

NATIONAL BUREAU OF STANDARDS

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52

INSTALLATION RESTORATION PROGRAM PHASE II - CONFIRMATION/QUANTIFICATION STAGE 2

APPENDICES

FOR

TINKER AFB, OKLAHOMA

AIR FORCE LOGISTICS COMMAND WRIGHT-PATTERSON AFB, OHIO

OCTOBER, 1985

PREPARED BY

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CONTRACT NO. F33615-83-D-4001

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PREPARED FOR

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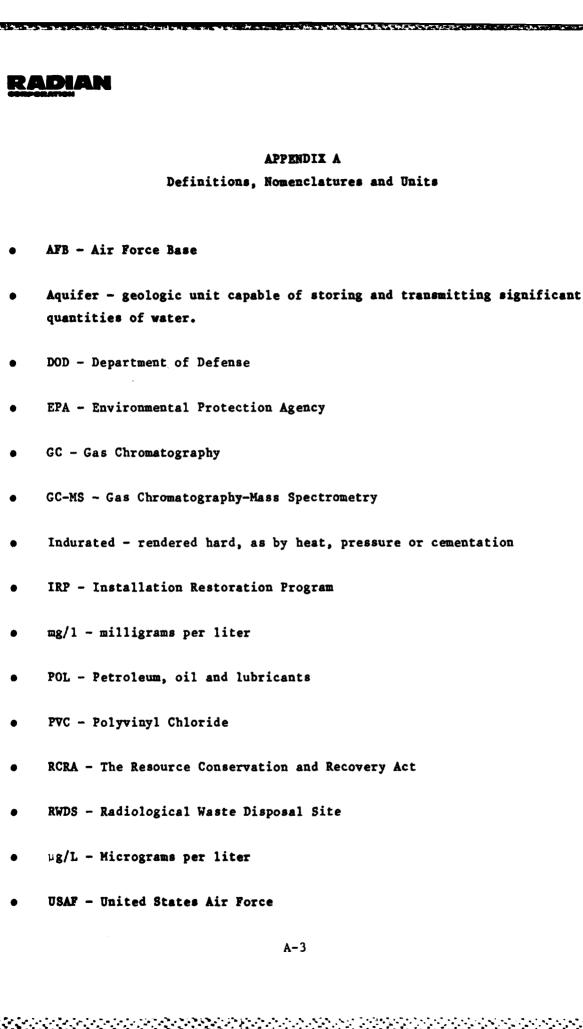
APPENDIX A Definitions, etc.

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APPENDIX B Scope of Work

84 Apr 16

Revision 1, 84 Aug 27

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INSTALLATION RESTORATION PROGRAM PHASE II, STAGE 2 FIELD INVESTIGATION TINKER AFB, OKLAHOMA

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I. DESCRIPTION OF WORK

The purpose of this task is to determine if environmental contamination has resulted from solvent storage and waste disposal practices at Tinker AFB OK; to provide estimates of the magnitude, extent and direction of movement of contamination should contamination be found; to identify potential environmental consequences of migrating pollutants, and to identify future monitoring efforts required to document conditions at Tinker AFB.

Ambient air monitoring of hazardous and/or toxic material and Air Force personnel shall be accomplished when necessary, especially during drilling operations.

The presurvey report (mailed under separate cover) and Phase I IRP report (mailed under separate cover) incorporated background and description of the sites for this task. To accomplish this investigation, the contractor shall take the following actions:

A. General

1. All water samples collected shall be analyzed on site by the contractor for pH, temperature and specific conductance. Sampling, maximum holding time and preservation of samples shall strictly comply with the following references: <u>Standard Methods for The Examination of Water and Wastewater</u>, 15th Ed. (1980), pp. 35-42; <u>ASTM</u>, Part 31, pp. 76-86, (1980), Method D-3370; and <u>Methods for Chemical Analysis of Waters and Wastes</u>, EPA Manual 600/4-79-020, pp. xiii to xix (1979). Minimum detection limits and methods for analysis are shown in Attachment 1.

2. All wells installed during this effort shall be constructed of Schedule 40 PVC casing and screen. Each well shall be completed to ten feet below the level of the aquifer to be monitored, and ten feet of screen shall be set. Each well shall be provided with a surface grout seal, protective steel casing with locking cap and three guard posts placed radially away from the well.

a. Shallow wells shall be installed into the first water bearing zone encountered (average depth, 30 feet). Well casing and screen shall be 2" ID PVC; wells shall be installed using hollow-stem auger drilling techniques.

b. Deep wells shall be installed into the first significant saturated sandstone body encountered (average depth, 100 feet). Well casing and screen shall be 4" ID PVC; wells shall be installed using air-rotary drilling techniques.

c. Total footage of wells installed shall not exceed 1190 linear feet.

3. All contractor installed wells shall be developed, water levels measured and locations recorded on a project map and specific site maps. * Changes are underscored.

4. Field data collected for each site shall be plotted and mapped. The nature, magnitude and potential for contaminant flow within each zone to receiving streams and groundwaters shall be estimated. Upon completion of the sampling and analysis, the data shall be tabulated in the next R&D Status report as specified in Item VI.

B. In addition to items delineated in A above, conduct the following specific actions at sites identified on Tinker AFB:

1. Buried Tanks and Pits (Bldg 3001)

a. Inventory past and present industrial operations to locate any buried storage tanks or pits within a quarter-mile radius around Bldg 3001. To perform the inventory, the contractor shall:

(1) review available Air Force records;

and,

(2) interview appropriate Tinker Air Force Base personnel;

(3) conduct a detailed surface inspection tour. No tanks or pits shall be entered or sampled.

b. Provide the results of this inventory, with summary of findings and recommendations for future work, in the final report specified in Item VI.

2. Base Water Supply Wells

a. Measure depth to water in each available (27) base water supply wells, after a shutdown of 2-4 days for equilibration. Wells shall be shutdown and measured in blocks; the shutdown shall be coordinated with the contractor, but shall be performed by Tinker AFB personnel (included in Base Support, Item III).

b. Determine the elevation of the piezometric surface and the local direction(s) of groundwater flow in the regional aquifer based on the depth-to-water measurements. Provide the depth-to-water data in the next R&D status report as specified in Item VI.

c. Compile an inventory of all public and private wells in the vicinity of the eastern boundary of Tinker AFB based on data available from the State of Oklahoma. The contractor shall obtain these data from the state. Water pumping rates and static depth to water, where available, shall also be used in the calculation specified in I.B.2(b) above.

3. Landfill Six

a. Install three shallow and four deep monitor wells in the vicinity of Landfill Six. The shallow wells shall be installed along the northern boundary of the base (below toe of landfill); the deep wells shall be installed around the private well located north of the landfill (information on private well provided under separate cover).

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b. Sample each well twice for Volatile Organic Halogens (14 analyses). Sample each well once for Volatile Organic Compounds (VOC) and Base/Neutrals and Acid Extractable (BNE) compounds (7 analyses each for VOC and BNE).

c. Collect and analyze one groundwater sample from monitor well #2A south of Landfill 6. The water sample shall be analyzed for purgeable Halocarbons using EPA Method 601. The contractor shall use the detection limits as specified by the method.

4. Radioactive Waste Disposal Sites

Conduct a geophysical investigation, using a magnetometer or equivalent technique to determine the exact location of the radioactive waste disposed at sites (EWDS) 1022E and 62598. Site RWDS 62598 contains a "lead still" made of sheet lead and is located south of Facility 1025 and north of Crutcho Creek (See Attachment 2). Site RWDS 1022E contains approximately 8-10 lead pigs containing low-level radioactive materials and is located adjacent to the northwest corner of Landfill No.3 south of West Crutcho Creek (See Attachment 2).

5. Building 3001

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a. Install seven deep monitor wells in the vicinity of Bldg 3001 between the building and the eastern base boundary. Three wells shall be installed along East Drive; four wells shall be installed along Douglas Boulevard.

b. Sample each well twice for Volatile Organic Halogens (14 analyses). Sample each well once for VOC and BNE compounds (7 analyses each).

6. Stream Sediment Study

a. Collect stream sediment samples at 24 locations on Tinker AFB as shown in Attachment 2.

b. Analyze the sediment samples for the parameters shown in Attachment 3.

C. Set up and drilling at site Landfill Six shall not proceed until written authorization is forwarded to the contractor by the PCO or his/her representative. The reason for this is that appropriate Tinker AFB personnel are in the process of obtaining the required permit(s) to drill on this non Air Force Property.

D. Data Review

Results of sampling and analysis shall be tabulated and incorporated in the Informal Technical Information report (Sequence 3 Attachment 1, and Sequence 2 Attachment 3 as reflected in Item VI below) and forwarded to USAF OEHL/TS for review. Results shall also be forwarded as available in the next monthly R&D status report.

E. Reporting

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1. A draft report delineating all findings of this field investigation shall be prepared and forwarded to the USAF OEHL as specified in Item VI below for Air Force review and comment. This report shall include a discussion of the regional hydrogeology; well logs of all project wells; data from water level surveys; water and stream sediment analysis results; well, pit and tank inventories; available geohydrologic cross sections; groundwater surface and gradient vector maps; and Laboratory quality assurance information. The report shall follow the USAF OEHL supplied format (mailed under separate cover).

2. Estimates shall be made of the magnitude, extent and direction of movement of contaminants discovered. Potential environmental consequences of discovered contamination, where known, must be identified.

3. Specific requirements, if any, for future groundwater and surface water monitoring must be identified.

F. Meetings

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Two of the contractor's Senior personnel shall meet with Air Force and/or state, county or federal officials on two occasions for 16 hours each to present and discuss the results of this investigation. Meetings will be held at Tinker AFB, on dates to be established later.

II. SITE LOCATION AND DATES

Tinker AFB OK USAF Clinic/SGB Dates to be established

III. BASE SUPPORT: Tinker AFB will provide the following base support for these sites:

A. Buried Tanks and Pits

1. Provide relevant installation records and access to, or support of, reproduction services.

2. Schedule interviews with appropriate base personnel and provide escort for industrial areas.

B. Base Water Supply Wells

1. Schedule and execute 2-4 day shutdown of blocks of base water supply wells. This will incur minimal effect on base water supply.

2. Provide wellhead elevation data of each base water supply well. If data is not available, base will obtain such data by surveying.

C. Landfill 6

1. Provide required surveying to determine relative elevations of monitor wells.

2. Provide cuttings removal and drill site cleanup, including packaging when required.

D. Bldg 3001

1. Provide advance drill site clearance for selected locations.

2. Provide temporary construction barriers and parking/traffic control support for wells sited in parking lots and/or roadways.

3. Provide required surveying to determine relative elevations of monitor wells.

4. Provide cuttings removal and drill site cleanup, including packaging when required.

IV. GOVERNMENT FURNISHED PROPERTY: None

V. GOVERNMENT POINTS OF CONTACT

- 1. Capt Robart Bauer2. Col Harry RussellUSAF OEHL/TSHQ AFLC/SGPBBrooks AFB TX 78235Wright-Patterson AFB OH 45433(512) 536-2158(513) 257-6210AV 240-2158AV 787-6210
 - 3. Capt Darrel Cornell USAF Hospital/SGB Tinker AFB OK 73145 (405) 734-7844 AV 735-7844

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VI. In addition to sequence numbers 1, 5 and 10 which are applicable to all orders, the reference numbers below are applicable to this order. Also shown are data applicable to this order.

Sequence No.	Block 10	Block 11	Block 12	Block 13	Block 14
Attachment 1					
4 3	ONE/R ONE/T	84 NOV 05	84 NOV 19	85 FEB 18	• 2
Attachment 3					
2	ON E/T	**	**		2

*A minimum of two draft reports will be required. After incorporating Air Force comments concerning the first draft report, the contractor shall supply the USAF OEHL with a second draft report. The report shall be forwarded to the applicable regulatory agencies for their comments. Contractor shall supply the USAF OEHL with 25 copies of each draft report and 50 copies plus the original camera ready copy of the final report.

**Upon completion of analysis.

Attachment 1

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Analytical Methods and Required Detection Limits (For Water Unless Otherwise Shown)

Parameter	Method	Detection Limit
Arsenic	EPA 206.2	10 µg/L (1.0 µg/g, sediment)
Barium	EPA 208.2	200 μg/L (20 μg/g, sediment)
Cadmium	EPA 213.2	10 μ g/L (1.0 μ g/g, sediment)
Chromium	EPA 218.1	50 μ g/L (5.0 μ g/g, sediment)
Lead	EPA 239.2	20 μ g/L (2.0 μ g/g, sediment)
Mercury	EPA 245.1	$1 \ \mu g/L \ (0.1 \ \mu g/g, sediment)$
Selenium	EPA 270.3	10 μ g/L (1.0 μ g/g, sediment)
Silver	EPA 272.2	10 μ g/L (1.0 μ g/g, sediment)
Copper	EPA 220.1	20 μ g/L (2.0 μ g/g, sediment)
Zinc	EPA 289.1	50 μ g/L (5.0 μ g/g, sediment)
Maganese	EPA 243.1	50 μ g/L (5.0 μ g/g, sediment)
Nickel	EPA 249.1	100 μ g/L (10 μ g/g, sediment)
Fluoride	EPA 340.2	100 μ g/L (10 μ g/g, sediment)
Nitrate	EPA 353.2	100 μ g/L (10 μ g/g, sediment)
Cyanide	Standard 412	10 μ g/L (1.0 μ g/g, sediment)
Phenol	EPA 420.1	$1 \ \mu g/L$ (1.0 $\mu g/g$, sediment)
PCBs	EPA 608	$0.25 \ \mu g/L \ (1.0 \ \mu g/g, sediment)$
Total Organic		
Carbon (TOC)	EPA 415.1	1000 μ g/L (1000 μ g/g, sediment)
Endrin	Standard 509A	$0.02 \ \mu g/L \ (0.02 \ \mu g/g, sediment)$
Lindane	Standard 509A	0.01 µg/L (0.01 µg/g, sediment)
Methoxychlor	Standard 509A	0.20 μ g/L (0.20 μ g/g, sediment)
Toxaphene	Standard 509A	1.00 μ g/L (1.00 μ g/g, sediment)
2,4-D	Standard 509B	0.06 μ g/L (0.06 μ g/g, sediment)
2,4,5-TP Silver	Standard 509B	0.06 μ g/L (0.06 μ g/g, sediment)
Volatile Organic		
Halogens	EPA 601	•
Volatile Organic		
Compounds (VOC)	EPA 624	**
Base/Neutrals and Acid		
Extractable Compounds		
(BNE)	EPA 625	••

*Detection limits for Volatile Organic Halogens shall be as specified for the compounds by EPA Method 601. Method: Federal Register, Vol. 44, No. 233, pp. 69468-69473. This method should be strictly followed including these items:

. . .

Item 1.4 - This method is recommended by EPA for use only by experienced residue analysts or under the close supervision of such qualified persons.

Item 2.2 - This is most important. If interferences are encountered (as in early peaks such as vinyl chloride), the method provides a secondary gas chromotographic column that will be helpful in resolving the compounds of interest from interferences. This must be done in the case of vinyl chloride and so noted in analysis report.

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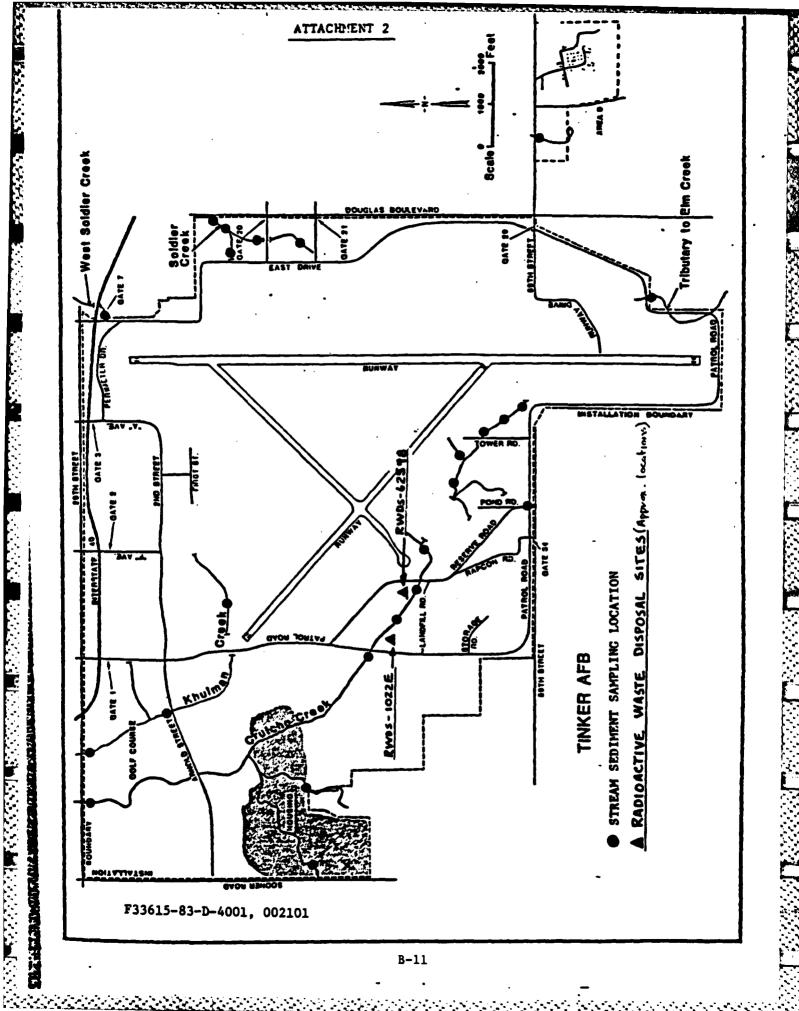
Items 3.3, 7.1-7.3 - These sections on interferences, contamination and QC should be strictly followed.

Item 8.3 - All samples must be analyzed within the recommended holding times. This must be followed without exception.

If questions are encountered about certain contaminants, you may be asked to show both chromatograms used to rule out possible interferences.

•*Detection limits for VOC and BNE compounds shall be as specified for the compounds by EPA Methods 624 and 625 respectively.

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Attachment 3

Analytic Parameters by Site

		Number of Sa	mples	
Parameter	<u>LF_6</u>	<u>B1dg 3001</u>	QA	<u>Total</u>
Volatile Organic				
Halogens	14	14	3	31*
Volatile Organic				
Compounds (VOC)	7	7	2	16
Base/Neutrals and Acid				
Extractable Compounds				
(BNE)	7	7	2	16
	Stream	Sediment	QA	Total
Arsenic	24	4	3	27
Barium	24	4	3	27
Cadmium	2.	4	3	27
Chromium	2.		3	27
Lead	2.	4	3	27
Nercury	24	-	3	27
Selenium	24	-	3	27
Silver	24	4	3	27
Copper	24	•	3	27
Zinc	24	•	3	27
Maganese	24	-	3	27
Nickel	24	-	3	27
Fluoride	24		3	27
Nitrate	2		3	27
Cyanide	24		3	27
Phenol	24	-	3	27
PCB's	24	4	3	27
Total Organic				
Carbon (TOC)	24		3	27
Endrin	2	•	3	27
Lindane	2		3	27
Ne thoxychlor	2		3	27
Tozaphene	2		3	27
2,4-D	2	-	3	27
2,4,5-TP Silver	24	4	3	27

*Since each sample for Volatile Organic Halogens shall be analyzed twice (see method footnote item 2.2 in Atch 1), the contractor shall price 62 analyses by EPA method 601

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APPENDIX C

Well Numbering System

The wells drilled for the Tinker Air Force Base Installation Restoration Program, Phase II Stage 2, were designated by Zone Number and sequential letters within zones. This nomenclature is an extension of that used in the Stage 1 investigation. Designators were assigned in the order in which the drilling locations were established. Zone 6 applies to the Building 3001 Investigation. Zone 7 applies to the Landfill 7 investigation. Table C-1 contains a list of all wells and cores for the project, listed by zone of investigation.



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TABLE C-1. LIST OF WELLS

Building 3001 Area

	Well 6A	Well 6E
	6B	6F
	6C	6G
	6D	
Landfill 6		
	Well 7A	Well 7E (not completed
	7B	7F
	70	7G
	70	



APPENDIX D

Well Logs

This Appendix contains the logs of drilling and well completion activities for the project. Table C-1 (Appendix C) containes a list of all wells and cores for the project, listed by zone of investigation.



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Logs of Drilling Operations

Lithologic Symbols Utilized Massive sandstone, fine-grained Sandstone beds with shale partings Shale with sandstone lenses Shale Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays Gravel C1212

「こうためのない」「「いたい」」

	AN		Log	of Drillin	g Operations	Sheet of
Boring or W	ell No. <u>6</u>	A		<u> </u>	Project	Phase II Stage 2
				lley Drive		
.og Record	ed By <u>W.</u>	<u>M. Litt</u>	1e		<u>26 June 1984</u>	of drilling operation
					Sampling Interval (Estimate	d) <u>variable</u> (ft) Failing 1250
					Type Drill Rig and Operator	Jim Winnek, Inc.
Depth (ft)	Graphic Log	ID No. of Sample Taken	Type of Sample Taken		Stratigraphy	Remarks
• L		None	grab	Gravelly	clay fill.	
F			from	CLAY, red	-brown.	
┝			cutting	Þ		
⊢					k brown, damp, becoming	
5-	V////			drier wit by 6'.	h depth, completely dry	
F				by 0 .		
Γ						
	$\nabla D D$			SAND, red	, fine, dry.	
LO						
\vdash						
F						
15						
┝						
F						
20			· ·	SHALE, re	d-brown, sandy, friable.	Very hard drilling
F				-	· · · ·	minor water at 22',
⊢						dry below, continu- ous drilling.
						and attitude
.5						
E						
Ļ						
┝						
30-						
 -						
F						
E						
35						
⊢						
→ ·	9444.0400000			C 4 1 1 2	1	
⊢					brown, fine.	
	E. States			D-7		

		_	Log	of Drillir	g Operations	Sheet of
Boring or W	/ell No. <u>64</u>	l	of Brod	low Drivo	Project <u>Tinker AFB IRP</u> Beginning 26 June 1	
.ocation <u>_E</u> .og Record				ley Drive		4 of drilling operation
	,				Sampling Interval (Estimate	ed) <u>variable</u> (ft)
					Type Drill Rig and Operato	f Failing 1250 Jim Winnek, Inc.
	0	5				
Depth (ft)	Graphic Log	ID No. of Sample Taken	Type of Sample Taken		Stratigraphy	Remarks
┝						
E						
5 —						
F			} :	SAND, brow	wn, fine.	
E						
				SHALE, bro	own, grey mottle, dry.	
•+						
E						
F						
			1			
5						
┝			}			
F						
				SAND, red	-brown, fine, dry.	
F					-	
<u> </u>						
F			1			
5						
E				CDAUET	ad known films ailt	
F			ł		ed-brown, fine, silt, er returns.	
			1			
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E				ם	-8	
		L		L		L, , , , , , , , , , , , , , , , , , ,

RAD CORPORATIO	AN		Log	of Drillin	g Operations	Sheet <u>3</u> of <u>3</u>	
Boring or Well No. 6A				<u>dley Driv</u> e	Project <u>Tinker AFB IRP Phase II Stage 2</u> Beginning <u>26 June 1984</u> and end <u>26 June 1984</u> of drilling operation Sampling Interval (Estimated) <u>variable</u> (ft) Type Drill Rig and Operator <u>Failing 1250</u>		
Depth (ft)	Graphic Log	ID No. of Sampte Taken	Type of Sample Taken		Stratigraphy	Jim Winnek, Inc. Remarks	
				Same mater	ials. TD = 82'.		
L15							

RADIA	N				Sheet of
CURPURATION			Log	of Drilling Operations	
Boring or Well	No. 6B			Project AFB IRP P	hase II Stage 2
Location East	Drive, s	outh	of Bradl	ey Drive Beginning 27 June 1984	and end
og Recorded	By <u>W.M.</u>	Littl	e	27 June 1984	of drilling operation
				Sampling Interval (Estimated	
				Type Drill Rig and Operator.	Failing 1250
					Jim Winnek, Inc.
Depth	Graphic Log D No. of	Sample Taken	a Be		
(ft)	No.	ak	Type of Sample Taken	Stratigraphy	Remarks
	<u>ه</u>	° -	FOF		
	No	one	grab	CLAY, brown, plastic (fill).	
			from cutting		
				CLAY, red-brown.	
5 + [
+				CLAY, brown.	
				CLAY, grey-brown, plastic.	
			}		
		1			
15-				CLAY, red-brown, sandy, dry.	
			ļ		
				CLAY, mixed red-brown and brown-	
20 -				black, plastic, damp, minor sand.	
"T 🛛					
$ + \mathbb{R} $				CLAY, brown, sandy.	
\vdash					
25					
T N					
F R		1			
\vdash					
30+			4		
35					
				SAND, red-brown, fine, silty,	
				dry.	

	AN		Log	of Drilling Operations	Sheet <u>2</u> of <u>3</u>
Soring or W .ocation <u>E</u> .og Recorde	ast Drive	e, south		lley Drive Beginning 27 27 Jun	ne 1984 of drilling operation
					(Estimated) <u>variable</u> (ft) Operator <u>Failing 1250</u> Jim Winnek, Inc.
Depth (ft)	Graphic Log	ID No. of Sample Taken	Type of Sample Taken	Stratigraphy	Remarks
				SANDY CLAY, red-brown.	Thin clay layers 40-42'.
5 					
°					
5 -				SAND, red-brown, fine, lit	tle
				clay. Same, lighter color.	
∘ - -				, , ,	
5				Same, damp.	
₀ 					
		;			
5				Same, moist.	Driller reports beginning of water production.

	AN		Log	of Drillir	Sheet <u>3</u> of <u>3</u> ng Operations		
	<u>ast Driv</u>	e, south		ley Drive		IRP Phase II Stage ine 1984a 4 of drilling ope	nd end
					Sampling Interval (Esti Type Drill Rig and Ope	mated) <u>variable</u>	(ft)
Depth (ft)	Graphic Log	ID No. of Sample Taken	Type of Sample Taken		Stratigraphy	Remarks	
80							
85							
-							
90				Same mate:	rials. TD = $90'$.		
95 -							
100							
Ē							
105							
-							
110							
E							
115							
- -				Е	≻13	1	

Log Recorded By <u>W.M. Little</u> 28 June 1984 of drilling operat Sampling interval (Estimated) <u>variable</u> Type Drill Rig and Operator <u>Failing 1250</u> Jim Winnek, Inc. Depth (ft) 9 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		Log	of Drilling Operations	Sheet _1 of _3
Location East Drive at Entry Road A Log Recorded By <u>W.M. Little</u> Beginning <u>27 June 1984</u> and e <u>28 June 1984</u> of drilling operat Sampling Interval (Estimated) <u>variable</u> Type Drill Rig and Operator <u>Failing 1250</u> Jim Winnek, Inc. Depth (ft) 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	oring or Well No. 6C		- Project Tinker AFB IRP F	hase II Stage 2
Log Recorded By <u>W.M. Little</u> 28 June 1984 of drilling operation Sampling Interval (Estimated) <u>variable</u> Type Drill Rig and Operator <u>Failing 1230</u> Jim Winnek, Inc. Depth (ft) 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	ocation East Drive a	t Entry Road	A Beginning 27 June 198	and end
Sampling Interval (Estimated) variable Type Drill Rig and Operator Failing 1230 Jim Winnek, Inc. Depth (ff) Q g g g g g g g g g g g g g g g g g g g			<u>28 June 1984</u>	of drilling operation
Jim Winnek, Inc. Depth (ft) Image: Section of the sectin of the section of the sectin of the sectin of the sectin			Sampling Interval (Estimate	d) <u>variable</u> (ft)
Jim Winnek, Inc. Depth (ft) Image: Section of the sectin of the section of the sectin of the sectin of the sectin			Type Drill Rig and Operator	Failing 1250
0			-	Jim Winnek, Inc.
5 5 CLAY, dark brown, sandy. SANDSTONE, light brown, hard, dry. SANDY CLAY, red-brown, increasing sand with depth. 5 CLAY, red-brown, some clay. 5 CLAY, red-brown, moist, friable, some sand, drier with depth. 5 10 10 10 10 10 10 10 10 10 10	Depth (ft) Log	Taken Taken Type of Sample Taken	Stratigraphy	Remarks
5 CLAY, dark brown, sandy. SANDSTONE, light brown, hard, dry. SANDY CLAY, red-brown, increasing sand with depth. 10 15 20 20 20 20 20 21 22 23 30			CLAY, brown, with gravel (fill).	
5 CLAY, dark brown, sandy. 10 SANDSTONE, light brown, hard, dry. 10 SANDY CLAY, red-brown, increasing sand with depth. 10 SAND, red-brown, some clay. 15 CLAY, red-brown, moist, friable, some sand, drier with depth. 20 CLAY, red-brown, moist, friable, some sand, drier with depth. 30 Sand with depth.				
SANDSTONE, light brown, hard, dry. SANDY CLAY, red-brown, increasing sand with depth. SAND, red-brown, some clay. CLAY, red-brown, moist, friable, some sand, drier with depth. Minor water at ~2 dry below, contind rilling.		cuttings		
SANDSTONE, light brown, hard, dry. SANDY CLAY, red-brown, increasing sand with depth. SAND, red-brown, some clay. CLAY, red-brown, moist, friable, some sand, drier with depth. Minor water at ~2 dry below, contind rilling.			· · · · ·	
SANDSTONE, light brown, hard, dry. SANDY CLAY, red-brown, increasing sand with depth. SAND, red-brown, some clay. CLAY, red-brown, moist, friable, some sand, drier with depth. Minor water at ~2 dry below, contind rilling.	5 +		CLAY, dark brown, sandy.	
10 SANDY CLAY, red-brown, increasing sand with depth. 10 SAND, red-brown, some clay. 15 SAND, red-brown, some clay. 20 CLAY, red-brown, moist, friable, some sand, drier with depth. 20 CLAY, red-brown, moist, friable, some sand, drier with depth. 30 Sand with depth.				
10 sand with depth. 10 SAND, red-brown, some clay. 15 SAND, red-brown, some clay. 20 CLAY, red-brown, moist, friable, some sand, drier with depth. 21 CLAY, red-brown, moist, friable, some sand, drier with depth. 30 Image: some sand, drier with depth.			-	
10 Image: Sand synthesis of the synthesyntext of the synthesynthesyntext of the synthesynthesynt				
15 20 20 20 20 21 25 30 25 25 25 25 25 25 25 25 25 25			·	
15- 20- 20- 20- 20- 25- 30- 25- 30- 25- 25- 25- 25- 25- 25- 25- 25				
15- 20- 20- 20- 20- 25- 30- 25- 30- 25- 25- 25- 25- 25- 25- 25- 25				
15- 20- 20- 20- 20- 25- 30- 25- 30- 25- 25- 25- 25- 25- 25- 25- 25			SAND red-brown, some clay,	
20 20 CLAY, red-brown, moist, friable, some sand, drier with depth. 25 30 30				
25 30 CLAY, red-brown, moist, friable, some sand, drier with depth. CLAY, red-brown, moist, friable, some sand, drier with depth. Minor water at 2 dry below, contin drilling.				
25 30 CLAY, red-brown, moist, friable, some sand, drier with depth. CLAY, red-brown, moist, friable, some sand, drier with depth. Minor water at 2 dry below, contin drilling.				
25 30 CLAY, red-brown, moist, friable, some sand, drier with depth. CLAY, red-brown, moist, friable, some sand, drier with depth. Minor water at 2 dry below, contin drilling.				
25 30 CLAY, red-brown, moist, friable, some sand, drier with depth. CLAY, red-brown, moist, friable, some sand, drier with depth. Minor water at 2 dry below, contin drilling.				
25 drilling.				Minor water at ${\sim}20$ ',
	-		some sand, drier with depth.	
				~~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~
			1	
			1	
			1	
		1	1	
SAND, red-brown, fine, dry.				
		·	SAND, red-brown, tine, dry.	
				1
35	35			
D-15			D-15	

		Sheet of3						
Locatio	n_ <u>Eas</u>				<u>A</u> Beginning <u>27 June 198</u> 28 June 1984	28 June 1984 of drilling operation		
					Sampling Interval (Estimate Type Drill Rig and Operator	Failing 1250		
Depti (ft)	h	Graphic Log	tD No. of Sample Taken	Type of Sample Taken	Stratigraphy	Jim Winnek, Inc.		
					No discharge.			
F								
·5	11800 118000 11800 11800 11800 11800 11800 11800 11800 11800 11800 1180							
F								
₀⊥								
F					SAND, red-brown, fine, some clay.			
F								
5 +								
F	10000				SAND, red-brown, fine.			
F	00000000000000000000000000000000000000				No change.	Shale streak at 63'.		
Ē								
⁵┿								
F								
₀-₽						Begin water produc- tion.		
F					· ·			
, È								
Ŧ					SAND, red-brown, fine, silt, some water.	Scant returns.		
F					D-16			

CORPORATIO	AN		Log	of Drilling Operations	Sheet <u>3</u> of <u>3</u>		
Boring or We Location <u>Ea</u> Log Recorde	st Drive	at Enti		A Project <u>Tinker AFB IF</u> Beginning <u>27 June</u> 28 June 198	Phase II Stage 2 1984 34 of drilling operation		
				Sampling Interval (Estim Type Drill Rig and Opera	ated) <u>variable</u> (ft)		
Depth (ft)	Graphic Log	ID No. of Sample Taken	Type of Sample Taken	Stratigraphy	Remarks		
				SAND, red-brown, medium.			
85							
				SANDSTONE, red-brown, friable.	Hard drilling.		
90 -				TD = 90'.			
Ē							
95 - - -							
100							
105							
115							
E							

	AN		Log	of Drilling	Sheet of g Operations		
Boring or We Location <u>Do</u> Log Recorded	uglas Bl	<u>lvd. nor</u>		adley Drive	Project <u>Tinker AFB IRP Phase II Stage 2</u> e Beginning <u>19 June 1984</u> and end <u>19 June 1984</u> of drilling operation		
					Sampling Interval (Estimat Type Drill Rig and Operato	ted) variable (ft	
Depth (ft)	Graphic Log	ID No. of Sample Taken	Type of Sample Taken		Stratigraphy	Remarks	
		none	grab from cutting	(fill).	red-brown, with grave	L	
5 5 					brown, minor sand. thered, red-brown, inor sand.		
				SHALE, red	-brown.		
20				SAND, fine	e, red-brown.		
25							
30							
35				SAND, fine layers.	e, red-brown, thin clay	Harder drilling.	
L L		-1	Í	1 r	≻ 19	,	

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Sheet 2 of 2 Log of Drilling Operations Sheet 2 of 2 Boring or Well No. 6D Project Tinker AFB IRP Phase II Stage 2 Socation Douglas Blvd. north of Bradley Drive Beginning 19 June 1984 and end Sog Recorded By W.M. Little 19 June 1984 of drilling operation Sampling Interval (Estimated) variable (ft) Type Drill Rig and Operator Failing 1250 Time								
				SAND, fine, red-brown, fines.	Begin water produc- tion.			
45 <u>-</u> - -				SHALE, red-brown. SAND, medium, fine gravel, fines.	Reduced water pro- duction. Water production ∿l gpm or less.			
				Same materials. $TD = 57$ '.				
60 								
65 <u>-</u>								
70								
75								

RADI	AN		Log	of Drilling Operations	Sheet of3		
Boring or We	ll No	6E		Project <u>Tinker AFB IRP</u>	Phase II Stage 2		
Location Dou	glas Bl	vd. & Ei	ntry Road	A Beginning 19 June 1	.984 and en		
Log Recorde	d By <u>W</u>	.M. Litt	<u>le</u>	<u> </u>	4 of drilling operation		
				Sampling Interval (Estimate	d) <u>variable</u> (fi		
				Type Drill Rig and Operator	Type Drill Rig and Operator Failing 1250		
		1		·	Jim Winnek, Inc.		
Depth (ft)	Graphic Log	ID No. of Sample Taken	Type of Sample Taken	Stratigraphy	Remarks		
° L	(((((none	grab	CLAY, red-brown, sandy, with			
	/////]	from	mixed gravel (fill).			
	/////	1	cuttings	Same, no gravel.			
	11111	1					
5-	/////	1					
	/////	1					
				SHALE, weathered, red-gray, minor			
				sand, changing to red-brown with			
10				depth.			
-			i l				
				SHALE, sandy, red-brown, friable,			
				increasing sand with depth.			
15-				SAND, fine, friable red-brown,			
				minor fines.			
20-							
-							
			1				
25			1				
				SHALE, red-brown.			
_ -		1		SHALE, ICU-DIOWN.			
		1					
		1					
30							
		1					
35				SAND, fine, friable, red-brown,			
				minor fines.			
				SHALE, red-brown, with grey			
- H E		-		mottling.	1		

	An	-	Log	of Dril	ling Operations	SI	neet2	of	3
boring or Well No. <u>6E</u> ocation <u>Douglas Blvd. & Entry Road A</u> og Recorded By <u>W.M. Little</u> Sampling Interval (Estimated) <u>variable</u> Type Drill Rig and Operator <u>Failing 1250</u> Jim Winnek, Inc.									
Depth (ft)	Graphic Log	ID No. of Sample Taken	Type of Sample Taken		Stratigraphy		Re	marks	
				SAND, f	ine, tan/pink, clean. ine, red-brown. edium, red-brown, wit and fines.	Sat	Scant ret add ∿80 g to clean cuttings.	als. w hole,	ater
					D-22				

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	AN		Log	of Drilling Operations	Sheet <u>3</u> of <u>3</u>
Boring or W Location <u>Do</u> Log Recorde	uglas Bl	vd. & E1			1984and end 1984of drilling operation Ited)(ft)
	0	5.0			Jim Winnek, Inc.
Depth (ft)	Graphic Log	ID No. of Sample Taken	Type of Sample Taken	Stratigraphy	Remarks
				Same materials, more indurated. Same materials.	Harder drilling, driller reports minor water. Scant returns, water in hole when change rods.
				Same materials. TD = 115'.	Water production ∿1 gpm. Water production 3-5 gpm.

	AN		Log	of Drilling Operations	Sheet <u>1</u> of <u>3</u>			
Boring or W	eil No. 6	5F		Project AFB IRP P	hase II Stage 2			
Location D	PDO Yard			Beginning 20 June 1	984 and end			
Log Record	ed By <u>W</u> .	M. Litt	1e	20 June 1984	4 of drilling operation			
				Sampling Interval (Estimated) <u>variable</u> (ft)			
				Type Drill Rig and Operator	Failing 1250			
					Jim Winnek, Inc.			
Depth (ft)	Graphic Log	ID No. of Sample Taken	Type of Sample Taken	Stratigraphy	Remarks			
° L		none	grab	SHALE, weathered, red-brown.				
L			from					
┝		1	cutting	P				
-		1						
5				SHALE, grey.				
F		1		SHALE, red-brown.				
E				SAND, fine, red-brown, minor silt.				
10				SHALE, pink, turning red-brown	Hard drilling, high			
-				with depth, very dry.	dust.			
-								
- F								
15			1					
			Į					
\vdash]					
-								
20								
E								
┣-	100000000000000000000000000000000000000	t	1	SAND, fine, pink/tan.				
-								
25								
E			•					
F			1	SANDY SHALE, red-brown, some thin				
┝				hard streaks.				
30								
<u> </u> -				• •				
E			1					
F			1					
35								
⊢		1						
F		3	· ·	D 05				
F		1		D-25				
40		7	1		1			

		Loc	Shi of Drilling Operations	eet of
oring or Well No. ocation <u>DPDO Ya</u> og Recorded By _	rd		Project <u>Tinker AFB IRP Phase</u> Beginning <u>20 June 1984</u> <u>20 June 1984</u> Sampling Interval (Estimated) Type Drill Rig and Operator <u>Fa</u>	of drilling operation variable (ft)
Depth dat (ft) g	ID No. of Sample Taken	Type of Sample Taken	Stratigraphy	Remarks
			SAND, medium, red-brown. SAND, medium, red-brown, with fine gravel. SAND, fine, tan/yellow. SAND, fine, brown, with shale pebbles SANDSTONE, grey, hard. SHALE, red-brown.	
E		•	D-26	

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		Log	of Drilling Operations	Sheet <u>3</u> of <u>3</u>							
cation DPDO Yard	or Well No. <u>6F</u> <u>on DPDO Yard</u> ecorded By <u>20 June 1984</u> and en <u>20 June 1984</u> of drilling operatio Sampling Interval (Estimated) <u>variable</u> (f Type Drill Rig and Operator <u>Failing 1250</u> Jim Winnek, Inc.										
Depth (ft) (ft)	ID No. of Sample Taken	Type of Sample Taken	Stratigraphy	Remarks							
			SAND, fine, red-brown, soft. SANDSTONE, hard. Same materials. TD = 102'.	Sand collapse, add water to clean hole. Scant returns.							

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	An		•			Sheet of3	
Boring or We Location <u>We</u>	ell No	ldg. 311	7	;	• •		
		<u></u>	± C		Sampling Interval (Estimate Type Drill Rig and Operator		
Depth (ft)	Graphic Log	ID No. of Sample Taken	Type of Sample Taken		Stratigraphy	Remarks	
5		none	grab from cuttings	ered shale	, brown (heavily weath-		
10	·			SHALE, red	l-brown.		
				SAND, fine	e, red-brown, minor silt.		
20), red-brown, partially m up-hole poor returns.	Mud on bit, minor water, dry below, continue drilling.	
25							
35_							
40					D-29		

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and the fail and

oring or Well No. ocation <u>West of</u> og Recorded By	Bldg. 311	7	Beginning	Project <u>Tinker AFB IRP Phase II Stage 2</u> Beginningand end of drilling operation Sampling Interval (Estimated) <u>variable</u> (ft)				
Depth de (ft) S	Log ID No. of Sample Taken	Type of Sample Taken	Stratigraphy	Jim Winnek, Inc.				
			No change.					
			Shale streak.	Hard drilling.				
			Shale streak.	Hard drilling.				
			Shale streak.	Hard drilling.				
			SANDY CLAY, red-brown, damp.					
			Shale streak.	Hard drilling.				
E			SAND, red-brown, fine scant returns. D-30					

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	an		Log	of Drilling Operations	Sheet <u>3</u> of <u>3</u>
Boring or W _ocation <u>We</u>	st of Bl	dg. 311/		Project <u>Tinker AFB IR</u> Beginnfng	and end
				Sampling Interval (Estima Type Drill Rig and Operat	ated) <u>variable</u> (ft) or <u>Failing 1250</u> Jim Winnek, Inc.
Depth (ft)	Graphic Log	ID No. of Sample Taken	Type of Sample Taken	Stratigraphy	Remarks
5				Shale streak.	Hard drilling. Begin water production.
0 				Same materials. TD = 90'.	
.00					
.05					
.10					
L15				D 31	

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	N		Log	of Drilling	Sheet <u>1</u> of <u>3</u>		
Boring or Well Location <u>Adj</u>	acent	(north)		th St.	Project <u>Tinker AFB IRP P</u> Beginning <u>11 July 1</u>	Phase II Stage 2 984and end	
Log Recorded	By <u>L.</u>	N. Fren	ch	<u> </u>	<u>11 July 1984</u>	of drilling operation	
					Sampling Interval (Estimated Type Drill Rig and Operator.	d) <u>variable</u> (ft) Failing 1250	
						Jim Winnek, Inc.	
Depth (ft)	Graphic Log	ID No. of Sample Taken	Type of Sample Taken		Stratigraphy	Remarks	
		none	grab from cutting(fragments,	dark brown-red, organic silty sand; grades to	sents highway fill. Drilling performed	
5-4-					-brown, plastic, appearance.	with 7-7/8" diamete tricone bit.	
				SANDSTONE, orange, fr	fine-grained, red- iable.	Cuttings damp at ll minor water produce to 20'.	
20-							
				SANDSTONE /S	HALE (gradational con-	Much water blown from hole at 22'.	
25				tact with a	bove sandstone), inter- orange sandstone and		
30							
						Rig vibrates at 35'	
					-33		

		Log	of Drilling Operations	Sheet <u>2</u> of <u>3</u>
loring or Well No ocation <u>Adjace</u> og Recorded By	nt (north)		* Project Tinker AFB IRP th St. Beginning 11 July Beginning 11 July 11 July 198 Sampling Interval (Estimate Type Drill Rig and Operator	1984and end 4of drilling operation ed)variable(ft)
				Jim Winnek, Inc.
Depth (ft) 5	Log ID No. of Sample Taken	Type of Sample Taken	Stratigraphy	Remarks
				No water produced at 42' after adding drill rod.
				Harder and slower drilling at 47'; in- creasing water pro- duction below 49'.
			SANDSTONE, fine-medium grained, orange, friable, slightly moist.	Easy drilling below 55'.
				Hole caved slightly at 62'.
			Sandstone is dry.	
· -				

	AN		Log	of Drilling Operations	Sheet <u>3</u> of <u>3</u> of <u>3</u>		
Boring or W _ocation_Ad _og Recorde	jacent (north) (of SE 59 nch	11 July 1984	of drilling operation		
				Sampling Interval (Estimate Type Drill Rig and Operato	ed) <u>variable</u> (ft) <u>Failing 1250</u> Jim Winnek, Inc.		
Depth (ft)	Graphic Log	ID No. of Sample Taken	Type of Sample Taken	Stratigraphy	Remarks		
				SANDSTONE with few mottled shale fragments, trace gravel.	Few cuttings returned below 84'.		
5 							
					Water produced at 88'; dry at 93'.		
15							
00					Poor cuttings return.		
.05							
				End of boring-110'.	Rig vibrates at 108-109'.		
-							
				D-35			

D						Sheet <u>1</u> of <u>2</u>		
CORP	ORATIO	AN		Log	of Drilling	g Operations		
Borin	g or W	ell No7	В		4	Project Tinker AFB IRP	Phase II Stage 2	
Locat	ion_No	orth of S	E 59th	St.		Beginning 10 July 198	and en	
		ed By <u>L.N</u>				11 July 198	³⁴ of drilling operatio	
						Sampling Interval (Estimate	ed) variable (f	
						Type Drill Rig and Operator		
						·.	Jim Winnek, Inc.	
Dep	oth	Graphic Log	o. of ple en	e of en			_	
(fi		Graph Log	ID No. of Sample Taken	Type of Sample Taken		Stratigraphy	Remarks	
	_		none	grab		brown, some clay and or-		
	_			from	ganic frag	ments.	with 7-7/8" diamet	
	_			cuttings		fine be madding	tricone bit.	
1	_					fine to medium grained friable, slightly	>	
5_	_					ses and layers of SHALE		
- 1	_					mottled, plastic.	1	
	_					•		
	-						1	
	-	==_						
	_							
	_			l			1	
l								
	_						1	
[_							
15-	_							
	_							
				1	1			
20_	_							
20-								
	-				SHALE. red	-brown, moist, plastic;		
						sand laminae. Shale is		
25_	-					d with fine-grained,		
	-				orange san	-		
	-							
	-						1	
30-	-							
	-				CANDORONS	fin he made a sector 1	Driller notes damp	
	-	-			SANDSTONE, red-brown,	fine to medium grained, friable	conditions, few cu tings returned to	
	-				reu-brown,	LI TADIE.	surface.	
<u> </u>	-							
35_	-					rbedded with SHALE, red		
	-				brown, mott	led, plastic.	ed to surface.	
	-							
	-					27		
	-				р— о-	37		
0							I	

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		Log	of Drilling Operations	Sheet of
oring or Well No ocation <u>North</u> of S	7B E 59th S		Project <u>Tinker AFB IR</u> Beginning 10 July	P Phase II Stage 2 1984and end
og Recorded By <u>L</u> .	N. Frenc	h	<u>11 July</u>	1984 of drilling operation
			Sampling Interval (Estimative) Type Drill Rig and Opera	ated) <u>variable</u> (ft)
				Jim Winnek, Inc.
Depth de J (ft) 5	ID No. of Sample Taken	Type of Sample Taken	Stratigraphy	Remarks
		1	End of boring - 45'.	Drilling suspended; much water blown from hole.
F				
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· -				
E				
F				
F				
			•	
E				
			D-38	

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	A N		Log	of Drilling Operations	Sheet <u>1</u> of <u>3</u>		
Boring or W Location <u>N</u>	/ell No	7C	<u>St.</u>		100/		
Log Record	ed By	.N. Frei	nch	Beginning <u>10 July</u> 10 July 19	1984 and end 984 of drilling operation		
				Sampling Interval (Estimate	ed) <u>variable</u> (ft)		
				Type Drill Rig and Operator	Jim Winnek, Inc.		
Depth (ft)	Graphic Log	ID No. of Sample Taken	Type of Sample Taken	Stratigraphy	Remarks		
5		none	grab from cuttings	SANDSTONE, fine-medium grained, red-brown, friable, uniform tex- ture, dry. Grades to orange-red color below 3'. Thin sandy soil (less than 1') at surface.	Drilling performed with 7-7/8" diameter tricone bit.		
				Thin layers/lenses of SHALE, red, plastic; between 9-11'.			
				Indurated sandstone, white at 15'. SHALE, red-brown, plastic, slightl moist, few lenses or layers of fine-med. grained sandstone (in- durated zone at 18').			
20				durated zone at 16).			
25							
30							
35				SANDSTONE, fine-medium grained, slightly indurated, slightly moist	Rig vibrates at 34'.		
<u> </u>							

Location N	orth of S	C		of Drilling Operations			
	Boring or Well No. 7C Location <u>North of SE 59th St.</u> Log Recorded By <u>L.N. French</u>			Project <u>Tinker AFB IRP Phase II Stage 2</u> Beginning <u>10 July 1984</u> and en <u>10 July 1984</u> of drilling operation Sampling Interval (Estimated) <u>variable</u> (Type Drill Rig and Operator <u>Failing 1250</u>			
Depth (ft)	Graphic Log	ID No. of Sample Taken	Type of Sample Taken	Stratigraphy	Jim Winnek, Inc. Remarks		
				<pre>Increasing moisture at 42', few cuttings returned. Decreasing moisture, increasing silt content, few thin shale layers. Sandstone is orange, no silt, friable. SHALE, red-brown, plastic, slightly moist; some sandstone lenses and layers in shale matrix.</pre>			
75 				SANDSTONE, fine to medium grained, trace shale fragments, red-brown. Few cuttings returned to surface.	Rig vibrates at 77'.		

	AN			of Drilling Operations	Sheet _3 of 3
Boring or W Location <u>No</u> Log Recorde	orth óf S	<u>SE 59th.</u>	St.	Project <u>Tinker AFB IRP</u> BeginnIng <u>10 July 19</u> <u>10 July 19</u> Sampling Interval (Estimate Type Drill Rig and Operator	284and end 284of drilling operation adyvariable(ft)
Depth (ft)	Graphic Log	ID No. of Sample Taken	Type of Sample Taken	Stratigraphy	Remarks
85				Sandstone mixed with shale frag- ments.	Rig vibrates at 88'. Water blown from hole after pause in dril- ling; drilling to 102' yielded very
95				End of boring - 102'.	few cuttings.
				D-41	

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	AN		Log	of Drilling Operations	Sheet of
Boring or W Location <u>W</u> Log Record	est edge	of Land		Project <u>Tinker AFB IRP F</u> Beginning <u>28 June 198</u> 28 June 1984	4 and end
				Sampling Interval (Estimated Type Drill Rig and Operator	d) variable (ft)
Depth (ft)	Graphic Log	ID No. of Sample Taken	Type of Sample Taken	Stratigraphy	Remarks
		none	grab from cuttings	Clay-loam soil, brown. Sandy clay, red-brown.	
5				Shale, red-brown, weathered.	
- - - 15				Shale, red-brown, slight to no weathering.	
20				Sand, red-brown, fine, some silt.	
25				Sand, red/tan, fine, becoming red- brown by 24'.	
30					
35 ·					
40				No change. D-43	

	A N		Log	of Drilling Operations	Sheet <u>2</u> of <u>2</u> ng Operations				
ocation W	Vell No. <u>71</u> est edge led By <u>W</u> .	of Land		Project <u>Tinker AFB IRP</u> Beginning <u>28 June</u> <u>28 June</u> Sampling Interval (Estimat Type Drill Rig and Operato	ed) <u>variable</u> (ft)				
Depth (ft)	Graphic Log	ID No. of Sample Taken	Type of Sample Taken	Stratigraphy	Remarks				
				No change.					
5 				Shale streak.	Hard drilling, 4".				
0 				Same materials, slight moisture.					
5 0				Shale streak. Sandy clay, red-brown, moist.	Hard drilling, 2".				
5				No change.	Little water produc- tion.				
^{'5}	71111			Same materials. TD - 75'.					
┢				D-44					

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	An		Log) of Drillin	g Operations	Sheet <u>1</u> of 2
Borina or V	vell No	7E			Project Tinker AFB IRP	Phase II Stage 2
ocation N	orth edge	of Land	ifill 6		Beginning 21 June 1984	4and end
.og Record	led By <u>W</u>	M. Litt	1e			of drilling operation
					Sampling Interval (Estimate	
					Type Drill Rig and Operato	Jim Winnek, Inc.
				1		
Depth (ft)	Graphic Log	ID No. of Sample Taken	Type of Sample Taken		Stratigraphy	Remarks
		none		Clay, red-	brown, plastic.	
-			from cutting			
┝						
				Clay, grey		
٦ ^۲	∇DDD		SS	Clay, red,	mottled w/grey, firm, s	
F					thered, red-brown. , red-brown, damp.	at 6'.
⊢			cutting		,,,, ,	
				1		
L			1			
┝						
ŀ				Sand, red-1	brown, fine, many fines.	
Ę						
-						
- F						
20						
F						Negative Draeger
┝						hydrocarbon, poly-
,						test.
25						
E						
┝						
F				Sand, red-tules, damp	orown, sandstone gran-	
30+				, samp	-	
L						
. F						
35						Harder drilling.
E						
F				_		
40				I	D-45	1

at that that, but had

	AN		Log	of Drilling Operations	Sheet <u>2</u> of <u>2</u>			
Boring or We Location <u>Nor</u> Log Recorded	rth edge	<u>e of Lan</u>	<u>dfill 6</u>	Beginning <u>21 June</u>	1984and end of drilling operation ed)(ft)			
Depth (ft)	Graphic Log	ID No. of Sample Taken	Type of Sample Taken	Stratigraphy	Remarks			
				Sand, red-brown, fine, becoming darker with depth. Same materials. TD = 60', no water encountered.	Hole dry 6/22/84. Abandon by grouting.			
E				D-46				

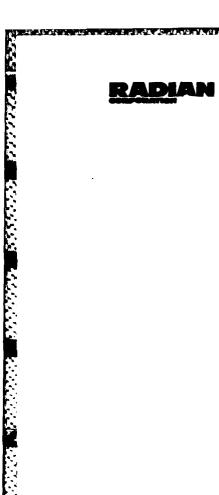
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Boring or Well No. <u>77</u> Location North edge of Landfill 6 Log Recorded By <u>W.M. Little</u> Project <u>Tinker AFB IRP Phase II Stag</u> Beginning <u>22 June 1984</u> <u>22 June 1984</u> <u>22 June 1984</u> <u>22 June 1984</u> <u>22 June 1984</u> <u>22 June 1984</u> <u>22 June 1984</u> <u>23 Jim Winnek</u> , Sampling Interval (EStimated) <u>variable</u> Type Drill Rig and Operator <u>Failing 1250</u> <u>Jim Winnek</u> , <u>30 Lim Vinnek</u> Sand, red-brown, fine, silty. <u>15 Lim Vinnek</u> <u>20 Lim Vinnek</u> Sand, red-brown, fine, less silt. <u>5 Lim Vinnek</u> Sand, brown, damp. <u>15 Lim Vinnek</u> <u>22 June 1984</u> <u>22 June 1984</u> <u>22 June 1984</u> <u>22 June 1984</u> <u>23 Jim Vinnek</u> <u>5 Lim Vinnek</u>	Sheet1of1 ng Operations				
Location_North_edge_of_Landfill 6 Beginning_22 June 1984 Log Recorded By W.M. Little Sampling Interval (Estimated) variable Sampling Interval (Estimated) variable Type Drill Rig and Operator Failing 1250 Jim Winnek, Jim Winnek, Depth 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 10 0	2				
Log Recorded By <u>W.M. Little</u> 22 June 1984 of drilling Sampling interval (Estimated) <u>variable</u> Type Drill Rig and Operator <u>Failing</u> 1250 Jim Winnek, Depth (ft) 9 9 9 9 9 9 9 9 9 9 9 9 9	and en				
Sampling Interval (Estimated) variable Type Drill Rig and Operator Failing 1250 Jim Winnek, Depth (t) 000 (t) 0000 (t) 000 (t) 0000 (t) 000					
Depth (ft) O g O g O g O g Sand, red-brown, fine, silty. from cuttings Remark 0 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 11 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10	(f				
Depth (ft) 9 0					
0 - - Sand, red-brown, fine, silty. 5 - - Sand, red-brown, fine, less silt. 10 - - - 10 - - - 10 - - - 10 - - - 10 - - - 10 - - - 11 - - - 12 - - - 13 - - - 20 - - - 20 - - - 20 - - - 20 - - - 20 - - - 20 - - - 21 - - - 22 - - - 23 - - - 30 - - - 30 - - -	nc.				
5 10 10 15 20 20 20 21 20 20 20 21 20 20 20 20 20 20 20 20 20 20	S				
10 Cuttings Sand, red-brown, fine, less silt. 10 Indext in the second seco					
5 10 10 11 15 Sand, brown, damp. 20 Clay, brown, sandy. 20 Clay, brown, sandy. 20 Same materials. 25 TD = 25'. 30 Small water tion.					
15 Sand, brown, damp. 20 Clay, brown, sandy. 21 Same materials. 25 TD = 25'.					
15 Sand, brown, damp. 20 Clay, brown, sandy. 21 Same materials. 25 TD = 25'.					
15 Sand, brown, damp. 20 Clay, brown, sandy. 21 Same materials. 25 TD = 25'.					
15 Sand, brown, damp. 20 Clay, brown, sandy. 21 Same materials. 25 TD = 25'.					
15 Sand, brown, damp. 20 Clay, brown, sandy. 21 Same materials. 25 TD = 25'.					
20 20 20 20 20 21 25 25 30 25 25 25 25 25 25 25 25 25 25					
20 20 20 20 20 21 25 25 30 25 25 25 25 25 25 25 25 25 25					
20 20 20 20 20 20 20 21 22 23 24 25 25 25 25 30 25 25 25 25 25 25 25 25 25 25					
20 20 20 20 20 21 25 25 30 25 25 25 25 25 25 25 25 25 25					
20 20 Clay, brown, sandy. 25 25 30 25 25 25 25 25 25 25 25 25 25					
20 Clay, brown, sandy. 22 gals. wat hole when re drilling. 30 30 21 30 22 gals. wat hole when re drilling. Same materials. TD = 25'. Small water tion.					
20 Clay, brown, sandy. 22 gals. wat hole when re drilling. 30 30 21 30 22 gals. wat hole when re drilling. Same materials. TD = 25'. Small water tion.					
20 Clay, brown, sandy. 22 gals. wat hole when re drilling. 30 30 20 21 gals. wat hole when re drilling. Same materials. TD = 25'. Small water tion.					
25- 25- 30- 30- 30- 25- 30- 30- 30- 30- 30- 30- 30- 30					
25 TD = 25'. Small water tion. Small water					
25 TD = 25'. Small water tion.					
30					
	roduc-				
35					
D~47					

	AN	_	Log	of Drilling Operations	Sheet <u>1</u> of <u>1</u>
Boring or We		G G		- Project <u>Tinker AFB IRP</u>	Phase II Stage 2
ocation <u>Ea</u>	st edge	of Land	fill 6	Beginning 21 June 19	and end
.og Recorde				<u>21 June 1984</u>	of drilling operation
				Sampling Interval (Estimate	ed) <u>variable</u> (ft
				Type Drill Rig and Operator	Jim Winnek, Inc.
			I		
Depth (ft)	Graphic Log	ID No. of Sample Taken	Type of Sample Taken	Stratigraphy	Remarks
° L	/////	none	grab	Clay-loam soil, dark brown, damp.	
			from cuttings		
┝	())))		Lacrings		. ·
	())))				
5 <u>+</u>	()))))				
E	())))	1			
	$\langle \rangle$	1			Negative Draeger hydrocarbon.
				Sand rod-brown find silts	nydrocarbon.
10				Sand, red-brown, fine, silty, damp.	
E				Sand, red-brown, fine, damp.	
F					
15-					
-					
E					
_					
20				Clay, brown, moist.	
⊢		1			
F			 	Gravel, fine, silty and sandy.	Heavy water produc-
Ľ					tion.
25					
⊢		1			
F		4			
E		1		Same materials.	
30-		1		TD = 30'.	
⊢		1			
⊢					
E		1			
35		1			
┝					
\vdash		1		·	
F				D-49	
40		I	1		1



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in the line

ا هوه هرسه، به ما ما ما ها ها روان ها روان هر والمروز ها موارها هو به مرده ها به ما دم الله ما ها هو والور والوروز ها والوروز و

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Well Completion Logs

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	Typical	Grading	Effective	Uniformity		
Screen	Average	Range	Average	Range	Coefficient	
6	0%	0	1.25	1.18-1.30	1.53	
8	3.7%	2.1-5.1				
10	22.9%	18.0-25.6				
12	51.4%	45.6-62.3				
14	72.8%	66.5-79.0				
16	94.6%	89.9-99.4				
20	98.4%	96.0-99.9				
25	98.6%	96.5-99.9				

TABLE D-1. SPECIFICATION SHEET FOR GRAVEL PACK USED

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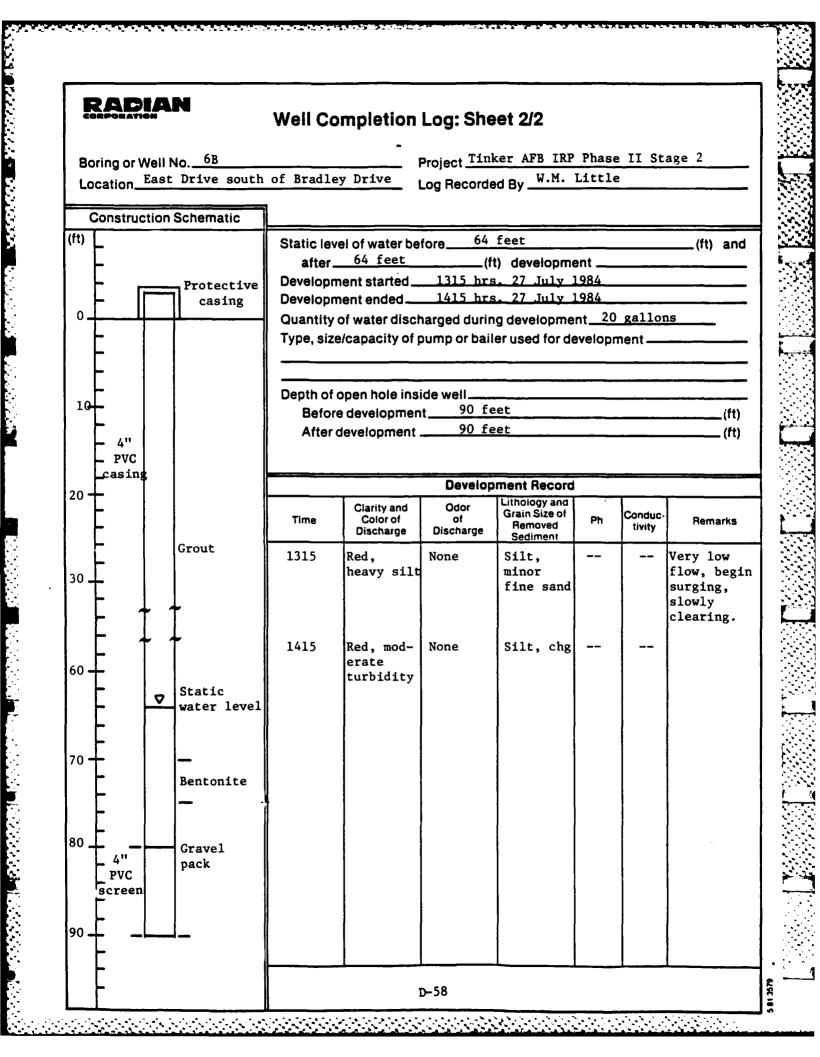
RADIAN Well Completion	on Log: Sheet 1/2
64 ····	Project Tinker AFB IRP Phase II Stage 2
loring or Well No. <u>6A</u> ocation East Drive, north of Bradley Drive	_ Project N.B. Little
Construction started 26 June 1984	completed 26 June 1984
AC - 100/	completed26 June 1984
otal depth drilled (ft)82 feet.	
,	
roblems encountered during drilling <u>None</u>	
Vater source for drilling and completion procedures	s_base_supply
· · · · · · · · · · · · · · · · · · ·	
lumber and type of samples collected <u>Grab</u> sam	nples from discharge
ample interval (ft-ft)	
torage method(s) plastic bags, ambient	temperature
Schedule 40 PVC flush joint	Diamotor 4 inches
Casing type Schedule 40 PVC, flush joint Depth of casing (ft)	_ Diameter 4 Inches
Screen type Schedule 40, PVC, mill slot	Diameter 4 inches
Slot size_0.020 inchesSo	The pintery of (ft-ft) 72-82 feet
ype(s) of glue used to join casing <u>none</u>	
ype of gravel pack used <u>8-12 sand</u>	
Mount of gravel pack used <u>see next page</u>	
arain size distribution of gravel pack <u>see specif</u>	fleation sheet
ithology of gravel pack Quartz, trace rock fr	ragments
Source (company and quarry/pit) Arkhola Sand	a Gravel, Ft. Smith, Ak
atencel of gravel pack (ft ft) 62-82 feet	
nterval of gravel pack (ft-ft) <u>62-82</u> feet nterval of bentonite seal (ft-ft) <u>60-62</u> feet	
nterval of grouting (ft-ft)	
Description of security measures 8 inch steel 1	protective casing and lid; secured with padloc
Padlock ID NoMaster 3213	Location of key(s) TAFB/SGB, DEEP; Radian

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	AN	Well Co	mpletion	Log: She	et 2/2			
Boring or We	ll No. <u>6A</u>		•	Project <u>Tink</u>	er AFB IRP	Phase	II St	age 2
Location East	st Drive, north	n of Bradl	ey Drive	Log Recorde	d ByM.	Little		
Constructio	on Schematic	L						
(ft)		Static lev	el of water be		rox. 67 fee			(ft) and
–		after_	65 feet	(ft) developm	ent		
	Protective casing	Developn Developn	nent started_ nent ended	1755 hrs,	26 June 198	34		
o		Quantity	of water discl	narged durin	g developme	nt <u>3</u> (
Εl		Type, size	e/capacity of p	bump or bail	er used for d	evelopn	nent	
				LIX/ WICH	Valiable	11901181	. <u>s</u> e_	
			open hole ins					
			e developmen development					(ft) (ft)
- ₄ "		Alter	development					(11)
PVC		Filo		Develop	ment Record			
20 casing			Clarity and	Odor	Lithology and	· · ·	<u> </u>	· · · · · · · · · · · · · · · · · · ·
F I		Time	Color of Discharge	of Discharge	Grain Size of Removed Sediment	Ph	Conduc- tivity	Remarks
	Grout	1700	,	None	Silt			Slowly clearing
30 🗕		1730	heavy silt Begin surg	ing 1-minu	te cvcles.	heavy		apprx. $1/2$
\vdash	+	1.	silt with	each new	cycle, slo ^v	vly clo	aring	gpm.
F 4	+	1750	clearing,	tinuous di greater f	low (>1/2	gpm).		
-		1755	Cease deve	loping.				
50 +								
⊢								
60 +	 Bentonite							
	-							
	7 Static			1				
70	water level							
		1						
- 4" - PVC	Gravel pack							
screer								
80+						l	1	

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Well Completio	n Log: Sheet 1/2
(P	
Boring or Well No. 6B	Project Tinker AFB IRP Phase II Stage 2
ocation East Dr., South of Bradley Drive	Log Recorded By w.M. Little
Construction started27_June_1984	completed27_June 1984
Development started27 June 1984	completed 27 June 1984
Total depth drilled (ft)90 feet	
9 4 - 1	······································
Problems encountered during drilling <u>None</u>	
	base supply
Number and type of samples collected <u>Grab</u> sam	ples from discharge
Sample interval (ft-ft)	
	temperature
Casing type <u>Schedule 40 PVC</u> , flush joint Booth size (4) 80 feet	Diameter <u>4 Inches</u>
Depth of casing (ft)	Diameter 4 inches
Screen type <u>Schedule 40, PVC, mill slot</u>	
Slot size 0.020 inches Sci Type(s) of glue used to join casing <u>none</u>	reen interval (ft-ft)
rype(s) of glue used to join casing <u></u>	
Type of gravel pack used <u>8-12 sand</u>	
Amount of gravel pack used	
	ication sheet
Grain size distribution of gravel pack <u>see specif</u>	
Lithology of gravel pack <u>Quartz</u> , trace rock fra	
Lithology of gravel pack <u>Quartz</u> , <u>trace</u> rock frace Source (company and quarry/pit) <u>Arkhola</u> Sand	
Lithology of gravel pack <u>Quartz</u> , trace rock fra Source (company and quarry/pit) <u>Arkhola Sand</u>	
Lithology of gravel pack <u>Quartz</u> , trace rock fraces Source (company and quarry/pit) <u>Arkhola Sand</u> Interval of gravel pack (ft-ft) <u>75-90 feet</u>	
Lithology of gravel pack <u>Quartz</u> , trace rock fraces Source (company and quarry/pit) <u>Arkhola Sand</u> Interval of gravel pack (ft-ft) <u>75-90 feet</u>	
Lithology of gravel pack <u>Quartz</u> , trace rock fraces Source (company and quarry/pit) <u>Arkhola Sand</u> Interval of gravel pack (ft-ft) <u>75-90 feet</u> Interval of bentonite seal (ft-ft) <u>70-75 feet</u> Interval of grouting (ft-ft) <u>0-70 feet</u>	& Gravel, Ft. Smith, AR
Lithology of gravel pack <u>Quartz</u> , trace rock fraces Source (company and quarry/pit) <u>Arkhola Sand</u> Interval of gravel pack (ft-ft) <u>75-90 feet</u> Interval of bentonite seal (ft-ft) <u>70-75 feet</u> Interval of grouting (ft-ft) <u>0-70 feet</u>	
Lithology of gravel pack <u>Quartz</u> , trace rock fraces Source (company and quarry/pit) <u>Arkhola Sand</u> Interval of gravel pack (ft-ft) <u>75-90 feet</u> Interval of bentonite seal (ft-ft) <u>70-75 feet</u> Interval of grouting (ft-ft) <u>0-70 feet</u>	& Gravel, Ft. Smith, AR
Lithology of gravel pack <u>Quartz</u> , trace rock fraces Source (company and quarry/pit) <u>Arkhola Sand</u> Interval of gravel pack (ft-ft) <u>75-90 feet</u> Interval of bentonite seal (ft-ft) <u>70-75 feet</u> Interval of grouting (ft-ft) <u>0-70 feet</u>	& Gravel, Ft. Smith, AR
Lithology of gravel pack <u>Quartz</u> , trace rock fraces Source (company and quarry/pit) <u>Arkhola Sand</u> Interval of gravel pack (ft-ft) <u>75-90 feet</u> Interval of bentonite seal (ft-ft) <u>70-75 feet</u> Interval of grouting (ft-ft) <u>0-70 feet</u>	& Gravel, Ft. Smith, AR
Lithology of gravel pack <u>Quartz</u> , trace rock fraces Source (company and quarry/pit) <u>Arkhola Sand</u> Interval of gravel pack (ft-ft) <u>75-90 feet</u> Interval of bentonite seal (ft-ft) <u>70-75 feet</u> Interval of grouting (ft-ft) <u>0-70 feet</u>	& Gravel, Ft. Smith, AR
Lithology of gravel pack <u>Quartz</u> , trace rock fraces Source (company and quarry/pit) <u>Arkhola Sand</u> Interval of gravel pack (ft-ft) <u>75-90 feet</u> Interval of bentonite seal (ft-ft) <u>70-75 feet</u> Interval of grouting (ft-ft) <u>0-70 feet</u> Description of security measures <u>8 inch steel p</u>	& Gravel, Ft. Smith, AR



	Well Completi	ion Log: Sheet 1/2
Boring or Well No. <u>6</u>		Project Tinker AFB IRP Phase II Stage 2
	ry Road A	Log Recorded ByW.M. Little
Construction started27	June 1984	completed 28 June 1984
	June 1984	completed28 June 1984
, <u></u>		
Total depth drilled (ft)90	•	
Hole diameter8 incl		
Drilling method air ro		
Problems encountered during	drilling <u>none</u>	- <u></u>
Water source for drilling and c	ompletion procedure	es _base supply
	Or all a s	
Number and type of samples c	ollected Grab sa	amples from discharge
Sample interval (ft-ft)	able	
	tic bags, ambient	t temperature
Sabedule /// /		
Casing type Schedule 40 1	PVC, flush joint	Diameter <u>4 inches</u>
Depth of casing (ft) $\frac{80 \text{ f}}{2}$	eet	
Depth of casing (ft) <u>80 f</u> Screen type_Schedule 40,	eet PVC, mill slot	Diameter4 inches
Depth of casing (ft) <u>80 f</u> Screen type <u>Schedule 40,</u> Slot size <u>0.020 inches</u>	eet PVC, mill slot S	Diameter4 inches
Depth of casing (ft) <u>80 f</u> Screen type_Schedule 40,	eet PVC, mill slot S	Diameter4 inches
Depth of casing (ft) <u>80 f</u> Screen type <u>Schedule 40,</u> Slot size <u>0.020 inches</u>	eet PVC, mill slot sing_noneS	Diameter4 inches
Depth of casing (ft) <u>80 f</u> Screen type <u>Schedule 40,</u> Slot size <u>0.020 inches</u> Type(s) of glue used to join cas Type of gravel pack used <u>8-</u> Amount of gravel pack used <u>8-</u>	eet PVC, mill slot singnone 12 sand seenext_page	Diameter4 inches Screen interval (ft-ft)
Depth of casing (ft) <u>80 f</u> Screen type <u>Schedule 40</u> , Slot size <u>0.020 inches</u> Type(s) of glue used to join cas Type of gravel pack used <u>8-</u> Amount of gravel pack used <u>8-</u> Grain size distribution of grave	eet PVC, mill slot singnone 12 sand see_next_page blpacksee_spect	Diameter4 inches Screen interval (ft-ft)80-90 feet ification sheet
Depth of casing (ft) <u>80 f</u> Screen type <u>Schedule 40, i</u> Slot size <u>0.020 inches</u> Type(s) of glue used to join cas Fype of gravel pack used <u>8-</u> Amount of gravel pack used <u>-</u> Grain size distribution of grave Lithology of gravel pack <u>Qua</u>	eet PVC, mill slot singnone 12 sand see next_page sea packsee speci rtz, trace rock f	Diameter 4 inches Screen interval (ft-ft) 80-90 feet ification sheet fragments
Depth of casing (ft) <u>80 f</u> Screen type <u>Schedule 40, i</u> Slot size <u>0.020 inches</u> Type(s) of glue used to join cas Fype of gravel pack used <u>8-</u> Amount of gravel pack used <u>-</u> Grain size distribution of grave Lithology of gravel pack <u>Qua</u>	eet PVC, mill slot singnone 12 sand see next_page sea packsee speci rtz, trace rock f	Diameter4 inches Screen interval (ft-ft)80-90 feet ification sheet
Depth of casing (ft) <u>80 f</u> Screen type <u>Schedule 40</u> , Slot size <u>0.020 inches</u> Type(s) of glue used to join cas fype of gravel pack used <u>8-</u> Amount of gravel pack used <u>8-</u> Grain size distribution of grave Lithology of gravel pack <u>Qua</u> Source (company and quar	eet PVC, mill slot singnone 12 sand see next_page sea packsee speci rtz, trace rock f	Diameter 4 inches Screen interval (ft-ft) 80-90 feet ification sheet fragments
Depth of casing (ft) <u>80 f</u> Screen type <u>Schedule 40</u> , Slot size <u>0.020 inches</u> Type(s) of glue used to join cas Type of gravel pack used <u>8-</u> Amount of gravel pack used <u>8-</u> Grain size distribution of gravel Lithology of gravel pack <u>Qua</u> Source (company and quar	eet PVC, mill slot sing none 12 sand see next page pack see spect rtz, trace rock f ry/pit)Arkhola Sand 61-90 feet	Diameter 4 inches Screen interval (ft-ft) 80-90 feet ification sheet fragments
Depth of casing (ft) <u>80 f</u> Screen type <u>Schedule 40</u> , Slot size <u>0.020 inches</u> Type(s) of glue used to join cas fype of gravel pack used <u>8-</u> Amount of gravel pack used <u>8-</u> Grain size distribution of grave Lithology of gravel pack <u>Qua</u> Source (company and quar	eet PVC, mill slot sing none 12 sand see next page pack see spect rtz, trace rock f ry/pit)Arkhola Sand 61-90 feet	Diameter 4 inches Screen interval (ft-ft) 80-90 feet ification sheet fragments
Depth of casing (ft) <u>80 f</u> Screen type <u>Schedule 40</u> , Slot size <u>0.020 inches</u> Type(s) of glue used to join cas Type of gravel pack used <u>8-</u> Amount of gravel pack used <u>8-</u> Grain size distribution of gravel Lithology of gravel pack <u>Quar</u> Source (company and quar nterval of gravel pack (ft-ft) <u>1000</u> nterval of bentonite seal (ft-ft) nterval of grouting (ft-ft) <u>1000</u>	eet PVC, mill slot singnone 12 sand see next_page packsee speci rtz, trace rock f ry/pit)Arkhola Sand 61-90 feet 57-61 feet 0-57 feet	Diameter4 inches Screen interval (ft-ft)80-90 feet ification sheet fragments d & Gravel, Ft. Smith, AR
Depth of casing (ft) <u>80 f</u> Screen type <u>Schedule 40</u> , Slot size <u>0.020 inches</u> Type(s) of glue used to join cas Type of gravel pack used <u>8-</u> Amount of gravel pack used <u>8-</u> Grain size distribution of gravel Lithology of gravel pack <u>Quar</u> Source (company and quar nterval of gravel pack (ft-ft) <u>1000</u> nterval of bentonite seal (ft-ft) nterval of grouting (ft-ft) <u>1000</u>	eet PVC, mill slot singnone 12 sand see next_page packsee speci rtz, trace rock f ry/pit)Arkhola Sand 61-90 feet 57-61 feet 0-57 feet	Diameter 4 inches Screen interval (ft-ft) 80-90 feet ification sheet fragments
Depth of casing (ft) <u>80 f</u> Screen type <u>Schedule 40</u> , Slot size <u>0.020 inches</u> Type(s) of glue used to join cas Type of gravel pack used <u>8-</u> Amount of gravel pack used <u>8-</u> Grain size distribution of gravel Lithology of gravel pack <u>Quar</u> Source (company and quar nterval of gravel pack (ft-ft) <u>1000</u> nterval of bentonite seal (ft-ft) nterval of grouting (ft-ft) <u>1000</u>	eet PVC, mill slot singnone 12 sand see next_page packsee speci rtz, trace rock f ry/pit)Arkhola Sand 61-90 feet 57-61 feet 0-57 feet	Diameter4 inches Screen interval (ft-ft)80-90 feet ification sheet fragments d & Gravel, Ft. Smith, AR
Depth of casing (ft) <u>80 f</u> Screen type <u>Schedule 40</u> , Slot size <u>0.020 inches</u> Type(s) of glue used to join cas Type of gravel pack used <u>8-</u> Amount of gravel pack used <u>8-</u> Grain size distribution of gravel Lithology of gravel pack <u>Quar</u> Source (company and quar nterval of gravel pack (ft-ft) <u>1000</u> nterval of bentonite seal (ft-ft) nterval of grouting (ft-ft) <u>1000</u>	eet PVC, mill slot singnone 12 sand see next_page packsee speci rtz, trace rock f ry/pit)Arkhola Sand 61-90 feet 57-61 feet 0-57 feet	Diameter4 inches Screen interval (ft-ft)80-90 feet ification sheet fragments d & Gravel, Ft. Smith, AR
Depth of casing (ft) <u>80 f</u> Screen type <u>Schedule 40</u> , Slot size <u>0.020 inches</u> Type(s) of glue used to join cas Type of gravel pack used <u>8-</u> Amount of gravel pack used <u>8-</u> Grain size distribution of gravel Lithology of gravel pack <u>Quar</u> Source (company and quar nterval of gravel pack (ft-ft) <u>1000</u> nterval of bentonite seal (ft-ft) nterval of grouting (ft-ft) <u>1000</u>	eet PVC, mill slot singnone 12 sand see next_page packsee speci rtz, trace rock f ry/pit)Arkhola Sand 61-90 feet 57-61 feet 0-57 feet	Diameter4 inches Screen interval (ft-ft)80-90 feet ification sheet fragments d & Gravel, Ft. Smith, AR
Depth of casing (ft) <u>80 f</u> Screen type <u>Schedule 40</u> , Slot size <u>0.020 inches</u> Type(s) of glue used to join cas Type of gravel pack used <u>8-</u> Amount of gravel pack used <u>8-</u> Grain size distribution of gravel Lithology of gravel pack <u>Quar</u> Source (company and quar nterval of gravel pack (ft-ft) <u>1000</u> nterval of bentonite seal (ft-ft) nterval of grouting (ft-ft) <u>1000</u>	eet PVC, mill slot singnone 12 sand see next_page packsee speci rtz, trace rock f ry/pit)Arkhola Sand 61-90 feet 57-61 feet 0-57 feet	Diameter4 inches Screen interval (ft-ft)80-90 feet ification sheet fragments d & Gravel, Ft. Smith, AR
Depth of casing (ft) <u>80 f</u> Screen type <u>Schedule 40</u> , Slot size <u>0.020 inches</u> Type(s) of glue used to join cas Type of gravel pack used <u>8-</u> Amount of gravel pack used <u>8-</u> Grain size distribution of gravel Lithology of gravel pack <u>Quar</u> Source (company and quar nterval of gravel pack (ft-ft) <u>1000</u> nterval of bentonite seal (ft-ft) nterval of grouting (ft-ft) <u>1000</u>	eet PVC, mill slot singnone 12 sand see next_page packsee speci rtz, trace rock f ry/pit)Arkhola Sand 61-90 feet 57-61 feet 0-57 feet	Diameter4 inches Screen interval (ft-ft)80-90 feet ification sheet fragments d & Gravel, Ft. Smith, AR
Depth of casing (ft) <u>80 f</u> Screen type <u>Schedule 40</u> , Slot size <u>0.020 inches</u> Type(s) of glue used to join cas Type of gravel pack used <u>8-</u> Amount of gravel pack used <u>8-</u> Grain size distribution of gravel Lithology of gravel pack <u>Quar</u> Source (company and quar nterval of gravel pack (ft-ft) <u>1000</u> nterval of bentonite seal (ft-ft) nterval of grouting (ft-ft) <u>1000</u>	eet PVC, mill slot Sing_none 12 sand see next_page P pack_see specif rtz, trace rock f ry/pit)Arkhola Sand 61-90 feet 57-61 feet 0-57 feet res_8 inch steel	Diameter 4 inches Screen interval (ft-ft) 80-90 feet ification sheet fragments d & Gravel, Ft. Smith, AR

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i i			N	Well Co	mpletion	Log: She	et 2/2		•	·
Вс	orina or V	Veli I	No. 6C		-	Project Tin	ker AFB IRF	Phase	e II St	age 2
Lo	cationE	ast	Drive at Enti	v Road A		Log Recorde	ed By <u>W.M.</u>	Littl	2	
	_		Schematic							
ft)				Static lev	el of water be	fore é	approx. 67	feet		(ft) and
	L .			after_	67.5 feet	(f	t) developm	ent		
	┝┍		Protective	Developm	ent started ¹	.050 hrs, 2	28 June 198	4		
•	⊢		casing				28 June 198			
0-							ng developme			
	-			•••	· ·	•	l <mark>er used for d</mark> h variable		-	
	 -									
10-				Depth of o	open hole ins	ide well				
10 -	4"				edevelopmer		eet		<u> </u>	(ft)
	PVC casing	5		Arter	levelopment					(ft)
	 -]		Grout		- <u></u>					
20 -	F					Develop	ment Record			
20	-			Time	Clarity and Color of	Odor of	Lithology and Grain Size of Removed	Ph	Conduc-	Remarks
	-			1050	Discharge Red,	Discharge None	Sediment Silt			Very low
	 -			1020	heavy silt		[flow
30 -	t			1150	Red, mod-		Silt			Slowly ele-
			┥ ║		erate silt					vating
	\vdash		┥ ║	1000	Shut down			L.		1
~~	-		Bentonite	1300	Blow appro	x. 10 gal.	lons from h	pie, s	LOWLY (learing.
60 -	È i		-							
	Ļ									
	┝	ᢦ	Static							
70 -	Ŀ		water level						1	
	F									
	┝									
	F									
80 -	F -		Gravel		1					
00	- <u>4</u> "		pack							
	PVC									
	screen									
90-										
	F									
						D-60				
	F					D-60				

Boring or Well No. 6D Project Tinker AFB IRP Phase II Stage 2 Location_Douglas_Blvd, north of Bradley Dr. Log Recorded By W.M. Little Construction started 19 June 1984 completed_20 June 1984 Development started 20 June 1984 completed_20 June 1984 Total depth drilled (ft) 57 feet	ing or Well No ^{6D}	
Location Douglas Blvd, north of Bradley Dr. Log Recorded By V.M. Little Construction 19 June 1984 Completed 20 June 1984 Construction started 19 June 1984 completed 20 June 1984 Development started 20 June 1984 completed 20 June 1984 Problement started 20 June 1984 completed 20 June 1984 Fotal depth drilled (ft) 57 feet feet feet Hole diameter 8 inch field field field Problems encountered during drilling none none field field field Number and type of samples collected Grab samples from discharge field field field Storage method(s) plastic bags, ambient temperature field field field field Storage method(s) plastic bags, ambient temperature field		Project Tinker AFB IRP Phase II Stage 2
Development started 20 June 1984 completed 20 June 1984 Development started 20 June 1984 completed 20 June 1984 Fotal depth drilled (ft) 57 feet	ation Douglas Blvd, north of Bradley Dr.	Log Recorded By W.M. Little
Development started 20 June 1984 completed20 June 1984 Development started 20 June 1984 completed20 June 1984 Total depth drilled (ft) 57 feet Hole diameter 8 inch Drilling method		
Development started 20 June 1984 completed20 June 1984 Development started 20 June 1984 completed20 June 1984 Total depth drilled (ft) 57 feet Hole diameter 8 inch Drilling method	19 June 1984	
Total depth drilled (ft) 57 feet Hole diameter 8 inch Drilling method air rotary Problems encountered during drilling none Water source for drilling and completion procedures base supply Water source for drilling and completion procedures base supply Number and type of samples collected Grab samples from discharge Sample interval (ft-ft) variable Storage method(s) plastic bags, ambient temperature Casing type Schedule 80 PVC, flush joint Diameter 4 inches Depth of casing (ft) 47 feet Screen type Schedule 40, PVC, mill slot Diameter Storage 0.020 inches Screen interval (ft-ft) Type(s) of glue used to join casing none 47-57 feet Type of gravel pack used 8-12 sand Amount of gravel pack used see specification sheet Lithology of gravel pack (used see specification sheet Lithology of gravel pack (used 41-57 feet Interval of gravel pack (tt-ft) 41-57 feet 11-57 feet 11-57 feet 11-57 feet Interval of gravel pack (tt-ft) 39-41 feet 3	istruction started	completed
Hole diameter 8 inch Drilling method air rotary Problems encountered during drilling none Water source for drilling and completion procedures base supply Number and type of samples collected Grab samples from discharge Sample interval (ft-ft) variable Storage method(s) plastic bags, ambient temperature Casing type Schedule 80 PVC, flush joint Diameter 4 inches Depth of casing (ft) 47 feet Screen type Schedule 40, PVC, mill slot Diameter Storage of gravel pack used 8-12 sand Amount of gravel pack used 3-12 sand Amount of gravel pack used See specification sheet Lithology of gravel pack (tert, trace rock fragments Source (company and quarry/pit)Arkhola Sand & Gravel, Ft. Smith, AR Interval of gravel pack (ft-ft) 41-57 feet Interval of gravel pack (ft-ft) 0-39 feet		
air rotary Problems encountered during drilling	al depth drilled (ft) <u>57</u> feet	
Problems encountered during drilling	e diameter <u>8 inch</u>	
Water source for drilling and completion procedures _base_supply Number and type of samples collectedGrab_samples from discharge Sample interval (ft-ft)variable Storage method(s)plastic_bags, ambient_temperature Casing typeSchedule 80_PVC, flush_jointDiameter4 inches Depth of casing (ft)47_feet Screen typeSchedule 40, PVC, mill slotDiameter4 inches Slot size0.020_inches		
Water source for drilling and completion procedures _base supply Number and type of samples collectedGrab_samples from discharge Sample interval (ft-ft)variable Storage method(s)plastic_bags, ambient temperature Casing typeSchedule 80 PVC, flush jointDiameter4 inches Depth of casing (ft)47 feet Screen typeSchedule 40, PVC, mill slotDiameter4 inches Slot size0.020 inchesScreen interval (ft-ft)47-57 feet Type (s) of glue used to join casing Screen interval (ft-ft)47-57 feet Type of gravel pack usedsee next page Grain size distribution of gravel packsee specification sheet Lithology of gravel pack Quartz, trace rock fragments Source (company and quarry/pit)Arkhola Sand & Gravel, Ft. Smith, AR Interval of gravel pack (ft-ft)41-57 feet Interval of bentonite seal (ft-ft)39-41 feet Interval of grouting (ft-ft)0-39 feet	blems encountered during drilling <u>none</u>	
Number and type of samples collectedGrab_samples from discharge	ter source for drilling and completion procedures	
Sample interval (ft-ft) variable Storage method(s) plastic bags, ambient temperature Casing type Schedule 80 PVC, flush joint Diameter 4 inches Depth of casing (ft) 47 feet Screen type Schedule 40, PVC, mill slot Diameter 4 inches Slot size 0.020 inches Screen interval (ft-ft) 47-57 feet Type(s) of glue used to join casing none Stype of gravel pack used 8-12 sand Amount of gravel pack used see next page Grain size distribution of gravel pack see specification sheet Lithology of gravel pack Quartz, trace rock fragments Source (company and quarry/pit)Arkhola Sand & Gravel, Ft. Smith, AR Interval of gravel pack (ft-ft) 41-57 feet nterval of grouting (ft-ft) 0-39 feet		
Sample interval (ft-ft) variable Storage method(s) plastic bags, ambient temperature Casing type Schedule 80 PVC, flush joint Diameter 4 inches Depth of casing (ft) 47 feet 6 6 6 Screen type Schedule 40, PVC, mill slot Diameter 4 inches Slot size 0.020 inches Screen interval (ft-ft) 47-57 feet Type(s) of glue used to join casing	mber and type of samples collected Grab_sam	ples from discharge
Storage method(s) plastic bags, ambient temperature Casing type Schedule 80 PVC, flush joint Diameter 4 inches Depth of casing (ft) 47 feet 4 inches Screen type Schedule 40, PVC, mill slot Diameter 4 inches Site size 0.020 inches Screen interval (ft-ft) 47-57 feet Type(s) of glue used to join casing none Screen interval (ft-ft) 47-57 feet Type of gravel pack used 8-12 sand Amount of gravel pack usedsee next_page Grain size distribution of gravel pack see specification sheet Lithology of gravel pack Quartz, trace rock fragments Source (company and quarry/pit)Arkhola Sand & Gravel, Ft. Smith, AR Interval of gravel pack (ft-ft) 41-57 feet Interval of bentonite seal (ft-ft) 39-41 feet Interval of grouting (ft-ft) 0-39 feet		
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Depth of casing (ft) 47 feet Screen type Schedule 40, PVC, mill slot Diameter 4 inches Slot size 0.020 inches Screen interval (ft-ft) 47-57 feet Type(s) of glue used to join casing none Screen interval (ft-ft) 47-57 feet Type of gravel pack used 8-12 sand Amount of gravel pack usedsee next page Grain size distribution of gravel packsee specification sheet	rage method(s) plastic bags, ambient (
Depth of casing (ft) 47 feet Screen type Schedule 40, PVC, mill slot Diameter 4 inches Slot size 0.020 inches Screen interval (ft-ft) 47-57 feet Type (s) of glue used to join casing none Screen interval (ft-ft) 47-57 feet Type of gravel pack used 8-12 sand Amount of gravel pack usedsee next_page Grain size distribution of gravel pack see specification sheet Lithology of gravel pack Quartz, trace rock fragments Source (company and quarry/pit) Arkhola Sand & Gravel, Ft. Smith, AR Interval of gravel pack (ft-ft) 41-57 feet Interval of gravel pack (ft-ft) 0-39 feet	sing type Schedule 80 PVC, flush joint	Diameter4 inches
Screen type Schedule 40, PVC, mill slot Diameter 4 inches Slot size 0.020 inches Screen interval (ft-ft) 47-57 feet Type(s) of glue used to join casing none Type of gravel pack used 8-12 sand Amount of gravel pack used see next page Grain size distribution of gravel pack see specification sheet Lithology of gravel pack Quartz, trace rock fragments Source (company and quarry/pit) Arkhola Sand & Gravel, Ft. Smith, AR Interval of gravel pack (ft-ft) 41-57 feet Interval of grouting (ft-ft) 0-39 feet	Depth of casing (ft) 47 feet	
Type(s) of glue used to join casing <u>none</u> Type of gravel pack used <u>8-12 sand</u> Amount of gravel pack used <u>see next page</u> Grain size distribution of gravel pack <u>see specification sheet</u> Lithology of gravel pack <u>Quartz</u> , trace rock fragments Source (company and quarry/pit) <u>Arkhola Sand & Gravel</u> , Ft. Smith, AR Interval of gravel pack (ft-ft) <u>41-57 feet</u> Interval of bentonite seal (ft-ft) <u>39-41 feet</u> Interval of grouting (ft-ft) <u>0-39 feet</u>	een type Schedule 40, PVC, mill slot	
Type of gravel pack used		reen interval (ft-ft) 47-57 feet
Amount of gravel pack usedsee next_page Grain size distribution of gravel packsee specification sheet Lithology of gravel pack Source (company and quarry/pit) Arkhola Sand & Gravel, Ft. Smith, AR Interval of gravel pack (ft-ft) 41-57 feet Interval of bentonite seal (ft-ft) 0-39 feet	e(s) of glue used to join casing <u>none</u>	
Amount of gravel pack usedsee next_page Grain size distribution of gravel packsee specification sheet Lithology of gravel pack Source (company and quarry/pit) Arkhola Sand & Gravel, Ft. Smith, AR Interval of gravel pack (ft-ft) 41-57 feet Interval of bentonite seal (ft-ft) 0-39 feet	a of gravel pack used 8-12 sand	
Grain size distribution of gravel pack see specification sheet Lithology of gravel pack	-	
Lithology of gravel pack <u>Quartz</u> , trace rock fragments Source (company and quarry/pit) <u>Arkhola Sand & Gravel, Ft. Smith, AR</u> Interval of gravel pack (ft-ft) <u>41-57 feet</u> Interval of bentonite seal (ft-ft) <u>39-41 feet</u> Interval of grouting (ft-ft) <u>0-39 feet</u>	in size distribution of gravel packsee specif:	ication sheet
Source (company and quarry/pit) <u>Arkhola Sand & Gravel, Ft. Smith, AR</u> Interval of gravel pack (ft-ft) <u>41-57 feet</u> Interval of bentonite seal (ft-ft) <u>39-41 feet</u> Interval of grouting (ft-ft) <u>0-39 feet</u>	nology of gravel pack Quartz, trace rock fra	agments
Interval of grouting (ft-ft)	Source (company and quarry/pit) Arkhola Sand	& Gravel, Ft. Smith, AR
Interval of grouting (ft-ft)		
Interval of grouting (ft-ft)0-39 feet		
Description of security measures 8 inch steel protective casing and lid; secured with padl	erval of grouting (ft-ft)0-39 feet	
	anistics of accurity many and 8 inch stool at	metactive cooling and lide secured with medled
	scription of security measures o flich steer pr	rocective casing and rid, secured with padroch
	~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~	
	· · · · · · · · · · · · · · · · · · ·	
Padlock ID No. Master 3213 Location of key(s) TAFB/SGB, DEEP; Radian		

	Well Co	mpletion	Log: She	et 2/2						
Boring or Well No. <u>6D</u>		Project Tinker AFB IRP Phase II Stage 2								
Location Douglas Blvd, nor		ley Drive	Log Recorde	ed By W.M.	Littl	e				
Construction Schematic	Ţ									
ft)		el of water be					(ft) and			
Protective	Developr	30 feet nent started_	(N 0855 hrs,	1) developm 20 June 19	ent 984					
- casing	Developr	nent ended	<u>0935 hrs</u>	<u>20 June 19</u>	984					
		of water disc e/capacity of								
		t (drilling								
	Depth of	open hole ins	ide well	<u>.</u>						
	Befor	e developmer	nt <u>57 fee</u>	et						
- 4" Grout - PVC casing	After	After development57 feet(ft)								
20	Development Record									
	Time	Clarity and Color of Discharge	Odor of Discharge	Lithology and Grain Size of Removed Sediment	Ph	Conduc- tivity	Remarks			
30 Static	0855	Red, heavy silt	None	Silt, minor fine sand			<l flow<="" gpm="" td=""></l>			
water level	0915	Slowly cl minute c	earing, beg	ain surging	, 1		∿1/2 gpm			
0 Bentonite	0935	Red, mod- erate silt	None	Silt .						
50-4" -PVC Gravel pack screen										
╞╺└╌┙╸		1								
60-			1							
F										
F			1 1 1							
Ŧ			}							
F										

	on Log: Sheet 1/2					
Boring or Well No ^{6E}	Project Tinker AFB IRP Phase II Stage 2					
ocation Douglas Blvd. at Entry Road A	Log Recorded By W.M. Little					
Construction started 19 June 1984	completed 19 June 1984					
Development started 19 June 1984	completed <u>20 June 1984</u>					
Total depth drilled (ft)						
0 1 1						
Drilling methodair rotary						
Problems encountered during drilling <u>none</u>						
Vater source for drilling and completion procedures	s base supply					
Grab san	nples from discharge					
ample interval (ft-ft)						
torage method(s) <u>plastic bags</u> , ambient	temperature					
Casing type Schedule 80 PVC, flush joint	Diameter 4 inches					
Depth of casing (ft)105 feet						
Screen type <u>Schedule 40, PVC, mill slot</u>						
Slot size 0.020 inches Sc	creen interval (ft-ft) 105-115 feet					
Type(s) of glue used to join casing <u>none</u>						
rype(s) of give used to join casing						
Type of gravel pack used <u>8-12 sand</u>						
Type of gravel pack used <u>8-12 sand</u> Amount of gravel pack used <u>see next page</u> Grain size distribution of gravel pack <u>see specif</u>	fication sheet					
Type of gravel pack used <u>8-12 sand</u> Amount of gravel pack used <u>see next page</u> Grain size distribution of gravel pack <u>see specif</u> Lithology of gravel pack <u>Quartz</u> , trace rock fr	ragments					
Type of gravel pack used <u>8–12 sand</u> Amount of gravel pack used <u>see next page</u> Grain size distribution of gravel pack <u>see specif</u>	ragments					
Type of gravel pack used <u>8-12 sand</u> Amount of gravel pack used <u>see next page</u> Grain size distribution of gravel pack <u>see specif</u> Lithology of gravel pack <u>Quartz</u> , trace rock fr Source (company and quarry/pit) <u>Arkhola Sand</u> nterval of gravel pack (ft-ft) <u>99-115 feet</u>	ragments					
Type of gravel pack used <u>8-12 sand</u> Amount of gravel pack used <u>see next page</u> Grain size distribution of gravel pack <u>see specif</u> Lithology of gravel pack <u>Quartz</u> , trace rock fr Source (company and quarry/pit) <u>Arkhola Sand</u> Interval of gravel pack (ft-ft) <u>99-115 feet</u> Interval of bentonite seal (ft-ft) <u>97-99 feet</u>	ragments					
Type of gravel pack used <u>8-12 sand</u> Amount of gravel pack used <u>see next page</u> Grain size distribution of gravel pack <u>see specif</u> Lithology of gravel pack <u>Quartz</u> , trace rock fr Source (company and quarry/pit) <u>Arkhola Sand</u> nterval of gravel pack (ft-ft) <u>99-115 feet</u> nterval of bentonite seal (ft-ft) <u>97-99 feet</u>	ragments					
Type of gravel pack used <u>8-12 sand</u> Amount of gravel pack used <u>see next page</u> Grain size distribution of gravel pack <u>see specific</u> Lithology of gravel pack <u>Quartz</u> , trace rock fr Source (company and quarry/pit) <u>Arkhola Sand</u> Interval of gravel pack (ft-ft) <u>99-115 feet</u> Interval of bentonite seal (ft-ft) <u>97-99 feet</u> Interval of grouting (ft-ft) <u>0-97 feet</u>	ragments					
Type of gravel pack used <u>8-12 sand</u> Amount of gravel pack used <u>see next page</u> Grain size distribution of gravel pack <u>see specific</u> ithology of gravel pack <u>Quartz</u> , trace rock fr Source (company and quarry/pit) <u>Arkhola Sand</u> Interval of gravel pack (ft-ft) <u>99-115 feet</u> Interval of bentonite seal (ft-ft) <u>97-99 feet</u> Interval of grouting (ft-ft) <u>0-97 feet</u>	& Gravel, Ft. Smith, AR					
Type of gravel pack used <u>8-12 sand</u> Amount of gravel pack used <u>see next page</u> Brain size distribution of gravel pack <u>see specific</u> ithology of gravel pack <u>Quartz</u> , trace rock fr Source (company and quarry/pit) <u>Arkhola Sand</u> Interval of gravel pack (ft-ft) <u>99-115 feet</u> Interval of bentonite seal (ft-ft) <u>97-99 feet</u> Interval of grouting (ft-ft) <u>0-97 feet</u>	& Gravel, Ft. Smith, AR					
Type of gravel pack used <u>8-12 sand</u> Amount of gravel pack used <u>see next page</u> Brain size distribution of gravel pack <u>see specif</u> ithology of gravel pack <u>Quartz</u> , trace rock fr Source (company and quarry/pit) <u>Arkhola Sand</u> Interval of gravel pack (ft-ft) <u>99-115 feet</u> Interval of bentonite seal (ft-ft) <u>97-99 feet</u> Interval of grouting (ft-ft) <u>0-97 feet</u>	& Gravel, Ft. Smith, AR					
Type of gravel pack used <u>8-12 sand</u> Amount of gravel pack used <u>see next page</u> Grain size distribution of gravel pack <u>see specif</u> Lithology of gravel pack <u>Quartz</u> , trace rock fr Source (company and quarry/pit) <u>Arkhola Sand</u> Interval of gravel pack (ft-ft) <u>99-115 feet</u> Interval of bentonite seal (ft-ft) <u>97-99 feet</u> Interval of grouting (ft-ft) <u>0-97 feet</u>	& Gravel, Ft. Smith, AR					
Type of gravel pack used <u>8-12 sand</u> Amount of gravel pack used <u>see next page</u> Grain size distribution of gravel pack <u>Quartz</u> , trace rock fr Lithology of gravel pack <u>Quartz</u> , trace rock fr Source (company and quarry/pit) <u>Arkhola Sand</u> Interval of gravel pack (ft-ft) <u>99-115 feet</u> Interval of bentonite seal (ft-ft) <u>97-99 feet</u> Interval of grouting (ft-ft) <u>0-97 feet</u> Description of security measures <u>8 inch steel p</u>	& Gravel, Ft. Smith, AR					

			N	Well Co	mpletion	Log: She	et 2/2					
Bo	ring or \	Veil I	No. <u>6E</u>			Project <u>Tin</u> l	ker AFB IRP	Phase	≥ II St	age 2		
Lo	cation_I	ougl	las Blvd and	Entry Road	LA	Log Recorde	ed By	Little	<u> </u>			
C	Construc	tion	Schematic									
	-									(ft) and		
	-		Protective									
	Fſ		casing	Developm	Development started <u>1455 hrs, 19 June 1984</u> Development ended <u>1615 hrs, 20 June 1984</u>							
Ж	I						g developme					
	F			Air lif	t (drilling	pumporbail g rig) with	erused for de h variable (evelopr discha	n ent irge			
								-				
0-	-						feet					
		ہ ب ا	ł				feet					
			-									
0-		ᢦ	Static water level		Development Record							
	- 4" - PVC		Water level	Time	Clarity and Color of Discharge	Odor of Discharge	Lithology and Grain Size of Removed Sediment	Ph	Conduc- tivity	Remarks		
5-	easing		Grout	19 June 1455	Red, heavy sile	None	Silt			Low produc- tion		
	-			1530	Over press	ure distu	bs sandpac	k, cea	ise dev	eloping.		
հ				20 June 1535	Red, heavy silt	None	Silt			Slowly clean ing ∿1/2 gpm		
				1615	Moderate silt	None	Silt					
6												
9 I	-		Bentonite									
	- - - 4"		Gravel pack									
6	PVC Screen											
	F		ļ		<u> </u>	l			<u> </u>			

RADIAN Well Con	npletion Log: Sheet 1/2
Boring or Well No6F	Project Tinker AFB IRP Phase II Stage 2
Location_DPDO Yard	Log Recorded By_W.M. Little
	completed 21 June 1984
Development started 21 June 1984	completed 21 June 1984
Total depth drilled (ft)102 feet	
Hole diameter8 inch	
Drilling method <u>air rotary</u>	d collapse at approx 100 feet traps bit, some
difficulty withdrawing.	· · ·
Water source for drilling and completion pr	rocedures base supply
Number and type of samples collected	Grab samples from discharge
Sample interval (ft-ft) <u>variable</u> Storage method(s) <u>plastic bags</u> , a	ambient temperature
Casing type Schedule 80 PVC, flush	joint Diameter <u>4 inches</u>
Depth of casing (ft) <u>92 feet</u>	
Screen type <u>Screaute</u> 40, rvc, mill 8	slot Diameter4 inches Screen interval (ft-ft)92-102 feet
Type(s) of glue used to join casing <u>none</u>	
Type of gravel pack used <u>8-12 sand</u>	
Amount of gravel pack used <u>see next</u>	
Amount of gravel pack used <u>see next</u> Grain size distribution of gravel pack <u>see</u>	page e specification sheet
Amount of gravel pack used <u>see next</u> Grain size distribution of gravel pack <u>see</u> Lithology of gravel pack <u>Quartz</u> , trace	page e specification sheet rock fragments
Amount of gravel pack used <u>see next</u> Grain size distribution of gravel pack <u>see</u> Lithology of gravel pack <u>Quartz</u> , trace Source (company and quarry/pit) <u>Arkho</u>	page e specification sheet rock fragments la Sand & Gravel, Ft. Smith, AR
Amount of gravel pack used <u>see next</u> Grain size distribution of gravel pack <u>see</u> Lithology of gravel pack <u>Quartz</u> , trace Source (company and quarry/pit) <u>Arkho</u> Interval of gravel pack (ft-ft) <u>89-102</u> fe	page e specification sheet rock fragments la Sand & Gravel, Ft. Smith, AR eet
Amount of gravel pack used <u>see next</u> Grain size distribution of gravel pack <u>see</u> Lithology of gravel pack <u>Quartz</u> , trace Source (company and quarry/pit) <u>Arkho</u> Interval of gravel pack (ft-ft) <u>89-102</u> fe Interval of bentonite seal (ft-ft) <u>86-89</u>	page e specification sheet rock fragments la Sand & Gravel, Ft. Smith, AR eet feet
Amount of gravel pack used <u>see next</u> Grain size distribution of gravel pack <u>see</u> Lithology of gravel pack <u>Quartz</u> , trace Source (company and quarry/pit) <u>Arkho</u> Interval of gravel pack (ft-ft) <u>89-102</u> fe	page e specification sheet rock fragments la Sand & Gravel, Ft. Smith, AR eet feet
Amount of gravel pack used <u>see next</u> Grain size distribution of gravel pack <u>See</u> Lithology of gravel pack <u>Quartz</u> , trace Source (company and quarry/pit) <u>Arkho</u> Interval of gravel pack (ft-ft) <u>89–102</u> fe Interval of bentonite seal (ft-ft) <u>86–89</u> Interval of grouting (ft-ft) <u>0–86</u> feet	page e specification sheet rock fragments la Sand & Gravel, Ft. Smith, AR eet feet
Amount of gravel pack used <u>see next</u> Grain size distribution of gravel pack <u>See</u> Lithology of gravel pack <u>Quartz</u> , trace Source (company and quarry/pit) <u>Arkho</u> Interval of gravel pack (ft-ft) <u>89–102</u> fe Interval of bentonite seal (ft-ft) <u>86–89</u> Interval of grouting (ft-ft) <u>0–86</u> feet	page e specification sheet rock fragments la Sand & Gravel, Ft. Smith, AR eet feet
Amount of gravel pack used <u>see next</u> Grain size distribution of gravel pack <u>See</u> Lithology of gravel pack <u>Quartz</u> , trace Source (company and quarry/pit) <u>Arkho</u> Interval of gravel pack (ft-ft) <u>89–102</u> fe Interval of bentonite seal (ft-ft) <u>86–89</u> Interval of grouting (ft-ft) <u>0–86</u> feet	page e specification sheet rock fragments la Sand & Gravel, Ft. Smith, AR eet feet
Amount of gravel pack used <u>see next</u> Grain size distribution of gravel pack <u>See</u> Lithology of gravel pack <u>Quartz</u> , trace Source (company and quarry/pit) <u>Arkho</u> Interval of gravel pack (ft-ft) <u>89–102</u> fe Interval of bentonite seal (ft-ft) <u>86–89</u> Interval of grouting (ft-ft) <u>0–86</u> feet	page e specification sheet rock fragments la Sand & Gravel, Ft. Smith, AR eet feet steel protective casing and lid; secured with padlock
Amount of gravel pack used <u>see next</u> Grain size distribution of gravel pack <u>See</u> Lithology of gravel pack <u>Quartz</u> , trace Source (company and quarry/pit) <u>Arkho</u> Interval of gravel pack (ft-ft) <u>89–102</u> fe Interval of bentonite seal (ft-ft) <u>86–89</u> Interval of grouting (ft-ft) <u>0–86</u> feet	page e specification sheet rock fragments la Sand & Gravel, Ft. Smith, AR eet feet steel protective casing and lid; secured with padlock
Amount of gravel pack used <u>see next</u> Grain size distribution of gravel pack <u>See</u> Lithology of gravel pack <u>Quartz</u> , trace Source (company and quarry/pit) <u>Arkho</u> Interval of gravel pack (ft-ft) <u>89–102</u> fe Interval of bentonite seal (ft-ft) <u>86–89</u> Interval of grouting (ft-ft) <u>0–86</u> feet	page e specification sheet rock fragments la Sand & Gravel, Ft. Smith, AR eet feet steel protective casing and lid; secured with padlock

1.7.1

	N	Well Co	mpletion	Log: She	et 2/2				
Boring or Well	No		~	Project Tin	ker AFB IRP	Phas	e II St	age 2	
Location_DPD	0 Yard			Log Recorde	ed By <u>W.M.</u>	Littl	e		
Construction									
(ft)		Static lev	vel of water be	fore 82	feet			(ft) an	
-		after.	82 feet	(f	t) developm	ent		• •	
	Protective	Developr	nent started_ nent ended	0900 hrs	, 21 June 1	984 984			
	casing		of water disc.					ns	
-		Type, siz	e/capacity of	pump or bail	ler used for de	evelop	ment	······	
		Air lif	t (drilling	rig) with	variable d	ischa	rge		
- 4" - PVC	Grout	Depth of	open hole ins	ide well					
10-casing			e developmer					(ft)	
		After	development	102 fe	et			(ft)	
F									
-		Development Record							
20			Clarity and	Odor	Lithology and Grain Size of	<u> </u>	Conduc		
F 7	≁ ∥	Time	Color of Discharge	of Discharge	Removed Sediment	Ph	tivity	Remarks	
E +	∱	0900	Red,	None	Silt,			∿1/4 gpm	
80-			heavy silt		minor fine sand				
	Static water level	0010						011	
		0910	Begin sur	ging in 1 i	inute cycl	es		Slowly clearing	
	Bentonite	0940	Moderate	None	Silt				
90	-	0940	silt	None	5110				
– –	Gravel pack								
- 4" - PVC									
screen									
							1		
-	1								
 									
L L									
-								ł	
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RADIAN Well Comple	tion Log: Sheet 1/2
Boring or Well No. 6G	Project Tinker AFB IRP Phase II Stage 2
ocation West of Building 3117	Log Recorded ByW.M. Little
Construction started 29 June 1984	completed 29 June 1984
Development started 30 June 1984	completed 30 June 1984
Total depth drilled (ft)	
Hole diameter 8 inch	
Drilling method air rotary	ascading water from approx. 25 feet inhibits
Problems encountered during drilling <u>Minor</u> Ca cuttings	
Water source for drilling and completion procedu	
Number and type of samples collected Grab	samples from discharge
Sample interval (ft-ft)	
Storage method(s)plastic bags, ambie	nt temperature
Casing type Schedule 80 PVC, flush join	t Diameter inches
Depth of casing (ft) 80 feet	
Screen type <u>Schedule 40, PVC, mill slot</u>	
Slot size 0.020 inches	Screen interval (tt-ft)
Type(s) of glue used to join casing <u>none</u>	
Type of gravel pack used <u>8-12 sand</u>	······································
Amount of gravel pack usedseenextpage	
Grain size distribution of gravel pack <u>see spe</u>	cification sheet
_ithology of gravel pack <u>Quartz</u> , trace rock	fragments
Source (company and quarry/pit) Arkhola_Sa	nd & Gravel, Ft. Smith, AR
76.00 6	
nterval of gravel pack (ft-ft)76-90_feet	
nterval of grouting (ft-ft)0-73 feet	
Description of security measures 8 inch stee	1 protective casing and lid; secured with padlo
voccupiton of occurry measures	
· · · · · · · · · · · · · · · · · · ·	
Padlock ID No. Master 3213	Location of key(s)TAFB/SGB, DEEP; Radian

			N	Well Co	ompletion	Log: She	et 2/2			
	oring or V				I					age 2
			of Building	5117	<u></u> 1	Log Recorde	d By	rench	<u>.</u>	
	Construc	tion	Schematic						<u></u>	
it)	-				vel of water be 81 feet					(ft) and
	F ,		- Protective	Develop	ment started	0730 hrs	, 30 June 1	984		· · · ·
	-		casing	Develop	ment ended	0810 hrs	<u>, 30 June 1</u>	984	1 1	
0-			1		of water discl					
	<u> </u>				t (drilling					
							<u></u>		<u> </u>	
10-	-				open hole ins re developmen					
			-		development					
	F		-							
	4"		Grout	Development Record						
40 -	PVC casing			Time	Clarity and Color of Discharge	Odor of Discharge	Lithology and Grain Size of Removed Sediment	Ph	Conduc- tivity	Remarks
50 -				0730	Red, very heavy silt		Silt, fine sand			Very low flow.
50	F				Flush casi developme		ve material	insid	ie, res	ume
	F			0740			low, slowly	clear	ing.	
60 -				0805	Moderate silt	None	Silt, minor fine sand			
				0810	No change,	cease dev	eloping.			
70-	t i									
	- -		Bentonite							
80 -	4" 9VC	▼	Static water level							
	screen		Gravel pack							
90-	⊢		-							
	F					D-68			<u> </u>	

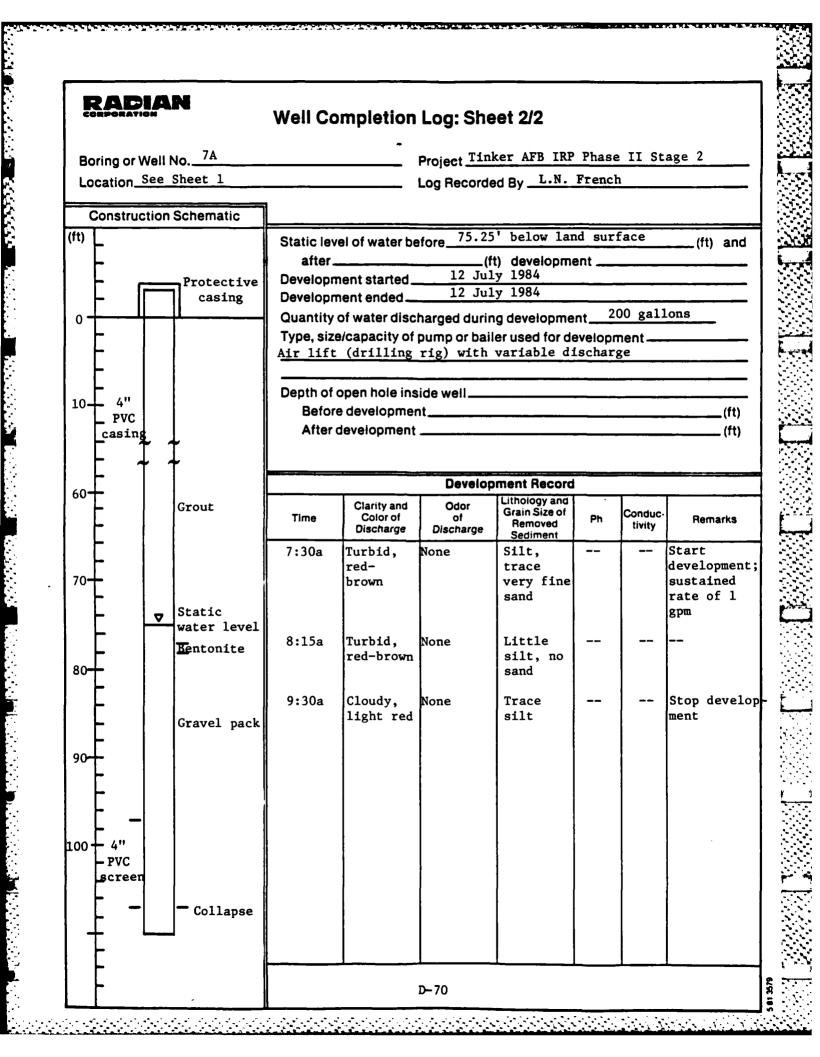
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RADIAN Well Completion	on Log: Sheet 1/2	
Boring or Well No7A	- Project Tinker AFE	IRP Phase II Stage 2
Location 30 ft. north of SE 59th St.,	_ Log Recorded By	N. French
75 ft. east of unnamed tributary of Soldier Creek		
Construction started 11 July 1984	completed	12 July 1984
Development started 12 July 1984	completed	12 July 1984
110 5		
Total depth drilled (ft) <u>110 feet</u>		
Hole diameter <u>8 inch</u>		
Drilling method air rotary		
Problems encountered during drilling <u>None</u>		
Water source for drilling and completion procedure	s base supply	
Number and type of samples collected <u>Grab</u> sam	nples from discharge	
Sample interval (ft-ft) variable		
	temperature	
Storage method(s)plastic bags, ambient		
Casing type Schedule 40 PVC, flush joint	_ Diameter inch	les
Depth of casing (ft)97 feet		
Screen type <u>Schedule 40, PVC, mill slot</u>		
Slot sizeSo	creen interval (ft-ft)97	<u>-107 feet</u>
Type(s) of glue used to join casing <u>none</u>		······
Type of gravel pack used <u>8-12 sand</u>		
Amount of gravel pack used <u>see next page</u>		
Grain size distribution of gravel pack <u>see specif</u>	fication sheet	
Lithology of gravel pack Quartz, trace rock fi	ragments	
Source (company and quarry/pit) Arkhola Sand		AR
Interval of gravel pack (ft-ft)		
Interval of bentonite seal (ft-ft)		
Interval of grouting (ft-ft)0-77_feet		
Description of security measures <u>8 inch steel</u>	protective casing and	lid; secured with padlock
······································		
	<u> </u>	
Detter 1913		COR DEED: Podias
Padlock ID No. Master 3213	Location of key(s) TAFE	5/5GB, DEEP; Radian
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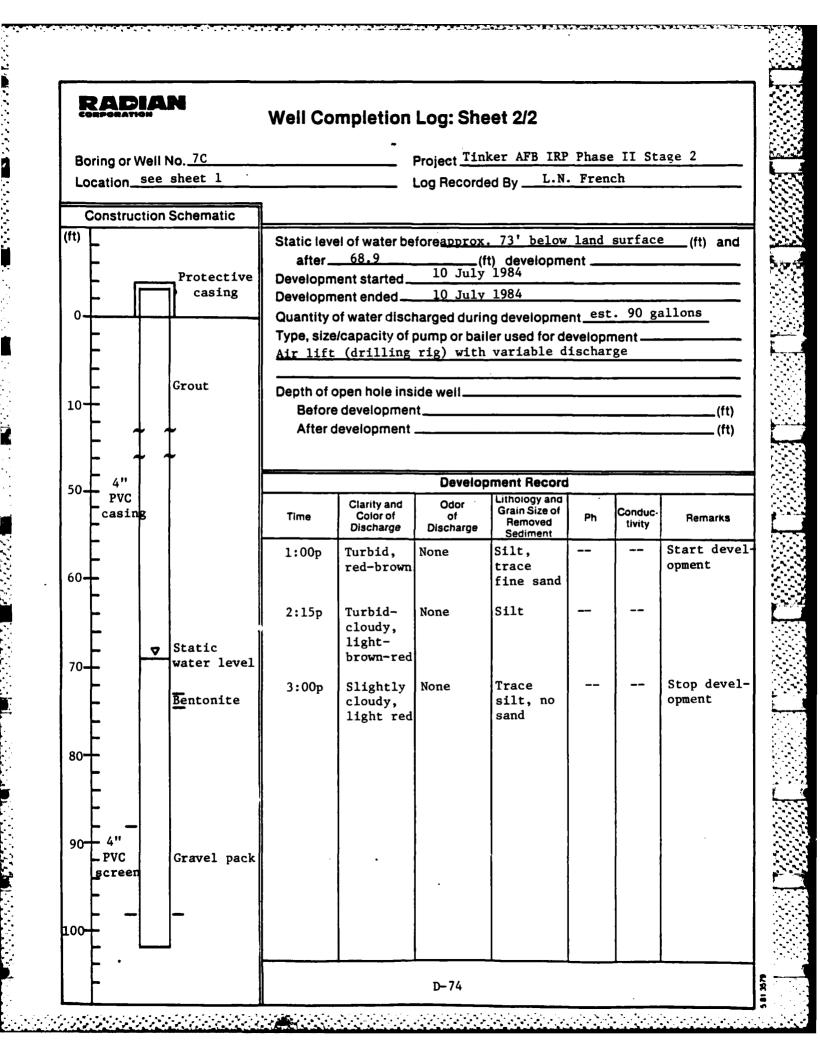


	Project <u>Tinker AFB IRP Phase II Stage 2</u> Log Recorded By L.N. French
Location 200 ft. north of SE 59th St., 200 ft. west of unnamed tributary of Soldier Creek Construction started11 July 1984	_ Log Recorded By L.N. French
	completed <u>11 July 1984</u>
Development started <u>11 July 1984</u>	completed11_July 1984
Total depth drilled (ft)45 feet	
• • • • • • • • • • • • • • • • • • •	
Drilling methodair rotary	
Problems encountered during drilling <u>none</u>	· · · · · · · · · · · · · · · · · · ·
	no water used
Water source for drilling and completion procedure	5
Number and type of samples collected <u>Grab</u> sam	nples from discharge
Sample interval (ft-ft)	
Storage method(s)plastic bags, ambient	temperature
Cobodula (0 DVC fluck inist	Diameter 4 inches
Casing type <u>Schedule 40 PVC</u> , flush joint	_ Diameter 4 Inches
Depth of casing (ft) <u>35 feet</u> Screen type <u>Schedule 40</u> , PVC, mill slot	Diameter 4 inches
	creen interval (ft-ft)
Type(s) of glue used to join casing <u>none</u>	
Type of gravel pack used <u>8-12 sand</u>	
Amount of gravel pack used <u>see next page</u>	
Grain size distribution of gravel pack see specif	fication sheet
Lithology of gravel pack <u>Quartz</u> , trace rock fi	ragments
Source (company and quarry/pit) Arkhola Sand	& Gravel, Ft. Smith, AR
Interval of gravel pack (ft-ft)	
Interval of bentonite seal (ft-ft) 29-30 feet	
Interval of grouting (ft-ft)0-29 feet	
Description of security measures <u>8 inch steel</u>	protective casing and lid; secured with padloc
Padlock ID No. Master 3213	Location of key(s) TAFB/SGB, DEEP; Radian

	Well Co	mpletion	Log: She	eet 2/2			
Boring or Well No. 7B Location see sheet 1			Project <u>Tin</u>	ker AFB IRP	Phas Fren	e II St. ch	age 2
Construction Schematic				ed by			
Protective Protective casing 10 4" PVC Grout	e Developm Developm Quantity o Type, size <u>Air lift</u> Depth of o Before	39.8 feet 1 ent started_ ent ended_ of water disch /capacity of p (drilling open hole ins e developmen	bls (11 J 11 J harged durin pump or bai rig) with ide well	below land ft) developme July 1984 July 1984 Ing developme ler used for de h variable d	nt2 nt2 evelop ischa	0 gallo ment — rge	<u>ns (est.)</u> (ft)
casing			Develo	pment Record			
	Time	Clarity and Color of Discharge	Odor of Discharge	Lithology and Grain Size of Removed Sediment	Ph	Conduc- tivity	Remarks
30-Bentonite	9:00a	Turbid, red-brown	None	Silt			Start devel opment (0.5 gpm continu- ous)
40 40 40 40 40 40 40 40 40 40	[Cloudy, red-brown	None	Silt			Sharp de- crease in pumping rate; pause in pumping to allow fo water-level recovery
	10:30a	Cloudy	None	Some silt			Continued d crease in discharge; stop develo ment.

RADIAN Well Comple	etion Log: Sheet 1/2
Boring or Well No7C	Project Tinker AFB IRP Phase II Stage 2
ocation 375' north of SE 59th St.,	Log Recorded By L.N. French
75' west of unnamed tributary of Solider Creek	
Construction started <u>10 July 1984</u>	completed 10 July 1984
Development started <u>10 July 1984</u>	completed 10 July 1984
Total depth drilled (ft) <u>102 feet</u>	
Hole diameter8 inch	·
Drilling method air rotary	
Problems encountered during drilling <u>None</u>	
Water source for drilling and completion proced	Jures no water used
Type(s) of glue used to join casing <u>none</u> Type of gravel pack used <u>8–12 sand</u> Amount of gravel pack used <u>see next page</u>	Diameter <u>4 inches</u> <u>Screen interval (ft-ft)</u>
Grain size distribution of gravel pack <u>see</u> spe	ecification sheet
Lithology of gravel pack <u>Quartz</u> , trace rocl	k fragments
Source (company and quarry/pit) <u>Arkhola_Sa</u>	and & Gravel, Ft. Smith, AR
nterval of gravel pack (ft-ft)74.5-98 feet	
Interval of bentonite seal (ft-ft) 73-74.5 feet	
Interval of grouting (ft-ft)0-73 feet	
Description of security measures <u>8 inch_stee</u>	el protective casing and lid; secured with padlock
Padlock ID No. Master 3213	Location of key(s) TAFB/SGB, DEEP; Radian

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RADIAN Well Com	pletion Log: Sheet 1/2
Boring or Well No. 70	Project Tinker AFB IRP Phase II Stage 2
	Log Recorded By W.M. Little
construction started 28 June 1984	completed 29 June 1984
Development started29_June_1984	completed29 June 1984
Total depth drilled (ft)75 feet	
tole diameter <u>8 inch</u>	<u> </u>
Drilling method <u>air rotary</u> Problems encountered during drilling <u>no</u>	ne
Nater source for drilling and completion pro	Ceduresbase suppry
lumber and type of samples collected <u>Gr</u>	ab samples from discharge
ample interval (ft-ft)	
Storage method(s) plastic bags, am	bient temperature
Casing type <u>Schedule 40</u> PVC, flush j	oint Diameter4 inches
Depth of casing (ft) <u>65 feet</u> Screen type <u>Schedule 40, PVC, mill sl</u>	ot Diameter 4 inches
Slot sizeinches	
Type(s) of glue used to join casing <u>none</u>	
Type of gravel pack used <u>8-12 sand</u>	
Amount of gravel pack used <u>see next</u> pa	
Grain size distribution of gravel pack see	specification sheet
ithology of gravel pack <u>Quartz</u> , trace r Source (company and quarry/pit) <u>Arkhola</u>	Sand & Gravel, Ft. Smith, AR
nterval of gravel pack (ft-ft) <u>64–75 fee</u> nterval of bentonite seal (ft-ft) <u>60–64 fee</u>	
nterval of grouting (ft-ft)0-60 feet	
Description of security measures <u>8 inch</u>	teel protective casing and lid; secured with padlock
Padlock ID No. Master 3213	Location of key(s)TAFB/SGB, DEEP; Radian

			N	Well Co	ompletion	Log: She	et 2/2			
Bo	oring or N	Vell N	No. 7D	<u>-</u>		Project <u>Tin</u>	ker AFB IRP	Phas	e II St	age 2
Lo	cation_	West	of Landfill	6		Log Record	ed By <u>W.M.</u>	Littl	e	·
	Construc	tion	Schematic	İ						
(ft)				Statio lo	vel of water be		57 feet			(ft) and
•				after	57 feet	(f	t) developm	ent		
			Protective	Develop	nent started	0935 hrs.	29 June_4	784		
	-		casing		nent ended					
0-	╘──┸				of water disc	-				
	F				e/capacity of t (drilling					
	╞						· · · · · · · ·			
10-	E			-	open hole ins					
10-	F				re developmer development					、 /
	┝			Aiter	reveropment			·····		(Tt)
20-	PVC				Development Record					
	casing			Time	Clarity and Color of	Odor of	Grain Size of Removed	Ph	Conduc	Remarks
	F				Discharge	Discharge	Sediment		tivity	
	-		Grout	0935	Red, mod- erate	None	Silt			Production apprx. 1 gpm
30-	+				silt					
				0955	Moderate	None	Silt			Production
	Ļ				silt					slows to <1/2 gpm
	┝									TIT BPm
40-	Ē				Slowly cle	aring, beg	gin surging			
	-			1035	Moderate s	ilt; cease	e developmen	nt.		
	-					[
5 0-	F									
	┝									
			Shahi -							
	[Static water level							
60-	┢									
	E	ļ	Bentonite		1					
	F —									
	- 4"		Gravel pack							
	PVC screet									
	-				<u> </u>	l	L			
	⊢ —				•	-76				

RADIAN Well Co	ompletion Log: Sheet 1/2
Boring or Well No. 7F	Project Tinker AFB IRP Phase II Stage 2
Location <u>North edge of Landfill 6</u>	Log Recorded By <u>W.M. Little</u>
Construction started 22 June	
Development started 22 June	e 1984 completed22 June 1984
Total depth drilled (ft)25 feet	
Hole diameter <u>8 inch</u>	· · · · · · · · · · · · · · · · · · ·
-	
Problems encountered during drilling	
Water source for drilling and completion	procedures base supply
Number and type of samples collected_	Grab samples from discharge
Sample interval (ft-ft)variable	
Storage method(s) plastic bags,	, ambient temperature
Casing type <u>Schedule</u> PVC, flus Depth of casing (ft)	
Screen type Schedule 40, PVC, mill	1 slot Diameter 2 inches
Slot size 0.020 inches	Screen interval (ft-ft) _15-25 feet
Type(s) of glue used to join casing <u>none</u>	e
Type of gravel pack used <u>8-12 sand</u>	
Amount of gravel pack usedseenext	
Grain size distribution of gravel pack	see specification sheet
Lithology of gravel pack Quartz, trac	ce rock fragments
Source (company and quarry/pit)	hola Sand & Gravel, Ft. Smith, AR
Interval of gravel pack (ft-ft)	
	2 feet
Interval of grouting (ft-ft)0-10_fee	et
Description of security measures <u>8 inc</u>	ch steel protective casing and lid; secured with padloc

Boring or V				mpletion -	•				
I contion N	Vell I	No. 7F n edge of Lan		I	Project <u>Tink</u>	er AFB IRP	Phase Little	e II St	age 2
					Log Recorde	а ву			
Construc	tion	Schematic			. 16	fact			
"E			Static leve	l of water be 16 fee	fore et (ff				(ft) and
F -		Protective	Developm	ent started	1012 hrs, 2	22 June 198	4		
<u>_</u>		casing				22 June 198			
°						g developme			<u>ns</u>
-		Grout				variable d			
				· · · · ·					
				-		foot			
		Bent onite	After d	evelopment	2	j feet			(ft)
⊢ -	- T -	Static water level		p					
2 "	÷.	Gravel pack			Develop	ment Record			
0- PVC		oraver pack		Clarity and	Odor	Lithology and		1	
- scree	Ω		Time	Color of Discharge	of Discharge	Grain Size of Removed	Ph	Conduc- tivity	Pemarks
			1012	Red-brown		_Sediment Silt		<u> </u>	Wearing
1			1012	heavy	determined				respirators
Ŧ				silt					
-				Slowly cl	earing				
E			1032	Clear		None			Production
$\overline{+}$									approx 1/2 gpm
+									6F
E									
-				1					
+		1							
F									
-									
F									
-									
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Ľ			1						
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F				ת	-78				
				2					

Well Completion	on Log: Sheet 1/2	2
Boring or Well No. 7G	- Project Tinker A	FB IRP Phase II Stage 2
Boring or Well No. <u>7G</u> .ocation_East_edge_of_Landfill_6	Log Recorded By	W.M. Little
Construction started 21 June 1984	completed	22 June 1984
Development started 22 June 1984		22 June 1984
Total depth drilled (ft) <u>30 feet</u>		
Drilling method <u>air rotary</u> Problems encountered during drilling <u>None</u>		<u></u>
Nater source for drilling and completion procedure		
lumber and type of samples collected <u>Grab</u> sam	mples from discharg	e
Sample interval (ft-ft)		<u> </u>
Storage method(s) plastic bags, ambient	temperature	
Schodula 80 DWC fluch inist		2 inches
Casing type <u>Schedule</u> 80 PVC, flush joint	_ Diameter	2 Inches
Depth of casing (ft) <u>13 feet</u> Screen type <u>Schedule 40</u> , PVC, mill slot	Diameter	2 inches
Slot size0.020 inchesSo		13-28 feet
Type(s) of glue used to join casing <u>none</u>		
Type of gravel pack used <u>8-12 sand</u> Amount of gravel pack used <u>see next page</u>		
Grain size distribution of gravel pack see specifi	fication sheet	
_ithology of gravel pack <u>Quartz</u> , trace rock fi	ragments	
Source (company and quarry/pit) Arkhola Sand	& Gravel, Ft. Smit	h, AR
10-28 foot		
nterval of gravel pack (ft-ft) <u>10-28 feet</u> nterval of bentonite seal (ft-ft) <u>5-10 feet</u>		
Description of security measures <u>8 inch steel</u>	protective casing a	nd lid; secured with padloc
	<u></u>	
		······································

CORPORA		N	Well C	ompletion	Log: She	et 2/2			
Boring or	Well N	No7G		~	Project <u>Tink</u>	cer AFB IRP	Phase	e II Sta	age 2
Location	East	edge of Land	lfil <u>l 6</u>	<u>_</u>	Log Recorde	d By	Little	2	
Constru	iction	Schematic	1						
(ft)			Static le	vel of water be	fore 12 f	eet			(ft) and
F			after	12 feet	(f1) developm			
-		Protective	Develop	ment started_	0840, 22	June 1984			
		casing		ment ended of water disc					s
Ĩ -			Type, siz	e/capacity of	pump or bail	er used for de	evelop	nent	
F		_	Air li	ft (drilling	; rig) with	variable d	lischa	rge	
Γ		Bentonite		open hole ins	ido well	<u></u>			
10+		Static	Befo	re developmer	nt28_f	eet			(ft)
		water level	After	development	28_f	eet			(ft)
F									
20 PVC		Gravel pack		<u></u>	Develop	ment Record			
ecre	3		Time	Clarity and Color of Discharge	Odor of Discharge	Lithology and Grain Size of Removed Sediment	Ph	Conduc- tivity	Remarks
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			0850	Lighter color & turbidity					Productio slows to approx. 1/2 gpm.
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APPENDIX E Raw Field Data

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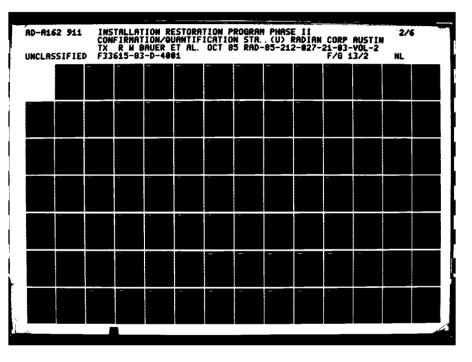
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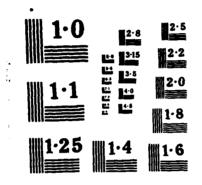
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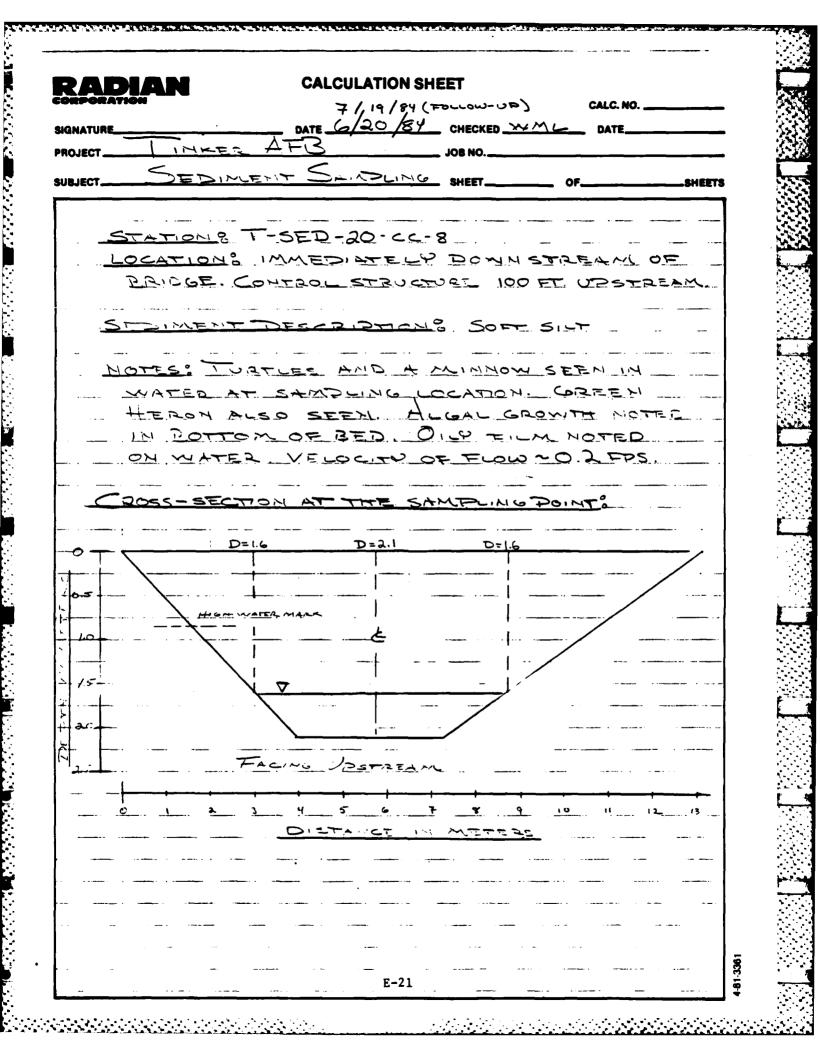
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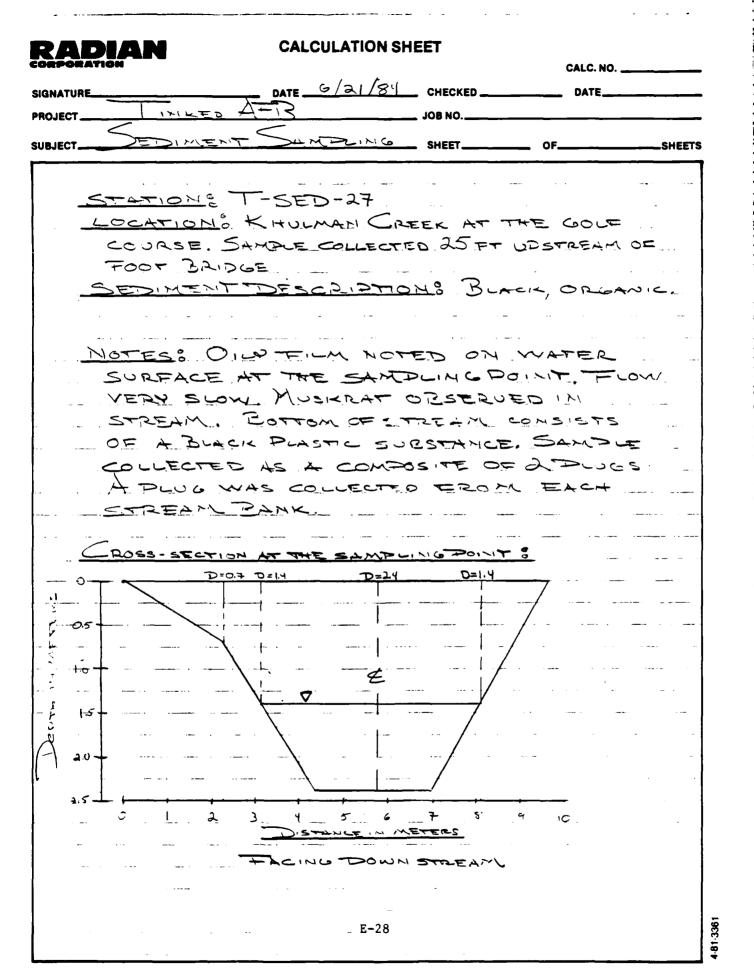
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CALCULATION SHEET RADIAN CALC. NO. DATE 6/21/84 CHECKED WML DATE ____ SIGNATURE_ INKEA -Fr PROJECT_ JOB NO. HIMDUING SHEET OF EDIMENT SUBJECT. SHEETS STATION: T-SED-26-CC-11 LOCATION! CRUTCHO CREEK AT THE GOLF COURSE. SEDIMENT DESCRIPTION: RED _____ NOTES: WATER VERY TURBID AT SAMPLING POINTS _ SAMPLE COMPOSITED FROM PLUCS COLLECTED FLOM THE CHANNEL 20 FEFT UDSTREAM AND 100 FEFT DOWNSTREAM OF FOOT BRIDGE VELOCITY OF FLOW ~0.5 FPS AT THE SAMPLING POINT? Doss -SECTON D=1.5 Dais D=1.5 ACING UDSTREAM Ł ∇ 3 121 NTERS 81-3361 E-26

ADIAN	CALCULATION SHEET
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SEDIMENT	DESCRIPTION & RED SILT.
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	NCHES VELOCITY ~ 0.5 FPS. CHANNEL
OBSCURE	DHERE SAMPLE COMPOSITED
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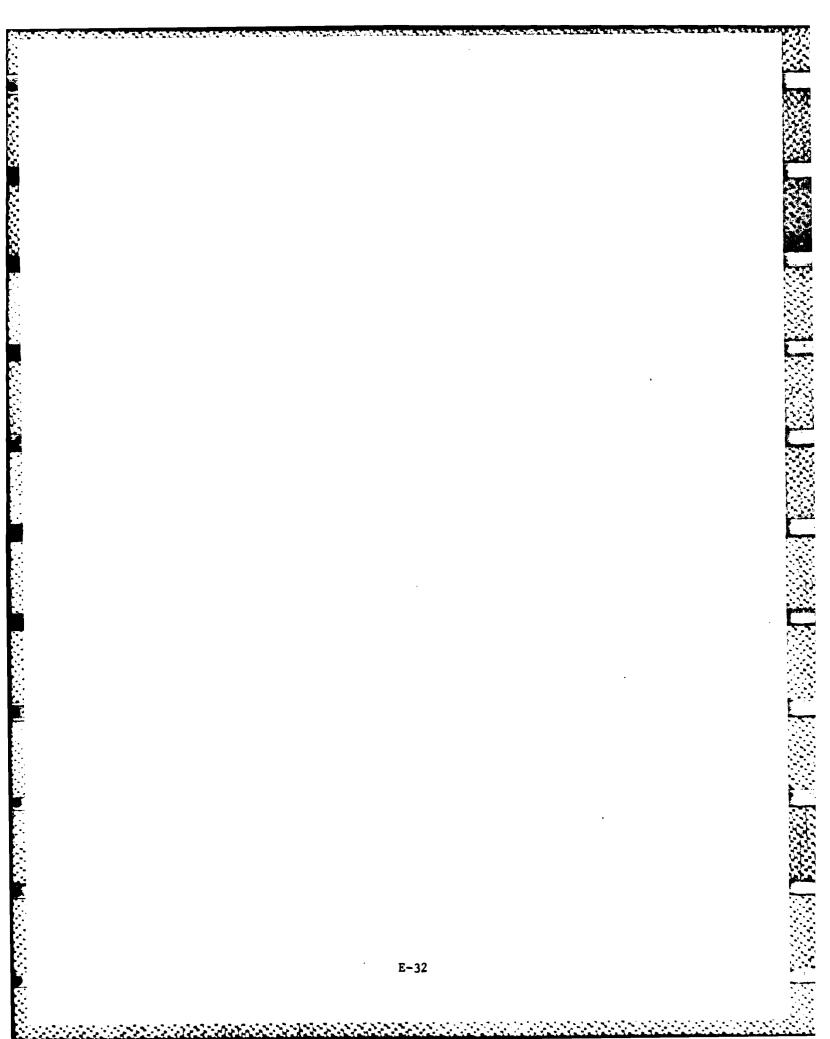
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Monitor Well Sampling

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UBJECT					·····	SHEET.		OF	SHEETS
Well Number	Depth to Water	Depth to Bottom	Stickup (inches)		Field ph	Field Cond.		Sampler	Comments
6G	84.67	93.07	3.13	7/16/84	11.4 9.4 7.7	840 420	20	DHG/NPS	Well water very turbid. Much sediment.
				Sample	7.9	320			Approximately 15 gallons bailed by hand. The 3 measurements of ph and conduc- tivity refer to the first 3 5-gallon bucket- fulls.
6D	32.94	59.00	2.94	7/16/84	7.4 6.8 7.0	340 330 330		dhg/nps	Measurements taken at approx- imately 5 gallon
				Sample	7.0				intervals. 22 gallons purged prior to sampling.
7 F	19.20	28.45	3.25	7/71/84 Sample		900	18	DGH/NPS	Very redhigh sediment.
7G	12.97	31.4	2.54	7/18/84	6.5	190	18	DHG/NPS	Very redhigh sediment.
6 A	60.00	80.45	3.53	7/18/84	6.5-7	345	21		
6 B	67.28	92.68	3.01	7/18/84	6.5-7	460	20	NPS/DHG	
6C	69.69	85.28	2.20	7/18/84	6.5-7	750	19.5	NP S/DHG	Pump broke at approximately 2 well casings; bailed the rest.
6G	85.00	93.32		7/30/84	8.1	560		NP S/DHG	Field dupli- cate. After evacuating approximately 10 gallons, well pumped dry. Waited for well to recover and then sampled
				1	E-33				(approximately 45 minutes). 601. 624/625.

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									CALC. NO	l
SIGNATURE			VATE							
UBJECT						, SHEET.		OF	SHEETS	
Well Number	Depth to Water	Depth to Bottom	Stickup (inches)		Field ph	Field Cond.	Temp. (°C)	Sampler	Comments	
6E	63.11	115.55		7/30/84	7.4	490	18	NPS/DHG	Pumped 100 gal. before sampling.	
6F	84.15	105	2.61	7/30/84	7.2	720	18	NP S / DHG	pH=7.1, C=740 @ 18 gal. Pumped 40 gal. before sample. 601, 624/625. Left to go set up next well and DPD0 closed so grabbed sample first thing on 7/31/84.	
7C	72.40	101.5	2.93	7/30/84	7.1	420	17	NPS/DHG	601, 624/625.	
7▲	79.18	108.8	3.60	7/31/84	7.2	590	17	NPS/DHG	<pre>@ 33 gal., pH= 7.1, C=590. 55 gal. evacu- ated. 601, 624/625.</pre>	
6D	32.85			7/31/84	7.2	590	18	NPS/DHG	Field duplicate for 601, 624/625. @ 15 gal. pH = 7.2, C=600. @ 30 gal., pH=7.2, C=600.	
2A	39.46	48.97	3.0	7/31/84	6.6	960	18.5	NPS/DHG	<pre>@ approximately 8 gal., pH=6.7, C=960. Approxi- mately 20 gal. evacuated. 601 only.</pre>	
6C	69.74			7/31/84	7.2	700	19	NPS/DHG	30 gal. evacu- ated. 601 only.	
7 F	20.36			7/31/84	6.6	1400	19	NP S	20 L evacuated. 601.	
6 A	60.00			8/1/84	6.5	440	20	NPS/DHG	101.40 gel.	
6 A	60.00				6.5 E-34	440	20	NPS/DHG	101.40 gal.	

									CALC. NO	
GNATURE			DATE						DATE	
									SHEETS	
Well Number	Depth to Water	Depth to Bottom	Stickup (inches)		Field ph				Comments	
7G	13.03			8/1/84	6.0	250	17	NPS/DHG	@ approximately 25 gal., pH=6.8, C=620.	
6B A	Aprx. 67			8/1/84	6.8	640	19	NP S/DHG	<pre>@ approximately 35 gal., pH=6.8, C=600. 50 gal. evacuated. 601.</pre>	
6D	32.9			8/1/84	7.2	580	18	NP S/DHG	@ 15 gal., pH= 7.2, C=590. @ 28 gal., pH= 7.2, C=580.	
6G	84.69			8/1/84	7.7	530	19	NPS/DHG	Pumped dry @ approximately 12 gallons. Waited 20 min. for recovery. 601.	
6E	62.88			8/14/84	7.3	450		DHG/AES		
6F	83.89				7.1	740				
7C	72.24			8/14/84	7.6	420		DHG/AES		
7▲	79.17			8/15/84	8.8	570		DHG/AES		
7C	72.37			8/15/84	7.2	440		DHG/AES		

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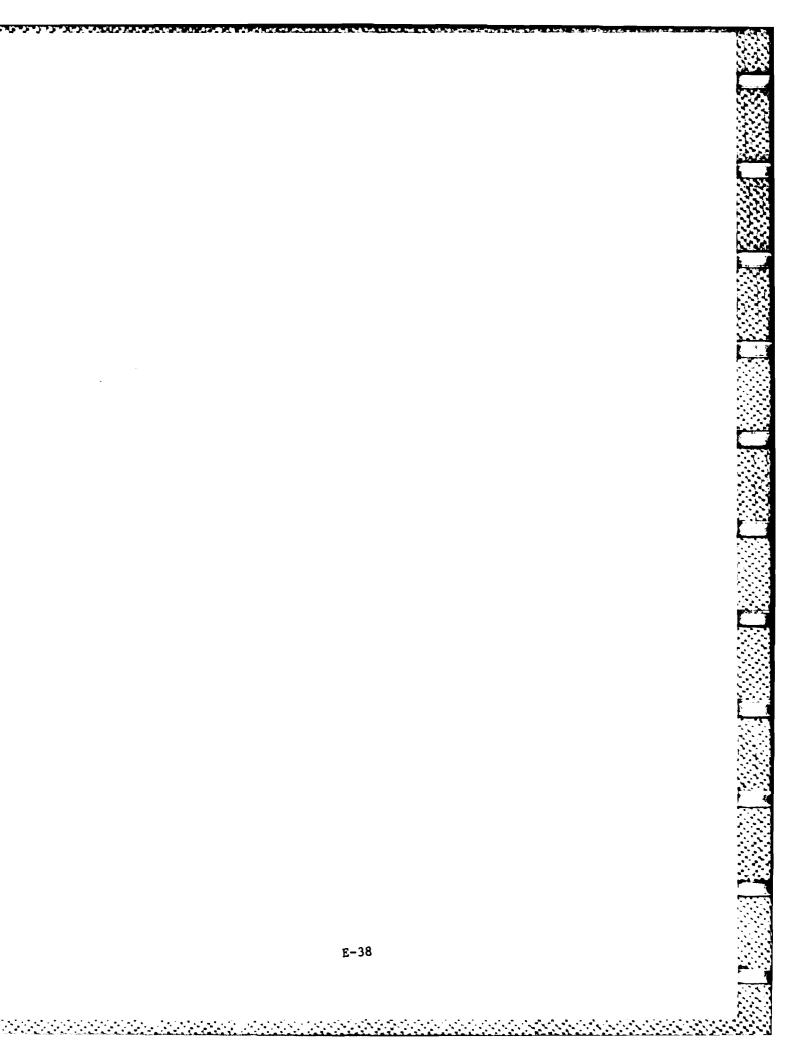
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Base Well Measurements



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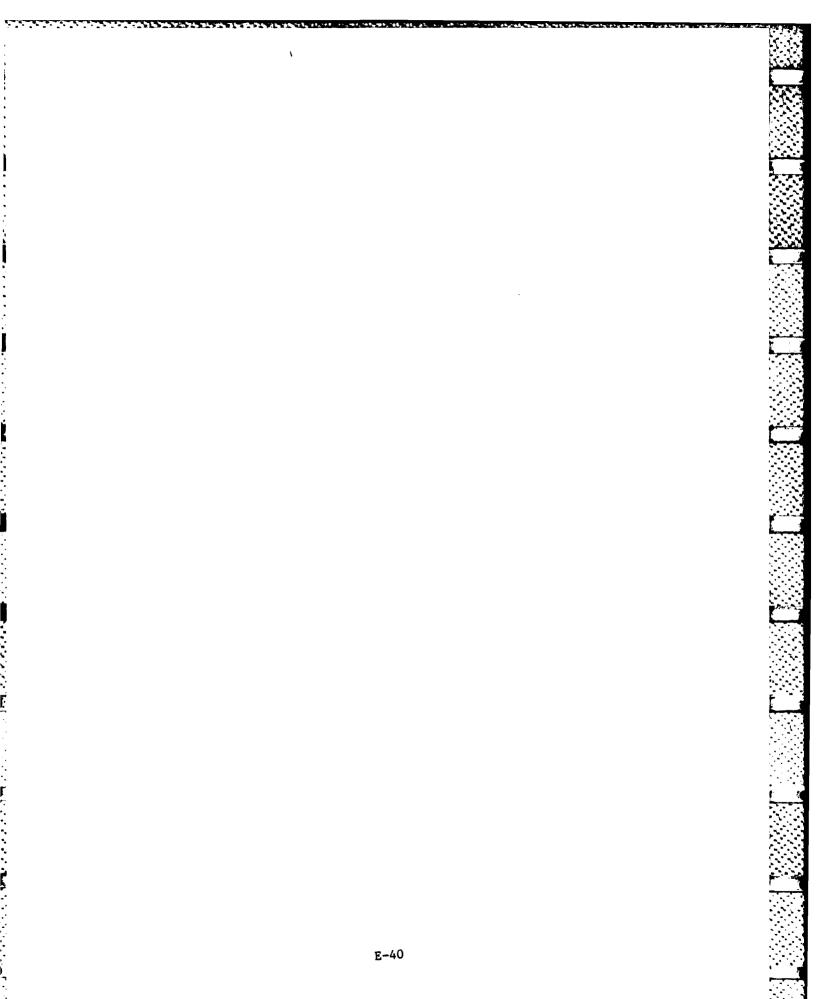
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RPORATION				CALC. NO		
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JECT Dept	h-To-Water Me	easurements, Base	Wells SHEET,	SHEETS		
Vell No.	Date	Depth to Water (ft)	Height of Measuring Point (inches)	Comments		
16	10/1/84	235'	15 1/2	Cascading water interferes with measurement.		
15	11	220'	20 1/2	do.		
14	**	-	-	No access.		
17	**	205' 4"	2	Open casing.		
18	**	100' 8 1/4"	4	do.		
19	**	240' 8"	4	do., sound of cascading wate		
13	10/8/84	-	-	No access.		
12	**	-	-	No access.		
11	**	260' 5"	10			
20	11	310' 18 1/2"	7			
21	,,	230' 8"	8			
17	**	205' 26"	2	Re-measurement.		
22	10/15/84	-	-	No access.		
23	**	230' 23 1/4"	7	Cascading water.		
24	**	-	-	No access.		
25	**	-	-	do., access port plugged.		
26	11	-	-	do.		

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Report of Base Surveyors



DEPARTMENT OF THE AIR FORCE 2854TH CIVIL ENGINEERING SQUADRON (AFLC) TINKER AIR FORCE BASE, OKLAHOMA 73145.

ATTN OF: DEEE (Sgt Deguzman, 42868)

21 Aug 84

summer: Elevation Survey of IRP Phase II, Stage 2 Wells (Your Ltr, 2 Aug 84)

•• USAFH/SGB

Results of wells survey, as per your request, is found on Attachment 1.

Α.

Engrg & Envmtl Planning Branch

2 Atch 1. Well Elevations

2. USAFH/SGB Ltr, 2 Aug 84

AFLC - Lifetime of the Acre pace Team

E-43



DEPARTMENT OF THE AIR FORCE USAF HOSPITAL TINKER (AFLC) TINKER AIR FORCE BASE, OKLAHOMA 73148

BAUG 1964

TTH OP. SGB

usuce. Elevation Survey of IRP Phase II, Stage 2 Wells

• 2854 CES/DEE

Radian Corp requests that absolute well elevations surveys be obtained by 22 Aug 84 for the six on-base wells shown on attachment one. Similarly, they request that absolute elevations be obtained for the seven wells shown on attachment two. These wells rise about three feet above the ground surface and are approproximately eight inches in diameter. This data is needed to verify groundwater flow direction. Quéstions regarding this request should be addressed to Capt Cornell at ext 47844.

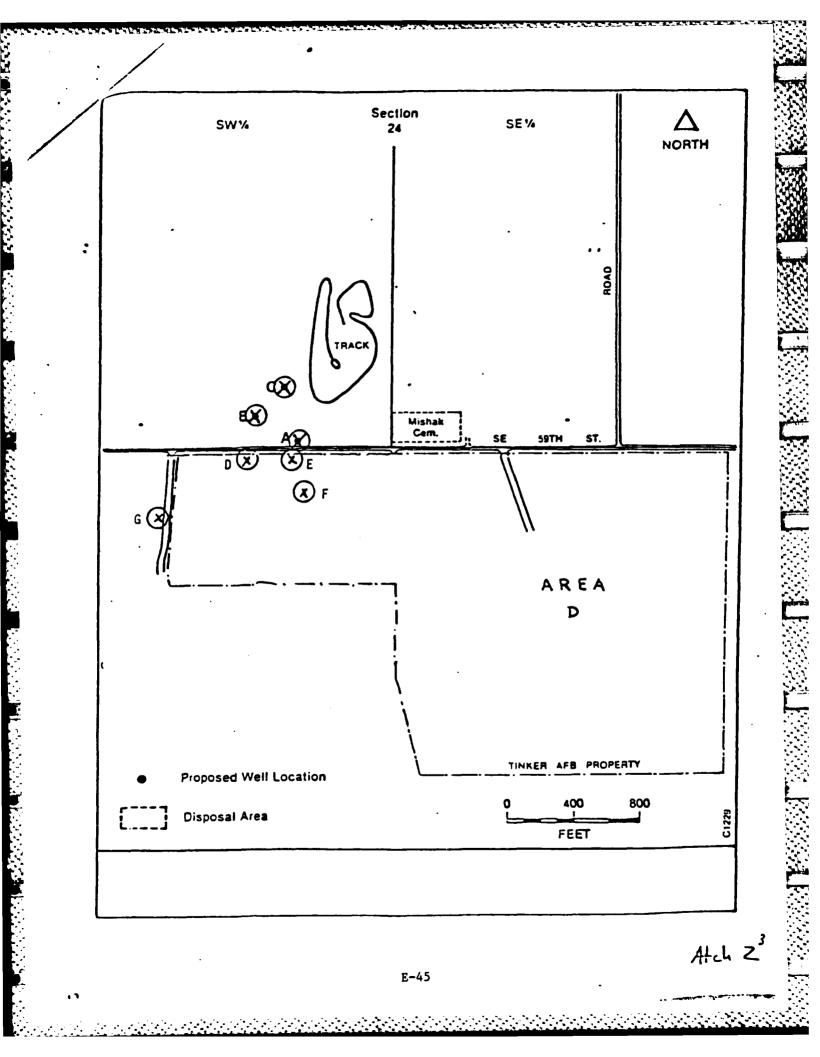
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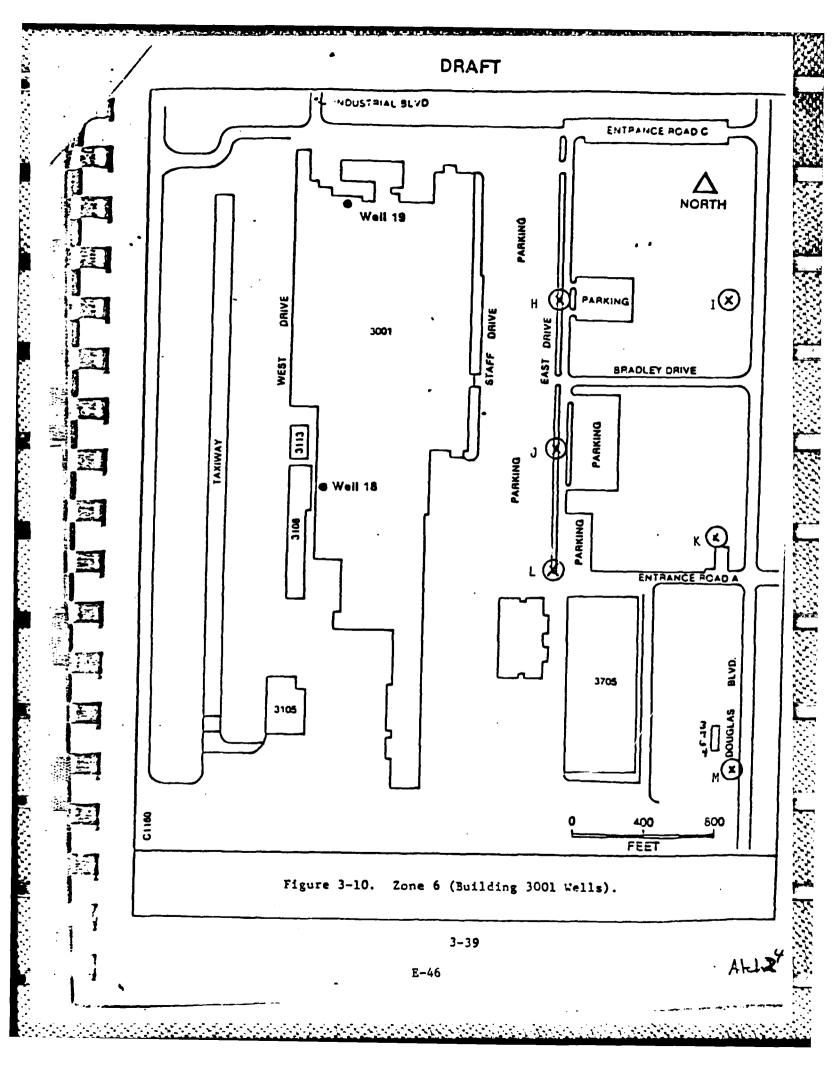
DAVID W. McELWEY, Lt Col, USAF, BSC Chief, Bioenvironmental Engineering Division

2 Atch: 1)On-base well locations 2)Off-base well locations

1 2 ANS REEL

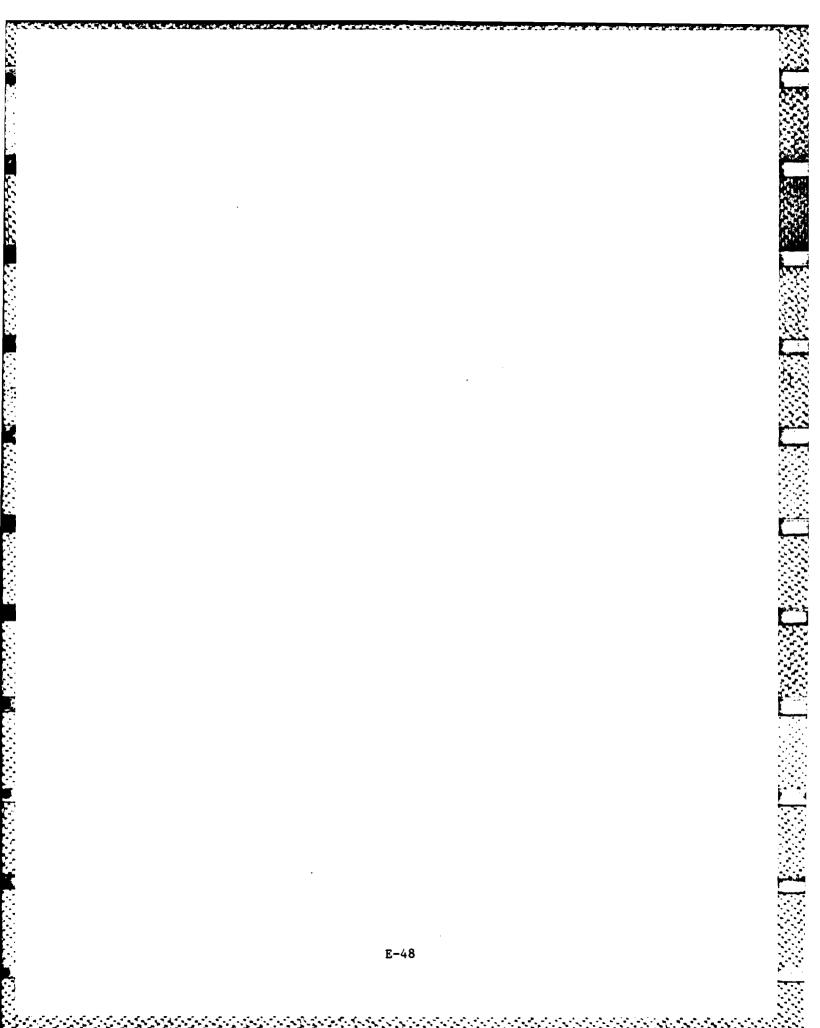
AFLC - Lifeline of the Acrospace Jeam





WELL "A"	<u>ELEVATION</u> 1277.73'
WELL "B"	1281.68'
WELL "C"	1272.30'
WELL "D"	1282.55'
WELL "E"	1280.99'
WELL "F"	1280.48'
WELL "G"	1300.00'
WELL "H"	1271.91'
WELL "I"	1256.15'
WELL "J"	1271.58'
WELL "K"	1270.22'
WELL "L"	1271.03'
WELL "M"	1287.29'

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APPENDIX F

Sampling and Analytical Procedures

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Field Procedures



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QUALITY ASSURANCE

The bulk of the field sampling procedures were presented in Section 3.0 of the report. The purpose of this Appendix Section is to describe the quality control and quality assurance aspects of the field program.

Many of the traditional quality assurance techniques (duplicate or spiked samples, for instance) are designed to test instrument or analyst performance and do not address the needs of a field program of monitoring well installation. In lieu of such techniques, field practices are built around a principal of "do it right the first time", and procedures are developed to insure this. The three main elements of the field QA program are:

- Record-keeping;
- Peer review; and
- Technical staff management review.

Eash is discussed below.

Record-Keeping

Each supervising geologist kept field notes as the coring and well installation activities progressed. In addition, the drilling subcontractor's team chief also kept field notes. These two sets of notes were compared to develop the logs of drilling activities shown in Appendix D. Discrepancies were resolved by reference to the geologic samples collected.

Ground-water samples were collected in accordance with a written list. The servicing laboratory prepared sample containers and provided them to the field team, who were working from the same list. After the samples were logged into the laboratory, the log-in sheets were compared against the original analytical schedule. All samples were shipped or hand-carried to the laboratory, accompanied by chain-of-custody forms (Appendix G).

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Peer Review

Each of the supervising geologists served overlapping tours of duty in the field. This provided all with the opportunity to participate in broad portions of the study, rather than focusing on a single zone. Each person overlapped with his successor to insure a smooth transition. Once the field effort was concluded, the supervising geologists were assigned to write up separate zones. These writing assignments provided for close coordination with other members of the field team, so that observations during drilling and sampling were incorporated into the text. After the drilling logs and report text were prepared, they were reviewed for completeness and accuracy by other members of the field team. Thus, each portion of the report was subjected to peer review before entering the formal review process.

Technical Staff Management Review

After the complete report was finalized by the Project Director, it was formally reviewed by a senior member of Radian's technical staff management. This review focused on quality of presentation and soundness of discussion and recommendations.

FIELD EQUIPMENT CALIBRATION

This program utilized very little in the way of field instrumentation. The four items of equipment were:

- pH meter (Corning Model 610A with a combination electrode), standardized daily against pH 7.00 and 10.00 or 4.00 buffers.
- Conductivity meter (YSI Model 33), calibrated before deployment against an 800 µmho standard and daily internal calibration check ("red line"):



- Water level probe (Soiltest Model 762A), no calibration required; and
- Threshold Limit Value Detector "TLV meter" (Bacharach Model 23-7231), zeroed with organic-free air and spanned with hexane standards. Not used for emissions level data determinations, but only for field drilling safety.



Laboratory Quality Assurance Program

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Quality Assurance/Quality Control Program for Radian Analytical Services

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THE QUALITY ASSURANCE/QUALITY CONTROL PROGRAM FOR RADIAN ANALYTICAL SERVICES

Radian Analytical Services' (RAS) objective is to provide high quality chemical analyses to all clients regardless of the size of the analytical task. To aid in achieving this goal, a strong quality assurance program and rigid quality control practices are integral parts of all analyses. This document describes these quality assurance/quality control protocols for the Radian Analytical Services laboratories.

The basic quality control program includes procedures for sample handling, calibration, spiking and replicate analyses, analysis of QC test samples, equipment maintenance, and supplies control. These procedures can be integrated with a client's additional requirements, such as spiking studies, analysis of replicate samples, linearity determinations, and stability studies.

The quality assurance program consists of the frequent submission of blind QA samples, duplicates, and spiked sample splits. Also included are personnel training, analytical methodologies, sample control procedures, data handling, and equipment maintenance and calibrations.

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1.0 QA Organization/Policy

The objective of Radian's quality assurance/quality control program is to assure, assess, and document the precision, accuracy, and adequacy of data obtained from chemical analysis and to assure the technical accuracy of the results obtained for all samples.

Radian has organized the quality assurance function within the company to allow complete independence of program review. Radian's Quality Assurance Director reports directly to the Vice President of the Technical Staff. This position provides independent reviews at all levels of the technical staff and laboratory organization and allows immediate access to Radian's top management on QA-related matters.

The QA Director's involvement may be limited to a review of quality control practices or as extensive as active development and implementation of quality control procedures and statistical data analysis. The QA Director may be asked to contribute expertise and assistance when a need is perceived by either the client, the technical staff, or the management staff.

Because of the large number of samples analyzed by RAS, a QA coordinator has been assigned to monitor and maintain an effective QA/QC program for these laboratories. The RAS Quality Assurance Coordinator, directly responsible to the Corporate QA Director, serves as an independent auditor of all RAS laboratories. The responsibilities of the RAS QA Coordinator are as follows:

Monitor QA/QC within RAS laboratories,

• Supervise the preparation of blind audit samples,



- inform the Director of RAS and the corporate QA Director of quality assurance problems,
- summarize and report QA activities in the laboratories,
- document all QA and QC procedures within RAS,
- act as liaison between the corporate QA Director and RAS,
- provide QA data to the corporate QA Director for inclusion in the corporate QA reports.

The RAS laboratory managers function as the quality control coordinators in each particular analytical area. Their efforts are coordinated and monitored by the QA Coordinator.

Quality control coordinators serve as a focal point for all QC activities pertaining to each RAS laboratory. They work as a committee coordinated by the RAS Quality Assurance Coordinator. Their activities include the following:

- monitor the QA/QC activities of the laboratory area,
- inform the Director of Analytical Services and the QA coordinator of QC problems and needs.
- summarize, document, and report quality control activities and data generated in the laboratory,

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- provide documentation of all QC procedures in the laboratory,
- maintains summaries of QC activities and data in a form suitable for client review upon request.

2.0 Quality Control for Laboratory Analyses

Radian Analytical Services has developed and implemented quality control procedures for all of the analyses performed in the laboratory. The laboratory quality control program provides an effective and efficient laboratory protocol for QC regardless of the size or scope of the analytical requirements. Approved analytical methods are used whenever available. When approved methods are not available, a method is developed by the Radian technical staff, and a technical note written describing the method. The quality control procedures are designed to insure that the standard operating procedures and quality control protocols are being followed and accurate results are obtained.

The general quality control program utilized in each laboratory includes consideration of the following areas:

- personnel training and certification,
- analytical methodology documentation,
- sample handling and control,
- laboratory facilities and equipment,
- calibration and standards,
- data handling and documentation,
- quality control check samples,

The general approach to quality control in each of these areas is discussed in the remainder of this section.

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2.1 Personnel Training and Certification

The successful implementation of any QA/QC program is determined by the training and dedication of the laboratory personnel. The quality and consistency of data should be independent of the analyst. With the proper training and supervision, an analyst will be able to obtain quality data by the use of proven methodology. Periodic assessment of training requirements and certification are performed to maintain a high level of laboratory awareness.

The training and certification methods employed in the RAS laboratories are briefly described below:

- study of laboratory standard operating procedures,
- study of QA manual,
- observation of experienced operators/analysts,
- study of operating manuals,
- instruction by the laboratory manager on all aspects of the analysis,
- perform the analysis under the direct supervision of the laboratory manager,
- perform analysis under supervision of experienced personnel,
- analysis of blind QC samples prepared by laboratory QC coordinator,
- participation in in-house seminars on laboratory methods and procedures.

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PERSONNEL TRAINING RECORD

Employee

Employee Number

Date of Employment

Laboratory Orientation:

Upon completion of each phase of personnel training the employee and Laboratory Manager will initial and date the step completed.

> The RAS laboratory Standard Operating Procedures have been read and understood.

> > Employee Lab Mgr. Date

• The RAS Quality Assurance manual has been read and the procedures for the laboratory in which the employee worker have been explained.

Employee Lab Mgr. Date

• Operation manuals for instruments with which the employee performs analyses have been studied and the procedures for operation and maintenance are understood.

Instrument	Employee	Lab Mgr.	Date	Instrument	Employee	<u>Lab Mgr.</u>	Date
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Figure 2-1.





Test Specific Training:

Each specific test performed in the RAS laboratories involves procedures which may be unique. The steps involved in training an employee are:

- <u>Instruction</u> by the Laboratory Manager on all aspects of the analysis,
- Observation of experienced operators/analysts,
- Perform the analysis under supervision of the laboratory manager,
- Perform <u>analysis of QA samples</u> submitted by the QA coordinator, and
- Participation in in-house <u>seminars</u> on laboratory methods and procedures.

The following table is to be completed by dating and initialing by the employee and Laboratory Manager upon completion of each step.

Method	Instruction	Observation	Perform the Analysis	Analysis of QA samples	Seminars
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Figure 2-1. (Cont'd)



All RAS personnel must complete a quality control training program. This system includes motivation toward producing data of acceptable quality and involves "practice work" by new employees. New personnel are made aware of the quality standards established by RAS and the reasons for those standards. They are made aware of the various ways of achieving and maintaining quality data. After an employee has been trained to use a method and the work validated by the laboratory manager, the employee is certified to perform the analysis. As these people progress to higher degrees of proficiency, their accomplishments are reviewed and then documented. Documentation of proficiency training is maintained by the QC Coordinator for each laboratory technician using the two-page form shown in Figure 2-1.

2.2 Analytical Methodologies

All analytical procedures followed in the RAS laboratories are documented in a methods manual for the specific laboratory. A set of standard operating procedures (SOP) has been established for each analysis to insure consistency. Most methods used are directly from an approved analytical manual, e.g., EPA methods, APHA Standard Methods for Water and Wastewater, ASTM, etc.

Methodologies may contain the following information:

- method title,
- scope of method,
- summary of interferences, and applications,
- concentration ranges and detection limits,
- safety precautions,
- required equipment and materials,
- standardization directions,
- detailed analytical procedure,
- calculations, with examples,
- reporting method,
- precision and accuracy statement,
- references.

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2.3

Sample Control and Record Keeping

The Radian Analytical Services Sample Control Center is a controlled access area. Only employees of the Sample Control Center have access to sample receiving, sample storage, documentation files, and the computer terminals. Analysts check out samples under the supervision of the sample control personnel. All samples are stored in locked storage areas. Sample tracking is maintained by a computerized laboratory management system and a sample checkout logbook. The RAS Sacramento laboratory is linked to the central processing unit of the computer in Austin via a dedicated phone line. This insures that the laboratories are in constant communication. All sample information and data entries can be immediately accessed at either location.

Detailed record keeping and control of samples are essential for effective laboratory operation. All samples received for analysis in the Radian Analytical Service laboratories are processed through the Sample and Analysis Management System (SAM). Radian Corporation's SAM is a software and hardware system for controlling and handling information for the analytical laboratory. SAM provides a dynamic, easy-to-use method for tracking, scheduling, reporting, and laboratory management. The system has been designed to accommodate and promote good laboratory management practices by providing high visibility of the information laboratory managers need to make good decisions regarding schedules and priority. The system is designed around a Data General Nova-IV computer with a 64K-byte memory. It also includes a 65M-byte disk drive and a line printer with plotting capabilities. Data is entered via a TEC terminal and CRT. All data stored on the disk is backed up on magnetic tape to prevent loss in the event of a system malfunction. The system is designed so that an individual designated as the principal operator can process the required paperwork for a large laboratory with little difficulty. The approach centralizes information input and data retrieval, and provides the mechanism for organized, up-to-date laboratory performance monitoring.

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SAM maintains complete client information files, generates laboratory status reports, flags sample analyses which are overdue, accepts analysis results manually or automatically, and generates reports and invoices.

The Sample Control Center and SAM have six basic functions:

- sample receipts and logging,
- sample storage and maintenance of sample integrity,
- laboratory status reporting,
- document control,
- data compilation and reporting, and
- invoicing.

In order to assure the integrity of a sample and the accompanying documentation, a security plan has been established. This plan consists of three parts:

- chain of custody,
- secured refrigerated storage, and
- document control.

The progression of samples and documentation through the Sample Control Center and the analytical laboratories is presented in Figure 2-2. Detailed descriptions of each sample control function are presented below:

- Samples are received from the commercial carrier at Radian's shipping and receiving facilities by the receiving clerk.
- Within one hour of arrival, the samples are accepted by RAS sample control personnel.

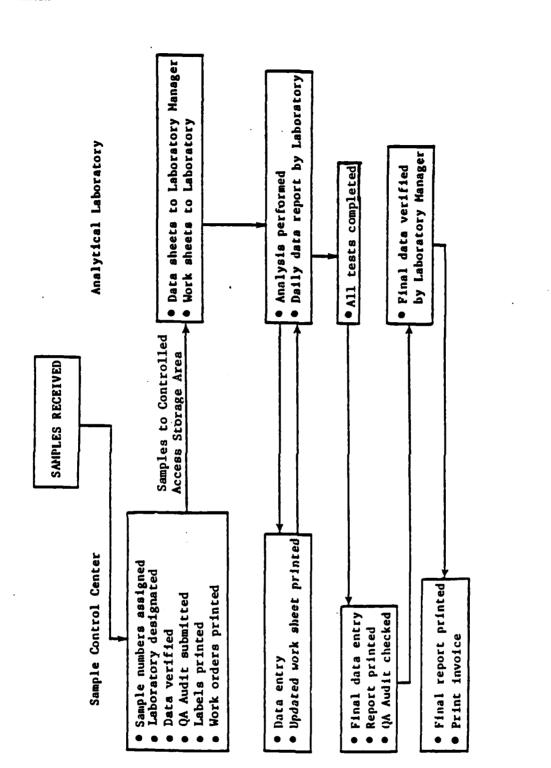


Figure 2-2. SAM Laboratory Management System

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- All shipping containers and security seals, when appropriate, are inspected for physical damage or evidence of tampering.
- The samples are unpacked in the sample receiving area by the RAS sample custodian. The method of shipment, shipping container integrity, condition of samples, the number of samples/ container, integrity of the security seal, and accompanying documentation are noted. Sample identification is verified against custody documents. The enclosed chain-of-custody forms, Figure 2-3, when required, are completed and filed with the shipping and receiving documentation. In the event that peculiarities are noted, the project officer or client is immediately advised of the irregularity.
- Samples are logged into a bound sample logbook, Figure 2-4.
 Again, sample identity is verified. All discrepancies are noted in the logbook.
- The handwritten logbook and all documentation are transferred to the Sample Control Center.
- The samples are logged into the SAM system. Each batch of samples is assigned a consecutive work order number by the system. Analytical requirements for each sample are entered into the computer.
- Hard copy of the work order and other information is printed and filed with the received documentation in the Sample Control Center.
- Labels are printed and secured to each sample. Label information includes sample number, identification, storage location, and analytical requirements.

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1

CHAIN OF CUSTODY RECORD

	Field	d Sample No
Company Sampled / Address		
Stream Characteristics:		
	Flow	pH
•		
Collector's Name	Date/Time Sampled	
Amount of Sample Collected		
Sample Description		
Store at: 🗆 Ambient 🗆 5°C 🖾 — 1	10°C 🗆 Other	
Caution - No more sample available	Return unused portion of sample I	Discard unused portions
-		
Other Instructions · Special Handling ·	Hazards	
🗆 Hazardous sample (see below)		
• • •		□ Flammable (FP< 40°C
		□ Shock sensitive
Pyrophoric	Lachrymator Sielesiesi	
	Biological Peroxide	
C Other		
Sample Allocation/Chain of Possessic	on:	
Organization Name		
Received By	Date Received	Time
Transported By	Lab Sample No	·
Comments		
Inclusive Dates of Possession		·
Organization Name		
Received By	Date Received	Time
Transported By	Lab Sample No	
Comments		
Inclusive Dates of Possession	·····	
Organization Name		··
	Date Received	
Transported By	Lab Sample No	
Comments		
Inclusive Dates of Possession		
	Figure 2-3. Chain or Custody Rec	ord
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			Lab No.	
	•			
Company	q	uoted \$	Contact	
cility	S	ampie ș	Received	
		Misc S	Date Due	
Rep		Total \$	Samples Keep for	
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Figure 2-4. Sample Log Sheet

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- Data sheets and work sheets are printed for each batch of samples and distributed to the appropriate laboratory managers. The work sheets list sample numbers, sample identification, storage location, and analytical requirements. Data sheets are for results and contain only the parameters to be determined by a given laboratory.
- Following sample logging, the samples are placed in the designated locked storage area.
- Subsequent sample custody is documented and all transactions witnessed by sample control personnel.
- The analyst retrieves the samples from the Sample Control Center by sample number and storage location.
- The Sample checkout log (Figure 2-5) is completed by the analyst, noting the laboratory to which the sample is being removed.
- After analysis, or when the required aliquot is removed, the sample is returned to the Sample Control Center and return is noted in the sample checkout log.
- The sample is returned to the designated storage location.
- When requested, addition chain-of-custody documentation can be provided using a SAM-generated document (Figure 2-6). This document can be retained by sample control to provide a more easily retrievable record of sample custody within the analytical laboratory.
- The sample is stored until the assigned time or written permission is given to either properly dispose of or return the sample to the client.

			7S/196		7S/194	6 Water Labs	7S/180 (ICP and AA Labs)	7S/191		(Technician)	7S/171 (GC)	 		
	MATION	INITIALS												
	RETURN INFORMATION	TIME												
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SAMPLE CHECK OUT LOG	INFORMATION	DESTINATION											Figure 2~5. Sampl	
RAS SAM	CHECK-OUT	TIME											I	
		DATE												
	<u>!</u>	SPLITS REMOVED												
		WORK ORDER											F-28	

DASH	02/26/80	PAGE 1 RCVD: 02/26/83 DUE: 03/19/83	Analytical	Serv CHA 04/21/83 09:56:49	CHAIN 56: 49	CHAIN OF CUSTODY 1:49		LAB # 83-0 Keep: 05/0	83-02-A67 05/09/83	DISP: D
	SAMPLE	SAMPLE IDENTIFICATION	LOCATION	V TESTS						
01A-B	Number	001	Ref 2		CO3_A SO3_TA	HARD_B TANNIN	HCD3_A	MH0_A	DNG A	∀ Hd
	Number	002	Ref 2	I ACFS						
•	Number	002	Ref 2	1 ICP_40	•	• • • • •	•	• • • • • • • • •	•	•
OBA	Super so	soil	Ref 2	I ANFS			*****	*****		
04A	Boiler	scale 222	Ref 2	- CA - P	CL_TA SD4_NA	CO3_A 8_E_A	FE ZN E	HCD3_A	MO_E	NALE
05A		AV56	Shelf 13		C_MET					
06A	Water	#164	Ref. 023		AS_HA Na_E	BA_E PB_GA	CD_E BE_HA	CR_E		HG_CA
•	Water	#164	Ref. 023		F_BIEA	MHDA	VD3_A	PH_A	SO4_NA	TDS
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			Figure 2-6.	Laboratory Chain of Custody	iain of Cus	tody				



 All documentation, including shipping documents, field sampling documents, computer-generated log sheets, chain-of-custody forms, laboratory data sheets, final computer reports, and other documents, are maintained in the sample control area. All reports are kept in locked filing cabinets. As with the sample storage area, the document storage area is limited-access.

All storage areas are within the Sample Control Center and are locked when not in use. Access to the storage area is limited to sample control personnel or other RAS employees accompanied by sample control personnel. There are four storage locations that are used depending on the sample and the required analyses. They are:

- ambient storage for samples that do not require refrigeration,
- 4°C storage for most samples requiring water quality analysis and extractable organics,
- 4°C storage for samples requiring volatile organic analysis, and
- -20[°]C storage for extracts and samples that require freezing.

A temperature log is maintained to monitor the cold storage facilities.

2.4 Laboratory Facilities and Equipment

A clean well-lighted, and well maintained laboratory is essential for accurate analytical results. Each laboratory is well-lighted, air conditioned and equipped with chemical fume hoods. Instrumentation that may emit noxious odors is vented externally.



Quality Control of Equipment and Supplies

Each laboratory QC program includes detailed requirements for equipment and supplies. Reagents, solvents, and standards with specific levels of purity are used as specified by the analytical protocol. Specific GC column materials, glassware and sample handling equipment are also specified. The quality control procedures for equipment and supplies generally include the following items:

- operator checklists for required supplies,
- documentation and reporting of all deviations from specified instrument performance,
- procedures for testing for purity of reagents,
- tolerances for calibrated glassware where applicable,
- monitoring of refrigerated storage space,
- maintenance logbooks,
- service contracts on analytical instrumentation.

Quality control procedures during sample preparation include the preparation of reagent or solvent blanks. Additional quality control techniques implemented in sample preparation include:

- deionized water piped into all laboratories, monitored daily,
- purchasing high purity distilled-in-glass solvents in large quantities from a single lot,



- use of Ultrex acids in trace metal digestion,
- cleaning of organic glassware with chromic acid or firing in a kiln at 450°C,
- cleaning of trace metal glassware with nitric acid,
- use of organic-free water prepared at Radian by distillation over alkaline permanganate under nitrogen atomsphere in allglass still,
- use of volatile-free water prepared by purging organic-free water with nitrogen,
- sample preparation performed by experienced technical personnel under the supervision of senior level analysts.

2.5 Quality Control for Standards and Calibration

The quality of all test results is greatly impacted by the calibration procedures used. Calibration procedures and standards should be specified for all equipment and supplies used in the test procedure. Traceability to common standards is essential for test procedures to be used in multiple laboratories. Quality control procedures for standards and calibrations include the following considerations:

- written, detailed calibration instructions,
- preparation procedures for secondary standards, when applicable,
- requirements for frequency of calibration,
- recordkeeping of all calibrations and standards used,





- quality control charts for recording results from multiple calibrations,
- evaluation of internal standards, and
- tolerances for calibration requirements.

All calibration standards are prepared from NBS-traceable, EPA certified, or primary standard materials. Daily logs are maintained to monitor instrument response to a given standard.

Quality Control Test Samples

Routine quality control samples to be analyzed concurrently with client samples are a significant portion of the RAS laboratory quality control programs. The purpose of these checks is twofold: 1) to assure that samples being analyzed satisfy predetermined standards of accuracy, and 2) to measure and document achieved levels of accuracy and precision.

There are many different types of quality control samples which could be used for these purposes. The correct combination of these will depend on the complexity of the test method and the desired degree of accuracy. The following quality control parameters are general considerations for Radian's quality control for test methods.

Interferences

The analytical results of a test method might be affected by interferences from the glassware, solvents, reagents, or the sample matrix. Blank samples which are subjected to conditions similar to samples being analyzed are used to evaluate the purity of laboratory reagents. The frequency of blank analysis is method dependent. For example, a laboratory or field blank is analyzed after each GC/MS volatile organic analysis with high levels for any of the pollutants. Ten percent of the samples from a



and the statistics

given sample batch are spiked with a known standard. Spike recovery data are calculated to determine matrix interference.

Precision

The precision or repeatability of a test method is required for proper interpretation and weighting of the data. Replicate samples or standards are used to determine the precision on a regular basis. The precision of multiple analyses are compared against predetermined precision limits to determine their acceptability. The precision is usually reported as a standard deviation or repeatability statistic and often depends on the concentration of the parameters analyzed. Replicate analyses are defined as separate digestions or extractions of the same sample, when possible. The percentage difference or range between replicate analyses is also used to monitor precision.

Reproducibility

The reproducibility of a test method refers to the repeatability over a period of time. How well will analytical results repeated a month later agree with today's results? Reproducibility can be measured by the repeated analysis of samples from a previous time period or by analysis by more than one laboratory or laboratory technician.

Qualitative Specificity

In the analysis of complex sample matrices containing multiple components, the use of a single method can lead to misidentification of compounds. The misidentification can be detected by repeated analysis of standards containing the compounds of interest or by independent analysis by a more specific method. For example, mass spectral confirmation can be used to evaluate misidentification problems in the GC laboratory.

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2.6 Documentation and Data Handling

Documentation of methods, procedures, and results is an essential aspect of a QA/QC program.

Adequate documentation is required for an instrument maintenance system. RAS laboratories use an individual logbook, which is kept at each instrument, to record all calibration and maintenance activities. This logbook gives a chronology of that instrument's installation, operation, calibrations, maintenance, malfunction, and repairs. An accompanying binder includes all pertinent manufacturing information, service manuals, and similar reference materials.

Directions for calibrations and maintenance, along with appropriate forms and checklists, are maintained in a manual accompanying the logbook. The directions specify the required frequency for calibrations and maintenance, the tolerances for calibrations, and the action to be taken when calibration requirements are not met.

In this system, there is a single source for reference purposes as well as record keeping. All the instrument logbooks are reviewed periodically by the quality assurance coordinator and laboratory manager. A record of these logbook checks is maintained by the QA coordinator.

Work sheets have been developed to insure consistent laboratory data entry for most parameters determined in the laboratories. These sheets are designed to organize the data in a clear and logical manner, and to simplify calculations. The work sheets are divided into various sections including a section for reporting calibration standards and blank values and a section for plotting calibration curves. These work sheets are usually a standard data entry form which the laboratory technician enters in his/her bound lab notebook. When automated calibration is not applicable, electronic calculators are available in the laboratories to generate calibration curves by the method of least squates. Thus errors in reading calibration curves and calculating data are minimized. After an analysis



is completed and a data sheet filled out, the laboratory manager checks the data for completeness and approves the data sheet. After the data have been entered into the SAM system, an updated data sheet is issued to the laboratory manager. When the work is complete, a preliminary report is printed and distributed to the contributing laboratory managers for the final data check and approval. A final report is printed, certified by the laboratory manager, and forwarded to the client.

Proper documentation of quality assurance and quality control activities is an essential requirement. Documentation is needed to demonstrate that quality control activities were completed as scheduled and to communicate the results of the QC tests to laboratory managers and clients. Documentation of QA results is required to provide feedback for improvement of quality control programs.

Quality control documentation should be timely in order for feedback to occur. Daily reporting to laboratory managers is mandatory. Forms are designed to organize the QC data in a clear and logical manner, and to simplify calculations. Control charts are another excellent tool for summarizing quality control test results.

As part of Radian's QA audit program weekly reports summarizing audit results in the laboratories are prepared and distributed to QC coordinators.

3.0 Quality Assurance Audits

The quality assurance audit program of the RAS laboratories is conducted by the RAS QA Coordinator in conjunction with the corporate QA Director. The program consists of the following:

> QA standards are prepared using EPA certified standards, NBS standards, primary standard materials, and NBS-traceable compounds. All standards preparations are recorded in the QA Sample logbook (Figure 3-1).

	Standard No. QAS
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Figure 3-1. Standards preparation logbook

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Calculations

<u> </u>		Sample Distr	ibution	
Date	SAM No.	Client	Remarks	
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		Figure 3-1. (Cont.	.)	
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- An inventory of stock standards is maintained within the limits of published stability data. This decreases the time required for daily standard preparation.
- Duplicate samples are requested from clients. These are blind to the laboratory and the client is not billed for the duplicate.
- Blind QA samples are submitted through the Sample Control
 Center to all laboratories. The parameters and concentration
 levels are selected by the RAS Quality Assurance Coordinator.
- Laboratory managers submit, via a "QA Alert Form" (Figure 3-2).
 a list of the types of QA samples needed the following week.
 This insures that the parameters with which there have been problems are included in the sample.
- Monthly reports are issued from the RAS QA Coordinator (Fig. 3-3). These are submitted to the corporate QA Director, laboratory managers and Director of RAS. Managers are notified immediately of major problems with the results of analysis of a QA sample.
- The results of the program are summarized on a quarterly basis for Radian's management.

In addition to the continuous audit program, provisions for third party review are made with each client's work. Radian Analytical Services welcomes onsite audits, performance samples, and independent evaluations.

	QA ALERT FORM		
	QA standa	rd for the week of	
PDES Form A water Form B water metals Form C water metals organics		netals pesticide anions OC OP herbicide 02 624 02 625	
		_ Acids A/N	
		GC VOA	
Matrix requirements:	PCB		
Concentration requirement			
Special Star	ndards/Instructions	Individual Parameters	
······	<u>_</u>		
Date	Mgr		
	Figure 3-2. QA alert	form	
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ANALYTICAL SERVICES MONTHLY QA REPORT

QA prep report for the month of _____

Order No.	Lab	Parameter	Certified Value	Analyzed Value	% Recovery	Date Reported
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Figure 3-3. Monthly QA Report



3.1 Data Review and Validation

All analysis results are entered into the SAM computer system. Following completion of the analyses, a preliminary report is printed and returned to the appropriate laboratory manager for review and validation. A final report is printed after the certification by the manager. This report is signed and approved by the laboratory manager before being forwarded to the client. The following diagram (Fig. 3-4) illustrates the data flow for a typical sample analysis.

Upon completion of the analysis and before the final data are issued, the results of the QA audit samples are compared to the certified values. These results are plotted on control charts. Separate control charts are maintained for each analysis. If results are outside the accepted control limits, the analytical results are held until the problem is resolved.

3.2 Control Charts

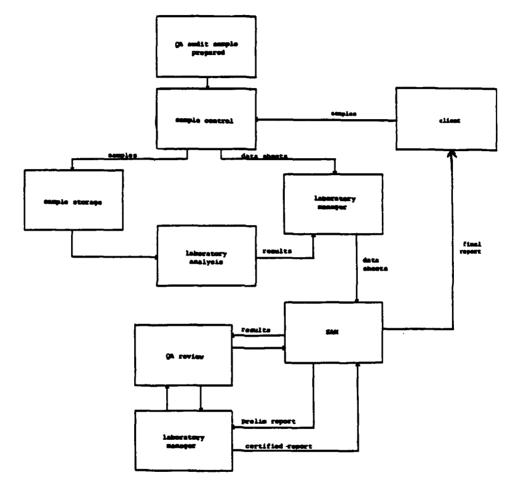
Quality control charts are maintained for both accuracy and precision. Both charts are structured as shown in Figure 3-5. The main portions of the chart are the center line and the two control limits. The center line is the 100% or total recovery/total agreement of analytical results. The upper and lower control limits are calculated from historical data.

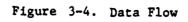
Control charts for accuracy are constructed as follows:

Precent recovery of standards (P_{ST}):

 $P_{cT} = 100 \times certified value$







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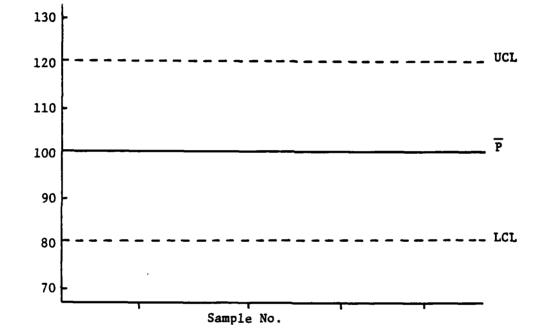


Figure 3-5. Control Chart

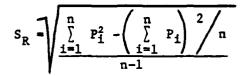


Percent recovery of spikes in samples (PSP):

From a set of analyses, the average percent recovery (F):

$$\overline{P} = \frac{\sum_{i=1}^{n} P_i}{n}$$

The standard deviation for percent recovery (S_R) :



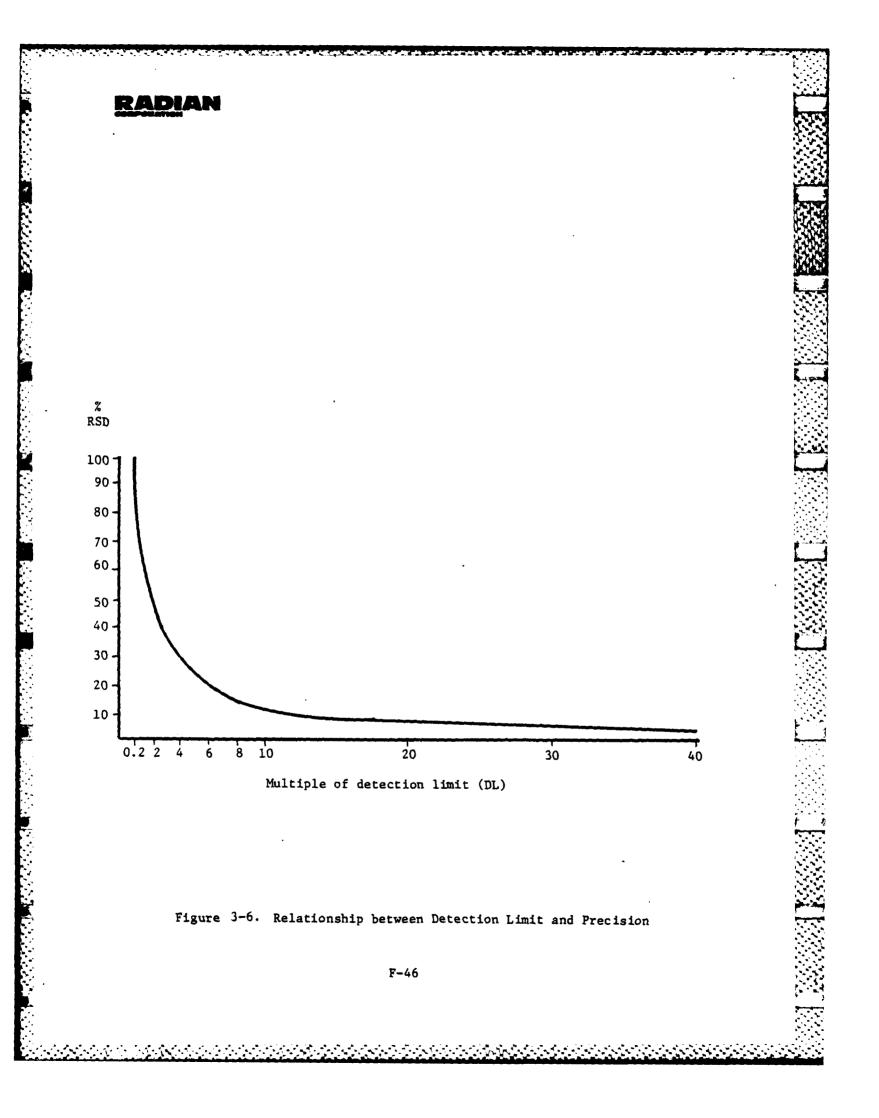
The upper and lower control limits are therefore

$$UCL = \overline{P} + 3S_{R}$$
$$LCL = \overline{P} - 3S_{R}$$

An analysis is out of control when either of the two conditions apply:

- 1) Any results outside the control limits
- 2) Seven successive results on the same side of the control line.

Control charts for precision are also constructed. Precision is a function of the concentration range of the analyte. The closer the result is to the analytical detection limit, the more imprecise the data become on a percentage scale. Figure 3-6 illustrates the relationship between detection limit and precision for a typical methodology. Because of this concentration dependence, precision control charts need to be developed for specific concentration ranges for each analyte. For duplicate samples A and B, the ratio of the values of A and B are plotted.



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3.3 <u>Concurrent Review</u>

Upon review of analytical results of QA audit samples, the QA Coordinator will schedule a meeting with the laboratory manager if there are any tests out of control or which are deviant from an expected precision/ accuracy norm. The purpose of this meeting is to:

- review raw data and determine if there is an explanation for the deviance.
- outline analyses of quality control and/or quality assurance samples to further define the problem and its solution.
- establish a schedule for monitoring the analysis after a solution is implemented, to assure that the problem does not recur.

Involvement of the laboratory manager in the problem assessment and solution is essential to a mutual committment to a quality analytical laboratory.



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APPENDIX G Chain of Custody Forms

CORPORATION	CHAIN OF CUSTODY RECORD	TOCA
		FIELD SAMPLE No. <u>TSED-01</u>
COMPANY SAMPLED/ADDRESS	Le cubert value Bot	rol Rd - 150' E of Pond R
STREAM CHARACTERISTICS:		
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ISUAL OBSERVATIONS/CONNENTS SAM	ury Red Clay Solim	euts
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SAMPLE DESCRIPTION Sauda re	<u>I clan sediment</u>	
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HAZARDOUS SAMPLE (SEE BELOW)	X Non-HAZARDO	US SAMPLE
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TOXIC Pyrophoric	SKIN IRRITANT	FLAMMABLE (FP 40°C)
Pyrophor IC		SHOCK SENSITIVE
PYROPHORIC Acidic	LACHRYMATOR BIOLOGICAL	GROCK SENSITIVE
PYROPHORIC ACIDIC CAUSTIC	LACHRYMATOR BIOLOGICAL PEROXIDE	GROCK SENSITIVE
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MPANY SAMPLED ADDRESS Turk	or AFB vence @ Soldior (m	FIELD SAMPLE No. TSED - 14
TREAM CHARACTERISTICS: EMPERATUREMA	FLOW MA	PH
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Toxic Pyrophoric	Ē	
	SKIN IRRITANT	FLAMMABLE (FP 40°C)
Pyrophor I C	SKIN IRRITANT	FLAMMABLE (FP 40°C)
Pyrophoric Acidic	SKIN IRRITANT	FLAMMABLE (FP 40°C) Shock sensitive Carcinogenic - suspect
Pyrophoric Acidic Caustic Other	SKIN IRRITANT LACHRYMATOR BIOLOGICAL PEROXIDE	FLAMMABLE (FP 40°C) Shock sensitive Carcinogenic - suspect
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CORPORATION	CHAIN OF CUSTODY RECORD	TS O JA
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MPLE POINT DESCRIPTION CRUTC	no aven	
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PYROPHORIC		SHOCK SENSITIVE
ACIDIC	BIOLOGICAL	CARCINOGENIC - SUSPECT
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MPLE ALLOCATION / CHAIN OF POSSES	- .	
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OMPANY SAMPLED/ADDRESS TINKE	r AFB	
MPLE POINT DESCRIPTION ORVIC		
TREAM CHARACTERISTICS:		
	FLOW NA	PH NA
EMPERATUREN/A	AR LANDFILL	
OLLECTOR'S NAME GANCARZ	DATE/TIME	SAMPLED 6/21/87 BROD
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PLE POINT DESCRIPTION CRUC	HO CREEK	
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LLECTOR'S NAME	JATE/ IME SA	MPLED
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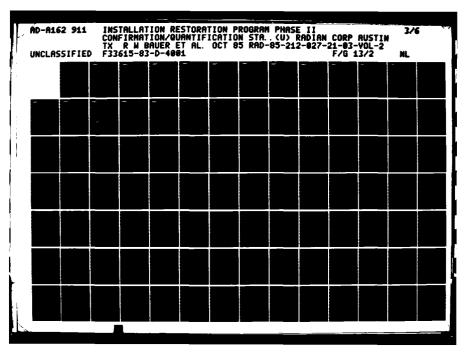
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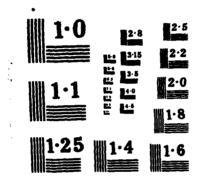
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Pyrophoric		SHOCK SENSITIVE
ACIDIC	BIOLOGICAL	CARCINOGENIC - SUSPEC
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Amount of Sample Collected	vere/ i me sampied _/	
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ther Instructions - Special Handling - H	lazards	
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Jiganization Name <u>IV() /</u>	L Skin irritant Lachrymator Biological Peroxide	<ul> <li>Flammable (FP&lt; 40°C)</li> <li>Shock sensitive</li> <li>Carcinogenic · suspect</li> <li>Radioactive</li> </ul>
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xic rophoric idic ustic	Skin irritant	Flammable (FP< 40°C     Shock sensitive     Carcinogenic - suspect
Toxic Pyrophoric Acidic Caustic Dther	Skin irritant Lachrymator Biological Peroxide	Flammable (FP< 40°C     Shock sensitive     Carcinogenic - suspect
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oxic Pyrophoric Acidic Caustic Other nple Allocation/Chain of Po anization Name	Skin irritant Lachrymator Biological Peroxide	☐ Flammable (FP< 40°C ☐ Shock sensitive ☐ Carcinogenic - suspec ☐ Radioactive
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	CHAIN OF CUSTODY RECORD	
	Fie	d Sample No. TSED - 20
Tink	or AFB	
Company Sampled / Address / INK- Sample Point Description	COAK	
Stream Characteristics:	The state	рн/А
/emperature/	there	рн_ <u>-///</u>
itream Characteristics: 'emperatureN/K /leual Observations/CommentsA		
Collector's Name GANCAR2	Date/Time Sampled	7/17/8+
Amount of Semple Collected		<u> </u>
iample Description		
iore at: 🗆 Amblent 🌾 5°C 🗆 -	10°C 🗆 Other	
Caution . No more cample available		history waves and anothers
	Return unused portion of sample	
ther Instructions - Special Handling -	Hazarda	
		•
) Hazardous cample (see below)	M Non berender	
• • •	Non-hazardous	•
] Toxic	Skin irritent	□ Flammable (FP< 40°C)
] Toxic ] Pyrophoric	Skin irritant Lachrymator	□ Flammable (FP< 40°C) □ Shock sensitive
Toxic Pyrophoric Acidic	Skin irritent  Lachrymetor  Siological	<ul> <li>Flammable (FP&lt; 40°C)</li> <li>Shock sensitive</li> <li>Carcinogenic - suspect</li> </ul>
Toxic Pyrophoric Acidic Caustic	Skin irritant Lachrymator	□ Flammable (FP< 40°C) □ Shock sensitive
Toxic         Pyrophoric         Acidic         Caustic         Other	Skin irritant Lachrymator Siological Peroxide	<ul> <li>Flammable (FP&lt; 40°C)</li> <li>Shock sensitive</li> <li>Carcinogenic - suspect</li> </ul>
Toxic         Pyrophoric         Acidic         Caustic         Other         ample Allocation/Chain of Possessic	Skin irritant Lachrymator Siological Peroxide	<ul> <li>Flammable (FP&lt; 40°C)</li> <li>Shock sensitive</li> <li>Carcinogenic - suspect</li> </ul>
Hazardous sample (see below) Toxic Pyrophoric Acidic Caustic Other Chain of Possessic Organization Name RAS Construct By Caustic	Skin irritent Lachrymetor Siological Peroxide	□ Flammable (FP< 40°C) □ Shock sensitive □ Carcinogenic - suspect □ Radioactive
Toxic         Pyrophoric         Acidic         Caustic         Other	Skin irritent Lachrymator Siological Peroxide Date Received 1-6	□ Flammable (FP< 40°C) □ Shock sensitive □ Carcinogenic - suspect □ Radioactive □ -64 Time 10: ↓℃
Toxic Pyrophoric Acidic Caustic Other ample Allocation / Chain of Possessic rganization Name eceived By Tansported By	Skin irritant Lachrymator Biological Peroxide Date Received <u>1-0</u> Lab Sample No. <u>94071</u>	□ Flammable (FP< 40°C) □ Shock sensitive □ Carcinogenic - suspect □ Radioactive 13-01
Toxic         Pyrophoric         Acidic         Caustic         Other	Skin irritant Lachrymator Biological Peroxide Date Received 1-2 Lab Sample No. 94071	□ Flammable (FP< 40°C) □ Shock sensitive □ Carcinogenic - suspect □ Radioactive 0-64
Toxic         Pyrophoric         Acidic         Caustic         Other         ample Allocation/Chain of Possessic         Organization Name         RAS         Icceived By         Mult MMMSU         Transported By         Placeive Dates of Possession	Skin irritant Lachrymator Biological Peroxide Date Received 1-2 Lab Sample No. 94071	□ Flammable (FP< 40°C) □ Shock sensitive □ Carcinogenic - suspect □ Radioactive 0-64 Time 10: ∞ 13-01
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Toxic         Pyrophoric         Acidic         Caustic         Other         ample Allocation / Chain of Possessic         organization Name         RAS         received By         Others         comments         received By         Others         comments         received By         Official Structure         Proganization Name         Inclusive Dates of Possession         organization Name         organization Name	Skin irritent Lachrymator Biological Peroxide Date Received 1-2 Lab Sample No	□ Flammable (FP< 40°C) □ Shock sensitive □ Carcinogenic - suspect □ Radioactive 10-64 Time 10: ∞ 13-01
Toxic Pyrophoric Acidic Caustic Caustic Other ample Allocation / Chain of Possessic rganization Name aceived By	Skin irritent Lachrymator Siological Peroxide Date Received 1-2 Lab Sample No. 94071 Lab Sample No. 94071 Lab Sample No. 94071 Lab Sample No. 94071	□ Flammable (FP< 40°C) □ Shock sensitive □ Carcinogenic - suspect □ Radioactive 13-01 Time
Toxic         Pyrophoric         Acidic         Caustic         Other         ample Allocation / Chain of Possessic         organization Name         RAS         received By         Automation Name         Acidic         comments         comments         received By         received By         Acidic         Somments         received By         received By         received By         received By         received By         and the set of Possession	Skin irritent Lachrymator Biological Peroxide Date Received 1-2 Lab Sample No	□ Flammable (FP< 40°C) □ Shock sensitive □ Carcinogenic - suspect □ Radioactive 0-64 Time 10: ∞ 13-01
Toxic         Pyrophoric         Acidic         Caustic         Other         ample Allocation / Chain of Possessic         Organization Name         Received By         Actual With Market         Comments         Inclusive Dates of Possession         Organization Name         Inclusive Dates of Possession         Comments         Inclusive Dates of Possession         Comments         Inclusive Dates of Possession         Comments         Inclusive Dates of Possession	Skin irritant Lachrymator Biological Peroxide Date Received 1-2 Lab Sample No. 94071 Lab Sample No. 94071 Lab Sample No	□ Flammable (FP< 40°C) □ Shock sensitive □ Carcinogenic - suspect □ Radioactive 0-64 Time 10: ∞ 13-01
Toxic         Pyrophoric         Acidic         Caustic         Other         ample Allocation / Chain of Possessic         organization Name         Preceived By         Automatic Market         Proprint         Action Name         Proprint	Skin irritant Lachrymator Biological Peroxide  Lab Sample No Lab Sample No Lab Sample No Lab Sample No Lab Sample No Lab Sample No	□ Flammable (FP< 40°C) □ Shock sensitive □ Carcinogenic - suspect □ Radioactive 0-64 Time 10: \C 13-0  Time
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	CHAIN OF CUSTODY RECORD	•
	Fie	Nd Sample No. <u>TSED-23</u>
Company Sampled / Address <u>Tivkck</u> Sample Point Description <u>CRUTCH</u>	2 AFB	
Stream Characteristics; Temperature///	Flow/Y	DH NA
Visual Observations / Comments		pH/#
		· · · · · · · · · · · · · · · · · · ·
Collector's Name D GANCARZ	Date/Time Sampled	1/19/84 :
Amount of Sample Collected		
Sample Description $Set (NENT)$ Store at: $\Box$ Ambient $\Im$ 6°C $\Box = 10^{\circ}$		······································
•		• •
Caution - No more sample available	Return unused portion of sample Ø	Discard unused portions
Other Instructions · Special Handling · Ha		
····		z
🗆 Hazardous sample (see below)	<b>jiCNon-hazardo</b> u	e eemale
	/	-
	Skin irritant	□ Flammable (FP< 40°C)
C Pyrophoric	Lachrymator     Selected	Shock sensitive
Caustic	Biological     Peroxide	Carcinogenic - suspect
Causic Cother		
Sample Allocation / Chạin of Possession:		-
Organization Name KAS		
Organization Name <u>KAS</u> Received By <u>MUMA</u> MU	Date Received 7	30-84 Time 10:00
Organization Name	Date Received Lab Sample No9401	<del>20-54 Time 10:00</del> 113-02
Drganization NameKAS Received By	Lab Sample No9407	113.02
Organization NameKAS Received By	Lab Sample No9407	113.02
Organization NameKAS Received By	Leb Sample No9407	<u> </u>
Organization NameKAS Received By	Lab Sample No9407	Time
Organization Name       KAS         Received By       MUMMMW         Transported By       Fld W.         Comments       Fld W.         Inclusive Dates of Possession       Flore         Organization Name       Flore         Received By       Flore	Leb Sample No9407 Date Received Leb Sample No	Time
Organization Name       KAS         Received By       MUMMMW         Fransported By       Fild W         Comments       Second         Inclusive Dates of Possession       Second         Organization Name       Second         Received By       Second         Fransported By       Second         Comments       Second         Comments       Second         Comments       Second         Comments       Second         Second By       Second	Leb Sample No9407	Time
Organization Name       KAS         Received By       MUMMMW         Fransported By       Fild W         Comments       Second         Inclusive Dates of Possession       Second         Organization Name       Second         Received By       Second         Fransported By       Second         Comments       Second         Comments       Second         Comments       Second         Comments       Second         Second By       Second	Leb Sample No9407	Time
Organization Name       KAS         Received By       MU MM/MU         Fransported By       Fill M         Comments       Second         Inclusive Dates of Possession       Second         Organization Name       Second         Received By       Second         Fransported By       Second         Comments       Second         Comments       Second         Comments       Second         Comments       Second         Comments       Second         Second       Second	Leb Sample No9407	Time
Organization Name	Leb Sample No9407	Time
Organization Name       KAS         Received By       MUTAMANU         Fransported By       FLAL M.         Comments       Someonic         nclusive Dates of Possession       Someonic         Organization Name       Someonic         Pransported By       Someonic         Comments       Someonic         Organization Name       Someonic         Comments       Someonic         Organization Name       Someonic         <	Leb Sample No9407 Date Received Leb Sample No Date Received	Time
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Organization Name KAS Received By	Leb Sample No9407	Time
Sample Allocation / Chain of Possession: Organization Name	Leb Sample No Date Received Leb Sample No Date Received Leb Sample No	Time

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RADIAN		
CORPORATION		
	CHAIN OF CUSTODY RECORD	
	Fie	Id Sample No. ISED 28
Company Sampled / Address		
Company Sempled / Address / /// <		
Sample Point Description AREA	-D	
Stream Characteristics:	. [ 4	
Temperature N/A	Flow	pH/A
Visual Observations/Comments	NE	
Collector's Name GAN CARE	Bada (There & Gammala A	7/19/84
Amount of Sample Collected	Date/Time Sampled	- <u>4 (-</u>
Semple Description SED IMENT		
	10°C 🗆 Other	
,		
Caution - No more sample available	$\Box$ Return unused portion of sample $ otaci$	<b>Discard unused portions</b>
Other Instructions - Special Handling -	Hazarda	
······································		
🗆 Hazardous sample (see below)	Non-hazardou	s sample
• • •	Non-hazardou	s sample □ Flammable (FP< 40°C)
L) Toxic L) Pyrophoric	L Skin irritant L Lachrymator	•
Toxic  Pyrophoric  Acidic	L 🗆 Skin irritant	□ Flammable (FP< 40°C) □ Shock sensitive □ Carcinogenic - suspect
Toxic  Tyrophoric  Caustic	L Skin irritant L Lachrymator	□ Flammable (FP< 40°C) □ Shock sensitive
Toxic  Tyrophoric  Caustic	L Skin irritant Lachrymator Biological	□ Flammable (FP< 40°C) □ Shock sensitive □ Carcinogenic - suspect
Toxic     Toxic     Pyrophoric     Acidic     Caustic     Other	L Skin irritant Lachrymator Biological Peroxide	□ Flammable (FP< 40°C) □ Shock sensitive □ Carcinogenic - suspect
Toxic  Pyrophoric  Acidic  Caustic  Other Sample Allocation/Chain of Possessic	L Skin irritant Lachrymator Biological Peroxide	□ Flammable (FP< 40°C) □ Shock sensitive □ Carcinogenic - suspect
Toxic  Pyrophoric  Acidic  Caustic  Other Sample Allocation/Chain of Possessic	L Skin irritant Lachrymator Biological Peroxide	<ul> <li>□ Flammable (FP&lt; 40°C)</li> <li>□ Shock sensitive</li> <li>□ Carcinogenic · suspect</li> <li>□ Radioactive</li> </ul>
Toxic  Pyrophoric  Caustic  Other  Sample Allocation/Chain of Possessic  Organization Name Received By	L Skin irritant Lachrymator Biological Peroxide	□ Flammable (FP< 40°C) □ Shock sensitive □ Carcinogenic - suspect □ Radioactive 20-6H Time 10.00
Toxic  Toxic  Pyrophoric  Acidic  Caustic  Other  Sample Allocation/Chain of Possessic  Organization Name  Received By  Transported By  Transported By	L Skin irritant Lachrymator Biological Peroxide Peroxide Date Received 1 Lab Semple No. <u>8407</u>	□ Flammable (FP< 40°C) □ Shock sensitive □ Carcinogenic • suspect □ Radioactive 20.55 Time_10.00 13.03
Toxic  Pyrophoric  Acidic  Caustic  Other Sample Allocation/Chain of Possessic  Organization Name Received By Transported By Comments Comments	L Skin irritant Lachrymator Biological Peroxide M: Lab Sample No	□ Flammable (FP< 40°C) □ Shock sensitive □ Carcinogenic · suspect □ Radioactive 20.9H Time _0.00 1/3-03
Toxic  Toxic  Pyrophoric  Acidic  Caustic  Other  Sample Allocation/Chain of Possessid  Organization Name  Received By  Transported By  Comments	L Skin irritant Lachrymator Biological Peroxide Main: Lab Sample No	□ Flammable (FP< 40°C) □ Shock sensitive □ Carcinogenic · suspect □ Radioactive 20.54 Time 10.00 13.03
Toxic  Pyrophoric  Acidic  Caustic  Other  Caustic  Corganization Name  Comments  Comments  Comments  Corganization Name  Comments  Com	L Skin irritant Lachrymator Biological Peroxide	□ Flammable (FP< 40°C) □ Shock sensitive □ Carcinogenic · suspect □ Radioactive 20.4/ Time_10.00 13.03
Toxic  Pyrophoric  Acidic  Caustic  Other  Comple Allocation/Chain of Possessic  Organization Name  Comments  Comme	L Skin irritant Lachrymator Biological Peroxide Date Received 1: Leb Sample No Date Received	□ Flammable (FP< 40°C) □ Shock sensitive □ Carcinogenic · suspect □ Radioactive 20-54 Time 1/3-03
Toxic  Toxic  Pyrophoric  Acidic  Caustic  Other  Sample Allocation/Chain of Possessid  Organization Name  Received By  Transported By  Comments	Lab Semple No	□ Flammable (FP< 40°C) □ Shock sensitive □ Carcinogenic · suspect □ Radioactive 20.59 Time_U·CO 1/3-03
Toxic  Toxic  Pyrophoric  Acidic  Caustic  Caustic  Offer  Sample Allocation/Chain of Possessia  Organization Name  Fransported By  Comments  Comments  Received By  Fransported By  Fransported By  Comments   Lachrymator Biological Peroxide Lab Sample No Date Received Lab Sample No Lab Sample No	□ Flammable (FP< 40°C) □ Shock sensitive □ Carcinogenic · suspect □ Radioactive 20.94 Time 1/3-03	
Toxic Pyrophoric Acidic Caustic Other Sample Allocation/Chain of Possessid Organization Name Received By Transported By Transported By Inclusive Dates of Possession Organization Name Received By Transported By Transported By Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments	Lachrymator Biological Peroxide Date Received 1 Lab Sample No Date Received    Lab Sample No	□ Flammable (FP< 40°C) □ Shock sensitive □ Carcinogenic · suspect □ Radioactive 20.94 Time 1/3-03
Toxic Pyrophoric Acidic Caustic Other	Skin irritant         Lachrymator         Biological         Peroxide         Date Received 1:         Lab Sample No         Date Received 1:         Lab Sample No         Lab Sample No	□ Flammable (FP< 40°C) □ Shock sensitive □ Carcinogenic · suspect □ Radioactive 20-54 Time 1/3-03
Comments	Skin irritant         Lachrymator         Biological         Peroxide         Date Received _1.         Lab Sample No         Date Received         Lab Sample No         Date Received         Date Received         Date Received         Date Received         Date Received	□ Flammable (FP< 40°C) □ Shock sensitive □ Carcinogenic · suspect □ Radioactive 20 5/f Time_10.00 1/3 03 Time
Toxic Pyrophoric Acidic Caustic Other Sample Allocation/Chain of Possessid Organization Name Received By Multimut Allocation/Chain of Possessid Organization Name Comments Inclusive Dates of Possession Organization Name Received By Transported By Comments Inclusive Dates of Possession Organization Name Received By Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments </td <td>Skin irritant         Lachrymator         Biological         Peroxide         Date Received 1:         Lab Sample No         Date Received 1:         Lab Sample No         Lab Sample No</td> <td>□ Flammable (FP&lt; 40°C) □ Shock sensitive □ Carcinogenic · suspect □ Radioactive 20_5/f</td>	Skin irritant         Lachrymator         Biological         Peroxide         Date Received 1:         Lab Sample No         Date Received 1:         Lab Sample No         Lab Sample No	□ Flammable (FP< 40°C) □ Shock sensitive □ Carcinogenic · suspect □ Radioactive 20_5/f

ومحاربه والموجوب والمراجع والمعاد والمحار والمحار والمراجع والمحارب والمحارب والمحارب والمحار والمحار والمحار والمحار والمحار والمحار والمحار والمحار والمحار والمحار والمحار والمحار والمحار والمحار والمحار والمحار والمحار والمحار والمحار والمحار والمحار والمحار والمحار والمحار والمحار والمحار والمحار والمحار والمحار والمحار والمحار والمحار والمحار والمحار والمحار والمحار والمحار والمحار والمحار والمحار والمحار والمحار والمحار والمحار والمحار والمحار والمحار والمحار والمحار والمحار والمحار والمحار والمحار والمحار والمحار والمحار والمحار والمحار والمحار والمحار والمحار والمحار والمحار والمحار والمحار والمحار والمحار والمحار والمحار والمحار والمحار والمحار والمحار والمحا

<b>RADIAN</b>	CHAIN OF CUSTODY RECORD	60, 60, 66, 66, 66, 66, 66, 66, 66, 66,
		FIELD SAMPLE NO. TA, TC, TF, 2A
MPANY SAMPLED/ADDRESS TINKER	AFB, OK	
HPLE POINT DESCRIPTION MOUNDR		
REAM CHARACTERISTICS;		
	FLOW	PH
SUAL OBSERVATIONS/COMMENTS	É	
	1/- 1/	
LLECTOR'S NAME NANCY STEL	N/DAG DATE/TIME SAU	HPLED 7/30/84 - 7/31/8+
DUNT OF SAMPLE COLLECTED 2 40 MPLE DESCRIPTION Well Water	early site	
· /		
CAUTION - NO MORE SAMPLE AVAILAB		RETURN UNUSED PORTION OF SAMPLE
HER INSTRUCTIONS - SPECIAL HANDLI	ng - Hazards NONE	
	- <u></u>	
	Ľ.	
HAZARDOUS SAMPLE (SEE BELOW)	Non-HAZARDOU	S SAMPLE
Toxic	SKIN IRRITANT	FLAMMABLE (FP 40°C)
Pyrophoric		SHOCK SENSITIVE
ACIDIC	BIOLOGICAL	CARCINOGENIC - SUSPECT
CAUSTIC	PEROXIDE	RADIOACTIVE
OTHER		·
MPLE ALLOCATION / CHAIN OF POSSES	<u>sion</u> :	
GANIZATION NAME	<u>U</u> s	DATE RECEIVED 8-1-54
GANIZATION NAME RAS	liz	DATE RECEIVED 8-1-54
GANIZATION NAME	Comments	-
GANIZATION NAME RAS CEIVED BY AND FUNCTION B SAMPLE NO. HOBOO3	Comments	· · · · · · · · · · · · · · · · · · ·
GANIZATION NAME	Comments	
GANIZATION NAME	Сомментя	
GANIZATION NAME	Comments	
GANIZATION NAME	Comments	DATE RECEIVED
GANIZATION NAME	Comments	DATE RECEIVED
CANIZATION NAME RAS CEIVED BY	Comments	DATE RECEIVED
GANIZATION NAME	Сомментя Сомментя Сомментя	DATE RECEIVED
ANIZATION NAME EIVED BYANLEANAAAAAAAAAAAAAAAAAAAAAAAAAAAA	Comments	DATE RECEIVED
ANIZATION NAME EIVED BYANLEANAAAAAAAAAAAAAAAAAAAAAAAAAAA	Сомментя Сомментя Сомментя	DATE RECEIVED

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HAIN OF CUSTODY RECORD	6A,6B,6D,66
Field	i Sample No76
AFB, OK	
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Flow/A	pH/k
E	· · · · · · · · · · · · · · · · · · ·
A Data (Time Complete 1	11/84
EACH SITE	· · · · · · · · · · · · · · · · · · ·
C 🗆 Other	
	Niscard unused portions
zerde	
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	
Anon-hazardous	sample
	-
	□ Flammable (FP< 40°C) □ Shock sensitive
-	Carcinogenic - suspect
•	
	L THERE
Date Received	7.54 Time 11:15
Lab Sample No 94050	W
Date Received	Time
	Time
Date Received	Time
Date Received Lab Sample No	Time
	AFB, DK         Flow       N/A         IN       Date/Time Sampled _A         IN       Date/Time Sampled _A         IN       Date/Time Sampled _A         IN       Date for sample _A         IN       NONE         Return unused portion of sample       Date sample         INON-hazardous          Lachrymator          Biological          Peroxide           Date Received _G-

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RADIAN	CHAIN OF CUSTODY RECORD	
		FIELD SAMPLE No. 6E, 6F, 7C, 7A, 7C
COMPANY SAMPLED/ADDRESS	USAF	/ _ /
SAMPLE POINT DESCRIPTION	TINKER AFB, OKLA	HOUA
STREAM CHARACTERISTICS:	·	
TEMPERATURE	FLOW	PHAA
COLLECTOR'S NONE GANC		WALED 8/14/84 - 8/15/84
ANDUNT OF SAMPLE COLLECTED SAMPLE DESCRIPTION <u>EPA</u>	2 VOA VIAL EALH SITE	
	5°C -10°C 0THER	
	AVAILABLE _ RETURN ALL PORTIONS	RETURN UNUSED PORTION OF SAMPLE
	HANDLING - HAZARDS _NONE	
HAZARDOUS SAMPLE (SEE BE	LON)	US SAMPLE
Toxic	SKIN IRRITANT	FLAMMABLE (FP 40°C)
PYROPHORIC		SHOCK SENSITIVE
ACIDIC	BIOLOGICAL	CARCINGENIC - SUSPECT
CAUSTIC	PEROXIDE	RAD I DACT I VE
OTHER	<u></u>	
SAMPLE ALLOCATION / CHAIN O	F POSSESSION:	
ORGANIZATION NAME	u turdser	DATE RECEIVED 8-16-84
LAB SAMPLE NO.	ATOBIO AND AND AND AND AND AND AND AND AND AND	
	ow	
INCLUSIVE DATES OF PASSES		
ORGANIZATION NAME		
ORGANIZATION NAME	Comments	<u> </u>
ORGANIZATION NAME RECEIVED BY LAB SAMPLE NO	Comments	
ORGANIZATION NAME RECEIVED BY LAB SAMPLE NO INCLUSIVE DATES OF POSSESSI	ON	
ORGANIZATION NAME RECEIVED BY LAB SAMPLE NO INCLUSIVE DATES OF POSSESSI ORGANIZATION NAME	Comments	
ORGANIZATION NAME RECEIVED BY LAB SAMPLE NO INCLUSIVE DATES OF POSSESSI ORGANIZATION NAME RECEIVED BY	ON	DATE RECEIVED
ORGANIZATION NAME RECEIVED BY LAB SAMPLE NO INCLUSIVE DATES OF POSSESSI ORGANIZATION NAME RECEIVED BY LAB SAMPLE NO	ON	DATE RECEIVED
ORGANIZATION NAME RECEIVED BY LAB SAMPLE NO INCLUSIVE DATES OF POSSESSI ORGANIZATION NAME RECEIVED BY LAB SAMPLE NO	ON COMMENTS	DATE RECEIVED

	CHAIN OF CUSTODY RECORD	
		1-17 11
_	Field	d Sample No. <u>77, 60, 66</u>
ompany Sampled / Address TINKE ample Point Description MONITOR	RAFB OKLAHOMA	
ample Point Description MONITAR	WELLS 7F.6D GG	
treem Characteristics:		
emperatureNA	Flow NA	ph/A
Isual Observations / Comments		· · · · · · · · · · · · · · · · · · ·
		THE ALALGI
ollector's Name <u>NANCY</u> STE	Dete/Time Sempled _7	1147 JULI 87
mount of Semple Collected emple Description MATER_		
ample Description $(U/U/U/U/U/U/U/U/U/U/U/U/U/U/U/U/U/U/U/$		
e e e e e e e e e e e e e e e e e e e		
Caution - No more sample available	Return unused portion of sample	Discard unused portions
ther Instructions - Special Handling -	Hazarde NONE	
Hazardous sample (see below)	🔊 Non-hazardou	s sample
	Skin irritant	☐ Flammable (FP< 40°C)
IVAR		
	[] Lechownetor	Shock sensitive
Pyrophoric	Lachrymator     Biological	Shock sensitive     Carcinogenic - suspect
Pyrophoric Acidic	🗆 Biological	Shock sensitive Carcinogenic - suspect Radioactive
Pyrophoric Acidic Caustic	•	Carcinogenic - suspect
Pyrophoric         Acidic         Caustic         Other	Biological     Peroxide	Carcinogenic - suspect
Pyrophoric         Acidic         Caustic         Other	Biological     Peroxide	Carcinogenic - suspect
Pyrophoric Acidic Caustic Other Chein of Possessio Organization Name	□ Biological □ Peroxide	Carcinogenic - suspect
Pyrophoric Acidic Caustic Other mple Allocation/Chein of Possessia rganization Name	Biological     Peroxide	Carcinogenic - suspect Radioactive
Pyrophoric Acidic Caustic Other Content of Possessid Organization Name Content of Possessid Organization Name Content of Possessid Content of Possessid Content of Possessid Content of Possessid Content of Possessid Content of Possessid Content of Possessid Content of Possessid Content of Possessid Content of Possessid Content of Possessid Content of Possessid Content of Possessid Content of Possessid Content of Possessid Content of Possessid Content of Possessid Content of Possessid Content of Possessid Content of Possessid Content of Possessid Content of Possessid Content of Possessid Content of Possessid Content of Possessid Content of Possessid Content of Possessid Content of Possessid Content of Possessid Content of Possessid Content of Possessid Content of Possessid Content of Possessid Content of Possessid Content of Possessid Content of Possessid Content of Possessid Content of Possessid Content of Possessid Content of Possessid Content of Possessid Content of Possessid Content of Possessid Content of Possessid Content of Possessid Content of Possessid Content of Possessid Content of Possessid Content of Possessid Content of Possessid Content of Possessid Content of Possessid Content of Possessid Content of Possessid Content of Possessid Content of Possessid Content of Possessid Content of Possessid Content of Possessid Content of Possessid Content of Possessid Content of Possessid Content of Possessid Content of Possessid Content of Possessid Content of Possessid Content of Possessid Content of Possessid Content of Possessid Content of Possessid Content of Possessid Content of Possessid Content of Possessid Content of Possessid Content of Possessid Content of Possessid Content of Possessid Content of Possessid Content of Possessid Content of Possessid Content of Possessid Content of Possessid Content of Possessid Content of Possessid Content of Possessid Content of Possessid Content of Possessid Content of Possessid Content of Possessid Content of Possessid Content of Possessid Content of Possessid Con	□ Biological □ Peroxide	Carcinogenic - suspect Radioactive
Pyrophoric Acidic Caustic Other ample Allocation (Chein of Possession rganization Name oceived By ceived By pansported By	Biological     Peroxide      Date Received 7      Date Received 7      Date Received 7      Date Received 7	Carcinogenic - suspect Radioactive
Pyrophoric Acidic Caustic Other ample Allocation (Chein of Possession rganization Name Course ceived By Transported By Transp	Biological     Peroxide      Peroxide      Date Received 7      Dit Old Lab Sample No. 6407	Carcinogenic - suspect Radioactive
Pyrophoric Acidic Caustic Other ample Allocation Chein of Possession rganization Name ceived By cansported By comments rganization Name rganization Name	Biological     Peroxide      Peroxide      Date Received 7      Diloblab Sample No. 8407	Carcinogenic - suspect Radioactive
Pyrophoric Acidic Caustic Other	Biological Peroxide   Date Received  PLPC_ALab Sample No Date Received Date Received Date Received	Carcinogenic - suspect Radioactive
Pyrophoric Acidic Caustic Other ample Allocation / Chein of Possession rganization Name ceived By comments rganization Name rganization Name rganization Name rganization Name rganization Name rganization Name rganization Name rganization Name rganization Name rganization Name rganization Name rganization Name rganization Name rganization Name rganization Name rganization Name rganization Name rganization Name rganization Name rganization Name rganization Name rganization Name rganization Name rganization Name rganization Name rganization Name rganization Name rganization Name rganization Name rganization Name rganization Name	Biological     Peroxide      Date Received 7      Diloblab Sample No. 6407      Date Received      Date Received      Lab Sample No	Carcinogenic - suspect Radioactive
Pyrophoric Acidic Caustic Other ample Allocation/Chein of Possession rganization Name ceived By ansported By clusive Dates of Possession rganization Name received By ansported By pomments comments	Biological     Peroxide      Date Received      Date Received      Date Received      Lab Sample No	Carcinogenic - suspect Radioactive
Pyrophoric Acidic Caustic Other ample Allocation / Chein of Possession ganization Name ceived By omments clusive Dates of Possession ansported By ansported By ceived By comments clusive Dates of Possession clusive Dates of Possession	Biological     Peroxide      Date Received 7      Diloblab Sample No. 6407      Date Received      Date Received      Lab Sample No	Carcinogenic - suspect Radioactive
Pyrophoric Acidic Caustic Other ample Allocation/Chein of Possession rganization Name ceived By ansported By clusive Dates of Possession rganization Name ansported By crusive Dates of Possession clusive Dates of Possession ansported By	Biological     Peroxide   Date Received 7  PLPCALab Sample No. 5407  Lab Sample No Lab Sample No	Carcinogenic - suspect Radioactive
Pyrophoric Acidic Caustic Other imple Allocation/Chein of Possession ganization Name ceived By omments clusive Dates of Possession ansported By ansported By omments clusive Dates of Possession pomments clusive Dates of Possession clusive Dates of Possession	Biological     Peroxide	Carcinogenic - suspect Radioective
Pyrophoric Acidic Caustic Other	Biological     Peroxide	Carcinogenic - suspect Radioective
Pyrophoric Acidic Caustic Caustic Other	Biological     Peroxide	Carcinogenic - suspect Radioective
Pyrophoric Acidic Caustic Other ample Allocation / Chein of Possession ganization Name clusive Dates of Possession rganization Name ansported By ansported By clusive Dates of Possession clusive Dates of Possession ansported By clusive Dates of Possession clusive Dates of Possession	Biological     Peroxide	Carcinogenic - suspect Radioective

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CORPORATION	CHAIN OF CUSTODY RECORD	R
	CHAIN OF CUSTOUT NECON	
		Field Sample No. $6A, B < 7$
Company Sampled / Address	TINKER AFB Jell samples	
Sample Point Description	Jell samples	
Stream Characteristics:/		
Temperature	Flow	pH//X
Visual Observations/Comme	nts <u>NONE</u>	
Collector's Name NANC	Y STEIN Date/Time San	
Amount of Sample Collected		re
Semple Description <u>EPA</u>	62+/625	
Store at: 🗆 Ambient 🔰 5	•C 🗆 - 10•C 🗆 Other	······
Caution - No more sample	available 🛛 Return unused portion of sar	nole 🔲 Discard unused portions
	landling - Hazards <u>NONE</u>	
Other Instructions - Special r	anding · Hazards	
	· · · · · · · · · · · · · · · · · · ·	
🗋 Hazardous sample (see be	iow) Z Non-h	azardous sample
	Skin Irritant	□ Flammable (FP< 40°C)
C Pyrophoric	L3 Lachrymator	Shock sensitive
Li Acidic Caustic	Biological     Peroxide	Carcinogenic - suspect     Redicective
Causic		
Sample Allocation/Chain of I	Possession:	
Organization Name Kad	lan constin	
Organization Name KOC Received By <u>D1090</u>	Lan Copration Date Receiv	
Organization Name KOC Received By DL 090 Transported By <b>TECH</b>	Lan Copration Date Receiv	340 + 131
Organization Name KOC Received By DL 090 Transported By <b>TECH</b>	Lan: Copration) Date Received Date Received Date Received Date Received Lab Sample No ~ Lab Sample No ~ Lab Sample No ~	340 + 131
Organization Name KOd Received By DLOOO Transported By ALCA Comments ALCA OM Inclusive Dates of Possessio Organization Name	Lan: Copiration) Dete Receive ↓ Jad - X_Leb Semple No Ly Samples: (eA, B, C n	\$407131 *7G
Organization Name KOC Received By DLOGO Transported By ZEE Comments ZECL On( Inclusive Dates of Possessio Organization Name Received By	Lan: Copiration Dete Receive Dete Receive Dete Receive Lab Sample No S Ly Samples: (eA. B. C n Dete Receive	x +
Organization Name KOC Received By DLOOO Transported By ALCA Comments ALCA OM Inclusive Dates of Possessio Organization Name Received By Transported By	Lan: Coperation Date Received Lab Semple No Lab Semple No Date Received Lab Semple No	x 40 4131 x 4G redTime
Organization Name KOC Received By DLOOO Transported By TLE Comments XICA MI Inclusive Dates of Possessio Organization Name Received By Transported By Comments	Lan: Coperation Date Received did-X_Lab Semple No Ly Samples: (eA, B, C n Date Receive Date Receive Lab Semple No	x + G x + G red Time
Organization Name Kod Received ByOOO Transported ByOOO Comments & LCAOM Inclusive Dates of Possessio Organization Name Received By Transported By Comments Inclusive Dates of Possessio	Lan: Copination Date Received Date Received Date Received Date Received Date Received Lab Sample No.	redTime
Organization Name Add Received ByOOO Transported ByOOO Comments ALCA Inclusive Dates of Possessio Organization Name Received By Transported By Comments Inclusive Dates of Possessio Organization Name	Lan: Coperation Date Received Date Received Lab Sample No 5  Date Receive  Lab Sample No n	xed Time
Organization Name KOC Received ByOOO Transported ByOOO Comments KICA _OM Inclusive Dates of Possessio Organization Name Received By Comments Inclusive Dates of Possessio Organization Name Received By	Lan: Constration Date Received Date Received Date Received Date Received Date Received Date Received Date Received Date Received	red Time
Organization Name Kod Received ByOOO Transported ByOOO Comments & LCd_OM Inclusive Dates of Possessio Organization Name Received By Comments Inclusive Dates of Possessio Organization Name Received By Transported By Transported By	Lab Sample No Date Received Date Received Date Received Date Received Date Received Date Received Lab Sample No Date Received Lab Sample No	red Time
Organization Name Kod Received ByOOO Transported ByOOO Comments & LCA Inclusive Dates of Possessio Organization Name Received By Comments Inclusive Dates of Possessio Organization Name Received By Received By Transported By Comments	Lab Sample No Date Received Date Received	red Time
Organization Name Kod Received ByOOO Transported ByOOO Comments & LCd_OM Inclusive Dates of Possessio Organization Name Received By Comments Inclusive Dates of Possessio Organization Name Received By Fransported By Transported By	Lab Sample No Date Received Date Received	red Time
Organization Name Kod Received By D.O.O. Transported By D.O.O. Comments SLCA MI Inclusive Dates of Possessio Organization Name Received By Comments Inclusive Dates of Possessio Organization Name Received By Fransported By Fransported By Comments	Lab Sample No Date Received Date Received	red Time

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CORPORATION		
	CHAIN OF CUSTODY RECORD	
	Fie	d Sample No (e.f), (e.E., . le F
Company Sampled / Address	has AFB	46, 7A, 7C
Sample Point Description	L'Samples	
Stream Characteristics:		
Temperature N/A	Flow//4	pHN/A
Visual Observations / Confiments		/
Collector's Name Maran P	Stein_ Date/Time Sampled_	July 30 -31
	10 A and I liter / sa	male
Sample Description <u>[Well Wo</u>		
Store at: 🗆 Ambient 🕅 5°C 💷 —	10°C 🛛 Other	
-	Return unused portion of sample	
<b>)ther Instructions · Special Handling ·</b>	Hazarda	
_! Mazardous sample (see Delow)	V Non-hazardous	sample
• • •	Non-hazardous	·
	Skin irritant	I Flammable (FP< 40°C)
□ Toxic □ Pyrophoric	Skin irritant Lachrymator	<ul> <li>Flammable (FP&lt; 40°C)</li> <li>Shock sensitive</li> </ul>
] Toxic ] Pyrophoric ] Acidic	Skin irritant	I Flammable (FP< 40°C)
Toxic Pyrophoric Acidic Caustic	<ul> <li>Skin irritant</li> <li>Lachrymator</li> <li>Biological</li> </ul>	- - Flammable (FP< 40°C) - Shock sensitive - Carcinogenic - suspect
Toxic Pyrophoric Acidic Caustic Other	<ul> <li>Skin irritant</li> <li>Lachrymator</li> <li>Biological</li> <li>Peroxide</li> </ul>	- - Flammable (FP< 40°C) - Shock sensitive - Carcinogenic - suspect
Toxic Pyrophoric Acidic Caustic Other Sample Allocation/Chain of Possessio	Skin irritant Lachrymator Biological Peroxide	<ul> <li>Flammable (FP&lt; 40°C)</li> <li>Shock sensitive</li> <li>Carcinogenic - suspect</li> <li>Radioactive</li> </ul>
Toxic Pyrophoric Acidic Caustic Other Sample Allocation/Chain of Possessio	Skin irritant Lachrymator Biological Peroxide	<ul> <li>Flammable (FP&lt; 40°C)</li> <li>Shock sensitive</li> <li>Carcinogenic - suspect</li> <li>Radioactive</li> </ul>
Toxic Pyrophoric Acidic Caustic Other Chain of Possessio	Skin irritant Lachrymator Biological Peroxide	<ul> <li>Flammable (FP&lt; 40°C)</li> <li>Shock sensitive</li> <li>Carcinogenic - suspect</li> <li>Radioactive</li> </ul>
Toxic Pyrophoric Acidic Caustic Caustic Other Canon Chain of Possessio Organization Name Cadian Comported By Cransported By Comments Comments	Skin irritant Lachrymator Biological Peroxide	□ Flammable (FP< 40°C) □ Shock sensitive □ Carcinogenic · suspect □ Radioactive 1/84
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## APPENDIX H

## Analytical Data

All samples for chemical analysis were submitted to Radian Analytical Services' laboratory. The samples were logged in, and the data reported out, in "batches". The following pages contain the analytical data reports for the various batches of samples. Table H-l is a key for assigning the samples to the proper batch. Table H-2 is a cross-reference between zones and corresponding laboratory sample batches.



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## TABLE H-1. LABORATORY BATCH BREAKOUT KEY

Lab	# 84-06-166, June 20, 1984 Sediment Samples TSED-01, 02, 03, 04, 05, 06
Lab	# 84-06-190, June 21, 1984 Sediment Samples TSED-07, 08, 09, 10, 11, 12, 13, 14, 15, 16, 18
Lab	<pre># 84-06-206, June 22, 1984 Sediment Samples TSED-19, 21, 22, 24, 25, 26, 27</pre>
Lab	# 84-07-090, July 18, 1984 6D, 6G, 7F for EPA Method 601
Lab	# 84-07-093, July 18, 1984 6D, 6G, 7F for EPA Method 624/625
Lab	# 84-07-112, July 20, 1984 6A, 6B, 6C, 7G for EPA Method 601
Lab	# 84-07-113, July 20, 1984 Sediment Samples TSED-20, 23, 28
Lab	# 84-07-131, July 23, 1984 6A, 6B, 6C, 7G for EPA Method 624/625
Lab	# 84-08-003, August 1, 1984 2A, 6C, 6D, 6E, 6F, 6G, 7A, 7C, 7F for EPA Method 601
Lab	# 84-08-013, August 1, 1984 6D, 6E, 6F, 6G, 7A, 7C, for EPA Method 624/625
Lab	# 84-08-020, August 2, 1984 6A, 6B, 6D, 6G, 7G for EPA Method 601
Lab	<pre># 84-08-167, August 16, 1984 6E, 6F, 7A, 7C (Sample on 8/14), 7C (Sample on 8/15) for EPA Method 601</pre>

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	(	Figure 3-	4)					
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	13	15			06-1			
	14	16			06-1			
	15	14			06-1	190		
	16	19			06-1	L90		
	17	discar	ded*		06-1	190		
	18	15	(duplicat	:e)	06-1	190		
	19	10			06-2	206		
	20	8			07-3	113		
	21	9			06-2	206		
	22	9	(duplicat	:e)	06-2	206		
	23	7			07-3	113		
	24	6			06-2	206		
	25	5			06-3	206		
	26	11			06-2	206		
	27	23			06-3	206		
	28	24			07-	113		
Monitor Wells -	2 <b>A</b>				08-0	003		
	6 <b>A</b>		C	7-112,	07-131,	08-020		
	6B				07-131,			
	6C				07-131,			
	6D		(	)7-090,	07-093,	08-003,	08-013,	08-020
	6E		(	8-003,	08-013,	08–167		
	6F				08-013,			
	6G		(	7-090,	07-093,	08-003,	08-013,	08-020
	7 <b>A</b>				08-013,			
	7C				08-013,			
	7F				07-093,			
	7G		(	)7-112,	07-131,	08-020		

## TABLE H-2. CROSS REFERENCE

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*Incorrect sample site; sample discarded.

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E			and RGRA Pesticides ort of OB/15/84. tnotes and Comments lue less than 5 tim for such low values		
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		Analutical Serv REPORT	LAB # 84-06-166
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FIC FIC MN E V9/m1 V9/m1 V1/E V9/m1 PREP W PREP W PREP W PREP W PREP W PREP W PREP W PREP W PREP W PREP W V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/0 V0/		23	
MN E WN E WN E WN E WN E WN E WN E WN E WN I WN I	L LD L L L L L L L L L L L L L L L L L	6/6n	
HG CA vg/m1 NN E vg/m1 NG IC vg/m1 NG IC ng/L PH A pH A pH A pH A pH A phere complete vg/m1 vg/m1 phere complete vg/m1 phere complete phere com		2. CC Ug/g	
vg/ml vg/ml vg/ml vg/ml vg/ml PHEN A PHEN A	HG_CA H	0. 049	
Vg/ml Vg/ml Vg/ml PB GA Vg/ml PHEN A PHEN A	working with a second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second s	01/5n	
NI E Ug/m1 NO3 IC mg/L PB GA Ug/m1 PHEN A mg/L PHEN A mg/L PHEN A mg/L PREP W date complete Vg/m1 Ug/m1 UC Ug/m1 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 06/0 0		5/5n	
NO3 IC mg/L PB GA vg/m PCB SS vg/g PHEN A mg/L PHEN A mg/L PREP W date complete PREP W date complete Vg/ml vg/ml vg/ml vg/ml vg/m		4/ 10/01	
PB GA vg/ml PCB SS vg/g PHEN A PHEN A mg/L PHEN A mg/L PREP W date complete PREP W date complete vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/ml vg/m			
PCB_SS ug/g PHEN_A PHEN_A PHEP_W PREP_W date complete PREP_X date complete Ug/ml Ug/ml Ug/ml	PR CA	100 100	
PHEN A mg/L PH A PH A PH A PH A PH A PHEP W date complete date complete date complete date complete vg/m1 vg/m1 vg/m1		5/5n VIN	
PHEN A mg/L PH A PH A PH Units PREP W date complete PREP X date complete SE GA ug/m1 TOC mg/L 2N E ug/m1		N	
amplete 06/0		0.09	
inplete 06/		ug/g 8.53	~
mplete	PH units		
mplete	seteronolete	Vo/22/84	
	PREP	06/27/84	
	SE GA Complete	0. 61	
	: ug7ml : 1 TOC	1 20 2 20 2 20	
		6,6n	
	i ug⊼ml i	6 <i>/</i> 5n	

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LAB # 84-06-166	NAME RCRA Herbicides Category	VERIFIED BY <u>LLN</u>	DET. LIMIT				NAME RCRA Pesticides Category	VERIFIED BY <u>LLN</u>	DET. LIMIT						
LAB #	NAME RCRA		RESULT			specified.	NAME RCRA		RESULT						
REPORT Samp 1 e	FRACTION OIB TEST CODE HIRCRA Date & Time Collected <u>O6/19/84</u>	DATE INJECTED 07/23/84 ANALYST DRL	OTHER HERBICIDES			REPORT. limit. ess otherwise	ACTION OIB TEST CODE PIRCRA te & Time Collected <u>O6/19/84</u>	INJECTED 07/06/84 ANALYST DRL	OTHER PESTICIDES					THIS REPORT.	
Analytical Serv REP Results by Sample	FRACTION <u>OIB</u> Date & Time Co	DATE	DET. LIMIT			AND DEFINITIONS FOR THIS the specified detection in micrograms/liter unl	FRACTION 01B Date & Time Co	DATE	DET. LIMIT					AND DEFINITIONS FOR	
•		07/17/84	RESULT	¢ V	0	NOTES A tected at reported		06/29/84	RESULT	<. 002	<. 002	<. 02	<u>&lt;. 02</u>	NDTES AN	
PAGE 5 RECEIVED: 06/20/84	SAMPLE ID ISED-01	DATE EXTRACTED <u>o</u> Concentration factor	COMPOUND	2, 4-D	2,4,5-TP (Silver)	ND = not de All results	SAMPLE ID ISED-01	DATE EXTRACTED <u>o</u> Concentration factor	COMPOUND	Lindane	Endrin	Methoxychlor	Toxaphene		-

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PAGE 6 RECEIVED: 06/20/84	Anal	Analytical Serv REP Results by Sample	REPURT Sample	LAB # 84-06-166 Continued From Above
SAMPLE ID ISED-01		FRACTION OIB Date & Time Col	FRACTION <u>OIB</u> TEST CODE <u>PIRCRA</u> Date & Time Collected <u>06/19/84</u>	NAME RCRA Pesticides Category
ND = not de All results	detected at the ts reported in	ie specified detec' ≀ micrograms/liter	! specified detection limit. micrograms∕liter unless otherwise specified.	becified.
SAMPLE ID ISED-02		FRACTION <u>O2B</u> Date & Time Co	FRACTION O2B TEST CODE HIRCRA Date & Time Collected <u>O6/19/84</u>	NAME <u>RCRA Herbicides</u> Category
DATE EXTRACTED <u>O</u> Concentration factor	07/17/84	DATE	INJECTED 07/23/84 ANALYST DRL	VERIFIED BY <u>LLN</u>
COMPOUND	RESULT	DET. LIMIT	OTHER HERBICIDES	RESULT DET. LIMIT
2, 4-D	<.2			
-H-2,4,5-TP (Silvex) 01-H	ć Ç			
ND = not de All results	NOTES AND I detected at the ts reported in f	DEFINITIONS FOR specified deter micrograms/liter	THIS REPORT. :ion limit. unless otherwise	) specified.
SAMPLE ID ISED-02			FRACTION <u>O2B</u> TEST CODE <u>PIRCRA</u> Date & Time Collected <u>O6/19/84</u>	NAME <u>RCRA Pesticides</u> Category
DATE EXTRACTED <u>o</u> Concentration factor	06/29/84	DATE	INJECTED 07/06/84 ANALYST DRL	VERIFIED BY <u>LLN</u>
COMPOUND	RESULT	DET. LIMIT	OTHER PESTICIDES	RESULT DET. LIMIT
Lindane	<. 002			
Endrin	<u> 5.02</u>			
Methoxychlor	< 02			

SAMPLE ID ISED-02 Toxaphene <u>5.02</u> All results reported at All results reported at All results reported at All results reported at COMPOUND RESULT 2, 4, 5-TP (Silvex) <u>5.4-D</u> 2, 4, 5-TP (Silvex) <u>5.4-D</u> 3, 4-D <u>5.4-D</u> 3, 4-D <u>5.4-D</u> 4, 5-TP (Silvex) <u>5.4-D</u> 4, 5-TP (Silvex) <u>5.4-D</u> 5, 4-D <u>5.4-D</u> 5, 4-D <u>5.4-D</u> 5, 4-D <u>5.4-D</u> 5, 4-D <u>5.4-D</u> 5, 4-D <u>5.4-D</u> 5, 4-D <u>5.4-D</u> 5, 4-D <u>5.4-D</u> 5, 4-D <u>5.4-D</u> 5, 4-D <u>5.4-D</u> 5, 4-D <u>5.4-D</u> 5, 4-D <u>5.4-D</u> 5, 4-D <u>5.4-D</u> 5, 4-D <u>5.4-D</u> 5, 4-D <u>5.4-D</u> 5, 4-D <u>5.4-D</u> 5, 4-D <u>5.4-D</u> 5, 4-D <u>5.4-D</u> 5, 4-D <u>5.4-D</u> 5, 4-D <u>5.4-D</u> 5, 4-D <u>5.4-D</u> 5, 4-D <u>5.4-D</u> 5, 4-D <u>5.4-D</u> 5, 4-D <u>5.4-D</u> 5, 4-D <u>5.4-D</u> 5, 4-D <u>5.4-D</u> 5, 4-D <u>5.4-D</u> 5, 4-D <u>5.4-D</u> 5, 4-D <u>5.4-D</u> 5, 4-D <u>5.4-D</u> 5, 4-D <u>5.4-D</u> 5, 4-D <u>5.4-D</u> 5, 4-D <u>5.4-D</u> 5, 4-D <u>5.4-D</u> 5, 4-D <u>5.4-D</u> 5, 4-D <u>5.4-D</u> 5, 4-D <u>5.4-D</u> 5, 4-D <u>5.4-D</u> 5, 4-D <u>5.4-D</u> 5, 4-D <u>5.4-D</u> 5, 4-D <u>5.4-D</u> 5, 4-D <u>5.4-D</u> 5, 4-D <u>5.4-D</u> 5, 4-D <u>5.4-D</u> 5, 4-D <u>5.4-D</u> 5,
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Analytical Serv     REPORT     LAB # 84-06-166       Analytical Serv     Results by Sample     Continued From       Bate & Time Collected <u>06/17/04</u> NAME RCRA Pesticide       Bane     5002       Bane     5002       Anne     Continued From       Bate % Time Collected <u>06/17/04</u> Category       Continued From     Category       Category     Category       Anne     5002       Anne     50017/169       Anne     50017/164       Anne     50017/164       Anne     50017/164       Category     50117/164       Anne     50017/164       Category     50017/164       Category     50110/184       Anne     50017/164       Category     50017/164       Category     50117/184       Category     50111/184       Category     50111/184       Category     50111/184       Category     50111/184       Category     50111/184 <th>0Ve</th> <th></th> <th>LIMIT</th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th><b>LLN</b></th> <th>LIMIT</th> <th></th> <th></th> <th></th> <th></th>	0Ve		LIMIT							<b>LLN</b>	LIMIT				
Analytical Serv     REPORT     LAB       4     Analytical Serv     REPORT     LAB       6     FRACTION     03B     TEST CODE     PIRCRA     Conti       0     Date & Time Collected     06/19/84     MANE     RCRA       0     Anne     <.002	14-06-166 Ied From Ab	<u>esticides</u> ategory							lerbicides ategory	RIFIED BY					i.
Analytical Serv     REPORT       4     Analytical Serv     RepORT       6     FRACTION 038     TEST CODE PIRCRA       00ND     RESULT     Date & Time Collected 06/19/84       010ND     RESULT     Date & Time Collected 06/19/84       010ND     RESULT     DET. LIMIT     OTHER PESTICIDES       010ND     RESULA     DEFINITIONS FOR THIS REPORT     Imate       010ND     RESULA     Date & Time Collected 06/19/84       010ND     RESULT     DATE INJECTED 00/19/84       010ND     RESULT     DATE INJECTED 00/19/84       010ND     RESULT     DET. LIMIT     OTHER HERBICIDES       040ND     RESULT     DATE INJECTED 00/19/84       010ND     RESULT     DATE INJECTED 02/23/84       010ND     RESULT     DATE INJECTED 02/19/84       010ND     RESULT     DATE INJECTED 02/19/84       010ND     RESULT     DATE INJECTED 02/19/84       010ND </td <td>LAB # E Continu</td> <td>NAME RCRA P</td> <td>REGULT</td> <td></td> <td></td> <td></td> <td></td> <td>ecified.</td> <td>NAME RCRA H</td> <td>ÿ</td> <td>RESULT</td> <td></td> <td></td> <td>ecified.</td> <td></td>	LAB # E Continu	NAME RCRA P	REGULT					ecified.	NAME RCRA H	ÿ	RESULT			ecified.	
Analytical S Analytical S DUND RESULT DET. L Date DUND RESULT DET. L dane <u>&lt;.002</u> hior <u>&lt;.02</u> hior <u>&lt;.02</u> here specification in microgram Date CTED <u>07/13/84</u> CTED <u>07/13/84</u> CTED <u>07/13/84</u> CTED <u>07/13/84</u> here <u>&lt;.02</u> here specification in microgram	RT	0DE P1RCRA 06/19/84	PESTICIDES						RA	D 07/23/84 T DRL	HERBICIDES			1 W 1 5 G	
Analytical S Analytical S Analytical S Bate DUND RESULT DET. L dane <u>&lt;.002</u> hene <u>&lt;.002</u> here <u>&lt;.02</u> here <u>&lt;.03</u> here <u>&lt;.03</u> h	REPO by Sample	Collected	OTHER					<b>1</b>	Collected	NTE INJECTE ANALYS	OTHER			THIS REP tion lia unless	
Analy dane Analy dane <u>C.002</u> drin <u>C.002</u> hior <u>C.002</u> here <u>C.02</u> here <u>C.03</u>	tical Serv Results	FRACTION 03E Date & Time						DEFINITIONS specified micrograms/	FRACTION 04E Date & Time	- -	<b>ب</b>			)EFINITIONS specified ∩icrograms/	(224) 112(2) 112(2)
dane dane dane dane dane dane dane dane	Analy		RESULT	<. 002	<. 002	<u>&lt;. 02</u>	.02	ES AND at the ted in		7/17/84	RESULT	2 V	ŝ	r n r t d t	98.5 <b>643</b> 69 <b>4</b>
VED: 06 VED: 06 A. 5-TP II IS 06	06/20/84	SAMPLE ID ISED-03	COMPOUND	Lindane	Endrin	Methoxychlor	Toxaphene	not 'esul	SAMPLE ID ISED-04	EXTRACTED ION FACTOR	COMPOUND	2, 4-D	2,4,5-TP (Silvex)	not resul	

06/2	FRACTION 04B	serv keruki Results by Sample	LAB # 84-06-166
DATE EXTRACTED <u>06/27/84</u> CONCENTRATION FACTOR COMPOUND RESU	Date & Time C	FRACTION 04B TEST CODE PIRCRA Date & Time Collected 06/19/84	NAME RCRA Pesticides Category
-		DATE INJECTED 07/96/84 ANALYST DRL	VERIFIED BY LLN
	ULT DET. LIMIT	OTHER PESTICIDES	RESULT DET. LIMIT
Lindane <u>&lt;.</u> C	<. 002		
Endrin <u>5. 002</u>	002		
Methaxychlor <u>&lt;.</u>	<u>&lt;. 02</u>		
Toxaphene < 🔨	<u>&lt;. 02</u>		
H-13 ND = not detected at All results reported	ES AND DEFINITIONS FOR at the specified detec ted in micrograms/liter	THIS REPORT. tion limit. unless otherwise	specified.
SAMPLE ID ISED-05	FRACTION 05B Date & Time C	% Time Collected <u>06/19/84</u>	NAME RCRA Herbicides Category
DATE EXTRACTED <u>07/17/84</u> Concentration Factor	14 DATE	E INJECTED 07/23/84 ANALYST DRL	VERIFIED BY LLN
COMPOUND RESULT	WLT DET. LIMIT	OTHER HERBICIDES	RESULT DET. LIMIT
2, 4-D	<u> </u>		
2, 4, 5-TP (Silvex)	<u> </u>		
NOTE	NOTES AND DEFINITIONS FOR THIS REPORT.	THIS REPORT.	

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PAGE 10 RECEIVED: 06/20/84		Analytical Serv REP Results by Sample	REPORT Sample	LAB # 84-06-166 Continued From Above
SAMPLE ID ISED-05		FRACTION <u>O5B</u> Date & Time Col	VIDN <u>058</u> TEST CODE <u>HIRCRA</u> & Time Collected <u>06/19/84</u>	NAME RCRA Herbicides Category
ND = n( All re:	<pre>not detected at the results reported in .</pre>	ie specified detection limit 1 micrograms∕liter unless ot	tion limit. unless otherwise	specified.
SAMPLE ID ISED-05			FRACTION OSB TEST CODE PIRCRA Date & Time Collected <u>O6/19/84</u>	NAME RCRA Pesticides Category
DATE EXTRACTED CONCENTRATION FACTOR	TED <u>06/29/84</u> Tor	DATE	DATE INJECTED <u>07/06/84</u> ANALYST <u>DRL</u>	VERIFIED BY LLN
COMPOUND	UND RESULT	DET. LIMIT	OTHER PESTICIDES	RESULT DET. LIMIT
Lindane	ane <u>&lt;. 002</u>	84.		
H-14	rin <u>5. 002</u>			2 7 1 7
Methoxychlor	lor <u>&lt;. 02</u>			ο ε Ν
Toxaphene	ene <u>&lt;. 02</u>			
ND = n All re	NOTES AND I NOTES AND I not detected at the results reported in $\epsilon$	DEFINITIONS FOR specified detec micrograms/liter	REPORT. limit. ess otherwise	2001 100 100 100 100 100 100 100 100 100
SAMPLE ID ISED-06		FRACTION 06B	TEST CODE HIRCRA	NAME RCRA Herbicides
		Date & Time Co	Date & Time Collected 06/19/84	Category
DATE EXTRACTED CONCENTRATION FACTOR	TED <u>07/17/94</u> TOR	DATE	INJECTED 07/23/84 ANALYST DRL	VERIFIED BY LLN
COMPOUND	UND RESULT	DET. LIMIT	OTHER HERBICIDES	RESULT DET. LIMIT

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LAB # 84-06-166 Continued From Above	11RCRA NAME RCRA Herbicides 1/84 Category	wise specified.	PIRCRA NAME RCRA Pesticides 7/84 Category	07/06/84 VERIFIED BY LLN DRL	ICIDES RESULT DET. LIMIT					00RT. Ait. otherwise specified.	HIRCRA NAME RCRA Herbicides 9/84 Category	>	ICIDES RESULT DET. LIMIT
Analytical Serv REPORT Results by Sample	FRACTION OSB TEST CODE HIRCRA Date & Time Collected 06/19/84	le specified detection limit. N micrograms∕liter unless otherwise specified.	FRACTION OSB TEST CODE PIRCRA Date & Time Collected <u>O6/19/84</u>	DATE INJECTED 071	DET. LIMIT OTHER PESTICIDES					DEFINITIONS FOR THIS REF specified detection lim micrograms/liter unless	FRACTION OGB TEST CODE HIRCRA	DATE INJECTED <u>07</u> 4 ANALYST <u>DRI</u>	DET. LIMIT OTHER HERBICIDES
Anal		detected at the ts reported in		06/27/84	RESULT	<u>&lt;. 002</u>	<. 002	<u>&lt;. 02</u>	<u>&lt;. 02</u>	NOTES A tected at reported		07/17/84	RESULT
PAGE 10 RECEIVED: 06/20/84	SAMPLE ID ISED-05	ND = not de All results	SAMPLE ID ISED-05	DATE EXTRACTED <u>06/29/84</u> CONCENTRATION FACTOR	COMPOUND	Lindane	Endrin H-14	Methoxychlor	Toxaphene	ND = not de All results	SAMPLE ID ISED-06	DATE EXTRACTED CONCENTRATION FACTOR	COMPOUND

LAB # 84-06-166 Continued From Above	NAME RCRA Herbicides Category			specified.	NAME <u>RCRA Pesticides</u> Category	VERIFIED BY L <u>ln</u>	RESULT DET. LIMIT					specifiad.	
cical Serv REPORT Results by Sample	FRACTION <u>068</u> TEST CODE <u>HIRCRA</u> Date & Time Collected <u>06/19/84</u>			DEFINITIONS FOR THIS REPORT. • specified detection limit. micrograms/liter unless otherwise sp	FRACTION <u>O6B</u> TEST CODE <u>PIRCRA</u> Date & Time Collected <u>O6/19/84</u>	DATE INJECTED 07/06/84 ANALYST DRL	DET. LIMIT OTHER PESTICIDES					DEFINITIONS FOR THIS REPORT specified detection limit. micrograms/liter unless otherwise sp	
Analytical		ý V	~ 5	NDTES AND tected at the reported in		<u>06/29/84</u>	RESULT	<. 002	<002	<u>&lt;. 02</u>	< <u>02</u>	NUTES AND tected at the reported in	
PAGE 11 RECEIVED: 06/20/84	SAMPLE ID ISED-06	2, 4-D	2,4,5-TP (Silver)	ND = not de All results	SAMPLE ID ISED-06	H DATE EXTRACTED C CONCENTRATION FACTOR	COMPOUND	Lindane	Endrin	Methoxychlor	Toxaphene	ND = not de All results	

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	Services 6 CERTIFIED BY	CONTACT <u>CONOVER</u> ted in vg/g.	/16/84. d Comments then 5 times the detection limit. low values ranges between	<u>veru for this analysis on the</u> hin acceptable limits indicating	and NAMES used on this report PHEN A Total Phenolics PHEN A PHEN A PHEN A PHEN	
Analytical Serv KEruki 04/26/85 11:49:10	Radian Analutical 8501 MoPac Blvd. P.O. Box 9948 Austin, Texas 7876	PHONE (512) 454-4797 SAMPLES 12 PIRCRA and RIRCRA are reported	Duplicate of report of OB/16/84       Footnotes and Comm       * Indicates a value less than 5       Potential error for such low va       50 and 100%.	<u>C Indicates that spike recoveru</u> specific matrix was not within an interferent present	Analytical Serv IEST CODES and NA Ac E Silver.ICPES AS GA Arsenic. low level BA E Detain Cyanide CD E Cadmium. ICPES CNTOTA Detai Cyanide CNTOTA Iotal Cyanide CNTOTA Iotal Cyanide CONTOTA Iotal Iotal Iotal CONTOTA Iotal Iotal Iotal Iotal CONTOTA Iotal Iotal Iotal Iotal Iotal Iotal Iotal Iotal Iotal Iotal Iotal Iotal Iotal Iotal Iotal Iotal Iotal Iotal Iotal Iotal Iotal Iotal Iotal Iotal Iotal Iotal Iotal Iotal Iotal Iotal Iotal Iotal Iotal Iotal Iotal Iotal Iotal Iotal Iotal Iotal Iotal Iotal Iotal Iotal Iotal Iotal Iotal Iotal Iotal Iotal Iotal Iotal Iotal Iotal Iotal Iotal Iotal Iotal Iotal Iotal Iotal Iotal Iotal Iotal Iotal Iotal Iotal Iotal Iotal Iotal Iotal Iotal Iotal Iotal Iotal Iotal Iotal Iotal Iotal Iotal Iotal Iotal Iotal Iotal Iotal Iotal Iotal Iotal Iotal Iotal Iotal Iotal Iotal Iotal Iotal Iotal Iotal Iotal Iotal Iotal Iotal Iotal Iotal Iotal Iotal Iotal Iotal Iotal Io	
RECEIVED: 06/21/84	Radian Bl. 4 Austin	CLIENT TINKER CLIENT TINKER COMPANY Tinker AFB FACILITY	WORK ID <u>sediments</u> TAKEN <u>Gancari</u> TRANS <u>Fed Ex</u> TYPE P. D. # <u>212-027-21-05</u> INV. # <u>3844</u>	H-17	SAMPLE       IDENTIFICATION         01       15ED-07         02       15ED-07         03       15ED-08         04       15ED-11         05       15ED-12         06       15ED-12         07       15ED-12         07       15ED-12         07       15ED-12         08       15ED-12         09       15ED-12         10       15ED-12         11       15ED-14         12       15ED-16	

RECEIVED:         Child I Content Serv         Met Vision         Lot # 84-06-170           I TEST CODE         Sample QI         Sample QI         Sample QI         Sample QI           #FSC CODE         Sample QI         Sample QI         Sample QI         Sample QI           #FSC CODE         Sample QI         Sample QI         Sample QI         Sample QI           #FSC CODE         Sample QI         Sample QI         Sample QI         Sample QI           #AC         C         C         C         C         C           #AC         1.19         2.1         3.5         0.71         0.99           #AC         1.19         2.1         3.5         0.71         0.99           #AC         1.1         0.35         1.6         0.99         99         0.99           #AC         0.01         0.35         1.6         0.99         99         0.99           #AC         0.35         1.6         0.35         0.71         0.39         0.99           #AC         0.35         1.6         0.36         1.6         0.39         0.39           #AC         0.35         0.79         0.39         0.39         0.39         0.39		LATION COLOR			4	
CODE         Sample OI         Sam	PAGE 2 Received: 06/21/84	-	I Serv RESULTS	REPURT TEST	LAB # 84-06	-170
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$		e <u>01</u> unit	in the second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second se	e 03 unit	e 04 unit	Sample 05 (entered units)
NG 6A     NG 6A     1.9     2.1     3.5     9.1       NG 6A     1.9     1.9     2.1     3.5     9.1       NG 6A     1.1     1.1     9.5     2.1     3.5     9.1       NG 6A     1.1     1.1     0.36     1.1     3.5     9.1       NG 6A     1.1     1.1     0.36     1.1     3.5     9.4       NG 1     0.36     1.1     0.36     1.6     0.4       NG 1     0.36     1.2     3.3     3.7     0.4       NG 1     0.36     1.2     3.3     3.7     0.4       NG 1     0.36     1.2     3.3     3.3     0.4       NG 1     0.36     0.0     0.36     0.0     0.4       NG 1     0.36     0.0     0.0     0.4     0.0       NA     0.0     0.0     0.0     0.0     0.0       NA     0.0     0.0     0.0     0.0 <td< td=""><td>AG E</td><td>9</td><td>6</td><td>Ç</td><td>3</td><td>3</td></td<>	AG E	9	6	Ç	3	3
R5.64         1.9         2.1         3.5         0.91           usylation         usylat	· •	5,5n	5/5n	5/5n	5,50	5/50
430     430       430     430       430     430       430     430       430     430       430     430       430     430       430     430       430     430       430     430       430     430       5.1     5.1       5.1     5.1       5.1     5.1       5.1     5.1       5.1     5.1       5.1     5.1       5.1     5.1       5.1     5.1       5.1     5.1       5.1     5.1       5.1     5.1       5.1     5.1       5.1     5.1       5.1     5.1       5.1     5.1       5.1     5.1       5.1     5.1       5.1     5.1       5.1     5.1       5.1     5.1       5.1     5.1       5.1     5.1       5.1     5.1       5.1     5.1       5.1     5.1       5.1     5.1       5.1     5.1       5.1     5.1       5.1     5.1       5.1     5.1       5.1     5.1	AS_GA		i	സ്	0.91	0. 66
0.01     0.03       0.01     0.03       0.01     0.03       0.03     0.03       0.03     0.03       0.03     0.03       0.03     0.03       0.03     0.03       0.03     0.03       0.03     0.03       0.03     0.03       0.03     0.03       0.03     0.03       0.03     0.04       0.03     0.03       0.03     0.03       0.03     0.03       0.03     0.04       0.03     0.03       0.03     0.04       0.03     0.03       0.04     0.04       0.03     0.03       0.04     0.04       0.04     0.04       0.04     0.04       0.04     0.04       0.04     0.04       0.04     0.04       0.04     0.04       0.04     0.04       0.04     0.04       0.04     0.04       0.04     0.04       0.04     0.04       0.04     0.04       0.04     0.04       0.04     0.04       0.04     0.04       0.04     0.04 <t< td=""><td>ug/ml</td><td>0/07</td><td>00¥ 100</td><td>100 100</td><td>0762 0752</td><td>021 5/5n</td></t<>	ug/ml	0/07	00¥ 100	100 100	0762 0752	021 5/5n
1.1     0.35       1.1     0.35       1.1     0.35       37     0.1       37     0.35       5.1     0.35       5.1     0.35       5.1     0.35       5.1     0.35       5.1     0.33       5.1     0.33       5.1     0.33       5.1     0.33       5.1     0.33       5.1     0.33       5.1     0.33       6.1     0.03       6.1     0.03       6.1     0.03       6.1     0.1       7.1     0.33       7.1     0.33       7.1     0.33       7.1     0.33       7.1     0.33       7.1     0.33       7.1     0.33       7.1     0.33       7.1     0.33       7.1     0.33       7.1     0.33       7.1     0.33       7.1     0.33       7.1     0.33       7.1     0.33       7.1     0.33       7.1     0.33       7.1     0.44       7.1     0.45       7.1     0.45       7.1     0.45 <td></td> <td></td> <td>00<b>+</b></td> <td></td> <td></td> <td>0/00 0/1</td>			00 <b>+</b>			0/00 0/1
$\begin{array}{cccccccccccccccccccccccccccccccccccc$		7 7 9 9 9 9	0.36		0,54	20
0.01       0.02       0.03       0.01       0.01         0.03       0.03       0.03       0.03       0.01         0.03       0.03       0.03       0.03       0.01         0.03       0.03       0.03       0.03       0.03         0.03       0.03       0.03       0.03       0.03         0.03       0.03       0.03       0.03       0.03         0.03       0.03       0.03       0.03       0.03         0.03       0.03       0.03       0.03       0.03         0.03       0.03       0.03       0.03       0.03         0.03       0.03       0.03       0.03       0.03         0.048       0.03       0.03       0.03       0.03         0.048       0.048       0.048       0.03       0.03         0.03       0.03       0.03       0.03       0.03         0.03       0.03       0.03       0.03       0.03         0.03       0.03       0.03       0.03       0.03         0.03       0.03       0.03       0.03       0.03         0.03       0.048       0.043       0.044       0.044	ug/ml	6/6n	5,/5n	5/57	5/57	5/5n
37       12       12         37       12       12         37       12       12         5.1       12       12         5.1       12       12         5.1       12       12         5.1       12       12         5.1       12       12         5.1       12       12         5.1       12       12         5.1       12       12         5.1       12       12         5.1       12       12         5.1       12       12         5.1       12       12         5.1       12       12         5.1       10       12         5.2       0.038       0.033         9.5       9.9       9.9         9.5       9.9       9.9         9.5       9.9       9.9         100       11       12         15       9.9       9.9         10       13       12         10       13       13         10       13       13         10       13       13         10	CNIUTA	< 01	< 01	{ 0]	10 >	<pre>{ 01</pre>
5.1       5.1         5.1       5.1         5.1       5.1         5.1       5.1         5.1       5.1         5.1       5.1         5.1       5.1         5.1       5.1         5.1       5.1         5.1       5.1         5.1       5.1         5.1       5.1         5.1       5.1         5.1       5.1         5.1       5.1         5.1       5.1         5.1       5.1         5.1       5.1         5.1       5.1         5.1       5.1         5.1       5.1         5.1       5.1         5.1       5.1         5.1       5.1         5.1       5.1         5.1       5.1         5.1       5.1         5.2       5.1         5.3       5.3         5.3       5.3         5.3       5.3         5.3       5.3         5.3       5.3         5.3       5.3         5.3       5.3         5.3       5	- mg/t	5/5n ;	5/5n	5722 57	6/6n	00C1
5.13       4.4         0.22       0.22         0.33       0.038         0.038       0.038         0.038       0.038         0.038       0.038         0.038       0.038         0.038       0.038         0.038       0.038         0.038       0.038         0.038       0.038         0.038       0.038         0.038       0.038         0.038       0.033         0.038       0.033         0.048       0.19         0.19       0.19         0.20       0.19         0.19       0.19         0.19       0.19         0.19       0.19         0.19       0.19         0.19       0.19         0.19       0.19         0.10       11         0.11       11         0.11       11         0.12       11         0.19       11         0.19       11         0.10       11         0.10       11         0.10       11         11       11         12 <td></td> <td></td> <td>1C 10/0</td> <td>0,01</td> <td>00</td> <td></td>			1C 10/0	0,01	00	
C $(10, 10, 10, 10, 10, 10, 10, 10, 10, 10, $	CU E			0		
C $(10^{-10})^{-10}$ C $(10^{-10})^{-10}$ C $(10^{-10})^{-10}$ C $(10^{-10})^{-10}$ C $(10^{-10})^{-10}$ C $(10^{-10})^{-10}$ C $(10^{-10})^{-10}$ C $(10^{-10})^{-10}$ C $(10^{-10})^{-10}$ C $(10^{-10})^{-10}$ C $(10^{-10})^{-10}$ C $(10^{-10})^{-10}$ C $(10^{-10})^{-10}$ C $(10^{-10})^{-10}$ C $(10^{-10})^{-10}$ C $(10^{-10})^{-10}$ C $(10^{-10})^{-10}$ C $(10^{-10})^{-10}$ C $(10^{-10})^{-10}$ C $(10^{-10})^{-10}$ C $(10^{-10})^{-10}$ C $(10^{-10})^{-10}$ C $(10^{-10})^{-10}$ C $(10^{-10})^{-10}$ C $(10^{-10})^{-10}$ C $(10^{-10})^{-10}$ C $(10^{-10})^{-10}$ C $(10^{-10})^{-10}$ C $(10^{-10})^{-10}$ C $(10^{-10})^{-10}$ C $(10^{-10})^{-10}$ C $(10^{-10})^{-10}$ C $(10^{-10})^{-10}$ C $(10^{-10})^{-10}$ C $(10^{-10})^{-10}$ C $(10^{-10})^{-10}$ C $(10^{-10})^{-10}$ C $(10^{-10})^{-10}$ C $(10^{-10})^{-10}$ C $(10^{-10})^{-10}$ C $(10^{-10})^{-10}$ C $(10^{-10})^{-10}$ C $(10^{-10})^{-10}$ C $(10^{-10})^{-10}$ C $(10^{-10})^{-10}$ C $(10^{-10})^{-10}$ C $(10^{-10})^{-10}$ C $(10^{-10})^{-10}$ C $(10^{-10})^{-10}$ C $(10^{-10})^{-10}$ C $(10^{-10})^{-10}$ C $(10^{-10})^{-10}$ C $(10^{-10})^{-10}$ C $(10^{-10})^{-10}$ C $(10^{-10})^{-10}$ C $(10^{-10})^{-10}$ C $(10^{-10})^{-10}$ C $(10^{-10})^{-10}$ C $(10^{-10})^{-10}$ C $(10^{-10})^{-10}$ C $(10^{-10})^{-10}$ C $(10^{-10})^{-10}$ C $(10^{-10})^{-10}$ C $(10^{-10})^{-10}$ C $(10^{-10})^{-10}$ C $(10^{-10})^{-10}$ C $(10^{-10})^{-10}$ C $(10^{-10})^{-10}$ C $(10^{-10})^{-10}$ C $(10^{-10})^{-10}$ C $(10^{-10})^{-10}$ C $(10^{-10})^{-10}$ C $(10^{-10})^{-10}$ C $(10^{-10})^{-10}$ C $(10^{-10})^{-10}$ C $(10^{-10})^{-10}$ C $(10^{-10})^{-10}$ C $(10^{-10})^{-10}$ C $(10^{-10})^{-10}$ C $(10^{-10})^{-10}$ C $(10^{-10})^{-10}$ C $(10^{-10})^{-10}$ C $(10^{-10})^{-10}$ C $(10^{-10})^{-10}$ C $(10^{-10})^{-10}$ C $(10^{-10})^{-10}$ C $(10^{-10})^{-10}$ C $(10^{-10})^{-10}$ C $(10^{-10})^{-10}$ C $(10^{-10})^{-10}$ C $(10^{-10})^{-10}$ C $(10^{-10})^{-10}$ C $(10^{-10})^{-10}$ C $(10^{-10})^{-10}$ C $(10^{-10})^{-10}$ C $(10^{-10})^{-10}$ C $(10^{-10})^{-10}$ C $(10^{$	ug/ml	6/6n ;	5/50	6/5n	5/5n	5/5n
C (10, 038 0, 048 0, 19, 9, 9, 9, 9, 9, 9, 9, 9, 9, 9, 9, 9, 9		0.22	0. 20	0. 31	0, 31	0. 31
C (10. (10. (10. (10. (10. (10. (10. (10.	HG CA	1 0.038	0,048	0,19 0,19	0.33	0.35
C [100 940 4700 180 4700 940 4700 180 4700 180 4700 180 4700 180 4700 180 4700 180 4700 111 112 112 112 112 112 112 112 112 1	ug/ml	6,6n	5/5n	5/5n	5/5n	5/5n
C 10. (10. (10. (10. (10. (10. (10. (10.	L.	1000	940	4700	180	790
C (10, (10, 10, 10, 10, 10, 10, 10, 10, 10, 10,	NI E	5/5n	5/50 10	5/5n	5/5n	5/67 530
C 1 (6 (6 (6 (6 (6 (6 (6 (6 (6 (6 (7 (6 (7 (6 (7 (6 (7 (6 (7 (6 (7 (6 (7 (6 (7 (6 (7 (6 (7 (6 (7 (6 (7 (6 (7 (6 (7 (6 (7 (6 (7 (6 (7 (6 (7 (6 (7 (6 (7 (6 (7 (6 (7 (6 (7 (6 (7 (6 (7 (6 (7 (6 (7 (6 (7 (6 (7 (6 (7 (6 (7 (6 (7 (6 (7 (6 (7 (6 (7 (6 (7 (6 (7 (6 (7 (6 (7 (6 (7 (6 (7 (6 (7 (6 (7 (6 (7 (6 (7 (6 (7 (6 (7 (6 (7 (6 (7 (6 (7 (6 (10)))) 10 (10)) 10 (10)) 10 (10)) 10 (10)) 10 (10)) 10 (10)} 2) S 1 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2	ug/al	6/5n	5/57	5/6n	6/6n	6/5n
A 10. (10. (10. (10. 10.))	DI EON	<b>9</b> <b>/</b>	<b>9</b> V	<b>9</b> >	<b>9</b>	<b>9</b> V
1     1     1     1       1     10     10     10	PP CA	6/6n	51 5/5n	បច្ច/ ច ជាជា	6/6n	1970 212
I <10. <10. <10. <10.		6/6n	5/5n	5/5n	6/6n	5/5n
	L PCB_SS	(10)	(10.	(10)	(10	<10.

190 DM ABDVE	0.04 7.73	06/27/84 0.28 0.28 0.28	5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	Sample 10 (entered units) 0.62 220 220 220 11 220 300 9/9 9/9
LAB # 84-06-190 CONTINUED FROM ABOVE	0, 11 7, 03	06/27/84 0.32 0.32	6/6n 99	Sample 09 (entered units) 0.28 0.28 330 330 330 30 140 140 140
REPORT TEST	0, 08 7, 24 04 Mac 104	06/27/84 06/27/84 1.8 0.54		Sample 08 (entered units) 0.54 0.54 0.70 27 27 27 27 27
I Serv Results By	0, 10 7, 32 24 /15 /04	06/27/84 06/27/84 1.0 0.50	5/5n 21 5/5n	Sample 07 (entered units) (20 1.6 220 220 220 1.3 1.3 1.3 1.3 1.3 1.3 1.3 1.3 1.3 1.3
Analytica	0, 13 7, 19 0, 13	06/27/84 06/27/84 0.93	6/67 5/67 75	Sample <u>Ob</u> (entered units) 0.31 410 12 130 130 130 130
PAGE 3 RECEIVED: 06/21/84	PHEN A PH_A PH_A PH_Cunits	PREP K date complete date complete CE GA vg/ml vg/ml	Im/22 Im/22 H-	AG E AG E

AGE 4 ECEIVED: 06/21/84	Analytica	I Serv RESULIS BY	REPORT Test	LAB # 84-06-190 CONTINUED FROM ABOVE	190 DM ABDVE	
CU E	160	230	<u>အ</u> က	52	69	
ug/m]	5/6n	6/6n	5/5n	6/6n	6/5n	
FIC	0.23	0. 20	0.37	0, 16	0.33	
mg/L	6/6n ;	5/5n	5/5n	6/6n	5/5n	
HG_CA	0.10	1.0	0.034	1. 6	0.14	
ug/ml	6/6n	6/67	5/57	6/6n	4	** •
<b>NN</b> E	330	250	530	140	170	
ug/ml NI E	6/6n ;	5/57 5/57	បច្ច/ចិក ភូវ	01 01	ng/gu	
		2	r Ó	- 	` ۲ / ۸	
ug/ml Minn Ir	6/6n ·	5/5n	5/5n	5/5n	5.57 V	
	0	• •	0 .>			-
mg/L 50 00	5/5n	6/6/	5/5n	6/6n	5/5n	
PB_GA	00/	140	<b>{</b> , <b>]</b>	050	2	
ug/m] Don Co		0/07 11/0	6/6n	5/5n	6/57 6/57	
	10.	10.	110	10.	¢. čV	
PHEN A	0 04	0 10	11 0	90 U	0 14	• • • •
		10 / U			1011	
PH A	7, 54	7, 19	7.25	7.01	7.16	
pH units DDCD []		V0/ 3C/ 7U	V0/ 50/ 70			
FREF W Aata romolata			V0/ E.V. 01	10/ 57/ 01	VO/ ZJ/ 04	
PREP_X	06/27/84	06/27/84	06/27/84	06/27/84	06/27/84	
date complete SE GA	0.12	0.93	0.21	0.21	0.32	~ ~~
va/m1		ua/a	0/0/		na/a	
100	Et 0		0	3.80	1. 68	
mg/L	5/5n	5/5n	6/50	6,6n	6/5n	
ZNE	88	210	16	160	60	
ug/ml	10/07	0/07	0/07	040	ua/a	••

H-20

805 S		1 AR # 84-04-140
RECEIVED: 06/21/84	MILAL SET RESULTS BY TEST	
TEST CODE default units	Sample 11 (entered units)	
AG_E	Ç	
ug/ml	6/6n	
AU GA	U. JI ug/g	
BAE	200	
rg/ml FD F	- 5/5n	
ug/ml	5/6n	
CNTDTA	C 01	
ag/L RR F	6/6n	
	5/52	
	04 50/0	
	0.31	
mg∕L HC C∆	6/6/ 033	
lm/gu	5/5a	
MN E	250	
NIE		
JI LUN	لاً ج م الم 20 م	
	5/5n	
PB_GA		
PCB_SS	<10. <10.	
ת קייני ז		
	手掛ける かんせい かんせいせい しょうけんしょう しょうしん しん 御知者の のみ うせん かいせいせん いんしん 水 時間 せい	

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LAB # 84-06-190 CONTINUED FROM ABOVE		
Serv REPORT RESULTS BY TEST		
Analytical	0, 10 7, 15 06/25/84 06/27/84 0. 31 0. 55 0. 55 0. 55 0. 55 0. 97 97 97 97 97	
PAGE 6 RECEIVED: 06/21/84	H-22	

TEST CODE HIRCRA NAME RCRA Herbicides lected not specified Category		INJECTED 07/16/84 VERIFIED BY MSF ANALYST DRL	OTHER HERBICIDES RESULT DET. LIMIT			HIS REPORT. :ion limit. unless otherwise specified.	TEST CODE PIRCRA NAME RCRA Pesticides ected not specified Category	INJECTED <u>06/29/84</u> ANALYST <u>DRL</u>	OTHER PESTICIDES RESULT DET. LIMIT					S REPORT.	
	FRACTION OIB TEST CODE Date & Time Collected not	DATE INU AN	DET. LIMIT OI			AND DEFINITIONS FOR THIS REPORT the specified detection limit. in micrograms/liter unless oth	FRACTION OIB TEST CODE Date & Time Collected not	DATE IN. AN	DET. LIMIT OI					AND DEFINITIONS FOR THIS REPORT	
		07/09/84	RESULT	<u> &lt; 2</u>	<ul> <li>2</li> </ul>	NOTES An detected at 1 ts reported 3		06/25/84	RESULT	<. 002	<. 002	<u>&lt;. 02</u>	<ul><li>.02</li></ul>	NDTES AN	
RECEIVED: 06/21/84	SAMPLE ID ISED-07	DATE EXTRACTED ( CONCENTRATION FACTOR	COMPOUND	2, 4-D	2,4,5-TP (Silver)	ND = not de All results	SAMPLE ID ISED-07 H-53	DATE EXTRACTED ( CONCENTRATION FACTOR	COMPOUND	Lindane	Endrin	Methoxychlor	Toxaphene		

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	<b>05</b>	Me thoxych lor
	< 002	Endrín
	<u>&lt;. 002</u>	Lindane
DET. LIMIT OTHER PESTICIDES RESULT DET. LIMIT	RESULT	COMPOUND
DATE INJECTED <u>06/29/84</u> VERIFIED BY <u>MSF</u> ANALYST <u>DRL</u>	06/25/84	DATE EXTRACTED <u>o</u> Concentration factor
FRACTION O2B TEST CODE PIRCRA NAME RCRA Pesticides Date & Time Collected not specified Category		SAMPLE ID ISED-08
ND DEFINITIONS FOR THIS REPORT. the specified detection limit. in micrograms∕liter unless otherwise specified.	NOTES A tected at reported	ND = not de All results
	N ب	H-24, 5-TP (Silvex)
	<u> </u>	2, 4-D
DET. LIMIT OTHER HERBICIDES RESULT DET. LIMIT	RESULT	COMPOUND
DATE INJECTED 07/16/84 VERIFIED BY MSF ANALYST DRL	07/09/84	DATE EXTRACTED <u>o</u> Concentration factor
FRACTION <u>O2B</u> TEST CODE <u>HIRCRA</u> NAME <u>RCRA Herbicides</u> Date & Time Collected <u>not specified</u> <u>Category</u>		SAMPLE ID TSED-08
the specified detection limit. in micrograms/liter unless otherwise specified.	tected at reported	ND = not de All results
FRACTION OIB TEST CODE PIRCRA NAME RCRA Pesticides Date & Time Collected not specified Category		SAMPLE ID ISED-07
Analytical Serv REPORT LAB # 84-06-190 Results by Sample Continued From Above	•	PAGE 8 RECEIVED: 06/21/84

FRACTION 02B TEST CODE PIRCRA NAME RCRA Pesticides		DEFINITIONS FOR THIS REPORT. • specified detection limit. micrograms/liter unless otherwise specified.	FRACTION <u>O3B</u> TEST CODE <u>HIRCRA</u> NAME <u>RCRA Herbicides</u> Date & Time Collected <u>not specified</u> <u>Category</u>	DATE INJECTED 07/16/84 VERIFIED BY MSF ANALYST DRL	DET. LIMIT OTHER HERBICIDES RESULT DET. LIMIT			DEFINITIONS FOR THIS REPORT. specified detection limit. micrograms/liter unless otherwise specified.	FRACTION O3B TEST CODE PIRCRA NAME RCRA Pesticides Date & Time Collected not specified Category	DATE INJECTED 06/29/84 VERIFIED BY MSF ANALYST DRL
	<ul> <li>02</li> </ul>	NDTES AND   detected at the ts reported in (		07/09/84	RESULT	¢ 2	<. 2	NOTES AND detected at the ts reported in		<u>06/25/84</u>
CAMPIE IN TCEN_AD	Toxaphene	ND = not de All results	SAMPLE ID ISED-09	CONCENTRATION FACTOR	COMPOUND	2, 4-D	2,4,5-TP (Silvex)	ND = not de All results	SAMPLE ID ISED-09	DATE EXTRACTED C CONCENTRATION FACTOR

łbove	10	LIMIT						12	/ <u>MSF</u>	LIMIT					
LAB # 84-06-190 Continued From Above	Pesticide: Category	DET. (						<u>Herbicide</u> Category	VERIFIED BY	DET. L					
LAB # Contin	NAME RCRA	RESULT					specified.	NAME RCRA	2	RESULT			specified.		
REPORT Samp 1 e	TEST CODE PIRCRA NAME RCRA Pesticides llected not specified Category	OTHER PESTICIDES					THIS REPORT. tion limit. unless otherwise	TEST CODE <u>HIRCRA</u> NAME <u>RCRA Herbicides</u> llected <u>not specified</u> <u>Category</u>	INJECTED 07/16/84 ANALYST DRL	OTHER HERBICIDES			THIS REPORT. ction limit. r unless otherwise sp		
Analytical Serv REP Results by Sample	FRACTION 03B TEST CODE Date & Time Collected not	DET. LIMIT					AND DEFINITIONS FOR THIS the specified detection in micrograms/liter unl	FRACTION 04B TEST CODE Date & Time Collected not	DATE	DET. LIMIT	-		AND DEFINITIONS FOR the specified detec in micrograms/liter		
		RESULT	<u>&lt;. 002</u>	<u>&lt;. 002</u>	<u>&lt;. 02</u>	<u> &lt;. 02</u>	NOTES tected at reported		07/09/84	RESULT	¢ \$	<u> </u>	NDTES & tected at reported		
PAGE 10 Received: 06/21/84	SAMPLE ID ISED-09	COMPOUND	Lindane	Endrin	Methoxychlor	Toxaphene	ND # not de All results	SAMPLE ID ISED-10	DATE EXTRACTED C Concentration Factor	COMPOUND	2, 4-D	2,4,5-TP (Silver)	ND = not de All results	, r	

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PAGE 11 RECEIVED: 06/21/84	ł	Analytical Serv REP Results by Sample	REPORT   Sample	LAB # 84-06-190
SAMPLE ID ISED-10		FRACTION 04B Date & Time Co	TEST CODE PIRCRA	FRACTION <u>04B</u> TEST CODE PIRCRA NAME RCRA Pesticides Date & Time Collected <u>not specified</u> Category
DATE EXTRACTED 06/25/84 CONCENTRATION FACTOR	<u>6/25/84</u>	DATE	DATE INJECTED <u>06/29/84</u> ANALYST <u>DRL</u>	VERIFIED BY MSE
COMPOUND	RESULT	DET. LIMIT	OTHER PESTICIDES	RESULT DET. LIMIT
Lindane	< 002			
Endrin	<. 002			
Methoxychlor	<u>&lt;. 02</u>			
Toxaphene	<. 02			
H-27				
ND = not de All results	NOTES AND I detected at the ts reported in d	AND DEFINITIONS FOR THIS the specified detection in micrograms/liter unle	THIS REPORT. :tion limit. · unless otherwise specified.	pecified.
SAMPLE ID ISED-11		FRACTION 05B	TEST CODE HIRCRA	FRACTION O5B TEST CODE HIRCRA NAME RCRA Herbicides Date & Time Collected not specified Category
DATE EXTRACTED CONCENTRATION FACTOR	07/09/84	DATE	DATE INJECTED 07/16/84 ANALYST DRL	VERIFIED BY MSE
COMPOUND	RESULT	DET. LIMIT	OTHER HERBICIDES	RESULT DET. LIMIT
2, 4D	<. 2			
2,4,5-TP (Silver)	ć. 2			
	NOTES AND	AND DEFINITIONS FOR THIS REPORT.	THIS REPORT.	

LAB # 84-06-190 Continued From Above				<u>u</u>	₩.	×, +2 <b>( ▲</b> , 7	* 1.a 1						<u>u</u>	
LAB # 84-06-190 Continued From Above	rhicides tegory		Pesticides Category	verified by <u>msf</u>	DET. LIMIT						rbicides	Category	VERIFIED BY <u>MSF</u>	DET LIMIT
LAB # 84-06-190 Continued From	AME RCRA He	cified.	AME RCRA Pe	VER	RESULT					specified.	IAME RCRA He	Ca	VER	RESULT
REPORT Samp 1 e	FRACTION <u>O5B</u> TEST CODE <u>HIRCRA</u> NAME <u>RCRA Herbicides</u> Date & Time Collected <u>not specified</u> <u>Category</u>	∵ specified detection limit. micrograms/liter unless otherwise specified	FRACTION <u>O5B</u> TEST CODE <u>PIRCRA</u> NAME <u>RCRA Pesticides</u> Date & Time Collected <u>not specified</u> <u>Category</u>	DATE INJECTED <u>06/29/84</u> ANALYST <u>DRL</u>	OTHER PESTICIDES					THIS REPORT. sion limit. unless otherwise	FRACTION 06B TEST CODE HIRCRA NAME RCRA Herbicides	llected not specified	DATE INJECTED 07/16/84 ANALYST DRL	OTHER HERBICIDES
Analytical Serv REP Results by Sample	FRACTION 05B Date & Time Col	the specified detect in micrograms/liter	FRACTION O5B Date & Time Col	DATE	DET. LIMIT					DEFINITIONS FOR specified detec micrograms/liter	FRACTION 06B	Date & Time Col	DATE	DET. LIMIT
		tected at reported		<u>06/25/84</u>	RESULT	<u>&lt;. 002</u>	<u>&lt;. 002</u>	<u>&lt;. 02</u>	<u>&lt;. 02</u>	NOTES A tected at reported			07/09/84	RESULT
PAGE 12 RECEIVED: 06/21/84	SAMPLE ID ISED-11	ND = not de All results	SAMPLE ID ISED-11	DATE EXTRACTED Q Concentration factor	COMPOUND	Lindane	Endrin H-2	∞ Methoxychlor	Toxaphene	ND = not de All results	SAMPLE ID ISED-12		DATE EXTRACTED <u>C</u> Concentration factor	

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PAGE 13 RECEIVED: 06/21/84	6/21/84		Analytical Serv REP Results by Sample	REPORT Samp 1 e	LAB # 84-06-190 Continued From Above	OVe
SAMPLE ID ISED-12	SED-12		FRACTION 06B TEST CODE Date & Time Collected not	TEST CODE <u>HIRCRA</u>  lected <u>not specifie</u>	TEST CODE <u>HIRCRA</u> NAME <u>RCRA Herbicides</u> ected <u>not specified</u> <u>Category</u>	
	2, 4-0	.2				
2, 4, 5-TP	P (Silver)	<b>2</b>				
	ND = not de All results	NOTES A tected at reported	DEFINITIONS FOR specified detec micrograms/liter	REPORT. limit. ess otherwise	specified.	
SAMPLE ID I	1SED-12		_ FRACTION <u>O6B</u> _ Date & Time Col	FRACTION <u>O6B</u> TEST CODE <u>PIRCRA</u> N Date & Time Collected <u>not specified</u>	NAME RCRA Pesticides ed Category	
DATE EXTRACTED CONCENTRATION FACTOR	EXTRACTED ION FACTOR	06/25/84	DATE	INJECTED <u>06/29/84</u> ANALYST <u>DRL</u>	VERIFIED BY MSF	
	COMPOUND	RESULT	DET. LIMIT	OTHER PESTICIDES	RESULT DET. LIMIT	<b>مەرىمەر ئەپەر ئە</b>
H	Lindane	<u>&lt;. 002</u>	ł			
29	Endrin	<. 002				£1, , , , , , , , , , , , , , , , , , ,
Ae	Me thoxych lor	<u>&lt;. 02</u>				
	Toxaphene	<. 02 </th <th></th> <th></th> <th></th> <th></th>				
	ND = not de All results	MOTES AND I detected at the ts reported in r	DEFINITIONS FOR specified detec micrograms/liter	REPORT. limit. ess otherwise	specified.	<u></u>

La Marchi, Marchi, Marchi, Marchi, C.S., State, M.S., (no. 2016, 1997, 1997, 1997, 1997, 1997, 1997, 1997, 1997, 1997, 1997, 1997, 1997, 1997, 1997, 1997, 1997, 1997, 1997, 1997, 1997, 1997, 1997, 1997, 1997, 1997, 1997, 1997, 1997, 1997, 1997, 1997, 1997, 1997, 1997, 1997, 1997, 1997, 1997, 1997, 1997, 1997, 1997, 1997, 1997, 1997, 1997, 1997, 1997, 1997, 1997, 1997, 1997, 1997, 1997, 1997, 1997, 1997, 1997, 1997, 1997, 1997, 1997, 1997, 1997, 1997, 1997, 1997, 1997, 1997, 1997, 1997, 1997, 1997, 1997, 1997, 1997, 1997, 1997, 199

LAB # 84-V6-170	NAME RCRA Herbicides ed Category	VERIFIED BY MSE	RESULT DET. LIMIT			specified.	RION 07B TEST CODE PIRCRA NAME RCRA Pesticides & Time Collected not specified Category	VERIFIED BY MSE	RESULT DET. LIMIT					
REPORT Sample	KION O7B TEST CODE HIRCRA N & Time Collected not specified	INJECTED 07/16/84 ANALYST DRL	OTHER HERBICIDES			THIS REPORT. tion limit. unless otherwise	TEST CODE PIRCRA llected not specifi	INJECTED 06/29/84 ANALYST DRL	OTHER PESTICIDES					FOR THIS REPORT
Analytical Serv REPORT Results by Sample	FRACTION 07B Date & Time Co	DATE	DET. LIMIT			ND DEFINITIONS FOR THIS the specified detection in micrograms/liter unle	FRACTION O7B Date & Time Co	DATE	DET. LIMIT					AND DEFINITIONS FOR
		07/09/84	RESULT	✓	\$	NOTES A tected at reported		5/25/84	RESULT	< 002	<u>&lt;. 002</u>	<u>&lt;. 02</u>	<u>&lt;. 02</u>	NDTES AN
PAGE 14 RECEIVED: 06/21/84	SAMPLE ID TSED-13	DATE EXTRACTED <u>o</u> Concentration factor	COMPOUND	2, 4-D	2,4,5-TP (Silver)	ND = not de All results	SAMPLE ID ISED-13	DATE EXTRACTED <u>06/25/84</u> Concentration factor	COMPOUND	Lindane	Endrin	Methoxychlor	Toxaphene	

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Serv REPORT LAB # 84-06-190 Results by Sample Continued From Above	FRACTION O7B TEST CODE PIRCRA NAME RCRA Pesticides Date & Time Collected not specified Category	ified detection limit. grams/liter unless otherwise specified.	FRACTION <u>OBB</u> TEST CODE <u>HIRCRA</u> NAME <u>RCRA Herbicides</u> Date & Time Collected <u>not specified</u> <u>Category</u>	DATE IN SCTED 07/16/84 VERIFIED BY MSF ANALYST DRL	LIMIT OTHER HERBICIDES RESULT DET. LIMIT			lTTIONS FOR THIS REPORT. ified detection limit. grams∕liter unless otherwise specified.	FRACTION <u>OBB</u> TEST CODE <u>PIRCRA</u> NAME <u>RCRA</u> <u>Pesticides</u> Date & Time Collected <u>not specified</u> <u>Category</u>	DATE INJECTED <u>06/29/84</u> VERIFIED BY <u>MSF</u> ANALYST <u>DRL</u>	LIMIT OTHER PESTICIDES RESULT DET. LIMIT			
Results by Sample	FRACTION O/B TEST CODE Date & Time Collected not	at the specified detect ted in micrograms/liter	FRACTION OBB TEST CODE Date & Time Collected not	07/09/84 DATE INJECTED 01 ANALYST DE		<ul> <li>2</li> </ul>	<u></u>	ES AND DEFINITIONS FOR 1 at the specified detect ted in micrograms/liter	FRACTION OBB TEST CODE Date & Time Collected not	06/25/84 DATE INJECTED 04		<. 002	<u>&lt;. 002</u>	<u>&lt;. 02</u>
PAGE 13 RECEIVED: 06/21/84	SAMPLE ID ISED-13	ND = not detected All results repor	SAMPLE ID ISED-14	DATE EXTRACTED <u>07/</u> Concentration factor	COMPOUL	2, 4-D	H-3,4,5-TP (Silvex)	NOTI ND = not detected All results repor	SAMPLE ID ISED-14	DATE EXTRACTED <u>06/</u> Concentration factor	COMPOUND	Lindane	Endrin	Methoxychlor

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Analytical Serv REPORT LAB # 84-06-190 Results by Sample Continued From Above	FRACTION OBB     TEST CODE     PIRCRA     NAME     RCRA     Pesticides       Date & Time     Collected     not     specified     Category	0.00	NOTES AND DEFINITIONS FOR THIS REPORT. detected at the specified detection limit. ts reported in micrograms/liter unless otherwise specified.	TION 09B TEST CODE HIRCRA NAME RCRA	Date & Time Collected not specified Category	07/09/84 DATE INJECTED 07/16/84 VERIFIED BY MSF ANALYST DRL	RESULT DET. LIMIT OTHER HERBICIDES RESULT DET. LIMIT		2	NOTES AND DEFINITIONS FOR THIS REPORT. detected at the specified detection limit. ts reported in micrograms/liter unless otherwise specified.	FRACTION 09B TEST CODE PIRCRA NAME RCRA Pesticides Date & Time Collected not specified Category		
PAGE 16 RECEIVED: 06/21/84	SAMPLE ID ISED-14	Toxaphene	ND ≈ not detec All results re	SAMPLE ID ISED-15	H-3	DATE EXTRACTED ONCENTRATION FACTOR	COMPOUND	2, 4-D	2,4,5-TP (Silver)	ND = not detec All results re	SAMPLE ID ISED-15	DATE EXTRACTED 06/2	

DAAC 17			DCDADT	-	001-70-80 # 0V I	0 <b>1</b> -100	
rage 1/ RECEIVED: 06/21/84	TPIH	Analytical Serv Analytical Sample	Sample		continued	continued From Above	
SAMPLE ID ISED-15		FRACTION <u>098</u> TEST CODE <u>PIRCRA</u> N Date & Time Collected <u>not specified</u>	TEST CODE PIRCRA NAME RCRA Pesticides	RCRA NAME	RCRA Pes	Pesticides Category	
COMPOUND	RESULT	DET. LIMIT	OTHER PESTICIDES		RESULT	DET. LIMIT	
Lindane	<. 002						
Endrin	<u>&lt;. 002</u>						
Methoxychlor	<u>&lt;. 02</u>						
Toxaphene	<. 02						
SAMPLE ID ISED-16		FRACTION 10B TEST CODE HIRCRA N Date & Time Collected not specified	TEST CODE <u>HIRCR</u>	RCRA NAME RCF	¥	<u>Herbicides</u> Category	
DATE EXTRACTED <u>o</u> Concentration factor	07/09/84	DATE	DATE INJECTED <u>07/1</u> ANALYST <u>DRL</u>	<u>07/16/84</u> DRL	VERI	VERIFIED BY MSF	
COMPOUND	RESULT	DET. LIMIT	OTHER HERBICIDES		RESULT	DET. LIMIT	
2, 4-D	¢ V						
2,4,5-TP(Silvex)	<u> </u>						
ND = not de All results	NOTES A tected at reported	ND DEFINITIONS FOR THIS the specified detection in micrograms/liter unl	THIS REPORT. tion limit. . unless otherwise	vise specifi	ied.		

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LAB # 84-06-190	Pesticide Category	VERIFIED BY <u>MSF</u>	DET.						Lerbicid Category	VERIFIEI	DET.				
LAB #	NAME <u>RCRA Pesticides</u> ed Category		RESULT					acified.	NAME RCRA Herbicides ed Category		RESULT				
REPORT Sample	FRACTION 10B TEST CODE PIRCRA N Date & Time Collected not specified	DATE INJECTED <u>06/29/84</u> ANALYST <u>DRL</u>	OTHER PESTICIDES					THIS REPORT. tion limit. unless otherwise specified	<u>HIRCRA</u> specifi	DATE INJECTED <u>07/16/84</u> ANALYST <u>DRL</u>	OTHER HERBICIDES			THIS REPORT.	
Aralytical Serv REP Results by Sample	FRACTION 10B Date & Time Co	DATE	DET. LIMIT					AND DEFINITIONS FOR THIS the specified detection in micrograms/liter unl	FRACTION <u>11B</u> TEST CODE Date & Time Collected <u>not</u>	DATE	DET. LIMIT			NDTES AND DEFINITIONS FOR THIS REPORT.	
Ana		25/84	RESULT	<u> &lt;. 002</u>	<u>&lt;. 002</u>	ć. 02	<u>&lt;. 02</u>	NDTES AN detected at t ts reported i		109/84	RESULT	ć. 2	Ş	NDTES AN	
PAGE 18 RECEIVED: 06/21/84	SAMPLE ID TSED-16	DATE EXTRACTED <u>06/25/84</u> Concentration Factor	COMPOUND	Lindane	Endrin	Methoxychlor	Toxaphene	H-34	SAMPLE ID ISED-18	DATE EXTRACTED <u>07/09/84</u> Concentration factor	COMPOUND	2, 4-D	2,4,5-TP (Silver)		

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LAB # 84-06-190 Continued From	RA Herbi Categi	·	RA Pesticid Category	VERIFIED								
LAB Con	NAME RC	ipecified	NAME RC		RESULT					specified.		
	E HIRCRA	herwise	TEST CODE <u>PIRCRA</u> NAME <u>RCRA Pesticides</u> lected <u>not specified</u> <u>Category</u>	<u>06/29/84</u> DRL	OTHER PESTICIDES					र इ. व. र		
REPORT Samp 1 e	FRACTION <u>11B</u> TEST CODE <u>HIRCRA</u> NAME <u>RCRA Herbicides</u> Date & Time Collected <u>not specified</u> <u>Category</u>	cified detection limit. ograms/liter unless otherwise specified.	FRACTION <u>118</u> TEST CODE <u>PIRCRA</u> NA Date & Time Collected <u>not specified</u>	DATE INJECTED ANALYST	OTHER PE					5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5		
Serv REP Results by Sample	CN <u>11B</u> Time Col	ed detect ms/liter	ON <u>118</u> 1 Time Col	DATE	LIMIT					IDNS FOR THIS ied detection ams/liter unl	}	
	FRACTI Date &	r Spe Mict	FRACTI Date &		DET. LI					DEFINIT specif nicrogr		
Analytic		ected at the reported in		06/25/84	RESULT	<u>&lt;. 002</u>	<. 002	<u>&lt;. 02</u>	. 02	4 E 6 E 6 C		
an an an an an an an an an an an an an a		: not detected results repor			compound	Lindane	Endrin	hlor	h e n e	not detected results repor		
PAGE 19 RECEIVED: 06/21/84	SAMPLE ID ISED-18	ND = All r	SAMPLE ID ISED-18	DATE EXTRACTED Concentration factor	COMP	Lin	En	Methoxychlor	Toxaphene	= QN = IIV	r r r	
PAGE 19 RECEIVED	SAMPLE I		SAMPLE I	D		• .	H-35					

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	LAB # 84-06-190					
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	PAGE 20 RECEIVED: 06/21/84	FRACTION AND TEST CODES FOR WORK NOT REPORTED ELSEWHERE	1			
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LAB # 84-06-206	Analytical Services Pac Blvd x 9948 Texas 78766 54-4797 54-4797 CONTACT CONOVER and RCRA Pesticides are reported in uq/q	rt of OB/15/B4. notes and Comments <u>ve less than 5 times the detection limit.</u> or such low values ranges between spike recovery for this analysis on the as not within acceptable limits indicating	I NAMES Used On this report PHEN A Total Phenolics PHEN A Total Phenolics PHEN A PHEN A PHEN A Total Phenolics PHEN A PHEN A PHEN A PHE	
Analytical Serv REPORT REPORT 04/26/85 11:52:34	PREPAREDRadianAnalyticalBY8501MoPacBlvd.BY8501MoPacBlvd.BY9.0.Box9948ATTENATTENAustin.TexasATTEN(512)454-4797SAMPLES7RCRAHerbicides and RCRA	Duplicate of report of 0       Footnotes at       * Indicates a value less       Potential error for such       50 and 100%       @ Indicates that spike rist       * of indicates that spike rist	Analytical Serv IEST CODES and AG E Silver.ICPES AG E Silver.ICPES AG E Silver.ICPES AG E Silver.ICPES CONTOTA BA E Darium. ICPES CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONTOTA CONT	
PAGE 1 RECEIVED: 06/22/84	REPORT <u>Radian</u> TO <u>Bl. 4</u> Austin Atten <u>William Little</u> CLIENT <u>TINKER</u> COMPANY <u>Tinker AFB</u>	HORK ID sediments TAKEN Gancarz TRANS Fed Ex TYPE P. 0. # 212-027-21-05 INV. # 3829	SAMPLE       IDENTIFICATION         01       15ED-19         02       15ED-22         03       15ED-24         04       15ED-24         05       15ED-27         07       15ED-27	

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06/22/84         RESULTS BY TEST           06/22/84         RESULTS BY TEST           E         Sample 01         Sample 02         Sample 03           0.81         1.5         Sample 03         Sample 04           0.82         0.82         0.82         0.37           0.74         1.7         1.7         1.5         2.7           1.83         1.40         0.83         0.93         0.93           1.80         1.9         1.3         0.31         0.33           1.4         1.1         1.5         2.7         2.7 <th>RECEIVED: 06/22/84</th> <th></th> <th></th> <th>REPORT</th> <th>LAB # 84-06-206</th> <th>1-206</th>	RECEIVED: 06/22/84			REPORT	LAB # 84-06-206	1-206
Sample 01         Sample 02         Sample 03         Sample 04           0.81         (entered units) (entered units)         (entered units)         (entered units)           0.81         1.5         2.7         2.3           0.81         1.5         2.7         2.3           0.81         1.5         2.7         2.3           0.81         1.5         2.7         2.3           0.81         1.5         2.7         2.3           0.81         1.5         2.7         2.3           0.81         1.5         2.7         2.3           330         390         397         2.7         2.3           330         3.9         3.0         3.0         3.0         2.7           3.7         3.9         3.0         3.0         3.0         2.7           3.9         3.0         3.0         3.0         3.0         3.0         3.0           3.9         3.9         3.0         3.0         3.0         3.0         3.0           3.9         3.0         3.0         3.0         3.0         3.0         3.0           1.2         1.2         1.3         3.3         3.3			RESULTS	TEST		
	)E units	a 7	S S			Sample 05 (entered units
		6	6	6	5	S
		6/60	5/5n	6/6n	5/5n	5/57
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		330	390	370	480 480	310
	• •• ••	5/5n	6/6л 	5/57 57	5/5n	5/55 5 5
		5/5n	5/5n	1, č UG/Q	5, 5 Ug/g	5/5n n0/5
		<. 02 <	<ul><li>.02</li></ul>	<. 02 <	<. 02	<. 02 <
	~~ ~~ ~~	6/67 99	6/67 80	5/6n	150	21 21 21
		6/5n	5/57 5/57	0/07 11	5, 5, 5, 5,	5/57 5/57
0.23 0.06 0.09 0.12 0.01 0.02 0.01 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02	~ ~~	16 Ug/g	10/07 00/0	6/8n ??	5/6n	5, 63 5, 63
0. 06 0. 06 0. 12 0.		0.2	0.23	0. 31	0, 38	0.54
2000 2001 2000 2001 2002 2001 2002 2002		0.45	0.06	0,12	0, 090	0.094
		1350 1350	007 700	0001 1000	0/6/ 6/6/	010 10
01 04 0,4 0,4 0,4 0,4 0,4 0,4 0,4	<b></b>	0,6n	5/5n 7/2/	5/5a	6/6n	5/5a 277
6/67 6/67 6/67 6/67 6/67 6/67 6/67		50 m	10	ື ຜ	14	2
6/67 5/67 6/67 6/67		6 00 5 5 00 5	5/5/ 5/5/	5/5n 5/5n	5/5n	1010
		40	5,57 57	5/52	5/57 5/7	5/6n
		6/65	6/67 NIN	6/6n	6/6n UN	5/62 UN

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CONSTRUCTION 

KELEIVEU: VO/ 22/84		RESULTS BY 1	TEST	CONTINUED FROM ABOVE	M ABOVE
PHEN_A PH_A PH_A	<ul> <li>01</li> <li>7, 62</li> </ul>	<ol> <li>01</li> <li>7.26</li> </ol>	<ol> <li>01</li> <li>6. 34</li> </ol>	<ol> <li>01</li> <li>7. 34</li> </ol>	<ol> <li>01</li> <li>6. 39⁻⁹</li> </ol>
PH UNITS	06/27/84	06/27/84	06/27/84	06/27/84	06/27/84
	06/27/84	06/27/84	06/27/84	06/27/84	06/27/84
	0.67	0. 65	0,48	0. 63	0. 71
: ug/ml	0.81	6/5/ 1 40	101	5/57 0.44	1, 32 1, 32
	6/6n	5 / 5 A	579 35		5/57
6.7	6, 6n	5/57	5/6n	6/6n	6/6n
IEST CODE default units	Sample <u>06</u> (entered units)	Sample 07 (entered units)			
AGE	6	3			
L AC DA		6/5n			
· · ·	1,0	1. U Ug/g			
	320	240			
		5/57 C'1			
CNTDTA	6/6n	5/6n			
La F	6/6n	6/67 SE			
	5/5n	5/6n			

U0/25/04			TLUT		
		עם כו אבשר	Ical	LUNI INVELI FRUM ABUVE	
	5 <b>1</b>	0.12			7. La 14 La 1
	5,6n	1 / 5/5n			
معد بن	6,/6n	6/6n			48) <u>- 4</u> 870
•	0.036	0.30			
	500 500	5/6n			
	6/6n	6/6/ 2			
	5,5n	5/57			1020002 100 - 100 - 1
					×1-0
	5/5n	5∕57			
	ug/g ND	6/67 UN			
PHENA	0	<ul><li>10 &gt;</li></ul>			
	7, 68	7.16			
PREP_W 106/27/84		06/27/84			
Complete : 06/		06/27/84			
e te 	0. 63	0.43			
: ng/m1 : 0	5/6n	6/6n 0 82			
	5/57	5,6n			
	6/6n	6/6n			

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PAGE 5 RECEIVED: 06/22/84	Ana	Analytical Serv REP( Results by Sample	REPORT Samp Le	LAB # 84-06-206
SAMPLE ID ISED-19		FRACTION OIB Date & Time Col	TEST CODE <u>HIRCRA</u> Llected <u>not specifi</u>	ION <u>OIB</u> TEST CODE <u>HIRCRA</u> NAME <u>RCRA Herbicides</u> & Time Collected <u>not specified</u> <u>Category</u>
DATE EXTRACTED <u>o</u> Concentration factor	07/13/84	DATE	DATE INJECTED <u>07/26/84</u> ANALYST <u>DRL</u>	VERIFIED BY LLN
annoquos	RESULT	DET. LIMIT	OTHER HERBICIDES	RESULT DET. LIMIT
2, 4-D	<0.2			
2,4,5-TP (Silvex)	<u>&lt;0. 2</u>			
ND = not de All results	NOTES A tected at reported	AND DEFINITIONS FOR THIS the specified detection in micrograms/liter unl	REPORT. limit. ess otherwise	5 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
61-01 ISED-19 H-41		FRACTION OIB Date & Time Col	TEST CODE <u>PIRCRA</u> Llected <u>not specifi</u>	ION <u>OIB</u> TEST CODE <u>PIRCRA</u> NAME <u>RCRA Pesticides</u> & Time Collected <u>not specified</u> <u>Category</u>
DATE EXTRACTED <u>O</u> Concentration factor	07/01/84	DATE	INJECTED 07/02/84 ANALYST DRL	VERIFIED BY LLN
anno4woo	RESULT	DET. LIMIT	OTHER PESTICIDES	RESULT DET. LIMIT
Lindane	<u>&lt;. 002</u>			
Endrin	<. 002			
Methoxychlor	<u> </u>			
Toxaphene	<u>&lt;.</u> 02			
	NOTES ANI	NOTES AND DEFINITIONS FOR 1	THIS REPORT.	
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KECEIVED: 06/22/84		Results by Sample	Sample	Continued From Above	
SAMPLE ID ISED-19		FRACTION OIB Date & Time Co.	<pre>% Time Collected not specified</pre>	NAME RCRA Pesticides	
ND = not detected All results repor	ected at the reported in	e specified detec micrograms/liter	) specified detection limit. micrograms/liter unless otherwise specified.	acified.	
SAMPLE ID ISED-21		- FRACTION 028 Date & Time Co	UN <u>O2B</u> TEST CODE <u>HIRCRA</u> N Time Collected <u>not specified</u>	NAME RCRA Herbicides ied Category	
DATE EXTRACTED <u>07/</u> Concentration factor	07/13/84	DATE	INJECTED 07/26/84 ANALYST DRL	VERIFIED BY L <u>LN</u>	
COMPOUND	RESULT	DET. LIMIT	OTHER HERBICIDES	RESULT DET. LIMIT	
2, 4-D	<u>&lt;0.2</u>				
2,4,5-TP (Silvex) H	<u> </u>				
NDT ND = not detected All results repor	4 H 6 4 C	DEFINITIONS FOR specified detecnic rograms/liter	THIS REPORT. tion limit. unless otherwise	specified.	
SAMPLE ID ISED-21		- FRACTION 02B Date & Time Co	FRACTION 02B TEST CODE PIRCRA No Date & Time Collected not specified	NAME <u>RCRA Pesticides</u> ed <u>Category</u>	
DATE EXTRACTED <u>07/</u> Concentration factor	07/01/84	DATE	DATE INJECTED <u>07/02/84</u> ANALYST <u>DRL</u>		
COMPOUND	RESULT	DET. LIMIT	OTHER PESTICIDES	RESULT DET. LIMIT	
Lindane	< 002				
Endrin	<u>&lt;. 002</u>				
Methoxychlor	<u>&lt;. 02</u>				

<pre>/// Continued From Above // Continued From Above // Continued From Above</pre>	FRACTION 02B TEST CODE PIRCRA NAME RCRA Pesticides Date & Time Collected not specified Category		NITIONS FOR THIS REPORT. A cified detection limit. A cgrams/liter unless otherwise specified.	FRACTION <u>O3B</u> TEST CODE <u>HIRCRA</u> NAME <u>RCRA Herbicides</u> Date & Time Collected <u>not specified</u> <u>Category</u>	DATE INJECTED 07/26/84 VERIFIED BY LLN ANALYST DRL	L. LIMIT OTHER HERBICIDES RESULT DET. LIMIT			NITIONS FOR THIS REPORT. •cified detection limit. •ograms/liter unless otherwise specified.	FRACTION <u>O3B</u> TEST CODE PIRCRA NAME RCRA Pesticides Date & Time Collected <u>not specified</u> Category	DATE INJECTED 07/02/84 VERIFIED BY LLN ANALYST DRL	
PAGE 7 RECEIVED: 06/22/84	SAMPLE ID <u>ISED-21</u> FR	Toxaphene <u>.02</u>	NOTES AND DEFINI ND = not detected at the speci All results reported in microg	SAMPLE ID TSED-22	CONCENTRATION FACTOR	H-43 COMPOUND RESULT DET.	2, 4-D <0.2	2,4,5-TP (Silvex) <0.2	NOTES AND DEFINI ND = not detected at the speci All results reported in microg	SAMPLE ID ISED-22	DATE EXTRACTED 07/01/84 CONCENTRATION FACTOR	

T LAB # 84-06-206 Continued From Above	FRACTION <u>O3B</u> TEST CODE <u>PIRCRA</u> NAME <u>RCRA</u> <u>Pesticides</u> Date & Time Collected <u>not specified</u> <u>Category</u>	DTHER PESTICIDES RESULT DET. LIMIT					ORT. it. otherwise specified.	TEST CODE <u>HIRCRA</u> NAME <u>RCRA Herbicides</u> ected <u>not specified</u> <u>Category</u>	0 07/26/84 VERIFIED BY LLN	DTHER HERBIGIDES RESULT DET. LIMIT		~	ORT. it. otherwise specified.	
Analytical Serv REPORT Results by Sample	FRACTION <u>O3B</u> TEST COI Date & Time Collected <u>D</u>	DET. LIMIT GTHER PI				~	)EFINITIONS FOR THIS REP specified detection lim acrograms/liter unless	FRACTION 04B TEST CODE Date & Time Collected not	DATE INJECTED ANALYST	DET. LIMIT OTHER H			DEFINITIONS FOR THIS REP specified detection lim nicrograms/liter unless	
		RESULT	<u>&lt;. 002</u>	<u>&lt;. 002</u>	<. 02	<ul> <li>02</li> </ul>	NOTES AND tected at the reported in		07/13/84	RESULT	<u>&lt;0.2</u>	<u>&lt;0.2</u>	NOTES AND tected at the reported in	
PAGE 8 RECEIVED: 06/22/84	SAMPLE ID ISED-22	COMPOUND.	Lindane	Endrin	Methoxychlor	Toxaphene	H-44 HI results	SAMPLE ID TSED-24	DATE EXTRACTED ( CONCENTRATION FACTOR	COMPOUND	2, 4-0	2,4,5-TP (Silvex)	ND = not de All results	

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		Results by	tesults by Sample	- - -	
SANPLE ID ISED-24		FRACTION 04B Date & Time Co	CN <u>04B</u> TEST CODE <u>PIRCRA</u> N Time Collected <u>not specified</u>	AME RCRA	<u>Pesticides</u> Category
DATE EXTRACTED <u>07</u> Concentration factor	07/01/84	DATE	E INJECTED 07/02/84 ANALYST DRL	VERI	VERIFIED BY <u>LLN</u>
COMPOUND	RESULT	DET. LIMIT	OTHER PESTICIDES	RESULT	DET. LIMIT
Lindane	<u>&lt;. 002</u>				
Endrin	<. 002				
Methoxychlor	<. 02				
Toxaphene	<. 02				
AII results AMPLE ID ISED-25	NDTES AND detected at the ts reported in	DEFINITI specifi microgra FRACTI	THIS REPORT. tion limit. unless otherwise TEST CODE <u>HIRCRA</u> llected <u>not specif</u>	specified. NAME RCRA Her	<u>Herbicides</u> Category
DATE EXTRACTED <u>07/13/84</u> Concentration factor	/13/84	DATE	E INJECTED <u>07/26/84</u> ANALYST <u>DRL</u>	VERL	VERIFIED BY <u>LLN</u>
COMPOUND	RESULT	DET. LIMIT	OTHER HERBICIDES	RESULT	DET. LIMIT
2, 4-D	<0.2 2				
2,4,5-TP (Silver)	<u>&lt;0 2</u>				
	NDTES ANI	NOTES AND DEFINITIONS FOR	ONS FOR THIS REPORT.		

PAGE 10 Received:	06/		Analytical Serv REP Results by Sample	REPORT Sample	LAB # 84-06-206 Continued From Above
SAMPLE ID	D ISED-25		FRACTION 05B Date & Time Co.	TION <u>OSB</u> TEST CODE <u>HIRCRA</u> N & Time Collected <u>not specified</u>	NAME RCRA Herbicides ed Category
	ND = not de All results	tected at reported	the specified detect in micrograms/liter	tion limit. Unless othe	⊕ Tit tit tit tit tit tit tit tit tit tit
SAMPLE I	SAMPLE ID TSED-25		FRACTION OSB TEST CODE Date & Time Collected not	TEST CODE PIRCRA llected not specifie	PIRCRA NAME RCRA Pesticides specified Category
CONCENTI	DATE EXTRACTED CONCENTRATION FACTOR	07/01/84	DATE	DATE INJECTED 07/03/84 ANALYST DRL	VERIFIED BY LLN
	COMPOUND	RESULT	DET. LIMIT	OTHER PESTICIDES	RESULT DET. LIMIT
	Lindane	<u>&lt;. 002</u>			¥€ ~
H-	Endrin	<. 002			
-46	Methoxychlor	<u>&lt;. 02</u>			
	Toxaphene	ć. 02			
	ND = not de All results	NOTES A tected at reported	DEFINITIONS FOR specified detec micrograms/liter	THIS REPORT. tion limit. unless otherwise specified	ານ ຄະນະມີມາດຄະນະເປັນມີຄະນະນີ້ນ 
SAMPLE ID	D <u>TSED-26</u>		FRACTION 068	FRACTION <u>06B</u> TEST CODE <u>HIRCRA</u>	ANE RCRA
			הסוב א וזווג רח	TLLVER HOP SECTIFICS	
D	DATE EXTRACTED ( CONCENTRATION FACTOR	07/13/84	DATE	INJECTED 07/26/84 ANALYST DRL	VERIFIED BY LLN
	COMPOUND	RESULT	DET. LIMIT	OTHER HERBICIDES	RESULT DET. LIMIT

1.0 2.0

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SAMPLE ID TSED-26		CDAPTTON ALO		
		Date & lime CC	TEST CODE <u>HIRCRA</u> Dilected <u>not specifie</u>	FRACTION <u>O6B</u> TEST CODE <u>HIRCRA</u> NAME <u>RCRA Herbicides</u> Date & Time Collected <u>not specified</u> <u>Category</u>
2, 4-0	<u>60. 2</u>			
2, 4, 5-TP(Silvex) 🧹	0.2			
NOTES ND = not detected at All results reported	ES AND at th ted in	DEFI spe micr	REPORT. limit. ess otherwise	specified.
SAMPLE ID ISED-26		FRACTION 06B Date & Time Co	FRACTION <u>O6B</u> TEST CODE <u>PIRCRA</u> NAME <u>RCRA Pesticides</u> Date & Time Collected <u>not specified</u> <u>Category</u>	NAME <u>RCRA Pesticides</u> d Category
DATE EXTRACTED <u>07/01/84</u> Concentration factor	84	DATE	DATE INJECTED 07/03/84 ANALYST DRL	VERIFIED BY LLN
COMPOUND RES	RESULT	DET. LIMIT	OTHER PESTICIDES	RESULT DET. LIMIT
Lindane <u>S.</u>	<. 002			
Endrin <u>&lt;.</u>	<. 002			
Methoxychlor	<u>&lt;. 02</u>			
Toxaphene	<. 02			
ND = not detected at All results reported	ES AND at the ted in	AND DEFINITIONS FOR THIS the specified detection in micrograms/liter unl	THIS REPORT. tion limit. unless otherwise	specified.

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1 AR # 84-06-206		NAME RCRA Herbicides id Category	VERIFIED BY LLN	RESULT DET. LIMIT			specified.	NAME RCRA Pesticides ed Category	VERIFIED BY <u>LLN</u>	RESULT DET. LIMIT						
ttiral Canv REPORT	Results by Sample	FRACTION O7B TEST CODE HIRCRA NA Date & Time Collected not specified	DATE INJECTED 07/26/84 ANALYST DRL	DET. LIMIT OTHER HERBICIDES			DEFINITIONS FOR THIS REPORT. specified detection limit. Nicrograms/liter unless otherwise	FRACTION O7B TEST CODE PIRCRA NA Date & Time Collected not specified	DATE INJECTED 07/03/84 ANALYST DRL	DET. LIMIT OTHER PESTICIDES				and the state of the state of the state of the state of the state of the state of the state of the state of the	DEFINITIONS FOR THIS REPORT.	
	RECEIVED: 06/22/84	SAMPLE ID ISED-27	DATE EXTRACTED <u>07/13/84</u> CONCENTRATION FACTOR	COMPOUND RESULT	2, 4-D < <u>&lt;0. 2</u>	2,4,5-TP (Silvex) < <u>&lt;0.2</u>	NDTES AND I ND = not detected at the All results reported in a	SAMPLE ID ISED-27	DATE EXTRACTED <u>07/01/84</u> CONCENTRATION FACTOR	COMPOUND RESULT	Lindane <u>&lt;. 002</u>	Endrin <u>&lt;.002</u>	Methoxychlor 🔆 02	Toxaphene <u>&lt;.02</u>	NOTES AND	

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LAB # 84-06-206 Continued From Above	icides Jory					
	NAME RCRA Pesticides ied Category	specified.				
REPORT ample	O7B TEST CODE PIRCRA N ime Collected not specified	8 7 7 8 8				
tical Serv REPORT Results by Sample	078 Me Coll					
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	<u>ISED-27</u> ND = not					
PAGE 13 RECEIVED: 06/22/84	SAMPLE ID <u>ISED-27</u>		H-49			

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LAB # 84-07-090	tical Services 11/4 12/4 12/46 13/46 13/46 14/47 14/08/07/84 14/08/07/84 14/08/07/84 15/08/07/84 15/08/07/84 15/08/07/84 15/08/07/84 15/08/07/84 15/08/07/84 15/08/07/84 15/08/07/84 15/08/07/84 15/08/07/84 16/08/07/84 16/08/07/84 16/08/07/84 16/08/07/84 16/08/07/84 16/08/07/84 16/08/07/84 16/08/07/84 16/08/07/84 16/08/07/84 16/08/07/84 16/08/07/84 16/08/07/84 16/08/07/84 16/08/07/84 16/08/07/84 16/08/07/84 16/08/07/84 16/08/07/84 16/08/07/84 16/08/07/84 16/08/07/84 16/08/07/84 16/08/07/84 16/08/07/84 16/08/07/84 16/08/07/84 16/08/07/84 16/08/07/84 16/08/07/84 16/08/07/84 16/08/07/84 16/08/07/84 16/08/07/84 16/08/07/84 16/08/07/84 16/08/07/84 16/08/07/84 16/08/07/84 16/08/07/84 16/08/07/84 16/08/07/84 16/08/07/84 16/08/07/84 16/08/07/84 16/08/07/84 16/08/07/84 16/08/07/84 16/08/07/84 16/08/07/84 16/08/07/84 16/08/07/84 16/08/07/84 16/08/07/84 16/08/07/84 16/08/07/84 16/08/07/84 16/08/07/84 16/08/07/84 16/08/07/84 16/08/07/84 16/08/07/84 16/08/07/84 16/08/07/84 16/08/07/84 16/08/07/84 16/08/07/84 16/08/07/84 16/08/07/84 16/08/07/84 16/08/07/84 16/08/07/84 16/08/07/84 16/08/07/84 16/08/07/84 16/08/07/84 16/08/07/84 16/08/07/84 16/08/07/84 16/08/07/84 16/08/07/84 16/08/07/84 16/08/07/84 16/08/07/84 16/08/07/84 16/08/07/84 16/08/08/07/84 16/08/07/84 16/08/08/08/08 16/08/08/08 16/08/08/08 16/08/08/08 16/08/08/08 16/08/08/08 16/08/08/08 16/08/08/08 16/08/08/08 16/08/08/08 16/08/08/08 16/08/08/08 16/08/08 16/08/08 16/08/08 16/08/08 16/08/08 16/08/08 16/08/08 16/08/08 16/08/08 16/08/08 16/08/08 16/08/08 16/08/08 16/08/08 16/08/08 16/08/08 16/08/08 16/08/08 16/08/08 16/08/08 16/08/08 16/08/08 16/08/08 16/08/08 16/08/08 16/08/08 16/08/08 16/08/08 16/08/08 16/08/08 16/08/08 16/08/08 16/08/08 16/08/08 16/08/08 16/08/08 16/08/08 16/08/08 16/08/08 16/08/08 16/08/08 16/08/08 16/08/08 16/08/08 16/08/08 16/08/08 16/08/08 16/08/08 16/08/08 16/08/08 16/08/08 16/08	
Analytical Serv REPORT 04/26/85 11:54:42	PREPARED     Radian     Analutical     Serv       BY     B501     MoPac     Blvd.       BY     B501     MoPac     Blvd.       BY     B501     MoPac     Blvd.       BY     B501     MoPac     Blvd.       BY     BS01     Box 7948       ATTEN     Austin.     Texas 78766       ATTEN     PHONE     Second column confirmati       BAMPLES     A     Interferent of texas 78766       BAMPLES     A     PHONE     Second column confirmati       BAMPLES     A     Footnotes and comm     Second comm       PLODIICATES on this work order.     Buplicates a value less than 5     Second 100 value       Potential error for such low value     Second under     Second within       Anallytical     Server present     Anal       Anallytical     Server present     Second coll/GC       Anallytical     Server product     Second within	
PAGE 1 RECEIVED: 07/18/84	REPORT Radian TO BI. 4 ATTEN WILLIAM LITTIE CLIENT TINKER CLIENT TINKER CCMPANY FACILITY TAKEN WELLS. 601 TYPE P. 0. # 3850 INV. # 3850 INV. # 3850 INV. # 3850 INV. # 3850 INV. # 3850 INV. # 3850	

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LAB # 84-07-090	TEST CODE <u>GC 601</u> NAME <u>EPA Method 601/GC</u> ected <u>not specified</u> <u>Category</u>	-YST RGS VERIFIED BY USG TENT b COMPOUNDS DETECTED 7	COMPOUND RESULT	Trichloroethene <u>0.6</u>	Dibromochloromethane * <u>ND</u>	1, 1, 2-Trichloroethane * ND	cis-1, 3-Dichloropropene * ND	2-Chloroethylvinyl Ether ND	Bromoform ND	1, 1, 2, 2-Tetrachloroethane # <u>NB</u>	Tetrachloroethylene # <u>NB</u>	Chlorobenzene <u>20.5</u>	1, 3-Dichlorobenzene <u>ND</u>	1, 2-Dichlorobenzene <u>B.4</u>	1, 4-Dichlorobenzens <u>ND</u>					
REPORT Sample	TEST CODE lected not	ANALYST INSTRUMENT	SCAN	ŋ								<u>6</u>								
Analytical Serv REP Results by Sample	FRACTION OIA TEST CODE Date & Time Collected not	B DATE INJECTED 07/24/84	COMPOUND RESULT	Chloromethane <u>ND</u>	Bromomethane <u>ND</u>	Vinyl Chloride ND	Chloroethane <u>ND</u> :	Methylene Chloride 2.0	Trichlorofluoromethane <u>1.8</u>	1, 1-Dichloroethene <u>ND</u>	1,1-Dichloroethane <u>1.7</u>	trans-1, 2-Dichloroethene 0.4	Chloroform <u>ND</u>	1, 2-Dichloroethane ND	1, 1, 1-Trichloroethane ND	Carbon Tetrachloride <u>ND</u>	Bromodichloromethane <u>ND</u>	1, 2-Dichloropropane <u>ND</u>	trans-1,3-Dichloropropene <u>ND</u>	
PAGE 2 RECEIVED: 07/18/84	SAMPLE ID 6D	DATA FILE CONC. FACTOR	SCAN			H	-52		24		0	4							t t	 kom regent vooro

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LAB # 84-07-090 Continued From Above	FRACTION OIA TEST CODE <u>GC 601</u> NAME EPA Method 601/GC Date & Time Collected <u>not specified</u> Category						
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Anal		REPO	retention n <u>ug/L</u> PA detect 1,1,2-tr hane and				
		SIHI	تتك يشابها ها				
		FOR	er or rteđ dat thane loroe				2 2 2
,84		AND DEFINITIONS FOR THIS REPORT	SCAN = scan number or reter All results reported in ND = not detected at EPA da *Dibromochloromethane, 1,1, #1,1,2,2-tetrachloroethane				<u>ل</u> ــــــــــــــــــــــــــــــــــــ
8/84		NITI	scan ults t det 2-tet 2-tet				
07/18/	60	DEFI	NN = scan results = not de bromoch1 1,2,2-te				P [*]
_ E		AND	SCAN All ND = *Dib 1,1,				
PAGE 3 RECEIVED: 07/18/84	SAMPLE ID 6D	NOTES		H-53	•		
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LAB # 84-07-090	<u>GC 601</u> NAME EPA Method 601/GC specified Category	ST RGS VERIFIED BY JSC NT b COMPOUNDS DETECTED 6	COMPOUND RESULT	Trichloroethene 1.3	Dibromochloromethane * <u>ND</u>	1,1,2-Trichloroethane * <u>ND</u>	cis-1, 3-Dichloropropene * <u>ND</u>	2-Chloroethylvinyl Ether <u>ND</u>	Bromoform <u>ND</u>	1, 1, 2, 2-Tetrachloroethane <b>#</b> <u>ND</u>	Tetrachloroethylene # ND	Chlorobenzene <u>ND</u>	1, 3-Dichlorobenzene <u>ND</u>	1, 2-Dichlorobenzene <u>ND</u>	1, 4-Dichlorobenzene <u>ND</u>				
REPORT Sample		ANALYST INSTRUMENT	SCAN	6															
Analytical Serv Results by S	FRACTION OZA TEST CODE Date & Time Collected not	DATE INJECTED 07/25/84	ND RESULT	Chloromethane <u>ND</u>	Bromomethane <u>ND</u>	Vinyl Chloride ND	Chloroethane <u>1.1</u>	Methylene Chloride <u>1.9</u>	luoromethane 7.6	1,1-Dichloroethene ND	1,1-Dichloroethane <u>ND</u>	chloroethene <u>ND</u>	Chloroform 4.6	1,2-Dichloroethane 4.9 1	chloroethane <u>ND</u>	etrachloride ND	loromethane ND	Nloropropane NB	loropropene <u>ND</u>
		B DA	COMPOUND	Сл	α,	Vin	U	Methyle	Trichlorofluoromet	1, 1-Dic	1, 1-Dic	trans-1, 2-Dichloroet		1, 2-Dic	1, 1, 1-Trichloroet	Carbon Tetrachlo	Bromodichloromet	1, 2-Dichloropro	trans-1, 3-Dichloroprop
PAGE 4 RECEIVED: 07/18/84	SAMPLE ID 66	DATA FILE CONC. FACTOR	SCAN				1	2	ო H-	-54	Î		4	ŋ					

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Serv REP Results by Sample	FRACTION <u>O2A</u> TEST CODE <u>GC 601</u> NAME <u>EPA Method 601/GC</u> Date & Time Collected <u>not specified</u> <u>Category</u>	t on chromatogr iss otherwise s imit method 60 roethane and c ichloroethylene			
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/18/84		DEFINITI N = scan results bromochio 1,2,2-tet			
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PAGE 5 RECEIVED: 07	SAMPLE ID 60		H-55		
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LAB # 84-07-090	<u>CC 601</u> NAME EPA Method 601/GC specified Category	LYST RGS VERIFIED BY JSC MENT b COMPOUNDS DETECTED 10	COMPOUND RESULT	Trichloroethene 0.9	Dibromochloromethane * ND	1, 1, 2-Trichloroethane * <u>ND</u>	cis-1,3-Dichloropropene * <u>ND</u>	2-Chloroethylvinyl Ether <u>ND</u>	Bromoform ND	1, 1, 2, 2-Tetrachloroethane # <u>ND</u>	Tetrachloroethylene # ND	Chlorobenzene <u>5.7</u>	1, 3-Dichlorobenzene <u>ND</u>	1, 2-Dichlorobenzene <u>ND</u>	1,4-Dichlorobenzene <u>6.0</u>				
REPORT Sample	TEST CODE lected not	ANAL YST INSTRUMENT	SCAN	8								6	1		10				
Analytical Serv Results by 1	FRACTION 03A TEST CODE Date & Time Collected not	B DATE INJECTED 07/25/84	COMPOUND	Chloromethane <u>63.8</u> {	Bromomethane <u>ND</u>	Vinyl Chloride 10.8	Chloroethane <u>15.3</u> ;	Methylene Chloride <u>6.0</u>	Trichlorofluoromethane 4.4	1,1-Dichloroethene <u>ND</u>	1,1-Dichloroethane 2.3	trans-1, 2-Dichloroethene ND	Chloroform <u>15.7</u> ;	1,2-Dichloroethane ND	1, 1, 1-Trichloroethane <u>ND</u>	Carbon Tetrachloride <u>ND</u>	Bromodichloromethane <u>ND</u>	1, 2-Dichloropropane <u>ND</u>	trans-1,3-Dichloropropene <u>ND</u> :
PAGE 6 Received: 07/18/84	SAMPLE ID 7F	DATA FILE CONC. FACTOR	SCAN	1	-	2	0	4	ן מי	  -56	8	t.	7						С Т Т

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SAMPLE ID 7F	FRACTION 03A TEST CODE Date & Time Collected not	<u>GC 601</u> specifie	NAME EPA Method 601/GC dd Category	
NOTES AND DEFINITIONS FOR THIS REPORT				
	time on chromato unless otherwise ion limit method ichloroethane and tetrachloroethyle	gram. specified. 601. (Federal Register, cis-1.3-dichloropropene ne co-elute.	er, 12/3/79). pene co-elute.	
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PAGE 8 RECEIVED:	018 028 038 038	H-58		

Analytical Serv REPORT LAB # 84-07-093 04/26/85 11:55:37	PREPARED     Radian Analytical Services       BY     8501 MoPac Blvd.       BY     8501 MoPac Blvd.       BY     9501 MoPac Blvd.       P. D. Box 9948     M.L.       ATTEN     Pustin. Texas 78766       PHONE     (512) 454-4797       CONTACT CONDVER	F. 4D. 6GDuplicate of report of OB/07/84.84. NPS/HGFootnotes and Comments* Indicates a value less than 5 times the detection limit. Fotential error for such low values ranges between	<u>© Indicates that spike recovery for this analysis on the specific matrix was not within acceptable limits indicating an interferent present.</u>	Analytical Serv TEST CODES and NAMES used on this report M625 A method 623 Acid Compounds M625 B method 623 Base/Neutrals MS 624 EPA method 624/6C-MS	
PAGE 1 RECEIVED: 07/18/84	REPORT Radian TO <u>B1.4</u> Austin ATTEN <u>William Little</u> CLIENT <u>TINKER</u> COMPANY <u>Tinker AFB</u>	WORK ID <u>Monitor Wells 7F</u> , TAKEN <u>7/16/84 - 7/17/84</u> , TRANS <u>federal express</u> TYPE <u>H20</u> P. D. # <u>212-027-21-05</u> INV. # <u>3851</u>	H-59	SAMPLE IDENTIFICATION OI ZF, Area D O2 6D O3 66, B149 3001	

REPORT LAB # 84-07-093 Sample	A NAME Method 625 Acid Compounds Category	BWS VERIFIED BY LAK COMPOUNDS DETECTED 0	COMPOUND RESULT	4-nitrophenol ND	2,4-dinitrophenol <u>ND</u>	2-methyl-4, 6-dinitrophenol <u>ND</u>	pentachlorophenol <u>ND</u>	phenol ND		Register, 11/26/84).	
REPORT nple	FRACTION <u>OIA</u> TEST CODE <u>M625</u> Date & Time Collected <u>07/17/84</u>	ANAL YST I NSTRUMENT	SCAN EPA	58A	59A	60A	644	65A		r.fied (Federal	
RE I Samp I	TEST 011ecte		NPDES	7A	<b>₹</b>	44 4	<b>4</b> 6	104		atogram. ise speci od 625, (	
Serv REP Results by Sample	ION <u>OIA</u> & Time C(	<u>07/25/84</u> 07/31/84	RESULT	Q	Q	Q	QN	QN	QN	on chromatog ss otherwise imit method 6	
PAGE 2 RECEIVED: 07/18/84	FRACT	DATE EXTRACTED DATE INJECTED	COMPOUND	2, 4, 6-trichlorophenol	4-chloro-3-methylphenol	2-chlorophenol	2, 4-dichlorophenol	2, 4-dimethylphenol	2-ni trophenol	THIS REPORT. r retention time in ug/l unle EPA detection l	
-		5		2,4	-ch1						
PAGE 2 RECEIVED: 07/18/84	SAMPLE ID 7F, Area D	DATA FILE <u>2CU07093C01</u> CONC. FACTOR 4	EPA	21A	22A 4	24A	31A	34A	57A	AND DEFINITIONS FOR SCAN = scan number o All results reported ADD = not detected at ND = not detected at	

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Analytical Serv REPORT LAB # 84-07-093 Results by Sample	FRACTION OIA TEST CODE M625 B NAME Method 625 Base/Neutrals Date & Time Collected 07/17/84 Category	DATE EXTRACTED 07/25/84 ANALYST BWS VERIFIED BY LAK DATE INJECTED 07/31/84 INSTRUMENT COMPOUNDS DETECTED 3	IPOUND RESULT NPDES SCAN EPA COMPOUND RESULT	acenaphthene <u>ND</u> 1 41B 61B N-nitrosodimethylamine <u>ND</u>	benzidine <u>ND</u> 43B 62B N-nitrosodiphenylamine <u>ND</u>	richlorobenzene <u>ND</u> 1 42B 63B N-nitrosodi-n-propylamine <u>ND</u>	rachlorobenzene <u>ND</u> i 138 <u>1640</u> 668 bis(2-ethylhexyl)phthalate <u>B</u>	iexachloroethane <u>ND</u> i 15B 67B butyl benzyl phthalate <u>ND</u>	loroethyl)ether <u>ND</u> 268 688 di-butyl phthalate <u>ND</u>	iloronaphthalene <u>ND</u> 29B 69B di-n-octyl phthalate <u>ND</u>	-dichlorobenzene <u>ND</u> i 24B <u>1023</u> 70B diethyl phthalate <u>32</u>	-dichlorobenzene <u>ND</u> i 25B 71B dimethyl phthalate <u>ND</u>	-dichlorobenzene <u>12</u> 5B 72B benzo(a)anthracene A <u>ND</u>	chlorobenzidine <u>ND</u> 5B 73B benzo(a)pyrene <u>ND</u>	H-dinitrotoluene ND 77B 74B benzo(b)fluoranthene * ND	5-dinitrotoluene <u>ND</u> 75B benzo(k)fluoranthene * <u>ND</u>	iphenylhydrazine <u>ND</u> 18B 76B chrysene A <u>ND</u>	fluoranthene ND 2B 77B acenaphthylene ND	nyl phenyl ether <u>ND</u>   3B 7BB anthracene B <u>ND</u>	-
Analytical	0	XTRACTED INJECTED	COMPOUND	acenaphthene 👝		1, 2, 4-trichlorobenzene 🗕	hexachlorobenzene	hexachloroethane	bis(2-chloroethyl)ether 🚽	2-chloronaphthalene	1, 2-dichlorobenzene	1, 3-dichlorobenzene 🗕	1, 4-dichlorobenzene 🗕	3, 3'dichlorobenzidine 🗕	2,4-dinitrotoluene 🗕	2, 6-dinitrotoluene 🚽	1, 2-diphenylhydrazine 📃		4-chlorophenyl phenyl	
ED: 07/	SAMPLE ID 7F, Area	DATA FILE <u>2CU</u> CONC. FACTOR	SCAN EPA	18	58	88	98	128	188	208	258	268	493 27B	288	358	368	378	86E	408	
PAGE 3 RECEIVE	SAMPLE	DA1 CONC.	NPDES SCAN	18	48	468	338	368	118	H 168	80 N -61	218	228	238	278	288	298	318	178	

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	rals	Ð	QV	QN	QN	QN	QN										
LAB # 84-07-093 Continued From Above	NAME Method 625 Base/Neutrals Category	benzo(ghi}perylene _	fluorene _	phenanthrene B _	dibenzo(a, h)anthracene 🛛	indeno(1,2,3-cd)pyrene _	" əuəıfid					Register, 11/26/84).		ons.			
REPORT	CODE M625 B 07/17/84	79B	BCB	818	828	838	848			·	specified.		elute.	co-elute in high concentrations	concentrations.		
REP Samp Le	TEST Lected	88	328	448	198	37B	458			togram.		1 623,	-02 944	high r	gh conc		
Analytical Serv REP /18/84 Asults by Sample	FRACTION OIA TEST CODE M625 Date & Time Collected 07/17/84	4-bromophenyl phenyl ether <u>ND</u> {	bis(2-chloroisopropyl)ether <u>ND</u>	bis(2-chloroethoxy)methane <u>ND</u> {	hexachlorobutadiene ND	herachlorocyclopentadiene <u>ND</u>	isophorone <u>ND</u>	naphthalene <u>ND</u>	DR THIS REPORT. nzene ND	SCAN = scan number or retention time on chromatogram.	ted in <u>uq/l</u> unless otherwise	at EPA detection limit method 625, (Federal	benzo(b)fluoranthene and benzo(k)fluoranthene co⊶elute	benzo(a)anthracene and chrysene co-elute ir	/ phenanthrene comelute in high		
	SAMPLE ID 7F, Area D	41B 4-bromo	42B bis(2-ch	43B bis(2-c	528	53B hexach	548	558	NOTES AND DEFINITIONS FOR THIS REPORT. nz	SCAN = scan number	All results reported in	ND = not detected at EPA detection	* = benzo(b)fluora	A = benzo(a)anthra	B = anthracene and phenanthrene		
PAGE 4 RECEIVED: 07	SANPLE	148	128	108	G4B	3 <b>2B</b>	3 <b>8</b> 8	39B	NDTES	H-62	<u>-</u>						

LAB # 84-07-093	624 NAME EPA Method 624/GC-MS 34 Category	BWS VERIFIED BY LAK f4 COMPOUNDS DETECTED 3	COMPOUND	1,2-dichloropropane <u>ND</u>	cis-1,3-dichloropropylene <u>ND</u>	trans-1, 3-dichloropropylene <u>ND</u>	ethylbenzene <u>18</u>	methylene chloride <u>ND</u>	methyl chloride <u>ND</u>	methyl bromide <u>ND</u>	bromoform <u>ND</u>	dichlorobromomethane <u>ND</u>	trichlorofluoromethane <u>ND</u>	dichlorodifluoromethane <u>ND</u>	chlorodibromomethane <u>ND</u>	tetrachloroethylene <u>ND</u>	toluene <u>ND</u>	trichloroethylene <u>ND</u>	vinyl chloride <u>ND</u>
	MS 6	ANAL YST TRUMENT	EPA	32V	<b>NEE</b>	750 93	<b>78</b> C	440	450	46V	470	46V	490	50V	51V	85V	86V	87V	<b>N88</b>
REPORT Sample	FRACTION OIB TEST CODE MS 60 Date & Time Collected 07/17/84	ANAL YST INSTRUMENT	NPDES SCAN	170	18V	18V	19V 520	22V	21V	201	> 0	12V	NOE	130	B۷	24V	254	294	31V
Serv REP Results by Sample	UN OIB Time Col	07/25/84	RESULT	QN	QN	Ω	QN	Q	QN	QN	an	QN	aN	aN	an	QN	aN	Q	5
Analytical	0	2CU07093V01 DATE INJECTED	COMPOUND	acrolein	acrylonitrile	benzene	carbon tetrachloride	chlorobenzene	1, 2-dichloroethane	1, 1, 1-trichloroethane	1, 1-dichloroethane	1, 1, 2-trichloroethane	1, 1, 2, 2-tetrachloroethane	chloroethane	bis (chloromethyl) ether	2-chloroethylvinyl ether	chloroform	1, 1-dichloroethylene	1, 2-trans-dichloroethylene
/18/84	, Area		EPA	22	2e	4	۶v	2	10V	11V	13V	14V	15V	16V	170	190	23V	291	300
PAGE 5 RECEIVED: 07/18/84	SAMPLE ID 7F, Area	DATA FILE CONC. FACTOR	NPDES SCAN	17	20	3V 339	<i>6</i> ۷	~~	150	H 27V	<b>741</b> 63	284	23V	76	4	10V	11V	16V	26V <u>220</u>

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PAGE 6 RECEIVED: 07/18/84 SAMPLE ID 7F, Area D					
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PAGE 7 RECEIVED: 07/18/84 Analytical Serv REPORT LAB # 84-07-093 RECEIVED: 07/18/84	ID 6D FRACTION 02A TEST CODE M625 A NAME Method 625 Acid Compounds Date & Time Collected 07/17/84 Category Category	DATA FILE <u>2CU07093C02</u> DATE EXTRACTED 07/19/84 ANALYST <u>BWS</u> VERIFIED BY LAK CONC. FACTOR <u>2</u> DATE INJECTED 07/24/84 INSTRUMENT COMPOUNDS DETECTED 0	ICAN EPA COMPOUND RESULT NPDES SCAN EPA COMPOUND RESULT	21A 2,4,6-trichlorophenol <u>ND</u> 7A 58A 4-nitrophenol <u>ND</u>	22A 4-chloro-3-methylphenol ND 5A 59A 2,4-dinitrophenol ND	24A 2-chlorophenol <u>ND</u> ; 4A 60A 2-methyl-4.6-dinitrophenol <u>ND</u>	31A 2,4-dichlorophenol <u>ND</u> 7A 64A pentachlorophenol <u>ND</u>	34A 2,4-dimethylphenol <u>ND</u> 100A 65A phenol <u>ND</u>	57A 2-nitrophenol ND 1
7/18/E	Q	RE 2CUC	EPA	21A	22A	24A	31A	344	57A
PAGE 7 Received:	SAMPLE ID <u>60</u>	DATA FI CONC. FACT	NPDES SCAN	114	BA	14	24	<mark>Ф</mark> н-65	¢ ¥

SCAN = scan number or retention time on chromatogram. NOTES AND DEFINITIONS FOR THIS REPORT.

All results reported in ug/l unless otherwise specified. ND = not detected at EPA detection limit method 625, (Federal Register, 11/26/84). ug/l unless otherwise specified.

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LAB # 84-07-093	B NAME Method 625 Base/Neutrals Category	BWS VERIFIED BY LAK COMPOUNDS DETECTED 1	COMPOUND RESULT	N-nitrosodimethylamine <u>ND</u>	N-nitrosodiphenylamine <u>ND</u>	N-nitrosodi-n-propylamine <u>ND</u>	bis(2-ethylhexyl)phthalate <u>13</u>	butyl benzyl phthalate <u>ND</u>	di-butyl phthalate <u>ND</u>	di-n-octyl phthalate <u>ND</u>	diethyl phthalate <u>ND</u>	dimethyl phthalate <u>ND</u>	benzo(a)anthracene A <u>ND</u>	benzo(a)pyrene <u>ND</u>	benzo(b)fluoranthene * <u>ND</u>	benzo(k)fluoranthene * <u>ND</u>	chrysene A <u>ND</u>	acenaphthylene <u>ND</u>	anthracene B <u>ND</u>
REPORT Sample	TEST CODE <u>M625</u> lected <u>07/17/84</u>	ANALYST INSTRUMENT	NPDES SCAN EPA	41B 61B	<b>43</b> B 62B	42B 63B	138 <u>1635</u> 668	158 678	268 688	29B 69B	24B 70B	25B 71B	5B 72B	6B 73B	7B 74B	98 75B	18B 76B	2B 77B	38 788
Analytical Serv Results by S	FRACTION O2A TEST C Date & Time Collected	DATE EXTRACTED <u>07/19/84</u> Date injected <u>07/24/84</u>	COMPOUND RESULT NF	acenaphthene <u>ND</u> {	benzidine <u>ND</u>	1, 2, 4-trichlorobenzene <u>ND</u>	hexachlorobenzene <u>ND</u>	hexachloroethane <u>ND</u>	bis(2-chloroethyl)ether ND	2-chloronaphthalene ND	1,2-dichlorobenzene <u>ND</u>	1,3-dichlorobenzene <u>ND</u>	1,4-dichlorobenzene <u>ND</u>	3, 3'dichlorobenzidine <u>ND</u>	2,4-dinitratoluene <u>ND</u>	2, 6-dinitrotoluene <u>ND</u>	1,2-diphenylhydrazine <u>ND</u>	fluoranthene ND	phenyl phenyl ether <u>ND</u> :
PAGE 8 RECEIVED: 07/18/84	SAMPLE ID 6D	DATA FILE <u>2CU07093C02</u> CONC. FACTOR <u>2</u>	NPDES SCAN EPA	1B 1B	4B 5B	46B BB 1, 2,	3 <b>3</b> 8 98	36B 12B	11B 18B bis(2	16B 20B 2	208 258 1	21B 26B 1	22B 27B 1	23B 28B 3, 3	27B 35B	288 36Ê	29B 37B 1,2	31B 39B	17B 4-chlorophenyl

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3 Above	se/Neutrals	ylene <u>ND</u>	fluorene ND	ne B <u>ND</u>	acene <u>ND</u>	yrene ND	pyrene <u>ND</u>									
LAB # 84-07-093 Continued From Above	NAME Method 625 Base/Neutrals Category	benzo(ghi)perylene	flu	phenanthrene	dibenzo(a, h)anthracene	indeno(1,2,3-cd)pyrene	Ċ.					Register, 11/26/84).		ns.		
DRT	CODE M625 B 07/17/84	798	BCB	818	828	838	848				ified.	(Federal Reg	elute.	concentratio	entrations.	
REPORT Sample	TEST ( lected	88	32B	44B	198	378	458			.ogram.	sads a		ne co-	high .	h conc	
Analytical Serv REP Results by Sample	FRACTION 02A TEST CODE M625 Date & Time Collected 07/17/84	4-bromophenyl phenyl ether <u>ND</u>	bis(2-chloroisopropyl)ether <u>ND</u>	bis(2-chloroethoxy)methane <u>ND</u>	hexachlorobutadiene <u>ND</u>	hexachlorocyclopentadiene <u>ND</u>	isophorone <u>ND</u>	naphthalene <u>ND</u>	NOTES AND DEFINITIONS FOR THIS REPORT. NIENE ND	SCAN = scan number or retention time on chromatogram	ted in <u>uq/l</u> unless otherwise specified	at EPA detection limit method 623,	anthene and benzo(k)fluoranthene co-elute	acene and chrysene co-elute in high concentrations	anthracene and phenanthrene comelute in high concentrations	
PAGE 9 RECEIVED: 07/18/84	0 60	41B 4-bromo	42B bis(2-ch	43B bis(2-c	52B	53B hexach	54B	558	DEFINITIONS FC	AN = scan number	All results reported in_	= not detected at EPA	<pre>= benzo(b)fluoranthene</pre>	= benzo(a)anthracene and	= anthracene and	
PAGE 9 Received:	SAMPLE ID <u>60</u>	148	128	108	348	35 <b>8</b>	988 888	39B	NOTES ANI	<b>25</b> н-67	A1	QN	*	" ◀	-	

LAB # 84-07-093	EPA Method 624/GC-MS Category	VERIFIED BY LAK COMPOUNDS DETECTED. 1	COMPOUND RESULT	1,2-dichloropropane <u>ND</u>	cis-1, 3-dichloropropylene <u>ND</u>	trans-1,3-dichloropropylene <u>ND</u>	ethylbenzene <u>ND</u>	methylene chloride <u>ND</u>	methyl chloride <u>ND</u>	methyl bromide <u>ND</u>	bromoform <u>ND</u>	dichlorobromomethane <u>ND</u>	trichlorofluoromethane <u>ND</u>	dichlorodifluoromethane <u>NB</u>	chlorodibromomethane <u>ND</u>	tetrachloroethylene <u>ND</u>	tolvene <u>ND</u>	trichloroethylene <u>ND</u>	vinyl chloride <u>ND</u>	
	24 NAME	ANALYST BMS TRUMENT <u>f4</u>	EPA	32V 1,	33V cis-1,3	33V trans-1,3	380	44V	450	4 <i>6</i> V	47V	48V di	49V tric	SOV dichl	51V ch	85V t	86V	870	BBV	
REPORT y Sample	FRACTION 02B TEST CODE MS 6 Date & Time Collected 07/17/84	SNI	NPDES SCAN	170	187	180	190	22V	21V	200	26	12V	304	130	∧8 	24V	- 25V	290	31V	
Serv Results by	CIN 02B	07/25/84	RESULT	QN	QN	QN	QN	21	an	QN	QN	QN	QN	Q	QN	QN	QV	QN	QN	
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PAGE 10 RECEIVED: 07/18/84	SAMPLE ID <u>60</u>	DATA FILE CONC. FACTOR	NPDES SCAN	17	24	ле	79	7	-H 15V	۶ ۶ 68	140	280	234	<b>^6</b>	4	10V	11V	16V	26V	

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phenol <u>ND</u>	10A 65A	enol <u>ND</u> enol <u>ND</u>	2,4-dimethylpheno 2-nitropheno	34A 57A	<b>ቂ ቂ</b> ም <b>ዓ</b>
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2,4-dinitrophenol <u>ND</u>	5A 57A	enol <u>ND</u>	4-chloro-3-methylpheno	22A 4-	BA
4-nitrophenol <u>ND</u>	7A 58A	I ON I OUB	2,4,6-trichloropheno	21A	114
COMPOUND RESULT	NPDES SCAN EPA	RESULT NF	COMPOUND	EPA	NPDES SCAN
BWS VERIFIED BY LAK COMPOUNDS DETECTED 0	ANAL YST INSTRUMENT	CTED <u>07/25/84</u> CTED <u>07/31/84</u>	03 DATE EXTRACTED DATE INJECTED	LE <u>2007093003</u> DR 4	DATA FILE CONC. FACTOR
NAME Method 625 Acid Compounds Category	TEST CODE <u>M625 A</u> ected <u>07/16/84</u>	FRACTION <u>O3A</u> TEST CODE <u>M625</u> Date & Time Collected <u>07/16/84</u>		SAMPLE ID 66, BIdg 3001	SAMPLE ID
LAB # 84-07-093	REPORT iample	al Serv REP( Results by Sample	Analytical	07/18/84	PAGE 12 RECEIVED: 07/18/84

SCAN = scan number or retention time on chromatogram. All results reported in ug/l unless otherwise specified. ND = not detected at EPA detection limit method 625, (Federal Register, 11/26/84). NOTES AND DEFINITIONS FOR THIS REPORT.

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4-chlorophenyl phenyl ether <u>ND</u> i 3B 78B anthracene B <u>ND</u>

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PAGE 14 RECEIVED: 07/18/84	07/18/		Analytical Serv REP( Results by Sample		REPORT Samp Le		LAB # 84-07-093 Continued From Above	⁸ .148.447384.147.52 ⁻ .384
SAMPLE ID 66, BIdq 3001	66, BI	lde 3001	FRACTION 03A Date & Time	Col	ION 03A TEST CODE M625 & Time Collected 07/16/84	TEST CODE <u>M625 B</u> ected 07/16/84	NAME Method 625 Base/Neutrals Category	ند. تکلیم کرکی <b>کی کر ک</b> ی کرک
148	418	4-bromophenyl phenyl	ether		88	79B	benzo(ghi}perylene <u>ND</u>	44 Mart 44
128	42B	bis(2-chloroisopropyl)ether		 뫼	32B	808	fluorene <u>ND</u>	<u>i melete</u>
108	43B	bis(2-chloroethoxy}methane		 9	44B	818	phenanthrene B <u>ND</u>	1. d <b>* .</b> *
3 <b>4B</b>	52B	he xach lorobutadiene		 9	158	828	dibenzo(a, ħ}antħracene <u>ND</u>	5 <u>193</u> 198
358	<b>3</b> 38	he xach lorocyclopentadiene		 2	37B	838	indeno(1,2,3-cd)pyrene <u>ND</u>	ر م ^{یر} معلوں
388	54B	, <b>1</b>	isophorone <u>N</u>	 및	458	848	pyrene <u>ND</u>	م <u>ر ه^وهم درم</u>
398	55B	nap	naphthalene <u>N</u>	 9				914 ⁴ 8448
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<b>N</b> พื่ พื่ -72	4	scan number or retention	ion time on chromatogram	'omatı	ogram.			م: <u>م</u> علام م
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QN	= not d	≈ not detected at EPA detection li	etion limit me	thod	625, (Fe	deral Rey	mit method 625, (Federal Register, 11/26/84).	- <u>1</u>

= benzo(a)anthracene and chrysene co-elute in high concentrations.

benzo(bifluoranthene and benzo(k)fluoranthene co-elute.

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anthracene and phenanthrene co-elute in high concentrations. H æ

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	SH	LIFIED BY LAK DETECTED 3	RESULT	e ND	e <u>ND</u>	e <u>ND</u>	e <u>ND</u>	le <u>21</u>	e <u>ND</u>	e <u>ND</u>	an w.	le <u>ND</u>	le ND	le <u>ND</u>	ie <u>ND</u>	le ND	1e 670	le ND	ie <u>ND</u>	
LAB # 84-07-093	NAME EPA Method 624/GC-MS Category	BWS VERIFIED f4 COMPOUNDS DETEC	COMPOUND	1, 2-dichloropropane	cis-1, 3-dichloropropylene	trans-1, 3-dichloropropylene	ethylbenzene	methylene chlorid	methyl chlorid	methyl bromid	bromoform	dichlorobromomethane	trichlorofluoromethane	dichlorodifluoromethane	chlorodibromomethane	tetrachloroethylene	tolvene	trichloroethylen	vinyl chloride	
	MS 624	ANAL YST	EPA	320	NEE	33V tr	78C	440	450	46V	470	48V	490	200	51V	85V	86V	87V	<b>N88</b>	
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Serv Results by	amil a	07/25/84	RESULT	QN	QN	47	QN	QN	QN	QN	QN	QN	Q	QN	QN	QN	QN	QN	QN	
Analytical S	FRACT Date 8	DATE INJECTED	COMPOUND	acrolein	acrylonitrile	pen zene	n tetrachloride	chlorobenzene	l, 2-dichloroethane	1, 1, 1-trichloroethane	l, 1-dichloroethane	1, 1, 2-trichloroethane	1, 1, 2, 2-tetrachloroethane	chloroethane	bis (chloromethyl) ether	2-chloroethylvinyl ether	chloroform	1, 1-dichloroethylene	1, 2-trans-dichloroethylene	
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PAGE 15 RECEIVED: 07/18/84	SAMPLE ID 66, BIdq 3001	DATA FILE <u>4CU07093V03</u> CONC. FACTOR 1	NPDES SCAN	17	20	9EE AE	67	2	150	₹ ₹	140	28V	23V	76	47	100	11V	167	26V	

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T LAB # 84-07-112	utical Services Blvd. 14B 14B 14B 14B 14B 14B	97 CONTACT CONQVER confirmation performed on all four	is work orger. report of OB/O7/B4. Footnotes and Comments value less than 5 times the detection limit. or for such low values ranges between	e recovery for this analysis on the ot within acceptable limits indicating t.	and NAMES used on this report	
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07/20/84	-	William Little TINKER SAMPLES Tinker AFB	wells, 601 NS Fed Ex 212-027-21-05 3856		IDENTIFICATION	
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PAGE 2 PAGE 2 RECEIVED: 07/20/84 SAMPLE ID 6A Conc. Factor Bata File Conc. Factor H-18	Analytica Analytica Analytica Analytica Dat Dat Dat Dat Dat Dat Dat Dat Dat Da	REPORI Sample TEST CODE Ilected not scan B B B B B B B B B B B B B B B B B B B	LAB # 84-07-112 LAB # 84-07-112 <u>601</u> NAME EPA Method 601/GC <u>cified</u> Category <u>RGS MCL</u> Category COMPOUNDS DETECTED <u>6</u> Trichloroethane * ESU Trichloroethane * 6 Dibromochloromethane * 6 1,1,2-Trichloroethane * 7 2-Chloroethylvinyl Ether Bromoform 1,1,2,2-Tetrachloroethane * 7 Tetrachloroethylene * 6 1,3-Dichloroethylene * 6 1,3-Dichloroethane * 7 Chlorobenzene * 7
n a	1,2-Dichloroethane <u>2.6</u> 1,1,1-Trichloroethane <u>4.2</u>		1, 2-Dichlorobenzene <u>ND</u> 1, 4-Dichlorobenzene <u>ND</u>
	Carbon Tetrachloride <u>ND</u> Bromodichloromethane <u>ND</u>		
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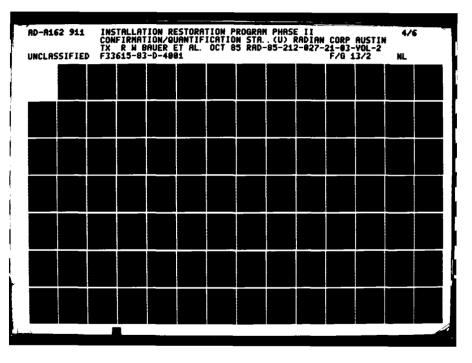
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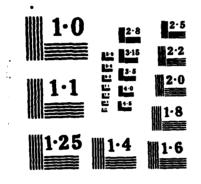
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PAGE 3 RECEIVED: 07/20/84	SAMPLE IU GA Notes and definitions for this report	SCAN = scan number or retention time All results reported in <u>ug/L</u> unle AD = not detected at EPA detection 1 *Dibromochloromethane, 1,1,2-trichlo #1,1,2,2-tetrachloroethane and tetra			
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	SAMPLE ID 68	NOTES	H-81		
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LAB # 84-07-112	GC 601 NAME EPA Method 601/GC specified Category	ST RGS VERIFIED BY <u>USG</u> VT <u>b</u> compounds detected <u>6</u>	COMPOUND	Trichloroethene 4.9	Dibromochloromethane * <u>ND</u>	1,1,2-Trichloroethane * <u>ND</u>	cis-1,3-Dichloropropene * <u>ND</u>	2-Chloroethylvinyl Ether <u>ND</u>	Bromoform <u>ND</u>	1, 1, 2, 2-Tetrachloroethane # <u>ND</u>	Tetrachloroethylene # 0.7	Chlorobenzene ND	1, 3-Dichlorobenzene <u>ND</u>	1,2-Dichlorobenzene <u>ND</u>	1,4-Dichlorobenzene <u>ND</u>				
REPORT by Sample	TEST CODE <u>CC 601</u> lected <u>not specif</u>	ANALYST INSTRUMENT	SCAN	ŝ		ļ		1			9	a L N	l I						
Analytical Serv Results by S	FRACTION 03A TEST CODE Date & Time Collected not	DATE INJECTED 07/26/84	COMPOUND	Chloromethane ND	Bromomethane <u>ND</u>	Vinyl Chloride ND	Chloroethane <u>ND</u>	Methylene Chloride <u>ND</u>	Trichlorofluoromethane <u>3.9</u>	1, 1-Dichloroethene ND	1, 1-Dichloroethane 0.3	, 2-Dichloroethene <u>2.9</u>	Chlaroform 0.7	1, 2-Dichloroethane <u>ND</u>	1, 1, 1-Trichloroethane ND	oon Tetrachloride <u>ND</u>	Bromodichloromethane ND	1,2-Dichloropropane <u>ND</u>	trans-1,3-Dichloropropene <u>ND</u> :
07/20/84		8	CC					Ma	Trichl	1,	1,	trans-1,		4,	1.1.1	Carbon	Broa	1, 2	trans-1,0
PAGE 6 RECEIVED: 07/	SAMPLE ID 60	DATA FILE CONC. FACTOR	SCAN		1				1	 H-82	2	Ð	4						

LAB # 84-07-112 Continued From Above	t specified Category	ed. deral Register, 12/3/79). -dichloropropene co-elute. ute.		·	
Analytical Serv REPORT Results by Sample	FRACTION 03A TEST CODE <u>GC 601</u> N Date & Time Collected <u>not specified</u>	FOR THIS REPORT. The or retention time on chromatogram. Stred in <u>ug/L</u> unless otherwise specified at EPA detection limit method 601, (Fe thane, 1,1,2-trichloroethane and cis-1,3 sloroethane and tetrachloroethylene co-el			
PAGE 7 RECEIVED: 07/20/84	SAMPLE ID 60	NOTES AND DEFINITIONS SCAN = scan numt All results repo ND = not detecte *Dibromochlorome #1,1,2,2-tetrach	H-83		

: 07/20/84 Analytical Serv REPORT LAB # 84-07-112 Results by Sample	D 7G FRACTION 04A TEST CODE <u>GC 601</u> NAME <u>EPA Method 601/GC</u> Date & Time Collected <u>not specified</u> <u>Category</u>	FILE <u>B</u> DATE INJECTED <u>07/26/84</u> ANALYST <u>RGS</u> VERIFIED BY <u>JGC</u> CTOR <u>b</u> COMPOUNDS DETECTED <u>2</u>	AN COMPOUND RESULT SCAN COMPOUND RESULT	Chloromethane ND : 2 Trichloroethene 0.4	Bromomethane ND   Dibromochloromethane * ND	Vinyl Chloride ND   1, 1, 2-Trichloroethane * ND	Chloroethane ND   cis-1,3-Dichloropropene * ND	Methylene Chloride ND   2-Chloroethylvinyl Ether ND	1 Trichlorofluoromethane 2.6 [ Bromoform ND	1,1-Dichloroethene ND   1,1,2,2-Tetrachloroethane # ND	1,1-Dichloroethane ND   Tetrachloroethylene # ND	trans-1, 2-Dichloroethene ND i Chlorobenzene ND	Chloroform ND   1, 3-Dichlorobenzene ND	1, 2-Dichloroethane ND   1, 2-Dichlorobenzene ND	1, 1, 1-Trichloroethane ND   1, 4-Dichlorobenzene ND	Carbon Tetrachloride ND	Bromodichloromethane ND	1, 2-Dichloropropane ND	
PAGE 8 RECEIVED: 07/20/84	SAMPLE ID 76	DATA FILE CONC, FACTOR	SCAN					H-8	-										

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REPORT LAB # 84-07-112 Sample Continued From Above	NAME EPA Method 601/GC ied Category	jister, 12/3/79). propene co-elute.			
Analytical Serv REPORT Results by Sample	FRACTION 04A TEST CODE <u>GC 601</u> N Date & Time Collected <u>not specified</u>	<pre>&gt; xcrux etention time on chromatogram <u>ug/L</u> unless otherwise specified. A detection limit method 601, (Federal Register, 1,1,2-trichloroethane and cis-1,3-dichloropropene ane and tetrachloroethylene co-elute.</pre>			
PAGE 9 RECEIVED: 07/20/84		AND DEFINITIONS TOR SCAN = scan number o All results reported AD = not detected at *Dibromochloromethan #1,1,2,2-tetrachloro	H-85		

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LAB # 34-07-113	Services M. M. M. M. M. M. M. M. M. CONTACT CONOVER	08/20/84. and Comments ss than 5 times the detection limit. ch low values ranges between	ery for this analysis on the in acceptable limits indicating	NAMES used on this report PH A PH	
Anaiytıcal Serv REPORT 04/26/85 11:59:17	PREPAREDRadian Analytical SBYB501 MoPac BlvdBYB0x 9948ATTENAustin, Texas 78766ATTENAustin, 1exas 78766SAMPLES3	Duplicate of report of OB/20/84 Footnotes and Comm * Indicates a value less than 5 Potential error for such low va 50 and 100%.	<u>e Indicates that spike recoveru</u> specific matrix was not within an interferent present	Analytical Serv TEST CODES and NAM AG E Silver.ICPES AS GA Barium. ICPES BA E Barium. ICPES CONTDTA Call Cuanide CR E Connium. ICPES Content Cuanide CR E Connium. ICPES CU E Connium. ICPES CU E Connium. ICPES CU E Connium. ICPES CU E Connium. ICPES CU E Connium. ICPES CU E Connium. ICPES CU E Connium. ICPES CU E Connium. ICPES CU E Connium. ICPES CU E Connium. ICPES CO E Connium. ICPES CU E Connium. ICPES CU E Connium. ICPES CU E Connium. ICPES CU E Connium. ICPES CU E Connium. ICPES CU E Connium. ICPES CU E Connium. ICPES CU E Connium. ICPES CU E Connium. ICPES CU E Connium. ICPES CU E Connium. ICPES CU E Connium. ICPES CU E Connium. ICPES CU E Connium. ICPES CO E CONNIUM. ICPES CO E CONNIUM. ICPES CO E CONNIUM. ICPES CO E CONNIUM. ICPES CO E CONNIUM. ICPES CO E CONNIUM. ICPES CO E CONNIUM. ICPES CO E CONNIUM. ICPES CO E CONNIUM. ICPES CO E CONNIUM. ICPES CO E CONNIUM. ICPES CO E CONNIUM. ICPES CO E CONNIUM. ICPES CO E CONNIUM. ICPES CO E CONNIUM. ICPES CO E CONNIUM. ICPES CO E CONNIUM. ICPES CO E CONNIUM. ICPES CO E CONNIUM. ICPES CO E CONNIUM. ICPES CO E CONNIUM. ICPES CO E CONNIUM. ICPES CO E CONNIUM. ICPES CO E CONNIUM. ICPES CO E CONNIUM. ICPES CO E CONNIUM. ICPES CO E CONNIUM. ICPES CO E CONNIUM. ICPES CO E CONNIUM. ICPES CO E CONNIUM. ICPES CO E CONNIUM. ICPES CO E CONNIUM. ICPES CO E CONNIUM. ICPES CO E CONNIUM. ICPES CO E CONNIUM. ICPES CO E CONNIUM. ICPES CO E CONNIUM. ICPES CO E CONNIUM. ICPES CO E CONNIUM. ICPES CO E CONNIUM. ICPES CO E CONNIUM. ICPES CO E CONNIUM. ICPES CO E CONNIUM. ICPES CO E CONNIUM. ICPES CO E CONNIUM. ICPES CO E CONNIUM. ICPES CO E CONNIUM. ICPES CO E CONNIUM. ICPES CO E CONNIUM. ICPES CO E CONNIUM. ICPES CO E CONNIUM. ICPES CO E CONNIUM. ICPES CO E CONNIUM. ICPES CO E CONNIUM. ICPES CO E CONNIUM. ICPES CO E CONNIUM. ICPES CO E CONNIUM. ICPES CO E CONNIUM. ICPES CO E CONNIUM. ICPES CO E CONNIUM. ICPES CO E CONNIUM. ICPES CO E CONNIUM. ICPES CONNIUM. ICPES CONNIUM. ICPES CONNIUM. ICPES CONNIUM. ICPES CONNIUM. ICPES CONNIUM. ICPES CONNIUM. ICPES CONNIUM. ICPES CONNIUM. ICPES CO	
PAGE 1 RECEIVED: 07/20/84	REPORT Radian TO <u>B1 4</u> Austin ATTEN <u>William Little</u> CLIENT <u>TINKER</u> SK COMPANY <u>Tinker AFB</u> SK	WORK ID <u>sediments</u> TAKEN <u>DG</u> TRANS <u>Fed Ex</u> TYPE P. 0. # <u>212-027-21-05</u> INV. # <u>3907</u>	H-87	SAMPLE IDENTIFICATION SAMPLE IDENTIFICATION 15ED-28 03 15ED-28	

D: 07/20/84 RESULTS BY TEST CODE Sample <u>01</u> Sample <u>02</u> Sample <u>02</u> Sample <u>02</u> Sample <u>01</u> (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units) (entered units)	
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PAGE 3	am' Analytic	ical Serv REPORT	REPORT	LAB # 84-07-113	
RECEIVED: 07/20/84		RESULTS BY	IEST	CONTINUED FROM ABOVE	
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	7.30	7.30	<b>6</b> . 37		
	07/31/84	07/31/84	07/31/84		
	07/31/84	07/31/84	07/31/84		
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ug7ml :	6/6ი	5,60	6/5n		

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Conporting					1	
PAGE 4		Analytical Serv	REPORT	LAB #	LAB # 84-07-113	
RECEIVED: 07/20/84			Sample			R. F. L.
SAMPLE ID <u>15ED-20</u>		FRACTION 01B Date & Time Co	FRACTION OIB TEST CODE HIRCRA N Date & Time Collected not specified	NAME RCRA	NAME RCRA Herbicides ed Category	
DATE EXTRACTED Concentration factor	<u>08/16/84</u> 10	DATE	DATE INJECTED <u>08/18/84</u> ANALYST <u>MSF</u>	-	VERIFIED BY <mark>LLN</mark>	
COMPOUND	RESULT	DET. LIMIT	OTHER HERBICIDES	RESULT	DET. LIMIT	
2, 4-D	QN	1.0				
2,4,5-TP (Silver)	<u>UN</u>	1.0				
ND ≃ not de All results	NDTES A tected at reported	SEFINITIONS FOR specified detec vicrograms/liter	THIS REPORT. tion limit. unless otherwise	specified.		
SAMPLE ID ISED-20 H-90		FRACTION OIB TEST CODE Date & Time Collected not	<u>PIRCRA</u> specifie	NAME RCRA	NAME <u>RCRA Pesticides</u> id Category	
DATE EXTRACTED CONCENTRATION FACTOR	<u>08/13/84</u> 10	DATE	INJECTED 08/16/84 ANALYST MSF		VERIFIED BY L <u>LN</u>	
COMPOUND	RESULT	DET. LIMIT	OTHER PESTICIDES	RESULT	DET. LIMIT	
Lindane	QN	5.0				
Endrin	QN	2.0				
Methoxychlor	QN	20.				
Toxaphene	QN	20.				
	NOTES AND	NOTES AND DEFINITIONS FOR THIS REPORT.	THIS REPORT.			

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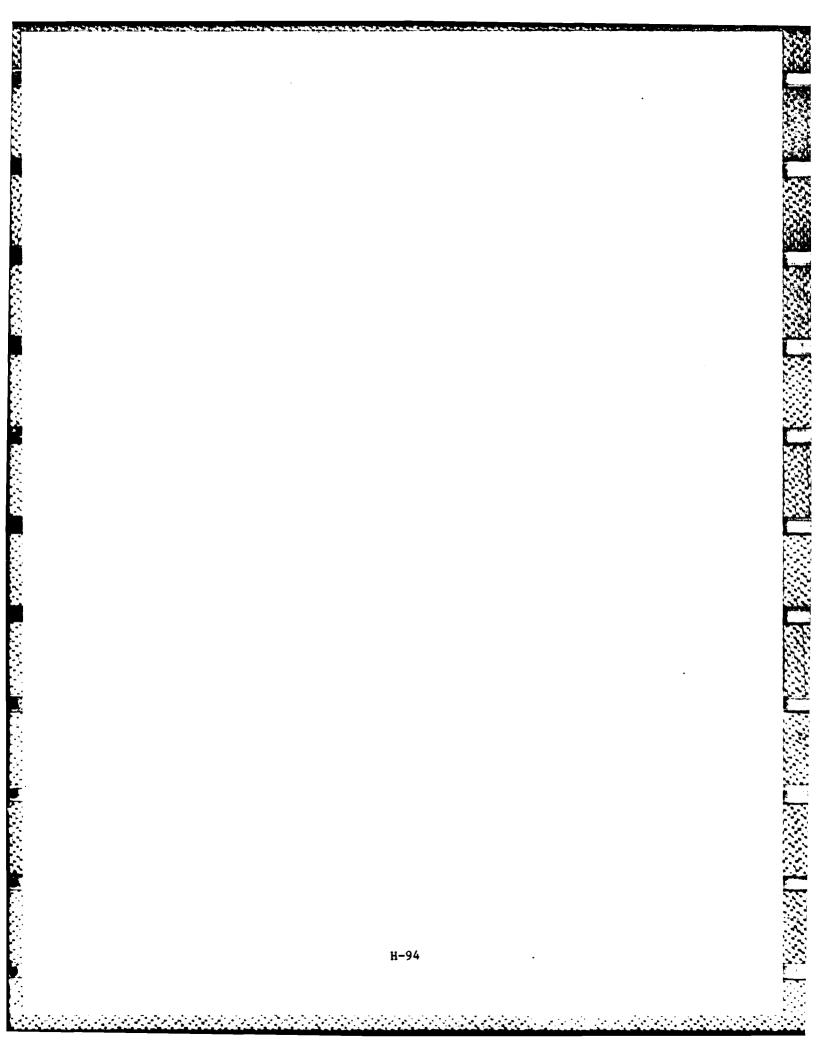
LAB # 84-07-113 Continued From Above	PIRCRA NAME RCRA Pesticides specified Category	ion limit. unless otherwise specified.	TEST CODE <u>HIRCRA</u> NAME <u>RCRA Herbicides</u> lected <u>not specified</u> <u>Category</u>	08/18/84 VERIFIED BY LLN	IDES RESULT DET. LIMIT			úse specified.	PIRCRA NAME RCRA Pesticides specified Category	08/16/84 VERIFIED BY LLN	IDES RESULT DET. LIMIT				
Serv REPORT Results by Sample	FRACTION <u>OIB</u> TEST CODE <u>PIRCRA</u> Date & Time Collected <u>not specifi</u>	! specified detection limit. micrograms∕liter unless otherw	FRACTION O2B TEST CODE HIRCRA N Date & Time Collected not specified	DATE INJECTED 08/1 ANALYST SE	DET. LIMIT OTHER HERBICIDES	1.0	1.0	DEFINITIONS FOR THIS REPORT. • specified detection limit. micrograms/liter unless otherwise	FRACTION <u>O2B</u> TEST CODE <u>PIRCRA</u> Date & Time Collected <u>not specif</u>	DATE INJECTED 08/1 ANALYST MSF	DET. LIMIT OTHER PESTICIDES	2.0	2.0	20.	
Analytical		tected at the reported in m		<u>08/16/84</u> 10	RESULT DI	QN	QN	NOTES AND D tected at the treported in m		08/13/84 10	RESULT DI	<u>an</u>	QN	<u>UN</u>	
PAGE 5 RECEIVED: 07/20/84	SAMPLE ID ISED-20	ND = not de All results	SAMPLE ID ISED-23	DATE EXTRACTED Q CONCENTRATION FACTOR _	COMPOUND	2, 4-D	2,4,5-TP (Silvex)	ND = not det	SAMPLE ID ISED-23	DATE EXTRACTED O CONCENTRATION FACTOR	COMPOUND	Lindane	Endrin	Methoxychlor	

LAB # 84-07-113 Continued From Above	NAME RCRA Pesticides d Category			NAME RCRA Herbicides ed Category	VERIFIED BY LLN	RESULT DET. LIMIT			specified.	ME RCRA Pesticides Category	VERIFIED BY LLN
ical Serv REPORT Results by Sample	FRACTION <u>O2B</u> TEST CODE <u>PIRCRA</u> NAI Date & Time Collected <u>not specified</u>	20.	DEFINITIONS FOR THIS REPORT. • specified detection limit. micrograms/liter unless otherwise specified.	FRACTION <u>O3B</u> TEST CODE <u>HIRCRA</u> NAI Date & Time Collected <u>not specified</u>	DATE INJECTED 08/16/84 ANALYST MSF	DET. LIMIT OTHER HERBICIDES	1.0	1.0	DEFINITIONS FOR THIS REPORT. • specified detection limit. micrograms/liter unless otherwise spec	FRACTION 03B TEST CODE PIRCRA NAME RCRA Pesticides Date & Time Collected not specified Category	DATE INJECTED <u>OB/16/84</u> ANALYST <u>MSF</u>
PAGE 6 RECEIVED: 07/20/84	SAMPLE ID ISED-23	Toxaphene ND	NDTES AND DE ND'= not detected at the All results reported in m	SAMPLE ID ISED-28	DATE EXTRACTED 08/13/84 CONCENTRATION FACTOR 10	RESULT	2, 4-D ND	2,4,5-TP (Silver) ND	NDTES AND DE ND = not detected at the All results reported in m	SAMPLE ID ISED-28	DATE EXTRACTED <u>08/13/84</u> CONCENTRATION FACTOR <u>10</u>

	-113 rom Above	cides ory	DET. LIMIT					)
	LAB # 84-07-113 Continued From Above	NAME RCRA Pesticides ed Category	RESULT D					i B G
		PIRCRA NAMI specified						۲. ۹ ۹ ۹ ۹ ۹ ۹ ۹ ۹ ۹ ۹ ۹ ۹ ۹ ۹ ۹ ۹ ۹ ۹ ۹
	REPORT Sample	TEST CODE Llected not	OTHER PESTICIDES					FOR THIS REPORT. etection limit. iter unless otherwi
	l Serv REPOR Results by Sample	FRACTION <u>O3B</u> TEST CODE PIRCRA N Date & Time Collected <u>not specified</u>	LIMIT	2.0	5.0	20.	20.	L Smarth Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Strategy Str
	Analytical	Day	ULT DET.	QN	Q	QN	QN	ES AND at the spect micro
-			RESULT					de te c te c te c te c te c te c te c te
	07/20/84	15ED-28	COMPOUND	Lindane	Endrin	Methoxychlor	Toxaphene	ND = not de All results
	PAGE 7 RECEIVED: 07/20/84	SAMPLE ID ISED-28				Σ		н-93

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LAB # 84-07-131	14. Services 14. Terrices 78766 CERTIFIED BY CONTACT CONDVER	08/17/84. and Comments is than 5 times the detection limit. ih low values ranges between recovery for this analysis on the recovery for this analysis on the within acceptable limits indicating	and NAMES used on this report	
Serv REPORT 04/26/85 12:00:28	PREPARED Radian Analuti BY 8501 MoPac Blv P. 0. Box 9948 ATTEN ATTEN PHONE (512) 454-479	Duplicate of report of OB/17/84 Footnotes and Comm * Indicates a value less than 5 Potential error for such low va 50 and 100%. @ Indicates that spike recovery specific matrix was not within an interferent present.	Analytical Serv TEST CODES and N M623 A Method 623 Acid Compounds M625 B Method 625 Base/Newtrals M5 624 EPA Method 624/6C-M5	
PAGE 1 Analytical Analytical Analytical	REPORT <u>Radian</u> TO <u>B1.4</u> Austin Atten <u>William Little</u> CLIENT <u>TINKER</u> COMPANY <u>Tinker AFB</u> FACILITY	WORK ID USAF, Well Water TAKEN <u>7/18/84, Nancu Stein</u> TRANS <u>federal express</u> TVPE H20 P. 0. # 212-027-21-05 INV. # 3908	SAMPLE IDENTIFICATION OI 6A OI 6A OI 6A OI 6A OI 6A OI 6A OI 76	

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LAB # 84-07-131	A NAME Method 625 Acid Compounds Category	BWS VERIFIED BY LAK COMPOUNDS DETECTED 0	COMPOUND	4-nitrophenol ND	2, 4-dinitrophenol ND	2-methyl-4, 6-dinitrophenol <u>ND</u>	pentachlorophenol <u>ND</u>	phenol ND		Register, 11/26/84).	)
REPORT y Sample	TEST CODE M625 011ected 07/18/84	14 ANALYST _	NPDES SCAN EPA	1 7A 58A	59A 57A	1 4A 60A	1 9A 64A	10A 65A		gram. specified. 625. (Federal	
Analytical Serv REP Results by Sample	FRACTION 01A Date & Time C	DATE EXTRACTED <u>07/25/84</u> Date injected <u>07/30/84</u>	ID RESULT	thlorophenol ND	nethylphenol <u>ND</u>	2-chlorophenol ND	2, 4-dichlorophenol ND	2, 4-dimethylphenol ND	2-nitrophenol <u>ND</u>	time on unless o on limit	
		20107131001 DAT	A COMPOUND	A 2, 4, 6-trichloroph	A 4-chloro~3-methylph					FOR THIS ber of ret orted in ed at EPA	
PAGE 2 RECEIVED: 07/23/84	SAMPLE ID 6A	DATA FILE 2 CONC. FACTOR _	NPDES SCAN EPA	11A 21A	8 <b>A</b> 22A	549 1-96	2A 31A	3A 34A	6A 57A	NOTES AND DEFINITIONS SCAN = scan numb All results repo ND = not detecte	;

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eutrals	D BY LAK	RESULT	<u>UN</u>	<u>d</u> v	QN	CN N	<b>N</b>	ND	e ND	ON •	ON N	A ND	e ND	ON *	dN *	A ND	e ND	B	
NAME Method 625 Catego	BWS VERIFIED	COMPOUND	N-nitrosodimethylamine	N-ni trosodipheny lamine	N-nitrosodi-n-propylamine	is(2-ethylheryl)phthalate	butyl benzyl phthalate	di-butyl phthalate	di-n-octyl phthalate	diethyl phthalat	dimethy! phthalat	benzo(a)anthracene	benzo(a)pyren	benzo(b)fluoranthene	benzo(k)fluoranthene	chrysene /	acenaphthylen	anthracene	
	NENT	EPA	61B	62B	8C9	66B b	67B	<b>88</b> 9	69B	708	718	728	<b>33B</b>	748	758	768	77B	768	
TEST CODE	SNI	UPDES SCAN	418	<b>4</b> 3B	428	138	158	268	298	248	258	38	<b>6</b> B	7 <b>B</b>	9B	188	2B	88	
UN UIA Time Co	07/25/84 07/30/84	RESULT	an	Q	Q	QN	QN	Q	Ŷ	Q	Q	Q	Q	Q	Q	QN	Q	Q	
FRACTI Date &	DATE EXTRACTED DATE INJECTED	COMPOUND	acenaphthene	benzidine	4-trichlorobenzene	hexachlorobenzene	hexachloroethane	-chloroethy])ether		, 2-dichlorobenzene	, 3-dichlorobenzene	, 4-dichlorobenzene	'dichlorobenzidine	2, 4-dinitrotoluene	2, 6-dinitrotoluene	-diphenylhydrazine	fluoranthene	henyl phenyl ether	
	2007131001 2		18	58	88 1,2,	9B	28										39B		
ID 6A	A FILE FACTOR						4	44 1	N	(N	N	CN.	CV	( ¹ )	Ċ	Ċ	ניז	4	
	FRACTION OIA TEST CODE M625 B NAME Metho Date & Time Collected 07/18/84	FRACTION     OIA     TEST     CODE     M625     B ase/Neutra       Date     & Time     Collected     07/18/84     Category       2cuo7131col     Date     extracted     07/23/84     Analyst     Category       2cuo7131col     Date     extracted     07/30/84     Analyst     BMS     Verified     BV	FRACTION       OIA       TEST       CODE       M625       B ase/Neutra         Date       & Time       Collected       07/18/84       Category         Date       INSTRUMENT       BMB       Compounds       Detected         Compound       RESULT       NPDES       SCAN       EPA       Compound       RESIL	EPA     FRACTION     OIA     TEST     CODE     M625     Base/Neutra       Date     & Time     Collected     07/18/84     Category       Contracted     07/23/84     INSTRUMENT     BMS     Category       BMS     Date     8 Time     Collected     07/18/84     Category       COOZIALCOL     Date     8 Time     Collected     07/25/84     INSTRUMENT     Category       EPA     COMPOUND     RESULT     NPDES     SCAN     EPA     COMPOUND     RESUL       1B     acenaphthene     ND     41B     61B     N-nitrosodimethylamine	ERACTIONOldTESTCODEM625Base/NeutraDate& TimeCollected07/18/84Category2cuoziaicoiDate& TimeCollected07/18/84Category2cuoziaicoiDate& TimeCollected07/18/84Category2cuoziaicoiDate©2/30/84INSTRUMENTBMSVERIFIED2cuoziaicoiDate07/30/84INSTRUMENTBMSCompounds2cuoziaicoiDate07/30/84INSTRUMENTBMSCompounds2cuoziaicoiDate07/30/84INSTRUMENTBMSCompounds2cuoziaicoiDate07/30/84INSTRUMENTBMSCompounds2cuoziaicoiDate07/30/84INSTRUMENTBMSCompounds2cuoziaicoiDate07/30/84INSTRUMENTBMSCompounds2cuoziaicoiDate07/30/84INSTRUMENTBMSCompounds2cuoziaicoiDate07/30/84INSTRUMENTBMSCompounds2cuoziaicoiDate07/30/84INSTRUMENTBMSCompounds2conpoundResultNPDESScanEPACompoundsResi1BacenaphtheneND41B61BN-nitrosodimethylamineEPA5BbenzidineND43B62BN-nitrosodimethylamineEPA	FRACTIONOIATESTCODEM625Base/NeutraDate& TimeCollected07/18/84Category2cuoziaicoiDateExtracted07/25/84INSTRUMENTBMSCategory2cuoziaicoiDateExtracted07/20/84INSTRUMENTBMSCompoundsVERIFIEDBV2cuoziaicoiDateExtracted07/30/84INSTRUMENTBMSCompoundsVERIFIEDBVEPACOMPOUNDRESULTNPDESSCANEPACOMPOUNDRES1BacenaphtheneND41B61BN-nitrosodimethylamine5BbenzidineND43B62BN-nitrosodimethylamineBB1, 2, 4-trichlorobenzeneND42B63BN-nitrosodin-n-propylamine	FRACTION     OIA     TEST     CODE     M625     B     NAME     Method     625     Base/Neutral       Date     & Time     Collected     07/18/84     Categony     Categony       2cuoziaicoi     Date     Extracted     07/23/84     INNERT     Categony       2cuoziaicoi     Date     Extracted     07/23/84     INNERT     Categony       2cuoziaicoi     Date     Extracted     07/23/84     INNERT     Categony       2cuoziaicoi     Date     Extracted     07/18/84     Categony     Categony       2cuoziaicoi     Date     Extracted     07/18/84     Compounds     Certed       2cuoziaicoi     Date     Extracted     07/18/84     Compounds     Certed       2cuoziaicoi     Date     Extracted     07/18/84     Compounds     Certed       2cuoriation     Result     NPDES     SCAN     EPA     Compounds     Result       1B     acenaphthene     ND     41B     61B     N-nitrosodimethylamine       5B     1.2.4-trichlorobenzene     ND     42B     62B     N-nitrosodin-n-propylamine       9B     1.2.4-trichlorobenzene     ND     13B     66B     bis(2-ethylhenyllamine	FRACTION 01ATEST CODEM625NAMEMethod625Base/NeutralDate & Time Collected07/18/6407/18/64Category2CU07131C01Date Extracted07/23/84INSTRUMENTEMS2CU07131C01Date Extracted07/30/84INSTRUMENTEMS2CU07131C01Date Extracted07/30/84INSTRUMENTCategory2CU07131C01Date Extracted07/30/84INSTRUMENTCategory2CU07131C01Date Extracted07/30/84INSTRUMENTCategory2PACOMPOUNDRESULTNPDES SCANEPACOMPOUND1BacenaphtheneND41B61BN-nitrosodimethylamine9B1.2.4-trichlorobenzeneND42B63BN-nitrosodinethylamine9BhexachlorobenzeneND13B66Bbis(2-ethylhenyl1amine12BhexachlorobenzeneND13B67Bbutyl benzyl phthalate	FRACTIONOIATESTCODEM625B Ase/NeutralDate& TimeCollected07/18/84NAMENethod625Base/NeutralZCU07131C01DATEEXTRACTED97/23/84INSTRUMENTBMSCategoryZCU07131C01DATEINJECTED97/23/84INSTRUMENTBMSCompoUNDSDETECTEDZCU07131C01DATEINJECTED97/30/84INSTRUMENTBMSCOMPOUNDSDETECTEDZCU07131C01DATEINJECTED97/30/84INSTRUMENTBMSCOMPOUNDSDETECTEDZENCOMPOUNDRESULTNPDESSCANEPACOMPOUNDRESULEPACOMPOUNDRESULTNPDESSCANEPACOMPOUNDRESULBB1.2.4-TTICHIOTOBENZENEND43B62BN-nittrosodimethylamineDis(2-ethylhenylamineBB1.2.4-TTICHIOTOBENZENEND13B62BN-nittrosodin-repylamineDis(2-ethylhenylamineCBherachlorobenzeneND13B66Bbis(2-ethylhenyl1)Dis(2-ethylhenyl1)Dis(2-ethylhenyl1)12Bbis(2-ethlorobethaneND15B68Bdi-butyl1Dithalate12Bbis(2-ethlorobethaneND12B68Bbis(41 benzyl1 phthalate	FRACTIONOIATESTCODEM625BNAMEMethod625Base/NeutralDateNateDateNateNateNateCategoryNerriteNerriteNerriteZCU07131C01DateEXTRACTED07/23/94INSTRUMENTBMSCategoryNerriteNerriteNerriteZCU07131C01DateEXTRACTED07/23/94INSTRUMENTBMSCategoryNerriteNerriteNerriteNerriteNerriteNerriteNerriteNerriteNerriteNerriteNerriteNerriteNerriteNerriteNerriteNerriteNerriteNerriteNerriteNerriteNerriteNerriteNerriteNerriteNerriteNerriteNerriteNerriteNerriteNerriteNerriteNerriteNerriteNerriteNerriteNerriteNerriteNerriteNerriteNerriteNerriteNerriteNerriteNerriteNerriteNerriteNerriteNerriteNerriteNerriteNerriteNerriteNerriteNerriteNerriteNerriteNerriteNerriteNerriteNerriteNerriteNerriteNerriteNerriteNerriteNerriteNerriteNerriteNerriteNerriteNerriteNerriteNerriteNerriteNerriteNerriteNerriteNerriteNerriteNerriteNerriteNerriteNerriteNerriteNerriteNerriteNerriteNerriteNerriteNerriteN	FRACTIONOIATEST CODEM625NAMEMethod623Base/NeutralDate& 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Mac25       Base/Neutral         2CU02131C01       Date       % Time Collected       0//18/84       Category       Category         2CU02131C01       Date       % Time Collected       0//18/84       Category       Category         2CU02131C01       Date       EXTRACTED       97/23/84       INSTRUMENT       BMS       Category         2CU02131C01       Date       INSCRED       0//18/84       Category       Category       Category         2CU02131C01       Date       100       RESULT       MALYST       BMS       Category       RESUL         2CU02131C01       Date       100       RESULT       MALYST       BMS       Category       RESUL         2CU07131C01       Acconspiration       ND       41B       AMALYST       BMS       Compounds       RESUL         2B       Compound       RESUL       AMALYST       BMS       Compounds       RESUL       RESUL         2B       Acconspiration       ND       41B       61B       N-nitrosodianthylamine       Levention         2B       Actinitrosodiation       ND       13B       62B       N-nitrosodiathylamine       Leventio	FRACTION       COIL       FEAT       COIL       FEAT       COIL       FEAT       Coll       FEAT       FEAT       Coll       FEAT       FEAT       Coll       FEAT       FEAT	FRACTION         OIA         TEST         CODE         MAME         Method         625         Base/Neutral           2CU07131C01         DATE EXTRACTED         07/23/94         TIME         COIPECUED         07/23/94         TIME         Colegony           2CU07131C01         DATE EXTRACTED         07/23/94         TIMETRUMENT         BMS         Colegony         Colegony           2CU07131C01         DATE EXTRACTED         07/23/94         TIMETRUMENT         BMS         CompouND         RESUL           2CU07131C01         DATE EXTRACTED         07/23/94         TIMETRUMENT         BMS         CompouND         RESUL           2EPA         COMPOUND         RESUL         NPDES         SCAN         EPA         COMPOUND         RESUL           5B         benzidine         ND         41B         61B         N-nitrosodimethylamine         EEC           9B         herachlorobenzene         ND         42B         62B         N-nitrosodimethylamine         EEC           9B         herachlorobenzene         ND         13B         64B         Nicylibenzylibenzylibenzylibenzylibenzylibenzylibenzylibenzylibenzylibenzylibenzylibenzylibenzylibenzylibenzylibenzylibenzylibenzylibenzylibenzylibenzylibenzylibenzylibenzylibenzylibenzylibenzylibenzylibenzylibenzylibenzylibenzylibenzylibenzylibenzylibenzyliben	FRACTION OIA         TEST CODE M625         NAME Method 625         Base/Neutral           Date & Time Collected 07/18/64         Category         Category           2CUO7131C01         Date Extracted 07/18/64         INSTRUMENT         ENE           2CUO7131C01         Date Extracted 07/18/64         INSTRUMENT         Category           2CU07131C01         Date Extracted 07/18/64         INSTRUMENT         ENE           2CU07131C01         Date Extracted 07/18/64         INSTRUMENT         ENE           2EPA         COMPOUND         RESULT         Non         Vertree By Level           3B         Latrichtorobenzene         ND         4.18         Navety Immine         EEB           9B         Li.2.4-trichtorobenzene         ND         4.28         6.38         N-nitrosodischylamine         EEB           9B         hezachlorobenzene         ND         1.38         6.68         bis(2-ethyllamine         EEB           9B         hezachlorobenzene         ND         138         6.68         bis(2-ethyllamine         EEB           128         hezachlorobenzene         ND         138         6.68         bis(2-ethyllamine         EEB           208         2-chlorobenzene         ND         28         6.88	FRACTION OIA         TEST CODE M625         NAME Method 625         Base/Neutral           Date & Time Collected 07/18/64         Category         Category           2cuoziaicoi         Date Extracrete 07/18/64         INSTRUMENT         BMS         Coreounds better by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by vertice by ver	FRACTION         TEST         CODI         REST         CODE         RACT         Rest         Category         Rest         Category         Rest         Category         Rest         Rest         Category         Rest         Res         Rest         Rest         Re

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PAGE 4 RECEIVED: 07/23/84	07/23/		Analytical Serv Resu	Serv REP Results by Sample	REPORT Samp Le	huu	LAB # 84-07-131 Continued From Above
SAMPLE ID 6A	Að		FRACTIO Date &	N OIA Time Col	FRACTION OIA TEST CODE M625 Date & Time Collected 07/18/84	TEST CODE <u>M625 B</u> ected <u>07/18/84</u>	NAME Method 625 Base/Neutrals Category
148	418	4-bromophenyl phenyl	henyl ether _	â	88	798	benzc´ghi}perylene <u>ND</u>
12B	428	bis(2-chloroisopropy])e	ropyl)ether _	Q	32 <b>B</b>	808	fluorene ND
108	<b>4</b> 3B	bis(2-chloroethoxy)met	oxy}methane	Ŷ	44B	618	phenanthrene B ND
3 <b>4B</b>	528	hexachlorobutad	orobutadiene 🗕	Q	198	828	dibenzo(a, h)anthracene <u>ND</u>
358	33B	hexachlorocyclopentad	lopentadiene	Q	37B	838	indeno(1,2,3-cd)pyrene <u>ND</u>
<b>38B</b>	54B		ísophorone _	Q	458	648	pyrene <u>ND</u>
39B	55B		naphthalene _	Q			
NDTES AND	DEFINI	DEFINITIONS FOR THIS REPORT. N	REPORT. nzene 🚽	Q			
<b>н-</b> 9	n	scan number or retention	ention time on	ı chromatogram.	0 <b>01-20</b> .		

All results reported in <u>ug/L</u> unless otherwise specified.

ND = not detected at EPA detection limit method 625, (Federal Register, 11/26/84).

* = benzo(b)fluoranthene and benzo(k)fluoranthene comelute.

A = benzo(a)anthracene and chrysene co-elute in high concentrations.

B = anthracene and phenanthrene co-elute in high concentrations.

H-98

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	9	BY LAK TED 1	RESULT	Ŷ	Q	ŪN	QN	QN	QN	an	DN	ON	an	DN	QN	đN	QN	522	QN	
LAB # 84-07-131	NAME EPA Method 624/GC-MS Category	BWS VERIFIED BY	COMPOUND	1, 2-dichloropropane	cis-1, 3-dichloropropylene	trans-1, 3-dichloropropylene	ethylbenzene	methylene chloride	methyl chloride	methyl bromide	bromaform	dichlorobromomethane	trichlorofluoromethane	dichlorodifluoromethane	chlorodibromomethane	tetrachloroethylene	toluene	trichloroethylene	vinyl chloride	
	: <u>MS 624</u> /18/84	ANAL YST	EPA	32V	<b>NEE</b>	33V t1	<b>78</b> C	44/	450	46V	470	480	490	50V	51V	85V	86V	87V	788	
REPORT Sample	FRACTION OIB TEST CODE MS 6 Date & Time Collected 07/18/84	ANAL YST INSTRUMENT	NPDES SCAN	174	18V	18V	190	22V	21V	201	50	12V	NOE	130	78	240	250	294 313	31V	
lts by	UN <u>OIB</u> Time Col	07/25/84	RESULT	Q	Q	Q	Q	Q	Q Q	Q	Q	Q	Q	Q	QN	QN	QN		Q	
Analytical Serv Resu	FRACTI Date &	DATE INJECTED	COMPOUND	acrolein	acrylonitrile	benzene	carbon tetrachloride	chlorobenzene	1, 2-dichloroethane	1, 1, 1-trichloroethane	1, 1-dichloroethane	1, 1, 2-trichloroethane	1, 1, 2, 2-tetrachloroethane	chloroethane	(chloromethyl) ether	2-chloroethylvinyl ether	chloroform	1, 1-dichloroethylene	1, 2-trans-dichloroethylene	
`84		<u>4cuo7131v01</u> 1	J				C.41		1	1, 1,	1	1, 1,	1, 1, 2, 2-		bis (ct	2-ch101		1.1		
PAGE 5 RECEIVED: 07/23/84	D 6A		AN EPA	20	>e €	4	60	74	101	110	130	140	150	16V	170	190	23V	290	300	
PAGE 5 Received	SANPLE ID <u>6A</u>	DATA FILE CONC. FACTOR	NPDES SCAN	17	20	ле	64	<b>с</b> н	-99	274	141	287	23V	<b>^6</b>	<b>74</b>	10V	110	16V	26V	
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LAB # 84-07-131 Continued From Above	NAME EPA Method 624/6C-MS Gategory ster. 12/3/79).		
Cont			
REPORT LAB # 84-07-131 ple Continued From Above	d 18/8		
K I	cted 07/18 specified. 24, (Feder		
REPORT			
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Serv REP( Results by Sample	FKACIIUN UIB IESI CUDE MS 624 Date & Time Collected 07/18/84 time on chromatogram. unless otherwise specified. on limit method 624, (Federal Reg		
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	AND DEFINI SCAN = scat All result ND = not d		
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PAGE 6 RECEIVED: 07/23/84	SAMPLE IU 6A NOTES AND DE SCAN = All re ND = n	H-100	

LAB # 84-07-131	5 A NAME Method 625 Acid Compounds 4 Category	BWS VERIFIED BY LAK COMPOUNDS DETECTED 0	COMPOUND RESULT	4-nitrophenol <u>ND</u>	2, 4-dinitrophenol ND	2-methyl-4, 6-dinitrophenol ND	pentachlorophenol ND	phenol ND			Register, 11/26/84).
REPORT Samp 1 e	RACTION <u>OZA</u> TEST CODE <u>M625 A</u> Late & Time Collected <u>07/18/84</u>	ANALYST INSTRUMENT	NPDES SCAN EPA	7A 58A	5A 59A	4A 60A	9A 64A	10A 65A		ogram. 	, <b>O</b>
Analytical Serv REP Results by Sample	FRACTION 02A Date & Time Col	DATE EXTRACTED 07/25/84 DATE INJECTED 07/30/84	COMPOUND RESULT N	2, 4, 6-trichlorophenol ND	4-chloro-3-methylphenol ND	2-chlorophenol <u>ND</u>	2,4-dichlorophenol ND	2, 4-dimethylphenol ND	Z-nitrophenol ND :	THIS REPORT. r retention time on chromatogram in worl unless otherwise she	detection limi
PAGE 7 RECEIVED: 07/23/84	SAMPLE ID 68	DATA FILE <u>2CUO7131CO2</u> CONC. FACTOR	NPDES SCAN EPA CO	11A 21A 2,4,4	8A 22A 4-chloi	н-1 Ан-1	2 <b>a</b> 31A	3A 34A 2,	6A 57A	NOTES AND DEFINITIONS FOR THIS REPORT. SCAN = scan number or retention All results reported in 10.4	ND = not detected at

Ball No.

		rais	BV LAK ED 0	RESULT	an	ŪN	QN	QN	QN	ŪN	Q	QN	Ŋ	QN	QN	ON	QN	UN	QV	QN
3	LAB # 84-0/-131	B NAME Method 625 Base/Neutrals Category	BWS VERIFIED BY COMPOUNDS DETECTED	COMPOUND	N-nitrosodimethylamine 🗕	N-nitrosodiphenylamine _	N-nitrosodi-n-propylamine _	bis(2-ethylhexyl)phthalate _	butyl benzyl phthalate _	di-butyl phthalate _	di-n-octyl phthalate 🚽	diethyl phthalate 🚽	dimethyl phthalate	benzo(a)anthracene A	benzo(a)pyrene 🚬	benzo(b)fluoranthene *	benzo(k)fluoranthene * _	chrysene A _	acenaphthylene 🔔	anthracene B _
ŀ		M625 18/84	ANALYST	SCAN EPA	618	628	638	66B 1	678	<b>68</b> B	69B	708	718	728	738	748	758	768	778	788
	REPORI Sample	TEST CODE		NPDES S	418	438	42B	13B	158	268	29B	248	25B	58	<b>6</b> B	7B	9 <b>B</b>	188	28	80
	Serv Results by	RACTION <u>O2A</u> ate & Time Col	<u>07/25/84</u> 07/30/84	RESULT	<u>an</u>	Q	Q	QN	QN	QN	Q	QN	Q.	Q	Q	Q	QN	QN	Q.	 Q
	Analytıcal Se Re	FRACTI Date &	DATE EXTRACTED DATE INJECTED	COMPOUND	acenaphthene	benzidine	1, 2, 4-trichlorobenzene	hexachlorobenzene	hexachloroethane	bis(2-chloroethyl)ether	2-chloronaphthalene	1, 2-dichlorobenzene	1, 3-dichlorobenzene	1, 4-dichlorobenzene	3, 3'dichlorobenzidine	2, 4-dinitrotoluene	2, 6-dinitrotoluene	1,2-diphenylhydrazine	fluoranthene	henyl phenyl ether
CORPORATION	PAGE 8 RECEIVED: 07/23/84		E <u>2007131002</u> R <u>2</u>	EPA C	18	58	8B 1, 2, 4	<b>9B</b>	128	188 bis(2-	20B 2-	258 1,	268 1,	27B 1,	288 3, 3,	358 2	36B	378 1, 2-	398	40B 4-chlorophenyl
	PAGE 8 RECEIVED: 01	SANPLE ID 68	DATA FILE CONC. FACTOR	NPDES SCAN	18	48	468	3 <b>3</b> 8	36B	11B	<b>891</b> H-10	20B	21B	22B	23B	27 <b>B</b>	28B	29B	318	17B

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10 1 10 10 10 10 10						
6		ncentrations.	gh con	phenanthrene co-elute in high concentrations	≖ anthracene and phenanthrene	μ μ
	.506	i concentrations	n high	benzo(a}anthracene and chrysene co-elute in high	= benzo(a)anthra	K
		helute.	ene co	benzo(b)fluoranthene and benzo(k)fluoranthene co-elute	≂ benzo(b)fluora	*
	jister, 11/26/84).	(Federal Reg	d 625,	= not detected at EPA detection limit method 625,	= not detected	QN
	•	specified.		ed in <u>uq/L</u> unless otherwise	l results reported in	A11
137.27		ė	togram	or retention time on chromatogram	AN = scan number	<b>ບັດ</b> (~103
				NDTES AND DEFINITIONS FOR THIS REPORT. NIENE ND : H	D DEFINITIONS FO	NDTES AN
				naphthalene <u>ND</u>	558	39B
2220	pyrene <u>ND</u>	848	458	isophorone <u>ND</u>	548	880
	indeno(1,2,3-cd)pyrene ND	858	378	hexachlorocyclopentadiene <u>ND</u>	53B hexach	358
	dibenzo(a, h)anthracene <u>ND</u>	828	198	hexachlorobutadiene <u>ND</u>	528	348
	phenanthrene B <u>ND</u>	818	44B	bis(2-chloroethoxy)methane ND	43B bis(2-c	108
	fluorene ND	808	328	bis(2-chloroisopropyl)ether <u>ND</u> i	42B bis(2-ch	128
	benzo(ghi}perylene <u>ND</u>	798	88	4-bromophenyl phenyl ether <u>ND</u> ;	41B 4-bromo	148
	NAME METROD OLO BASE/NEUTRAIS Category	d 07/18/84	lecte	Date & Time Collected 07/18/84	00	SATTLE IU OB
			• 4 = 77			
	LAB # 84-07-131 Continued From Above	REPORT No 1 e	RE Long	Analytical Serv REP Recuire hu Samule	PAGE 9 RECETVED: 07/23/84	PAGE 9 RECEIVED
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			BY LAK	RESULT	QN	ON	QN	UN	QN	QN	an	QN	QN	QN	QN	an	QN	QN	134	9
i	LAB # 84-07-131	I NAME EPA Method 624/GC-MS Category	BWS VERIFIED BY	COMPOUND	1,2-dichloropropane _	cis-1, 3-dichloropropylene _	trans-1, 3-dichloropropylene _	ethylbenzene _	methylene chloride _	methyl chloride .	methyl bromide _	bromoform _	dichlorobromomethane _	trichlorofluoromethane _	dichlorodifluoromethane .	chlorodibromomethane .	tetrachloroethylene .	toluene .	trichloroethylene .	vinyl chloride
	QRT	FRACTION 02B TEST CODE MS 624 Date & Time Collected 07/18/84	ANALYST	SCAN EPA	72F	<b>NEE</b>	334 t	786	440	450	46V	47V	480	490	500	517	85V	86V	<u>316</u> 87V	887
	REPORT Samp Le	TEST 11ected		NPDES S	17V	18V	18V	197	22V	21V	200	5	12V	300	VE1	<b>8</b>	24V	25V	29V .	31V
	Serv Results by 3	N <u>O2B</u> Time Co	07/25/84	RESULT	Q	Q	QN	g	ĝ	뎼	g	윋	윗	윗	윗	뫼	윗	뫼	밁	48
			0	ũ.	- I															
	Analytical Serv Resu	FRACTIC Date &	DATE INJECTED O		acrolein	acrylonitrile	penzene	bon tetrachloride	chlorobenzene	, 2-dichloroethane	1-trichloroethane	, 1-dichloroethane	2-trichloroethane	tetrachloroethane	chloroethane	loromethyl) ether	oethylvinyl ether	chloroform	-dichloroethylene	-dichloroethylene
1 	Analytical	FRACTIC Date &	DATE INJECTED	COMPOUND	acrolein _	acrylonitrile	penzene	carbon tetrachloride	chlorobenzene	1, 2-dichloroethane	1, 1, 1-trichloroethane	1, 1-dichloroethane	1, 1, 2-trichloroethane	1, 1, 2, 2-tetrachloroethane	chloroethane	bis (chloromethyl) ether	2-chloroethylvinyl ether	chloroform	1, 1-dichloroethylene	1, 2-trans-dichloroethylene
ι	Analytical	SAMPLE ID 68 FRACTIC Date &			2V acrolein _	3V acrylonitrile	4V benzene	6V carbon tetrachloride	7V chlorobenzene	10V 1, 2-dichloroethane	11V 1, 1, 1-trichloroethane	13V 1. 1-dichloroethane	14V 1, 2-trichloroethane	15V 1, 1, 2, 2-tetrachloroethane	16V chloroethane	đ	¢	23V chloroform	29V 1, 1-dichloroethylene	214 30V 1, 2-trans-dichloroethylene

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LAB # 84-07-131 Continued From Above	/6C-MS		
LAB # 84-07-131 Continued From Above	NAME EPA Method 624/GC-MS Category ster, 12/3/79).		
LAB # Conti	24 NAME EPA Register, 12/		
	11/18/84 17/18/84 ied.		
REPORT y Sample	IEST CO ollected Q atogram. ise specified od 624, (F		
Serv REPU Results by Sample	FRACTION 02B TEST CODE MS 624 Date & Time Collected 07/18/84 time on chromatogram. unless otherwise specified. on limit method 624, (Federal Reg		
Analytical	FRA IS REPORT. retention time PA detection		
	FOR THIS ber or ret orted in ed at EPA		
1/23/84	FINITI scan scan ot det det		
PAGE 11 RECEIVED: 07/23/84	SAMPLE ID 68 NOTES AND DE SCAN = All re ND = n	H-105	
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LAB # 84-07-131	A NAME Method 625 Acid Compounds Category	BWS VERIFIED BY LAK COMPOUNDS DETECTED 0	COMPOUND	4-nitrophenol <u>ND</u>	2,4-dinitrophenol ND	2-methyl-4, 6-dinitrophenol <u>ND</u>	pentachlorophenol <u>ND</u>	phenol ND		Register, 11/26/84).	
REPORT amp 1 e	TEST CODE <u>M625</u> ected <u>07/18/84</u>	ANAL YST INSTRUMENT	NPDES SCAN EPA	7A 58A	5A 59A	4A 60A	9A 64A	10A 65A		gram. specified. 625, (Federal	
jtical Serv REP Results by Sample	FRACTION 03A TEST CODE M625 Date & Time Collected 07/18/84	ATE EXTRACTED <u>07/25/84</u> DATE INJECTED <u>07/30/84</u>	RESULT NP	.ophenol <u>ND</u>	/lphenol ND	ophenol ND	rophenol <u>ND</u>	Jphenol ND	rophenol ND	₹T. on time on chromatogram /L unless otherwise spe ction limit method 625,	
123/84		2CU07131CO3 DATE EXTRA Z DATE INJE	COMPOUND	2, 4, 6-trichloroph	4-chloro-3-methylph	2-chloroph	2, 4-dichloroph	2, 4-dimethylph	, Z-nitroph	AND DEFINITIONS FOR THIS REPORT. SCAN = scan number or retention t All results reported in ug/L u ND = not detected at EPA detection	
PAGE 12 RECEIVED: 07/23/84	SAMPLE ID 6C	DATA FILE <u>2007)</u> CONC. FACTOR	NPDES SCAN EPA	11A 21A	8A 22A	r 1A 24A	<b>VIE</b> <b>VZ</b> -106	3A 34A	6A 57A	NDTES AND DEFINITIG SCAN = scan i All results i ND = not det	

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LAB # 84-07-131	NAME Method 625 Base/Neutrals Category	BWS VERIFIED BY LAK COMPOUNDS DETECTED 1	COMPOUND	N-nitrosodimethylamine <u>ND</u>	N-nitrosodiphenylamine <u>ND</u>	N-nitrosodi-n-propylamine <u>ND</u>	bis(2-ethylhexyl)phthalate <u>ND</u>	butyl benzyl phthalate <u>ND</u>	di-butyl phthalate <u>ND</u>	di-n-octyl phthalate 44	diethyl phthalate <u>ND</u>	dimethyl phthalate <u>ND</u>	benzo(a)anthracene A <u>ND</u>	benzo(a)pyrene <u>ND</u>	benzo(b}fluoranthene * <u>ND</u>	benzo(k)fluoranthene * <u>ND</u>	chrysene A <u>ND</u>	acenaphthylene <u>ND</u>	anthracene B <u>ND</u>
	CODE M625 B 07/18/84	ANAL YST TRUMENT	EPA	<b>61</b> B	62B	829	66B b	67B	688	698	708	718	728	738	74B	758	768	778	788
REPORT Samp Le	Collected 07/	ANALYST INSTRUMENT	NPDES SCAN	418	438	428	138	158	268	298 1840	248	258	8	68	78	98	168	28	3B
lts by	ACTION <u>O3A</u> te & Time Col	07/25/84 07/30/84	RESULT N	QN	Q	QN	9	Q	Q	QN	QN	Q	Q	Q	QN	QN	QN	 QV	QU
PAGE 13 RECEIVED: 07/23/84 Resu	FRACTIC Date &	DATE EXTRACTED	COMPOUND	acenaphthene	benzidine	1, 2, 4-trichlorobenzene	hexachlorobenzene	hexachloroethane	bis(2-chloroethyl)ether _.	2-chloronaphthalene	1, 2-dichlorobenzene	1, 3-dichlorobenzene	1,4-dichlorobenzene	3, 3'dichlorobenzidine	2, 4-dinitrotoluene	2, 6-dinitrotoluene	1,2-diphenylhydrazine	fluoranthene	henyl phenyl ether
123/84		2007131003 2	EPA C	18	58	88 1, 2, 4	<b>9</b> B	128	18B bis(2-	20B 2-	258 1,	26B 1,	27B 1,	288 3, 3,	358	368	37B 1, 2-	39B	40B 4-chlorophenyl
PAGE 13 RECEIVED: 07/23/84	SAMPLE ID 60	DATA FILE CONC. FACTOR	NPDES SCAN	18	48	468	BEE	36 <b>8</b>	<b>8</b> 	16B	208	218	22B	862	27 <b>B</b>	288	298	318	178

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LAB # 84-07-131	Continued From Above	NAME Method 625 Base/Neutrals Category	benzo(ghi)perylene <u>ND</u>	fluorene <u>ND</u>	phenanthrene B ND	dibenzo(a, h)anthracene <u>ND</u>	indeno(1,2,3-cd)pyrene <u>ND</u>	pyrene ND					Register, 11/26/84).		ions.		)	
REPORT	nple	& Time Collected 07/18/84	88 79B	32B 80B	44B 81B	198 828	37 <b>B</b> 83B	45B 84B			raa.	specified.	.625, (Federal Re	e co-elute.	co-elute in high concentrations	concentrations.		
state (server) a server) a server a server a server a server a server a server a server a server a server a serv Ansintical Server	Allary Litar Jery Results by San	FRACI	41B 4-bromophenyl phenyl ether <u>ND</u>   ⁸	42B bis(2-chloroisopropyl)ether <u>ND</u> { 3	43B bis(2-chloroethoxy)methane <u>ND</u> ; 4	52B hexachlorobutadiene <u>ND</u> i 1 ⁴	53B hexachlorocyclopentadiene <u>ND</u> 3	54B isophorone <u>ND</u> 4	55B naphthalene <u>ND</u>	AND DEFINITIONS FOR THIS REPORT NIENE ND	scan number or retention time on chromatogram	All results reported in <u>vg/L</u> unless otherwise	ND = not detected at EPA detection limit method $\dot{\phi}$	benzo(b)fluoranthene and benzo(k)fluoranthene co-elute	benro(a)anthracene and chrysene comelute in h	anthracene and phenanthrene co-elute in high		
	PAGE 14 RECEIVED: 07/23/84	SAMPLE ID 60	148 4	128 4	108 4	34B 5	338	388	39B	NOTES AND DEF	# NCCAN H-1		ou = QN	* # ber	A = ber			

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			OK	RESULT	Ø	DN	QN	Ø	QN	QV	Q	g	g	Q	Q	g	Q	QN	Q	Q	
:	LAB # 84-07-131	NAME EPA Method 624/GC-MS Category	BWS VERIFIED BY	COMPOUND	1, 2-dichloropropane	cis-1, 3-dichloropropylene	trans-1, 3-dichloropropylene	ethylbenzene	methylene chloride	methyl chloride	methyl bromide	bromoform	dichlorobromomethane	trichlorofluoromethane	dichlorodifluoromethane	chlorodibromomethane	te trach loroethy lene	toluene	trichloroethylene	vinyl chloride	
		MS 624 8/84	ANAL YST TRUMENT	EPA	32V	33V ci	33V tran	780	440	450	46V	470	480	490	SOV	51V	85V	86V	87V	<b>788</b>	
	REPORT Sample	Collected 07/1	ANAL YST INSTRUMENT	NPDES SCAN	170	18V	18V	190	22V	21V	20V	50	12V	JOE	13V	28	24V	254	29V	31V	
	Serv Results by	FRACTION <u>03B</u> Date & Time Col	07/25/84	RESULT N	Q	Q	QN	Q	Q	Q	QN	Q	 QN	QN	Q	Ũ	Q	Q	Q	an	
	Analytical Se Re	FRACTI Date &	DATE INJECTED	COMPOUND	acrolein	acrylonitrile	benzene	arbon tetrachloride	chlorobenzene	1, 2-dichloroethane	1, 1, 1-trichloroethane	1, 1-dichloroethane	1, 1, 2-trichloroethane	, 1, 2, 2-tetrachloroethane	chlaroethane	(chloromethyl) ether	2-chloroethylvinyl ether	chloroform	1, 1-dichloroethylene	1, 2-trans-dichloroethylene	
HILL N. W. C.	/84		4007131V03 1					U						***		bís					
X.	PAGE 15 RECEIVED: 07/23/84	SAMPLE ID 60	DATA FILE 40 40. FACTOR	SCAN EPA	20	>€	4	6	~	10/	117	13V	140	150	16V	17V	190	23V	795	NOE	
	PAGE 15 RECEIVE	SAMPLE	DAT CONC.	NPDES	17	20	УС С	6V	22	150	н-: 27	<b>2</b> 109	280	23V	76 26	4	101	110	16V	26V	

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an <u>aloyidan analon</u> a loofia analon 14 1-		ልጊዜ ካታ ጊዜ ዓልጋ ስ ካል ይገ ላይ ይች ንቅ ላይ ስላ ትንቅ እን የመራት ማድረግ ብዙ ታ ግር ነ - -	and a figure a strain of the second state strain the strain the second state strain the second state of the second state strain strain strain strain strain strain strain strain strain strain strain strain strain strain strain strain strain strain strain strain strain strain strain strain strain strain strain strain strain strain strain strain strain strain strain strain strain strain strain strain strain strain strain strain strain strain strain strain strain strain strain strain strain strain strain strain strain strain strain strain strain strain strain strain strain strain strain strain strain strain strain strain strain strain strain strain strain strain strain strain strain strain strain strain strain strain strain strain strain strain strain strain strain strain strain strain strain strain strain strain strain strain strain strain strain strain strain strain strain strain strain strain strain strain strain strain strain strain strain strain	and a second second second second second second second second second second second second second second second	
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LAB # 84-07-131 Continued From Above	NAME EPA Method 624/GC-MS Category	ج			
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		Register.			
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Serv REP( Results by Sample	FRACTION <u>O3B</u> TEST CODE <u>MS 624</u> Date & Time Collected <u>07/18/84</u>	chromatogram otherwise spe t method 624,			
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PAGE 16 RECEIVED: 07/23/84	sample ID <u>60</u>	NOTES	H-110		
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LAB # 84-07-131	A NAME Method 625 Acid Compounds Category	BMS VERIFIED BY LAK COMPOUNDS DETECTED 0	COMPOUND	4-nitrophenol ND	2,4-dinitrophenol <u>ND</u>	2-methyl-4, 6-dinitrophenol ND	pentachlorophenol ND	phenol ND		Register, 11/26/84).
REPORT Samp I e	FRACTION 04A TEST CODE M625 Date & Time Collected 07/18/84	ANALYST INSTRUMENT	NPDES SCAN EPA	7A 58A	5A 59A	4A 60A	9A 64A	10A 65A		gram. specified. 625, (Federal
al Serv REP Results by Sample	RACTION 04A hate & Time Coll	ЮТЕР <u>07/25/84</u> ССТЕР <u>07/30/84</u>	RESULT NF	enol <u>ND</u>	enol <u>ND</u>	enol <u>ND</u>	enol <u>ND</u>	enol ND	enol <u>ND</u>	ime on chromatogram nless otherwise spe n limit method 625,
PAGE 17 RECEIVED: 07/23/84		DATE EXTRA DATE INJE	COMPOUND	2, 4, 6-trichloroph	4-chloro-3-methylph	2-chloroph	2, 4-dichloroph	2, 4-dimethylph	2-nitroph	INITIONS FOR THIS REPORT. scan number or retention t ults reported in ug/L u t detected at EPA detectio
07/23/84	76	LE <u>2CU07131C04</u> DR2	EPA	21A 2,4	22A 4-ch]	24A	31A	34A	57A	
PAGE 17 RECEIVED: 07/23/84	SAMPLE ID 76	DATA FILE CONC. FACTOR	NPDES SCAN	114	BA	н Н	<b>%</b> -111	<b>A</b> E	6 <b>A</b>	NDTES AND DEF SCAN = All res ND = ng

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LAB # 84-07-131	B NAME Method 625 Base/Neutrals Category	BWS VERIFIED BY LAK COMPOUNDS DETECTED 0	COMPOUND RESULT	N-nitrosodimethylamine <u>ND</u>	N-nitrosodiphenylamine <u>ND</u>	N-nitrosodi-n-propylamine <u>ND</u>	bis(2-ethylhexyl)phthalate <u>ND</u>	butyl benzyl phthalate <u>ND</u>	di-butyl phthalate <u>ND</u>	di-n-octyl phthalate <u>ND</u>	diethyl phthalate <u>ND</u>	dimethyl phthalate <u>ND</u>	benzo(a)anthracene A <u>ND</u>	benzo(a)pyrene <u>ND</u>	benzo(b)fluoranthene * <u>ND</u>	benzo(k)fluoranthene * <u>ND</u>	chrysene A <u>ND</u>	acenaphthylene <u>ND</u>	anthracene B <u>ND</u>	
REPORT ND 1 e	FRACTION 04A TEST CODE M625 Date & Time Collected 07/18/84	ANAL YST INSTRUMENT	ES SCAN EPA	41B 61B	43B 62B	42B 63B	138 668	15B 67B	268 688	29B 69B	24B 70B	25B 71B	58 728	6B 73B	7B 74B	9B 75B	188 768	28 778	38 788	
Serv REP Results by Sample	CIN 04A TE	<u>07/25/84</u> 07/30/84	RESULT NPDES	14 - 41		QN 	UN N	UN N	72 	QN	72 QN	α Ω	Q Q	GN	Q	QN	an an	QN	Q	
Analytical	FRACTI Date &	DATE EXTRACTED DATE INJECTED	COMPOUND	acenaphthene	benzidine	1, 2, 4-trichlorobenzene	hexach lorobenzene	hexach loroethane	b is (2-chloroethyl) ether	2-chloronaphthalene	1, 2-dichlorobenzene	1, 3-dichlorobenzene	1,4-dichlorobenzene	3, 3'dichlorobenzidıne	2,4-dinitrotoluene	2, 6-dinitrotoluene	1, 2-diphenylhydrazine	fluoranthene	4-chlorophenyl phenyl ether	
7/23/84	بع	E 2007131004	EPA	18	58	88 1,1	98	128	18B bis	208	258	26B	278	288 3	35B	368	378 1	З9в	40B 4-chlor	
PAGE 18 RECEIVED: 07/23/84	SAMPLE ID <u>76</u>	DATA FILE CONC. FACTOR	NPDES SCAN	18	48	468	33B	368	118	<b>89</b> H-11	<b>802</b> 2	218	228	<b>33</b> B	27B	288	298	318	178	

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/23/84 Analytical Serv /23/84 Analytical Serv RRACTION 41B 4-bromophenyl phenyl ether Date & 1 Date &	LAB # 84-0/-131 Continued From Above B NAME Method 625 Base/Neutral Category benzo(ghi)perylene fluorene
ID     76       41B     4-bromophenyl     phenyl       42B     bis(2-chloroisopropyl)       42B     bis(2-chloroethoxy)me       43B     bis(2-chloroethoxy)me       52B     hexachlorobuta       53B     hexachlorocyclopenta       53B     hexachlorocyclopenta       54B     isoph       55B     naphth       55B     naphth       55B     naphth       55B     naphth       55B     naphth	B NAME Method 625 Base/Neutral Category benro(ghi)perylene fluorene
41B4-bromophenylphenylether42Bbis(2-chloroisopropyl)ether43Bbis(2-chloroethoxy)methane52Bhexachlorobutadiene53Bhexachlorocyclopentadiene54Bisophorone54Bnaphthalene55Bnaphthalene55BDEFINITIONS FOR THIS REPORT. nzene	benzo(ghi)perylene fluorene
42Bbis(2-chloroisopropyl)ether43Bbis(2-chloroethoxy)methane52Bhexachloroethorobutadiene53Bhexachlorocyclopentadiene53Bhexachlorocyclopentadiene54Bisophorone54Bnaphthalene55Bnaphthalene55BANDDEFINITIONS FOR THIS REPORT. nzene	fluorene
43Bbis(2-chloroethoxy)methane52Bhexachlorobutadiene53Bhexachlorocyclopentadiene54Bisophorone54Bnaphthalene55Bnaphthalene55BANDDEFINITIONS <for< td="">THIS</for<>	•
52B hexachlorobutadiene 53B hexachlorocyclopentadiene 54B isophorone 55B naphthalene AND DEFINITIONS FOR THIS REPORT. nzene	818 phenanthrene B ND
53B       hexachlorocyclopentadiene         54B       isophorone         54B       isophorone         54B       naphthalene         55B       naphthalene         AND       DEFINITIONS <for< td=""></for<>	828 dibenzo(a, h)anthracene <u>ND</u>
	83B indeno(1,2,3-cd)pyrene <u>ND</u>
55B naphthalene and DEFINITIONS FOR THIS REPORT nzene	84B pyrene <u>ND</u>
AND DEFINITIONS FOR THIS REPORT. nzene	
SCAN = scan number or retention time on chromatogram.	
All results reported in <u>uq/L</u> unless otherwise specified	. Pa
ND = not detected at EPA detection limit method $625$ , (Fe	(Federal Register, 11/26/84).
* = benzo(b)fluoranthene and benzo(k)fluoranthene comelute	·
A = benzo(a) anthracene and chrysene co-elute in high concentrations	centrations.
B = anthracene and phenanthrene co-elute in high concentrations	ations.

LAB # 84-07-131	NAME EPA Method 624/GC-MS Category	BWS VERIFIED BY LAK f4 COMPOUNDS DETECTED 0	COMPOUND	1, 2-dichloropropane <u>ND</u>	cis-1, 3-dichloropropylene <u>ND</u>	trans-1,3-dichloropropylene <u>ND</u>	ethylbenzene <u>ND</u>	methylene chloride ND	methyl chloride <u>ND</u>	methyl bromide <u>ND</u>	bromoform <u>ND</u>	dichlorobromomethane <u>ND</u>	trichlorofluoromethane ND	dichlorodifluoromethane <u>ND</u>	chlorodibromomethane <u>ND</u>	tetrachloroethylene <u>ND</u>	toluene <u>ND</u>	trichloroethylene <u>ND</u>	vinyl chlorid <b>e <u>ND</u></b>	
REPORT Samp 1 e	FRACTION 04B TEST CODE MS 624 Date & Time Collected 07/18/84	ANALYST INSTRUMENT	NPDES SCAN EPA	17V 32V	18V 33V	18V 33V tr.	19V 3BV	22V 44V	21V 45V	20V 46V	50 470	12V 48V	30V 49V	13V 50V	BV 51V	24V 85V	25V 86V	29V 87V	31V 88V	
Analytical Serv REP Results by Sample	FRACTION 04B Date & Time Col	DATE INJECTED 07/25/84	COMPOUND RESULT NI	acrolein <u>ND</u> {	acrylonitrile ND	benzene <u>ND</u>	carbon tetrachloride <u>ND</u>	chlorobenzene <u>ND</u>	1, 2-dichloroethane <u>ND</u>	1, 1, 1-trichloroethane ND	1, 1-dichloroethane <u>ND</u>	1, 1, 2-trichloroethane ND	1, 1, 2, 2-tetrachloroethane <u>ND</u>	chloroethane <u>ND</u>	bis (chloromethyl) ether <u>ND</u>	2-chloroethylvinyl ether <u>ND</u>	chloroform <u>ND</u>	1,1-dichloroethylene ND	1,2-trans-dichloroethylene <u>ND</u> i	
PAGE 20 RECEIVED: 07/23/84		4007131004 1	EPA COM	20	۸e	4	6V carbo	74	10V 1,2	11/ 1,1,1-	1,1 VE1	14V 1, 1, 2-	15V 1, 1, 2, 2-te	16V	17V bis (chlo	19V 2-chloroe	23V	29V 1.1-d	30V 1,2-trans-d	
- · · · · · · · · · · · · · · · · · · ·		DATA FILE CONC. FACTOR	LŪ -	-						-	***	***	***	**	<b>**1</b>		2	2	C)	

LAB # 84-07-131 Continued From Above NAME EPA Method 624/GC-MS Category	r. 12/3/79}.	·	
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tical Serv Results by Sar RACTION 04B TE Date & Time Colle	REPORT. ention time on chromatogram <u>ug/L</u> unless otherwise spe detection limit method 624,		
PAGE 21 RECEIVED: 07/23/84 SAMPLE ID 76	NDTES AND DEFINITIONS FOR THIS SCAN = scan number or ret All results reported in ND = not detected at EPA	H-115	

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serv REPORT NonReported Work

LAB # 84-07-131

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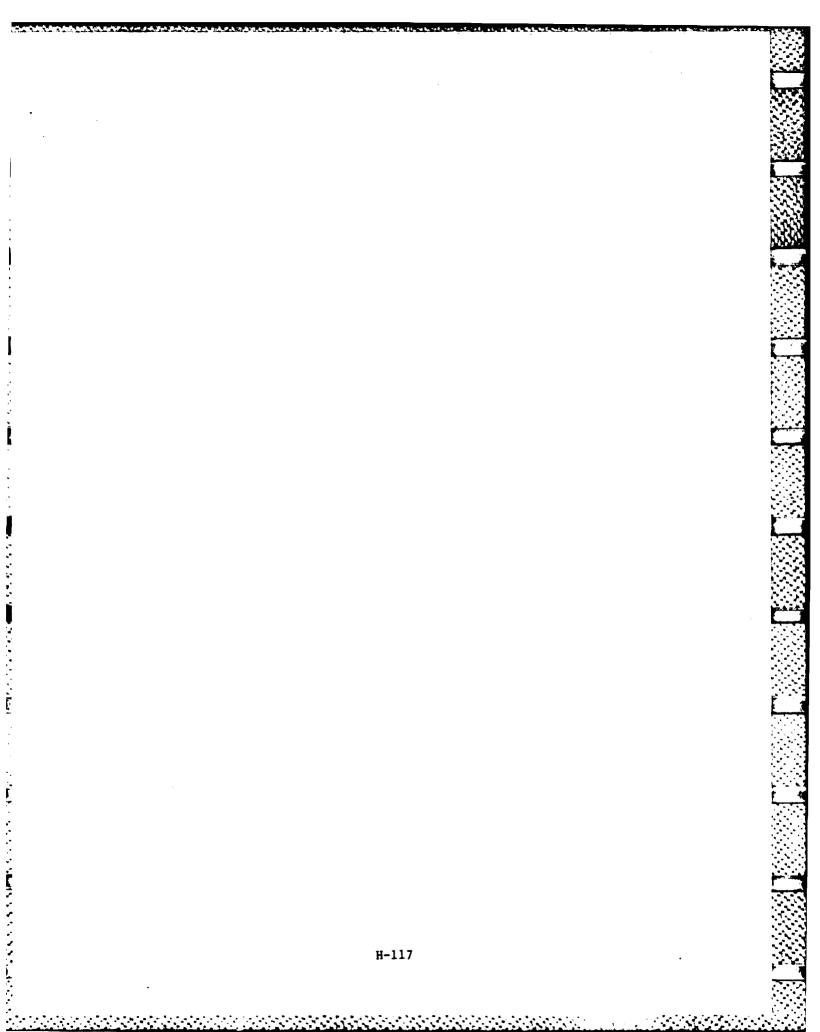
PAGE 22 Received: 07/23/84

FRACTION AND TEST CODES FOR WORK NOT REPORTED ELSEWHERE

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Analytical Serv REPORT LAB # 84-08-003 04/26/85 12:03:31	Mreiner       Preserves       Mreiner       Mreiner         Reference       Box 9981       More 481 vd.       Mreiner 481 vd.         Reference       Box 9981       Box 9981       Mreiner 481 vd.         Reference       SameLes       Martin       Preservation       Mreiner         SameLes       SameLes       Mreiner       Mreiner       Mreiner         Mreiner       SameLes       Mreiner       Connact       Connact       Connact         Mreiner       SameLes       Mreiner       Same       Mreiner       Mreiner         Mreiner       Same       Footnotes and Coulum confirmer       Mreiner       Mreiner       Mreiner         Mreiner       Same       Footnotes and Councers       Mreiner       Mreiner       Mreiner         Mreiner       Same       States states frage detection       Haldstating       Mreiner       Mreiner         Mreiner       Mreiner       Mreiner       Mreiner       Mreiner       Mreiner	
PAGE 1 RECEIVED: 08/01/84		

I AR # R4-0R-007		<u>C 601</u> NAME EPA Method 601/GC pecified Category	ST MCL VERIFIED BY JSC NT b COMPOUNDS DETECTED B	COMPOUND RESULT	Trichloroethene <u>61.0</u>	Dibromochloromethane * <u>ND</u>	1, 1, 2-Trichloroethane * <u>ND</u>	cis-1, 3-Dichloropropene * <u>ND</u>	2-Chloroethylvinyl Ether <u>ND</u>	Bromoform <u>ND</u>	1, 1, 2, 2-Tetrachloroethane # ND	Tetrachloroethylene <b># 22.5</b>	Chlorobenzene <u>ND</u>	1, 3-Dichlorobenzene <u>ND</u>	1, 2-Dichlorobenzene <u>ND</u>	1,4-Dichlorobenzene <u>ND</u>					
REPUBL	Samp Le	TEST CODE <u>GC 601</u> N lected <u>not specified</u>	ANAL YST INSTRUMENT	SCAN	7							8	ļ								
AN WE THAT AND AND INTICAL CONV	10173 6 1010	FRACTION <u>OIA</u> TEST CODE Date & Time Collected <u>not</u>	B DATE INJECTED 08/08/84	COMPOUND RESULT	Chloromethane <u>ND</u>	Bromomethane <u>ND</u>	Vinyl Chloride <u>ND</u>	Chloroethane <u>ND</u>	Methylene Chloride <u>11.5</u>	Trichlorofluoromethane <u>12.2</u>	1,1-Dichloroethene <u>ND</u>	1,1-Dichloroethane <u>29.9</u>	trans-1, 2-Dichloroethene ND	Chloroform 7.8	1, 2-Dichloroethane <u>ND</u>	1,1,1-Trichloroethane 3.5	Carbon Tetrachloride ND	Bromodichloromethane <u>ND</u>	1,2-Dichloropropane 0.6	trans-1, 3-Dichloropropene <u>ND</u> :	
PARE 2	RECEIVED: 08/01/84	SAMPLE ID 2A	DATA FILE CONC. FACTOR	SCAN	1	-	-	1		N   -1	19	C	1	4	1	2	1		9		

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B4-08 Cateo	e 1 c t e	
LAB # 84-08-003 Continued From EPA Method 601 Category	12 2	
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LAB # 84-08-003 Continued From Abo GC 601 NAME EPA Method 601/GC specified Category	Карт Тотор	
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REPORT Sample TEST CODE	аа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа албаа ас ас ас ас ас ас ас ас ас ас ас ас а	
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LAB # 84-08-003	<u>GC 601</u> NAME EPA Method 601/GC specified Category	T MCL VERIFIED BY <u>JSG</u> T <u>b</u> COMPOUNDS DETECTED <u>6</u>	COMPOUND	Trichloroethene <u>3.1</u>	Dibromochloromethane * ND	1,1,2-Trichloroethane * <u>ND</u>	cis-1, 3-Dichloropropene * <u>ND</u>	2-Chloroethylvinyl Ether ND	Bromoform ND	1, 1, 2, 2-Tetrachloroethane # <u>ND</u>	Tetrachloroethylene # <u>0.2</u>	Chlorobenzene <u>ND</u>	1, 3-Dichlorobenzene <u>ND</u>	1,2-Dichlorobenzene <u>ND</u>	1, 4-Dichlorobenzene <u>ND</u>					:
REPORT Sample		ANALYST INSTRUMENT	SCAN	S							9									
Analytical Serv Results by S	FRACTION 02A TEST CODE Date & Time Collected not	DATE INJECTED 08/08/84	COMPOUND RESULT	Chloromethane ND	Bromomethane <u>ND</u>	Vinyl Chloride ND	Chloroethane <u>ND</u>	Methylene Chloride <u>ND</u>	Trichlorofluoromethane <u>0.4</u> {	1,1-Dichloroethene ND	.1-Dichloroethane 0.2	trans-1, 2-Dichloroethene ND	Chloroform 1.6	1,2-Dichloroethane 0.3	1, 1, 1-Trichloroethane ND	Carbon Tetrachloride <u>ND</u>	Bromodichloromethane <u>ND</u>	1,2-Dichloropropane <u>ND</u>	ichlaropropene <u>ND</u>	
<b>184</b>		23	COMP					Meth	Trichlor	1,1	1,1-	trans-1, 2-		1, 2-	1,1,1-T	Carbon	Bromod	1, 2-D	trans-1, 3-Dichloropro	
PAGE 4 RECEIVED: 08/01/84	SAMPLE ID 6C	DATA FILE CONC. FACTOR	SCAN			and the second second			 H	-121	2		e	4						)

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	Analytical Serv REPORT Results by Sample	LAB # 84-08-003 Continued From Above
SAMPLE ID 6C	FRACTION O2A TEST CODE <u>GC 601</u> N Date & Time Collected not specified	AME EPA Method 601/GC Category
NOTES AND DEFINITIONS FOR THIS REPORT	tEPORT.	
SCAN = scan number or retention time on chron All results reported in <u>ug/L</u> unless otheru ND = not detected at EPA detection limit meth *Dibromochloromethane, 1,1,2-trichloroethane #1,1,2,2-tetrachloroethane and tetrachloroeth	aatogram. vise specified. tod 601, (Federal and cis∽1,3-dichl tylene co∽elute.	Register, 12/3/79). oropropene co-elute.
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REPORT LAB # 84-08-003		Collected not specified Category	ANALYST MCL VERIFIED BY USC INSTRUMENT b COMPOUNDS DETECTED 4	SCAN COMPOUND RESULT	Trichloroethene ND	Dibromochloromethane * ND	1, 1, 2-Trichloroethane * ND	cis-1, 3-Dichloropropene * <u>ND</u>	2-Chloroethylvinyl Ether ND	Bromoform ND	1, 1, 2, 2-Tetrachloroethane # ND	Tetrachloroethylene # ND	3 Chlorobenzene 21.8	1, 3-Dichlorobenzene ND	4 1, 2-Dichlorobenzene 11.0	1, 4-Dichlorobenzene <u>ND</u>					
server and the Analutical Serv		FRACTION 03A Date & Time Col	B DATE INJECTED 08/08/84	COMPOUND RESULT	Chloromethane ND	Bromomethane ND	Vinyl Chloride <u>ND</u>	Chloroethane ND	Methylene Chloride <u>ND</u>	Trichlorofluoromethane <u>22.0</u>	1,1-Dichloroethene <u>2.0</u>	1, 1-Dichloroethane <u>ND</u>	trans-1, 2-Dichloroethene ND	Chloroform <u>ND</u>	1, 2-Dichloroethane <u>ND</u>	1,1,1-Trichloroethane ND	Carbon Tetrachloride <u>ND</u>	Bromodichloromethane <u>ND</u>	1, 2-Dichloropropane <u>ND</u>	trans-1, 3-Dichloropropene <u>ND</u>	
PAGE A	RECEIVED: 08/01/84	SAMPLE ID 60	DATA FILE CONC. FACTOR	SCAN						-	₩-12	3									

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REPORT		₹5					cis-1, 3-Dichloropropene	2-Chloroethylvinyl		1, 1, 2, 2-Tetrachloroethane	Tetrachloroethylene		1, 3-Dichlorobenzene	1, 2-Díchlorobenzene	1,4-Dichlorobenzene					
REP( Sample	TEST ( lected	ANALYST INSTRUMENT	SCAN																	
Serv Results by	FRACTION 04A     TEST 0       Date & Time Collected	DATE INJECTED 08/09/84	COMPOUND RESULT	Chloromethane <u>ND</u>	Bromomethane ND	Vinyl Chloride <u>ND</u>	Chloroethane ND	Methylene Chloride <u>ND</u>	Trichlorofluoromethane ND	1.1-Dichloroethene <u>ND</u>	1.1-Dichloroethane <u>ND</u>	trans-1, 2-Dichloroethene <u>ND</u> 1	Chloroform <u>ND</u>	1,2-Dichloroethane ND	1, 1, 1-Trichloroethane ND	Carbon Tetrachloride <u>ND</u>	Bromodichloromethane <u>ND</u>	1, 2-Dichloropropane ND	trans-1,3-Dichloropropane <u>ND</u>	·
PAGE 8 RECEIVED: 08/01/84	SAMPLE ID <u>6E</u>	DATA FILEB CONC. FACTOR	SCAN					_	Trici			-sus-			1, 1,	Ca1	Br.	1,	trans-1.	)

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LAB # 84-08-003 Continued From Above	EPA Method 601/GC Category	12/3/79 co-elu					
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RT LAB # 84-08-003	<u>GC 601</u> NAME EP specified	ANALYST MCL VERIFIED BY JSC INSTRUMENT b COMPOUNDS DETECTED 2	SCAN COMPOUND RESULT	Z Trichloroethene 0.1	Dibromochloromethane * <u>ND</u>	1, 1, 2-Trichloroethane * ND	cis-1, 3-Dichloropropene *	2-Chloroethylvinyl Ether ND	Bromoform ND	1,1,2,2-Tetrachloroethane # ND	Tetrachloroethylene # ND	Chlorobenzene ND	í, 3-Dichlorobenzene ND	1, 2-Dichlorobenzene NU	1, 4-Dichlorobenzene <u>ND</u>				
Analytical Serv REPORI Results by Sample	FRACTION OSA TEST CODE Date & Time Collected not	DATE INJECTED 08/09/84 INS	COMPOUND RESULT SC	Chloromethane ND	Bromomethane ND	Vinyl Chloride ND	Chloroethane ND	Methylene Chloride ND	Trichlorofluoromethane 0.5	1,1-Dichloroethene ND	1,1-Dichloroethane ND	ans-1, 2-Dichloroethene ND	Chloroform ND	1, 2-Dichloroethane ND	1, 1, 1-Trichloroethane ND	Carbon Tetrachloride <u>ND</u>	Bromodichloromethane ND	1, 2-Dichloropropane <u>ND</u>	trans-1, 3-Dichloropropene <u>ND</u> :
PAGE 10 RECEIVED: 08/01/84	SAMPLE ID 6F	DATA FILE B CONC. FACTOR	SCAN						1110 H-1	27		trans-	-	-	1,1	Ca	81		trans-1

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PAGE 1 RECEIV	SAMPLE		H-128		
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LAB # 84-08-003	TEST CODE <u>GC 601</u> NAME <u>EPA Method 601/GC</u> ected <u>not specified</u> <u>Category</u>	ANALYST MCL VERIFIED BY <u>USG</u> INSTRUMENT <u>b</u> COMPOUNDS DETECTED <u>3</u>	COMPOUND RESULT	Trichloroethene 0.7	Dibromochloromethane * <u>ND</u>	1,1,2-Trichloroethane * <u>ND</u>	cis-1, 3-Dichloropropene * <u>ND</u>	2-Chloroethylvinyl Ether <u>ND</u>	Bromoform <u>ND</u>	1, 1, 2, 2-Tetrachloroethane # ND	Tetrachloroethylene <b># <u>ND</u></b>	Chlorobenzene ND	1, 3-Dichlorobenzene <u>ND</u>	1, 2-Dichlorobenzene <u>ND</u>	1,4-Dichlorobenzene <u>ND</u>					
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Analytical Serv REP Results by Sample	FRACTION <u>OGA</u> TEST CODE <u>CC 601</u> N Date & Time Collected <u>not specified</u>	B DATE INJECTED 08/09/84	COMPOUND RESULT	Chloromethane ND	Bromomethane <u>ND</u>	Vinyl Chloride ND	Chloroethane ND	Methylene Chloride ND	Trichlorofluoromethane <u>1.7</u>	1,1-Dichloroethene <u>ND</u>	1,1-Dichloroethane <u>ND</u>	trans-1, 2-Bichloroethene ND	Chloroform <u>3.8</u>	1, 2-Dichloroethane ND	1, 1, 1-Trichloroethane ND	Carbon Tetrachloride <u>ND</u>	Bromodichloromethane <u>ND</u>	1,2-Dichloropropane <u>ND</u>	trans-1,3-Dichloropropene <u>ND</u>	
PAGE 12 RECEIVED: 08/01/84	SAMPLE ID 66	DATA FILE CONC. FACTOR	SCAN	1					H	-129	1		5		-					

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PAGE 13		Analutical Serv	REPORT		A BERRIE
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LAB # 84-08-003	<u>GC 601</u> NAME EPA Method 601/GC specified Category	ANALYST RGS VERIFIED BY JSC TRUMENT b COMPOUNDS DETECTED 1	COMPOUND RESULT	Trichloroethene ND	Dibromochloromethane * ND	1,1,2-Trichloroethane * <u>ND</u>	cis-1,3-Dichloropropene * <u>ND</u>	2-Chloroethylvinyl Ether <u>ND</u>	Bromoform ND	1, 1, 2, 2-Tetrachloroethane # <u>ND</u>	Tetrachloroethylene # ND	Chlorobenzene <u>ND</u>	1,3-Dichlorobenzene <u>ND</u>	1, 2-Dichlorobenzene <u>ND</u>	1, 4-Dichlorobenzene <u>ND</u>					
REPORT Sample	TEST CODE lected not	ANALYST INSTRUMENT	SCAN																	
Analytical Serv REP Results by Sample	FRACTION 07A TEST CODE Date & Time Collected not	B DATE INJECTED 08/09/84	COMPOUND RESULT	Chloromethane ND	Bromomethane ND	Vinyl Chloride ND	Chloroethane ND	Methylene Chloride ND	Trichlorofluoromethane 2.2	1, 1-Dichloroethene ND	1, 1-Dichloroethane ND	trans-1, 2-Dichloroethene ND	Chloroform ND	1, 2-Dichloroethane ND	1, 1, 1-Trichloroethane ND	Carbon Tetrachloride <u>ND</u>	Bromodichloromethane ND	1, 2-Dichloropropane ND	trans-1, 3-Dichloropropene <u>ND</u>	
RECEIVED: 08/01/84	SAMPLE ID 7A	DATA FILE CONC. FACTOR	SCAN				•			1 31			1						<b>t</b>	

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PAGE 15 RECEIVED: 08/01/84	SAMPLE ID ZA	AND DEFINITIONS FOR THIS	Z_ # <u>0</u> =		
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Serv REPORT LAB # 84-08-003 Results by Sample	-RACTION <u>OBA</u> TEST CODE <u>GC 601</u> NAME <u>EPA Method 601/GC</u> Date & Time Collected <u>not specified</u> <u>Category</u>	08/09/84 ANALYST RGS VERIFIED BY USC INSTRUMENT b COMPOUNDS DETECTED 1	RESULT SCAN COMPOUND RESULT	ND   Trichloroethene ND	ND   Dibromochloromethane * ND	ND   1, 1, 2-Trichloroethane * ND	ND   cis-1, 3-Dichloropropene * ND	ND 2-Chloroethylvinyl Ether ND	0.5 Bromoform ND	ND   1, 1, 2, 2-Tetrachloroethane # ND	ND Tetrachloroethylene # ND	ND Chlorobenzene ND	ND 1, 3-Dichlorobenzene ND	ND 1, 2-Dichlorobenzene ND	ND 1, 4-Dichlorobenzene ND	QN	<u>ON</u>	đN	QN
Analytical	FRACT Date	B DATE INJECTED 08/09/84	COMPOUND	Chloromethane	Bromomethane	Vinyl Chloride	Chloroethane	Methylene Chloride	Trichlorofluoromethane	1,1-Dichloroethene	1, 1-Dichloroethane	trans-1, 2-Dichloroethene	Chloroform	1, 2-Dichloroethane	1, 1, 1-Trichloroethane	Carbon Tetrachloride	Bromodichloromethane	1,2-Dichloropropane	trans-1, 3-Dichloropropene
PAGE 16 RECEIVED: 08/01/84	SAMPLE ID 7C	DATA FILE CONC. FACTOR	SCAN					-		133								-	

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PAGE 17 PAGE 17 RECEIVED: 08/01/84	2	AND DEFINITIONS FOR THIS REPORT. SCAN = scan number or retention tim All results reported in <u>ug/L</u> unl MD = not detected at EPA detection *Dibromochloromethane, 1,1,2-trich1 *Dibromochloromethane, 1,1,2-trich1		
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LAB # 84-08-003	<u>GC 601</u> NAME EPA Method 601/GC specified Category	YST RGS VERIFIED BY JSC ENT b COMPOUNDS DETECTED 6	COMPOUND	Trichloroethene <u>0.4</u>	Dibromochloromethane * <u>ND</u>	1,1,2-Trichloroethane * <u>ND</u>	cis-1,3-Dichloropropene * <u>ND</u>	2-Chloroethylvinyl Ether <u>ND</u>	Bromoform ND	1, 1, 2, 2-Tetrachloroethane # <u>ND</u>	Tetrachloroethylene # <u>ND</u>	Chlorobenzene 4.5	1, 3-Dichlorobenzene <u>ND</u>	1,2-Dichlorobenzene <u>6.5</u>	1, 4-Dichlorobenzene <u>ND</u>					
REPORT Sample	TEST CODE <u>GC 601</u> lected <u>not specif</u>	ANALYST INSTRUMENT	SCAN	4								ŝ		<u>6</u>						
Analytical Serv REP Results by Sample	FRACTION 09A TEST CODE Date & Time Collected not	B DATE INJECTED 08/07/84	COMPOUND RESULT	Chloromethane <u>ND</u>	Bromomethane <u>ND</u>	Vinyl Chloride ND	Chloroethane <u>13.3</u>	Methylene Chloride <u>6.8</u>	Trichlorofluoromethane <u>ND</u>	1, 1-Dichloroethene <u>ND</u>	1, 1-Dichloroethane ND	trans-1, 2-Dichloroethene ND	Chloroform <u>19.2</u>	1, 2-Dichloroethane ND	1, 1, 1-Trichloroethane ND	Carbon Tetrachloride ND	Bromodichloromethane ND	1,2-Dichloropropane <u>ND</u>	trans-1,3-Dichloropropene <u>ND</u>	
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LAB # 84-08-013	CONTACT CO	is the detection ranges between	this analusis table limits	on this report			
JRT	nelutical Services ac Blvd. 9948 Teras 78766 14-4797	report of OB/17/84. Footnotes and Comments value less than 5 times or for such low values r	recoveru t within	Analytical Serv TEST CODES and NAMES used on this report M623 A method 623 Acid Compounds M625 B method 623 Base/Neutrals M5 624 EPA method 624/GC-MS			
Serv REPORT 04/26/85 12: 06: 04	PREPARED <u>Radian Analutical</u> BY <u>B501 MoPac Blvd.</u> P. <u>D. Box 9948 Austin. Texas 787</u> ATTEN PHDNE (512) 454-4797	ate of cates a ial err 100%.	e Indicates that spike specific matrix was no an interferent present	Cal Serv TEST CODES and Method 623 Acid Compound Method 625 Base/Neutrals EPA Method 624/GC-MS		N	
Analytical So Ov	SAMPLES	Duplic * Indi Potent 50 and		Analytical M625 A Met M525 B Met M5 624 EP4			
08/01/84	Radian Bl. 4 Austin William Little Tinker AFB	Monitoring Wells NS/DHG federal express H2D 212-027-21-05 3911		IDENTIFICATION	•		
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PAGE 2 Received:	8/	01/84	Serv Results by	REPORT by Sample	LAB # 84-08-013	r
SAMPLE ID	1D <u>6D</u>	FRAC		FION <u>01A</u> TEST CODE <u>M</u> & Time Collected <u>07/31</u>	<u>M625 A NAME Method 625 Acid Compounds</u> 31/84 Category	Compounds
DATA FILE CONC. FACTOR		<u>2CUOBO13CO1</u> DATE EXTRACTED 2 DATE INJECTED	ED <u>08/01/84</u> ED <u>08/06/84</u>	ANAL YST INSTRUMENT	BMS COMPOUNDS	LETED BY LAK DETECTED 0
NPDES SCAN	N EPA	COMPOUND	RESULT N	NPDES SCAN EPA	A COMPOUND	RESULT
114	214	2, 4, 6-trichlorophenol		7A 58A	A 4-nitrophenol	UN lot
BA	22A	4-chloro-3-methylpheno	I ON	5A 59A	A 2, 4-dinitrophenol	dN lot
<b>⊈</b> H-1:	24A	2-chloropheno	I ND	4A 6(	60A 2-methyl-4,&-dinitrophenol	UN lot
<b>₹</b> N 39	31A	2, 4-dichloropheno		9A 64	64A pentachlorophenol	dN lot
<b>e</b>	348	2, 4-dimethylpheno		10A 65	65A phenol	ON Iou
<b>6</b> Å	57 <b>A</b>	2-ni tropheno				
NOTES AND SCAN All ND =	DEFINITI 4 = scan results not det	ONS FOR THIS REPORT. number or retention time reported in ug/L unle ected at EPA detection 1	e on chromatogram ess otherwise spe limit method 625,	togram. se specified. 1 625, (Feder	il Register, 11/26/84).	
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		Base/Neutrals ry	IFIED BY LAK DETECTED 0	RESULT	ine ND	ine <u>ND</u>	ine <u>ND</u>	ate <u>ND</u>	ate ND	ste ND	ate ND	ate ND	ate ND	A ND	ane <u>ND</u>	QN *	<u>an</u> *	A ND	ene ND	B
	#	B NAME Method 625 Base/ Category	BWS COMPOUNDS DETEC	COMPOUND	N-nitrosodimethylamine	N-nitrosodiphenylamine	N-nitrosodi-n-propylamine	bis(2-ethylhexyl)phthalate	butyl benzyl phthalate	di-butyl phthælate	di-n-octyl phthalate	diethyl phthalate	dimethyl phthalat	benzo(a)anthracene	benzo(a)pyrene	benzo(b)fluoranthene	benzo(k)fluoranthene	chrysene	acenaphthylene	anthracene
econo T	ple	07/31/84	ANALYST	S SCAN EPA	8 618	8 628	8 638	B 66B	B 67B	889 688	B 69B	B 70B	B 71B	5B 72B	6B 73B	7B 74B	9B 75B	B 76B	2B 77B	3B 78B
	Results by Sample	ACTION <u>OIA</u> TEST C ite & Time Collected	<u>08/01/84</u> 08/06/84	RESULT NPDES	ND   418	43B	ND 42B	13B	ND   158	ND 1 268	ND   29B	ND 248	ND   258		9  ON		6 ON	ND 188	Z DN	
	an all all all all all all all all all a	FRACTI Date &	DATE EXTRACTED DATE INJECTED	COMPOUND	acenaphthene	benzidine	1, 2, 4-trichlorobenzene	hexachlorobenzene	hexachloroethane	bis(2-chloroethyl)ether	2-chloronaphthalene	1, 2-dichlorobenzene	1, 3-dichlorobenzene	1,4-dichlorobenzene	3, 3'dichlorobenzidine	2, 4-dinitrotoluene	2, 6-dinitrotoluene	1.2-diphenylhydrazine	fluoranthene	4-chlorophenyl phenyl ether
	: 08/01/84	D 60	FILE <u>2CU08013C01</u> CTDR <u>2</u>	AN EPA	18	58	88 1	9 <b>B</b>	12B	18B bi	208	25B	268	27B	288	35B	368	37B	34B	40B 4-chlo
DACE	RECEIVED:	SAMPLE ID 60	DATA FILE CONC. FACTOR	NPDES SCAN	18	4	468	33 <b>B</b>	896 F	<b>2</b> -140	16B	208	21B	22B	23 <b>8</b>	27B	28B	29B	318	1 7B

	LAB # 84-08-013 Continued From Above	NAME Method 625 Base/Neutrals Category	benzo(ghi)perylene <u>ND</u>	fluorene ND	phenanthrene B <u>ND</u>	dibenzo(a, h)anthracene <u>ND</u>	indeno(1,2,3-cd)pyrene ND	pyrene ND					Register, 11/26/84).		ns.	
	REPORT Ip le	TEST CODE <u>M625 B</u> ected 07/31/84	79B	808	818	828	828	848				specified.	(Federal Reg	elute.	co-elute in high concentrations	entrations.
	REP Sample	TEST lected	88	328	44B	198	37B	458			ogram.		625,	-00 eu	high	h conc
	Analytical Serv REP '84 Results by Sample	FRACTION <u>OIA</u> TEST CODE <u>M625</u> Date & Time Collected <u>07/31/84</u>	4-bromophenyl phenyl ether <u>ND</u> ;	bis(2-chloroisopropyl)ether <u>ND</u> {	bis(2-chloroethoxy)methane ND	hexachlorobutadiene <u>ND</u> :	hexachlorocyclopentadiene <u>ND</u>	isophorone <u>ND</u>	naphthalene <u>ND</u>	NOTES AND DEFINITIONS FOR THIS REPORT. NIENE ND	SCAN = scan number or retention time on chromatogram	results reported in <u>uq/L</u> unless otherwise	not detected at EPA detection limit method	benzo(b)fluoranthene and benzo(k)fluoranthene comelute	benio(a)anthracene and chrysene co-elute in	anthracene and phenanthrene co-elute in high concentrations
2.1	08/01/	. 09	418	42B	<b>4</b> 3B	528	<b>3</b> 3B	548	558	DEFINI		result		benzo (	benzo(	anthra
	PAGE 4 RECEIVED: 08/01/84	SAMPLE ID 60	148	128	108	34B	358	388	398	NOTES AND		<b>e</b> 1-141	= QN	4 *	H K	#

	LAB # 84-08-013	4 NAME EPA Method 624/GC-MS Category	BWS VERIFIED BY LAK <u>#4</u> COMPOUNDS DETECTED <u>1</u>	COMPOUND RESULT	1,2-dichloropropane <u>ND</u>	cis-1, 3-dichloropropylene <u>ND</u>	trans-1, 3-dichloropropylene <u>ND</u>	ethylbenzene <u>ND</u>	methylene chloride <u>ND</u>	methyl chloride <u>ND</u>	methyl bromide <u>ND</u>	bromoform <u>ND</u>	dichlorobromomethane <u>ND</u>	trichlorofluoromethane <u>ND</u>	dichlorodifluoromethane <u>ND</u>	chlorodibromomethane <u>ND</u>	tetrachloroethylene <u>ND</u>	tolvene ND	trichloroethylene ND	vinyl chloride <u>ND</u>
	REPORT by Sample	ACTION OIB TEST CODE MS 624 te & Time Collected 07/31/84	ANALYST	NPDES SCAN EPA	170 320	18V 33V	18V 33V t	19V 38V	22V 44V	21V 45V	20V 46V	5V 47V	12V 48V	30V 49V	13V 50V	8V 51V	24V 85V	25V 86V	29V 87V	31V 88V
	Serv Results by	ACTION <u>OIB</u> te & Time Col	TED <u>08/02/84</u>	RESULT N	Q	Q	QN	QN	 00	Q	9 9	QN	QV N	 17	Q	Q	Q	Q	Ŷ	QN
Conformation	Analytical Se Re	FRACTI Date &	DATE INJEC	COMPOUND	acrolein	acrylonitrile	ben zene	carbon tetrachloride	chlorobenzene	1, 2-dichloroethane	1, 1, 1-trichloroethane	1, 1-dichloroethane	1, 1, 2-trichloroethane	1, 1, 2, 2-tetrachloroethane	chloroethane	bis (chloromethyl) ether	2chloroethylvinyl ether	chloroform	1, 1-dichloroethylene	1, 2-trans-dichloroethylene
Contraction and the second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second sec	08/01/84	0	E 40008013V01	EPA	20	ле	47	6V	7	10V	11V	VE1	140	150 1,	16V	170 1	190	23V	290	30V 1.
•	PAGE 5 RECEIVED: 0	SAMPLE ID 60	DATA FILE CONC. FACTOR	NPDES SCAN	10	24	<u>ک</u> و	6V	71 475	20	74	. 4V	28V	23V	26	4	10V	11V	16V	26V

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LAB # 84-08-013 Continued From Above NAME EPA Method 624/GC-MS Category	÷		
3 # 84- Itinued A Meth Cat	12/3/79)		
Col NAME EI	ن در ۵		
	al Regi		
rv REPORT sults by Sample ON <u>OIB</u> TEST CODE <u>MS 624</u> Time Collected <u>07/31/84</u>	с i f i e d . (Feder,		
REF Sample TEST Ilected	gram 5 2 4 -		
Serv REPORI Results by Sample TION <u>OIB</u> TEST COD & Time Collected <u>O7</u>	chromato otherwise t method		
e Re e Re	time on unless on limi		
Analytical FRA Dat	IS REPORT. retention t n <u>ug/l</u> u PA detectio		
Ā	THIS in et EPA		
	ber orte ed a		
/01/84	DEFINITIONS   = scan num results rep : not detect		
PAGE 6 Received: 08/01/84 Sample ID <u>60</u>	AND DEF SCAN = All res ND = nc		
Page 6 Received: 08 Sample ID <u>60</u>	NOTES	H-143	F T

A NAME Method 625 Acid Compounds Category	BWS VERIFIED BY LAK COMPOUNDS DETECTED 0	COMPOUND RESULT	4-nitrophenol <u>ND</u>	2,4-dinitrophenol <u>ND</u>	2-methyl-4,6-dinitrophenol <u>ND</u>	pentachlorophenol <u>ND</u>	phenol <u>ND</u>		Register. 11/26/84;	
REPORT Sample TEST CODE <u>M625</u> Lected <u>07/30/84</u>	ANAL YST INSTRUMENT	NPDES SCAN EPA	7A 58A	5A 59A	4A 60A	9A 64A	10A 65A		gram. specified 623, (Federal	
cal Serv REPORT Results by Sample FRACTION <u>O2A</u> TEST CODE <u>M625</u> Date & Time Collected <u>07/30/84</u>	ACTED <u>08/01/84</u> ECTED <u>08/06/84</u>	RESULT NI	henol <u>ND</u>	henol <u>ND</u>	henol <u>ND</u>	henol <u>ND</u>	henol <u>ND</u>	henol ND	time on chromatogram unless otherwise spe on limit method 623,	
Analytic	2 DATE EXTRA DATE INJE	COMPOUND	2, 4, 6-trichloroph	4-chloro-3-methylph	2-chloroph	2, 4-dichloroph	2, 4-dimethylph	2-nitroph	FOR THIS REPORT. er or retention t rted in ug/L u d at EPA detectio d	
PAGE 7 RECEIVED: 08/01/84 SAMPLE ID 6E	TLE <u>2008013002</u>	N EPA	21A 2	22A 4-c	24A	31A	34A	57A	DEFINITIONS = scan numb results repo not detecte	
PAGE 7 RECEIVED: 08 SAMPLE ID <u>6E</u>	DATA FILE CONC. FACTOR	NPDES SCAN	114	BA	H	<b>4</b> 144	<b>Y</b> E	<b>6</b> 4	NDTES AND SCAN Alian ND =	

LAB # 84-08-013	B NAME Method 625 Base/Neutrals Category	BWS VERIFIED BY LAK COMPOUNDS DETECTED 0	COMPOUND RESULT	N-nitrosodimethylamine <u>ND</u>	N-nitrosodiphenylamine <u>ND</u>	N-nitrosodi-n-propylamine <u>ND</u>	bis(2-ethylhexyl}phthalate <u>ND</u>	butyl benzyl phthalate <u>ND</u>	di-butyl phthalate <u>ND</u>	di-n-octyl phthalate <u>ND</u>	diethyl phthalate ND	dimethyl phthalate <u>ND</u>	benzo(a)anthracene A <u>ND</u>	benzo(a)pyrene <u>ND</u>	benzo(b)fluoranthene * <u>ND</u>	benzo(k)fluoranthene * <u>ND</u>	chrysene A <u>ND</u>	acenaphthylene <u>ND</u>	anthracene B <u>ND</u>
REPORT Sample	Collected 07/30/84	ANALYST - INSTRUMENT -	NPDES SCAN EPA	418 618	438 628	42B 63B	138 668	158 &78	26B 68B	29B 69B	24B 70B	25B 71B	58 728	<b>5</b> B 73B	78 748	9B 75B	188 768	2B 77B	3B 78B
Analytical Serv Results by S	FRACTION 02A Date & Time Coll	DATE EXTRACTED 08/01/84 DATE INJECTED 08/06/84	COMPOUND RESULT NP	acenaphthene ND	benzidine <u>ND</u>	1,2,4-trichlorobenzene <u>ND</u>	hexachlorobenzene <u>ND</u> :	hexachloroethane ND	þis(2-chloroethyl)ether <u>ND</u>	2-chloronaphthalene <u>ND</u> ;	1, 2-dichlorobenzene <u>ND</u>	1, 3-dichlorobenzene <u>ND</u>	1,4-dichlorobenzene <u>ND</u>	3'dichlorobenzidi≈e <u>ND</u>	2,4-dinitrotoluene <u>ND</u>	2, 6-dinitrotoluene <u>ND</u>	1,2-diphenylhydrazine <u>ND</u>	fluoranthene ND	enyl phenyl ether <u>ND</u>
PAGE 8 RECEIVED: 08/01/84	SAMPLE ID <u>6E</u>	DATA FILE 2CUOB013C01 CONC. FACTOR 2	NPDES SCAN EPA C	18 18	<b>4B</b> 5B	46B 8B 1,2,4	3 <b>3</b> 8 85	368 128	-н 1 118 18В þis(2- 7	16B 20B	208 258 1,	21B 26B 1,	22B 27B 1,	238 288 3, 3,	27 <b>B</b> 35B 2	28B 36B 2	29B 37B 1, 2-	31B 39B	17B 4-chlorophenyl

LAB # 84-08-013 Continued From Above	NAME Method 625 Base/Neutrals Category	benzo(ghi}perylene <u>ND</u>	fluorene ND	phenanthrene B <u>ND</u>	dibenzo(a, h)anthracene <u>ND</u>	indeno(1,2,3-cd)pyrene <u>ND</u>	pyrene <u>ND</u>					er, 11/26/84).				
	~~	79B	808	818	828	838	848				ed.	(Federal Register,	te.	concentrations	rations.	
REPORT y Sample	TEST CODE <u>M625</u> 01lected <u>07/30/84</u>	88	328	446	198	378	458			chromatogram.	ise specified		hene comelute		igh concent	
Analytical Serv REP Results by Sample	FRACTION <u>02A</u> TEST CODE <u>M625</u> Date & Time Collected <u>07/30/84</u>	yl phenyl ether <u>ND</u>	bis(2-chloroisopropyl)ether <u>ND</u>	bis{2-chloroethoxy}methane <u>ND</u>	hexachlorobutadiene <u>ND</u>	hexachlorocyclopentadiene <u>ND</u>	isophorone <u>ND</u>	naphthalene <u>ND</u>	IS REPORT. nzene ND	or retention time on chroma	n <u>uq/L</u> unless otherwise	PA detection limit method 625,	ne and benzo(k)fluoranthene	and chrysene co-elute in high	and phenanthrene co-elute in high concentrations	
PAGE 9 Analytica RECEIVED: 08/01/84	<i>ا</i> معا	41B 4-bromophenyl phenyl	42B bis(2-chloro	43B bis(2-chlor	52B hexa	53B hexachloro	54B	55B	AND DEFINITIONS FOR THIS REPORT. nz	≕ scan number or	results reported in_	= not detected at EPA detection	benzo(b}fluoranthene	benzo(a)anthracene and chrysen	anthracene and phe	
PAGE 9 RECEIVED: 08/01/84	SAMPLE ID <u>6</u> E	148	128	108	348	358	388	398	NOTES AND D	SCAN	- 116	n UN	ی ۱۱ *	<b>d</b> = <b>A</b>	۹۳ ۱۱ ۲۵	

# 84-08-013	A Method 624/GC-MS Category	VERIFIED BY <u>LAK</u> COMPOUNDS DETECTED <u>1</u>	COMPOUND RESULT	1,2-dichloropropane <u>ND</u>	cis-1, 3-dichloropropylene <u>ND</u>	trans-1, 3-dichloropropylene <u>ND</u>	ethylbenzene <u>ND</u>	methylene chloride <u>NG</u>	methyl chloride <u>ND</u>	methyl bromide <u>ND</u>	bromoform <u>ND</u>	dichlorobromomethane <u>ND</u>	trichlorofluoromethane <u>ND</u>	dichlorodifluoromethane <u>ND</u>	chlorodibromomethans <u>ND</u>	tetrachloroethylene <u>ND</u>	toluene <u>61</u>	trichloroethylene <u>ND</u>	vinyl chloride <u>ND</u>
LAB	624 NAME EPA	T <u>BWS</u>	-				2		>	>	2						>		>
REPORT ID le	k Time Collected 07/30/84	ANALYST INSTRUMENT	SCAN EPA	726	<b>NEE</b>	<b>NEE</b>	<b>786</b>	440	45V	46V	470	480	490	207	51V	85V	45 <u>3</u> 86V	87V	788
Sad	TEST ollecte		NPDES	170	187	187	190	220	214	200	20	120	70E	130	8	24V	557	294	310
Serv Results by	ACTION <u>02B</u> te & Time C(	08/02/84	RESULT	QN	QN	QN	QN	<u>UN</u>	QN	QN	QN	QN	QN	QN	QN	QN	QN	QN	ÛN
Analytical	FRACTI Date &	/02 DATE INJECTED 08/02/84	COMPOUND	acrolein	acrylonitrile	benzene	carbon tetrachloride	chlorobenzene	1, 2-dichloroethane	1, 1, 1-trichloroethane	1, 1-dichloroethane	1, 1, 2-trichloroethane	1, 1, 2, 2-tetrachloroethane	chloroethane	s (chloromethyl) ether	2-chloroethylvinyl ether	chloroform	1, 1-dichloroethylene	1,2-trans-dichloroethylene
08/01/84		2 4CU08013V02	EPA	20	л е	47	6V	70	10V	11V	13V	14V	150 1,1,	16V	17V bis	190 2-0	23V	290	30V 1, 2-1
PAGE 10 Received: OB	SAMPLE ID <u>6</u> E	DATA FILE CONC. FACTOR	NPDES SCAN	17	50	ле	24	7	н 150	-147	141	280	230	<b>^6</b>	4	10V	114	16V	26V

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LAB # 84-08-013 Continued From Above	NAME EPA Method 624/GC-MS Category	Register, 12/3/79}.		
Analytical Serv REPORT Results by Sample	FRACTION <u>O2B</u> TEST CODE <u>MS 624</u> Date & Time Collected <u>07/30/84</u>	IIS REPORT. retention time on chromatogram. n <u>ug/l</u> unless otherwise specified. PA detection limit method 624, (Federal Re		
PAGE 11 RECEIVED: 08/01/84	SAMPLE ID <u>6E</u>	NDTES AND DEFINITIONS FOR THIS SCAN = scan number or ret All results reported in ND = not detected at EPA	H-148	

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LAB # 84-08-013	A NAME Method 625 Acid Compounds Category	BWS VERIFIED BY LAK COMPOUNDS DETECTED 0	COMPOUND RESULT	4-ni trophenol <u>ND</u>	2,4-dinitrophenol <u>ND</u>	2-methyl-4,6-dinitrophenol <u>ND</u>	pentachlorophenol <u>ND</u>	phenol <u>ND</u>		Register, 11/26/84}.
	ACTION <u>03A</u> TEST CODE <u>M625</u> Ite & Time Collected <u>07/30/84</u>	ANAL YST INSTRUMENT	SCAN EPA	SBA	59A	60A	64A	65A		
REPORT Sample	TEST C Dilected		NPDES SQ	74	S.A.	44	9A	104		9 τ 4 Ω Ω Ω Ω Ω Ω Ω
Serv REP Results by Sample	CON <u>03A</u> & Time Co	<u>08/01/84</u> 08/06/84	RESULT	Q	Ŷ	Ŷ	Q	Q	Q	
PAGE 12 RECEIVED: 08/01/84	FRACTI Date 8	DATE EXTRACTED DATE INJECTED	COMPOUND	2, 4, 6-trichlorophenol	4-chloro-3-methylphenol	2-chlorophenol	2, 4-dichlorophenol	2,4-dimethylphenol	2-nitrophenol	THIS REPORT. r retention tim in ug/L unl EPA detection
101/84	a e a compañía de la	<u>2008013003</u>	۲			¥	α.	×	¢	NITIONS FOR can number o its reported detected at
PAGE 12 RECEIVED: 08/01/84	10 <u>6F</u>	Data File 24 46. Factor _	SCAN EPA	214	22A	244	31A	34A	57A	AND DEFINITIONS SCAN = scan numb All results repo ND = not detecte ND = not detecte
PAGE 15 RECEIVE	SAMPLE ID <u>6F</u>	DATA CONC. F	NPDES S	11A	BA	18	<b>₹</b> ₹3 H-14	<b>4</b> M	<b>6</b> 8	4 0 4 2 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1

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LAB # 84-08-013	B NAME Method 625 Base/Neutrals Category	BNS VERIFIED BY LAK COMPOUNDS DETECTED 0	COMPOUND RESULT	N-nitrosodimethylamine <u>ND</u>	N-nitrosodiphenylamine <u>ND</u>	N-nitrosodi-n-propylamine <u>ND</u>	bis(2-ethylhexyl)phthalate <u>ND</u>	butyl benzyl phthalate <u>ND</u>	di-butyl phthalate <u>ND</u>	di-n-octyl phthalate <u>ND</u>	diethyl phthalate <u>ND</u>	dimethyl phthalate <u>ND</u>	benzo(a)anthracene A <u>ND</u>	benzo(a)pyrene <u>ND</u>	benzo(b)fluoranthene * <u>ND</u>	benzo(k)fluoranthene * <u>ND</u>	chrysene A <u>ND</u>	acenaphthylene <u>ND</u>	anthracene B <u>ND</u>
REPORT	CODE M625 07/30/84	ANALYST	S SCAN EPA	B 61B	8 628	853 83	B 64B	(B 67B	899 88	13 698	B 70B	1B 71B	58 728	48 73B	78 748	9B 75B	16 76B	28 778	3B 78B
Serv Results by Sam	FRACTION <u>03A</u> TEST ( Date & Time Collected	<u>08/01/84</u> 08/06/84	RESULT NPDES	41B	43B	ND 428	8E1   <u>UN</u>	ND 158	892   <u>ON</u>	ND 298	ND 24B	ND 25B	5  QV	9 		GN	ND   188		0 9
Analytical Se Re	FRACTI Date &	DATE EXTRACTED DATE INJECTED	COMPOUND	acenaphthene	benzidine	1, 2, 4-trichlorobenzene	hexach lorobenzene	hexachloroethane	bis(2-chloroethyl)ether	2-chloronaphthalene	1, 2-dichlorobenzene	1, 3-dichlorobenzene	1, 4-dichlorobenzene	3'dichlorobenzidine	2, 4-dinitrotoluene	2, 6-dinitrotoluene	1,2-diphenylhydrazine	fluoranthene	ophenyl phenyl ether
08/01/84	6F	1LE <u>2CU08013C03</u> TDR <u>2</u>	N EPA	18	58	8B 1,2	98	128	18B bis(	208	258	268	27 <b>B</b>	288 3,	358	368	378 1,	39B	40B 4-chlorophenyl
PAGE 13 RECEIVED.	SANPLE ID 6F	DATA FILE CONC. FACTOR	NPDES SCAN	18	48	468	338	368	118	н 168	80 CV	218	228	23B	278	288	2 <b>9</b> 8	318	178

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LAB # 84-08-013 Continued From Above	B NAME Method 625 Base/Neutrals Category	benzo(ghi)perylene <u>ND</u>	fluorene <u>ND</u>	phenanthrene B <u>ND</u>	dibenzo(a, h)anthracene <u>ND</u>	indeno(1,2,3-cd)pyrene <u>ND</u>	byrene <u>ND</u>					Register, 11/26/84).		ions.		
REPURT Dple		798	808	818	828	858	848			E	specified.	(Federal	o-elute.	co-elute in high concentrations	concentrations.	
R	TES Ilecti	88	328	448	198	378	458			tograi	¢	d 625,	u e u e	n hig		
Analytical Serv REP Results by Sample	FRACTION 03A TEST CODE M625 Date & Time Collected 07/30/84	4-bromophenyl phenyl ether <u>ND</u> {	bis(2-chloroisopropyl)ether <u>ND</u> {	bis(2-chloroethoxy)methane <u>ND</u>	hexachlorobutadiene <u>ND</u> {	hexachlorocyclopentadiene <u>ND</u> {	isophorone <u>ND</u>	naphthalene <u>ND</u>	RTHIS REPORT. nzene ND	scan number or retention time on chromatogram	ed in <u>uq/L</u> unless otherwis	at EPA detection limit method	benzo(b)fluoranthene and benzo(k)fluoranthene co-elute	benzo(a)anthracene and chrysene co-elute ir	phenanthrene co-elute in high	
PAGE 14 RECEIVED: 08/01/84	D 6F	41B 4-bromop	428 bis(2-ch]	438 bis(2-ch	52B h	53B hexachl	548	558	NOTES AND DEFINITIONS FOR THIS REPORT. NZ	SCAN = scan number	l results reported in_	ND = not detected at EPA detection	= benzo(b}fluoran	= benzo(a)anthrac	= anthracene and	
PAGE 14 Received	SAMPLE ID <u>6F</u>	148	128	108	3 <b>4B</b>	338	<b>38B</b>	398	NDTES AN		<b>Г</b> Н-15		*	¢	ß	

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LAB # 84-08-013	NAME EPA Method 624/GC-MS Category	BMS VERIFIED BY LAK F4 COMPOUNDS DETECTED 0	COMPOUND	1,2-dichloropropane <u>ND</u>	cis-1, 3-dichloropropylene <u>ND</u>	trans-1,3-dichloropropylene <u>ND</u>	ethylbenzene <u>ND</u>	methylene chloride <u>ND</u>	methyl chloride <u>ND</u>	methyl bromide <u>ND</u>	bromoform <u>ND</u>	dichlorobromomethane <u>ND</u>	trichlorofluoromethane <u>ND</u>	dichlorodifluoromethane <u>ND</u>	chlorodibromomethane <u>ND</u>	tetrachloroethylene <u>ND</u>	toluene <u>ND</u>	trichloroethylene <u>ND</u>	vinyl chloride <u>ND</u>
REPORT ND 1e	TEST CODE <u>MS 624</u> ected 07/30/84	ANAL YST	SCAN EPA	1320	<b>NEE</b>	<b>NEE</b>	7 38V	440	450	460	470	480	490	/ 50V	/ 51V	√ 85V	, 86V	ر 1870	7 BBV
Serv REP( Results by Sample	FRACTION 03B TEST Obste & Time Collected	08/02/84	RESULT NPDES	NZ1 I ON	ND 18V	NB1 18/	761 19V	V22   UN	ND 21V	702   <u>DN</u>	ND   20	V <u>D</u> 12V	AOE I III	AEI I DN		ND 24V	ND 25V	795 : 29V	∧1E : <u>0</u> N
Analytical	FRACTI Date &	DATE INJECTED	COMPOUND	acrolein	acrylonitrile	penzene	carbon tetrachloride	chlorobenzene	1, 2-dichloroethane	1, 1, 1-trichloroethane	1, 1-dichloroethane	1, 1, 2-trichloroethane	1, 1, 2, 2-tetrachloroethane	chloroethane	bis (chloromethyl) ether	2-chloroethylvinyl ether	chloroform	1, 1-dichloroethylene	1, 2-trans-dichloroethylene
08/01/84	6F	LE <u>40008013003</u>	I EPA	20	٨E	47	64	24	10V	11V	<b>NEI</b>	14V	150 1	16V	170	190	23V	290	30V 1.
PAGE 15 Received:	SAMPLE ID 6F	DATA FILE CONC. FACTOR	NPDES SCAN	1	20	٨E	60	74	150	± ≥7V	-152	28V	23V	76	47	10V	11V	16V	26V

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LAB # 84-08-013 Continued From Above NAME EPA Method 624/GC-MS Category	Register, 12/3/79).			
Analytical Serv REPORT Results by Sample FRACTION 03B TEST CODE MS 624 1 Date & Time Collected 07/30/84	lIS REPORT. retention time on chromatogram. n <u>ug/l</u> unless otherwise specified. PA detection limit method 624, (Federal Regi			
PAGE 16 RECEIVED: 08/01/84 SAMPLE ID 6F	NDTES AND DEFINITIONS FOR THIS R SCAN = scan number or rete All results reported in ND = not detected at EPA d	H-1	153	

LAB # 84-08-013	A NAME Method 625 Acid Compounds Category	BWS VERIFIED BY LAK COMPOUNDS DETECTED 0	COMPOUND	4-nitrophenol <u>ND</u>	2, 4-dinitrophenol <u>ND</u>	2-methyl-4, 6-dinitrophenol <u>ND</u>	pentachlorophenol <u>ND</u>	phenol <u>ND</u>		Register, 11/26/84).
I.	30/84	ANALYST	EPA	58A	59A	60A	64A	65A		Etieden.
5	ACTION 04A TEST CODE <u>M625</u> te & Time Collected <u>07/30/84</u>	ANAL YST INSTRUMENT	NPDES SCAN	7A	€ P	44	9A	104		5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5
	TION 04A TEST % Time Collected	<u>08/01/84</u> 08/06/84	RESULT N	<u>G</u>	 9	Q Q	 R	Q	Q	
Analytical	FRACTION 04A Date & Time	DATE EXTRACTED <u>OB.</u> DATE INJECTED <u>OB</u> .	COMPOUND RE	2, 4, 6-trichlorophenol 🚽	4-chloro-3-methylphenol	2-chlorophenol	2, 4-dichlorophenol	2, 4-dimethylphenol	2-nitrophenol	THIS REPORT. retention time on in ug/L unless EPA detection limi
	r l	20008013004	0	2, 4,	4-chlo		(1)	Ci		
	n/17/n7	ILE <u>2CUO</u>	N EPA	21A	22A	24A	31A	34A	57A	
PAGE 17	SAMPLE ID 60	DATA FILE CONC. FACTOR	NPDES SCAN	11A	BA	14	<b>ч</b> Сі н–1	<b>4</b> M	64	NDTES AND DEF SCAN = All re ND = ND = C

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	Base/Neutrals ry	HED TED	RESULT		Ì	8		8			-	•	۲ ۲		*	*	A		8	
13	y	VERIFIED BY DS DETECTED		lamine	N-ni trosodiphenylamine	lamine	ihalate	phthalat:	phthalate	phthalat	phthalat	phthalat		berzo(a)pyrene				chylene		
84-08-013	625 atego	VEI COMPOUNDS	QN	N-nitrosodimethylamin	ipheny	-propy	41)pht						benzo(a)anthracene	nzo(a)	benzo(b)fluoranth <b>e</b> ne	benzo(k)fluoranthene	chrysene	acenaphthyl	anthracene	
LAB # 8	Method	COM	COMPOUND	trosod	trosod	a−i boa	hylhex	l benzyl	diーねぃちな!	di-n-octyl	diethyl	dimethyl	50(8)a	<b>a</b> q	(b)flu	(k)flu		ac	ą	
Ľ	NAME	BMB	Ŭ	N-ni	N-n i	N-nitrosodi-n-propylamin	b is(2-ethylhexyl}phthalat	butyl	-	d i-		-	þen		benzo	benzo				
	~~		A	8	ġ			æ	8	â	æ	æ	8	8	8	8	E,	a	8	
RT	CODE M6	ANALYST INSTRUMENT	AN EPA	618	628	859	66B	678	688	698	708	718	728	73B	746	758	768	778	188	
REPORT Sample	ACTION 04A TEST CODE M625 te & Time Collected 07/30/84	SNI	NPDES SCAN	418	438	428	138	158	268	29B	24B	25B	58	58	78	98	188	28	<b>a</b> e	
ňą	Coll	/84			Q	g	- 2	 9	Q N	Q	 2	<u>Q</u>	 9	 2	 9	 9	<u>Q</u>	 9	 9	•
Serv Results	ACTION 04A te & Time	<u>08/01/84</u> 08/06/84	RESULT		2															
	FRACT Date	ACTED JECTED		thene	ridine	ana z na	anazna	thane	ether)	halene	a na z na	an s en e	an s en e	zidine	oluene	oluene	razine	nthene	ether	
Analytica		ATE EXTRAC DATE INJEC	ů	acenaphth	benzid	lorob	lorob	hexach loroeth	ethyl	naphti	lorob	lorob	larob	roben	itrot	itrot	phyth	fluoranth	ព្រទពឬ ]	
<b>~</b>		DATE DATE	COMPOUND	ŵ		1, 2, 4-trichlorobenz	hexach lorobenz	hexac	chlara	2-chloronaphthal	1, 2-dichlorobenz	1, 3-dichlorobenz	1, 4-dichlorobenz	3,3'dichlorobenzid	2, 4-dinitrotolu	2, 6-dinitrotolu	1, 2-diphenylhydra	ф.		
		3004 2	Ü			1,2,4			bis(2-chloroethyl)e	ч М	1,	Т,	1,	, е 'е	N	ni	1, 2-		4-chlorophenyl	
<del>сонголион</del> (01/84		2008013004	æ	~	~	~	~	~		m	~	m	~	m	m	ŵ	m	ŵ	3 4-ch	
PAGE 18 RECEIVED: 08/01/84	90	1LE <u>20</u> TOR	N EPA	18	58	88	9B	128	188	208	25B	268	27B	288	358	368	378	39B	408	
PAGE 18 Received:	SANPLE ID <u>60</u>	DATA FILE VC. FACTOR	ES. SCAN	18.	48	46B	33B	36B	118	168	20B	218	22B	23B	27B	288	29B	318	17B	
PAG	SAM	DAT CONC.	NPDES		•	4	й	ĕ		-155		nj	Ň	Ň	N	5	ดั	ň		

9       Continued From Above         ED: 08/01/084       Results by Sample       Continued From Above         10       66       FRACTION 04A       TEST CODE M625       B Anter Method 625       B Saevleutrais         10       66       738       bistozenter       00       0730/084       Category       00         418       4-bromophenyl phenyl ether       40       88       778       benzofniperylene       40         428       bistozentorovtadisne       40       818       phenanthrene       80         428       bistozentorovtadisne       40       818       phenanthrene       40         528       hessethorovtadisne       40       82       44       82       40       40         528       hessethorovetoropertadisne       40       32       83       indenotit22.3-cd)pyrene       40         528       hessethorovetoropertadisne       40       32       83       indenotit22.3-cd)pyrene       40         528       hessethorovetoropertadisne       40       33       83       indenotit22.3-cd)pyrene       40         538       hessethorovetoropertadisne       40       33       83       indenotit22.3-cd)pyrene       40         539       he														
I Serv REPORT Results hy Sample Results hy Sample ACTION 04A TEST CODE M625 ACTION 04A TEST CODE M625 are ND 32B 80B are ND 32B 80B are ND 19B 82B are ND 37B 82B are ND 44B 81B 37B 82B 37B 82B 82B 37B 82B 82B 37B 82B 82B 82B 82B 82B 82B 82B 82B 82B 82B 82B 82B	LAB # 84-08-013 Continued From Above			8			•					ions.		
	REPORT ple	1 1						. WE	pecified.	(Federal	co-elute.	gh concentrati	oncentrations.	
	l Serv Results by San	Col	QN	 • •	ene ND	 Q	e n e	r or retention time on chromatogr		ND = not detected at EPA detection limit method 62	<pre>= benio(b)fluoranthene and benio(k)fluoranthene </pre>	benzo(a)anthracene and chrysene co-elute in hi	in high	

		LAK 3	RESULT	QN	QN	ŪN	QN	QN	QN	QN	aN	QN	QN	đN	QN	an	1886	an	Q
LAB # 84-08-013	NAME EPA Method 624/GC-MS Category	BWS VERIFIED BY f4 COMPOUNDS DETECTED	COMPOUND	1, 2-dichloropropane 💴	cis-1, 3-dichloropropylene 🔜	trans-1,3-dichloropropylene	ethylbenzene	methylene chloride	methyl chloride	methyl bromide	bromoform	dichlorobromomethane	trichlorofluoromethane	dichlorodifluoromethane	chlorodibromomethane	tetrachloroethylene	toluene	trichloroethylene	vinyl chloride
REPORT Sample	TION 04B TEST CODE MS 624 & Time Collected 07/30/84	ANAL YST	NPDES SCAN EPA	17V 32V	18V 33V 6	18V 33V tre	19V 38V	22V 44V	21V 45V	20V 46V	5V 47V	12V 48V	30V 49V	13V 50V	BV 51V	24V 85V	25V 44B 86V	29V 87V	31V 88V
l Serv Results by	- FRACTION 04B Date & Time Coll	(NJECTED 08/02/84	RESULT NP	acrolein <u>ND</u>	onitrile <u>ND</u>	benzene <u>39</u>	chloride ND	penzene <u>ND</u>	oethane <u>ND</u>	roethane <u>ND</u>	roethane <u>ND</u>	roethane <u>ND</u>	roethane <u>ND</u>	chloroethane <u>ND</u> :	1) ether <u>ND</u> :	41 ether ND	chloroform <u>NB</u>	ethylene ND	ethylene <u>11</u>
Analytica 34		4CU08013V04 DATE INJEC	COMPOUND	·v	acrylonitr		carbon tetrachlor	chlorobenz	1,2-dichloroeth	1, 1, 1-trichlaroeth	1, 1-dichloroeth	1, 1, 2-trichloroeth	1, 1, 2, 2-tetrachloroeth	chlo	bis (chloromethyl)	2-chloroethylvinyl	Υ Υ	1, 1-dichloroethyl	1, 2-trans-dichloroethyl
08/01/84	90		EPA.	22	M	47	. 6V	2	101	11V	130	141	150	16V	170	190	23V	290	NOE
PAGE 20 Received: C	SAMPLE ID 60	DATA FILE CONC. FACTOR	NPDES SCAN	17	24	327 JSZ	79	7	H-1 5C	∧42 157	14V	28V	23V	76	4	10V	11V	16V	260 193

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OVE	NAME EPA Method 624/GC-MS Category			
LAB # 84-08-013 Continued From Above	624/( ry			
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# 84 tinue	A Me	12/3/79)		
Cent		-		
	NAM	1. 5 6 7		
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RE	lecto	002 004 004 004 004		
Serv REPORT Results by Sample	FRACTION 04B TEST CODE MS 624 Date & Time Collected 07/30/84	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		
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08/	99	) DEFI NN = so Tresu = not		
PAGE 21 RECEIVED: 08/01/84	SAMPLE ID <u>60</u>			
PAGE	SAMPI	NOTES	H-158	4 

-08-013	NAME Method 625 Acid Compounds Category	VERIFIED BY LAK COMPOUNDS DETECTED	4D RESULT	4-nitrophenol <u>ND</u>	2, 4-dinitrophenol <u>ND</u>	initrophenol <u>ND</u>	pentachlorophenol <u>ND</u>	phenol ND		/8 <b>4</b> }
LAB # 84-08-013	<b>√</b>	BWS COMP	COMPOUND	- 4	2, 4-di	2methyl-4, 6-dinitropheno	pentac			Register, 11/26/84}
REPORT Samp Le	TEST CODE M625 lected 07/31/84	ANALYST INSTRUMENT	NPDES SCAN EPA	7A 58A	5A 59A	4A 60A	9A 64A	10A 65A		ogram. e specified. 625, (Federal
Analytical Serv REP Results by Sample	FRACTION 05A TEST CODE M625 Date & Time Collected 07/31/84	ATE EXTRACTED <u>08/01/84</u> Date injected <u>08/06/84</u>	RESULT NI	srophenol ND	ylphenol ND	2-chlorophenol <u>ND</u>	srophenal <u>ND</u>	uylphenol <u>ND</u>	2-nitrophenol <u>ND</u> i	EPORT ation time on chromatogram ug/L unless otherwise spe etection limit method 625,
Anal 84		2CUOB013C01 DATE E DATE DATE	COMPOUND	2,4,5-trichlorophenol	4-chloro-3-methylphenol	2-ch1(	2,4-dichlorophenal	2, 4-dimethylphenol	-1 1	AND DEFINITIONS FOR THIS REPORT SCAN = scan number or retention ti All results reported in ug/L un ND = not detected at EPA detection ND = not detected at EPA detection
): 08/01/	10 7A	DATA FILE <u>2008</u> 4c. Factor	SCAN EPA	21A	22A	24A	314	34A	57A	AND DEFINITI SCAN = scan All results ND = not det N
PAGE 22 RECEIVEI	SAMPLE ID 7A	DATA CONC. F	NPDES S	118	84	14	е Сі Н-1	₩ 59	6A	<ul> <li>. Ω</li> /ul>

LAB # 84-08-013	B NAME Method 625 Base/Neutrals Category	BWS VERIFIED BY LAK COMPOUNDS DETECTED 0	COMPOUND RESULT	N-nitrosodimethylamine <u>ND</u>	N-nitrosodiphenylamine ND	N-nitrosodi-n-propylamine <u>ND</u>	bis(2-ethylhexyl}phthalate <u>ND</u>	butyl benzyl phthalate <u>ND</u>	di-butyl phthalate <u>ND</u>	di-n-octyl phthalate <u>ND</u>	diethyl phthalate <u>ND</u>	dimethyl phthalate <u>ND</u>	benzo(a)anthracene A <u>ND</u>	benzo(a)pyrene <u>ND</u>	benzo(b)fluoranthene * <u>ND</u>	benzo(k)fluoranthene * <u>ND</u>	chrysene A ND	acenaphthylene <u>ND</u>	anthracene B <u>ND</u>
REPORT Samp 1 e	Collected 07/31/84	ANAL YST INSTRUMENT	NPDES SCAN EPA	418 618	43B 62B	42B 63B	13B 66B	15B 67B	268 688	29B 69B	24B 70B	258 718	58 728	48 73B	78 748	9B 75B	188 748	28 778	<b>3</b> 8 1
Serv Results by	ACTION <u>O5A</u> te & Time Col	<u>08/01/84</u> 08/06/84	RESULT N	QN	Ŷ	QN	Q	Q		Q	Ŷ	Q	QN	<u>an</u>	Q	QN	Q	Û	GN
Analytical	FRACT	DATE EXTRACTED DATE INJECTED	COMPOUND	acenaphthene	benzidine	1, 2, 4-trichlorobenzene	hexach lorobenzene	hexachloroethane	bis(2-chloroethyl}ether	2-chloronaphthalene	1, 2-dichlorobenzene	1, 3-dichlorobenzene	1, 4-dichlorobenzene	3, 3'dichlorobenzidine	2, 4-dinitrotoluene	2, 6-dinitratoluene	1,2-diphenylhydrazine	fluoranthene	4-chlorophenyl phenyl ether
08/01/84	0 7A	FILE <u>2008013V05</u> CTOR 2	AN EPA	18	58	8B 1,	9B	128	188 bis	208	258	268	27 <b>B</b>	288	35B	368	37B 1	39B	40B 4-chlor
PAGE 23 RECEIVED:	SAMPLE ID 7A	DATA FILE CONC. FACTOR	NPDES SCAN	18	48	46B	338	368	118	89 H-16	0 <b>8</b>	21B	22 <b>B</b>	23B	27 <b>B</b>	288	29B	318	178

= anthracene and phenanthrene co-elute in high concentrations. 8

■ benzo(a)anthracene and chrysene co-elute in high concentrations.

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	S	BY LAK ED 1	REGULT	QN	QN	QN	ÛN	UD	UN	ND	QN	ŪN	ŪN	ŪN	<u>an</u>	QN	\$	QN	Q
LAB # 84-08-013	NAME EPA Method 624/GC-MS Category	BWS VERIFIED BY <u>f4</u> COMPOUNDS DETECTED	COMPOUND	1, 2-dichloropropane	cis-1, 3-dichloropropylene	trans-1, 3-dichloropropylene	ethylbenzene	methylene chloride	methyl chloride	methyl bromide	<b>bromofarm</b>	d i ch lorobromome thane	trichlorofluoromethane	dichlorodifluoromethane	chlorodibromomethane	tetrachloroethylene	toluene	trichloroethylene	vinyl chloride
RT	FRACTION O5B TEST CODE MS 624 Date & Time Collected 07/31/84	ANALYST	SCAN EPA	32V	75E	33V tr.	<b>NBE</b>	440	450	460	470	480	490	50V	51V	830	<u>449</u> B6V	87V	<b>V88</b>
REPORT Sample	TEST C lected	INE	NPDES SC	17V	18V	18V	190	22V	21V	20V	50	12V	<b>NOE</b>	13V	ВV	24V	25V -	294	31V
lts by	UN <u>O5B</u> Time Col	<u>08/02/84</u>	RESULT	QN	Ø	QN	Q	Q	Q	Q	Q	Q	Q	Ŷ	ũ	Q	Q	 GN	QN
Analytical	FRACTI Date &	DATE INJECTED	COMPOUND	acrolein	acrylonitrile	penzene	carbon tetrachloride	chlorobenzene	1,2-dichloroethane	1, 1, 1-trichloroethane	1, 1-dichloroethane	1, 1, 2-trichloroethane	, 2, 2-tetrachloroethane	chloroethane	s (chloromethyl) ether	2-chloroethylvinyl ether	chloroform	1, 1-dichloroethylene	1,2 trans-dichloroethylene
08/01/84		40008013V05	EPA	2V	۸e	40	60	70	10V	11V	13V	14V	150 1,1,	16V	17V bis	190 2-0	23V	290	30V 1, 2-1
PAGE 25 Received: 08/	SAMPLE ID 7A	DATA FILE CONC. FACTOR	NPDES SCAN E	10	20	٨E	60	7	150	>∠ 8-1	14V	28V	23V	76	4V	100	11V 8	16V	26V

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LAB # 84-08-013 Continued From Above	NAME EPA Method 624/GC-MS	(ate	
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PAGE 26 Received:	SAMPLE ID 7A	ហ្គ H-163	
R PA	SA	H-163	

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LAB # 84-08-013	NAME Method 625 Acid Compounds Category	BWS VERIFIED BY LAK COMPOUNDS DETECTED 0	COMPOUND	4-nitrophenol <u>ND</u>	2,4-dinitrophenol <u>ND</u>	2-methyl-4, 6-dinitrophenol ND	pentachlorophenol <u>ND</u>	phenol ND	
REPORT ample	TEST CODE M625 A lected 07/31/84	ANAL YST INSTRUMENT	NPDES SCAN EPA	7A 58A	5A 59A	4A 60A 2	9A 64A	10A 65A	
ical Serv REP( Results by Sample	FRACTION OGA TEST CODE M625 Date & Time Collected 07/31/84	RACTED <u>08/01/84</u> JECTED <u>08/06/84</u>	RESULT NP	phenol <u>ND</u>	phenol <u>ND</u>	phenol <u>ND</u>	phenol <u>ND</u>	phenol <u>ND</u>	phenol <u>ND</u> :
Analytical		CO6 DATE EXTRACTED DATE INJECTED	COMPOUND	2,4,6-trichloroph	4-chloro-3-methylph	2-chloroph	2, 4-dichloroph	2, 4-dimethylph	2-nitroph
PAGE 27 RECEIVED: 08/01/84	37 (	DATA FILE <u>2CUOBO13C06</u> CDNC. FACTDR 2	AN EPA	21A	22A 4	24A	31A	34A	57A
PAGE 27 Received:	SAMPLE ID <u>7C</u>	DATA F CONC. FAC	NPDES SCAN	11A	BA	н- 1 А	<b>ଟ୍ଟ</b> ଲା 164	ЗA	6A

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NOTES AND DEFINITIONS FOR THIS REPORT.

All results reported in ug/L unless otherwise specified. ND = not detected at EPA detection limit method 625. (Federal Register, 11/26/84). SCAN = scan number or retention time on chromatogram.

estantes estatuta estatuta estatuta estatuta estatuta estatuta estatuta estatuta estatuta estatuta estatuta est	F	B NAME Method 625 Base/Neutrals Category	BWS VERIFIED BY LAK COMPOUNDS DETECTED 0	COMPOUND	N-nitrosodimethylamine <u>ND</u>	N-nitrosodiphenylamine <u>ND</u>	N-nitrosodi-n-propylamine <u>ND</u>	bis(2-ethylhexyl)phthalate <u>ND</u>	butyl benzyl phthalate <u>ND</u>	di-butyl phthalate <u>ND</u>	di-n-octyl phthalate <u>ND</u>	diethyl phthalate <u>ND</u>	dimethyl phthalate <u>ND</u>	benzo(a)anthracene A <u>ND</u>	benzo(a)pyrene <u>ND</u>	benzo(b)fluoranthene * <u>ND</u>	benzo(k)fluoranthene * <u>ND</u>	chrysene A <u>ND</u>	acenaphthylene <u>ND</u>	anthracene B <u>ND</u>
	2	CODE M625 1 07/31/84	ANALYST INSTRUMENT	AN EPA	<b>61</b> B	628	638	648	67B	68B	69B	708	718	728	738	74B	758	768	778	788
	Sau	IEST C		NPDES SCAN	418	438	428	138	158	26B	298	248	258	35	<b>6</b> B	78	98	188	28	8 6
	cerv Results by	FRACTION <u>OGA</u> TEST ( Date & Time Collected	<u>08/01/84</u> <u>08/06/84</u>	RESULT	QN	QN	Q	ŨN	QN	GN	<u>Q</u>	QN	Ŷ	Q	QN	Q	QN	QN	Ŋ	
	שומוליורמו אנ	FRACTI Date &	DATE EXTRACTED DATE INJECTED	COMPOUND	acenaphthene	benzidine	1, 2, 4-trichlorobenzene	hexach lorobenzene	hexachloroethane	bis(2-chloroethyl)ether	2-chloronaphthalene	1, 2-dichlorobenzene	1, 3-dichlorobenzene	1, 4-díchlorobenzene	3, 3′dichlorobenzidine	2, 4-dinitrotoluene	2, 6-dinitrotoluene	1,2-diphenylhydrazine	fluoranthene	phenyl phenyl ether
	08/01/84		2CU08013C06	EPA	18	58	BB 1, 2,	<b>9B</b>	128	18B bis(2	20B	258	268	27B	288 3, 3	35B	36B	378 1, 2	39B	40B 4-chlorophenyl
	RECEIVED: 08	SAMPLE ID 70	DATA FILE CONC. FACTOR	NPDES SCAN	18	48	468	<b>3</b> 26	368	118	<b>8</b> 91 н-16	802 5	218	22B	2 <b>3</b> B	27 <b>B</b>	288	29B	318	178

LAB # 84-08-013 Continued From Above	1625 B NAME Method 625 Base/Neutrals /84 Category	79B benzo(ghi)perylene <u>ND</u>	BCB fluorene <u>ND</u>	BIB phenanthrene B <u>ND</u>	82B dibenzo(a, h)anthracene <u>NB</u>	83B indeno(1,2,3-cd)pyrene <u>ND</u>	84B pyrene <u>ND</u>					al Register, 11/26/84).		frations.	lions.		•	•
REPORT Sample	TEST CODE <u>M625</u> Ilected <u>07/31/84</u>	88 7	32B	44B B	198 8	378 8	458 8			.mengo	se specified.	l 625, (Federal	ene comelute.	n high concentrati	Jh concentrati			
Analytical Serv Results by	FRACTION OGA TEST C Date & Time Collected	4-bromophenyl phenyl ether ND	bis(2-chloroisopropyl)ether <u>ND</u> ;	bis(2-chloroethoxy)methane <u>ND</u> {	hexachlorobutadiene <u>ND</u> {	hexachlorocyclopentadiene <u>ND</u> {	isophorone <u>ND</u>	naphthalene <u>ND</u>	AND DEFINITIONS FOR THIS REPORT. nzene ND I	SCAN = scan number or retention time on chromatogram	All results reported in <u>ug/L</u> unless otherwise	= not detected at EPA detection limit method	henzo(b)fluoranthene and benzo(k)fluoranthene	benzo(a)anthraccne and chrysene co~elute in high	ne and phenanthrene co-elute in high			
D: 08/	ID 7C	41B 4-	42B bi	43B b	52B	53B	54B	55B	AND DEFINITI	SCAN = scan	All results	ND = not det	<pre>* = henzo(b)+</pre>	á = benzo(a);	B = aithracene			
PAGE 29 RECEIVE	SAMPLE ID <u>70</u>	148	128	108	34B	<b>8</b> 50	388C	3 <b>9B</b>	NOTES .		-166			-				

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RECEIVED: 08	08/01/84	Analytical Serv Results by	REPORT Sample	LAB #	# 84-08-013	
SAMPLE ID <u>70</u>	دے	FRACTION 06B Date & Time Col	Collected 07/5	<u>MS 624</u> NAME 81/84	EPA Method 624/GC-MS Category	1 1
DATA FILE CONC. FACTOR		4CU08013V06 DATE INJECTED 08/02/84	ANALYST	BWS f4	VERIFIED BY L <u>AK</u> COMPOUNDS DETECTED <u>0</u>	
NPDES SCAN	EPA	COMPOUND RESULT N	NPDES SCAN	EPA COMF	COMPOUND RESULT	
17	22	acrolein <u>ND</u>	170	32V 1, 2-0	1,2-dichloropropane <u>ND</u>	
24	ле С	acrylonitrile <u>ND</u>	180	33V cis-1, 3-dio	, 3-dichloropropylene <u>ND</u>	
۸e	47	penzene <u>ND</u>	18V	33V trans-1, 3-die	trans-1, 3-dichloropropylene <u>ND</u>	
60	67	carbon tetrachloride <u>ND</u>	190	ABC	ethylbenzene <u>ND</u>	
74	2	chlorobenzene <u>ND</u>	22V	44V meti	methylene chloride <u>ND</u>	
15V	10V	1,2-dichloroethane <u>ND</u> {	21V	45V 45V	methyl chloride <u>ND</u>	
27V	11V	1, 1, 1-trichloroethane <u>ND</u>	202	46V	methyl bromide <u>ND</u>	
24 -167	13V	1,1-dichloroethane <u>ND</u>	20	470	bromoform <u>ND</u>	
284	14V	1, 1, 2-trichloroethane <u>ND</u>	12V	48V dichle	dichlorobromomethane <u>ND</u>	
73V	150	1, 1, 2, 2-tetrachloroethane <u>ND</u>	NOE	49V trichlo	trichlorofluoromethane <u>ND</u>	
76	160	chloroethane <u>ND</u>	13V	50V dichloro	dichlorodifluoromethane <u>ND</u>	
47	170	bis (chloromethyl) ether <u>ND</u>	20	51V chlor	chlorodibromomethane <u>ND</u>	~ <b>*</b>
10V	190	2-chloroethylvinyl ether <u>ND</u>	24V	85V tetra	tetrachloroethylene <u>ND</u>	
11V	23V	chloroform <u>ND</u>	25V	86V	toluene <u>ND</u>	<i></i>
16V	290	1,1-dichloroethylene <u>ND</u>	290	87V tr	trichloroethylene <u>ND</u>	<i></i> •
260	200	1.2-trans-dichlorostbulane ND	310	86V	vinyl chloride <u>ND</u>	، سر

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	LAB # 84-08-013 Continued From Above	NAME EPA Method 624/GC-MS Category			
	# 84-08 inved F	Method 624 Category	12/3/79).		
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· · · · · · · · · · · · · · · · · · ·	Serv REPORT Results by Sample	TEST C lected	gram. spec. 624,		
	lts by	<u>068</u> ime Col	chromatogram otherwise spe t method 624,		
÷.		FRACTION <u>068</u> TEST CODE <u>MS 624</u> Date & Time Collected <u>07/31/84</u>	ae or Less Liài		
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	/01/84		AND DEFINITIONS SCAN = scan num All results rep ND = not detect		
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LAB # 84-08-013			
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PAGE 32 RECEIVED: 08/01/84 FRACTION AND TEST CODES FOR V	01C 1 DUP624 02C 1 DUP624 03C 1 DUP624 04C 1 DUP624 05C 1 DUP624 06C 1 DUP624	н-169	

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LAB # 84-08-020	<u>CC 601</u> NAME EPA Method 601/GC specified Category	ANALYST RAM VERIFIED BY JSC TRUMENT <u>a</u> COMPOUNDS DETECTED <u>7</u>	COMPOUND RESULT	Trichloroethene 444	Dibromochloromethane * <u>ND</u>	1,1,2-Trichloroethane * <u>ND</u>	cis-1,3-Dichloropropene * <u>ND</u>	2-Chloroethylvinyl Ether <u>ND</u>	Bromoform <u>ND</u>	1, 1, 2, 2-Tetrachloroethane # <u>2.7</u>	Tetrachloroethylene # ND	Chlorobenzene <u>ND</u>	1, 3-Dichlorobenzene <u>ND</u>	1, 2-Dichlorobenzene <u>ND</u>	1,4-Dichlorobenzene <u>ND</u>				
Serv REPORT Results by Sample	FRACTION OIA TEST CODE <u>GC 601</u> Date & Time Collected <u>not specif</u>	SNI	RESULT SCAN	8 - <u></u> 0		du la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constante da la constant		1.4	QN	0.8	1.3	Q	6 - 6	<u>2.0</u>	5.2		- <del>DN</del>	0	- <del>D</del> N
Analytical Serv Resul	FRACTION Date & Ti	A DATE INJECTED 08/09/84	COMPOUND	Chloromethane	Bromomethane	Vinyl Chloride	Chloroethane	Methylene Chloride	Trichlorofluoromethane	1, 1-Dichloroethene	1,1-Dichloroethane	trans-1, 2-Dichloroethene	Chloroform	1, 2-Dichloroethane	1, 1, 1-Trichloroethane	Carbon Tetrachloride	Bromodichloromethane	1, 2-Dichloropropane	trans-1, 3-Dichloropropene
PAGE 2 RECEIVED: 08/02/84	SAMPLE ID <u>6A</u>	DATA FILE	SCAN		a state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the sta			1	H-17	୍ୟ 1	C N	trans	4	ŝ	1,	C			trans

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LAB # 84-08-020	<u>CC 601</u> NAME EPA Method 601/GC specified Category	ANALYST RAM VERIFIED BY <u>JSG</u> TRUMENT <u>b</u> COMPOUNDS DETECTED <u>2</u>	COMPOUND RESULT	Trichloroethene 52.8	Dibromochloromethane * <u>ND</u>	1,1,2-Trichloroethane * <u>ND</u>	cis-1,3-Dichloropropene * <u>ND</u>	2-Chloroethylvinyl Ether <u>ND</u>	Bromoform ND	1, 1, 2, 2-Tetrachloroethane # <u>ND</u>	Tetrachloroethylene # <u>ND</u>	Chlorobenzene <u>ND</u>	1, 3-Dichlorobenzene <u>ND</u>	1, 2-Dichlorobenzene <u>ND</u>	1,4-Dichlorobenzene <u>ND</u>					
REPORT Sample	TEST CODE lected <u>not</u>	ANAL YST INSTRUMENT	SCAN	N																
Analytical Serv REP Results by Sample	FRACTION 02A TEST CODE Date & Time Collected not	B DATE INJECTED 08/09/84	COMPOUND RESULT	Chloromethane <u>ND</u>	Bromomethane <u>ND</u>	Vinyl Chloride <u>ND</u>	Chloroethane <u>ND</u>	Methylene Chloride <u>ND</u> :	Trichlorofluoromethane <u>ND</u> /	1,1-Dichloroethene <u>ND</u>	1,1-Dichloroethane <u>ND</u>	trans-1, 2-Dichloroethene <u>ND</u>	Chloroform <u>19.6</u>	1, 2-Dichloroethane <u>ND</u>	1, 1, 1-Trichloroethane ND	Carbon Tetrachloride <u>ND</u>	, Bromodichloromethane ND	1,2-Dichloropropane <u>ND</u>	trans-1,3-Dichloropropene <u>ND</u>	
PAGE 4 RECEIVED: 08/02/84	SAMPLE ID 68	DATA FILE CONC. FACTOR	SCAN	-		<b>2</b>		897	 H	173			1	o de la manuma da				***		

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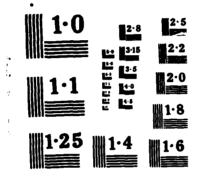
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LAB # 84-08-020	<u>GC 601</u> NAME EPA Method 601/GC specified Category	YST MGL VERIFIED BY JSG ENT b COMPOUNDS DETECTED 5	COMPOUND RESULT	Trichloroethene 0.5	Dibromochloromethane * <u>ND</u>	1,1,2-Trichloroethane * ND	cis-1,3-Dichloropropene * <u>ND</u>	2-Chloroethylvinyl Ether ND	Bromoform <u>ND</u>	1, 1, 2, 2-Tetrachloroethane # ND	Tetrachloroethylene # <u>ND</u>	Chlorobenzene 34.5	1, 3-Dichlorobenzene <u>ND</u>	1,2-Dichlorobenzene <u>10.3</u>	1,4-Dichlorobenzene <u>ND</u>					
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Analytical Serv Results by	FRACTION 03A TEST C Date & Time Collected	DATE INJECTED 08/09/84	COMPOUND RESULT	Chloromethane ND	Bromomethane <u>ND</u>	Vinyl Chloride ND	Chloroethane ND	Methylene Chloride <u>ND</u>	Trichlorofluoromethane <u>ND</u>	1,1-Dichloroethene <u>ND</u>	1,1-Dichloroethane <u>1.8</u>	trans-1, 2-Dichloroethene ND	Chloroform 0.8	1,2-Dichloroethane <u>ND</u>	1,1,1-Trichloroethane ND	Carbon Tetrachloride <u>ND</u>	Bromodichloromethane <u>ND</u>	1,2-Dichloropropane <u>ND</u>	trans-1,3-Dichloropropene <u>ND</u>	
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NATIONAL BUREAU OF STANDARDS MICROCOPY RESOLUTION TEST CHART 

RT LAB # 84-020	TEST CODE <u>GC 601</u> NAME EPA Method 601/GC ected not specified Category	ANALYST MCL VERIFIED BY <u>JSC</u> INSTRUMENT <u>a</u> COMPOUNDS DETECTED <u>4</u>	AN COMPOUND RESULT	4 Trichloroethene 0.6	Dibromochloromethane * <u>ND</u>	1, 1, 2-Trichloroethane * ND	cis-1,3-Dichloropropene * <u>ND</u>	2-Chloroethylvinyl Ether <u>ND</u>	Bromoform ND	1, 1, 2, 2-Tetrachloroethane # ND	Tetrachloroethylene # ND	Chlorobenzene ND	1, 3-Dichlorobenzene ND	1, 2-Dichlorobenzene <u>ND</u>	1, 4-Dichlorobenzene <u>ND</u>				
Analytical Serv REPORT Recults hu Samole		A DATE INJECTED <u>08/07/84</u> /	COMPOUND RESULT SCAN	Chloromethane ND :	Bromomethane ND	Vinyl Chloride ND	Chloroethane 0.6	Methylene Chloride 0.6	Trichlorofluoromethane ND :	1,1-Dichloroethene ND	1,1-Dichloroethane ND	trans-1, 2-Dichloroethene ND	Chloroform 1.6	1, 2-Dichloroethane ND	1, 1, 1-Trichloroethane ND	Carbon Tetrachloride <u>ND</u> ;	Bromodichloromethane <u>ND</u>	1,2-Dichloropropane <u>ND</u>	trans-1,3-Dichloropropene <u>ND</u> :
PAGE 8 PAGE 8 PFCFTVFD 08/02/84		DATA FILE	SCAN		1		-	2	1	177		tran	0	9	1			-	trans.

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	JRT	CODE			
	REPORT amp 1 e	IEST (			
	. Serv REPO Results by Sample	ION 04A TEST CODE <u>6C 601</u> NAME EPA Method 601/6C	on chromatogr s otherwise s mit method 60 oethane and c hloroethylene		
	rv sults	UN 04	on chroma s otherwi mit metho oethane a hloroethy		
	al Se Re	FRACTI Date &	ime on n less h loroe trach l		
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	08/0	99	AND DEFINITIONS FOR SCAN = scan number All results reporte ND = not detected a *Dibromochlorometha #1,1,2,2-tetrachlor		
	PAGE 9 Received: 08/02/84	SAMPLE ID			
Ĺ	PAGE	SAMP	NOTES	H-178	

LAB # 84-08-020	NAME EPA Method 601/GC td Category	MCL VERIFIED BY <u>JSG</u> b compounds detected <u>o</u>	COMPOUND	Trichloroethene ND	Dibromochloromethane * <u>ND</u>	1, 1, 2-Trichloroethane * ND	cis-1,3-Dichloropropene * <u>ND</u>	2Chloroethylvinyl Ether <u>ND</u>	Bromoform ND	1, 1, 2, 2-Tetrachloroethane # ND	Tetrachloroethylene # <u>ND</u>	Chlorobenzene <u>ND</u>	1, 3-Dichlorobenzene ND	1, 2-Dichlorobenzene <u>ND</u>	1, 4-Dichlorobenzene ND				
REPORT Samp I e	<u>GC 601</u> specifie	ANAL YST	SCAN	-	ī	1,1	cis-1	5(	ł	1, 1, 2, 5			Alexandra and Alexandra and Alexandra and Alexandra and Alexandra and Alexandra and Alexandra and Alexandra and						
Analytical Serv REP Results by Sample	FRACTION <u>OSA</u> TEST CODE Date & Time Collected <u>not</u>	B DATE INJECTED 08/10/84	COMPOUND RESULT	Chloromethane ND	Bromomethane <u>ND</u>	Vinyl Chloride ND	Chloroethane ND	Methylene Chloride ND	Trichlorofluoromethane ND	1, 1-Dichloroethene ND	1, 1-Dichloroethane ND	trans-1, 2-Dichloroethene ND	Chloroform <u>ND</u>	1, 2-Dichloroethane ND	1, 1, 1-Trichloroethane ND	Carbon Tetrachloride ND	Bromodichloromethane ND	1,2-Dichloropropane ND	trans-1,3-Dichloropropene <u>ND</u> ;
Page 10 Received: 08/02/84	SAMPLE ID 7G	DATA FILE CONC. FACTOR	SCAN						H-1	79	States for the	tra	84,999,199	<b>An an and an an an an an an an an an an an an an </b>					tra

PAGE 11 RECEIVED: 08/02/84	Analytical Serv REPORT Results by Sample	LAB # 84-08-020 Continued From Above
SAMPLE ID 7G	FRACTION <u>OSA</u> TEST CODE <u>CC 6(</u> Date & Time Collected not spec:	IDN 05A TEST CODE <u>GC 601</u> NAME <u>EPA Method 601/GC</u> & Time Collected <u>not specified</u> <u>Category</u>
NOTES AND DEFINITIONS FOR THIS	IS REPORT.	
SCAN = scan number or reter All results reported in ND = not detected at EPA d *Dibromochloromethane, 1,1, #1,1,2,2-tetrachloroethane	ntion time on chromatogram. <u>ug/L</u> unless otherwise specif etection limit method 601, (F 2-trichloroethane and cis-1, and tetrachloroethylene co-e	ied ederal Register, 12/3/79}. 3-dichloropropene co-elute. lute
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LAB # 84-08-167	Services A Men Min Min A CONTACT CONOVER ation performed on Split 4A.	/05/84. d Comments than 5 times the detection limit. low values ranges between	<u>very for this analysis on the</u> hin acceptable limits indicating	NAMES used on this report	
Analytical Serv REPORT 04/26/85 12:12:00	PREPARED     Radian     Analutical     Servi       BY     8501     MoPac     Blvd       BY     8501     MoPac     Blvd       BY     8501     MoPac     Blvd       ATTEN     Austin, Texas     78766       ATTEN     Austin, Texas     78766	Duplicate of report of 09/05/84Footnotes and Comm* Indicates a value less than 5Potential error for such low value value	<u>C Indicates that spike recovery</u> specific matrix w <mark>as not within</mark> an interferent present.	Analytical Serv TEST CODES and NAN GC 601 EPA Method 601/GC	
/84	REPORT Radian TO B1 4 Austin ATTEN William Little CLIENT TINKER COMPANY FACILITY FACILITY	WORK ID <u>601</u> TAKEN <u>DG</u> TRANS <u>Fed Ex</u> TVPE P. D. # <u>212-027-21-05</u> INV. # <u>4075</u>	H-182	SAMPLE         IDENTIFICATION           01         6E           02         6F           03         7C, B/14           04         7A           05         7C, B/15	

RECEIVED: 08/16/84	Analytical	Serv REP Results by Sample	REPORT np 1 e	LAB # 84-08-167
SAMPLE ID <u>6E</u>	FRACTION (Date & Tin	FRACTION <u>OIA</u> TEST CODE Date & Time Collected <u>not</u>	<u>GC 601</u> specifie	NAME EPA Method 601/GC d Category
DATA FILE	ATE INJECTED 08/3	08/23/84	ANALYST M INSTRUMENT	MCL VERIFIED BY <u>USC</u> A COMPOUNDS DETECTED <u>0</u>
SCAN	COMPOUND RESULT	ULT	SCAN	COMPOUND
	Chloromethane	QN		Trichloroethene ND
	Bromomethane	Q	Di	Dibromochloromethane * <u>ND</u>
	Vinyl Chloride	Ð	1,1	1, 1, 2-Trichloroethane * <u>ND</u>
	Chloroethane	Q	cis-1	cis-1, 3-Dichloropropene * <u>ND</u>
ł	Methylene Chloride	Ð	2-C	2-Chloroethylvinyl Ether <u>ND</u>
	Trichlorofluoromethane	Q		Bromoform ND
 H-1	1, 1-Dichloroethene	Q	1,1,2,2	1, 1, 2, 2-Tetrachloroethane # <u>ND</u>
83	1, 1-Dichloroethane	 9	Ŧ	Tetrachloroethylene # <u>ND</u>
	trans-1, 2-Dichloroethene	Q		Chlorobenzene <u>ND</u>
	Chloroform	Q		1, 3-Dichlorobenzene <u>ND</u>
	1, 2-Dichloroethane			1, 2-Dichlorobenzene ND
ł	1, 1, 1-Trichloroethane	QN		1, 4-Dichlorobenzene <u>ND</u>
	Carbon Tetrachloride	QN		
	Bromodichloromethane	QN		
	1, 2-Dichloropropane	QN		
a T	trans-1, 3-Dichloropropene	 Q		

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LAB # 84-08-167 Continued From Above	hod 601/GC tegory		4 ~ 6 4 . 6 4 .				
LAB # 84- Continue(	NAME EPA Method 601/GC		ter, 12/3/7° opene co-el(				
	<u>6C 601</u> specifie		d. eral Regis dichloropr te.				
REPORT by Sample	TEST CODE Ilected not		togram. se specifie d 601, (Fed nd cis-1,3- lene co-elu				
Serv Results	FRACTION <u>OIA</u> TEST CODE Date & Time Collected <u>not</u>		e on chromatograf ess otherwise spe limit method 601, oroethane and cis achloroethylene c				
Analytical	FRA	REPORT.	ntion tim <u>ug/L</u> unl etection ,2-trichl and tetr				
		AND DEFINITIONS FOR THIS REPORT					
08/16/84	6Ε	DEFINITION	SCAN = scan number or All results reported i ND = not detected at E *Dibromochloromethane, #1,1,2,2-tetrachloroet				
PAGE 3 Received: 08/16/84	SAMPLE ID <u>6E</u>	NOTES AND	SCAN All 1 ND = *Dib #1,1,	H-1	84		

REPORT LAB # 84-08-167 Sample	TEST CODE <u>GC 601</u> NAME <u>EPA Method 601/GC</u> ected <u>not specified</u> <u>Category</u>	ANALYST MCL VERIFIED BY USC INSTRUMENT A COMPOUNDS DETECTED 0	SCAN COMPOUND RESULT	Trichloroethene ND	Dibromochloromethane * ND	1, 1, 2-Trichloroethane * ND	cis-1,3-Dichloropropene * ND	2-Chloroethylvinyl Ether ND	Bromoform <u>ND</u>	1, 1, 2, 2-Tetrachloroethane # ND	Tetrachloroethylene # ND	Chlorobenzene ND	1, 3-Dichlorobenzene ND	1, 2-Dichlorobenzene ND	1, 4-Dichlorobenzene ND		-			
Analytical Serv A Results by Samp	FRACTION O2A TEST CODE Date & Time Collected not	A DATE INJECTED 08/23/84	COMPOUND RESULT	Chloromethane ND	Bromomethane ND	Vinyl Chloride ND	Chloroethane ND	Methylene Chloride ND	Trichlorofluoromethane ND	1, 1-Dichloroethene ND	1,1-Dichloroethane ND	trans-1, 2-Dichloroethene ND	Chloroform ND	1, 2-Dichloroethane ND	1, 1, 1-Trichloroethane ND	Carbon Tetrachloride ND	Bromodichloromethane ND	1, 2-Dichloropropane ND	trans-1,3-Dichloropropene <u>ND</u>	
PAGE 4 RECEIVED: 08/16/84	SAMPLE ID 6F	DATA FILE CONC: FACTOR	SCAN							-185		tra							tran	

LAB # 84-08-167	<u>GC 601</u> NAME EPA Method 601/GC specified Category	ST MCL VERIFIED BY JSC INT A COMPOUNDS DETECTED 0	COMPOUND RESULT	Trichloroethene <u>ND</u>	Dibromochloromethane * <u>ND</u>	1, 1, 2-Trichloroethane * <u>ND</u>	cis-1,3-Dichloropropene * <u>ND</u>	2-Chloroethylvinyl Ether <u>ND</u>	Bromoform <u>ND</u>	1, 1, 2, 2-Tetrachloroethane # <u>ND</u>	Tetrachloroethylene # <u>ND</u>	Chlorobenzene <u>ND</u>	1,3-Dichlorobenzene <u>ND</u>	1, 2-Dichlorobenzene <u>ND</u>	1,4-Dichlorobenzene <u>ND</u>					
REPORT by Sample		ANAL YST INSTRUMENT	SCAN																	
Analytical Serv Results by	FRACTION 03A TEST C Date & Time Collected	DATE INJECTED 08/23/84	COMPOUND RESULT	Chloromethane <u>ND</u> 1	Bromomethane ND	Vinyl Chloride <u>ND</u>	Chloroethane ND	Methylene Chloride <u>ND</u>	Trichlorofluoromethane ND	1,1-Dichloroethene <u>ND</u>	1,1-Dichloroethane <u>ND</u>	trans-1,2-Dichloroethene <u>ND</u>	Chloroform <u>ND</u>	1, 2-Dichloroethane <u>ND</u>	1, 1, 1-Trichloroethane ND	Carbon Tetrachløride <u>ND</u> :	Bromodichloromethane ND	1,2-Dichloropropane <u>ND</u>	trans-1, 3-Dichloropropene <u>ND</u> :	
PAGE & Received: 08/16/84	SAMPLE ID 7C, 8/14	DATA FILE A	SCAN			********		-		-187		trans.			1,	Ċ	â		trans-	

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LAB # 84-08-167 Continued From Abo NAME EPA Method 601/GC			
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GC 601 N specified	Reg		
2 Jo Jo Jo	на 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		
	m. ecified. . {Federa s-1,3-dic co-elute.		
REPORT Sample TEST CODE <u>CC 601</u> lected <u>not specif</u>			
Serv Results by FION 03A & Time Co	e on chromato ess otherwise limit method ( oroethane and achloroethyle		
l Serv Results ACTION 03A te & Time	5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5		
cal S cal S RACT Date	time or unless on lim chloro etrach		
Analytical FRA			
Anal	FOR THIS REPORT ber or retention brted in <u>ug/L</u> ed at EPA detect ethane, 1,1,2-tr iloroethane and		
	<u> </u>		
	CCR T ted ted hane orce		
	ITTONS FOR an number o ts reported detected at hloromethan tetrachloro		
16/84	INITIO s an n ults r t dete t dete 2-tetr 2-tetr		
	DEFINIT N = scan results = not de bromoch1 1,2,2-te		
PAGE 7 PAGE 7 RECEIVED: 08/16/84 SAMPLE ID 7C, 8/14	AND DEFINITIONS FOR THIS R SCAN = scan number or rete All results reported in ND = not detected at EPA d *Dibromochloromethane, 1,1 #1,1,2,2-tetrachloroethane	·	
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: 08/16/84 Analytical Serv REPORT LAB # 84-08-167 Results by Sample	D 7A FRACTION 04A TEST CODE <u>GC 601</u> NAME <u>EPA Method 601/GC</u> Date & Time Collected <u>not specified</u> <u>Category</u>	FILE <u>A DATE INJECTED 08/23/84</u> ANALYST <u>MCL</u> VERIFIED BY <u>JSC</u> CTDR <u>ANALYST</u> INSTRUMENT <u>A COMPOUNDS DETECTED 5</u>	AN COMPOUND RESULT SCAN COMPOUND RESULT	Chloromethane ND 5 Trichloroethene 0.5	Bromomethane ND   Dibromochloromethane * ND	Vinyl Chloride ND 1, 1, 2-Trichloroethane * ND	Chloroethane ND   cis-1, 3-Dichloropropene * ND	Methylene Chloride ND 2-Chloroethylvinyl Ether ND	1 Trichlorofluoromethane 0.2   Bromoform ND	1,1-Dichloroethene ND   1,1,2,2-Tetrachloroethane # ND	2 1,1-Dichloroethane 0.6   Tetrachloroethylene # ND	3 trans-1, 2-Dichloroethene 0.4 Chlorobenzene ND	Chloroform ND 1, 3-Dichlorobenzene ND	4 1, 2-Dichloroethane 0.2   1, 2-Dichlorobenzene ND	1, 1, 1-Trichloroethane NB   1, 4-Dichlorobenzene ND	Carbon Tetrachloride ND	Bromodichloromethane ND	1,2-Dichloropropane ND	trans-1, 3-Dichloropropene ND :
PAGE 8 RECEIVED: 08/16/	SAMPLE ID 7A	DATA FILE	SCAN						1	 H-18	<b>N</b>   39	E		4				ļ	

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PAGE Y RECEIVED: 08/16/84	Analytıcal Serv KEP Results by Sample	KEPUKI Sample	LAB # 84-08-16/ Continued From Above	) OV <del>e</del>	
SAMPLE ID 7A	FRACTION 04A TEST CODE Date & Time Collected not	<u>GC 601</u> specifie	NAME EPA Method 601/GC	30	
NOTES AND DEFINITIONS FOR THIS REPORT	PORT.				
SCAN = scan number or retention time on chro All results reported in <u>ug/L</u> unless other ND = not detected at EPA detection limit met *Dibromochloromethane, 1,1,2-trichloroethane #1,1,2,2-tetrachloroethane and tetrachloroet	ition time on chromatogram <u>ug/L</u> unless otherwise spe itection limit method 601, 2-trichloroethane and cis and tetrachloroethylene c	ogram. e specified. 601. (Federal Register. d cis-1.3-dichloropropene ene co-elute.	ster, 12/3/79). ropene co-elute.		
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LAB # 84-08-167	GC 601 NAME EPA Method 601/GC specified Category	T MCL VERIFIED BY JSG T A COMPOUNDS DETECTED 0	COMPOUND RESULT	Trichloroethene ND	Dibromochloromethane * <u>ND</u>	1,1,2-Trichloroethane * ND	cis-1, 3-Dichloropropene * <u>ND</u>	2-Chloroethylvinyl Ether <u>ND</u>	Bromoform <u>ND</u>	1, 1, 2, 2-Tetrachloroethane # <u>ND</u>	Tetrachloroethylene <b>#</b> ND	Chlorobenzene <u>ND</u>	1, 3-Dichlorobenzene <u>ND</u>	1, 2-Dichlorobenzene <u>ND</u>	1,4-Dichlorobenzene <u>ND</u>					
REPORT Sam Le	IOF IOF	ANALYST INSTRUMENT	SCAN							ł										
Analytical Serv Reculte bu	FRACTION OSA TEST C Date & Time Collected	DATE INJECTED 08/23/84	COMPOUND	Chloromethane ND	Bromomethane ND	Vinyl Chloride <u>ND</u>	Chloroethane <u>ND</u>	Methylene Chloride <u>ND</u> {	Trichlorofluoromethane ND	1, 1-Dichloroethene <u>ND</u>	1,1-Dichloroethane ND	trans-1, 2-Dichloroethene ND	Chloroform <u>ND</u>	1,2-Dichloroethane ND :	1, 1, 1-Trichloroethane ND	Carbon Tetrachloride <u>ND</u> :	Bromodichloromethane <u>ND</u>	1,2-Dichloropropane <u>ND</u> {	trans-1,3-Dichloropropene <u>ND</u> i	-
PAGE 10 PECETVEN: 08/16/84	SAMPLE ID 7C, 8/15	DATA FILE A	SCAN					Σ		-191	-	trans-1		1	1, 1,	Car	810	1.	trans-1,	

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RECEIVED: 08/16/84 Analytical Serv KEPUKI Received: 08/16/84	PUKI LAB # 84-08-16/ e Continued From Above	bove.
SAMPLE ID 7C, 8/15 FRACTION 05A TEST CODE CC 601 N Date & Time Collected not specified	CODE <u>GC 601</u> NAME <u>EPA Method 601/GC</u> d <u>not specified</u> <u>Category</u>	oc
NOTES AND DEFINITIONS FOR THIS REPORT.		
SCAN = scan number or retention time on chromatogram All results reported in <u>ug/L</u> unless otherwise spe ND = not detected at EPA detection limit method 601, *Dibromochloromethane, 1,1,2-trichloroethane and cis #1,1,2,2-tetrachloroethane and tetrachloroethylene c	f т п с л с л с т с т с т с с с с с с с с с с	
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APPENDIX I Correspondence with Federal, State and/or Local Regulatory Authorities

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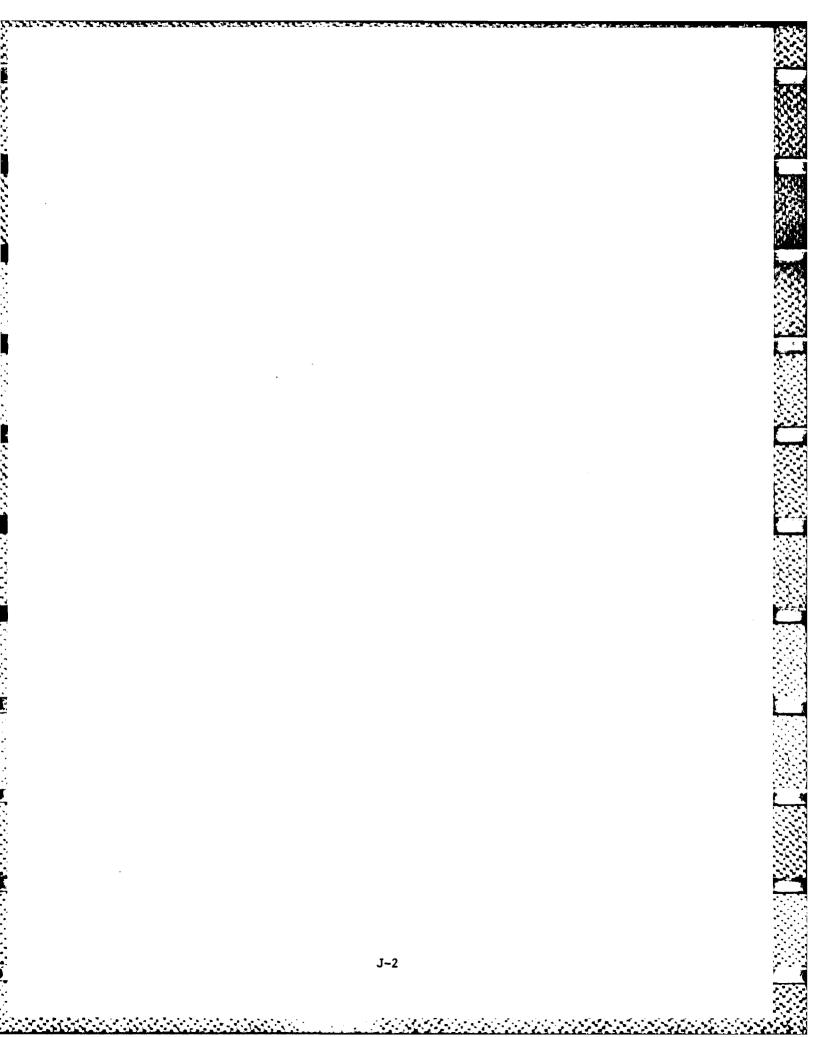
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APPENDIX J References

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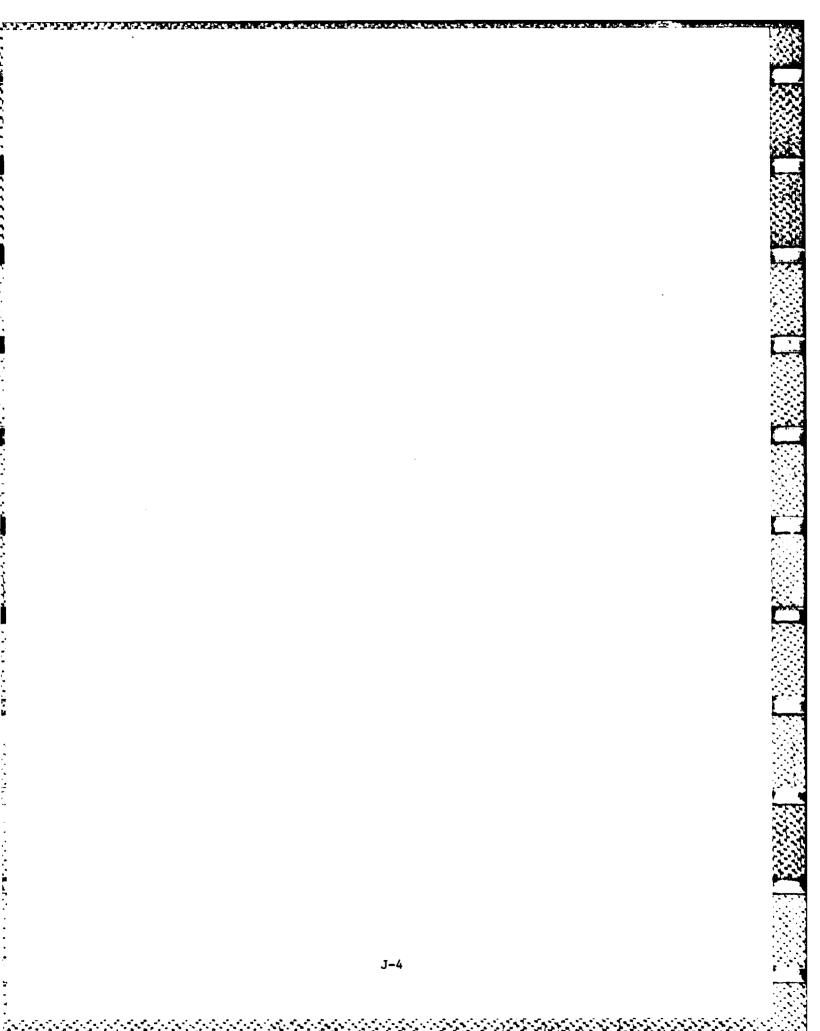


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# APPENDIX K

Biographies of Key Personnel

Thomas W. Grimshaw - Program Manager William M. Little - Project Director Lawrence N. French - Supervising Geologist Robert C. Wallace - Pit and Tank Surveying David H. Gancarz - Sediment Sampling Nancy P. Stein - Monitor Well sampling Jill P. Rossi - Cartographer Ann E. S.Clair - Technical Review



#### THOMAS W. GRIMSHAW

#### **EDUCATION:**

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Ph.D., Geology, University of Texas at Austin, 1976.

M.S., Geology, University of Texas at Austin, 1970.

B.S., Geological Engineering, South Dakota School of Mines and Technology, 1967.

**EXPERIENCE:** 

Division Manager, Policy and Environmental Analysis Division, Radian Corporation, Austin, TX, 1982-Present.

Department Head, Environmental Analysis Department, Radian Corporation, 1978-1982.

Group Leader, Radian Corporation, 1976-1978.

Teaching Assistant, The University of Texas at Austin, 1974.

Captain (R&D Coordinator), U.S. Army, 1970-1972.

Geologist, Junior Grade, Amoco Production Company, 1969-1970.

Geologic Field Assistant, Amoco Production Company, 1967.

Certification: AIPG Certified Professional Geologist No. 4425

FIELDS OF EXPERIENCE:

Dr. Grimshaw has served in a technical and management role in numerous programs at Radian. Most recently, he has been the Technical Coordinator for several survey programs for Environmental Impairment Liability insurance applications. He has also performed or participated in several surveys, including a hazardous waste disposal site, large wastewater treatment plants, pulp and paper mills, aluminum forging and extrusion plants, and a large sanitary landfill.

Dr. Grimshaw is currently acting as Program Manager for two programs for site investigation and remedial action planning for solid/hazardous waste disposal and related activities at installations of the U.S. Air Force. These programs are being conducted at bases in Texas and Louisiana as part of the Air Force's Installation Restoration Program.

In recent months, Dr. Grimshaw has been the Technical Coordinator for a large program being conducted by a major paper company to develop Closure Plans for



#### Thomas W. Grimshaw

impoundments at wood treatment plants in three states. This program included a full complement of studies to define the existing situation and prepare a plan of remedial action for each plant. The initial activity was the sampling and analysis of pond supernatant and sludge, subsoil, and ground water. Benchscale stabilization studies were performed on the sludge using a number of candidate commercial stabilizing compounds. Several closure alternatives were developed and screened, and a set of alternatives was selected for inclusion in conceptual plans. After the conceptual plans were approved by the client and the regulatory agency, a detailed design was prepared and specifications developed.

For Tuloma Energies, Inc., Radian performed a program directed by Dr. Grimshaw for development of a commercial Hazardous Waste Management Facility in northeastern Oklahoma. During the initial phases of this project, a market analysis was performed to determine the sources at waste that could potentially use the new facility. Subsequently, a regional screening analysis was performed to identify areas most likely to have suitable sites for the new facility. This analysis included screening for several factors, including hydrologic, geologic, topographic, ecologic, and aerometric characteristics as well as population density. Dr. Grimshaw assisted Tuloma Energies in coordinating with the state regulatory agency (Oklahoma Department of Health) during the initial phases of the project. The project is currently being held in abeyance pending improvement in the national economy.

Dr. Grimshaw was Project Director for two programs for a major paper company to evaluate the potential risk of proposed solid waste management plans for paper mills in Arkansas and Mississippi. These programs included collection of waste, soil, and ground-water samples, analysis of the wastes, and batch extraction of the wastes followed by analysis of the leachates. In addition, leachates were generated and attenuated in waste and soil columns to evaluate the capacity of the subsoil to attenuate any leachate that might escape from the disposal site. A ground-water flow model was used to assess the rate and direction of contaminant movement if contaminants were to reach the water table.

Dr. Grimshaw was Technical Director for a generic environmental assessment of wastes from fluidized bed combustion for the U.S. Environmental Protection Agency (EPA). Emphasis was placed on potential hydrologic impacts. Both laboratory studies and field lysimeter tests were conducted in the study. The objectives were to identify and investigate key variables which determine the acceptability of FBC waste disposal and to establish a reliable empirical correlation between laboratory and field results so that better conclusions on field effects can be drawn on the basis of laboratory studies. Provisions of the Resource Convervation and Recovery Act are allowed for in the investigation. Since the regulatory situation for FBC wastes was unclear during conduct of the program, provisions were made for both the eventuality that leachate migration will be allowed in the substrate below the landfill and that leachate escape will be controlled by liners. Interactions between



Thomas W. Grimshaw

leachate and representative disposal media and between leachate and several candidate liner materials were investigated in laboratory studies.

Dr. Grimshaw was also Technical Director for a program to investigate the ground-water impact of a spill of a coal-distillate liquid fuel at an SRC-II (Solvent Refined Coal) pilot plant at Fort Lewis Military Reservation near Tacoma, Pierce County, Washington. The spill site was underlain by highly permeable soils with a water table aquifer at a depth of approximately 30 feet. The study involved detailed coring to establish the location and extent of unsaturated zone cotamination and designing and constructing a set of ground-water monitoring wells to define the extent of ground-water contamination that had occurred. Analytical chemistry support was provided for Resource Conservation and Recovery Act (RCRA) Extraction Procedure testing of contaminated soils and for ground-water quality evaluation. A Remedial Measures Plan was formulated and implemented to remove contaminated material and to prevent the further spread of ground-water contamination. Measures included partial excavation of contaminated soils and installation of production wells for ground-water flow control. This program involved extensive coordination and interfacing with the states regulatory authority (Washington Department of Ecology).

In a follow-up program for which Dr. Grimshaw was again Technical Director, Radian evaluated the overall hydrogeologic impact of the entire SRC plant in addition to the spill area. This program again involved soil sampling, extraction, and analysis as well as water quality monitor well installation and sampling. A zone of contamination was identified, and a comprehensive Remedial Measures Plan was prepared to address the problem.

In a program for Utah International, Incorporated, Dr. Grimshaw was responsible for evaluating the implications of RCRA on the company's mining operations under various regulatory scenarios. Special reference was made to UI's proposed Springer Mine which is in Pershing County, Nevada. Several issues concerning the application of RCRA regulations to metal mines emerged, including the following: (1) applicability of the procedure for classifying solid waste as hazardous or non-hazardous; (2) problems associated with applying disposal regulations to all operations; (3) difficulties in applying limited interim regulations pending development of final regulations; (4) integration of RCRA regulations with other regulations, especially the Clean Water Act; and (5) the appropriateness of certain specific provisions of the regulations such as flood plain definition, financial requirements, and monitoring requirements.

Dr. Grimshaw was Technical Director for the first phase of a project to investigate the environmental feasibility of disposing of flue gas desulfurization (FGD) wastes, ash and sludge, from a mine mouth power plant by backfilling into the associated surface mine in northwestern Colorado. He also had major supervisory and hydrogeologic interpretation roles in the second phase of the program, which included extensive field studies. These field studies included infiltration tests of the mine floor and overburden, water balance



#### Thomas W. Grimshaw

investigations to estimate ground-water recharge, and emplacement of piezometers to ascertain the direction of ground-water flow. A major output of this program was a rating of the various parts of the large surface mine in terms of suitability for ash and sludge disposal.

Dr. Grimshaw was a Task Leader in a program for the EPA ground-water laboratory (Robert S. Kerr Environmental Research Laboratory) to investigate a technique for identifying sources of nitrate ions in ground waters and soils using stable nitrogen isotopes. The usefulness of nitrogen isotope ratios for differentiating sources of nitrate pollution (septic tanks, feedlots, barnyards, and lands receiving municipal waste waters) was evaluated. Soil samples were obtained both by surface augering and by deep boring and coring, and groundwater samples were collected from existing shallow wells. A total of 66 soil samples and contaminated ground waters were analyzed for nitrate, chloride, and for nitrate-nitrogen isotopic composition. Standard statistical techniques were used to analyze the observed variations in  $\delta^{15}N$  values, with respect to several nitrate-ion sources and various environmental factors.

For a comprehensive environmental assessment for a proposed large lignite mine in Texas, Dr. Grimshaw prepared and conducted an aquifer test program. These efforts included design of the pump wells and piezometers, layout of the well configuration in the field, oversight of well drilling operations, conduct of the two pump tests, and interpretation of the results in terms of the basic aquifer parameters. In another program related to this mine, Dr. Grimshaw was responsible for evaluating the potential effects on ground water resulting from disposal of ash and FGD solids from a power plant by emplacement of the wastes in the mine.

Prior to his employment by Radian Corporation, Dr. Grimshaw was employed as an oil and gas exploration geologist by Amoco Production Company, Denver, Colorado. Initially, he was a geologic field assistant near the coast of the Gulf of Alaska. This work entailed measuring, describing, and collecting stratigraphic sections in the Tertiary rocks in the vicinity of Cordova and Cape Yakataga, Alaska. Subsequently, Dr. Grimshaw was involved in a gas and petroleum exploration program in northcentral Montana. Most of the effort was in working out the stratigraphy and structural geology in the area of investigation, and he served for a time as well-site geologist on gas exploration wells. In addition, he launched a program of regional exploration in a much larger area in Montana. This work included study of down-hole geophysical logs, preparation of structural contour maps, and assembly of isopachous maps.

#### HONORARY AND PROFESSIONAL SOCIETIES:

Sigma Xi, Phi Kappa Phi, Sigma Tau, Sigma Gamma Epsilon, Geological Society of America, American Association of Petroleum Geologists, Association of Engineering Geologists.



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Thomas W. Grimshaw

#### PUBLICATIONS/REPORTS:

Grimshaw, T.W. and W.M. Little, "Remedial Measures Plan for a Spill of Solvent Refined Coal Liquid at the SRC Pilot Plant, Ft. Lewis, Washington," Radian Corporation, Austin, TX, August 1980.

Grimshaw, T.W., et al., "Generation and Attenuation of Leachate from Fluidized Bed Combustion Solid Wastes: First Year Progress Report," Radian Corporation, Austin, TX, April 1980.

French, L.N., J.C. Lacy, and T.W. Grimshaw, "Regulation of the Hydrologic Impacts of In-Situ Fossil Fuel Recovery," Radian Corporation, Austin, TX, April 1980.

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Grimshaw, T.W., et al., "Implications of the Resource Conservation and Recovery Act for the Metals Mining Industry: A Case Study of the Springer Project," Radian Corporation, Austin, TX, March 1979.

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Thomas W. Grimshaw

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Grimshaw, T.W., J.L. Machin, and L. Michel, "An Evaluation of Factors Affecting Acceptability of the Proposed Site for the Conoco Coal Development Coal Company Coal Conversion Facility, Noble County, Ohio," Radian Corporation, Austin, TX, November 1977.

Machin, J.L. and T.W. Grimshaw, "Investigation of Water Quality Impacts Related to Development of the Horsepan Creek Basin, Guilford County, North Carolina," Radian Corporation, Austin, TX, October 1977.

Grimshaw, T.W., et al., "Preliminary Environmental Assessment for a Proposed Lignite Surface Mine near Athens, Texas," Radian Corporation, Austin, TX, October 1977.

Holland, W.F., et al., "Environmental Impact Statement for the Greensboro, Guilford County, North Carolina, 201 Wastewater Treatment System (Draft and Final EIS)," Radian Corporation, Austin, TX, September 1977.



#### WILLIAM M. LITTLE

EDUCATION:

M.S., Civil Engineering, University of California, Berkeley, 1974.

M.S., Hydrology, University of Arizona, Tucson, 1968.

B.S., Hydrology, University of Arizona, Tucson, 1967.

**EXPERIENCE:** 

Senior Engineer and Group Leader, Radian Corporation, Austin, TX, 1982-Present.

Senior Engineer, Radian Corporation, Austin, TX, 1978-1982.

Hydrologist, U.S. Army Environmental Hygiene Agency, 1973-1978.

Research and Technical Operations Officer, U.S. Army Engineer Nuclear Cratering Group, 1969-1971.

Graduate Student in Research, University of Arizons, Tucson, 1968.

FIELDS OF EXPERIENCE:

Mr. Little is a Senior Engineer and Group Leader with a major technical specialty in ground-water pollution studies. He is currently the Project Director for hydrogeologic investigations of multiple waste disposal sites on Kelly Air Force Base, Texas, and Tinker Air Force Base, Oklahoma. These investigations include monitoring well construction, ground-water sampling, and contaminant transport assessment. He is responsible for program design and execution, subcontractor selection, and managing and editing the final report. He has recently completed a hydrogeologic investigation of a Superfund site in western New York state. The project included monitoring well construction, definition of ground-water flow system, assessment of contaminant transport potential, and presentations to regulatory authorities. Mr. Little served as Project Director and principal investigator.

He has served as Project Director and field manager for a large, multidisciplinary characterization of an abandoned hazardous waste disposal site in southern California. The waste materials consist of acid petroleum refinery sludges. Major areas of investigation were: chemical characterization of wastes and geologic materials; quantification of sulfur dioxide and hydrocarbon emissions; and ground-water monitoring. Mr. Little was responsible for managing the field operations and supervising report preparation.

Mr. Little has served as assistant Project Director and field manager for an investigation of the ground-water quality impact of a spill of a coal-distillate liquid at an SRC pilot plant near Tacoma, Washington. The study involved





detailed unsaturated zone coring and designing and constructing a series of ground-water monitoring wells A Remedial Measures Plan was formulated and adopted to remove contaminated materials and to prevent the further spread of ground-water contamination. Following the evaluation of the spill event, Mr. Little directed an expanded program to evaluate the ground-water quality effects of overall plant operations. The possible sources of contamination were identified and characterized. Mr. Little then developed a ground-water monitoring program and supervised the installation of the monitoring network. He designed and conducted aquifer pump tests to define aquifer performance and interpreted the results.

Mr. Little has also conducted a program to evaluate the extent of ground-water contamination by refinery operations and wastes at an oil refinery near Duncan, Oklahoma. The initial assessment was based on site reconnaissance, interviews with refinery personnel and a study of existing hydrogeologic and process data.

Mr. Little has recently completed two environmental/regulatory fatal flaw studies for lignite mines and associated power plants in East Texas. He was both Project Director, responsible for overall management and preparation of the final report, and hydrology task leader, responsible for assembling data on hydrologic conditions and assessing probable impacts. He has also recently served as task leader for regulations review, impact analysis and permit application preparation for a commercial-scale coal gasification facility in Wyoming and ground-water hydrology task leader for environmental analysis of a major lignite mine and associated synfuels plant in east Texas.

In another program, Mr. Little directed an evaluation of surface-water and ground-water availability in the vicinity of the proposed Solvent Refined Coal-II (SRC-II) demonstration plant and commercial facilities near Morgantown, West Virginia.

For a private industrial client, Mr. Little reviewed and evaluated the environmental monitoring data from the vicinity of an in situ coal gasification test in the Powder River Basin of Wyoming. The water quality impacts of the test burn were assessed, and a program of aquifer restoration and hydrologic testing recommended. Based on available hydrologic and geochemical data, a conceptual model of the test site was developed. He also developed a groundwater monitoring and contingency aquifer restoration program for a proposed future test. The program includes selection of well locations and parameters for monitoring and specification of restoration strategies.

Mr. Little has also participated in an assessment of the environmental behavior of fluidized bed combustion (FBC) waste for EPA, IERL. Mr. Little was responsible for the design, construction and operation of field cells for testing FBC waste disposal alternatives and for the development of a preliminary waste transport model. He has also been project director and hydrology





task leader in the evaluation of the environmental suitability of an ash/ scrubber sludge disposal site. He was responsible for the overall management of the program, evaluated the laboratory and hydrogeologic data and predicted contaminant migration.

As a hydrologist with the Water Quality Engineering Division, U.S. Army Environmental Hygiene Agency, Mr. Little served as a consultant to the Office of the Surgeon General and to major commands and installations on hydrologic aspects of water supply and wastewater disposal. He prepared design criteria for programs of effluent and receiving water monitoring at Army manufacturing and research facilities, evaluated ground-water pollution potential of waste disposal practices, and reviewed draft NPDES discharge permits issued to Army installations. He performed preliminary technical feasibility studies of land treatment of wastewater including field investigations and trial systems design. He conducted environmental impact statement data requirements review and prepared and reviewed portions of environmental impact statements. Mr. Little also managed the Army Medical Department's nationwide Drinking Water Surveillance Program.

With the Corps of Engineers, Mr. Little was assigned as a Research and Technical Operations Officer, U.S. Army Engineer Nuclear Cratering Group. There he conducted a general investigation of hydrologic transport of radionuclides from Plowshare application sites. This work included literature searches, computer simulation, experimental design and conceptual modeling of transport phenomena. He also participated in final preparation of a 1971 Corps of Engineers report on Wastewater Management in the San Francisco Bay Region.

While at the University of Arizona, Mr. Little was a member of the Operations Research Study Group on the Tucson Basin, gathering background hydrologic material, and conducting a literature and data file search. He directed and participated in preliminary adaptation of a two-dimensional, finite difference model of a large, heterogeneous ground-water basin.

HONORARY AND PROFESSIONAL SOCIETIES:

American Geophysical Union, American Water Resources Association, National Water Well Association, Sigma Xi.

#### **CERTIFICATION:**

AIPG Certified Professional Geological Scientist No. 6468.

**PUBLICATIONS/REPORTS:** 

Numerous technical reports in the fields of water resources development, ground-water contaminant migration, occurrence of radionuclides in ground water, land treatment feasibility and receiving water monitoring, including:





Little, W.M., "Hydrogeologic Investigations, Facet Enterprises, Inc., Elmira, New York," Radian Corporation Final Report to Facet Enterprises, Inc., September 1983.

Little, W.M., et al., "McColl Site Investigation - Phase 1," Radian Corporation Report to the Participants Committee, November 1982.

Little, W.M., et al., "Environmental Considerations and Air Quality Modeling for the Freestone County Project," Radian Corporation Report to Tenneco Coal Company, March 1982.

Grimshaw, T.W., et al., "Assessment of Fluidized-Bed Combustion Solid Wastes for Land Disposal," Draft Final Report, Radian Corporation Report to EPA Industrial Environmental Research Laboratory, December 1982.

Little, W.M., et al., "Environmental Considerations and Air Quality Modeling for the Edgewood and Mustang Creek Prospects and Associated Energy Park," Radian Corporation Report to Tenneco Coal Company, November 1981.

Little, W.M., et al., "Ground-Water Impact of SRC Pilot Plant Activities Fort Lewis, Washington," Radian Corporation report to Gulf Mineral Resources Company, January 1981.

Little, W.M., et al., "Ground Water Modeling at an In-Situ Coal Gasification Test," Radian Corporation Report to confidential industrial client, September 1980.

Little, W.M. and H.J. Williamson, "Recommended Ground-Water Monitoring and Aquifer Restoration Programs, Future In-Situ Coal Gasification Test," Radian Corporation Report to confidential industrial client, September 1980.

Little, W.M. and W.C. Micheletti, "Recommended Aquifer Restoration and Hydrologic Testing Program for an In-Situ Coal Gasification Test," Radian Corporation Report to confidential industrial client, August 1980.

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Little, W.M., et al., "Hydrologic Evaluation of a Combined Ash/FGD Sludge Storage Site, Craig Station," Radian Corporation Report to Colorado Ute Electric Association, July 1980.

Little, W.M., T.J. Wolterink, and M.H. McCloskey, "Water Availability Appraisal for the Proposed Solvent Refined Coal-II Demonstration Plant, Monongalia County, West Virginia," Radian Corporation Report to U.S. Department of Energy, February 1980.



Little, W.M., "Water Quality Geohydrologic Consultation No. 24-0286-77," Twin Cities Army Ammunition Plant, New Brighton, MN, 21-23 July 1976, U.S. Army Environmental Hygiene Agency, 11 January 1977 (six additional geohydrologic consultations; sole author on two, senior on three, junior on one).

Little, W.M., Drinking Water Consultation Visit No. 24-1301-77, Joliet Army Ammunition Plant, Illinois, 2-4 August 1976, USAEHA, 9 February 1977 (four additional drinking water consultations).

Little, W.M., Water Quality Geohydrologic Consultation No. 24-058-75/76, Land Disposal Feasibility Study, Fort Polk, Louisiana, 2-29 April and 9-29 October 1975, USAEHA, 19 August 1976.

Little, W.M., Water Quality Geohydrologic Consultation No. 24-005-76, Land Disposal Feasibility Study, Fort Dix, New Jersey, 21-30 July and 15-23 September 1975, USAEHA, 18 June 1976 (two additional land treatment evaluations as part of water quality engineering special studies).

Little, W.M., Water Quality Monitoring Consultation No. 24-048-74/75, Aberdeen Proving Ground, Maryland, 25-27 February 1974, USAEHA, 17 December 1974 (three additional monitoring consultations).

Little, W.M., Water Quality Engineering Special Study No. 24-017-74, Mixing in Receiving Waters, 7 September-24 October 1973, USAEHA, 3 January 1974.

Little, W.M., Analysis of Hydrologic Transport of Tritium, U.S. Army Engineer Nuclear Cratering Group Technical Memorandum 70-7, Lawrence Radiation Laboratory, Livermore, CA, April 1971.

Little, W.M., An Engineering and Economic Feasibility Study for Diversion of Central Arizona Project Waters from Alternate Sites, M.S. Thesis, Department of Hydrology, University of Arizona, Tucson, AZ, 1968.

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LAWRENCE N. FRENCH

**EDUCATION:** 

M.A., Geological Sciences, University of Texas at Austin, 1979.

B.S., Geological Sciences, University of California at Riverside, 1975.

EXPERIENCE:

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Group Leader, Radian Corporation, Austin, TX, 1982-Present.

Staff Geologist, Radian Corporation, Austin, TX, 1979-Present.

Geologist, Sargent and Lundy Engineers, Chicago, IL, 1978-1979.

Teaching Assistant, University of Texas at Austin, 1975-1976.

FIELDS OF EXPERIENCE:

At Radian, Mr. French is involved in a variety of hydrogeologic and geologic studies. His roles in these studies range from collecting and analyzing hydrogeologic data, interpreting and reporting results of investigations, to directing interdisciplinary programs.

Mr. French has been involved in various aspects of ground-water investigations at several hazardous waste disposal sites. He recently served as Project Director for a study of PCB-contaminated soils at an industrial site in North Texas. The study involved sampling and analysis of near-surface soils to define the extent of PCB contamination. Remedial measures options were also identified. Mr. French also developed a ground-water monitoring plan in accordance with the Compliance Agreement between the state and the property owner. As Ground-Water Task Leader, he supervised the installation of monitoring wells at an abandoned petroleum products waste dump in Southern California. This effort involved collection and logging of soil samples and collection of water samples for chemical analysis. He later co-authored a technical report on the occurrence and character of ground water at the site. As Radian's involvement in the investigation continued, Mr. French prepared technical designs and specifications for a permanent, post-remedial action ground-water monitoring network. Mr. French has also been responsible for field activities related to the USAF Installation Restoration Program at Tinker AFB, Oklahoma. At Tinker, electromagnetics surveys were performed at closed industrial waste impoundments and monitoring wells were installed near landfills. At England AFB, Louisiana, Mr. French developed a work plan for the evaluation of waste disposal practices at the base.

As part of a comprehensive hydrogeologic evaluation of a solvent refined coal pilot plant in Washington, Mr. French supervised the installation of water quality monitoring wells and conducted pumping tests for the evaluation of

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### Lawrence N. French

aquifer characteristics. He also supervised soil coring and sampling efforts at the site of process fluid spill. Mr. French also served as Project Director for a pre-closure evaluation of two hazardous waste impoundments at a wood treatment plant in Washington. The plant had discharged wastewater containing creosote and pentachlorophenol to the unlined impoundments, which are located on floodplain sands and gravels of the Columbia River. A second site was also examined in terms of disposal practices and the character and volume of wastes. Results of the pre-closure survey were used for a definition of areas of concern requiring closure and for the selection of ground-water monitoring parameters based on the character and volume of wastes.

Mr. French has participated in several ground-water studies for Western coal mining programs. For a large surface mine in New Mexico, he was a principal author of the cumulative hydrologic impat assessment conducted for the Office of Surface Mining. Principal hydrologic concerns for individual mines were identified and compared to predicted hydrologic impacts in order to determine if material damage would result from mining. For a proposed commercial underground coal gasification project, Mr. French was involved in the conceptual design of an aquifer restoration program. Ground water would be withdrawn from the burn cavity, treated at the surface, and reinjected into the coal seam. As Task Leader for both geology and ground-water hydrology tasks for a feasibility study of a proposed lignite gasification facility, Mr. French investigated waste disposal and ground-water supply issues. In addition, Mr. French examined the feasibility of a deep well injection system for the disposal of process wastewaters. This initial evaluation included the identification and characterization of possible injection zones, formation water chemistry, probable injection rates and pressures, and subsurface migration of waste fluids.

As a Project Director on a quick-response effort for the Department of Energy, Division of Fossil Fuel Processing, Mr. French evaluated the water availability for a proposed solvent refined coal demonstration plant in northwestern Kentucky. This project consisted of a comprehensive appraisal of existing and future water supplies, demands, and policies that affect water availability in the vicinity of the demonstration plant.

While employed by Sargent and Lundy Engineers, Mr. French was involved in detailed hydrologic and geologic studies for Preliminary and Final Safety Analysis Reports (PSAR and FSAR) for several nuclear power plants. The PSARs and FSARs involved detailed geologic mapping, inventory of water wells, analysis of subsurface flow, and reviews of regional geologic features. In a study conducted with the Illinois and Indiana Geological Surveys, Mr. French analyzed stratigraphic, structural, and hydrologic features at sites in the Illinois Basin for a compressed air energy storage project. Mr. French directed an extensive hydrogeologic and geologic study of potential sites for a lignite-fired electric generation station in Walker County, Texas. Mr. French also conducted the field program for an engineering soils exploration

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effort at a construction site for a lignite-fired power plant in Harrison County, Texas.

Mr. French supervised several field programs at Sargent and Lundy. These programs included: construction and testing of two industrial water wells near Cincinnati; installation and testing of pneumatic piezometers at a nuclear power plant excavation in northern Indiana; and aquifer testing and analysis of hydraulic characteristics of the alluvial-glacial outwash aquifer near Wausau, Wisconsin.

HONORARY AND PROFESSIONAL SOCIETIES:

American Institute of Professional Geologists, CPGS No. 6307; California Registered Geologist No. 3804; Ground-Water Technology Division of the National Water Well Association; Geological Society of America.

**PUBLICATIONS/REPORTS:** 

French, L.N. and J.L. Machin, "Cumulative Hydrologic Impact Assessment for McKinley Mine," Radian Corporation, Austin, TX, January 1984.

Little, W.M. and L.N. French, "Hydrogeologic Aspects of the McColl Site, Fullerton, California," Radian Corporation, Austin, TX, November 1982.

French, L.N., "Pre-Closure Evaluation of the Treated Wood Products Facility and Site C, Longview, Washington," Radian Corporation, Austin, TX, May 1983.

Lacy, J.C., L.N. French, and T.W. Grimshaw, "Regulation of the Hydrologic Impacts of Underground Coal Gasification," <u>in</u> Proc. Sixth Underground Coal Conversion Symposium, Shangri-La, OK, pp. V-79 thru V-88, July 1980.

French, L.N., et al., "Environmental Constraint Analysis of the Proposed Coastal Bend Coal Gasification Project," Radian Corporation, Austin, TX, August 1981.

White, D.M. and L.N. French, "Evaluation, Screening, and Prioritization of Candidate Gulf Coast Lignite Resource Blocks," Radian Corporation, Austin, TX, April 1981.

French, L.N. and J.L. Machin, "Water Availability Appraisal for the Proposed Solvent Refined Coal-I Demonstration Plant, Daviess County, Kentucky," Radian Corporation, Austin, TX, December 1979.

U.S. Bureau of Land Management, "Proposed Camp Swift Lignite Leasing (Draft and Final EIS)," Radian Corporation, Austin, TX, September 1980.

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French, L.N., "Compilation of Environmental Information for a Proposed Olefins Complex, Brazoria County, Texas," Radian Corporation, Austin, TX, July 1981 (author of Ground-Water Hydrology and Topography and Geology chapters).

Skinner, F.D., L.N. French, and D.E. Pusch, "Regulatory Review and Estimated Costs for a Proposed In-Situ Gasification Facility," Radian Corporation, Austin, TX, April 1982.

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#### ROBERT C. WALLACE

#### **EDUCATION:**

Master of Engineering, Environmental Engineering, (Minor, Coastal and Oceanographic Engineering), University of Florida, Gainesville, FL, 1980.

Graduate Studies in Statistics, Florida State University, Tallahassee, FL, 1977.

B.A., Environmental Science, University of Virginia, Charlottesville, VA, 1971.

**EXPERIENCE:** 

Staff Engineer, Radian Corporation, Austin, TX, 1981-Present.

Environmental Engineer, Radian Corporation, Austin, TX, 1980-1981.

Graduate Research Assistant, Water Resources Research Center, University of Florida, 1977-1980.

Lieutenant, United States Navy, 1971-1976.

FIELDS OF EXPERIENCE:

While at Radian, Mr. Wallace pursues engineering solutions to environmental problems and issues for both private industry and government clients. His experience and training includes both operational management and engineering research and development roles. His primary research interests at Radian include hydrologic investigations, transport processes in natural systems, and evaluation of alternative waste management treatment systems for energy industries.

Mr. Wallace is participating in the preparation of RCRA part B applications for a variety of clients who operate hazardous waste treatment, storage, or disposal facilities. These include two major petroleum refineries, a new hazardous waste incinerator at a major chemical manufacturing facility, and a research and development facility for a new PCB thermal destruction process. Mr. Wallace has been involved in all phases of the requirements for a RCRA permit incuding incinerator and land treatment demonstrations, liner compatibility testing, ground water investigations, and facility management plans.

Mr. Wallace was the project director of a study of wastewater treatment alternatives available to a major Midwest refinery which had been unble to consistently meet its NPDES discharge limitatinos. The study included a survey of the literature and screening of control technologies for

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feasibility and cost considerations. A series of alternatives were developed and the impact of these alternatives in terms of cost and effectiveness evaluated.

At Radian, Mr. Wallace has served as the project director for a number of programs related to the feasibility, environmental acceptability, and permitting strategy for major new energy facilities. This work includes: a stormwater management study for a major oil refinery in the midwest, a feasibility study for a proposed coal gasification plant that included separate studies on site selection, environmental assessment, regulatory analysis, and CPM schedule preparation; several programs to provide all permitting support to proposed natural gas-fired cogeneration power plants to be situated adjacent to major energy or chemical facilities; environmental analysis of noise impacts on nearby communities and wildlife from two large energy plants, one in Kentucky and one in North Texas; hydrologic analysis of the impacts of the discharge of lignite mine depressurization waters to four small creeks in Central Texas; a comparative analysis of the environmental impacts of industrial lignite utilization via direct firing versus medium Btu gasification; a technical review of alternative stormwater management/treatment alternatives for the solvent refined coal (SRC) pilot plant in Fort Lewis, Washington. nd

Mr. Wallace is currently involved in the conduct of environmental surveys of private facilities in support of the risk assessment exercise required by the underwriters of Environmental Impairment Liability Insurance. The survey consists of applicant interviews and facility site visits to assess the level of environmental concern and conduct, particularly in the area of waste handling and disposal practices. Facility surveys have included a hazardous waste treatment and disposal site, a multi-facility metal fabrication manufacturing concern, a diversified high technology corporation, a major airline, and a nuclear power plant construction site.

Mr. Wallace evaluated the air and water environmental impacts of alternative remedial actions proposed for the Superfund clean-up of the Lipari landfill in Pittman, New Jersey. At this site a variety of synthetic organic chemicals were leaching into an urban watershed. In order to predict the fate of individual chemicals, Mr. Wallace employed an environmental fate (Fugacity) model to examine the partitioning behavior of the chemicals leaching into the watercourse and lake downstream from the landfill. This analysis demonstrated that although most of the chemicals were volatile, two substances Bis 2(chloroethyl)ether and Bis 2(chloroethoxy)ethane were soluble enough to be found in the stream and lake downstream.

In Fullerton, California, at the McColl Superfund site, Mr. Wallace evaluated the odor impacts of various alternative clean-up options being considered. In this effort, he exercised a calibrated odor prediction model for evaluating removal options involving site disturbance. This model strongly indicated that even small disturbances of the site (by earth-moving equipment) would produce large odor impacts in nearby residential areas.

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As a research assistant at the University of Florida, Mr. Wallace investigated the hydrology of cypress wetlands to assess their potential for use as water management areas for secondary sewage effluent recycling. This long-term study was under the auspices of the Rockefeller Foundation and the RANN Division of the National Science Foundation. His specific research task was to quantify the surface-water budget. This included measurement and analysis of basin geometry; flow rate determination from analysis of level records; and development of a mathematical prediction model for surface outflow.

Mr. Wallace studied under an EPA-funded program to collect from all sources urban rainfall-runoff-quality data for use in modeling and for characterization of urban stormwater runoff. This data base includes records of over a thousand rainstorms from 85 different catchments in urban areas all over North America. In this effort, Mr. Wallace contributed to the design of the data structure and developed the software programs to access, analyze, and display the data. As part of his Master's research project, he examined the relationship between stormwater quality loadings and precipitation characteristics.

While in the Navy, Mr. Wallace was assigned to several service ships of the U.S. Atlantic Fleet that performed a wide range of ocean engineering tasks including diving operations, oil pollution control, ship and aircraft salvage, and search and rescue throughout the Atlantic and Mediterranean.

**PUBLICATIONS:** 

"Statistical Modeling of Water Quality Parameters in Urban Runoff," Master's Project, University of Florida, 1980.

Surface Water in "Cypress Wetlands for Water Management, Recycling, and Conservation," Final Report to National Science Foundation, Center for the Wetlands, University of Florida, 1980.

"Review of Alternative Stormwater Treatment Systems for the Solvent Refined Coal (SRC) Pilot Plant, Fort Lewis, Washington," Technical Memorandum, Radian Corporation, Austin, TX, 1980.

Environmental Noise - in "An Environmental Assessment for a Geothermal Direct Utilization Project in Reno, Nevada," Radian Corporation, Austin, TX, 1980.

Surface Water and Noise - in "Environmental Report: Combustion Engineering/ Gulf States Utilities Company Fuel Gas Demonstration Plant, West Lake, Louisiana," Radian Corporation, Austin, TX, September 1981.

"Analysis of the Impacts of Mine Depressurization Discharges from the Milam Mine," Technical Memorandum, Radian Corporation, Austin, TX, March 1982.

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"Preliminary Site Screening Studies: Celanese East Texas Project Final Report, for Task 2 and 3," Radian Corporation, Austin, TX, May 1981.

"Air Quality Siting Constraints in Robertson and Shelby Counties, Texas," Technical Memorandum, Radian Corporation, Austin, TX, July 1981.

"Environmental Screening of Candidate Sites in Brazoria, Robertson, and Shelby Counties," Final Report for Tasks 4 and 5, Radian Corporation, Austin, TX, October 1981.

"Regulatory Compliance Schedule for Environmental Licensing of a Coal Gasification Facility in Texas," Final Report for Task 7, Radian Corporation, Austin, TX, October 1981.

Noise in - "Environmental Information Document for a Proposed Lignite Beneficiation Plant Demonstration Project, Robertson County, Texas," Radian Corporation, Austin, TX, May 1981.

"Problems and Issues Related to Surface-Water Quality Regulation," Report to the Department of Energy, Radian Corporation, Austin, TX, July 1981.

Noise and odor Chapters in - "Compilation of Environmental Information for Tri-State Synfuels Project," Radian Corporation, Austin, TX, September 1981.

"Environmental Assessment of Air Quality, Surface Water, and Noise Impacts for the Proposed Milam Mine," Radian Corporation, Austin, TX, July 1982.

Surface Water Controls in - "Evaluating Cost-Effectiveness of Remedial Actions at Uncontrolled Hazardous Waste Sites," Draft Methodology Manual, Radian Corporation, Austin, TX, January 1983.

Surface Water and Air Ouality in - "Draft Environmental Information Document for Remedial Actions at the Lipari Landfill, Pitman, New Jersey," Radian Corporation, Austin, TX, October 1982.

Environmental Fate in - "Development of a Monitoring Program to Evaluate the Effect of Remedial Actions at the Lipari Landfill on Alcyon Lake, Pitman, New Jersey," Radian Corporation, Austin, TX, January 1983.

"Interim Task Report: Noise and Odor, Texas Gasification Project," Techncial Report, Radian Corporation, Austin, TX, January 1983.

Closure, Contingency, and Training Plans in - "Hazardous Waste Incinerator, Industrial Hazardous Waste Part B Permit Application," Radian Corporation, Austin, TX, January 1983.

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"Audible Noise Measurements from an Electric Transmission Line near Weimar, Texas," Technical Note, Radian Corporation, Austin, TX, March 1982.

"Noise Assessment for a Proposed Snack Food Manufacturing Facility in Kern County, California," Radian Corporation, Austin, TX, October 1982.

Surface Water in - "Site Evaluation and Regional Screening Analysis for the Tuloma Waste Management Facility," Radian Corporation, Austin, TX, February 1982.

#### **PRESENTATIONS:**

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"Gasification vs. Direct Firing of Lignite: An Environmental Comparison," Paper presented at American Water Resources Association Symposium on Water for Energy, Houston, TX, December 1980.

"Permitting of a Hazardous Waste Incineration Facility in Northern California," Presentation to the Peninsula Industrial and Business Association Symposium on Practical Alternatives to the Land Disposal of Hazardous Wastes, Palo Alto, CA, June 1982.

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#### DAVID H. GANCARZ

EDUCATION:

Master of Engineering, Environmental Engineering (Hydrology), University of Florida, Gainesville, FL, 1984.

Bachelor of Arts, Grinnell College, Grinnell, IA, 1976.

**EXPERIENCE:** 

Engineer, Radian Corporation, Austin, TX, 1984-Present.

Graduate Research Assistant, Department of Environmental Engineering, University of Florida, Gainesville, FL, 1983-1984.

Chemist I, Department of Food Science & Human Nutrition, University of Florida, Gainesville, FL, 1981-1982.

Laboratory Technologist I, Department of Soil Science and Department of Fruit Crops, University of Florida, Gainesville, FL, 1977-1981.

Graduate Teaching Assistant, Department of Botany, University of Florida, Gainesville, FL, 1976-1977.

FIELDS OF EXPERIENCE:

As an Engineer at Radian, Mr. Gancarz has been involved with the final preparation of an atmospheric modeling study for the EPA using STRATOS. Mathematical manipulations of the model output as well as graphical presentation were performed on the IBM PC using Lotus 1-2-3.

As a Graduate Research Assistant, Mr. Gancarz was responsible for researching and writing a thorough literature review of the sources, effects, and regulations concerning ambient air flourides for the Florida Department of Environmental Regulation. A later project under the South West Florida Water Management District involved a study of the surface and subsurface hydrology around a 150 MGD wellfield in central Florida. The focus of the project was a modeling effort using the hydrologic models HSPF and PLASM.

His graduate research was an adaptation of the Storage/Treatment block of the widely used urban stormwater runoff model SWMM to microcomputer. A consequence of this research is proficiency with MS DOS, Apple DOS, Apple PASCAL, CP/M, and the FORTRAN compilers F-80 by Microsoft and IBM PC FORTRAN by Microsoft.

Prior to his return to graduate school, Mr. Gancarz conducted analyses of pesticide residues in soil and tissue samples for the Institute of Food and Agricultural Sciences at the University of Florida. Various phases of this

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work involved sample preparation, gas chromatographic analysis, and radioisotope tracer techniques. While at the Department of Fruit Crops at the University of Florida, Mr. Gancarz developed an efficient assay for cellulase isozymes in citrus.

#### **PUBLICATIONS:**

Gancarz, D.H. and W.C. Huber, "The USEPA Storm Water Management Model Storage/Treatment Block for the IBM Personal Computer," Paper to be presented at the Storm Water & Water Quality Model Users Group Conference, Hamilton, Ontario, Canada, 1984 (in preparation).

Gancarz, D.H., et al., "Ambient Atmospheric Fluoride Pollution in Florida," Report to State of Florida Department of Environmental Regulation, 1983.

Huber, W.C., D.H. Gancarz, and R.E. Dickinson, "Apple SWMM, a Possibility?" Proceedings of Conference on Emerging Computer Techniques in Stormwater Management, Ontario, Canada, 1983.

Ou, L.T., et al., "Infuence of Soil Temperature and Soil Moisture on Degradation and Metabolism of Carbofuran in Soils," <u>Journal of Environmental Quality</u>, 11:293-298, 1982.



#### NANCY PACHARZINA STEIN

EDUCATION:

B.S., Engineering Science/Environmental Engineering, University of Texas at Austin, 1979.

**EXPERIENCE:** 

Environmental Engineer, Radian Corporation, Austin, TX, 1979-Present.

FIELDS OF EXPERIENCE:

As an environmental engineer at Radian, Ms. Stein has performed several wastewater, solid/hazardous waste, and hydrology related studies.

At present, Ms. Stein is working on several projects including an evaluation of treated wastewater from a gasification facility for use as cooling water. As task leader on this project, Ms. Stein coordinated laboratory bench-scale cooling tower tests and was responsible for data reduction and analysis. These data will subsequently be used to verify Radian's predictive cooling tower computer model.

In addition to the cooling tower study, Ms. Stein is also coordinating a project to characterize the Biotechnology Industry in terms of major processes and products and to identify and characterize the waste streams associated with this industry.

Ms. Stein served as Project Director in the conduct of a laboratory biological treatability study of contaminated leachate from a superfund site in New Jersey. Specific issues addressed in this study include: bioaccumulation of contaminants in the waste sludge, release of volatile organics over the aeration basin, and overall treatment performance for the pollutants of concern. As project director for this study, Ms. Stein's role included development of the test plan, monitoring laboratory operations, data reduction and analysis, and overall project management.

For the Environmental Protection Agency, Ms. Stein recently participated on a project to perform a cost-effectiveness evaluation of various remedial action alternatives for a superfund site in New Jersey. Her primary role on this project was to assess various alternatives for treatment of contaminated ground water at the site. Specifically, Ms. Stein identified treatment alternatives, developed the design criteria for each, and provided cost estimates for leachate treatment.

For a related project, Ms. Stein is participating in an effort to prepare a guidance document which can be used by EPA and state regulatory personnel in developing remedial action plans and/or evaluating the factors affecting reliability and cost-effectiveness. Her task on this project is to develop

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remedial action data summaries for biological and in-situ waste treatment technologies. Items to be addressed for each technology include applicability, limitations, performance, reliability, safety considerations, and development of a design basis to derive cost estimates.

For a major industrial client, Ms. Stein participated in a project to evaluate remedial action alternatives for the clean-up of wood processing waste ponds. Specifically, Ms. Stein identified appropriate technologies for treatment of both the sludges and liquid wastes and assessed the expected performance of each. Future work on this project will involve development of plans and specifications for the selected alternative and management of implementation.

For a major synfuels syndicate, Ms. Stein participated in the development of a test plan for a bench-scale biological treatment study of coal gasification process wastewaters. Based on the characterization of the wastewater, Ms. Stein derived the appropriate operational parameters and was responsible for monitoring the reactors through the acclimation phase.

For EPA's Effluent Guidelines Division, Ms. Stein served as Task Leader in the Development of Effluent Limitations Guidelines and Standards for the Aluminum Forming Point Source Category. During the project Ms. Stein interfaced with both EPA and representatives from the industrial s ctor. Major activities on this project included responding to comments on the proposed regulation and planning and conducting plant sampling trips in response to industry comments.

On a major contract for EPA's Office of Solid Waste, Ms. Stein prepared an engineering analysis of High Density Polyethylene (HDPE) production processes. This effort included identifying the major production processes for HDPE, identification and characterization of waste streams from these processes, and development of material balances for each process. The purpose of this analysis was to identify waste streams for potential listing as hazardous waste under RCRA.

For the Laramie Energy Technology Center (LETC), Ms. Stein served as task leader on a project to develop a Hazardous Waste Management Plan (HWMP) and Employee Training Seminar. Her role on this project included critical evaluation of waste handling procedures, development of the HWMP and Training Program, as well as presentation of the training seminar to LETC personel.

On another project for LETC, Ms. Stein participated in a project to inventory and sample potentially hazardous waste at a Department of Energy (DOE) facility. This project involved participating in the actual sampling program, classification of the wastes under RCRA, and development of subsequent disposal alternatives.

Ms. Stein also provided technical assistance to the Environmental Protection Agency (EPA) on the development of Pollution Control Technical Manuals for the synfuels industry. Her role in this project involved characterization of

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process effluents and the evaluation of biological treatment performance. Additionally, Ms. Stein assisted in the development of a performance and cost model of biological treatment for coal gasification wastewaters.

For a major industrial client, Ms. Stein recently performed a study on the characterization of BIOX sludge from gasification wastewater treatment. This project involved wastewater characterization, a quantitative assessment of BIOX performance, and a determination of trace metal concentrations in the BIOX sludge.

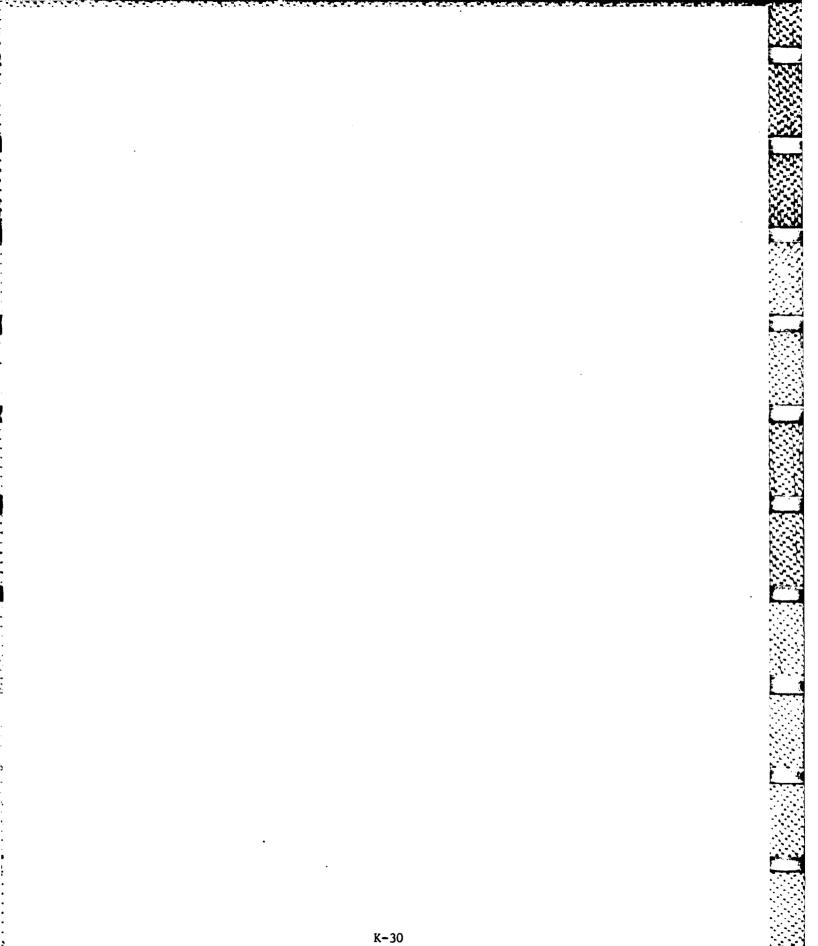
Ms. Stein participated in a study of stormwater runoff treatment for a pilotscale SRC-II plant. Her role on this project consisted of assessing the quality of coal pile and general plant area runoff to be treated.

For a generic study of the environmental residuals and resource requirements associated with gasification of lignite in Texas, Ms. Stein provided technical input in the areas of water resources and wastewater and solid waste residuals. On this project, Ms. Stein 4as also responsible for management of the project team.

Ms. Stein was responsible for evaluation of surface coal mining wastewater treatability studies in support of an EPA contract to develop effluent guidelines for the Energy and Mining Point Source Category. This project involved a critical evaluation of the methods used during the studies as well as analysis of the data generated.

Ms. Stein has performed numerous surface-water hydrology site assessments for both government and industrial clients. These projects typically involve a complete characterization of baseline conditions and quantitative assessment of potential impacts to surface waters by the proposed action.

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#### JILL P. ROSSI

EDUCATION:

B.A. Geography, The University of Minnesota at Minneapolis, 1972.

**EXPERIENCE:** 

Geographer, Cartographer, Policy and Environmental Analysis Division, Radian Corporation, Austin, TX, 1980-Present.

Drafting and Graphics Assistant, Dam Safety Unit, Texas Department of Water Resources, Austin, TX, 1979-1980.

Cartographer, Continental Map Inc., Austin, TX, 1978-1979.

Teaching Assistant, University College-Geology, University of Minnesota at Minneapolis, 1972.

FIELDS OF EXPERIENCE:

At Radian, Ms. Rossi is responsible for producing maps and coordinating graphics for the Policy and Environmental Analysis Division. She utilizes data from a variety of technical disciplines (geology, hydrology, noise and air monitoring, sociology, soils, and hydrogeology) to create maps which clearly and concisely illustrate the written text. Ms. Rossi has been responsible for work in the following projects:

- o Develop base maps and coordinate graphics throughout an Environmental Impact Statement prepared for the U.S. Bureau of Land Management for a central Texas lignite mine;
- Develop color overlay method of mapping for site selection process of commercial waste disposal sites in Texas and southeastern Oklahoma;
- o Develop a series of figures used as illustrations in a manual for the Environmental Protection Agency on Remedial Actions at Uncontrolled Hazardous Waste Sites:
- o Draft maps and coordinate the graphics for an Environmental Impact Statement for a synfuels plant in Tennessee;
- Create base and thematic maps for Air Force Installation Restoration Programs (Phase I and Phase II) for the following locations: Kelly AFB, Texas; Hill AFB, Utah; Bergstrom AFB, Texas; Cannon AFB, New Mexico; England AFB, Louisiana; Tinker AFB, Oklahoma; and Reese AFB, Texas;

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- Map limestone deposits, lime plants, and limestone quarries in the United States by county in a series of regional maps for the Electric Power Research Institute;
- Map compliance/non-compliance with air pollution standards for counties in the United States in a series of EPA regional maps;
- Map concentrations of selected air pollutants in the El Paso, Texas, area for a Texas Air Control Board study in a series of quarterly and annual reports;
- Prepare aerial photography history of a wood preserving plant for a commercial client which included extensive research of available aerial photography and interpretation of those photos to determine historical features of interest;
- Prepare complex permitting schedules for proposed mines, energy facilities, and hazardous waste handling sites;
- Preparation of base and thematic maps for various feasibility studies, fatal flaw analyses, Environmental Information Documents, and Environmental Impact Statements; and
- Research of available map resources, aerial photography, remote sensing products, and mapping technologies as required by individual client needs.

While with the Texas Department of Water Resources, Ms. Rossi worked in the graphics section of the Dam Safety Unit, a federal grant program. She prepared maps and exhibits, and laid out phototypset text into camera-ready form according to standards, developed with her assistance, for the technical reports written by the engineering section.

During her employment with Continental Map Incorporated, Ms. Rossi was involved in all phases of four color map production. These included source information procurement and classification, imaging base maps, scribing plates, cutting specialties, sizing and adhering type, designing customer copy panels, indexing streets and points of interest, photo-lab contact reproduction of base plates, and the final compositing of the four negative plates to be sent to the printer. These maps included large metroplex areas, counties, enlarged downtown sections, and simplified principle city thoroughfares.

While employed by the University of Minnesota as a Geology Teaching Assistant, Ms. Rossi taught geology laboratory sessions, prepared geology lab work materials, tutored students, and assisted the professors by preparing classroom presentations and grading and proctoring exams.

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ANN E. ST. CLAIR

#### EDUCATION:

M.A., Geological Sciences, The University of Texas at Austin, 1979.

B.A., Geology, Trinity University, 1973.

**EXPERIENCE:** 

Department Head, Radian Corporation, Austin, TX, 1982-Present.

Group Leader, Radian Corporation, 1979-1982.

Senior Geologist, Radian Corporation, 1980-Present.

Staff Geologist, Radian Corporation, 1978-1980.

Research Scientist Associate, The University of Texas at Austin, Bureau of Economic Geology, 1975-1978.

Research Scientist Assistant, The University of Texas at Austin, Bureau of Economic Geology, 1973-1975.

#### FIELDS OF EXPERIENCE:

At Radian, Ms. St. Clair has had extensive experience in studies relating to ground-water geology, waste disposal, and environmental impacts. Her work has included acquisition of data on ground water, assessment of water quality impacts, and compilation and interpretation of geologic data including geophysical and core logs, and evaluation of impacts of waste disposal and other activities. In hazardous waste studies her work has also involved evaluation of remedial action alternatives and interface with engineers, chemists and other specialists regarding various aspects of hazardous waste investigations including engineering design and cost of remedial action, control of emissions and odors, and waste characteristics. As Department Head at Radian Ms. St. Clair supervises the work of geologists, hydrologists, and ecologists and has management and technical review responsibility for programs in these technical areas.

Ms. St. Clair was Project Director for the second phase of a continuing study at the McColl hazardous waste site in the Los Angeles area. In this phase, data collected in Radian's Phase 1 field investigation of the site were evaluated and used in the selection and design of the remedial action plan for the site. The site, which is located adjacent to a residential and recreational area, contains various hydrocarbon wastes, principally acidic refinery sludges and drilling muds. Control of volatile emissions, odors, and the potential for contamination of surface water and ground water were addressed in the



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remedial action design. The design must meet strict criteria regarding exposure to contaminants both during remedial action implementation and over the long term.

Ms. St. Clair has major responsibility for studies being performed at several uncontrolled hazardous waste sites, including sites identified as priority sites for remedial action under Superfund. She was Project Director for the first phase of a study to evaluate ground-water conditions at a Superfund site in up-state New York which was used for disposal of wastes from a metal plating operation. The study included installation of monitor wells and test borings and collection of soil and ground-water samples in order to define the presence or extent of subsurface contamination. Based on the results of the field investigation, recommendations for further study or remedial action were developed. During the course of this program, Ms. St. Clair has been involved in initial site evaluation and data collection, development of a site field program, and interface with state and federal regulatory agencies.

Ms. St. Clair has had overall technical responsibility for a variety of activities for the EPA Solid and Hazardous Waste Research Division. These studies, generally involving technical support of Superfund activities, have included a field geophysical survey, treatability studies, column absorption/desorption studies, hydrogeologic evaluations, review of feasibility studies, and evaluation of remedial action technologies for approximately ten Superfund sites. Ms. St. Clair's role included project management, technical supervision and review, and agency coordination.

For the Lipari landfill Superfund site near Pitman, New Jersey, Ms. St. Clair was responsible for coordinating a variety of technical activities as support to EPA Region II. The site contains a variety of industrial wastes, of which several volatile organic chemicals known to be extremely hazardous are of primary concern. Leachate seeps enter surface streams adjacent to the site and have resulted in a ban on fishing and boating in a lake 1000 feet downstream. Ms. St. Clair had overall responsibility for coordinating the following activities at this site--cost-effectiveness evaluation of 32 remedial action alternatives, preparation of an Environmental Information Document assessing the environmental impacts of remedial action alternatives, definition of baseline conditions and design of a long-term monitoring program on the lake, and a treatability study of the landfill leachate. For all these activities Ms. St. Clair was the principal interface with EPA and had primary technical review and management responsibility.

In a study for the EPA Municipal Environmental Research Laboratory, Ms. St. Clair supervised development of a methodology for conducting evaluations of cost-effectiveness of remedial actions at uncontrolled hazardous waste sites. Under the Comprehensive Environmental Response, Compensation and Liability Act (Superfund), remedial actions conducted at Superfund sites must be demonstrated to be cost-effective. The study involved review of technical and cost





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data on remedial technologies, evaluation of methodologies for cost-effectiveness and related types of analyis, assessment of impacts of time and discount rates on the evaluation, and development of the analytical framework and guidance manual to be used by decision makers in selecting remedial measures.

Ms. St. Clair has participated in Radian's activities related to collection of insurance underwriting information for Environmental Impairment Liability (EIL) Insurance. She worked closely with Radian's parent company, Hartford Steam Boiler Inspection and Insurance Company (HSB) in developing procedures for collection of technical and engineering underwriting information and functions in a Quality Assurance role by reviewing results of all Radian investigations of this type. In 1981 Ms. St. Clair was Project Director for a risk assessment of three power plants in the Boston area. The study involved brief site visits and review of corporate and regulatory agency files in order to assess the potential for gradual environmental impairment as a result of plant activities. The study included assessment of ground-water conditions, waste management practices, hazardousness of materials used on-site, population-atrisk, and corporate approach to environmental matters. A report was prepared containing information for use in underwriting Environmental Impairment (EIL) Insurance.

During 1981, Ms. St. Clair was Project Director for a large program to develop a waste management strategy for the Wyoming Coal Gasification Project. The program involved chemical and physical analysis and regulatory classification of power plant and gasification wastes and organic by-products. Based on the results of the testing, recommendations were made for treatment and disposal of wastes to meet applicable regulatory requirements. In addition, the study included column leaching studies to assess impacts of mine disposal of plant wastes, evaluation of ground water impact of disposal facilities at the plant site, and preparation of applicable state and federal permit applications.

In 1980-1981, Ms. St. Clair was Project Director for a program to evaluate waste disposal practices and ground-water conditions at a large petroleum refinery in Kenai, Alaska. The study focused on development of a long-term waste management strategy for disposal of refinery wastes, principally API separator bottoms and crude tank bottoms, which have been designated as hazardous wastes under RCRA. Initially Ms. St. Clair supervised design, installation and sampling of ground-water monitoring wells in the vicinity of existing disposal sites in order to assess the water-quality impacts of past disposal practices. Samples of all refinery waste streams and wastes from existing pits were characterized for the purpose of developing a plan for closure of existing pits and an ultimate waste management plan. Options were evaluated with respect to technical feasibility (particularly in light of climatic factors), environmental acceptability, regulatory compliance, and economics.

In 1979, Ms. St. Clair was Project Director for an investigation of soil/ ground-water contamination and remedial action at a pesticide formulation



#### Ann E. St. Clair

facility in north Texas. The study was aimed at evaluating possible contamination from underground waste storage tanks suspected of leaking. Ms. St. Clair initially conducted sampling of soils in the vicinity of the tanks to determine if leakage had occurred. She also designed and supervised installation of a network of ground-water monitoring wells in order to evaluate ground-water flow at the site and to assess water-quality impacts of the suspected leakage. During drilling, core samples were taken in both the unsaturated and saturated zone for chemical analysis. Ms. St. Clair performed slug tests on the wells to provide data on squifer properties. She also supervised infiltration tests in order to evaluate the surface infiltration conditions and to qualitatively assess the potential for leachate generation. Based upon the results of this study, recommendations were made for further studies and possible remedial actions.

In a study to determine impacts of a product spill at a Solvent Refined Coal-II demonstration plant in Fort Lewis, Washington, Ms. St. Clair was responsible for portions of the ground-water evaluation, including installation of monitoring wells, measurements of water levels, and interpretation of hydrologic and chemical data. She was also involved in interfacing with state regulatory agencies.

Ms. St. Clair was Project Director of a study for EPA Region III, evaluating the suitability of land around the Cheswick Power Station near Pittsburgh, Pennsylvania, for disposal of coal ash and scrubber sludge. The study was conducted as technical support for enforcement actions brought by EPA Region III concerning alleged violations of air emissions regulations from the coalfired power plant. In the event that installation of SO₂ scrubbers was to be required by EPA, this study was underaken to document the availability of land for disposal of wastes from the scrubbers. During the study, Ms. St. Clair supervised a multidisciplinary team evaluating the hydrogeology, transportation, land use, ecology, and economic factors affecting the acceptability of sites in the vicinity of the plant for disposal of wastes.

In a study for EPA Region VII, Ms. St. Clair supervised several programs concerned with suitability of soils for septic tanks and nitrate contamination of ground water in Missouri. Ms. St. Clair supervised technical efforts on three programs. One program involved detailed soils mapping and field examination of septic tank failures in Greene County, Missouri, and in order to develop a septic-tank suitability map. Another study focused on determination of any relationships between water well construction practices and occurrence of ground water contamination in Howell County, Missouri. It involved a field survey for sampling of ground water and for obtaining information on well construction. A third program was conducted to develop a regional map of nitrate concentrations in ground water in the four-state area of EPA Region VII. In addition to development of technical reports for each of these studies, reports were prepared for lay readers.



#### Ann E. St. Clair

Ms. St. Clair was Project Director for a feasibility and site selection study for an in-situ gasification project utilizing Texas lignite. The study focused on evaluation of environmental factors that might affect project feasibility. Ms. St. Clair was involved in overall project coordination as well as studies related to environmental and hydrologic conditions at several candidate sites.

As a research associate at the Bureau of Economic Geology, Ms. St. Clair was involved in numerous studies requiring collection and interpretation of geologic data, sampling and chemical analysis of ground water, and evaluation of environmental and engineering impacts of man's activities. She was responsible for the preparation of maps, technical reports, and presentations, as a part of these programs.

#### **PROFESSIONAL/TECHNICAL SOCIETIES:**

American Institute of Profession Geological Scientists, Certified Professional Geological Scientist 4741; National Water Well Association, Ground Water Technology Division; Geological Society of America; Austin Geological Society.

#### **PUBLICATIONS:**

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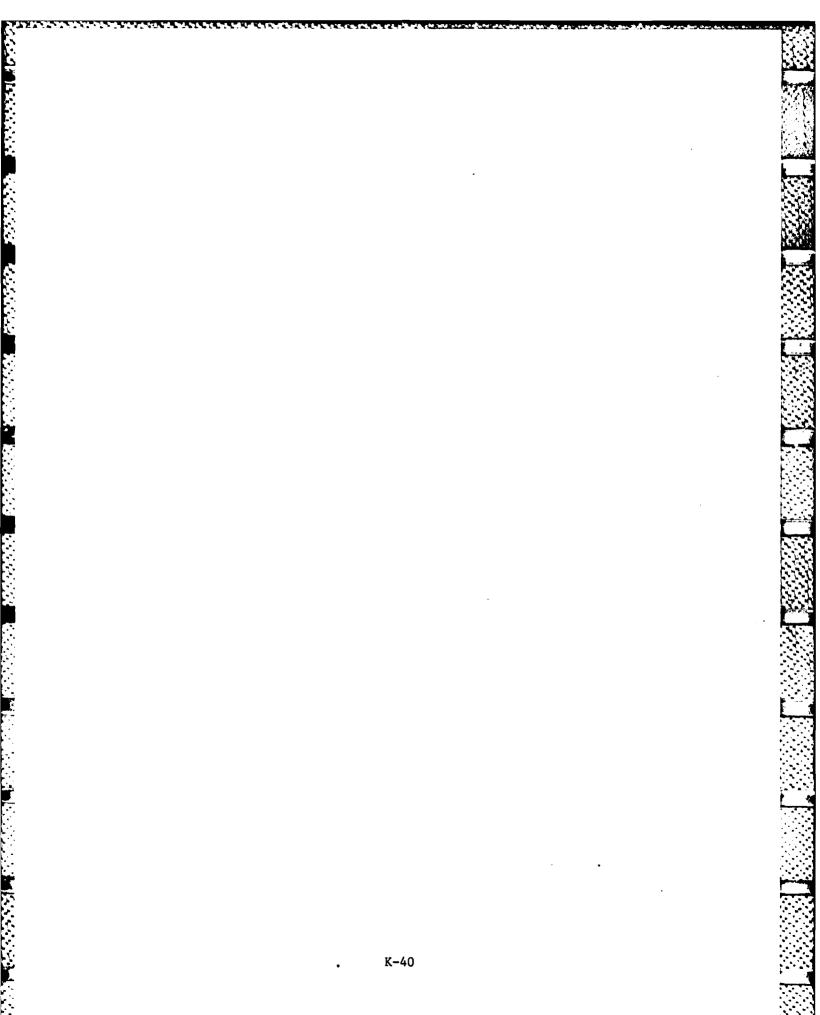
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Ann E. St. Clair

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APPENDIX L Geophysical Tracings



## DRAFT

Specifications of Ground Conductivity Meters Utilized for Geophysical Surveys (from manufacturer's literature, Geonics, Ltd.)



### EM31

The Gennes EM31 provides a measurement of terrain consuctivity working contacting the ground using a palented inductive exectromogeness technique. The instrument is direct reading in multilation per mean and surveys are carried out simply by traversing the ground.

The effective depth of explaration is approximately six meters making it ideal for engineering geophysics. By enimating ground contact measurements are easily contract out in regions of ingin resistive social as graves compares and between Over a uniform nail space the EN31 reads idemically with conventional resistivity and the measurement is analogous to a convertional garvanic resistivity survey with a hined array spacing interpretation curves subshall will each instrument of an parma an estimate of a layard earth.

The advantages of the EM31 are the speed with which surveys can be carried out. The abuny to precisely measure small changes in conductivity, and the communities regeted which provides a previously undetainable therai resolution.

## Specifications

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MEASURED QUANTITY	According Comp	ctivity of the ground in minimize per	
	meter		
PRIMARY FIELD SOURCE	Self-contained d	igele transmitter	
SENGOR	Sall-carriernee dicere receiver		
INTERCOIL SPACING	3 66 meners		
OPERATING FREQUENCY	9.8 1092		
POWER SUPPLY	8 disperable all trively uses	name C' cells (approx 20 hrs we con-	
CONDUCTIVITY RANGES	3, 10, 30, 100, 300, 1000 mm/los/meter		
MEASUREMENT PRECISION	:2% of full sca	•	
MASUREMENT ACCURACY	:5% at 20 mm	mhos per meter	
HINNE LEVEL	<0 1 multimities per meter		
OPERATOR CONTROLS	Mose Switch		
	Conductivity Range Switch		
	Phasing Potentiameter     PCoarse Inohase Compensation		
	OFine Inchese Companyation		
QINE HEIGHE	Soom.	4 0 meters extended 1 4 meters stored	
		24 + 20 = 18 cm	
	Shoeing Craie	155 x 42 x 28 cm	
WEIGHT	Instrument West		
	Shaping Weight	23 kgm	

# VARIABLE DEPTH



#### EM34-3

Operating on the same unit-coles as the EM31 the EM34-3 is designed to achieve a substantially increased depth of experanen and a readily available vertical conduc twily prove.

The underwing principle of operation of this patterned non-conjugating method of measuring terrain conjugativity is that the depth of penetration is independent of terrain conductivity and is determined policy for instrument geometry is enter terrain issaching ane con enertation. The EVG4-3 can be used at three hind searing of 10. 20. or 40 meters and in the vertical cospansi rais showing in noncorrait coplanar mode. In the vertical coplanar mode, the vistument series to approx 0.75 of the intercol searing in the neutronic coplanar mode, the vistument can series to 1.5 times the intercol spacing. For the noncorrait cospanar mode, nonexity con mail adjument errors are more serious man in the vertical mode so greater care must be exercised to achieve the materiar each.

Simple operation, survey seeke and straight forward data interpretation makes the EM34-3 a versatile and cost effective test for the engineering geophysicital.

## **Specifications**

MEASURED GUARTITY Assessed conductivity of the ground in minimum per meter

PRIMARY FIELD SOURCE	Self contained dipole transmitter		
SENSOR	Self contained dicate receiver		
REFERENCE CABLE	Lightweight, 2 wire sheldes case		
INTERCOIL SPACING &	010 meters at 6 4 s	M2	
OPERATING FREQUENCY	● 20 meters at 1 6 k ● 40 meters at 0 4 k		
POWER SUPPLY	Transmitter & orspe Receiver & disee		
CONDUCTIVITY RANGES	3 10 30 100 300	www.ele	
MEASUREMENT PRECISION	t 2% of full scale deflection		
MEASUREMENT ACCURACY	1.5% at 20 millioning	Der meter	
NOISE LEVEL	< 0 2 millionas per meter		
DMENSIONS	Receiver Console Transmitter Console Colls	19 5 x 13 1 x 28cm 15 x 8 x 26cm 53cm diameter	
WEIGHTS	Receiver Consele Receiver Coll Transmitter Consele Transmitter Coll Shiogung Weight		
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#### SPECIFICATIONS OF MAGNETOMETER UTILIZED FOR GEOPHYSICAL SURVEYS (From Manufacturer's Literature, EDA Instruments, Inc.)

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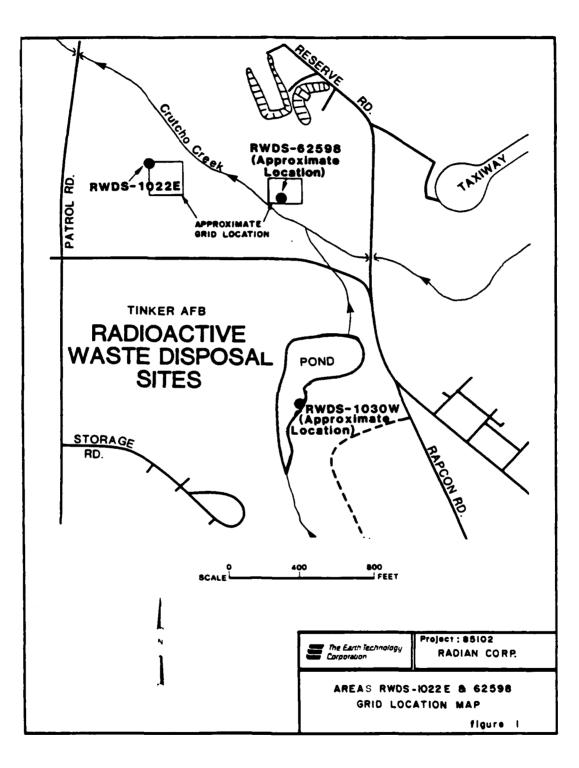
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#### **Specifications** 18,000 to 110,000 gammas. Roll-over display feature suppresses first significant digit upon exceeding 100,000 **Dynamic Range** cammas. Tuning value is calculated accurately utilizing a specially developed tuning algorithm Tuning Method Automatic Fine Tuning ± 15% relative to ambient field strength of last stored value 0.1 camma **Display Resolution** + 0 02 camma **Prohessing Sensitivity** Statistical Error Resolution 0.01 gamma + 1 gamma at 50.000 gammas at 23°C Absolute Accuracy ± 2 gamma over total temperature range Standard Memory Capacity Total Field or Gradient Tie-Line Points 1,200 data blocks or sets of readings 100 data blocks or sets of readings 5,000 data blocks or sets of readings **Base Station** Custom-designed, ruggedized liquid crystal display with an operating temperature range from -40°C to +55°C. The display contains six numeric digits, decimal point, battery Display status monitor, signal decay rate and signal amplitude monitor and function descriptors. RS 232 Serial I/O Interface 2400 baud, 8 data bits, 2 stop bits, no parity Gradient Tolerance 6,000 gammas per meter (field proven) A. Diagnostic testing (data and programmable memory) B. Self Test (hardware) Test Mode Optimized miniature design. Magnetic cleanliness is consistent with the specified absolute accuracy. Sensor 0.5 meter sensor separation (standard), normalized to gammas/meter. Optional 1.0 meter sensor separation available. Horizontal sensors optional. Gradient Sensors Remains flexible in temperature range specified, includes strain-relief connector Sensor Cable Octing Time (Base Station Mode) Programmable from 5 seconds up to 60 minutes in 1 second increments -40°C to +55°C; 0-100% relative humidity; weatherproof **Operating Environmental Range** Non-magnetic rechargeable sealed lead-acid battery cartridge or beit; rechargeable NiCad or Disposable battery cartridge or beit; or 12V DC power source option for base station operation. Power Supply 2,000 to 5,000 readings, for sealed lead acid power supply, depending upon ambient temperature and rate of readings Battery Cartridge/Belt Life Weights and Dimensions 2.8 kg, 238 x 150 x 250mm Instrument Console Only NiCad or Alkaline Battery Cartridge 1.2 kg, 235 x 105 x 90mm NiCad or Alkaline Battery Belt 1.2 kg, 540 x 100 x 40mm Lead-Acid Battery Cartridge 1.8 kg, 235 x 105 x 90mm Lead-Acid Battery Belt 1.8 kg, 540 x 100 x 40mm Sensor 1.2 kg, 56mm diameter x 200mm Gradient Sensor (0.5 m separation - standard) 2.1 kg, 56mm diameter x 790mm Gradient Sensor (1.0 m separation - optional) 2.2 kg, 56mm diameter x 1300mm Instrument console; sensor; 3-meter cable, aluminum sectional sensor staff, power supply, harness assembly, Standard System Complement operations manual. Base Station Option Standard system # Standard system 200.5 meter sensor Gradiometer Option

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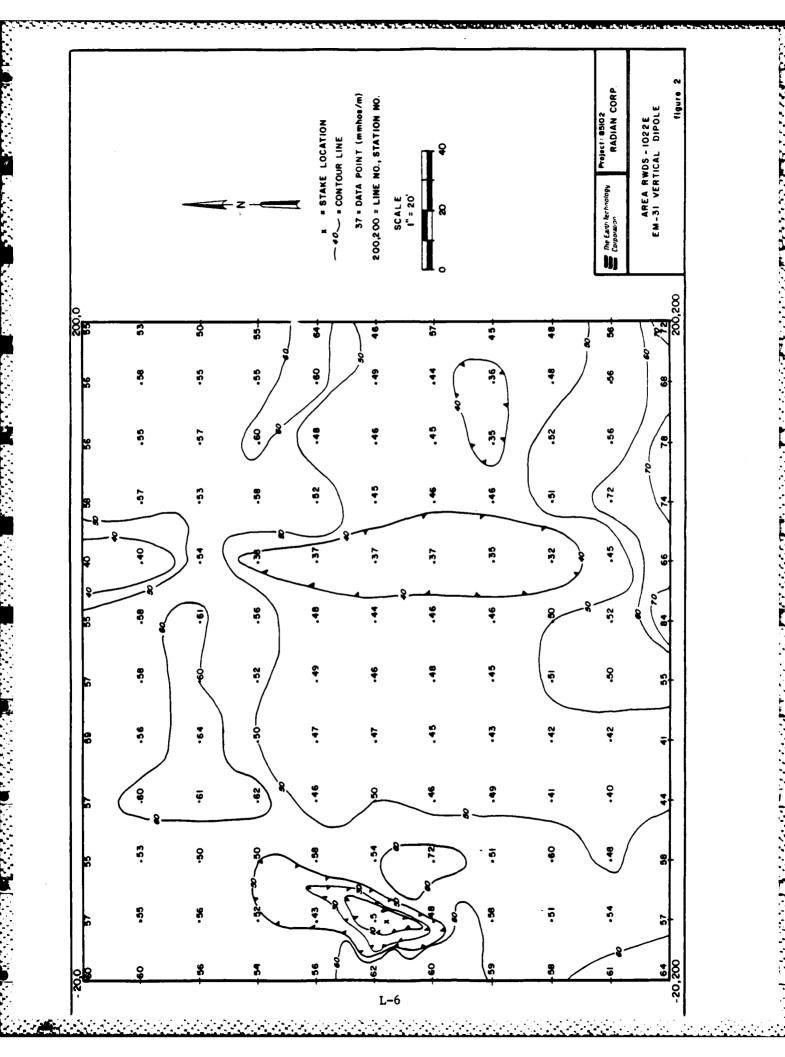
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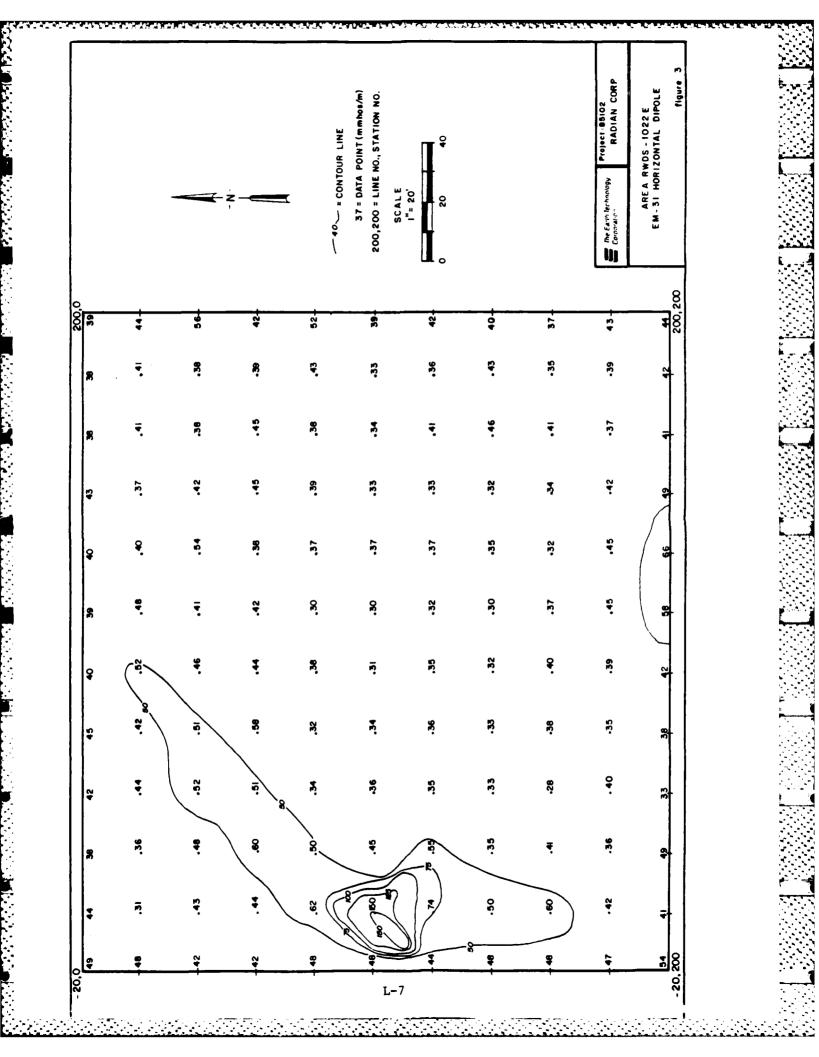


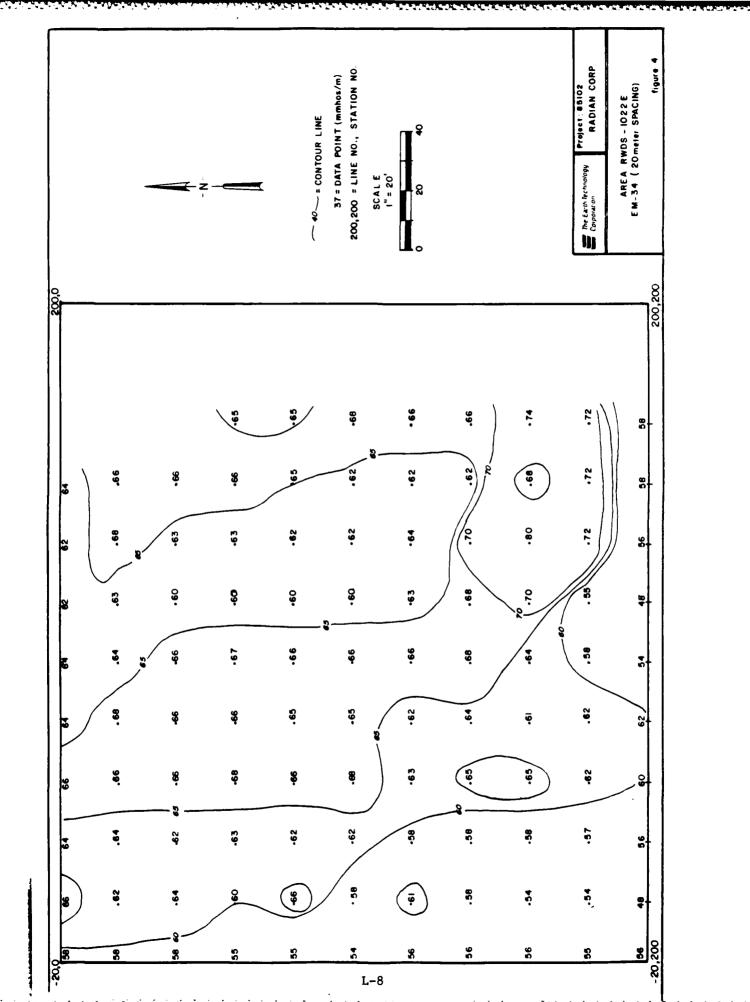
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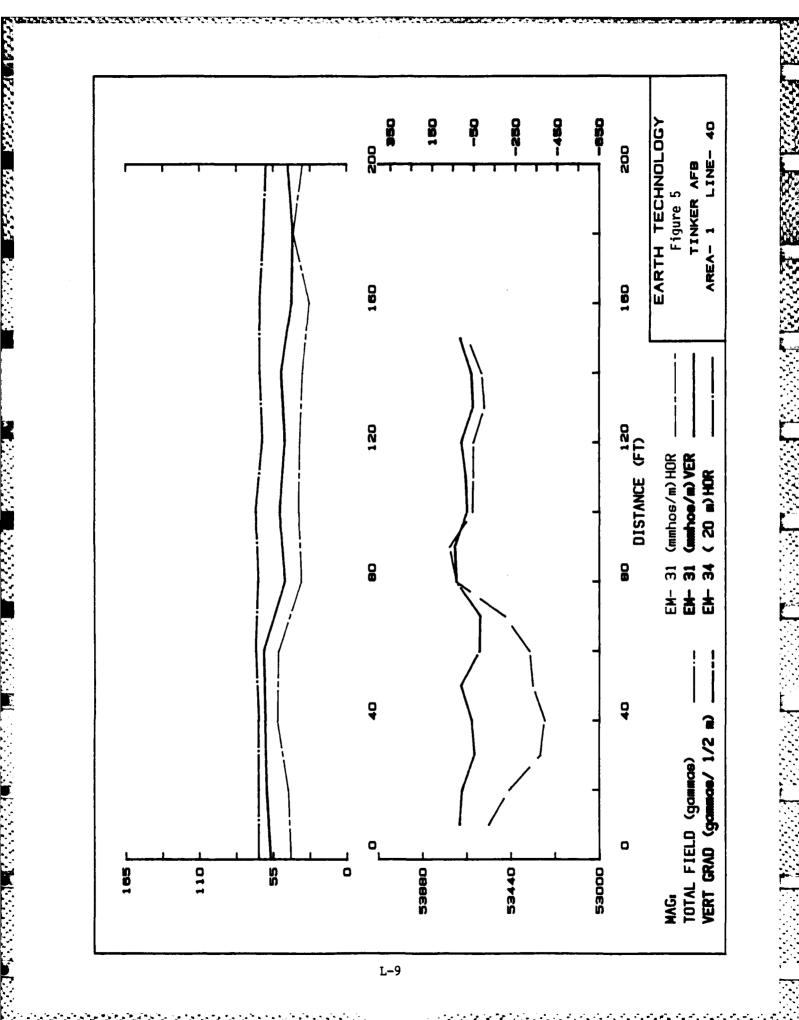
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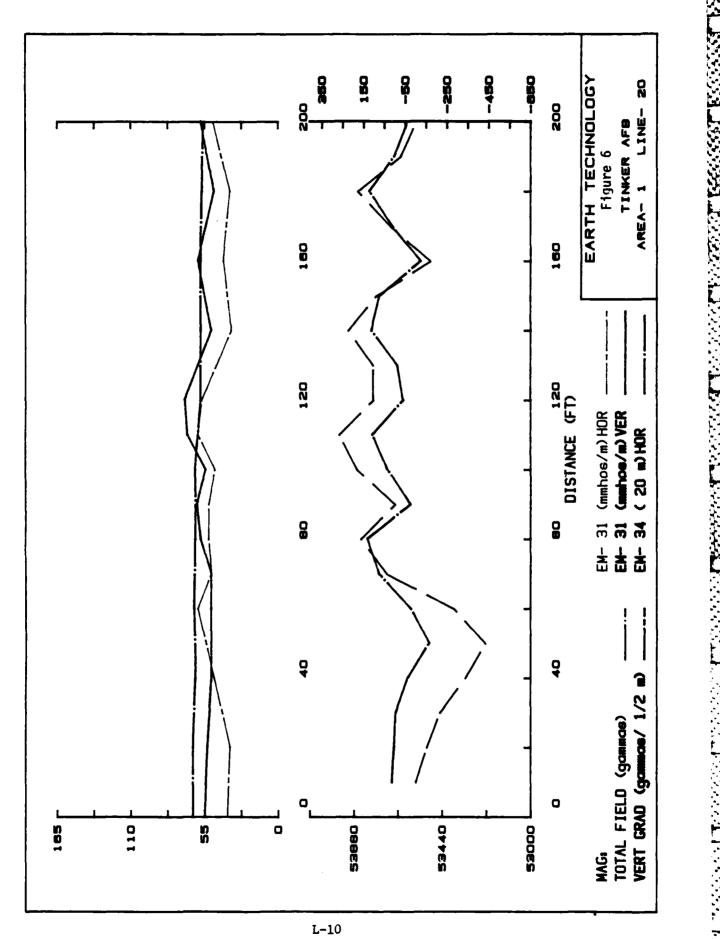


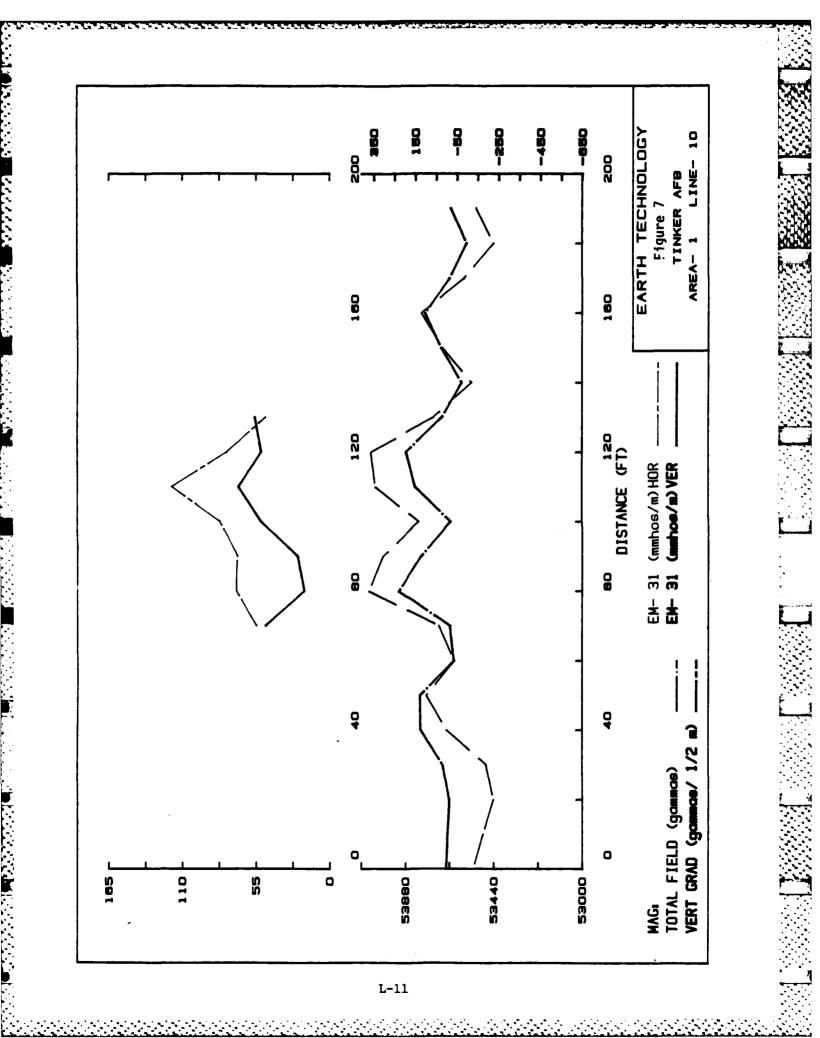
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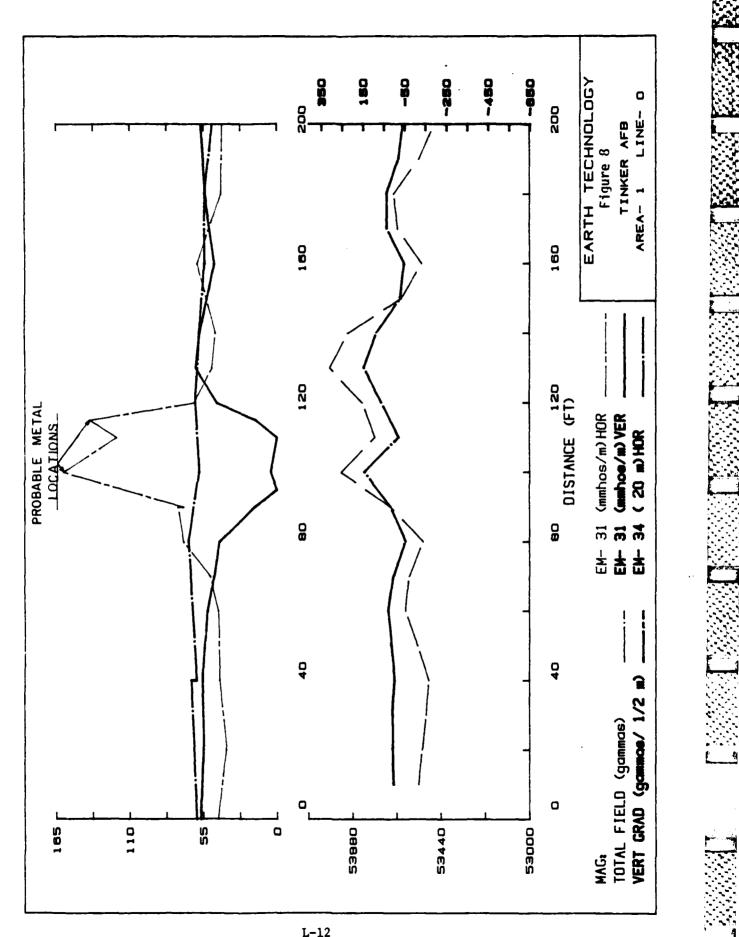




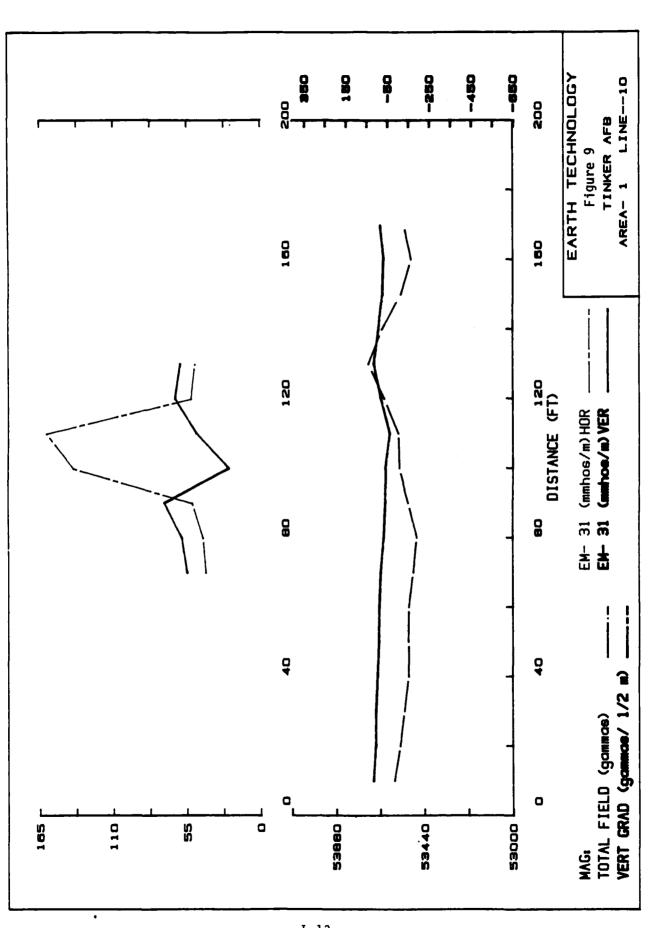




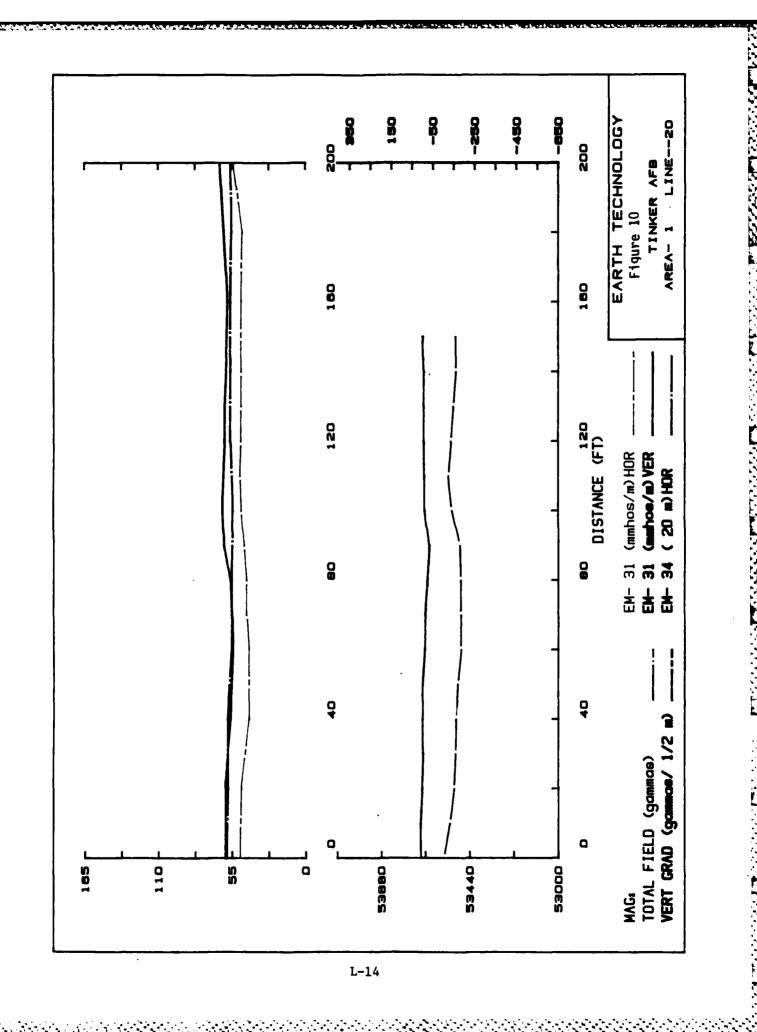




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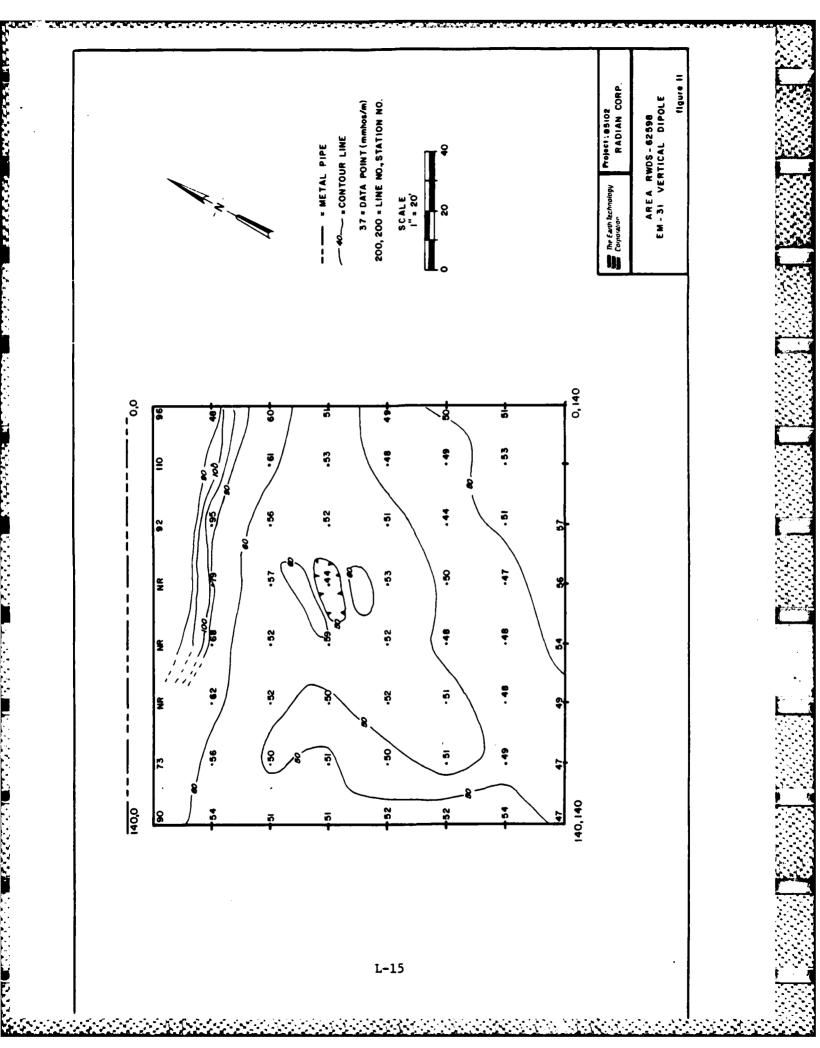
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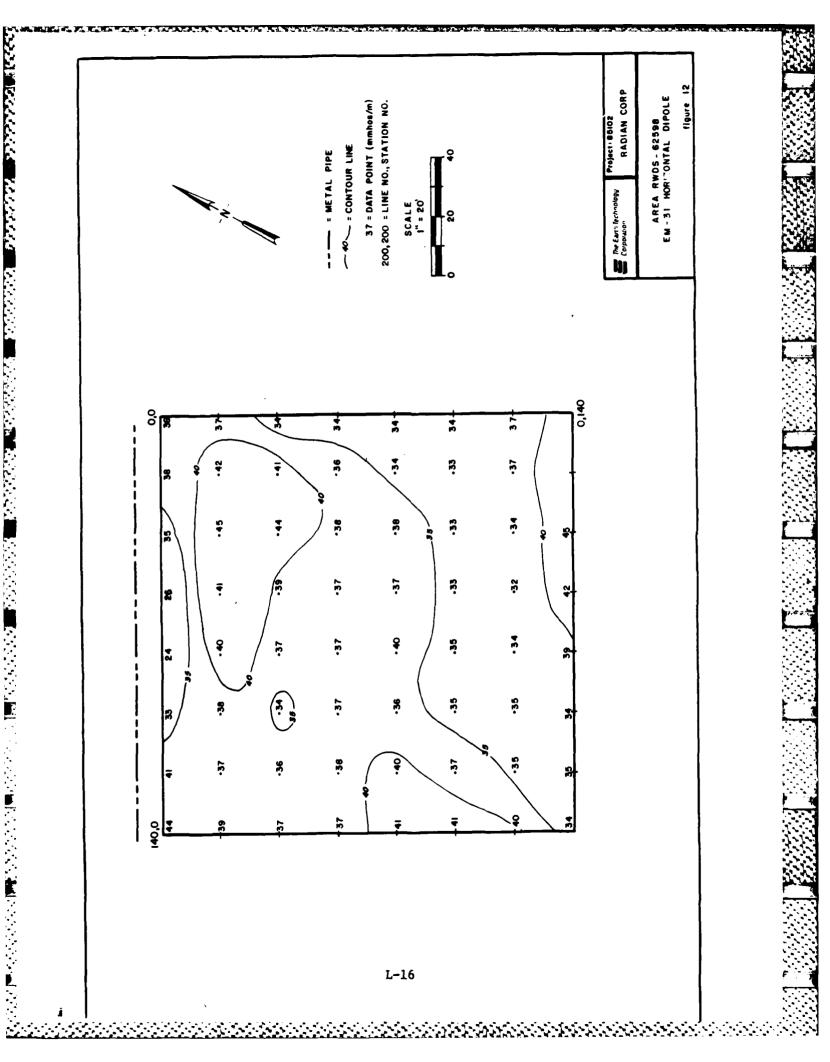


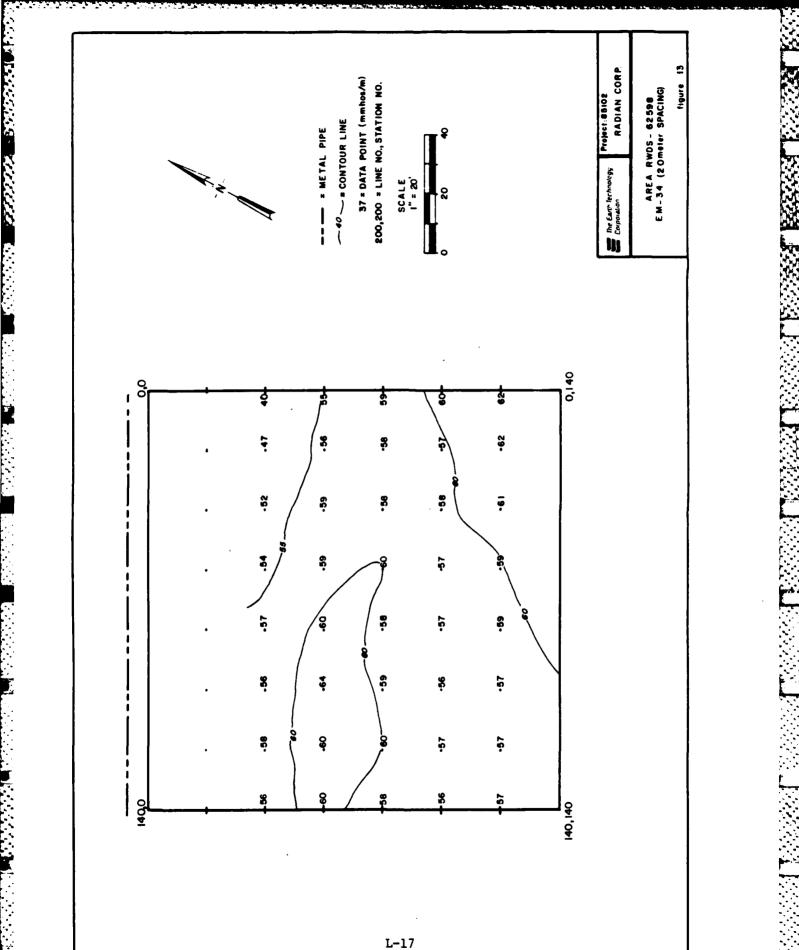
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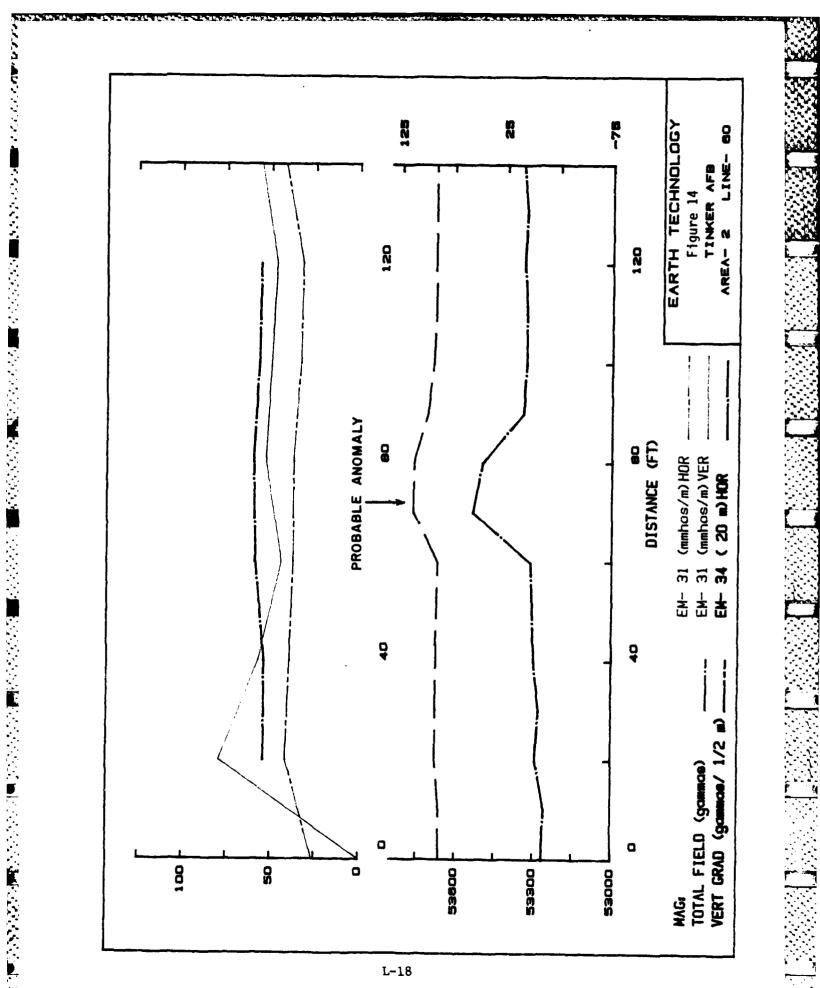
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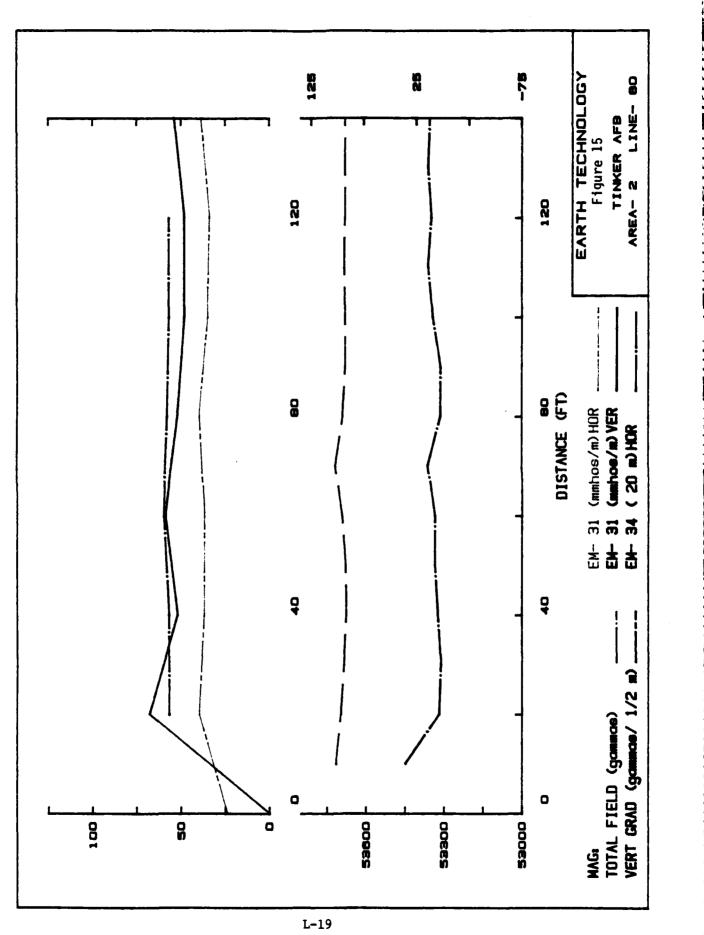
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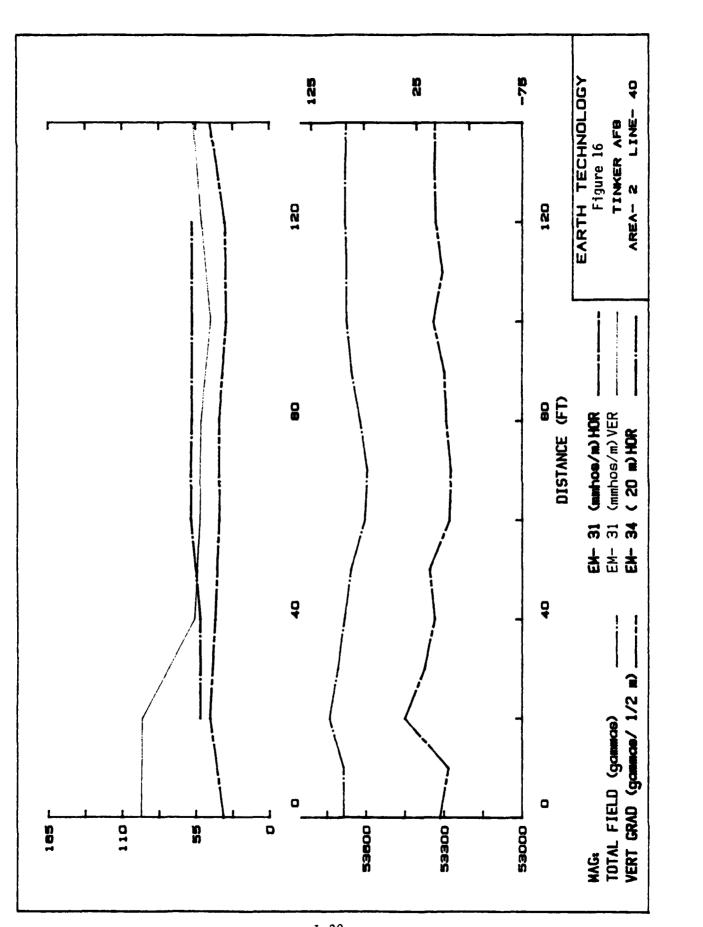








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## APPENDIX M

Safety Plan Utilized on this Project

DCN 83-212-027-04-01

TINKER AFB IRP PHASE IIB SAFETY AND HEALTH PLAN ,

Prepared by: Fred B. Blood

25 October 1983

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## 1.0 PROJECT DESCRIPTION

The purpose of this project is to determine if environmental contamination has occurred from the waste disposal practices at Tinker AFB, OK. The project consists of a variety of field activities; the installation of wells and sample collection, analysis of samples, and reporting. This safety plan is to address the field activities.

The following activities are required in the field portion of the project:

- Installation of six deep sampling wells utilizing an air rotary drilling rig (open hole drilling prior to well casing installation). These wells are not situated directly over the waste site, but they may pass through contaminated ground water.
- Drilling of five soil borings utilizing a hollow-stem auger. These soil borings are directly over a waste site.
- o Collection of 16 well water samples, six from the newly completed deep wells, eight from existing shallow ground water wells, and two from the soil boring holes.
- Collection of 30 soil samples from the soil boring holes.
- Collection of five leachate samples from existing seeps.

 Collection of four water samples from an existing recreational impoundment.

o Performance of surface geophysical testing.

There exists a reasonable probability that all of these activities, with the exception of the geophysical testing, will result in contact with waste contaminated materials. The waste materials include pesticide containers, a wide variety of solvents (including trichloroethylene), metal plating wastes, fuels and oils and radioactive wastes. It is considered highly improbable that radioactivity will be encountered in any samples except the impoundment water samples, and there in low to background levels.

#### 2.0 RATIONALE OF SAFETY APPROACH

The Supervising Geologist is responsible for the proper execution of the safety plan described herein which is for the prevention of deleterious exposure to hazards associated with the handling of toxic wastes. Additionally, typical safety practices related to drilling activities must also be observed (use of safety hats, shoes, and life vests in boat use, etc.). These safety and health practices are to be observed by all Radian personnel and subcontractor personnel.

The potential for worker exposure to fumes and vapors requires gas-proof eye protection. This is accomplished by using full-face respirators. Respiratory protection must include organic vapor, acid gas, and fume protection. The expected concentrations should be within the capacity of air purifying respirator protection. Ambient air monitoring will be performed to provide an indication of excessive levels, which will then require increased protections. The collection of and working with aqueous samples requires splash protection, to be provided by coveralls and jackets. The handling of samples that may contain a wide range of solvents, including trichloroethylene, requires twolayer hand protection.

This safety program is established as a minimum requirement. Variations from the program for greater protection will not be discouraged. However, decreasing the protection must be authorized by the Supervising Geologist or the Project Director. Program changes will be documented in the after-action report.

## 3.0 SAFETY TRAINING

Prior to the initiation of site activities, a training session will be held to discuss the proposed work, associated safety and health plans, and emergency response plans. All personnel assigned to drilling activities and water sampling efforts will be instructed regarding the potential health and safety hazards associated with the work and protective measures available. Specifically, the following topics will be covered in the training session:

- Potential routes of contact with toxic and/or corrosive substances
  - skin contact/adsorption
  - eye contact
  - inhalation
  - ingestion
- Types, proper use, limitations and maintenance of applicable protective clothing and equipment
  - safety helmet
  - industrial safety glasses
  - chemical goggles
  - chemical resistant gloves
  - chemical resistant safety-toe boots
  - chemical resistant body coverings (apron, blouse, trousers, coveralls)
- ο

Respiratory protection using half- and fullfacepiece air purifying respirator with replaceable filter cartridges

- Hierarchy of protective controls: engineered, administrative, work practice, personal protective clothing and equipment.

- Forms of respiratory protection: air purifying (disposal/reusable), air supplied, self contained.
- Selection of respiratory protection based on hazard: dust, fume, mist, gas, irritant, warning properties.
- NIOSH certification/approval of respiratory protection equipment.
- Medical/physical/physiological fitness to wear respiratory protection (e.g., spirometry, clean shaven, etc.).
- Reevaluation of respirator selection.
- Use, limitations and maintenance of full-facepiece air-purifying respirator: qualitative fit test, routine inspection, replacement of parts, cleaning/ disinfection, storage.
- Use, limitations and maintenance of half-facepiece air-purifying respirator: qualitative fit test, routine inspection, replacement of parts, cleaning/ disinfection, storage.
- Reporting of accidents and availability of medical assistance.

All monitoring well installation work will be performed by persons wearing the following required personal protective equipment:

- o PVC bib overalls
- o PVC jacket

- Gauntlet style, chemical resistant, Viton gloves over butyl rubber gloves
- o Chemical resistant safety toe, steel shank boots
- o Respirator (full-facepiece air purifying)
- o Safety helmet

Depending on site conditions and drilling conditions, other items may be used for supplemental protection. Such items may include:

- o Tyvek® coveralls
- o Chemical resistant apron
- o Respirator (half-facepiece, air purifying)
- Chemical eye goggles or safety spectacles with side shields

Because of the potential for migration of contaminants into and through the shallow aquifer zone, well-defined disposal site boundaries are uncertain. Several disposal sites have a high potential for migration of contaminants. Most of the monitoring wells will be installed in areas hydraulically down-gradient of known disposal sites or in areas of unknown ground water flow direction. Since the degree of contamination and potential migration patterns of contaminants are not known, respirator use will be required as a precaution during all drilling activities and well installation work. Full-facepiece air purifying respirators will be used with Ultra-Twin GMC Cartridges for acid gases, dust and fume protection, and organic vapors. The Supervising Geologist may decide to implement the use of half-facepiece, air purifying respirators depending on specific site and drilling conditions. Only when well installation work is being performed in areas hydraulically up-gradient of respective sites and when there is considerable confidence that well locations are outside zones of possible cross-contamination, may respirator use be discontinued.

#### 5.0 WORK ZONES AND DECONTAMINATION PROCEDURES

To minimize the transfer of hazardous substance(s) from the site, contamination control procedures are needed. Contaminants must be removed from people and equipment prior to relocation from a work zone.

#### 5.1 Work Zones

Prevention of exposures and spread of contamination will be controlled through the establishment of work zones. Two primary work zones will be utilized and will be referred to as the (1) Exclusion Zone and (2) Decontamination Zone.

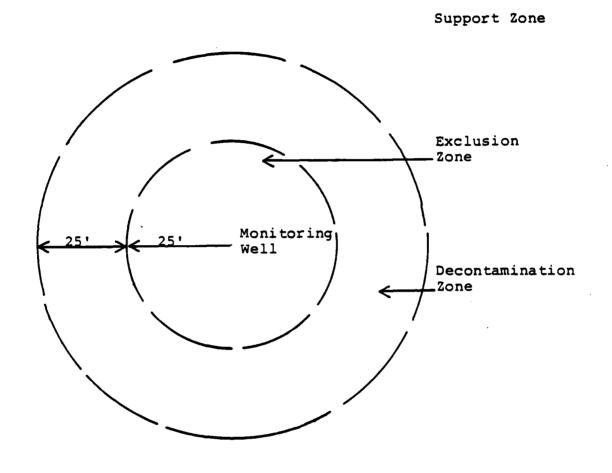
The Exclusion Zone is the area where disturbance activities are conducted and where contaminants are or may be present. Only those properly trained individuals attired in the specific protective clothing and equipment will be allowed to enter and work in this zone.

The Decontamination Zone is the area where personnel and equipment will be decontaminated before moving to the next site.

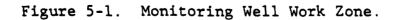
The Exclusion Zone will comprise a 25-foot radius circle around the monitoring well and the Decontamination Zone will comprise a 25-foot wide ring around the Exclusion Zone as shown in Figure 5-1.

#### 5.2 Decontamination Procedures

Personal protective equipment and drilling/sampling equipment can become contaminated in a number of ways including:



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- Contacting vapors, gases, mists, or particulates in the air.
- Walking through puddles of liquids or on contaminated soil.
- Using contaminated instruments or equipment.

Protective clothing and respirators help prevent the wearer from becoming contaminated or inhaling contaminants, while good work practices help reduce contamination of protective clothing, instruments, and equipment. Even with these safeguards, contamination may occur. Harmful materials can be transferred into clean areas, exposing unprotected personnel. Or in removing contaminated clothing, personnel may contact contaminants on the clothing and/or inhale them.

Decontamination consists of physically removing contaminants. How extensive decontamination must be depends on a number of factors, the most important being the type of contaminants involved. The more harmful the contaminant, the more extensive and thorough the decontamination must be. Combining decontamination, the correct method of doffing personnel protective equipment, and the use of site work zones minimizes cross-contamination from protective clothing to wearer, equipment to personnel, and one area to another.

Decontamination at the monitoring wells will be accomplished by physically removing contaminants from the surfaces of personal protective equipment and drilling/sampling equipment with detergent water followed by rinse with clean water. The process will be repeated (see Figure 5-2).

Final rinse of drilling/ sampling equipment with clean water

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Rewash drilling/ sampling equipment with detergent water

Rinse drilling/ sampling equipment with clean water

Wash drilling/ sampling equipment with detergent water

Decontamination Zone

Wash exposed skin surfaces

Remove respirators and gloves

Final rinse of PPE with clean water

Rewash PPE with detergent water

Rinse PPE with clean water

Wash PPE with detergent water

Monitoring Well



Exclusion Zone

Figure 5-2. Monitoring Well Decontamination Procedures.

#### 6.0 SAFETY MONITORING

In addition to the use of personal protective equipment and respirator protection, safety support plans are also necessary. At Tinker AFB, safety support will constitute ambient air monitoring of hazardous and/or toxic materials for the protection of Radian and Air Force personnel and emergency response in the event of an employee injury or other medical emergency.

#### 6.1 Ambient Air Monitoring

Ambient air monitoring will be performed using two techniques. One technique will use the combustible gas meter (TLV Sniffer) and the other will use colorimetric indicator tubes and the grabsampling method. All readings must be documented (minimum 2/hole) in field notes.

Air monitoring will be performed during drilling activities to determine if the respiratory protection chosen affords adequate protection from contaminant concentrations found on-site.

#### 6.1.1 TLV Sniffer

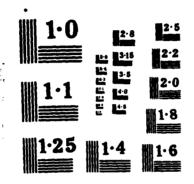
A Bacharach Instruments TLV Sniffer will be used to locate on-site organic vapor concentrations that are higher than ambient outdoor air concentrations. The instrument will be used to determine general areas of elevated organic vapor concentrations, and not as a precision analytical instrument. It is an instantaneous measuring instrument and displays concentrations on a meter in parts per million (ppm), referenced to hexane. The TLV Sniffer displays a meter reading directly in parts per million (ppm) volatile flammable vapor allowing an estimate of combustible gas concentrations. The instrument can be calibrated to read directly in parts per million for any one of many kinds of combustible gases. Factory calibration is for hexane unless otherwise specified, though readings from other gases and vapors may be interpreted easily by means of reading conversion curves (Figure 6-1).

#### 6.1.2 Grab-Sampling Using Colorimetric Indicator Tubes

A Draeger[®] kit with an assortment of indicator tubes will be used to obtain quick analysis of unknown hazardous substances in The Draeger[®] tubes are colorimetric direct reading detecair. tor tubes and function as "real time" hazardous condition indicators. Samples will be collected during drilling activities. An initial screening tube (Polytest[®]) will be used for a general qualitative test. This tube will give a positive reaction indicating the presence of ethyl acetate, benzene, acetone, alcohol, and/or hydrocarbons. If a positive reaction does occur, more specific tests may be made using more specifically reacting Draeger® tubes. Table 6-1 lists the sampling strategy to be used when obtaining grab-samples via Draeger® tubes at Tinker AFB. In addition to the Polytest[®], any of the detector tubes listed in Table 6-1 may be used individually if the presence of that compound is suspected.

The respirators selected for use at Tinker AFB have been assigned protection factors by the National Institute for Occupational Safety and Health (NIOSH). These respirator protection factors are listed in Table 6-2. In event that sampling results indicate that the respective Threshold Limit Values (TLVs) may be exceeded, concentrations should be compared to the Protection

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NATIONAL BUREAU OF STANDARDS

**O-XYLENE** 100-HEXANE 90-TOLUENE 80 BENZENE/CS2 70-% LEL EQUIVALENT 60 50-40 ETHYLENE ETHANOL 30-VINYL CHLORIDE 20 METHANE 10-0 10000 4000 6000 8000 2000 Ó 9000 1000 3000 7000 5000 PPM CONCENTRATION IN SAMPLE

223) CLARKER STRAND REALESS BARRELESS REPAIRED

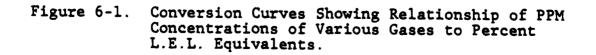


TABLE 6-1. DETECTOR TUBES FOR AMBIENT AIR MONITORING

	Detector Tube ^l	Positive Reaction Indicates Presence of	Detection Limit	TLV (ACGIH 1982)	MUC ²
Γ.	Polytest	2, 3, 4, 5, 6*	50 ppm (benzene) 2000 ppm (acetone)		
2.	Ethyl acetate 200/a	Esters, 3, 4, 5	200 ppm	400 ppm	1000 ppm
э.	Benzene 0.05	Aromatic H/C	15 ppm	10 ppm	500 ppm
4.	Acetone 100/b	ketones	100 ppm	750 pp <b>m</b>	1000 ppm
5.	Alcohol 100/a	Alcohols	100 ppm		
6.	Hydrocarbon 0.1%/b	Aliphatic H/C	0.1% (butane)		
7.	Sulfur dioxide l/a	Sulfur dioxide	l ppm	2 ppm	100 ppm
<b>.</b>	Hydrogen sulfide l/c	Hydrogen sulfide	1 ppm	10 ppm	500 ppm

- ¹ List is a modification of the sampling strategy for unknown substances developed by National Draeger, Inc. Tubes are manufactured by National Draeger, Inc.
- ² MUC Maximum Use Concentration based on full-faced respirators. If levels exceed this value, respiratory protection must be increased.
- A positive test also occurs for arsin, carbon disulfide, nitric oxide, carbon monozide, and methyl bromide. *

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С Т	TABLE 6-2.	RESPIRATOR PROTECTION	FACTORS
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	Type Respirator	Facepiece Pressure	Protection Factor
	Half- or Quarter-mask, High-Efficiency Air Purifying	negative	10*
	Full Facepiece, High Efficiency Air Purifying	negative	50*

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* These Protection Factors pertain to properly fitted facepieces with new cartridges and filters.

Factor associated with the particular respirator in use. If the concentrations of contaminants are not conservatively within the listed Protection Factor, work activities will be terminated until satisfactory respiratory protection can be obtained.

## 6.2 Personal/Site Hygiene

Punctured, internally contaminated, cracked, stubbornly soiled, protective items will be disposed in sealed plastic bags.

Paper, rags, and other disposables used on-site or in equipment/sample container clean up will be disposed of in sealed plastic bags.

No food will be consumed on the exploration site. Employees will thoroughly wash their hands, forearms and face before consuming food or beverages other than water held in disposal cups. Drinking water will be available at the perimeter of the site being investigated. Disposable cups will be used to consume water after protective gauntlet gloves are removed.

Soil cuttings from augering which display contamination will be removed from the site in suitable sealed containers for eventual disposal.

#### 6.3 Emergency Medical Services

In the event of an employee injury or other medical emergency on-site, the Supervising Geologist and other personnel trained in first aid and CPR will immediately provide assistance. An MSA model self-contained breathing apparatus (SCBA) will be nearby for use by the Supervising Geologist and back-up geologist during emergency rescue situations requiring respiratory protection.

