< 4.0	1,3-TRANS DICHLOROPROPENE	< 6.0
BROMOFORM	< 8.0	1,3-CIS DICHLOROPROPENE	< 2.0
CARBON TETRACHLORIDE	< 2.0	METHYLENE CHLORIDE	< 3.0
CHLOROBENZENE	< 2.0	1,1,2,2 TETRACHLOROETHANE	< 2.0
CHLORODIBROMOMETHANE	< 2.0	TETRACHLOROETHYLENE	< 2.0
CHLOROETHANE	< 2.0	1,2 TRANS DICHLOROETHYLENE	< 2.0
2-CHLOROETHYLVINYL ETHER	< 2.0	1,1,1 TRICHLOROETHANE	< 2.0
CHLOROFORM	< 2.0	1,1,2 TRICHLOROETHANE	< 2.0
DICHLOROBROMOMETHANE	< 2.0	TRICHLOROETHYLENE	< 2.0
DICHLORODIFLUOROMETHANE	< 4.0	TRICHLOROFLUOROMETHANE	< 3.0
1,2-DICHLOROBENZENE	< 3.0	VINYL CHLORIDE	< 4.0
1,3-DICHLOROBENZENE	< 3.0		
1,4-DICHLOROBENZENE	< 3.0	BENZENE	< 2
1,1-DICHLOROETHANE	< 2.0	TOLUENE	< 2
1,2-DICHLOROETHANE	< 2.0	ETHYL BENZENE	< 2
1,1-DICHLOROETHYLENE	< 2.0		
1,2-DICHLOROPROPANE	< 2.0	OTHER	
CHLOROMETHANE	< 4.0		

DETECTION LIMITS ARE INDICATED BY "LESS THAN" SIGNS

Approved By: Earl M. Hansen

Earl M. Hansen, Ph.D.
Manager
WESTON Analytical Laboratories

AR301173

AR301173

DATE OF REPORT: October 30, 1985

SUMMARY FOR: OLMSTEAD A.F.B.

DATE SAMPLE COLLECTED: DNA

DATE RECEIVED: DNA

DATE ANALYZED: October 4, 1985

REW NO.: 8509-027/

SAMPLE DESCRIPTION: LAB BLANK

GC ANALYSIS
VOLATILE COMPOUNDS
EPA METHOD 601, 602

REPORTING UNITS: ug/L

BROMOMETHANE	< 4.0	1,3-TRANS DICHLOROPROPENE	< 6.0
BROMOFORM	< 8.0	1,3-CIS DICHLOROPROPENE	< 2.0
CARBON TETRACHLORIDE	< 2.0	METHYLENE CHLORIDE	< 3.0
CHLOROBENZENE	< 2.0	1,1,2,2 TETRACHLOROETHANE	< 2.0
CHLORODIBROMOMETHANE	< 2.0	TETRACHLOROETHYLENE	< 2.0
CHLOROETHANE	< 2.0	1,2 TRANS DICHLOROETHYLENE	< 2.0
2-CHLOROETHYLVINYL ETHER	< 2.0	1,1,1 TRICHLOROETHANE	< 2.0
CHLOROFORM	< 2.0	1,1,2 TRICHLOROETHANE	< 2.0
DICHLOROBROMOMETHANE	< 2.0	TRICHLOROETHYLENE	< 2.0
DICHLORODIFLUOROMETHANE	< 4.0	TRICHLOROFLUOROMETHANE	< 3.0
1,2-DICHLOROBENZENE	< 3.0	VINYL CHLORIDE	< 4.0
1,3-DICHLOROBENZENE	< 3.0		
1,4-DICHLOROBENZENE	< 3.0	BENZENE	< 2
1,1-DICHLOROETHANE	< 2.0	TOLUENE	< 2
1,2-DICHLOROETHANE	< 2.0	ETHYL BENZENE	< 2
1,1-DICHLOROETHYLENE	< 2.0		
1,2-DICHLOROPROPANE	< 2.0	OTHER	
METHYLCHLOROMETHANE	< 4.0		

DETECTION LIMITS ARE INDICATED BY "LESS THAN" SIGNS

Approved By: Earl M. Hansen

Earl M. Hansen, Ph.D.
Manager
WESTON Analytical Laboratories

AR301174

DATE OF REPORT: October 30, 1985

DATA SUMMARY FOR: OLMSTEAD A.F.B.

DATE SAMPLE COLLECTED: DNA

DATE RECEIVED: DNA

DATE ANALYZED: October 4, 1985

RFW NO.: 8509-027/SPIKE

SAMPLE DESCRIPTION: BLANK SPIKE

GC ANALYSIS
VOLATILE COMPOUNDS
EPA METHOD 601, 602

REPORTING UNITS: ug/L

BROMOMETHANE	< 4.0	1,3-TRANS DICHLOROPROPENE*	101% RECOVERY
BROMOFORM	< 8.0	1,3-CIS DICHLOROPROPENE*	120% RECOVERY
CARBON TETRACHLORIDE	< 2.0	METHYLENE CHLORIDE	< 3.0
CHLOROBENZENE	< 2.0	1,1,2,2 TETRACHLOROETHANE	< 2.0
CHLORODIBROMOMETHANE	< 2.0	TETRACHLOROETHYLENE*	112% RECOVERY
CHLOROETHANE	< 2.0	1,2 TRANS DICHLOROETHYLENE	< 2.0
2-CHLOROETHYLVINYL ETHER	< 2.0	1,1,1 TRICHLOROETHANE	< 2.0
CHLOROFORM	< 2.0	1,1,2 TRICHLORDETHANE	< 2.0
DICHLOROBROMOMETHANE	< 2.0	TRICHLOROETHYLENE	< 2.0
DICHLORODIFLUOROMETHANE	< 4.0	TRICHLOROFLUOROMETHANE	< 3.0
1,2-DICHLOROBENZENE	< 3.0	VINYL CHLORIDE	< 4.0
1,3-DICHLOROBENZENE	< 3.0		
1,4-DICHLOROBENZENE	< 3.0	BENZENE	< 2
1,1-DICHLOROETHANE	< 2.0	TOLUENE	< 2
1,2-DICHLOROETHANE	< 2.0	ETHYL BENZENE	< 2
1,1-DICHLOROETHYLENE	< 2.0		
1,2-DICHLOROPROPANE	< 2.0	OTHER	
CHLOROMETHANE	< 4.0		

DETECTION LIMITS ARE INDICATED BY "LESS THAN" SIGNS

* = SPIKED COMPOUNDS

Approved By: Earl M. Hansen

Earl M. Hansen, Ph.D.
Manager
WESTON Analytical Laboratories

AR301175

AR301175

LISA LAKE

- Inactive residential well LL-28
- Partially active (non-consumption purposes) residential well LL-124

NORTH BASE LANDFILL

- Inactive Production wells HIA-17, HIA-18
- Monitor well RFW-1
- Intermittent Stream - sediment

INCINERATOR/LANDFILL AND INDUSTRIAL AREAS

- Monitor wells RFW-2, 3, 4, 5, 6, and 7
- Monitor wells WRT-1, 2, 3, 4, 5, 6, and 7
- Production wells HIA-9, 11, and 13

WESTON

DATE OF REPORT: AUGUST 30, 1985

OMSTEAD A.F.B.
INORGANICS SUMMARY REPORT
FOR
SAMPLES RECEIVED AUG. 2, 1985
0628-05-50

DATE SAMPLES COLLECTED: JULY 30-AUGUST 1, 1985

SAMPLES SUBMITTED BY: TOM DREW

R.F.W. NO.	SAMPLE DESCRIPTION	TOC,mg/L	OIL & GREASE/IR mg/L
8508-795-0010	WRT-1	2.0	0.84
-0020	WRT-2	1.5	0.29
-0030	WRT-3	1.9	0.18
-0040	WRT-4	1.2	<0.10
-0050	WRT-5	1.8	0.45
-0060	WRT-6	4.3	0.59
-0070	WRT-7	2.3	2.68
-0080	WRT-6 DUP.	4.3	0.47
-0080 DUP.	WRT-6 DUP. (LAB DUPLICATE)	---	0.41
-0090	FIELD BLANK	1.0	0.17
-0100	RFW-6	1.6	0.34
-0110	RFW-7	233	75.8
-0120	RFW-1	4.8	1.36
-0130	RFW-2	5.5	0.80
-0140	LISA LAKE #28	1.8	0.26
-0150	LISA LAKE #124	1.2	<0.10
-0160	WELL #13	1.4	<0.10
-0170	WELL #11	1.3	<0.10
-0170 DUP.	WELL #11 (LAB DUPLICATE)	1.3	----
8508-795-0170 SPIKE	WELL #11 (MATRIX SPIKE)	102% RECOVERY	----
DETECTION LIMIT:		0.5	0.10
DATE OF ANALYSIS:		8-5-85	8-2-85
EPA METHOD:		415.2	335.2

WESTON

DATE OF REPORT: AUG. 30, 1985

OLMSTEAD A.F.B. (CON'T.) PG. 2

R.F.W. NO.	SAMPLE DESCRIPTION	TOTAL COLIFORM BACTERIA, COLONIES/ 100 ml. H_2O	F^- mg/L	NO_3-NO_2 mg/L	TURBIDITY N.T.U.
8508-795-0140	LISA LAKE #28	44	<0.2	1.8	37.0
-0150	LISA LAKE #124	500	<0.2	5.3	2.3
-0150 DUP	LISA LAKE #124 (LAB DUPLICATE)	---	<0.2	---	----
-0150 SPIKE	LISA LAKE #124 (MATRIX SPIKE)	---	100%	---	----
DETECTION LIMIT:		1	0.2	0.2	0.5
DATE OF ANALYSIS:		8-3-85	8-5-85	8-9-85	8-2-85
DATE COLLECTED:		8-1-85	8-1-85	8-1-85	8-1-85
EPA METHOD:		MEMBRANE FILTER	340.3	353.2	180.1

OLMSTEAD A.F.B. (CON'T.) PG. 3

DATE OF REPORT: AUGUST 30, 1985

R.F.W. NO.	SAMPLE DESCRIPTION	Ag mg/L	As mg/L	Ba mg/L	Cd mg/L	Cr mg/L	Hg ug/L	Pb mg/L	Se mg/L
8508-795-0140	LISA LAKE 28	<.025	<.010	.680	.010	<.010	<.5	<.005	<.010
-014R	REPLICATE		<.010						<.010
-0150	LISA LAKE 124	<.025	<.010	.340	<.010	<.010	<.5	<.005	<.010
	METHOD BLANK	<.025	----	<.010	<.010	<.010	---	----	-----
	METHOD SPIKE	5.58	----	5.05	5.20	.531	---	----	-----
	SPIKE RECOVERY	112%	----	101%	104%	106%	---	----	-----
	DETECTION LIMIT:	0.025	0.010	0.010	0.010	0.010	0.5	0.005	0.010
	DATE OF ANALYSIS:	8-14-85	8-7-85	8-13-85	8-14-85	8-9-85	8-8-85	8-8-85	8-9-85
	EPA METHOD:	272.2	206.2	208.1	213.1	218.2	245.2	239.2	270.2

Compiled By: Judith A Porta

Judith A. Porta
Laboratory Support Manager
WESTON Analytical Laboratories

Approved By: Earl M. Hansen

Earl M. Hansen, Ph.D.
Manager
WESTON Analytical Laboratories

WESTON

DATE OF REPORT: September 5, 1985

OLMSTEAD A.F.B.
INORGANICS SUMMARY REPORT
FOR
SAMPLES REC'D AUGUST 2, 1985

W.O. NO. 0628-05-50

R.F.W. NO.	SAMPLE DESCRIPTION	OIL & GREASE (IR) DATE COLLECTED	OIL & GREASE (IR) DATE ANALYZED	OIL & GREASE (IR) CONC. mg/L	TOC DATE COLLECTED	TOC DATE ANALYZED	TOC CONC. mg/L
8508-799-0010	PRODUCTION WELL #17	8-1-85	8-2-85	1.04	8-1-85	8-5-85	2.4
-0010 DUP.	PRODUCTION WELL #17 (LAB DUPLICATE)	---	---	---	8-1-85	8-5-85	2.6
-0020	PRODUCTION WELL #18	8-1-85	8-2-85	0.55	8-1-85	8-5-85	3.7
-0040	RFW WELL #3	8-2-85	8-2-85	14.2	8-2-85	8-5-85	9.5
-0050	RFW WELL #4	8-2-85	8-2-85	9.61	8-2-85	8-5-85	10.0
-0060	RFW WELL #5	8-2-85	8-2-85	1.52	8-2-85	8-5-85	11.4
-0070	FIELD BLANK	8-2-85	8-2-85	0.16	8-2-85	8-5-85	1.5
-0080	RFW-18 DUP	8-1-85	---	--- *	8-1-85	8-5-85	1.7
-0090	PRODUCTION WELL #9	8-2-85	8-2-85	0.13	8-2-85	8-5-85	1.6
8508-799/	LAB METHOD BLANK	---	---	---	---	8-5-85	<0.5
8508-799/	METHOD SPIKE	---	---	---	---	8-5-85	104% REC.
DETECTION LIMIT:				0.10			0.5
EPA METHOD:				413.2			415.2

* SAMPLE CANNOT BE LOCATED

R.F.W. NO.	SAMPLE DESCRIPTION	DATE COLLECTED	DATE ANALYZED	OIL/GREASE CONCENTRATION ug/g
8508-799-0030	STREAM SEDIMENT	8-2-85	8-14-85	96.6
8508-799/	LAB METHOD BLANK	---	8-14-85	41.8

COMPILED BY: Judith A Porta

Judith A. Porta
Laboratory Operations Manager
WESTON Analytical Laboratories

APPROVED BY: Earl M. Hansen

Earl M. Hansen, Ph.D.
Manager
WESTON Analytical Laboratories

AR301180

DATE OF REPORT: August 16, 1985

ATA SUMMARY FOR: OLMSTEAD A.F.B.

DATE SAMPLE COLLECTED: August 1, 1985

DATE RECEIVED: August 2, 1985

DATE ANALYZED: August 8, 1985

RFW NO.: 8508-795-0140

SAMPLE DESCRIPTION: LISA LAKE #28

GC ANALYSIS
VOLATILE COMPOUNDS
EPA METHOD 601, 602

REPORTING UNITS: ug/L

BROMOMETHANE	< 4.0	1,3-TRANS DICHLOROPROPENE	< 6.0
BROMOFORM	< 8.0	1,3-CIS DICHLOROPROPENE	< 2.0
CARBON TETRACHLORIDE	< 2.0	METHYLENE CHLORIDE	< 3.0
CHLOROBENZENE	< 2.0	1,1,2,2 TETRACHLOROETHANE	< 2.0
CHLORODIBROMOMETHANE	< 2.0	TETRACHLOROETHYLENE	< 2.0
CHLOROETHANE	< 2.0	1,2 TRANS DICHLOROETHYLENE	< 2.0
2-CHLOROETHYLVINYL ETHER	< 2.0	1,1,1 TRICHLOROETHANE	< 2.0
CHLOROFORM	< 2.0	1,1,2 TRICHLOROETHANE	< 2.0
DICHLOROBROMOMETHANE	< 2.0	TRICHLOROETHYLENE	< 2.0
DICHLORODIFLUOROMETHANE	< 4.0	TRICHLOROFLUOROMETHANE	< 3.0
1,2-DICHLOROBENZENE	< 3.0	VINYL CHLORIDE	< 4.0
1,3-DICHLOROBENZENE	< 3.0		
1,4-DICHLOROBENZENE	< 3.0	BENZENE	< 2
1,1-DICHLOROETHANE	< 2.0	TOLUENE	< 2
1,2-DICHLOROETHANE	< 2.0	ETHYL BENZENE	< 2
1,1-DICHLOROETHYLENE	< 2.0		
1,2-DICHLOROPROPANE	< 2.0	OTHER	
CHLOROMETHANE	< 4.0		

DETECTION LIMITS ARE INDICATED BY "LESS THAN" SIGNS

Approved By: Earl M. Hansen

Earl M. Hansen, Ph.D.
Manager
WESTON Analytical Laboratories

DATE OF REPORT: August 16, 1985

SUMMARY FOR: OLMSTEAD A.F.B.

DATE SAMPLE COLLECTED: August 1, 1985
DATE RECEIVED: August 2, 1985
DATE ANALYZED: August 8, 1985

IFW NO.: 8508-795-0150

SAMPLE DESCRIPTION: LISA LAKE #124

GC ANALYSIS
VOLATILE COMPOUNDS
EPA METHOD 601, 602

REPORTING UNITS: ug/L

BROMOMETHANE	< 4.0	1,3-TRANS DICHLOROPROPENE	< 6.0
BROMOFORM	< 8.0	1,3-CIS DICHLOROPROPENE	< 2.0
CARBON TETRACHLORIDE	< 2.0	METHYLENE CHLORIDE	< 3.0
CHLOROBENZENE	< 2.0	1,1,2,2 TETRACHLOROETHANE	< 2.0
CHLORODIBROMOMETHANE	< 2.0	TETRACHLOROETHYLENE	< 2.0
CHLOROETHANE	< 2.0	1,2 TRANS DICHLOROETHYLENE	< 2.0
2-CHLOROETHYLVINYL ETHER	< 2.0	1,1,1 TRICHLOROETHANE	< 2.0
CHLOROFORM	< 2.0	1,1,2 TRICHLORDETHANE	< 2.0
DICHLOROBROMOMETHANE	< 2.0	TRICHLOROETHYLENE	< 2.0
DICHLORODIFLUOROMETHANE	< 4.0	TRICHLOROFLUOROMETHANE	< 3.0
1,2-DICHLOROBENZENE	< 3.0	VINYL CHLORIDE	< 4.0
1,3-DICHLOROBENZENE	< 3.0		
1,4-DICHLOROBENZENE	< 3.0	BENZENE	< 2
1,1-DICHLOROETHANE	< 2.0	TOLUENE	< 2
1,2-DICHLOROETHANE	< 2.0	ETHYL BENZENE	< 2
1,1-DICHLOROETHYLENE	< 2.0		
1,2-DICHLOROPROPANE	< 2.0	OTHER	
CHLOROMETHANE	< 4.0		

DETECTION LIMITS ARE INDICATED BY "LESS THAN" SIGNS

Approved By: Earl M. Hansen

Earl M. Hansen,
Manager
WESTON Analytical Laboratories

AR301182

DATE OF REPORT: August 16, 1985

DATA SUMMARY FOR: OLMSTEAD A.F.B.

DATE SAMPLE COLLECTED: August 1, 1985

DATE RECEIVED: August 2, 1985

RFW NO.: 8508-795-0150 DUP.

DATE ANALYZED: August 8, 1985

SAMPLE DESCRIPTION: LISA LAKE #124 - LAB DUPLICATE

GC ANALYSIS
VOLATILE COMPOUNDS
EPA METHOD 601, 602

REPORTING UNITS: ug/L

BROMOMETHANE	< 4.0	1,3-TRANS DICHLOROPROPENE	< 6.0
BROMOFORM	< 8.0	1,3-CIS DICHLOROPROPENE	< 2.0
CARBON TETRACHLORIDE	< 2.0	METHYLENE CHLORIDE	< 3.0
CHLOROBENZENE	< 2.0	1,1,2,2 TETRACHLOROETHANE	< 2.0
CHLORODIBROMOMETHANE	< 2.0	TETRACHLOROETHYLENE	< 2.0
CHLOROETHANE	< 2.0	1,2 TRANS DICHLOROETHYLENE	< 2.0
2-CHLOROETHYLVINYL ETHER	< 2.0	1,1,1 TRICHLORDETHANE	< 2.0
CHLOROFORM	< 2.0	1,1,2 TRICHLORDETHANE	< 2.0
DICHLOROBROMOMETHANE	< 2.0	TRICHLOROETHYLENE	< 2.0
DICHLORODIFLUOROMETHANE	< 4.0	TRICHLOROFLUOROMETHANE	< 3.0
1,2-DICHLOROBENZENE	< 3.0	VINYL CHLORIDE	< 4.0
1,3-DICHLOROBENZENE	< 3.0		
1,4-DICHLOROBENZENE	< 3.0	BENZENE	< 2
1,1-DICHLOROETHANE	< 2.0	TOLUENE	< 2
1,2-DICHLOROETHANE	< 2.0	ETHYL BENZENE	< 2
1,1-DICHLOROETHYLENE	< 2.0		
1,2-DICHLOROPROPANE	< 2.0	OTHER	
CHLOROMETHANE	< 4.0		

DETECTION LIMITS ARE INDICATED BY "LESS THAN" SIGNS

Approved By: Earl M. Hansen

Earl M. Hansen, PA
Manager
WESTON Analytical Laboratori

AR301183

WESTON

DATE OF REPORT: August 15, 1985

OLMSTEAD A.F.B.
HERBICIDE SUMMARY REPORT
FOR
SAMPLES REC'D AUGUST 2, 1985
W.O. NO. 0628-05-50

DATE SAMPLES COLLECTED: August 1, 1985
DATE EXTRACTED: August 7, 1985
DATE ANALYZED: August 9, 1985

R.F.W. NO.	SAMPLE DESCRIPTION	2,4-D µg/L	2,4,5-TP µg/L	2,4,5-T µg/L
8507-795-0140	LISA LAKE #28	<10	<1	<1
-0150	LISA LAKE #124	<10	<1	<1
8507-795/	LAB METHOD BLANK	<10	<1	<1
8507-795/SPIKE	METHOD SPIKE	21% REC.	35% REC.	25% REC.
8507-795/SPIKE DUP.	METHOD SPIKE DUPLICATE	17% REC.	36% REC.	25% REC.

COMPILED BY: Judith A Porta
Judith A. Porta
Laboratory Operations Manager
WESTON Analytical Laboratories

APPROVED BY: Earl M. Hansen
Earl M. Hansen, Ph.D.
Manager
WESTON Analytical Laboratories

AR301184

DATE OF REVISED REPORT: April 11, 1986

ROY F. WESTON
ORGANIC ANALYSIS DATA SUMMARY
FOR
OLMSTED A.F.B.
WATER-PESTICIDE/PCB SUMMARY REPORT

R.F.W. NO.: 8508-	DETECTION LIMITS	795-0140	795-0150	Blank	B.S.	B.S.D.
SAMPLE DESCRIPTION:		28	124			
DATE COLLECTED:						
DATE EXTRACTED:		8-6-85	8-6-85	8-6-85	8-6-85	8-6-85
DATE ANALYZED:		8-8-85	8-8-85	8-8-85	8-8-85	8-8-85
PARAMETER, ug/L						
Alpha-BHC	.2	ND	ND	ND	NS	NS
Beta-BHC	"	"	"	"	"	"
Delta-BHC	"	"	"	"	"	"
Gamma-BHC(Lindane)	"	"	"	"	69%	71%
Heptachlor	"	"	"	"	87%	97%
Aldrin	"	"	"	"	53%	55%
Heptachlor Epoxide	"	"	"	"	NS	NS
Endosulfan I	"	"	"	"	"	"
Dieldrin	.5	"	"	"	70%	74%
4,4-DDE	.5	"	"	"	NS	NS
Endrin	.2	"	"	"	90%	91%
Endosulfan II	.5	"	"	"	NS	NS
4,4-DDD	"	"	"	"	"	"
Endrin Aldehyde	"	"	"	"	"	"
Endosulfan Sulfate	"	"	"	"	"	"
4,4-DDT	"	"	"	"	68%	76%
Methoxychlor	2	"	"	"	NS	NS
Endrin Ketone	.5	"	"	"	"	"
Chlordane	2	"	"	"	"	"
Toxaphene	5	"	"	"	"	"
Aroclor-1016	5	"	"	"	"	"
Aroclor-1221	10	"	"	"	"	"
Aroclor-1232	5	"	"	"	"	"
Aroclor-1242	"	"	"	"	"	"
Aroclor-1248	"	"	"	"	"	"
Aroclor-1254	"	"	"	"	"	"
Aroclor-1260	"	"	"	"	"	"

N.S. = Not Spiked

N.D. = Not Detected < detection limit

Approved By: Earl M. Hansen

Earl M. Hansen, Ph.D.
Manager
WESTON Analytical Laboratories

AR301185

AR301185

DATE OF REPORT: August 16, 1985

DATA SUMMARY FOR: OLMSTEAD A.F.B.

DATE SAMPLE COLLECTED: August 1, 1985

DATE RECEIVED: August 2, 1985

DATE ANALYZED: August 8, 1985

FW NO.: 8508-799-0010

SAMPLE DESCRIPTION: PRODUCTION WELL 17

GC ANALYSIS
VOLATILE COMPOUNDS
EPA METHOD 601, 602

REPORTING UNITS: ug/L

BROMOMETHANE	< 4.0	1,3-TRANS DICHLOROPROPENE	< 6.0
BROMOFORM	< 8.0	1,3-CIS DICHLOROPROPENE	< 2.0
CARBON TETRACHLORIDE	< 2.0	METHYLENE CHLORIDE	< 3.0
CHLOROBENZENE	< 2.0	1,1,2,2 TETRACHLOROETHANE	< 2.0
CHLORODIBROMOMETHANE	< 2.0	TETRACHLOROETHYLENE	< 2.0
CHLOROETHANE	< 2.0	1,2 TRANS DICHLOROETHYLENE	< 2.0
2-CHLOROETHYLVINYL ETHER	< 2.0	1,1,1 TRICHLOROETHANE	< 2.0
CHLOROFORM	< 2.0	1,1,2 TRICHLORDETHANE	< 2.0
DICHLOROBROMOMETHANE	< 2.0	TRICHLOROETHYLENE	< 2.0
DICHLORODIFLUOROMETHANE	< 4.0	TRICHLOROFLUOROMETHANE	< 3.0
1,2-DICHLOROBENZENE	< 3.0	VINYL CHLORIDE	< 4.0
1,3-DICHLOROBENZENE	< 3.0		
1,4-DICHLOROBENZENE	< 3.0	BENZENE	< 2
1,1-DICHLOROETHANE	< 2.0	TOLUENE	< 2
1,2-DICHLOROETHANE	< 2.0	ETHYL BENZENE	< 2
1,1-DICHLOROETHYLENE	< 2.0		
1,2-DICHLOROPROPANE	< 2.0	OTHER	
CHLOROMETHANE	< 4.0		

DETECTION LIMITS ARE INDICATED BY "LESS THAN" SIGNS

Approved By: Earl M. Hansen

AR301186

Earl M. Hansen, Ph.D.
Manager
WESTON Analytical Laboratorie

DATE OF REPORT: August 16, 1985

ATA SUMMARY FOR: OLMSTEAD A.F.B.

DATE SAMPLE COLLECTED: August 1, 1985

DATE RECEIVED: August 2, 1985
DATE ANALYZED: August 8, 1985

RFW NO.: 8508-799-0020

SAMPLE DESCRIPTION: PRODUCTION WELL 18

GC ANALYSIS
VOLATILE COMPOUNDS
EPA METHOD 601, 602

REPORTING UNITS: ug/L

BROMOMETHANE	< 4.0
BROMOFORM	< 8.0
CARBON TETRACHLORIDE	< 2.0
CHLOROBENZENE	< 2.0
CHLORODIBROMOMETHANE	< 2.0
CHLOROETHANE	< 2.0
2-CHLOROETHYLVINYL ETHER	< 2.0
CHLOROFORM	< 2.0
DICHLOROBROMOMETHANE	< 2.0
DICHLORODIFLUOROMETHANE	< 4.0
1,2-DICHLOROBENZENE	< 3.0
1,3-DICHLOROBENZENE	< 3.0
1,4-DICHLOROBENZENE	< 3.0
1,1-DICHLOROETHANE	< 2.0
1,2-DICHLOROETHANE	< 2.0
1,1-DICHLOROETHYLENE	< 2.0
1,2-DICHLOROPROPANE	< 2.0
CHLOROMETHANE	< 4.0

1,3-TRANS DICHLOROPROPENE	< 6.0
1,3-CIS DICHLOROPROPENE	< 2.0
METHYLENE CHLORIDE	< 3.0
1,1,2,2 TETRACHLOROETHANE	< 2.0
TETRACHLOROETHYLENE	< 2.0
1,2 TRANS DICHLOROETHYLENE	< 2.0
1,1,1 TRICHLOROETHANE	< 2.0
1,1,2 TRICHLOROETHANE	< 2.0
TRICHLOROETHYLENE	< 2.0
TRICHLOROFLUOROMETHANE	< 3.0
VINYL CHLORIDE	< 4.0
BENZENE	< 2
TOLUENE	< 2
ETHYL BENZENE	< 2
OTHER	

DETECTION LIMITS ARE INDICATED BY "LESS THAN" SIGNS

Approved By: Earl M. Hansen

Earl M. Hansen, Ph.D.
Manager
WESTON Analytical Laboratorie

DATE OF REPORT: August 16, 1985

SUMMARY FOR: OLMSTEAD A.F.B.

DATE SAMPLE COLLECTED: August 1, 1985

DATE RECEIVED: August 2, 1985

RFW NO.: 8508-799-0080 (HIA-18)

DATE ANALYZED: August 12, 1985

SAMPLE DESCRIPTION: RFW-18 DUP.

GC ANALYSIS
VOLATILE COMPOUNDS
EPA METHOD 601, 602

REPORTING UNITS: ug/L

BROMOMETHANE	< 4.0	1,3-TRANS DICHLOROPROPENE	< 6.0
BROMOFORM	< 8.0	1,3-CIS DICHLOROPROPENE	< 2.0
CARBON TETRACHLORIDE	2.0	METHYLENE CHLORIDE	< 3.0
CHLOROBENZENE	< 2.0	1,1,2,2 TETRACHLOROETHANE	< 2.0
CHLORODIBROMOMETHANE	< 2.0	TETRACHLOROETHYLENE	< 2.0
CHLOROETHANE	< 2.0	1,2 TRANS DICHLOROETHYLENE	< 2.0
2-CHLOROETHYLVINYL ETHER	< 2.0	1,1,1 TRICHLOROETHANE	< 2.0
CHLOROFORM	< 2.0	1,1,2 TRICHLORDETHANE	< 2.0
DICHLOROBROMOMETHANE	< 2.0	TRICHLOROETHYLENE	< 2.0
DICHLORODIFLUOROMETHANE	< 4.0	TRICHLOROFLUOROMETHANE	< 3.0
1,2-DICHLOROBENZENE	< 3.0	VINYL CHLORIDE	< 4.0
1,3-DICHLOROBENZENE	< 3.0		
1,4-DICHLOROBENZENE	< 3.0	BENZENE	< 2
1,1-DICHLOROETHANE	< 2.0	TOLUENE	< 2
1,2-DICHLOROETHANE	< 2.0	ETHYL BENZENE	< 2
1,1-DICHLOROETHYLENE	< 2.0		
1,2-DICHLOROPROPANE	< 2.0	OTHER	
CHLOROMETHANE	< 4.0		

DETECTION LIMITS ARE INDICATED BY "LESS THAN" SIGNS

Approved By: Earl M. Hanse

Earl M. Hanse
Manager
WESTON Analytical Laboratori

DATE OF REPORT: August 16, 1985
DATE OF REVISED REPORT: October 28, 1985

ATA SUMMARY FOR: OLMSTEAD A.F.B.

DATE SAMPLE COLLECTED: August 1, 1985

DATE RECEIVED: August 2, 1985
DATE ANALYZED: August 8, 1985

RFW NO.: 8508-795-0120

SAMPLE DESCRIPTION: RFW-1

GC ANALYSIS
VOLATILE COMPOUNDS
EPA METHOD 601, 602

REPORTING UNITS: ug/L

BROMOMETHANE	< 4.0	1,3-TRANS DICHLOROPROPENE	< 6.0
BROMOFORM	< 8.0	1,3-CIS DICHLOROPROPENE	< 2.0
CARBON TETRACHLORIDE	< 2.0	METHYLENE CHLORIDE	< 3.0
CHLOROBENZENE	13 *	1,1,2,2 TETRACHLOROETHANE	< 2.0
CHLORODIBROMOMETHANE	< 2.0	TETRACHLOROETHYLENE	< 2.0
CHLOROETHANE	9.2	1,2 TRANS DICHLOROETHYLENE	46
2-CHLOROETHYLVINYL ETHER	< 2.0	1,1,1 TRICHLOROETHANE	< 2.0
CHLOROFORM	< 2.0	1,1,2 TRICHLORDETHANE	< 2.0
DICHLOROBROMOMETHANE	< 2.0	TRICHLOROETHYLENE	41
DICHLORODIFLUOROMETHANE	< 4.0	TRICHLOROFLUOROMETHANE	< 3.0
1,2-DICHLOROBENZENE	< 3.0	VINYL CHLORIDE	< 4.0
1,3-DICHLOROBENZENE	< 3.0		
1,4-DICHLOROBENZENE	14 *	BENZENE	< 2
1,1-DICHLOROETHANE	7.8	TOLUENE	< 2
1,2-DICHLOROETHANE	< 2.0	ETHYL BENZENE	< 2
1,1-DICHLOROETHYLENE	< 2.0		
1,2-DICHLOROPROPANE	< 2.0	OTHER	
CHLOROMETHANE	< 4.0		

DETECTION LIMITS ARE INDICATED BY "LESS THAN" SIGNS

* = REVISION

Approved By: Earl M. Hansen

Earl M. Hansen
Manager
WESTON Analytical Laboratorie

AR301188

AR301189

DATE OF REPORT: August 16, 1985

D. A SUMMARY FOR: OLMSTEAD A.F.B.

[.TE SAMPLE COLLECTED: August 1, 1985

DATE RECEIVED: August 2, 1985
DATE ANALYZED: August 8, 1985

P W NO.: 8508-799-0030

SAMPLE DESCRIPTION: STREAM SEDIMENT

GC ANALYSIS
VOLATILE COMPOUNDS
EPA METHOD 601, 602

REPORTING UNITS: ng/g

BROMOMETHANE	< 4.0	1,3-TRANS DICHLOROPROPENE	< 6.0
BROMOFORM	< 8.0	1,3-CIS DICHLOROPROPENE	< 2.0
CARBON TETRACHLORIDE	< 2.0	METHYLENE CHLORIDE	< 3.0
CHLOROBENZENE	< 2.0	1,1,2,2 TETRACHLOROETHANE	< 2.0
CHLORODIBROMOMETHANE	< 2.0	TETRACHLOROETHYLENE	< 2.0
CHLOROETHANE	< 2.0	1,2 TRANS DICHLOROETHYLENE	< 2.0
CHLOROETHYLVINYL ETHER	< 2.0	1,1,1 TRICHLOROETHANE	< 2.0
CHLOROFORM	< 2.0	1,1,2 TRICHLORDETHANE	< 2.0
DICHLOROBROMOMETHANE	< 2.0	TRICHLOROETHYLENE	< 2.0
DICHLORODIFLUOROMETHANE	< 4.0	TRICHLOROFLUOROMETHANE	< [illegible]
1,2-DICHLOROBENZENE	< 3.0	VINYL CHLORIDE	< 4.0
1,3-DICHLOROBENZENE	< 3.0		
1,4-DICHLOROBENZENE	< 3.0	BENZENE	< 2
1,1-DICHLOROETHANE	< 2.0	TOLUENE	< 2
1,2-DICHLOROETHANE	< 2.0	ETHYL BENZENE	< 2
1,1-DICHLOROETHYLENE	< 2.0		
1,2-DICHLOROPROPANE	< 2.0	OTHER	
CHLOROMETHANE	< 4.0		

DETECTION LIMITS ARE INDICATED BY "LESS THAN" SIGNS

Approved By: Earl M. Hansen

AR301190

Earl M. Hansen, Ph.D.
Manager
WESTON Analytical Laboratorie

DATE OF REPORT: August 16, 1985

DATA SUMMARY FOR: OLMSTEAD A.F.B.

DATE SAMPLE COLLECTED: August 1, 1985

DATE RECEIVED: August 2, 1985

DATE ANALYZED: August 8, 1985

RFW NO.: 8508-795-0130

SAMPLE DESCRIPTION: RFW-2

GC ANALYSIS
VOLATILE COMPOUNDS
EPA METHOD 601, 602

REPORTING UNITS: ug/L

BROMOMETHANE	< 4.0	1,3-TRANS DICHLOROPROPENE	< 6.0
BROMOFORM	< 8.0	1,3-CIS DICHLOROPROPENE	< 2.0
CARBON TETRACHLORIDE	< 2.0	METHYLENE CHLORIDE	< 3.0
CHLOROBENZENE	< 2.0	1,1,2,2 TETRACHLOROETHANE	< 2.0
CHLORODIBROMOMETHANE	< 2.0	TETRACHLOROETHYLENE	< 2.0
CHLOROETHANE	< 2.0	1,2 TRANS DICHLOROETHYLENE	< 2.0
2-CHLOROETHYLVINYL ETHER	< 2.0	1,1,1 TRICHLOROETHANE	< 2.0
CHLOROFORM	< 2.0	1,1,2 TRICHLOROETHANE	< 2.0
DICHLOROBROMOMETHANE	< 2.0	TRICHLOROETHYLENE	< 2.0
DICHLORODIFLUOROMETHANE	< 4.0	TRICHLOROFLUOROMETHANE	< 3.0
1,2-DICHLOROBENZENE	< 3.0	VINYL CHLORIDE	< 4.0
1,3-DICHLOROBENZENE	< 3.0		
1,4-DICHLOROBENZENE	< 3.0	BENZENE	< 2
1,1-DICHLOROETHANE	< 2.0	TOLUENE	< 2
1,2-DICHLOROETHANE	< 2.0	ETHYL BENZENE	< 2
1,1-DICHLOROETHYLENE	< 2.0		
1,2-DICHLOROPROPANE	< 2.0	OTHER	
CHLOROMETHANE	< 4.0		

DETECTION LIMITS ARE INDICATED BY "LESS THAN" SIGNS

Approved By: Earl M. Hanse

Earl M. Hansen, Ph.D.
Manager
WESTON Analytical Laboratories

DATE OF REPORT: August 16, 1985

SUMMARY FOR: OLMSTEAD A.F.B.

DATE SAMPLE COLLECTED: August 2, 1985

DATE RECEIVED: August 2, 1985

RFW NO.: 8508-799-0040

DATE ANALYZED: August 8, 1985

SAMPLE DESCRIPTION: RFW WELL #3

GC ANALYSIS
VOLATILE COMPOUNDS
EPA METHOD 601, 602

REPORTING UNITS: ug/L

BROMOMETHANE	< 4.0	1,3-TRANS DICHLOROPROPENE	< 6.0
BROMOFORM	< 8.0	1,3-CIS DICHLOROPROPENE	< 2.0
CARBON TETRACHLORIDE	< 2.0	METHYLENE CHLORIDE	< 3.0
CHLOROBENZENE	< 2.0	1,1,2,2 TETRACHLOROETHANE	< 2.0
CHLORODIBROMOMETHANE	< 2.0	TETRACHLOROETHYLENE	11.4
CHLOROETHANE	< 2.0	1,2 TRANS DICHLOROETHYLENE	360
2-CHLOROETHYLVINYL ETHER	< 2.0	1,1,1 TRICHLOROETHANE	3
CHLOROFORM	< 2.0	1,1,2 TRICHLORDETHANE	< 2.0
DICHLOROBROMOMETHANE	< 2.0	TRICHLOROETHYLENE	230
DICHLORODIFLUOROMETHANE	< 4.0	TRICHLOROFLUOROMETHANE	< 3.0
1,2-DICHLOROBENZENE	8.9	VINYL CHLORIDE	< 4.0
1,3-DICHLOROBENZENE	< 3.0		
1,4-DICHLOROBENZENE	< 3.0	BENZENE	2
1,1-DICHLOROETHANE	< 2.0	TOLUENE	2
1,2-DICHLOROETHANE	< 2.0	ETHYL BENZENE	< 2
1,1-DICHLOROETHYLENE	< 2.0		
1,2-DICHLOROPROPANE	< 2.0	OTHER	
METHYLCHLOROMETHANE	< 4.0		

DETECTION LIMITS ARE INDICATED BY "LESS THAN" SIGNS

Approved By: Earl M. Hansen

Earl M. Hansen, Ph.D.
Manager
WESTON Analytical Laboratories

AR301192

DATE OF REPORT: August 16, 1985

ATA SUMMARY FOR: OLMSTEAD A.F.B.

DATE SAMPLE COLLECTED: August 2, 1985

DATE RECEIVED: August 2, 1985

DATE ANALYZED: August 12, 1985

RFW NO.: 8508-799-0050

SAMPLE DESCRIPTION: RFW WELL 4

GC ANALYSIS
VOLATILE COMPOUNDS
EPA METHOD 601, 602

REPORTING UNITS: ug/L

BROMOMETHANE	< 4.0	1,3-TRANS DICHLOROPROPENE	< 6.0
BROMOFORM	< 8.0	1,3-CIS DICHLOROPROPENE	< 2.0
CARBON TETRACHLORIDE	2.0	METHYLENE CHLORIDE	< 3.0
CHLOROBENZENE	< 2.0	1,1,2,2 TETRACHLOROETHANE	< 2.0
CHLORODIBROMOMETHANE	< 2.0	TETRACHLOROETHYLENE	< 2.0
CHLOROETHANE	< 2.0	1,2 TRANS DICHLOROETHYLENE	2.0
2-CHLOROETHYLVINYL ETHER	< 2.0	1,1,1 TRICHLOROETHANE	< 2.0
CHLOROFORM	< 2.0	1,1,2 TRICHLOROETHANE	< 2.0
DICHLOROBROMOMETHANE	< 2.0	TRICHLOROETHYLENE	2.0
DICHLORODIFLUOROMETHANE	< 4.0	TRICHLOROFLUOROMETHANE	< 3.0
1,2-DICHLOROBENZENE	< 3.0	VINYL CHLORIDE	< 4.0
1,3-DICHLOROBENZENE	< 3.0		
1,4-DICHLOROBENZENE	< 3.0	BENZENE	< 2
1,1-DICHLOROETHANE	< 2.0	TOLUENE	3
1,2-DICHLOROETHANE	< 2.0	ETHYL BENZENE	< 2
1,1-DICHLOROETHYLENE	< 2.0		
1,2-DICHLOROPROPANE	< 2.0	OTHER	
CHLOROMETHANE	< 4.0		

DETECTION LIMITS ARE INDICATED BY "LESS THAN" SIGNS

Approved By: Earl M. Hansen

Earl M. Hansen, Ph.D.
Manager
WESTON Analytical Laboratories

AR301193

AR301193

DATE OF REPORT: August 16, 1985

DATA SUMMARY FOR: OLMSTEAD A.F.B.

DATE SAMPLE COLLECTED: August 2, 1985

DATE RECEIVED: August 2, 1985

DATE ANALYZED: August 12, 1985

RFW NO.: 8508-799-0060

SAMPLE DESCRIPTION: RFW WELL 5

GC ANALYSIS
VOLATILE COMPOUNDS
EPA METHOD 601, 602

REPORTING UNITS: ug/L

BROMOMETHANE	< 4.0	1,3-TRANS DICHLOROPROPENE	< 6.0
BROMOFORM	< 8.0	1,3-CIS DICHLOROPROPENE	< 2.0
CARBON TETRACHLORIDE	2.0	METHYLENE CHLORIDE	< 3.0
CHLOROBENZENE	< 2.0	1,1,2,2 TETRACHLOROETHANE	< 2.0
CHLORODIBROMOMETHANE	< 2.0	TETRACHLOROETHYLENE	< 2.0
CHLOROETHANE	< 2.0	1,2 TRANS DICHLOROETHYLENE	3.0
2-CHLOROETHYLVINYL ETHER	< 2.0	1,1,1 TRICHLOROETHANE	< 2.0
CHLOROFORM	< 2.0	1,1,2 TRICHLORDETHANE	< 2.0
DICHLOROBROMOMETHANE	< 2.0	TRICHLOROETHYLENE	2.0
DICHLORODIFLUOROMETHANE	< 4.0	TRICHLOROFLUOROMETHANE	< 3.0
1,2-DICHLOROBENZENE	< 3.0	VINYL CHLORIDE	< 4.0
1,3-DICHLOROBENZENE	< 3.0		
1,4-DICHLOROBENZENE	< 3.0	BENZENE	< 2
1,1-DICHLOROETHANE	< 2.0	TOLUENE	4
1,2-DICHLOROETHANE	< 2.0	ETHYL BENZENE	< 2
1,1-DICHLOROETHYLENE	< 2.0		
1,2-DICHLOROPROPANE	< 2.0	OTHER	
CHLOROMETHANE	< 4.0		

DETECTION LIMITS ARE INDICATED BY "LESS THAN" SIGNS

Approved By: Earl M. Hansen

Earl M. Hansen, Ph.D.
Manager
WESTON Analytical Laboratorie

DATE OF REPORT: August 16, 1985

ATA SUMMARY FOR: OLMSTEAD A.F.B.

DATE SAMPLE COLLECTED: July 31, 1985

DATE RECEIVED: August 2, 1985

DATE ANALYZED: August 8, 1985

RFW NO.: 8508-795-0100

SAMPLE DESCRIPTION: RFW-6

GC ANALYSIS
VOLATILE COMPOUNDS
EPA METHOD 601, 602

REPORTING UNITS: ug/L

BROMOMETHANE	< 4.0	1,3-TRANS DICHLOROPROPENE	< 6.0
BROMOFORM	< 8.0	1,3-CIS DICHLOROPROPENE	< 2.0
CARBON TETRACHLORIDE	< 2.0	METHYLENE CHLORIDE	< 3.0
CHLOROBENZENE	< 2.0	1,1,2,2 TETRACHLOROETHANE	< 2.0
CHLORODIBROMOMETHANE	< 2.0	TETRACHLOROETHYLENE	< 2.0
CHLOROETHANE	< 2.0	1,2 TRANS DICHLOROETHYLENE	21
2-CHLOROETHYLVINYL ETHER	< 2.0	1,1,1 TRICHLOROETHANE	< 2.0
CHLOROFORM	2.0	1,1,2 TRICHLORDETHANE	< 2.0
DICHLOROBROMOMETHANE	< 2.0	TRICHLOROETHYLENE	36
DICHLORODIFLUOROMETHANE	< 4.0	TRICHLOROFLUOROMETHANE	< 3.0
1,2-DICHLOROBENZENE	< 3.0	VINYL CHLORIDE	< 4.0
1,3-DICHLOROBENZENE	< 3.0		
1,4-DICHLOROBENZENE	< 3.0	BENZENE	< 2
1,1-DICHLOROETHANE	< 2.0	TOLUENE	< 2
1,2-DICHLOROETHANE	< 2.0	ETHYL BENZENE	< 2
1,1-DICHLOROETHYLENE	< 2.0		
1,2-DICHLOROPROPANE	< 2.0	OTHER	
CHLOROMETHANE	< 4.0		

DETECTION LIMITS ARE INDICATED BY "LESS THAN" SIGNS

Approved By: Earl M. Hansen

Earl M. Hansen, PhD
Manager
WESTON Analytical Laboratories

AR301195

AR301195

DATE OF REPORT: August 16, 1985

SUMMARY FOR: OLMSTEAD A.F.B.

DATE SAMPLE COLLECTED: July 30, 1985

DATE RECEIVED: August 2, 1985

DATE ANALYZED: August 8, 1985

RFW NO.: 8508-795-0110

SAMPLE DESCRIPTION: RFW-7

GC ANALYSIS
VOLATILE COMPOUNDS
EPA METHOD 601, 602

REPORTING UNITS: ug/L

ROMOMETHANE	< 4.0	1,3-TRANS DICHLOROPROPENE	< 6.0
BROMOFORM	< 8.0	1,3-CIS DICHLOROPROPENE	< 2.0
ARBON TETRACHLORIDE	< 2.0	METHYLENE CHLORIDE	13
CHLOROBENZENE	< 2.0	1,1,2,2 TETRACHLOROETHANE	< 2.0
HLORODIBROMOMETHANE	< 2.0	TETRACHLOROETHYLENE	< 2.0
CHLOROETHANE	< 2.0	1,2 TRANS DICHLOROETHYLENE	< 2.0
HLOROETHYLVINYL ETHER	< 2.0	1,1,1 TRICHLOROETHANE	< 2.0
LOROFORM	2.0	1,1,2 TRICHLOROETHANE	< 2.0
ICHLOROBROMOMETHANE	< 2.0	TRICHLOROETHYLENE	< 2.0
ICHLORODIFLUOROMETHANE	< 4.0	TRICHLOROFLUOROMETHANE	< 3.0
1,2-DICHLOROBENZENE	< 3.0	VINYL CHLORIDE	< 4.0
,3-DICHLOROBENZENE	< 3.0		
1,4-DICHLOROBENZENE	< 3.0	BENZENE	< 2
,1-DICHLOROETHANE	< 2.0	TOLUENE	< 2
1,2-DICHLOROETHANE	< 2.0	ETHYL BENZENE	< 2
,1-DICHLOROETHYLENE	< 2.0		
1,2-DICHLOROPROPANE	< 2.0	OTHER	
CHLOROMETHANE	< 4.0		

DETECTION LIMITS ARE INDICATED BY "LESS THAN" SIGNS

Approved By: Earl M. Hansen

Earl M. Hansen, Ph.D.
Manager
WESTON Analytical Laboratories

DATE OF REPORT: August 16, 1985

DATA SUMMARY FOR: OLMSTEAD A.F.B.

DATE SAMPLE COLLECTED: July 30, 1985

DATE RECEIVED: August 2, 1985

RFW NO.: 8508-795-0010

DATE ANALYZED: August 7, 1985

SAMPLE DESCRIPTION: WRT-1

GC ANALYSIS
VOLATILE COMPOUNDS
EPA METHOD 601, 602

REPORTING UNITS: ug/L

BROMOMETHANE	< 4.0	1,3-TRANS DICHLOROPROPENE	< 6.0
BROMOFORM	< 8.0	1,3-CIS DICHLOROPROPENE	< 2.0
CARBON TETRACHLORIDE	2.0	METHYLENE CHLORIDE	< 3.0
CHLOROBENZENE	< 2.0	1,1,2,2 TETRACHLOROETHANE	< 2.0
CHLORODIBROMOMETHANE	< 2.0	TETRACHLOROETHYLENE	< 2.0
CHLOROETHANE	< 2.0	1,2 TRANS DICHLOROETHYLENE	13
2-CHLOROETHYLVINYL ETHER	< 2.0	1,1,1 TRICHLOROETHANE	< 2.0
CHLOROFORM	< 2.0	1,1,2 TRICHLOROETHANE	< 2.0
DICHLOROBROMOMETHANE	< 2.0	TRICHLOROETHYLENE	55
DICHLORODIFLUOROMETHANE	< 4.0	TRICHLOROFLUOROMETHANE	< 3.0
1,2-DICHLOROBENZENE	< 3.0	VINYL CHLORIDE	< 4.0
1,3-DICHLOROBENZENE	< 3.0		
1,4-DICHLOROBENZENE	< 3.0	BENZENE	< 2
1,1-DICHLOROETHANE	< 2.0	TOLUENE	< 2
1,2-DICHLOROETHANE	< 2.0	ETHYL BENZENE	< 2
1,1-DICHLOROETHYLENE	< 2.0		
1,2-DICHLOROPROPANE	< 2.0	OTHER	
CHLOROMETHANE	< 4.0		

DETECTION LIMITS ARE INDICATED BY "LESS THAN" SIGNS

Approved By: Earl M. Hansen

Earl M. Hansen, Ph.D.
Manager
WESTON Analytical Laboratorie

RR301197

DATE OF REPORT: August 16, 1985

SUMMARY FOR: OLMSTEAD A.F.B.

DATE SAMPLE COLLECTED: July 30, 1985

DATE RECEIVED: August 2, 1985

DATE ANALYZED: August 7, 1985

RFW NO.: 8508-795-0020

SAMPLE DESCRIPTION: WRT-2

GC ANALYSIS
VOLATILE COMPOUNDS
EPA METHOD 601, 602

REPORTING UNITS: ug/L

ROMOMETHANE	< 4.0	1,3-TRANS DICHLOROPROPENE	< 6.0
BROMOFORM	< 8.0	1,3-CIS DICHLOROPROPENE	< 2.0
ARBON TETRACHLORIDE	2.0	METHYLENE CHLORIDE	< 3.0
CHLOROBENZENE	< 2.0	1,1,2,2 TETRACHLOROETHANE	< 2.0
HLORODIBROMOMETHANE	< 2.0	TETRACHLOROETHYLENE	< 2.0
CHLOROETHANE	< 2.0	1,2 TRANS DICHLOROETHYLENE	3.8
-CHLOROETHYLVINYL ETHER	< 2.0	1,1,1 TRICHLOROETHANE	< 2.0
OROFORM	< 2.0	1,1,2 TRICHLORDETHANE	< 2.0
DICHLOROBROMOMETHANE	< 2.0	TRICHLOROETHYLENE	30
ICHLORODIFLUOROMETHANE	< 4.0	TRICHLOROFLUOROMETHANE	< 3.0
1,2-DICHLOROBENZENE	< 3.0	VINYL CHLORIDE	< 4.0
,3-DICHLOROBENZENE	< 3.0		
1,4-DICHLOROBENZENE	< 3.0	BENZENE	< 2
,1-DICHLOROETHANE	< 2.0	TOLUENE	< 2
1,2-DICHLOROETHANE	< 2.0	ETHYL BENZENE	< 2
1,1-DICHLOROETHYLENE	< 2.0		
1,2-DICHLOROPROPANE	< 2.0	OTHER	
CHLOROMETHANE	< 4.0		

DETECTION LIMITS ARE INDICATED BY "LESS THAN" SIGNS

Approved By: Earl M. Hansen

Earl M. Hansen, Ph.D.
Manager
WESTON Analytical Laboratorie

DATE OF REPORT: August 16, 1985

DATA SUMMARY FOR: OLMSTEAD A.F.B.

DATE SAMPLE COLLECTED: July 30, 1985

DATE RECEIVED: August 2, 1985

DATE ANALYZED: August 8, 1985

RFW NO.: 8508-795-0030

SAMPLE DESCRIPTION: WRT-3

GC ANALYSIS
VOLATILE COMPOUNDS
EPA METHOD 601, 602

REPORTING UNITS: ug/L

BROMOMETHANE	< 4.0	1,3-TRANS DICHLOROPROPENE	< 6.0
BROMOFORM	< 8.0	1,3-CIS DICHLOROPROPENE	< 2.0
CARBON TETRACHLORIDE	2.0	METHYLENE CHLORIDE	< 3.0
CHLOROBENZENE	< 2.0	1,1,2,2 TETRACHLOROETHANE	< 2.0
CHLORODIBROMOMETHANE	< 2.0	TETRACHLOROETHYLENE	< 2.0
CHLOROETHANE	< 2.0	1,2 TRANS DICHLOROETHYLENE	8.3
2-CHLOROETHYLVINYL ETHER	< 2.0	1,1,1 TRICHLOROETHANE	< 2.0
CHLOROFORM	< 2.0	1,1,2 TRICHLORDETHANE	< 2.0
DICHLOROBROMOMETHANE	< 2.0	TRICHLOROETHYLENE	32
DICHLORODIFLUOROMETHANE	< 4.0	TRICHLOROFLUOROMETHANE	< 3.0
1,2-DICHLOROBENZENE	< 3.0	VINYL CHLORIDE	< 4.0
1,3-DICHLOROBENZENE	< 3.0		
1,4-DICHLOROBENZENE	< 3.0	BENZENE	< 2
1,1-DICHLOROETHANE	< 2.0	TOLUENE	< 2
1,2-DICHLOROETHANE	< 2.0	ETHYL BENZENE	< 2
1,1-DICHLOROETHYLENE	< 2.0		
1,2-DICHLOROPROPANE	< 2.0	OTHER	
CHLOROMETHANE	< 4.0		

DETECTION LIMITS ARE INDICATED BY "LESS THAN" SIGNS

Approved By: Earl M. Hansen

Earl M. Hansen
Manager
WESTON Analytical Laboratorie

DATE OF REPORT: August 16, 1985

D. , SUMMARY FOR: OLMSTEAD A.F.B.

D TE SAMPLE COLLECTED: July 30, 1985

DATE RECEIVED: August 2, 1985
DATE ANALYZED: August 8, 1985

REW NO.: 8508-795-0040

SAMPLE DESCRIPTION: WRT-4

GC ANALYSIS
VOLATILE COMPOUNDS
EPA METHOD 601, 602

REPORTING UNITS: ug/L

ROMOMETHANE	< 4.0	1,3-TRANS DICHLOROPROPENE	< 6.0
BROMOFORM	< 8.0	1,3-CIS DICHLOROPROPENE	< 2.0
ARBON TETRACHLORIDE	2.0	METHYLENE CHLORIDE	< 3.0
CHLOROBENZENE	3.1	1,1,2,2 TETRACHLOROETHANE	< 2.0
HLORODIBROMOMETHANE	< 2.0	TETRACHLOROETHYLENE	< 2.0
CHLOROETHANE	< 2.0	1,2 TRANS DICHLOROETHYLENE	3.0
HLOROETHYLVINYL ETHER	< 2.0	1,1,1 TRICHLOROETHANE	< 2.0
OROFORM	< 2.0	1,1,2 TRICHLORDETHANE	< 2.0
ICHLOROBROMOMETHANE	< 2.0	TRICHLOROETHYLENE	17
ICHLORODIFLUOROMETHANE	< 4.0	TRICHLOROFLUOROMETHANE	< 3.0
1,2-DICHLOROBENZENE	< 3.0	VINYL CHLORIDE	< 4.0
,3-DICHLOROBENZENE	< 3.0		
1,4-DICHLOROBENZENE	< 3.0	BENZENE	< 2
,1-DICHLOROETHANE	< 2.0	TOLUENE	< 2
1,2-DICHLOROETHANE	< 2.0	ETHYL BENZENE	< 2
,1-DICHLOROETHYLENE	< 2.0	OTHER	
1,2-DICHLOROPROPANE	< 2.0		
HLOROMETHANE	< 4.0		

DETECTION LIMITS ARE INDICATED BY "LESS THAN" SIGNS

Approved By: Earl M. Hansen

Earl M. Hansen, Ph.D.
Manager
WESTON Analytical Laboratorie

DATE OF REPORT: August 16, 1985

DATA SUMMARY FOR: OLMSTEAD A.F.B.

DATE SAMPLE COLLECTED: July 31, 1985

DATE RECEIVED: August 2, 1985.

RFW NO.: 8508-795-0050

DATE ANALYZED: August 8, 1985

SAMPLE DESCRIPTION: WRT-5

GC ANALYSIS
VOLATILE COMPOUNDS
EPA METHOD 601, 602

REPORTING UNITS: ug/L

BROMOMETHANE	< 4.0	1,3-TRANS DICHLOROPROPENE	< 6.0
BROMOFORM	< 8.0	1,3-CIS DICHLOROPROPENE	< 2.0
CARBON TETRACHLORIDE	< 2.0	METHYLENE CHLORIDE	< 3.0
CHLOROBENZENE	< 2.0	1,1,2,2 TETRACHLOROETHANE	< 2.0
CHLORODIBROMOMETHANE	< 2.0	TETRACHLOROETHYLENE	< 2.0
CHLOROETHANE	< 2.0	1,2 TRANS DICHLOROETHYLENE	8.7
2-CHLOROETHYLVINYL ETHER	< 2.0	1,1,1 TRICHLOROETHANE	< 2.0
CHLOROFORM	< 2.0	1,1,2 TRICHLOROETHANE	< 2.0
DICHLOROBROMOMETHANE	< 2.0	TRICHLOROETHYLENE	35
DICHLORODIFLUOROMETHANE	< 4.0	TRICHLOROFLUOROMETHANE	< 3.0
1,2-DICHLOROBENZENE	< 3.0	VINYL CHLORIDE	< 4.0
1,3-DICHLOROBENZENE	< 3.0		
1,4-DICHLOROBENZENE	< 3.0	BENZENE	< 2
1,1-DICHLOROETHANE	< 2.0	TOLUENE	< 2
1,2-DICHLOROETHANE	< 2.0	ETHYL BENZENE	< 2
1,1-DICHLOROETHYLENE	< 2.0		
1,2-DICHLOROPROPANE	< 2.0	OTHER	
CHLOROMETHANE	< 4.0		

DETECTION LIMITS ARE INDICATED BY "LESS THAN" SIGNS

Approved By: Earl M. Hansen

Earl M. Hansen, AR3012
Manager
WESTON Analytical Laboratorie

DATE OF REPORT: August 16, 1985

D. A SUMMARY FOR: OLMSTEAD A.F.B.

E TE SAMPLE COLLECTED: July 31, 1985

DATE RECEIVED: August 2, 1985

DATE ANALYZED: August 8, 1985

RFW NO.: 8508-795-0060

SAMPLE DESCRIPTION: WRT-6

GC ANALYSIS
VOLATILE COMPOUNDS
EPA METHOD 601, 602

REPORTING UNITS: ug/L

BROMOMETHANE	< 4.0	1,3-TRANS DICHLOROPROPENE	< 6.0
BROMOFORM	< 8.0	1,3-CIS DICHLOROPROPENE	< 2.0
CARBON TETRACHLORIDE	< 2.0	METHYLENE CHLORIDE	< 3.0
CHLOROBENZENE	< 2.0	1,1,2,2 TETRACHLOROETHANE	< 2.0
CHLORODIBROMOMETHANE	< 2.0	TETRACHLOROETHYLENE	< 2.0
CHLOROETHANE	< 2.0	1,2 TRANS DICHLOROETHYLENE	53
2-CHLOROETHYLVINYL ETHER	< 2.0	1,1,1 TRICHLOROETHANE	< 2.0
CHLOROFORM	< 2.0	1,1,2 TRICHLORDETHANE	< 2.0
DICHLOROBROMOMETHANE	< 2.0	TRICHLOROETHYLENE	19
DICHLORODIFLUOROMETHANE	< 4.0	TRICHLOROFLUOROMETHANE	< 3.0
1,2-DICHLOROBENZENE	< 3.0	VINYL CHLORIDE	< 4.0
1,3-DICHLOROBENZENE	< 3.0		
1,4-DICHLOROBENZENE	< 3.0	BENZENE	< 2
1,1-DICHLOROETHANE	< 2.0	TOLUENE	< 2
1,2-DICHLOROETHANE	< 2.0	ETHYL BENZENE	< 2
1,1-DICHLOROETHYLENE	< 2.0		
1,2-DICHLOROPROPANE	< 2.0	OTHER	
CHLOROMETHANE	< 4.0		

DETECTION LIMITS ARE INDICATED BY "LESS THAN" SIGNS

Approved By: Earl M. Hansen

Earl M. Hansen, Ph.D.
Manager
WESTON Analytical Laboratorie

AR301202

DATE OF REPORT: August 16, 1985

DATA SUMMARY FOR: OLMSTEAD A.F.B.

DATE SAMPLE COLLECTED: July 31, 1985

DATE RECEIVED: August 2, 1985

RFW NO.: 8508-795-0080

DATE ANALYZED: August 8, 1985

SAMPLE DESCRIPTION: WRT-6 DUP.

GC ANALYSIS
VOLATILE COMPOUNDS
EPA METHOD 601, 602

REPORTING UNITS: ug/L

BROMOMETHANE	< 4.0	1,3-TRANS DICHLOROPROPENE	< 6.0
BROMOFORM	< 8.0	1,3-CIS DICHLOROPROPENE	< 2.0
CARBON TETRACHLORIDE	< 2.0	METHYLENE CHLORIDE	< 3.0
CHLOROBENZENE	< 2.0	1,1,2,2 TETRACHLOROETHANE	< 2.0
CHLORODIBROMOMETHANE	< 2.0	TETRACHLOROETHYLENE	< 2.0
CHLOROETHANE	< 2.0	1,2 TRANS DICHLOROETHYLENE	41
2-CHLOROETHYLVINYL ETHER	< 2.0	1,1,1 TRICHLOROETHANE	< 2.0
CHLOROFORM	< 2.0	1,1,2 TRICHLOROETHANE	< 2.0
DICHLOROBROMOMETHANE	< 2.0	TRICHLOROETHYLENE	19
DICHLORODIFLUOROMETHANE	< 4.0	TRICHLOROFLUOROMETHANE	< 3.0
1,2-DICHLOROBENZENE	< 3.0	VINYL CHLORIDE	< 4.0
1,3-DICHLOROBENZENE	< 3.0		
1,4-DICHLOROBENZENE	< 3.0	BENZENE	< 2
1,1-DICHLOROETHANE	< 2.0	TOLUENE	< 2
1,2-DICHLOROETHANE	< 2.0	ETHYL BENZENE	< 2
1,1-DICHLOROETHYLENE	< 2.0		
1,2-DICHLOROPROPANE	< 2.0	OTHER	
CHLOROMETHANE	< 4.0		

DETECTION LIMITS ARE INDICATED BY "LESS THAN" SIGNS

Approved By: Earl M. Hansen

Earl M. Hansen
Manager
WESTON Analytical Laboratories

DATE OF REPORT: August 16, 1985

DATA SUMMARY FOR: OLMSTEAD A.F.B.

DATE SAMPLE COLLECTED: July 31, 1985

DATE RECEIVED: August 2, 1985

DATE ANALYZED: August 8, 1985

RFW NO.: 8508-795-0070

SAMPLE DESCRIPTION: WRT-7

GC ANALYSIS
VOLATILE COMPOUNDS
EPA METHOD 601, 602

REPORTING UNITS: ug/L

BROMOMETHANE	< 4.0	1,3-TRANS DICHLOROPROPENE	< 6.0
BROMOFORM	< 8.0	1,3-CIS DICHLOROPROPENE	< 2.0
CARBON TETRACHLORIDE	< 2.0	METHYLENE CHLORIDE	< 3.0
CHLOROBENZENE	< 2.0	1,1,2,2 TETRACHLOROETHANE	< 2.0
CHLORODIBROMOMETHANE	< 2.0	TETRACHLOROETHYLENE	< 2.0
CHLOROETHANE	< 2.0	1,2 TRANS DICHLOROETHYLENE	2.3
2-CHLOROETHYLVINYL ETHER	< 2.0	1,1,1 TRICHLOROETHANE	2.5
CHLOROFORM	< 2.0	1,1,2 TRICHLOROETHANE	< 2.0
DICHLOROBROMOMETHANE	< 2.0	TRICHLOROETHYLENE	37
DICHLORODIFLUOROMETHANE	< 4.0	TRICHLOROFLUOROMETHANE	< 3.0
1,2-DICHLOROBENZENE	< 3.0	VINYL CHLORIDE	< 4.0
1,3-DICHLOROBENZENE	< 3.0		
1,4-DICHLOROBENZENE	< 3.0	BENZENE	< 2
1,1-DICHLOROETHANE	< 2.0	TOLUENE	< 2
1,2-DICHLOROETHANE	< 2.0	ETHYL BENZENE	< 2
1,1-DICHLOROETHYLENE	< 2.0		
1,2-DICHLOROPROPANE	< 2.0	OTHER	
CHLOROMETHANE	< 4.0		

DETECTION LIMITS ARE INDICATED BY "LESS THAN" SIGNS

Approved By: Earl M. Hansen

Earl M. Hansen, Ph.D.
Manager
WESTON Analytical Laboratorie

DATE OF REPORT: August 16, 1985

ATA SUMMARY FOR: OLMSTEAD A.F.B.

AT SAMPLE COLLECTED: August 2, 1985

DATE RECEIVED: August 2, 1985

FW NO.: 8508-799-0090

DATE ANALYZED: August 12, 1985

H/A-9

AMPLE DESCRIPTION: PRODUCTION WELL 9

GC ANALYSIS
VOLATILE COMPOUNDS
EPA METHOD 601, 602

REPORTING UNITS: ug/L

BROMOMETHANE	< 4.0	1,3-TRANS DICHLOROPROPENE	< 6.0
BROMOFORM	< 8.0	1,3-CIS DICHLOROPROPENE	< 2.0
CARBON TETRACHLORIDE	2.0	METHYLENE CHLORIDE	< 3.0
CHLOROBENZENE	< 2.0	1,1,2,2 TETRACHLOROETHANE	< 2.0
CHLORODIBROMOMETHANE	< 2.0	TETRACHLOROETHYLENE	< 2.0
CHLOROETHANE	< 2.0	1,2 TRANS DICHLOROETHYLENE	< 2.0
2-CHLOROETHYLVINYL ETHER	< 2.0	1,1,1 TRICHLOROETHANE	< 2.0
ROFORM	< 2.0	1,1,2 TRICHLORDETHANE	< 2.0
DICHLOROBROMOMETHANE	< 2.0	TRICHLOROETHYLENE	< 2.0
DICHLORODIFLUOROMETHANE	< 4.0	TRICHLOROFLUOROMETHANE	< 3.0
1,2-DICHLOROBENZENE	< 3.0	VINYL CHLORIDE	< 4.0
1,3-DICHLOROBENZENE	< 3.0		
1,4-DICHLOROBENZENE	< 3.0	BENZENE	< 2
1,1-DICHLOROETHANE	< 2.0	TOLUENE	< 2
1,2-DICHLOROETHANE	< 2.0	ETHYL BENZENE	< 2
1,1-DICHLOROETHYLENE	< 2.0		
1,2-DICHLOROPROPANE	< 2.0	OTHER	
CHLOROMETHANE	< 4.0		

DETECTION LIMITS ARE INDICATED BY "LESS THAN" SIGNS

Approved By: Earl M. Hansen 830 1205

Earl M. Hansen, Ph.D.
Manager
WESTON Analytical Laboratorie

DATE OF REPORT: August 16, 1985

SUMMARY FOR: OLMSTEAD A.F.B.

DATE SAMPLE COLLECTED: August 2, 1985

DATE RECEIVED: August 2, 1985

DATE ANALYZED: August 12, 1985

R W NO.: 8508-799-0090 DUP.

H/A-9

SAMPLE DESCRIPTION: LAB DUPLICATE - PRODUCTION WELL 9

GC ANALYSIS
VOLATILE COMPOUNDS
EPA METHOD 601, 602

REPORTING UNITS: ug/L

BROMOMETHANE	< 4.0	1,3-TRANS DICHLOROPROPENE	< 6.0
ROMOFORM	< 8.0	1,3-CIS DICHLOROPROPENE	< 2.0
ARBON TETRACHLORIDE	2.0	METHYLENE CHLORIDE	< 3.0
HLOROBENZENE	< 2.0	1,1,2,2 TETRACHLOROETHANE	< 2.0
HLORODIBROMOMETHANE	< 2.0	TETRACHLOROETHYLENE	< 2.0
CHLOROETHANE	< 2.0	1,2 TRANS DICHLOROETHYLENE	< 2.0
HLOROETHYLVINYL ETHER	< 2.0	1,1,1 TRICHLOROETHANE	< 2.0
CHLOROFORM	< 2.0	1,1,2 TRICHLORDETHANE	< 2.0
ICHLOROBROMOMETHANE	< 2.0	TRICHLOROETHYLENE	< 2.0
DICHLORODIFLUOROMETHANE	< 4.0	TRICHLOROFLUOROMETHANE	< 3.0
1,2-DICHLOROBENZENE	< 3.0	VINYL CHLORIDE	< 4.0
1,3-DICHLOROBENZENE	< 3.0		
1,4-DICHLOROBENZENE	< 3.0	BENZENE	< 2
1,1-DICHLOROETHANE	< 2.0	TOLUENE	< 2
1,2-DICHLOROETHANE	< 2.0	ETHYL BENZENE	< 2
1,1-DICHLOROETHYLENE	< 2.0		
1,2-DICHLOROPROPANE	< 2.0	OTHER	
CHLOROMETHANE	< 4.0		

DETECTION LIMITS ARE INDICATED BY "LESS THAN" SIGNS

Approved By: Earl M. Hansen

Earl M. Hansen, Ph.D.
Manager
WESTON Analytical Laboratori

DATE OF REPORT: August 16, 1985

DATA SUMMARY FOR: OLMSTEAD A.F.B.

DATE SAMPLE COLLECTED: August 1, 1985

DATE RECEIVED: August 2, 1985

RFW NO.: 8508-795-0170

DATE ANALYZED: August 8, 1985

HIA-11

SAMPLE DESCRIPTION: WELL #11

GC ANALYSIS
VOLATILE COMPOUNDS
EPA METHOD 601, 602

REPORTING UNITS: ug/L

BROMOMETHANE	< 4.0	1,3-TRANS DICHLOROPROPENE	< 6.0
BROMOFORM	< 8.0	1,3-CIS DICHLOROPROPENE	< 2.0
CARBON TETRACHLORIDE	< 2.0	METHYLENE CHLORIDE	< 3.0
CHLOROBENZENE	< 2.0	1,1,2,2 TETRACHLOROETHANE	< 2.0
CHLORODIBROMOMETHANE	< 2.0	TETRACHLOROETHYLENE	14
CHLOROETHANE	< 2.0	1,2 TRANS DICHLOROETHYLENE	< 2.0
2-CHLOROETHYLVINYL ETHER	< 2.0	1,1,1 TRICHLOROETHANE	< 2.0
ROFORM	< 2.0	1,1,2 TRICHLORODETHANE	< 2.0
DICHLOROBROMOMETHANE	< 2.0	TRICHLOROETHYLENE	2.6
DICHLORODIFLUOROMETHANE	< 4.0	TRICHLOROFLUOROMETHANE	< 3.0
1,2-DICHLOROBENZENE	< 3.0	VINYL CHLORIDE	< 4.0
1,3-DICHLOROBENZENE	< 3.0		
1,4-DICHLOROBENZENE	< 3.0	BENZENE	< 2
1,1-DICHLOROETHANE	< 2.0	TOLUENE	< 2
1,2-DICHLOROETHANE	< 2.0	ETHYL BENZENE	< 2
1,1-DICHLOROETHYLENE	< 2.0		
1,2-DICHLOROPROPANE	< 2.0	OTHER	
CHLOROMETHANE	< 4.0		

DETECTION LIMITS ARE INDICATED BY "LESS THAN" SIGNS

AR301207

Approved By: Earl M. Hansen

Earl M. Hansen, Ph.D.
Manager
WESTON Analytical Laboratorie

DATE OF REPORT: August 16, 1985

DATA SUMMARY FOR: OLMSTEAD A.F.B.

DATE SAMPLE COLLECTED: August 1, 1985

DATE RECEIVED: August 2, 1985

DATE ANALYZED: August 8, 1985

REW NO.: 8508-795-0160 H/A-13

SAMPLE DESCRIPTION: WELL #13

GC ANALYSIS
VOLATILE COMPOUNDS
EPA METHOD 601, 602

REPORTING UNITS: ug/L

BROMOMETHANE	< 4.0	1,3-TRANS DICHLOROPROPENE	< 6.0
BROMOFORM	< 8.0	1,3-CIS DICHLOROPROPENE	< 2.0
CARBON TETRACHLORIDE	< 2.0	METHYLENE CHLORIDE	< 3.0
CHLOROBENZENE	< 2.0	1,1,2,2 TETRACHLOROETHANE	< 2.0
CHLORODIBROMOMETHANE	< 2.0	TETRACHLOROETHYLENE	8.4
CHLOROETHANE	< 2.0	1,2 TRANS DICHLOROETHYLENE	54
2-CHLOROETHYLVINYL ETHER	< 2.0	1,1,1 TRICHLOROETHANE	< 2.0
CHLOROFORM	< 2.0	1,1,2 TRICHLORDETHANE	< 2.0
DICHLOROBROMOMETHANE	< 2.0	TRICHLOROETHYLENE	11
DICHLORODIFLUOROMETHANE	< 4.0	TRICHLOROFLUOROMETHANE	< 3.0
1,2-DICHLOROBENZENE	< 3.0	VINYL CHLORIDE	< 4.0
1,3-DICHLOROBENZENE	< 3.0		
1,4-DICHLOROBENZENE	< 3.0	BENZENE	< 2
1,1-DICHLOROETHANE	2.3	TOLUENE	< 2
1,2-DICHLOROETHANE	< 2.0	ETHYL BENZENE	< 2
1,1-DICHLOROETHYLENE	< 2.0		
1,2-DICHLOROPROPANE	< 2.0	OTHER	
METHYLCHLOROMETHANE	< 4.0		

DETECTION LIMITS ARE INDICATED BY "LESS THAN" SIGNS

Approved By: Earl M. Hansen AR301208

Earl M. Hansen, Ph.D.
Manager
WESTON Analytical Laboratories

AR301208

DATE OF REPORT: August 16, 1985

SUMMARY FOR: OLMSTEAD A.F.B.

DATE SAMPLE COLLECTED: August 2, 1985

DATE RECEIVED: August 2, 1985

DATE ANALYZED: August 12, 1985

RFW NO.: 8508-799-0070

SAMPLE DESCRIPTION: FIELD BLANK

GC ANALYSIS
VOLATILE COMPOUNDS
EPA METHOD 601, 602

REPORTING UNITS: ug/L

BROMOMETHANE	< 4.0
BROMOFORM	< 8.0
CARBON TETRACHLORIDE	2.0
CHLOROBENZENE	< 2.0
CHLORODIBROMOMETHANE	< 2.0
CHLOROETHANE	< 2.0
2-CHLOROETHYLVINYL ETHER	< 2.0
CHLOROFORM	5.5
DICHLOROBROMOMETHANE	< 2.0
DICHLORODIFLUOROMETHANE	< 4.0
1,2-DICHLOROBENZENE	< 3.0
1,3-DICHLOROBENZENE	< 3.0
1,4-DICHLOROBENZENE	< 3.0
1,1-DICHLOROETHANE	< 2.0
1,2-DICHLOROETHANE	< 2.0
1,1-DICHLOROETHYLENE	< 2.0
1,2-DICHLOROPROPANE	< 2.0
CHLOROMETHANE	< 4.0

1,3-TRANS DICHLOROPROPENE	< 6.0
1,3-CIS DICHLOROPROPENE	< 2.0
METHYLENE CHLORIDE	3.6
1,1,2,2 TETRACHLOROETHANE	< 2.0
TETRACHLOROETHYLENE	< 2.0
1,2 TRANS DICHLOROETHYLENE	< 2.0
1,1,1 TRICHLOROETHANE	< 2.0
1,1,2 TRICHLORODETHANE	< 2.0
TRICHLOROETHYLENE	< 2.0
TRICHLOROFLUOROMETHANE	< 3.0
VINYL CHLORIDE	< 4.0
BENZENE	< 2
TOLUENE	< 2
ETHYL BENZENE	< 2
OTHER	

DETECTION LIMITS ARE INDICATED BY "LESS THAN" SIGNS

Approved By: Earl M. Hansen 8/30/85

Earl M. Hansen, Ph.D.
Manager
WESTON Analytical Laboratori.

AR301209

DATE OF REPORT: August 16, 1985

TA SUMMARY FOR: OLMSTEAD A.F.B.

SAMPLE COLLECTED: July 31, 1985

DATE RECEIVED: August 2, 1985

DATE ANALYZED: August 8, 1985

FW NO.: 8508-795-0090

MPLE DESCRIPTION: FIELD BLANK

GC ANALYSIS
VOLATILE COMPOUNDS
EPA METHOD 601, 602

REPORTING UNITS: ug/L

OMOMETHANE	< 4.0	1,3-TRANS DICHLOROPROPENE	< 6.0
BROMOFORM	< 8.0	1,3-CIS DICHLOROPROPENE	< 2.0
RBON TETRACHLORIDE	< 2.0	METHYLENE CHLORIDE	< 3.0
CHLOROBENZENE	< 2.0	1,1,2,2 TETRACHLOROETHANE	< 2.0
LORODIBROMOMETHANE	< 2.0	TETRACHLOROETHYLENE	< 2.0
CHLOROETHANE	< 2.0	1,2 TRANS DICHLOROETHYLENE	< 2.0
CHLOROETHYLVINYL ETHER	< 2.0	1,1,1 TRICHLOROETHANE	< 2.0
JROFORM	4.9	1,1,2 TRICHLORDETHANE	< 2.0
ICHLOROBROMOMETHANE	< 2.0	TRICHLOROETHYLENE	< 2.0
ICHLORODIFLUOROMETHANE	< 4.0	TRICHLOROFLUOROMETHANE	< 3.0
1,2-DICHLOROBENZENE	< 3.0	VINYL CHLORIDE	< 4.0
,3-DICHLOROBENZENE	< 3.0		
1,4-DICHLOROBENZENE	< 3.0	BENZENE	< 2
,1-DICHLOROETHANE	< 2.0	TOLUENE	< 2
1,2-DICHLOROETHANE	< 2.0	ETHYL BENZENE	< 2
,1-DICHLOROETHYLENE	< 2.0		
,2-DICHLOROPROPANE	< 2.0	OTHER	
HLOROMETHANE	< 4.0		

DETECTION LIMITS ARE INDICATED BY "LESS THAN" SIGNS.

Approved By: Earl M. Hansen

Earl M. Hansen
Manager
WESTON Analytical Laboratorie

AR301210

AR301210

DATE OF REPORT: August 16, 1985

DATA SUMMARY FOR: OLMSTEAD A.F.B.

DA. SAMPLE COLLECTED: DNA

DATE RECEIVED: DNA

CFW NO.: 8508-795/

DATE ANALYZED: August 8, 1985

SAMPLE DESCRIPTION: LAB BLANK

GC ANALYSIS
VOLATILE COMPOUNDS
EPA METHOD 601, 602

REPORTING UNITS: ug/L

BROMOMETHANE	< 4.0	1,3-TRANS DICHLOROPROPENE	< 6.0
BROMOFORM	< 8.0	1,3-CIS DICHLOROPROPENE	< 2.0
CARBON TETRACHLORIDE	< 2.0	METHYLENE CHLORIDE	< 3.0
CHLOROBENZENE	< 2.0	1,1,2,2 TETRACHLOROETHANE	< 2.0
CHLORODIBROMOMETHANE	< 2.0	TETRACHLOROETHYLENE	< 2.0
CHLOROETHANE	< 2.0	1,2 TRANS DICHLOROETHYLENE	< 2.0
2-CHLOROETHYLVINYL ETHER	< 2.0	1,1,1 TRICHLOROETHANE	< 2.0
CHLOROFORM	< 2.0	1,1,2 TRICHLORDETHANE	< 2.0
DICHLOROBROMOMETHANE	< 2.0	TRICHLOROETHYLENE	< 2.0
DICHLORODIFLUOROMETHANE	< 4.0	TRICHLOROFLUOROMETHANE	< 3.0
1,2-DICHLOROBENZENE	< 3.0	VINYL CHLORIDE	< 4.0
1,3-DICHLOROBENZENE	< 3.0		
1,4-DICHLOROBENZENE	< 3.0	BENZENE	< 2
1,1-DICHLOROETHANE	< 2.0	TOLUENE	< 2
1,2-DICHLOROETHANE	< 2.0	ETHYL BENZENE	< 2
1,1-DICHLOROETHYLENE	< 2.0		
1,2-DICHLOROPROPANE	< 2.0	OTHER	
CHLOROMETHANE	< 4.0		

DETECTION LIMITS ARE INDICATED BY "LESS THAN" SIGNS

Approved By: Earl M. Hansen

AR301211

Earl M. Hansen, Ph.D.
Manager
WESTON Analytical Laboratorie

AR301211

DATE OF REPORT: August 16, 1985

DATA SUMMARY FOR: OLMSTEAD A.F.B.

DATE SAMPLE COLLECTED: DNA

DATE RECEIVED: DNA

REW NO.: 8508-795/SPIKE

DATE ANALYZED: August 8, 1985

SAMPLE DESCRIPTION: LAB BLANK SPIKE

GC ANALYSIS
VOLATILE COMPOUNDS
EPA METHOD 601, 602

REPORTING UNITS: ug/L

BROMOMETHANE	< 4.0	1,3-TRANS DICHLOROPROPENE	< 6.0
BROMOFORM	< 8.0	1,3-CIS DICHLOROPROPENE	< 2.0
CARBON TETRACHLORIDE	< 2.0	METHYLENE CHLORIDE	< 3.0
CHLOROBENZENE	< 2.0	1,1,2,2 TETRACHLOROETHANE	< 2.0
CHLORODIBROMOMETHANE	< 2.0	TETRACHLOROETHYLENE	< 2.0
CHLOROETHANE	< 2.0	1,2 TRANS DICHLOROETHYLENE	< 2.0
2-CHLOROETHYLVINYL ETHER	< 2.0	1,1,1 TRICHLOROETHANE	< 2.0
CHLOROFORM	< 2.0	1,1,2 TRICHLOROETHANE	< 2.0
DICHLOROBROMOMETHANE	< 2.0	TRICHLOROETHYLENE*	83% RECOVERY
DICHLORODIFLUOROMETHANE*	93% RECOVERY	TRICHLOROFLUOROMETHANE	< 3.0
1,2-DICHLOROBENZENE	< 3.0	VINYL CHLORIDE	< 4.0
1,3-DICHLOROBENZENE	< 3.0		
1,4-DICHLOROBENZENE	< 3.0	BENZENE	< 2
1,1-DICHLOROETHANE	< 2.0	TOLUENE	< 2
1,2-DICHLOROETHANE	< 2.0	ETHYL BENZENE	< 2
1,1-DICHLOROETHYLENE	< 2.0		
1,2-DICHLOROPROPANE	< 2.0	OTHER	
CHLOROMETHANE	< 4.0		

DETECTION LIMITS ARE INDICATED BY "LESS THAN" SIGNS

* = SPIKED COMPOUND .

Approved By:

Earl M. Hansen, Ph.D.
Manager
WESTON Analytical Laboratori.

ATA SUMMARY FOR: OLMSTEAD A.F.B.

SAMPLE COLLECTED: DNA

DATE RECEIVED: DNA

DATE ANALYZED: August 12, 1985

LFW NO.: 8508-799/

SAMPLE DESCRIPTION: LAB BLANK

GC ANALYSIS
VOLATILE COMPOUNDS
EPA METHOD 601, 602

REPORTING UNITS: ug/L

BROMOMETHANE	< 4.0	1,3-TRANS DICHLOROPROPENE	< 6.0
BROMOFORM	< 8.0	1,3-CIS DICHLOROPROPENE	< 2.0
CARBON TETRACHLORIDE	2.0	METHYLENE CHLORIDE	< 3.0
CHLOROBENZENE	< 2.0	1,1,2,2 TETRACHLOROETHANE	< 2.0
CHLORODIBROMOMETHANE	< 2.0	TETRACHLOROETHYLENE	< 2.0
CHLOROETHANE	< 2.0	1,2 TRANS DICHLOROETHYLENE	< 2.0
2-CHLOROETHYLVINYL ETHER	< 2.0	1,1,1 TRICHLOROETHANE	< 2.0
_OROFORM	< 2.0	1,1,2 TRICHLORDETHANE	< 2.0
DICHLOROBROMOMETHANE	< 2.0	TRICHLOROETHYLENE	< 2.0
DICHLORODIFLUOROMETHANE	< 4.0	TRICHLOROFLUOROMETHANE	< 3.0
1,2-DICHLOROBENZENE	< 3.0	VINYL CHLORIDE	< 4.0
1,3-DICHLOROBENZENE	< 3.0		
1,4-DICHLOROBENZENE	< 3.0	BENZENE	< 2
1,1-DICHLOROETHANE	< 2.0	TOLUENE	< 2
1,2-DICHLOROETHANE	< 2.0	ETHYL BENZENE	< 2
1,1-DICHLOROETHYLENE	< 2.0		
1,2-DICHLOROPROPANE	< 2.0	OTHER	
CHLOROMETHANE	< 4.0		

DETECTION LIMITS ARE INDICATED BY "LESS THAN" SIGNS

Approved By: Earl M. Hansen

AR301213

Earl M. Hansen, Ph.D.
Manager
WESTON Analytical Laborator

AR301213

DATE OF REPORT: August 16, 1985

DATA SUMMARY FOR: OLMSTEAD A.F.B.

DATE SAMPLE COLLECTED: DNA

DATE RECEIVED: DNA

DATE ANALYZED: August 12, 1985

RUN NO.: 8508-799/SPIKE

SAMPLE DESCRIPTION: BLANK SPIKE

GC ANALYSIS
VOLATILE COMPOUNDS
EPA METHOD 601, 602

REPORTING UNITS: ug/L

BROMOMETHANE	< 4.0	1,3-TRANS DICHLOROPROPENE	< 6.0
BROMOFORM	< 8.0	1,3-CIS DICHLOROPROPENE	< 2.0
CARBON TETRACHLORIDE	2.0	METHYLENE CHLORIDE	< 3.0
CHLOROBENZENE	< 2.0	1,1,2,2 TETRACHLOROETHANE	< 2.0
CHLORODIBROMOMETHANE	< 2.0	TETRACHLOROETHYLENE	< 2.0
CHLOROETHANE	< 2.0	1,2 TRANS DICHLOROETHYLENE	< 2.0
CHLOROETHYLVINYL ETHER	< 2.0	1,1,1 TRICHLOROETHANE	< 2.0
CHLOROFORM *	120% RECOVERY	1,1,2 TRICHLORDETHANE	< 2.0
DICHLOROBROMOMETHANE	< 2.0	TRICHLOROETHYLENE*	97% RECOVER
DICHLORODIFLUOROMETHANE	< 4.0	TRICHLOROFLUOROMETHANE	< 3.0
1,2-DICHLOROBENZENE	< 3.0	VINYL CHLORIDE	< 4.0
1,3-DICHLOROBENZENE *	118% RECOVERY		
1,4-DICHLOROBENZENE	< 3.0	BENZENE	< 2
1,1-DICHLOROETHANE	< 2.0	TOLUENE	< 2
1,2-DICHLOROETHANE	< 2.0	ETHYL BENZENE	< 2
1,1-DICHLOROETHYLENE	< 2.0		
1,2-DICHLOROPROPANE	< 2.0	OTHER	
CHLOROMETHANE	< 4.0		

* = SPIKED COMPOUND .

DETECTION LIMITS ARE INDICATED BY "LESS THAN" SIGNS

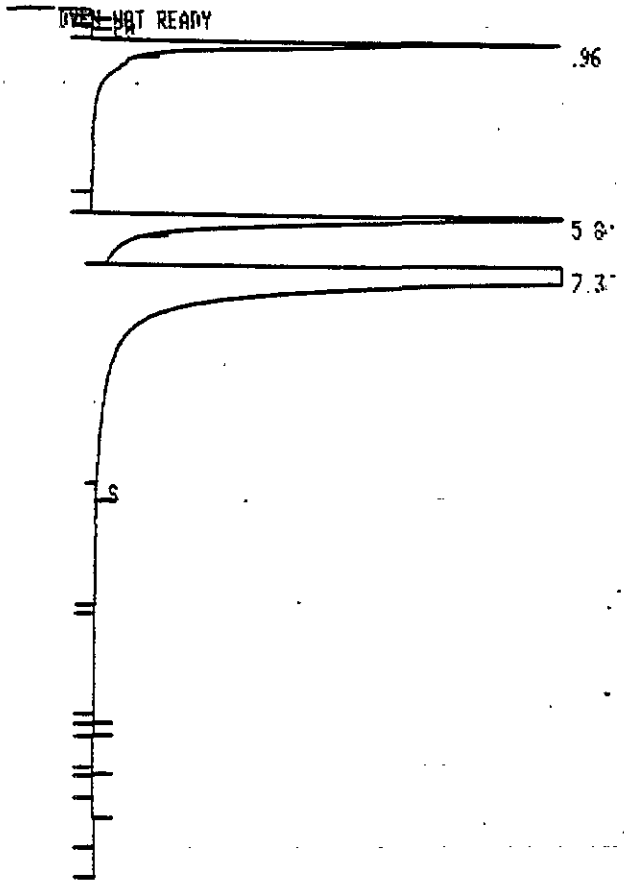
AR301214

Approved By: Earl M. Hansen

Earl M. Hansen, Ph.D.
Manager
WESTON Analytical Laboratory

Second Column Confirmation

GC Analysis
Volatile Compounds
EPA Method 601, 602



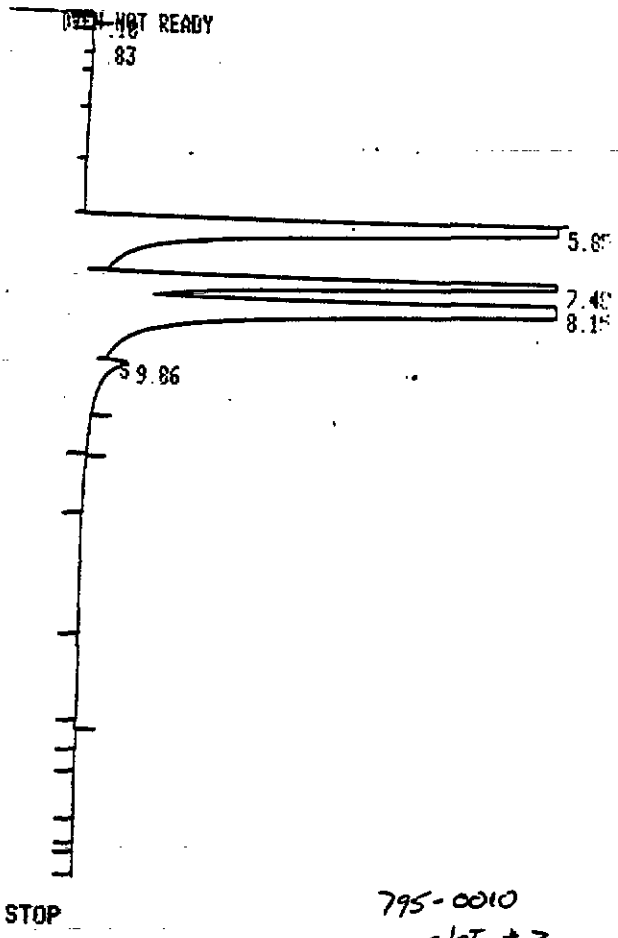
Chloroform

RUN # 421 OCT/14/85 18:37:1

AREA%

RT	AREA	TYPE	AR/HT	AREA
0.96	1.1058E+07	PB	0.168	4.6
5.84	1.8545E+07	PB	0.215	7.8
7.36	2.0671E+08	↑SBB	0.407	87.4

TOTAL AREA= 2.3632E+08
MUL FACTOR= 1.0000E+00



795-0010
slot #3

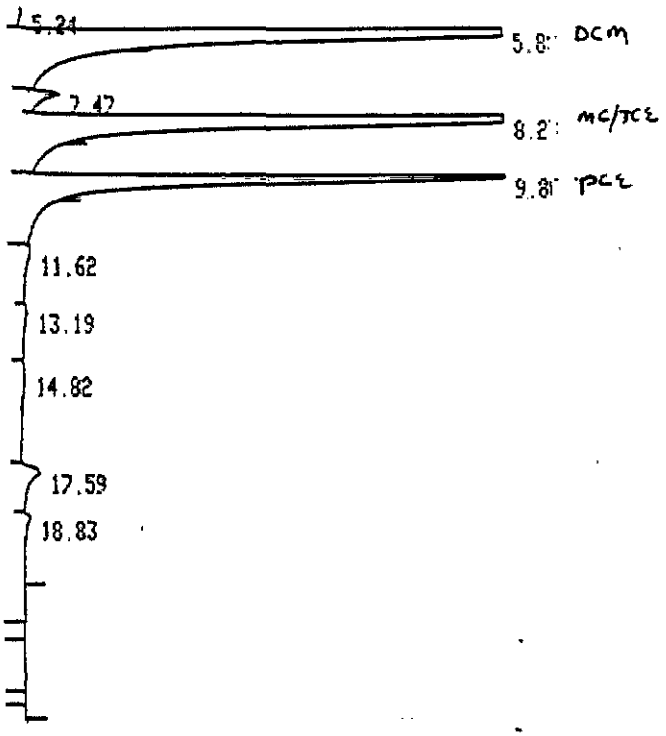
RUN # 428 OCT/15/85 09:57:5

AREA%

RT	AREA	TYPE	AR/HT	AREA
0.18	17787	BB	0.056	0.0
0.83	54431	PV	0.328	0.0
5.85	5.3759E+07	PB	0.224	26.8
7.48	2.7435E+07	BH	0.253	13.7
8.15	1.1824E+08	↑SHB	0.244	59.0
9.86	695030	BB	0.279	0.3

TOTAL AREA= 2.0026E+08
MUL FACTOR= 1.0000E+00

AR301216



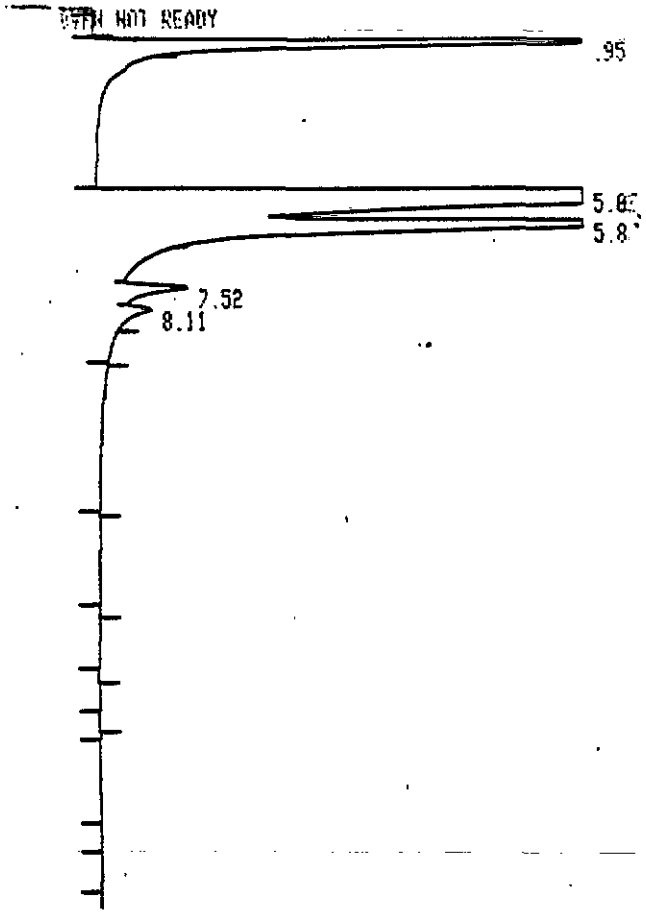
STOP

RUN # 419 OCT/14/85 17:40:1

AREA%

RT	AREA	TYPE	AR/HT	AREA
1.81	1.7578E+07	PB	0.150	16.5
2.64	314448	BP	0.352	0.2
3.81	210130	PP	0.446	0.1
5.24	171798	PP	0.310	0.1
5.88	4.0471E+07	PB	0.196	38.0
7.47	666390	BP	0.241	0.6
8.23	2.9302E+07	PB	0.272	27.5
9.80	1.5508E+07	PB	0.240	14.5
11.62	75492	BP	0.220	0.0
13.19	195720	PP	0.533	0.1
14.82	144420	PP	0.522	0.1
17.59	1124700	PV	0.542	1.0
18.83	496980	VB	0.578	0.4

TAL AREA= 1.0626E+08
FACTOR= 1.0000E+00



STOP

Trans - 1,2-dichloroethene

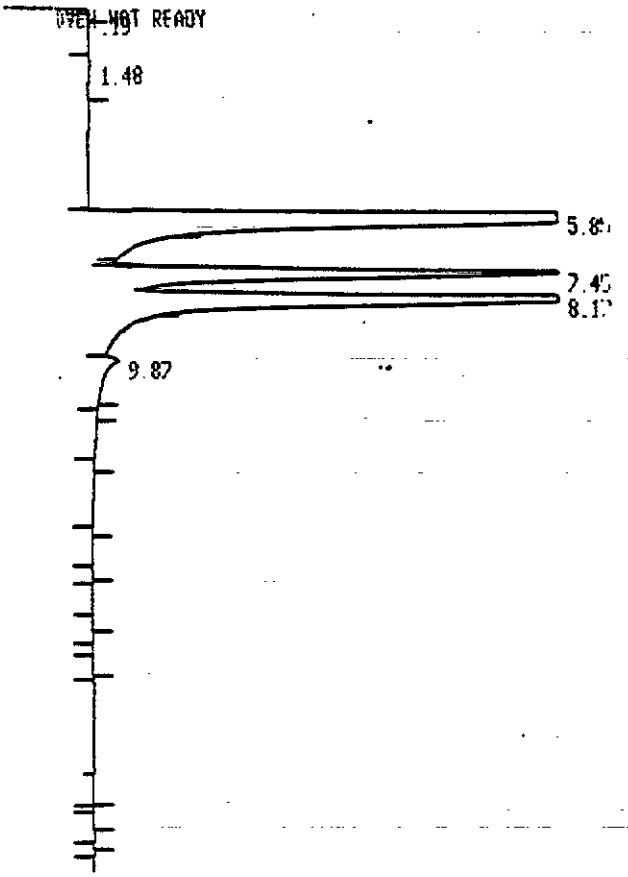
RUN # 420 OCT/14/85 18:08:

AREA%

RT	AREA	TYPE	AR/HT	AREA
0.95	1.7874E+07	PB	0.167	8.0
5.82	1.7214E+08	TSPB	0.344	77.9
5.83	2.7724E+07	TBB	0.214	12.5
7.52	1932700	TBV	0.265	0.8
8.11	1028800	TVB	0.301	0.4

TOTAL AREA= 2.2070E+08
NUL FACTOR= 1.0000E+00

AR301217



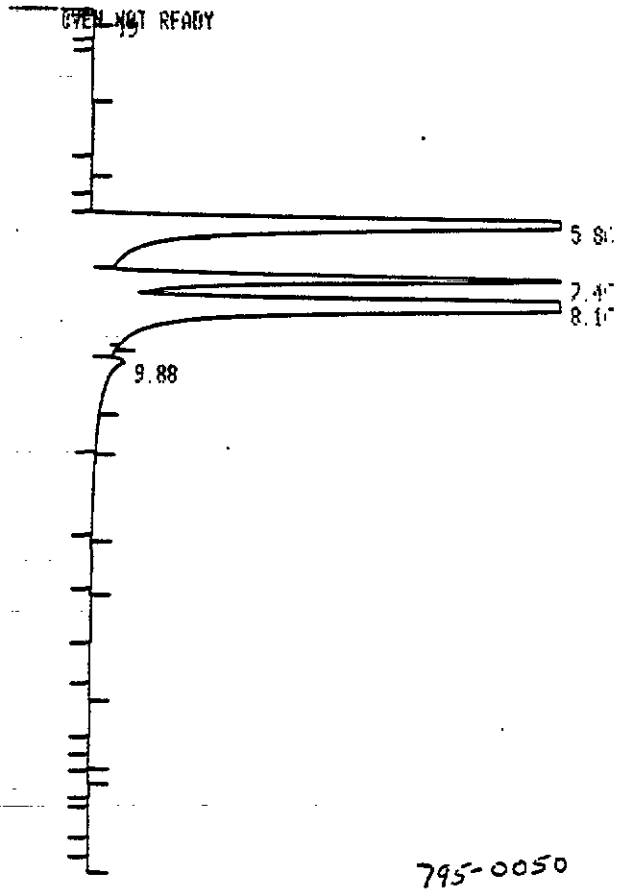
795-0040
slot #6

RUN # 431 OCT/15/85 11:24:

AREA%

RT	AREA	TYPE	AR/HT	AREA%
0.19	19083	BB	0.071	0.01
1.48	11861	BB	0.068	0.01
5.85	5.2851E+07	PB	0.227	52.57
7.45	1.5692E+07	PV	0.250	15.60
8.17	3.1488E+07	VB	0.226	31.31
9.87	488840	BB	0.326	0.49

TOTAL AREA= 1.0053E+08
MUL FACTOR= 1.0000E+00



795-0050
slot # 7

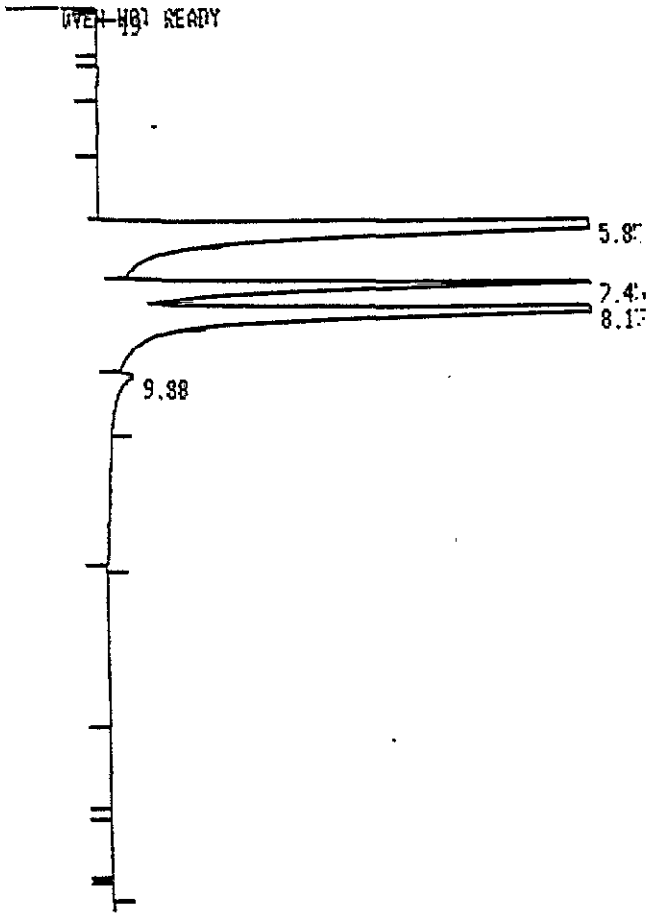
RUN # 432 OCT/15/85 11:53:

AREA%

RT	AREA	TYPE	AR/HT	AREA%
0.19	22022	BB	0.070	0.01
5.86	4.5200E+07	PB	0.217	30.89
7.46	1.5196E+07	PH	0.266	10.38
8.16	8.5816E+07	SHB	0.233	58.62
9.88	383750	BB	0.250	0.26

TOTAL AREA= 1.4662E+08
MUL FACTOR= 1.0000E+00

AR301218

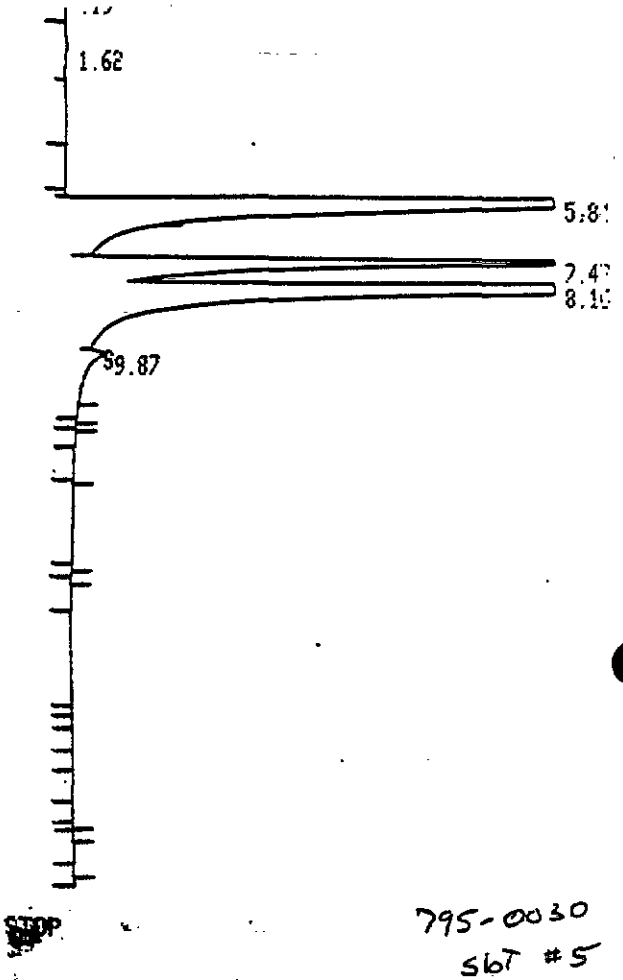


795-0020
slot #4

RUN # 429 OCT/15/85 10:26:4

RT	AREA	TYPE	AR/HT	AREA%
0.19	18701	PB	0.067	0.0
5.85	5.1321E+07	PB	0.224	50.64
7.45	1.4331E+07	PV	0.250	14.14
8.17	3.5206E+07	VB	0.215	34.7
9.88	460448	BB	0.298	0.4

TOTAL AREA= 1.0134E+08
MUL FACTOR= 1.0000E+00



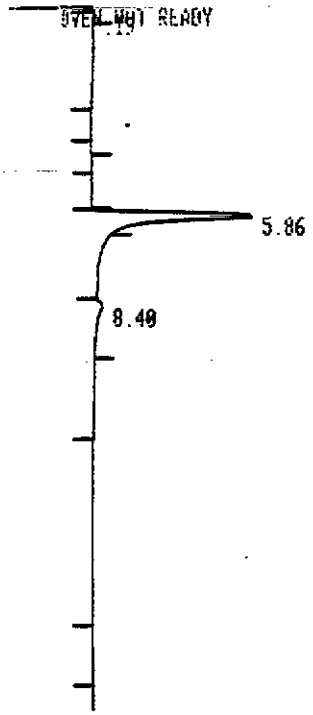
795-0030
slot #5

RUN # 430 OCT/15/85 10:55:

RT	AREA	TYPE	AR/HT	AREA%
0.19	31400	PB	0.071	0.02
1.62	216280	BB	0.584	0.13
5.84	5.0193E+07	PB	0.228	32.10
7.47	2.0883E+07	PH	0.259	13.3
8.16	8.4568E+07	SHB	0.234	54.0
9.87	453270	BB	0.277	0.29

TOTAL AREA= 1.5634E+08
MUL FACTOR= 1.0000E+00

AR301219



STOP

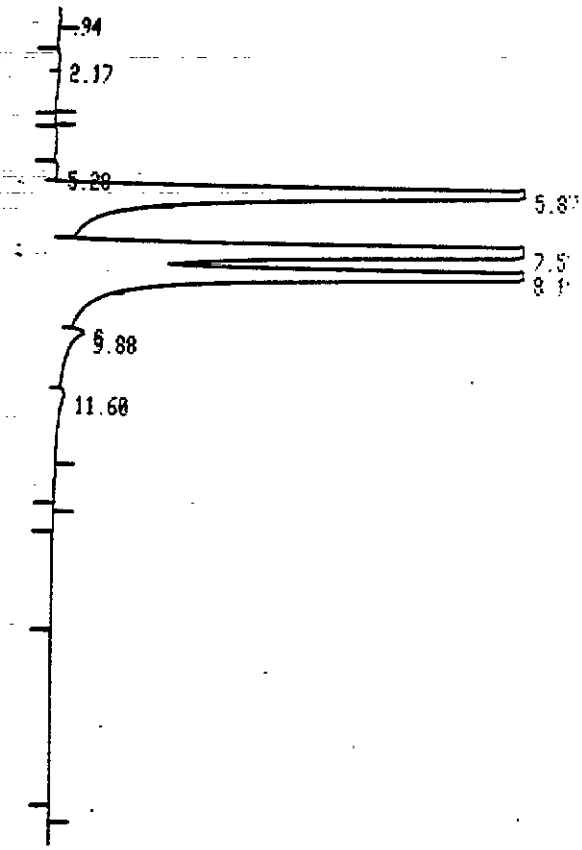
Blank
slot # 10

RUN # 435 OCT/15/85 13:19:[illegible]

AREA%

RT	AREA	TYPE	AR/HT	AREA%
0.19	18795	PB	0.078	0.41
5.86	4226200	PB	0.233	92.3[illegible]
8.40	330470	BB	0.436	7.2[illegible]

TOTAL AREA= 4575500
MUL FACTOR= 1.0000E+00



STOP

795-0080
Slot #1

RUN # 436 OCT/15/85 13:42:[illegible]

AREA%

RT	AREA	TYPE	AR/HT	AREA%
0.94	40956	PB	0.269	0.0[illegible]
2.17	140550	BV	0.363	0.0[illegible]
5.28	106840	PP	0.260	0.0[illegible]
5.87	4.2325E+07	PB	0.212	26.0[illegible]
7.50	8.2953E+07	SBB	0.249	50.9[illegible]
8.18	3.6425E+07	TBB	0.217	22.3[illegible]
9.88	406050	BP	0.264	0.2[illegible]
11.60	263540	PB	0.433	0.1[illegible]

TOTAL AREA= 1.6266E+08
MUL FACTOR= 1.0000E+00

AR301220