U.S. Environmental Protection Agency
Hazardous Waste Ground-Water Task Force

Information and Documents for Compliance Assessment of the Bob's Home Service Wright City, Missouri Facility

Volume 6
Technical Reports and Plans -- General Technical Reports and Plans

October, 1985

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Volume 6

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BOB'S HOME SERVICE

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VOLUME 6

TECHNICAL REPORTS AND PLANS

GENERAL TECHNICAL REPORTS AND PLANS

		DOCUMENT CONTROL NUMBER																
		T013-P09-603-001	T013-P09-603-002	T013-P01-603-003	T013-P01-603-004													
NUMBER OF PAGES		5	5	426	48													
PART B APPLICATION																		
PART A APPLICATION/INTERIM STATUS																		
COMPLIANCE ENFORCEMENT																		
HYDROGEOLOGIC REPORTS																		
CORRESPONDENCE																		
TECHNICAL REPORTS AND PLANS		●	●	●	●													
MAPS, DRAWINGS AND PHOTOGRAPHS																		
CONFIDENTIAL INFORMATION																		
TASK FORCE REPORTS AND PLANS																		
	MODIFIER CODE																	
REVIEW/REQUEST	1001																	
RESPONSE/REVISIONS	1002																	
COMMENTS	1003																	
RESPONSIBLE AGENCY TO OWNER/OPERATOR	1501																	
OWNER/OPERATOR TO RESPONSIBLE AGENCY	1502																	
THIRD PARTY	1503																	
INTERNAL	1504																	
APPLICATION FOR WAIVER, AMENDMENT	2001																	
ACL DEMONSTRATION	2002																	
SITE INSPECTION REPORTS	2501																	
NOTICES OF DEFICIENCY, NON-COMPLIANCE	2502																	
LITIGATION ACTIONS	2503																	
CONSENT DECREES	2504																	
ORDERS	2505																	
COMPLAINTS	2506																	
PENALTIES	2507																	
WATER, SOLID WASTE PERMITS	3001																	
WASTE INVENTORY/MANIFESTS/ANALYSIS	3501			●	●													
BIENNIAL REPORTS	3502																	
GROUND WATER	4001				●													
SURFACE WATER	4002																	
SOIL, SEDIMENT	4003	●	●															
LEACHATE	4004																	
SAMPLING/ANALYSIS	4005	●	●	●														
DATA	4006																	
WASTE STORAGE	4501																	
WASTE TREATMENT, DISPOSAL	4502																	
LAND DISPOSAL	4503																	
INCINERATION	4504																	
SPECIAL WASTES (PCBs, DIOXIN, ETC.)	5001																	
GROUND-WATER SAMPLING AND ANALYSIS PLAN	5501																	
GROUND-WATER MONITORING/ASSESSMENT PLAN	5502																	
WASTE ANALYSIS PLAN	5503			●	●													
EMERGENCY CONTINGENCY PLANS	5504																	
EMPLOYEE HEALTH AND SAFETY PLANS	5505																	
CLOSURE/POST-CLOSURE PLANS, FINANCIAL DATA	5506			●														
STANDARD OPERATING PROCEDURES	5507			●														
HEALTH, BIOTA STUDIES	6001																	
FOOD CHAIN STUDIES	6002																	
ENGINEERING STUDIES, REPORTS	6501																	
LEACHATE/LINER SYSTEM	6502																	
MAN-MADE HYDROLOGIC CONTROLS	6503																	
HYDROLOGIC/GEOLOGIC REPORTS	6504			●														
SOIL/WATER RESOURCE REPORTS	6505	●	●		●													
AQUIFER CHARACTERISTICS	6506	●	●															
WELL INVENTORY/WATER USE	6507																	
WELL/BORE LOGS, GEOPHYSICAL DATA	6508			●														
OTHER TECHNICAL REPORTS	6509																	
CONSTRUCTION DETAILS, SPECIFICATIONS	6510																	
MAPS, DRAWINGS AND PHOTOGRAPHS	6511			●														
FACILITY DESCRIPTION, HISTORY	9001			●														
DEEDS OF TRANSFER	9002																	
INCIDENT REPORTS	9003																	
HAZARDOUS SITE RANKING	9004																	
REMEDIAL INVESTIGATION	9005																	
FEASIBILITY STUDY	9006																	
IMMEDIATE REMEDIAL MEASURES	9007																	
REMEDIAL DESIGN, ACTION	9008																	
REMOVAL ACTION	9009																	

TECHNICAL REPORTS AND PLANS -- GENERAL TECHNICAL REPORTS AND PLANS

DOCUMENT	DATE	DESCRIPTION
T013-P09-603-001	01-28-80	Compaction Test Data Determination Sheet for Bob's Home Service (5 Pages) o Results for Sample III at 12 feet; glacial till
T013-P09-603-002	01-28-80	Compaction Test Data Determination Sheet for Bob's Home Service (5 Pages) o Results for Sample II at 15 feet; glacial till
T013-P01-603-003	05-11-81	Field Investigations of Uncontrolled Hazardous Waste Sites; FIT Project prepared by: Ecology and Environment, Inc., Region 7 (426 Pages) o Site Inspection Report of Bob's Home Service Inc., Wright City, Missouri - Section Two-Geophysical background, Piezometer wells - Section Three-Site Inspection RCRA Requirements on ground-water monitoring - Section Five-Summary of general recommendations * Attachment I-MDNR, EPA file information, MDNR Permit Site Inspection Reports, Citizen complaints, General correspondence * Attachment II-MDNR Waste Disposal Authorization for B.H.S., Inc.

TECHNICAL REPORTS AND PLANS -- GENERAL TECHNICAL REPORTS AND PLANS

DOCUMENT	DATE	DESCRIPTION
T013-P01-603-003	(continued)	* Attachment III-RCRA Compliance Information -- 3A-EPA RCRA Compliance information for B.H.S. -- 3B-B.H.S. Waste Characterization Scheme -- 3C-B.H.S. Analytical Data for Waste Shipments -- 3D-B.H.S. Waste Manifests -- 3E-General RCRA Compliance Information -- 3F-B.H.S. Facility and Operations Manuals * Attachment IV-B.H.S. Sampling Data and Records -- B.H.S.Monitoring Data -- Field Sampling Records
T013-P01-603-004	08-28-81	Field Investigation of Uncontrolled Hazardous Waste Site, FIT Project prepared by Ecology and Environment, Inc., Region 7 (48 Pages) o Bob's Home Service Sample Report Summary of Data; Acid Fraction, Volatile Organics, Comparison of Related Samples, Piezometer Wells, Private Wells

Warren County

Compaction Test Determination Sheet

T013-P09-603-001

Soil Sample Bob's Home Service
Sample III - glacial till
depth 12 ft.

Location SE-NW-SE 32-47N-1W

Sample No. Wright City

Specific Gravity 2.65

Test No. Williams

Date 28 Jan. 1980

Tested by St. Ivany

Test type

Mold

Weight

Density

Run No.	38						
Wt. Mold + Soil	796.0						
Wt. Mold lbs.	217.4						
Wt. Comp. Soil lbs.	578.6						
Wet Density in lbs./ft.^{3}	127.56						
Dry Density lbs./ft.^{3} γ_d	110.85						
Void Ratio e	.49						
Porosity n	32.90						

Water Content

Run No.							
Container No.	C						
Cont. + Wet Soil in gms.	50.95						
Wt. Container + Dry Soil gms.	45.78						
Wt Water gms. W_w	5.17						
Wt. Container gms.	11.48						
Wt Dry Soil gms. W_s	34.30						
Water Content W%	15.07						

Percent Saturation

	W	γ_d		W	γ_d
S = 100%			S = 80%		

STATE OF MISSOURI
DIVISION OF GEOLOGICAL SURVEY AND WATER RESOURCES

PERMEABILITY TEST Warren County

PROJECT: BHS - sample III	DATE SAMPLE: Jan. 22, 1980 BY Williams
LOCATION: SE-NW-SE 32-47N-1W	DATE TESTED: Feb. 5, 1980 BY ST. Ivany
BORING NO: SAMPLE NO:	DATE COMPUTED: BY
DEPTH: 12 ft. SURF ELEV:	DATE CHECKED: BY
PERMEAMETER NO. glacial till	DATE PLOTTED: BY

RUN NO	WATER TEMP. °C	SAMPLE LENGTH CM L	INITIAL HEAD CM H_1	FINAL HEAD CM H_2	TEST TIME SEC. t	$\log_e \frac{H_1}{H_2}$	$\frac{aL}{At}$	K CM/SEC.	TEMP. CORR.
38		6.78	68.6	64.1	23h15		1.4×10^{-4}	8.4×10^{-6}	

a - STAND PIPE AREA = 1.75 CM²

A - SAMPLE AREA = 41.71 CM²

$K = \frac{aL}{At} \log_e \frac{H_1}{H_2} = \{$ PERMEABILITY IN CM/SEC.

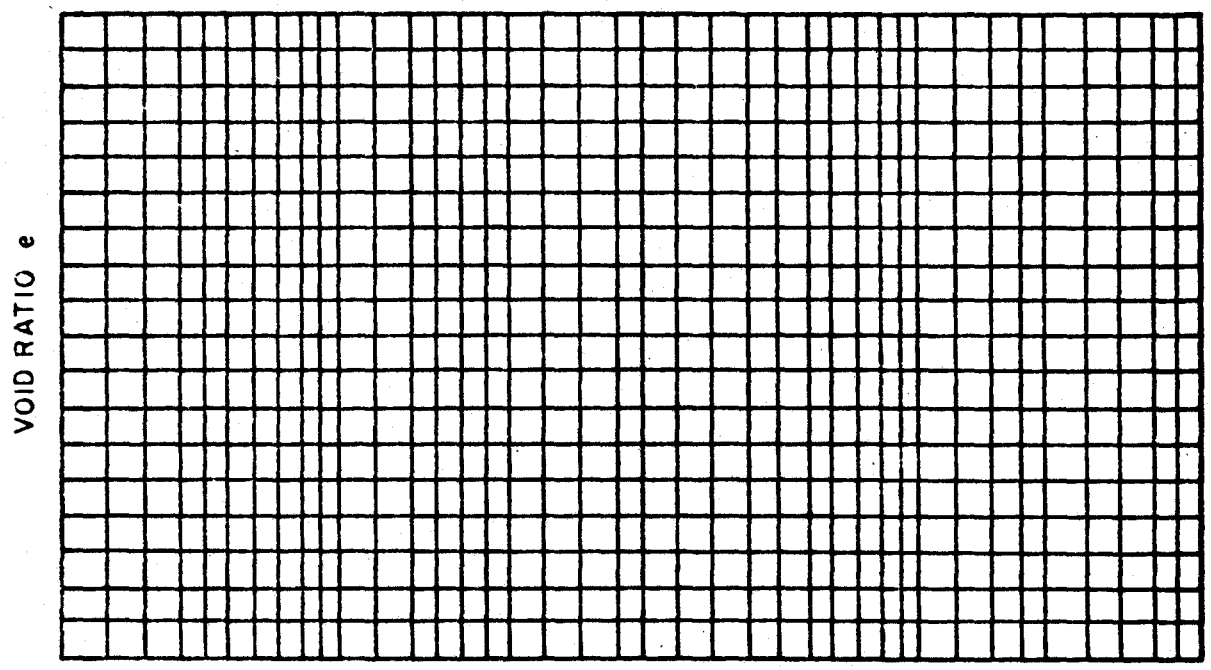
$e = \frac{SAL - W_s}{W_s}$ = VOID RATIO

S = SPECIFIC GRAVITY

W_s = WT. OF DRY SOIL IN GMS.

SUMMARY

TEST	WT. DRY SOIL	e	K $\frac{CM}{SEC.}$



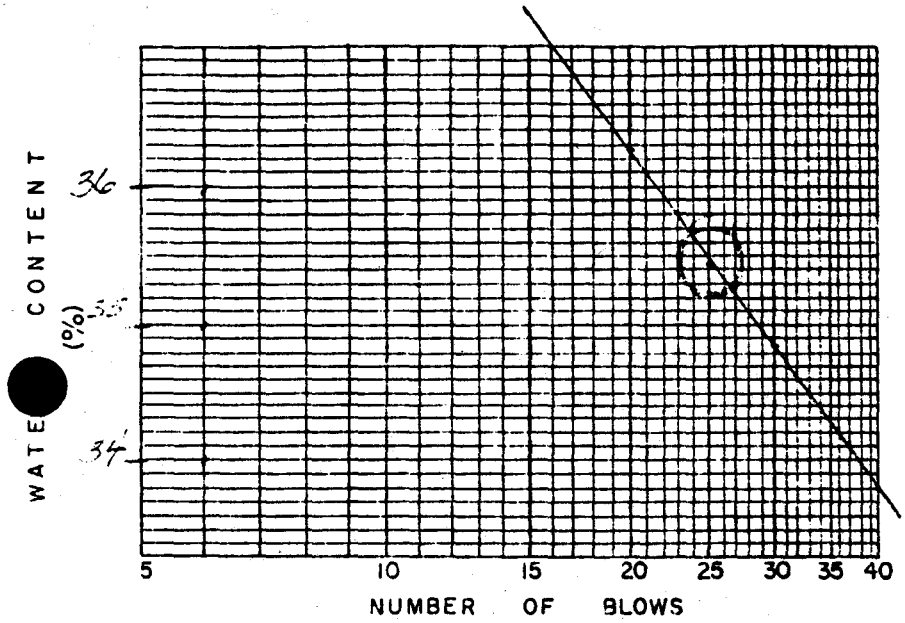
ATTERBERG LIMITS

Warren County

SAMPLE BHS - sample III - glacial till DATE Jan. 29, 1980

LIMIT depth 12 ft.

NO.	1	2	3	4	5	6	NATURAL WATER CONTENT 1	2
TARE NO.	Q	M	H					
WT. WET SOIL + TARE	21.93	22.93	20.72					
WT. DRY SOIL + TARE	19.17	19.99	18.44					
WT. WATER	2.76	2.94	2.28					
WT TARE	11.56	11.69	11.90					
WT. DRY SOIL	7.61	8.30	6.54					
WATER CONTENT (w)	36.27	35.42	34.86					
NUMBER OF BLOWS	20	25	30					



SHRINKAGE LIMIT

SHRINKAGE DISH NO.	
WT. WET SOIL + DISH	
WT. DRY SOIL + DISH	
WT. WATER	
WT. SHRINKAGE DISH	
WT. DRY SOIL (W_S)	
WT. SHRINKAGE DISH + H_G	
WT. H_G IN SHRINKAGE DISH	
WT. PETRI DISH + H_G	
WT. PETRI DISH	
WT. H_G IN PETRI DISH	
VOL. SHRINKAGE DISH (V_O)	
VOL. DRY SOIL (V_S)	
$V_O - V_S$ (V_D)	
$(V_D / W_S) \times 100$ (Q)	
WATER CONTENT (w)	
SHRINKAGE LIMIT - SL (w-Q)	
SHRINKAGE RATIO - R(W_S/V_S)	

PLASTIC LIMIT

MATERIAL NO.	1	2	3
TARE NO	U	K	F
WT. WET SOIL + TARE	15.08	15.71	15.97
WT. DRY SOIL + TARE	14.59	15.17	15.37
WT WATER	.49	.54	.60
WT TARE	11.80	11.75	11.92
WT DRY SOIL	2.79	3.42	3.45
WATER CONTENT (w)	17.56	15.79	17.39

LIQUID LIMIT 35.45

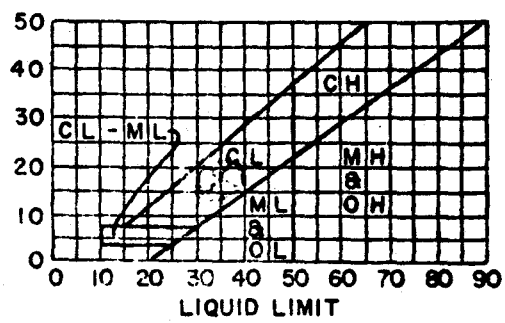
PLASTIC LIMIT ~~35.45~~ 16.91

PLASTICITY INDEX 18.54

SHRINKAGE LIMIT

CLASSIFICATION CL

PLASTICITY INDEX



HYDROMETER ANALYSIS

Warren County

SAMPLE B.H.S. - sample III - glacial till DATE Jan. 29, 1980

TARE NO. ____ WT AIR DRY SOIL + TARE ____ WT. DRY SOIL + TARE ____ WT. WATER ____

WT. TARE ____ WT. DRY SOIL ____ AIR DRY WATER CONTENT, w_A ____

AIR DRY SAMPLE 50 gr WT. SOLIDS, w_o ____ MENISCUS CORRECTION, c_M 1

DISPERSING AGENT USED Calgon QUANTITY 50ml DISPERSING AGENT CORR., c_D 1

depth 12

CLOCK TIME	ELAPSED TIME MIN.	TEMP. °C	HYDROMETER READING (R')	MENISCUS CORRECTED HYDROMETER READING (R)	EFFECTIVE DEPTH (H_R) CM.	PARTICLE DIAMETER (D) MM.	TEMP CORRECTION (M)	R-C_D+M	PERCENT FINER PARTIAL	PERCENT FINER TOTAL
7:52	1/4	20	43	44		.080	0	43.0	86.0	
7:52	1/2	20	40	41		.058	0	40.0	80.0	
7:53	1	20	38	39		.041	0	38.0	76.0	
7:54	2	20	36	37		.030	0	36.0	72.0	
7:56	4	20	34	35		.021	0	34.0	68.0	
8:00	8	20	32	33		.015	0	32.0	64.0	
8:07	15	20	30	31		.011	0	30.0	60.0	
8:22	30	20	27	28		.0085	0	27.0	54.0	
8:52	60	20	25	26		.0060	0	25.0	50.0	
9:52	120	20	22	23		.0043	0	22.0	44.0	
11:52	240	20	20	21		.0032	0	20.0	40.0	
[illegible]52	480	20	18	19		.0022	0	18.0	36.0	
[illegible]52	1440	20	17	18		.0013	0	17.0	34.0	

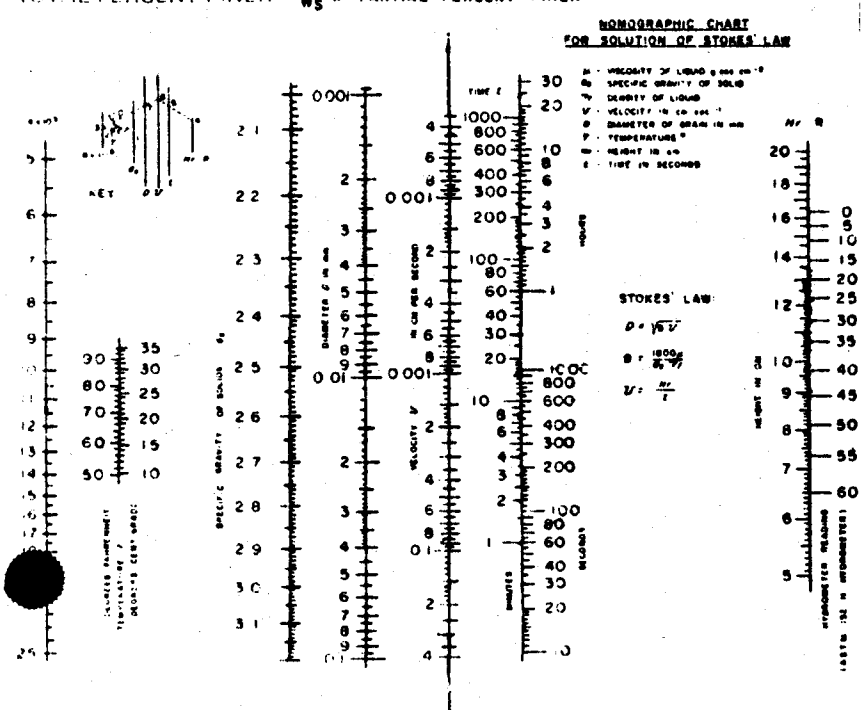
TEMPERATURE (°C)	21.0	21.5	22.0	22.5	23.0	23.5	24.0	24.5	25.0	25.5	26.0	26.5	27.0	27.5	28.0	28.5	29.0
TEMP. CORR. (M)	+0.2	+0.3	+0.4	+0.5	+0.6	+0.7	+0.8	+0.9	+1.0	+1.1	+1.3	+1.4	+1.5	+1.6	+1.8	+1.9	+2.1

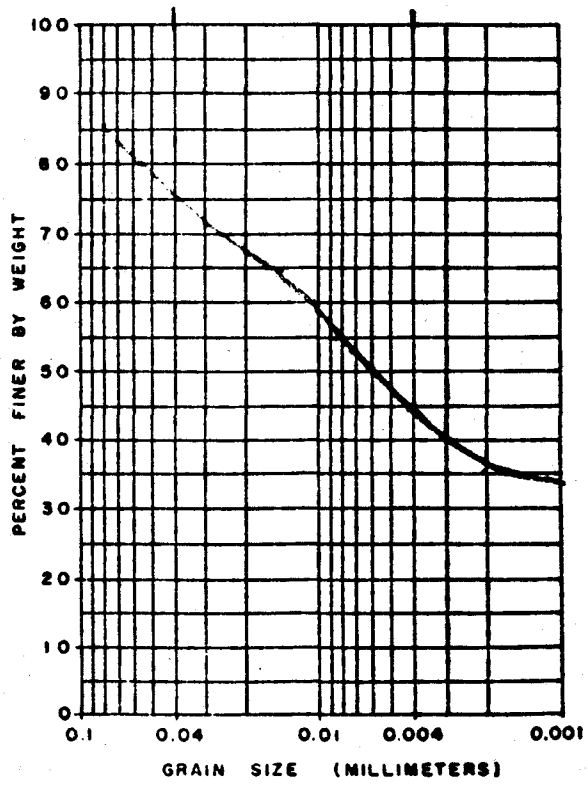
WT. COMBINED ANALYSIS SAMPLE, w_s ____

SPECIFIC GRAVITY OF SOLIDS 2.65

PARTIAL PERCENT FINER = $\frac{100}{w_o}(R - C_D + M)$

TOTAL PERCENT FINER = $\frac{w_o}{w_s} \times$ PARTIAL PERCENT FINER





Ph [illegible] Capacity

Soil Sample Description Bob's Home Service - Sample III
glacial till - depth 12ft.

Soil Sample Location SE¼, NW¼, SE¼, Sec. 32, T. 47N R. 1W, Quad. Wright City

County Warren

Soil Ph 7.03

Ammonium acetate (exchangeable) pH 7.11

milli equivalents 0 Adjusted 0

Acetic acid (exchangeable) pH 3.88

milli equivalents greater than 18 Adjusted greater than 18

Purpose Hazardous Waste Site

St. Irvany Jan. 30, 1980

Warren County

Compaction Test Determination Sheet

T013-P09-603-002P09

Soil Sample Bob's Home Service
Sample II - glacial till
Depth 15 ft.

Test No. Williams

Date Jan. 28, 1980

Tested by St. Ivany

Location SE-NW-SE 32-47N-1W

Test type

Sample No. Wright City Quad.

Mold

Specific Gravity 2.65

Weight

Density

Run No.	24						
Wt Mold + Soil	780.0						
Wt Mold lbs.	192.2						
Wt Comp. Soil lbs.	587.8						
Wet Density in lbs./ft.^{3}	139.58						
Dry Density lbs./ft.^{3} γ_d	110.76						
Void Ratio e	.51						
Porosity n	33.58						

Water Content

Run No							
Container No	T						
Cont + Wet Soil in gms.	51.72						
Wt Container + Dry Soil gms.	45.91						
Wt Water gms W_w	5.81						
Wt Container gms	11.68						
Wt Dry Soil gms W_s	34.23						
Water Content W%	16.97						

Percent Saturation

	W	γ_d		W	γ_d
S = 100%			S = 80%		

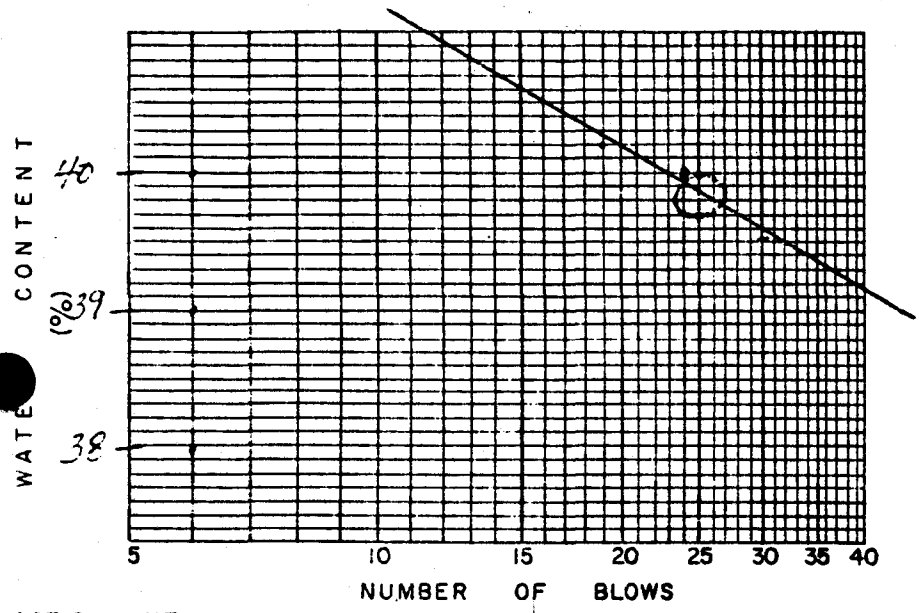
ATTERBERG LIMITS

Warren County

SAMPLE BHS - sample II - glacial till DATE Jan. 28, 1980

LIQUID LIMIT depth 15 ft.

							NATURAL WATER CONTENT	
TRIAL NO.	1	2	3	4	5	6	1	2
TARE NO.	T	W	B					
WT. WET SOIL + TARE	21.21	21.03	19.87					
WT. DRY SOIL + TARE	18.38	18.44	17.59					
WT. WATER	2.83	2.59	2.28					
WT. TARE	11.34	11.96	11.82					
WT. DRY SOIL	7.04	6.48	5.77					
WATER CONTENT (w)	40.20	39.97	39.51					
NUMBER OF BLOWS	19	24	30					



SHRINKAGE LIMIT

SHRINKAGE DISH NO.	
WT. WET SOIL + DISH	
WT. DRY SOIL + DISH	
WT. WATER	
WT. SHRINKAGE DISH	
WT. DRY SOIL (W_S)	
WT. SHRINKAGE DISH + H_G	
WT. H_G IN SHRINKAGE DISH	
WT. PETRI DISH + H_G	
WT. PETRI DISH	
WT. H_G IN PETRI DISH	
VOL. SHRINKAGE DISH (V_O)	
VOL. DRY SOIL (V_S)	
$V_O - V_S$ (V_D)	
(V_D / W_S) X 100 (Q)	
WATER CONTENT (w)	
SHRINKAGE LIMIT - SL (w-Q)	
SHRINKAGE RATIO - R(W_S/V_S)	

PLASTIC LIMIT

TRIAL NO.	1	2	3
TARE NO.	D	A	R
WT. WET SOIL + TARE	14.10	14.62	13.82
WT. DRY SOIL + TARE	13.78	14.24	13.50
WT. WATER	.32	.38	.32
WT. TARE	11.89	11.87	11.65
WT. DRY SOIL	1.89	2.37	1.85
WATER CONTENT (w)	16.93	16.03	17.29

LIQUID LIMIT 39.85

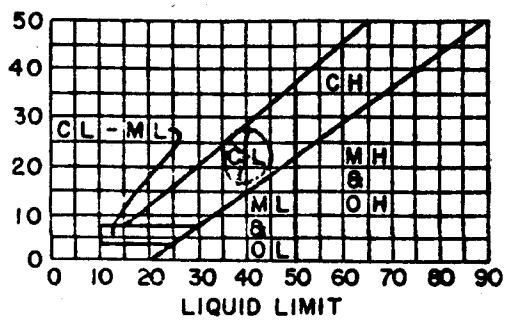
PLASTIC LIMIT 16.75

PLASTICITY INDEX 23.10

SHRINKAGE LIMIT

CLASSIFICATION CL

PLASTICITY INDEX



[illegible] Exchange Capacity

Soil Sample Description Bob's Home Service - sample II glacial till - depth 15 ft.

Soil Sample Location SE ¼, NW ¼, SE ¼, Sec. 32, T. 47N R. 1W, Quad. Wright City

County Warren

Soil Pt. 7.10

Ammonium acetate (exchangeable H) Pt. 7.62

Milli equivalents 0 Adjusted 0

Acetic acid (exchangeable bases) Pt. 3.15

Milli equivalents greater than 18 Adjusted greater than 18

Purpose Hazardous Waste Site

By St. Ivany 30 Jan. 1980

ecology and environment, inc.
NEW BROTHERHOOD BLDG., SUITE #374, 8TH & STATE, KANSAS CITY, KANSAS 66101, TEL. 913-371-3213
International Specialists in the Environmental Sciences

T013-P01-603-003

May 11, 1981

Mr. William Keffer
Emergency Planning and Response Branch
U.S. Environmental Protection Agency
25 Funston Road
Kansas City, KS 66115

Dear Mr. Keffer:

The attached report on Bob's Home Service, Inc. hazardous waste landfill is submitted in fulfillment of Technical Direction Document (TDD) F7-8102-7. This report summarizes information collected during the background file search and the March 10-12, 1981 site inspection. In order to reduce the costs associated with reproduction of this report, only one copy of the documentation obtained during this investigation has been included.

Before releasing this report to Bob's Home Service (BHS) or other interested parties, the agency should consider removing certain information from this report. For example, the citizen complaints should be removed to protect the confidentiality of those citizens. We welcome the opportunity to discuss any sections of the report with the agency in order to determine if such sections should also be considered confidential. Mr. Mike Gill, BHS site manager, has requested that this report be considered confidential. It is our understanding that Mr. Gill's primary concern in making the confidentiality request was to ensure that BHS receives a copy of the report prior to being released to the public.

If you have any questions pertaining to the report, please feel free to contact John Zirschky, Kenneth Snell, or myself.

Sincerely,

James Buchanan

James Buchanan
Regional Technical Manager

JB:kw

recycled paper

FIELD INVESTIGATIONS OF UNCONTROLLED HAZARDOUS WASTE SITES

FIT PROJECT

TASK REPORT TO THE ENVIRONMENTAL PROTECTION AGENCY CONTRACT NO. 68-01-6056

SITE INSPECTION REPORT

BOB'S HOME SERVICE, INC.
WRIGHT CITY, MISSOURI

MAY 8, 1981

TDD #F-7-8102-7

Prepared By: Region VII FIT
Submitted To: Mr. William Keffer

ecology and environment, inc.

International Specialists in the Environmental Sciences

1100

TABLE OF CONTENTS

	Page
SECTION 1 INTRODUCTION	1-1
SECTION 2 BACKGROUND	2-1
INTRODUCTION	2-1
GEOPHYSICAL INFORMATION	2-3
Geology	2-3
Hydrology	2-4
FACILITY DESCRIPTION	2-7
General	2-7
Site Buildings	2-7
Holding Ponds, Truck Wash Pad	2-8
Monitoring System	2-8
General	2-8
Piezometer Wells	2-9
Monitoring Well	2-9
Background Wells	2-9
Stream Monitoring Points	2-12
Additional Monitoring Well	2-12
Sampling	2-13
Operating Procedures	2-15
Mode of Operation	2-15
Type of Wastes	2-18
Waste Characterization	2-18
Past Operating History	2-20
Site Inspection Reports	2-20
Citizen Complaints	2-22
SECTION 3 SITE INSPECTION	3-1
INTRODUCTION	3-1
RCRA REQUIREMENTS	3-1
General	3-1
General Facility Standards	3-2
Waste Analysis Plan	3-2
Security	3-3
Inspection Requirements	3-6
Personnel Training	3-7
Igniteable, Reactive, and Incompatible Wastes	3-8
Preparedness and Prevention, Contingency Plan	3-8
Manifest System, Recordkeeping and Reporting	3-9
Manifest System	3-9
Operating Records	3-11
Groundwater Monitoring	3-11
Closure and Post Closure	3-12
Requirements for Landfills	3-12
Surface Impoundment Requirements	3-12
Transporter Requirements	3-13

Page

SECTION 3 (Cont.) 3-15
SAMPLING 3-15
General 3-17
Monitoring Wells 3-17
Sampling Methodology 3-17
Piezometer Well 12 3-18
Piezometer Well 10 3-18
Piezometer Well 5 3-18
Piezometer Well 8 3-18
Monitoring Well 3-19
Old (Wash) Well 3-19
Creek Samples 3-19
Upstream Creek Sample 3-19
Downstream Creek Sample 3-22
Private Well Samples 3-22
Private Well 1 3-22
Private Well 2 3-23
East Holding Pond 3-23
Incoming Wastes 3-23
Great Lakes Container Corp. 3-26
Litton Waste Sample 3-26
GENERAL OBSERVATIONS 3-36
Disposal Operations 3-28
Surface Drainage 3-31
SANITARY LANDFILL, ADDITIONAL SITES 3-34
RCRA INSPECTION FORM 4-1

SECTION 4 SITE EVALUATION 4-1
INTRODUCTION 4-1
MONITORING SYSTEM 4-1
Evaluation of the Monitoring System 4-1
General 4-2
Piezometer Wells 4-5
Monitoring, Old, and New Wells 4-6
Zykan Well 4-7
Summary 4-7
Summary of Past Monitoring Data 4-7
General 4-9
pH 4-12
Specific Conductivity 4-12
Chemical Oxygen Demand 4-12
Hardness 4-14
Chlorides 4-16
Data Evaluation 4-19
OPERATING PRACTICES 4-19
General 4-20
Disposal Practices 4-23
Security 4-24
Holding Ponds 4-25
Waste Analysis Plan 4-26
Site Inspection Form 5-1

SECTION 5 SUMMARY 5-1
GENERAL 5-2
RECOMMENDATIONS . . . . .

ATTACHMENT 1 EPA, MDNR FILE INFORMATION.

ATTACHMENT 2 MDNR WASTE DISPOSAL AUTHORIZATIONS FOR BHS.

ATTACHMENT 3 RCRA COMPLIANCE INFORMATION.

ATTACHMENT 4 BHS SAMPLING DATA AND RECORDS.

LIST OF FIGURES

		Page
Figure 1:	Location of Bob's Home Service, Inc. Hazardous Waste Landfill	2-2
Figure 2:	Site Sketch of BHS Area 1	2-6
Figure 3:	Cross-section of Subsurface Statigraphy at Bob's Home Service	2-10
Figure 4:	Location of Bob's Home Service (BHS) Sampling Points	2-11
Figure 5:	Site Sketch of BHS Area 1	2-17
5a:	(overlay) Location of Disposal Trenches	2-17
Figure 6:	Security Signs at Bob's Home Service	3-4
Figure 7:	Entrance sign at Bob's Home Service	3-5
Figure 8:	East Holding pond at Bob's Home Service	3-14
Figure 9:	Site Sketch of Bob's Home Service Area 1	3-20
Figure 10:	Location of Inspection Sampling Points	3-21
Figure 11:	Exposed Waste in BHS Trench 5N	3-29
Figure 12:	Construction of BHS Trench 2N	3-30
Figure 13:	Silt Fences at Bob's Home Service	3-32
Figure 14:	Site Sketch of Bob's Home Service	4-3
Figure 15:	Location of Bob's Home Service Sampling Points	4-4
Figure 16:	Mean pH Concentrations for the BHS Piezometer Wells	4-11
Figure 17:	Mean Specific Conductivity for the BHS Piezometer Wells	4-11
Figure 18:	Mean COD Concentrations for BHS Piezometer Wells	4-13
Figure 19:	Mean Hardness Concentrations for BHS Piezometer Wells	4-13
Figure 20:	Mean Chloride Concentrations for BHS Piezometer Wells	4-15
Figure 21:	Variation of Iron, Hardness, and pH Data for Piezometer Well 13	4-18

LIST OF TABLES

		Page
Table 1	Summary of Wastes Recieved at BHS between March 10-12, 1981	3-10
Table 2	Summary of the Characteristics of Great Lakes Container Wastes	3-24
Table 3	Summary of BHS Data of Great Lakes Container Wastes	3-24
Table 4	Summary of Analytical Data of Litton Company, Springfield, Mo. Waste Sludge	3-27
Table 5	Summary of Past BHS Monitoring Well Data	4-10

SECTION 1

INTRODUCTION

Bob's Home Service, Inc. is one of two commercial hazardous waste landfills in Missouri which applied for interim status under the Resource Conservation and Recovery Act (RCRA). On March 10-12, 1981 an uncontrolled hazardous waste inspection including sampling was conducted at BHS. A secondary purpose of this field effort was to compile compliance information under RCRA subtitle C. regulations. Bob's Home Service was informed of this inspection approximately one week in advance. Participating in the inspection were Mr. Phil Keary and Mr. Harry Kimball of the U. S. Environmental Protection Agency (EPA), Mr. Paul Mieburger, Mr. Ken Gambara, and Mr. Sam Brenneke, of the Missouri Department of Natural Resources (MDNR), and Mr. Ken Snell and Mr. John Zirschky of Ecology and Environment, Inc. During this inspection, Mr. Mike Gill and Mrs. James Zykan, site manager and vice president of BHS, respectively, were interviewed, and samples were collected from the monitoring wells and incoming waste loads at BHS. In addition, samples were collected from several private wells and a creek near Bob's Home Service, Finally, MDNR's and EPA's files on BHS, and the facility plan and operations manual prepared by Reitz and Jens, Inc., consultants for BHS, were reviewed. The results of the inspection and background file review are summarized in the following report.

This report has been prepared in four major sections: Background, Site Inspection, Site Evaluation, and Summary and Conclusions. In the background section (Section 2), the site geology, hydrology, facilities, and past and present operating practices are reviewed. The Reitz and Jens, Inc. reports prepared for BHS, and EPA's and MDNR's files were primarily used to compile this information. Copies of portions of this information are provided in Attachments 1 and 2.

Section 3 presents the information collected during this field inspection. A review of the RCRA requirements, and the sampling conducted during this inspection are also presented. In addition, the RCRA inspection checklist is included in this section. Support information for this section, including an additional copy of the RCRA inspection checklist, is provided in attachments 3 and 4.

A limited evaluation of the operating procedures, past and present, is presented in Section 4, the site evaluation section. Recommendations for improving the operation at BHS and an evaluation of the monitoring system and past monitoring data at BHS are presented. Information presented in Sections 2 and 3 and observations made at the site were used to prepare this evaluation. A hazardous waste site inspection form (2070-3) is presented at the end of this section. When the results of the sampling are available, a supplemental report can be prepared which more fully characterizes the operational practices at BHS.

The major items from each of the preceding sections are summarized in the Summary and Conclusions section (Section 5). Recommendations for further field work at BHS and possible deficiencies in the operational practices at BHS are reviewed. Once the results of the sampling are available, additional recommendations can be prepared.

SECTION 2

BACKGROUND

INTRODUCTION

In 1974, Bob's Home Service opened a sanitary landfill near Wright City, Missouri. This landfill was opened on a 10-15 acre section of a 158 acre farm in Section 32, Township 47 North, Range 1W of Warren County, Missouri. The farm and landfill were owned and operated by Mr. James Zykan of R.R. 1, Wright City. Mr. Zykan is now deceased, and the property is owned by Mrs. James Zykan. Municipal solid waste, bulky wastes, dead animals, and brush were primarily disposed of in this landfill.

BHS applied for a permit to operate a special industrial waste disposal facility in March of 1977. A 12 acre section of the Zykan farm (Area 1) was to be developed for the disposal of at least 40,000 cubic yards of industrial waste. Including a 200 foot buffer zone, Area 1 occupies approximately 26.5 acres. An operating permit was granted by MDNR on May 25, 1977, and operation at this site began in June of 1977. In addition to operating a disposal site, BHS also operates a waste transport service which transports approximately 95% of the wastes disposed of at BHS. Area 1 is expected to last until the spring of 1983. The location of both Area 1 and the old sanitary landfill is shown in Figure 1.

Although some information related to the old sanitary landfill was collected, the majority of the information collected during this investigation pertains to the operation of Area 1. Geophysical information, a summary of the past operating procedures, and a facility description are all presented in this section. The sources of information used to compile this information include MDNR and EPA's files, and the Reitz and Jens, Inc. facility plan and operating manual prepared for BHS.

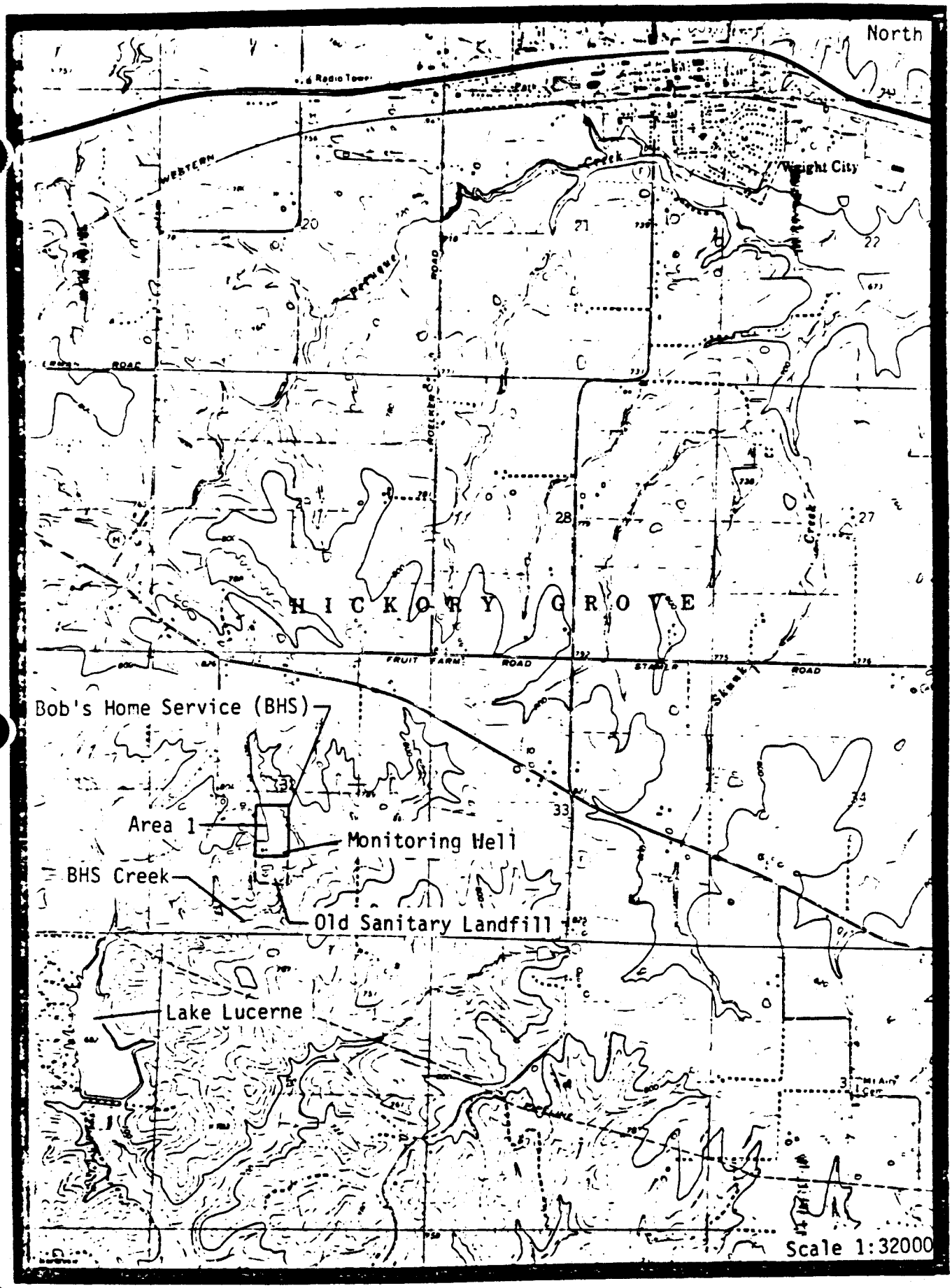


Figure 1: Location of Bob's Home Service, Inc., Hazardous Waste Landfill.

GEOPHYSICAL INFORMATION

Geology

BHS is primarily underlain by Kansan glacial till in excess of 60 feet thick. Analysis performed on soil samples collected from BHS and the surrounding area indicate that the permeability of the till is low, ranging from (1.3 to 20) x 10^{-9} cm/sec. The cation exchange capacity (CEC) of the subsoils is also low (7.4 to 23.5 millequivalents per 100 grams). These low CEC values are usually indicative of a stabilized kaolinitic soil. Normally, a high CEC value is desireable to prevent or reduce the migration of cationic contaminants. The soil at BHS, however, was found to be alkaline with the soil pH varying from 7.6 to 8.1 standard pH units. The relatively high soil pH may be effective in precipitating, and thereby limiting migration of, contaminants such as heavy metals. Soil precipitation of these compounds may thus partially compensate for the low CEC of the soil.

The eastern portion of Area 1 is partially underlain by alluvial soils with a relatively higher permeability. Beneath the alluvial soil is glacial till, and the interface beneath the till and alluvium slopes toward the east. The potential for migration along this interface is high; therefore, BHS is planning to construct an impervious cutoff trench along the eastern boundary of Area 1. This cutoff trench should prevent any lateral migration of leachate towards the east. The date that this cutoff trench will be completed is not yet known.

Pockets of sand and gravel are also located within the glacial till. One such pocket was found at an elevation of approximately 665 feet above mean sea level (approximately 140 feet beneath the surface) in several of the soil borings near BHS. Water was found in some of the pockets encountered

during soil borings at BHS. Reitz and Jens concluded in their site evaluation that these pockets were not connected. Sufficient data was not included in the BHS site plans prepared by Reitz and Jens to support this conclusion.

The bedrock beneath BHS is primarily composed of limestone and is located in excess of 60 feet beneath the surface. Generally, the bedrock appears to slope to the northeast in the vicinity of BHS. At monitoring well number 1 (Figure 1), limestone bedrock was encountered 168 feet beneath the surface (585 feet above mean sea level). Sixteen additional borings were made around the perimeter of Area 1 for the development of piezometric wells. The depth of these piezometer wells ranges from 30 to 40 feet deep, and bedrock was not encountered in any of these wells.

Hydrology

Three National Weather Service rain gaging stations are located within a twenty mile radius of BHS. The average annual precipitation recorded at these three stations ranges from 37.15 to 38.02 inches per year. Using the distance between the gaging station and BHS as a weighting factor, an average rainfall of 37.3 inches per year at BHS was estimated. Average runoff and infiltration at BHS have been estimated to be 9.6 and 2.6 inches, respectively, based upon data compiled by the U. S. and Missouri Geologic Surveys.

The watershed above and including the BHS landfill was estimated by Reitz and Jens to contain 482 acres. Using the average runoff value of 9.6 inches per year, an estimated 1.26×10^8 gallons of water per year drain from the watershed above the BHS landfill. This surface runoff drains

into an intermittent creek, (hereinafter referred to as BHS Creek), which flows south and east of the landfill and eventually flows into Lake Lucerne (Figure 1).

Surface runoff from the watershed above and including BHS is diverted away from the active portions of the landfill using swales and berms. These diversion structures were designed to control the runoff from a 6 inch, 24 hour, 25 year storm. Diversion structures are also used to prevent runoff from the active portions of the landfill from entering any open trenches or active disposal areas. Silt fences have been installed in the downgradient portions of BHS to remove any soil particles or other solid material from the runoff.

The principal aquifer beneath BHS is the St. Peter Sandstone. The top of this aquifer is located approximately 300 to 450 feet beneath the surface (elevation of 350 to 530 feet above mean sea level) and appears to slope toward the northeast. Thus, the direction of water movement in this aquifer is probably also towards the northeast. This aquifer serves as the principal private well water source near BHS and yields less than 50 gallons per minute.

Shallower aquifers also exist beneath BHS. A review of the boring log data from the area surrounding BHS compiled by Reitz and Jens shows that a small aquifer may exist at a mean elevation of approximately 665 to 697 feet above sea level (85 to 115 beneath the surface). This elevation corresponds to the bedrock/overburden interface in the western portions of the Zykan farm and to the sand and gravel strata at the monitoring well in Area 1 (Figure 2). The direction of flow and yeild rate of this aquifer is not known at this time.

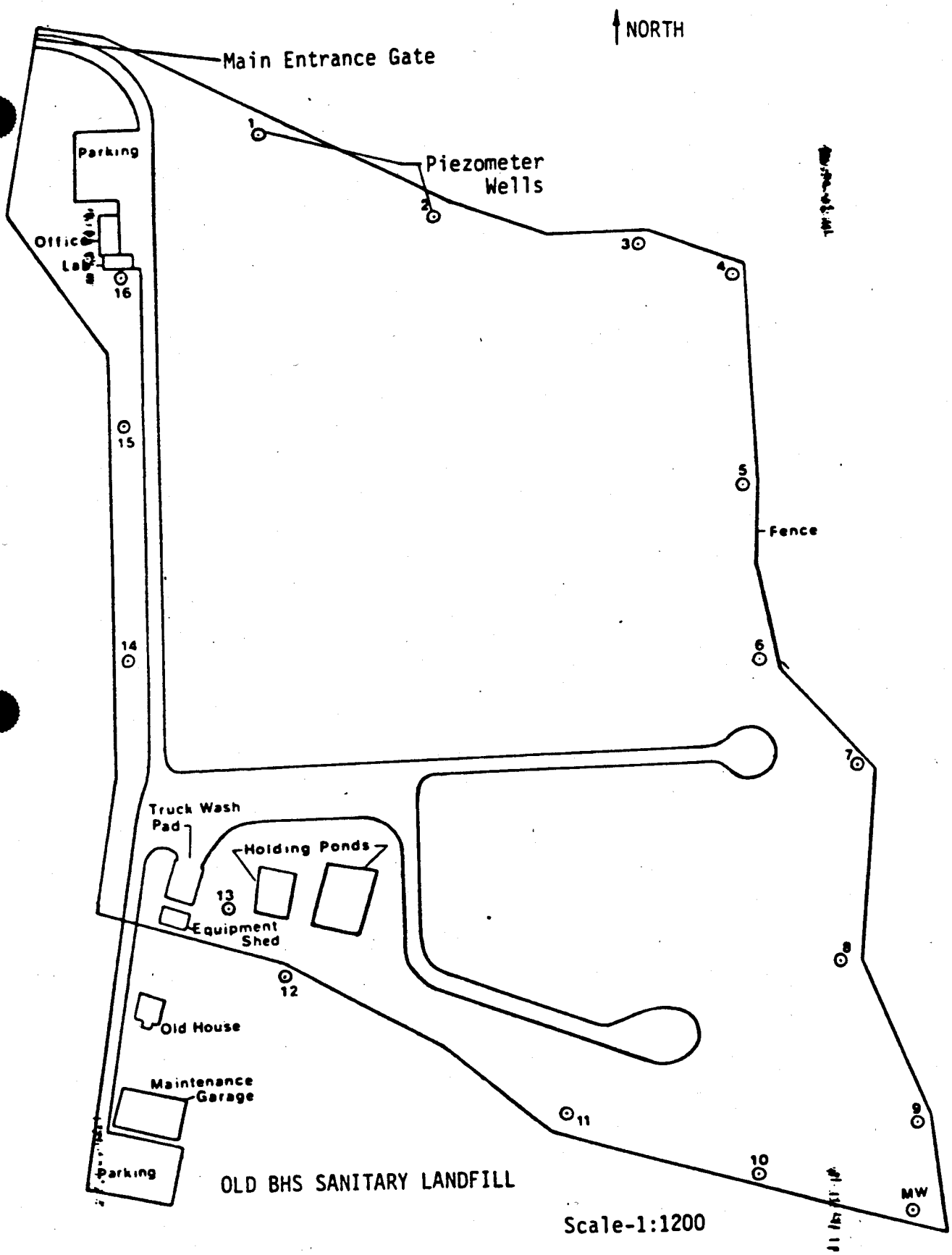


Figure 2: Site Sketch of BHS Area 1.

FACILITY DESCRIPTION

General

Area 1 is located in the northwestern section of the Zykan farm. The entirety of Area 1 is surrounded by a six foot high chain link fence topped with three strands of barbed wire. Access to the site can be gained through three gates. The first access gate is located at the northwest corner of Area 1 and serves as the vehicle and public access gate and is electronically controlled. The remaining two gates are located at the southwestern corner of Area 1 and are used exclusively by BHS or other authorized personnel.

Located within the fenced area are the office and equipment buildings, the disposal area, two holding ponds, and the majority of the monitoring system. The location of these facilities is shown on Figure 2. A more detailed description of the major facilities and a review of the operating practices at BHS follows.

Site Buildings

Three buildings are located within Area 1: an office trailer, a chemical laboratory, and an equipment/employee shed. First aid supplies, site records, and the communication system are located in the office trailer which is located in the northwestern section of Area 1. Public access to Area 1, via the electronically operated gate, is also controlled from the office trailer. Each of the BHS trucks is also equipped with an electronic gate control. The chemical laboratory is located adjacent to the office trailer. The equipment used to characterize the incoming wastes is operated in this facility. Finally, the equipment/employee shed is located in the southwestern section of Area 1. First aid equipment and sanitary facilities are located in this building.

Holding Ponds, Truck Wash Pad

Two holding ponds are located adjacent to the equipment shed (Figure 2). The western pond is used to treat runoff collected from the concrete truck wash pad which is located immediately west of this pond. Trucks are driven onto this pad and any waste which has adhered to the truck is washed off. The frequency at which a truck is cleaned is unknown. Also, trucks that cannot be unloaded at the end of an operating day are parked on the pad overnight in case a leak or spill occurs. The truck wash water or spilled material collects at a drain located at the southeast corner of the pad and flows into the west holding pond.

The east holding pond is used primarily to treat leachate collected from the disposal trenches. The primary method of treatment provided by both of these ponds is volume reduction through evaporation. Spray irrigation is used to enhance evaporation of the wastes. Neither of these ponds is lined, so infiltration to groundwater from these ponds could occur. BHS has submitted plans to MDNR to replace the holding ponds with four concrete lined basins; however, these plans have not yet been approved.

Monitoring System

General

The monitoring system at Bob's Home Service (BHS), consists of sixteen (16) piezometer wells surrounding the site, one monitoring well, two background wells, and two surface water monitoring locations. No gas or air monitoring stations are located at the site. The water monitoring system is designed to detect any leachate or contaminated surface water migration from the site. A more detailed description of the monitoring system at BHS is provided below.

Piezometer Wells

Sixteen piezometer wells have been installed around the perimeter of Area 1 at Bob's Home Service (Figure 2). Each of these wells is constructed of 3 inch polyvinyl chloride (PVC) pipe, and range in depth from 35 to 42 feet. The top ten feet of the PVC pipe is surrounded by a 2.5 inch bentonite seal to reduce the chance of rainwater infiltration into the well. Below the bentonite seal the PVC pipe is perforated with 0.025 inch wide slots and surrounded by sand and gravel. Figure 3 shows the elevations of each of the wells, and the general subsurface soil conditions in the area. The soil types were determined from the boring logs and core samples taken when the wells were installed.

Monitoring Well

A monitoring well is located at the southeast corner of Area 1 (Figure 2). This well is 175 feet deep, extending approximately 7 feet into the limestone bedrock. The monitoring well is constructed of 4 inch PVC pipe. The PVC pipe is perforated with 0.025 inch wide slots from the bottom up to approximately 10 feet above bedrock, and surrounded by sand and gravel. Above the perforated section, the pipe is surrounded by a 2.5 inch thick bentonite seal, 10 feet in length. Figure 3 shows the subsurface soil types encountered while installing the well.

Background Wells

Two wells located near Area 1 at Bob's Home Service have been identified as background wells (Figure 4). One well, designated as the "old well", is located approximately 50 feet west of the truck wash lagoon and is around 150 feet deep. The second well is located near the Zykan residence, approximately 500 feet west of the entrance gate to Area 1. The Zykan well

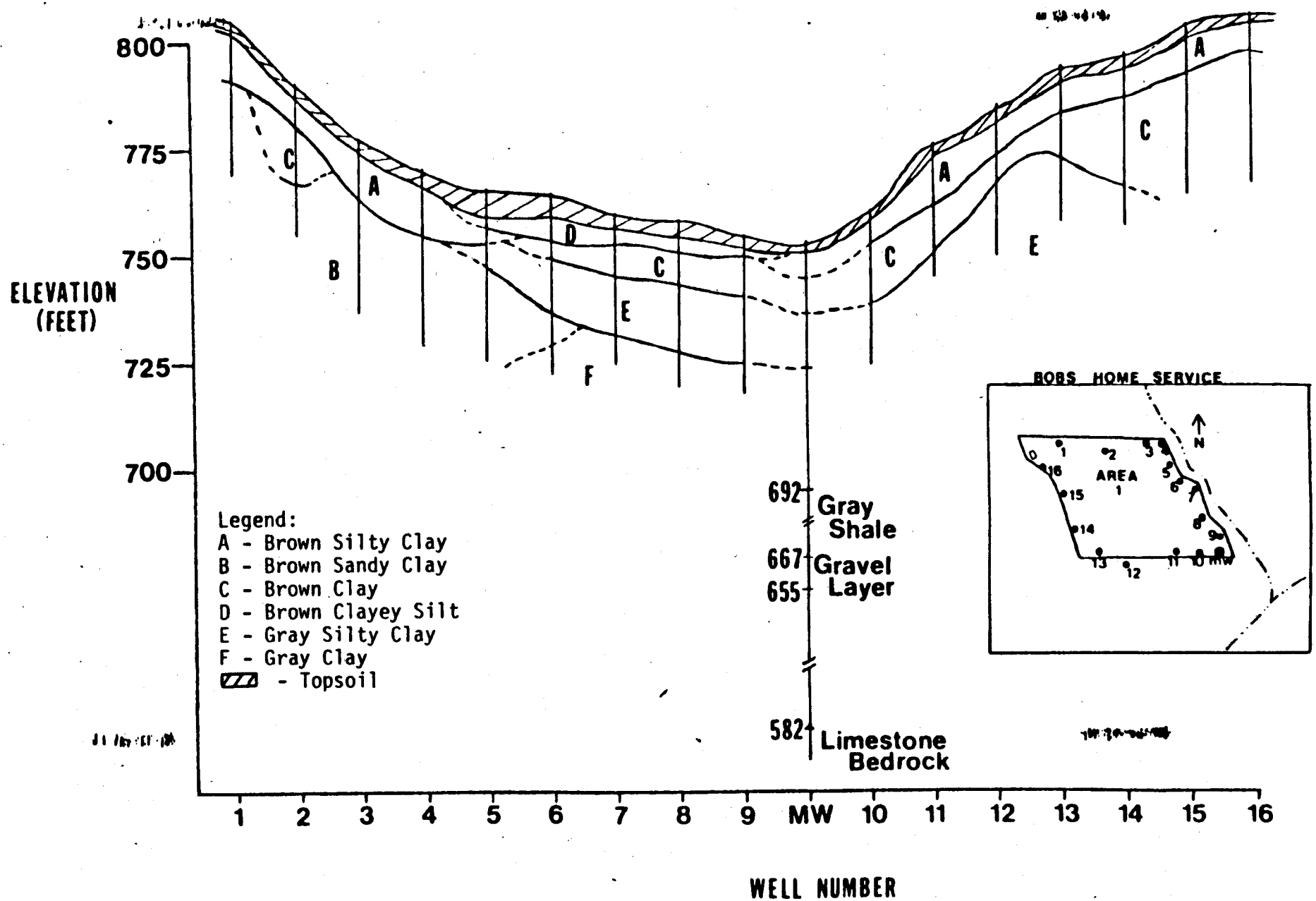


Figure 3: Cross-section of Subsurface Statigraphy at Bob's Home Service.

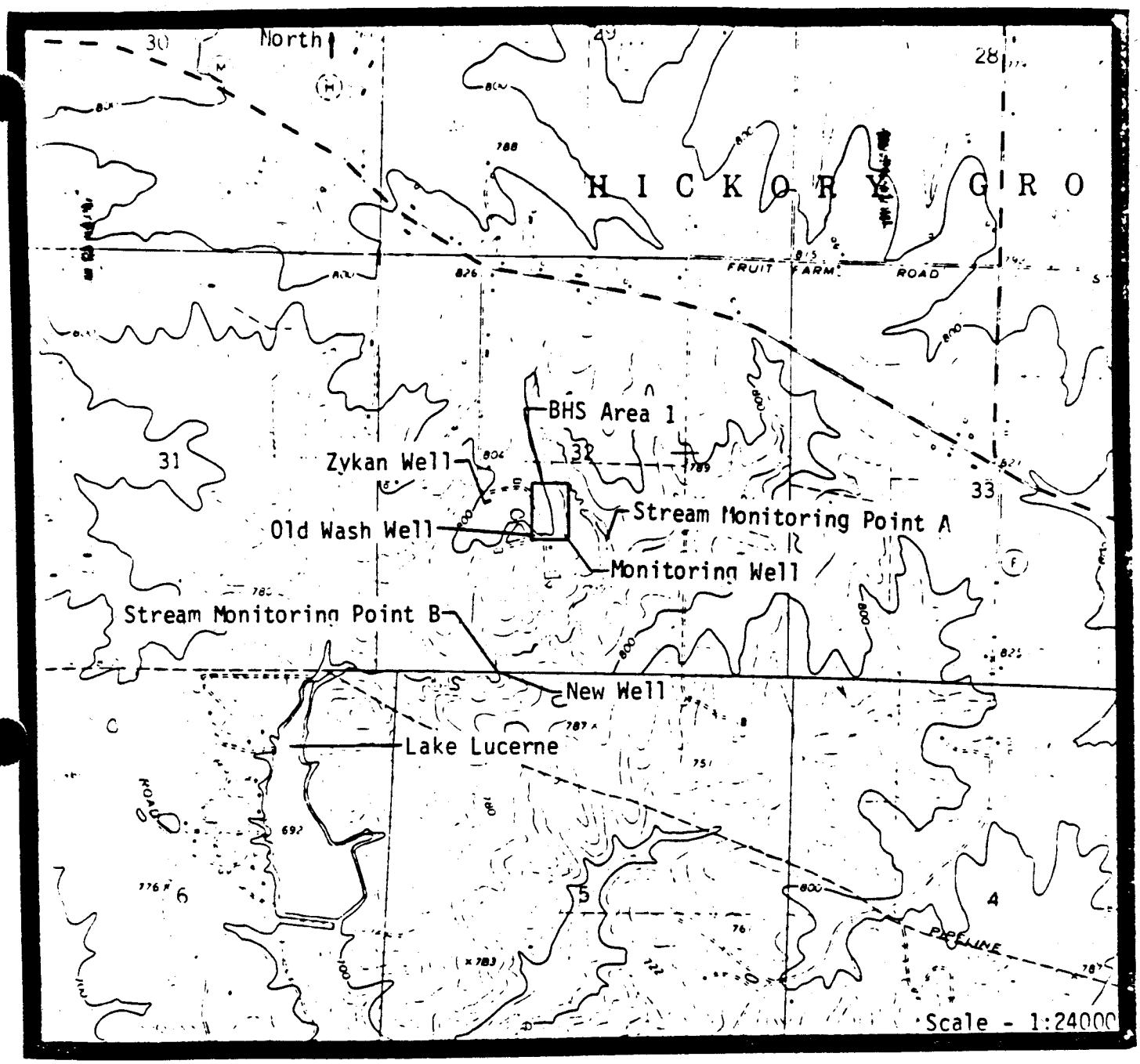


Figure 4: Location of Bob's Home Service (BHS) Sampling Points.

is approximately 410 feet deep. Both these wells are located west, or upgradient from the active disposal site. They are both sampled on an annual basis to provide background groundwater quality information.

Stream Monitoring Points

Bob's Home Service has designated two locations in the BHS creek as surface water monitoring points (Figure 4). Stream Station "A" is located approximately 400 feet southeast of the monitoring well, and Station "B" is located further downstream approximately 100 feet north of the Zykan's south property line. At the present time, samples from these locations are taken directly from the stream, although BHS does have plans to install a leachate monitoring system at each of these sites. The plans are to excavate a trench below the stream bed at each station, at the alluvium and glacial till interface. A drain tile will be installed in the trench and surrounded by sand. At the trench's lowest point, the drain tile will be intercepted by a 4 inch PVC vertical riser. The 4 inch PVC pipe will serve as a sample collection point to monitor any leachate flowing through the alluvium layer, between the stream bed and the glacial till.

Additional Monitoring Well

BHS currently plans to install a second monitoring well near stream monitoring Station "B". This monitoring well will be drilled to bedrock and will be used to detect leachate migration along the bedrock/overburden interface. The effectiveness of this well in detecting leachate migration is questionable, as will be discussed in Section 4.

Sampling

Bob's Home Service is required to sample each of the piezometer wells and the monitoring well on a quarterly basis. The other monitoring stations, background wells, and surface water stations are to be sampled annually. At a minimum, analysis of the samples collected quarterly are to include the following tests:

1) pH
2) Redox-Potential
3) Specific Conductivity
4) Total Organic Carbon (TOC)
5) Chemical Oxygen Demand (COD)
6) Hardness (Total as $CaCO_3$)
7) Chlorides
8) Iron

Additional tests may be required by the State each quarter depending on the types of wastes BHS has received. In the past, BHS has been required to test for arsenic on a quarterly basis along with the eight regular tests.

Samples taken on an annual basis, including the piezometer and monitoring wells, must be analyzed for the eight quarterly parameters along with the following tests:

1) Biochemical Oxygen Demand (BOD)
2) Suspended Solids
3) Total Dissolved Solids (TDS)
4) Turbidity
5) Extractable Oil
6) Fecal Coliform Bacteria

7) Alkalinity

8) Phenols

9) Nitrates as Nitrogen

10) Sulfates

11) Fluorides

12) Cyanides

13) Heavy metals including arsenic, barium, cadmium, hexavalent chromium, total chromium, copper, lead, manganese, mercury, nickel, selenium, silver, and zinc.

14) Gas chromatograph scan for chlorinated hydrocarbons and pesticides.

Bob's Home Service has also been voluntarily taking samples from Lake Lucern, located approximately one mile southwest of Area 1, on an annual basis. Bob's Home Service has employed Mid-Missouri Testing Co. of Columbia, Missouri to conduct the sampling and analysis of the samples.

Operating Procedures

Mode of Operation

When operations began at the site, the trench cell method of disposal was used. Incoming wastes were segregated as either acid bulk, acid drums, alkaline bulk, and alkaline drums. Four separate trenches, each approximately 18 feet deep, were constructed for the disposal of each of these waste categories. A one-foot soil cover was placed over the wastes at the end of each operating day, and a two-foot compacted soil cover was placed over the wastes when a section of these trenches was completed. Later in the first year of operation, the waste segregation and disposal scheme was modified. Wastes were segregated as organics, alkaline, acid, or flammable, and bulk and drummed wastes were disposed of in the same trench.

In June of 1978, BHS began using the drilled cell method of disposal. Three foot diameter cells up to 27 feet deep were drilled approximately 1 to 2 feet apart. As many as eight drums were placed on top of each other with no soil cover between the drums. A three foot compacted soil cover was used as a final cell cover. According to a December 1, 1979, MDNR memorandum to Mr. Rick Roberts from Mr. Robert Pappenfort (see Attachment 1), the success of this method is very dependent upon the compaction of the three foot final cover. One instance where this method of disposal failed was referenced, but not described in this memorandum. Apparently, this incident refers to an occassion where the soil cover was not compacte- sufficiently in one cell to prevent infiltration through the top of the cell, thereby allowing the cell to fill with water. This method of disposal was later modified by constructing a number of small trenches into which the wastes were placed in a manner similar to the drilled cell method.

In late 1979 or early 1980, BHS reverted to the trench cell method of disposal with a few modifications from the initial trench cell method employed at the site. This method of disposal is currently used at BHS. Three 27 foot deep trenches were constructed for the disposal of acid, alkaline, and organic wastes. One trench for each of these types of waste was constructed, and drummed and bulk wastes are placed in the same trench. Drums are placed directly against each other, and the void spaces between the drums are filled with granular material. Limestone, sand, or agricultural lime is used as the granular fill depending upon the type of wastes present. At the end of an operating day, a one foot soil cover is placed over the drums or bulk wastes. Once a trench has been filled, a two foot compacted soil layer, a three foot non-compacted soil cover layer, and one foot top-soil are successively placed over the trench. The surface of the trench is then graded at a 3 to 10 percent slope to minimize infiltration and promote runoff.

Although a number of disposal methods have been used, BHS has maintained records of the location and amount of every waste disposed of at the facility since it opened in 1977. Figures 5 and 5a show the approximate location of all of the disposal trenches. Twelve trenches, numbered 1N-12N remain to be filled.

Prior to placing a trench into operation, Reitz and Jens inspect the trench for evidence of gravel or sand pockets. If such pockets or lenses are encountered, the lense is excavated and replaced with compacted till. A bentonite seal is used if a lense is found in the sidewall at a depth in excess of 18 feet. Compacted till is then placed over the bentonite seal.

Once the trench has been inspected and approved for disposal, a leachate collection system is installed at the base of the trench. The bottom of

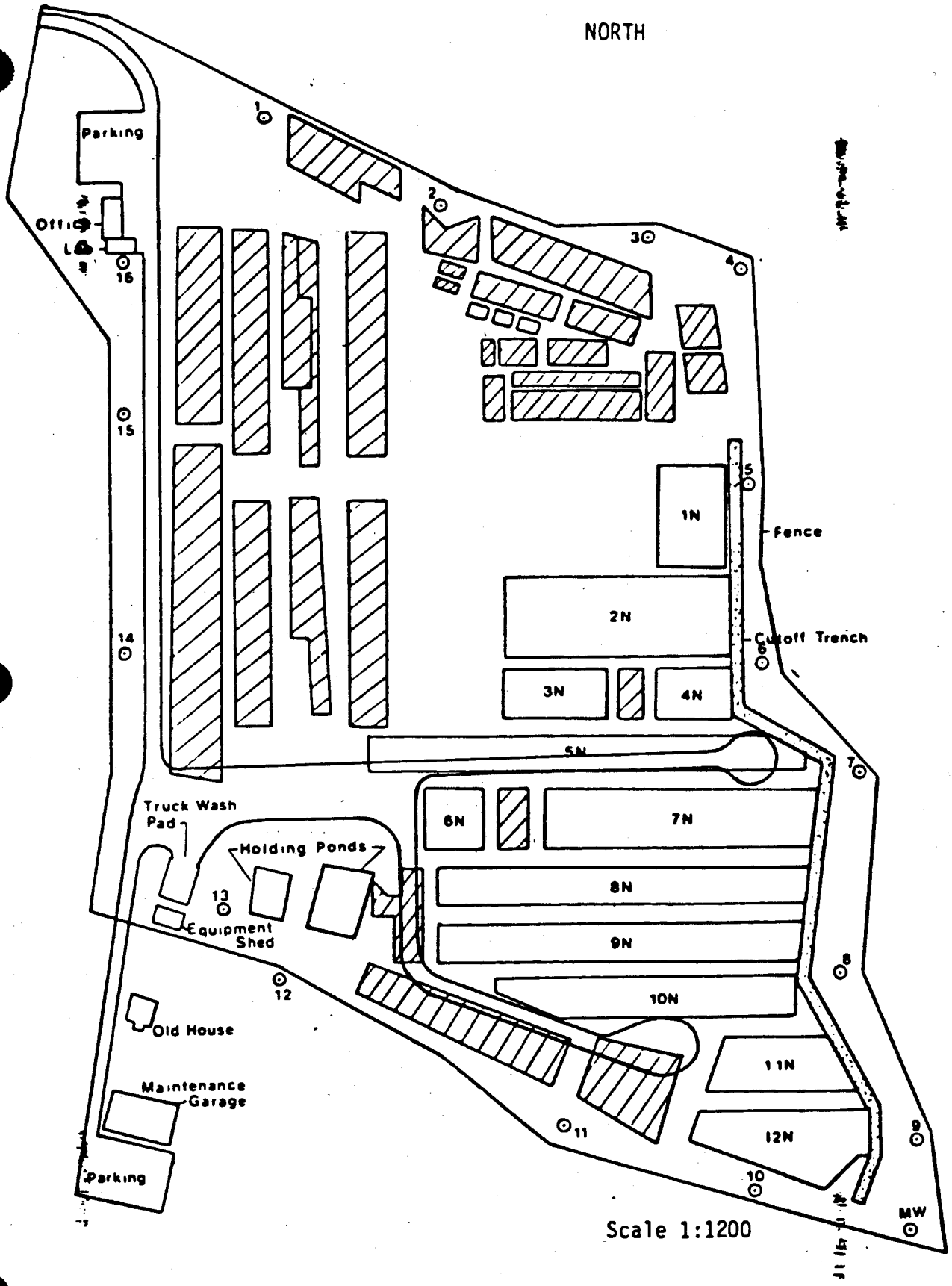


Figure 5: Site Sketch of BHS Area 1.

Figure 5a (overlay): Location of Disposal Trenches.

the trench is sloped to one side where a three to four foot wide drainage channel has been constructed along the length of the trench. This drainage channel is sloped towards one end of the trench where a leachate collection well has been installed. Every month the water level in the collection well is checked and recorded. When the depth of leachate in the well exceeds two feet, the leachate is pumped out of the well and transported to the east holding pond using a tank truck.

Types of Wastes

The MDNR disposal authorizations issued to BHS were reviewed to indicate the types of wastes disposed of at BHS. Attachment 2 provides a summary of these authorizations. BHS maintains records on the chemical characteristics and volumes of these wastes; however, sufficient time was not available to review all of this information. Authorizations for the disposal of arsenic, asbestos, lead, chromium, PCB, and solvent containing wastes, however, have all been issued to BHS.

Waste Chracterization

Overall, BHS receives approximately 34,000 cubic yards of waste material a year. These wastes are currently segregated and disposed of as either acids, alkalines, or organics. In order to segregate the wastes properly, BHS requires that the generator submit the following information with a request for permission to dispose of the waste:

1. The name, address, telephone number, generator identification number, and waste stream identification number of the generator.
2. The name, address, and telephone number of person employed by the generator who is familiar with waste management practices.
3. The hazard class of each waste stream.
4. A brief description of the generation process.
5. A description of containerization for each waste.

6. The flashpoint, if applicable.

7. Major hazardous components and corresponding concentration.

8. pH

9. Percent volatiles at 600°C.

10. Percent volatiles at 100°C.

11. Materials data handling sheets or product specification sheets to indicate handling and spill cleanup recommendations.

12. Any additional information MDNR has deemed necessary to complete the identification process.

13. Any additional information BHS, Inc. deems necessary to complete the characterization process.

According to the BHS facility manual, incoming wastes are both visually inspected and chemically analyzed to confirm the composition of the waste. BHS monitors all incoming wastes for pH, specific gravity, and percent volatiles at 100°C and 600°C. Should the analysis performed by BHS not agree with the information supplied by the generator, a sample of the waste is sent to an independent laboratory for analysis. Any discrepancies between the independent lab analysis and the information supplied by the generator are reported to MDNR, and the waste is refused for disposal by BHS.

Based upon the information supplied by the generators and the tests performed by BHS, the wastes are segregated for disposal in one of the following areas:

1. Organic Area "O" - organic-based waste with a flashpoint above 140°F or materials contaminated with an organic-based waste.

2. Alkaline Area "B" - materials with a pH greater than or equal to 7 or inorganic-based materials compatible with an alkaline environment.

3. Acid Area "R" - materials with a pH less than 7 or inorganic-based materials compatible with an acidic environment.

Wastes not compatible with any of these waste types are not accepted by BHS. Currently, the following trenches have been designated for disposal of these three waste categories.

1. Trench #1N, 2N, 3N, and 4N for Organic wastes

2. Trench #5N, 7N, 8N, 9N, 10N, 11N, and 12N for Alkaline wastes

3. Trench #6N for Acid wastes

These designations may change depending upon the volume of waste received in each category. The location of these trenches is shown on Figure 5a.

Past Operating History

Site Inspection Reports

In order to determine the operating history of BHS, copies of a portion of the past MDNR site inspection reports were obtained and reviewed. The time span covered by these inspection reports is from July 19, 1977 to November 26, 1980. Inspection reports for 1981 were not found in the background file review. A brief summary of these inspection reports is provided below in reverse chronological order by the date that the report was filed. A copy of each inspection report is included in the attachment 1.

December 3, 1980 - In general, the condition and operation of the landfill was reported to be in good order. Trench 1N, however, was reported as not having sufficient daily soil cover. This inspection was performed on November 26, 1980.

October 14, 1980 - The freeboard in the wash water lagoon and the daily soil cover in Trench 1N were both reported as being insufficient. This inspection report summarized inspections conducted on September 5, 1980 and October 8, 1980.

September 15, 1980 - The security fencing was reported to be torn, sagging, or otherwise damaged in several places. Tall grass was observed growing in and near the trench water lagoon, and sufficient daily cover was not being provided in a trench on the north side of the landfill. Swine waste odors were noticed at the site (note: a hog farm is located near BHS). The date of this inspection was July 29, 1980.

July 17, 1980 - Improper disposal of water from the monitoring wells at BHS, poor weed and grass control, and a large number of flies were noted in this report. The back gates to the facility were found unlocked indicating poor security. The date of this inspection was June 9, 1980.

November 8, 1979 - The purpose of this inspection was to observe the subsurface soil structure in a perimeter trench. No gravel or sand strata were found in this trench. The inspection date was not reported.

August 8, 1979 - Standing water was observed in several of the trenches; however, only Trench 9 was reported as containing excessive amounts of water. Surface water diversion structures around this trench were absent. Wastes were observed being placed in this trench in violation of the MDNR regulations which forbid placing wastes in a trench which contains water. A load of drums was observed being buried properly by the inspector; however, the operational problems encountered during this burial led the inspector to believe that the proper disposal methods were not routinely used. This inspection was conducted on August 2 and 3, 1979.

July 19, 1979 - Migration of paint wastes from one disposal cell to another was noted in this report. The wall between the two cells had collapsed permitting the migration to occur. A new portion of Trench 8 was excavated, but was not properly inspected prior to use. Finally, daily cover was not placed over some of the cells at the end of the day. This inspection was conducted on July 12, 1979.

June 27, 1979 - A new disposal trench, Number 8, was inspected prior to use. After a representative for BHS inspected the trench and said it was acceptable, the MDNR representative examined the soil structure in the trench. The MDNR representative found what he believed to be a sand pocket. The MDNR representative was concerned that the BHS representative did not notice this sand pocket. The dates of this inspection were June 26, 1979 and June 27, 1979.

June 22, 1979 - The spray irrigation system of runoff containment water is discussed in this report. No major problems with this system were noted. This report summarizes a portion of the previous work at the site from April 27, 1979 to June 22, 1979.

May 11, 1979 - One of the alkali trenches was observed to contain an appreciable amount of gray water which appeared to be boiling. The boiling effect was caused by alkali sludge from Monsanto according to BHS officials. This inspection was conducted on April 26, 1979.

February 7, 1979 - During a January 25, 1979 inspection, exposed sludges were observed in Trenches 3 and 5. A hydrogen sulfide odor was also noticed coming from Trench 5. The holding lagoons had also not been sampled in the past year.

September 25, 1978 - In general, no major problems were observed during a September 11, 1978 inspection. Cattails were observed growing in the lagoons.

July 19, 1977 - Poor sludge management practices were observed on an inspection on this date. Daily cover was not placed on the sludge trenches overnight. Two gates were also found to be open during the inspection.

Based on these inspection reports, several operational difficiencies have existed at this facility. On numerous occassions, sufficient daily cover was reportedly not placed over the wastes. Odor and drainage problems were also noted in several inspection reports. Disposal trenches may not have been inspected properly by BHS representatives prior to use, and proper site security was deficient on several occassions. MDNR informed BHS of these deficiencies; however, no record of any legal actions or penalities against BHS by MDNR was found in the file review.

Citizen Complaints

Several citizen complaints about the BHS facility were found in the background file review, most of which pertained to odor problems. Between May 29 and June 4, 1980, several residents of the area surrounding BHS alledged that a severe odor problem was being generated by BHS. One resident alledged that the odor had made people in the area ill. An investigation of this incident was conducted by MDNR on June 9, 1980. MDNR determined that the odor resulted from wastes brought to BHS from a spill of Orthochlorophenol in Sturgeon, Missouri.

One complaint, however, alledged that poor operating procedures and safety practices were used by BHS. The complainant stated that he was a former employee of BHS, however, the complainant did not sign his name to the complaint. A copy of this complaint is included in attachment 1.

SECTION 3

SITE INSPECTION

INTRODUCTION

The following section summarizes the information collected during the field sampling, file review, and interviews conducted during this investigation. A RCRA inspection form was also completed during this field inspection and is included in this section. The support documentation and an additional copy of the RCRA inspection form are included in attachment 3. The additional copy of the inspection form is provided to facilitate removal of the form from this report for reproduction.

Although a brief site tour and some on-site work (well bailing) was conducted on January 10, 1981, the actual field inspection began at approximately 9:00 a.m. on January 11, 1981, with a review of the applicable RCRA requirements for BHS. During this initial interview, the RCRA inspection form was completed. Additional information, including copies of manifests, chemical analysis, and monitoring data was collected during the remainder of the inspection. Information relating to the RCRA requirements for BHS is summarized in the following subsection.

RCRA REQUIREMENTS

General

According to the EPA RCRA Permits File, BHS has completed all of the Phase I interim regulatory requirements and has obtained an EPA identification number (MOD068521228). BHS has applied for a permit as both a treatment/storage/disposal (TSD) facility and as a waste transporter. A copy of the BHS application for interim status is included in attachment 3. During this inspection, information relating to the RCRA requirements for BHS was

reviewed, and the RCRA inspection form was completed. Where the inspection form does not provide sufficient detail, a more descriptive paragraph has been prepared to support this form. As per general instructions from the regional enforcement branch of EPA for conducting RCRA inspections, no judgements as to whether BHS is in compliance with the interim RCRA requirements have been made. Several possible deficiencies in the requirements are noted, however. The format used to prepare the descriptive paragraphs and to organize the support documentation included in attachment 3 parallels the format used for the inspection form.

General Facility Standards

Waste Analysis Plan

The waste analysis plan provided by BHS includes a list of the parameters to be tested, the sampling procedures, and the test methods used at BHS. The rationale for selecting the parameters to be analyzed has also been prepared by BHS. This documentation is included in attachment 3. In general, BHS requires each waste generator to submit a description of the waste which includes analysis of the waste for pH, specific gravity, and percent volatile at 100°C. and 600°C. A complete list of the information required from generators by BHS was provided in Section 2 of this report. The information provided by the generator is used to obtain a disposal permit from MDNR. Only one such analysis is required from each generator to obtain an authorization. A minimum of three analyses should be conducted so that the variability of the waste can be determined.

Incoming waste loads are analyzed by BHS for the four parameters listed above. A visual inspection of the incoming wastes is also performed to check for odors, color, and the physical state. Mr. Gill stated that wastes which do not appear to match the description of the waste provided by the generator

will be sampled, and the sample will be sent to an independent lab for analysis. If the results obtained from the independent lab indicate that the waste does not match the waste description provided by the generator, the waste will be returned to the generator, and MDNR will be notified.

According to the BHS sampling procedures, three drums, one from the front, middle, and back of each load of 80 drums, will be sampled. These sampling procedures, however, do not state the procedures to be used for sampling shipments of bulk wastes. These procedures also do not state the frequency at which generators will be requested to repeat their more detailed analysis.

Security

A six foot chain link fence with three strands of barbed wire surrounds Area 1. The main entrance to the facility is located in the northeast corner of the site, and an electrically operated gate controls access to the site through this entrance. A warning sign is present at this entrance to the facility and at 100 yard intervals around the perimeter of Area 1 (Figure 6). In addition, a sign is present at the entrance gate which states the nature of business conducted by Bob's Home Service (Figure 7). Neither of these signs, however, state that entrance onto the facility could be hazardous. Also, these signs are not readily visible from 25 feet. Two other entrances to the facility are located at the southwest corner. One of these gates remained open during operating hours. Mr. Gill stated that the workers would spot any unauthorized entry to the facility through this gate. It does not, however, seem inconceivable that someone could gain entry to the facility through this gate without being observed. Also, warning signs were not observed at these entrances.

Figure 6: Security signs at Bob's Home Service.

Photographer: J. Zirschky
Date and Time: 3-12-81, 1600 hrs.

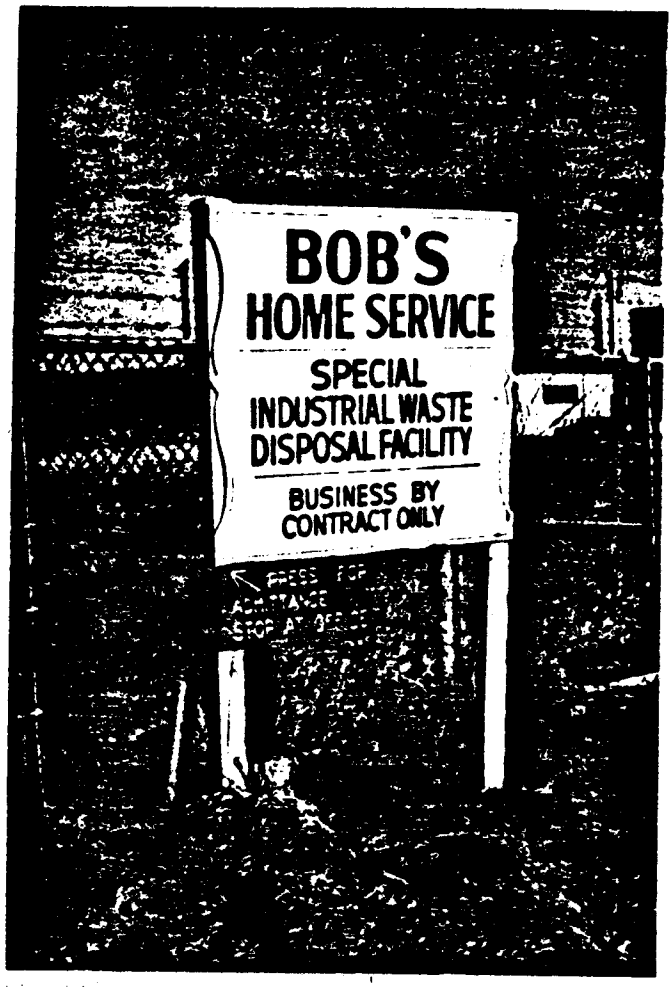


Figure 7: Entrance sign at Bob's Home Service.

Photographer: J. Zirschky
Date and Time: 3-12-81, 1600 hrs.

All of the gates except the main entrance gate are reportedly locked during non-operating hours. The main entrance gate can only be opened using the elctronic control. One electronic control is hidden in a tree on the access road to BHS. According to Mr. Gill, unauthorized use of this gate control device should not be a problem because Mrs. Zykan, BHS vice president, lives on the access road and would notice any traffic movement on the access road.

Inspection Requirements

BHS has developed a daily inspection schedule which includes checking the following items:

1. Fencing for damage.
2. Above ground well heads for damage.
3. Evaporation basins for leakage.
4. Evaporation basins water sprayers.
5. Walkie talkies for broadcasting and receiving.
6. Site vegetation and immediately adjacent vegetation for unusual die-off.
7. Fugitive gas emissions.

This inspection schedule is recorded in July, 1980 revised BHS operations manual, a copy of which was obtained on the morning of March 12, 1981. Only seven items were listed on the inspection schedule included in this manual. On the afternoon of March 12, 1981, the inspection team and Mr. Gill reviewed the inspection schedule. Three additional items for inspection had been hand-written on Mr. Gill's copy of the revised operations manual. These items are as follows:

8. Ponded water.
9. Intergrity of trench wall.
10. Diversion berms.

Since these items were not listed on the copy provided to the inspection team, these additional items were either added after the copy for the inspection team was prepared, or not all of the operations manuals at the site contain these additions.

In general, the inspection schedule appears to be vague with regard to the problems an inspector should look for. For example, inspection item number 3 (evaporation basins for leakage) does not state what the indicators of leakage might be, such as a rapid drop in water level. In addition, the inspection schedule should contain the frequency at which safety equipment such as fire extinguishers are inspected. Loading and unloading zones should also be inspected for signs of spillage, and the trenches should be inspected to ensure adequate daily cover. In order to determine if the trenches have adequate cover, the inspection should be ~~to be~~ conducted at the end of an operating day.

A copy of the daily log for March 5 - 11, 1981, was also obtained (attachment 3). The results of the daily inspections for this time period were recorded in the log; although, the inspection entry for March 11, 1981 was added to the log on March 12, 1981 by Mr. Gill. Mr. Gill recorded this inspection annotation immediately before copying this portion of the daily log.

Personnel Training

The majority of the revised BHS operations manual is dedicated to personnel training and safety. A copy of the revised operations manual is included in attachment 3. This manual should be reviewed when determining the adequacy of the BHS training and safety program. The employee training program provided by BHS includes waste handling procedures, cardio-pulmonary

resuscitation, and emergency response procedures. The job descriptions and the names of the personnel filling these positions are also included in attachment 3. Records of the training given to the employees were available at BHS, however, copies of these records were not obtained.

Ignitable, Reactive, and Incompatible Wastes

MDNR's hazardous waste regulations forbid BHS from accepting ignitable or reactive wastes. The waste analysis plan at BHS is designed to prevent such wastes from being disposed of at this site. Based on this analysis scheme, wastes accepted at BHS are segregated as organic, alkaline, or acid wastes. By segregating wastes in this manner, BHS believes that incompatible wastes will not come in contact with each other. Sufficient information about the chemical composition of all of the wastes accepted by BHS was not obtained to determine if this segregation system is adequate. Such an investigation would be labor intensive and is beyond the scope of this investigation.

Preparedness and Prevention, Contingency Plan

Evidence of fires, explosions, or contamination of the environment was not evident during the inspection. Portable fire extinguishers, sand pits, and fire blankets for fire control, respirators and self contained breathing apparatus, emergency eyewash units, and a shower facility were observed during the inspection. All of the fire extinguishers observed during the inspection (two) were charged and ready for use. The operational status of the respiratory protective equipment and other safety equipment was not checked during this inspection.

A copy of the contingency plan from the BHS operations manual is included in attachment 3. This plan is general in nature and lists the emergency equipment and procedures that will be used in the event of a fire or

other emergency. This contingency plan also includes an emergency evacuation plan and the names and phone numbers of all persons qualified to act as emergency coordinators. The plan does not, however, include the addresses of the emergency coordinators. The procedures for testing and maintenance of all emergency equipment are also not included in the contingency plan. According to Mr. Gill, arrangements have not been made with the local authorities (fire, police) to provide assistance in the event of an emergency. Also, copies of the contingency plan have not been distributed to the local authorities.

Manifest System, Recordkeeping, and Reporting

Manifest System

Copies of the manifests for shipments received at BHS between March 10-12, 1981 were obtained during this inspection and are included in Attachment 3. The wastes received during this time period are summarized in Table 1. Only one generator, McDonnell Douglas, listed the EPA identification numbers of both themselves and the transporter on the manifest. McDonnell Douglas was also the only generator to list that the waste should be returned to the generator if unable to deliver to BHS. The RCRA regulations, however, may not be applicable to the other wastes; thus, the requirement to list this information on the manifests may not be applicable. All of the generators, however, have applied and received EPA identification numbers and have indicated that some of their wastes are regulated under RCRA. The generators should perhaps be contacted to determine if the wastes indicated on these manifests are hazardous as defined by RCRA.

Samples were collected from two of these incoming waste loads, Litton Systems and Great Lake Containers, to determine the composition of these wastes. The details of this sampling will be discussed later in this section.

Table 1 - Summary of Wastes Received at BHS between March 10-12, 1981.

Generator	Waste Description	Waste Volume	Date of Shipment
Ford Motor Co. St. Louis, Mo.	Paint Sludge	15 cubic yards	3-10-81
Mobay Chemical Co. Kansas City, Mo.	Organic Phosphate Mixture	52 drums	3-10-81
	Hazardous Waste, N.O.S.	25 drums	3-10-81
McDonnell Douglas St. Louis, Mo	Hazardous Waste, N.O.S.	1 cubic yard	3-11-81
	Hazardous Waste, N.O.S.	3 cubic yards	3-11-81
	Hazardous Waste, N.O.S.	11 cubic yards	3-11-81
Great Lakes Container St. Louis, Mo.	Hazardous Waste, N.O.S.	14 cubic yards	3-11-81
Litton Systems, Inc. Springfield, Mo.	Hazardous Waste, N.O.S.	10 cubic yards	3-12-81

Operating Records

The operating records at BHS were examined during this inspection. BHS maintains records of all wastes received, including the dates and location of all waste disposal. The location of the disposal cells is recorded on a facility/site plan, and the location of each waste disposed of in a particular trench is recorded using a cartesian coordinate system. A copy of the portion of the operating records which depicts the system used to record the location of wastes within a trench is included in Attachment 3. The operating records also contain the MDNR authorization and manifest numbers for each waste.

Copies of all waste analyses conducted by both the generators and BHS, past monitoring data, BHS site inspection records, and closure and post closure cost estimates are also maintained at BHS. The site inspections records were discussed previously, and the monitoring data and cost estimates will be discussed later in this section.

Groundwater Monitoring

The RCRA requirement for groundwater monitoring is not yet applicable. BHS, however, plans to use piezometric wells 10, 8, and 5 as shallow downgradient wells. The upgradient piezometric wells are usually dry, so an upgradient shallow well which would consistently yield data is not available. The monitoring well and the old wash well will be used to monitor the groundwater quality at 150 to 170 feet, with the monitoring well serving as the downgradient well. The Zykan residence well, located approximately 300 feet west of the northwest corner of Area 1 will be used to monitor the St. Peters Sandstone aquifer. The adequacy of the present monitoring system is discussed in Section 4 of this report.

Closure and Post Closure

BHS has prepared a closure and post closure plan, and a copy of this plan, including cost estimates, is included in attachment 3. The adequacy of this plan should be reviewed by the compliance branch of EPA.

Requirements for Landfills

Most of the requirements for landfills applicable to BHS under RCRA have been previously discussed; however, a brief review of these requirements is presented in support of the landfills checklist. Diversion ditches and berms are used to prevent runon to the active portions of Area 1. At present, there is no means of runoff collection. BHS feels that only the open trenches should be considered as active, and because the trenches are below grade, runoff from the trenches is not possible. Collection of runoff from Area 1 is, therefore, not needed in the opinion of BHS. All trenches currently in operation and all future trenches have or will have a leachate collection system installed. The leachate collection system is checked monthly and accumulations of leachate are removed as needed.

BHS maintains records of the locations of all wastes disposed of at the facility since it opened in 1977. A site map and a cartesian coordinate system are used to record the location of the wastes. At present, BHS is not permitted to handle ignitable, reactive, or liquid wastes, so these portions of the regulations should not be applicable. Wastes are segregated as acid, organic, and alkaline wastes and placed in separate trenches. It is not known at this time if this segregation scheme is adequate to prevent the mixture of incompatible wastes.

Surface Impoundment Requirements

Leachate and truck waste water are primarily placed in the two holding ponds at BHS. Igniteable and reactive wastes are not accepted at BHS and

should not be present in the ponds. Leachate from the different disposal trenches (i.e., acid, alkaline, organic), however, may not be compatible with each other. Also, the inspection schedule for the impoundment should include checking the dikes for deterioration, and the freeboard level. Both holding ponds at BHS had a freeboard in excess of 2 feet at the time of the inspection. Although controls for erosion are not present on the impoundment dikes, erosion of the dikes was not evident. Evidence of leaks, deterioration, or other malfunctions was also not observed (Figure 8).

Transporter Requirements

According to Mr. Gill, BHS transports approximately 95 percent of the waste disposed of at the facility. During this inspection period, eight loads of waste were delivered to BHS (Table 1). Only one of these loads, however, was checked to determine if the transporter met all of the RCRA requirements, since the majority of the loads were not delivered to BHS when the inspection team could examine the shipments. A transporter checklist was completed for the one waste load inspected.

On March 10, 1981, the emergency planning and response branch of EPA received an anonymous tip that BHS had informed a generator not to send a waste load to BHS for disposal during the inspection. The caller was supposedly mployed by the generator who was requested not to bring a waste load to BHS. Records of the waste loads received during the preceding two months were obtained during this inspection to determine the approximate number of waste loads delivered each week. The McDonnell Douglas wastes were not included in this evaluation, because the number of loads of this waste was not always recorded in the records obtained from BHS. During the two

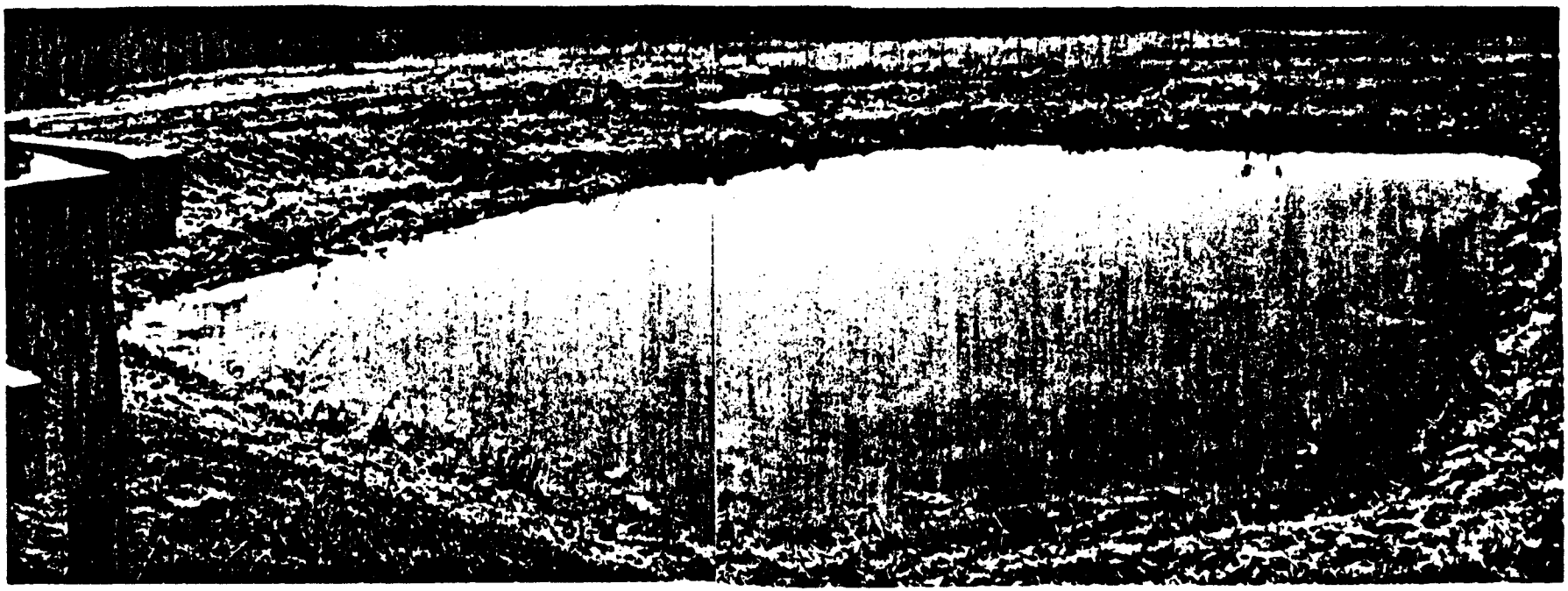


Figure 8: East Holding Pond at Bob's Home Service.

Photographer: J. Zirschky
Date and Time: 3-12-81, 0915 hrs.

month period from January 5 to February 28, 1981, BHS recieved a range of between 6 to 15 loads per week, with an average of approximately twelve loads of waste per week. During the week of the inspection, March 9 - 13, 1981, BHS recieved 10 waste loads, which is within the range of wastes normally accepted by BHS.

According to these records, Mobay in Kansas City, Missouri; and McDonnell Douglas and Ford Motor Company in St. Louis, Missouri generate the largest quantity of wastes disposed of at BHS. The number of waste shipments sent to BHS by Ford during the week of the inspection increased over the normal volume of waste received, while no significant differences in the volume of waste received from the other two generators during this week was apparent.

If the anonymous phone call was legitimate, then the generator asked not to send a load may have been a smaller quantity generator. If further action on this complaint is desired, EPA should consider obtaining the records of all wastes received the week after the inspection (March 16 - 20, 1981). The waste load not recieved during the week of this inspection would probably have been received during the week following the inspection. The next inspection conducted at BHS should be unannounced to preclude a similar situation from occurring again.

SAMPLING

General

Piezometer wells numbers 5, 8, 10, and 12 were sampled during this inspection (Figure 9). Piezometer well 12 was sampled because of the close proximity of this well to the old sanitary landfill and the holding ponds. Wells 5, 8, and 10, were sampled primarily because these wells are believed

form for these samples are included in Attachment 4. The analytical results are currently not available and will require review at a later date.

Monitoring Wells

Sampling Methodology

The piezometer wells were bailed and sampled using solvent-rinsed stainless steel bailers attached to a rope with a solvent-rinsed eight foot, stainless steel leader. These wells were bailed the day before they were sampled using a clean bailer and leader for each well. Then, to avoid or minimize the risk of contamination of the wells, a clean bailer and leader were used to collect the samples. BHS normally uses one bailer to sample all of the wells, and this bailer is rinsed with distilled water between wells. According to Mr. Gill, this bailer is made out of PVC pipe with a raquetball used as a float/footvalve. By using this method of bailing, BHS increases the risk of well contamination. The monitoring well and old wash well are equipped with pumps which negated the need to use the bailers. The pumps on these wells were allowed to run for 3-5 minutes before the samples were collected.

With a few exceptions, all of these samples were analyzed for priority pollutants, pH, and specific conductivity. The pH and specific conductivity were determined in the field using pH test paper and a Graphic Controls model PHM 7800 specific conductivity meter, respectively.

Piezometer Well 12 (Sample Number AA0403)

This well was bailed on the afternoon of March 10, 1981 and sampled at 0900 hours on the following morning. The depth to water in this well prior to bailing was approximately 33 feet and the well was almost completely bailed dry. The water level prior to sampling was approximately 34 feet deep. Although sufficient sample was collected for priority pollutant analysis, sufficient sample was not collected for analysis of pH and specific conductivity.

to be hydraulically downgradient of BHS, and also because BHS is planning to use these wells as part of the monitoring system required by RCRA. The data collected from these wells can thus be used to compare with the results obtained by BHS, once their RCRA monitoring program begins. Samples were not collected from the upgradient wells (numbers 1-3, 14-16) because these wells are normally dry. The monitoring well and the old wash well at BHS were also sampled to indicate the groundwater quality at approximately 150 to 170 feet. Both of these wells are also included in the required RCRA groundwater monitoring system to be implemented at BHS. A more complete description of these wells is presented in Section 2 of this report. A summary of the past monitoring data at BHS is presented in Section 4.

Two off-site private wells in the vicinity of BHS were also sampled. Both of these wells are located in the St. Peter Sandstone aquifer. Attempts were made to locate a sufficient number of wells in the vicinity of BHS in order to fully characterize the quality of this groundwater aquifer. These attempts, however, were not successful.

Two surface water samples were collected from the BHS creek. One upstream and downstream sample was collected from this creek. Finally, samples were collected from the east holding pond and two incoming waste loads. The east holding pond is used to treat leachate, thus these sample results should indicate the levels of contamination in the leachate. The incoming waste loads were sampled to determine if the characteristics of these wastes provided to BHS by the generators were accurate and to determine if the RCRA regulations are applicable to these wastes.

Below, a more detailed description of each of these samples is presented. The field data sheets, receipt for samples, and chain of custody

The sample appearance was cloudy and muddy.

Piezometer Well 10 (Sample Number AA0404)

The sample was collected at 1000 hours on March 11, 1981; the well having been bailed on the preceding afternoon. The water level in this well prior to bailing was 16 feet deep and approximately one well volume was removed from the well during the bailing operation. Sufficient sample for priority pollutants, pH, and specific conductivity was collected. The pH was determined to be approximately 7 std. units, and the specific conductivity was found to be 2000 micromhos. The sample appearance was slightly cloudy.

Piezometer Well 5 (Sample Number AA0410)

This well was bailed on March 11, 1981, and sampled at 0945 hours on March 12, 1981. The depth to water prior to bailing was 20 feet. Approximately 1.25 well volumes were removed from this well during the bailing. A complete set of samples was also collected from this well. The pH of this well was 6.8 and the specific conductivity was 1950 micromhos. The appearance of this sample was also slightly cloudy.

Piezometer Well 8 (Sample Number AA0409)

Piezometer well 8 was bailed on March 11, 1981, and sampled at 0900 hours the following day. The water level prior to bailing was 33 feet deep. This well was bailed almost completely dry and the well did not recharge overnight. Only 0.4 feet of water was found in the well prior to sampling. The sample volume collected was sufficient only for the analysis of metals, extractable organics, and volatile organics analysis. The appearance of this sample was grey and murky.

Monitoring Well (Sample Number AA0412)

The monitoring well was sampled on the afternoon (1445 hours) of March 12, 1981, and the monitoring well pump was allowed to run for 3-5 minutes

before the well was sampled. A complete set of samples was collected from this well. The pH and specific conductivity were found to be 5.7 std. units and 1900 micromhos, respectively. Water level readings were not taken from this well.

Old (Wash) Well (Sample Number AA0413)

This sample was collected from a faucet in the equipment shed at 1530 hours on March 12, 1981. The water was allowed to run for approximately 5 minutes before the sample was collected. The pH of this sample was determined to be approximately 6 std. units, and the specific conductivity was found to be 1850 micromhos.

Creek Samples

Upstream Creek Sample (Sample Number AA0411)

The upstream creek sample was collected at approximately 1130 hours on March 12, 1981. The sample was collected approximately 50 feet downstream of where the creek crosses the first road east of BHS. The location of this sampling point is shown on Figure 10. The samples were collected by submerging the sample containers in the creek. A complete set of priority pollutant, pH, and specific conductivity samples was collected. The pH and specific conductivity were found to be approximately 7 std. units and 390 micromhos, respectively. The appearance of this sample was clear.

Downstream Creek Sample (Sample Number AA0407)

The location of the downstream sampling point is also shown on Figure 10. This sample was collected at approximately 950 hours on March 12, 1981. A priority pollutant sample was collected from this location by submerging the sample containers in the creek; however, a sample for pH and specific conductivity was inadvertently omitted. A thin sheet of

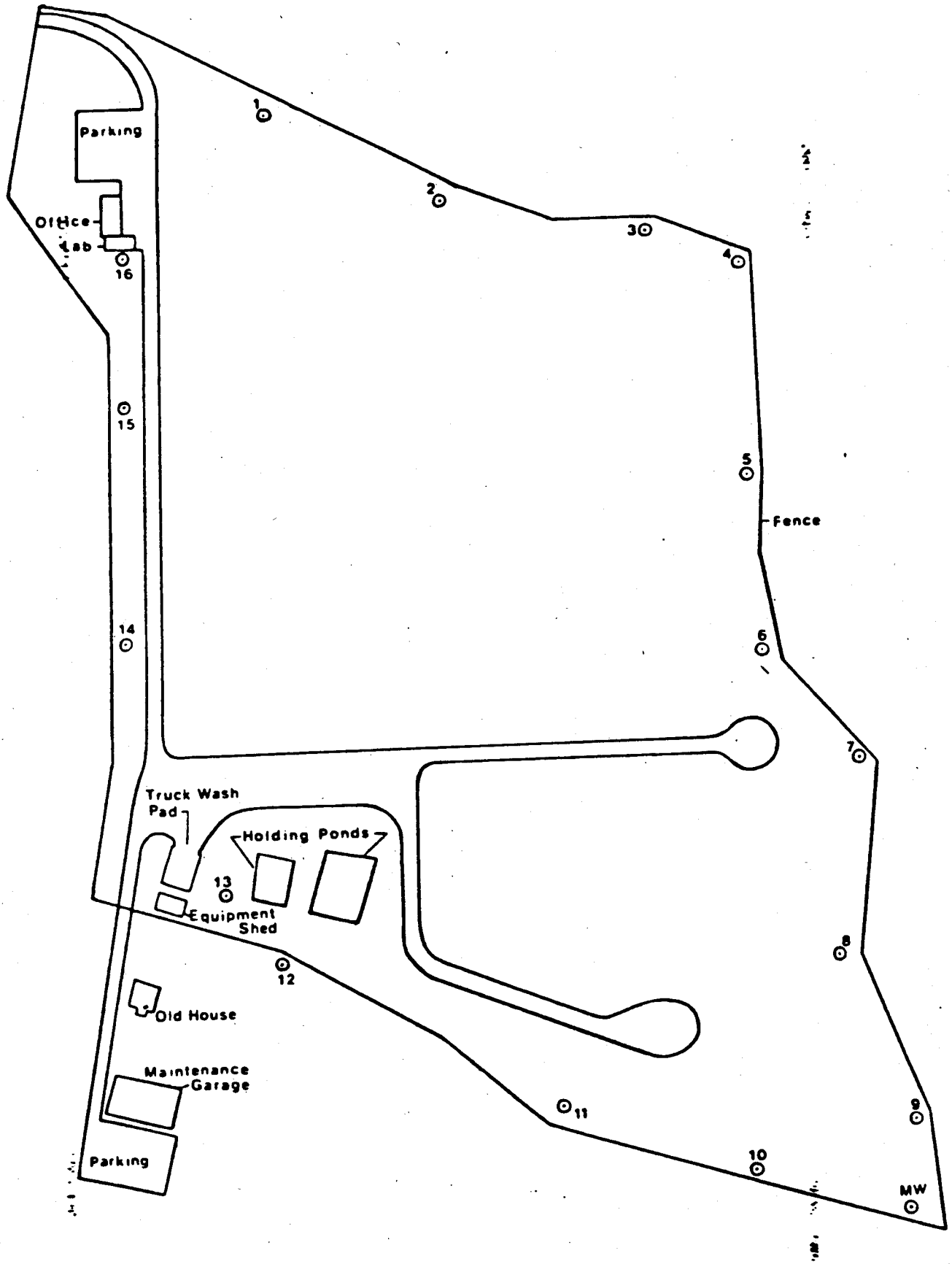


Figure 9: Site Sketch of Bob's Home Service Area 1.

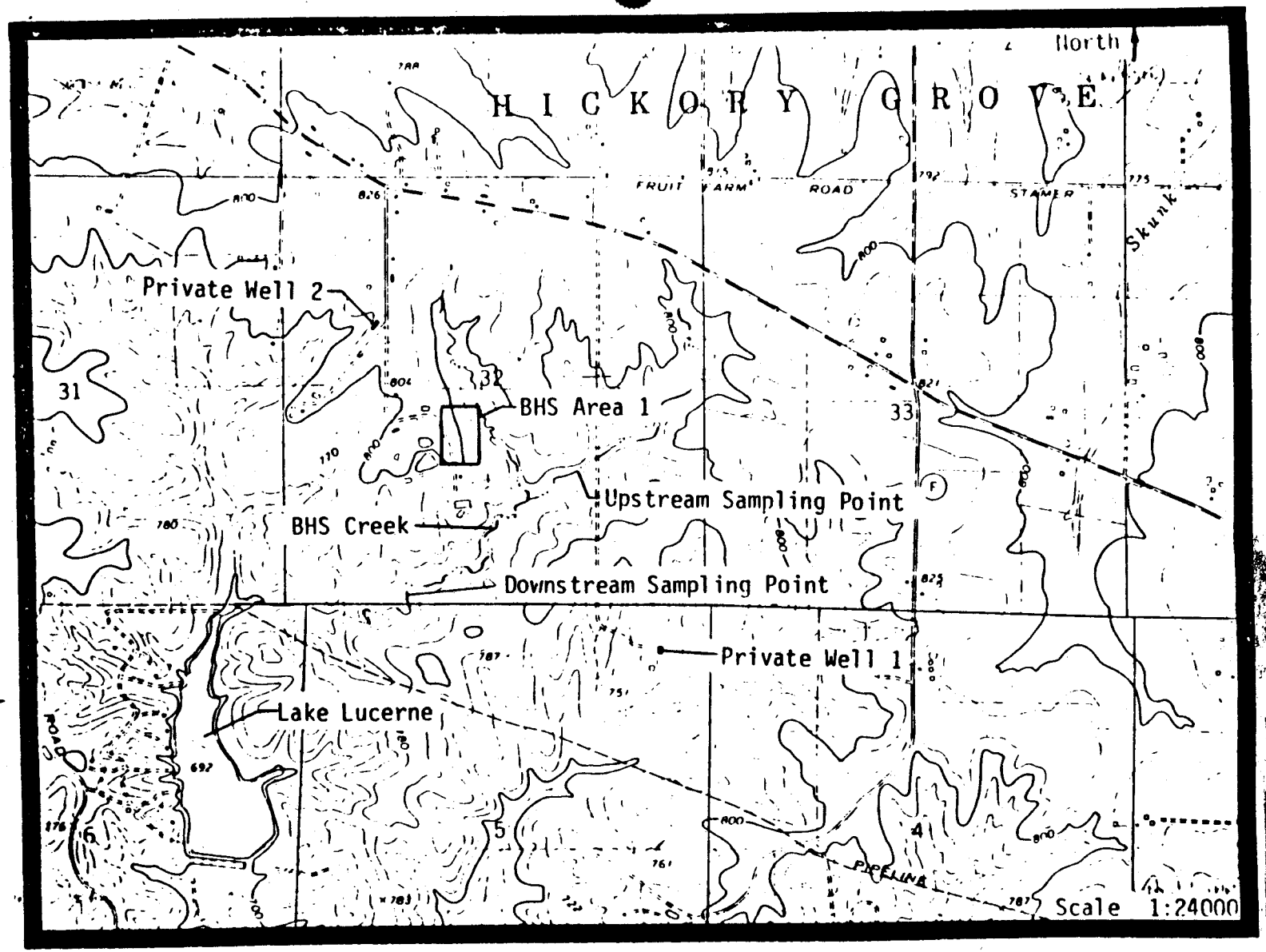


Figure 10: Location of Inspection Sampling Points.

ice covered the sampling point. The appearance of this sample was also clear.

Private Well Samples

Private Well 1 (Sample Number AA0401)

The first private well was sampled on March 10, 1981, and is lcoated approximately one-half mile southeast of Area 1. The location of this well is shown on Figure 10. The sample was collected from an outdoor water tap at the northeast corner of the residence. The owner estimated this well to be approximately 325 feet deep. The well was allowed to run for approximately three minutes at a high flow rate prior to sampling. A complete set of samples was collected from this well. The specific conductivity and pH of this sample were found to be 700 micromhos and 7 std. units, respectively. The appearance of this sample immediately after collection was clear. The next day, however, the sample was visually reexamined and found to be brown in appearance. This change in color probably indicates that the sample contained dissolved (ferrous) iron which oxidized and precipitated after collection.

The name, address, and phone number of the owner of the well are:

Mrs. Deloris Siegmund
Box 128, RR 1
Wright City, MO 63390
314-745-3632

Private Well 2 (Sample Number AA0402)

Private well 2 is located approximately one-quarter mile northwest of Area 1 (Figure 10) and is 404 feet deep. This sample was collected on March 10, 1981, from the kitchen faucet at the residence after the water was allowed to run for five minutes. Sufficient volume was available to collect all of the samples. The pH was found to be approximately 7 std. units, while the specific conductivity was 1300 micromhos. The appearance

of this sample was clear immediately after collection; and the following day, this sample had also turned brown.

The name, address, and phone number of the owner of this well are:

Mr. Harlan McLaughlan
Box 116C, RR 1
Wright City, MO 63390
314-745-3204

East Holding Pond (Sample Number AA0406)

A priority pollutant sample was collected from the east holding pond at approximately 900 hours on March 12, 1981. The sample was collected by submerging the sample containers at the north end of the pond. Specific conductivity and pH measurements were not taken at this location.

Incoming Wastes

Great Lakes Container Corp. (Sample Number AA0405)

At approximately 1525 hours on March 11, 1981, a sample was collected from a bulk waste shipment from Great Lakes Container Corp. (GLC), St. Louis, Missouri. A one pint sludge sample was collected from this shipment using a solvent-rinsed stainless steel spoon. This waste is described by Great Lakes Container as a mixture of oven sludge, dust, and wash sludge from container reclaiming operations. Table 2 summarizes the data provided to BHS by Great Lakes Container as a representative analysis of this waste. A copy of the analysis records provided by GLC to BHS is included in Attachment 4. Table 3 summarizes the data analyzed by BHS from this waste shipment. Based on these waste analyses, the sample collected during this inspection was analyzed for extractable organics, metals, cyanide, and reactivity.

A preliminary and limited comparison of the analysis of the waste provided by Great Lakes Container (GLC) and analyzed by BHS can be made based on Tables 2 and 3. The pH and specific gravity of the waste appear to differ

Table 2 Summary of the Characteristics of Great Lakes Container Wastes.

Parameter	Concentration	Parameter	Concentration
Flash Point, ^{o}F.	140°F.	Selenium	0.006
pH, std. units	11.4	Silver	none
Reactivity	none	Solids, % at 105°C.	67.2
Arsenic, mg/l	0.04	Volatiles, % at 550°C.	48.9
Barium, mg/l	none	Oil and Grease	5.2
Cadmium, mg/l	3.3	Specific Gravity, g/ml	0.81
Chromium, mg/l	10.35	Cyanides, ppm	330
Lead, mg/l	127.2	Phenols, ppm	26.4
Mercury, mg/l	0.006		

Table 3 Summary of BHS Data of Great Lakes Container Waste*

Parameter	Concentration	Parameter	Concentration
pH, std. units	8.3	Volatiles, % at 100°C.	16
Specific Gravity	1.6 g/ml	Volatiles, % at 600°C.	43

* Data analyzed from waste shipment received at BHS on March 11, 1981.

significantly between the sample collected and analyzed by BHS on March 11, 1981 (Table 3) and the data provided by GLC (Table 2). The sample analyzed by GLC had a pH of 11.4 and a specific gravity of 0.81 g/ml, while the sample analyzed by BHS from the March 11, 1981 shipment had a pH of 8.3 and a specific gravity of 1.6 g/ml. The percent volatiles at 550°C. analyzed by GLC and at 600°C. by BHS, 48.9 and 43 percent respectively, do not appear to vary significantly.

The percent solids at 105°C and the percent volatiles at 100°C analyzed by GLC and BHS respectively, are not the same test. The percent solids at 105°C (67.2%) can be converted to percent volatiles at 105°C by subtracting 67.2% from 100% (32.8%). The 32.8% volatiles at 100°C is double the 16% volatiles at 100°C determined by BHS. Thus, without more data to determine the variance of these parameters, it appears that the waste received from GLC on March 11, 1981 varies from the analysis provided to BHS by GLC. The results of the sample collected by the inspection team should also indicate if the waste appears to vary from the description provided to BHS by GLC.

Finally, GLC did not perform at least two of the tests BHS states that they require from a generator, the percent volatiles at 100°C and 600°C. These tests were performed by GLC at 105°C and 550°C, instead of the temperature prescribed by BHS. BHS continues to analyze the incoming waste loads from GLC at 100°C and 600°C even though there is no data from GLC at these temperatures to compare the analyses with. Also, GLC apparently only analyzed samples for the BHS disposal authorization on one occassion. Because the the contents of the containers received by GLC for reconditioning is likely to vary, the composition of the resulting sludge is also likely to vary. Therefore, a number of samples collected over a period of time should be

analyzed by GLC so that the variance of the waste characteristics could be determined. In this manner, BHS could make statistical comparisons to determine if an incoming waste load from GLC is similar to the description provided by GLC.

BHS should also develop and maintain a statistical data base of the samples analyzed by BHS. In this manner, BHS could determine if the analytical results from one waste differ significantly from the data previously analyzed by BHS. Such a difference could indicate either an analytical error or an actual difference in the characteristics of the waste. This data should be developed for all wastes accepted at BHS.

Litton Waste Sample (Sample Number AA0408)

A sample of a bulk load of sludge from Litton Co., Springfield, Missouri was collected at approximately 1300 hours on March 12, 1981. Mr. Gill collected this sample from different portions of the bulk waste container by hand (note: Mr. Gill was wearing disposable gloves).

The data provided to BHS by Litton as part of Litton's request for a disposal authorization, and the analysis of a sample collected and analyzed by Mr. Gill from the waste load received on March 12, 1981 is summarized in Table 4. The sample collected by Mr. Gill for his analysis was taken from the same waste load sampled by Mr. Gill for the inspection team. The data initially analyzed by Litton and the data collected by Mr. Gill appear to correspond reasonably well.

GENERAL OBSERVATIONS

Disposal Operations

The disposal of several wastes loads was observed during this inspection. In general, the disposal appeared to have been conducted properly. The

Table 4 Summary of Analytical Data of Litton Company, Springfield, Mo. Waste Sludge.

Parameter	Litton Analysis[1] Value	BHS Analysis[2] Value
Specific Gravity, g/ml	1.072	1.3
Volatiles at 100°C, %	77.7	45
Volatiles at 600°C., %	87.9	65
pH, std. units	10	8.9
Chromium, mg/l	1980	---
Cyanide, mg/l	4	---
Copper, mg/l	2900	---
Nickel, mg/l	270	---
Zinc, mg/l	120	---

[1]Analyzed by Litton Co. as part of request for disposal authorization.

[2]Analyzed by BHS from March 12, 1981 waste load.

employees were provided with safety equipment during the disposal operations. Once a waste load was placed in a trench, the coordinates of the waste were measured and recorded for entry into the facility operating records. At the end of the operating day, the wastes were covered with soil.

Exposed wastes were observed in what is believed to be trench 5N (see Figure 5a, alkaline trench). Figure 11 is a photograph of the current bottom of trench 5N. The edge of a container is slightly visible in this photograph. In this instance, improper daily cover probably does not represent a serious threat to the environment; however, it does represent a lack of proper trench inspection at the end of an operating day.

Trench 2N was being constructed during this inspection. Figure 12 is a photograph of the construction operation. As can be seen from Figure 12, the sidewalls of this trench are nearly vertical indicating a high clay content in the soil. A closer examination of the trench sidewalls was not conducted by the inspection team to determine if sand or gravel lenses were present.

Surface Drainage

Ponded water was observed in several locations of Area 1, including the bottom of the acid trench (6N) and the drainage ditch along the west edge of the truck wash pad (see Figure 5a). A small amount of yellow material similar in appearance to paint was also present in this drainage ditch. While drainage from the pad itself flows into the west holding pond, this drainage ditch discharges water to the area south of Area 1 (the old sanitary landfill). This ditch intercepts runoff from the road which runs from the office to the truck wash pad. The presence of the yellow material in this ditch may be indicative of minor spillage from either an unloading operation

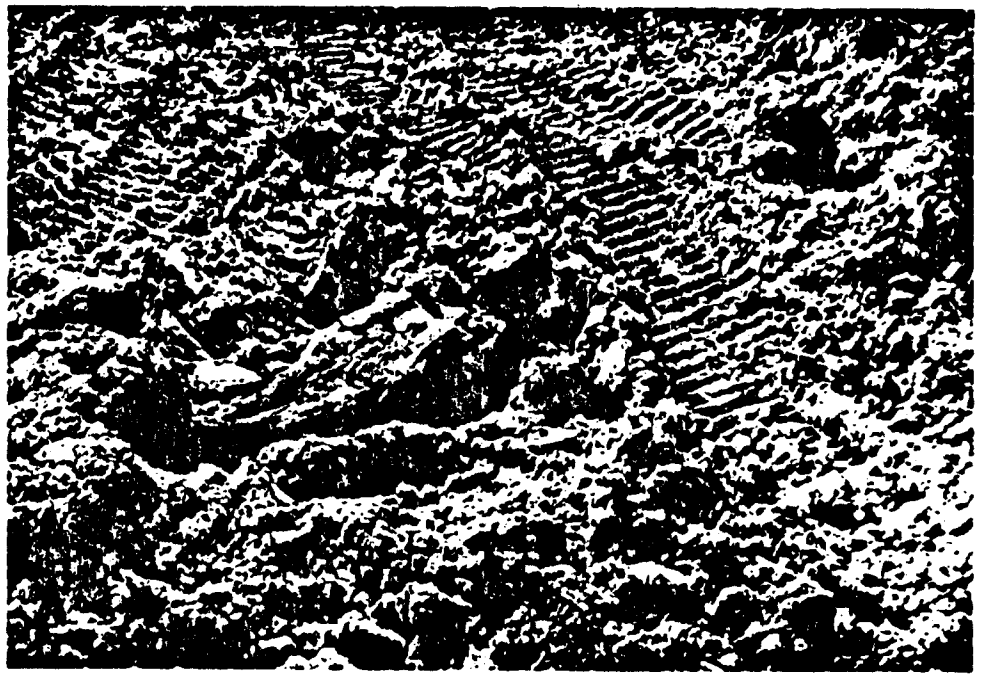


Figure 11: Exposed Waste in BHS Trench 5N.

Photographer: J. Zirschky
Date and Time: 3-12-81, 1530 hrs.

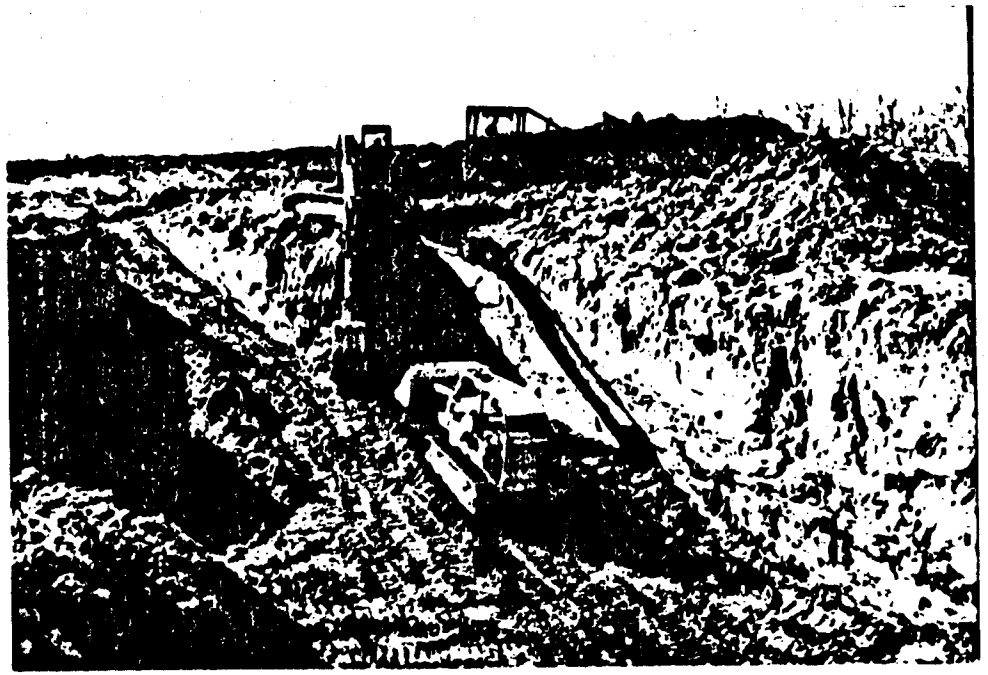


Figure 12: Construction of BHS Trench 2N.

Photographer: J. Zirschky
Date and Time: 3-12-81 1515 hrs.

or the truck cleaning operations. Because of the potential for spillage into this drainage ditch with subsequent transport off-site, BHS should probably consider modifying this drainage system such that if a spill should occur the spillage and runoff can be directed into one of the holding ponds until the spillage is removed.

The silt screens present at BHS (Figure 13) appear adequate to remove a large percentage of any suspended matter from the runoff. These screens would not, however, remove a significant amount of any dissolved contaminants from the runoff. Samples should be collected of the runoff from or of the soil in the drainage ditches to determine the potential for migration of pollutants through this system. Presently BHS does not feel collection and/or treatment of runoff is necessary since runoff entering these ditches is not generated from active portions of Area 1.

SANITARY LANDFILL, ADDITIONAL SITES

Mrs. James Zykan, vice president of BHS, was interviewed on the afternoon of March 12, 1981, to determine the types of wastes that were disposed of in the old BHS sanitary landfill. To the best of Mrs. Zykan's memory, wastes from the Tretolite Division of Petrolite Corporation in St. Louis, Missouri, and perhaps some lab wastes from the hospitals near Wright City were the only non-municipal wastes disposed of in this landfill. Primarily, this landfill accepted municipal wastes from Troy, Warrenton, Wright City, and other communities in Warren County, Missouri. Mrs. Zykan stated that her husband, now deceased, would have known more about the types of waste present in this sanitary landfill. Mrs. Zykan did not believe, however, that a significant quantity of any hazardous wastes were disposed of in this landfill. Other than the leachate spring observed at this landfill in the May 7, 1979, MDNR

Figure 13: Silt Fences at Bob's Home Service.

Photographer: J. Zirschky
Date and Time: 3-12-81, 1500 hrs.

inspection report (section 2), no records of any problems at this landfill were discovered during the background file search. No further investigation of this site was conducted during this investigation of Area 1.

Mrs. Zykan did identify two landfills in St. Louis County which she believed were used for the disposal of hazardous wastes. The first site was referred to as the Alton Brick Company - St. Louis County landfill located near Midland and 80th Street in St. Louis, Missouri. The second site was identified as Fred Weber's Quarry near Bridgeton, Missouri. According to Mrs. Zykan, these sites were used for the disposal of several industrial wastes. A preliminary assessment of these sites may be warrented to determine if these sites pose a threat to public health or the environment.

GENERAL SITE INSPECTION CHECKLIST

1. Site Identification:

a. site name — Bob's Home Service, Inc.

b. street (or other identifier) — P. O. Box 116F

c. city, state, zip — Wright City, Mo. 63390

d. county name — Warren

e. owner/operator — Laverne Zykan/Bob's Home Service

f. telephone (if known) _____ / / Federal / / State / / County / / Municipal /XX/ Private / / Unknown

g. site description — 12 acre hazardous waste landfill

2. Characterization of site activity:

a. check off the appropriate activities below:

STORER	TREATER	DISPOSER
Pile___	Filtration___	Landfill X
Surface Inmpoundment X	Incineration___	Land Treatment___
Drums___	Thermal Treatment___	Surface Impoundment___
Tank, Above Ground___	Volume Reduction___	Incineration___
Tank, Below Ground___	Recycling/Recovery___	Other_____
Other_____	Chem/Phys/Bio Treatment___	_____
_____	Waste Oil ___	
	Reprocessing___	
	Solvent Recovery___	
	Other evaporation ponds (surface impoundments)	

b. specify details of site activities as needed:

_____

Note: This form is undergoing Agency review. A final form will be distributed at a later date, accompanied by a separate transmittal notice.

Actions Taken or Planned

3. Permit information:

a. List all applicable permits held by the site:

NPDES Permit SPCC Plan State Permit (Specify) 721901 iss. May 25, 1973

Air Permits Local Permit RCRA Disposer

RCRA Storer RCRA Treater

Other (Specify) RCRA transporter

In Compliance Yes No Unknown with respect to: _____
Regulation Name/#

4. Past regulatory actions:

None

Yes - If yes, summarize: _____

5. Inspection activity (past or on-going):

	Date of Past Action	Performed by EPA/State	Describe:
None			
Yes -- Specify:	bi-weekly	State	routine inspections

6. Remedial activity (past or on-going):

None

Yes -- Specify:

General Facility Standards

	Yes	No
7. Regional notices to RA present:		
a. foreign shipments	( )	(X)
b. new owner/operator	( )	(X)

	Yes	No
8. General Waste Analysis Plan must include:		
a. test methods	(X)	( )
b. sampling method	(X)	( )
c. review or repeat of analysis	( )	(X)

9. Adequate security:	
a. 24 hour surveillance system	No
b. artificial or natural barrier around facility	Yes - 6 foot fence
c. means to control entry	Yes, but not satisfactory
d. danger sign(s) at entrance(s)	

10. Inspection requirements must include:	
a. malfunction	Yes
b. operator error- BHS stated operating procedures preclude burying wastes in improper location.	No
c. discharges	Yes
d. inspection schedule	Yes
e. safety, emergency equipment	No
f. security devices	Yes
g. operating and structural equipment	Yes
h. inspection log	Yes

11. Personnel training records:	
a. job titles	Yes

b. description of training	Yes
c. records of training	Yes

12. Requirements for ignitable, reactive or incompatible wastes: ignitable, reactive wastes not accepted at Bob's Home Service

a. handling	
b. no smoking signs	
c. separation and confinement	Yes
d. check waste containers	Yes

Preparedness and Prevention

13. Maintenance and operation of facility:

a. evidence of fire, explosion or contamination of the environment	None

14. Required equipment:

a. alarm system	Yes - loud horn
b. telephone or 2-way radio	Yes - both
c. portable fire extinguishers, fire control, spill control equipment and decontamination equipment	Yes
d. water of adequate volume for hoses, sprinklers or water spray system	Yes - nearby lake

15. Testing and maintenance of equipment:

a. testing and maintenance procedures	Yes
b. condition of equipment	Yes

16. Required aisle space	—
17. Arrangements with local authorities (operating record)	No

Contingency Plan and Emergency Procedures

18. Content of contingency plan	appears too general
19. Copies of contingency plan - copies have not been distributed to local authorities.	No
20. Emergency coordinator:	
a. identify emergency coordinator, address not listed, however.	Yes
b. ensure qualifications of coordinator	Yes
21. Emergency procedures	Yes

Manifest System, Recordkeeping, and Reporting

22. Use of manifest system:	
a. procedures for processing each manifest	Yes
b. records of past shipments	Yes
23. Manifest discrepancies (methods of detection)	Yes
24. Operating record:	
a. presence	Yes
b. maintenance	Yes
25. Availability, retention and disposition of records	Yes
26. Annual report (records are being kept to prepare this document)	Not yet required
27. Unmanifested waste report: all wastes observed being accepted at BHS were manifested.	
a. procedures for filling out report	
b. compliance file for reports	

28. Additional reports:

    a. releases, fires and explosions _____

    b. groundwater contamination _____

    c. facility closure _____

Groundwater Monitoring

29. Applicability:

    a. check applicability N/A _____

    b. operation and maintenance of a system 10, 8, 5, & MW downgradient; old wash well and Zykan well upgradient. _____

    c. waiver of requirement _____

30. Groundwater monitoring system:

    a. presence _____

    b. number and placement of wells _____

    c. maintenance of wells _____

    d. well integrity _____

31. Sampling and analysis:

    a. sampling and analysis plan _____

    b. records of sampling and analysis _____

32. Preparation, evaluation and response:

    a. outline of water quality assessment program _____

    b. adequacy of outline _____

33. Recordkeeping and reporting:

    a. groundwater analysis records _____

    b. reports of groundwater monitoring information to Regional Administrator _____

    c. annual groundwater quality reports _____

34.	Closure and post closure:	
	a. closure plan	Yes
	b. adequacy of plan	Unknown
35.	Time for closure:	
	a. 90 day closure requirements	Yes
	b. six month closure requirements	Yes
36.	Disposal or decontamination of equipment	Yes
37.	Certification of closure	
38.	Post closure care and use of property:	
	a. post closure plan	Yes
	b. period of post closure plan	Yes
	c. plan and amendments approved	Unknown
39.	Notice to local land authority:	
	a. survey plat including records of all waste types and quantities of waste	No
	b. submitted to proper authorities	No
40.	Notice in deed to property:	
	a. proper notification to potential purchasers	No

FIGURE 16

LANDFILLS CHECKLIST

1. General operating requirements:	
a. adequate diversion of run-on	Yes
b. adequate collection of run-off	Questionable
c. adequate control of leachate	Yes, in new trenches
d. control of wind dispersal (note blowing debris)	Yes
2. Surveying and recordkeeping - operating record must include:	
a. map (locating cells, dimensions, depths)	Yes
b. contents of each cell	Yes
3. Proper disposal of ignitable or reactive wastes	N/A
4. Proper disposal of incompatible wastes	Unknown
5. Proper disposal of liquid wastes:	liquid wastes are not accepted at the facility.
a. bulk or non-containerized liquids	
chemically and physically resistant liner	N/A
leachate collection and removal, or	N/A
liquid waste treatment or stabilization (no longer free liquid)	N/A
b. liquids in containers	
adequacy of container design	N/A

Note: This form is undergoing Agency review. A final form will be distributed at a later date, accompanied by a separate transmittal notice.

SURFACE IMPOUNDMENTS CHECKLIST

1. General operating requirements: At least 60 cm (2 feet) of freeboard (note overtopping by overfilling, wave action, or a storm) — Yes

2. Containment system: dikes adequately covered with grass, shale or rock (note erosion) — No, but dike integrity appears sound.

3. Waste analysis and trial tests:

   a. procedures for and records of waste analysis and trial tests — _____

4. Inspections and maintenance of:

	Yes	No
a. freeboard level	( )	(X)
b. dikes	( )	(X)
c. vegetation surrounding dikes	( )	(X)

5. Closure and post closure plans present at site — Yes

6. Proper disposal of ignitable or reactive wastes — N/A

7. Proper disposal of incompatible wastes — Unknown

8. Evidence of leaks, deterioration, or malfunction — No

Note: This form is undergoing Agency review. A final form will be distributed at a later date, accompanied by a separate transmittal notice.

TRANSPORTERS CHECKLIST
(GREAT LAKES CONTAINER WASTE SHIPMENT)

1. EPA or authorized state identification number — 0566/004 Illinois; B1002, Missouri; No EPA Number

2. License number and current date on tag — 52 350 Mo. 1981

3. Maintenance of records for the specified three year time limit — Yes

4. Copy of manifest or delivery document available — Yes (#01101 001010 Mo

Manifest containing at least:	YES	NO
a. name and address of transporter	(X)	( )
b. name, address, identification code of generator EPA ID # not on manifest, State ID# was on manifest	(X)	( )
c. name, address, identification code of designated permitted facility Mo. # on manifest but not EPA ID#	(X)	( )
d. corresponding manifest document number	(X)	( )
e. description and quantity of each hazardous waste	(X)	( )
f. signature of subsequent transporters	( )	( )
g. signatures signifying proper delivery or reasons why delivery could not be certified	( )	(X)

5. Containers properly labeled and marked — ORM-E; No placard required

6. International shipments:	YES	NO
a. record of date waste left U.S. N/A	( )	( )
b. presence of one signed copy in records N/A	( )	( )

Note: This form is undergoing Agency review. A final form will be distributed at a later date, accompanied by a separate transmittal notice.

7. Evidence of leaking or damaged containers (note appearance of truck also) — truck was fully tarpe

8. Vehicles containing hazardous waste placarded properly (see 49 CFR 172.500) — no placard required

9. If it is required of vehicle or if vehicle contains more than 1,000 lbs. of hazardous waste, check to see that markings: this section not completed.

	YES	NO
a. appear on both sides of vehicle	(X)	( )
b. are in letters contrasting in color with background	(X)	( )
c. are legible during daylight from 50 feet away	(X)	( )

SECTION 4

SITE EVALUATION

INTRODUCTION

Based upon the information collected during the background review and site inspection of BHS, a brief evaluation of the site has been prepared. Several potential problems are noted in this evaluation; however, this evaluation is by no means complete. A thorough evaluation of BHS would not have been possible within the given time constraints. Furthermore, the data from the samples collected during this inspection are not yet available to assist in this evaluation. When this data becomes available, an addendum to this report should be prepared.

This section has been arranged in two major subsections. In the first subsection, the effectiveness of the monitoring system is evaluated, and the past monitoring data are reviewed. The past and present operational practices and problems, as indicated by the past MDNR inspection reports and the March 10 - 12, 1981, inspection, are reviewed in the second section.

MONITORING SYSTEM

Evaluation of the Monitoring System

General

Although the BHS monitoring system will meet the future RCRA groundwater monitoring requirement for 3 downgradient and one upgradient monitoring wells, the adequacy of this system is questionable. At present, 19 monitoring wells and two surface water monitoring points are used by BHS to detect any migration of pollutants. The monitoring well system has been designed to monitor three levels of groundwater. The first level extends to 42 feet below the ground surface and is monitored by the 16 piezometer

wells. The next groundwater level monitored is at approximately 150 to 170 feet beneath the surface, and the monitoring well and old well monitor this level. Also, an additional well will be constructed south of Area 1 to monitor this aquifer (Figure 15). Finally, the Zykan residence well is used to monitor the St. Peter sandstone aquifer at a depth of 410 feet. A discussion of the monitoring system for each of these levels is presented below.

Piezometer Wells

In general, the piezometer wells which surround Area 1 will probably detect any shallow, lateral migration of leachate from Area 1. Lateral migration could occur along the alluvium/glacial till interface located in the eastern portion of Area 1; however, the impervious cutoff trench to be constructed should prevent migration along this interface. The potential for lateral migration in other sections of Area 1 seems lower than the potential for such migration in the eastern portion of Area 1. Thus, it seems unlikely that the piezometer wells on the western, northern, and southern edges of Area 1 would detect any leachate migration that might occur from the existing disposal trenches.

Piezometer wells 12 and particularly 13 may detect seepage from the two holding ponds at BHS. Well 13 is located adjacent to the west holding pond while well 12 is located south of the east holding pond, near the old sanitary landfill (Figure 14). Several anomalies were apparent in the past monitoring data from both wells 12 and 13 which may be indicative of contamination from the holding ponds. Well 12 may also be intercepting leachate migration from the old sanitary landfill. Attempts were made to perform an electrical resistivity study around the holding ponds in hopes

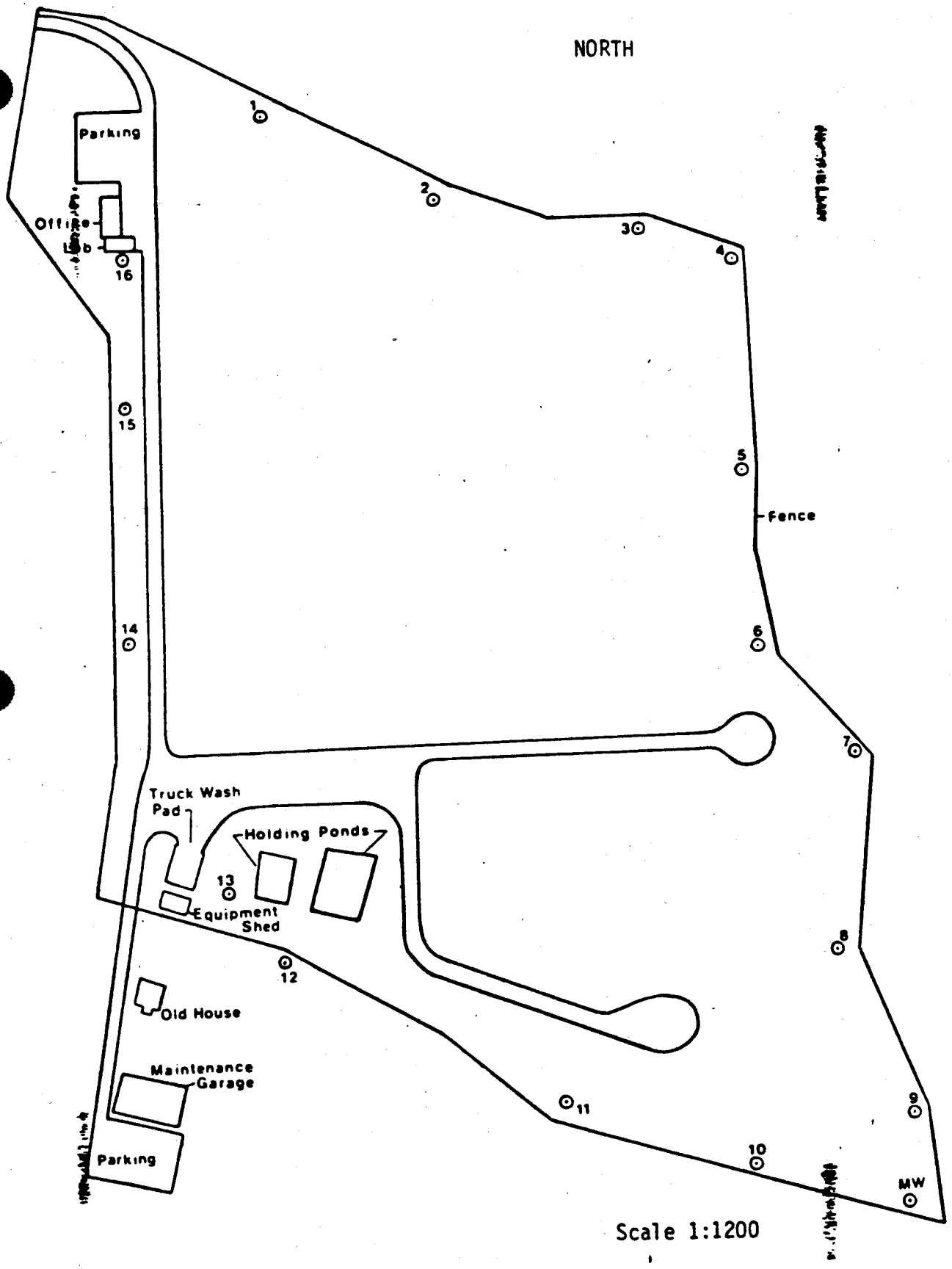


Figure 14: Site Sketch of Bob's Home Service.

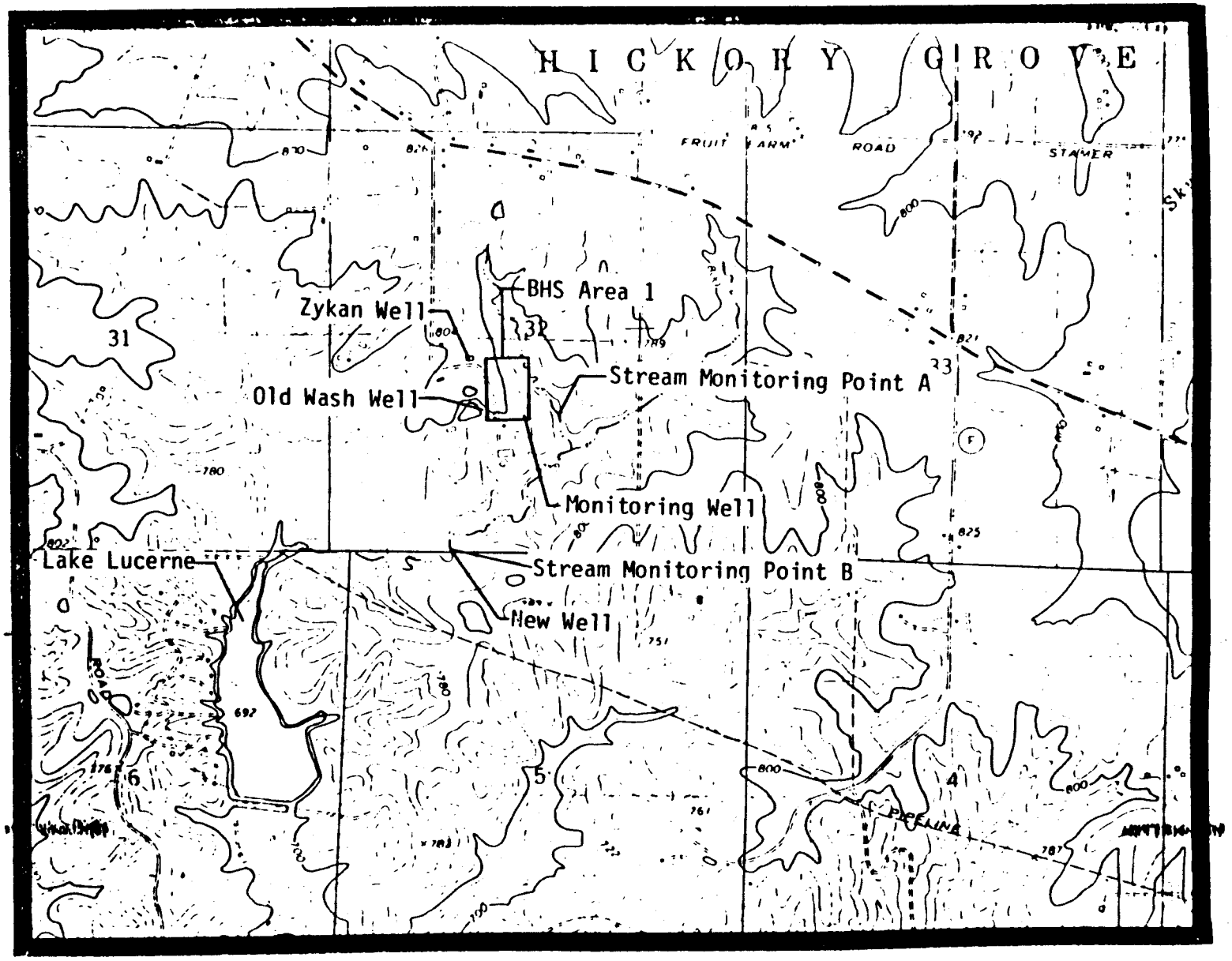


Figure 15: Location of Bob's Home Service (BHS) Sampling Points.

Dave Doyle
ARHM-TSS

E P A PROJECT

ECOLOGY AND ENVIRONMENT, INC.

MEMORANDUM: REGION VII

TO: Dave Doyle

THRU: Bill Keffer

FROM: John Zirschky

DATE: September 2, 1981

SUBJECT: Bob's Home Service Site Inspection Report Corrections

After our conversation today, I reviewed the Bob's Home Service site inspection report and found an error in this report. On page 4-5, the statement is made that "BHS appears correct in their assumption that the monitoring well is upgradient of the old well." This statement is incorrect, the words monitoring well and old well were accidently transposed. The sentence should read as follows:

> "BHS appears correct in their assumption that the old well is upgradient of the monitoring well."

A copy of the corrected page 4 is attached for inclusion in the site inspection report.

JZ:kw
.cc:Bill Keffer

of detecting any seepage: however, these attempts were not successful. The chain link fence, equipment shed, and truck wash pad prevented obtaining sufficient data points for this study. Furthermore, the lower resistance of the chain link fence would most likely have caused interference with the test.

According to the soil boring logs recorded in the BHS site plans, there is not a shallow aquifer within 35 to 42 feet (the depth of the piezometer wells) of the surface at Area 1. BHS plans, however, to use piezometer wells 5, 8, and 10 as the downgradient monitoring wells for the RCRA monitoring system. Section 265.19(a)(2) of RCRA requires that the monitoring system detect contamination in the shallowest aquifer beneath the site. Since an aquifer is not located within the range monitored by these piezometer wells, this monitoring system does not appear to satisfy the RCRA requirements.

Monitoring, Old, and New Wells

The monitoring well and old wash well (Figure 15) probably monitor the groundwater near the limestone bedrock/overburden interface. The monitoring well is known to be screened at this interface, however, the construction of the old well is unknown. BHS appears correct in their assumption that the old well is upgradient of the monitoring well. Placement of the new well which is to be constructed south of Area 1 also appears to be hydraulically upgradient of the monitoring well (Figure 15). Based upon the review of boring logs, the bedrock appears to slope towards the northeast and not towards the south. Although secondary soil structures (i.e., fissures in the bedrock or overburden) may promote leachate migration towards the south, leachate is more likely to move along the bedrock/overburden interface towards the northeast. Thus, the new well should

of detecting any seepage: however, these attempts were not successful. The chain link fence, equipment shed, and truck wash pad prevented obtaining sufficient data points for this study. Furthermore, the lower resistance of the chain link fence would most likely have caused interference with the test.

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probably be located northeast of Area 1.

These wells appear to monitor the shallowest aquifer beneath BHS. Thus, the RCRA requirement for three downgradient wells and one upgradient well should be applicable to these wells. The system, as currently designed, contains two background wells (old well, new well) and one downgradient well (monitoring well). Two additional downgradient wells, therefore, would need to be installed to meet the RCRA requirements. These additional wells should probably be installed north, northeast, or east of Area 1, depending upon the exact direction of groundwater flow. By locating the wells in this manner, the chances of detecting subsurface migration would be greatly increased.

Zykan Well

The Zykan well (Figure 15) is used to monitor the St. Peter Sandstone aquifer. The chances of this well detecting contamination from BHS are minimal at best. First, the low permeability of the overburden makes the chance of contamination of this aquifer in the vicinity of BHS unlikely. Improper casing of any wells in the area could, however, promote migration through the overlying strata. Secondly, the St. Peter aquifer appears to slope generally from the southwest to the northeast; and therefore, the groundwater flow through this aquifer is probably towards the northeast. Subsequently, any leachate that migrated into this aquifer would flow towards the northeast. The Zykan well is located west of Area 1 and would therefore not be in line with any potential flow pattern of leachate from BHS in this aquifer. Private wells to the northeast of BHS should be monitored to detect contamination of this aquifer. Attempts were made to sample private wells located northeast of BHS during this inspection;

however, as previously discussed, these attempts were not successful.

Summary

The monitoring system at BHS seems inadequate to detect any subsurface migration of leachate below approximately 40 feet beneath the surface. Although the chance of such migration occuring may be minimal, additional wells should be installed along the probable migration pathways. Additional geologic information obtained during the development phase of Area 2 of BHS may indicate that the current placement of the wells is correct. A more detailed geologic evaluation of this site, beyond the scope of this investigation, should be performed to definitively determine the effectiveness of the monitoring system at BHS.

Summary of Past Monitoring Data

General

During this inspection, records of the data from the piezometer wells between September, 1977 and December, 1980 were provided by BHS. These data were reviewed to determine if any of the piezometer wells showed significantly higher or lower levels of five general parameters. These wells are all located around the perimeter of Area 1 at Bob's Home Service, and are from 35-40 feet deep. A more detailed discussion of the monitoring system is provided in Section 2. Piezometer wells number 1, 2, 3, 4, 14, 15, 16 are not included in this analysis since these wells generally dry and have only been sampled on a few occassions. Comparisons were made of the remaining wells with respect to pH, specific conductivity, chemical oxygen demand (COD), hardness, and chlorides. These parameters are analyzed quarterly. A sufficient number of data points was not available to

perform a detailed analysis of the other wells at BHS. Table 5 summarizes the mean and standard deviations of these parameters in the well. A copy of the past monitoring data is included in Attachment 4.

The mean, standard deviation, and variance of these parameters were first calculated for each well. Then, a Fisher's Protected Least Square Differences (FSD) comparison was run to determine if the sample means could be considered identical at a 95 percent confidence level. If a one-way analysis of variance indicated that the mean of a parameter from at least one of the wells was significantly different from the means from the other wells, then a Fisher's Least Squared Difference Test was performed to determine which well or wells differed from the others. The reason for this analysis was 1) to determine the background concentrations of the parameters in the piezometer wells for future reference, and 2) to identify any piezometer well which shows a significantly higher or lower concentration of a parameter compared to the other wells, which might be indicative of pollutant migration. A summary of these comparisons made between the piezometer wells for each of the five parameters is presented below.

pH

The average pH levels found in the piezometer wells range from 6.4 std. units in well 13 to 7.2 std. units in well 10, (Figure 16). This difference is not large enough to conclude that the mean pH levels in any of the wells is significantly different. All the wells had slight variations in pH throughout the sample periods. One individual sample taken from well 13 had a substantially lower pH than would be expected at the site (3.5 std. units). This sample from well 13 was taken in the second quarter of 1979 (Attachment 4). The reason for this unusually low pH is unknown.

Table 5: Summary of Past BHS Monitoring Well Data.

Well Number	pH		Redox		Spec. Cond.		TOC		COD		Hardness		Chlorides		Iron	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
5	6.8	0.257	-231.5	318.8	1864	514	28.2	20.6	28.2	32.4	1386	358	26.9	28	2.26	2.7
6	6.7	0.258	-306.8	243	1871	349	35.0	23.3	38.4	69.0	1397	404	16.1	6.0	1.07	1.2
7	6.8	0.253	-319.7	257	1550	272	29.9	23.1	28.7	40	1123	191	24.8	7.7	6.22	18
8	6.8	0.327	-303.5	247	2324	409	33.9	21.3	33.8	50	1925	250	17.2	7.0	7.0	21.9
9	6.7	0.306	-301.6	234	2294	494	28.7	20.6	13.0	13.7	1732	320	10.8	3.3	1.5	2.1
10	7.2	0.734	-341.1	276.7	1477	284	23.9	19.0	12.6	17.3	1018	67	17.7	3.9	2.1	3.3
11	6.9	0.290	-342.5	290	1852	590	22.9	13.7	21.9	22.8	1435	458	9.1	3.7	16.7	47.8
12	6.8	0.309	-335.2	237.9	2874	588	28.0	13.5	30.2	13.0	2016	354	230.0	77.7	10.2	14.3
13	6.4	1.00	-247	217	725.0	354	32.3	18.2	47.5	43.0	353	152	40.0	22.0	43.3	91
MW	7.02	0.405	-285	229	1920	379	25.6	23	65.1	122	1473	330	32.5	71	17.1	30.0

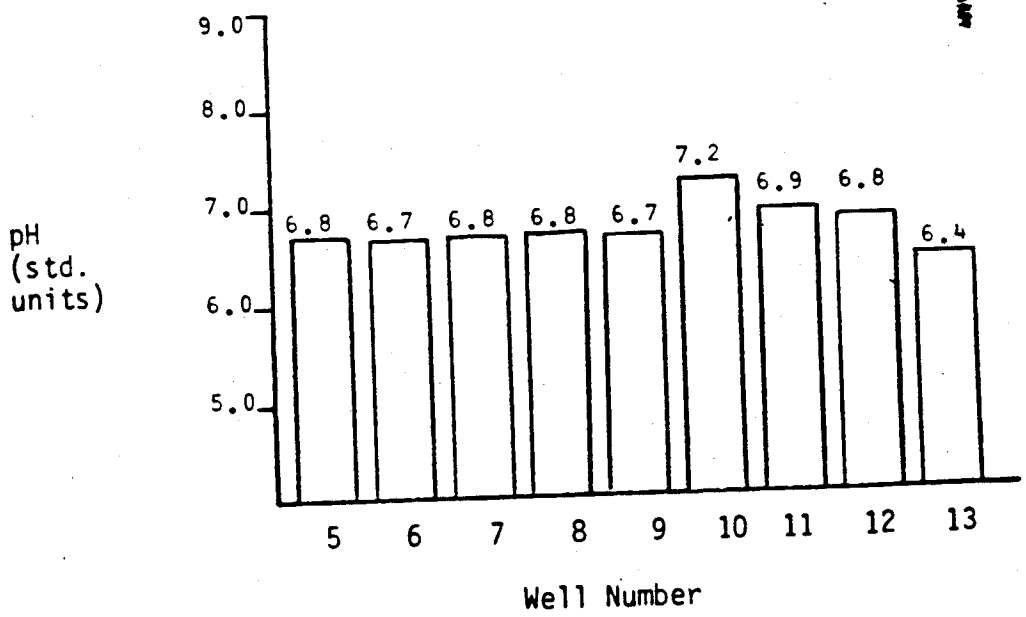

Figure 16 Mean pH Concentrations for the BHS Piezometer Wells.

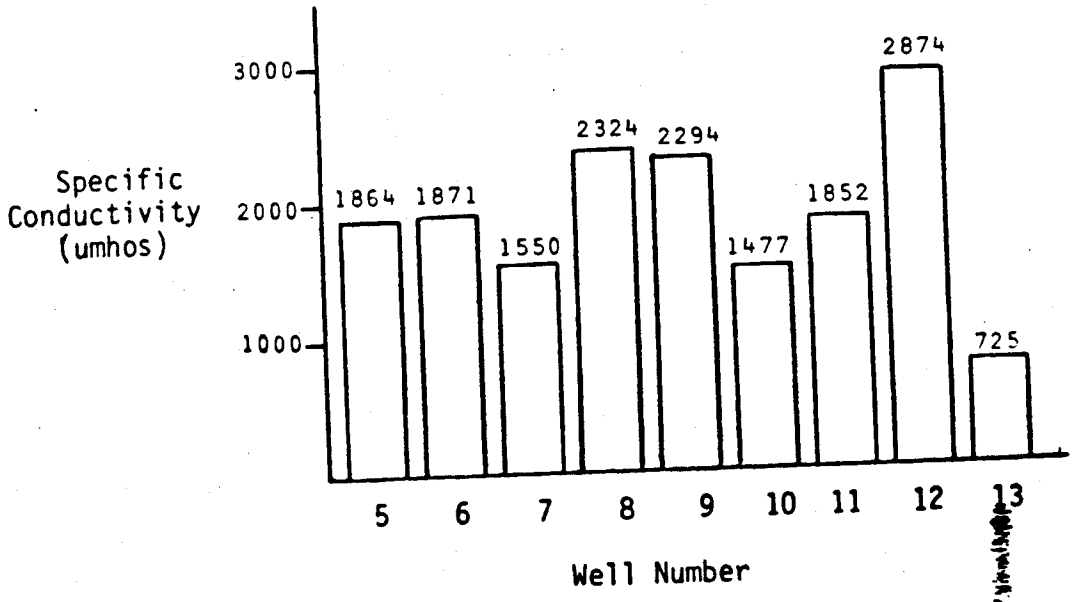

Figure 17 Mean Specific Conductivity for the BHS Piezometer Wells.

Specific Conductivity

Figure 17 shows the mean levels of specific conductivity for each of the piezometer wells. An initial comparison of these means indicated that at least one mean was significantly different from the other means. Based upon the FSD comparison of each of the wells, the following differences in mean specific conductivity were observed:

- Well 12 was significantly higher in specific conductivity than all of the other wells.
- Wells 8 and 9 were significantly higher than all of the other wells except 12, but 8 and 9 were not significantly different from each other.
- Well 10 was significantly lower than all of the wells except 13.
- Well 13 was significantly lower in specific conductivity than all the other wells.

Chemical Oxygen Demand (COD)

The mean COD concentrations for each of the wells are graphically presented in Figure 18. Although this graph seems to show some rather large variations in COD concentrations, these variations are not large enough to conclude that the COD in any of the wells are statistically different. Each well showed a large seasonal variation in COD concentrations. All the wells had some COD concentrations less than 10 mg/l and almost all the wells had COD concentrations greater than 100 mg/l at some time during the past 3 years.

Hardness

Figure 19 is a graph of the average hardness levels measured in each

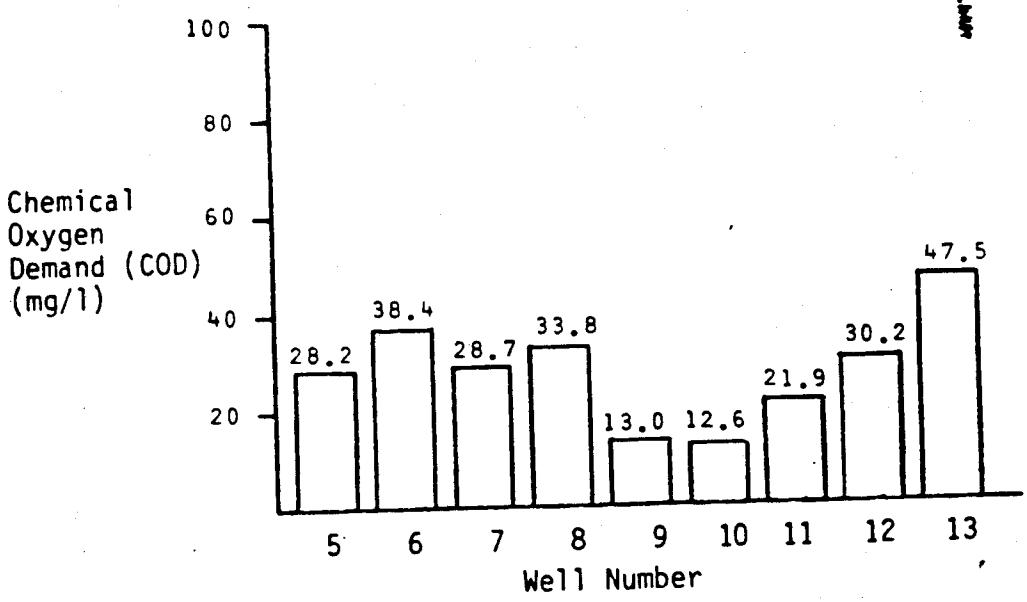

Figure 18 Mean COD Concentrations for BHS Piezometer Wells.

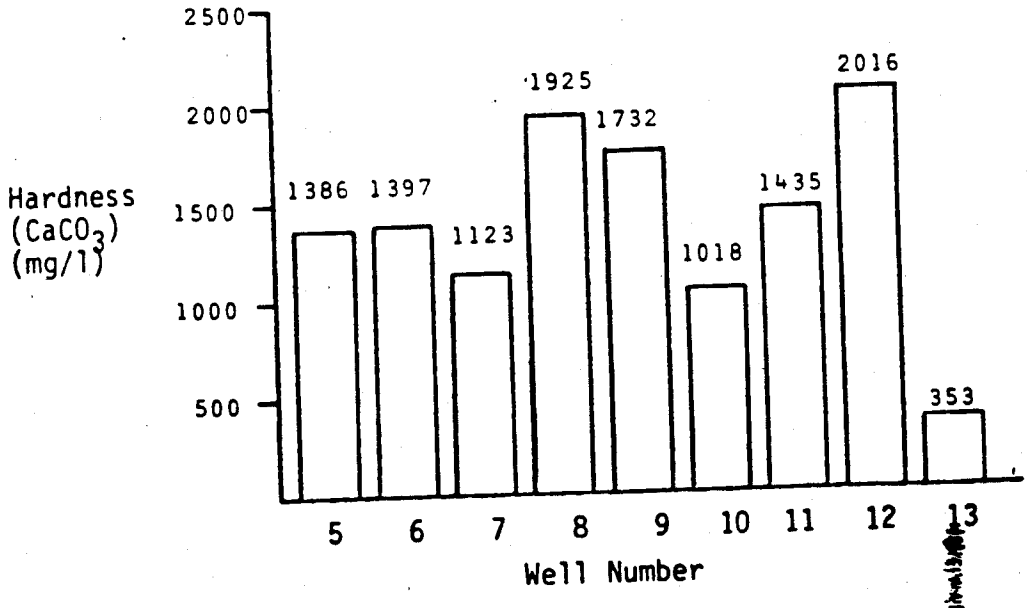

Figure 19 Mean Hardness Concentrations for BHS Piezometer Wells.

of the piezometer wells. Significant differences in the mean hardness concentration between the wells were found during the FSD analysis. A summary of the test results is presented below:

- Wells 8, 9, and 12 had average hardness concentrations significantly higher than the other wells. There was not, however, a statistical difference between these wells. Well 12 had the highest average hardness concentration, with a mean of 2016 mg/l.
- Well 11 was statistically higher than wells 7, 10, and 13, but was not different than 6 or 5.
- Wells 5, 6, and 7 were not statistically different from each other, and with the exception of well 7, these wells were significantly higher than wells 10 and 13. Wells 10 and 7 were not significantly different from each other.
- Well 13 showed significantly lower hardness concentrations than all of the other wells. Well 13 had the lowest average hardness concentration of any of the wells (353 mg/l).

The reason for these variations in hardness from well to well cannot be determined from the background data. It should be noted however that the largest difference in hardness concentration occured between wells 12 and 13 which are both located at the southwest corner of Area 1 (Figure 14).

Chlorides

Figure 20 is a graph of the average chloride concentrations found in each of the piezometer wells. As can be seen from Figure 20, Well 12 has a significantly higher average concentration of chlorides than all the other wells. The FSD data analysis showed that Well 12 is the only well which is statistically different from the other wells.

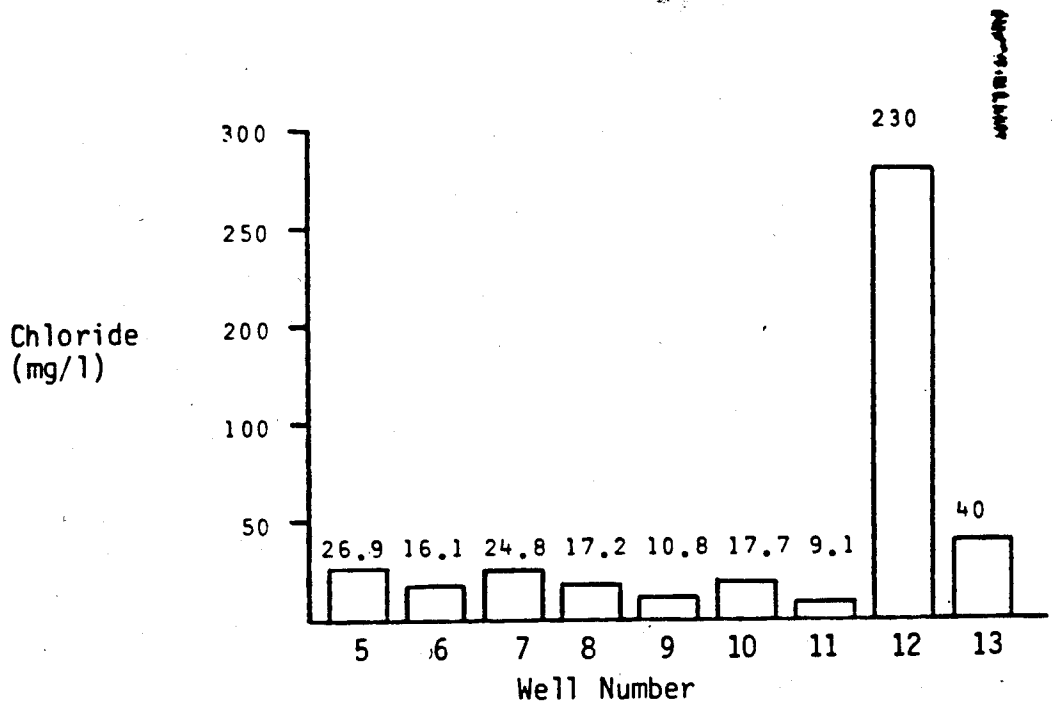

Figure 20 Mean Chloride Concentrations for BHS Piezometer Wells.

Data Evaluation

Several anomalies were apparent in the past monitoring data. Piezometer well 12, for example, was significantly higher in specific conductivity (2874 umhos/cm) and chlorides (230 mg/l) than all of the other piezometer wells. This well was also significantly higher in hardness (2016 mg/l) than all of the wells except 8 and 9. Piezometer well 13, on the other hand, was statistically lower in mean specific conductivity (725 umhos/cm) and hardness (353 mg/l). The reason for the difference in the mean concentrations of specific conductivity, hardness, and chlorides is unknown. Several possible explanations for these differences, however, are presented below.

Seepage from the west holding pond could be migrating to well 13. Only approximately 15 feet separate well 13 from the west holding pond. One set of sampling data collected from the west holding pond in September of 1979 shows a specific conductivity of 490 umhos/cm and a hardness of 169 mg/l. These values are reasonably similar to the mean specific conductivity (725 umhos/cm) and hardness (353 umhos/cm) for well 13. Increases in these parameters between the holding pond and well 13 could be accounted for by "leaching" of dissolved solids from the soil. While sufficient data is not avilable to prove seepage from the holding pond is occurring, the low data values found in well 13 tend to indicate that seepage may be occurring. Such seepage would have serious implications as to the permeability of the soils at the site. A reassessment of the geology at the site may therefore be warrented.

One other anomaly in the data from well 13 was observed in this evaluation. A pH of 3.5 was found in this well in the third quarter of

1979. Several other parameters including hardness and iron appeared to have varied in this sample (Figure 21). Both the pH and iron concentration for this sample were statistically different at a 95 percent confidence level from the mean values determined for this well. This marked change may be indicative of a spill near the top of the well which subsequently migrated vertically or seepage of acidic leachate from the holding ponds. It appears that this irregularity went unnoticed by BHS and MDNR. Although Mr. Gill was not questioned regarding this incident, no records of any action by either MDNR or BHS officials to investigate this incident were found in MDNR's headquarter's files in Jefferson City, Missouri. Records of this incident, however, may be present in other MDNR files either in the regional MDNR office or at the MDNR laboratory. Further investigative action of this incident seems warrented to determine first, if this peak was noticed, and secondly, if it was noticed, what investigative actions were undertaken to determine the cause of this anomaly. Failure to adequately review all of the sampling data negates the effectiveness of the monitoring system.

The high mean chloride (230 mg/l), specific conductivity (2874 umhos/cm), and hardness (2016 mg/l) in well 12 may be indicative of leachate migration. While seepage from the holding ponds may be occurring, leachate from the old sanitary landfill seems to be a more likely source of contamination. Sanitary landfill leachate normally contains high chloride concentrations. At present, there are no monitoring wells specifically designed to detect leachate migration from this site. Again, such leachate migration might indicate that the soil's permeability is not as low as previously thought.

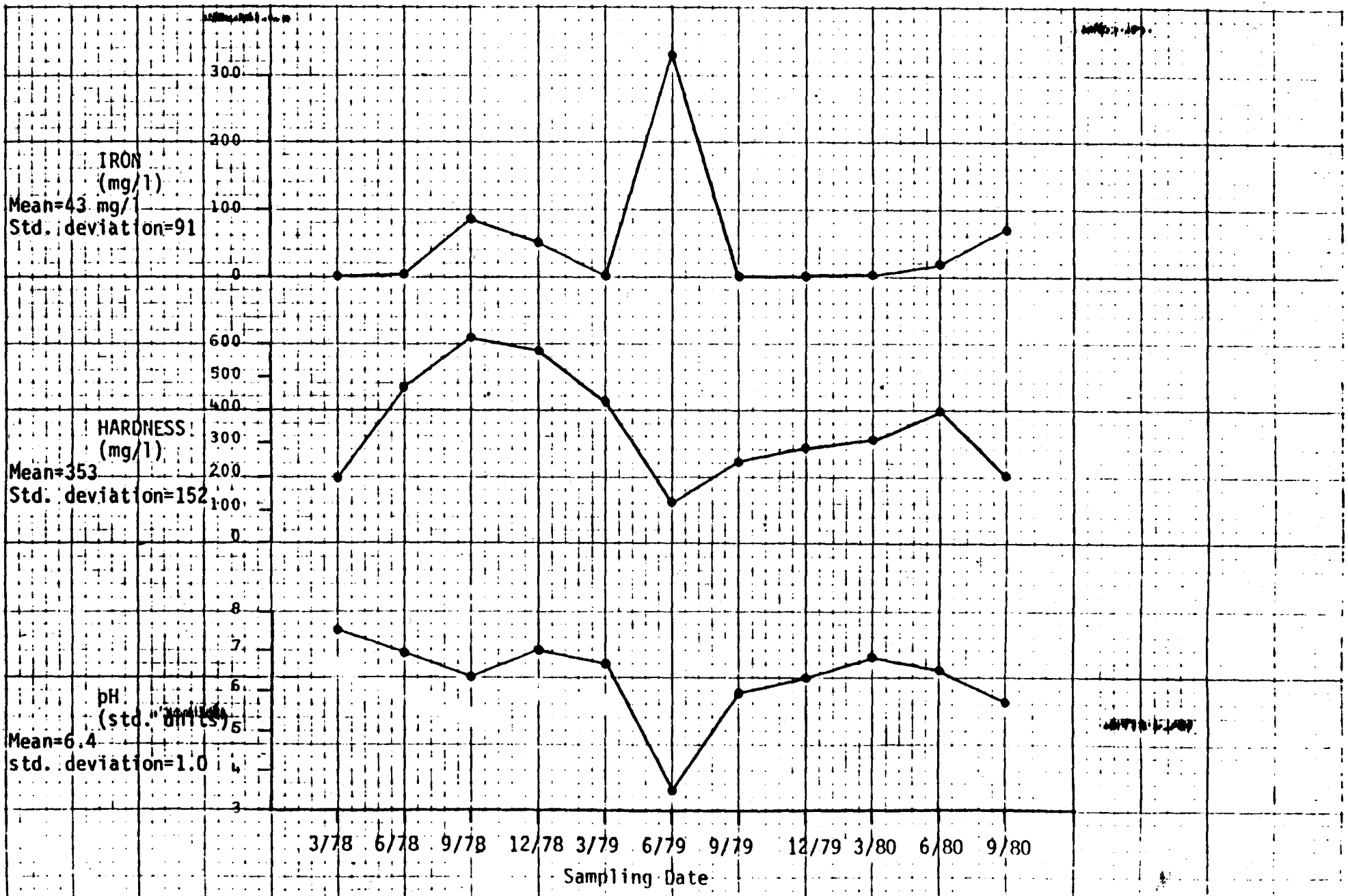

Figure 21 Variation of Iron, Hardness, and pH Data for Piezometer Well 13.

Records were not found in MDNR's headquarter's files which would indicate that MDNR considers the results from well 12 suspect. Mr. Gill should be contacted to determine if BHS is aware of the relatively high data values in well 12. Additional monitoring wells may need to be installed to determine if leachate migration is occurring from the old BHS sanitary landfill.

OPERATING PRACTICES

General

Assessing the past operational practices at BHS would be both difficult and subjective. A number of past problems were noted in the review of the MDNR site inspection reports (Section 2, Attachment 1). However, without questioning BHS officials about each incident, it would not be possible to ensure that an objective evaluation of each incident was made. For example, several incidents where BHS did not provide sufficient daily cover are noted in the MDNR inspection reports. Mr. Gill mentioned during this inspection that a type of clay encountered at BHS resembles a sludge, and that a MDNR inspector had collected a sample of this clay because the inspector believed it to be a sludge that had not been properly covered. According to Mr. Gill, the results of this sample showed that the material was soil and not an uncovered waste. Records of this analysis, however, were not found in the MDNR files that were reviewed. Thus, without sufficient information pertaining to each incident, the overall evaluation of this site could be biased. Thus, while specific problems relating to past operational practices will be noted, no overall evaluation of these past practices can be made. These past deficiencies will however be related to observations made during this inspection. Where applicable, the date of the

inspection report will be referenced in parentheses.

Disposal Practices

A primary concern with regard to the disposal practices at BHS is the inspection of the trenches prior to disposal. Two instances where the MDNR inspector felt the trench inspection performed by BHS representatives prior to disposal was inadequate (July 19, 1979; June 27, 1979 inspection reports) are noted in the past MDNR inspection reports. Sand and gravel layers were found in these trenches by the MDNR inspector but were not observed by the BHS inspector. Failure to note sand or gravel strata in the trench walls would be a serious error as such strata could serve as a migration pathway for leachate and/or wastes. BHS should take measures to ensure that all future trenches are thoroughly inspected prior to use to prevent a reoccurance of this incident.

Migration of wastes from one disposal trench to another was also noted in the July 19, 1979 inspection report. The wall between two disposal cells collapsed allowing paint wastes to migrate between cells. No other records of any similar instances were noted in the MDNR inspection reports, nor were any similar problems observed during this inspection.

An incident where a disposal cell filled with water is noted in a December 12, 1979 MDNR memorandum (Attachment 1). The final soil cover on this cell was improperly compacted allowing infiltration into the disposal cell. Proper compaction of the final soil cover is imperative, since water which infiltrates into a cell can promote the deterioration of any waste containers and the generation of leachate. The leachate collection system installed in the new trenches could be used to detect infiltration; however, the older trenches are not equipped with any means to detect

excessive infiltration. The effectiveness of final soil cover in preventing infiltration into the new trenches may give an indication of the effectiveness of this soil cover in the old trenches.

Ponded water was observed in the open trenches by MDNR inspectors on at least two occassions (August 8, 1979; May 7, 1979) and the absence of surface water diversion structures for preventing runoff from entering the trench was noted in the August 8, 1979 inspection report. Standing water was also observed in one trench (6N) during this inspection. According to BHS representatives, the daily cover placed over a load of wastes prevented this water from flowing towards the leachate collection point where it could be removed. Once this daily cover was removed for placement of another waste load, the water would be free to drain to the leachate collection system. Runoff diversion structures to prevent runoff from entering the open trenches, such as diversion berms or swales, were not observed around any of the open trenches. BHS considers only the open trenches as the active portion of BHS; the area between the trenches is not considered an active portion of the disposal site by BHS. Runoff which enters the trenches is collected by the leachate collection system; therefore, BHS feels that they meet the requirement for runoff collection from the active areas. However, if BHS feels that only the trenches are the active portion, then runon control measures must be implemented around the trenches.

Standing water within a trench is not a significant problem if the contact between the water and wastes can be minimized. The feasibility of minimizing such contact is doubtful, however, since the trench bottoms are sloped to promote water movement through the wastes to the leachate collection system. The trenches are constructed parallel to the surface

drainage pattern and access to the bottom of the trenches is gained by ramps which are located at the upgradient end of the trenches. The heavy equipment must therefore enter the trenches from the same direction that the majority of any runoff would enter the trenches. Control measures such as berms or swales would likely be comprised by the vehicle traffic. Tire tracks, for example, during wet weather could tend to channalize the runoff into the trenches. By placing the access ramps at the downgradient ends of the trenches, berms and swales could be constructed at the upgradient end of the trenches and would not be subject to deterioration from vehicle traffic. Thus, runoff into the trenches could be minimized.

As previously mentioned, several instances where sufficient daily soil cover was not provided are noted in the past MDNR inspection reports (December 3, September 15, 1980; July 19, February 7, 1979; July 19, 1977). Mr. Gill stated that a type of clay present at BHS was responsible for some of these instances. An exposed waste container was observed during this inspection (Figure 12). Improved inspection procedures could eliminate or reduce the incidence of not providing adequate daily cover.

One instance where an apparently reactive waste was placed in a trench was noted in a May 11, 1979 MDNR inspection report. Water which had reacted with an alkaline sludge from Monsanto in St. Louis was observed "boiling" in one of the trenches. Prior to July of 1980, BHS was permitted to accept igniteable and reactive wastes; thus, this occurrance does not appear to represent any violation of MDNR regulations. However, this occurrance is indicative of the need to prevent imcompatable or reactive substances from coming in contact with each other. Minimizing infiltration, for example, is important to reduce the potential for the migration of wastes and subsequent mixing. Proper segregation of the wastes is another important

safeguard. The adequacy of the BHS waste segregation system is unknown. Currently, BHS has MDNR authorizations for the disposal of at least 300 wastes (Attachment 2). Reviewing the chemical composition of all of these wastes is beyond the scope of this investigation. Samples were collection from two incoming wastes both of which are reported to contain cyanide. The reactivity analysis requested for these samples should reveal if cyanide gas could be generated by the decomposition of this waste. The generation of such gas would indicate that the waste is reactive and cannot be placed in a landfill according to MDNR regulations.

Finally, operational difficulties encountered during the disposal of a waste prompted an MDNR inspector to conclude that proper disposal methods were not routinely employed at BHS (August 8, 1979). An unsigned complaint by a person who alledges to have worked for BHS also states that proper safety and operating procedures were not used at BHS. Because the complaint was not signed, it is not possible to determine whether if the complaint was written by a former employee who would have knowledge of such practices. Operational problems were not observed during disposal of wastes by the inspection team. The BHS employees were also equipped with protective equipment including air purifying respirators during the disposal operations. BHS should consider equipping employees with escape air packs or devices which can supply a short-term (5 minutes) air supply in the event localized oxygen depletion or toxic atmospheric conditions should develop for any reason.

Security

Several instances where the "back" or southern gates to Area 1 were not closed are noted in the past MDNR site inspection reports (July 17,

1978; July 19, 1977). One of these gates was left open during operating hours during this inspection. Mr. Gill believes that the workers, particularly those in the maintenance shed, would spot any unauthorized entry to the site. These workers could, however, not observe an unauthorized entry to the facility. Furthermore, without clear, descriptive signs stating the potential hazard involved with entry onto the site at this entrance, the potential for unknowing entry onto the site also exists. The potential for unknowing entry, however, seems minimal as BHS is located in a relatively remote location. Regardless of the potential for unknowing entry, this gate should remain locked during operational hours and warning signs should be posted to prevent an unauthorized person from accessing the site, for whatever purpose, and potentially claiming that the entry was made without knowledge of the activities at the site.

Holding Ponds

To prevent seepage, BHS has submitted plans to MDNR to replace the existing unlined holding ponds with four concrete-lined evaporation basins. The results of the sampling data from piezometer wells 12 and 13 indicate that some seepage from the ponds may be occurring. The new basins, if approved, should eliminate any seepage. Any soil removed from the holding ponds during the construction of the concrete basins should be used as daily cover material in the disposal trenches. By using the soil in this manner, any potentially contaminated soil particles would not be subject to migration.

Spray irrigation is used to enhance evaporation from the holding ponds and will be used with the evaporation basins. Use of this system should be reevaluated by BHS. Spray irrigation can generate aerosols

which may be highly mobile in the atmosphere. Leachate and drainage from the truck wash pad are currently evaporated in these ponds. Both of these waste streams have a high potential for containing contaminants; although, BHS analyzes the content of the ponds and has reportedly not found any evidence of significant contamination of the water. Analyses are only performed on general indicators, however, such as specific conductivity, chemical exygen demand, and pH; thus, organic contaminants, particularly in low concentrations, might not be detected in these analysis.

Generating aerosols which could contain toxic contaminants might have a detrimental effect on the health of the surrounding population and particularly that of the BHS employees. Unless BHS undertakes a more detailed analysis of the water in these ponds, restricting the use of this system should be considered by EPA or MDNR. Instead of spray irrigation, BHS should consider passive measures to increase evaporation, such as painting the bottom of the new evaporation basins black, to enhance solar heating and evaporation of the water.

Waste Analysis Plan

The waste analysis plan used by BHS has several deficiencies. First, generators are apparently required to submit only one waste analysis to obtain a disposal authorization, unless a greater number of analysis are specifically requested by MDNR. The results of one analysis are not sufficient to determine the variability of the waste characteristics. A minimum of three samples should be analyzed by the generators prior to obtaining a disposal authorization.

Once a disposal authorization has been issued for a waste, BHS should collect a sample from the waste and have the sample analyzed for

the parameters analyzed by the generator and other parameters as appropriate. In this manner, BHS could compare the results from their sample analyses with those of the generator. By making such a comparison, BHS could ensure that the generators collected a representative sample of their waste for analysis.

Finally, BHS should develop and maintain a statistical data base of the results of the samples analyzed from the incoming waste loads. By determining the mean and standard deviation of each waste, BHS could determine if the characteristics of a particular waste shipment differ significantly from the previous wastes received from a generator. This information could also be used to determine the frequency at which generators should repeat their waste analysis. A waste with high variability, for example, should be analyzed more frequently than a waste with a low variability.

Site Inspection Form

Based upon the observations made during this inspection and the background file review, a "Potential Hazardous Waste Site Inspection Report" form (T2070-3) has been prepared. Insufficient information is available to determine the substances of greatest concern or the volumes of each waste type present at BHS. Such an investigation would require a considerable manpower commitment. A copy of this form is included at the end of this section.

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT

REGION	SITE NUMBER (to be assigned by Hq)
VII	

GENERAL INSTRUCTIONS: Complete Sections I and III through XV of this form as completely as possible. Then use the information on this form to develop a Tentative Disposition (*Section II*). File this form in its entirety in the regional Hazardous Waste Log file. Be sure to include all appropriate Supplemental Reports in the file. Submit a copy of the forms to: U.S. Environmental Protection Agency, Site Tracking System, Hazardous Waste Enforcement Task Force (*EN-335*), 401 M St., SW, Washington, DC 20460.

I. SITE IDENTIFICATION

A. SITE NAME: BOB'S HOME SERVICE

B. STREET (or other identifier): P.O. BOX 116F

C. CITY: WRIGHT CITY

D. STATE: MO

E. ZIP CODE:

F. COUNTY NAME: WARREN

G. SITE OPERATOR INFORMATION

1. NAME: BOB'S HOME SERVICE

2. TELEPHONE NUMBER: 314-745-3371

3. STREET: Muenz Road

4. CITY: Wright City

5. STATE: MO

6. ZIP CODE: 66390

H. REALTY OWNER INFORMATION (*if different from operator of site*)

1. NAME: Mrs. James (Laverne) Zykan

2. TELEPHONE NUMBER: 745-3401

3. CITY: Wright City, MO 73390

4. STATE:

5. ZIP CODE:

I. SITE DESCRIPTION: HAZARDOUS WASTE LANDFILL

J. TYPE OF OWNERSHIP

☐ 1. FEDERAL ☐ 2. STATE ☐ 3. COUNTY ☐ 4. MUNICIPAL ☒ 5. PRIVATE

II. TENTATIVE DISPOSITION (*complete this section last*)

A. ESTIMATE DATE OF TENTATIVE DISPOSITION (*mo., day, & yr.*)

B. APPARENT SERIOUSNESS OF PROBLEM

☐ 1. HIGH ☐ 2. MEDIUM ☐ 3. LOW ☐ 4. NONE

C. PREPARER INFORMATION

1. NAME:

2. TELEPHONE NUMBER:

3. DATE (*mo., day, & yr.*):

III. INSPECTION INFORMATION

A. PRINCIPAL INSPECTOR INFORMATION

1. NAME: John Zirschky

2. TITLE: Environmental Engineer

3. ORGANIZATION: Ecology & Environment

4. TELEPHONE NO. (*area code & no.*): 913-371-3213

B. INSPECTION PARTICIPANTS

1. NAME	2. ORGANIZATION	3. TELEPHONE NO.
Ken Snell	Ecology & Environment	913-371-3213
Phil Keary/Harry Kimball	EP & R/SVAN, Region 7 EPA	816-374-4482
Paul Meiburger, et.al.	MDNR, Jefferson City, MO	314-751-3241

C. SITE REPRESENTATIVES INTERVIEWED (*corporate officials, workers, residents*)

1. NAME	2. TITLE & TELEPHONE NO.	3. ADDRESS
Mike Gill	Site Manager	P.O. Box 116F, Wright City, MO
Mrs. James Zykan	Vice President	Muenz Road, R. 1, Wright City, MO

Continued From Front

III. INSPECTION INFORMATION *(continued)*

D. GENERATOR INFORMATION *(sources of waste)*

1. NAME	2. TELEPHONE NO.	3. ADDRESS	4. WASTE TYPE GENERATED
complete list			
of generators			
included in site report.			

E. TRANSPORTER/HAULER INFORMATION

1. NAME	2. TELEPHONE NO.	3. ADDRESS	4. WASTE TYPE TRANSPORTED
Bob's Home Service		Wright City, MO	Misc.
Botkins Trucking		Moberly, MO	Sturgeon Spill Wastes

F. IF WASTE IS PROCESSED ON SITE AND ALSO SHIPPED TO OTHER SITES, IDENTIFY OFF-SITE FACILITIES USED FOR DISPOSAL.

1. NAME	2. TELEPHONE NO.	3. ADDRESS

G. DATE OF INSPECTION *(mo., day, & yr.)*	H. TIME OF INSPECTION	I. ACCESS GAINED BY: *(credentials must be shown in all cases)*
3-10-81 to 3-12-81		[XX] 1. PERMISSION [ ] 2. WARRANT

J. WEATHER *(describe)*

40-60°F., windy, generally clear skies.

IV. SAMPLING INFORMATION

Mark 'X' for the types of samples taken and indicate where they have been sent e.g., regional lab, other EPA lab, contractor, etc. and estimate when the results will be available.

1. SAMPLE TYPE	2. SAMPLE TAKEN *(mark 'X')*	3. SAMPLE SENT TO:	4. DATE RESULTS AVAILABLE
a. GROUNDWATER	X	all samples sent to EPA Region 7 Lab	
b. SURFACE WATER	X		
c. WASTE	X		
d. AIR			
e. RUNOFF			
f. SPILL			
g. SOIL			
h. VEGETATION			
i. OTHER *(specify)*			

B. FIELD MEASUREMENTS TAKEN *(e.g., radioactivity, explosivity, PH, etc.)*

1. TYPE	2. LOCATION OF MEASUREMENTS	3. RESULTS

Continued From Page 2

IV. SAMPLING INFORMATION (continued)

C. PHOTOS

1. TYPE OF PHOTOS

[X] a. GROUND [X] b. AERIAL (EMSL-LV)

2. PHOTOS IN CUSTODY OF

Ground photos in report & in custody of Ecology & Environment

D. SITE MAPPED?

[X] YES. SPECIFY LOCATION OF MAPS

U.S.G.S. Wright City Quadrangle, and site map in facility plans.

E. COORDINATES

1. LATITUDE (deg.-min.-sec.)

2. LONGITUDE (deg.-min.-sec.)

V. SITE INFORMATION

A. SITE STATUS

[X] 1. ACTIVE (Those industrial or municipal sites which are being used for waste treatment, storage, or disposal on a continuing basis, even if infrequently.)

[ ] 2. INACTIVE (Those sites which no longer receive wastes.)

[ ] 3. OTHER (specify) _____ (Those sites that include such incidents like "midnight dumping" where no regular or continuing use of the site for waste disposal has occurred.)

B. IS GENERATOR ON SITE?

[X] 1. NO [ ] 2. YES (specify generator's four-digit SIC Code) _____

C. AREA OF SITE (in acres)

12 acres.

D. ARE THERE BUILDINGS ON THE SITE?

[ ] 1. NO [X] 2. YES (specify): office buildings

VI. CHARACTERIZATION OF SITE ACTIVITY

Indicate the major site activity(ies) and details relating to each activity by marking 'X' in the appropriate boxes.

X	A. TRANSPORTER	X	B. STORER	X	C. TREATER	X	D. DISPOSER
	1. RAIL		1. PILE		1. FILTRATION	X	1. LANDFILL
	2. SHIP		2. SURFACE IMPOUNDMENT		2. INCINERATION		2. LANDFARM
	3. BARGE		3. DRUMS		3. VOLUME REDUCTION		3. OPEN DUMP
X	4. TRUCK		4. TANK, ABOVE GROUND		4. RECYCLING/RECOVERY		4. SURFACE IMPOUNDMENT
	5. PIPELINE		5. TANK, BELOW GROUND		5. CHEM./PHYS./TREATMENT		5. MIDNIGHT DUMPING
	6. OTHER (specify):		6. OTHER (specify):		6. BIOLOGICAL TREATMENT		6. INCINERATION
					7. WASTE OIL REPROCESSING		7. UNDERGROUND INJECTION
					8. SOLVENT RECOVERY		8. OTHER (specify):
				X	9. OTHER (specify): 2 evaporation ponds		

E. SUPPLEMENTAL REPORTS If the site falls within any of the categories listed below, Supplemental Reports must be completed. Indicate which Supplemental Reports you have filled out and attached to this form.

[ ] 1. STORAGE [ ] 2. INCINERATION [X] 3. LANDFILL [X] 4. SURFACE IMPOUNDMENT [ ] 5. DEEP WELL

[ ] 6. CHEM/BIO/PHYS TREATMENT [ ] 7. LANDFARM [ ] 8. OPEN DUMP [ ] 9. TRANSPORTER [ ] 10. RECYCLOR/RECLAIMER

VII. WASTE RELATED INFORMATION

A. WASTE TYPE

[X] 1. LIQUID [X] 2. SOLID [X] 3. SLUDGE [ ] 4. GAS

B. WASTE CHARACTERISTICS

[X] 1. CORROSIVE [ ] 2. IGNITABLE [ ] 3. RADIOACTIVE [X] 4. HIGHLY VOLATILE

[X] 5. TOXIC [ ] 6. REACTIVE [X] 7. INERT [X] 8. FLAMMABLE

[ ] 9. OTHER (specify):

C. WASTE CATEGORIES

1. Are records of wastes available? Specify items such as manifests, inventories, etc. below.

yes, manifests, inventories, disposal diagrams.

Continued From Front

VII. WASTE RELATED INFORMATION *(continued)*

2. Estimate the amount *(specify unit of measure)* of waste by category, mark 'X' to indicate which wastes are present.

a. SLUDGE	b. OIL	c. SOLVENTS	d. CHEMICALS	e. SOLIDS	f. OTHER
AMOUNT unknown	AMOUNT unknown	AMOUNT unknown	AMOUNT unknown	AMOUNT unknown	AMOUNT unknown
UNIT OF MEASURE	UNIT OF MEASURE	UNIT OF MEASURE	UNIT OF MEASURE	UNIT OF MEASURE	UNIT OF MEASURE
X (1) PAINT, PIGMENTS	X (1) OILY WASTES	X (1) HALOGENATED SOLVENTS	X (1) ACIDS	X (1) FLYASH	X (1) LABORATORY PHARMACEUTICAL
X (2) METALS SLUDGES	(2) OTHER *(specify)*	X (2) NON-HALOGNTD. SOLVENTS	(2) PICKLING LIQUORS	X (2) ASBESTOS	(2) HOSPITAL
(3) POTW		(3) OTHER *(specify)*	(3) CAUSTICS	(3) MILLING/MINE TAILINGS	(3) RADIOACTIVE
(4) ALUMINUM SLUDGE			X (4) PESTICIDES	(4) FERROUS SMELTING WASTES	(4) MUNICIPAL
(5) OTHER *(specify)*			(5) DYES/INKS	(5) NON-FERROUS SMLTG. WASTES	(5) OTHER *(specify)*
			(6) CYANIDE	(6) OTHER *(specify)*	
			X (7) PHENOLS		
			(8) HALOGENS		
			X (9) PCB		
			(10) METALS		
			(11) OTHER *(specify)*		

3. LIST SUBSTANCES OF GREATEST CONCERN WHICH ARE ON THE SITE *(place in descending order of hazard)*

1. SUBSTANCE	2. FORM *(mark 'X')*			3. TOXICITY *(mark 'X')*				4. CAS NUMBER	5. AMOUNT	6. UNIT
	a. SOLID	b. LIQ.	c. VAPOR	a. HIGH	b. MED.	c. LOW	d. NONE			
Insufficient information										
to determine order of										
hazard, form, and toxicity										
of wastes disposed at BHS.										

VIII. HAZARD DESCRIPTION

FIELD EVALUATION HAZARD DESCRIPTION: Place an 'X' in the box to indicate that the listed hazard exists. Describe the hazard in the space provided.

☐ A. HUMAN HEALTH HAZARDS

Continue On Page 5

Continued From Page 4

VIII. HAZARD DESCRIPTION (continued)

☐ B. NON-WORKER INJURY/EXPOSURE

☐ C. WORKER INJURY/EXPOSURE

☐ D. CONTAMINATION OF WATER SUPPLY

☐ E. CONTAMINATION OF FOOD CHAIN

☒ F. CONTAMINATION OF GROUND WATER

Piezometer well 12 may have been contaminated by leachate from the Old BHS sanitary landfill.

☐ G. CONTAMINATION OF SURFACE WATER

Continued From Front

VIII. HAZARD DESCRIPTION *(continued)*

[X] H. DAMAGE TO FLORA/FAUNA

Aerial photographic analysis by EMSL (Las Vegas) indicates that some vegetation stress around BHS has occurred.

[ ] I. FISH KILL

[ ] J. CONTAMINATION OF AIR

[X] K. NOTICEABLE ODORS

Odor complaints have been recieved by EPA and MDNR; however, odors were not observed during this inspection.

[ ] L. CONTAMINATION OF SOIL

[ ] M. PROPERTY DAMAGE

Continued From Page 6

VIII. HAZARD DESCRIPTION (continued)

☐ N. FIRE OR EXPLOSION

☐ O. SPILLS/LEAKING CONTAINERS/RUNOFF/STANDING LIQUID

☐ P. SEWER, STORM DRAIN PROBLEMS

☐ Q. EROSION PROBLEMS

☒ R. INADEQUATE SECURITY

Back gates were not locked during operational hours.

☐ S. INCOMPATIBLE WASTES

VIII. HAZARD DESCRIPTION *(continued)*

T. MIDNIGHT DUMPING

☐ U. OTHER *(specify)*

IX. POPULATION DIRECTLY AFFECTED BY SITE

A. LOCATION OF POPULATION	B. APPROX. NO. OF PEOPLE AFFECTED	C. APPROX. NO. OF PEOPLE AFFECTED WITHIN UNIT AREA	D. APPROX. NO. OF BUILDINGS AFFECTED	E. DISTANCE TO SITE *(specify units)*
1. IN RESIDENTIAL AREAS	less than 200 (est.)	200/½ mile rad.	est. 20	
2. IN COMMERCIAL OR INDUSTRIAL AREAS	probably none			
3. IN PUBLICLY TRAVELLED AREAS	probably none			
4. PUBLIC USE AREAS *(parks, schools, etc.)*	probably none			

X. WATER AND HYDROLOGICAL DATA

A. DEPTH TO GROUNDWATER *(specify unit)*	B. DIRECTION OF FLOW	C. GROUNDWATER USE IN VICINITY
St. Peter Aquifer-400 ft.	northeast	drinking water.
D. POTENTIAL YIELD OF AQUIFER	**E. DISTANCE TO DRINKING WATER SUPPLY** *(specify unit of measure)*	**F. DIRECTION TO DRINKING WATER SUPPLY**
less than 50 gpm		

TYPE OF DRINKING WATER SUPPLY

☒ 1. NON-COMMUNITY < 15 CONNECTIONS ☐ 2. COMMUNITY *(specify town)*: > 15 CONNECTIONS

☐ 3. SURFACE WATER ☐ 4. WELL

Continue On Page 9

Continued From Page 8

X. WATER AND HYDROLOGICAL DATA (continued)

ST ALL DRINKING WATER WELLS WITHIN A 1/4 MILE RADIUS OF SITE

1. WELL	2. DEPTH (specify unit)	3. LOCATION (proximity to population/buildings)	4. NON-COMMUNITY (mark 'X')	5. COMMUNITY (mark 'X')
BHS	150 ft.	150' west of disposal site	X	
Zykan	410 ft.	300' west of disposal site	X	
		other wells are present within ¼ mile		
		of the site, however, specific information		
		on these wells is not available.		

I. RECEIVING WATER

1. NAME: unnamed creek

☐ 2. SEWERS ☒ 3. STREAMS/RIVERS

☐ 4. LAKES/RESERVOIRS ☐ 5. OTHER (specify):

6. SPECIFY USE AND CLASSIFICATION OF RECEIVING WATERS

XI. SOIL AND VEGITATION DATA

LOCATION OF SITE IS IN

☐ A. KNOWN FAULT ZONE ☐ B. KARST ZONE ☐ C. 100 YEAR FLOOD PLAIN ☐ D. WETLAND

☐ E. A REGULATED FLOODWAY ☐ F. CRITICAL HABITAT ☐ G. RECHARGE ZONE OR SOLE SOURCE AQUIFER

XII. TYPE OF GEOLOGICAL MATERIAL OBSERVED

Mark 'X' to indicate the type(s) of geological material observed and specify where necessary, the component parts.

'X'	A. OVERBURDEN	'X'	B. BEDROCK (specify below)	'X'	C. OTHER (specify below)
	1. SAND		limestone, nonfractured		
X	2. CLAY				
	3. GRAVEL				

XIII. SOIL PERMEABILITY

☐ A. UNKNOWN ☐ B. VERY HIGH (100,000 to 1000 cm/sec.) ☐ C. HIGH (1000 to 10 cm/sec.)

☐ D. MODERATE (10 to .1 cm/sec.) ☐ E. LOW (.1 to .001 cm/sec.) ☒ F. VERY LOW (.001 to .00001 cm/sec.)

G. RECHARGE AREA

☐ 1. YES ☐ 2. NO 3. COMMENTS

H. DISCHARGE AREA

☐ 1. YES ☐ 2. NO 3. COMMENTS

I. SLOPE

1. ESTIMATE % OF SLOPE: 3 to 10%

2. SPECIFY DIRECTION OF SLOPE, CONDITION OF SLOPE, ETC.: surface slopes toward the east

J. OTHER GEOLOGICAL DATA

Continued From Front

XIV. PERMIT INFORMATION

List all applicable permits held by the site and provide the related information.

A. PERMIT TYPE (e.g., RCRA, State, NPDES, etc.)	B. ISSUING AGENCY	C. PERMIT NUMBER	D. DATE ISSUED (mo., day, & yr.)	E. EXPIRATION DATE (mo., day, & yr.)	F. IN COMPLIANCE (mark 'X') 1. YES	2. NO	3. UNKNOWN
RCRA interim status	EPA						
State	MDNR						

XV. PAST REGULATORY OR ENFORCEMENT ACTIONS

☐ NONE ☐ YES (summarize in this space)

NOTE: Based on the information in Sections III through XV, fill out the Tentative Disposition *(Section II)* information on the first page of this form.

SECTION 5

SUMMARY

GENERAL

On March 10 - 12, 1981, a combination Resource Conservation and Recovery Act (RCRA) and Uncontrolled Hazardous Waste Site (UHWS) inspection of Bob's Home Service, Inc. was conducted. Participating in the inspection were representatives from the U. S. Environmental Protection Agency (EPA), the Missouri Department of Natural Resources (MDNR), and the Ecology and Environmental Field Investigation Team (FIT). Bob's Home Service (BHS) operates a commercial hazardous waste landfill near Wright City, Missouri. Operations at this site began in 1974 when BHS opened a sanitary landfill. In June of 1977, BHS developed a special (hazardous) waste disposal area (Area 1) and ceased operation of the sanitary landfill. Area 1 is expected to be completed in 1983, and BHS is currently in the development phase of a second waste disposal area (Area 2) east of Area 1.

This inspection focused primarily on Area 1, although a limited amount of information pertaining to the old sanitary landfill was also collected. The design and projected operation of Area 2 was not reviewed during this inspection. Samples were collected from several of the monitoring wells and two incoming waste loads at BHS, and from a nearby creek and two private residence wells during this inspection. The analytical results of this sampling are not yet available. The MDNR and EPA files and the past monitoring data provided by BHS were also reviewed. The results of this inspection and background information review have been summarized in this report. Based upon this information, the following

recommendations for improving BHS's operating procedures and for further investigative action at BHS have been prepared.

RECOMMENDATIONS

1. Waste Analysis and Characterization

   a) BHS should require waste generators to perform a minimum of three waste analyses prior to obtaining a disposal authorization so that the variability of a waste's composition can be determined.

   b) BHS should collect a minimum of one sample of each waste type from every generator to ensure that the generator's waste analysis is representative of the wastes' characteristics.

   c) BHS should develop and maintain a statistical data base for each waste stream using the analytical results of the samples collected by BHS from incoming waste loads. This data base can then be used to objectively determine if a particular waste shipment is similar to the previous waste shipments received from a generator.

2. Security

   a) Warning signs which explicitly state the potential hazard associated with entry onto the site should be posted around the perimeter of BHS.

   b) All gates at BHS should be secured during operating and non-operating hours.

   c) The electronic entrance gate control hidden on the access road should be removed or secured to prevent unauthorized use of this device.

3. Inspection Procedures

   a) BHS should prepare a more detailed inspection schedule which

lists specific deficiencies to check for and the specific indicators of these deficiencies.

b) The inspection schedule should list the remedial action(s) to be taken in the event a deficiency is noted.

c) The site inspection should be conducted at the end of an operating day to ensure that a potentially threat to the environment does not exist before the site is closed.

d) BHS should consider adding the following items to the inspection schedule: 1) Safety equipment for operational status, 2) Trenches for adequate daily cover, 3) Evidence of spillage.

4. Preparedness and Prevention, Contingency Plan

a) BHS should develop a more incident specific contingency plan.

b) Arrangements should be made with the local authorities to provide emergency assistance.

c) Copies of the contingency plan should be distributed to the local authorities.

5. Manifest System

a) A review of the generators' waste streams and manifests should be conducted to determine if these wastes are hazardous as defined by RCRA, and if so, to determine if the manifests have been properly completed.

6. Disposal Operations

a) BHS should inspect all disposal trenches at the end of an operating day to ensure that adequate daily cover has been provided.

b) BHS should consider providing personnel some type of short-term emergency air supply system in the event low oxygen or toxic atmospheric conditions should develop.

c) The effectiveness of the final soil cover in preventing infiltration into the trenches should be monitored using the leachate collection system.

7. Surface Drainage

a) The surface drainage pattern near the truck wash pad should be modified such that any spillage or contaminated truck wash water can be diverted into the holding basins.

b) Runoff diversion structures should be developed to prevent runoff from entering the trenches.

8. Sanitary Landfill, Additional Sites

a) An investigation of the old BHS sanitary landfill to determine if leachate migration from this site is occurring should be conducted. This evaluation might include an electrical resistivity survey and/or groundwater monitoring.

b) A preliminary assessment of the two additional sites identified during this investigation should be conducted. These sites are as follows: 1) Alton Brick Company in St. Louis County, Missouri; and 2) Fred Weber's Quarry near Bridgeton, Missouri.

9. Holding Ponds

a) When the existing holding ponds are replaced by the concrete basins, any soil removed from the holding ponds should be used as daily cover material to prevent migration of any contaminated soil particles.

b) Spray irrigation of the contents of the holding ponds or basins should be discontinued unless the contents are adequately analyzed prior to conducting this practice as spray irrigation can form highly mobile aerosols. Passive means of increasing evaporation should be considered.

10. Groundwater Monitoring System

a) BHS should reexamine the geohydrologic data to determine the direction of groundwater flow. EPA should then review this geohydrologic evaluation.

b) BHS should develop a minimum of two additional wells in the same aquifer as the existing monitoring well and the old wash well for compliance with the RCRA groundwater monitoring requirement. The existing piezometer wells are not located in the shallowest aquifer and should therefore not be used for the RCRA groundwater system. The placement of the new wells will depend upon the results of the geohydrologic study recommended in a) above.

c) A thorough review of all past monitoring data and BHS should be conducted immediately and at regular intervals to determine if there is any evidence of leachate migration from the site. It does not appear that a thorough review of this monitoring data has been conducted.

d) An investigation to determine the cause of the high data values in piezometer well 12 and the low data values in well 13 should be conducted. This investigation should also determine if BHS is aware of these anomalies in the data, and if so, what measures BHS has undertaken to determine the cause of these anomalies.

11. Further Investigation

a) The next inspection of BHS should be unannounced.

b) A major portion of the next inspection should focus on the incoming waste loads to determine if the wastes are suitable for landfill disposal, if the wastes' characteristics agree with the analytical data provided by the generator, and if the wastes are transported according to RCRA regulations.

c) Soil samples should be taken from the drainage pathways at BHS to determine if contaminant migration via runoff has occurred.

ATTACHMENT 1: MDNR, EPA FILE INFORMATION

Contents: MDNR Permit

Site Inspection Reports

Citizen Complaints

General Correspondence

MISSOURI DEPARTMENT OF NATURAL RESOURCES
Division of Environmental Quality
Solid Waste Management Program

SPECIAL

SOLID WASTE DISPOSAL AREA OPERATING PERMIT

In accordance with Section 260.205, Paragraph 2, RSMo, Supplement 1973, the Missouri Department of Natural Resources hereby approves the application and issues Permit Number 721901 *to* James R. Zykan, Bob's Home Service, Inc. *for the operation of a solid waste disposal area set forth in the application as the* Bob's Home Service, Inc. Special Industrial Waste Disposal Facility *located in the* south 1/2 of Section 32 *Township* 47 N. *Range* 1 W. Warren *County, Missouri. This permit applies only to that tract of land of approximately* 12 *acres covered by the engineering plans, specifications and operating procedures submitted to the Department.*

Operation of this solid waste disposal area shall be in accordance with the provisions of the Missouri Solid Waste Management Law (Sections 260.200 to 260.245, RSMo, Supplement 1973), the rules and regulations promulgated thereunder, and the engineering plans, specifications and operating procedures approved by the Department. The Department does not examine structural features of design or efficiency of mechanical equipment and the issuance of this permit does not imply approval of those features.

The Department reserves the right to revoke or modify this permit after due notice if it is found that the holder of the permit is in violation of the Missouri Solid Waste Management Law, the Missouri Solid Waste Rules and Regulations, or failure to operate in accordance with the approved plans, specifications and operating procedures or is creating a public nuisance, health hazard or environmental pollution. Furthermore, if it is found that additional construction or alteration of the solid waste disposal area is necessary to comply with any and all rules and regulations promulgated in accordance with the Missouri Solid Waste Management Law, then, and in that event, the Department has and does hereby reserve the right to revoke or modify this permit.

This permit for operation of a solid waste disposal area is issued only to the person named in the application and shall not be transferable. This permit shall become void after notice to the Department by the person named in the permit that said person has discontinued operation of the disposal area. The Department may revoke this permit after determining an area has not operated for a period of one year. This permit is issued contingent upon and may be revoked for failure to comply with any and all conditions described on the attached "Report of Approval of Plans and Specifications for Solid Waste Disposal Area."

By Carolyn Ashwood
DIRECTOR DEPARTMENT OF NATURAL RESOURCES

Date May 25, 1977

25.290 Warren County
Bob's Home Service, Inc.
Special Industrial Waste Disposal Facility

December 3, 1980

RECEIVED
DEC 8 1980
SOLID WASTE MANAGEMENT PROGRAM

Mr. Michael D. Gill, Manager
Bob's Home Service, Inc.
Route 1, Box 116 F
Wright City, MO 63390

Dear Mr. Gill:

A monthly reinspection was made on the condition and operation of Bob's Home Service, Incorporated, Special Industrial Waste Disposal Facility on November 26, 1980. This report is based on the findings made at the time of the inspection. I trust that you will direct your attention to these findings and that you will proceed to carry out the recommendations presented.

FINDINGS:

1. There was a small amount of waste visible in trench 1-N.

2. Other aspects of the condition and operation of the landfill appeared to be in good order.

DISCUSSION:

Care should be taken to ensure that all waste material is covered with a minimum of twelve (12) inches of compacted soil cover at the end of the work day. This problem was also discussed in the inspection report of October 14, 1980.

RECOMMENDATIONS:

1. Take adequate steps to ensure that waste materials receive the required daily cover.

Should you have any questions concerning this report, please contact Kevin Brown of the St. Louis Regional Office.

APPROVED:

Earl F. Holtgraewe, P.E.
Regional Administrator
St. Louis Regional Office
Department of Natural Resources

SUBMITTED BY:

Kevin Brown
Environmental Engineer I
St. Louis Regional Office
Department of Natural Resources

EFH/KB/be
cc Mr. Glennon W. Zykan, President-Bob's Home Service
Industrial Waste Disposal Facility
Warren County Court
Reitz & Jens, Incorporated
✓Central Office, Hazardous Waste Management Program

MISSOURI DEPARTMENT OF NATURAL RESOURCES
8460 Watson Road St. Louis, Missouri 63119 (314) 849-1313

Joseph P. Teasdale Governor
Fred A. Lafser Director
St. Louis Regional Office

MISSOURI DEPARTMENT OF NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL QUALITY

Annual Inspection ☐
Reinspection ☑

~~SANITARY~~ LANDFILL SURVEILLANCE RECORD

November 26, 1980 — Days/Week Open: 5

Name of Sanitary Landfill: Bob's Home Service, Inc. Special Industrial Waste Disposal Facility

Permit No: 721 901 — County: Warren

Owner: Mr. Solomon W. Zykan — Site Manager Operator: Mr. Michael D. Gill

Address: Route 1, Box 116F — Address: Route 1, Box 116F

Wright City, Mo. 63390 — Wright City, Mo 63390

phone: 745-3158, 745-3311; 946-4782

I. Special Conditions and Approved Modifications

A. Are there any special conditions or approved modifications of the satisfactory compliance subsections of the rules and regulations? (e.g. impermeable barrier, limited excavation, exceptions to daily cover requirements)

✓ Yes ____ No

B. Is the sanitary landfill operation in compliance with the special conditions or approved modifications? (If "No," describe violations under "REMARKS.")

✓ Yes ____ No

II. Check Types of Waste Accepted

	INDICATED ON PERMIT APPLICATION	REPORTED BY OPERATOR	AS OBSERVED
Municipal solid waste			
Hay waste			
Dead animals			
Incinerator residue			
Demolition and construction waste			
Brush and untreated wood waste			
Septic tank pumpings			
Wastewater treatment plant sludges			
various industrial sludges — OTHER SLUDGES (SPECIFY)	✓		
LIQUIDS (SPECIFY)			
waste chemicals — INDUSTRIAL PROCESS WASTES (SPECIFY)	✓		
DNR approved — HAZARDOUS WASTES (SPECIFY)	✓		✓
OTHER WASTES (SPECIFY)			

III. Remaining Life of Landfill

A. Estimated amount of solid waste coming through gate.
Compacted loads ____ yds/wk ____ tons/wk
Noncompacted loads ____ yds/wk ____ tons/wk

B. Estimated volume of remaining landfill covered by approved engineering plans.
____ acre feet ____ years

INSPECTION FORM DISTRIBUTION LIST

Owner ____
Operator ____
City ____
County Court ____
Consulting Engineer ____
Solid Waste Program ____
Regional Office File ____
Others ____

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Satisfactory Compliance Subsections Regulations 80 3 010

Check all subsections: SAT — Satisfactory, UNS — Unsatisfactory (If necessary describe "UNS" violations under "Remarks")

SATISFACTORY COMPLIANCE OPERATING PROCEDURE	SAT	UNS
ACCEPTED		
Waste solid waste crushed on solid ground and pushed onto working face near bottom of the cell		—
Small dead animals covered immediately with soil or solid waste. Large dead animals placed in pit and covered with four feet compacted soil		—
Disposal of dewatered sludges on working face along with municipal solid waste		—
Incinerator and air pollution control residues prevented from becoming airborne		—
WASTE EXCLUDED		
No unpermitted waste accepted	✓	
Sign posted at entrance listing excluded wastes		
SELECTION		
Site accessible in all weather conditions. Temporary roads provided for delivery to working face	✓	
R QUALITY		
Surface water courses and runoff properly diverted from the landfill. Sanitary landfill construction and grading to promote rapid surface water runoff without excessive erosion	✓	
Leachate collection and treatment systems utilized where necessary to protect ground and surface water resources	✓	
No ground or surface water in contact with solid waste	✓	
UALITY		
No open burning without written permission of the proper air pollution agency and the Division		—
CONTROL		
Fermenting decomposition gas control plan as necessary to prevent problems		—
L		
Vector control programs implemented when necessary to prevent or rectify vector problems		—
THETICS		
Litter control devices utilized near working face and elsewhere as needed. Litter collected from fences, and the ground surface and incorporated into the daily cell at the end of each day or containerized		—
Wastes easily moved by wind covered as necessary to prevent their becoming airborne and scattered		—
On-site vegetation and natural windbreaks being utilized to improve appearance and operation of the sanitary landfill	✓	

SUBSECTION NUMBER	SATISFACTORY COMPLIANCE OPERATING PROCEDURE	SAT	UNS
(10) AESTHETICS (Continued)			
(10)(C)4	Salvaged materials removed daily or stored in aesthetically acceptable containers or enclosures		—
(11) COVER MATERIAL			
(11)(C)1	Daily cover applied regardless of weather in not less than a six inch layer. Cover material available in all weather conditions		✓
(11)(C)2	Intermediate cover applied to all areas idle for more than 60 days in a layer not less than one foot after compaction		
(11)(C)3	Final cover applied on each area as completed in a layer not less than two feet after compaction		—
(12) COMPACTION			
(12)(C)1	Adequate equipment on-site operated daily	✓	
(12)(C)1A	Solid waste spread in layers not to exceed two feet and confined to smallest practical area		
(12)(C)1B	Wastes compacted to smallest practical volume		
(12)(C)1C	Cover material compacted as much as practical		✓
(12)(C)2	Preventive maintenance performed	✓	
(12)(C)3	Daily task operating manual provided	✓	
(13) SAFETY			
(13)(C)1	Fire extinguishers provided on all equipment	✓	
(13)(C)2	Provisions for extinguishing fires in waste equipment and structures	✓	
(13)(C)3	Communication equipment available	✓	
(13)(C)4	Scavenging prohibited		—
(13)(C)5	Controlled access to site by established roadways and limited to hours when operating personnel are on duty	✓	
(13)(C)6	Traffic controlled and directed to designated disposing points	✓	
(13)(C)7	Site dust controlled for safety purposes and to prevent nuisances		—
(14) RECORDS			
(14)(C)1A	Records of major problems and complaints	✓	
(14)(C)1B	Monitoring record maintained a leachate sampling and analyses b gas sampling and analyses c ground and surface water analyses	✓	
(14)(C)1C	Records of vector control efforts		—
(14)(C)1D	Records of dust and litter control efforts		—
(14)(C)1E	Records of quantity of waste handled	✓	
(14)(C)1F	Records of description, sources and volume of special wastes listed in Subsection (3)(A)	✓	

V. Operation Proceeding in Accordance with Approved Engineering Plans? (If "NO," describe violations under "Remarks.")

✓ Yes _____ No

REMARKS cover in break 1-N' needs to be improved

(Attach additional sheets as necessary.)

BY [signature] SIGNATURE OF INVESTIGATOR

File
BHS

25.290 Warren County HWMP
Bob's Home Service, Incorporated
Special Industrial Waste Disposal Facility

RECEIVED
OCT 20 1980
SOLID WASTE
MANAGEMENT PROGRAM

October 14, 1980

Mr. Michael D. Gill, Manager
Route 1, Box 116F
Wright City, Missouri 63390

Dear Mr. Gill:

Monthly reinspections were made of the condition and operation of Bob's Home Service, Incorporated, Special Industrial Waste Disposal Facility on September 5, 1980 and October 8, 1980. This report is based on the findings made at the time of the inspections. I trust that you will direct your attention to these findings and that you will proceed to carry out the recommendations presented.

FINDINGS:

1. There was a small amount of waste visible in trench 1-N.

2. Freeboard at the wash water lagoon was insufficient.

DISCUSSION:

The waste which was exposed in trench 1-N consisted of used rags from McDonnell-Douglas. Care should be taken to ensure that all waste material reaches the bottom of the trench, and does not get hung up on the side of the trench. The waste material should then be covered with a minimum of twelve (12) inches of compacted soil cover at the end of the work day.

Freeboard in the southeast corner of the wash water lagoon was less than a foot. The site manager pointed out that BHS, Incorporated is hoping to construct new evaporation basins in the near future. This does not, however, relieve the company of any responsibility for the present lagoon system. Sufficient freeboard should be maintained to provide adequate protection against an unauthorized discharge.

General housekeeping items were also discussed at the site.

RECOMMENDATIONS:

1. Take whatever steps are necessary to place all waste material in the trench properly.

2. Maintain sufficient freeboard in the lagoons to protect against accidental discharge.

MISSOURI DEPARTMENT OF NATURAL RESOURCES
8460 Watson Road St. Louis, Missouri 63119 (314) 849-1313

Joseph P. Teasdale Governor
Fred A. Laiser Director
St. Louis Regional Office

Should you have any questions concerning this report, please contact Kevin Brown of the St. Louis Regional Office.

APPROVED:

Earl F. Holtgraewe, P.E.
Regional Administrator
St. Louis Regional Office
Department of Natural Resources

SUBMITTED BY:

Kevin Brown
Environmental Engineer I
St. Louis Regional Office
Department of Natural Resources

EFH/KB/jk

CC: Mr. Glennon W. Zykan, President, Bob's Home Service, Incorporated
Special Industrial Waste Disposal Facility
Warren County Court
Reitz and Jens, Incorporated
Central Office, Hazardous Waste Management Program

MISSOURI DEPARTMENT OF NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL QUALITY

Annual Inspection ☐
Reinspection ☒

recorded

~~SANITARY~~ LANDFILL SURVEILLANCE RECORD

October 8, 1980 Days/Week Open: 5

Name of ~~Sanitary~~ Landfill: Bob's Home Service, Inc. Special Industrial Waste Disposal Facility

Permit No: 721 901 County: Warren

Owner: Mr. Gennon W. Zykan ~~Operator~~ Site Manager: Mr. Michael D. Gill

Address: Route 1, Box 116F Address: Route 1, Box 116F

Wright City, Mo 63390 Wright City, Mo 63390

phone: 745-3158, 745-3371, 946-4782

Special Conditions and Approved Modifications

A. Are there any special conditions or approved modifications of the satisfactory compliance subject to the rules and regulations? (e.g. impermeable barrier, limited excavation, exceptions to daily cover requirements)
✓ Yes ____ No

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OCT 20 1980
SOLID WASTE MANAGEMENT PROGRAM

B. Is the sanitary landfill operation in compliance with the special conditions or approved modifications? (If "No," describe violations under "REMARKS.")
✓ Yes ____ No

Check Types of Waste Accepted

	INDICATED ON PERMIT APPLICATION	REPORTED BY OPERATOR	AS OBSERVED
Municipal solid waste			
Bulk waste			
Dead animals			
Incinerator residue			
Demolition and construction waste			
Brush and untreated wood waste			
Septic tank pumpings			
Wastewater treatment plant sludges			
various industrial sludges	✓		
OTHER SLUDGES (SPECIFY)			
LIQUIDS (SPECIFY) waste chemicals	✓		
INDUSTRIAL PROCESS WASTES (SPECIFY) DNR approved	✓		✓
HAZARDOUS WASTES (SPECIFY)			
OTHER WASTES (SPECIFY)			

Remaining Life of Landfill

A. Estimated amount of solid waste coming through gate.
Compacted loads ____ yds/wk ____ tons/wk
Noncompacted loads ____ yds/wk ____ tons/wk

B. Estimated volume of remaining landfill covered by approved engineering plans.
____ acre feet ____ years

INSPECTION FORM DISTRIBUTION LIST

Owner ____
Operator ____
City ____
County Court ____
Consulting Engineer ____
Solid Waste Program ____
Regional Office File ____
Others ____

MA - 11/78

atisfactory Compliance Subsections Regulations 80-3.010
Check all subsections: SAT — Satisfactory; UNS — Unsatisfactory. (If necessary describe "UNS" violations under "Remarks.")

	SATISFACTORY COMPLIANCE OPERATING PROCEDURE	SAT	UNS
	ACCEPTED		
	ky solid waste crushed on solid ground and pushed onto working face near bottom of the cell	—	—
	Small dead animals covered immediately with soil or solid waste. Large dead animals placed in pit and covered with four feet compacted soil	—	—
	Disposal of dewatered sludges on working face along with municipal solid waste	—	—
	Incinerator and air pollution control residues prevented from becoming airborne	—	—
LID WASTE EXCLUDED			
	No unpermitted waste accepted.	✓	
	Sign posted at entrance listing excluded wastes	—	—
TE SELECTION			
	Site accessible in all weather conditions. Temporary roads provided for delivery to working face	✓	
ATER QUALITY			
	Surface water courses and runoff properly diverted from the landfill. Sanitary landfill construction and grading to promote rapid surface water runoff without excessive erosion	✓	
	Leachate collection and treatment systems utilized where necessary to protect ground and surface water resources	✓	
	No ground or surface water in contact with solid waste	✓	
R QUALITY			
	No open burning without written permission of the proper air pollution agency and the Division.	—	—
AS CO			
	plementing decomposition gas control plan as necessary o prevent problems	✓	
ECTORS			
	Vector control programs implemented when necessary to prevent or rectify vector problems	—	—
AESTHETICS			
)1	Litter control devices utilized near working face and elsewhere as needed. Litter collected from fences, and the ground surface, and incorporated into the daily cell at the end of each day or containerized	—	—
)2	Wastes easily moved by wind covered as necessary to prevent their becoming airborne and scattered.	—	—
)3	On-site vegetation and natural windbreaks being utilized to improve appearance and operation of the sanitary landfill.	—	—

SUBSECTION NUMBER	SATISFACTORY COMPLIANCE OPERATING PROCEDURE	SAT	UNS
(10) AESTHETICS (Continued)			
(10)(C)4	Salvaged materials removed daily or stored in aesthetically acceptable containers or enclosures.	—	—
(11) COVER MATERIAL			
(11)(C)1	Daily cover applied regardless of weather in not less than a six inch layer. Cover material available in all weather conditions	✓	
(11)(C)2	Intermediate cover applied to all areas idle for more than 60 days in a layer not less than one foot after compaction	—	—
(11)(C)3	Final cover applied on each area as completed in a layer not less than two feet after compaction	—	—
(12) COMPACTION			
(12)(C)1	Adequate equipment on-site, operated daily	✓	
(12)(C)1A	Solid waste spread in layers not to exceed two feet and confined to smallest practical area	—	—
(12)(C)1B	Wastes compacted to smallest practical volume	—	—
(12)(C)1C	Cover material compacted as much as practical	—	—
(12)(C)2	Preventive maintenance performed	✓	
(12)(C)3	Daily task operating manual provided	✓	
(13) SAFETY			
(13)(C)1	Fire extinguishers provided on oil equipment	✓	
(13)(C)2	Provisions for extinguishing fires in waste, equipment and structures.	✓	
(13)(C)3	Communication equipment available	✓	
(13)(C)4	Scavenging prohibited.	—	—
(13)(C)5	Controlled access to site by established roadways and limited to hours when operating personnel are on duty	✓	
(13)(C)6	Traffic controlled and directed to designated disposing points.	✓	
(13)(C)7	Site dust controlled for safety purposes and to prevent nuisances	—	—
(14) RECORDS			
(14)(C)1A	Records of major problems and complaints	—	—
(14)(C)1B	Monitoring record maintained a. leachate sampling and analyses. b. gas sampling and analyses. c. ground and surface water analyses	✓ ✓ ✓	
(14)(C)1C	Records of vector control efforts.	—	—
(14)(C)1D	Records of dust and litter control efforts.	—	—
(14)(C)1E	Records of quantity of waste handled	✓	
(14)(C)1F	Records of description, sources, and volume of special wastes listed in Subsection (3)(A)	✓	

V. Operation Proceeding in Accordance with Approved Engineering Plans? (If "NO," describe violations under "Remarks.")

✓ Yes _____ No

REMARKS: Trench HW - some regs from McDonnell waste were visible
wash down pond - more freeboard needed
firebrick has been removed

(Attach additional sheets as necessary.)

BY Kevin Brown
SIGNATURE OF INVESTIGATOR

3.600 Warren County, SWMP
Bob's Home Service, Inc. Special Industrial
Waste Disposal Facility

RECEIVED
AUG 21 1980
SOLID WASTE
MANAGEMENT PROGRAM

August 15, 1980

Mr. Michael D. Gill
Route 1, Box 116F
Wright City, Missouri 63390

Dear Mr. Gill:

On July 29, 1980, Kevin Brown and Howard Winburn visited the Bob's Home Service site to check a number of items relating to the operation of the landfill. These areas are listed below along with our findings and recommendations.

1. Records

Findings: The records were being maintained in good order. No discrepancies were noted.

2. Security Fencing

Findings: The fence was torn, sagging, or otherwise damaged in several locations.

Recommendations: The fence should be frequently inspected and promptly repaired when damage is discovered.

3. Holding Lagoons

Findings: Tall grass was growing in and near the water's edge of the Trench Water Lagoon.

Recommendations: Remove all vegetation from the water and from along the water's edge.

4. Daily Cover

Finding: Some shop waste such as paper sheets and fiberboard containers was visible in the side of an open trench on the north side of the landfill.

Recommendations: Give closer attention to adequate application and maintenance of required daily cover.

5. Odor Control

Finding: No odors other than those of swine waste were detected. These odors were noted outside of the security fence.

MISSOURI DEPARTMENT OF NATURAL RESOURCES
8460 Watson Road St. Louis, Missouri 6
(314) 849-1313

ph P. Teasdale Governor
Fred A. Lafser Director
St. Louis Regional Office

Should you have any questions concerning this report, contact Howard Winburn of the St. Louis Regional Office.

APPROVED:

Earl F. Holtgraewe, P.E.
Regional Administrator
St. Louis Regional Office
Department of Natural Resources

SUBMITTED BY:

Howard J. Winburn
Environmental Engineer II
St. Louis Regional Office
Department of Natural Resources

EFH/HJW/jk

CC: Central Office, Hazardous Waste Management Section
Warren County Court
Reitz and Jens, Incorporated
Mr. Glennon W. Zykan, President
Bob's Home Service, Incorporated

MISSOURI DEPARTMENT OF NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL QUALITY

Annual Inspection ☐
Reinspection ☑

SANITARY LANDFILL SURVEILLANCE RECORD

Date: 7/29/80 Days/Week Open: 5 + some Saturdays

Name of ~~Sanitary~~ Landfill: Bob's Home Service, Inc. Special Industrial Waste Disposal Facility

Permit No: 72190 County: Warren

~~Owner~~ President: Mr. Glennon W. Zykan ~~Operator~~ Site Manager: Michael D. Gill

Address: Route 1, Box 116F, Wright City, Missouri 63390 Address: Route 1, Box 116F, Wright City, MO 63390 745-3158 745-3571 946-4782

I. Special Conditions and Approved Modifications

A. Are there any special conditions or approved modifications of the satisfactory compliance subsections of the rules and regulations? (e.g. impermeable barrier, limited excavation, exceptions to daily cover requirements)
✓ Yes ____ No

B. Is the sanitary landfill operation in compliance with the special conditions or approved modifications? (If "No," describe violations under "REMARKS.")
✓ Yes ____ No

II. Check Types of Waste Accepted

	INDICATED ON PERMIT APPLICATION	REPORTED BY OPERATOR	AS OBSERVED
Municipal solid waste			
Bulky waste			
Dead animals			
Incinerator residue			
Demolition and construction waste			
Brush and untreated wood waste			
Septic tank pumpings			
Wastewater treatment plant sludges			
Chemical, industrial, paint	✓	✓	
OTHER SLUDGES (SPECIFY) waste chemicals, pesticides	✓	✓	
~~LIQUIDS~~ (SPECIFY) & other approved hazardous	✓	✓	
INDUSTRIAL PROCESS WASTES (SPECIFY) Wastes			
HAZARDOUS WASTES (SPECIFY) contaminated materials, process	–	✓	
OTHER WASTES (SPECIFY) filter media, lab chemicals			

III. Remaining Life of Landfill

A. Estimated amount of solid waste coming through gate.
Compacted loads ____ yds/wk ____ tons/wk
Noncompacted loads ____ yds/wk ____ tons/wk

B. Estimated volume of remaining landfill covered by approved engineering plans.
____ acre feet ____ years

INSPECTION FORM DISTRIBUTION LIST

Owner ____
Operator ____
City ____
County Court ____
Consulting Engineer ____
Solid Waste Program ____
Regional Office File ____
Others ____

11/76

atisfactory Compliance Subsections Regulations 80-3 010
Check all subsections SAT — Satisfactory UNS — Unsatisfactory. (If necessary describe "UNS" violations under "Remarks")

	SATISFACTORY COMPLIANCE OPERATING PROCEDURE	SAT	UNS
	EPTED		
	solid waste crushed on solid ground and pushed onto working face near bottom of the cell	—	—
	Small dead animals covered immediately with soil or solid waste. Large dead animals placed in pit and covered with four feet compacted soil	—	—
	Disposal of dewatered sludges on working face along with municipal solid waste	—	—
	Incinerator and air pollution control residues prevented from becoming airborne	—	—
	WASTE EXCLUDED		
	No unpermitted waste accepted	✓	
	Sign posted at entrance listing excluded wastes	—	—
	SELECTION		
	Site accessible in all weather conditions. Temporary roads provided for delivery to working face	✓	
	ER QUALITY		
	Surface water courses and runoff properly diverted from the landfill. Sanitary landfill construction and grading to promote rapid surface water runoff without excessive erosion	✓	
	Leachate collection and treatment systems utilized where necessary to protect ground and surface water resources	—	—
	No ground or surface water in contact with solid waste	✓	—
	QUALITY		
	No open burning without written permission of the proper air pollution agency and the Division	—	—
	CONT		
	lementing decomposition gas control plan as necessary to prevent problems	—	—
	TORS		
	Vector control programs implemented when necessary to prevent or rectify vector problems	—	—
	STHETICS		
	Litter control devices utilized near working face and elsewhere as needed. Litter collected from fences, and the ground surface, and incorporated into the daily cell at the end of each day or containerized	—	—
	Wastes easily moved by wind covered as necessary to prevent their becoming airborne and scattered	—	—
	On-site vegetation and natural windbreaks being utilized to improve appearance and operation of the sanitary landfill	—	—

SUBSECTION NUMBER	SATISFACTORY COMPLIANCE OPERATING PROCEDURE	SAT	UNS
(10)	**AESTHETICS (Continued)**		
(10)(C)4	Salvaged materials removed daily or stored in aesthetically acceptable containers or enclosures	—	—
(11)	**COVER MATERIAL**		
(11)(C)1	Daily cover applied regardless of weather in not less than a six inch layer. Cover material available in all weather conditions		✓
(11)(C)2	Intermediate cover applied to all areas idle for more than 60 days in a layer not less than one foot after compaction	—	—
(11)(C)3	Final cover applied on each area as completed in a layer not less than two feet after compaction	—	—
(12)	**COMPACTION**		
(12)(C)1	Adequate equipment on site operated daily	✓	
(12)(C)1A	Solid waste spread in layers not to exceed two feet and confined to smallest practical area	—	—
(12)(C)1B	Wastes compacted to smallest practical volume	—	—
(12)(C)1C	Cover material compacted as much as practical	✓	—
(12)(C)2	Preventive maintenance performed	✓	—
(12)(C)3	Daily task operating manual provided	✓	—
(13)	**SAFETY**		
(13)(C)1	Fire extinguishers provided on oil equipment	—	—
(13)(C)2	Provisions for extinguishing fires in waste, equipment and structures	✓	—
(13)(C)3	Communication equipment available	✓	—
(13)(C)4	Scavenging prohibited	—	—
(13)(C)5	Controlled access to site by established roadways and limited to hours when operating personnel are on duty	✓	—
(13)(C)6	Traffic controlled and directed to designated disposing points	✓	—
(13)(C)7	Site dust controlled for safety purposes and to prevent nuisances	—	—
(14)	**RECORDS**		
(14)(C)1A	Records of major problems and complaints	—	—
(14)(C)1B	Monitoring record maintained a. leachate sampling and analyses. b. gas sampling and analyses c. ground and surface water analyses	✓	
(14)(C)1C	Records of vector control efforts	—	—
(14)(C)1D	Records of dust and litter control efforts	—	—
(14)(C)1E	Records of quantity of waste handled	✓	—
(14)(C)1F	Records of description, sources, and volume of special wastes listed in Subsection (3)(A)	✓	—

V. Operation Proceeding in Accordance with Approved Engineering Plans? (If "NO," describe violations under "Remarks.")

✓ Yes _____ No

REMARKS Fence was in need of repair in several places. Grass was growing in the water's edge of the Trench Water Lagoon. Shop waste from McDonald Douglas Corp. was exposed in an open trench on the north side of the landfill.

(Attach additional sheets as necessary.)

BY Howard J. Minburn
SIGNATURE OF INVESTIGATOR

3.600 Warren County SWMP
Bob's Home Service, Inc.
Special Industrial Waste Disposal Facility

3.500 Warren County APCP
Bob's Home Service Landfill

RECEIVED
JUL 23 1980
SOLID WASTE
MANAGEMENT PROGRAM

July 17, 1980

Mr. Michael D. Gill
Route 1, Box 116 F
Wright City, Missouri 63390

Dear Mr. Gill:

An annual inspection was made of the condition and operation of Bob's Home Service, Inc. Special Industrial Waste Disposal Facility on June 9, 1980. The recommendations contained in this report are based on the findings made at the time of the investigation. I trust that you will direct your attention to these findings and that you will proceed to carry out the recommendations presented.

FINDINGS:

1. Improper disposal of groundwater monitoring well's flush water.

2. Weed and grass control was poor.

3. Some flies were attracted to the landfill.

4. Additional measures are needed to control odors.

DISCUSSION:

It was learned that the flush water pumped from the groundwater monitoring well prior to collecting samples from this well is discharged onto the ground surface below the well and that the resulting runoff is not collected or analyzed. Any water that is pumped from this well or bailed from the piezometer wells should not be disposed of until it has been analyzed for possible contamination.

The height of weeds and grass in the southeast part of the landfill indicated that the landfill had not been mowed recently. Likewise, the height of vegetation on the two lagoon dikes and in and near the water's edge was excessive. Cattails were also growing in the edge of the washdown lagoon.

Flies were observed swarming in one of the open alkaline trenches. The operator stated they were attracted to the exposed sulphur waste in that trench.

MISSOURI DEPARTMENT OF NATURAL RESOURCES
8460 Watson Road St. Louis, Missouri 63119 (314) 849-1313

seph P. Teasdale Governor
Fred A. Laiser Director
St. Louis Regional Office

Two recent complaints were received by this office concerning odors believed to have originated at the landfill. The operator recalled that the last of the Sturgeon waste had been brought to the landfill on the day of the complaints, and it was acknowledged that odors are associated with this waste. Possibly, these odors could have been controlled better had cover been immediately applied after the waste was put into the trench. Some sort of wind screen may also be warrented.

Two back gates were open at the time of the inspection. Comment was previously made concerning the adviseability of keeping these gates closed and locked during hours of nonoperation. Considering the sensitive nature of this site, it seems appropriate to reiterate this recommendation.

RECOMMENDATIONS:

1. Collect, store, and analyze all water pumped or bailed from the monitoring wells prior to disposal.

2. Maintain adequate weed and grass control throughout the site. Control vegetation on the lagoon dikes and along the water's edge. Root out new growths in the water as soon as they are observed.

3. Control flies by covering wastes that attracts them or by use of fly bait.

4. Take necessary measures needed to control odors and avert odor complaints.

5. Close and lock all gates to the facility during hours of non-operation.

Should you have any questions concerning this report, contact Howard Winburn of the St. Louis Regional Office.

APPROVED:

Earl F. Holtgraewe, P.E.
Regional Administrator
St. Louis Regional Office
Department of Natural Resources

SUBMITTED BY:

Howard J. Winburn
Environmental Engineer II
St. Louis Regional Office
Department of Natural Resources

EFH/HJW/dak

CC: Mr. Glennon W. Zykan, President, Bob's Home Service, Inc. Special Industrial Waste Disposal Facility
Warren County Court
Reitz and Jens, Inc.
✓Central Office, Hazardous Waste Management Program
Central Office, Air Pollution Control Program

MISSOURI DEPARTMENT OF NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL QUALITY

Annual Inspection ☑
Reinspection ☐

SANITARY LANDFILL SURVEILLANCE RECORD

recorded

6/9/80 Days/Week Open: 5+ (some Saturdays)

n... of [redacted] Landfill: Bob's Home Service, Inc. Special Industrial Waste Disposal Facility

rmit No: 721 901 County: Warren 745-3158

vner: Mr. Glennon W. Zykan President Site Manager ~~Operator~~: Michael D. Gill 745-3371

dress: Route 1, Box 116 F Address: Route 1, Box 116F 946-4782

Wright City, Missouri 63390 Wright City, Missouri 63390

Special Conditions and Approved Modifications

A. Are there any special conditions or approved modifications of the satisfactory compliance subsections of the rules and regulations? (e.g. impermeable barrier, limited excavation, exceptions to daily cover requirements)
✓ Yes ____ No

RECEIVED JUL 2 7 1980

B. Is the sanitary landfill operation in compliance with the special conditions or approved modifications? (If "No," describe violations under "REMARKS.")
✓ Yes ____ No

SOLID WASTE MANAGEMENT PROGRAM

. Check Types of Waste Accepted

	INDICATED ON PERMIT APPLICATION	REPORTED BY OPERATOR	AS OBSERVED
Municipal solid waste			
Bu[illegible] waste			
D[illegible] animals			
I[illegible]erator residue			
Demolition and construction waste			
Brush and untreated wood waste			
Septic tank pumpings			
Wastewater treatment plant sludges			
Chemical or Industrial, paint		✓	✓
OTHER SLUDGES (SPECIFY) Various industrial sludges, waste chemicals,	✓		
~~LIQUIDS (SPECIFY)~~ pesticides & other approved hazardous wastes	✓		
INDUSTRIAL PROCESS WASTES (SPECIFY)			
HAZARDOUS WASTES (SPECIFY) contaminated materials, process	-	✓	
OTHER WASTES (SPECIFY) filter media, lab chemicals			

II. Remaining Life of Landfill

A. Estimated amount of solid waste coming through gate.
~~Compacted~~ loads 300 yds/wk — tons/wk
~~Noncompacted loads~~ — yds/wk — tons/wk

B. Estimated volume of remaining landfill covered by approved engineering plans.
3 acre feet — years

INSPECTION FORM DISTRIBUTION LIST

Owner	✓
Operator	✓
City	
County Court	
Consulting Engineer	✓
Solid Waste Program	✓
Regional Office File	✓
Others	

5 05A - 11/78

isfactory Compliance Subsections Regulations 80-3.010
.neck all subsections: SAT — Satisfactory; UNS — Unsatisfactory. (If necessary describe "UNS" violations under Remarks ")

SATISFACTORY COMPLIANCE OPERATING PROCEDURE	SAT	UNS
...EPTED		
...ulky solid waste crushed on solid ground and pushed onto working face near bottom of the cell	—	—
Small dead animals covered immediately with soil or solid waste. Large dead animals placed in pit and covered with four feet compacted soil	—	—
Disposal of dewatered sludges on working face along with municipal solid waste	—	—
Incinerator and air pollution control residues prevented from becoming airborne	—	—
VASTE EXCLUDED		
No unpermitted waste accepted	✓	—
Sign posted at entrance listing excluded wastes		
LECTION		
Site accessible in all weather conditions. Temporary roads provided for delivery to working face	✓	
QUALITY		
Surface water courses and runoff properly diverted from the landfill. Sanitary landfill construction and grading to promote rapid surface water runoff without excessive erosion.	✓	
Leachate collection and treatment systems utilized where necessary to protect ground and surface water resources.	—	—
No ground or surface water in contact with solid waste	✓	
ITY		
No open burning without written permission of the proper air po... agency and the Division	—	—
TROL		
...nenting decomposition gas control plan as necessary t... event problems.	—	—
Vector control programs implemented when necessary to prevent or rectify vector problems		✓
ICS		
Litter control devices utilized near working face and elsewhere as needed. Litter collected from fences, and the ground surface, and incorporated into the daily cell at the end of each day or containerized	—	—
Wastes easily moved by wind covered as necessary to prevent their becoming airborne and scattered.	—	—
On-site vegetation and natural windbreaks being utilized to improve appearance and operation of the sanitary landfill.	—	—

SUBSECTION NUMBER	SATISFACTORY COMPLIANCE OPERATING PROCEDURE	SAT	UNS
(10) AESTHETICS (Continued)			
(10)(C)4	Salvaged materials removed daily or stored in aesthetically acceptable containers or enclosures.	—	—
(11) COVER MATERIAL			
(11)(C)1	Daily cover applied regardless of weather in not less than a six inch layer. Cover material available in all weather conditions		✓
(11)(C)2	Intermediate cover applied to all areas idle for more than 60 days in a layer not less than one foot after compaction	—	—
(11)(C)3	Final cover applied on each area as completed in a layer not less than two feet after compaction	—	—
(12) COMPACTION			
(12)(C)1	Adequate equipment on-site, operated daily	✓	—
(12)(C)1A	Solid waste spread in layers not to exceed two feet and confined to smallest practical area	—	—
(12)(C)1B	Wastes compacted to smallest practical volume	—	—
(12)(C)1C	Cover material compacted as much as practical	✓	—
(12)(C)2	Preventive maintenance performed	✓	—
(12)(C)3	Daily task operating manual provided	✓	—
(13) SAFETY			
(13)(C)1	Fire extinguishers provided on oil equipment.	✓	—
(13)(C)2	Provisions for extinguishing fires in waste, equipment, and structures.	✓	
(13)(C)3	Communication equipment available	✓	—
(13)(C)4	Scavenging prohibited.	—	—
(13)(C)5	Controlled access to site by established roadways and limited to hours when operating personnel are on duty	✓	
(13)(C)6	Traffic controlled and directed to designated disposing points.	✓	—
(13)(C)7	Site dust controlled for safety purposes and to prevent nuisances	—	—
(14) RECORDS			
(14)(C)1A	Records of major problems and complaints		✓
(14)(C)1B	Monitoring record maintained a. leachate sampling and analyses. b. gas sampling and analyses. c. ground and surface water analyses.	✓	—
(14)(C)1C	Records of vector control efforts	—	—
(14)(C)1D	Records of dust and litter control efforts	—	—
(14)(C)1E	Records of quantity of waste handled	✓	—
(14)(C)1F	Records of description, sources, and volume of special wastes listed in Subsection (3)(A):	✓	—

Operation Proceeding in Accordance with Approved Engineering Plans? (If "NO," describe violations under "Remarks.")

✓ Yes _____ No

MARKS Water flushed from the groundwater monitoring well as discharged from the property without testing. Some flies ...tly attracted to sulphur waste were in one of the alkaline ...hes. Grass and weeds should be mowed. Cattails should be emoved from the washdown lagoon.

tach additional sheets as necessary.)

Howard D. Wi...

25.290 Warren County
Bob's Home Service, Inc.
Special Industrial Waste Disposal Facility

December 3, 1980

RECEIVED
DEC 8 1980
SOLID WASTE MANAGEMENT PROGRAM

Mr. Michael D. Gill, Manager
Bob's Home Service, Inc.
Route 1, Box 116 F
Wright City, MO 63390

Dear Mr. Gill:

A monthly reinspection was made on the condition and operation of Bob's Home Service, Incorporated, Special Industrial Waste Disposal Facility on November 26, 1980. This report is based on the findings made at the time of the inspection. I trust that you will direct your attention to these findings and that you will proceed to carry out the recommendations presented.

FINDINGS:

1. There was a small amount of waste visible in trench 1-N.

2. Other aspects of the condition and operation of the landfill appeared to be in good order.

DISCUSSION:

Care should be taken to ensure that all waste material is covered with a minimum of twelve (12) inches of compacted soil cover at the end of the work day. This problem was also discussed in the inspection report of October 14, 1980.

RECOMMENDATIONS:

1. Take adequate steps to ensure that waste materials receive the required daily cover.

Should you have any questions concerning this report, please contact Kevin Brown of the St. Louis Regional Office.

APPROVED:

Earl F. Holtgraewe, P.E.
Regional Administrator
St. Louis Regional Office
Department of Natural Resources

SUBMITTED BY:

Kevin Brown
Environmental Engineer I
St. Louis Regional Office
Department of Natural Resources

EFH/KB/be
cc

Mr. Glennon W. Zykan, President-Bob's Home Service
Industrial Waste Disposal Facility
Warren County Court
Reitz & Jens, Incorporated
✓Central Office, Hazardous Waste Management Program

MISSOURI DEPARTMENT OF NATURAL RESOURCES
8460 Watson Road St. Louis, Missouri 63119 (314) 849-1313

Joseph P. Teasdale Governor
Fred A. Lafser Director
St. Louis Regional Office

MEMORANDUM

Date: November 8, 1979

To: Bob's Home Service File

From Ben Moore BM

Subject: NE Corner Perimeter Trench Inspection

This inspection was conducted specifically to observe Bob Healy's (of Reitz and Jens) inspection of a perimeter trench. Mike Gill was also present.

When I arrived at the site, the trench had already been excavated. I talked with Mike Gill about the site operation while waiting for Bob Healy. When he arrived, we proceeded to the trench.

Mr. Healy inspected the trench walls from the top and then was lowered to the bottom in the excavator bucket. He inspected and photographed the walls from the bottom and inspected the floor of the trench in the few places it was not covered by rubble. He then used a shovel to dig several holes through the rubble at random spots across the bottom.

I was lowered into the trench and observed the bottom and sides.

The soil rubble was claylike and no sand or gravel pockets were noted. Mr. Healy said the nature of the rubble and the condition of the bottom where observed was sufficient evidence to show that the bottom was secure.

We were lifted out of the trench, Mr. Healy measured the lengths and depth, then left.

I was then able to observe the drum burial operation. Ten steel sleeves are now available for simultaneous use and an attachment has been constructed for the loader which allows nine drums to be moved at one time. The operation proceeded smoothly. Operator skill had improved significantly since the inspection conducted on August 3, and I would conclude that this procedure is currently being used on a more regular basis.

BM/jc

MISSOURI DEPARTMENT OF NATURAL RESOURCES
P.O. Box 1368 2010 Missouri Blvd. Jef. City, Missouri 65102 (314) 751-3241

MISSOURI DEPARTMENT OF NATURAL RESOURCES
P.O. Box 1368 2010 Missouri Blvd. Jefferson City, Missouri 65102 (314) 751-3241

MEMORANDUM

Date: August 8, 1979
To: BHS File
From: Ben Moore
Subject: Site Inspection of August 2 and 3, 1979
Persons Present: Mike Gill, BHS; Ben Moore, Missouri DNR

An inspection of the BHS secure landfill was conducted on August 2nd and 3rd to observe typical daily operations and, specifically, to observe the cell burial method used to dispose of drummed wastes. There has been some doubt that personnel at this facility have been following proper operating procedures with respect to using a steel sleeve to align drums as they are placed in each cell.

I arrived unannounced at the site on August 2, at approximately 7:30 A.M. Conditions were very wet and muddy due to heavy rains the previous two days. Mike Gill said that a truckload of drums from Mobay was expected in the afternoon. If the truck arrived before 3:00 P.M., drums would be buried that day. Otherwise, they would be buried the following morning (which was the case).

Gill accompanied me on an inspection of the facility. Observations made during that inspection were noted as follows:

1. The holding basin and truckwash pond had 1½ and 3 feet of freeboard respectively. The pump, which had been used in the past to aerate the holding basin and to increase evaporation, was not working. I suggested these impoundments be sampled and properly disposed of as soon as possible to prepare the site for fall and winter operation.

2. Trench # 8 was still open (uncompacted daily cover had been applied) and had an estimated remaining capacity of 100 yards. A two foot deep pool of water was standing in the lower corner of the trench. Gill said he did not plan to close this trench until definite word was received that the clean-up in Houston, Missouri was complete. Water was not removed from this trench by 4:30 P.M., August 3.

3. 1½ to 2 feet of water was pooled in the lower end of trench 5. As this trench is used infrequently, and the holding basin was already overfilled, I suggested that Gill consider spraying the water on the dry up-slope end of the trench to aid evaporation. Surface water control appeared adequate as evidenced by the small quantity of water accumulated after heavy rain.

4. Trench #9 had been extended to the east approximately 30 feet since the July 12 inspection. A 4 foot soil wall had been left between the new and old sections which had since collapsed exposing sludge and polyethelene from previous burials. A near vertical face was exposed which could not be covered.

Gill said a Reitz and Jens representative had inspected this new excavation prior to the collapse.

A relatively large quantity of water was noted in the trench. No diversion structures were noted, hince the excess accumulation. Gill was instructed to provide proper surface water control in the future. He was also instructed to remove the water prior to depositing any sludge in the trench.

When I returned to the site at 2:30 P.M., a pump was noted next to the trench. Despite this, sludge had been deposited in the trench and a slurry was formed as the materials mixed. Later attempts to apply final cover were futile as the slurry would not support soil materials. Gill's explanation was that the pump had been clogged by sludge and soil particle in the water. I maintained that this was not a valid excuse as equipment and surface water diversion should have been provided which was capable of keeping the trench dry regardless of the conditions. I also pointed out that placing waste materials in a trench that contained water was a violation of the permit conditions.

A truckload of drums from Mobay was to be buried the following morning. I agreed to return to observe the operation.

I arrived at the site at 7:00 A.M. on August 3. The truck, cherry picker, and steel liner were in place near the organic area. A private excavator had been contracted by BHS to use his high loader to assist in the burial operation. Gill said this person was sometimes hired to help out when the on-site high loader was not working properly. Three of the five men in the crew suited up in new DuPont tivek coveralls, dust masks or respirators and hard hats. Work commenced around 7:30 A.M.

Shortly after work began it became evident that the crew member directing the operation was having problems. Gill said he was nervous about being watched by a state inspector so he (Gill) took over direction.

The burial procedure observed is described as follows:

The steel liner was lowered into a three foot cell and the hopper (also used for sludge disposal in 5 foot cells) was placed over that cell. A workman then placed four drums from the truck into the high loader bucket which were moved to a position near the cherry picker and unloaded by a second workman. The second workman then attached the drum handler to individual drums and a third workman, standing in the hopper, guided each drum into the steel liner. When the cell was full the steel liner was slowly removed as fill material was poured into the hopper with the highloader. The procedure was repeated for other cells.

Two equipment problems were encountered during the observed operation. The liner was dented by the high loader and had to be straightened with a hydraulic jack and the take up reel on the cherry picker hydraulic line was not operating properly causing the line to become wrapped around the pulley.

Total time for burial of one truckload of drums was approximately 7½ hours. The time used for moving and repairing equipment and for applying final cover accounted for 3½ hours of this total. Therefore, 4 hours or approximately 35 minutes per cell were required for a five man crew to bury one truckload of drums.

Gill had previously told me that 10 cells could be properly filled by this method in a maximum of 2 hours. On one previous occasion, I arrived at the site to be told that a load of drums had been buried between 6:00 and 8:00 that morning. My observations on August 3 indicate that this crew would require much additional practice to approach this speed. Also, several minor modifications in equipment and procedures (a slight flair around the top of the steel sleeve for instance) would speed up the operation. Had this procedure been used over the past year I would expect these modifications to have been incorporated. Finally, considering the wear sustained by the steel liner in one day, I would be very surprised if one liner could withstand a year's use at twice the rate of the observed operation.

The above observations seem to make it apparent that the steel liner has not been used regularly in the past. Despite our meeting with BHS representatives on June 20, 1979, in which Robbie stressed the importance of filling the annular space completely, the inefficient operation observed indicates that use of the liner is not a regular procedure at the present. As the granular material settles over time, I would expect to see settling over most of the drilled cells. Subsequent infiltration would be relatively high and the standing column of water formed in each cell could significantly increase permeability in these areas.

The fact that diversion structures had not been constructed for trench #9 and that sludge had been dumped into standing water in the trench, indicates that surface water control is not a high priority at this facility. This may be one reason for the problems with stability of the walls of trench #5 in the past.

One other incident occurred which seems to indicate a disregard for our instructions and the approved plans. During the closing operation on August 2, Gill instructed a workman to put daily cover over a material in a five foot cell. He looked puzzled and said he thought more materials were to be buried on the following day. Gill became agitated and again told him to apply daily cover. The implication here is that the cover is applied when a state representative is present but not at other times.

It seems that more frequent inspections will be required to insure proper operation of this facility. The potential infiltration problem in the cell areas can possibly be controlled by continued filling and compaction as settling occurs. The operators of this facility have demonstrated an ability to control surface water as evidenced by the current condition of trench #5. The main problem seems to be an attitude that proper operation will be followed if it is convenient or if an inspector is watching. If we expect proper

2

operation without constant observation, we will have to demonstrate that some kind of action will be taken when we do discover incidents of permit violation.

BM/jlc

MISSOURI DEPARTMENT OF NATURAL RESOURCES
P.O. Box 1368 2010 Missouri Blvd. Jefferson City, Missouri 65102 (314) 751-3241

MEMORANDUM

Date: June 27, 1979

To: Bob's Home Service Landfill File

From Ben Moore

Subject: Site Inspection on June 26, June 27, 1979

Persons Present: Mike Gill, Bob's Home Service, Inc.
Robert Healy, Reitz and Jens, Inc.
Ben Moore, Missouri DNR

The reason for this inspection was to observe perimeter trench Number 8 which had been prepared for contaminated soil from the oil spill near Houston, Missouri. Also, to observe the daily operation at Bob's Home Service and to try to determine whether or not the steel sleeve was being used in the cell disposal process. As it turned out, I was also able to observe Bob Healy's inspection of a perimeter trench which had been prepared for disposal of sludge from Monsanto.

When I arrived, Healy was beginning his inspection of the Monsanto sludge trench which was on the north perimeter of the BHS property. He was lowered into the trench in the backhoe bucket and viewed and photographed all four walls. He spent about fifteen minutes looking at the sides, and when he came out said that the trench was acceptable and that sludge could be disposed of in it. While Healy was in the trench, I had noticed an unusually textured area of soil in the northwest corner of the trench. An area approximately fifteen feet long extending to five or six feet below the ground surface was present in the west end of the north wall. I pointed this out to Healy and he said that he didn't believe it was a problem but that we could dig it out if I wanted to see what the material was like. The back hoe was moved to the north side of the trench and several buckets were moved from that area. The material consisted of large chunks of clay, six inches to a foot across, surrounded by a very sandy material with a clay binder. Healy contended that this was a very common occurrence in glacial till and that it was an impermeable material. Without sampling equipment I was unable to obtain a sample for testing but I feel that the material was permeable and should be of concern, especially in a situation where it is within twenty feet of the perimeter. I requested that the material be excavated to determine whether this represented a pocket of sandy clay or a seam which might allow the relatively rapid escape of leachate from this trench. As it turned out, it represented a small pocket. The wall of the trench was excavated back five or six feet and the clay material similar to that surrounding the rest of the trench was encountered.

I am concerned by the fact that Healy would not have investigated the sandy pocket had I not been present to point it out. I also question his contention that this relatively sandy material was as impermeable as the surrounding clay. Finally, I am concerned that he did not request that the loose material be removed from the bottom of the trench prior to the inspection.

As the trench bottom was covered with a foot of loose soil, it seemed to me impossible to determine whether or not pockets of unusual material were present there.

No materials were to be buried on the afternoon of the 26th. The truck was down due to a failed wheel bearing. If a part could be obtained, it was to be repaired that evening and a shipment of drums from Chemagro would be buried on the morning of the 27th. Cells were being drilled for that shipment and it was noted that the steel shaft laying nearby had been recently used as determined by the fact that the sides were scraped and free of rust.

I proceeded to trench number 8. Gill said that at that time they had accepted approximately 360 yards of contaminated soil. I estimate that one-third of the trench was filled at this time. Three additional loads of the contaminated soil were accepted while I was at the site bringing the total, by the evening of the 26th, to approximately 420 yards. Daily cover was applied to a depth of one foot where possible. On the sloping sides of the material placed in the trench it was impossible to obtain a full foot of cover as the soil rolled down the sides into the bottom of the trench. I instructed Gill to deposit material in these trenchs in the future in such a way that a more gradual easily covered slope would be obtained.

I returned to the site on the morning of the 27th. At that time, Gill informed me that their truck had been repaired and sent to Kansas City, but ~~the wheel~~ bearing had seized again on the way there. Jim Zykan and a mechanic had taken additional parts and gone to try to repair the truck again but Gill had no idea of whether or not they would be able to bring a load of material in that day.

An additional 100 yards of contaminated soil was brought in that morning from Houston. It was deposited in trench 8 and spread around with a back hoe in such a manner that a slope which could be covered with a foot of soil was established. I attempted to contact Gary Snodgrass in Houston, for an up-dated estimate of the total quantity of contaminated soil to be shipped to the Wright City Facility. I was unable to reach him in three phone calls. Gill measured the deminsions of the trench after 500 yards of soil had been put into place. Assuming that a foot of daily cover and two feet of final freeboard would be required over the next two days before the trench was closed, Gill estimated that an additional 300 yards of contaminated soil could be buried in the trench.

Water from trench number 5 was being pumped into the holding basin and being sprayed into the air. The trench 5 water level had been lowered three or four feet since my previous visit and three feet of free board was noted in the storage basin. Considering the volumes involved I would estimate that a significant portion of the water from trench 5 had been irrigated prior to our meeting on June 20. I do not believe evaporation could have accounted for the net loss of water noted.

Gill asked whether he should contact the St. Louis Regional Office or the Central Office when he had obtained an analysis of the water in the holding basin. I told him that I wasn't sure that a spray irrigation system would be acceptable and that he should certainly contact the Central Office before any type of discharge.

In conclusion, it seems that the steel liner has been used recently and the spray irrigation has stopped. Water was being pumped to the holding basin as requested in our June 20 meeting. I remain concerned about Reitz and Jens inspection of the perimeter trenches and I feel it would be a good idea for us to talk to Dave Murray about who will being doing the inspections and to determine the criteria used to decide whether or not unusual soil seams noted meet the required permeability limits.

cc: St. Louis Regional Office

MISSOURI DEPARTMENT OF NATURAL RESOURCES
P.O. Box 1368 2010 Missouri Blvd. Jefferson City, Missouri 65102 (314) 751-3241

MEMORANDUM

Date: July 19, 1979
To: BHS Landfill File
From: Ben Moore BM
Subject: Site Inspection on July 12, 1979

Persons present: Mike Gill, Bob's Home Service; Ben Moore, Missouri Department of Natural Resources

This inspection was conducted as a routine random inspection of the landfill site.

Perimeter trench #8 had been expanded twice since the last inspection (June 27, 1979). The first was as wide as the original trench and extended approximately 30 feet to the east. The second was a 30' x 30' excavation immediately north of the first expansion. The original trench was filled to within 2 feet of the ground surface, the first expansion to within 6 feet of the surface and the second expansion was approximately 20 feet deep when observed.

Gill said the first expansion had been inspected by Bob Healy of Reitz and Jens, Inc. It had rained prior to the inspection and Healy was reluctant to be lowered into the 26' deep trench. He conducted his inspection from the ground surface and from the surface of material in the original trench (approximately 6' below ground surface).

A slurry-like material had been deposited in the bottom of the second expansion. Gill said this was contaminated pond bottom and would be mixed with dry soil from the original trench before daily cover was applied.

Very little water remained in trench #5. Gill said the majority had been pumped into the holding basin (1½ foot freeboard observed). One "gas tank of pumping" had been directed to the truck wash pond (3 foot freeboard observed) to avoid overfilling the holding basin. The holding basin aeration pump was being repaired at the time of this inspection.

The steel liner was observed and appeared slightly rusty. Gill maintained that it had been used earlier that morning.

Two 5 foot cells had been opened for disposal of a contaminated soil from Monsanto Co. (BHS-0235). One of the cells had been drilled adjacent to a paint sludge disposal area and paint sludge was observed which had broken through the cell wall into the BHS-0235 cell. Gill said that the adjacent cell (paint sludge) would be recompacted and backfilled to eliminate the void which had formed. The hopper was in place

7/30/79

over one of the cells and no provision for covering the cells overnight was noted.

Workers were preparing to drill cells in the organic area. A load of drums was expected later that day or early the following morning. No provisions were noted for covering the cells overnight if necessary.

Bob Healy's inspection again seems inadequate. Our requirement is that a person be lowered into each perimeter trench to insure, by close visual observation, that there are no sand or gravel seams. When Healy determined that it was unsafe to enter the trench, he should have deferred approval. His decision indicates a poor understanding of the type of inspection we need to insure the security of this site. If Reitz and Jens can provide no better service, we should consider other alternatives.

It seems that the operation at this facility involves wastes arriving and being buried, early in the morning (6 - 7 a.m.) or late afternoon (4 - 6 p.m.). The next inspection should be scheduled to be on site during one or both of these time periods. Possibly, the inspector should plan to stay on site until a load of drums is received and buried. It may be possible to determine from the crew's ability to use the liner in the disposal process whether or not they have been using it regularly.

BM/jlc

3.600 Warren
Bob's Home Service, Inc.,
Special Industrial Waste Disposal Facility

MEMORANDUM

Date: June 22, 1979

To: Rick Roberts, C. O. SWMP R.L.R.

From: Mike Duvall, SLRO MD

Subject: Bob's Home Service, Inc., Landfill

JUL 3 1979

In accordance with our discussion, this is a summary of my involvement with the surface water irrigation system being utilized at the above facility.

1. Inspected the site on 4/27/79. Addressed the matter in some detail at that time - see report on investigation dated 5/7/79.

2. Received written reply to my report from Mike Gill on 5/18/79. See attached copy of this.

3. Received call from Mr. Gill on 5/29/79. As I recall, he wanted additional approval for the concept of spray-irrigating the ponded runoff water on completed landfill areas. I basically reiterated my previous discussion and recommendations as indicated in the report of 5/7/79. I do not recall realizing the significance of Gill's specific request to spray-irrigate directly from the water accumulations in the trenches. In retrospect however, I would probably not have had any problem with him irrigating directly from trench #5, as they have in fact proceeded to do since then. I say this taking into account our observations of the holding ponds at the time of inspection, the analysis of a sample of the trench contents, and my determination that irrigation with this water would put it to a useful purpose.

   I did stress at the time that every effort be made to prevent any surface runoff from leaving the property and thereby resulting in an unauthorized discharge to waters of the state.

4. Received follow-up letter from Gill on 6/18/79, including pictures of irrigation system in operation. See attached copy of this also.

   I would conclude by restating that I believe there is no particular problem with the present spray irrigation process being used at the B.H.S. site. I do realize now however that the operator should make every effort in the future to adhere to the approved plans exactly as they were developed - in other words, to pump all storm water accumulations from the trenches to the containment pond for analysis and Department approval prior to irrigating with it. I can see that strict adherence to this provision would afford greater control over the process; however, this would go hand in hand with B.H.S. providing us with assurance that the containment pond(s) are sufficiently sized and properly constructed to preclude unauthorized discharges there, such as were documented at the time of our inspection.

   Should further clarification of this be needed, please advise.

be

S.W.

B. H. B., inc.

HAZARDOUS WASTE
LANDFILL
Route 1, Box 116F
Wright City, Mo. 63390
314-745-3371

May 16, 1979

JUL 3 1979

Mr. Mike Duvall
St. Louis Regional Office
Missouri Department of Natural Resources
8460 Watson Road
St. Louis, Missouri 63119

Dear Mr. Duvall:

I have reviewed your inspection letter dated May 7, 1979 and thought you might be interested in the progress toward fulfulling your recommendations to date.

The water in the holding lagoon is being spray irrigated over the pasture land directly south and west of the maintenance area. The operation should be completed by Wednesday, May 16, 1979. Approximately half the water contained in the truck wash lagoon has been spray irrigated. The seepage from the holding lagoon stopped once the water level dropped approximately one foot. The berm is not dry enough to allow compaction at the present. If the rains will hold off another week or the temperature rises, we should be able to compact the berm in the next few weeks. Any water added to the lagoon will be maintained well below the seepage level.

Once the holding lagoon is empty, the water from Trench #3 (alkaline) will be pumped into it alleviating the sludge/water contact problem.

The final grade will be completed on the inactive portion of the site the latter part of this week. Seeding will start when the final grade is completed.

The maintenance area has been cleaned up and outside storage of oil drums stopped.

B. H. B., inc.

HAZARDOUS WASTE
LANDFILL
Route 1, Box 116F
Wright City, Mo. 63390
314-745-3371

June 15, 1979

Mr. Mike Duvall
St. Louis Regional Office
Missouri Department of Natural Resources
8460 Watson Road
St. Louis, Missouri 63119

Dear Mr. Duvall:

I am enclosing the pictures and analysis I promised you concerning your last visit.

1. Analysis of trench #5 rain water accumulation presently being used to water new grass over trenches 1, 2, 3, and 4.

2. Grading completed around truck wash area to divert water.

3. Pictures showing sprinkling system to remove water from trench #5

4. Compaction of Holding lagoon berm.

5. Repair of hole in fence south east corner of Sturgeon trench

If you have any questions, please give me a call.

Very truly yours,

Michael D. Gill

Michael D. Gill
Technical Manager

MDG/bh

enc.

JUL 3 1979

MEMORANDUM

Date: May 11, 1979

To: File

From: Tom Ellis, Technical Services Section and Bill Moore, Hazardous Waste Management Section

Subject: Warren County - Bob's Home Service Industrial Waste Disposal Facility

On the afternoon of April 26, 1979, at approximately 3:30 p.m., the writer and Bill Moore, of the Hazardous Waste Section, visited the subject disposal facility. The purpose of the visit was to become familiar with current operating areas and disposal procedures at the facility. The weather at the time of the visit was clear and windy with temperatures in the 70's. The area had received moderate to heavy rainfall two days before the visit.

Mr. Mike Gill, Technical Manager for Bob's Home Service, Inc., was available at the time of the visit and gave a tour of the area and the operation.

Despite the rain of a few days prior, the current operating area, near the ridge-top along the western one half of the site, was relatively dry. A walk through and along the periphery of the site revealed some areas that remained wet and muddy. The wet areas were near a tree in the central portion of the site and along the creek on the eastern boundary of the site. While touring the operating area of the facility, it was noted that the alkali trench contained an appreciable amount of water, of unknown depth inside the trench. The water, gray in color, appeared to be boiling rapidly. When questioned about this, Mr. Gill reported that the boiling effect was typical of what happened when an alkali sludge from Monsanto was deposited in the trench. He also reported that the boiling effect lasted for a week or so.

Also of special interest were the two ponds along the southern boundary of the present operating area. The ponds are used for treatment of hauling truck wash-down water and water pumped from operating trenches when it accumulates there. One of the ponds contained a spray nozzle being used to spray pond

MISSOURI DEPARTMENT OF NATURAL RESOURCES
P.O. Box 1368 2010 Missouri Blvd. Jefferson City, Missouri 65102 (314) 751-3241

Division of Environmental Quality
James P. Odendahl Director

Joseph P. Teasdale Governor
XXXXXXXXXXXXXXXXX Director
Fred A. Lafser

contents vertically a few feet into the air. While walking toward the pond from the downwind side, the presence of a mist (aerosol) from the spray nozzle was noticed (approximately 50-100 feet downwind). Mr. Gill reported that the spray nozzle was used to aid in evaporation of the pond contents.

We departed from the facility at approximately 5:00 p.m. Mr. Gill left the site right behind us. As we were leaving, a Bob's Home Service tractor-trailer pulled into the site. We returned to the site to inspect unloading operations. When we did return to where the truck was parked, we were told by an employee that no unloading is done at the site after 3:30 p.m. We spoke with the driver of the truck about the contents in the truck. He told us it was an oil waste in 55 gallon drums, and that the bottom six inches of the drums contained settled material from a cutting operation and the remainder of the drums' contents was liquid cutting oil. He said the shipment was from Ramey Company in Sullivan, Missouri. We then left the site.

TBE:pdi

3.600 Warren County
Bob's Home Service, Inc.
Special Industrial Waste Disposal Facility

May 7, 1979

MAY 9 1979

Mr. James R. Zykan
Route 1, Box 116 F
Wright City, MO. 63390

Dear Mr. Zykan:

A re-inspection was made of the condition and operation of Bob's Home Service, Incorporated Special Industrial Waste Disposal Facility on April 27, 1979. The recommendations contained in this report are based on the findings made at the time of the investigation. I trust that you will direct your attention to these findings and that you will proceed to carry out the recommendations presented.

FINDINGS:

1. Surface water was ponded in the trench used for disposal of sludge from the Monsanto Company.

2. Runoff water had accumulated in the other open trench, and 2 crates of material containing PCB's were observed to be deposited on the inner slope of this trench.

3. Seepage was occurring from the berm of one of the wastewater containment ponds, resulting in a discharge from the landfill property to surface waters of the State.

4. Storm water drainage and wastewater containment provisions appear to be inadequate around the truck washdown area.

5. A final covered area of the landfill has not yet been graded and seeded to establish vegetative growth.

6. Some accumulations of fire brick and associated rubble were noted in at least 2 different locations around the site.

7. At least one outbreak of leachate was observed occurring from the completed sanitary landfill.

8. Housekeeping appeared to be poor in the machinery maintenance area.

DISCUSSION:

The operator explained that earlier efforts to dike the flow of stormwater to prevent it from entering the trench used for disposal of the Monsanto Company sludge had been successful at the time, but had recently failed when heavy rains were encountered. This has resulted in the formation of a slurry of sludge and water within the trench, which in turn may pose [illegible] tional problems in terms of odor production and reduced efficiency of the daily operation. Provisions should be made for the proper disposal of the

DEPARTMENT OF NATURAL RESOURCES
Watson Road St. Louis, Missouri 63119 (314) 849-1313

eph P. Teasdale Governor
d A. Lafser Director
Louis Regional Office

accumulated water, and every effort should be made to ensure application of the required one (1) foot of compacted cover material over the sludge by the end of each day.

Likewise the runoff water ponded in the other open trench should be pumped down for proper containment and/or on-site disposal. Due to the substantial volume that has been allowed to accumulate here, it may be necessary to make arrangements for disposal of this water other than pumping to the present containment pond. On this point, the operator indicated that other avenues of disposal were being considered including hauling the wastewater for treatment within the MSD sewer system in St. Louis, pending the necessary approvals from MSD.

The PCB contaminated material in the crates should be disposed of in accordance with the terms of approval as stated in the letter from this office pertaining to that particular waste load. All wastes approved for disposal at the site should be incorporated into the landfill as they are received.

The wastewater containment ponds are apparently not of sufficient capacity to handle the volume generated by the present trench operations and the truck wash down pad. One of the results of this which must now be dealt with is the seepage through the berm of the cell containing the trench pump-down. Immediate steps should be taken to eliminate this unauthorized discharge to waters of the State. Such steps could include compacting the outside of the berm with a sheepsfoot roller or other suitable equipment to seal the seepage points, along with application of additional clay soil material to further stabilize the dike structure. As was also discussed at the time of inspection, serious consideration should be given to spray irrigation of the wastewater as a method of reducing the contents in the pond while avoiding a discharge off the property; needless to say, great care should be exercised to prevent runoff if this option is selected. Apparently there is ample pasture land available for this purpose immediately adjacent to the landfill. If the operator is unable to implement such a spray irrigation plan, or if arrangements cannot be made with the MSD for hauling a portion of the wastewater off-site, the only reasonable alternative left will be construction of another containment pond to provide additional on-site holding capacity.

Likewise there is some concern about the truck wash down facility. It appears that the present structure may not be adquately designed to confine all of the washings to the pad itself, leaving open the possibility that some wastewater could bypass the drain pipe to the holding pond and be shed off the property with stormwater runoff. This potential problem could be corrected by constructing a clay berm around the pad perimeter. Also, the surface drainage around the pad area could be improved by providing a diversion ditch along the opposite side of the access road, coupled with a culvert to drain it under the road out behind the pad area altogether. The present drainage situation has no doubt contributed in some measure to the overloading of the holding ponds

The area which has been final-covered (over the original Monsanto Company sludge trenches) should be graded and seeded now to stabilize it from surface erosion and further minimize moisture infiltration. The operator indicated that he would begin this work in the very near future.

The salvaged firebrick rubble piled on the completed landfill site and in the vicinity of the maintenance shed should be disposed of in an acceptable manner unless the intent is to reclaim these materials for another use elsewhere. One acceptable means of disposal would be to spread and cover the rubble on the old sanitary site.

The completed sanitary fill should be monitored periodically for leachate outbreaks. Judging by the size of the outbreak observed during this inspection, it is believed that dressing the eroded sections with additional cover material as needed should minimize and hopefully eliminate this problem. It would behoove the operator to rectify any problems with the old landfill considering the close proximity to the active site, and the possibility of such problems indirectly implicating the other site.

Some oil was found pooled in the vicinity of the maintenance shed, around several 55 gallon drums. This area should be cleaned up because of the potential for runoff with surface water drainage as well as to present a better overall image of the site at large.

Especially in light of the public concern in general about special waste disposal sites such as this, the importance of keeping the operation in compliance with the above discussed items, as well as all Permit conditions and terms of the Law, Rules, and Regulations, cannot be overemphasized.

RECOMMENDATIONS:

1. Pump the accumulated stormwater from both open trenches, and provide proper containment/disposal for the same.

2. Ensure application of the required one foot of soil cover material over all wastes disposed at the site each day such wastes are received.

3. Dispose of the PCB laden material in accordance with the letter of approval from this office applicable to that material.

4. Immediately take all necessary steps to eliminate the unauthorized discharge from the containment pond(s) to waters of the State. Specifically, stabilize the berm from further seepage, and implement plans to deal with the additional volume of wastewater anticipated from the open trenches and the truck wash down area. Give serious consideration to spray irrigation as one of the alternatives.

5. Take any necessary steps to prevent unauthorized discharges off the property from the truck wash down facility. Consider constructing a clay berm around the pad as an additional means of containment, and improve storm-water drainage provisions in the immediate area.

6. Complete final grading and seeding of the completed portion of the landfill.

7. Provide for proper disposal of the fire brick rubble piles around the site.

8. Monitor the old sanitary landfill periodically for outbreaks of leachate. Add cover material and re-grade eroded areas of the fill as needed.

9. Clean-up the spilled oil and drums in the maintenance shed area. Practice better housekeeping here in the future.

Should you have any questions concerning this report, contact Mike Duvall of the St. Louis Regional Office. .

APPROVED:

Earl F. Holtgraewe

Earl F. Holtgraewe, P.E.
Regional Administrator
St. Louis Regional Office
Department of Natural Resources

SUBMITTED BY:

Mike Duvall

Mike Duvall
Environmental Specialist II
St. Louis Regional Office
Department of Natural Resources

EFH/MD/be

CC: Chem-Dyne Corporation, 500 Ford Blvd., Hamilton Ohio. 45011
Warren County Court
Reitz & Jens, Inc.
✓Central Office-Solid Waste Management Program

MISSOURI DEPARTMENT OF NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL QUALITY

Annual Inspection ☐
Reinspection ☒

SANITARY LANDFILL SURVEILLANCE RECORD

1/27/79 Days/Week Open: 5

Name of Sanitary Landfill: Bob's Home Service, Inc., Special Industrial Waste Disposal Facility

Permit No: 72190 County: Warren

Owner: James R. Zykan Operator: same

Address: Bob's Home Service, Inc. Rte. 1, Box 116-F Wright City, MO 63390 Address: " "

Special Conditions and Approved Modifications

A. Are there any special conditions or approved modifications of the satisfactory compliance subsections of the rules and regulations? (e.g. impermeable barrier, limited excavation, exceptions to daily cover requirements)
✓ Yes ____ No

B. Is the sanitary landfill operation in compliance with the special conditions or approved modifications? (If "No," describe violations under "REMARKS.")
____ Yes ____ No

Check Types of Waste Accepted

	INDICATED ON PERMIT APPLICATION	REPORTED BY OPERATOR	AS OBSERVED
Municipal solid waste			
Bulky waste			
Dead animals			
Incinerator residue			
Demolition and construction waste			
Brush and untreated wood waste			
Septic tank pumpings			
Wastewater treatment plant sludges			
OTHER SLUDGES (SPECIFY) various industrial sludges	✓	✓	✓
LIQUIDS (SPECIFY) waste chemicals, pesticides	✓		
INDUSTRIAL PROCESS WASTES (SPECIFY)			
HAZARDOUS WASTES (SPECIFY) wastes approved by DNR	✓		
OTHER WASTES (SPECIFY)			

Remaining Life of Landfill

A. Estimated amount of solid waste coming through gate.
Compacted loads ~100 yds/wk ____ tons/wk
Noncompacted loads ____ yds/wk ____ tons/wk

B. Estimated volume of remaining landfill covered by approved engineering plans.
____ acre feet ____ years

INSPECTION FORM DISTRIBUTION LIST

Owner	
Operator	
City	
County Court	
Consulting Engineer	
Solid Waste Program	✓
Regional Office File	✓
Others	

...tory Compliance Subsections Regulations 80-5-010

...k all subsections. SAT — Satisfactory, UNS — Unsatisfactory. (If necessary describe "UNS" violations under ...emarks.")

SATISFACTORY COMPLIANCE OPERATING PROCEDURE	SAT	UNS
WASTE ACCEPTED		
...solid waste crushed on solid ground and pushed onto ...g face near bottom of the cell	—	—
Small dead animals covered immediately with soil or solid waste. Large dead animals placed in pit and covered with four feet compacted soil	—	—
Disposal of dewatered sludges on working face along with municipal solid waste	—	—
Incinerator and air pollution control residues prevented from becoming airborne	—	—
WASTE EXCLUDED		
No unpermitted waste accepted	✓	
Sign posted at entrance listing excluded wastes	—	—
...ELECTION		
Site accessible in all weather conditions. Temporary roads provided for delivery to working face	✓	
...R QUALITY		
Surface water courses and runoff properly diverted from the landfill. Sanitary landfill construction and grading to promote rapid surface water runoff without excessive erosion		✓
Leachate collection and treatment systems utilized where necessary to protect ground and surface water resources	—	—
No ground or surface water in contact with solid waste		✓
...JALITY		
No open burning without written permission of the proper air pollution agency and the Division	—	—
...ONTROL		
...lementing decomposition gas control plan as necessary ...event problems	—	—
Vector control programs implemented when necessary to prevent or rectify vector problems	—	—
...THETICS		
Litter control devices utilized near working face and elsewhere as needed. Litter collected from fences, and the ground surface, and incorporated into the daily cell at the end of each day or containerized	—	—
Wastes easily moved by wind covered as necessary to prevent their becoming airborne and scattered	—	—
On-site vegetation and natural windbreaks being utilized to improve appearance and operation of the sanitary landfill	✓	

SUBSECTION NUMBER	SATISFACTORY COMPLIANCE OPERATING PROCEDURE	SAT	UNS
(10) AESTHETICS (Continued)			
(10)(C)4	Salvaged materials removed daily or stored in aesthetically acceptable containers or enclosures	—	—
(11) COVER MATERIAL			
(11)(C)1	Daily cover applied regardless of weather in not less than a six inch layer. Cover material available in all weather conditions		✓
(11)(C)2	Intermediate cover applied to all areas idle for more than 60 days in a layer not less than one foot after compaction	✓	
(11)(C)3	Final cover applied on each area as completed in a layer not less than two feet after compaction	✓	
(12) COMPACTION			
(12)(C)1	Adequate equipment on-site, operated daily	✓	
(12)(C)1A	Solid waste spread in layers not to exceed two feet and confined to smallest practical area	—	—
(12)(C)1B	Wastes compacted to smallest practical volume	—	—
(12)(C)1C	Cover material compacted as much as practical	—	—
(12)(C)2	Preventive maintenance performed	✓	
(12)(C)3	Daily task operating manual provided	—	—
(13) SAFETY			
(13)(C)1	Fire extinguishers provided on oil equipment	✓	
(13)(C)2	Provisions for extinguishing fires in waste, equipment, and structures.	✓	
(13)(C)3	Communication equipment available	✓	
(13)(C)4	Scavenging prohibited	✓	
(13)(C)5	Controlled access to site by established roadways and limited to hours when operating personnel are on duty	✓	
(13)(C)6	Traffic controlled and directed to designated disposing points.	✓	
(13)(C)7	Site dust controlled for safety purposes and to prevent nuisances	—	—
(14) RECORDS			
(14)(C)1A	Records of major problems and complaints	—	—
(14)(C)1B	Monitoring record maintained a. leachate sampling and analyses b. gas sampling and analyses. c. ground and surface water analyses	✓ — ✓	—
(14)(C)1C	Records of vector control efforts	—	—
(14)(C)1D	Records of dust and litter control efforts	—	—
(14)(C)1E	Records of quantity of waste handled	✓	
(14)(C)1F	Records of description, sources, and volume of special wastes listed in Subsection (3)(A)	✓	

V. Operation Proceeding in Accordance with Approved Engineering Plans? (If "NO," describe violations under "Remarks.")

✓ Yes _____ No

REMARKS Some concern about containing potentially contaminated water on the site. Also, current disposal of Monsanto Comp. sludges is somewhat shoddy. See attached report for detail.

(Attach additional sheets as necessary.)

MAY 9 1979

BY M. Duvall
SIGNATURE OF INVESTIGATOR

SWMP

3.000 Warren County
APCP General
Complaint AQ 2-79

3.600 Warren County SWMP
Bob's Home Service, Inc.
Special Industrial Waste Disposal Facility

FEB 15 1979

February 7, 1979

Mr. James R. Zykan
Route 1-Box 116 F
Wright City, Missouri 63390

Dear Mr. Zykan:

A re-inspection was made of the condition and operation of Bob's Home Service, Inc. Special Industrial Waste Disposal Facility on January 25, 1979. The recommendations contained in this report are based on the findings made at the time of the investigation. I trust that you will direct your attention to these findings and that you will proceed to carry out the recommendations presented.

FINDINGS:

1. Sludges were exposed in Trenches #3 and #5.

2. Some completed drill holes require additional fill.

3. A strong odor was emanating from the vicinity of Trench #5.

4. The lagoons had not been sampled in the last year.

5. Vacant drilled holes are collecting snow.

DISCUSSION:

Various colored sludges were observed uncovered in Trenches #3 and #5. It is understood that adverse weather has hampered the application of daily cover over these wastes. However, the plans call for all material that is delivered to the site to be covered daily with 12 inches minimum cover. Adequate cover should be kept stockpiled for use in inclement weather. If it is impossible to cover wastes in the trenches during bad weather, the wastes should be diverted to the drilled holes and covered properly.

Some cave-in has occurred in the top cover of a few filled drilled holes. These holes should be refilled and crowned with compacted soil to prevent water accumulating and leaching through the wastes in the holes.

MISSOURI DEPARTMENT OF NATURAL RESOURCES
8460 Watson Road St. Louis, Missouri 6
(314) 849-1313

Joseph P. Teasdale Governor
Fred A. Lafser Director
St. Louis Regional Office

3.600 Warren County SWMP
Bob's Home Service, Inc.
Special Industrial Waste Disposal Facility
February 7, 1979

A pungent odor similar to that of rotten eggs or H_2S was detected in the vicinity of Trench #5. There may be some correlation between this odor and an odor complaint directed against this site which we received recently. At any rate, you should investigate the source of the odor and take the necessary steps to eliminate it and prevent its recurrence. Please find enclosed one copy of Chapter 3 - Air Pollution Control regulations for the Outstate Missouri Area. At your early convenience, please review the enclosure and comply with the applicable regulations.

A check revealed that the two holding lagoons had not been sampled in the last year. In accordance with the operating plans, water that has collected in the trenches must be transferred to the holding lagoon for testing and treatment prior to disposal. In order to do this, you will have to have an adequate volume of free space in the lagoon to accomodate the liquid pumped from the trenches, and this may require pumping some, if not all, of the water out of the lagoon first. However, prior to doing that, the lagoon's contents must be sampled and analyzed to insure it is safe to discharge the contents.

Some holes had been drilled in advance anticipation of future incoming wastes. These holes had not been covered and were collecting snow. Some provision should be made for temporarily covering them to prevent snow or ice and subsequently water collecting in them and mixing with their future contents.

RECOMMENDATIONS:

1. Apply at least one foot of daily compacted cover over all wastes on the day they are received according to your operating plan.

2. Keep completed drilled holes filled in with compacted soil and their tops level with or crowned slightly above the surrounding ground surface.

3. Identify source of, eliminate, and prevent recurrence of the odor in the vicinity of Trench #5.

4. When the lagoons thaw, sample their contents in anticipated need for discharging them and refilling with liquid from the trenches.

5. Protect any open drilled holes from collecting precipitation.

Should you have any questions concerning this report, contact Howard Winburn of the St. Louis Regional Office.

APPROVED:

Earl F. Holtgraewe, P.E.
Regional Administrator
St. Louis Regional Office
Department of Natural Resources

SUBMITTED BY:

Howard J. Winburn
Environmental Engineer II
St. Louis Regional Office
Department of Natural Resources

EFH/HJW/dak

CC: Central Office, Solid Waste Management Program
Chem-Dyne Corporation, 500 Ford Blve., Hamilton, Ohio, 45011
Warren County Court
Reitz and Jens, Inc.
Central Office, Air Pollution Control Program

MISSOURI DEPARTMENT OF NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL QUALITY

Annual Inspection ☐
Reinspection ☑

SANITARY LANDFILL SURVEILLANCE RECORD

recorded

January 25, 1979 Days/Week Open: 5

Name of ~~Sanitary~~ Landfill: Bob's Home Service, Inc. Special Industrial Waste Disposal Facility

Permit No: 73190 County: Warren

Owner: James R. Zykan, Bob's Home Service, Inc. Operator: James R. Zykan, Bob's Home Service, Inc.

Address: Route 1 - Box 116F Address: Route 1 - Box 116F

Wright City, MO 63390 Wright City, MO 63390

I. Special Conditions and Approved Modifications

A. Are there any special conditions or approved modifications of the satisfactory compliance subsections of the rules and regulations? (e.g. impermeable barrier, limited excavation, exceptions to daily cover requirements)

✓ Yes _____ No

B. Is the sanitary landfill operation in compliance with the special conditions or approved modifications? (If "No," describe violations under "REMARKS.")

_____ Yes _____ No

II. Check Types of Waste Accepted

	INDICATED ON PERMIT APPLICATION	REPORTED BY OPERATOR	AS OBSERVED
Municipal solid waste			
Bulk waste			
Dead animals			
Incinerator residue			
Demolition and construction waste			
Brush and untreated wood waste			
Septic tank pumpings			
Wastewater treatment plant sludges			
OTHER SLUDGES (SPECIFY) Various Industrial Sludges	✓		✓
LIQUIDS (SPECIFY) Waste Chemicals, pesticides	✓		
INDUSTRIAL PROCESS WASTES (SPECIFY)			
HAZARDOUS WASTES (SPECIFY) other Hazardous Wastes approved by DNR	✓		
OTHER WASTES (SPECIFY)			

III. Remaining Life of Landfill

A. Estimated amount of solid waste coming through gate.
Compacted loads ~ 110 yds/wk _____ tons/wk
Noncompacted loads _____ yds/wk _____ tons/wk

Estimated volume of remaining landfill covered by approved engineering plans.
_____ acre feet _____ years

INSPECTION FORM DISTRIBUTION LIST

Owner	
Operator	✓
City	
County Court	
Consulting Engineer	✓
Solid Waste Program	✓
Regional Office File	✓
Others	

.actory Compliance Subsections Regulations 80-3.010

ck all subsections: SAT — Satisfactory; UNS — Unsatisfactory. (If necessary describe "UNS" violations under emarks.")

SATISFACTORY COMPLIANCE OPERATING PROCEDURE	SAT	UNS
STE [illegible]TED		
[illegible]d waste crushed on solid ground and pushed onto [illegible] face near bottom of the cell	—	—
Small dead animals covered immediately with soil or solid waste Large dead animals placed in pit and covered with four feet compacted soil	—	
Disposal of dewat[illegible]d sludges on working face along with municipal solid wa[illegible]e	—	—
Incinerator and air pollution control residues prevented from becoming airborne	—	—
ASTE EXCLUDED		
No unpermitted waste accepted	✓	
Sign posted at entrance listing excluded wastes	—	—
ECTION		
Site accessible in all weather conditions Temporary roads provided for delivery to working face	✓	
UALITY		
Surface water courses and runoff properly diverted from the landfill Sanitary landfill construction and grading to promote rapid surface water runoff without excessive erosion	✓	
Leachate collection and treatment systems utilized where necessary to protect ground and surface water resources	—	—
No ground or surface water in contact with solid waste	✓	
ITY		
No open burning without written permission of the proper air pollution agency and the Division	—	—
TROL		
I[illegible]nting decomposition gas control plan as necessary [illegible]nt problems	—	—
Vector control programs implemented when necessary to prevent or rectify vector problems	—	—
TICS		
Litter control devices utilized near working face and elsewhere as needed Litter collected from fences, and the ground surface, and incorporated into the daily cell at the end of each day or containerized	—	—
Wastes easily moved by wind covered as necessary to prevent their becoming airborne and scattered	—	—
On-site vegetation and natural windbreaks being utilized to improve appearance and operation of the sanitary landfill	—	—

SUBSECTION NUMBER	SATISFACTORY COMPLIANCE OPERATING PROCEDURE	SAT	UNS
(10) AESTHETICS (Continued)			
(10)(C)4	Salvaged materials removed daily or stored in aesthetically acceptable containers or enclosures	—	—
(11) COVER MATERIAL			
(11)(C)1	Daily cover applied regardless of weather in not less than a six inch layer Cover material available in all weather conditions		✓
(11)(C)2	Intermediate cover applied to all areas idle for more than 60 days in a layer not less than one foot after compaction	—	—
(11)(C)3	Final cover applied on each area as completed in a layer not less than two feet after compaction	—	—
(12) COMPACTION			
(12)(C)1	Adequate equipment on-site, operated daily	✓	
(12)(C)1A	Solid waste spread in layers not to exceed two feet and confined to smallest practical area	—	—
(12)(C)1B	Wastes compacted to smallest practical volume	—	—
(12)(C)1C	Cover material compacted as much as practical	—	—
(12)(C)2	Preventive maintenance performed	—	—
(12)(C)3	Daily task operating manual provided	—	—
(13) SAFETY			
(13)(C)1	Fire extinguishers provided on oil equipment	—	—
(13)(C)2	Provisions for extinguishing fires in waste, equipment, and structures	✓	
(13)(C)3	Communication equipment available	✓	
(13)(C)4	Scavenging prohibited	✓	
(13)(C)5	Controlled access to site by established roadways and limited to hours when operating personnel are on duty	✓	
(13)(C)6	Traffic controlled and directed to designated disposing points	✓	
(13)(C)7	Site dust controlled for safety purposes and to prevent nuisances	—	—
(14) RECORDS			
(14)(C)1A	Records of major problems and complaints	—	—
(14)(C)1B	Monitoring record maintained a. leachate sampling and analyses. b. gas sampling and analyses. c. ground and surface water analyses	✓ — — ✓	
(14)(C)1C	Records of vector control efforts	—	—
(14)(C)1D	Records of dust and litter control efforts	—	—
(14)(C)1E	Records of quantity of waste handled	✓	
(14)(C)1F	Records of description, sources, and volume of special wastes listed in Subsection (3)(A)	✓	

V. Operation Proceeding in Accordance with Approved Engineering Plans? (If "NO," describe violations under "Remarks.")

_____ Yes _____ No

EMARKS Some filled holes need addition fill. Sludges were exposed in Trenches #3 and #5. Strong odor similar to that from rotten eggs coming from Trench #3.

Attach additional sheets as necessary.)

BY Howard J. Hirlwm

SIGNATURE OF INVESTIGATOR

File:

3.600 Warren County
Bob's Home Service, Inc.
Special Industrial Waste Disposal Facility

RECEIVED
NOV 1978
BUREAU OF
SOLID WASTE MANAGEMENT

October 25, 1978

Mr. James R. Zykan
Route 1, Box 116-F
Wright City, MO 63390

Dear Mr. Zykan:

An annual inspection was made of the condition and operation of Bob's Home Service, Inc., Special Industrial Waste Disposal Facility on October 11, 1978. The recommendations contained in this report are based on the findings made at the time of the investigation. I trust that you will direct your attention to these findings and that you will proceed to carry out the recommendations presented.

FINDINGS:

1. The landfill was found to be in satisfactory condition. Although only one brief operation was observed, personnel appeared to be knowledgeable and proficient at their tasks.

2. Lagoons were not being properly maintained.

DISCUSSION:

Disposal operations and accounting procedures appeared to be well managed in accordance with applicable rules and regulations. The site was well maintained except for the area around the lagoons and on the eastern half of the site. Grass and weeds had overgrown these areas. It seems reasonable and proper that a mowing machine or bushhog should be used on these areas two or three times during the summer to control vegetation. The improved appearance would be a better advertisement for the site.

A brief visit to the laboratory and review of a few records revealed no major problems. Some records not readily available in the office should be checked during the next inspection.

MISSOURI DEPARTMENT OF NATURAL RESOURCES
8460 Watson Road St. Louis, Missouri 63119 (314) 849-1313

Joseph P. Teasdale Governor
Carolyn Ashford Director
St. Louis Regional Office

3.600 Warren County
Bob's Home Service, Inc.
Special Industrial Waste Disposal Facility

Vegetation was growing in and along the water's edge of the two lagoons. Cattails were becoming established in the wash water lagoon. While it is recognized that these are not waste treatment lagoons, nevertheless they should be properly maintained. The cattails including their root systems should be removed from the lagoon. New growths should be rooted out as soon as they are observed. Burning or application of suitable herbicides two or three times during the year should satisfactorily control the vegetation in and along the water's edge.

RECOMMENDATIONS:

1. Control all vegetation within the perimeter fence.

2. Remove all vegetation from the water and from along the water's edge in the two lagoons.

Should you have any questions, please contact Howard J. Winburn of the St. Louis Regional Office.

APPROVED:

Earl F. Holtgraewe, P.E.
Regional Administrator
St. Louis Regional Office
Department of Natural Resources

SUBMITTED BY:

Howard J. Winburn
Environmental Engineer
St. Louis Regional Office
Department of Natural Resources

EFH/HJW/lb

CC: Central Office, Solid Waste Management Program
Chem-Dyne Corp. 500 Ford Blvd. Hamilton
Ohio 45011
Warren County Court
Reitz and Jens, Inc.

MISSOURI DEPARTMENT OF NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL QUALITY

SANITARY LANDFILL SURVEILLANCE RECORD

recorded

ite 10-11-78 Days/Week Open: 5 1/2

ne of Sanitary Landfill: Bob's Home Service, Inc. Special Industrial Waste Disposal Facility

rmit No: 721901 County: Warren

vner: James R. Zykan, Bob's Home Service, Inc. Operator: James R. Zykan

dress: Route 1, Box 116-F Wright City, Missouri 63390 Address: Route 1, Box 116-F Wright City, Missouri 63390

I. Special Conditions and Approved Modifications

A. Are there any special conditions or approved modifications of the satisfactory compliance subsections of the rules and regulations? (e.g. impermeable barrier, limited excavation, exceptions to daily cover requirements)

✓ Yes _____ No

B. Is the sanitary landfill operation in compliance with the special conditions or approved modifications? (If "No," describe violations under "REMARKS.")

_____ Yes _____ No

. Check Types of Waste Accepted

	INDICATED ON PERMIT APPLICATION	REPORTED BY OPERATOR	AS OBSERVED
Municipal solid waste			
Bulky waste			
Dead animals			
Incinerator residue			
Demolition and construction waste			
Brush and untreated wood waste			
Septic tank pumpings			
Wastewater treatment plant sludges			
OTHER SLUDGES (SPECIFY) Various Industrial Sludges	✓	✓	✓
LIQUIDS (SPECIFY) Waste Chemicals, pesticides	✓		
INDUSTRIAL PROCESS WASTE (SPECIFY)			
HAZARDOUS WASTES (SPECIFY) Hazardous Wastes approved by DNR	✓		
OTHER WASTES (SPECIFY)			

Remaining Life of Landfill

A. Estimated average volume of compacted solid waste received.
25 to 36 ~~(tons~~, yards/day, ~~week)~~

B. Estimated volume of remaining landfill covered by approved engineering plans.
260 acre feet

RECEIVED
NOV - 1 1978
BUREAU OF SOLID WASTE MANAGEMENT

DSA — 11/76

sfactory Compliance Subsections Regulations 80-3.010
.ieck all subsections: SAT — Satisfactory; UNS — Unsatisfactory (If necessary describe "UNS" violations under "Remarks.")

SATISFACTORY COMPLIANCE OPERATING PROCEDURE	SAT	UNS
STE D		
e sanitary landfill techniques of spreading and compacting waste and placing cover material daily	—	—
Bulky solid waste crushed on solid ground and pushed onto working face near bottom of the cell	—	—
Small dead animals covered immediately with soil or solid waste Large dead animals placed in pit and covered with four feet compacted soil	—	—
Disposal of dewatered sludges on working face along with municipal solid waste	—	—
Incinerator and air pollution control residues prevented from becoming airborne	—	—
STE EXCLUDED		
No unpermitted waste accepted	✓	
Sign posted at entrance listing excluded wastes		
CTION		
Site accessible in all weather conditions Temporary roads provided for delivery to working face	✓	
Public roads or access roads to the site above flood elevation	✓	
UALITY		
Surface water courses and runoff properly diverted from the landfill Sanitary landfill construction and grading to promote rapid surface water runoff without excessive erosion	✓	
Leachate collection and treatment systems utilized where necessary to protect ground and surface water resources	✓	
No dwater in contact with solid waste	✓	
ITY		
en burning without written permission of the proper air on agency and the Division	—	—
TROL		
Decomposition gases adequately vented to prevent danger to occupants of adjacent property	—	—
Decomposition gases vented in a manner to prohibit accumulation in explosive or toxic concentrations	—	—
Vector control programs implemented when necessary to prevent or rectify vector problems	—	—
ICS		
Litter control devices utilized near working face and elsewhere as needed Litter collected from fences, and the ground surface, and incorporated into the daily cell at the end of each day or containerized	—	—
Wastes easily moved by wind covered as necessary to prevent their becoming airborne and scattered	—	—

SUBSECTION NUMBER	SATISFACTORY COMPLIANCE OPERATING PROCEDURE	SAT	UNS
(10) AESTHETICS (continued)			
(10)(C)3	On site vegetation and natural windbreaks being utilized to improve appearance and operation of the sanitary landfill	—	—
(10)(C)4	Salvaged materials removed daily or stored in aesthetically acceptable containers or enclosures	—	—
(11) COVER MATERIAL			
(11)(C)1	Daily cover applied regardless of weather in not less than a six inch layer Cover material available in all weather conditions	✓	
(11)(C)2	Intermediate cover applied to all areas idle for more than 60 days in a layer not less than one foot after compaction	✓	
(11)(C)3	Final cover applied on each area as completed in a layer not less than two feet after compaction	✓	
(12) COMPACTION			
(12)(C)1	Adequate equipment on site, operated daily	✓	
(12)(C)1A	Solid waste spread in layers not to exceed two feet and confined to smallest practical area	—	—
(12)(C)1B	Wastes compacted to smallest practical volume	—	—
(12)(C)1C	Cover material compacted as much as practical	—	—
(12)(C)2	Preventive maintenance performed	✓	
(12)(C)3	Daily task operating manual provided		
(13) SAFETY			
(13)(C)1	Fire extinguishers provided on oil equipment	✓	
(13)(C)2	Provisions for extinguishing fires in waste, equipment and structures	✓	
(13)(C)3	Communication equipment available	✓	
(13)(C)4	Scavenging prohibited	—	—
(13)(C)5	Controlled access to site by established roadways and limited to hours when operating personnel are on duty	✓	
(13)(C)6	Traffic controlled and directed to appropriate disposing points	✓	
(13)(C)7	Dust controlled for safety purposes and to prevent nuisances	—	—
(14) RECORDS			
(14)(C)1A	Records of major problems and complaints	—	—
(14)(C)1B	Monitoring record maintained a leachate sampling and analyses, b gas sampling and analyses, c. ground and surface water analyses	—	—
(14)(C)1C	Records of vector control efforts	—	—
(14)(C)1D	Records of dust and litter control efforts	—	—
(14)(C)1E	Records of quantity of waste handled	✓	
(14)(C)1F	Records of description, sources, and volume of special wastes listed in Subsection (3)(A)	✓	

V. Operation Proceeding in Accordance With Approved Engineer Plans? (If "No," describe violations under "Remarks.")

✓ Yes _____ No

REMARKS Cattails were growing in the wash water lagoon, Grass was growing in the water's edge in both lagoons.

(Attach additional sheets as necessary.)

BY Howard J. Winkler

Warren Co

JOSEPH P. TEASDALE
GOVERNOR

CAROLYN ASHFORD
DIRECTOR

missouri department of natural resources

2010 Missouri Blvd.
P.O. Box 1368 Jefferson City, Missouri 65101 314-751-3241

July 19, 1977

Mr. James Zykan
Bob's Home Service, Inc.
Route 1, Box 116F
Wright City, MO 63390

Dear Mr. Zykan:

As a result of a citizen complaint, Dr. Joseph Eigner of this office and Bud Stein of the St. Louis Regional Office visited your hazardous waste landfill at 8:30 a.m. today. You were not at home, but your son granted us admission to the fenced area. He did not accompany us during our inspection.

Lumps of the Monsanto Company sludge, dried to a gray, clay-like consistency, were seen scattered over the surface of the ground near and in the disposal area. A large mass of sludge was exposed about half-way down the steep slope of the disposal trench. The slope itself was not compacted, and the most recently completed area of the trench was inadequately compacted. The tracks of your front loader were covered with dry sludge. Most seriously, fill material apparently removed from the sludge trench and placed at the far edge of the sanitary landfill area was found to contain clumps of dry sludge. This area was uncompacted, uncovered, and ungraded, and clearly subject to erosion.

These on-ground observations correlate well with a pilot's report made to our St. Louis Regional Office over the July 4th weekend. The pilot and another witness stated that the Monsanto sludge remained uncovered for at least one night, and that the next day your front-end-loader was seen mixing sludge, slumped soil from the walls of the trench and rain water in the bottom of the trench and that this mixture was being hauled by truck to the old fill area.

Our observations today and the citizen report indicate that the sludge is not being handled in accordance with your permit plans.

Our findings raise serious questions about your handling of the Monsanto Company sludge. Until these questions are resolved, approval to receive this waste is immediately suspended. Mr. Gunn of the Monsanto St. Peter's plant has been informed and has agreed to suspend shipments for the time being.

Before we can consider lifting this suspension we shall require:

1. A written explanation of the failure to cover the sludge for at least one night over the Fourth of July weekend, if this occurred, and an explanation of how sludge was allowed to be removed from the permitted area. In addition, please indicate how a repetition of this incident will be avoided in the future if the suspension is lifted.

2. Collection of the dried sludge outside of the permitted area and placement in the disposal trench.

3. Grading, compaction and seeding of the edge of the old fill area to prevent erosion.

4. Submittal by your consulting engineer of detailed plans for future management of the Monsanto sludge. If this sludge cannot be adequately covered and compacted in the wet state and a drying period is required before burial, the plans must state this and provide specific procedures for both wet and dry periods, maximum quantities allowable per cell, etc. The plan must indicate the sequence of trench filling (e.g. by layers or from one end). We suggest that your consultant and one of our engineers witness a trial reception of sludge to iron out problems before the plan is submitted.

While the Monsanto sludge is of low toxicity and relatively inert, we feel it is essential that you follow plans to the letter. It is especially important to develop good daily procedures in the first months of operation.

At the time of our inspection, the front gate was closed and locked, as it should be. However, the other two gates were open.

Sincerely,

Robert M. Robinson

Robert M. Robinson, P.E.
Director
Solid Waste Management Program

RMR:JE:dl

cc: St. Louis Regional Office
Monsanto Company, attn: Charles Gunn

BHS

R. R 1, Box 127B
Wright City, Mo. 63390
June 2, 1980

Missouri Department of Natural Resources
P. O. Box 1368
2010 Missouri
Jefferson City, Missouri 65102

ATTN: Robert M. Robinson, Director

Dear Mr Robinson:

We live South of Wright City, Missouri on Hwy M. This location in very close to Bob's Home Service Hazardous Waste Disposal location. During the past year and a half the checmical odor has been so strong at times we had to close our windows and stay in the house.

Our present odor complaint was noticed between 8:00 and 9:30 A M on May 29, 1980. The chemical odor was very strong.

Please check and advise immediately what was the cause of this horrible odor. We feel certain that serious dangers are posed to our health by constantly being exposed to these chemical odors.

This waste site is not being monitored and cared for carefully enough as we know how dangerous these chemicals are.

Sincerely,

Mr. & Mrs. Paul Toedebusch

Mr. & Mrs. Paul Toedebusch

RECEIVED
JUN 6 1980
SOLID WASTE
MANAGEMENT PROGRAM

RECEIVED

JUN 9 1980

SOLID WASTE
MANAGEMENT PROGRAM

R. R. 1, Box 127B
Wright City, Mo. 63390
June 5, 1980

Missouri Department of Natural Resources
P. O. Box 1368
2010 Missouri
Jefferson City, Missouri 65102

ATTN: Solid Waste Management Director

Dear Sir:

This letter will confirm my phone conversation this date with your office. The odor I reported to you was the worst I have ever experienced and never want to have to live through it again.

The wind was blowing from the Southwest--a load of some very potent and probably very dangerous chemical was dumped at Bob's Home Service, Inc. about 8:00 A.M. The odor was so strong it was difficult to breathe. We live about 1/2 mile Northeast of BHS however this odor was noticeable on Interstate Hwy 70 some miles away. Several of my neighbors, myself, and my children felt quite ill for some time.

You assured me on the phone the odor would be gone when dirt was placed on the stuff, however, it is now 10:00 P.M. and we can still smell it. How sick will we be in the morning? Do you or anyone responsible for this care?

What was dumped in that hole today? What health hazards outside of feeling ill were all of us exposed to? My neighbors noticed this odor on June 4th as well as the wind was from a different direction. A group of telephone company workes smelled it both days while working in this area.

This odor had to be a violation of the law. Why aren't these violations handled as any other law violation, fines, trials, prosecution, etc.? These criminals should be punished as I would be if I broke the law in any way.

You are invited to my house any time so you can sit here and have to be exposed to these health hazards as we who live here have to.

Let us know what was dumped and how this chemical will effect us.

Sincerely,

Mr. & Mrs. Paul Toedebusch

Mr. & Mrs. Paul Toedebusch
Phone 745-3292

file · Bobs Home Service

DEPARTMENT OF NATURAL RESOURCES
Division of Environmental Quality

TELEPHONE OR CONFERENCE RECORD

Date 6-4-80

PHONE CALL

ming ( )

oine ( )

CONFERENCE

Field ( )

Office ( )

JECT Bobs Home Service - Wright City

SONS INVOLVED

Name	Representing
Dayne Imbert	Citizen - Wright City
Ph 745-3350	lives 1½ mi from
	Bobs Home Service

MMARY OF CONVERSATION

Mr. Imbert reported a chemical smell coming from Bobs Home Service. He was located on Hwy F about ¼ to ½ mile from the site when he noted the odor. He smelled the odor the afternoon of June 4, 1980. He felt sure the smell was coming from

CTION TAKEN waste from Monsanto, because he said he had visited Monsanto at one time and it smelled the same.

INAL RESULTS Called Mike Gill and he said there was some odor because they were again getting waste on Stugeon. Said they would cover completely the evening and that they would be getting more loads tomorrow and that would be the last of it.

Art Grimes
Signature

Bob's Home Kit

3.600 Warren County
Bob's Home Service Incorporated
Special Industrial Waste
Disposal Facility

3.500 Warren County
Air Pollution Control Program
Bob's Home Service Landfill

RECEIVED
JUL 10 1980
SOLID WASTE
MANAGEMENT PROGRAM

July 3, 1980

Ms. Karen Rogers
17 Trembly Lane
Wright City, Missouri 63390

Dear Ms. Rogers:

This is to inform you of the investigation of your complaint of odors alleged to be related to chemical spill material (odor detection level: 1-2 parts per billion) recently delivered to the above indicated landfill. Our investigation of your telephoned complaint can be summarized as follows:

On June 9, 1980 two staff members, namely, Bob Kaatman with our Air Pollution Control Section and Howard Winburn with our Hazardous Waste Management Section visited the site to investigate recent odor complaints. At the time of the investigation, no odor was detected beyond the perimeter of the site.

However, Mr. Gill, the site manager, acknowledged that the last of the "Sturgeon Spill" waste had been disposed of in a trench on the site recently. Since that was to be the last shipment of this waste from said spill, odors associated with it should not be a problem in the future.

Mr. Gill was advised to apply more frequent soil cover under cirsumstances where the potential for odor problems is greatest (e.g. when malodorous wastes are received, etc.).

Should you have additional questions, please do not hesitate contacting the St. Louis Regional Office.

Sincerely,

Earl F. Holtgraewe

Earl F. Holtgraewe, P.E.
Regional Administrator
St. Louis Regional Office
Department of Natural Resources

EFH/HJW/BK/jk

CC: Central Office, Hazardous Waste Management Section
Central Office, Air Pollution Control Program

MISSOURI DEPARTMENT OF NATURAL RESOURCES
8460 Watson Road St. Louis, Missouri (314) 849-1313
Joseph P. Teasdale Governor
Fred A. Lafser Director
St. Louis Regional Office

MISSOURI DEPARTMENT OF NATURAL RESOURCES
8460 Watson Road St. Louis, Missouri 63119 (314) 849-1313

3.600 Warren County
Bob's Home Service, Incorporated
Special Industrial Waste
Disposal Facility

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Air Pollution Control Program
Bob's Home Service Landfill

RECEIVED
JUL 10 1980
SOLID WASTE
MANAGEMENT PROGRAM

July 3, 1980

Mr. and Mrs. Paul Toedebusch
Route 1, Box 127B
Wright City, Missouri 63390

Dear Mr. and Mrs. Toedebusch:

This is to acknowledge receipt of your letters addressed to Mr. Robert Robinson dated June 2nd and June 5th, 1980. Our investigation of your complaints can be summarized as follows:

On June 9, 1980, two staff members, namely Bob Kaatman with our Air Pollution Control Section and Howard Winburn with our Hazardous Waste Management Section visited the site to investigate recent odor complaints. At the time of the investigation, no odor was detected beyond the perimeter of the site.

However, Mr. Gill, the site manager, acknowledged that the last of the "Sturgeon Spill" waste had been disposed of in a trench on the site recently. Since that was to be the last shipment of this waste from said spill, odors associated with it should not be a problem in the future.

Mr. Gill was advised to apply more frequent soil cover under circumstances (e.g. when malodorous wastes are received, etc.) where the potential for odor problems is greatest.

Should you have additional questions, please do not hesitate contacting the St. Louis Office.

Sincerely,

Earl F. Holtgraewe

Earl F. Holtgraewe, P.E.
Regional Administrator
St. Louis Regional Office
Department of Natural Resources

EFH/HJW/BK/jk

CC: Central Office, Hazardous Waste Management Section
Central Office, Air Pollution Control Program

Joseph P. Teasdale Governor
Frederick A. Lafser Director
St. Louis Regional Office

Bob Home Service

July 24, 1980

Mr. John A. Eigel
Prosecuting Attorney
Warren County
117 West Main
Warrenton, MO 63383

Dear Mr. Eigel:

I am in receipt of your recent letter reminding me that I have failed to reply to your letter in April regarding the Bob's Home Service, Inc. Industrial Waste Disposal Facility. I apologize for having neglected to correspond with you following my visit to your office and visit to the landfill on April 28, 1980.

At the time of my visit to the site on April 28, 1980, I found the site to be in proper operation, and there was no odor problem. Representatives of the department, however, have conducted an investigation in early June, as a result of citizens' complaints regarding odor. That investigation, on June 9, 1980, did not find odors existing in violation of the state's odor regulations. Apparently, waste accepted the previous week from the Sturgeon, MO area, as a result of a railroad spill, was the reason for the odor complaints. The soil being excavated from within the City of Sturgeon does have a very detectable odor at a very low concentration. This detectable odor concentration is more than a thousand times less than the harmful concentrations in air. The odor problem is eliminated when the waste is covered in the landfill. We are advised that the clean-up problem at Sturgeon has been completed, and the disposal site should no longer be receiving any of the waste.

It is my opinion that Bob's Home Service, Inc. disposal area is not a public nuisance or health hazard. I would acknowledge that the department's reports have noted some relatively minor deficiencies, which do not necessarily indicate a violation of a specific regulation. Most of the recommendations relate to improvement of housekeeping and items related to employee safety, which are not a specific regulation reference. We have found the company to be reasonably responsive to complying with the department recommendations.

MISSOURI DEPARTMENT OF NATURAL RESOURCES
P.O. Box 1368 2010 Missouri Blvd. Jefferson City, Missouri 65102 (314) 751-3241

Joseph P. Teasdale Governor
Fred A. Lafser Director

Division of Environmental Quality
James P. Odendahl Director

If I can provide you with further information, please advise. Again, I apologize for the failure to respond at an earlier date.

Sincerely,

Robert M. Robinson, P.E.
Director
Solid Waste Management Program

RMR:pdi

WEST MAIN
WARRENTON, MISSOURI 63383

AREA CODE 314
456-3301

JOHN A. EIGEL
PROSECUTING ATTORNEY
WARREN COUNTY, MISSOURI

July 15, 1980

RECEIVED
JUL 18 1980
SOLID WASTE
MANAGEMENT PROGRAM

Mr. Robert M. Robinson, P.E.
Staff Director
Hazardous Waste Management Program
Missouri Department of Natural Resources
P.O. Box 1368
2010 Missouri Boulevard
Jefferson City, Missouri 65102

Dear Mr. Robinson:

In April you called at my office and stated that you would personally make an inspection of the hazardous waste site south of Wright City operated by Bob's Home Service, Inc. To this date I have not received a report from you concerning this inspection which you made.

Complaints have continued to come in from residents of the area stating that water has become contaminated, that the odors emanating from the waste site have become so bad that the residents have had to leave home or become ill. These conditions are not consistent with a proper operation of a waste site.

The reports which have been shown to me indicate that upon every inspection there have been deficiences cited in the operation of the site, and it has become such that we believe that is now a public nuisance and in violation of state law.

I am asking for a report from you as to your opinion concerning the operation of this site and unless I do hear within the next ten days I intend to file a suit asking the Court to enjoin this as a public nuisance and health hazard.

Kindly give this matter your immediate attention.

Very truly yours,

John A. Eigel

JAE:hp

MISSOURI DEPARTMENT OF NATURAL RESOURCES
P.O. Box 1368 2010 Missouri Blvd. Jefferson City, Missouri 65102 (314) 751-3241

MEMORANDUM

Date: December 12, 1979

To: Rick Roberts, P.E., Chief, Hazardous Waste Management Section

From: Robert Pappenfort, P.E., Environmental Eng., Hazardous Waste Mgt. Section

Subject: Proposed New Burial Method (Drums), Bob's Home Service, Inc. Wright City, Missouri

I have reviewed Mr. Murray's Memorandum Report dated November 1979, which was received December 3, 1979.

In general, the procedure could be accomplished although it is labor intensive and will severely limit the handling capacity of the site as did the drilled cell method. These are not my main concerns. I question the rationale of the design concept for this method.

Initially, Bob's Home Service, Inc. plans (May, 1977) were approved for a trench (cell) method. The trench method called for each layer of drums to be "covered with a 12-inch minimum daily cover" which is to "be tracked over by a tractor or otherwise tamped to densify cover material between and on top of the drums." Final cover would be 24 inches (two feet) in depth. Each trench was to be 18 feet deep. Assuming the drums are three feet in height, the trenches would hold four layers with three feet of intermittent soil cover and three feet of final cover for a total of six feet of soil per 18 feet vertical height protecting against vertical percolation of groundwater. Assuming one truck arrived at a time, the largest continuous cell would be 80 drums in one single layer. The cell side cover (one foot) prevents lateral migration between cells. The soil in the trench also reduces the amount of settling.

Next, the drilled cell method was proposed and approved in June 1978. This method permitted vertical cells up to 27 feet deep. This method provides <u>no</u> soil between layers of drums in the vertical direction. The one-two feet of soil between the three feet holes do however provide good segregation of the different wastes and prevented lateral migration of leachate from hole to hole. This method fails miserably (as we witnessed with the Cyanamid waste) when the three foot cap is not well compacted over the cell. The drilled cell method has proved ineffective when it comes to handling larger volumes of wastes. My main concern about the drilled cell method is that these cells will fill with water in a few years, and this promotes the decomposition of the drums, additional settling, and migration of the waste materials.

As an example, consider the piezometer wells (miniature drilled cells). In March, 1977, 16 three-inch piezometer holes were drilled to a depth of 35 feet and backfilled with sand. Fourteen of these holes were <u>dry.</u> "None of the piezometer holes encountered any material groundwater table nor did they encounter any perched table." The following is a history of the water levels found in these holes.

Well	11/16/77	6/14/78	12/5/78	7/17/79	10/1/79
[illegible]	mud	mud	dry	mud	0.4
[illegible]	dry	dry	dry	dry	0.65
3	dry	mud	wet	dry	0.4
4	dry	wet	2.3'	1.2'	1.8'
5	15.2'	31.1'	20.5'	29.3'	23.2'
6	23'	30'	26.5'	29.5'	24.8'
7	15'	30'	21.4'	28.8'	28.1'
8	14'	18'	14.6'	16.8'	13.5'
9	15'	21'	13.9'	15.9'	15.0'
10	28'	29'	28.2'	29.9'	27.6'
11	16'	18'	17'	20.2'	18.8'
12	dry	wet	1.7'	3.9'	4.0'
13	30'	25'	34.6'	30'	26.2'
14	dry	wet	1'	1.2'	1.0'
15	3'	wet	wet	2.5'	0.6'
16	dry	dry	dry	0.2'	.03'

Several factors do affect the water levels in these holes, but the fact is, of the 16 dry holes drilled in early 1977, eight of these wells continually have more than ten feet of water in them and five of these continually have more than 20 feet of water in them despite the fact they are bailed every three months. A similar phenomena would also occur and is occurring in the three feet cells' annular space with the amount of water varying from hole to hole.

The new proposed cell method will use a cell 14 feet wide by 23 feet long by 26 feet deep holding eight layers of 40 drums or 320 drums in each cell. This is equivalent to 40 drilled cells (three feet) spaced right next to each other with no separation of wastes horizontal. Granular material is placed between the layers so, in fact, there is no containment vertically. The pit will gradually fill with water. The only deterrent would be the two feet of final cover which is insufficient. With no soil in the cell, wastes could easily be mixed. When wastes are allowed to come in contact there are too many unknown to consider. Although the wastes are separated into acid, alkaline, organic, and flammable categories, this doesn't necessarily mean that adverse reaction could not happen between one or more alkaline or one or more organic wastes.

Conclusion

The proposed cell method offers a less environmentally safe method of disposal than the approved trench method or the approved drilled cell method because of lack of vertical and/or horizontal containment using soil. The dug pits, due to size and construction, will enhance groundwater infiltration, mixing of wastes, while providing little as far as increased ability to

handle larger volumes of drummed wastes.

It is recommended that Bob's Home Service, Inc. discontinue this approach and revert back to a trench burial as approved in 1977 with smaller trenches or better yet a progressive trench burial method. Either of these methods can provide cells with compacted soil on the top and sides of each cell.

RWP:vw

DEAR SIR; I AM WRITING IN REGARDS TO THE HAZARDOUS WASTE SITUATION HERE IN MISSOURI. I WAS EMPLOYED FOR A TIME AT THE BOB'S HOME SERVICE AND J. Z. LANDFILL WASTE DISPOSAL ~~ST~~ SITES IN WRIGHT CITY, MISSOURI. I PERSONALLY SAW VARIOUS CHEMICALS BEING DUMPED FROM THEIR CONTAINERS RIGHT INTO THE GROUND NUMEROUS TIMES. THESE CONTAINERS WERE DAMAGED DURING THE 'BURIAL' PROCEDURE. I ALSO SAW NUMEROUS THINGS RELATED TO THE SAFETY OF THE WORKERS BEING VIOLATED. THE WEARING OF GOGLES, MASKS AND ETC. WERE NOT ENFORCED. THE COMPANY AS SUCH ACTS LIKE THEY DO NOT CARE FOR THE WELL BEING OF THE EMPLOYEES. THERE WERE TIMES I, AND SOME OF THE OTHER EMPLOYEES WERE TOLD TO GO AND WORK WITH UNSAFE EQUIPMENT ANYWAY.

THANK YOU FOR YOUR TIME. AND FOR READING THIS.

RECEIVED
SEP 19 1980
SOLID WASTE
MANAGEMENT PROGRAM

ATTACHMENT 2: MDNR WASTE DISPOSAL AUTHORIZATIONS FOR BHS.

MDNR Approval Number	Type of Waste Either O, B, R, S	Company	Waste Description
0001	B	Monsanto, St. Peters, Mo.	Filter Cake Sludge
0002	S	Western Litho Plate, St. Louis, Mo.	Silica Sand
0003	O	Ford Motor Co. Hazelwood, Mo.	Paint Sludge
0004	S	Conservation Chem. St. Louis, Mo.	Metal Hydroxide Sludge
0005	O,B, R, S	Mallinckrodt, Inc. St. Louis, Mo.	35 drums Pkgd. Chemicals
0006	O	Smith Overall St. Louis, Mo.	Dry cleaning Sludge
0007		Petrolite	Site Area Cleanup
0008	B	Ramsey Corp. Sullivan, Mo.	Barium Chromate Sludge
0009	O	Chevron Chemical Maryland Heights	Pesticides
0010	B	Mallinckrodt, Inc. St. Louis, Mo.	Potassium Sulfite
0011	R	Mallinckrodt, Inc.	TX Acid
0012	R	Mallinckrodt, Inc.	Thionyl Chloride
0013	R, S	Mallinckrodt, Inc.	Ammonium Persulfate
0014	Deferred	Mallinckrodt, Inc.	Phenols & Zinc Oxides
0015	Denied	Mallinckrodt, Inc.	Phenols
0016	O	Mallinckrodt, Inc.	Resorchinol
0017	R	Mallinckrodt, Inc.	Phosphorus Oxychloride
0018	O	GMC, St. Louis, Mo.	Paint Sludge
0019	B	Lever Bros.	Sodium Silicate

MDNR Approval Number	Type of Waste either O, B, R, S	Company	Waste Description
0020	R	McDonnell Douglas Corp. St. Louis, Mo.	Empty Acid Drums
0021	B	Mallinckrodt, Inc. St. Louis, Mo.	Pottassium Metabisulfite
0022	O	Jackes-Evans Mfg. Co. St. Louis, Mo.	Dry Paint Sludge
0023	B	Brown Shoe Co. St. Louis, Mo.	Latex suspension
0024	R	Monsanto Co. Augusta, Ga.	Arsenic Trisulfide
0025	Denied	Chevron	
0026	O	Electro Motive Division Hazelwood, Mo.	Oil Separator Sludge
0027	O	Sigma Chemical Co. St. Louis, Mo.	Waste Packaging 1% misc. carcinogens
0028	O	Chevron U.S.A. Maplewood	Mixed Asphalt Waste
0029	B	Westinghouse Elec. St. Louis, Mo.	Silver Cyanide Bath
0030	O	Westinghouse Elec. St. Louis, Mo.	Phosphatizing Solution
0031	B	Westinghouse Elec. St. Louis, Mo.	Caustic Stripping Solution
0032	O	Westinghouse Elec. St. Louis, Mo.	Mixed Solvents Paint Res.
0033	O	American Cyanamid Co. Hannibal, Mo.	Water Treatment Chem.
0034	O	American Cyanamid Co.	Insecticides
0035	O	American Cyanamid Co.	DETA
0036	O	American Cyanamid Co.	Chloroform

MDNR Approval Number	Type of Waste Either O, B, R, S	Company	Waste Description
0037	R	American Cyanamid Co. Hannibal, Mo.	HCL Solution
0038	S	American Cyanamid Co.	Phosphorus Pentasulfide
0039	O	American Cyanamid Co.	DETA Filter Cake
0040	O	W. U. Conference Center Grubville, Mo.	Insecticide/Herbicide
0041	O	Clayton Chemical Co. Sauget, Ill.	Bottom Sludge Sol.
0042	O	Tretolite Division St. Louis, Mo.	Organic Chem. Waste
0043	O	Tretolite Division	Kerosene saturated filter
0044	O	Tretolite Division	Solvents
0045	O	Chevron Chemical Co. Maryland Hghts.	Arsenic Trioxide
0046	O	Chevron Chemical Co.	Organic Phosphates
0047	O	Chevron Chemical Co.	Fertilizer in Liq. Sol.
0048	O	Scientific Inc. Scotch Plains, N. J.	Empty RH787 Drums
0049	O	Scientific Inc.	Gloves/clothing
0050	O	Scientific Inc.	Solvent
0051	O	Scientific Inc.	Filter Cake Sludge
0052	R	Scientific Products Maryland Heights, Mo.	H_2SO_4 & HCl
0053	B	Scientific Products	Basic Solutions
0054	R	Scientific Products	Bottles of Acid Reagents
0055	O	Scientific Products	Organic Reagents
0056	B	Scientific Products	Chemical Reagents

MDNR Approval Number	Type of Waste Either O, B, R, S	Company	Waste Description
0057	B	Scientific Products Maryland Heights, Mo.	Ammon-Hyro. & Potassium Cyan.
0058	B	Scientific Products	Aniline
0059	R	Scientific Products	Perchloric Acid
0060	R	Scientific Products	Nitric Acid
0061	O	Scientific Products	Hexane Diamine/ Acetic Acid
0062		Midwest Refining	Oil Sludge
0063	O	Petrolite Corp. Tretolite Div. St. Louis, Mo.	Poly. Alkanol Amine
0064	O	National Vendors	Solid Paint
0065	Deferred	Findett St. Charles, Mo.	Waste Liquid Hydro-Carbon
0066	Deferred	Findett St. Charles, Mo.	Polymeric Still Residue
0067	O	General Motor Assn. St. Louis, Mo.	Solid waste contam. with PCB
0068	O	Findett St. Charles, Mo.	P.C.B. Dirt & Hyd. Fluid
0069	R	Monsanto Luling, La.	Arsenic trisulfide
0070	Denied	American Can	Paint Solvents
0071	O	Int'l Clinical Lab. St. Louis, Mo.	Solvents
0072	Denied	McConnell Douglas	Paint Sludge
0073	S	Scientific Products Maryland Heights, Mo.	Flammable Chemical reagents

MDNR Approval Number	Type of Waste Either O, B, R, S	Company	Waste Description
0074	S	Scientific Products Maryland Heights, Mo.	Sodium Methoxide in 25% Methanol
0075	O	Rohm & Haas Philadelphia, PA.	Pesticide wastes
0076	Denied	Chevron Chem. Co.	Waste Pesticide
0077	O	Cape Chemical Co. Cape Giradeau, Mo.	Insecticide/fungicide
0078	O	Cape Chemical Co.	Bar Sprout
0079	O	Cape Chemical Co.	Insecticide & base oils
0080	O	Cape Chemical Co.	Toxaphene, DDT & Residual spray
0081	O	Cape Chemical Co.	Dairy spray & fly spray
0082	O	Cape Chemical Co.	Horn Fly Oil
0083	O	Cape Chemical Co.	Toxaphene 6 EH
0084	O	Cape Chemical Co.	Powdered pesticide waste
0085	O	Cape Chemical Co.	Lindane and powdered pestacide
0086	O	Cape Chemical Co.	Pesticide waste Captan & red motar dye
0087	Deferred	Westinghouse Elec. Jefferson City, Mo.	Alkaline liquid
0088	Deferred	Westinghouse Elec.	Acid waste
0089	O	Westinghouse Elec.	Cresylic acid wash
0090	O	Westinghouse Elec.	Insul-Mastic 553 Type D asphalt coat.
0091	O	Westinghouse Elec.	Polyvinyl butyral
0092	O	Westinghouse Elec.	Black airdrying enamel
0093	S	Westinghouse Elec.	Mixed Peroxides

MDNR Approval Number	Type of Waste Either O, B, R, S	Company	Waste Description
0094	O	Westinghouse Elec. Jefferson City, Mo.	Epoxy B-281
0095	S	E. I. DuPont Moberly, Mo.	Still bottom residue cont. solvents
0096	O	Riverside Chemical Co.	Dust collector tailings cont. Thimet
0097	Denied	Modine Mfg. Co.	Wastewater treatment sludge
0098	Deferred	A. H. Schwab Co.	paint wastes
0099	Denied	King Adhesive Corp.	mixed solvents resins, rubber
0100		Sikeston Light & Water Co.	dirt from PCB clean up
0101	Deferred	F.M.C. West Virgina	spent aluminum cat.
0102	S	F.M.C. Corp. Baltimore, Md.	Sodium Bromide Sludge
0103	Denied	St. Charles Furn. Co.	solvent waste
0104	Denied	Lianco Container Corp.	high content solv.
0105	Denied	Ralston Purina Co.	pesticide flush waste
0106	Denied	Inmont Corp. Charlotte, N.C.	caustic wash waste
0107	Denied	Inmont Corp.	paint sludge wash
0108	Denied	Borg-Warner Corp. Washington, Mo.	caustic soda & water
0109	Deferred	Borg-Warner Corp.	Dutone Dc-1
0110	Deferred	Borg-Warner Corp.	Dutone Dc-1

MDNR Approval Number	Type of Waste Either O, B, R, S	Company	Waste Description
0111	Denied	Borg-Warner Corp. Washington, Mo.	Actran, Phos. Grip TL
0112	Denied	Borg-Warner Corp.	Actran, Phos. Grip TL
0113	Denied	Borg-Warner Corp.	caustic soda & water
0114	Denied	Borg-Warner Corp.	Chromic acid flakes
0115	Deferred	Borg-Warner Corp.	Oakite A-2 & M-3
0116	Denied	Borg-Warner Corp.	Nitric acid
0117	Denied	Borg-Warner Corp.	caustic soda & water
0118	Denied	Borg-Warner Corp.	Chromic acid flakes
0119	Denied	Borg-Warner Corp.	Concent. Sulphuric acid
0120	Deferred	Borg-Warner Corp.	Dutone DC-1
0121	Denied	Borg-Warner Corp.	Actran Phos Grip TL
0122	Denied	Borg-Warner Corp.	Actran Phos Grip TL
0123	B	Borg-Warner Corp.	sodium metabisulfite
0124	Deferred	Borg-Warner Corp.	Oakite A-2 & M-3
0125	Deferred	Borg-Warner Corp.	Du-Cleaner
0126	Deferred	Borg-Warner Corp.	Oakite A-2 & M-3
0127	Denied	Borg-Warner Corp. Washington, Mo.	caustic soda & water
0128	Denied	FMC Corp. Baltimore, Md.	waste copper sludge
0129	Deferred	Crown Zellerbach	printing ink sludge
0130	Denied	American Can Co.	paint sludge, waste thinners
0131	Denied	Lanson Chemical	alkyd waste

MDNR Approval Number	Type of Waste Either O, B, R, S	Company	Waste Description
0132	S	Mississippi County Administration	calcium arsenate pestacide
0133	Denied	P.P.G. Industries	sprout nip herbicide
0134	Denied	P.P.G. Industries	butyl chloroformates
0135	B	St. Louis County Hosp. Pharmacy	Mercuric cyanide Mercury Bichloride
0136	S	Jewish Hospital St. Louis, Mo.	Benzene
0137	R	Jewish Hospital	Hydrochloric, Sulfuric and Nitric Acid
0138	S	Jewish Hospital	Propylene Oxide
0139	R	Jewish Hospital	Formic Acid
0140	R	Jewish Hospital	Perchloric Acid
0141	S	Jewish Hospital	Pyridine
0142	S	Jewish Hospital	Butanol
0143	O	Jewish Hospital	2-Mercaptoethanol
0144	O	Scientific, Inc. Scotch Plains, N.J.	FH787 rat poison
0145	O	Scientific, Inc.	Filter cake sludge with RH787
0146	Deferred	Scientific, Inc.	Skelly Solve solvent and DMF
0147	O	Scientific, Inc.	Miscellaneous material contamin. with RH787
0148	O	Jewish Hospital St. Louis, Mo.	Dodecenyl Succine Anhydride
0149	O	Jewish Hospital	Nadil Methyl Anhydride

MDNR Approval Number	Type of Waste Either O, B, R, S	Company	Waste Description
0150	Denied	K. J. Quinn & Co. Bridgeton, Mo.	Acetone, laquer thinners
0151	B	Rohm & Haas Co. Deer Park, Texas	Dikar fungicide
0152	S	American Cyanamid Hannibal, Mo.	Lab solvents
0153	S	American Cyanamid	Prowl 4E filter Cake
0154	Deferred	American Cyanamid	Acetone and Robenze
0155	Deferred	P. D. George Co. St. Louis, Mo.	Polymers, solvents varnish sludge
0156	Denied	Carboline Co. Brentwood, Mo.	Organic Solvents
0157	Denied	Valtec, Inc.	solvents, oil
0158	Deferred	Laclede Steel Co.	Capacitors w/PCB
0159	S	Mallinckrodt, Inc. St. Louis, Mo.	Xanthane Press Cake
0160	F	Clayton Chemical Sauget, Ill.	solvent recovery still bottom
0161	Denied	Martin Marietta Chem. Charlotte, N. C.	Hexachlorobenzene
0162	Deferred	St. Regis Paper Ofallon, Mo.	analine ink/dowanalee
0163	S	Inmont Corp. Charlotte, N. C.	Clear finish gone bad
0164	S	Ashland Chemical Valley Park, Mo.	Solvents and Resins
0165	O	Ashland Chemical	Arolon 585 water-resin
0166	S	Ashland Chemical	7280 Polyester

MDNR Approval Number	Type of Waste Either O, B, R, S	Company	Waste Description
0167	O	Great Lakes Carbon. St. Louis, Mo.	absorbant pads
0168	O	Kellwood Co. New Haven, Mo.	wax, solvents
0169	D	Brown Shoe Co. St. Louis, Mo.	laboratory solvents
0170	O	Borden Chem. Co. Ink Div., St. Louis	waste ink, oil
0171	Denied	Allied Chem. Moundsville, W.V.	Still bottoms
0172	B	Greif Bros. St. Louis, Mo.	sodium silicate
0173			
0174	Denied	St. Joe Zinc Co. Monaco, Penn.	coke mercury
0175	Denied	St. Joe Zinc Co.	Mistcottrell
0176	Denied	Findett Serv. St. Charles, Mo.	water, ester rags, empty dms.
0177	B	Vactec, Inc. St. Louis, Mo.	lime neutralized acid waste
0178	Denied	F.M.C. Corp. Baltimore, Md.	Pyrethrum Residue
0179			
0180	S	A & B Nursery O'Fallon, Mo.	lead arsenate
0181	B	Solid States Cir. Springfield, Mo.	Wastewater sludge
0182	Deferred	KOI Pet. Co. Hamilton, Ohio	paint pigments
0183	Denied	KOI Petroleum Hamilton, Ohio	empty drums containing DETA

MDNR Approval Number	Type of Waste Either O, B, R, S	Company	Waste Description
0184	B	Mobay Chem. Co. Kansas City, Mo.	manganese dioxide filter cake
0185	B	Mobay Chem. Co.	wastewater sludge
0186	O	Mobay Chem. Co. Kansas City, Mo.	trash Cont. with pesticide
0187	O	Mobay Chem. Co. Kansas City, Mo.	organo-phosphate pesticide
0188	B	Mobay Chem. Co.	sulfur residue
0189	O	Chemagro Kansas City, Mo.	Waste Phenols
0190	R	Monsanto Carondolet St. Louis, Mo.	White Phosphorus
0191	B	Monsanto Carondelet St. Louis, Mo.	asbestos wastes
0192	B	FMC Corp. Cedar Rapids, Ia.	sludge w/heavy metals
0193	Denied	Watlow Elec. St. Louis, Mo.	ferric chloride
0194	Denied	Pan American Inc. St. Louis, Mo.	adhesive-solvent
0195	F	Ashland Chem. Co. Valley Park, Mo.	alkyd and polyester resins
0196	Denied	W-K-M Wellhead Sys. Shreveport, La.	Spent Syncarb31
0197	B	Litton Industries Springfield, Mo.	Wastewater treat. sludge
0198	Denied	Puritan Equipment Lenexa, Kan.	Oxidizers
0199	O	Inmont Corp. St. Louis, Mo.	trash cont. /oil
0200	O	U.S.D.A.Midwestern Lab. St. Louis, Mo.	Pesticide

MDNR Approval Number	Type of Waste Either O, B, R, S	Company	Waste Description
0201	Approved	Monsanto Co. St. Louis, Mo.	Lime Grits
0202	Deferred	McDonnell-Douglas St. Louis, Mo.	brine sludge
0203	O	McDonnell-Douglas St. Louis, Mo.	paint sludge
BHS0204	Denied	Don V. Davis Co.	caustic wash
BHS0205	B	Hitchiner Mfg. O'Fallon, Mo.	Virgo Salt
BHS0206	Approved Various	Jewish Hosp. St. Louis, Mo.	lab chemicals
BHS0207	Deferred	Diamond Shamrock Belle, W. F.	tank sludge
BHS0208	Approved Various	Monsanto Research St. Louis, Mo.	lab chemical
BHS0209	Approved Various	Midwest Research Kansas City, Mo.	lab chemicals
BHS0210	B	U.S. Steel Prod. Fenton, Mo.	de-watered ind. wastewater
BHS0211	B	Olin Water Serv. Kansas City, Kan.	sodium poly phosph
BHS0212	5	Whiteman A/F Whiteman, Mo.	power line filters
BHS0213	Partially Approved	Kellwood Co. New Haven, Mo.	Lab chemicals
BHS0214	Deferred	Veterans Hosp. St. Louis, Mo.	lab chemicals
BHS0215	Denied	Litton UHS Florence, Kentucky	paint sludge
BHS0216	Denied	Inmont Corp. St. Louis, Mo.	lab chem.

MDNR Approval Number	Type of Waste Either O, B, R, S	Company	Waste Description
BHS0217	R	Monsanto Soda Springs, Idaho	White P os.
BHS0218	B	Monsanto, Carondelet St. Louis, Mo.	dry lime paper
BHS0219	O B	Hussman Refrigerator Bridgeton, Mo.	paint sludge
BHS0220	B	Square D Columbia, Mo.	wastewater sludge
BHS0221	B	Square D Lincoln, Nebraska	wastewater sludge
BHS0222	B	Alcolac, Inc. Sedalia, Mo.	empty lead oxide bags
BHS0223	S	Chemetron St. Louis, Mo.	magnesium powder
BHS0224	Denied	Ralston Purina St. Louis, Mo.	PBB wastes
BHS0225	Deferred	Ralston Purina St. Louis, Mo.	Lab Chemicals
BHS0226	O	Findett Corp. St. Charles, Mo.	filter cakes & still residue
BHS0227	5	Tradco Washington, Mo.	titanium dioxide
BHS0228	Denied	Hopkins Chem. Co. Atlanta, Ill.	insecticide waste
BHS0229	B	Square D Co. Cedar Rapids, Iowa	wastewater treat sludge
BHS0230	Denied	Seymour Recycling Seymour, Ind.	organic residue
BHS0231	Denied	Mobil Chem, Co. Charleston, S.D.	acid-arsenic sulfide filter cake
BHS0232	Denied	Mobil Chemical Co. Fernald, Ohio	acid-arsenic sulfide filter cake

MDNR Approval Number	Type of Waste Either O, B, R, S	Company	Waste Description
BHS0233	#5	React St. Louis, Mo.	rock wood insul.
BHS0234	O	American Cyanamid Hannibal, Mo.	incinerator ash
BHS0235	O	Monsanto (Queeney) St. Louis, Mo.	soil contaminated choroanilines
BHS0236		Modine Mfg. Co. Trenton, Mo.	sludge wastewater treatment
BHS0237	Deferred	National Wastes Oil Chattanooga, Tenn.	waste cleanup
BHS0238			
BHS0239	S	I.B.M. Armonk, N.Y.	Cathode tubes
BHS0240	O (Partial only)	Spencer Kellog Valley Park, Mo. (formerly Ashland)	solvents & resins
BHS0241	Denied	Riverside Chem. Pine Bluff, Ark.	Endrin pesticide
BHS0242	Denied	Modine Mfg. Co. Paducah, Ky.	sludge wastewater treatment
BHS0243	B	Consolidated Freightways St. Louis, Mo.	Lithium Hydroxide
BHS0244	B	Vicksburg Chem. Vicksburg, Miss.	liner bags cont. cyanuric chloride
BHS0245	Deferred	Compo Chemical Co. Mansfield, Mass.	waste adhesive
BHS0246	#5	McQuay Norris St. Louis, Mo.	machining sludge
BHS0247	R	Emerson Elec. Ava, Missouri	varnish stripper
BHS0248	O	Western Environmental Sturgeon Spill	chlorinated phenols

MDNR Approval Number	Type of Waste Either O, B, R, S	Company	Waste Description
BHS0249	S	Falcon Products St. Louis, Mo.	nitro-cellulose
BHS0250	B	Timex Little Rock, Ark.	waste treat. sludge
BHS0251	F	Emerson Elec. Springfield, Mo.	varnish & stripper
BHS0252	B	General Electric Springfield, Mo.	sludge cake
BHS0253	O	Ramsey Corp. Sullivan, Mo.	oily sludges
BHS0254	O	A.C.F. Industries St. Charles, Mo.	paint bottoms
BHS0255	B	Superior Electric Cape Girardeau, Mo.	Sludge
BHS0256	O	Findett St. Charles, Mo.	cube root
BHS0257	O	Associated Equip. St. Louis, Mo.	methylene chloride
0258	O	Bliss Oil Co. Frontenac, Mo.	sludge
0259	O	A B Dick St. Louis, Mo.	waste ink
0260	B	Monsanto St. Peters, Mo.	gallium arsenide
0261	Deferred S Partial Approval	Olin Brass Alton, Illinois	baghouse dust
0262	" S	Olin Brass Alton, Illinois	Waste water treatment sludge
0263	" S	Olin Brass E. Alton, Ill.	Waste water treatment sludge
0264	Deferred	Waterlood Ind. Sedalia, Mo.	paint sludge

MDNR Approval Number	Type of Waste Either O, B, R, S	Company	Waste Description
0266	O	Jackes-Evans St. Louis, Mo.	paint sludge
0267	O	Ramsey Corp. Sullivan, Mo.	stop off wax
0268	Denied	Ryckman's St. Louis, Mo.	gasoline residue
0269	Deferred	University of Mo. Columbia, Mo.	lab chemicals
0270	R	Dept. of Nat.Resources Jefferson City, Mo.	lab wastes
0271	O	United Petroleum St. Louis, Mo.	tank sediment
0272	Deferred	U. S. Reduction Alton, Illinois	aluminum dross slag
BHS0273	O	American Can Co. Warrenton, Mo.	paint sludge
0274	B	Jackes-Evans Mfg. St. Louis, Mo.	phosphate sludge
0275	R	Monsanto Corp. (Carondelet) St. Louis, Mo.	Phos. Acid
0276	O	Monsanto Queeny St. Louis, Mo.	contaminated soil
0277	#8	United States E.P.A. Houston, Mo. (Spill Cleanup)	oil w/pentachlorophenol
0278	#5	McGraw Edison Boonville, Mo.	wastewater sludge
0279	O	Modine Mfg. Paducah, Kentucky	asphalt paint sludge
0280	B	Western Environmental Chesterfield, Mo.	zinc treatment sludge
0281	B	Eaton Corporation West Plains, Mo.	temperature elements

MDNR Approval Number	Type of Waste Either O, B, R, S	Company	Waste Description
0282	#5	React St. Louis, Mo.	asbestos
0283	Various	Ralston Purina St. Louis, Mo.	lab chemicals
0284	O	Union Carbide St. Louis, Mo.	pesticide dusts
0285	Denied	G A F Corp. St. Louis, Mo.	polyolisocyante
0286	B	Mo. Dept. of Conservation Jefferson City, Mo.	sludge w/heavy metal
0287	O	Monsanto Corp. (Queeney) St. Louis, Mo.	dirt cont. Nitrochlorobenzene
0288	B	React St. Louis, Mo.	arsenic trioxide soil
0289	O	American Can Co. Pevely, Mo.	waste water sludge
0290	Denied	General Electric Springfield, Mo.	old ink and solvents
0291	B	Mallinckrodt, Inc. St. Louis, Mo.	Mercurial Truf Fungicide
0292	Deferred	American Can Co. St. Louis, Mo.	waterbase paint sludge
0293	O	Heun/Norwood Lab. St. Louis, Mo.	Methapryilene HCL
0294	#5	Kozeny-Wagner, Inc. Arnold, Mo.	asbestos pipe insul.
0295	R	Litton Industries Springfield, Mo.	acid pit sludge
0296	O	American Hospital Supply St. Louis, Mo.	Viro-Tec
0297	O B	Clinton Middle School Clinton, Mo.	Lab Chemicals
0298	B	TWA Kansas City, Mo.	wastewater sludge

MDNR Approval Number	Type of Waste Either O, B, R, S	Company	Waste Description
0299	#5	Monsanto St. Peters, Mo.	Cont. ducting
0300	0 #5	Rhone-Poulance St. Joseph, Mo.	Ferbam
0301	B	Ramsey Corp. Sullivan, Mo.	lead sludge
0302	Various	Washington U. St. Louis, Mo.	lab chemicals
0303	0	Bluline Lab St. Louis, Mo.	Metapyralene HCL
0304	0	Chevron Chem. Fort Madison, Iowa	granules
0305	Denied	Chevron Chem.	baghouse dust
0306	Denied	Chevron Chem.	Di-syston
BHS0307	0	Mead Containers St. Joseph, Mo.	inke waste
BHS0308	Various	Western Litho Plate St. Louis, Mo.	lab chemicals
BHS0309	R	Chemtech Industries St. Louis, Mo.	(formerly hydrofluoric acid) empty drums
BHS0310	B	Great Lakes Container St. Louis, Mo.	baghouse dust
BHS0311	0	O'Neal, Jones, Feldman Maryland Heights, Mo.	cough syrup
BHS0312	5	Norris & Son St. Joseph, Mo.	contaminated soil
BHS0313	5	Kozeny-Wager Arnold, Mo.	asbestos insulation
BHS0314	0	McGraw Edison Co. Moberly, Mo.	paint residue
BHS0315	5	Mallinckrodt St. Louis, Mo.	cont. equipment

MDNR Approval Number	Type of Waste Either O, B, R, S	Company	Waste Description
BHS0316	Denied	Chevron Chemical Ft. Madison, Iowa	baghouse dust
BHS0317	O	Western Environmental St. Louis, Mo.	paint waste
BHS0318	O	Syntex Des Moines, Iowa	lab standards
BHS0319	O	Bomiseco Labs Springfield, Mo.	methylpyrilene capsules
BHS0320	P	ACF Industries E. St. Louis, Ill.	fixed sludge
BHS0321	O	Missouri U. Columbia, Mo.	pesticides
BHS0322	O	Northfolk and Western Sturgeon spill Site	contaminated soil
BHS0323	O	American Can Company St. Louis, Mo.	paint sludge
BHS0324	S	St. Charles Fire Dept. St. Charles, Mo.	Sodium Arsenite
BHS0325	O	Mallinckrodt, Inc. St. Louis, Mo.	Biological waste
BHS0326	S	Monsanto Carondelet Plant St. Louis, Mo.	contaminated dirt
BHS0327	O	Harrison & Hedgecock Edina, Missouri	recalled pesticides
BHS0328	Denied	Eagle-Pitcher Quapaw, Oklahoma	scrap metal
BHS0329	O	Rexall Drug Co. St. Louis, Mo.	Methapyrilene
BHS0330	O	TWA Kansas City, Mo.	engine cleaning sludge
BHS0331	B	Wire Hope Corp. St. Joseph, Mo.	iron phosphate sludge

MDNR Approval Number	Type of Waste Either O, B, R, S	Company	Waste Description
BHS0332			
BHS0333	O 5	McDonnell Douglas St. Louis, Mo.	cont. trash
BHS0334	Various	Fabpak, Inc. St. Louis, Mo.	cont. glass fibers
BHS0335	B	Olin Brass Corp. East Alton, Ill.	MRF Sump Sludge
BHS0336	B	Wire Rope Corporation St. Joseph, Mo.	ferric hydroxide sludge
BHD0337			
BHS0338	B	Mountain View Fabricating Mountain View, Mo.	Chromate plating waste
BHS0339	B	P.M.S. Consolidated St. Peters, Mo.	contaminated containers
BHS0340	B	Union Carbide Corp. Maryville, Mo.	dry cell battery
BHS0341	B	Union Carbide Corp Maryville, Mo.	complete cell scrap
BHS0342	Deferred	Findett Corp. St. Charles, Mo.	cont. dirt
BHS0343			
BHS0344	O	W. R. Sweeney Mfg. Salisbury, Mo.	mold pesticide waste
BHS0345	O	Continental Forest St. Louis, Mo.	paint sludge
BHS0346	O	Modine Mfg. Co. Trenton, Mo.	paint sludge
BHS0347	O	Intertherm, Inc. St. Louis, Mo.	paint overspray

MDNR Approval Number	Type of Waste Either O, B, R, S	Company	Waste Description
BHS0348	B	Intertherm, Inc. St. Louis, Mo.	Caustic stripper sludge
BHS0349	O	Intertherm, Inc.	paint overspray
BHS0350	B	Intertherm, Inc.	caustic stripper sludge
BHS0351	O	Intertherm, Inc.	metal treatment sludge
BHS0352	O	Intertherm, Inc.	paint overspray
BHS0353	B	Rival Mfg. Co. Sedalia, Mo.	sludge wastewater treat.
BHS0354	B	Kozeny-Wagner Arnold, Missouri	asbestos insulation
BHS0355	O	Ludlow Corp. Cape Girardeau, Mo.	contaminated bags
BHS0356	Deferred	M & R Plating Washington, Mo.	wastewater sludge
BHS0357	O	Olin Corp. East Alton, Ill.	scrap grounds incinerator residue
BHS0358	O	Olin Corp. East Alton, Ill.	bullet cleaning shot tower cobmeal
BHS0359	Deferred	Olin Corp	brass casting ref.
BHS0360	B	Olin Corp. East Alton, Ill.	brass casting cooling sludge
BHS0361	O	Olin Corp.	cobmeal Bldg. 33
BHS0362	B	Olin Corp.	sump sludge
BHS0363	O	Ortho Chevron Chemical Maryland Heights, Mo.	cont. trash
BHS0364	O R	Ortho Chevron Chem. Maryland Heights, Mo.	filteration of liquid fertilizer
BHS0365	B	Dickie Construction St. Louis, Mo.	asbestos

MDNR Approval Number	Type of Waste Either O, B, R, S	Company	Waste Description
BHS0366	R	Mobay Chemical Kansas City, Mo.	incineration salts
BHS0367	O	Griffin Corp. Mexico, Mo.	cont. plastic jugs (in plastic)
BHS0368	B	Ramsey Corp. Sullivan, Mo.	Sludge Waste water treatment
BHS0369	B	Monsanto Queeney St. Louis, Mo.	sludge - neutralization basin
BHS0370	O	Findett St. Charles, Mo.	Naph. rich forefraction
BHS0371	O	G. S. Guth Lighting St. Louis, Mo.	paint sludge
BHS0372	B	Cosmoflex, Inc. Hannibal, Mo.	dibasic lead sterate dust
BHS0373	B	Amax Zinc Co. Sauget, Ill.	waste water sludge
BHS0374	O	National Vendors Barnhart, Mo.	paint sludge
BHS0375	O	Rhone Poulance, Inc. St. Joseph, Mo.	contaminated bags, etc.
BHS0376	B	Loxcreen Co. Hayti, Missouri	wastewater sludge
BHS0377	O	General Electric Co. Mount Vernon, IN.	blender pigment
BHS0378	O	General Electric Co. Mount Vernon, IN.	contaminated filter cartridges
BHS0379	O	General Electric Co. Mount Vernon, IN.	dust-collector dust
BHS0380	O	General Electric Co.	contaminated insulation
BHS0381			
BHS0382	B	U.S.Dept. of Interior St. Louis, Mo.	asbestos

MDNR Approval Number	Type of Waste Either O, B, R, S	Company	Waste Description
BHS0383	B	Wm. R. Montgomery & Associates, Inc., St. Louis, Mo.	asbestos insulation
BHS0384	R	Intertherm, Inc. Boonville, Mo.	cold stripper solid
BHS0385	O	General Electric Co. Mount Vernon, IN.	lab waste
BHS0386	B	Kelsey Hayes Corp. Sedalia, Mo.	contaminated soil
BHS0387	O	Monsanto Chemical (Queeney) St. Louis, Mo.	cont. dirt
BHS0388	Various	Emergency Response Unit D.N.R. Jefferson City, Mo.	lab chemicals
BHS0389	B	McConnel Douglas St. Louis, Mo.	asbestos wall mat.
BHS0390	B	Gould, Inc. St. Louis, Mo.	Baghouse dust
BHS0391			
BHS0392	B	Spirtas Wrecking Co. St. Louis, Mo.	asbestos insulation
BHS0393	B	Intertherm, Inc. St. Louis, Mo.	cold stripper solids
BHS0394	B	Ramsey Corp. sullivan, Mo.	wastewater sludge
BHS0395	R	Buckman Labs Cadet, Mo.	filter media
BHS0396	O	Buckman Lab, Inc. Cadet, Mo.	filter media for organic materials
BHS0397	R	Rival Mfg. Co. Sweet Springs, Mo.	powder paint residue
BHS0398	B	Hercules Incorporated Louisiana, Mo.	residue from ammonia plant

MDNR Approval Number	Type of Waste Either O, B, R, S	Company	Waste Description
BHS0399	B	General Electric Co. Mt. Vernon, IN.	Asbestos cake
BHS0400	O	General Electric Co. Mt. Vernon, IN.	Sludge
BHS0401	O	General Electric Co.	Diaphram cell tops
BHS0402	Denied	General Electric Co.	Bis Phenol A Isomers
BHS0403	O	General Electric Co. Mt. Vernon, IN.	Translex pre-polymerization scrap
BHS0404	Denied	General Electric Co.	Bis Phenol A Tars
BHS0405	O	General Electric Co. Mt. Vernon, IN.	Spent catalyst and ceramic balls
BHS0406	O	General Electric Co.	DPC Waste
BHS0407	Denied	General Electric Co. Mt. Vernon, IN.	spent carbon and carbon balls
BHS0408	O	General Electric Co.	Distillation column heavy ends.
BHS0409	B	Toastmaster Inc. Boonville, Mo.	Waste water treatment sludge
BHS0410	O	MDNR, Emergency Response Unit Jefferson City, Mo.	Caulks Creek unknown drums
BHS0411	B	Olin Corporation East Alton, Ill.	Ballistics Sand
BHS0412	B	Litton Industries Springfield, Mo.	wastewater treatment sludge

ATTACHMENT 3 RCRA COMPLIANCE INFORMATION

Contents:

3A EPA RCRA Compliance Information for BHS.
3B BHS Waste Characterization Scheme.
3C BHS Analytical Data for Waste Shipments.
3D BHS Waste Manifests.
3E General RCRA Compliance Information.
3F BHS Facility and Operations Manuals.

Attachment 3A EPA RCRA Compliance Information for BHS.

[illegible] ACKN[illegible]

Part A, Permit Process --- Internal Checklist

ID Number [illegible] Firm Name Bob's Home Service, Inc.

Refer to Form No:	PHASE ONE Interim Regulatory Requirements	Indicate by your initials: Yes	No	Valid Form Date
1	T/S/D Facility? (If No, return to respondent.)	✓		
3	Form 1 received?	✓		
1	Form 3 received?	✓		
1 & 3	Postmarked on or before November 19, 1980?	✓		
3	Date of operation entered?	✓		
3	Date of operation on or before November 19, 1980?	✓		
Notif. record	Notifier?	✓		
"	Notified on or before August 18, 1980?	✓		
1	Form 1, XIII B signed?	✓		
3	Form 3, IX B Signed?	✓		

(If all ten items above are initialed in the Yes column, generate Interim Status Acknowledgement and indicate the trigger date here: DEC 17 1980)

PHASE TWO

1	Unsure if regulated or non-regulated?		
3	New facility?		
1 & 3	Core items missing? If Yes, indicate which items:		

Facility name___; location___; mail address___; operator info___;

certification___; process info___; waste info___; owner___; sigs___.

PHASE THREE

1 & 3 Non-core items missing? If Yes, indicate which items:

Maps___; photos___; drawings___; lat/long___.

Other observations and comments:

Received Date Stamp

SEP 02 1980

(Stamp forms also)

DATE SENT BACK _____

DATE RETURNED _____

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION VII
P. O. BOX 15606
KANSAS CITY MISSOURI - 64106

ACKNOWLEDGEMENT OF APPLICATION FOR A HAZARDOUS WASTE PERMIT

This is to acknowledge that the Environmental Protection Agency has received: (1) A notification pursuant to Section 3010 of the Resource Conservation and Recovery Act for the facility located at the address shown in the box below, and (2) Part A of a Hazardous Waste Permit Application for that facility, including a signed statement that the operation of the facility, or its construction, began prior to November 19, 1980. While the information provided by these submissions has not been fully reviewed for completeness or accuracy, EPA will accept this information as an initial qualification for interim status pursuant to Section 3005 of the Act. If after further review of this information, EPA determines that the owner or operator did not fulfill all the requirements for interim status, EPA may treat the owner or operator as not having qualified for interim status pursuant to that section and will advise the owner or operator of that determination. Facility owners and operators with interim status must comply with the standards set forth at 40 CFR Part 265 until a permit is issued. Interim status may be terminated if the owner or operator fails to furnish any additional information requested by EPA in order to process a permit application.

EPA I.D. NUMBER

FACILITY ADDRESS

FORM 1 GENERAL

EPA

U.S. ENVIRONMENTAL PROTECTION AGENCY

GENERAL INFORMATION

Consolidated Permits Program

(Read the "General Instructions" before starting.)

I. EPA I.D. NUMBER

GENERAL INSTRUCTIONS

If a preprinted label has been provided, affix it in the designated space. Review the information carefully; if any of it is incorrect, cross through it and enter the correct data in the appropriate fill-in area below. Also, if any of the preprinted data is absent (the area to the left of the label space lists the information that should appear), please provide it in the proper fill-in area(s) below. If the label is complete and correct, you need not complete Items I, III, V, and VI (except VI-B which must be completed regardless). Complete all Items if no label has been provided. Refer to the instructions for detailed item descriptions and for the legal authorizations under which this data is collected.

LABEL ITEMS

I. EPA I.D. NUMBER

FACILITY NAME

V. FACILITY MAILING ADDRESS

VI. FACILITY LOCATION

Bob's Home Service, Inc.
R. R. 1, Box 116-F
Wright City, Mo. 63390

II. POLLUTANT CHARACTERISTICS

INSTRUCTIONS: Complete A through J to determine whether you need to submit any permit application forms to the EPA. If you answer "yes" to any questions, you must submit this form and the supplemental form listed in the parenthesis following the question. Mark "X" in the box in the third column if the supplemental form is attached. If you answer "no" to each question, you need not submit any of these forms. You may answer "no" if your activity is excluded from permit requirements; see Section C of the instructions. See also, Section D of the instructions for definitions of bold-faced terms.

SPECIFIC QUESTIONS	MARK "X" YES	NO	FORM ATTACHED
A. Is this facility a publicly owned treatment works which results in a discharge to waters of the U.S.? (FORM 2A)		X	
B. Does or will this facility (*either existing or proposed*) include a concentrated animal feeding operation or aquatic animal production facility which results in a discharge to waters of the U.S.? (FORM 2B)		X	
C. Is this a facility which currently results in discharges to waters of the U.S. other than those described in A or B above? (FORM 2C)		X	
D. Is this a proposed facility (*other than those described in A or B above*) which will result in a discharge to waters of the U.S.? (FORM 2D)		X	
E. Does or will this facility treat, store, or dispose of hazardous wastes? (FORM 3)	X		X
F. Do you or will you inject at this facility industrial or municipal effluent below the lowermost stratum containing, within one quarter mile of the well bore, underground sources of drinking water? (FORM 4)		X	
G. Do you or will you inject at this facility any produced water or other fluids which are brought to the surface in connection with conventional oil or natural gas production, inject fluids used for enhanced recovery of oil or natural gas, or inject fluids for storage of liquid hydrocarbons? (FORM 4)		X	
H. Do you or will you inject at this facility fluids for special processes such as mining of sulfur by the Frasch process, solution mining of minerals, in situ combustion of fossil fuel, or recovery of geothermal energy? (FORM 4)		X	
I. Is this facility a proposed stationary source which is one of the 28 industrial categories listed in the instructions and which will potentially emit 100 tons per year of any air pollutant regulated under the Clean Air Act and may affect or be located in an attainment area? (FORM 5)		X	
J. Is this facility a proposed stationary source which is NOT one of the 28 industrial categories listed in the instructions and which will potentially emit 250 tons per year of any air pollutant regulated under the Clean Air Act and may affect or be located in an attainment area? (FORM 5)		X	

III. NAME OF FACILITY

1 SKIP Bob's Home Service, Inc.

IV. FACILITY CONTACT

A. NAME & TITLE (last, first, & title)	B. PHONE (area code & no.)
2 Gill Michael, Manager	314 745 3371

V. FACILITY MAILING ADDRESS

A. STREET OR P.O. BOX

3 R. R. 1 Box 116F

B. CITY OR TOWN	C. STATE	D. ZIP CODE
4 Wright City,	Mo	63390

VI. FACILITY LOCATION

A. STREET, ROUTE NO. OR OTHER SPECIFIC IDENTIFIER

5 Muenz Road

B. COUNTY NAME

Warren

C. CITY OR TOWN	D. STATE	E. ZIP CODE	F. COUNTY CODE
6 n/a	Mo	63390	

21980

Form Approved OMB No. [illegible]

FORM 3 RCRA

EPA

U.S. ENVIRONMENTAL PROTECTION AGENCY

HAZARDOUS WASTE PERMIT APPLICATION

Completed [illegible] Program

([illegible] 3005 of RCRA)

I. EPA I.D. NUMBER

FOR OFFICIAL USE ONLY

APPLICATION APPROVED	DATE RECEIVED (yr., mo., & day)	COMMENTS

II. FIRST OR REVISED APPLICATION

Place an "X" in the appropriate box in A or B below (mark one box only) [illegible] this is the first application you are submitting for your [illegible] application. If this is your first application and you already know your [illegible] EPA I.D. Number, or if this is a revised application [illegible] EPA I.D. Number in Item I above.

A. FIRST APPLICATION (place an "X" below and provide the appropriate date)

X 1. EXISTING FACILITY (See instructions for definition of "existing" [illegible] Complete item below.)

FOR EXISTING FACILITIES, PROVIDE THE DATE (yr., mo., & day) OPERATION BEGAN OR THE DATE CONSTRUCTION COMMENCED (use the boxes to the left)

YR	MO	DAY
72	05	25

2. NEW FACILITY (Complete [illegible])

FOR NEW FACILITIES, PROVIDE THE DATE (yr., mo., & day) OPERATION BEGAN OR IS EXPECTED

YR	MO	DAY
7[illegible]	05	25

B. REVISED APPLICATION (place an "X" below and complete Item I above)

1. FACILITY HAS INTERIM STATUS N/A

2. FACILITY HAS A RCRA PERMIT

III. PROCESSES – CODES AND DESIGN CAPACITIES

A. PROCESS CODE – Enter the code from the list of process codes below that best describes each process to be used at the facility. Ten lines are provided for entering codes. If more lines are needed, enter the code(s) in the space provided. If a process will be used that is not included in the list of codes below, describe the process (including its design capacity) in the space provided on the form (Item III-C).

B. PROCESS DESIGN CAPACITY – For each code entered in column A enter the capacity of the process.

1. AMOUNT – Enter the amount.
2. UNIT OF MEASURE – For each amount entered in column B(1), enter the code from the list of unit measure codes below that describes the unit of measure used. Only the units of measure that are listed below should be used.

PROCESS	PROCESS CODE	APPROPRIATE UNITS OF MEASURE FOR PROCESS DESIGN CAPACITY
Storage:		
CONTAINER (barrel, drum, etc.)	S01	GALLONS OR LITERS
TANK	S02	GALLONS OR LITERS
WASTE PILE	S03	CUBIC YARDS OR CUBIC METERS
SURFACE IMPOUNDMENT	S04	GALLONS OR LITERS
Disposal:		
INJECTION WELL	D79	GALLONS OR LITERS
LANDFILL	D80	ACRE-FEET (the volume that would cover one acre to a depth of one foot) OR HECTARE-METER
LAND APPLICATION	D81	ACRES OR HECTARES
OCEAN DISPOSAL	D82	GALLONS PER DAY OR LITERS PER DAY
SURFACE IMPOUNDMENT	D83	GALLONS OR LITERS

PROCESS	PROCESS CODE	APPROPRIATE UNITS OF MEASURE FOR PROCESS DESIGN CAPACITY
Treatment:		
TANK	T01	GALLONS PER DAY OR LITERS PER DAY
SURFACE IMPOUNDMENT	T02	GALLONS PER DAY OR LITERS PER DAY
INCINERATOR	T03	TONS PER HOUR OR METRIC TONS PER HOUR GALLONS PER HOUR OR LITERS PER HOUR
OTHER (Use for physical, chemical, thermal or biological treatment processes not occurring in tanks, surface impoundments or incinerators. Describe the processes in the space provided; Item III-C.)	T04	GALLONS PER DAY OR LITERS PER DAY

UNIT OF MEASURE	UNIT OF MEASURE CODE	UNIT OF MEASURE	UNIT OF MEASURE CODE	UNIT OF MEASURE	UNIT OF MEASURE CODE
GALLONS	G	LITERS PER DAY	V	ACRE-FEET	A
LITERS	L	TONS PER HOUR	D	HECTARE-METER	F
CUBIC YARDS	Y	METRIC TONS PER HOUR	W	ACRES	B
CUBIC METERS	C	GALLONS PER HOUR	E	HECTARES	G
GALLONS PER DAY	U	LITERS PER HOUR	H		

EXAMPLE FOR COMPLETING ITEM III (shown in line numbers X-1 and X-2 below): A facility has two storage tanks, one tank can hold 200 gallons and the other can hold 400 gallons. The facility also has an incinerator that can burn up to 20 gallons per hour.

DUP 1

LINE NUMBER	A. PROCESS CODE (from list above)	B. PROCESS DESIGN CAPACITY 1. AMOUNT (specify)	2. UNIT OF MEASURE (enter code)	FOR OFFICIAL USE ONLY	LINE NUMBER	A. PROCESS CODE (from list above)	B. PROCESS DESIGN CAPACITY 1. AMOUNT	2. UNIT OF MEASURE (enter code)	FOR OFFICIAL USE ONLY
X-1	S02	600	G		5				
X-2	T03	20	E		6				
1	D80	58.9	A		7				
2	T01	123	U		8				
3					9				
4					10				

NOTE: Photocopy this page before completing if you have more than 20 wastes to list.

Form Approved OMB No. 158-[illegible]

EPA I.D. NUMBER (enter from page 1): W 1

FOR OFFICIAL USE ONLY: W DUP 2 DUP

DESCRIPTION OF HAZARDOUS WASTES (continued)

LINE NO.	A. EPA HAZARD. WASTE NO. (enter code)	B. ESTIMATED ANNUAL QUANTITY OF WASTE	C. UNIT OF MEASURE (enter code)	D. PROCESSES 1. PROCESS CODES (enter)	D. PROCESSES 2. PROCESS DESCRIPTION (if a code is not entered in D.1.)
1	F006	180	T	D80	
2	P012	2.5	T	D80	
3	P035	15	T	D80	
4	P039	15	T	D80	
5	U013	25	T	D80	
6	U036	15	T	D80	
7	U057	15	T	D80	
8	U122	1	T	D80	
9	U151	2.5	T	D80	
10	U155	6	T	D80	
11	U188	48	T	D80	
[illegible]	U224	15	T	D80	
13	D002	1660	T	D80	
14	D000	16000	T	D80	
15					
16					
17					
18					
19					
20					
21					
22					
23					
[illegible]					
25					
26					

EPA Form 3510-3 (6-80)

CONTINUE ON REVERSE

(enter "A", "B", "C", etc. behind the "3" to identify photocopied pages)

Please print or type in the unshaded areas only (Not in shaded areas or outside the lines)

FORM 1 GENERAL

EPA

U.S. ENVIRONMENTAL PROTECTION AGENCY

GENERAL INFORMATION

Consolidated Permits Program

(Read the "General Instructions" before starting.)

I. EPA I.D. NUMBER

F

LABEL ITEMS

I. EPA I.D. NUMBER

II. FACILITY NAME

V. FACILITY MAILING ADDRESS

VI. FACILITY LOCATION

Bob's Home Service, Inc.
R. R. 1, Box 116-F
Wright City, Mo. 63390

GENERAL INSTRUCTIONS

If a preprinted label has been provided, affix it in the designated space. Review the information carefully; if any of it is incorrect, cross through it and enter the correct data in the appropriate fill-in area below. Also, if any of the preprinted data is absent (*the area to the left of the label space lists the information that should appear*), please provide it in the proper fill-in area(s) below. If the label is complete and correct, you need not complete Items I, III, V, and VI (*except VI-B which must be completed regardless*). Complete all items if no label has been provided. Refer to the instructions for detailed item descriptions and for the legal authorizations under which this data is collected.

II. POLLUTANT CHARACTERISTICS

INSTRUCTIONS: Complete A through J to determine whether you need to submit any permit application forms to the EPA. If you answer "yes" to any questions, you must submit this form and the supplemental form listed in the parenthesis following the question. Mark "X" in the box in the third column if the supplemental form is attached. If you answer "no" to each question, you need not submit any of these forms. You may answer "no" if your activity is excluded from permit requirements; see Section C of the instructions. See also, Section D of the instructions for definitions of bold-faced terms.

SPECIFIC QUESTIONS	MARK 'X' YES	NO	FORM ATTACHED
A. Is this facility a publicly owned treatment works which results in a discharge to waters of the U.S.? (FORM 2A)		X	
C. Is this a facility which currently results in discharges to waters of the U.S. other than those described in A or B above? (FORM 2C)		X	
E. Does or will this facility treat, store, or dispose of hazardous wastes? (FORM 3)	X		X
G. Do you or will you inject at this facility any produced water or other fluids which are brought to the surface in connection with conventional oil or natural gas production, inject fluids used for enhanced recovery of oil or natural gas, or inject fluids for storage of liquid hydrocarbons? (FORM 4)		X	
I. Is this facility a proposed stationary source which is one of the 28 industrial categories listed in the instructions and which will potentially emit 100 tons per year of any air pollutant regulated under the Clean Air Act and may affect or be located in an attainment area? (FORM 5)		X	

SPECIFIC QUESTIONS	MARK 'X' YES	NO	FORM ATTACHED
B. Does or will this facility (*either existing or proposed*) include a concentrated animal feeding operation or aquatic animal production facility which results in a discharge to waters of the U.S.? (FORM 2B)		X	
D. Is this a proposed facility (*other than those described in A or B above*) which will result in a discharge to waters of the U.S.? (FORM 2D)		X	
F. Do you or will you inject at this facility industrial or municipal effluent below the lowermost stratum containing, within one quarter mile of the well bore, underground sources of drinking water? (FORM 4)		X	
H. Do you or will you inject at this facility fluids for special processes such as mining of sulfur by the Frasch process, solution mining of minerals, in situ combustion of fossil fuel, or recovery of geothermal energy? (FORM 4)		X	
J. Is this facility a proposed stationary source which is NOT one of the 28 industrial categories listed in the instructions and which will potentially emit 250 tons per year of any air pollutant regulated under the Clean Air Act and may affect or be located in an attainment area? (FORM 5)		X	

III. NAME OF FACILITY

1 Bob's Home Service, Inc.

IV. FACILITY CONTACT

A. NAME & TITLE (last, first, & title)	B. PHONE (area code & no.)
2 Gill Michael, Manager	314 745 3371

V. FACILITY MAILING ADDRESS

A. STREET OR P.O. BOX

3 R. R. 1 Box 116F

B. CITY OR TOWN	C. STATE	D. ZIP CODE
4 Wright City,	Mo	63390

VI. FACILITY LOCATION

A. STREET, ROUTE NO. OR OTHER SPECIFIC IDENTIFIER

5 Muenz Road

B. COUNTY NAME

rren

C. CITY OR TOWN	D. STATE	E. ZIP CODE	F. COUNTY CODE (if known)
6 n/a	Mo	63390	

CONTINUED FROM THE FRONT

VII. SIC CODES (4-digit, in order of priority)

A. FIRST	B. SECOND
7 N A (specify)	7 N A (specify)
C. THIRD	**D. FOURTH**
7 N A (specify)	7 N A (specify)

VIII. OPERATOR INFORMATION

A. NAME: Bob's Home Service, Inc.

B. Is the name listed in Item VIII A also the owner? YES X NO

C. STATUS OF OPERATOR (Enter the appropriate letter into the answer box; if "Other" specify.)
F = FEDERAL, S = STATE, P = PRIVATE, M = PUBLIC (other than federal or state), O = OTHER (specify): P (specify) N A

D. PHONE (area code & no.): A 314 745 3 1

E. STREET OR P.O. BOX: R. R. 1 Box 116-F

F. CITY OR TOWN: Wright City | G. STATE: Mo | H. ZIP CODE: 63390

IX. INDIAN LAND
Is the facility located on Indian lands? YES NO X

X. EXISTING ENVIRONMENTAL PERMITS

A. NPDES (Discharges to Surface Water): 9 N N A	D. PSD (Air Emissions from Proposed Sources): 9 P N A
B. UIC (Underground Injection of Fluids): 9 U N A	E. OTHER (specify): 9 721901 (specify) Hazardous Waste Mo.
C. RCRA (Hazardous Wastes): 9 N A	E. OTHER (specify): 9 H-1002. (specify) Hazardous Waste Transp. Mo.

XI. MAP

Attach to this application a topographic map of the area extending to at least one mile beyond property boundaries. The map must show the outline of the facility, the location of each of its existing and proposed intake and discharge structures, each of its hazardous waste treatment, storage, or disposal facilities, and each well where it injects fluids underground. Include all springs, rivers and other surface water bodies in the map area. See instructions for precise requirements.

XII. NATURE OF BUSINESS (provide a brief description)

Hazardous Waste Landfill

Transportation of Hazardous Waste to Bob's Home Service, Inc.

XIII. CERTIFICATION (see instructions)

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this application and all attachments and that, based on my inquiry of those persons immediately responsible for obtaining the information contained in the application, I believe that the information is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

A. NAME & OFFICIAL TITLE (type or print)	B. SIGNATURE	C. DATE SIGNED
Lerne Zykan, Vice President		

COMMENTS FOR OFFICIAL USE ONLY

FORM 3 RCRA

EPA

U.S. ENVIRONMENTAL PROTECTION

HAZARDOUS WASTE PERMIT APPLICATION

Consolidated Permits Program

EPA I.D. NUMBER

FOR OFFICIAL USE ONLY

APPLICATION APPROVED | DATE RECEIVED | COMMENTS

II. FIRST OR REVISED APPLICATION

Place an "X" in the appropriate box in A or B below to mark the first only time you submit an application for your facility. If you are a first applicant and already have an EPA I.D. Number, enter it here.

A. FIRST APPLICATION (place an "X" below and provide the appropriate date)

1. EXISTING FACILITY (See instructions for definition of "existing facility") — X
   FOR EXISTING FACILITIES, PROVIDE THE DATE (MO., DAY, YR.) OPERATION BEGAN OR THE DATE CONSTRUCTION COMMENCED — 7 0 5 2 5

B. REVISED APPLICATION (enter the I.D. number of the facility)

1. FACILITY HAS INTERIM STATUS — N/A

III. PROCESSES - CODES AND DESIGN CAPACITIES

A. PROCESS CODE — Enter the code from the list of process codes below that best describes each process to be used at the facility. Begin with line X-1 if entering codes. If more lines are needed, enter the code(s) in the space provided. If a process will be used that is not included in the list of codes below, describe the process (including its design capacity) in the space provided on the back of this form.

B. PROCESS DESIGN CAPACITY — For each code entered in column A enter the capacity of the process.

1. AMOUNT — Enter the amount.
2. UNIT OF MEASURE — For each amount entered in column B(1), enter the code from the list of unit of measure codes below that describes the unit of measure used. Only the units of measure that are listed below should be used.

PROCESS	PROCESS CODE	APPROPRIATE UNITS OF MEASURE FOR PROCESS DESIGN CAPACITY
Storage		
CONTAINER (barrel, drum, etc.)	S01	GALLONS OR LITERS
TANK	S02	GALLONS OR LITERS
WASTE PILE	S03	CUBIC YARDS OR CUBIC METERS
SURFACE IMPOUNDMENT	S04	GALLONS OR LITERS
Disposal		
INJECTION WELL	D79	GALLONS OR LITERS
LANDFILL	D80	ACRE FEET (the volume that would cover one acre to a depth of one foot) OR HECTARE METER
LAND APPLICATION	D81	ACRES OR HECTARES
OCEAN DISPOSAL	D82	GALLONS PER DAY OR LITERS PER DAY
SURFACE IMPOUNDMENT	D83	GALLONS OR LITERS
Treatment		
TANK	T00	GALLONS PER DAY OR LITERS PER DAY
SURFACE IMPOUNDMENT	T02	GALLONS PER DAY OR LITERS PER DAY
INCINERATOR	T03	TONS PER HOUR OR METRIC TONS PER HOUR OR GALLONS PER HOUR OR LITERS PER HOUR
OTHER (specify)	T04	GALLONS PER HOUR OR LITERS PER HOUR

UNIT OF MEASURE	UNIT OF MEASURE CODE	UNIT OF MEASURE	UNIT OF MEASURE CODE	UNIT OF MEASURE	UNIT OF MEASURE CODE
GALLONS	G	LITERS PER DAY	V	ACRE-FEET	A
LITERS	L	TONS PER HOUR	U	HECTARE-METER	[illegible]
CUBIC YARDS	Y	METRIC TONS PER HOUR	W	ACRES	[illegible]
CUBIC METERS	C	GALLONS PER HOUR	E	HECTARES	[illegible]
GALLONS PER DAY	U	LITERS PER HOUR	H		

EXAMPLE FOR COMPLETING ITEM III (shown in line numbers X-1 and X-2 below) — A facility has two storage tanks; one tank can hold 600 gallons, the other can hold 400 gallons. The facility also has an incinerator that can burn up to 20 gallons per hour.

C — D U P — 1

LINE NUMBER	A. PROCESS CODE (from list above)	B. PROCESS DESIGN CAPACITY 1. AMOUNT (specify)	2. UNIT OF MEASURE (enter code)	FOR OFFICIAL USE ONLY
X-1	S 0 2	600	G	
X-2	T 0 3	20	L	
1	D 8 0	58.9	A	
2	T 0 1	173	U	
3				
4				

LINE NUMBER	A. PROCESS CODE	B. PROCESS DESIGN CAPACITY		FOR OFFICIAL USE ONLY

III. PROCESSES

C. SPACE FOR A [illegible] INCLUDE [illegible]

Note: The Treatment Tank indicated consists of Four (4) concrete Evaporation Basins. These evaporation basins are only for the treatme of leachate and rainwater in active trenches, and from a truck wash slab for hosing off external parts of a truck.

IV. DESCRIPTION OF HAZARDOUS WASTES

A. EPA HAZARDOUS WASTE NUMBER — Enter the four-digit number [illegible] 40 CFR [illegible] handle hazardous wastes which are not listed in 40 CFR, subpart D, enter the four-digit [illegible] from 40 CFR [illegible] tics and/or the toxic contaminants of those hazardous wastes.

B. ESTIMATED ANNUAL QUANTITY — For each listed waste entered in column A estimate the quantity of that waste that will be [illegible] basis. For each characteristic or toxic contaminant entered in column A estimate the total annual quantity of all the [illegible] which possess that characteristic or contaminant.

C. UNIT OF MEASURE — For each quantity entered in column B enter the unit of measure [illegible] codes are

ENGLISH UNIT OF MEASURE	CODE	METRIC UNIT OF MEASURE	CODE
POUNDS	P	KILOGRAMS	K
TONS	T	METRIC TONS	M

If facility records use any other unit of measure for quantity, the units of measure [illegible] account the appropriate density or specific gravity of the waste.

D. PROCESSES

1. PROCESS CODES

For listed hazardous waste: For each listed hazardous waste entered in column A [illegible] to indicate how the waste will be stored, treated, and/or disposed of at the facility.

For non-listed hazardous wastes: For each characteristic or toxic contaminant entered in column A [illegible] contained in Item III to indicate all the processes that will be used to store, treat, and/or dispose of all the non-listed hazardous wastes [illegible] that characteristic or toxic contaminant.

Note: Four spaces are provided for entering process codes. If more are needed: (1) Enter the first three as described above, (2) Enter [illegible] extreme right box of Item IV-D(1), and (3) Enter in the space provided on page 4, the line number and the additional code(s).

2. PROCESS DESCRIPTION — If a code is not listed for a process that will be used, describe the process in the space provided on the form.

NOTE: HAZARDOUS WASTES DESCRIBED BY MORE THAN ONE EPA HAZARDOUS WASTE NUMBER — Hazardous wastes that can be [illegible] more than one EPA Hazardous Waste Number shall be described on the form as follows:

1. Select one of the EPA Hazardous Waste Numbers and enter it in column A. On the same line complete columns [illegible] and [illegible] estimating the [illegible] quantity of the waste and describing all the processes to be used to treat, store, and/or dispose of the waste.
2. In column A of the next line enter the other EPA Hazardous Waste Number that can [illegible] "included with above" and make no other entries on that line.
3. Repeat step 2 for each other EPA Hazardous Waste Number that can be [illegible]

EXAMPLE FOR COMPLETING ITEM IV [illegible] per year of chrome shavings from [illegible] are corrosive only and there will be an estimated 200 [illegible] 100 pounds per year of that waste. [illegible]

LINE NO.	A. EPA HAZARD WASTE NO. (enter code)	B. ESTIMATED ANNUAL QUANTITY OF WASTE	[illegible]	[illegible]
X-1	K 0 5 4	[illegible]	[illegible]	[illegible]
X-2	D 0 0 2	[illegible]	[illegible]	[illegible]
X-3	D 0 0 [illegible]	[illegible]		
X-4	D 0 0 [illegible]			

Continued from p...
NOTE Photocopy ...

EPA I.D. NUMBER

DESCRIPTION OF HAZARDOUS WASTES

LINE NO.	A. EPA HAZARD WASTE NO. (enter code)	B. ESTIMATED ANNUAL QUANTITY OF WASTE	C. UNIT OF MEASURE	D. PROCESSES
1	F 0 06	180	T	D80
2	P0 1 2	[illegible]	T	D80
3	P 0 35	15	T	D80
4	P 0 39	15	T	D80
5	U 01 3	5	T	D80
6	U 0 36	15	T	D80
7	U 0 5	15	T	D80
8	U 1 2 2	1	T	D80
9	U 1 5 1	2.5	T	D80
10	U 1 5 5	6	T	D80
11	U 1 8 8	48	T	D80
	U 2 2 4	15	T	D80
13	D 0 0 2	1660	T	D80
14	D 0 0 0	16000	T	D80
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				

EPA ...

Continued from the [illegible]

IV. DESCRIPTION OF HAZARDOUS WASTES

E. USE THIS SPACE TO LIST AT DEFIGNAL PROCESS CODES [illegible]

EPA I.D. NO. (enter from page [illegible])

F

V. FACILITY DRAWING

All existing facilities must include in the space provided on page 5 a scale drawing of the facility [illegible]

VI. PHOTOGRAPHS

All existing facilities must include photographs *(aerial or ground level)* that clearly [illegible] treatment and disposal areas, and sites of future storage, treatment or disposal area [illegible]

VII. FACILITY GEOGRAPHIC LOCATION

LATITUDE (degrees, minutes, & seconds)	LONGITUDE [illegible]
38 47 01 5	091 02 0-5

VIII. FACILITY OWNER

A. If the facility owner is also the facility operator as listed in Section VIII [illegible] skip to Section IX below.

B. If the facility owner is not the facility operator as listed in Section VIII [illegible]

1. NAME OF FACILITY'S LEGAL OWNER

E LaVerne Zykan

[illegible]

3. STREET OR P.O. BOX

F Route 1, Box 116-F

G Wright City Mo. [illegible]

IX. OWNER CERTIFICATION

I certify under penalty of law that I have [illegible] documents, and that based on my [illegible] submitted information is true, [illegible] including the possibility of [illegible]

A. NAME

LaVerne Zykan

X. OPERATOR CERTIFICATION

I certify under penalty of law that I have personally examined and am [illegible] documents, and that based on my [illegible] submitted information is true, [illegible] including the possibility of [illegible]

A. NAME

LaVerne Zykan

Attachment 3B BHS Waste Characterization Scheme.

III. OPERATION

A. Waste Characterization

BHS, Inc. is designed to handle bulk waste and drummed waste. The differentiation between the two modes of containerization is made by the degree of hazard associated with the waste and physical state of the waste.

If the waste material has a low degree of hazard associated with it (i.e. waste treatment sludges with heavy metals, empty containers) and a low degree of mobility (i.e. thick non-flowing sludges, crushed drums), the waste can be properly and safely disposed of in bulk. If a waste does not meet these criteria, it will be required that the generator drum the waste prior to disposal. Drum is used only as a transport mechanism.

The Site Manager of BHS, Inc. will be a graduate chemist or chemical engineer with expertise to characterize the waste for proper disposal. Information supplied by the generator which completely identifies the waste and hazards associated with the waste will be reviewed by the Site Manager. From this information the trench location ("O" Organic, "B" Alkaline, "R" Acid) will be determined. When the waste arrives for disposal the Site Manager will visually inspect and sample the waste for analysis.

BHS, Inc. has the following laboratory equipment for determination of pH, specific gravity, percent volatiles at 100°C. and 600°C:

Fischer Scientific 107 Digital pH Meter
Blue M SW11TA Oven
Blue M M15A2A Furnace
Ohaus Dial-A-Gram Triple Beam Balance
Assorted beakers and graduated cylinders

Reitz & Jens, Inc. has backup laboratory equipment available if need arises.

The combination of generator information, visual inspection and basic analysis of the waste will ensure proper characterization. The waste will be accepted for disposal only after the waste has been analyzed to determine that the analysis conforms to the information submitted by the generator pertaining to that specific waste. Any waste that does not conform to waste information will be refused for burial and the Mo. DNR will be notified.

Generators utilizing this site will be required to submit the following:

1. The name, address, telephone number, generator identification number and waste stream identification number of the generator.
2. The name, address and telephone number of person employed by the generator who is familiar with waste management practices.
3. The hazard class of each waste stream.
4. A brief description of the generation process.
5. A description of containerization for each waste.
6. The flashpoint, if applicable.
7. Major hazardous components and corresponding concentration.
8. pH

9. Percent volatiles at 600°C.

10. Percent volatiles at 100°C.

11. Materials data handling sheets or product specification sheets to indicat handling and spill cleanup recommendations.

12. Any additional information Mo. DNR has deemed necessary to complete the identification process.

13. Any additional information BHS, Inc. deems necessary to complete the characterization process.

Hazardous Waste Accepted:

In accordance with the Mo. DNR Regulations, waste will be disposed of in the following areas:

1. Organic Area "O" - organic-based waste with a flashpoint above 140°F. or materials contaminated with an organic-based waste.

2. Alkaline Area "B" - materials with a pH greater than or equal to 7 or inorganic-based materials compatible with an alkaline environment.

3. Acid Area "R" - materials with a pH less than 7 or inorganic-based materials compatible with an acidic environment.

B. Capacity of Area 1

The 12 new trenches with a 25-foot maximum depth of waste have a total volu (including cover material) of over 90,000 cubic yards. The disposal volume for the trenches was calculated by using the following assumption:

One 80-drums load of waste uses 60 cubic yards of space
One 15 cubic yard load of bulk uses 25 cubic yards of space

Using previous disposal records as a base, the following estimates were made for incoming volumes:

Year 1,	24,000 drums	17,889 cu.yd. volume
	6,500 cu.yd. bulk	10,976 cu.yd. volume
	total	28,865 cu.yd. volume
	Volume Remaining	64,789 cu.yd. volume

Rationale for The Selection of Analysis Parameters

Physical Properties

(1) Color: Wastes from different processes will have colors typical to the process and chemicals. Even multiple colors (ie. paint sludge) can be typical for a given waste with a homogenous sampling indicating the possibility of non comformity.

(2) Physical State: The physical state of a waste is very indicative of the nature of the waste. Even wastes with the same basic characteristics (ie. sludge) can indicate conformity by the degree of the state (ie. soupy sludge, thick sludge, cake sludge) with changes in the degree indicating changes in process.

(3) Odor: A waste's odor is very typical for each waste.

(4) Specific gravity: The specific gravity can be used as an indicator since the make-up of each waste will have a definite range of specific gravity (ie. organic based waste 0.8 - 1.3). Changes in specific gravity in a range of ± 0.1 gm/ml can indicate different waste or change in process.

(5) PH: All waste streams will fall within their own ph range (ie. ± .5) with shifts indicating different wastes.

(6) Volatiles @ 100°C: Indicate the percent solids of a waste which will fall into a definite range for an individual waste (± 5%) and process.

(7) Volatiles @ 600°C: This test used in conjuction with Volatiles at 100°C will indicate the amount of liquid, organic solids and inorganic solids in each waste which will be typical for that individual waste and process.

Sampling procedure:

From each 80 drum load of waste a minimum of 3 drums one from the back/middle/and front of the load will be opened and a sample removed. The three samples will be mixed to form a representative sample by stirring or cutting and folding the samples together.

Specific Gravity and Ph

1. Apparatus

   (a) 100 ml beaker graduated at 20 ml intervals
   (b) 100 ml graduated cylinder
   (c) Balance accurate to 0.01g
   (d) Ph meter accurate to 0.1

2. Procedure

   (a) Specific gravity
      (1) Using graduated cylinder filled to 100 ml mark fill empty 100 ml beaker to 80 ml mark and record volume used (A). Dry beaker thoroughly
      (2) Weigh 100 ml beaker empty to nearest 0.01g (B)
      (3) Loosely place material in beaker to slightly less than 80 ml mark
      (4) tap bottom of beaker on counter
      (5) wipe any material above 80 ml mark off of beaker
      (6) Weigh beaker and material to nearest 0.01g (C)
      (7) Fill graduated cylinder to 100 ml mark with water
      (8) using filled graduated cylinder fill 100 ml beaker containing material to 80 ml mark
      (9) Record volume of water remaining in graduated cylinder (D)

   (b) Ph

      (1) After running the test for specific gravity determine the Ph of the solution remaining from the specific gravity test to the nearest 0.1 Ph units.

3. Calculations

   Specific gravity

$$gm/ml = \frac{C - B}{A - D}$$

Volatiles at 100°C to 600°C

1. Apparatus

(a) Evaporating dishes
(b) Oven for use @ 100°C
(c) Muffler furnace for use @ 600°C
(d) Desiccator
(e) Balance accurate to 0.01g

2. Procedure

(a) Preparation of evaporating dishes

(1) ignite evaporating dishes @ 600°C for 60 minutes
(2) Allow to cool in a desiccator
(3) Weigh to the nearest 0.01g ("A" tare weight)
(4) Store in desiccator for use

(b) Volatiles at 100°C

(1) In a prepared evaporating dish place approximately 25 - 50 g of material evenly distributed over dish.
(2) Weigh dish and material to nearest 0.01g (B)
(3) Dry in an oven set @ 100°c for one hour until constant dry weight is reached.
(4) Allow to cool in a desiccator
(5) Weigh dish and residue to nearest 0.01g (C)

(c) Volatiles at 600°C

(1) Follow same procedure as (b) except use muffler furnace set at 600°C for igniting dish and material.

3. Calculations

Volatiles @ 100°C & 600°C

$$(\%) = \frac{(B-A) - (C-A)}{B-A} \times 100$$

226 SPECIFIC CONDUCTANCE

specific electrical conductance [illegible] wastewater, treatment [illegible], and polluted water may [illegible] indications of the total con- [illegible] of ionic solutes. In some [illegible] waste, all or nearly all of the [illegible] material is ionic.

[illegible] and equipment required for [illegible] specific conductance are [illegible] in Section 154 and are [illegible] to most wastewaters. [illegible] may be required to [illegible] representative samples and to [illegible] fouling of electrode surfaces. [illegible] likely that the most useful [illegible] of specific conductance [illegible] to wastewater will be [illegible] monitoring equipment, which [illegible] commercially available. These instru- [illegible] provide essentially continuous [illegible] indications of the conduc- [illegible] flowing streams.

[illegible] conductance can be recorded [illegible] single-parameter instruments [illegible] elaborate monitors which [illegible] and record other variables such as dissolved oxygen, pH and temperature of the stream. The sensor (or cell) may be placed in a tank through which water is pumped continuously, or placed directly in the flowing stream, depending on conditions at the monitor site.

In order to obtain reliable results, these instruments must be carefully maintained and frequently checked. Procedures for doing so will depend on the nature of the effluents being monitored and the characteristics of the instruments, and cannot be prescribed here in detail. Periodic checks of the indicated conductance using another cell and bridge suitable for field measurements, and checking by means of sampling and laboratory determinations, as discussed in Section 154, will show how frequently the sensor and intake must be cleaned. Most problems in obtaining good records with monitoring equipment are related to electrode fouling and to inadequate circulation of solutions being measured.

227 SPECIFIC GRAVITY

[illegible] is determined by [illegible] weight of a volume of [illegible] sludge or industrial [illegible] an equal volume of [illegible] nearest 0.1 g an empty [illegible] or bottle of about 250-ml capacity. Fill completely with distilled water and weigh again.

If the sample flows readily, fill the flask completely with the sample, weigh, and calculate the result:

$$\text{sp gr} = \frac{\text{weight of sample}}{\text{weight of distilled water}}$$

If the sample does not flow readily, add as much of it to the bottle as possible, without exerting pressure, and weigh. Fill the bottle containing the sample with water and weigh again, making sure that all entrapped air bubbles have escaped. Determine the weight of added water by difference. Then:

$$\text{sp gr} = \frac{A}{B - C}$$

where A = weight of sample, B = weight of water to fill bottle, and C = weight of water added to sample.

STRONTIUM: See Metals (Groups I and II), Section 210.

228 SULFIDE

1. General Discussion

Sulfide may be found in water, wastewater and sludge as a result of microbial action on organic matter under anaerobic conditions and from certain industrial operations. Concentrations of a few tenths of a milligram per liter cause an objectionable rotten egg odor.

"Crown" corrosion of concrete sewers is often caused indirectly by the hydrogen sulfide liberated from slow-flowing sewage and wastewaters. Hydrogen sulfide-oxidizing bacteria are common in nature and frequently infect the walls and crowns of sewers. These bacteria produce sulfuric acid in the oxidation of H_2S; the sulfuric acid attacks the exposed concrete, sometimes leading to collapse of the pipe. High concentrations of soluble sulfides (over 200 mg/l) produce toxic effects in anaerobic treatment processes.

In analyses of sewage and wastewaters, three forms of sulfide are significant:

a. Total sulfide includes the dissolved H_2S and HS^-, as well as *acid-soluble* metallic sulfides present in the suspended matter. The $S^=$ ion is generally not present in significant amounts below a pH of 13. Acid-insoluble sulfides are not detected by the tests given here. Copper sulfide is the only common sulfide in this class.

b. Dissolved sulfide is that remaining after the suspended solids have been removed by flocculation and settling or centrifugation.

c. Un-ionized hydrogen sulfide may be calculated from the concentration of dissolved sulfide and the pH of the sample.

2. Selection of Method

Qualitatively, odors indicating hydrogen sulfide can be confirmed with lead acetate test paper, which becomes blackened on exposure to the vapor from a slightly acidified sample.

All three forms of sulfide may be

residue. Ordinarily, only the residue on evaporation and its and volatile fractions are determined.

e determination of both total and residue in these materials is to error due to the loss of ammonium carbonate and volatile organic er while drying, making the results than they should be. Although s also the case with wastewater les, the effect tends to be more ounced with sediments, and especially with sludges and sludge cakes. e mass of organic matter usually vered from sludge and sediment les requires a period of ignition er than that specified for the residue from wastewaters, effluents or polluted waters. The specified ignition and temperature must be carefully observed in order to control s of volatile inorganic salts.

weighings must be performed kly. Wet samples tend to lose ht by evaporation. After drying ition, the residues are often very scopic and rapidly absorb moisture from the air.

Apparatus

Evaporating dishes.
Oven, for use at 103 C.
Muffle furnace, for use at 550 C.
Desiccators.
Balance, accurate to 0.01 g.

Procedure

Total residue and moisture:

1) PREPARATION OF EVAPORATING DISHES—Ignite evaporating dishes at least min at a temperature of at least 550 then cool in a desiccator, weigh to nearest 10 mg, and keep in the desiccator until ready for use.

2) FLUID SAMPLES—If the sample contains enough moisture to flow more or less readily, stir to homogenize, then place 25-50 g in a prepared evaporating dish and weigh to the nearest 10 mg. Evaporate to dryness on a water bath, dry at 103 C for 1 hr, cool in an individual desiccator containing fresh desiccant, and weigh.

3) SOLID SAMPLES—If the sample consists of discrete pieces of solid material (dewatered sludge, for example), take cores from each piece with a No 7 cork borer, or pulverize the entire sample coarsely on a clean surface by hand, using rubber gloves. Place 25-50 g in a prepared evaporating dish and weigh to the nearest 10 mg. Place in an oven at 103 C overnight. Cool in an individual desiccator containing fresh desiccant and weigh. Heating for this prolonged period may result in a loss of volatile organic matter and ammonium carbonate, but it is usually necessary in order to realize thorough drying of samples of this kind.

b. Volatile residue: Determine volatile residue, which includes organic matter and volatile inorganic salts, on the total residue obtained in step 3a by igniting it in an electric muffle furnace at 550 C for 60 min, avoiding loss of solids by decrepitation. Cool in a desiccator and reweigh. Report results as percent ash and volatile solids.

4. Calculations

$$\text{Total residue (\%)} = \frac{A \times 100}{B}$$

$$\text{Volatile residue (\%)} = \frac{A - C}{A} \times 100$$

$$\text{Fixed residue (\%)} = \frac{C \times 100}{A}$$

where A = weight of dried solids, B = weight of wet sample, and C = weight of ash.

5. Precision and Accuracy

On digested sludge (42% ash) the standard deviation was found to be 0.2% ash ($n = 1.13 \times 10^1$). On elutriated sludge (29% ash) the standard deviation was found to be 0.2% ash ($n = 1.4 \times 10^1$).

224 H. Bibliography

Methods A–D

SYMONS, G. E. & B. MOREY. 1941. The effect of drying time on the determination of solids in sewage and sewage sludges. *Sewage Works J.* 13:936.

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CHASIN, G., E. H. CHOW, R. B. ALEXANDER & J. POWERS. 1958. Use of glass fiber filter medium in the suspended solids determination. *Sewage & Ind. Wastes* 30:1062.

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Methods E–G

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FISCHER, A. J. & G. E. SYMONS. 1944. The determination of settleable sewage solids by weight. *Water Works & Sew.* 91:37.

DEGEN, J. & F. E. NUSSBERGER. 1956. Notes on the determination of suspended solids. *Sewage & Ind. Wastes* 28:237.

GOODMAN, B. L. 1964. Processing thickened sludge with chemical conditioners. In *Sludge Concentration, Filtration and Incineration.* University of Michigan Continued Education Series No. 113. Ann Arbor. p. 78.

SETTLED VOLUME OF ACTIVATED SLUDGE:
See Tests on Activated Sludge, Section 230.

225 SLUDGE DIGESTER GAS

Gas produced during the anaerobic decomposition of wastes contains methane and carbon dioxide as the major components, and varying quantities of hydrogen, hydrogen sulfide, nitrogen, oxygen, and water vapor. It is common practice to analyze the gases produced to determine their fuel value,

Attachment 3C BHS Analytical Data for Waste Shipments Sampled by the Inspection Team (Great Lakes Container and Litton Company)

Generator/I.D. # Great Lake Contrac 01101

Waste/I.D.# [illegible] 001

Manifest Document # 01101-001-010

Date 11 March 81

Physical Description Crumble sludge and [illegible] sludge

Color dark gray/[illegible] white multi

Odor slight

Ph 8.3

% Vol 100°C 16 % Vol 600°C 43

Gross	126.81	121.74	101.64	84.97
Tare	94.45	94.45	63.23	63.23
Net	32.36	27.29	38.41	21.74

Specific Gravity

Gross 88.37 Volume 24 ml 1.6 gm/ml

Tare 51.13

Net 37.24

Comments

Signature MD Gill

GAS COMPANY

Laboratory Division

4118 SHREWSBURY
ST. LOUIS, MISSOURI 63119
(314) 644-6577

November 13, 1979

Mr. John Fisher
Great Lakes Container Corp.
P.O. Box 5496
St. Louis, Missouri 63147

Dear Mr. Fisher:

On October 10, 1979 this laboratory received five (5) special waste samples to be analyzed per proposed Federal Standards. Other tests were also requested that is not covered in the proposed Federal Standard.

	#1	#2	#3	#4	#5
Flash point °F	Above 140	Above 140	Above 140	Above 140	Above 140
PH	8.2	8.4	10.9	12.7	11.4
Reactivity	None	None	None	None	None
Arsenic mg/l	0.02	0.01	0.03	0.01	0.04
Barium mg/l	None	None	None	None	None
Cadium mg/l	3.6	0.42	3.4	0.31	3.3
Chromium mg/l	15.28	11.32	84.4	14.73	10.35
Lead mg/l	173.0	221.0	335.0	18.3	127.2
Mercury mg/l	0.007	0.004	0.009	0.002	0.006
Selenium mg/l	0.036	0.036	0.022	None	0.006
Silver mg/l	None	None	0.003	None	None
Solids %	64.9	97.7	72.4	61.6	67.2
Volatiles %	43.5	32.5	47.3	67.6	48.9
Oil & Grease %	10.8	4.1	3.7	3.3	5.2
Specific Gravity gr/ml	0.72	0.88	0.94	1.4	0.81
Cyanides PPM	8.0	97	65	216	330
Phenols PPM	3.7	15	2.2	52.5	26.4

It should be noted that solids were determined at 105° C and volatiles at 550° C.

Hexane Soluble oil and grease test was used with four (4) hours of solvent cycling.

Cyanide and Phenols are reported in parts per million by weight.

Sincerely,

Shaaban Ben-Poorat
Chief Chemist

CC: Mr. Ken Wilson
Zurheide-Herrmann, Inc.
4333 W. Clayton Avenue
St. Louis, Mo. 63110

MISSOURI DEPARTMENT OF NATURAL RESOURCES
P.O. Box 1368 2010 Missouri Blvd Jefferson City, Missouri 65102 (314) 751-3241

March 24, 1980

BHS-0310

Mr. Mike Gill
Bob's Home Service, Inc.
Route 1, Box 116F
Wright City, MO 63390

Dear Mr. Gill:

This is in reply to your request to dispose of 75 cubic yards per month of process sludge, ash, baghouse dust from (barrel drying operation) from Great Lakes Container Corp., St. Louis, Missouri, as submitted to us on your request form received February 7, 1980.

This request is approved with the following conditions:

1. Due to the large number of possible constituents which could be in such a waste, it will be necessary for you to sample this waste once per month for the first six months to insure the consistency. It should be tested for those parameters listed in your application (November 13, 1979) plus % water. This analysis should be submitted with your monthly report.

2. Burial should be in a separate trench in the alkaline area (approximately 20' x 40' x 20' deep or six months capacity). After six months, consideration will be given to burial with other wastes.

Please contact us if you have any questions concerning this matter.

Sincerely,

Robert W. Pappenfort

Robert W. Pappenfort, P.E.
Environmental Engineer
Hazardous Waste Management Section
Solid Waste Management Program

RWP/dlk

cc: Great Lakes Container Corp., ATTN: John Fischer
Reitz and Jens, Inc.
St. Louis Regional Office, ATTN: Howard Windburn

LITTON SPRINGFIELD, MO

Section E

Composition: List all the components of the waste and the concentration by weight. Material at a detectable level listed under paragraph [illegible] (5)(B)1, must be reported.

Major Components	wt.% Concentration ppm
1. Chromium	1980
2. Cyanide	[illegible]
3. Copper	2900
4. Nickel	270
5. Zinc	120

Section F

Physical Data:

1. Solubility in water 20%
2. Specific gravity (H2O = 1) 1.072
3. Vapor density (Air = 1) 0.999
4. Appearance and odor Black, non-transparent Ammonical
5. Physical State: a Solid ___ b Sludge X c Slurry ___ d Liquid ___ e Compressed Gas ___
6. 77.7% by weight of volatiles at 100°C
7. 87.9% by weight of volatiles at 600°C
8. 146 Boiling point (°C)
9. 10 pH

Section G

Fire and Explosion Data:

1. Flashpoint (if applicable) - Pensky - Martens closed cup tester ASTM std. D-93-77 or setaflash closed tester method ASTM std. D-3278-72

   Specify which method used: None

2. Extinguishing Media a. /__/ dry chemical, b. /__/ CO_2, c. /__/ alcohol foam,

   N/A d. /__/ water fog, e. /__/ water spray

   f. /__/ other, specify

Section H

Health Hazard Data:

1. Effects of over exposure None

2. Emergency and First Aid procedures Clean off of skin & rinse with water.

Generator/I.D. # [illegible] 01317

Waste/I.D. # [illegible] 001

Manifest Document # 01317-001-007

Date 12 [illegible]

Physical Description [illegible]

Color [illegible]

Odor [illegible]

Ph [illegible]

% Vol 100°C 45% % Vol 600°C 65%

Gross	139.73	120.43	[illegible]	82.41
Tare	96.47	96.47	68.18	68.18
Net	43.26	23.96	20.09	14.23

Specific Gravity

Gross [illegible] Volume [illegible] 1.3 [illegible]

Tare [illegible]

Net 33.42

Comments

Signature [illegible]

Attachment 3D BHS Waste Manifests.

F RHWG 0
HAZARDOUS WASTE MANIFEST DOCUMENT
MISSOURI DEPARTMENT OF NATURAL RESOURCES
P O Box 1368, Jefferson City, Missouri 65102 314-751-3241

MANIFEST DOCUMENT NUMBER
0 1 1 0 1 0 0 1 0 1 0
Generator I.D. No. | Waste I.D. No. | Shipment No.

Part 1 to be completed by the generator (Instructions for completing and handling this document are on the reverse side)

Name	Identification	Address	Telephone No.	Date Shipped or Received
Item 1. Generator GREAT LAKES CONTAINER CORPORATION	Generator I.D. No. 01101	P.O. Box 5496 Broadway Sta. St. Louis, Mo. 63147	314-436-1202	3/11/81
Item 2. Transporter B.H.S., INC.	Transporter No. B1002	RR 1, Box 116F Wright City, Mo. 63390	314-745-3371	3/11/81
Item 3. Treatment, Storage or Disposal Facility B.H.S., INC.	T.S.D. Facility Permit No. 721901	Same	Same	11/16/81
Item 4. Proper DOT Shipping Name HAZARD WASTE - NOS	DOT Hazard Class ORME	DOT Label Required or Exceptions NA	Quantity 14 / Units* 1 2 (3) 4 5	Weight (If applicable) 23,000#

*Circle one 1. tons; 2. gallons; 3. cubic yds; 4. drums - 55 gallon; or 5. Pounds

Item 5 Immediate Emergency Response Information
Bud Swank
In the event of a spill contact the National Response Center, U.S. Coast Guard, 800 424 8802
SPECIAL HANDLING INSTRUCTIONS
WEAR PROTECTIVE CLOTHING, RUBBER GLOVES/FACE SHIELD/GOGGLES

24 hour emergency telephone numbers
314-436-1202
Chemtrec 800 424-9300

Item 6. Placards Provided or Affixed

Shipper's Check List

DOT Labels Applied and Secure	DOT Approved Containers
Proper DOT Name on all Packages	Checked for Proper Sealing
Air Cargo Only	Poison Label Applied

Item 7 GENERATOR CERTIFICATION This is to certify that the above named materials are properly classified, described, packaged, marked, and labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation and the Missouri Department of Natural Resources

Generator's Signature Bud Swank Date 3-11-81

To be completed by the transporter

Item 8 TRANSPORTER CERTIFICATION This is to certify acceptance of the hazardous waste shipment Date accepted for Shipment

Transporter's Signature Thomas D. Brockmeier Date 3-11-81

Item 9 TSDF CERTIFICATION This is to certify acceptance of the hazardous waste for treatment, storage or disposal

TSDF Signature [illegible] Date 11/16/81

F... DNR H...

HAZARDOUS WASTE MANIFEST DOCUMENT
DEPARTMENT OF NATURAL RESOURCES
P. O. Box 176, Jefferson City, Missouri 65102
314-751-3241

FORD P.N. 7M1-2B-084

MANIFEST DOCUMENT NUMBER
Generator I.D. No. 01574 | Waste I.D. No. 001 | Shipment No. 02

Part 1 to be completed by the generator (Instructions for completing and handling this document are on the reverse side)

	Identification	Address	Telephone No.	Date Shipped or Rec'd
Generator FORD MOTOR COMPANY	Generator I.D. No. 01574	6250 N. Lindbergh Blvd. Hazelwood, Mo. 63042	314-731-1300	3/10/81
Item 2 Transporter BOB'S HOME SERVICE	Transporter No. B 1002	R. R. 1, Box 116F Wright City, Mo. 63390	314-745-3371	3/10/81
Item 3 Treatment, Storage or Disposal Facility BOB'S HOME SERVICE	T.S.D. Facility Permit No. LF-01	R. R. 1, Box 116F Wright City, Mo. 63390	314-745-3391	

Proper DOT Shipping Name	DOT Hazard Class	DOT Label Required or Exceptions	Quantity	Units*	Weight (if applicable)
Paint Sludge	N/A	N/A	15 cu.yd.	1 2 3 4 5	

*Circle one: 1. tons; 2. gallons; 3. cubic yds; 4. drums - 55 gallon; or 5. Pounds

Immediate Emergency Response Information

In the event of a spill, contact the National Response Center, U.S. Coast Guard, 800-424-8802

24-hour emergency telephone numbers
314-731-1300 Plant Security
Chemtrec 800-424-9300

SPECIAL HANDLING INSTRUCTIONS

Item 6. Placards Provided or Affixed

Shipper's Check List

	DOT Labels Applied and Secure	DOT Auth Containers
	Proper DOT Name on all Packages	Checked for Proper Sealing
	Air Cargo Only	Peligro Label Applied

GENERATOR CERTIFICATION. This is to certify that the above materials are properly classified, described, packaged, marked and labeled, and are in proper condition for transportation according to the applicable rules and regulations of the United States Department of Transportation and the Missouri Department of Natural Resources.

Generator's Signature [signature] Date 3/10/81

Completed by the transporter

TRANSPORTER CERTIFICATION. This is to certify acceptance of the hazardous waste shipment. Date accepted for Shipment:

Transporter's Signature [signature] Date 3/10/81

Item 9. TSDF CERTIFICATION. This is to certify acceptance of the hazardous waste for treatment, storage or disposal.

Signature

Date

Form [illegible] W.G. - 10
HAZARDOUS WASTE MANIFEST DOCUMENT
MISSOURI DEPARTMENT OF NATURAL RESOURCES
P. O. Box 1368, Jefferson City, Missouri 65102 314-751-3241

MANIFEST DOCUMENT NUMBER
0 1 2 3 1 0 0 7 [illegible]
Generator I.D. No. | Waste I.D. No. | [illegible]

Item 1 to be completed by the generator (Instructions for completing and handling this document are on the reverse side)

Item	Identification	Address	Telephone No.	Date Shipped
Item 1. Generator Mobay Chemical Corporation	Generator I.D. No. 01231	P. O. Box 4913 Hawthorn Road Kansas City, MO 64120	(816)242-2000	3-10-81
Item 2. Transporter Bob's Home Service	Transporter No. H-1002	R. R. 1 Wright City, MO 63390	(314)745-3158	3-10-81
Item 3. Treatment, Storage or Disposal Facility Bob's Home Service	T.S.D. Facility Permit No. 721901	R. R. 1 Wright City, MO 63390	(314)745-3158	3-10-81

Item 4 Proper DOT Shipping Name	DOT Hazard Class	DOT Label Required or Exceptions	Quantity	Units*	Weight (If applicable)
Organic Phosphate Mixture Solid Waste	POISON B	POISON	52	1 2 (4) 5	

*Circle one: 1. tons, 2. gallons; 3. cubic yds; (4. drums - 55 gallon) or 5. Pounds

Item 5

Immediate Emergency Response Information	24-hour emergency telephone numbers
John F. Lawson Hugh P. Kissinger In the event of a spill, contact the National Response Center, U. S. Coast Guard, 800-424-8802	(816) 242-2523 Chemtrec 800-424-9300

SPECIAL HANDLING INSTRUCTIONS
Barrel integrity to be maintained

Item 6.

Placards Provided or Affixed
POISON

Shipper's Check List	
✓ DOT Labels Applied and Secure	✓ DOT Approved Containers
✓ Proper DOT Name on all Packages	✓ Checked for Proper Sealing
Air Cargo Only	Penguin Label Applied

Item 7 GENERATOR CERTIFICATION This is to certify that the above named materials are properly classified, described, packaged, marked, and labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation and the Missouri Department of Natural Resources.

Generator's Signature [signature] Date 3-10-81

Item 8 To be completed by the transporter

Item 9 TRANSPORTER CERTIFICATION This is to certify acceptance of the hazardous waste shipment. Date accepted for Shipment

Transporter's Signature [signature] Date 3-10-81

Item 10 TSDF CERTIFICATION This is to certify acceptance of the hazardous waste for treatment, storage or disposal

Signature Michael D. Gill Date 3-11-81

F[illegible]NR H.W.G. - 10
HAZARDOUS WASTE MANIFEST DOCUMENT
MISSOURI DEPARTMENT OF NATURAL RESOURCES
P. O. Box 1368, Jefferson City, Missouri 65102 314-751-3241

MANIFEST DOCUMENT NUMBE

0 1 2 3 1	0 0 [illegible]	0 7 5
Generator I.D. No.	Waste I.D. No.	Shipment No.

Part 1 to be completed by the generator (Instructions for completing and handling this document are on the reverse side)

Name	Identification	Address	Telephone No.	Date Shipped or Re[illegible]
Item 1. Generator Mobay Chemical Corporation	Generator I.D. No. 01231	P. O. Box 4913 Hawthorn Road Kansas City, MO 64120	(816)242-2000	x 3-10-81
Item 2. Transporter Bob's Home Service	Transporter No. H-1002	R. R. 1 Wright City, MO 63390	(314)745-3158	x 3-10-81
Item 3. Treatment, Storage or Disposal Facility Bob's Home Service	T.S.D. Facility Permit No. 721901	R. R. 1 Wright City, MO 63390	(314)745-3158	3-10-81

Item 4. Proper DOT Shipping Name	DOT Hazard Class	DOT Label Required or Exceptions	Quantity	Units*	Weight (if applicab[illegible]
Hazardous Waste Solid N.C.S	~~N/A~~ ORM-E	N/A	25	1 2 3 (4) 5	

*Circle one: 1. tons; 2. gallons; 3. cubic yds; (4. drums - 55 gallon); or 5. Pounds

Item 5.

Immediate Emergency Response Information
John F. Lawson
Hugh P. Kissinger
In the event of a spill, contact the National Response Center, U. S. Coast Guard, 800 424 8802

24-hour emergency telephone numbers
(816) 242-2523
Chemtrec 800-424-9300

SPECIAL HANDLING INSTRUCTIONS APPREL INTEGRITY TO BE ~~Empty drums may contain toxic dust.~~ MAINTAINED

Item 6. N/A Placards Provided or Affixed

Shipper's Check List

✓	DOT Labels Applied and Secure	✓	DOT Auth Containers
✓	Proper DOT Name on all Packages	✓	Checked fo Proper Sealing
	Air Cargo Only		Pe[illegible]

Item 7. GENERATOR CERTIFICATION This is to certify that the above named materials are properly classified, described, packaged, marked, and labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation and the Missouri Department of Natural Resources.

Generator's Signature x [signature] Date x 3-10-81
Part 1

To be completed by the transporter

Item 8. TRANSPORTER CERTIFICATION This is to certify acceptance of the hazardous waste shipment. Date accepted for Shipment.

Transporter's Signature x [signature] Date x 3-10-81
Part 2

Item 9. TSDF CERTIFICATION This is to certify acceptance of the hazardous waste for treatment, storage or disposal

TSDF Signature Michael D Gill Date 3-11-81

Form R.H.W.G. - 10
HAZARDOUS WASTE MANIFEST DOCUMENT
MISSOURI DEPARTMENT OF NATURAL RESOURCES
P. O. Box 1368, Jefferson City, Missouri 65102

Return To:
ENVIRONMENTAL POLLUTION CONTROL
McDONNELL DOUGLAS CORP.
P. O. BOX 516 (DEPT. 191C)
ST. LOUIS, MO 63166
314-751-3241

MANIFEST DOCUMENT NUMBER

0 1 2 5 2	0 3 8	1 6
Generator I.D. No.	Waste I.D. No.	Shipment No

Part 1 to be completed by the generator (Instructions for completing and handling this document are on the reverse side)

Name	Identification	Address	Telephone No.	Date Shipped or Rec'd
Item 1. Generator MCDONNELL DOUGLAS CORP. - ST. LOUIS	Generator I.D. No. MOD 000818922 01001	P.O. BOX 516 ST. LOUIS, MO 63166	(314) 232-3319	11 Mar 81
Item 2. Transporter B.H.S., INC. "If unable to deliver to designated TSD Facility, return to Generator."	Transporter No. MOD 068521228 H-1002	R.R. 1, BOX 116-F WRIGHT CITY, MO 63390	(314) 946-4782	11 Mar 81
Item 3. Treatment, Storage or Disposal Facility B.H.S., INC.	T.S.D. Facility Permit No. MOD 068521228 LF01	R.R. 1, BOX 116-F WRIGHT CITY, MO 63390	(314) 946-4782	11 Mar 81

Item 4. Proper DOT Shipping Name	DOT Hazard Class	DOT Label Required or Exceptions	Quantity	Units*	Weight (If applicable)
HAZARDOUS WASTE, N.O.S.	ORM-E		1	1 2 (3) 4 5	

*Circle one: 1. tons, 2. gallons, (3. cubic yds) 4. drums - 55 gallon, or 5. Pounds

Item 5.

Immediate Emergency Response Information	24-hour emergency telephone numbers
In the event of a spill, contact the National Response Center, U. S. Coast Guard, 800 424 8802	(314) 232-0232 Chemtrec 800-424-9300

SPECIAL HANDLING INSTRUCTIONS

Item 6. Placards Provided or Affixed

Shipper's Check List

DOT Labels Applied and Secure	DOT Auth. Containers
Proper DOT Name on all Packages	Checked for Proper Sealing
Air Cargo Only	Poison Label Applied

Item 7. GENERATOR CERTIFICATION. This is to certify that the above named materials are properly classified, described, packaged, marked, and labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation and the Missouri Department of Natural Resources.

Generator's Signature [signature] Date 3-11-81

Part 2
To be completed by the transporter

Item 8. TRANSPORTER CERTIFICATION. This is to certify acceptance of the hazardous waste shipment. Date accepted for Shipment:

Transporter's Signature [signature] Date 3-11-81

Part 3

Item 9. TSDF CERTIFICATION. This is to certify acceptance of the hazardous waste for treatment, storage or disposal.

TSDF Signature [signature] Date 11 Mar 81

Form [illegible] H.W.G. - 10
HAZARDOUS WASTE MANIFEST DOCUMENT
[illegible]SSOURI DEPARTMENT OF NATURAL RESOURCES
P. O. Box 1368, Jefferson City, Missouri 65102

Return To:
ENVIRONMENTAL POLLUTION CONTROL
McDONNELL DOUGLAS CORP.
P. O. BOX 516 (DEPT. 191C)
ST. LOUIS, MO [illegible]
314-751-3241

MANIFEST DOCUMENT NUMBER

0 1 2 4 8	0 3 8	4 1 5
Generator I.D. No.	Waste I.D. No.	Shipment No.

[illegible] to be completed by the generator (Instructions for completing and handling this document are on the reverse side)

[illegible]me	Identification	Address	Telephone No.	Date Shipped or Rec'd
[illegible]m 1. Generator MCDONNELL DOUGLAS CORP. - ST. LOUIS	Generator I.D. No. MOD 000818906 02148	P.O. BOX 516 ST. LOUIS, MO 63166	(314) 232-3319	11 Mar 81
[illegible]m 2. Transporter "If unable to deliver to designated TSD Facility, return to Generator." B.H.S., INC.	Transporter No. MOD 068521228 H-1002	R.R. 1, BOX 116-F WRIGHT CITY, MO 63390	(314) 946-4782	11 Mar 81
[illegible]m 3. Treatment, Storage or Disposal Facility B.H.S., INC.	T.S.D. Facility Permit No. LF01 MOD 068521228	R.R. 1, BOX 116-F. WRIGHT CITY, MO 63390	(314) 946-4782	11 Mar 81

[illegible]m 4 Proper DOT Shipping Name	DOT Hazard Class	DOT Label Required or Exceptions	Quantity	Units*	Weight (If applicable)
HAZARDOUS WASTE, SOLID, N.O.S.	ORM-E		4	1 2 (3) 4 5	

*Circle one: 1. tons; 2. gallons; (3. cubic yds); 4. drums - 55 gallon; or 5. Pounds

Item 6. Placards Provided or Affixed

[illegible]m 5 [illegible]

Immediate Emergency Response Information	24-hour emergency telephone numbers
In the event of a spill, contact the National Response Center, U. S. Coast Guard, 800-424-8802	(314) 232-0232 Chemtrec 800-424-9300
SPECIAL HANDLING INSTRUCTIONS	

Shipper's Check List

	DOT Labels Applied and Secure		DOT Auth Containers
	Proper DOT Name on all Packages		Checked for Proper Sealing
	Air Cargo Only		Pel[illegible] Label Applied

[illegible]m 7. GENERATOR CERTIFICATION. This is to certify that the above named materials are properly classified, described, packaged, marked, and labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation and the Missouri Department of Natural Resources.

[illegible]nerator's Signature [signature] Date 3-11-81

[illegible] be completed by the transporter

[illegible] TRANSPORTER CERTIFICATION. This is to certify acceptance of the hazardous waste shipment. Date accepted for Shipment:

[illegible]ansporter's Signature [signature] Date 3-11-81

[illegible] TSDF CERTIFICATION. This is to certify acceptance of the hazardous waste for treatment, storage or disposal

[signature] 11 Mar 81

Form UNRHWG-10
HAZARDOUS WASTE MANIFEST DOCUMENT
MISSOURI DEPARTMENT OF NATURAL RESOURCES
P.O. Box 1368, Jefferson City, Missouri 65102

ENVIRONMENTAL POLLUTION CONTROL
McDONNELL DOUGLAS CORP.
P. O. BOX 516 (DEPT. 191C)
ST. LOUIS, MO 63166 (314) 232-3319

MANIFEST DOCUMENT NUMBER

0 1 0 0 1	0 3 8	1 4
Generator I.D. No.	Waste I.D. No	Shipment No.

Item 1 to be completed by the generator (Instructions for completing and handling this document are on the reverse side)

Name	Identification	Address	Telephone No.	Date Shipped or Received
Item 1. Generator McDONNELL DOUGLAS CORP. - ST. LOUIS	Generator I.D. No. MOD 000818963 01001	P.O. BOX 516 ST. LOUIS, MO 63166	(314) 232-3319	11 Mar 81
Item 2. Transporter "If unable to deliver to designated TSD Facility, return to Generator." B.H.S., INC.	Transporter No. MOD 068521228 H-1002	R.R. 1, BOX 116-F WRIGHT CITY, MO 63390	(314) 946-4782	11 Mar 81
Item 3 Treatment, Storage or Disposal Facility B.H.S., INC.	T.S.D. Facility Permit No. MOD 068521228 LF01	R.R. 1, BOX 116-F WRIGHT CITY, MO 63390	(314) 946-4782	11 Mar 81

Item 4. Proper DOT Shipping Name	DOT Hazard Class	DOT Label Required or Exceptions	Quantity	Units*	Weight (If applicable)
HAZARDOUS WASTE, SOLID, N.O.S.	ORM-E		11	1 2 (3) 4 5	

*Circle one: 1. tons; 2. gallons; (3. cubic yds.); 4. drums - 55 gallon; or 5. Pounds

Item 5

Immediate Emergency Response Information	24-hour emergency telephone numbers
In the event of a spill, contact the National Response Center, U. S. Coast Guard, 800-424-8802	(314) 232-0232 Chemtrec 800-424-9300
SPECIAL HANDLING INSTRUCTIONS	

Item 6.

Placards Provided or Affixed	

Shipper's Check List			
	DOT Labels Applied and Secure		DOT Approved Containers
	Proper DOT Name on all Packages		Checked for Proper Sealing
	Air Cargo Only		Peligro Label Applied

Item 7. GENERATOR CERTIFICATION. This is to certify that the above named materials are properly classified, described, packaged, marked, and labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation and the Missouri Department of Natural Resources.

Generator's Signature [signature] Date 3-11-81

Items completed by the transporter

Item 8. TRANSPORTER CERTIFICATION. This is to certify acceptance of the hazardous waste shipment. Date accepted for Shipment:

Transporter's Signature [signature] Date 3-11-81

Item 9. TSDF CERTIFICATION. This is to certify acceptance of the hazardous waste for treatment, storage or disposal

Signature [signature] Date 11 Mar 81

Department Final Copy

Form DNRHWG-10
HAZARDOUS [illegible] MANIFEST DOCUMENT
MISSOURI DEPAR[illegible] OF NATURAL RESOURCES
P. O. Box 1368, Jefferson City, Missouri 65102 314-751-3241

Generator I.D. No.	Waste I.D. No.	[illegible]pment No.
01317	001	207

Part 1 to be completed by the generator (Instructions for completing and handling this document are on the reverse side)

Name	Identification	Address	Telephone No.	Date Shipped or Rec'd
LITTON SYSTEMS, INC ADVANCED CIRCUITRY DIV				
Item 1. Generator: ADVANCED CIRCUITRY DIVISION LITTON SYSTEMS, INC.	Generator I.D. No. 01317	4811 W. KEARNEY SPRINGFIELD, MO 65803	417-862-0751	3/12/81
Item 2. Transporter: BHS, INC. WRIGHT CITY, MO.	Transporter No. A1002	RRI WRIGHT CITY, MO 63390	314-745-3158	3/12/81
Item 3. Treatment, Storage or Disposal Facility: BHS, INC WRIGHT CITY, MO	T.S.D. Facility Permit No. 721901 LF01	RRI WRIGHT CITY, MO 63390	314-745-3158	

Item 4. Proper DOT Shipping Name	DOT Hazard Class	DOT Label Required or Exceptions	Quantity	Units*	Weight (If applicable)
NOT OTHERWISE SPECIFIED	C 2		10	1 2 3 4 5	76040

*Circle one: 1. tons; 2. gallons; 3. cubic yds; 4. drums - 55 gallon; or 5. Pounds

Item 5

Immediate Emergency Response Information	24-hour emergency telephone numbers
JIM DOW In the event of a spill, contact the National Response Center, U. S. Coast Guard, 800 424 8802	417-883-9785 Chemtrec 800-424-9300
SPECIAL HANDLING INSTRUCTIONS NONE	

Item 6. Placards Provided or Affixed

Shipper's Check List

	DOT Labels Applied and Secure		DOT Auth Containers
	Proper DOT Name on all Packages		Checked for Proper Sealing
	Air Cargo Only		Peligro Label Applied

Item 7 GENERATOR CERTIFICATION This is to certify that the above named materials are properly classified, described, packaged, marked, and labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation and the Missouri Department of Natural Resources

Generator's Signature [signature] Date 3/1/81

[illegible] completed by the transporter

Item 8 TRANSPORTER CERTIFICATION. This is to certify acceptance of the hazardous waste shipment. Date accepted for Shipment

Transporter's Signature [signature] Date 3/12/81

Item 9 TSDF CERTIFICATION This is to certify acceptance of the hazardous waste for treatment, storage or disposal

[illegible]ature [illegible] [illegible]te [illegible]

Attachment 3E General RCRA Compliance Information.

Contents: Site Personnel Job Descriptions
BHS Operating Log (Excerpts)
Closure and Post Closure Cost Estimates
Waste Location Records

6. SITE PERSONNEL

Site personnel will be comprised of the following job descriptions:

1. Owner/operator - Officer of BHS, Inc. with power to make all [illegible] concerning proper running of site. GLENNON ZYKAN LAVERNE ZYKAN

2. Site Manager - College graduate with degree in chemistry or chemical engineering. Duties are comprised of running the site in the manner outlined in the permit, screening all wastes for compatibility with landfilling requirements, scheduling waste shipments, setting safety requirements for each waste, [illegible] the training program, emergency first-aid capabilities and operation of heavy equipment. MICHAEL GILL

3. Operator/foreman - The operator/foreman must have demonstrated the ability to handle heavy equipment, have a knowledge of the proper application of safety equipment, demonstrate the ability to read and use a grid coordinate system and comprehension of basic emergency first-aid. BRUCE BOTE

The duties of an Operator/foreman are handling heavy equipment, supervision of waste unloading, responsibility for worker utilization of safety equipment, recording of waste coordinates, emergency response coordinator and first-aid during absence of the Site Manager and daily site inspections.

4. Operator - An operator must have demonstrated the ability to handle heavy equipment, proper use of safety equipment. The duties of an operator are handling heavy equipment, unloading of waste, removal of leachate and trench water, application of daily cover and maintenance of trenches. JIM BOYLES

5. General Laborer - A general laborer must have demonstrated a knowledge of the proper use of safety equipment. The duties of a laborer are unloading the waste and helping the operators in performance of site maintenance.

6. Truck Driver - The general truck driver must have demonstrated the ability to handle the site trucks, received the appropriate license and know the proper use of safety equipment. The duties of the general truck driver are the same as the general laborer in addition to transportation of dirt and fill materials.

7. Hazardous Waste Driver - Must demonstrate the same qualifications as the general truck driver as well as a comprehension of the [illegible] spill response. The duties of the hazardous waste driver are the [illegible] transportation of hazardous waste. RON Philyou, SHERMAN BROCKMEIR, [illegible]

8. Secretary - The secretary must have the basic secretarial skills as well as the ability to operate a C.B. radio. The duties of the secretary are those associated with a secretarial position and outside communications [illegible] emergencies. PAT HULL

9. MECHANIC VICTOR BROCKFIELD

March 5 1981

Temp [illegible]
Wind out of Northwest
rainfall 6/10" rainfall

Site inspection: [illegible]
[illegible]
No other abnormalities noted [illegible]

Visitors:
Daniel E. [illegible]
[illegible] MDNR
Sam [illegible] DNR

March 6, 1981

Temp: 38°F
Wind out of: Northwest
rainfall: 0.0"
Site inspection: No Abnormalities noted
Visitors: MD Gill

March 9, 1981

Temp: 50°F
Rainfall: 0.0"
Wind out of South

Site Inspection: No Abnormalities noted
MD Gill

March 10 1981

Visitors
Truett DeGeorge, U.S. EPA, Washington, D.C.

Stephen Lingle, US EPA Washington, DC.
JOHN ZIRSCHKY ECOLOGY & ENVIRONMENT K.C. KS.
KENNETH SNELL Ecology & Environment KC KS
RICHARD KLUG FORD MOTOR CO.
Jack T. McKenny
JOHN ZIRSCHKY E&E, KCKS
KENNETH SNELL E&E, KC KS.

Temp 50°F
Wind out of Northwest.
rainfall 0.0"

Site inspection: No Abnormalities other than well 6 see 5 March 81
M D Gill

March 11, 1981
Temp: 33°
Wind out of Northeast
Rainfall 0.0"
Visitors:
JOHN ZIRSCHKY E&E KCKS
PHIL KEARY EPA KCKS
Reed Melburger MDNR [illegible]
Stephen Lingle EPA Wash DC.
Ken Gunburg MDNR - SCRO
Sam Brunch MDNR - SCRO
[illegible] Remedians
David [illegible] Rudge Jr.

Closure Cost Estimate

At any one time there will be only three (3) active trenches (a) Organic (b) Alkaline (c) Acid. The largest trenches assigned to each category are as follows:

(a)	Organic	250' X 75'	=	18,750 sq. feet
(b)	Alkaline	330' X 35'	=	11,550 sq. feet
(c)	Acid	65' X 55'	=	3,575 sq. feet
				33,875 sq. feet

The largest area needing final closure during the lifetime of the site will be 33,875 sq. feet. Cost estimates for closure of the Site are based on actual costs incurred for final cover during 1980.

I.		$4,160.00
II.		416.00
III.		645.00
IV.		480.00
V.	Final topographical survey by aerial photo one time only	1,500.00
	Total	$7,201.00

I. Placement of 5' of cover over finished site

(a) 6 - 8" per 8 hour day per acre (1 scraper)
(b) 10 days to complete one acre @ 5' depth
(c) 10 days X 8 hours/day = 80 hours
(d) @ $52.00 per hour X 80 hours = $4,160 per acre $4160.00

II. Compaction of 6 - 8" intervals with sheeps foot

(a) To compact to 95% maximum by density requires [illegible] hours for each interval.
(b) For 2' of compaction it takes 2' + 0.5' X [illegible] hours 8 hours
(c) @ $52.00 per hour X 8 hours = $416.00 per acre 416.00

III. Compaction testing cost estimate
(a) Reitz and Jens estimate @ $0.20 per cu. yard
(b) 43560 square feet/acre X 2 foot = 87120 cu. feet
(c) 87120 cu. feet ÷ 27 cu. feet/cu. yard = 3226 cu. yds.
(d) @ $0.20/cu. yard X 3226 cu. yds. = 645.00 per acre 645.00

IV. Fertilize/lime/seed/mulch for cover

(a) Fertilizer @ 300 lbs/acre @ $5.00 per 50 lb. bag $30.00

Calculation of Post Closure Cost Trust Fund

6 wells to be monitored

Yearly	Chloride	$6.00 (1980 cost)	
	Iron	15.00	
	Manganese	12.50	
	Phenols	21.00	
	Sodium	12.50	
	Sulfate	11.50	
		$78.50	X 6 = $471.00
Semi-Yearly	Ph	7.00	
	Specific Conductance	7.50	
	TOC	29.00	
	TOX	75.00	
	Sampling/elevations	250.00	
		$360.50	
		X 2	
		$721.00	X 6 = $4326.00

Maintenance (See Engineering report Area 1)

176 manhours X $10.00/hr = $1760.00

Total $6557.00
X 30

$196,710.00

Cost Per Acre for Closure of Site

I. Placement of 5' of cover over finished site

(a) 6 - 8" per 8 hour day per acre (1 scraper)
(b) 10 days to complete one acre @ 5' depth
(c) 10 days X 8 hours/day = 80 hours
(d) @ $52.00 per hour X 80 hours = $4,160 per acre $4160.00

II. Compaction of 6 - 8" intervals with sheeps foot

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(a) Reitz and Jens estimate @ $0.20 per cu. yard
(b) 43560 square feet/acre X 2 foot = 87120 cu. feet
(c) 87120 cu. feet ÷ 27 cu. feet/cu. yard = 3226 cu. yds.
(d) @ $0.20/cu. yard X 3226 cu. yds. = 645.00 per acre 645.00

IV. Fertilize/lime/seed/mulch for cover

(a) Fertilizer @ 200 lbs/acre @ $5.00 per 50 lb. bag $20.00
(b) Lime @ 15 ton per acre @ $4.00 per ton $60.00
(c) Seed @ 40 lb./acre @ $2.00 per lb. $80.00
(d) Labor @ one 40 hour week @ $8.00 per hour $320.00 480.00

Total per acre cost $5701.00

V. There are approximately 3.6 acrea which would need cover in the remaining acreage.

3.6 acres X $570/per acre = $20,5[illegible].00

VI. Final topographical survey by aerial photo

One time only 1,500.00

VII. Total cost for final site closure of entire remained area [illegible] (note 1980 dollars)

VIII. B.H.S., Inc. in its application indicated that it would:

(1) Start fund with $15,000.00 15,000.00

Closure Cost Estimate

At any one time there will be only three (3) active trenches (a) Organic (b) Alkaline (c) Acid. The largest trenches assigned to each category are as follows:

(a)	Organic	250' X 75'	=	18,750 sq. feet
(b)	Alkaline	330' X 35'	=	11,550 sq. feet
(c)	Acid	65' X 55'	=	3,575 sq. feet
				33,875 sq. feet

The largest area needing final closure during the lifetime of the site will be 33,875 sq. feet. Cost estimates for closure of the Site are based on actual costs incurred for final cover during 1980.

I.		$4,160.00
II.		416.00
III.		645.00
IV.		480.00
V.	Final topographical survey by aerial photo one time only	1,500.00
	Total	$7,201.00

Mobay Chemical, Kansas City, Mo. BHS0187
01231-009-078, 01231-007-078 76 drums 2/9/81
McDonnell Douglas, St. Louis, Mo. BHS0333
01001-038-332 01248-038-333 11 cu. yds. 2/9/81

X	42	56	42	56	16 - 19'
Y	30	30	60	60	

McDonnell Douglas, St. Louis, Mo. BHS0333
01001-038-339, 01248-038-340, 01253-038-341
9 cu. yds. 2/11/81

X	56	66	56	60	16 - 19'
Y	52	52	60	60	

McDonnell Douglas, St. Louis, Mo. BHS0333
01001-038-345, 01248-038-346 7 cu. yds. 2/13/81
Chevron Chemical, Maryland Heights, Mo. BHS0009
01160-001-004, 80 drums 2/13/81
Ford Motor Co., Hazelwood, Missouri BHS0003
01574-001-024 15 cu. yds. 2/13/81

X	40	40	88	88	22 - 25'
Y	0	8	0	8	

McDonnell Douglas Corp., St. Louis, Mo. BHS0333
01001-038-347, 01248-038-348 15 cu. yds. 2/16/81
Mobay Chemical Corp., Kansas City, Missouri BHS0187
01231-007-080, 01231-009-080 2/16/81 75 drums

X	0	0	40	40	21 - 23'
Y	0	8	0	8	

Chevron Chemical Co., Maryland Heights, Mo. BHS0362
01160-003-011 26 cu. yds. 2/17/81

X	0	61	0	61	23 - 25'
Y	0	0	4	4	

Mobay Chemical Corp., Kansas City, Mo. BHS0187
01231-009-082, 01231-007-082 77 drums 2/19/81

X	43	88	43	88	21 - 23'
Y	8	8	17	17	

McDonnell Douglas, St. Louis, Mo. BHS0333
01252-038-355, 01248-038-351, 01001-038-350
24 cu. yds. 2/18/81

X	68	88	68	88	23 - 25'
Y	8	8	16	16	

Mobay Chemical Corporation, Kansas City, Mo.
BHS0186 01231-009-084 25 cu. yds. 2/19/81

X	56	66	56	66	16 - 19'
Y	28	60	28	60	

Chevron Chemical, Maryland Heights, Mo. BHS0362
01160-003-012 2/20/81 20 cu. yds.
McDonnell Douglas, St. Louis, Mo. BHS0333
01001-038-359, 01248-038-360
14 cu. yds. 2/20/81

X	76	95	76	95	19 - 24'
Y	15	15	34	34	

Ford Motor Co., Hazelwood, Mo. BHS0003
01574-001-025 15 cu. yds. 2/21/81

X	25	41	25	41	20 - 23'
Y	4	4	15	15	

Trench 6 - N

Fabpak, Inc., St. Louis, Mo. BHS0334
01323-001-001 76 drums 11/24/80

X	31	31	61	61	0 - 3'
Y	0	18	0	16	

Fabpak, St. Louis, Mo. BHS0334
01323-004-002, 01323-001-002 61 dms. 11/25

X	45	60	45	60	4 - 7'
Y	0	0	18	16	

Emerson Electric Co., Ava, Missouri
01702-001-001 20 drums BHS0247 12/4/80

X	52	62	52	62	8 - 11'
Y	0	0	15	15	

Fabpak, Inc., St. Louis, Mo. BHS0334
01323-001-005 38 drums 12/22/80

X	52	52	62	62	12 - 15'
Y	0	16	0	16	
X	47	47	52	52	8 - 11'
Y	0	16	0	16	

Emergency ResponseUnit, D.N.R., Jefferson City, Mo.
Non-Regulated BHS0388 1 drums 1/7/81

X	50	50	52	52	12 - 15'
Y	0	2	0	2	

Mobay Chemical Corpoation, Kansas City, Mo.
BHS0366 01231-021-069 65 drums 1/24/81

X	0	31	0	31	0 - 3'
Y	0	0	10	10	

Mobay Chemical, Kansas City, Mo. BHS0366
01231-021-074 22 drums 2/3/81
Emerson Electric Co., Ava, Missouri BHS0247
01702-001-001 20 drums 2/3/81

X	0	31	0	31	0 - 3'
Y	10	10	16	16	

Intertherm, Inc., St. Louis, Mo. (Gustine) BHS0393
01335-003-001, 2 drums, 1/19/81

X	63	66	63	66	4 - 7'
Y	18	18	27	27	

Mobay Chemical, Kansas City, Mo. BHS0188
01231-001-066 72 drums 1/20/81

X	30	63	30	63	4 - 7'
Y	18	18	27	27	

Mobay Chemical, Kansas City, Mo. BHS0188
01231-001-068 72 drums 1/22/81

X	6	30	14	30	4 - 7'
Y	16	16	37	37	

Litton Advanced Circuitry, Springfield, Mo. BHS0197
01717-001-004 13 cu. yds. 1/23/81

X	14	22	20	28	4 - 7'
Y	36	36	46	46	

Wire Rope Company, St. Joseph, Mo. BHS0331
01232-006-009, 41 drums 1/24/81

X	30	44	30	44	4 - 7'
Y	28	28	36	36	

Century Operation Wagner Division Formerly Gould, Inc. St. Louis, Mo.
02325-001-001 15 cu. yds. BHS0390 1/26/81

X	0	16	6	12	- 14'
Y	0	0	14	10	

Union Carbide, Maryville, Mo. BHS0341
01541-001-016 1/27/81 63 drums

X	44	57	43	57	4 - 7'
Y	28	28	44	44	

Century Operation, Wagner Div., Formerly
Gould, Inc. 02325-001-002 BHS0390
15 cu. yds. 1/27/81
Great Lakes Container Corp., St. Louis, Mo.
BHS0310 01101-001-004 13 cu. yds. 1/27/81

X	16	23	8	18	9 - 14'
Y	0	0	20	14	

Mobay Chemical, Kansas City, Mo. BHS0188
01231-001-071 72 drums 1/28/81
Square D Co., Columbia, Mo. BHS0220
01242-001-007 38 drums 1/28/81
Toastmaster, Inc., Boonville, Mo. BHS0400
01716-001-001 38 drums 1/28/81

X	57	70	57	69	4 - [illegible]
Y	28	28	44	44	
X	40	68	40	68	
Y	44	44	70	69	

F[illegible] HWG 10
HAZARDOUS [illegible] MANIFEST DOCUMENT
MISSOURI DEPARTMENT OF NATURAL RESOURCES
P. O. Box 1368 Jefferson City, Missouri 65102 314 751 3241

MANIFEST DOCUMENT NUMBER

0 1 1 0 1	0 0 1	[illegible] 1 0
Generator I.D. No.	Waste I.D. No.	Shipment No.

Part 1 to be completed by the generator (Instructions for completing and handling this document are on the reverse side)

Name	Identification	Address	Telephone No.	Date Shipped or Re
Item 1 Generator GREAT LAKES CONTAINER CORPORATION	Generator I.D. No. 01101	P.O. Box 5496 Broadway Sta. St. Louis, Mo. 63147	314-436-1202	3/11/81
Item 2 Transporter B.H.S., INC.	Transporter No. B1002	RR 1, Box 116F Wright City, Mo. 63390	314-745-3371	3/11/81
Item 3 Treatment, Storage or Disposal Facility B.H.S., INC.	T.S.D. Facility Permit No. 721901	Same	Same	

Item 4 Proper DOT Shipping Name	DOT Hazard Class	DOT Label Required or Exceptions	Quantity	Units*	Weight (If applicable)
HAZARD WASTE - NOS	ORME	NA	14	2(3)4 5	23,000#

*Circle one: 1 tons, 2 gallons, 3 cubic yds, 4 drums, 55 gallons, 5 Pound

Item 5 Immediate Emergency Response Information

Bud Swank

In the event of a spill contact the National Response Center, U. S. Coast Guard, 800 424 8802

24 hour emergency telephone numbers

314-436-1202

Chemtrec 800 424 9300

SPECIAL HANDLING INSTRUCTIONS

WEAR PROTECTIVE CLOTHING, RUBBER GLOVES/FACE SHIELD/GOGGLES

Item 6 Placards Provided or Affixed

Shipper's Check List

DOT Label Applied [illegible]

Proper [illegible] Packages

[illegible]

Check Proper Seal [illegible]

Peligro Label Applied

Item 7 GENERATOR CERTIFICATION This is to certify the above named material [illegible] packaged, marked, and labeled, and are in proper condition for transportation according to the applicable [illegible] of the Department of Transportation and the Missouri Department of Natural Resources

Generator's Signature Bud Swank Date 3-11-81

Part 2

To be completed by the transporter

Item 8 TRANSPORTER CERTIFICATION This is to certify acceptance of the hazardous waste shipment. Date accepted for Shipment

Transporter's Signature Shannon W. Brockmeier Date 3-11-81

Part 3

Item 9 TSDF CERTIFICATION This is to certify acceptance of the hazardous waste for treatment, storage or disposal

Signature Date

Attachment 3F BHS Facility and Operations Manuals.

BHS, INC.
Hazardous Waste Disposal Facility-Area No. 1

Wright City, Mo.

April 1980

(As supplemented July 1980)

BOB'S HOME SERVICE, INC.

Hazardous Waste Disposal Facility

Area 1

Wright City, Mo.

April 1980

Revised

July 1980

BOB'S HOME SERVICE, INC.
Hazardous Waste Disposal Facility
Area 1
Wright City, Mo.

INDEX

	Page No.
I. GENERAL	1
II. GEOPHYSICAL INFORMATION	2
A. Hydrogeologic Information	2
B. Geology	6
C. Subsurface Investigation	7
D. Soil Analysis	8
E. Shallow Redeposition of Eroded Soils	13
III. OPERATION	14
A. Waste Characterization	14
B. Capacity of Area 1	15
C. Method of Operation	16
1. Coordinate System	16
2. Method of Disposal	16
3. Surface Water Runoff	18
4. Truck Wash	18
5. Unloading Station	18
6. Trench Leachate Collection System	18
7. Final Cover	19
8. Trench Preparation and Inspection	19
9. Filling Sequence	20
D. Infiltration	21
E. Evaporation Basins	22
F. Monitoring	23
G. Gases	24
H. Equipment	25
I. Personnel	26
J. Security	27
IV. PLAN FOR REMEDIAL ACTION	28
V. FINANCIAL RESPONSIBILITY	30
VI. CLOSURE PLAN	32
VII. POST CLOSURE PLAN	33

APPENDIX

Test Laboratory Report A

BOB'S HOME SERVICE, INC.
Hazardous Waste Disposal Facility
Area 1
Wright City, Mo.

The Zykan property, on which the Hazardous Waste Disposal Facility is located, is a tract of land in Section 32, T47N, R1W, Warren County, Missouri, being the West half of the Southeast quarter and the East half of the Southwest quarter, excepting therefrom, the Northern one-fourth of the Northeast quarter of the Southwest quarter and being more particularly described as follows:

Measure from an old stone at the Southeast corner of Section 32, 1319.32 feet along the South line of Section 32 to the point of beginning which is an iron pipe at the Southeast corner of the East half of the Southeast quarter of Section 32; thence along the East line of said West half N1°46'E, 2742.70 feet to an old iron pipe on the East/West centerline of Section 32; thence along said East/West centerline N88°12'W, 1328.43 feet to an old iron pipe at the center of Section 32; thence S1°46'W, 324.05 feet along the North/South centerline of Section 32 to a concrete monument, being the Southeast corner of a 10-acre, more or less, tract of land owned by H. and L. Ruppert; thence N88°12'W, 1341.77 feet along the South line of said Ruppert tract to a concrete monument on the West line of the East half of the Southwest quarter of Section 32; thence along said West line S1°46'W, 2420.20 feet to a concrete monument on the South line of Section 32; thence along the South line of Section 32, S88°14'W, 2670.20 feet to the point of beginning and containing 158.19 acres, more or less, according to survey by A. Zavradinos in June 1980.

The BHS, Inc. Hazardous Waste Disposal Facility, including the 200-foot buffer zone is located on a parcel of ground on and in the above described tract and is described as follows:

Measure from an old iron pipe at the center of Section 32, S1°46'W, 324.05 feet along the North/South centerline of Section 32 to a concrete monument which is the point of beginning; thence proceed N88°12'W along the North boundary of the previously described tract 1044.82 feet to a point; thence the following courses and distances: S11°21'32"E, 325.852 feet; thence S57°34'46"E, 163.812 feet to a point; thence S17°22'18"E, 309.951 feet to a point; thence S9°24'11"E, 272.035 feet to a point; thence S88°51'10"E, 330.42 feet to a point; thence S79°27'59"E, 276.668 feet to a point; thence S87°29'44"E, 167.112 feet to a point; thence S89°38'38"E, 437.063 feet to a point; thence N11°18'05"W, 410.277 feet to a point; thence N43°13'15"W, 157.965 feet to a point; thence N14°27'01"W, 244.093 feet to a point; thence N67°23'44"W, 116.230 feet to a point; thence N27°31'16"W, 232.549 feet to a point; thence N88°12'W, 37.28 feet to the point of beginning and containing 26.49 acres, more or less.

BOB'S HOME SERVICE, INC.
Hazardous Waste Disposal Facility
Area 1
Wright City, Mo.

I. GENERAL

BHS, Inc. has been operating a hazardous waste disposal facility since June 1977 on 15 acres (Area 1) of a 158-acre farm in the south half of Section 32, Township 47 North, Range 1 West, in Warren County, Mo. The area surrounding the landfill is basically rural. The land bordering the property is occupied by farmland and woods with Innsbrook (part-time vacation houses) south of this in Section 5 (see Sheets 1 and 2).

This landfill is approximately 30 miles west of the I-70 bridge over the Missouri River at St. Charles and can be reached by driving south about 5 miles from Wright City over all-weather roads.

This report concerns the continued operation of Area 1 with the necessary changes to be made to comply with the new Missouri Department of Natural Resources Hazardous Waste Management Regulations.

II. GEOPHYSICAL INFORMATION

A. Hydrogeologic Information

1. An examination of the records of the wells drilled into the St. Peter Sandstone (the shallowest substantial aquifer under the site), gives the information listed on Sheet 3 which also shows locations of those wells. The logs of the wells closest to the BHS, Inc. property (Nos. 1, 4, 5, 7 and 8) give the top of the St. Peter as varying from elevations 439 to 462 at depths of 325 to 385 feet. Information from Mo. DNR reports that the State water levels have declined about 20 feet the past 50 years. Water production from St. Peter yields less than 50 gpm.

2. Mo. DNR records do not possess sufficient data for development of meaningful water table contours in the bedrock aquifer.

3. Mo. DNR is of the opinion that groundwater movement in the St. Peter Sandstone is generally to the east into the Illinois Basin. Flow rates are not available. No groundwater aquifer was found or from stratification in test holes can be inferred to be able to develop above the bedrocks.

4. The St. Peter Sandstone is the shallowest major bedrock source of fresh potable groundwater throughout this region. It is of the Ordovician System of the Paleozoic Era, the Champlanian Series. In this area, the St. Peter underlays Mississippian Limestones with 60 feet or more of dense, effectively impermeable, unstratified glacial drift lying on top of the limestone. This drift, along with the leachate collection system, precludes contamination of the St. Peter or lower formations.

The water source with the highest yield (greater than 50 gpm) comes from the Roubidoux and Gasconade (Gunter member) formations which are over 800 feet below the surface.

5. Where the test hole (TH#42) reached bedrock limestone, water entered and rose in what was previously a dry hole, indicating the tightness of the drift and that it was an aquiclude. This tightness is equally effective whether the water tries to move upward, downward or laterally through the drift.

6. Table 1 gives the analyses of background water samples taken in April and June 1977 from: (1) "M" the monitoring well in the southeastern corner of Area 1; (2) "E" the open stream near southwest corner of BHS, Inc. property; (3) "O" the 'old well' about 160 feet south of the southwest corner of Area 1; and (4) "Z" the Zykan residence well.

The April 11, 1977 samples for wells "O", "E" and "Z" all meet the Drinking Water Standards except for somewhat high phenol contents. Water from the monitoring well "M" exceeds the allowable drinking water standard for arsenic, barium, chromium, iron, lead, phenol, sulphate.

The June 16, 1977 samples were obtained from "M", "O" and "E". The iron content is above drinking water standards in all three wells, significantly high in "M" and "O". Phenols remain somewhat above the drinking water desirables. In all three wells the sulphates are high (see Appendix A).

TABLE 1

BHS, Inc. Site Water Quality Analyses Background Data

Test For	Unit	Well "M" 4/11/77	Well "M" 6/8/77	Well "O" 4/11/77	Well "O" 6/8/77	Sampling Pt. "E" 4/11/77	Sampling Pt. "E" 6/8/77	Well "Z" 4/11/77	EPA Drinking Water Stds. in ppm
Arsenic	ppb	216.	-	-	-	-	-	-	0.05
Barium	ppb	1120.	104.	62.2	52.9	89.0	114.	64.5	1.0
BOD, 5-day	ppm	7.08	55.3	1.43	9.64	3.06	4.19	1.19	
Cadmium	ppb	6.22	-	-	-	-	-	-	0.01
Cobalt	ppb	126.	-	-	-	-	-	-	
Chromium	ppb	70.1	7.34	-	-	-	-	-	0.05
COD	ppm	1.95	461.	2.34	40.3	290.	15.5	25.7	
Iron	ppb	620.	2330.	200.	1490.	190.	413.	160.	
Cyanide	ppm	0.0110	-	-	-	-	-	-	0.2
Nickel	ppb	298.	-	-	273.	-	-	-	
Lead	ppb	656.	-	26.1	-	8.25	-	-	0.05
Phenol	ppb	5.60	1.70	6.10	4.90	7.10	3.50	5.60	
Fluoride	ppm	0.461	0.292	0.469	0.262	0.566	0.195	0.620	1.4-2.4
pH	pH	7.20	7.20	7.20	7.00	7.80	7.00	7.60	
Sulfate	ppm	1110.	1220.	1110.	1120.	66.6	53.2	67.7	
Zinc	ppb	220.	222.	770.	1060.	-	-	230.	
Silver	ppb	-	-	-	-	-	-	-	0.05
Copper	ppb	-	-	-	-	-	-	-	
Mercury	ppb	-	-	-	-	-	-	-	0.002
Selenium	ppb	-	8.31	-	8.82	-	-	-	0.01
Tin	ppm	-	-	-	-	-	-	-	
Spec. Conduct.	mmpc	2.01	2.20	2.05	2.14	343.	0.371	561.	
Nitrate	ppm	-	0.330	-	0.270	-	0.310	-	10
ORGANO-PHOSPHATE									
Thimet	ppm	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	
Diazionon	ppm	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	
Disulfoton	ppm	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	
Methyl Parathion	ppm	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	
Malathion	ppm	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	
Parathion	ppm	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	
Thiodan	ppm	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	
Ethion	ppm	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	
Trithion	ppm	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	
PESTICIDES & PCB									
Lindane	ppm	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	
Heptachlor	ppm	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	
Aldrin	ppm	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	
Heptachlor Epoxide	ppm	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	
DDT (total)	ppm	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	
Dieldrin	ppm	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	
Technical Chlordane	ppm	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	
Methoxychlor	ppb		<0.10		<0.10		<0.10		
Polychlorinated Biphenyls	ppm	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15		
Toxaphene	ppb		<0.10		<0.10		<0.10		
DDE	ppm	<0.02		<0.02		<0.02		<0.02	
Endrin	ppm	<0.02		<0.02		<0.02		<0.02	

Well "M" is monitoring well at southeast corner of Area No. 1.
Well "O" is old well, 150 feet south of southwest corner of Area No. 1.
Well "Z" is well at Zykan residence, near northwest corner of Zykan Farm.
Sampling Point "E" is near the southwest corner of Zykan Farm where creek leaves property.

mmpc - Millimhos/centimeter at 25°C.
ppm - Parts per million
ppb - parts per billion

Prepared by KEITZ & [illegible], INC.
April 1980

INITIAL WATER ANALYSIS FOR PIEZOMETER WELLS

Piezometer		P-1	P-2	P-3	P-4	P-5	P-6	P-7	P-8	P-9	P-10	P-11	P-12	P-13	P-14	P-15	P-16
Date First Tested		*	*	*	9-79	8-77	8-77	8-77	8-77	8-77	8-77	8-77	6-79	8-77	9-79	3-79	*
Test For	Unit																
Arsenic	ppm				≤.002	.004	.002	.003	.007	.004	.002	.004	≤.028	.003	.0343	—.002	
Barium	ppm												≤.03				
BOD, 5-day	ppm																
Cadmium	ppm					0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	≤0.02	<0.01			
Cobalt	ppm																
Chromium	ppm					0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	≤0.01	<0.01			
COD	ppm				112										12	67.2	
Iron	ppm				.24	1.06	0.07	0.11	0.11	0.10	0.07	0.10		0.60	.24	5.8	
Cyanide	ppm												≤.002				
Nickel	ppm					0.05	0.04	0.04	0.04	0.04	0.02	0.04	.07	0.04			
Lead	ppm					0.11	0.06	0.06	0.06	0.06	0.06	0.06	≤0.05	0.01			
Phenol	ppm												≤.1				
Fluoride	ppm					0.30	0.15	0.24	0.18	0.15	0.60	0.60	≤.02	0.29			
pH	pH				6.9	6.75	6.95	6.93	6.88	6.85	7.07	7.18		8.08	7.5	6.6	
Sulfate	ppm												2000				
Zinc	ppm					0.08	0.02	0.02	0.02	0.03	0.02	0.02	.28	0.01			
Silver	ppm												≤.01				
Copper	ppm					0.02	0.01	0.01	0.01	0.01	0.01	0.01	≤0.01	0.01			
Mercury	ppm												.0018				
Selenium	ppm												≤.002				
Tin	ppm																
Spec. Condust.	mmpc				3300	1916	2041	1965	2083	2439	1592	1980		1695	3200	1880	
Nitrate	ppm												.70				

*No water for analysis in June 1979 for these wells.

ppm - parts per million

Prepared by
REITZ & JENS, INC.

TABLE 2

7. This site is in an area of Missouri glacial drift with thicknesses in excess of 60 feet in depth with limestone bedrock below the drift. In Section 32 records indicate some areas have formations of Mississippian and others of the Ordovician System as shallowest bedrock. Characteristics of glacial drift are denseness and impermeability when unstratified.

The current and projected regimen of surface water resources in the area is wet weather streams running from valley heads. No development of a connection between water which may seep into the landfill and natural groundwater is foreseen. The tills (drift) are effectively impermeable due to good gradational characteristics and high densities. Transmissibility is very low because of the thickness of the till and its relative impermeability which preclude contamination of groundwater from bedrock aquifers below the glacial tills used for domestic supplies.

The 158-acre property of BHS, Inc. is at the upper end of a watershed which starts about 2-1/2 miles southwest of Wright City in Warren County, Mo. and drains southwestwardly to Charette Creek which discharges into the Missouri River about 5 miles upstream of Washington, Mo.

No precipitation record is available for Wright City but the National Weather Service reports the following annual average rainfalls in inches for the following stations:

Troy (11.5 miles north of Wright City)	37.51
Warrenton (7.0 miles west of Wright City)	37.15
Washington (19.0 miles south of Wright City)	38.02

Plate 1, "Gaging Stations, Average Annual Runoff, Soil Infiltration Values and Areas of Anomalous Runoff in Missouri", 1973, from Water Resources Report 28, "Flood-Volume Design Data for Missouri Streams" by John Skelton, U.S. Geological Survey, prepared in cooperation with Missouri Geological Survey and Water Resources (1973) indicates the average annual runoff at the location of the property of BHS, Inc. is 9.6 inches; and the average soil infiltration value is 2.6 inches. This map also shows the average soil infiltration increasing to 3.5 inches south of the BHS, Inc. property.

Average annual lake evaporation at St. Louis for the 50-year record 1911-1962 was 35.21 inches ("Lake Evaporation in Illinois" by W. J. Roberts and John B. Stall; Illinois State Water Survey Report of Investigation 57, Urbana, 1967). Columbia, Mo. for the period 1891-1940 with a mean annual precipitation of 38.09 inches had 40.69 inches of mean annual evaporation ("Evaporation From Lakes and Reservoirs: A Study Based on 50-Years' Weather Bureau Records", directed by Adolph F. Meyer; Minnesota Resources Commission, St. Paul, Minn.; June 1942). This same reference for the same 50 years (1891-1940) shows that St. Louis, with a then mean annual precipitation of 36.57 inches, had 40.99 inches mean annual (lake) evaporation.

Evapotranspiration is substantially equivalent to total evaporation which "....is the sum of water lost from a given land area during any specific time by transpiration from vegetation and building of plant tissue; by evaporation from water surfaces, moist soil and snow; and by interception. The term is applied primarily to stream drainage basins for the period of the annual climatic cycle of subdivision of that period. Total evaporation is essentially precipitation upon the drainage basin minus runoff, corrected for change in storage volume

within the basin and for subsurface leakage" (from Lee, C. H.; "Transpiration and Total Evaporation", Chapter 8 in O. E. Meinzer (ed): "Hydrology", Volume IX of "Physics of the Earth", McGraw-Hill Co., Inc., New York, 1942).

Using an average annual rainfall of 37.3 inches and an average annual runoff of 9.6 inches the total evaporation at the property of BHS, Inc. is 27.7 inches. The portion of this that is strictly "transpiration" depends upon the types of vegetation on the watershed; trees can use 10 to 40 inches, tall grasses 20 to 30 inches, crops 12 to 48 inches annually.

There are 333 acres of upper watershed that drain surface runoff onto BHS, Inc. property. Adding to this the 158 acres within BHS, Inc. property, the surface runoff from 483 acres leaves the property.

The tight, effectively impermeable soils of the BHS, Inc. site are deep enough to preclude any "in and out" underflow. The limited information about the principal aquifer under the site, the St. Peter Sandstone, shows the top of the aquifer falling toward the east and north. Wells 23214, 26843 and 26966 indicate cop of the St. Peter at elevations 448, 462 and 441, respectively (23214 is about 1/2-mile northwest of BHS, Inc.; 26843 is about a mile west and 26966 about a mile east of BHS, Inc.). Well 27016 with top of St. Peter at 439 is about 1/2-mile southwest of the BHS, Inc. site.

The impact of the operations of BHS, Inc. on the existing water balance as to quantities is not significant. Surface and groundwater quality as they may be affected by the BHS, Inc. operation should be unchanged under the procedures and monitoring precautions governing the operation.

The existing and proposed slopes of the site are of the order of 3% to 10% and consequently, surface runoff is and will be relatively rapid with low detention of surface flows in the many small depressions which exist on all natural or man-made surfaces. The rapid surface runoff together with the lesser depression storage results in smaller amounts of infiltration than would occur in flatter terrain.

B. Geology

BHS, Inc. is located in the south half of Section 32, Township 47 North, Range 1 West, 2.5 miles southwest of Wright City. It is an area of thick Kansan glacial drift (in excess of 60 feet). The highest bedrock formations in the region are Mississippian Age shales and limestones of the Burlington and Fern Glen Formations under the thinner portion of the drift (typicaly 30' to 60' thick).

The Chouteau and Sulphur Springs Group are above the Burlington. Ordovician Age Formations (Kimmswick, Decorah or Plattin) are beneath the Mississippian rock. The large unconformity between formations of Ordovician and Mississippian Ages results from absence of Silurian and Devonian soils in this part of Missouri.

A paleo-erosional surface is at the contact between the bedrock and the drift of the Pleistocene Epic. A broad bedrock valley is indicated from the northwest to southeast. This erosional valley was filled with the massive, fine-grained drifts during the Pleistocene Epic. Through information gathered from the Mo. DNR this drift thickness greater than 60 feet in the erosional valley filled with massive, fine-grained, effectively tight drift is unusual and most favorable for

this type disposal operation. The disposal facility is situated over or close to the center of this thick drift valley (see Bedrock Stratigraphy, Sheet 5). The large thicknesses of effectively tight drifts, both vertical and horizontal in this valley, should curtail groundwater from migration downward or dispersal laterally.

In the northeast-southwest surface draw (Sheet 1), with intermittent stream through BHS, Inc., neither bedrock outcrops nor springs have been detected. Further, no bedrock outcrops, springs or sinkholes have been indicated during field inspection within the 158-acre farm. No field inspection has been performed on adjacent properties.

Drift: Overlying the bedrock in this area is a thick (60+ feet beneath all parts) glacial moraine. The drift in the moraine during test drilling was generally tight and dry. The holes were advanced by a continuous flight auger. This Pleistocene drift from the Kansan glacier is of a CL soil known to be fairly stiff clays of uniform texture, pre-consolidated and effectively impervious to fluid flow. Overlying the till are Putnam or related soils of windblown origin. A shallow clay pan soil profile is in the weathered loess near the natural surface grades.

Test drilling indicated isolated pockets (lenses) of sand and gravel in the drift. These lenses are of variable dimensions at various depths without indication of continuity in elevation or groundwater table between adjacent lenses. Some lenses had free water being perched on the tight stratum beneath the lens which perched the free water.

Most of the precipitation will flow laterally along the surface rather than infiltrate because of the tight shallow soils, along with sloping local upland topography. This rolling topography is more desirable than a flat site because it reduces infiltration opportunity by increasing surface runoff and reducing surface detention and retention storage.

A verbal report from Mo. DNR stated that there are no established mineral reserves within at least 1/4-mile of the site.

C. Subsurface Investigation

Sheet 5 shows test locations for 16 piezometer holes, one monitoring well and the initial test hole drilled in 1977. The 16 piezometer holes were drilled 35 feet deep; 3-inch diameter PVC pipes were installed with sand backfill in the annular space between the pipe and side of the hole. At a depth of 10 feet below ground surface a bentonite seal was placed around the pipe and a local soil backfill placed above the bentonite seal up to ground surface in the annular space between the pipe and side of the test hole. During drilling of each piezometer hole, soil samples were recovered at each change in strata for purposes of visual classification of soils. Also, soil samples were stored in air-tight glass containers for laboratory testing of two samples from each hole. A sketch (Sheet 21) is of a typical piezometer hole with depth of slotted pipe, depth of solid pipe and sand backfill and an impervious plug.

Fourteen of the piezometers were drilled dry with a continuous flight auger powered by a truck-mounted coring rig. The other two piezometer holes, 11 and 13, were advanced with a rotary coring rig using water for cooling and recirculation. None of the piezometer holes encountered any natural groundwater table nor did

they encounter any perched water table. From drilling, piezometer holes 11 and 13 were filled with water at the end of the drilling and pipe installation sequence as a result of method of hole advance using compressed air with injected water.

A monitoring well (MW#1) was drilled in the southeast corner of the tract, the lowest surface grade within the tract. Drilling for the deep monitoring well encountered a thin layer of topsoil at the surface and then entered glacial till deposits. The overwhelming soil types of drift drilled were clayey, either fine materials or sand and/or gravel with clay binder. Isolated sand and/or gravel strata were found. This stratification is typical of glacial drift and extended to a depth of 168 feet at which limestone bedrock was encountered. The bedrock was penetrated for a depth of 6 feet with the roller cone bit used on the drill rig to verify absence of voids in the surface of the bedrock. No voids were located by test drilling.

Initial test hole #1, drilled in August 1976, was 129 feet or at least 10 feet below elevation of the gravel pocket encountered in the monitoring well; however, neither gravel nor water was encountered.

The absence of a granular layer in TH#1 around the 660-foot elevation, appears to indicate no continuity of the sand layer around the 665-foot elevation in MW#1.

Three test holes were drilled in March 1980 (THs 43, 44, 45). These were drilled dry with a 6-inch continuous flight auger powered by a truck-mounted coring rig. The test holes were stopped at depths of 67 feet (criteria discussed with Mo. DNR). Split-spoon or Shelby tube samples were taken every 5 feet. No water was encountered. The holes were backfilled from 67 to 30 feet with bentonite pellets then filled to the surface with soil (see soil analysis for results of samples taken).

The combination of either absence or marked variability in the water elevation (see Table 3) in the subsurface investigation indicates no aquifer or recharge potential in the glacial deposits above bedrock within the boundary of BHS, Inc.

D. Soils Analysis

The soils information was obtained through extensive drilling and sampling in accordance with ASTM D-1452 Auger Borings, ASTM D-1586 Split-Barrel Sampling, and ASTM D-1587 Shelby Tube Sampling. The tests confirm this site has a very dense, preconsolidated, effectively impermeable low plastic clay (Tables 4, 5 and 6 for Summary of Soil Tests).

In 1977 samples from TH#1, MW#1 and 16 piezometer wells were analyzed for their gradational characteristics and Atterberg Limits. Gradations were determined by hydrometer and sieve analysis as outlined in ASTM D-422 Hydrometer Analysis.

Atterberg Limits were determined on the portion of each sample finer than No. 40 sieve in accordance with ASTM D-423 and ASTM D-424. The finer fractions of these samples in accordance with the hydrometer analysis indicate these soils have clay size particles (minus .002mm) ranging from 18% to 42% and plasticity indices from 7 to 41. The laboratory data is shown on 24" by 36" sheets 12 and 13.

The Grain Size Distribution curves of samples from the 16 piezometer holes and monitoring well have a remarkably similar gradation. All gradational curves fell within a very narrow band (Fig. 1). This indicates the similarity laterally, across the site which on an aggregate basis is expected in a glacial till. Another

TABLE 3

GROUNDWATER ELEVATION

Piez. No.	Surface Elev.	11/16/77	2/24/78	12/5/78	3/21/79	10/1/79	12/4/79	4/7/80
1	802.9	mud	mud	dry	774.41	774.01	774.01	dry
2	790.9	dry	dry	dry	760.15	760.65	760.20	dry
3	776.7	dry	dry	wet*	739.7	739.50	740.80	dry
4	770.0	dry	dry	735.48	734.7	734.9	734.2	734.9
5	756.2	736.5	740.8	741.77	750.55	744.55	743.05	746.3
6	761.2	749.3	753.7	752.70	756.95	750.85	750.55	750.9
7	759.9	740.5	752.8	747.15	757.06	753.85	733.15	750.6
8	756.0	735.8	738.5	735.6	739.5	734.50	733.5	734.8
9	752.5	732.2	735.7	731.35	737.75	732.35	734.10	738.3
10	761.2	753.6	752.7	753.52	757.4	752.9	751.30	755.1
11	775.1	756.6	755.8	756.73	761.2	758.5	758.15	758.4
12	786.7	dry	wet	757.13	758.8	759.4	759.30	dry
13	793.9	789.7	793.7	793.8	794.25	785.45	786.75	793.0
14	798.5	dry	wet	764.6	764.6	764.6	764.35	dry
15	804.4	772.0	wet	wet*	772.5	769.9	772.40	772.5
16	808.4	dry	dry	dry	774.9	774.1	774.30	dry
MW	753.5	684.6	681.9	**	691.1	679.1	689.10	689.0

*Not enough for sample.

** Unable to measure.

Revised 7/29/80

TABLE 4

Plasticity and Cation Exchange of Fine Soils

Test Hole	Depth	LL	PL	Soil Class	pH	Inherent Moisture %	Air-Dried me/100gms	Oven-Dried me/100gms
43	35'	32	18	CL	7.8	1.5	13.5	13.7
43	50'	27	18	CL	8.0	0.6	9.0	9.1
43	65'	26	16	CL	8.0	0.5	7.9	7.9
44	35'	25	13	CL	8.0	0.7	8.9	9.0
44	50'	24	15	CL	8.1	0.5	8.4	8.4
44	65'	25	17	CL	8.1	0.6	7.4	7.4
45	45'	41	21	CL	7.6	0.8	10.9	11.0
45	50'	30	18	CL	7.9	0.7	9.8	9.9
45	65'	23	15	CL	7.9	0.5	7.7	7.7

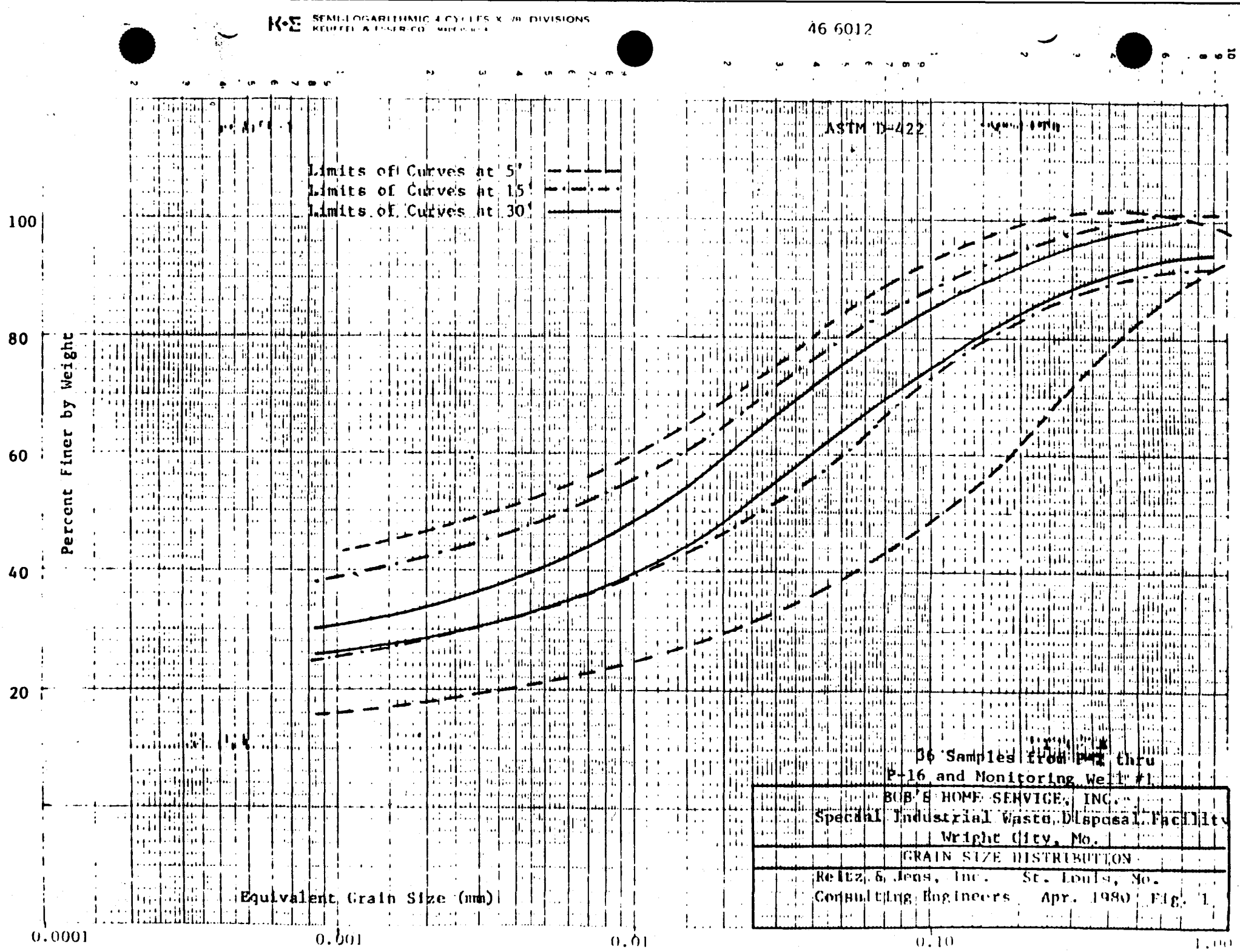
TABLE 5

Shelby Tube Samples

Test Hole	Depth	Density lbs/cu.ft.	Moisture Content Percent
43	35-37'	119.9	14.8
43	45-47'	113.6	18.6
43	55-57'	120.0	15.6
44	35-37'	118.4	16.2
44	55-57'	121.5	15.9
45	35-37'	117.2	16.1
45	45-47'	101.8	24.9

TABLE 6

Test Hole	Depth	Permeability cm/sec.
44	55-57'	5.4×10^{-9}
44	55-57'	7.7×10^{-9}
45	45-47'	20.0×10^{-9}
46	65-67'	10.0×10^{-9}
46	65-67'	5.8×10^{-9}
46	65-67'	2.6×10^{-9}
	35-37'	5.6×10^{-9}
47	45-47'	13.0×10^{-9}
48	45-47'	5.0×10^{-9}
20	30-32'	1.50×10^{-9}
20	35-37'	1.3×10^{-9}
20	40-42'	1.3×10^{-9}


K+E SEMI-LOGARITHMIC 4 CYCLES X 70 DIVISIONS
KEUFFEL & ESSER CO.
46 6012
ASTM D-422
Limits of Curves at 5'
Limits of Curves at 15'
Limits of Curves at 30'
Percent Finer by Weight
100
80
60
40
20
Equivalent Grain Size (mm)
0.0001
0.001
0.01
0.10
1.00
36 Samples from P-1 thru
P-16 and Monitoring Well #1
BOB'S HOME SERVICE, INC.
Special Industrial Waste Disposal Facility
Wright City, Mo.
GRAIN SIZE DISTRIBUTION
Reitz & Jens, Inc. St. Louis, Mo.
Consulting Engineers Apr. 1980 Fig. 1

important characteristic shown from these curves is the well-graded nature of the material from the continuity of the continuous curves from the larger sizes down to the clay size fractions. This well-graded property allows extremely dense packing without unusual difficulty which, in turn, can create a tight soil of low permeability without the need for presence of large quantities of platelet-shaped particles (clay) to create effective impermeability.

The tabulation of the percentage smaller than 2 microns indicates more clay size particles are evident in the deeper samples. This is fortuitious and assures greater resistance to water flow through the soil strata at and beneath the bottom of the disposal cells (Fig. 1).

Permeabilities were calculated from consolidation tests (ASTM D-2434, One Dimensional Consolidation) of undisturbed samples. This deductive method of permeability determination had to be used due to the impossibility of using permeameter time-flow measurement. Results of the tests are listed in Table 6.

Preconsolidation was indicated by the laboratory testing One Dimensional Consolidation Test using ASTM D-2434.

The additional soil tests in 1980 confirm that the glacial tills are dense and effectively impermeable. The glacial till that fills this valley on the buried bedrock surface at depth has favorable characteristics for minimizing possible surface or underground contamination in this area.

The magnitudes of the cation exchange capacity of the 9 samples from various locations shown in Table 4 are low. These low magnitudes suggest rather stable (volumetrically) clay minerals such as Kaolinites, Chlorites and Illites. The size of a clay particle can and will change with cations adsorbed and availability of polar liquids. The magnitude of cation exchange potential indicates that the potential for change in clay particle size which in turn controls the impermeability of the soil zone from which the sample is low and the permeability will not be adversely affected (increased) by possible changes in dissolved salts.

E. Shallow Redeposition of Eroded Soils

Along the eastern side of Area 1, there is alluvium deposited from and related to the nearby intermittent stream. This alluvial zone is a mixture of clay size through sand size particles. This zone is about 8 feet thick along the east fence from perimeter well #9 to perimeter well #5. Moving upslope westward this material pinches out about 150 feet from perimeter well #9 and about 50 feet at piezometer well #5.

Groundwater is in and moves through the alluvium because of its interrelation with the surface drainage path. Free water, if present, most often is found moving along or apparently static, perched on the tighter impervious till on which the relatively loose alluvial materials accumulated. To prevent movement of possibly contaminated perched groundwater into the natural draw, a trench through the shallow alluvium into the tighter tills is being dug generally paralleling the surface draw between the closest trench and the draw and this trench will be backfilled with well-graded till and compacted to a minimum of 95% ASTM D-698 for a tight impervious continuous cutoff barrier preventing shallow stream contamination from Area 1. Shallow subsurface water inside Area 1 will find its way into the leachate collection system.

III. OPERATION

A. Waste Characterization

BHS, Inc. is designed to handle bulk waste and drummed waste. The differentiation between the two modes of containerization is made by the degree of hazard associated with the waste and physical state of the waste.

If the waste material has a low degree of hazard associated with it (i.e. waste treatment sludges with heavy metals, empty containers) and a low degree of mobility (i.e. thick non-flowing sludges, crushed drums), the waste can be properly and safely disposed of in bulk. If a waste does not meet these criteria, it will be required that the generator drum the waste prior to disposal. Drum is used only as a transport mechanism.

The Site Manager of BHS, Inc. will be a graduate chemist or chemical engineer with expertise to characterize the waste for proper disposal. Information supplied by the generator which completely identifies the waste and hazards associated with the waste will be reviewed by the Site Manager. From this information the trench location ("O" Organic, "B" Alkaline, "R" Acid) will be determined. When the waste arrives for disposal the Site Manager will visually inspect and sample the waste for analysis.

BHS, Inc. has the following laboratory equipment for determination of pH, specific gravity, percent volatiles at 100°C. and 600°C:

Fischer Scientific 107 Digital pH Meter
Blue M SW11TA Oven
Blue M M15A2A Furnace
Ohaus Dial-A-Gram Triple Beam Balance
Assorted beakers and graduated cylinders

Reitz & Jens, Inc. has backup laboratory equipment available if need arises.

The combination of generator information, visual inspection and basic analysis of the waste will ensure proper characterization. The waste will be accepted for disposal only after the waste has been analyzed to determine that the analysis conforms to the information submitted by the generator pertaining to that specific waste. Any waste that does not conform to waste information will be refused for burial and the Mo. DNR will be notified.

Generators utilizing this site will be required to submit the following:

1. The name, address, telephone number, generator identification number and waste stream identification number of the generator.
2. The name, address and telephone number of person employed by the generator who is familiar with waste management practices.
3. The hazard class of each waste stream.
4. A brief description of the generation process.
5. A description of containerization for each waste.
6. The flashpoint, if applicable.
7. Major hazardous components and corresponding concentration.
8. pH

9. Percent volatiles at 600°C.

10. Percent volatiles at 100°C.

11. Materials data handling sheets or product specification sheets to indicate handling and spill cleanup recommendations.

12. Any additional information Mo. DNR has deemed necessary to complete the identification process.

13. Any additional information BHS, Inc. deems necessary to complete the characterization process.

Hazardous Waste Accepted:

In accordance with the Mo. DNR Regulations, waste will be disposed of in the following areas:

1. Organic Area "O" - organic-based waste with a flashpoint above 140°F. or materials contaminated with an organic-based waste.

2. Alkaline Area "B" - materials with a pH greater than or equal to 7 or inorganic-based materials compatible with an alkaline environment.

3. Acid Area "R" - materials with a pH less than 7 or inorganic-based materials compatible with an acidic environment.

B. Capacity of Area 1

The 12 new trenches with a 25-foot maximum depth of waste have a total volume (including cover material) of over 90,000 cubic yards. The disposal volume for the trenches was calculated by using the following assumption:

One 80-drums load of waste uses 60 cubic yards of space
One 15 cubic yard load of bulk uses 25 cubic yards of space

Using previous disposal records as a base, the following estimates were made for incoming volumes:

Year 1,	24,000 drums	17,889 cu.yd. volume
	6,500 cu.yd. bulk	10,976 cu.yd. volume
	total	28,865 cu.yd. volume
	Volume Remaining	64,789 cu.yd. volume

Year 2, 28,000 drums		20,870 cu.yd. volume
	7,684 cu.yd. bulk	12,976 cu.yd. volume
	Total	33,846 cu.yd. volume
	Volume remaining	30,943 cu.yd. volume
Year 3, 32,000 drums		23,852 cu.yd. volume
	8,880 cu.yd. bulk	15,000 cu.yd. volume
	Total	38,852 cu.yd. volume

Since the expected volume for year 3 is greater than the volume remaining, the site will close in that year (approximately 0.8 of year 3).

Therefore, the expected life of Area 1 is 2.8 years or the spring of 1983.

C. Method of Operation

1. A coordinate system has been established in Area 1 with iron pipe monuments at various locations, referenced to a base line located on the site with permanent benchmarks at each end. The permanent benchmarks are tied to a USGS benchmark. All measurements for locations of holes or trenches are tied into this coordinate system.(see Site Plan, Sheet 16).

2. Method of Disposal: The trench cell method was originally used for both drum and bulk wastes in separate trenches. The operation started with four large trenches for (1) alkaline bulk; (2) alkaline drums; (3) acid bulk; (4) acid drums. The four 200-foot long trenches had to be completely excavated before the permit was issued.

As the operation progressed it became evident that changes had to be made. Permission was given to put drums and bulk in the same trench. The plan was revised to provide for disposal areas for four separate categories: (1) organics; (2) alkaline; (3) acid; (4) flammable.

Later, a drilled hole method was initiated as an alternative disposal method. This soon became the primary disposal method used.

Eventually, the trench cell method was developed to expedite handling truck loads of drums. This method called for excavating small holes only as required for the volume coming in each week. A Caterpillar 215 Excavator was purchased and is used for excavating small trenches, putting drums into the trench, and applying cover material for each cell.

This method of excavation only as required will not be used in the remaining open area on the east side of Area 1 which has been designated for 12 large trenches using a leachate collection system. The 12 trench locations are shown on the Site Plan. One trench for each of three categories (acid, alkali and organic) will be open and available for use at one time. Compatible waste, either in drum or bulk, can be disposed of in the same trench.

Trench maximum depth will be 27 feet. Maximum depth of waste will be 25 feet. Depth of cover between top of waste and final surface elevation will be a minimum of 7 feet.

The trenches are laid out sloping downhill to take advantage of natural drainage. This will not impede or pond drainage either inside or outside trench. Any surface water runoff is quickly carried downhill rather than infiltrating. Any liquid inside the trench will drain down through the trench collection drain-pipe system to the collection well at the lower end of the trench.

Trench locations, as shown on the Site Plan, will be staked out by field survey. The entire trench will be excavated to slope downhill as shown on Sheet 14. Reitz & Jens, Inc. will inspect each trench after excavation is complete and approve it as excavated or modified before being used for disposal.

The all-weather roads will be constructed with at least 6 inches of crushed limestone to provide adequate access in inclement weather. The roads will be extended as trenches are filled and new trenches excavated.

All shipments of drums delivered to the site by highway transport trailers will be unloaded at the unloading station onto special flatbeds. The roll-off truck will carry the loaded flatbed down to the designated trench for disposal where it will be unloaded with a backhoe or highlift. Drummed waste will be unloaded into the bucket of the highlift and transported to the trench-cell or banded together and lifted to the trench-cell with the backhoe.

Filling will start at the upper end of the trench; the trench typically becomes a series of cells separated horizontally and vertically by at least one foot of earth cover. Cell size is limited to volume of compatible waste that can be buried in one day. The void between the drums on the bottom layer will be filled with 3/4-inch limestone. Above the bottom layer of drums, filling will be as follows:

a. Agricultural lime will be used when a high lime factor is desired around the waste (i.e. pesticides).

b. Sand will be used when a high pH surrounding waste could result in mixing of incompatible materials.

c. Limestone screenings will be used in all other instances.

A minimum of one foot of earth fill will be compacted by tracking with the highlift around and over each cell. A ramp will be built up one side of the trench and over the buried drum layer(s). The trench will be filled from one end with additional soil cover deposited to form a driving ramp over the cells for access into the trench. As the trench is filled on different days, the ramp is relocated farther along the unfilled trench portion. Before an adjoining cell is started, earth in the ramp may be partially removed but at least one foot of fill will remain to separate the cells.

The location of the cell inside the trench will be noted as to tier and grid coordinates. This information will be filed in the permanent site record.

The bulk waste will be disposed of mainly in the top three levels of the trench. No bulk waste will be buried in bottom layer of trench unless 6 inches of sand has been applied over bottom of trench to facilitate drainage to the collection system. Cell size is limited to volume of compatible waste that can be buried in one day. Daily cover of one foot of compacted fill will be applied. The location of bulk waste will also be noted and properly filed.

In inclement weather, top levels of the trench will be used for both drums and bulk wastes.

As trench filling progresses and the upper portions of trench are filled, an intermediate layer of at least two feet of earth cover material will be

deposited over the waste. This will be spread in layers of about 8 inches thick and compacted with a sheepsfoot roller to minimize infiltration of surface water. When the entire trench is filled, application of final cover will commence.

3. Surface Water Runoff: All diversion structures for surface runoff will be adequate to carry a 24-hour, 25-year storm (6 inches rainfall) and to divert surface runoff away from the active portion. Berms and swales will be constructed as necessary around the perimeter of the open trench to divert surface runoff away from trench.

The suspended solids from surface erosion will be caught and settled prior to release by use of the detention dike just below Area 1 and by use of preassembled "silt fences".

A temporary dam will be constructed across the width of the trench just below the active portion of the trench to separate the active end of the trench from the unused end. The dam will be compacted by tracking with a dozer. This dam will be of adequate size to contain any runoff from the active portion of the trench. Any surface runoff above the dam will be pumped out and hauled by tank truck to the evaporation basins. Water that falls on the unused portion of the trench will be discharged as surface runoff within 24 hours after rainfall.

4. Truck Wash: A truck wash is provided to wash off waste material from the sides and undersurface of trucks and other equipment. Any trucks requiring cleaning will be washed in this area. Operating equipment will be washed before leaving Area 1. Runoff will be collected in the evaporation basin and evaporated.

5. Unloading Station: The unloading station was designed for efficient handling of drums in all types of weather (see Sheet 23 for details).

The highway transport trailer proceeds from the site office to the unloading station, located on the south side of Area 1 near the truck wash. The trailer is backed up to the unloading dock. The drums are unloaded individually with a two-wheeled hand dolly into one of two flat beds. The drums are placed and banded together in groups of four until the flatbed is loaded with 40 drums; the next 40 drums are placed on the adjacent flatbed.

The roll-off truck removes the loaded flatbed from the rear of the unloading station and carries it down to the active trench for unloading and disposal.

6. Trench Leachate Collection System: The leachate collection system for the new trenches is designed to collect leachate formed in the landfill by gravity flow into leachate collection wells at the end of trenches. It will be pumped out of the wells and hauled by tank truck to the evaporation basins.

The bottom of the leachate collection system is underlain by at least 30 feet of soil which has a permeability equal to or no less than 10^{-8} cm/sec.

The trench leachate collection system will be installed for the entire trench length (see Sheet 20). The disposal trenches will have a minimum slope of 2%. The trench bottom will be sloped to one side where a 3-foot cut, width or depth, will be made along the entire trench length to accomodate the leachate collection system. A collection well will be installed at the lower end of the trench. The trench will be completely excavated and a survey conducted to verify elevations and slopes prior to backfilling the collection system. Water level in the collection well will be checked at least monthly and results recorded. When leachate reaches a depth of two feet, the liquid will be pumped out. All leachate removed will be transported by tank truck to the evaporation basin. All surface and groundwater sample test results will be submitted to Mo. DNR.

The trench leachate collection system under the unused portion of the trench will be covered with one foot of 3/4-inch limestone then two feet of earth cover material as shown on detail plan, to keep surface runoff out of the leachate collection system. This temporary cover will be removed as the filling operation continues down the trench to allow the waste material to be placed on the sand and provide proper drainage.

7. Final Cover: A compacted layer of two feet of earth fill will be placed over the intermediate cover. It will be placed in lifts of 8-inch thickness and compacted with a sheepsfoot roller to 95% of maximum dry density determined by ASTM D-698-66T. The compacted two-foot layer will eventually cover the entire burial area and not just over the top of each individual trench. Application of the seal will progress across the site as trenches are filled.

After compaction has been tested and approved by Reitz & Jens, Inc., a minimum two feet of earth cover material will be placed over the two-foot compacted layer.

When sufficient fill has been placed to raise grade to within one foot of finished grade, 12 inches of topsoil will be placed over the fill, fertilized, seeded and mulched to promote vegetation and minimize erosion. Final grading over the trenches will provide final slopes between 3% to prevent infiltration and 10% or less to minimize erosion. (The final plans show a 1V to 3H maximum slope in the 200-foot buffer zone on the north side of Area 1 where trenches were filled before July 1980). Prior to excavation of trenches, topsoil will be removed and stockpiled for final cover.

8. Trench Preparation and Inspection: Trenches will be staked out by field survey according to locations on the Site Plan. All locations will be tied into the coordinate system.

The trench will be excavated completely. Reitz & Jens, Inc. will then inspect each excavated trench for subsurface conditions indicating tightness and impermeability.

If continuous, tight stratification does not exist, one or more of the following will be done:

a. If a lense is detected in the bottom, dig down a depth of 4 feet to remove lense. If deeper than 4 feet, replace with till in lifts of 8 inches and compact each layer with sheepsfoot roller to 95% of maximum dry density determined by ASTM D-698.

b. If a lense is detected within 18 feet of original ground surface of the sidewall, the lense and overburden will be removed. The sidewall will be dug at a 1H to 1V slope, the till replaced in 8-inch lifts and compacted to 95% of maximum dry density determined by ASTM D-698.

c. If a lense is detected below 18 feet depth from the ground surface of the sidewall, the lense will be dug out, replaced with till by hand, a bentonite pellet seal placed along the wall and a compacted till ramp placed over the bentonite seal.

A survey crew will set stakes at the corners and along the sides of the trench and 12 feet off (for the 1H to 1V cut) to indicate limits of excavation. On service platforms in place in the buffer zone, an engineer's level will be set for known H.I. (height of instrument msl) using 25-foot level rod and the H.I. elevations of original ground, bottom of trench and upper limits of waste at all corners and at 50-foot intervals between corners will be determined. A written report of each trench inspection will be sent to Mo. DNR noting approval for filling as is or specific corrective action taken.

9. Filling Sequence: Initially, three trenches will be excavated:

Trench #1N for Organic wastes

Trench #6N for Acid wastes

Trench #12N for Alkaline wastes

Based on the estimated waste ratio plans call for

Trench #1N, 2N, 3N and 4N for Organic wastes

Trench #5N, 7N, 8N, 9N, 10N, 11N and 12N for Alkaline wastes

Trench #6N for Acid wastes

In the event the waste ratio varies from the estimate, trench waste designation will be changed to accomodate demand.

D. Infiltration

Two feet of fill compacted to 95% of ASTM D-698 may require one and one half feet to two feet of compacted fill at slightly lower densities beneath this layer to provide a foundation to work on. For frost protection, at least three feet of cover will be placed over the two-foot compacted layer.

Under these conditions, permeability of the compacted layer will be 10^{-8} cm/sec or lower.

Infiltration through this layer, when ground above it is saturated two feet deep, will be:

$$10^{-8}\text{cm/sec.} \times (3600 \times 24) \times \frac{61+61}{61} = 0.00173 \text{ cm/day}$$

Saturation of soil may total 30 days (not consecutive) each year. Infiltration (in inches per year) will be:

$$.00173 \times 30 \div 2.54 \text{ cm/inch} = .020 \text{ in/year}$$

For 10 acres annual infiltration will be:

$$0.020 \text{ in}/12 \text{ in/ft.} \times 10 \text{ acres} \times 43560 \text{ sq.ft./acre} = 726 \text{ cu.ft./year}$$

To evaporate 726 cubic feet at an annual evaporation of 30 inches from evaporation pan

$$\frac{726}{2.5} = 290 \text{ sq.ft.}$$

Provide 600 square feet (20' x 30') evaporation basin for 10 acres. This will provide for twice the calculated volume.

E. Evaporation Basins

Four evaporation basins will be located just east of the truck wash on the south side of Area 1. The truck wash drain will be connected to evaporation basin No. 1. The other three evaporation basins will be used to handle leachate collected from the collection wells or any surface water requiring treatment. The concrete basins (20'x30'x3') will have covered tops which can be rolled back in daytime to allow maximum evaporation during sunlight hours and rolled over to cover the pits during inclement weather. The fibreglass tops will be rolled back manually.

Sprayheads will be installed over basins to accelerate evaporation.

Maximum water depth will be 2 feet, 6 inches.

A leachate collection system will be installed under the evaporation basin (see Sheet 22).

F. Monitoring

There are 16 piezometer wells around the perimeter and a groundwater monitoring well at the southeast end of Area 1. In addition to the present monitoring system within Area 1 there will be installed downgradient, a monitoring station (A) across the bottom of the stream. This trench will provide a sampling station to monitor any liquid flow through the alluvium layer between the streambed and fill below (see Sheet 21).

Another monitoring station (B) will be installed across the bottom of the streambed, approximately 100 feet north of the south property line where the stream exits the Zykan farm. A groundwater monitoring well down to bedrock will be installed approximately 100 feet upgradient from monitoring station B.

A piezometer well will be installed adjacent to this new monitoring well No.2 to provide additional monitoring between the top of the till and top of bedrock. Details for this well will be determined from analysis of boring logs obtained from drilling and installing the new groundwater monitoring well.

Each new monitoring well will be sampled and tested by an independent testing laboratory on a monthly basis for one year after well construction to determine background water quality levels. After the first year each groundwater monitoring well will be sampled and tested once each quarter. Quarterly minimum analysis will be run on each sample. In October a comprehensive analysis will be run on a groundwater sample from each monitoring well with parameters to be tested determined by the hazardous wastes being received at the landfill and by the characteristics of the principal hazardous constituents in these hazardous wastes. The latest standard test parameters listed in the Mo. DNR guidelines will be used.

If leachate is detected in monitoring or piezometer wells, further investigation will be made immediately to locate source. Follow the Leachate Contingency Plan of the Operations Manual. Any leachate collected will be transported by tank truck to the evaporation basins. If it becomes necessary to treat surface water at this site, it will be collected and taken by tank truck to the evaporation bains. All surface and groundwater sample test results will be submitted to Mo.DNR.

Sampling and Analysis Methods: Requirements for quarterly sampling and analysis methods will be in accordance with the latest Mo. DNR guidelines. It is recommended that a two-liter sample volume be obtained from each test source for the quarterly analysis and a 7-liter sample for the annual analysis. To minimize possibility of contamination between wells, the sampler or bailer should be thoroughly rinsed with distilled water before collecting sample from next well. To minimize sample contamination the bailer or sampler should be flushed with the first sample from each well and that sample retained in the event there is insufficient volume in well so that a representative sample can then be taken. The initial sample can then be discarded if not needed. Every effort must be made to assure the sample is representative of a particular body of water being sampled. The time between sampling and testing should be kept to the absolute minimum.

Records: Adequate records must be obtained on each sample taken. Record information should include: (1) sample description, type and volume (example: groundwater, two quarts); (2) sample source; (3) time and date of sampling; (4) weather conditions; (5) sampling method (bailer, pressure, vacuum); (6) well data - depth, depth to water surface; (7) preservatives (if used); (8) sample containers, type, size, number (example: 1-gallon screw-cap bottle); (9) appearance of sample; (10) thermo preservation (example: samples packed in ice and transported in ice chest); (11) sampler's identity; (12) name and location of laboratory performing analysis; (13) time and date of receipt of samples by laboratory.

G. Gases

Since reactive wastes will not be buried in this facility, generation of toxic gases is not anticipated. The organic concentration in the waste will be low, therefore, appreciable amounts of methane gas due to bacteriological decomposition of organic matter should not be generated. However, in the event any unusual odor emanates from the landfill, further investigation will be made immediately to locate source. The following contingency plan will be initiated:

1. The Mo. DNR will be notified.

2. If the nature and source of the odor cannot be identified, an outside laboratory will take air samples for analysis.

3. Once the nature and source have been identified, the waste will be either treated in place or removed for treatment.

H. Equipment (as of Jan. 1, 1980)

931 Caterpillar LGP Hi-Lift
955K Caterpillar Hilift
Model 302, Massey-Ferguson Backhoe
EZ-230 Hughes Hydraulic Drill Rig, truck-mounted
18-ton Bucyrus Crane, truck-mounted
1972 8-ton commercial lime truck with conveyor

1979 Chevrolet pickup truck
1974 International 4070 tandem tractor with three (3) 40-foot van trailers
1970 Chevrolet van truck
1972 Chevrolet tandem dump truck
215 Caterpillar Excavator
Mac 1, 500-gallon water truck
40G-85 Huber-Warco Motor Grader
1976 International Pay Star 5000 Series (roll-off)
1979 International Roll-off
Ford 8N Tractor
1979 Kenworth K-100 Tractor
60-inch diameter sheepsfoot roller

The equipment is being maintained by a local mechanic. Major repair work is performed by outside contractors.

Additional equipment to be acquired:

Scraper (scraper work has been contracted out to date; anticipate acquiring scraper when business volume increases)

J. Security

Access to BHS, Inc. facility through electric gate is controlled by an attendant while the facility is in operation. All gates and other access will be secured whenever the facility is closed.

A security fence, 6 feet high of cyclone fencing, 3-strand barbed wire on top, will enclose the active working Areas 1 and 2, including perimeter wells. The gates will be kept locked during non-working hours. Communication is available by telephone from the facility office and the owner's residence adjacent to the landfill site and by walkie-talkie radio to the active working area.

A sign will be posted at one hundred (100) yard intervals around the perimeter and at the entrance of the facility having the following legend:

WARNING

HAZARDOUS WASTE

MANAGEMENT FACILITY

KEEP OUT

UNATHORIZED ENTRY PROHIBITED

The sign will be made of block letters at least four (4) inches in height. The letters will be black, the background bright yellow and legible from 100 feet.

IV. PLAN FOR REMEDIAL ACTION

If the groundwater monitoring results show evidence of contaminates which may harm the environment or public health as per Mo. DNR Guidelines, the following contingency plan will be initiated by BHS, Inc.:

1. The Mo. DNR will be notified initially and kept informed on a continuing basis.

2. A second water quality analysis (annual comprehensive scope) will be made to confirm presence of leachate and indicate the source.

3. If leachate is confirmed, at least four wells will be dug 45 feet deep (at least 10 feet deeper than the piezometer or sampling well) between the filled trench and contaminated piezometer well.

4. Water samples from these wells will be analyzed for the same parameters found to be high in the collection well.

5. The well(s) showing signs of contamination may indicate the direction of contamination.

6. A series of four wells with increasing 10-foot depth intervals will be dug in the apparent contaminated area (as indicated in "3" above), to determine the depth of contamination.

7. Wells will be dug to the contamination depth on a line parallel to the nearest filled trench to determine the lateral extent of contamination.

8. When the lateral extent of contamination has been determined, an interceptor trench will be excavated running parallel to the filled trench with the length of contamination plus 10 feet and depth 5 feet deeper than that at which leachate was found. The trench bottom will slope to a low point. The trench will be backfilled with medium Meramec River sand to within 10 feet of the original ground level. The top 10 feet will be backfilled with excavated till and compacted by tracking with a dozer. A 6-inch diameter or larger PVC pipe will be placed as a well casing. It will be slotted at the bottom to facilitate leachate removal.

9. The leachate collection well will be checked weekly and pumped whenever level is one foot above bottom. Records of water level, pumping and volume removed will be maintained. Leachate removed will be taken by tank truck to the evaporation basin.

In the event the above course of action does not completely remedy the situation:

1. Disposal records will be checked to try to identify the probable source of contamination.

2. If the records suggest the source of contamination, it can then be located by the site survey burial records.

3. A new interceptor trench will be excavated with the closest face about 15 feet downslope from the problem trench and 6 feet deeper to intercept leachate coming from the problem trench. This will provide opportunity to detect any sand or gravel lenses and determine extent and direction of any leachate seepage coming from the filled trench.

If leakage source is located, a 6-inch diameter vertical PVC pipe will be installed on the side of the interceptor trench adjacent to the leachate seepage point and backfilled with sand to remove leachate as a new collection well. The opposite wall of the trench will be covered with Volclay panels approximately 6 feet deep to confine leachate for removal from the new collection well. The trench will then be backfilled with earth to grade.

If this does not remedy the situation, after consultation with Mo. DNR, the wastes will be removed from the trench and moved to a new trench for disposal or other disposal alternatives will be considered and implemented as appropriate.

Any waste removed from an organic "O" trench will be reburied in the organic "O" area of the site; any waste removed from an alkaline "B" trench will be reburied in the alkaline "B" area of the site; and any waste removed from an acid "R" trench will be reburied in the acid "R" area of the site.

V. FINANCIAL RESPONSIBILITY

Area No. 1. Estimate life of site - 3 years (1980-1983).

1. Operating Liability Protection

Bob's Home Service, Inc. will file Form A "Uniform Facility Bodily Injury and Property Damage Liability Certificate of Insurance".

2. Closure Cost Trust Fund

Bob's Home Service, Inc. will deposit $15,000.00 cash in Area No. 1 Closure Cost Trust Fund at St. John's Bank & Trust Co., 8924 St. Charles Rock Road, St. Louis, MO 63114.

The Trust Fund will be cosigned by the Director of the Mo. DNR and one of the following:

a. Glennon W. Zykan, President
b. Laverne Zykan, Vice-President & Secretary

The Closure Cost Trust Fund will be used as a source of funds to completely close the site from anytime during its active operation up to completely filling the site.

The first three trenches will utilize approximately 0.6 acres. It is estimated that for 1980, $3,000.00 per acre will be needed to completely close an active acre. So, the initial $15,000.00 will be more than adequate. As new trenches are excavated, the fund will be increased by an amount equal to new trench area times closure cost at that time, per acre). The fund itself will be growing at a rate of approximately 10% per year due to interest earned. This should compensate for cost increases due to the rate of inflation on the initial $3,000.00 per acre cost estimate.

As an example, say that the initial 0.6 acres last a full year and that a second 0.6 acres of trench area are opened in 1981. Furthermore, the cost of closure per acre in 1981 has risen to $3,300.00. Therefore, an additional $1,980.00 (0.6 acre x $3,300 per acre) will be deposited into the fund before the new trenches are utilized. At that time, there would be:

Initial Fund	$15,000.00
Interest Earned	1,500.00
New Trenches	1,980.00
	$18,480.00

$18,480.00 in the fund. There would be 1.2 acres (0.6 acres 1980 and 0.6 acres 1981) that would need to be closed if operations were ceased. The cost of closure incurred at that time would be $3,960.00 (1.2 acres x $3,300 per acre). So, the fund would be more than adequate to close the site. In addition, BHS, Inc. will not wait until cessation of operation to complete closure on portions of the active areas. Therefore, when the site has reached capacity, the area needing closing will not be the total area utilized under the new permit.

When complete closure has been certified by the Mo. DNR, BHS, Inc. will remove all funds from this account.

3. Post-Closure Maintenance Cost Trust Fund

Bob's Home Service, Inc. will establish an Area No. 1 Post-Closure Maintenance Cost Trust Fund at St. John's Bank & Trust Co., 8924 St. Charles Rock Road, St. Louis, MO 63114.

The fund will be cosigned by the Director of the Mo. DNR and one of the following:

a. Glennon W. Zykan, President
b. Laverne Zykan, Vice President & Secretary

Bob's Home Service, Inc. will deposit $70,775.00 per year into this fund which at a 10% return will accumulate $216,480.00 in 2.8 years for the post-closure annual maintenance cost including monitoring into perpetuity.

This 1983 cost is based on the following requirements:

1. Once per month, a man measures water depths in the leachate collection system and removes the water in twelve trenches.

   8 man-hours per day x 12 days = 96 hours

2. Twice a year (spring and fall) a man repairs gullies and plants grass

   2 man-weeks — 80 hours

   176 hours

Therefore, $3,000.00 per year for maintenance in 1983.

The present cost for monitoring is $667.00 per well per year. Using an inflation factor of 10%, the cost per well will be $888.00 in 1983. The cost for monitoring 21 wells in 1983 will be $18,648.00 per year. When the maintenance cost of $3,000.00 per year is added to this, a total of $21,648.00 per year (AC) must be generated from the post-closure maintenance cost trust fund. It can be estimated that a fund in 1983 will receive 10% (i) on its investment. Therefore, using the formula:

$$\text{Post-Closure operating cost deposit} = \frac{AC}{i} = \frac{\$21,648.00}{.10}$$

By the spring of 1983, BHS, Inc. must have on deposit $216,480.00 in the fund.

Using 10% as the annual return on an investment, BHS, Inc. would have to deposit $70,775.00 per year to accumulate $216,480.00 in the fund.

Since the yearly volumes are only estimates, the Post-Closure maintenance cost trust fund as well as the annual deposit will be recalculated on a yearly basis.

VI. LANDFILL CLOSURE

Final Cover:

A compacted layer of two feet of earth fill will be placed over the intermediate cover in layers of about 8-inch thickness and compacted with a sheepsfoot roller to 95% of maximum dry density determined by ASTM D-698-66T. The compacted two-foot layer will eventually cover the entire burial area and not just over the top of each individual trench. Application of the seal will progress across the site as the trenches are filled.

After compaction has been tested and approved by Reitz & Jens, Inc., a minimum of two feet of earth cover material will be placed over the two-foot compacted layer.

When sufficient fill has been placed to raise grade to within one foot of finished grade, 12 inches of topsoil will be placed over the fill, fertilized, seeded and mulched to promote vegetation and minimize erosion. Final grading over filled trenches in new permit area will provide final slopes between 3% to prevent infiltration and 10% or less over the actual trenches to minimize erosion. This final cover application will be a continuing process following the filling operations across the site, so that a major portion will be completed by the time the landfill closes.

The concrete evaporation basins will remain and be available for evaporation of any leachate collected after Area 1 landfill closes.

Suggested future use is for grassland, not for pasture.

When all hazardous waste disposal operation ceases on the Zykan farm, the following will be implemented:

1. All equipment used will be thoroughly cleaned of all waste residues before leaving site, or properly disposed of by burial on-site.

2. The truck wash will be thoroughly cleaned to remove waste residue with all wash runoff being collected in evaporation basin No. 1. The truck wash drain will then be disconnected and the entrance pipe to evaporation basin will be sealed off. Any future surface runoff across truck wash will then drain across the site.

A legal description of the type landfill and a plat of the closed site, prepared by a professional land surveyor registered in the State of Missouri, will be recorded by the County Recorder of Deeds on the deed to the property. This plat will indicate the type and specific location of hazardous wastes disposed of in the landfill.

Estimated time for closure - 6 months.

Upon closure of Area 1, approved by the Director of Mo. DNR, Bob's Home Service, Inc. may apply for all remaining funds (principal and interest) in the Closure Cost Trust Fund.

VII. POST CLOSURE

BHS, Inc. will provide for long-term maintenance of the closed facility. Once a month, an employee of BHS, Inc. will inspect the closed facility to ascertain the integrity of the 6-foot fence barriers, to check for fugitive gas emissions, check drainage berms and swales, cover erosion, check unexplained vegetation die-off and inspect surveyed benchmarks for damage.

During the monthly inspection, he will check all monitoring wells and trench leachate collection wells and take corrective action necessary on any wells in need of repair. Any abnormalities will be noted in the Site Log. The water level in the trench leachate collection wells will be measured and recorded in the Site Log. Any leachate collection wells indicating a minimum of two feet of leachate will be pumped out with the volumes noted in the Site Log. All leachate will be transported to the evaporation basins.

Access to the landfill will be limited to main entrance gate.

BHS, Inc. will contract with an independent laboratory for sampling and analysis of the groundwater monitoring systems. Results of analysis will be submitted to the Mo. DNR quarterly.

MID-MISSOURI ENGINEERS, INC.

Water & Waste Water Systems • Environmental Investigations • Laboratory Services

506 NICHOLS COLUMBIA, MO 65201 314/442-0237

June 3, 1980

RECEIVED
JUN 5 1980
REITZ & JENS

Bob's Home Service, Inc.
Attn: Mr. Mike Gill
Rt. #1, Box 116F
Wright City, MO 63390

Dear Mr. Gill:

I have completed review of the BHS arsenic and phenol analytical monitoring data as per your request. The following comments are offered regarding the probable presence or absence of phenol and arsenic in the BHS monitoring wells.

Phenol

In April and June of 1977 phenol analyses were conducted by Research 900 on samples collected from the monitoring well, the creek, the Zykan residence, and the "old" well. These analyses were performed by the Automated 4-AAP Method with Distillation. This is an automated method "based on the distillation of phenol and subsequent reaction of the distillate with alkaline ferricyanide and 4-aminoantipyrine to form a red complex which is measured at 505 or 520 nm with a Technicon Autoanalyzer."

According to EPA Manual of Methods for Chemical Analysis of Water and Wastes[1], the minimum phenol detection limit of this test is 2 μg/l. The EPA Manual also reports that a single laboratory using sewage samples at a concentration of 3.8 μg/l phenol reported a standard deviation of 0.5.

Using the above statistical value it is possible to evaluate the Research 900 results by calculation of the 95% confidence interval for each of the analyses and comparing the confidence interval values to the detection limit. For small sample sizes ($n < 30$) the t-distribution[2] is used in place of the normal distribution to calculate the confidence interval according to the following formula:

$$\bar{x} - t_{.025} \frac{s}{\sqrt{n}} < \mu < \bar{x} + t_{.025} \frac{s}{n}$$

where,

$\bar{x}$ = sample mean
t = t value or statistic
s = sample standard deviation
n = sample population
μ = population true mean

APPENDIX A

By using the reported phenol value as an estimate for $\bar{x}$, a standard deviation of 0.5 μg/l, and assuming an n value of 7 (typical value for precision determinations) the 95% confidence interval can be determined for each of the phenol analyses.

Sample Date	Sample Point	Reported Phenol Value μg/l	95% Confidence Interval
4/11/77	Mon. Well	5.6	$5.1 < \mu < 6.1$
4/11/77	Creek	7.1	$6.6 < \mu < 7.6$
4/11/77	Old Well	6.1	$5.6 < \mu < 6.6$
4/11/77	Zykan Residence	5.6	$5.1 < \mu < 6.1$
6/8/77	Mon. Well	1.7	$1.2 < \mu < 2.2$
6/8/77	Creek	3.5	$3.0 < \mu < 4.0$
6/8/77	Old Well	4.9	$4.4 < \mu < 5.4$

As indicated in the above table, the lower confidence interval limit exceeds the 2 μg/l detection limit in 6 out of the 7 analyses. Therefore, there is at least a 95% probability that 6 of the samples did show trace amounts of phenol.

Of course this statistical procedure assumes that all interferences and sources of background contamination were eliminated in the sample analysis. This is a major assumption and one that cannot be adequately assessed. Another factor which should be taken into account is the fact that the reported phenol values are based on C_6H_6OH and, therefore, generally represent the minimum amount of phenol present. As stated in Standard Methods for Examination of Water and Wastewater[3], "This is true because the phenolic value varies as the types of phenols vary within a given sample."

Although available information suggests the presence of trace levels of phenol in the April and June, 1977 samples, a likely source of sample contamination has not been considered. As you know, the sample collection method is extremely rigorous and very much subject to contamination, particularly in light of the extremely low concentrations found. From a very practical, standpoint, I would suggest that while the laboratory results are statistically significant, the low levels of phenol reported and the low detection limit are ludicrous in light of the potential for contamination in sample collection.

In fact, in the June, 1979 sampling we reverted to the Direct Photometric Method (Standard Methods, p. 580) as standard practice for phenol determination. The minimum detection limit for

this test was 0.1 μg/l. The primary purpose for this change was to reduce the use of chloroform in the laboratory for safety purposes. We continue to perform the Silver Diethyldithiocarbamate Method, however, only upon request. I do believe, however, that 0.1 μg/l is a more realistic detection limit in light of the fact that this is a field sample not a laboratory research study.

Arsenic

Arsenic analyses were performed by the Silver Diethyldithiocarbamate Method. In this method inorganic arsenic is reduced to arsine by zinc in an acid solution in a Gutzeit generator. The arsine is then passed through a scrubber containing glass wool impregnated with lead acetate solution and into an absorber containing silver diethyldithiocarbamate dissolved in pyridine. In the absorber, arsenic reacts with silver salt, forming a soluble red complex which is suitable for photometric measurement.

It is the intent of the lead acetate impregnated glass wool to eliminate sulfide which can form a yellow to reddish color to give a false positive arsenic reading[4].

As you are aware, land fills provide optimum conditions for formation of large quantities of sulfide; aerobic decomposition of organic matter.

Following review of the arsenic data gathered to date and in light of the likely presence of high sulfides, I would say it is highly probable that the April 11, 1977 monitoring well arsenic reading was a false positive due to sulfide concentrations in excess of the lead acetate removal capacity.

I believe this may, also, have occurred in the May 13, 1980 sampling by our firm. On that occasion low levels of arsenic were found in well samples p-11 and p-12. A second sample was collected from each of these wells and no arsenic was detected. A second arsenic determination was made on the original p-12 well sample and the second analysis showed no trace of arsenic. At that time it was felt that excessive sulfide concentrations had resulted in a false positive arsenic determination and that the sulfide had volatilized prior to the re-run analysis, thereby, showing no trace of arsenic.

If desire any additional information on this subject please do not hesitate to contact me.

Sincerely,

Gregory P. Mattli
Laboratory Director

cc: David Murray

REFERENCES

1. Environmental Protection Agency, "Manual of Methods for Chemical Analysis of Water and Wastes," USEPA, Office of Technology Transfer (1974).

2. Meyer, Stuart L., "Data Analysis for Scientists and Engineers," John Wiley and Sons, Inc., New York (1975).

3. "Standard Methods for examination of Water and Wastewater," 14th Edition (1975).

4. Gardiner, George G., "Chemical Analysis-Qualitative and Quantitative," Adam and Charles Black, Inc., London, (1914).

BHS, INC.

OPERATIONS MANUAL

(As supplemented July 1980)

OPERATIONS MANUAL

Index

		Page
A.	GENERAL	1
B.	TRAINING PROGRAM	2
	SAFETY SHEET	5
C.	PROCEDURES	7
D.	RECORD KEEPING	11
E.	REPORTING	13
F.	SITE OPERATIONS	14
G.	SITE PERSONNEL	17
H.	CONTINGENCY PLAN	19
I.	EMERGENCY TELEPHONE NUMBERS	24

Appendices

NIOSH Publication - Working Safely With Pesticides	A
NFPA Hazard Identification System	B
Incompatible Waste	C
Information Supplied by Generator	D
Monthly Training Lectures	E
Employee Training Record	F
Daily Visual Inspection Sheet	G
Waste Characterization Report Form	H

OPERATIONS MANUAL

A. GENERAL INFORMATION

The purpose of this facility is to dispose of waste materials in the prescribed manner so as to protect the public health and environment. All employees of BHS, Inc. shall read and understand this Operations Manual before handling any waste at the site. Protection against exposure to all wastes handled at the site is a prime concern of BHS, Inc. as well as to the individual employee. An Operations Manual will be supplied to each employee as well as a copy posted in the office and in the employee's shed.

Safety in handling such hazardous solids depends on the effectiveness of employee education, proper safety instructions, intelligent supervision and the use of safety equipment.

Training employees to work safely and use personal protective equipment and other safeguards provided for them is the responsibility of supervision. Training for both new and old employees should be conducted periodically to maintain a high degree of safety in handling procedures. Workers should be thoroughly informed of the hazards that may result from improper handling and should be cautioned to prevent spills and instructed in proper action in case spills occur. Each employee should know what to do in an emergency and should be fully informed as to first-aid measures.

Knowledge of certain health factors leads to safer handling of chemicals.

Before an employee can adequately protect himself he must understand the varying modes of possible contact as well as proper use of personal hygiene and safety equipment to close these routes of exposure. All employees working on-site must be capable of properly using the safety equipment. An employee should also be knowledgeable of the basic principles of first-aid treatment.

Personnel should be familiar with and follow the instructions given for each type of chemical waste received. When needed call a physician as soon as possible or send someone to do this. Make sure the physician knows where he is needed and why.

General Rules:

1. Personnel will not eat, drink or smoke while in the landfill area, to avoid oral contamination.
2. Personnel shall wear protective equipment and clothing when needed.
3. Personnel shall wash thoroughly. Wash hands before eating, smoking and using toilet or shower.

B. TRAINING PROGRAM

A training program has been instituted which consists of two phases. The first phase of employee training is begun immediately after hiring. At this time the Site Manager will sit down with the new employee and review the NIOSH publication "Working Safely With Pesticides". Although other wastes besides pesticides are handled on-site, the information is applicable to all wastes. The NIOSH publication (see Appendix A) explains the varying modes of exposure and identifies the safety procedures and equipment needed to protect an employee. Personnel should understand ways by which noxious substances enter the body and exert their harmful effects and know the basic principles of first-aid treatment.

Mode of Entry:

1. Inhalation: Breathing a vapor, mist or dust is the most common form of exposure and with few exceptions, represents the most likely means to which a stomach illness will be produced.
2. Skin Penetration: Certain chemicals have the ability to penetrate the unbroken skin and be picked up by the bloodstream very quickly. Clothing wet with a chemical acts as a poultice and prolongs skin contact. It is important that contaminated clothing be removed at once to reduce time of contact.
3. Swallowing: Another form for this mode of entry is ingestion. Some materials which do not readily penetrate the skin may be absorbed rapidly from the mucus membrane lining in the mouth. Chemicals may be carried to the mouth by hands or other means.

Local Effects:

1. Skin Contact: Skin contact with a chemical may result in only a mild redness or in any of several degress of severity comparable to first-degree burns or extensive tissue destruction. Since covered skin contact results in the more severe skin reaction, this only emphasizes prompt removal of contaminated clothing. It is sound practice to avoid skin contact with chemicals as much as possible. If contact cannot be avoided, use protective equipment provided.
2. Eye Contact: Most chemicals have the ability to injure the eye in some degree upon surface contact. Wear safety glasses whenever chemicals are handled and an approved type of goggles when the more hazardous materials are involved.

   Personnel should promptly use the emergency showers and eye-wash facilities provided for their protection to minimize effects of acid or caustic burns.

Skin Exposure:

1. Small exposures should be promptly flooded with water and gently scrubbed with soap and water.
2. Contaminated clothing should be removed and underlying skin washed with running water followed by soap and water.
3. If large skin or clothing contact occurs, the employee should hasten to the nearest safety shower and remove clothing while standing in the shower. The skin should be thoroughly washed with water in the shower followed by gentle scrubbing with soap and water.
4. Contaminated clothing should not be worn again until laundered.
5. A physician should be consulted in cases which show skin effects from the exposure or in whom symptoms of stomach illness appear.

Eye Exposure:

1. Go immediately to the nearest eye-wash fountain or other source of clean, running water.
2. Spread the lids with the fingers and allow the water to flood the eye.
3. Roll the eye about so that the water may contact all eye surfaces.
4. Continue such emergency washing for 15 minutes.
5. Report for first-aid or to a physician as soon as possible after the emergency washing is completed.

After the new employee fully understands the need for safety equipment, the proper use of all safety equipment will be demonstrated to him.

1. Breathing Masks: BHS, Inc. provides three different types of masks for handling wastes. The appropriate mask to use for each waste will be indicated on the safety sheet. The paper mask is used for dust-borne particles of waste only. It is ineffective against gases and mists. The rubber dual cartridge nose and mouth mask is effective against dusts, mists and gases. The M.S.A. mask should be used when complete facial protection against dusts, gases and mists is required.
2. Eye Protection: BHS, Inc. provides three types of eye protection. The proper article is indicated on the safety sheet for each waste. The full face shield should be utilized when contact with exposed skin will result in an immediate reaction. Eye goggles must be used when splashing chemicals may flow down the face into the eyes. In all other cases, safety glasses must be worn.
3. Protective Clothing: BHS, Inc. provides rubber gloves, boots, hard hats and special uniforms which are chemical-resistant for body protection. Any article of clothing contaminated while handling waste must be removed

on-site and laundered before reusing.

After the new employee completely understands how and when to use the safety equipment he will be given a tour of the site, noting location of all safety and emergency equipment. At this time, the employee will be instructed in the use of the emergency equipment.

Emergency eye-wash bottles are located in the office, employee's shed and unloading platform. The emergency first-aid box is located in the office where an employee must notify the Site Manager concerning all injuries. Fire extinguishers are located on all equipment. Fire blankets and safety equipment are located in the employee's shed and unloading platform.

The new employee will be instructed in the use of the safety sheet(page 5). On this sheet the National Fire Protection Association Hazard Identification System is used (see Appendix B). This code gives an indication of the degree of hazard the waste possesses as to health, flammability and reactivity. The safety sheet goes further and indicates what must be done in case of spill or exposure to the waste and the safety equipment needed to safely handle the waste. The trench designation is also indicated.

When the new employee has demonstrated a comprehension of the first phase of training, it will be noted with the employee's signature and made a part of the employee's permanent file.

No employee will be allowed to work alone while handling or burying wastes.

The second phase of an employee's training is the ongoing operational training. Employees will initially be used as general laborer whose duties will be manual unloading of waste and general duties that maintain the site. During this time the laborer will be given on-the-site training in the use of heavy equipment. Once the laborer has demonstrated the ability to handle heavy equipment, he will be promoted to the classification of "Operator".

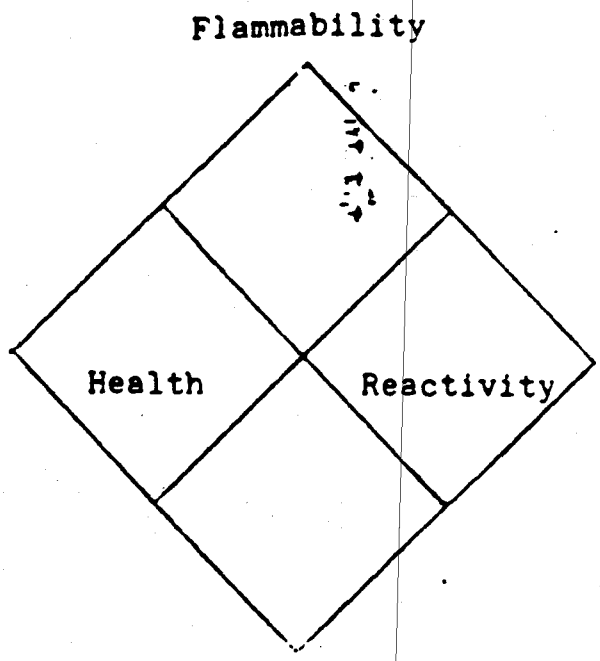
An operator's duties are comprised of operation of all heavy equipment as well as all general laborer duties.

Once a laborer has demonstrated the ability to handle the various wastes in a safe and proper manner and understands the emergency spill procedures for differing types of waste, he may request a position as driver. When the employee has obtained the necessary license for over-the-road truck drivers and has demonstrated his proficiency in that equipment, he can be used as a hazardous waste driver.

The duties of a driver are inspection of containers at the generator's site for road worthiness, obtaining the signed manifest prior to transporting the waste, safe transportation of the waste to the site, emergency containment of waste in

SAFETY DATA SHEET

0 - No Hazard
1 - Minor Irritation
2 - Hazard with long exposure
3 - Hazard with short exposure
4 - Hazard immediately with exposure



Generator I.D. #

Waste Description (I.D.#)

Handling Requirements

Spill Requirments

Special Instructions

Disposal Area

case of accident or spill enroute, helping unload waste and necessary paperwork to maintain travel logs. Before accepting the waste load and shipping manifest, he will verify that the shipment is the same as the information stated on the manifest.

4. Safety Lectures: Safety lectures will be given once a month to reiterate the different safety procedures for proper handling of hazardous waste as well as emergency lifesaving techniques. A typical 12-month listing of lectures follows:

a. Refresher course on use and maintenance of masks.

b. Refresher course on proper eye protection.

c. Refresher course on personal hygiene and handling waste.

d. Refresher course on emergency response.

e. Refresher course on waste handling from gate to trench.

f. Emergency procedures for incapacitating situations of unknown origin.

g. Movement of accident victims in emergency situations.

h. Emergency treatment of shock.

i. Control of bleeding.

j. Heat exhaustion and heat stroke.

k. CPR/mouth-to-mouth resuscitation.

l. Basic chemical terminology (ie. pH, oxidizer).

Lectures will not be limited to only one per month or solely to the above list of topics. Anytime an employee has a question concerning the site, health or work in general, he should question the Site Manager until he has been answered in full. Dates and attendance for all lectures and emergency response drills will be noted in the employee's file.

C. PROCEDURES

Before any waste (other than permitted emergencies and exempt persons and multiple collections of less than 220 lbs.) is acceptable for disposal at BHS, Inc. the generator must supply a copy of the information submitted to the Mo. DNR for waste permits to BHS, Inc. (see Appendix D). Once this information has been reviewed by the Site Manager and deemed acceptable for disposal at the site, arrangements will be made for shipments of waste. Normal waste acceptance hours are by appointment only, between 8:00 AM and 3:00 PM. Deliveries can be accepted at other times if prior arrangement has been made.

All initial requests for waste of a specific type or class will be reviewed by the Site Manager for suitability of burial and by Reitz & Jens, Inc. where special conditions are needed for handling ground burial, monitoring or record keeping.

I. Hazardous Wastes Accepted

a. In accordance with the Mo. DNR Regulations, waste will be disposed of in the following areas:

(1) Organic Area "O" - organic based waste with a flash point above 140°F. or materials which are contaminated with an organic based waste.

(2) Alkaline Area "B" - materials which have a pH greater than or equal to 7 or inorganic based materials which are compatible with an alkaline environment.

(3) Acid Area "R" - materials which have a pH less than 7 or inorganic based materials which are compatible with an acidic environment.

b. The following hazardous wastes shall not be disposed of:

(1) Ignitable waste

(A) Characteristics

1. Is a liquid waste and has a flash point of less than 60°C. (140°F.) as determined by the method cited in paragraph (B) below or equivalent method;
2. Is liable to cause fires through friction, absorption of moisture, spontaneous chemical changes, or retained heat from manufacturing or processing;
3. Is an ignitable compressed gas as defined in 49 CFR 173.300; or
4. Is an oxidizer as defined in 49 CFR 173.151.

(B) Testing methods

1. The flash point of liquids shall be determined by a Pensky-Martens Closed Cup Tester, using the protocol specified in ASTM Standard D-93-77 or the Setaflash Closed Tester using the protocol specified in ASTM Standard D-3278-73.
2. Ignitable gases shall be determined by the methods described in 49 CFR 173.300.

(2) Reactive waste

(A) Characteristics

1. Is normally unstable and readily undergoes violent chemical change but does not detonate; reacts violently with water, forms potential explosive mixtures with water, or generates toxic fumes when mixed with water; or is a cyanide or sulfide-bearing waste which might generate toxic fumes under mildly acidic or basic conditions.
2. Is capable of detonation or explosive reaction but requires a strong initiating source or which must be heated under confinement before initiation can take place, or which reacts explosively with water.
3. Is readily capable of detonation or of explosive decomposition or reaction at normal temperatures and pressure.
4. Is a forbidden explosive as defined in 49 CFR 173.51, Class A explosive as defined in 49 CFR 173.58, or Class B explosive as defined in 49 CFR 173.58 (e.g. such wastes include pyrophoric substances, explosives, autopolymerizable material and oxidizing agents).

(B) Testing methods

1. Place twenty five (25) mg of the material to be tested in a copper test tube (high thermal conductivity) and immerse in a sand or dimethyl silicon bath. Make the test at a series of bath temperatures, and recording the time lag prior to explosion at each temperature, raising the bath temperature until a temperature of 125°C is reached. If no explosion, ignition, or apparent decomposition occurs, after five (5) minutes at 125°C the test is negative.

2. Use the thermal stability test cited in 49 CFR 173.51a.
3. Wastes unstable to mechanical shock shall be identified using the Bureau of Mines Impact Test (U.S. Bureau of Mines Bulletin 346 (1931), at a 25 cm. drop height, or the test cited in 49 CFR 173.53(b).

(3) Volatile waste having a true vapor pressure of greater than 78 mm Hg at 25°C.

(4) Bulk liquids.

(5) Sludges which contain more than 75% liquid by weight, contain free liquids which will drain freely from the sludge by gravity or are free-flowing sludges. No sludge may be landfilled which contains more than 5% by weight organic liquids. Any exception to this rule requires prior approval of Mo. DNR.

c. Potentially incompatible waste materials or components listed in Appendix 1 of 10 CSR 25-7 (see Appendix C) or in NFPA MO. 491M "Manual of Hazardous Chemical Reactions 1975" shall be managed so that they will not come into contact or be mixed.

d. Small quantities of laboratory chemicals may be accepted at hazardous waste landfills as approved by Mo. DNR. The generator is required to segregate the chemicals into organic, alkaline and acid categories (no flammables will be accepted). The individual chemicals packaged in small (glass, metal, plastic) primary containers are segregated and packed in 55-gallon drums. The primary containers must be surrounded with an equal volume of absorbent material inside the 55-gallon drums. All primary containers must be labeled to identify nature and quantity of waste it contains.

e. Before accepting any particular hazardous waste at BHS, Inc. the generator will first submit a copy of the information required by 10CSR 25-5.010(3)(B). This information should provide sufficient chemical and physical data to identify the hazardous characteristics of the waste and enable BHS, Inc. to safely segregate and efficiently dispose of the waste. This information will be maintained in separate generator files in the office.

f. BHS, Inc. shall sample each truckload, other shipment or batch of hazardous waste designated for disposal at the facility. Each sample, at a minimum, shall be examined for physical appearance such as color and physical state (liquid, solid, semi-solid). Also to be determined are

specific gravity, pH and volatiles at 100°C. and at 600°C. as necessary to identify the waste.

g. Upon request by Mo. DNR, BHS, Inc. shall sample a designated load or shipment of hazardous waste and have the sample analyzed for properties of the waste, as specified in 10CSR 25-5.010(3)(B).

1. Physical state (solid, sludge, slurry, liquid or contained gas).
2. Flashpoint
3. pH
4. Major hazardous components and corresponding concentration ranges.
5. Percent volatiles at 100°C.
6. Percent volatiles at 600°C.

h. Criteria for acceptance of small quantities of waste:

1. Waste cannot be ignitable as defined in 10CSR 25-4.010-(2).
2. Waste cannot be reactive as defined in 10CSR 25-4.010-(4).
3. Liquids must be absorbed with an equal volume of absorbent material.
4. Waste must be segregated into organic, alkaline and acid categories
5. Waste must be packaged to afford safe handling.
6. Waste must be accompanied by a list identifying: (a) waste to be disposed of; (b) quantity to be disposed of; (c) origin of waste (name, address, phone number); (d) certification "This is to certify that_____is an exempt generator as defined by 10CSR 25-5.010(1)(A)".

D. RECORD KEEPING

A complete copy of the permit application including all approved engineering plans and operations manual and the locations with respect to a permanently surveyed benchmark where each waste shipment is buried will be maintained in a permanent file in the office until the Mo. DNR approves closure of this facility.

The following information will be maintained at the office for three years:

1. Manifests: A copy of each manifest will be maintained in each individual customer file and a loose-leaf binder will contain all copies of manifest arranged in order of waste arrival.
2. Trench File: A permanent file will be maintained in the office for each individual trench which shows the location of all waste in the trench as well as volumes, dates and disposition of leachate.
3. Monitoring Data: All monitoring data will be segregated into four categories comprised of Air, Groundwater (well samples), Surface Water (lakes, lagoons and creeks) and Leachate (trenches), which will be maintained in separate files in the office.
4. Daily Site Log: A Daily Site Log will be maintained in the office where information as to visitors, temperature, wind direction, rainfall and abnormalities encountered in daily visual inspections of truck wash facility, evaporation basins, operating and monitoring equipment, two-way portable radios, fences and gates, vegetation and fugitive air emissions will be noted. When any abnormal operating condition is noted, a repair date will be indicated next to the abnormality and correction will be made by the repair date, or if not repaired, a new date will be set (see Appendix G).
5. Generator Waste Analysis: Before a generator can utilize the site he must first submit a copy of the information required by the Mo. DNR (see Appendix H). This information will be maintained in the separate generator files in the office. Results of shipment analysis will be maintained in the individual generator files.
6. Files will be maintained on all deliveries of wastes accepted without a manifest. A separate file will be maintained for that group of generators that generate less than 220 pounds per month. Another separate file will be maintained for each transporter or collection agency that brings in a shipment which totals more than 220 pounds. The required information will include: 1) type or identity and quantity of waste from each source; 2) source of each waste; 3) the following certification statement, signed and dated: "This is to

certify that these small quantities of hazardous waste were collected from the above-listed generators, each of whom does not generate more than two hundred twenty (220) pounds of hazardous waste in any given month".

7. Employee Files: A list of job titles and descriptions will be given to each employee and a copy maintained in the general employee file. This list will be updated periodically to add new titles and expanded duties. Up-to-date training records will be maintained in each employee's individual file which indicates his comprehension of safety requirements and emergency response duties (see Appendices E and F). Any injuries incurred on-site will be noted in the file.
8. A file will be maintained recording details concerning injuries, spills, accidents, or emergencies which occur at this facility.

E. REPORTING

1. BHS, Inc. will immediately report to the Mo. DNR any emergency incident resulting from fire, expolsions, spills, unusual damage from weather conditions, and discharges or releases of hazardous waste.

2. Monthly Report: On or before the 15th of each month, BHS, Inc. will submit a monthly report to the Mo. DNR. The form provided by the State will be properly completed and returned to the Mo. DNR with any additional information needed for clarification.

3. Quarterly Report: At the end of each quarter, in addition to the monthly report, copies of all monitoring data accumulated over the quarterly period will be submitted to the Mo. DNR for review and comment.

4. After cessation of operation and before permanent closure of the site, BHS, Inc. will notify the Mo. DNR in writing of intent to close operations.

F. SITE OPERATIONS

The trench locations as shown on the Site Plan will be staked out by field survey. A representative of Reitz & Jens, Inc. will inspect each trench after excavation is completed and approve it before being used for disposal.

Before any waste (other than permitted emergencies and exempt persons and multiple collections of less than 220 pounds per month) is acceptable for disposal at BHS, Inc., the generator must supply a copy of the information submitted to the Mo. DNR for waste permits to BHS, Inc. Once this information has been reviewed by the Site Manager and deemed acceptable for disposal at the site, arrangements will be made for shipments of waste. Normal waste acceptance hours are by appointment only, between 8:00 AM and 3:00 PM. Deliveries can be accepted at other times if prior arrangement has been made.

When a shipment arrives on-site the driver must stop at the office and identify the load with an approved shipping manifest. If there is no manifest, the procedures outlined in the contingency plan will be followed. If the manifest has been properly completed, the Site Manager will visually inspect the load to ascertain its conformity to the waste description for physical appearance such as color and physical state (liquid, solid or semi-solid). If waste passes the visual inspection, a representative sample will be taken for analysis of specific gravity, pH, and percent volatiles at 100°C. and 600°C., results of which will be attached to the manifest in the generator's file. If the sample test results are satisfactory, the load will be accepted for burial and the manifest signed by the Site Manager or an officer of BHS, Inc. One copy of the manifest will be given to the driver, one will enter the generator's file, one will be placed in the manifest file and the original will be returned to the generator.

The Site Manager will prepare a safety sheet for each waste disposed of at the site. On the day of scheduled deliveries, the Site Manager will inform the employees of the hazards associated with the waste and necessary equipment for safe handling. Once the shipment has been accepted, the Site Manager will furnish a copy of the safety sheet to the employee that accompanies the driver to the unloading site. The foreman/operator will review the sheet with all employees who are helping unload the waste. If there are questions concerning the safe and proper means of unloading, the Site Manager will be notified. Only after all questions have been answered satisfactorily, will unloading proceed.

All safety equipment indicated on the safety sheet must be utilized by employees handling the waste.

All shipments of drums delivered to site by highway transport trailers will be unloaded at the unloading station onto special flat beds. The roll-off truck

will carry the loaded flatbed down to the designated trench for disposal, where it will be unloaded with a backhoe or highlift. Drummed waste will be unloaded into the bucket of the highlift and transported to the trench-cell or banded together and lifted to the trench-cell with the backhoe. Drummed waste will be buried in cells consisting of one or two layers of like material stacked together. Cell size is limited to volume of compatible waste that can be buried in one day. The void between drums on the bottom layer will be filled with 3/4-inch limestone. Above this bottom layer the filling will be as follows:

a. Agricultural lime will be used when a high lime factor is desired around the waste (i.e. pesticides).

b. Sand will be used when a high pH surrounding waste results in mixing of incompatible materials.

c. Limestone screenings will be used in all other instances.

A minimum of one foot of earth fill will be compacted by tracking with the highlift around and over each cell. A ramp will be built up one side of the trench and over the buried drum layer(s). The trench will be filled from one end with additional soil cover deposited to form a driving ramp over the cells for access into the trench. As the trench is filled on different days, the ramp is relocated farther along the unfilled trench portion.

Before the adjoining cell is filled, the earth ramp will be removed from the side of the cell but at least one foot of fill will remain to separate the cells. The location of the cell inside the trench will be noted as to tier and grid coordinates. This information will be filed in the separate trench files, the generator file and on the permanent site record.

The bulk waste will be disposed of mainly in the top three levels of the trench. No bulk waste will be buried in the bottom layer of trench unless 6 inches of sand has been applied over bottom of trench to facilitate drainage to the collection system. Cell size is limited to volume of compatible waste that can be buried in one day. Daily cover of one foot of compacted fill will be applied. The location of each load of bulk waste will also be noted and property filed.

In inclement weather, top levels of the trench will also be used for both drum and bulk wastes.

Berms and swales will be constructed as necessary around open trenches to divert surface runoff from trench. A berm will be constructed across the width of the trench just below the active portion of the trench. This berm will be of adequate size to contain any runoff from the active portion of the trench. Any water that collects in the berm will be pumped into the tank truck and transported

to the evaporation basins. Water that falls on the inactive portion of the trench will be discharged as surface runoff.

Once the trench has been filled with waste, an intermediate earth cover applied in lifts of 6 to 8 inches will be compacted at least two (2) feet thick with a sheepsfoot roller. Then the sealing layer of two (2) feet of compacted fill will be placed over the top. This fill will be compacted to a minimum of 95% of the maximum dry density determined by ASTM D-698-66T. After this compaction is tested and approved by a representative of Reitz & Jens, Inc., an additional two or more feet of fill will be placed over the compacted cover. The compacted two-foot layer will eventually be applied over the entire burial area, not just over the top of each individual trench. When sufficient fill has been placed to raise grade to within one foot of finished grade, twelve (12) inches of topsoil will be placed over the fill cover, then fertilized and seeded to support vegetation to prevent erosion.

The water level in the trench leachate collection wells will be checked at least monthly and results recorded. When the liquid reaches a depth of two (2) feet it will be pumped into the tank truck for transportation to the evaporation basins and volume recorded. A test for pH will be performed on each tank truck load and results reported to the Site Manager before the leachate is put into the evaporation basin.

Each piezometer well and groundwater monitoring well shall be tested on a monthly basis for one (1) year after well construction to determine back-groundwater quality levels. Water samples from monitoring wells will be tested by an independent laboratory. After the first year each monitoring well shall be sampled and tested once each quarter. All test results will be submitted to Mo. DNR.

The Site Manager or operator/foreman will carry out the daily visual site inspection as outlined in record keeping daily site log. Any abnormalities will be noted in the log and a completion of repairs date indicated.

All vehicles that leave the property must be maintained in proper working order. Vehicles will be inspected daily by driver and machanic and all discrepancies reported to the machanic and repairs scheduled. A truck wash is provided to wash off hauled material from sides and undersurface of trucks and other equipment. Any trucks requiring cleaning will be washed in this area. Operating equipment will be washed before leaving Area 1. Runoff will be collected in the evaporation basin.

G. SITE PERSONNEL

Site personnel will be comprised of the following job descriptions:

1. Owner/operator - Officer of BHS, Inc. with power to make all decisions concerning proper running of site.

2. Site Manager - College graduate with degree in chemistry or chemical engineering. Duties are comprised of running the site in the manner outlined in the permit, screening all wastes for compatibility with landfilling requirements, scheduling waste shipments, setting safety requirements for each waste, maintaining the training program, emergency first-aid capabilities and operation of heavy equipment.

3. Operator/foreman - The operator/foreman must have demonstrated the ability to handle heavy equipment, have a knowledge of the proper application of safety equipment, demonstrate the ability to read and use a grid coordinate system and comprehension of basic emergency first-aid.

The duties of an Operator/foreman are handling heavy equipment, supervision of waste unloading, responsibility for worker utilization of safety equipment, recording of waste coordinates, emergency response coordinator and first-aid during absence of the Site Manager and daily site inspections.

4. Operator - An operator must have demonstrated the ability to handle heavy equipment, proper use of safety equipment. The duties of an operator are handling heavy equipment, unloading of waste, removal of leachate and trench water, application of daily cover and maintenance of trenches.

5. General Laborer - A general laborer must have demonstrated a knowledge of the proper use of safety equipment. The duties of a laborer are unloading the waste and helping the operators in performance of site maintenance.

6. Truck Driver - The general truck driver must have demonstrated the ability to handle the site trucks, received the appropriate license and know the proper use of safety equipment. The duties of the general truck driver are the same as the general laborer in addition to transportation of dirt and fill materials.

7. Hazardous Waste Driver - Must demonstrate the same qualifications as the general truck driver as well as a comprehension of the emergency over-the-road spill response. The duties of the hazardous waste driver are the safe and proper transportation of hazardous waste.

8. Secretary - The secretary must have the basic secretarial skills as well as the ability to operate a C.B. radio. The duties of the secretary are those associated with a secretarial position and outside communications in case of emergencies.

9. Mechanic - Must have the same qualifications as the operator as well as the mechanical ability to properly maintain the operating equipment. The duties of the mechanic are to service and maintain the equipment in good operating condition.

G. CONTINGENCY PLAN

I. Emergencies in General: If a spill or accident occurs, the Site Manager must be notified immediately. Communications with the office will be maintained via two-way portable radios so that emergency vehicle requests can be made by telephone at the office. All workers will assemble at the spill/accident area and perform their designated function.

	Primary	Secondary
Site Manager	Coordinator/first-aid	
Operator/foreman	Heavy equipment	Coordinator/first-aid
Operator	Heavy equipment	Heavy Equipment
Mechanic	Radio Communications	Heavy Equipment
Laborer	Laborer	Radio
Driver	Laborer	Laborer
Secretary	Outside Communications	

In the instance that the accident/spill incapacitates one of the workers, the worker listed below the injured worker will automatically shift to their secondary function.

II. Emergency Control Equipment:

1. 955K Caterpillar Highlift - 931 Caterpillar LPG Highlift - movement of dirt and waste, formation of dikes, movement of lime and sand, removal of damaged equipment.
2. 215 Excavator - digging of interceptor trenches, movement of dirt and waste, removal of damaged equipment.
3. Mac-1 - 500-gallon tank truck for transportation of leachate and source of water while fighting fires.
4. 1972 Chevrolet tandem dump truck - for any hauling required.
5. Fire extinguishers are located on all pieces of equipment as well as being distributed around the site at the red and white fire boxes.
6. Fire blankets are located at the unloading platform and worker's shed.
7. Emergency eyewash containers are located at the unloading station, worker's shed and office.
8. All types of breathing masks (incl. MSA Industrial Type Gas Mask and MSA Model 401 Pressure Demand Air Mask (self-contained) located at unloading platform and worker's shed.
9. Eye protection is located at unloading station and worker's shed.
10. Water under pressure for decontamination of equipment located at the truck wash.
11. Special fire suits for protection against heat located at the unloading platform and worker's shed.

12. Special chemical resistance jump suits are located at the unloading platform and worker's shed.
13. The emergency first-aid box is located at the office.
14. Two (2) 300 gpm gasoline powered portable water pumps located in the supply shed.
15. A ton of lime for acid neutralization and fire control is maintained in the lime storage area.
16. An emergency shower is located at the unloading station.

III. Accidents:

1. The Site Manager will be notified immediately.
2. Emergency ambulance service will be requested if needed.
3. The Site Manager will ascertain the source and extent of the accident while administering emergency first-aid.
4. The Mo. DNR will be notified of the nature and extent of the accident.

IV. Fires: Due to the fact that flammable and ignitable wastes are not allowed into a landfill, any fires that occur at the site should be primarily equipment fires. Each piece of machinery on the site has a separate fire extinguisher to contain the fire.

Organic waste disposed of at the site is handled with hydraulic machinery and waste does not come in contact with a source of heat to raise the temperature of the waste above its flash point. If, for some unforeseen reason, a waste fire should occur, the following response will be put into effect:

1. Notify Site Manager via radio.
2. Outside fire departments notified.
3. Operator and operator/foreman will create a fire break to isolate the fire.
4. The laborers will utilize the on-site fire extinguishers to control the fire.
5. If the extinguishers do not control the fire, heavy equipment will be used to place cover over the fire to smother it.
6. The Mo. DNR will be notified via telephone, of the source and extent of the fire.

V. Spills: In the case of accidental spills, the following procedures will be put into effect:

A.1. The Site Manager will be notified via radio.
2. The operator and operator/foreman will construct diversion berms to contain the waste.
3. The waste and contaminated soil will be removed and disposed of in the appropriate trench.

B. In the instance that the spill enters a waterway:

1. The Site Manager will be notified via radio.
2. The operator and operator/foreman will dam the waterway above and below the source to contain all spillage.
3. The laborers will pump any contaminated water into the tank truck and dispose of the water in the evaporation basins (volumes will be recorded).
4. The contaminated bottom of the waterway will be removed and disposed of in the appropriate trench.

The Mo. DNR will be notified in instance A or B and the U.S. Coast Guard (1-800-424-8002) will be notified in instance B.

VI. Gases:

1. The Site Manager will be notified of any unusual odor emanating from the landfill.
2. The Mo. DNR will be notified.
3. If the nature and source of the odor cannot be identified, an outside laboratory will take air samples for analysis.
4. Once the nature and source have been identified, the waste will be either treated in place or removed for treatment.

VII. Leachate: If leachate is detected in a piezometer well:

1. The Mo. DNR will be notified.
2. A second analysis (yearly profile) will be made to verify initial analysis of leachate and indicate the source.
3. If leachate is conformed, at least four wells will be dug 45 feet deep (at least 10 feet deeper than the piezometer or sampling well) between the filled trench and contaminated piezometer well.
4. Water samples from these wells will be analyzed for the same parameters found to be high in the collection well.
5. The well(s) showing signs of contamination may indicate the direction of contamination.
6. A series of four wells with increasing 10-foot depth intervals will be dug in the apparent contaminated area (as indicated in "3" above), to determine the depth of contamination.
7. Wells will be dug to the contamination depth on a line parallel to the nearest filled trench to determine the lateral extent of contamination.
8. When the lateral extent of contamination has been determined, an interceptor trench will be excavated running parallel to the filled trench

with the length of contamination plus 10 feet and depth 5 feet deeper than that at which leachate was found. The trench bottom will slope to a low point. The trench will be backfilled with Meramec River sand to within 10 feet of the original ground level. The top 10 feet will be backfilled with excavated till and compacted by tracking with a dozer. A 6-inch diameter or larger PVC pipe will be placed as a well casing and slotted at the bottom to facilitate leachate removal.

9. The leachate collection well will be checked weekly and pumped whenever level is one foot above bottom. Records of water level, pumping and volume removed will be maintained. Leachate removed will be taken by tank truck to the evaporation basin.

In the event the above course of action does not completely remedy the situation:

1. Disposal records will be checked to try to identify the probable source of contamination.

2. If the records determine the source of contamination it can then be located by the site survey burial records.

3. A new interceptor trench will be excavated with the closest face about 15 feet downslope from the problem trench to intercept leachate coming from the problem trench. It will be excavated perpendicularly to the problem trench and 6 feet deeper. This will provide opportunity to inspect any sand or gravel lenses and determine extent and direction of any leachate seepage coming from the filled trench.

If leakage source is located, a 6-inch diameter vertical PVC pipe will be installed on the side of the interceptor trench adjacent to the leachage seepage point and backfilled with sand to remove leachate as a new collection well. The opposite wall of the trench will be covered with Volclay panels approximately 6 feet deep to confine leachate for removal from the new collection well. The trench will then be backfilled with earth to grade.

If this does not remedy the situation, after consultation with Mo. DNR, the wastes will be removed from the trench and moved over to a new trench for disposal or other disposal alternatives will be considered and implemented as appropriate.

VIII. <u>Waste Loads:</u> If load of waste enters the site and does not conform to required regulations:

1. Information on waste was not submitted by generator prior to shipping, waste will be refused.

2. Visual inspection does not conform to waste description, load will be refused.

3. Shipment not accompanied by manifest, Mo. DNR will be notified to determine disposition.

4. Transporter not the same as indicated on manifest, Mo. DNR will be notified to determine disposition.

5. Transporter is not licensed transporter, Mo. DNR will be notified to determine disposition.

6. Load is leaking, (a) truck will be placed on truck wash slab; (b) Mo. DNR will be notified to determine disposition; (c) local authorities will be notified of possible road contamination; (d) spill contingency plan will be implemented.

IX. Contingency Plan Training Program: New employees will be shown and become completely familiar with emergency equipment and procedures prior to working.

The ongoing lecture series will be used to refresh the emergency procedures in all employee's minds as well as introduce new procedures.

All training will be documented in the individual employee files.

X. Emergency Evacuation Plan: In the event an emergency arises which the Site Manager feels is completely out of control and continued action would be extremely hazardous and cause injury to the workers, he will contact the office and relay the message that all personnel are to evacuate the site immediately. The secretary will give three (3) long blasts followed by a pause followed by three (3) more long blasts on an air horn. Upon hearing this signal, all employees will immediately stop what they are doing and head for the nearest exit. All employees will then muster at the Zykan residence for further instructions.

XI. Emergency Arrangements: Copies of the contingency plan will be given to the fire departments and ambulance services in Wright City and Warrenton, the County Sheriff's Office, Missouri State Highway Patrol and Doctors Beckmeyer and Raymundo.

H. EMERGENCY TELEPHONE NUMBERS

Dr. J.R. Beckmeyer, 305 N. 2nd St., Wright City, Mo.	745-2400 (Office) 745-3121 (Residence)
Dr. Ruben S. Raymando, 230 E. Main St., Warrenton, Mo.	456-8914
Ambulance, Wright City, Mo.	745-3345
St. Joseph's Hospital, 3rd & First Capitol Dr., St. Charles, Mo.	724-2810
Fire Department, Wright City, Mo.	745-2261
Fire Department, Warrenton, Mo.	456-8535
Police Department, Wright City, Mo.	1-800-392-8263
Police Department, Warrenton, Mo.	1-800-392-8263
Warrenton County Sheriff	1-800-392-8263
Missouri Highway Patrol	434-5500
Mo. DNR, Jefferson City, Mo.	751-3241
U.S. Coast Guard	1-800-424-8802
L. Zykan	745-3401
M. Zykan	456-4411
M. Gill	327-8088

WORKING SAFELY WITH PESTICIDES

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
Public Health Service
Center for Disease Control
National Institute for Occupational Safety and Health
Division of Technical Services
Cincinnati, Ohio

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APPENDIX "A"

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Single copies are available from:
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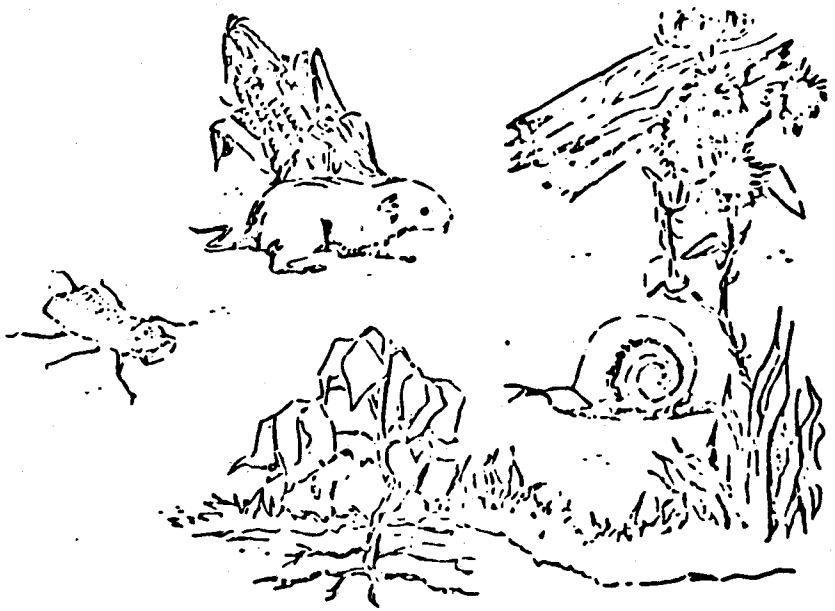
Cincinnati, Ohio 45226
Please include a self-addressed mailing label to assist in answering your request.

When you make materials that people use to get rid of pests, such as insects, mold, rot, plant blight, rats, mice, plant-eating [illegible]sts, snails and slugs, weeds and grasses, and others, you may be exposed to dangerous chemicals — unless you know how to take care of yourself. These products are made to poison and destroy some living thing, plant or animal, and many of them are dangerous to people as well if they are handled carelessly. Always treat them with respect. Before you handle chemicals used for pest control you owe it to yourself to study this booklet thoroughly. It is designed to help you learn how to avoid any injury to your health that might result from working with or around pesticides.



The pesticide industry is important to the American way of life and it gives our country the means to help feed a hungry world. About 70% of our most important food crops just couldn't be grown without pesticides.

In a short booklet like this, we can't give you all the details, but we have furnished general hints on how to stay safe and healthy when working with these chemicals. Your foreman or supervisor should be able to provide more detailed information or know where to find it. If he doesn't know the answer, he should try to get detailed safety and handling instructions from the company supplying the material. Always read labels on containers before you open them. It may save you from having a serious injury.

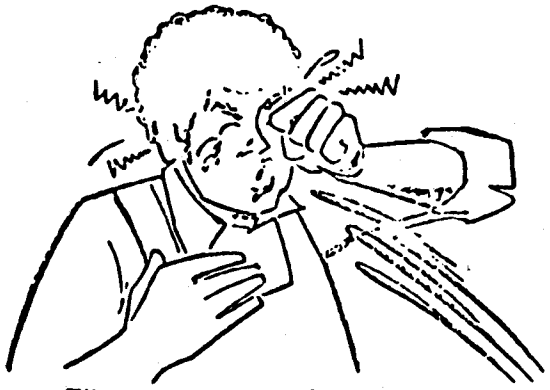
Don't hurt!

Be sure to keep all chemicals — solids, liquids, or gases — off your skin and away from your eyes. Be sure you don't breathe the vapors or dusts. Don't get the material on your food by eating with unwashed hands or from objects that have been in the work area. Know the ways chemicals can enter your body: through the eyes and skin, by breathing, and by eating.

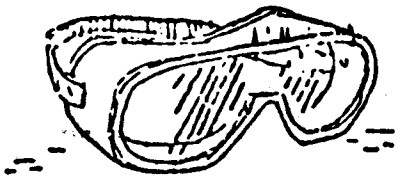
Eyes

You can not only be blinded by certain pesticides — and that is a big danger — but chemicals splashed in the eye can also enter your bloodstream and cause poisoning.

Particles are dangerous too. They can scratch or irritate your eyes. Or the particle can dissolve and cause further damage. If something gets in your eye, keep your fingers out — the only safe thing to rub your eyes with is your elbow. If you don't think that's safe, try it.



Protect your eyes. The easiest way to do this is to keep everything out of them that doesn't belong. You can't do much with your eyes shut, so wear safety glasses or goggles in all work areas. The type of eye protection to use will depend on the job, and your foreman or supervisor should see that you have the appropriate type.



Don't depend on reading glasses or contact lenses for protection

In fact, many doctors think wearing contact lenses is worse than wearing no glasses at all because they can trap material behind them, especially chemicals.

Anything that gets in your eyes should be washed out with flowing water until you can get medical help. If it is a solid particle, and a doctor or nurse is not readily available, somebody trained in first aid should be called on for help in getting it out. Use an eye bath or other source of clean flowing water immediately if liquid chemicals are splashed into your eyes and keep on washing your eyes with clear water for about 15 minutes.

SKIN

You may think, as many people do, that your skin will protect you from poisons as long as you don't have any cuts or open wounds. Probably the worst thing you would expect would be some itching or burning on your skin. But there are many chemicals that actually pass through your skin and get into your bloodstream, where they can make you sick or build up in your system. This is true of many of the pesticides, especially the insecticides. It happens sometimes even when you can't see any sign of injury or itching on your skin. Of course, if your skin is broken the chemical can get in even faster.

Many chemicals that don't go through the skin can still cause skin problems — redness, blisters, or dry scaliness. The doctor usually calls this dermatitis or eczema. Once you have a skin problem like this, it is easy to pick up infections that can give you real discomfort and even cause you to lose time from work.

Strong caustics and strong acids actually burn the skin. Certain other chemicals can cause rashes, boils or pimples (acne). The doctor usually calls this "chloracne".

Solvents used in pesticides can dissolve the oils out of your skin and leave it dry and flaky. If you are exposed to these solvents very often or leave them on your skin or clothing for any length of time, they are likely to cause eczema just the way the pesticides themselves do.

SKIN PROTECTION

Some chemicals that don't actually affect your skin and aren't absorbed very fast can still get into your system if you don't change your clothes as soon as they get contaminated.

Considering all the problems you can run into when you work with chemicals, you should do your best to keep them away from your skin. The best way to do this, of course, is to keep all pesticides in the equipment or in closed containers. When there is any danger of being splashed, you should wear the proper protective clothing, such as long-sleeved, moisture-resistant coveralls, protective hats or caps, gloves, and boots. In addition to the usual eye protection (safety glasses or goggles), you may have to wear a full-face shield when there is a real danger that pesticides may get splashed on your face.

Be certain that the inner surfaces of all protective clothing are clean and free of pesticides. Never wear gloves which have holes, cuts, or tears that could permit the pesticides to contact the skin of your hands.

After working around pesticides, always wash your hands, face, and any other bare skin before you smoke, eat, or go to the bathroom. Remember, chemicals can be absorbed through the skin of the crotch area faster than through any other skin of your body, so wash your hands carefully before using the toilet facilities and not only afterwards.

If you have long hair or wear a hat, remember that your hair and the sweatband can pick up chemicals from your hands or from the air and hold them against your forehead and scalp. Be sure to keep your hat clean and change the sweatband frequently. Wash your hair at the end of the workday to remove any chemicals. Naturally, if it is hot and you have been sweating, liquid chemicals, gases and dusts stick to you [illegible]

Don't wear or carry leather articles into the work area. Chemicals are easily absorbed by leather and very difficult to remove. They can later irritate your skin. Your shoes should be covered. Chemicals can be trapped under watches and jewelry and remain on your skin unnoticed. Leave all jewelry in the locker with your street clothes.

Whenever you have been working with dangerous pesticides, especially insecticides, take a shower and change your clothes before you go home after work. In your shower/locker room, you should have two lockers of your own — one for your work shoes and anything else that isn't changed daily — the other for your street clothes.

Don't take dirty work clothes home to wash. This would expose others in the family to the chemicals. Generally, work clothes should be washed at the plant or sent directly to a professional laundry for thorough cleaning.

If a chemical is splashed or spilled on your skin, wash the area at once. If quite a bit of chemical gets on your clothes, hurry to get under the nearest shower, strip them off, and shower and wash for at least 15 minutes. If the spilled material is known to be a poison, or if there is any chance that it is, see a doctor immediately. If the supplier of the chemical furnishes a safety booklet or a pamphlet with a note to the physician, show it to the doctor. The label should give you information on its danger.

Never put your bare hands into any chemical. That would just be asking for serious trouble and you might not live to regret it.

Remember!

1. Keep pesticides in proper containers or equipment.
2. Wear protective clothing.
3. Keep clean.

Don'ts to observe

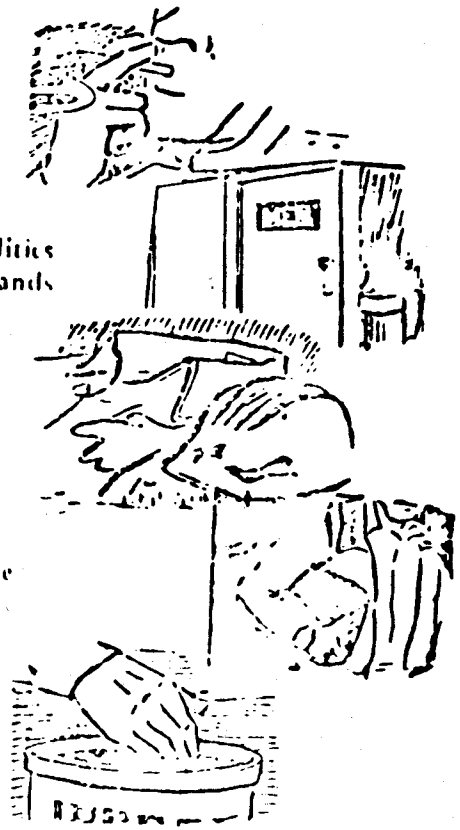
Don't smoke before washing hands.

Don't use toilet facilities before washing hands

Don't wear dirty clothes or hardhats with dirty sweatbands.

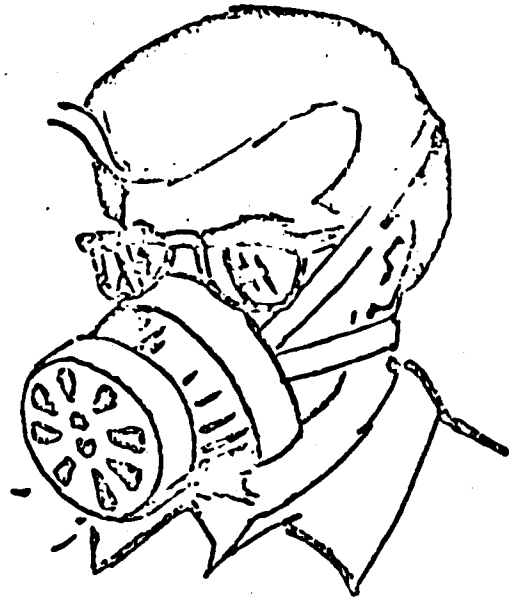
Don't take dirty work clothes home

Don't put your bare hand into chemicals, wet or dry.



BREATHING

You are more likely to get injured from breathing fumes and vapors of pesticides or breathing the dust than by contact with the liquid or solid itself.



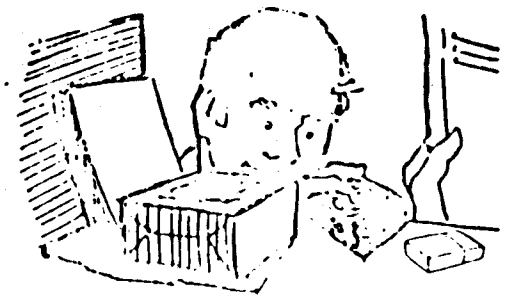
The lungs pass the oxygen you breathe into the bloodstream and they can pass chemicals too. This makes breathing the most direct way of getting chemicals into the bloodstream. And once they get in, they can do all sorts of damage. They can damage the lung itself or plug it up: when they get into the blood they can injure almost any part of the body, including the liver and kidneys. Some chemicals warn you of their presence in the air.

Before they can do any actual harm their odors may drive you away from the area, or they may cause sneezing, or smarting eyes — even vomiting — without doing any permanent harm to your system. On the other hand, most chemicals don't give you fair warning and it is possible to be poisoned before you are aware of the danger.

Your employer should have samples of air taken in your work area and studied by an industrial hygienist. If it is found that there are dangerous concentrations of chemicals in the air, your employer should eliminate them. Until this can be done, you will have to be provided protective breathing devices.

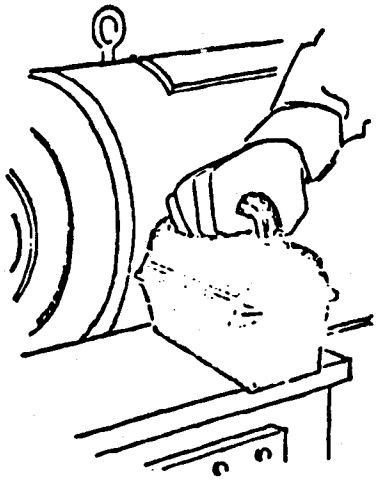
If the chemicals are easy to remove from the air, your employer may provide a chemical respirator. This fits over your mouth and nose and filters the air you breathe. If you use a chemical respirator, be sure it fits properly. Sideburns and beards may allow air to leak around the edges. Be sure to clean and disinfect the facepiece before wearing the respirator and be sure the absorbent cartridge is changed often enough to do the job it is made to do. Your foreman or supervisor will give you instructions for the use and maintenance of respirators. The box containing the respirator and the cartridge should be stamped with a certification of approval by NIOSH (National Institute for Occupational Safety and Health) or MESA (Mining Enforcement and Safety Administration).
With some chemicals you may even have to work in a helmet with its own air supply or in a protective suit.

We have already mentioned the danger of smoking before washing your hands and face when you have been working with pesticides. This warning can't be overemphasized, because the heat of the cigarette will vaporize chemicals on the cigarette and pass them directly to your lungs. Don't forget that cigarettes can get contaminated just by carrying them around in the work area. Keep them in the locker with your street clothes.
Large dust particles and droplets you breathe in may get trapped in your nose and throat. In time these can end up in your stomach, where they can make you sick. This is an indirect method of eating chemicals.

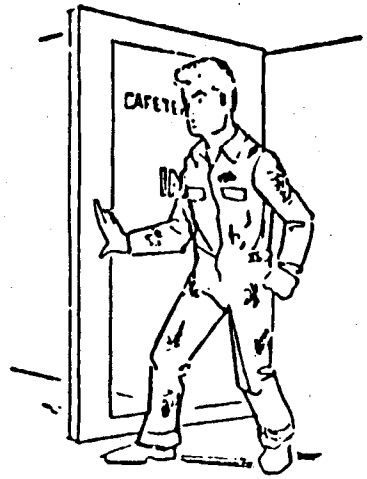


Watch what you eat!

We know you wouldn't purposely eat pesticides, but you may be doing just that without knowing it. Even if you can't see or smell the chemical on your hands, you can carry enough pesticide from the work area to make you sick if you don't wash your hands and face thoroughly before lunch or coffee breaks. You can also get sick on food that has been exposed to a chemical atmosphere. Make it a rule never to carry food into the work area and never to wear or carry contaminated clothing into the lunch room.
Keep food out of work areas.



KEEP FOOD OUT OF WORK AREA



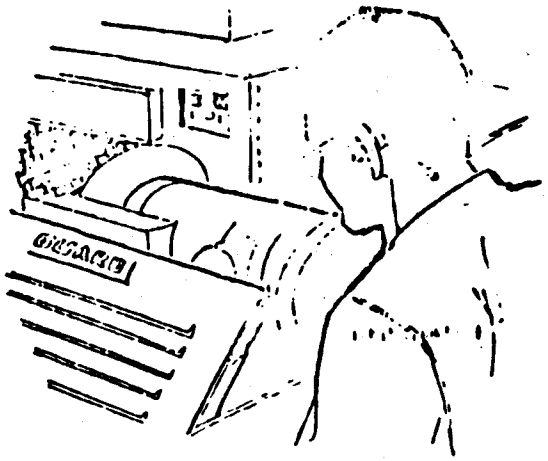
DON'T EAT WHILE WEARING CONTAMINATED CLOTHING

HANDLING

Before you handle any chemical, you will have to have the proper equipment. It is your employer's responsibility to ensure that such things as clean protective clothing, hats, respirators, boots, and goggles are used when needed. It is important for you to read the labels on materials you work with, and to ask questions of your supervisor if you have any doubts about the safety of your plant or your working methods.

Make sure you know where to find emergency equipment in a hurry when you need it. Find out the location of eye and safety showers, fire extinguishers, and the like. Check from time to time to make sure they work or have been inspected.

Before you operate any equipment, be sure it is ready and safe to use, with all guards in place, all connections and covers tight, all ventilating equipment operating safely, all valves open that should be open and all valves closed that should be closed.



MAKE SURE ALL GUARDS ARE IN PLACE

f you are using a flammable solvent, check to make sure that there re no open fires in the area. Smoking around chemicals creates he danger of fire or explosion in the work area. It may also oison you.

Never work alone around chemicals. If a leak or malfunction of the quipment occurred, you could be exposed to poisonous vapors nd lose consciousness. If you are working alone, who will be in the nmediate area to rescue you?

Use the buddy system — be sure somebody is with you at all times. e sure you know what to do a case of emergency.

n case of a spill, clean it up immediately to keep the pesticide from preading and contaminating the whole work area. When cleaning p spills, be sure to ask your supervisor how to do it and follow rocedures recommended. Also, ask your supervisor how to dispose f the wastes and the clean up materials.

you notice anything unusual happening, follow emergency rocedures and notify your supervisor at once. Some things to watch r are these:

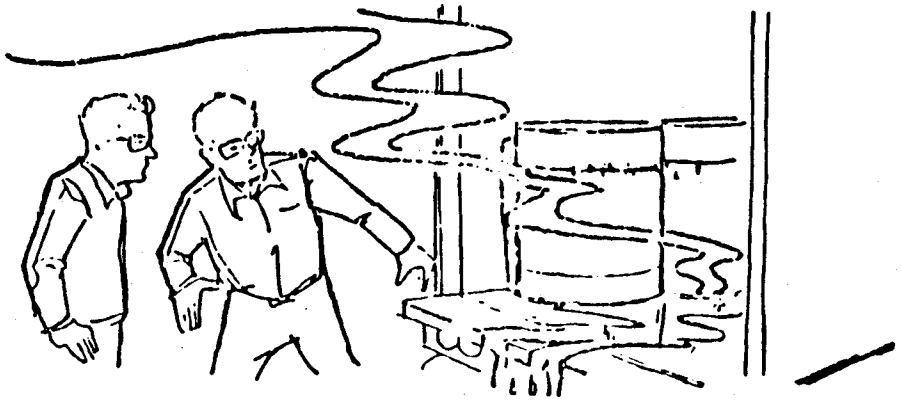
Unusual odors
A motor overheating
Pressure building up in a pipe
Leaks of liquid or dust
Temperature going up faster than normal

emember to wash or shower immediately if chemical gets on your in. If chemicals get on your work clothes use the emergency shower d take off the contaminated clothing (see the section titled SKIN").

Your supervisor should know all the necessary safety and handling precautions and know when to have you use protective equipment on the job. Chemical manufacturers usually provide the information your company needs to identify the hazard and to use their products safely.

At the end of the working day, be sure to clean up the equipment and do a thorough job of cleaning the whole work area, including floors, scales, etc. Remember — *don't* use a broom and *don't* use air to blow things around.

If a truckload or freight car of chemicals arrives at your plant with broken or leaking containers, don't unload it unless you are sure the chemical is not dangerous.



If it is dangerous, somebody from your company should phone the supplier for information on how to handle the situation.
If the supplier can't be reached, contact the National Agricultural Chemicals Association (Telephone No. 1-513-961-4300), or in an emergency, the Manufacturing Chemists Association ("Chemtrek" Telephone No. 1-800-424-9300). In certain cases one of the above may send somebody out to your plant to help you unload and repackage the material or dispose of it.
It is a good idea to have clean gloves and shoe coverings available at the dock to put on in case you have to get up on the truck to load or unload. This helps prevent contaminating the truck. Always change shoe coverings before changing gloves. Containers lined with plastic bags should be handy for the soiled gloves and shoe coverings if you do change.

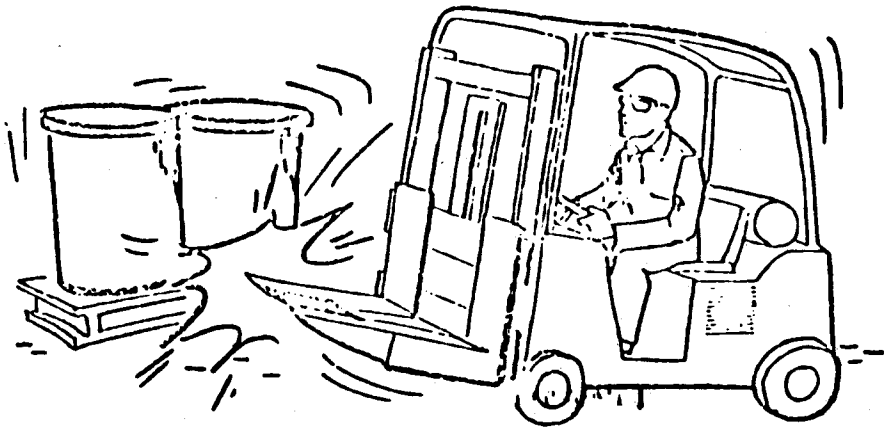
STORAGE

Be careful how you store chemicals. When they are allowed to stand for any period of time, some chemicals can spoil or change chemically. Moisture breaks down many chemicals and causes them to lose potency against pests, but they can still be hazardous to you.
Be sure they aren't stored where they'll get hot. Heat tends to break down many chemicals, and some may even explode.
On the other hand, some liquid chemicals will be ruined by freezing or may separate if they are kept in the cold. These can also be dangerous to handle.
Before storing, check the label and follow directions.

Never store chemicals near food or materials which might get in food!

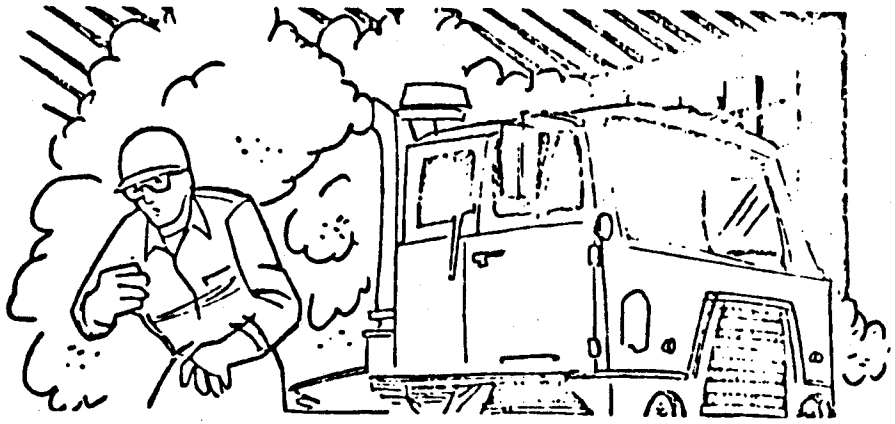
Always keep chemicals in the original container until they are used. A material stored without the label can be mistaken for another product and cause a serious problem — even an explosion — when mixed into a formulation. Never use the contents of an unmarked container.

If you are moving chemicals with a forklift truck or some other powered vehicle, be careful not to damage the container with your equipment. Chemicals have to be treated with respect.



If containers are damaged and you have a leak, get it stopped and cleaned up before the chemical spreads. (A simple way to stop a leak in a non-pressurized container is to turn it so that the leaking surface faces up.) Be sure you know how to clean up the area safely, and dispose of the waste and the used cleaning materials. If you haven't cleaned up this particular chemical before, be sure to get advice from your supervisor.

Don't operate a gasoline-powered vehicle in a closed area. Carbon monoxide fumes from the motor are deadly. Don't close doors in a garage or loading area when truck motors are running.



FORMULATING

Pesticides are usually used as a formulation. That is, the material that actually controls the pest is mixed with other ingredients, especially solvents, and sometimes with other additives. If water is to be the "carrier" and the material doesn't dissolve readily in water, emulsifiers are used. These are chemicals that make it possible for you to mix materials with water even if they aren't normally water soluble.

Besides water, many other types of solvents can be used. Some called chlorinated solvents, like those used in drycleaning, are commonly used as vehicles. Vapors of the chlorinated solvents are very dangerous to breathe. They can produce a "high," dizziness, or even unconsciousness in workers exposed to them and can cause permanent damage to the kidneys, liver, and nervous system in workers exposed to them over a period of time.

Kerosene and similar petroleum products are also used as solvents for pesticide formulations. The chief danger of products like kerosene is that they are flammable or combustible.

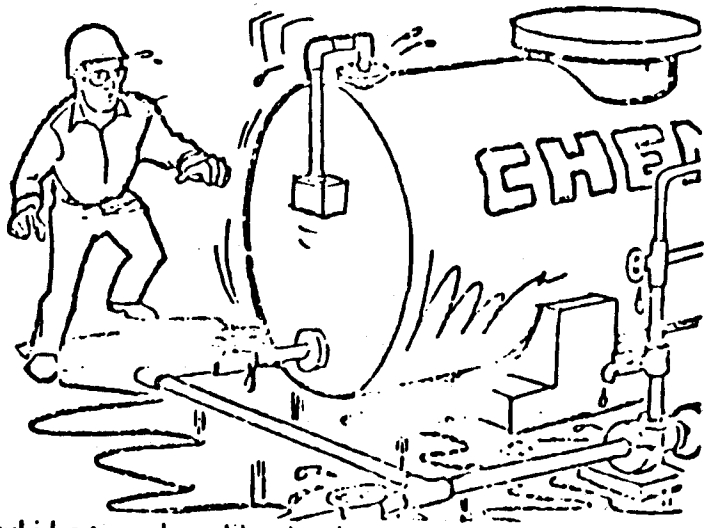
Solution formulations are usually made by putting materials into a tank, where they are mixed. Pesticides should never be added from an open bucket.

Always handle chemicals in a closed pumping system or ventilated pumping hood. NEVER leave a pump unattended while it is running.

Watch your step while formulating!

When you are formulating pesticides you can be exposed to danger during several of the steps. The greatest danger occurs when you take concentrated material out of a tank car or a large container, such as a 55-gallon drum, and add it to the mixing tank.

Never let concentrated chemicals get into the air, on your skin or clothing, or on anybody else's. Be sure the pumping system is in good condition. The pump, pipe unions, and valves must be leakproof.

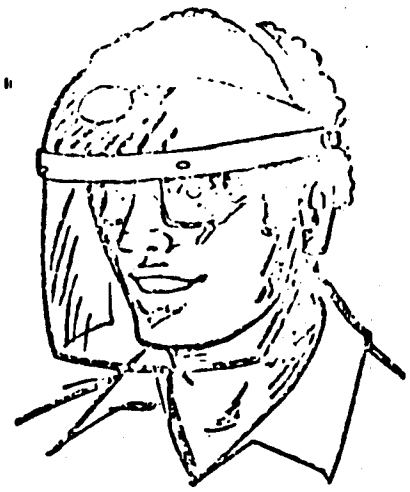


It's a good idea to make a dike ahead of time around pumps or other spots where you think a leak may occur so that leaks can be kept from spreading. If all the pumps can be kept in one area it is easier to keep any leaks from spreading and to control vapors.

Many pesticide concentrates come in solid form and have to be melted before you can pump them out of their containers. Melting can cause dangerous fumes, so take special care. Also be careful not to heat the material beyond a safe temperature, because many materials can change chemically when heated and can then explode. Melt the material with extreme care and keep the water bath, drum heater, or other device used for melting at a temperature below the danger point. The manufacturer should provide information on safe melting.

Keep melting temperature within the range of safety

When adding components of a formulation to the mixer, if there is any possibility that splashing may occur, be sure to wear a face shield.
Splashing can happen as materials are added, during the filling of the cans with the finished product, or any time the mixer paddles are moving. Play it safe. Use adequate protection.



Remember that heating materials builds up pressures and you have to allow them to escape to keep equipment from exploding.
When you are heating pesticide materials in a tight system, there should be proper safety release valves on the system so that pressure is released before the system blows up. These valves will have to be checked from time to time to make sure they work properly.
Be especially cautious when you add flammable solvents to the mixer. If the pipes aren't properly grounded or the solvent has to fall through the air into the mixer, static electricity can build up and touch off an explosion. Try to have the filling pipes touch the mixing tank.

MIXING PRECAUTIONS

When mixing wettable powders, dusts or granules, you have to take precautions to avoid exposure when you add them to the mixer.
If the pesticide is sprayed into the mixer, be sure there is adequate ventilation. Remember, when you put something into a mixer, air is forced out, and this air will carry some of the pesticide with it.
If there is a solvent in the concentrate solution, this solvent may be driven off before the formulation is complete. If the solvent is toxic or flammable (or both), be sure your dryer has adequate exhaust ventilation to keep vapors out of the work area. If you can smell solvent around the dryer, report it to your supervisor.

Another important caution [illegible] that mixers will [illegible] anything that goes in [illegible] clothes [illegible] fingers [illegible] Don't take chances, *never* wear ties or loose [illegible] [illegible] around a mixer.

EMULSIFIABLE CONCENTRATES

Emulsifiable concentrates are pesticide formulations that can be diluted to give a stable emulsion for spraying, which makes them convenient products for the end user. There are two main types: one is prepared by dissolving the pesticide in a solvent that can be further mixed with water and broken up fine in a colloid mill or mechanical homogenizer. The second is made by dissolving a non-liquid pesticide in a solvent with emulsifier added. Working with either of these types of emulsifiable concentrate presents the same dangers as working with other pesticide formulations. Be especially careful when you work around a colloid mill or a homogenizer. Both revolve at high speeds and must be provided with guards to keep clothing, fingers, etc. from being caught and pulled into the equipment.

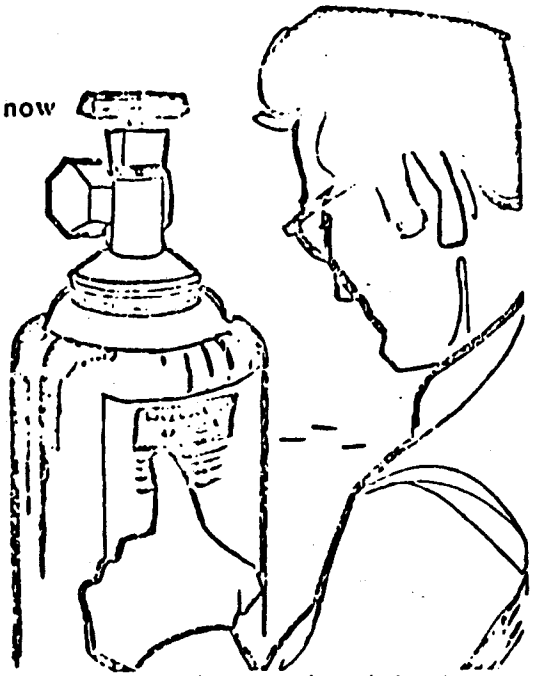
FUMIGANTS

Fumigants are used in a number of ways. For example, they are used to kill insects in grain, to destroy roaches and termites in buildings, and to kill insects and other pests in the soil before planting crops. Most fumigants are liquids when they are kept very cold, but they can easily turn into gases even at what you might think of as fairly low temperatures. For this reason, fumigants should be kept as cool as possible when they are handled in the formulating plant. Usually a formulator doesn't do any mixing — he just repackages the fumigants — but this in itself is a dangerous operation. The air-moving and cooling systems have to be checked frequently and kept in good working condition and the workers have to be carefully protected from exposure.
This includes filled cylinders which might leak under pressure. Many fumigants have no smell or taste so they can't be detected without special instruments. When you are working with fumigants, your work area must be well ventilated and the air you breathe should be tested frequently.

You shouldn't work with fumigants in unventilated areas without a respirator to remove the fumigant from the air you breathe. Your supervisor should know which type of respirator you should wear. This is very important because some respirators do not give enough protection. You may have to wear a canister gas mask or air-supplied hood or mask.

Remember — always wear suitable protective devices when they are recommended, and be careful when entering an area where fumigants are handled.

Read any labels and booklets provided by the chemical manufacturer and be sure you know the dangers of working around fumigants.



There are additional formulations we haven't described in this booklet. If you are making one of these less common products or using unusual methods, consult your foreman or supervisor about the specific hazards of the materials and equipment and learn how to work with them safely. Once again, the labels and the manuals put out by the producers of the chemicals should be consulted.

PACKAGING

The big problem in the packaging area is dust and vapor control. As was true of the mixer, the air in the container gets pushed out during the filling operation and carries some product with it. If the problem can't be controlled adequately by ventilation, you should wear a respirator when you are in that area. Good ventilation and good housekeeping are essential to prevent blowing poisonous dusts and gases around.

HOUSEKEEPING

Is housekeeping important? In a pesticide-formulating plant it certainly is, if you value your health. The danger of exposure to chemicals can be minimized by keeping the work area cleaned up frequently. Here is where you can really do something positive to protect your health.

If material gets on a switch, on a doorknob, or on a valve handle, you can be sure it will get on some worker's hands and be transferred to his mouth, eyes, and other exposed body areas. If a pesticide gets on the floor it will be picked up on shoes and tracked to locker rooms, lunch rooms, and elsewhere. Eventually it will be stirred up and end up in the air you breathe. As you have learned, most pesticides, especially insecticides, are dangerous chemicals, and many of them can be absorbed directly through your skin. Needless to say, if the work areas are kept clean there is no reason for you to worry about skin contamination from the floors and equipment. Good housekeeping means not leaving a pile of dust or a puddle of solution on the floor until the end of the day before cleaning it up. Your own safety and health depend on cleaning up the mess as soon as it appears, and then fixing any leaks that could produce more puddles or dust piles. Don't forget the warning — *never* use a broom or compressed air in cleaning up such spills. Brooms and compressed air stir material into the air and spread it over a wider area. Using steam or hot water is generally *not* a good way to clean up spills because either one tends to evaporate liquid chemicals into the air or disperse dusty materials. THE SYSTEM TO USE IS A VACUUM, fitted with a special filter. After vacuuming, wash with soap and water or a chemical cleaning solvent. Always check with your supervisor about the proper cleanup method for large spills.

Some materials may stick to surfaces in the work area and be hard to get off because they won't dissolve easily in water. In many cases your supervisor will have you use a dilute acid (acetic or muriatic) or a base (ammonia, washing soda, bleach, etc.) to break down the original material to something that will dissolve in water.
Don't forget to protect your hands and skin, because these cleaning materials will burn. If you use a chemical solvent to clean work surfaces, be sure not to breathe the vapors. To be safe from breathing poisonous solvent fumes, it is a good idea to wear an organic canister respirator that will filter all the solvent vapors out of the air.
Be particularly careful if you have to use a chemical solvent in an enclosed area such as a pit or a closed room. In such instances you will probably need a special breathing device with supplied air rather than a canister respirator.

WASTE DISPOSAL

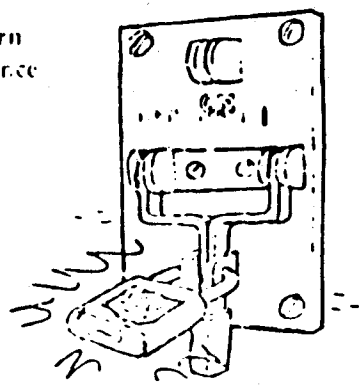
After you've cleaned up equipment or taken care of spills of poisonous chemicals, you will have the problem of getting rid of the waste. Cleaning up spills and leaks has to be done properly, and you have to know how to handle the job before a spill happens. Find out the proper way to do it from your foreman or supervisor and follow the correct procedure every time. Never skip any steps.
Keep rags for cleaning in properly labeled metal containers and keep covers over containers holding oily or greasy rags. If they are not covered up, they may heat up by themselves and catch fire.
Follow your supervisor's instructions about disposing of rags used for cleanup.
Before you dispose of any waste chemicals or used containers, check with your supervisor. Poisonous chemicals and materials that have been in contact with such chemicals shouldn't just be thrown out into the backyard or on a rubbish heap, or poured down a sink.

They are extremely dangerous to animals, fish, and people if they get into the environment.

Bags that have held pesticides cannot be used over again, but can — and usually should — be burned. Even if they are burned, that operation has to be done carefully in a suitable area where smoke and fumes can be controlled or contained. The burning should be done by somebody who understands the dangers and knows how to prevent danger to people and contamination of the environment.
The only place metal drums can ever be reused is in the formulating plant itself and then only for holding chemicals and only after they have been thoroughly cleaned and decontaminated. To decontaminate a drum, you have to wash it with a solvent that will completely remove all traces of the chemical. This should be done in a well-ventilated area. You should wear proper protective clothing and equipment to prevent contact with the materials.
Glass containers should be rinsed, broken and buried in a dump that is approved for handling the disposal of pesticides. If you can't reuse a metal container in the plant, destroy it by puncturing the top and bottom and have it buried in the dump, but be sure you clean and decontaminate it thoroughly before you destroy it.

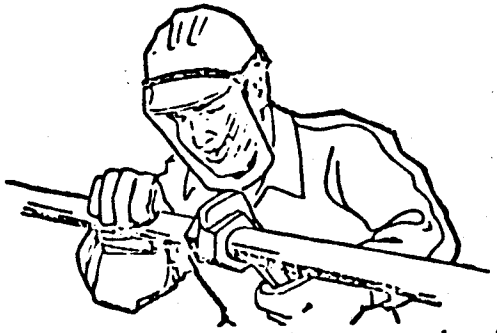
MAINTENANCE

Maintenance in work areas where pesticides are handled or formulated creates a constant danger of contact with poisons. When you are doing maintenance work always use the buddy system. Always make sure that someone who knows about the dangers and who is properly protected is with you.
Before you start . . .
Before you start working on any equipment be sure all the agitators, pumps, grinders, conveyors and other moving parts are turned off. Check to make sure the electricity is off and that there are locks on the switches so nobody can turn them on again until the maintenance is finished and everybody is clear of the area. Be sure you know where the eye showers and safety showers are located before you start work.



Be sure electricity is locked "off"

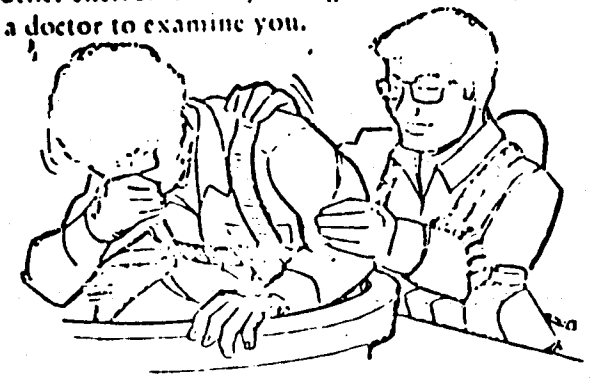
Also be sure all equipment is drained and flushed before you begin working on it. This is especially important with pesticides that can be absorbed through your skin. When you approach formulating equipment, be sure you are properly covered with protective clothes, such as gloves, coveralls and the like, and keep them on all the time you are working on the equipment. If you have to loosen or open pipes, pumps, reactors or anything else that may contain material under pressure, treat them as if you know they'll be full — wear rubber gloves, a rubber suit, and a face shield.



If you have to enter a tank, kettle, pit or any enclosed space, prepare for it ahead of time. Be sure the tanks are emptied, washed, and blown out with fresh air before you get in, because most chemical vapors are heavier than air and will keep air from getting down to the bottom of a tank or pit. And be sure that the air in the tank has been tested before you go in.

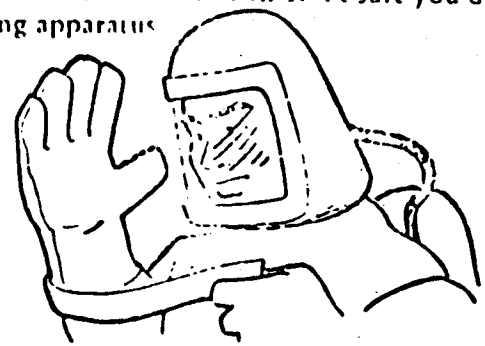
It is usually required that you wear a safety harness while in the tank and be sure another person is watching you from outside all the while you are working. This person should be equipped with the proper apparatus, such as an air-supplied breathing unit in case he has to go in to rescue you. If the tank has been used for fumigants, it must be inspected with particular care before anybody enters it.

If you are in a tank, pit or other enclosure and you begin to feel dizzy, *get out right away* and get a doctor to examine you.



If the enclosed area cannot be cleaned and aired as thoroughly as we have recommended, be sure you are completely covered and use the proper breathing apparatus. Put on rubber gloves pulled over the arms of your suit and pull boots over the legs, then carefully tape the gloves and boots closed. If you are wearing coveralls, you will have to cover your neck too.

Preferably use an air-supplied hood that fits around the collar to protect your whole head. If you don't have one of these be sure you do wear a self-contained breathing apparatus.

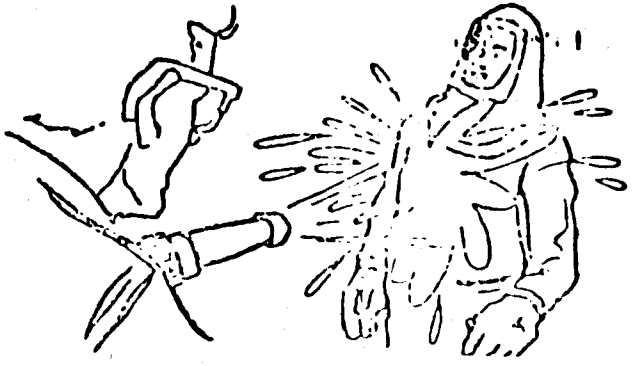


Don't treat this advice lightly. If a person enters a tank full of vapors without adequate protection, he may quickly get sick and become unconscious. And once he's unconscious if he isn't pulled out promptly he may die.

When you finish your maintenance work, get out of your protective equipment. If you can't take your protective equipment off right at the job site, take the shortest path to an area where you can.

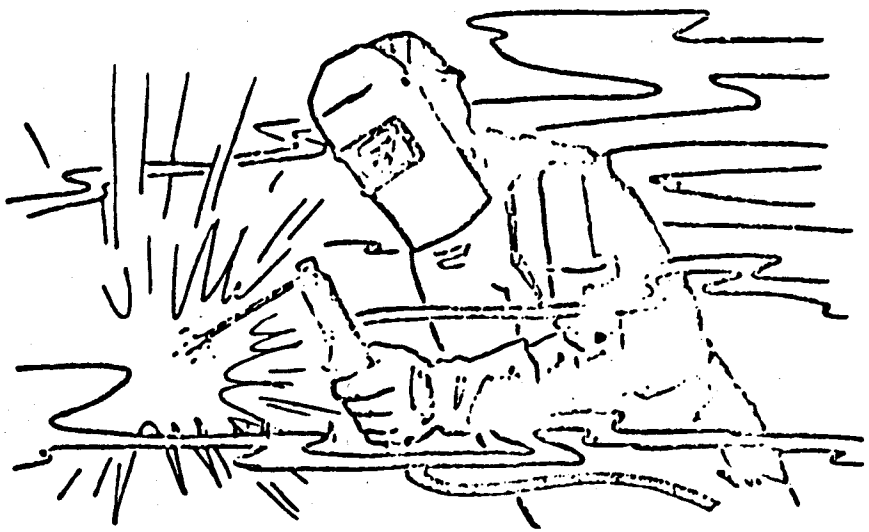
This will prevent spreading contamination all over the plant from your equipment.

Take a shower and put on clean clothes before you do anything else. If you were wearing a rubber suit, you should have it washed down at the work site before you get dressed. This will keep you from getting contaminated by the suit as you get out of it.



When the maintenance operation is completed, somebody will have to check over the equipment and the whole area to make sure safety guards are in place and that pipes, pumps, flanges, and fittings are all tightened. When everything is ready for safe operation, you can take the locks off the electrical and mechanical switches and start operations up again.

If you have to do any welding or cutting as part of the maintenance, work on clean surfaces in a clean area free from flammable vapors and materials. Never use chemical (chlorinated) solvents in any area where cutting or welding is being carried out. If you have used such solvents in cleaning up, allow time for thorough drying and then blow away any vapors thoroughly before using a torch. Heat and flame can break this vapor down to produce extremely irritating and poisonous gases.



Don't weld or cut with a torch when solvent vapors are present

FIRST AID

Your employer must provide at least one person on each shift who is properly trained to administer first aid. First aid kits approved by a consulting physician must be readily available.

Your supervisor should explain to you what can happen if you are overexposed to pesticides and the other chemicals used in making pesticide formulations. If you notice any of the symptoms after being exposed to these chemicals notify your supervisor immediately. Your employer should make arrangements with a local doctor, hospital, or clinic for prompt attention. Your employer should supply the medical people full details on the kinds of chemicals you will use, so that they will know the proper treatment in case you are affected. This information is readily available from the companies that supply the chemicals — sometimes it is right on the label. Your employer may ask you to have a physical examination or a blood test when you are working with these materials. These tests often can indicate overexposure before you feel anything. Be sure to cooperate.

The most important first aid measure you can learn is washing whenever you have been exposed and at all break times. If you are wearing a bandage, remove it when you wash, clean the area thoroughly and put on a new bandage.

If pesticides are spilled or splashed on you, be sure to wash the exposed skin with soap and water for at least 15 minutes. Change any contaminated clothing promptly and shower well before putting on clean clothes. Then the doctor or medical facility that takes care of your company's pesticide exposures should be called and told of the type and nature of the exposure.

If you feel dizzy or sick on the job, report immediately to your foreman or supervisor. If there is any chance your illness is due to chemicals, see a doctor.

If you ever feel itching or burning on your skin while you are working with chemicals, stop what you are doing right away and immediately wash the burning or itchy area thoroughly with soap and water.

f you smell unpleasant or unusual odors, leave the area immediately nd report it. If your mouth, nose, or eyes feel itchy, leave the area nd wash them. For itching of the eyes, use a special eye bath r another source of clean fresh water. When unpleasant odors r itching force you to leave the area, you, or whoever goes back o investigate, should be sure to wear proper protective equipment. top exposure to pesticide immediately.

f someone gets sick from pesticide poisoning, do the following:

f breathing has stopped, start artificial respiration.

Call a doctor immediately and get the patient to him as soon as ossible.

Have the patient wash thoroughly with plenty of clean water nd soap.

f a pesticide has been swallowed, check the label. If the label pecifies having the patient vomit, do it, following the instructions he manufacturer supplies. If the swallowed material contains erosene or another hydrocarbon solvent (check the container), lon't have him vomit, but inform the doctor. In any case, do as the abel indicates.

f pesticide gets into the worker's eyes, rinse them thoroughly vith clean water for at least 15 minutes and then have them hecked by a doctor.

f you know this information thoroughly, there is no reason why you ave to be afraid of working with pesticides. The pesticide industry s an important one and you can work with pride and a sense of ecurity when you know how to take care of yourself on the job.

NOW... READ THIS MANUAL AGAIN

APPENDIX A

VHAT IS A PESTICIDE ?

is easy to recognize a pesticide when somebody calls it a eed-killer or a rat poison, but you should be familiar with the ientific names too. Here are the most common technical r scientific names used for pesticides:

Pest	Scientific name
Insects, bugs	Insecticide
Weeds, grasses trees, etc.	Herbicide
Rats, mice, gophers, etc.	Rodenticide
Mold, fungus, rot, blight	Fungicide
Snails, slugs	Molluscicide
Eelworms, nematodes, plant-eating soil worms	Nematicide, Nematocide, or Nemacide

These are only the main groups. Under these there are about 125 major pesticides and these are mixed by formulators to make about 8000 different products.

Classification of some common pesticides

Insecticides		
Abate*	Dursban*	Mevinphos
Banvel*	Fenthion	Parathion
Barban	Dasanit*	Phorate
Carbaryl	DDT	Phosvel*
Carbon tetrachloride	Guthion*	Ronnel
Diazinon*	Lindane	Rotenone
Dichlorvos	Malathion	Ruelene*
Dimethoate	Meta-Sestox R*	Systox*
Disulfoton	Methomyl	TEPP
	Methyl Parathion	Toxaphene

Herbicides			
AAtrex*	Diquat	Paraquat	Sutan*
Benefin	DSMA	Picloram	2,4,5-T
2,4-D	Eptam*	Probe*	TCA
Dalapon	Lasso*	Ramrod*	Vernam*
Dinitro	MSMA	Silvex	

Rodenticides		
Antu	Fumarin*	MGK* Rodenticide
Diphacin*	Gophacide*	Warfarin

Molluscicides		
Bayluscide*	Bresian*	Mesurol*

Fungicides			
Benomyl	Chloropicrin	Thiram	Ziram
Captan	Maneb	Zineb	

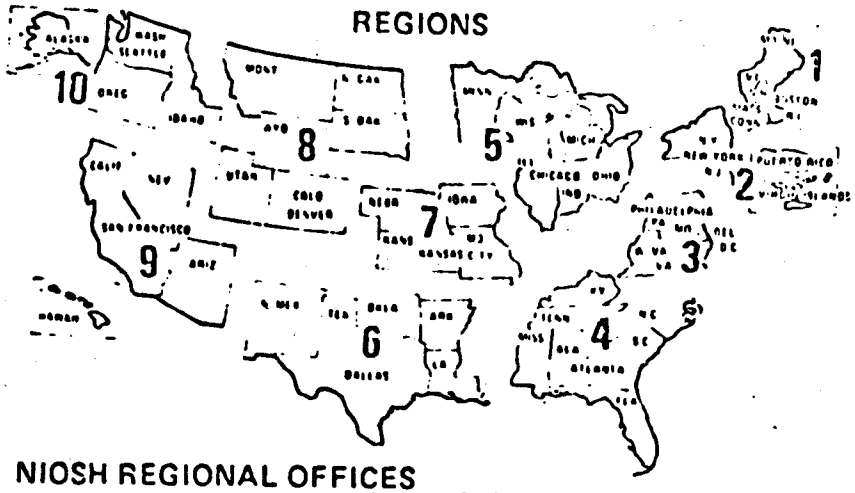
Nematocides		
EDB	Methyl Bromide	Nemacur*
DBCP	Nellite*	Vapam*

* *Proprietary names*

NIOSH A OSHA REGIONAL OFFICES

The following pages list NIOSH and OSHA regional offices. Either of these facilities serving the state can provide information on the OCCUPATIONAL SAFETY AND HEALTH ACT including questions on standards interpretations, voluntary compliance information, copies of the *OSHA Standards, OSHA Act, Employee Rights Posting Notice* and other OSHA publications.

REGIONS



NIOSH REGIONAL OFFICES

DHEW, Region I
Government Center (JFK Fed. Bldg.)
Boston, Massachusetts 02203
Tel.: 617/223-5807

DHEW, Region II—Federal Building
26 Federal Plaza
New York, New York 10007
Tel.: 212/264-2485/8

DHEW, Region III
3525 Market Street P.O. Box 13761
Philadelphia, Pennsylvania 19101
Tel.: 215/597-6716

DHEW, Region IV
50 Seventh Street, N.E.
Atlanta, Georgia 30323
Tel.: 404/626-5474

DHEW, Region V
300 South Wacker Drive
Chicago, Illinois 60607
Tel.: 312/353-1710

DHEW, Region VI
1114 Commerce Street (Rm. 8-C-53)
Dallas, Texas 75202
Tel.: 241/792-2261

DHEW, Region VII
601 East 12th Street
Kansas City, Missouri 64106
Tel.: 816/374-5322

DHEW, Region VIII
19th & Stout Streets
9017 Federal Building
Denver, Colorado 80202
Tel.: 303/837-3979

DHEW, Region IX
50 Fulton Street (254 FOB)
San Francisco, California 94012
Tel.: 415/666 3781

DHEW, Region X
1321 Second Avenue (Arcade Bldg.)
Seattle, Washington 99101
Tel.: 206/442-0530

OSHA REGIONAL OFFICES

Region I
U.S. Department of Labor
Occupational Safety and Health Administration
18 Oliver Street, Fifth Floor
Boston, Massachusetts 02110 . . . . . Telephone: 617/223-6712/3

Region II
U.S. Department of Labor
Occupational Safety and Health Administration
1515 Broadway (1 Astor Plaza)
New York, New York 10036 . . . . . Telephone: 212/972-5941/2

Region III
U.S. Department of Labor
Occupational Safety and Health Administration
15220 Gateway Center, 3535 Market Street
Philadelphia, Pennsylvania 19104 . . . . . Telephone: 215/596-1201

Region IV
U.S. Department of Labor
Occupational Safety and Health Administration
1375 Peachtree Street, N.E., Suite 587
Atlanta, Georgia 30309 . . . . . Telephone: 404/526-3573/4 or 2281/2

Region V
U.S. Department of Labor
Occupational Safety and Health Administration
300 South Wacker Drive, Room 1201
Chicago, Illinois 60606 . . . . . Telephone: 312/353-4716/7

Region VI
U.S. Department of Labor
Occupational Safety and Health Administration
7th Floor, Texaco Building, 1512 Commerce Street
Dallas, Texas 75210 . . . . . Telephone: 214/794-2477/8/9 or 2567

Region VII
U.S. Department of Labor
Occupational Safety and Health Administration
Federal Building, Room 3000, 911 Walnut Street
Kansas City, Missouri 64106 . . . . . Telephone: 816/374-5861

Region VIII
U.S. Department of Labor
Occupational Safety and Health Administration
Federal Building, Room 15010, 1961 Stout Street
Denver, Colorado 80202 . . . . . Telephone: 303/837-3883

Region IX
U.S. Department of Labor
Occupational Safety and Health Administration
9470 Federal Building, 450 Golden Gate Avenue
Post Office Box 36017
San Francisco, California 94102 . . . . . Telephone: 415/556-0584

Region X
U.S. Department of Labor
Occupational Safety and Health Administration
1808 Smith Tower Building, 506 Second Avenue
Seattle, Washington 98104 . . . . . Telephone: 206/442-5930

EMERGENCY INFORMATION

FIRE

Telephone Fire Department _____

Nearest Alarm Box at _____

CRIME

Telephone Police _____

INJURY/ILLNESSES

Avoid infection of minor injuries; always get medical attention or skilled first aid.

Doctor _____

Office _____ Tel. _____

Residence _____ Tel. _____

_____

_____

Hospital _____

Address _____ Tel. _____

Ambulance _____

Address _____ Tel. _____

(In emergencies, get medical attention and transportation elsewhere if necessary.)

In all cases of Fire, Crime, Accident, or Sickness, promptly notify:

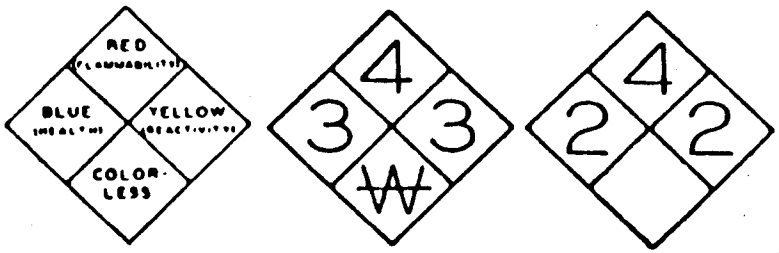
1. Name _____ Office Tel. _____
   Address _____ Res. Tel. _____

or

2. Name _____ Office Tel. _____
   Address _____ Res. Tel. _____

called initiating explosives) are comparatively sensitive to friction, impact (blows), shock, and heat. Primary high explosives differ widely in properties, and it is not to be inferred that those listed are equally hazardous. *Secondary high explosives* generally require initiation by a primary explosive.

Hazard Identification System. The diamond-shaped diagram shown for each chemical gives at a glance a general idea of the inherent hazards of the chemical and the order of severity of these hazards under emergency conditions such as spills, leaks and fires. The Hazard Identification System is not intended to identify the nonemergency health hazards of chemicals. Based on the hazard identification system in "Recommended System for the Identification of the Fire Hazards of Materials, NFPA No. 704M," the diagram provides planning guidance to fire departments for safe tactical procedures in emergency operations, gives on-the-spot information to safeguard the lives of fire fighting personnel and the others who may be exposed, and provides plant design engineers, plant protection and safety personnel with a means of identifying hazardous materials and areas in which they are stored.



Diborane Vinylidene Chloride

The diagram identifies the "health," "flammability" and "reactivity" (instability and water reactivity) of a chemical and indicates the order of severity of each hazard by use of one of five numeral gradings, from four (4), indicating the severe hazard or extreme danger, to zero (0), indicating no *special* hazard. In the diamond-shaped diagram "health" hazard is identified at the left, "flammability" at the top, and "reactivity" at the right.

The bottom space is primarily used to identify unusual reactivity with water. W with a line through its center ✠ alerts fire fighting personnel to the possible hazard in use of water. This bottom space may be also used to identify a radiation hazard by the symbol ☢. Oxidizing chemicals are identified in the bottom space by OXY.

To supplement the spatial arrangement, NFPA No. 704M recommends the use of colored backgrounds or colored numbers to identify the hazard categories — blue for "health," red for "flammability," yellow for "reactivity." Examples of spatial arrangement and color schemes are shown on the preceding page.

For a detailed description of the hazard identification system used here, see "Recommended System for the Identification of the Fire Hazards of Materials, NFPA No. 704M, 1969 Edition."

The following paragraphs summarize the meanings of the numbers in each hazard category and explain what a number should tell fire fighting personnel about protecting themselves and how to fight fires where the hazard exists.

Health

4 A few whiffs of the gas or vapor could cause death; or the gas, vapor, or liquid could be fatal on penetrating the fire fighters' normal full protective clothing which is designed for resistance to heat. For most chemicals having a Health 4 rating, the normal full protective clothing available to the average fire department will not provide adequate protection against skin contact with these materials. Only special protective clothing designed to protect against the specific hazard should be worn.

3 Materials extremely hazardous to health, but areas may be entered with extreme care. Full protective clothing, including self-contained breathing apparatus, rubber gloves, boots and bands around legs, arms and waist should be provided. No skin surface should be exposed.

2 Materials hazardous to health, but areas may be entered freely with self-contained breathing apparatus.

1 Materials only slightly hazardous to health. It may be desirable to wear self-contained breathing apparatus.

0 Materials which on exposure under fire conditions would offer no health hazard beyond that of ordinary combustible material.

APPENDIX "B"

Flammability

4 Very flammable gases, very volatile flammable liquids, and materials that in the form of dusts or mists readily form explosive mixtures when dispersed in air. Shut off flow of gas or liquid and keep cooling water streams on exposed tanks or containers. Use water spray carefully in the vicinity of dusts so as not to create dust clouds.

3 Liquids which can be ignited under almost all normal temperature conditions. Water may be ineffective on these liquids because of their low flash points. Solids which form coarse dusts, solids in shredded or fibrous form that create flash fires, solids that burn rapidly, usually because they contain their own oxygen, and any material that ignites spontaneously at normal temperatures in air.

2 Liquids which must be moderately heated before ignition will occur and solids that readily give off flammable vapors. Water spray may be used to extinguish the fire because the material can be cooled to below its flash point.

1 Materials that must be preheated before ignition can occur. Water may cause frothing of liquids with this flammability rating number if it gets below the surface of the liquid and turns to steam. However, water spray gently applied to the surface will cause a frothing which will extinguish the fire. Most combustible solids have a flammability rating of 1.

0 Materials that will not burn.

Reactivity

4 Materials which in themselves are readily capable of detonation or of explosive decomposition or explosive reaction at normal temperatures and pressures. Includes materials which are sensitive to mechanical or localized thermal shock. If a chemical with this hazard rating is in an advanced or massive fire, the area should be evacuated.

3 Materials which in themselves are capable of detonation or of explosive decomposition or of explosive reaction but which require a strong initiating source or which must be heated under confinement before initiation. Includes materials which are sensitive to thermal or mechanical shock at elevated temperatures and pressures or which react explosively with water without requiring heat or confinement. Fire fighting should be done from an explosion-resistant location.

2 Materials which in themselves are normally unstable and readily undergo violent chemical change but do not detonate. Includes materials which can undergo chemical change with rapid release of energy at normal temperatures and pressures or which can undergo violent chemical change at elevated temperatures and pressures. Also includes those materials which may react violently with water or which may form potentially explosive mixtures with water. In advanced or massive fires, fire fighting should be done from a protected location.

Reactivity (Continued)

1 Materials which in themselves are normally stable but which may become unstable at elevated temperatures and pressures or which may react with water with some release of energy but not violently. Caution must be used in approaching the fire and applying water.

0 Materials which are normally stable even under fire exposure conditions and which are not reactive with water. Normal fire fighting procedures may be used.

APPENDIX I

INCOMPATIBLE WASTE

Many wastes when mixed with others at a hazardous waste facility, can potentially produce adverse human health and environmental effects through means such as the following: (1) heat generation, (2) violent reaction, (3) release of toxic fumes and gases as a result of mixing, (4) release of toxic substances in case of fire or explosion, (5) fire or explosion, and (6) generation of flammable or toxic gases.

Below is a summary list of potentially incompatible waste materials or components and the adverse consequences resulting from mixing of waste in one group with waste in another group.

The mixing of a Group A waste with a Group B waste may have the potential consequence as noted.

Group 1 A	Group 1 B
Acetylene sludge	Acid sludge
Alkaline caustic liquids	Acid and water
Alkaline cleaner	Battery acid
Alkaline corrosive liquids	Chemical cleaners
Alkaline corrosive battery fluid	Electrolyte acid
Caustic wastewater	Etching acid liquid or solvent
Lime sludge and other corrosive alkalies	Liquid cleaning compounds
Lime wastewater	Pickling liquor and other corrosive acids
Lime and water	Spent acid
Spent caustic	Spent mixed acid
	Spent sulfuric acid

Potential consequences. Heat generation, violent reaction.

Group 2 A	Group 2 B
Asbestos waste and other toxic wastes	Chlorinated hydrocarbons
Beryllium wastes	Data processing liquid
Unrinsed pesticide containers	Obsolete explosives
Waste pesticides	Petroleum waste
	Refinery waste
	Retrograde explosives
	Solvents
	Waste oil and other flammable and explosive wastes

Potential consequences. Release of toxic substances in case of fire or explosion.

Group 3 A	Group 3 B
Aluminum	Any waste in Groups 1 A or 1 B
Beryllium	
Calcium	
Lithium	
Magnesium	
Potassium	
Sodium	
Zinc powder and other reactive metals and metal hydrides	

Potential consequences. Fire or explosion, generation of flammable hydrogen gas.

Group 4 A	Group 4 B
Alcohols	Any concentrated waste in Groups 1 A or 1 B
Water	Calcium
	Lithium
	Metal hydrides
	Potassium
	Sodium
	SO_2Cl_2, $SOCl_2$, PCl_3, CH_3SiCl_3, and other water reactive wastes

Potential consequences. Fire, explosion, or heat generation, generation of flammable or toxic gases.

Group 5 A	Group 5 B
Alcohols	Concentrated Group 1 A or 1 B wastes
Aldehydes	Group 3 A wastes
Halogenated hydrocarbons	
Nitrated hydrocarbons and other reactive organic compounds and solvents	
Unsaturated hydrocarbons	

Potential consequences. Fire, explosion or violent reaction.

Group 6 A	Group 6 B
Spent cyanide and sulfide solutions	Group 1 B wastes

Potential consequences. Generation of toxic hydrogen cyanide or hydrogen sulfide gas.

Group 7 A	Group 7 B
Chlorates and other strong oxidizers	Acetic acid and other organic acids
Chlorine	Concentrated mineral acids
Chlorites	Group 2 B wastes
Chromic acid	Group 3 A wastes
Hypochlorites	Group 5 A waste and other flammable and combustible wastes
Nitrates	
Nitric acid, fuming	
Perchlorates	
Permanganates	
Peroxides	

Potential consequences. Fire, explosion, or violent reaction.

Source: "Law, Regulations and Guidelines for Handling of Hazardous Waste" California Department of Health, February 1975.

I. Generators utilizing this site will be required to submit the following information:

(1) The name, address, telephone number, generator identification number and waste steam identification number of the generator.

(2) The name, address and telephone number of person employed by the generator who is familiar with waste management practices.

(3) The hazard class of each waste stream.

(4) A brief description of the generation process.

(5) A description of containerization for each waste.

(6) The flash point if applicable.

(7) Major hazardous components and corresponding concentration.

(8) pH

(9) Percent volatiles @ 600°C.

(10) Percent volatiles @ 100°C.

(11) Materials data handling sheets or product specification sheets to indicate handling and spill clean-up recommendations.

(12) Any additional information that the Missouri Department of Natural Resources has deemed necessary to complete the identification process.

(13) Any additional information that BHS, Inc. deems necessary to complete the characterization process.

Monthly Training Lectures

		Date
(a)	Use and maintenance of mask	
(b)	Proper eye protection	
(c)	Personal hygiene and waste handling	
(d)	Emergency response procedure	
(e)	Waste handling from gate to trench	
(f)	Incapacitating situations	
(g)	Movement of accident victims	
(h)	Treatment of shock	
(i)	Control of bleeding	
(j)	CPR/mouth to mouth resusitation	
(k)	Heat exhaustion/heat stroke	
(l)	Basic chemical terminology	

Employee Training Record

Employee_____

1. I have read and understand the safety requirements as outlined in the operating manual. I have also received a copy of the operating manual.

   Signature_____Date_____

2. I have been given a tour of the Site and know the location of the emergency equipment as outline on Pages 19 & 20 of the operating manual.

   Signature_____Date_____

3. I have been instructed in the use of the safety sheet and comprehend the significance of each section.

   Signature_____ Date_____

4. The employee has demonstrated the ability to handle the heavy equipment on Site and is aware of the responsibilities as an operator during normal operating conditions and under emergency conditions.

   Site Manager_____ Date_____

   Employee _____Date_____

5. The employee has demonstrated the ability to handle the various types of wastes in a safe and proper manner and understands the emergency spill procedures. I have obtained the necessary license for over the road transportation.

   Site Manager_____ Date_____

   License No. _____

   Employee _____ Date_____

DAILY VISUAL INSPECTION SHEET

1. Fencing for damage
2. Above ground well heads for damage
3. Evaporation basins for leakage
4. Evaporation basins water sprayers
5. Walkie talkies for broadcasting and receiving
6. Site vegetation and immediately adjacent vegetation for unusual die-off
7. Fugitive gas emissions

Any abnormalities must be noted in the Site Log and correction dates noted. Entries on correction completion dates will reference notice date.

these 3 will be added by BHS in next revision

8. Ponded water
9. integrity of bench wall
10. diversion berms

are handwritten in operating manual at BHS

JOHN Z RSCHKY

Generator/I.D. # _____

Waste/I.D.# _____

Manifest Document # _____

Date _____

Physical Description _____

Color _____

Odor _____

pH _____

	% Vol 100°C		% Vol 600°C	
Gross	_____	_____	_____	_____
Tare	_____	_____	_____	_____
Net	_____	_____	_____	_____

Specific Gravity

Gross _____ Volume _____ _____ gm/ml

Tare _____

Net _____

Comments _____

_____

Signature _____

ATTACHMENT 4 BHS SAMPLING DATA AND RECORDS

Contents:

BHS Monitoring Data.
Field Sampling Records.

RESEARCH 900 Research, Analysis and Consultation

900 CHECKERBOARD SQUARE PLAZA • SAINT LOUIS, MISSOURI 63188 • TELEPHONE (314) 982-3393

ETHOD REFERENCES

81754
PA STORET NO. TOTAL 01002

103658
PA STORET NO. 01012

123379
TANDARD METHODS OF ANALYSIS FOR WATER AND WASTEWATER, METHOD 218

158418
PA STORET NO. 01027

174032
TANDARD METHODS OF ANALYSIS FOR WATER AND WASTEWATER, METHOD 220

174846
PA STORET NO.

65
EPA STORET NO. 01034

311746
EPA STORET NO. TOTAL 01045

409907
STANDARD METHODS FOR WATER AND WASTEWATER, SECTION 207

773099
EPA STORET NO. TOTAL 01067

864822
EPA STORET NO. 01051

872253
CHEMICAL ANALYSIS OF WATER AND WASTEWATER, USEPA, 1974 STORET NO. 32730

1325990
EPA STORET NO. TOTAL 00951

1340568
RESEARCH 900 LABS

1347722
DETERMINATION OF SULFUR IN SOILS & PLANT MATERIAL, THE SULFUR INSTITUTE

1490455
EPA STORET NO. TOTAL 01092

AOAC METHODS-11TH ED (1970) EXCEPT THOSE NOTED * WHICH ARE FROM 12TH ED (1975)
[illegible] FROM 3RD EDITION (1969)

RESEARCH 900. Research, Analysis and Consultation

900 CHECKERBOARD SQUARE PLAZA • SAINT LOUIS, MISSOURI 63188 • TELEPHONE (314) 982-3393

DAVID E.MURRAY
REITZ & JENS, INC.
111 S. MERAMEC AVENUE
ST. LOUIS, MO. 63105

LAB NO. 239722

ENTERED 04/11/77

REPORTED 04/25/77

REIT M WATER MONITOR WELL

ASSAY	ANALYSIS	UNITS
✓ARSENIC 81754	216.	PARTS/BILLION
✓BARIUM 103658	1120.	PARTS/BILLION
✓BIOL OXY DEM 5 DAY 123379	7.08	PART/MILLION
✓CHROMIUM 158418	6.22	PARTS/BILLION
✓CHEM. OXYGEN DEMAND 174032	1.95	PART/MILLION
COBALT 174846	126.	PARTS/BILLION
✓CHROMIUM (TOTAL) 178965	70.1	PARTS/BILLION
✓IRON 311746	620.	PARTS/BILLION
✓CYANIDE 409907	0.0110	PART/MILLION
✓NICKEL 773099	298.	PARTS/BILLION
✓LEAD 864822	656.	PARTS/BILLION
✓PHENOL 872253	5.60	PARTS/BILLION
✓FLUORIDE 1325990	0.461	PART/MILLION
✓PH 1340568	7.20	PH
✓SULFATE 1347722	1110.	PART/MILLION
✓ZINC 490455	220.	PARTS/BILLION

✓SILVER REF- 61219
NONE MEASURABLE SENSITIVITY OF THIS ASSAY IS 2.0 PPB OR GREATER.

COPPER REF- 185798

RESEARCH 900. Research, Analysis and Consultation

900 CHECKERBOARD SQUARE PLAZA • SAINT LOUIS, MISSOURI 63188 • TELEPHONE (314) 982-3393

NONE MEASURABLE SENSITIVITY OF THIS ASSAY IS 100.0 PPB OR GREATER.

MERCURY REF- 415790
NONE MEASURABLE SENSITIVITY OF THIS ASSAY IS 2.00 PPB OR GREATER.

ORGANOPHOSPHATE PEST REF- 836735

THIMET	LESS THAN 0.02 PPM
DIAZINON	LESS THAN 0.02 PPM
DISULFOTON	LESS THAN 0.02 PPM
METHYL PARATHION	LESS THAN 0.02 PPM
MALATHION	LESS THAN 0.02 PPM
PARATHION	LESS THAN 0.02 PPM
THIODAN	LESS THAN 0.02 PPM
ETHION	LESS THAN 0.02 PPM
TRITHION	LESS THAN 0.02 PPM

PESTICIDES AND PCB REF- 868762

HEPTACHLOR EPOXIDE	LESS THAN 0.02 PPM
ALDRIN	LESS THAN 0.02 PPM
HEPTACHLOR	LESS THAN 0.02 PPM
DIELDRIN	LESS THAN 0.02 PPM
DDE	LESS THAN 0.02 PPM
DDT	LESS THAN 0.02 PPM
LINDANE	LESS THAN 0.02 PPM
CHLORDANE	LESS THAN 0.02 PPM
ENDRIN	LESS THAN 0.02 PPM
PCB	LESS THAN 0.15 PPM

SELENIUM REF-1122194
NONE MEASURABLE SENSITIVITY OF THIS ASSAY IS 5.0 PPB OR GREATER.

TIN REF-1135884
NONE MEASURABLE SENSITIVITY OF THIS ASSAY IS 2.00 PPM OR GREATER.

SPECIFIC CONDUCTANCE REF-1137754
SPECIFIC CONDUCTANCE = 2.01 MILLIMHOS/CENTIMETER AT 25°C

NITRATE REF-1337869
NONE MEASURABLE SENSITIVITY OF THIS ASSAY IS 0.1 PPM NO3 OR GREATER.

ANY QUESTIONS CALL K PROSSER - D CAUSEY (314)982-3393

RESEARCH 900. Research, Analysis and Consultation

900 CHECKERBOARD SQUARE PLAZA • SAINT LOUIS, MISSOURI 63188 • TELEPHONE (314) 982-3393

DAVID E.MURRAY
REITZ & JENS, INC.
111 S. MERAMEC AVENUE
ST. LOUIS, MO. 63105

LAB NO. 239725

ENTERED 04/11/77

REPORTED 04/25/77

REIT E WATER

WATER EXIT FROM PROPERTY

ASSAY	ANALYSIS	UNITS
BARIUM 103658	89.0	PARTS/BILLION
BIOL OXY DEM 5 DAY 123379	3.06	PART/MILLION
CHEM. OXYGEN DEMAND 174032	290.	PART/MILLION
ON 311746	190.	PARTS/BILLION
LEAD 864822	8.25	PARTS/BILLION
PHENOL 872253	7.10	PARTS/BILLION
FLUORIDE 1325990	0.566	PART/MILLION
PH 1340568	7.80	PH
SULFATE 1347722	66.6	PART/MILLION

SILVER REF- 61219
NONE MEASURABLE SENSITIVITY OF THIS ASSAY IS 2.0 PPB OR GREATER.

ARSENIC REF- 81754
NONE MEASURABLE SENSITIVITY OF THIS ASSAY IS 5.0 PPB OR GREATER.

CADMIUM REF- 158418
NONE MEASURABLE SENSITIVITY OF THIS ASSAY IS 2.0 PPB OR GREATER.

COBALT REF- 174846
NONE MEASURABLE SENSITIVITY OF THIS ASSAY IS 50.0 PPB OR GREATER.

CHROMIUM (TOTAL) REF- 178965
NONE MEASURABLE SENSITIVITY OF THIS ASSAY IS 5.00 PPB CR OR GREATER.

COPPER REF- 185798
NONE MEASURABLE SENSITIVITY OF THIS ASSAY IS 100.0 PPB OR GREATER.

RESEARCH 900. Research, Analysis and Consultation

00 CHECKERBOARD SQUARE PLAZA • SAINT LOUIS, MISSOURI 63188 • TELEPHONE (314) 982-3393

LAB NUMBER 239725

CYANIDE REF- 409907
NONE MEASURABLE. SENSITIVITY OF THE METHOD IS 0.01 PPM OR GREATER.

MERCURY REF- 415790
NONE MEASURABLE SENSITIVITY OF THIS ASSAY IS 2.00 PPB OR GREATER.

NICKEL REF- 773099
NONE MEASURABLE SENSITIVITY OF THIS ASSAY IS 250 PPB OR GREATER.

ORGANOPHOSPHATE PEST REF- 836735

THIMET	LESS THAN 0.02 PPM
DIAZINON	LESS THAN 0.02 PPM
DISULFOTON	LESS THAN 0.02 PPM
METHYL PARATHION	LESS THAN 0.02 PPM
MALATHION	LESS THAN 0.02 PPM
PARATHION	LESS THAN 0.02 PPM
THIODAN	LESS THAN 0.02 PPM
ETHION	LESS THAN 0.02 PPM
TRITHION	LESS THAN 0.02 PPM

CIDES AND PCB REF- 868762

HEPTACHLOR EPOXIDE	LESS THAN 0.02 PPM
ALDRIN	LESS THAN 0.02 PPM
HEPTACHLOR	LESS THAN 0.02 PPM
DIELDRIN	LESS THAN 0.02 PPM
DDE	LESS THAN 0.02 PPM
DDT	LESS THAN 0.02 PPM
LINDANE	LESS THAN 0.02 PPM
CHLORDANE	LESS THAN 0.02 PPM
ENDRIN	LESS THAN 0.02 PPM
PCB	LESS THAN 0.15 PPM

ELENIUM REF-1122194
NONE MEASURABLE SENSITIVITY OF THIS ASSAY IS 5.0 PPB OR GREATER.

IN REF-1135884
NONE MEASURABLE SENSITIVITY OF THIS ASSAY IS 2.00 PPM OR GREATER.

PECIFIC CONDUCTANCE REF-1137754
SPECIFIC CONDUCTANCE = 343 MICROMHOS/CENTIMETER AT 25°C
(0.343 MILLIMHOS/CENTIMETER AT 25°C)

ITRATE REF-1337869
NONE MEASURABLE SENSITIVITY OF THIS ASSAY IS 0.1 PPM NO3 OR GREATER.

REF-1490455
NONE MEASURABLE SENSITIVITY OF THIS ASSAY IS 0.10 PPM OR GREATER.

NY QUESTIONS CALL K PROSSER - D CAUSEY (314)982-3393

RESEARCH 900. Research, Analysis and Consultation

900 CHECKERBOARD SQUARE PLAZA • SAINT LOUIS, MISSOURI 63188 • TELEPHONE (314) 982-3393

DAVID E.MURRAY
REITZ & JENS, INC.
111 S. MERAMEC AVENUE
ST. LOUIS, MO. 63105

LAB NO. 239724

ENTERED 04/11/77

REPORTED 04/25/77

REIT Z WATER Zykan Res. Well

ASSAY	ANALYSIS	UNITS
BARIUM 103658	64.5	PARTS/BILLION
BIOL OXY DEM 5 DAY [illegible]379	1.19	PART/MILLION
[illegible] OXYGEN DEMAND 174032	25.7	PART/MILLION
IRON 311746	160.	PARTS/BILLION
PHENOL 872253	5.60	PARTS/BILLION
FLUORIDE 1325990	0.620	PART/MILLION
PH 1340568	7.60	PH
SULFATE 1347722	67.7	PART/MILLION
ZINC 1490455	230.	PARTS/BILLION

SILVER REF- 61219
NONE MEASURABLE SENSITIVITY OF THIS ASSAY IS 2.0 PPB OR GREATER.

ARSENIC REF- 81754
NONE MEASURABLE SENSITIVITY OF THIS ASSAY IS 5.0 PPB OR GREATER.

CADMIUM REF- 158418
NONE MEASURABLE SENSITIVITY OF THIS ASSAY IS 2.0 PPB OR GREATER.

COB[illegible]T REF- 174846
[illegible] MEASURABLE SENSITIVITY OF THIS ASSAY IS 50.0 PPB OR GREATER.

CHROMIUM (TOTAL) REF- 178965
NONE MEASURABLE SENSITIVITY OF THIS ASSAY IS 5.00 PPB CR OR GREATER.

COPPER REF- 185798
NONE MEASURABLE SENSITIVITY OF THIS ASSAY IS 100.0 PPB OR GREATER.

RESEARCH Q( )( ) Research, Analysis and Consultation

0 CHECKERBOARD SQUARE PLAZA • SAINT LOUIS, MISSOURI 63188 • TELEPHONE (314) 982-3393

LAB NUMBER 239724

CYANIDE REF- 40[illegible]07
NONE MEASURABLE. SENSITIVITY OF THE METHOD IS 0.01 PPM OR GREATER.

MERCURY REF- 41[illegible]790
NONE MEASURABLE SENSITIVITY OF THIS ASSAY IS 2.00 PPB OR GREATER.

NICKEL REF- 77[illegible]099
NONE MEASURABLE SENSITIVITY OF THIS ASSAY IS 250 PPB OR GREATER.

ORGANOPHOSPHATE PEST REF- 836735

THIMET	LESS THAN 0.02 PPM
DIAZINON	LESS THAN 0.02 PPM
DISULFOTON	LESS THAN 0.02 PPM
METHYL PARATHION	LESS THAN 0.02 PPM
MALATHION	LESS THAN 0.02 PPM
PARATHION	LESS THAN 0.02 PPM
THIODAN	LESS THAN 0.02 PPM
ETHION	LESS THAN 0.02 PPM
TRITHION	LESS THAN 0.02 PPM

EA[illegible] REF- 864822
NO[illegible] MEASURABLE SENSITIVITY OF THIS ASSAY IS 5.00 PPB OR GREATER.

ESTICIDES AND PCB REF- 868762

HEPTACHLOR EPOXIDE	LESS THAN 0.02 PPM
ALDRIN	LESS THAN 0.02 PPM
HEPTACHLOR	LESS THAN 0.02 PPM
DIELDRIN	LESS THAN 0.02 PPM
DDE	LESS THAN 0.02 PPM
DDT	LESS THAN 0.02 PPM
LINDANE	LESS THAN 0.02 PPM
CHLORDANE	LESS THAN 0.02 PPM
ENDRIN	LESS THAN 0.02 PPM
PCB	LESS THAN 0.15 PPM

ELENIUM REF-1122194
NONE MEASURABLE SENSITIVITY OF THIS ASSAY IS 5.0 PPB OR GREATER.

IN REF-1135884
NONE MEASURABLE SENSITIVITY OF THIS ASSAY IS 2.00 PPM OR GREATER.

PECIFIC CONDUCTANCE REF-1137754
SPECIFIC CONDUCTANCE = [illegible]1 MICROMHOS/CENTIMETER AT 25°C
(0.[illegible]1 MILLIMHOS/CENTIMETER AT 25°C)

ITR[illegible]E REF-1337[illegible]69
[illegible]MEASURABLE SENSITIVITY OF THIS ASSAY IS 0.1 PPM NO3 OR GREATER.

NY QUESTIONS CALL K PROSSER - D CAUSEY (314)982-3393

RESEARCH 900 Research, Analysis and Consultation

900 CHECKERBOARD SQUARE PLAZA • SAINT LOUIS, MISSOURI 63188 • TELEPHONE (314) 982-3393

DAVID E. MURRAY
REITZ & JENS, INC.
111 S. MERAMEC AVENUE
ST. LOUIS, MO. 63105

LAB NO. 239723

ENTERED 04/11/77

REPORTED 04/25/77

:EIT O WATER OLD WELL

ISSAY	ANALYSIS	UNITS
IARIUM 103658	62.2	PARTS/BILLION
IIOL OXY DEM 5 DAY 123379	1.43	PART/MILLION
:HEM. OXYGEN DEMAND 174032	2.34	PART/MILLION
IR [illegible] 746	200.	PARTS/BILLION
.EAD 864822	26.1	PARTS/BILLION
PHENOL 872253	6.10	PARTS/BILLION
FLUORIDE 1325990	0.469	PART/MILLION
PH 1340568	7.20	PH
SULFATE 1347722	1110.	PART/MILLION
ZINC 1490455	770.	PARTS/BILLION

SILVER REF- 61219
NONE MEASURABLE SENSITIVITY OF THIS ASSAY IS 2.0 PPB OR GREATER.

ARSENIC REF- 81754
NONE MEASURABLE SENSITIVITY OF THIS ASSAY IS 5.0 PPB OR GREATER.

CADMIUM REF- 158418
NONE MEASURABLE SENSITIVITY OF THIS ASSAY IS 2.0 PPB OR GREATER.

COBALT REF- 174846
[illegible] MEASURABLE SENSITIVITY OF THIS ASSAY IS 50.0 PPB OR GREATER.

[illegible]IUM (TOTAL) REF- 178965
[illegible] MEASURABLE SENSITIVITY OF THIS ASSAY IS 5.00 PPB OR OR GREATER.

REF- 185798

RESEARCH 900. Research, Analysis and Consultation

0 CHECKERBOARD SQUARE PLAZA • SAINT LOUIS, MISSOURI 63188 • TELEPHONE (314) 982-3393

LAB NUMBER 239723
NONE MEASURABLE SENSITIVITY OF THIS ASSAY IS 100.0 PPB OR GREATER.

CYANIDE REF- 409907
NONE MEASURABLE. SENSITIVITY OF THE METHOD IS 0.01 PPM OR GREATER.

MERCURY REF- 415790
NONE MEASURABLE SENSITIVITY OF THIS ASSAY IS 2.00 PPB OR GREATER.

NICKEL REF- 773099
NONE MEASURABLE SENSITIVITY OF THIS ASSAY IS 250 PPB OR GREATER.

ORGANOPHOSPHATE PEST REF- 836735

THIMET	LESS THAN 0.02 PPM
DIAZINON	LESS THAN 0.02 PPM
DISULFOTON	LESS THAN 0.02 PPM
METHYL PARATHION	LESS THAN 0.02 PPM
MALATHION	LESS THAN 0.02 PPM
PARATHION	LESS THAN 0.02 PPM
THIODAN	LESS THAN 0.02 PPM
ETHION	LESS THAN 0.02 PPM
TRITHION	LESS THAN 0.02 PPM

PESTICIDES AND PCB REF- 868762

HEPTACHLOR EPOXIDE	LESS THAN 0.02 PPM
ALDRIN	LESS THAN 0.02 PPM
HEPTACHLOR	LESS THAN 0.02 PPM
DIELDRIN	LESS THAN 0.02 PPM
DDE	LESS THAN 0.02 PPM
DDT	LESS THAN 0.02 PPM
LINDANE	LESS THAN 0.02 PPM
CHLORDANE	LESS THAN 0.02 PPM
ENDRIN	LESS THAN 0.02 PPM
PCB	LESS THAN 0.15 PPM

SELENIUM REF-1122194
NONE MEASURABLE SENSITIVITY OF THIS ASSAY IS 5.0 PPB OR GREATER.

TIN REF-1135884
NONE MEASURABLE SENSITIVITY OF THIS ASSAY IS 2.00 PPM OR GREATER.

SPECIFIC CONDUCTANCE REF-1137754
SPECIFIC CONDUCTANCE = 2.05 MILLIMHOS/CENTIMETER AT 25°C

NITRATE REF-1337869
NONE MEASURABLE SENSITIVITY OF THIS ASSAY IS 0.1 PPM NO3 OR GREATER.

ANY QUESTIONS CALL K PROSSER - D CAUSEY (314)982-3393

6/9/77

O. E. M.

rch. Analysis and Consultation

LAB NO. 255904

ENTERED 06/08/77

REPORTED 06/15/77

		/BILLION
		MILLION
		MILLION
174032 IRON	413.	PARTS/BILLION
311746 PHENOL	3.50	PARTS/BILLION
872253 FLUORIDE	0.195	PART/MILLION
1325990 NITRATE	0.310	PART/MILLION
1337960 PH	7.00	PH
1340568 SULFATE	53.2	PART/MILLION
1347722		

SILVER — REF- 61219
NONE MEASURABLE — SENSITIVITY OF THIS ASSAY IS 2.00 PPB OR GREATER.

ARSENIC — REF- 81754
NONE MEASURABLE — SENSITIVITY OF THIS ASSAY IS 5.00 PPB OR GREATER.

CADMIUM — REF- 158418
NONE MEASURABLE — SENSITIVITY OF THIS ASSAY IS 1.00 PPB OR GREATER.

COBALT — REF- 174846
NONE MEASURABLE — SENSITIVITY OF THIS ASSAY IS 50.00 PPB OR GREATER.

CHROMIUM (TOTAL) — REF- 178965
NONE MEASURABLE — SENSITIVITY OF THIS ASSAY IS 5.00 PPB OR GREATER.

COPPER — REF- 185798
NONE MEASURABLE — SENSITIVITY OF THIS ASSAY IS 100.00 PPB OR GREATER.

Research, Analysis and Consultation

LAB NO. 255904

ENTERED 06/08/77

REPORTED 06/15/77

MR. DAVID MURRAY
REITZ & JENS, INC.
111 S. MERAMEC AVENUE
ST. LOUIS, MO. 63105

REIT R & J INC. F

ASSAY	ANALYSIS	UNITS
BARIUM 103658	114.	PARTS/BILLION
BIOL OXY DEM 5 DAY 123370	4.10	PART/MILLION
CHEM. OXYGEN DEMAND 74032	15.5	PART/MILLION
N 311746	413.	PARTS/BILLION
PHENOL 872253	3.50	PARTS/BILLION
FLUORIDE 1325990	0.195	PART/MILLION
NITRATE 1337860	0.310	PART/MILLION
PH 134056P	7.00	PH
SULFATE 1347722	53.2	PART/MILLION

SILVER NONE MEASURABLE	REF- 61219 SENSITIVITY OF THIS ASSAY IS 2.00 PPB OR GREATER.
ARSENIC NONE MEASURABLE	REF- 81754 SENSITIVITY OF THIS ASSAY IS 5.00 PPB OR GREATER.
CADMIUM NONE MEASURABLE	REF- 158418 SENSITIVITY OF THIS ASSAY IS 1.00 PPB OR GREATER.
COBALT NONE MEASURABLE	REF- 174846 SENSITIVITY OF THIS ASSAY IS 50.00 PPB OR GREATER.
CHROMIUM (TOTAL) NONE MEASURABLE	REF- 178965 SENSITIVITY OF THIS ASSAY IS 5.00 PPB OR GREATER.
COPPER NONE MEASURABLE	REF- 185798 SENSITIVITY OF THIS ASSAY IS 100.00 PPB OR GREATER.

NUMBER 255904

:URY REF- 415790
NE MEASURABLE SENSITIVITY OF THIS ASSAY IS 2.0 PPB OR GREATER.

KEL REF- 773099
NE MEASURABLE SENSITIVITY OF THIS ASSAY IS 250 PPB OR GREATER.

ANOPHOSPHATE PEST REF- 836735

IMET	0.4184 PARTS PER BILLION
AZINON	0.1874 PARTS PER BILLION
SULFOTON	LESS THAN 0.12 PARTS PER BILLION
THYL PARATHION	LESS THAN 0.02 PARTS PER BILLION
LAT-ION	LESS THAN 0.04 PARTS PER BILLION
RATHION	LESS THAN 0.02 PARTS PER BILLION
IODAN	LESS THAN 0.02 PARTS PER BILLION
HION	LESS THAN 0.04 PARTS PER BILLION
ITHION	LESS THAN 0.02 PARTS PER BILLION

D REF- 864822
NE MEASURABLE SENSITIVITY OF THIS ASSAY IS 5.00 PPB OR GREATER.

TICIDES AND PCB REF- 868762

N	LESS THAN 0.01 PARTS PER BILLION
P-LOR	LESS THAN 0.01 PARTS PER BILLION
DRIN	LESS THAN 0.01 PARTS PER BILLION
EPTACHLOR EPOXIDE	0.0167 PARTS PER BILLION
DT (TOTAL)	0.0124 PARTS PER BILLION
ELDRIN	LESS THAN 0.01 PARTS PER BILLION
ECHNICAL CHLORDANE	0.1141 PARTS PER BILLION
ETHOXYCHLOR	LESS THAN 0.10 PARTS PER BILLION
OLYCHLORINATED BIPHENYLS	LESS THAN 0.10 PARTS PER BILLION
OXAPHENE	LESS THAN 0.10 PARTS PER BILLION

LENIUM REF-1122194
ONE MEASURABLE SENSITIVITY OF THIS ASSAY IS 5.00 PPB OR GREATER.

N REF-1135884
ONE MEASURABLE SENSITIVITY OF THIS ASSAY IS 2.00 PPM OR GREATER.

ECIFIC CONDUCTANCE REF-1137754
SPECIFIC CONDUCTANCE = 0.371 MILLIMHOS/CENTIMETER AT 25°C

NC REF-1490455
IONE MEASURABLE SENSITIVITY OF THIS ASSAY IS 100 PPB OR GREATER.

Y QUESTIONS CALL K PROSSER - D CAUSEY (314)982-3393

RESEARCH GROUP Research, Analysis and Consultation

900 CHECKERBOARD SQUARE PLAZA • SAINT LOUIS, MISSOURI 63188 • TELEPHONE 314 [illegible]

RECEIVED
JUN 15 1977
REITZ & JENS, INC.

DAVID [illegible]. MURRAY
REITZ & JENS, INC.
111 S. MERAMEC AVENUE
ST. LOUIS, MO. 63105

LAB NO. [illegible]

ENTERED 06/[illegible]/77

REPORTED 06/[illegible]/77

REIT R. & J. INC. [illegible]

CYANIDE REF- 409307
NONE MEASURABLE SENSITIVITY OF THE METHOD IS 0.[illegible] PARTS PER MILLION OR GREATER.

ANY QUESTIONS CALL K. PRUSSER - D. CAUSEY (314)[illegible]

Research, Analysis and Consultation

. DAVID MURRAY
ITZ & JENS, INC.
11 S. MERAMEC AVENUE
T. LOUIS, MO. 63105

LAB NO. 255903
ENTERED 06/08/77
REPORTED 06/15/77

R & J INC. 0

Y	ANALYSIS	UNITS
UM	52.9	PARTS/BILLION
3658		
OXY DEM 5 DAY	9.64	PART/MILLION
3379		
. OXYGEN DEMAND	40.3	PART/MILLION
40		
	1490.	PARTS/BILLION
1		
EL	273.	PARTS/BILLION
3099		
OL	4.90	PARTS/BILLION
2253		
NIUM	8.82	PARTS/BILLION
2194		
RIDE	0.262	PART/MILLION
5990		
ATE	0.270	PART/MILLION
7869		
	7.00	PH
0568		
ATE	1120.	PART/MILLION
7722		
	1060.	PARTS/BILLION
0455		

VER REF- 61219
NE MEASURABLE SENSITIVITY OF THIS ASSAY IS 2.00 PPB OR GREATER.

ENIC REF- 81754
NE MEASURABLE SENSITIVITY OF THIS ASSAY IS 5.00 PPB OR GREATER.

MI REF- 158418
N ASURABLE SENSITIVITY OF THIS ASSAY IS 2.00 PPB OR GREATER.

ALT REF- 174846
NE MEASURABLE SENSITIVITY OF THIS ASSAY IS 50.00 PPB OR GREATER.

NUMBER 255903

DMIUM (TOTAL) REF- 178965
NE MEASURABLE SENSITIVITY OF THIS ASSAY IS 5.00 PPB OR GREATER.

PER REF- 195798
NE MEASURABLE SENSITIVITY OF THIS ASSAY IS 100.00 PPB OR GREATER.

CURY REF- 415790
NE MEASURABLE SENSITIVITY OF THIS ASSAY IS 2.0 PPB OR GREATER.

ANOPHOSPHATE PEST REF- 836735

IMET	2.0226 PARTS PER BILLION
AZINON	LESS THAN 0.13 PARTS PER BILLION
SULFOTON	LESS THAN 0.12 PARTS PER BILLION
THYL PARATHION	LESS THAN 0.02 PARTS PER BILLION
LATHION	LESS THAN 0.04 PARTS PER BILLION
RATHION	LESS THAN 0.02 PARTS PER BILLION
IODAN	LESS THAN 0.02 PARTS PER BILLION
HION	LESS THAN 0.04 PARTS PER BILLION
ITHION	LESS THAN 0.02 PARTS PER BILLION

D REF- 864822
NE MEASURABLE SENSITIVITY OF THIS ASSAY IS 5.00 PPB OR GREATER.

TICIDES AND PCB REF- 868762

NDANE	LESS THAN 0.01 PARTS PER BILLION
PTACHLOR	LESS THAN 0.01 PARTS PER BILLION
DRIN	LESS THAN 0.01 PARTS PER BILLION
PTACHLOR EPOXIDE	0.0451 PARTS PER BILLION
T (TOTAL)	LESS THAN 0.01 PARTS PER BILLION
ELDRIN	LESS THAN 0.01 PARTS PER BILLION
CHNICAL CHLORDANE	0.1265 PARTS PER BILLION
THOXYCHLOR	LESS THAN 0.10 PARTS PER BILLION
LYCHLORINATED BIPHENYLS	LESS THAN 0.10 PARTS PER BILLION
XAPHENE	LESS THAN 0.10 PARTS PER BILLION

REF-1135884
NE MEASURABLE SENSITIVITY OF THIS ASSAY IS 2.00 PPM OR GREATER.

CIFIC CONDUCTANCE REF-1137754
SPECIFIC CONDUCTANCE = 2.14 MILLIMHOS/CENTIMETER AT 25°C

QUESTIONS CALL K PROSSER - D CAUSEY (314)982-3393

SEAM [illegible] Research, Analysis and Consultation

[illegible] CHECKERBOARD SQUARE [illegible] PLAZA • SAINT LOUIS [illegible] • [illegible] 314 982 [illegible]

LAB NO. 256191

DAVID E. MURRAY
REITZ & JENS, INC.
111 S. MERAMEC AVENUE
ST. LOUIS, MO. 63105

ENTERED 06/09/77

REPORTED 06/10/77

REIT R. & J. INC. U

CYANIDE REF- 40[illegible] .
NONE MEASURABLE SENSITIVITY OF THE METHOD IS [illegible] PARTS PER MILLION OR GREATER.

ANY QUESTIONS CALL K [illegible] - [illegible]CAUSEY (314)[illegible]

AR NUMBER 255907

COPPER REF- 185798
NONE MEASURABLE SENSITIVITY OF THIS ASSAY IS 100.00 PPB OR GREATER.

MERCURY REF- 415790
NONE MEASURABLE SENSITIVITY OF THIS ASSAY IS 2.0 PPB OR GREATER.

NICKEL REF- 773099
NONE MEASURABLE SENSITIVITY OF THIS ASSAY IS 250 PPB OR GREATER.

ORGANOPHOSPHATE PEST REF- 836735

THIMET	LESS THAN 0.06 PARTS PER BILLION
DIAZINON	0.1406 PARTS PER BILLION
DISULFOTON	LESS THAN 0.12 PARTS PER BILLION
METHYL PARATHION	LESS THAN 0.02 PARTS PER BILLION
MALAT-ION	LESS THAN 0.04 PARTS PER BILLION
PARATHION	LESS THAN 0.02 PARTS PER BILLION
THIODAN	LESS THAN 0.02 PARTS PER BILLION
ETHION	LESS THAN 0.04 PARTS PER BILLION
TRITHION	LESS THAN 0.02 PARTS PER BILLION

LEAD REF- 864822
NONE MEASURABLE SENSITIVITY OF THIS ASSAY IS 5.00 PPB OR GREATER.

STICIDES AND PCB REF- 868762

LINDANE	LESS THAN 0.01 PARTS PER BILLION
HEPTACHLOR	LESS THAN 0.01 PARTS PER BILLION
ALDRIN	LESS THAN 0.01 PARTS PER BILLION
HEPTACHLOR EPOXIDE	0.0268 PARTS PER BILLION
DDT (TOTAL)	0.0104 PARTS PER BILLION
DIELDRIN	LESS THAN 0.01 PARTS PER BILLION
TECHNICAL CHLORDANE	0.1380 PARTS PER BILLION
METHOXYCHLOR	LESS THAN 0.10 PARTS PER BILLION
POLYCHLORINATED BIPHENYLS	LESS THAN 0.10 PARTS PER BILLION
TOXAPHENE	LESS THAN 0.10 PARTS PER BILLION

TIN REF-1135884
NONE MEASURABLE SENSITIVITY OF THIS ASSAY IS 2.00 PPM OR GREATER.

SPECIFIC CONDUCTANCE REF-1137754
SPECIFIC CONDUCTANCE = 2.20 MILLIMHOS/CENTIMETER AT 25°C

ANY QUESTIONS CALL P PROSSER - D CAUSEY (314)982-3293

RESEARCH [illegible] Research, Analysis and Consultation

00 CHECKERBOARD SQUARE PLAZA • SAINT LOUIS [illegible] • TELEPHONE [illegible]

LAB NO. [illegible]

ENTERED 06/[illegible]/77

REPORTED 06/1[illegible]/77

DAVID E. MURRAY
REITZ & JENS, INC.
111 S. MERAMEC AVENUE
ST. LOUIS, MO. 63105

REITZ & J. INC. [illegible]

CYANIDE REF- [illegible]
NONE MEASURABLE. SENSITIVITY OF THE METHOD IS 0.01 PARTS PER MILLION OR GREATER.

ANY QUESTIONS CALL K. [illegible] - [illegible] CAUSEY (314)[illegible]-[illegible]

INDUSTRIAL TESTING LABORATORIES inc.

Chemists
Engineers
Metallurgists

2350 Seventh Blvd. • St. Louis, Missouri 63104 | 314/PRospect 1-7111

August 25, 1977

Report No. 77-8-260

Examination of nine (9) water samples submitted on August 16, 1977.

Reitz & Jens, Inc.
111 So. Meramec
St. Louis, MO. 63105

Attn: Mr. Dave Murray

TEST REPORT

	MW	P5	P6	P7	P8
Arsenic, mg/l	0.002	*0.001	0.002	0.003	0.007
Cadmium, mg/l	*0.01	*0.01	*0.01	*0.01	*0.01
Chromium Total, mg/l	*0.01	*0.01	*0.01	*0.01	*0.01
Conductivity, µmhos	2000	2786	2041	1965	2083
Copper, mg/l	0.01	0.01	0.01	0.01	0.01
Fluoride, mg/l	0.38	0.24	0.15	0.24	0.18
Iron, mg/l	0.08	0.09	0.07	0.11	0.11
Lead, mg/l	0.06	0.07	0.06	0.06	0.06
Manganese, mg/l	2.04	2.79	2.45	1.58	1.76
Nickel, mg/l	0.03	0.04	0.04	0.04	0.04
pH	7.22	6.98	6.95	6.93	6.88
Zinc, mg/l	2.9	0.03	0.02	0.02	0.02

*Less than.

INDUSTRIAL TESTING LABORATORIES inc.

Chemists
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Metallurgists

2350 Seventh Blvd. • St. Louis, Missouri 63104 | 314/PRospect 1-7111

	P9	P10	P11	P13
Arsenic, mg/l	0.004	0.002	0.004	0.004
Cadmium, mg/l	*0.01	*0.01	*0.01	*0.01
Chromium, Total, mg/l	*0.01	*0.01	*0.01	*0.01
Conductivity, mhos	2,439	1,592	1,980	1,563
Copper, mg/l	0.01	0.01	0.01	0.01
Fluoride, mg/l	0.15	0.60	0.60	0.44
Iron, mg/l	0.10	0.07	0.10	0.14
Lead, mg/l	0.06	0.06	0.06	0.06
Manganese, mg/l	1.97	0.31	0.88	1.89
Nickel, mg/l	0.04	0.02	0.04	0.04
pH	6.85	7.07	7.18	7.10
Zinc, mg/l	0.03	0.02	0.02	0.01

*Less than.

Respectfully submitted,

INDUSTRIAL TESTING LABORATORIES, INC.

Allan M. Siegel/k

Allan M. Siegel, P.E.
Director

RB:WL:k

INDUSTRIAL TESTING LABORATORIES inc.

Chemists
Engineers
Metallurgists

2350 Seventh Blvd. • St. Louis, Missouri 63104 | 314/PRospect 1-7111

RECEIVED SEP 1 1977 REITZ & JENS, INC.

Report No. 77-8-260A

August 31, 1977

Determination of the Total Organic Carbon in nine (9) water samples submitted.

Reitz & Jens, Inc.
111 South Meramec
St. Louis, MO 63105

Attn: Mr. Dave Murray

TEST REPORT

Sample Identification	Total Organic Carbon, mg/l
MW	7
P5	43
P6	17
P7	7
P8	15
P9	20
P10	3
P11	11
P13	21

Respectfully submitted,

INDUSTRIAL TESTING LABORATORIES, INC.

Allan M. Siegel, P.E.
Director

RB/eg

INDUSTRIAL TESTING LABORATORIES inc.

Chemists
Engineers
Metallurgists

2350 Seventh Blvd. • St. Louis, Missouri 63104

314/PRospect 1-7111

A SUBSIDIARY OF CHROMALLOY AMERICAN CORPORATION

DEC 7 1977
REITZ & JENS, INC.

Report No. 77-11-280

December 6, 1977

Examination of seven (7) water samples submitted on November 16, 1977.

Reitz & Jens, Inc.
111 South Meramec
St. Louis, MO 63105

Attn: Mr. Dave Murray

TEST REPORT

	#6	#7	#8	#9	#10	#11	#13
Arsenic, mg/l	0.002	0.001	*0.001	*0.001	0.002	0.004	*0.00
Cadmium, mg/l	0.02	0.02	0.02	0.02	0.01	0.01	*0.01
Chromium, Total, mg/l	0.01	0.01	0.02	0.01	0.01	0.02	*0.01
Conductivity, μmhos	2198	1946	2247	2299	1471	1835	826
Copper, mg/l	0.02	0.02	0.02	0.02	0.02	0.02	0.0
Fluoride, mg/l	0.26	0.08	0.17	0.16	0.71	0.59	0.5
Iron, mg/l	0.11	0.10	0.20	1.28	0.08	0.21	0.5
Lead, mg/l	0.23	0.21	0.23	0.20	0.12	0.20	0.0
Manganese, mg/l	2.38	1.56	1.97	1.97	0.11	0.02	0.0
Nickel, mg/l	0.08	0.07	0.07	0.07	0.04	0.07	0.0
pH	6.80	6.75	6.68	6.66	6.98	7.06	6.9
T.O.C., mg/l	79	57	41	58	53	38	45
Zinc, mg/l	0.04	0.04	0.08	0.04	0.02	0.02	0.0

* Less than

Respectfully submitted,

INDUSTRIAL TESTING LABORATORIES, INC.

Allan M. Siegel

Allan M. Siegel, P.E.
Director

INDUSTRIAL TESTING LABORATORIES inc.

Chemists
Engineers
Metallurgists

2350 Seventh Blvd. • St. Louis, Missouri 63104

314/PRospect 1-7111

A SUBSIDIARY OF CHROMALLOY AMERICAN CORPORATION

[illegible]rch [illegible], 1[illegible]8

Report No. 78-[illegible]-[illegible]7

[illegible]xamination of nine [illegible] water samples submitted.

Feitz & Jens, Inc.
111 South Meramec
St. Louis, MO. 63105

Attn: Mr. [illegible]ave [illegible]urray

TEST REPORT

	No. 5	No. 6	No. 7	No. 8
pH	7.32	7.24	7.37	[illegible]
Oxidation-Reduction Potential, millivolt	-83	-102	-109	-10[illegible]
Conductivity, mhos	2373	2060	1[illegible]24	2464
C. O. D., mg/l	[illegible]		*2	[illegible]
Hardness as $CaCO_3$, mg/l	1760	1420	1090	187[illegible]
Chloride, mg/l	10	13	[illegible]0	12
Iron, mg/l	0.07	0.03	0.03	[illegible]
Arsenic, mg/l	*0.001	0.004	0.001	*0.001
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

[illegible]

INDUSTRIAL TESTING LABORATORIES inc.

Chemists
Engineers
Metallurgists

2350 Seventh Blvd. • St. Louis, Missouri 63104 | 314/PRospect 1-7111

A SUBSIDIARY OF CHROMALLOY AMERICAN CORPORATION

Report No. 78-[illegible]-407 [illegible]

	No. 9	No. 10	No. 11	No. 12	Monitor
[illegible]	7.29	7.52	7.40	7.[illegible]	[illegible].15
Oxidation-Reduction Potention, millivolt	-91	-98	-105	-142	-105
Conductivity, mhos	2429	1605	1973	4[illegible]	[illegible]
[illegible]. O. D., mg/l	14	63	7	20	[illegible]
Hardness as $CaCO_3$, mg/l	1830	1040	1400	19[illegible]	1230
Chloride, mg/l	9	16	11	24	[illegible]
Iron, mg/l	0.04	0.04	0.05	0.05	.21
Arsenic, mg/l	*0.001	*0.001	*0.001	*0.001	[illegible].001
T. O. C., mg/l	2	4	5	8	[illegible]

* Less than.

Respectfully submitted,

INDUSTRIAL TESTING LABORATORIES, INC.

Allan M. Siegel, P.E.
Director

[illegible]

MID-MISSOURI TESTING LABORATORY

DETERMINATIONS MADE IN ACCORDANCE WITH AWWA - WPCF - APHA STANDARD METHODS

BOB NICHOLS COLUMBIA, MO 65201 314/442-0232

Date: June 29, 1978

Client: Reitz & Jens (Bob's Home Service)

Date Received: June 15, 1978

Sample Collected By: Mid-Missouri Testing Laboratory

SAMPLE

Parameter	Well # 5	Well # 6	Well # 7	Date Analyzed
pH	6.4	6.5	6.3	6/15/78
Redox Potential (millivolts)	-100	100	-100	6/15/78
Specific Conductivity (μ mhos)	2,100	2,000	1,400	6/15/78
TOC (mg/l)	42	46	41	6/16/78
[illegible] (mg/l)	117	249	59	6/16/78
Total Hardness (mg/l $CaCO_3$)	1,910	1,690	1,290	6/17/78
Chloride (mg/l)	17.6	15.4	34.6	6/21/78
Total Iron (mg/l)	3.1	3.7	3.6	6/28/78
BOD_5 (mg/l)	11	17	13	6/28/78
Susp. Solids (mg/l)	386	1,826	404	6/16/78
TDS (mg/l)	2,772	2,406	1,630	6/16/78
Turbidity (TU)	14	18	21	6/17/78
Extractable Oil (mg/l)	10.9	5.4	3.3	6/16/78
Fecal Coliform (#/100 ml)	0	0	0	6/15/78
Alkalinity (mg/l)	440	496	440	6/16/78

Comments: 1. $\leq$ means less than or equal to the lower detection limits of analytical equipment.

2. All metals are "total" concentrations. Samples for atomic absorption analysis were concentrated 5 to 1 during digestion.

Approved [illegible]

MID-MISSOURI TESTING LABORATORY

DETERMINATIONS MADE IN ACCORDANCE WITH AWWA – WPCF – APHA STANDARD METHODS

808 NICHOLS COLUMBIA, MO 65201 314/442-0237

Date: June 29, 1978

Client: Reitz & Jens (Bob's Home Service)

Date Received: June 15, 1978

Sample Collected By: Mid-Missouri Testing Laboratory

SAMPLE

Parameter	Well # 5	Well # 6	Well # 7	Date Analyzed
Phenol (mg/l)	≤0.001	≤0.001	≤0.001	6/16/78
Nitrate (mg/l N)	0.11	0.13	0.11	6/16/78
Sulfate (mg/l)	1,000	900	520	6/19/78
[illegible]ride (mg/l)	≤0.02	≤0.02	≤0.02	6/22/78
Cyanide (mg/l)	≤0.002	≤0.002	≤0.002	6/16/78
Arsenic (mg/l)	≤0.002	≤0.002	≤0.002	6/20/78
Barium (mg/l)	0.77	0.38	≤0.03	6/27/78
Cadmium (mg/l)	≤0.002	≤0.002	≤0.002	6/28/78
Chromium^{+6} (mg/l)	≤0.02	≤0.02	≤0.02	6/16/78
Total Chromium (mg/l)	≤0.02	≤0.02	≤0.02	6/16/78
Copper (mg/l)	≤0.01	≤0.01	≤0.01	6/28/78
Lead (mg/l)	≤0.05	≤0.05	≤0.05	6/28/78
Manganese (mg/l)	1.6	1.2	0.9	6/28/78
Mercury (mg/l)	≤0.0002	≤0.0002	0.0014	6/27/78
Nickel (mg/l)	0.04	0.08	0.06	6/27/78

Comments: 1. ≤means leass than or equal to the lower detection limits of analytical equipment.

2. All metals are "total" concentrations. Samples for atomic absorption analysis were concentrated 5 to 1 during digestion.

Approved [illegible]

MID-MISSOURI TESTING LABORATORY

DETERMINATIONS MADE IN ACCORDANCE WITH AWWA – WPCF – APHA STANDARD METHODS

505 NICHOLS COLUMBIA, MO 65201 314/442-0237

Date: June 29, 1978

Client: Reitz & Jens (Bob's Home Service)

Date Received: June 15, 1978

Sample Collected By: Mid-Missouri Testing Laboratory

SAMPLE

Parameter	Well # 5	Well # 6	Well # 7	Date Analyzed
:lenium (mg/l)	≤0.002	≤0.002	0.13	6/27/78
.lver (mg/l)	≤0.01	≤0.01	≤0.01	6 28/78
inc (mg/l)	≤0.005	≤0.005	≤0.005	6 28/78

omments: 1. ≤means less than or equal to the lower detection limits of analytical equipment.

2. All metals are "total" concentrations. Samples for atomic absorption analysis were concentrated 5 to 1 during digestion.

Approved _____

MID-MISSOURI TESTING LABORATORY

DETERMINATIONS MADE IN ACCORDANCE WITH AWWA - WPCF - APHA STANDARD METHODS

506 NICHOLS COLUMBIA, MO 65201 314/442-0237

Date: June 29, 1978

Client: Reitz & Jens (Bob's Home Service)

Date Received: June 15, 1978

Sample Collected By: Mid-Missouri Testing Laboratory

SAMPLE

Parameter	Well #5	Well #6	Well #7	Date Analyzed
BHC	<1	<1	<1	6/15-29/78
α BHC	<1	<1	<1	"
β BHC	<1	<1	<1	"
γ BHC	---	---	---	"
[illegible]	<1	<1	<1	"
Chlordane	<2	<2	<2	"
Heptachlor	<2	<2	<2	"
Heptachlor Epoxide	<2	<2	<2	"
α Chlordane	3.7	<2	3.5	"
β Chlordane	3.9	<2	2.0	"
Tech Chlordane	NR	NR	NR	"
Dieldrin + Aldrin	<3	9.2	2.0	"
Aldrin	<1	<1	<1	"
Dieldrin	<3	9.2	2.0	"
DDT + Metabolites	<5	<5	<5	"
o,p'-DDE	<3	<3	<3	"

Comments:
1. Results are expressed as nanograms/liter.
2. NR = Not reported.
3. < means lower than the lowest detection limit of analytical equipment.
4. Pesticide, chlorinated hydrocarbon, PCB analysis by Gary Brookhart ABC Labs, 474-8579.

Approved [illegible]

MID-MISSOURI TESTING LABORATORY

DETERMINATIONS MADE IN ACCORDANCE WITH AWWA – WPCF – APHA STANDARD METHODS

506 NICHOLS COLUMBIA, MO 65201 314/442-0237

Date: June 29, 1978

Client: Reitz & Jens (Bob's Home Service)

Date Received: June 15, 1978

Sample Collected By: Mid-Missouri Testing Laboratory

SAMPLE

Parameter	Well # 5	Well #6	Well # 7	Date Analyzed
p,p'-DDE	1.5	<3	<3	6-15-29-78
o,p'-DDT	<5	<5	<5	"
p,p'-DDD	<5	<5	<5	"
[illegible]p'-DDT	<5	<5	<5	"
Endrin	<5	<5	<5	"
Heptachlor	<2	<2	<2	"
Heptachlor Epoxide	<2	<2	<2	"
Lindane	6.5	4.2	7.1	"
Methoxychlor	<40	<40	<40	"
Toxaphene	<100	<100	<100	"
PCB	<50	<50	<50	"
Aroclor 1242	<50	<50	<50	"
Aroclor 1016	<50	<50	<50	"
Aroclor 1254	<50	<50	<50	"
Aroclor 1260	<50	<50	<50	"
HCB	0.88	1.3	0.84	"

Comments:
1. Results are expressed as nanograms/liter.
2. NR = Not reported.
3. < means lower than the lowest detection limit of analytical equipment.
4. Pesticide, chlorinated hydrocarbon, PCB analysis by Gary Brookhart ABC Labs, 474-8579.

Approved [illegible]

MID-MISSOURI TESTING LABORATORY

DETERMINATIONS MADE IN ACCORDANCE WITH AWWA – WPCF – APHA STANDARD METHODS

808 NICHOLS COLUMBIA, MO 65201 314/442-0237

Date: June 29, 1978

Client: Reitz & Jens (Bob's Home Service)

Date Received: June 15, 1978

Sample Collected By: Mid-Missouri Testing Laboratory

SAMPLE

Parameter	Well # 5	Well # 6	Well # 7	Date Analyzed
Mirex	<20	<20	<20	6/15-29/78

Comments:
1. Results are expressed as nanograms/liter.
2. NR = Not reported.
3. < means lower than the lowest detection limit of analytical equipment.
4. Pesticide, chlorinated hydrocarbon, PCB analysis by Gary Brookhart ABC Labs, 474-8579.

Approved _____

MID-MISSOURI TESTING LABORATORY

DETERMINATIONS MADE IN ACCORDANCE WITH AWWA – WPCF – APHA STANDARD METHODS

NICHOLS COLUMBIA, MO 65201 314/442-0237

Date: June 29, 1978

Client: Reitz & Jens (Bob's Home Service)

Date Received: June 15, 1978

Sample Collected By: Mid-Missouri Testing Laboratory

SAMPLE

Parameter	Well #8	Well #9	Well #10	Date Analyzed
pH	6.4	6.6	6.9	6/15/78
Redox Potential (millivolts)	-100	-100	-110	6/15/78
Specific Conductivity (μ mhos)	1,700	2,200	1,600	6/15/78
TOC (mg/l)	41	42	38	6/16/78
[illegible]g/l)	36	51	2	6/19/78
Total Hardness (mg/l $CaCO_3$)	1,250	1,750	1,050	6/17/78
Chloride (mg/l)	31.3	15.4	22.0	6/21/78
Total Iron (mg/l)	2.5	3.3	1.4	6/28/78
BOD_5 (mg/l)	11	10	5	6/15/78
Susp. Solids (mg/l)	155	161	69	6/19/78
TDS (mg/l)	1,848	2,473	1,490	6/19/78
Turbidity (TU)	20	18	18	6/17/78
Extractable Oil (mg/l)	2.6	2.8	10.1	6/16/78
Total Coliform (#/100 ml)	0	0	0	6/15/78
Alkalinity (mg/l)	424	428	312	6/16/78

Comments: 1. $\leq$ means less than or equal to the lower detection limits of analytical equipment.

2. All metals are "total" concentrations. Samples for atomic absorption analysis were concentrated 5 to 1 during digestion.

Approved [signature]

MID-MISSOURI TESTING LABORATORY

DETERMINATIONS MADE IN ACCORDANCE WITH AWWA – WPCF – APHA STANDARD METHODS

BOB NICHOLS COLUMBIA, MO 65201 314/442-0237

Date: June 29, 1978

Client: Reitz & Jens (Bob's Home Service)

Date Received: June 15, 1978

Sample Collected By: Mid-Missouri Testing Laboratory

SAMPLE

Parameter	Well # 8	Well # 9	Well # 10	Date Analyzed
Phenol (mg/l)	≤0.001	≤0.001	≤0.001	6/16/78
Nitrate (mg/l N)	0.17	0.17	2.6	6/16/78
Sulfate (mg/l)	960	900	500	6/19/78
Fluoride (mg/l)	≤0.02	≤0.02	0.4	6/22/78
Cyanide (mg/l)	≤0.002	≤0.002	≤0.002	6/16/78
Arsenic (mg/l)	≤0.002	≤0.002	≤0.002	6/21/78
Barium (mg/l)	0.19	0.29	≤0.03	6/27/78
Cadmium (mg/l)	≤0.002	≤0.002	≤0.002	6/28/78
Chromium^{+6} (mg/l)	≤0.02	≤0.02	≤0.02	6/16/78
Total Chromium (mg/l)	≤0.02	≤0.02	≤0.02	6/16/78
Copper (mg/l)	≤0.01	≤0.01	≤0.01	6/28/78
Lead (mg/l)	≤0.05	≤0.05	≤0.05	6/28/78
Manganese (mg/l)	0.4	0.8	0.1	6/28/78
Mercury (mg/l)	0.0028	≤0.0002	≤0.0002	6/28/78
Nickel (mg/l)	0.04	0.04	0.03	6/27/78

Comments: 1. ≤means leass than or equal to the lower detection limits of analytical equipment.

2. All metals are "total" concentrations. Samples for atomic absorption analysis were cencentrated 5 to 1 during digestion.

Approved _____

MID-MISSOURI TESTING LABORATORY

DETERMINATIONS MADE IN ACCORDANCE WITH AWWA – WPCF – APHA STANDARD METHODS

BOB NICHOLS COLUMBIA, MO 65201 314/442-0237

Date: June 29, 1978

Client: Reitz & Jens (Bob's Home Service)

Date Received: June 15, 1978

Sample Collected By: Mid-Missouri Testing Laboratory

SAMPLE

Parameter	Well # 8	Well # 9	Well # 10	Date Analyzed
Selenium (mg/l)	0.03	0.026	0.022	6/27/78
Silver (mg/l)	≤0.01	≤0.01	≤0.01	6/28/78
Zinc (mg/l)	≤0.005	≤0.005	≤0.005	6/28/78

Comments: 1. ≤means less than or equal to the lower detection limits of analytical equipment.

2. All metals are "total" concentrations. Samples for atomic absorption analysis were concentrated 5 to 1 during digestion.

Approved [signature]

MID-MISSOURI TESTING LABORATORY

DETERMINATIONS MADE IN ACCORDANCE WITH AWWA - WPCF - APHA STANDARD METHODS

506 NICHOLS COLUMBIA, MO 65201 314/442-0237

Date: June 29, 1978

Client: Reitz & Jens (Bob's Home Service)

Date Received: June 15, 1978

Sample Collected By: Mid-Missouri Testing Laboratory

SAMPLE

Parameter	Well # 8	Well # 9	Well #10	Date Analyzed
BHC	<1	<1	<1	6/15-29/78
α BHC	0.80	<1	<1	"
β BHC	<1	<1	<1	"
γ BHC	---	---	---	"
[illegible]C	<1	<1	<1	"
Chlordane	<2	<2	<2	"
Heptachlor	<2	<2	<2	"
Heptachlor Epoxide	---	<2	<2	"
α Chlordane	<2	1.1	2.7	"
β Chlordane	1.7	1.1	2.3	"
Tech Chlordane	NR	NR	NR	"
Dieldrin + Aldrin	1.8	2.8	2.8	"
Aldrin	<1	<1	<1	"
Dieldrin	1.8	2.8	2.8	"
DDT + Metabolites	<5	<5	<5	"
o,p'-DDE	<3	<3	<3	"

Comments:
1. Results are expressed as nanograms/liter.
2. NR = Not reported.
3. < means lower than the lowest detection limit of analytical equipment.
4. Pesticide, chlorinated hydrocarbon, PCB analysis by Gary Brookhart ABC Labs, 474-8579.

Approved _____

MID-MISSOURI TESTING LABORATORY

DETERMINATIONS MADE IN ACCORDANCE WITH AWWA - WPCF - APHA STANDARD METHODS

508 NICHOLS COLUMBIA, MO 65201 314/442-0237

Date: June 29, 1978

Client: Reitz & Jens (Bob's Home Service)

Date Received: June 15, 1978

Sample Collected By: Mid-Missouri Testing Laboratory

SAMPLE

Parameter	Well # 8	Well # 9	Well # 10	Date Analyzed
p,p'-DDE	<3	1.1	1.8	6/15-29/78
o,p'-DDT	<5	<5	<5	"
p,p'-DDD	<5	<5	<5	"
p,p'-DDT	<5	<5	<5	"
E. [illegible]	<5	<5	<5	"
Heptachlor	<2	<2	<2	"
Heptachlor Epoxide	0.90	<2	<2	"
Lindane	2.6	3.3	9.0	"
Methoxychlor	<40	<40	<40	"
Toxaphene	<100	<100	<100	"
PCB	<50	<50	<50	"
Aroclor 1242	<50	<50	<50	"
Aroclor 1016	<50	<50	<50	"
Aroclor 1254	<50	<50	<50	"
Aroclor 1260	<50	<50	<50	"
HCB	<1	0.81	0.73	"

Comments:
1. Results are expressed as nanograms/liter.
2. NR = Not reported.
3. < means lower than the lowest detection limit of analytical equipment.
4. Pesticide, chlorinated hydrocarbon, PCB analysis by Gary Brookhart ABC Labs, 474-8579.

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MID-MISSOURI TESTING LABORATORY

DETERMINATIONS MADE IN ACCORDANCE WITH AWWA - WPCF - APHA STANDARD METHODS

808 NICHOLS COLUMBIA, MO 65201 314/442-0228

Date: June 29, 1978

Client: Reitz & Jens (Bob's Home Service)

Date Received: June 15, 1978

Sample Collected By: Mid-Missouri Testing Laboratory

SAMPLE

Parameter	Well # 8	Well # 9	Well # 10	Date Analyzed
Mirex	<20	<20	<20	6/15-29/78

Comments:
1. Results are expressed as nanograms/liter.
2. NR = Not reported.
3. < means lower than the lowest detection limit of analytical equipment.
4. Pesticide, chlorinated hydrocarbon, PCB analysis by Gary Brooknart ABC Labs, 474-8579.

Approved [signature]

MID-MISSOURI TESTING LABORATORY

DETERMINATIONS MADE IN ACCORDANCE WITH AWWA – WPCF – APHA STANDARD METHODS

506 NICHOLS COLUMBIA, MO 65201 314/442-0237

Date: June 29, 1978

Client: Reitz & Jens (Bob's Home Service)

Date Received: June 15, 1978

Sample Collected By: Mid-Missouri Testing Laboratory

SAMPLE

Parameter	Well # 11	Well # 13	Monitoring Well #	Date Analyzed
pH	7.0	6.9	6.9	6/15/78
Redox Potential (millivolts)	-105	-110	-100	6/15/78
Specific Conductivity (μ mhos)	1,450	700	1,600	6/15/78
TOC (mg/l)	42	42	14	6/16/78
TC (mg/l)	69	40	47	6/19/78
Total Hardness (mg/l $CaCO_3$)	1,150	450	1,400	6/17/78
Chloride (mg/l)	8.8	34.6	15.9	6/21/78
Total Iron (mg/l)	3.9	4.0	3.9	6/28/78
BOD_5 (mg/l)	37	14	2	6/15/78
Susp. Solids (mg/l)	362	98	1,162	6/19/78
TDS (mg/l)	1,568	638	2,091	6/19/78
Turbidity (TU)	18	9	6	6/17/78
Extractable Oil (mg/l)	5.8	20.1	2.5	6/16/78
Fecal Coliform (#/100 ml)	0	0	0	6/15/78
Alkalinity (mg/l)	220	400	428	6/16/78

Comments: 1. ≤ means less than or equal to the lower detection limits of analytical equipment.

2. All metals are "total" concentrations. Samples for atomic absorption analysis were concentrated 5 to 1 during digestion.

Approved _____

MID-MISSOURI TESTING LABORATORY

DETERMINATIONS MADE IN ACCORDANCE WITH AWWA – WPCF – APHA STANDARD METHODS

506 NICHOLS COLUMBIA, MO 65201 314/442-0237

Date: June 29, 1978

Client: Reitz & Jens (Bob's Home Service)

Date Received: June 15, 1978

Sample Collected By: Mid-Missouri Testing Laboratory

SAMPLE

Parameter	Well # 11	Well # 13	Monitoring Well #	Date Analyzed
Phenol (mg/l)	<0.001	<0.001	<0.001	6/16/78
Nitrate (mg/l N)	0.25	0.12	0.08	6/16/78
Sulfate (mg/l)	720	40	960	6/19/78
[illegible]ide (mg/l)	0.15	0.015	<0.02	6/22/78
Cyanide (mg/l)	≤0.002	≤0.002	≤0.002	6/15/78
Arsenic (mg/l)	≤0.002	≤0.002	≤0.002	6/21/78
Barium (mg/l)	0.77	<0.03	0.10	6/27/78
Cadmium (mg/l)	≤0.002	≤0.002	≤0.002	6/28/78
Chromium^{+6} (mg/l)	≤0.02	≤0.02	≤0.02	6/16/78
Total Chromium (mg/l)	≤0.02	≤0.02	≤0.02	6/16/78
Copper (mg/l)	≤0.02	≤0.02	0.025	6/28/78
Lead (mg/l)	≤0.05	≤0.05	≤0.05	6/28/78
Manganese (mg/l)	0.3	0.2	1.2	6/28/78
Mercury (mg/l)	≤0.0002	≤0.0002	≤0.0002	6/28/78
Nickel (mg/l)	0.1	0.05	0.12	6/27/78

Comments: 1. ≤means leass than or equal to the lower detection limits of analytical equipment.

2. All metals are "total" concentrations. Samples for atomic absorption analysis were concentrated 5 to 1 during digestion.

Approved _____

MID-MISSOURI TESTING LABORATORY

DETERMINATIONS MADE IN ACCORDANCE WITH AWWA - WPCF - APHA STANDARD METHODS

506 NICHOLS COLUMBIA, MO 65201 314/442-0237

Date: June 29, 1978

Client: Reitz & Jens (Bob's Home Service)

Date Received: June 15, 1978

Sample Collected By: Mid-Missouri Testing Laboratory

SAMPLE

Parameter	Well # 11	Well #13	Monitoring Well #	Date Analyzed
Selenium (mg/l)	≤0.002	≤0.002	≤0.002	6/27/78
Silver (mg/l)	≤0.01	≤0.01	≤0.01	6/28/78
Zinc (mg/l)	≤0.005	≤0.005	0.45	6/28/78

Comments: -1. ≤means less than or equal to the lower detection limits of analytical equipment.

2. All metals are "total" concentrations. Samples for atomic absorption analysis were concentrated 5 to 1 during digestion.

Approved [signature]

MID-MISSOURI TESTING LABORATORY

DETERMINATIONS MADE IN ACCORDANCE WITH AWWA - WPCF - APHA STANDARD METHODS

508 NICHOLS COLUMBIA, MO 65201 314/442-0237

Date: June 29, 1978

Client: Reitz & Jens (Bob's Home Service)

Date Received: June 15, 1978

Sample Collected By: Mid-Missouri Testing Laboratory

SAMPLE

Parameter	Well # 11	Well # 13	Monitoring Well #	Date Analyzed
HC	<1	<1	<1	6/15-29/78
α BHC	<1	<1	<1	"
β BHC	<1	<1	<1	"
γ [illegible]	---	---	---	"
[illegible] BHC	<1	<1	<1	"
hlordane	<2	<2	<2	"
Heptachlor	<2	<2	<2	"
Heptachlor Epoxide	<2	<2	<2	"
α Chlordane	3.5	<2	<2	"
β Chlordane	3.9	2.4	<2	"
Tech Chlordane	NR	NR	NR	"
Dieldrin + Aldrin	5.8	2.8	<3	"
Aldrin	<1	<1	<1	"
Dieldrin	5.8	2.8	<3	"
DDT + Metabolites	14	<5	210	"
o,p'-DDE	<3	<3	23	"

Comments:
1. Results are expressed as nanograms/liter.
2. NR = Not reported.
3. < means lower than the lowest detection limit of analytical equipment.
4. Pesticide, chlorinated hydrocarbon, PCB analysis by Gary Brookhart ABC Labs, 474-8579.

Approved [illegible]

MID-MISSOURI TESTING LABORATORY

DETERMINATIONS MADE IN ACCORDANCE WITH AWWA - WPCF - APHA STANDARD METHODS

608 NICHOLS COLUMBIA, MO 65201 314/442-0237

Date: June 29, 1978

Client: Reitz & Jens (Bob's Home Service)

Date Received: June 15, 1978

Sample Collected By: Mid-Missouri Testing Laboratory

SAMPLE

Parameter	Well # 11	Well # 13	Monitoring Well #	Date Analyzed
p,p'-DDE	2.4	4.0	190	6/15-29/78
o,p'-DDT	4.6	<5	<5	"
p,p'-DDD	<5	<5	<5	"
[illegible]p'-DDT	6.7	<5	<5	"
[illegible]n	<5	<5	<5	"
Heptachlor	<2	<2	<2	"
Heptachlor Epoxide	<2	<2	<2	"
Lindane	7.8	15	4.1	"
Methoxychlor	<40	<40	<40	"
Toxaphene	<100	<100	<100	"
PCB	<50	<50	<50	"
Aroclor 1242	<50	<50	<50	"
Aroclor 1016	<50	<50	<50	"
Aroclor 1254	<50	<50	<50	"
Aroclor 1260	<50	<50	<50	"
HCB	2.4	8.1	<1	"

Comments:
1. Results are expressed as nanograms/liter.
2. NR = Not reported.
3. < means lower than the lowest detection limit of analytical equipment.
4. Pesticide, chlorinated hydrocarbon, PCB analysis by Gary Brookhart ABC Labs, 474-8579.

Approved [illegible]

MID-MISSOURI TESTING LABORATORY

DETERMINATIONS MADE IN ACCORDANCE WITH AWWA - WPCF - APHA STANDARD METHODS

606 NICHOLS COLUMBIA, MO 65201 314/442-0237

Date: June 29, 1978

Client: Reitz & Jens (Bob's Home Service)

Date Received: June 15, 1978

Sample Collected By: Mid-Missouri Testing Laboratory

SAMPLE

Parameter	Well #11	Well # 13	Monitoring Well #	Date Analyzed
Mirex	<20	<20	<20	6/15-29/78

Comments:
1. Results are expressed as nanograms/liter.
2. NR = Not reported.
3. < means lower than the lowest detection limit of analytical equipment.
4. Pesticide, chlorinated hydrocarbon, PCB analysis by Gary Brookhart ABC Labs, 474-8579.

Approved _____

MID-MISSOURI TESTING LABORATORY

DETERMINATIONS MADE IN ACCORDANCE WITH AWWA - WPCF - APHA STANDARD METHODS

508 NICHOLS COLUMBIA, MO 65201 314/442-0227

June 29, 1978

Re: Analytical Monitoring--Bob's Home Service

ANALYTICAL METHODS

Paramater	Method	Special Conditions
pH	Electrode	
Redox Potential (millivolts)	Electrode	
Specific Conductivity (μmhos)	Electrode	
TOC (mg/l)	Combustion	
COD (mg/l)	Dichromate reflux	
Total Hardness (mg/l $CaCO_3$)	E.D.T.A. Titration	
Chloride (mg/l)	Silver Nitrate	
Total Iron (mg/l)	Digestion--AA	
BOD	Winkler--Azide modification	
Suspended Solids (mg/l)	Glass fiber filtration 103°C	Samples were agitated before analysis.
TDS (mg/l)	Gravimetric 103°C	
Turbidity (TU)	Nephelometric	Samples were agitated, allowed to settle 15 minutes, and superatant turbidity was analyzed.
Extractable Oil (mg/l)	Trifluoro-gravimetric	
Fecal Coliform (#/100 ml)	Membrane filter	
Alkalinity (mg/l)	Electrometric titration (4.5)	
Phenol (mg/l)	Colorimetric	
Nitrate (mg/l N)	Brucine sulfate	
Sulfate (mg/l)	Turbidimetric	
Fluoride (mg/l)	Electrode	
Cyanide (mg/l)	Distillation, pyridine colorimetric	
Arsenic (mg/l)	Digestion--silver diethyldithiocarbamate	
Barium (mg/l)	Digestion--AA	
Cadmium (mg/l)	Digestion--AA	
Chromium^{+6} (mg/l)	Colorimetric (diphenylcarbazide)	

MID-MISSOURI TESTING LABORATORY

DETERMINATIONS MADE IN ACCORDANCE WITH AWWA - WPCF - APHA STANDARD METHODS

808 NICHOLS COLUMBIA, MO 65201 314/442-0237

June 29, 1978

Re: Analytical Monitoring--Bob's Home Service

ANALYTICAL METHODS, continued

Paramater	Method	Special Conditions
Total Chromium (mg/l)	Digestion--AA	
Copper (mg/l)	Digestion--AA	
Lead (mg/l)	Digestion--AA	
Manganese (mg/l)	Digestion--AA	
Mercury (mg/l)	Flameless AA	
Nickel (mg/l)	Digestion--AA	
Selenium (mg/l)	Diamobenzidine--colorimetric	
Silver (mg/l)	Digestion--AA	
Zinc (mg/l)	Digestion--AA	
Chlorinated Hydrocarbons and Pesticides (mg/l)	Gas chromatograph scan	
PCB's (mg/l)	Gas chromatograph scan	

Sample preservation was in accordance with EPA Methods for Chemical Analysis of Water and Wastes, 1974.

MID-MISSOURI TESTING LABORATORY

DETERMINATIONS MADE IN ACCORDANCE WITH AWWA - WPCF - APHA STANDARD METHODS

506 NICHOLS COLUMBIA, MO 65201 314/442-0237

RECEIVED JUL 21 1978 REITZ & JENS, INC.

Date: July 19, 1978

Client: Reitz & Jens (Bob's Home Service)

Date Received: July 7, 1978

Sample Collected By: Mid-Missouri Testing Laboratory

SAMPLE

Parameter	Wash Well	Stream at Property Line		Date Analyzed
	6.7	7.2		7/7/78
dox Potential (millivolts)	-40	-120		7/7/78
ecific Conductivity (μ mhos)	2,300	400		7/10/78
C (mg/l)	10	16		7/7/78
L (mg/l)	16	34		7/7/78
tal Hardness (mg/l $CaCO_3$)	1,302	178		7/7/78
loride (mg/l)	6.6	6.6		7/11/78
tal Iron (mg/l)	2.8	≤0.02		7/14/78
D_5 (mg/l)	8	8		7/7/78
isp. Solids (mg/l)	27	46		7/7/78
S (mg/l)	2,130	247		7/10/78
rbidity (TU)	15	4		7/10/78
xtractable Oil (mg/l)	2.8	2.3		7/10/78
ecal Coliform (#/100 ml)	0	10		7/7/78
lkalinity (mg/l)	387	122		7/7/78

omments: 1. ≤ means less than or equal to the lower detection limits of analytical equipment.

2. All metals are "total" concentrations.

Approved Vernon Stump

MID-MISSOURI TESTING LABORATORY

DETERMINATIONS MADE IN ACCORDANCE WITH AWWA - WPCF - APHA STANDARD METHODS

506 NICHOLS COLUMBIA, MO 65201 314/442-0237

Date: July 19, 1978

Client: Reitz & Jens (Bob's Home Service)

Date Received: July 7, 1978

Sample Collected By: Mid-Missouri Testing Laboratory

SAMPLE

Parameter	Wash Well	Stream at Property Line		Date Analyzed
Phenol (mg/l)	≤0.001	≤0.001		7/10/78
Nitrate (mg/l N)	0.8	0.3		7/10/78
Sulfate (mg/l)	880	42		7/10/78
Fluoride (mg/l)	0.03	0.07		7/10/78
[illegible]de (mg/l)	≤0.02	≤0.02		7/7/78
Arsenic (mg/l)	≤0.002	≤0.002		7/17/78
Barium (mg/l)	≤0.03	0.40		7/13/78
Cadmium (mg/l)	≤0.002	≤0.002		7/13/78
Chromium^{+6} (mg/l)	≤0.02	≤0.002		7/13/78
Total Chromium (mg/l)	≤0.02	≤0.002		7/13/78
Copper (mg/l)	≤0.01	≤0.01		7/13/78
Lead (mg/l)	≤0.05	≤0.05		7/13/78
Manganese (mg/l)	0.1	0.04		7/13/78
Mercury (mg/l)	≤0.0002	≤0.0002		7/17/78
Nickel (mg/l)	0.06	0.06		7/15/78

Comments: 1. ≤means leass than or equal to the lower detection limits of analytical equipment.

2. All metals are "total" concentrations.

Approved [illegible]

MID-MISSOURI TESTING LABORATORY

DETERMINATIONS MADE IN ACCORDANCE WITH AWWA – WPCF – APHA STANDARD METHODS

506 NICHOLS COLUMBIA, MO 65201 314/442-0237

Date: July 19, 1978

Client: Reitz & Jens (Bob's Home Service)

Date Received: July 7, 1978

Sample Collected By: Mid-Missouri Testing Laboratory

SAMPLE

Parameter	Wash Well	Stream		Date Analyzed
an for Chlorinated				
Hydrocarbons & Pesticides				
Total Concentration (mg/l)	0.0000026	≤0.000005		7 7 - 18 78
in for PCB's				
Total Concentration (mg/l)	≤0.00005	≤0.00005		7/7 - 18,78
cific Identification				
BHC (mg/l	0.0000013			7/17 - 18/78
BHC (mg/l)	0.0000013			7/17 - 18/78

ents: 1. ≤ means lower than or equal to the lowest detection limit of analytical equipment.

2. Unidentified peaks were observed in both samples and could represent phthalate esters.

3. Samples analyzed by Gary Brookhart, ABC Labs, 474-8579.

Approved Vernon L Stump

MID-MISSOURI TESTING LABORATORY

DETERMINATIONS MADE IN ACCORDANCE WITH AWWA - WPCF - APHA STANDARD METHODS

506 NICHOLS COLUMBIA, MO 65201 314/442-0239

Date: September 21, 1978

Client: Bob's Home Service

Date Received: September 14, 1978

Sample Collected By: Mid-Missouri Testing Laboratory

SAMPLE

Parameter	Well #5	Well #6	Well #7	Date Analyzed
Arsenic	≤.002	≤.002	≤.002	9/19/78
TOC (mg/l)	75	55	67	9/18/78
Total Iron (mg/l)	3.2	2.1	.04	9/18/78
pH	6.7	6.7	6.7	9/15/78
Redox (mv)	-35	-35	-40	9/15/78
Conductivity (μmhos)	2,590	1,670	1,740	9/15/78
Hardness(as mg/l $CaCO_3$)	1,803	952	1,053	9/18/78
Chloride (mg/l)	23	24.9	38.3	9/19/78

Comments: 1. ≤means less than or equal to the lowest detection limit of analytical equipment.

2. Metals are "total" concentrations.

Approved _____

MID-MISSOURI TESTING LABORATORY

DETERMINATIONS MADE IN ACCORDANCE WITH AWWA – WPCF – APHA STANDARD METHODS

506 NICHOLS COLUMBIA MO 65201 314/442 0239

Date: September 21, 1978

Client: Bob's Home Service

Date Received: September 14, 1978

Sample Collected By: Mid-Missouri Testing Laboratory

SAMPLE

Parameter	Well #8	Well #9	Well #10	Date Analyzed
Arsenic	≤.002	≤.002	≤.002	9/19/78
TOC (mg/l)	72	63	57	9/18/78
Iron (mg/l)	6.6	1.3	11.2	9/18/78
pH	6.7	5.9	6.4	9/15/78
Redox (mv)	-30	-90	-50	9/15/78
Conductivity (μmhos)	3,120	2,920	1,820	9/15/78
Hardness (as mg/l $CaCO_3$)	2,150	2,027	1,120	9/18/78
Chloride (mg/l)	21.7	16.6	26.2	9/19/78

Comments: 1. ≤ means less than or equal to the lowest detection limit of analytical equipment.

2. Metals are "total" concentrations.

Approved _____

MID-MISSOURI TESTING LABORATORY

DETERMINATIONS MADE IN ACCORDANCE WITH AWWA - WPCF - APHA STANDARD METHODS

506 NICHOLS COLUMBIA, MO 65201 314/442-0237

Date: September 21, 1978

Client: Bob's Home Service

Date Received: September 14, 1978

Sample Collected By: Mid-Missouri Testing Laboratory

SAMPLE

Parameter	Well #11	Well #12	Well #13	Date Analyzed
Arsenic	<.002	<.002	<.002	9/21/78
TOC (mg/l)	23	41	43	9/18/78
Iron (mg/l)	34	12.0	86	9/18/78
pH	6.4	6.3	6.3	9/15/78
Eh (mv)	-55	-70	-55	9/15/78
Conductivity (μmhos)	1,500	3,800	1,300	9/15/78
Hardness (as mg/l $CaCO_3$)	874	2,285	616	9/18/78
Chloride (mg/l)	14.0	262.2	48.5	9/19/78

Comments: 1. ≤ means less than or equal to the lowest detection limit of analytical equipment.

2. Metals are "total" concentrations.

Approved: [illegible]

MID-MISSOURI TESTING LABORATORY

DETERMINATIONS MADE IN ACCORDANCE WITH AWWA - WPCF - APHA STANDARD METHODS

506 NICHOLS COLUMBIA, MO 65201 314/442 0237

Date: September 21, 1978

Client: Bob's Home Service

Date Received: September 14, 1978

Sample Collected By: Mid-Missouri Testing Laboratory

SAMPLE

Parameter	Monitoring Well			Date Analyzed
Arsenic	≤.002			9/21/78
TOC (mg/l)	73			9/18/78
Iron (mg/l)	80			9/18/78
[illegible]	6.4			9/15/78
[illegible]ox (mv)	-60			9/15/78
Conductivity (μmhos)	2,500			9/15/78
Hardness (as mg/l $CaCO_3$)	1,602			9/18/78
Chloride (mg/l)	258.4			9/19/78

Comments: 1. ≤ means less than or equal to the lowest detection limit of analytical equipment.

2. Metals are "total" concentrations.

Approved _____

MID-MISSOURI TESTING LABORATORY

DETERMINATIONS MADE IN ACCORDANCE WITH AWWA - WPCF - APHA STANDARD METHODS

506 NICHOLS COLUMBIA, MO 65201 314/442-0237

September 22, 1978

Re: Analytical Monitoring--Bob's Home Service

ANALYTICAL METHODS

Parameter	Method
pH	Electrode
Redox Potential (millivolts)	Electrode
Specific Conductivity (μmhos)	Electrode
TOC (mg/l)	Combustion
Total Hardness (mg/l $CaCO_3$)	E.D.T.A. Titration
Chloride (mg/l)	Silver Nitrate
Total Iron (mg/l)	Digestion--AA
Arsenic (mg/l)	Digestion--silver diethyldithiocarbonate

Sample preservation was in accordance with EPA Methods for Chemical Analysis of Water and Wastes, 1974.

MID-MISSOURI TESTING LABORATORY

DETERMINATIONS MADE IN ACCORDANCE WITH AWWA - WPCF - APHA STANDARD METHODS

506 NICHOLS COLUMBIA, MO 65201 314/442-0237

Date: November 7, 1978

Client: Bob's Home Service

Date Received: October 23, 1978

Sample Collected By: Mid-Missouri Testing Laboratory

SAMPLE

Well #	COD			Date Analyzed
5	26 mg/l			10/24/78
6	2 mg/l			10/24/78
7	20 mg/l			10/24/78
8	18 mg/l			10/24/78
9	18 mg/l			10/26/78
10	12 mg/l			10/26/78
11	24 mg/l			10/26/78
12	46 mg/l			10/31/78
13	20 mg/l			10/26/78
itor Well	22 mg/l			10/26/78

Approved _____

MID-MISSOURI TESTING LABORATORY

DETERMINATIONS MADE IN ACCORDANCE WITH AWWA - WPCF - APHA STANDARD METHODS

506 NICHOLS COLUMBIA, MO 65201 314/442-0237

Date: November 7, 1978

Client: Bob's Home Service

Date Received: October 23, 1978

Sample Collected By: Mid-Missouri Testing Laboratory

SAMPLE

Parameter	Well #12			Date Analyzed
Cyanide (mg/l)	<.2			10/26/78
Barium (mg/l)	<.03			10/27/78
Cadmium (mg/l)	<.002			10/27/78
Chromium $^{+6}$ (mg/l)	.07			10/27/78
Chromium (mg/l)	.07			10/27/78
Copper (mg/l)	<.01			10/27/78
Lead (mg/l)	<.05			10/27/78
Manganese (mg/l)	<.01			10/27/78
Mercury (mg/l)	.001			10/27/78
Nickel (mg/l)	<.02			10/27/78
Selenium (mg/l)	.04			10/30/78
Silver (mg/l)	<.01			11/2/78
Zinc (mg/l)	.28			10/25/78
Hardness (mg/l as $CaCO_3$)	2,211			10/24/78

Comments: 1. < means less than or equal to the lowest detection limit of analytical testing.

Approved _____

MID-MISSOURI TESTING LABORATORY

DETERMINATIONS MADE IN ACCORDANCE WITH AWWA - WPCF - APHA STANDARD METHODS

506 NICHOLS COLUMBIA, MO 65201 314/442 0237

Date: November 7, 1978

Client: Bob's Home Service

Date Received: October 23, 1978

Sample Collected By: Mid-Missouri Testing Laboratory

SAMPLE

Parameter	Well #12			Date Analyzed
(mg/l)	11			11/1/78
senic (mg/l)	<.002			11/2/78
) (mg/l)	13			10/23/78
spended Solids (mg/l)	2,226			10/24/78
	7.0			10/23/78
nductivity (μmhos)	3,030			10/23/78
) (mg/l)	46			10/31/78
tal Dissolved Solids(mg/l)	3,301			10/24/78
bidity (NTU)	250			10/24/78
ase & Oil (mg/l)	4.8			10/24/78
alinity (mg/l)	536			10/24/78
nol (mg/l)	≤1			10/24/78
rates (mg/l)	8.5			10/29/78
fates (mg/l)	1,550			10/30/78
oride (mg/l)	≤.02			10/24/78
ox (mv)	-80			10/23/78

ments: 1. ≤means less than or equal to the lowest detection limit of analytical equipment.

Approved _____

MID-MISSOURI TESTING LABORATORY

DETERMINATIONS MADE IN ACCORDANCE WITH AWWA - WPCF - APHA STANDARD METHODS

506 NICHOLS COLUMBIA, MO 65201 314/442-0237

Date: October 1, 1979

Client: Bob's Home Service

Date Received: September 12, 1979

Sample Collected By: Mid-Missouri Testing Laboratory

SAMPLE

Parameter	Pond #1 West	Pond #2 East	Wash Well West of Site in small Building	Date Analyzed
pH	7.9	10.2	6.7	9-12-79
Redox-Potential (millivolts)	-1100	-550	-600	9-12-79
Specific Conductivity (μhos)	490	1600	1900	9-12-79
COC (mg/l)	58.3	29.5	9.5	9-20-79
COD (mg/l)	74	284	6	9-20-79
Total Hardness (mg/l $CaCO_3$)	169	382	1532	9-13-79
Chlorides (mg/l)	27.1	385	10	9-13-79
Total Iron (mg/l)	.19	.02	.08	9-18-79
Arsenic (mg/l)	<.002	<.002	<.002	9-18-79
BOD	8.7	34	5	9-12-79
Suspended Solids (mg/l)	66	106	17	9-12-79
Turbidity (TU)	55	27	33	9-21-79
Grease and Oil (mg/l)	.3	.8	<.1	9-21-79
Fecal Coliform (#/100 ml)	33	<1	<1	9-20-79
Alkalinity (mg/l)	140	78	306	9-18-79
Phenols (mg/l)	<.1	<.1	<.1	9-21-79

Approved _____

MID-MISSOURI TESTING LABORATORY

DETERMINATIONS MADE IN ACCORDANCE WITH AWWA - WPCF - APHA STANDARD METHODS

NICHOLS COLUMBIA, MO 65201 314/442-0237

Date: October 1, 1979

Client: Bob's Home Service

Date Received: September 12, 1979

Sample Collected By: Mid-Missouri Testing Laboratory

SAMPLE

Parameter	Well #5	Well #6	Well #7	Date Analyzed
	6.5	6.6	6.5	9-12-79
dox Potential (millivolts)	-500	-550	-500	9-12-79
ecific Conductivity (μhos)	1600	1320	1610	9-12-70
C (mg/l)	15.6	18.8	17.5	9-20-79
D [illegible]l)	14	8	66	9-17-79
tal hardness (mg/l $CaCO_3$)	1066	844	1021	9-13-79
lorides (mg/l)	21	14	21.5	9-13-79
tal Iron (mg/l)	.3	.3	.1	9-18-79
senic (mg/l)	<.002	<.002	<.002	9-18-79

Approved _____

MID-MISSOURI TESTING LABORATORY

DETERMINATIONS MADE IN ACCORDANCE WITH AWWA - WPCF - APHA STANDARD METHODS

506 NICHOLS COLUMBIA, MO 65201 314/442-0237

Date: October 1, 1979

Client: Bob's Home Service

Date Received: September 12, 1979

Sample Collected By: Mid-Missouri Testing Laboratory

SAMPLE

Parameter	Well #8	Well #9	Well #10	Date Analyzed
pH	6.5	6.5	7.0	9-12-79
Redox Potential (millivolts)	-400	-400	-700	9-12-79
Specific Conductivity (μhos)	2810	2510	1600	9-12-79
TOC (mg/l)	25.9	9.5	14.8	9-20-79
[illegible] (mg/l)	43	4	14	9-17-79
Total Hardness (mg/l $CaCO_3$)	2153	1931	977	9-13-79
Chlorides (mg/l)	14.5	10	15	9-13-79
Total Iron (mg/l)	.07	.1	.1	9-18-79
Arsenic (mg/l)	<.002	<.002	<.002	9-18-79

Approved _____

MID-MISSOURI TESTING LABORATORY

DETERMINATIONS MADE IN ACCORDANCE WITH AWWA – WPCF – APHA STANDARD METHODS

506 NICHOLS COLUMBIA, MO 65201 314/442-0237

Date: October 1, 1979

Client: Bob's Home Service

Date Received: September 12, 1979

Sample Collected By: Mid-Missouri Testing Laboratory

SAMPLE

Parameter	Well #11	Well #12	Well #13	Date Analyzed
	6.7	6.6	5.9	9-12-79
dox Potential (millivolts)	-500	-500	-50	9-12-79
ecific Conductivity (μhos)	2390	3100	700	9-12-79
C (mg/l)	23.8	22.3	25.0	9-20-79
D [illegible]l)	14	33	6.	9-17-79
tal Hardness (mg/l $CaCO_3$)	1732	2287	244	9-13-79
lorides (mg/l)	7	185	65.5	9-13-79
tal Iron (mg/l)	.02	.06	.13	9-18-79
senic (mg/l)	<.002	.0228	<.002	9-18-79

Approved _____

MID-MISSOURI TESTING LABORATORY

DETERMINATIONS MADE IN ACCORDANCE WITH AWWA - WPCF - APHA STANDARD METHODS

506 NICHOLS COLUMBIA, MO 65201 314/442-0237

Date: October 1, 1979

Client: Bob's Home Service

Date Received: September 12, 1979

Sample Collected By: Mid-Missouri Testing Laboratory

SAMPLE

Parameter	Monitor Well	Well #4	Well #14	Date Analyzed
pH	6.9	6.6	7.5	9-12-79
Redox Potential (millivolts)	-550	-500	-900	9-12-79
Specific Conductivity (μhos)	2380	3300	3200	9-12-79
TOC (mg/l)	14.3	24.8	26.4	9-20-79
[illegible]ng/l)	<1	112	12	9-17-79
Total Hardness (mg/l $CaCO_3$)	1598	2531	2398	9-13-79
Chlorides (mg/l)	7.5	10	55	9-13-79
Total Iron (mg/l)	.59	.24	.24	9-18-79
Arsenic (mg/l)	<.002	<.002	.0343	9-18-79

Approved _____

MID-MISSOURI TESTING LABORATORY

DETERMINATIONS MADE IN ACCORDANCE WITH AWWA - WPCF - APHA STANDARD METHODS

506 NICHOLS COLUMBIA, MO 65201 314/442-0237

Date: October 1, 1979

Client: Bob's Home Service

Date Received: September 12, 1979

Sample Collected By: Mid-Missouri Testing Laboratory

SAMPLE

Parameter	Pond #1	Pond #2	Wash Well West of Site	Date Analyzed
itrates (mg/l N)	<.02	<.02	1.6	9-19-79
ulfates (mg/l)	60	95	1160	9-25-79
luorides (mg/l)	3	2.6	<.02	9-14-79
yanides (µg/l)	<.2	<.2	<.2	10-1-79
a (mg/l)	<.03	<.03	<.03	9-20-79
admium (mg/l)	<.002	<.002	<.002	9-20-79
hromium Hexavalent (µg/l)	<.07	<.07	6	9-13-79
otal Chromium (mg/l)	<.02	<.02	<.02	9-20-79
opper (mg/l)	<.01	<.01	<.01	9-20-79
ead (mg/l)	<.05	<.05	<.05	9-20-79
anganese (mg/l)	<.01	<.01	.09	9-20-79
ercury (µg/l)	<.2	<.2	.9	9-24-79
ickel (mg/l)	<.02	<.02	<.02	9-20-79
elenium (µg/l)	3.5	6	<2	10-1-79
ilver (mg/l)	<.01	<.01	<.01	9-20-79
inc (mg/l)	.18	.05	.07	9-20-79

Approved _____

MID-MISSOURI TESTING LABORATORY

DETERMINATIONS MADE IN ACCORDANCE WITH AWWA – WPCF – APHA STANDARD METHODS

506 NICHOLS COLUMBIA, MO 65201 314/442-0237

Date: October 1, 1979

Client: Bob's Home Service

Date Received: September 12, 1979

Sample Collected By: Mid-Missouri Testing Laboratory

SAMPLE

Parameter	Pond #1 West	Pond #2 East	Wash Well West of Site in small Building	Date Analyzed
Bromide (mg/l)	7	<.1		9-25-79
Total Dissolved Solids (mg/l)	267	1137	2413	9-24-79

Approved _____

MISSOURI TESTING
RATORY

WRIGHT CITY
BOB'S HOME SERVICE

October 1, 1979

A Initial Depth	B Elev. Top of Pipe	B-A Elev. Water Before Bailing	Depth After Bailing	Depth After 24-hr. Recovery	Number of Bails	Recovery
32.2'	806.21	774.01	32.2	32.2	--	--
35.7'	795.95	760.65	35.7	35.7	--	--
35.8'	778.30	739.50	35.8	35.8	--	--
37 '	771.90	734.9	37.3	37.1	<1	.2
13.8 '	758.35	744.55	23.8	20.7	9	3.1'
15.1 '	765.95	750.85	15.7	15.7	2	0
11.3	765.15	753.85	22.0	20.3	13	1.7'
25.1 '	760.60	734.50	36.8	32.9	14	3.9'
25 '	757.35	732.35	26.6	25.9	2	.7'
12.2 '	765.10	752.9	19.9	12.1	7	7.8
19.9 '	778.40	758.5	34.6	20.0	15	14.6
32.4 '	791.80	759.4	35.0	33.9	3	1.1
13.1 '	798.55	785.45	15.0	13.8	5	1.2
39.5	804.10	764.60	39.5	39.8	<1	.3
37.3 '	809.40	769.90	37.4	37.4	--	--
40 '	814.10	774.1	40.0	40.0	--	--
76 '	755.10	679.1	113	76	Pumped	37'

MID-MISSOURI TESTING LABORATORY

DETERMINATIONS MADE IN ACCORDANCE WITH AWWA - WPCF - APHA STANDARD METHODS

505 NICHOLS COLUMBIA, MO 65201 314/442-0237

Date: December 29, 1978

Client: Bob's Home Service, Inc.

Date Received: December 6, 1978

Sample Collected By: Mid-Missouri Testing Laboratory

SAMPLE

Parameter	Well # 4	Well # 5	Well # 6	Date Analyze
pH	7.1	6.9	6.8	12/6
Redox Potential (millivolts)	-10	-10	0	12/6
Specific Conductivity (μ mhos)	2160	1700	2100	12/6
TOC (mg/l)	85	24.5	36	12/28
[illegible]D (mg/l)	182	59	75	12/8
Total Hardness (mg/l $CaCO_3$)	2479	1552	1969	12/7
Chloride (mg/l)	12	26.4	21	12/7
Total Iron (mg/l)	162.5	<.02	<.02	12/8
Arsenic	≤.002	≤.002	≤.002	12/12

Comments: 1. ≤means less than or equal to the lower detection limits of analytical equipment.

2. All metals are "total" concentrations.

Approved _____

MID-MISSOURI TESTING LABORATORY

DETERMINATIONS MADE IN ACCORDANCE WITH AWWA - WPCF - APHA STANDARD METHODS

506 NICHOLS COLUMBIA, MO 65201 314/442-0237

Date: December 29, 1978

Client: Bob's Home Service, Inc.

Date Received: December 6, 1978

Sample Collected By: Mid-Missouri Testing Laboratory

SAMPLE

Parameter	Well # 7	Well # 8	Well # 9	Date Analyzed
pH	6.9	6.9	6.9	12/6
Redox Potential (millivolts)	0	0	-10	12/6
Specific Conductivity (μ mhos)	1500	2100	2050	12/6
TOC (mg/l)	38.5	39	25	12/28
COD (mg/l)	137	89	23	12/11
Total Hardness (mg/l $CaCO_3$)	1316	1989	1928	12/7
Chloride (mg/l)	30.6	19.2	15.0	12/7
Total Iron (mg/l)	70	$\leq$.02	1.2	12/8
Arsenic	$\leq$.002	$\leq$.002	$\leq$.002	12/12

Comments: 1. $\leq$ means less than or equal to the lower detection limits of analytical equipment.

2. All metals are "total" concentrations.

Approved _____

MID-MISSOURI TESTING LABORATORY

DETERMINATIONS MADE IN ACCORDANCE WITH AWWA – WPCF – APHA STANDARD METHODS

508 NICHOLS COLUMBIA, MO 65201 314/442-0237

Date: December 31, 1978

Client: Bob's Home Service, Inc.

Date Received: December 6, 1978

Sample Collected By: Mid-Missouri Testing Laboratory

SAMPLE

Parameter	Well #10	Well # 11	Well # 12	Date Analyzed
pH	7.4	7.1	7.3	12/6
Redox Potential (millivolts)	-30	-20	-30	12/6
Specific Conductivity (μ mhos)	1300	1600	2200	12/6
TOC (mg/l)	14	11.5	30	12/28
[illegible] (mg/l)	12	14	37	12/11
Total Hardness (mg/l $CaCO_3$)	1000	1418	2132	12/7
Chloride (mg/l)	23.4	17.4	244.4	12/7
Total Iron (mg/l)	≤.02	.4	26.5	12/8
Arsenic	≤.002	≤.002	≤.002	12/12

Comments: 1. ≤ means less than or equal to the lower detection limits of analytical equipment.

2. All metals are "total" concentrations.

Approved _____

MID-MISSOURI TESTING LABO ORY

DETERMINATIONS MADE IN ACCORDANCE WITH AWWA - WPCF - APHA STANC THODS

506 NICHOLS COLUMBIA, MO 65201 42-0237

Date: December 31, 1978

Client: Bob's Home Service, Inc.

Date Received: December 6, 1978

Sample Collected By: Mid-Missouri Testing Labora

Parameter	SAMPLE Well # 13	SAMPLE Well # 14	Well # MW	Date Analyzed
pH	7.0	7.2	7.1	12/6
Redox Potential (millivolts)	-10	-20	-20	12/6
Specific Conductivity (μ mhos)	900	2300	1500	12/6
TOC (mg/l)	48.5	77.5	70	12/26
COD (mg/l)	155	103	101	12/13
Total Hardness (mg/l $CaCO_3$)	574	2295	1590	12/7
Chloride (mg/l)	21.6	76.5	19.	12/7
Total Iron (mg/l)	50	93.5	97.	12/8
Arsenic	≤.002	≤.002	.002	12/12

Comments:

1. ≤means less than or equal to the lower detection limits analytical equipment.
2. All metals are "total" concentrations.

Approved _____

MID-MISSOURI TESTING LABORATORY

DETERMINATIONS MADE IN ACCORDANCE WITH AWWA – WPCF – APHA STANDARD METHODS

506 NICHOLS COLUMBIA, MO 65201 314/442-0237

Date: April 10, 1979

Client: Bob's Home Service

Date Received: March 21, 1979

Sample Collected By: Mid-Missouri Testing Laboratory

SAMPLE

Parameter	Well 5	Well 6	Well 7	Date Analyzed
TOC (mg/l)	7.9	10.8	6.5	3/29/79
Specific Conductivity (μmhos)	1,750	2,300	1,320	3/23/79
pH	6.85	6.6	6.85	3/23/79
Redox Potential (MV)	-490	-500	-650	3/23/79
Arsenic (mg/l)	≤.002	≤.002	≤.002	3/29/79
COD (mg/l)	39.8	35.8	2	3/26/79
Hardness as $CaCO_3$ (mg/l)	1,392	2,006	968	3/23/79
Chloride (mg/l)	25.2	10.6	31.1	3/26/79
Iron (mg/l)	1	≤.02	≤.02	3/27/79

Comments: ≤means less than or equal to the lowest detection limit of analytical equipment.

Approved _____

MID-MISSOURI TESTING LABORATORY

:TERMINATIONS MADE IN ACCORDANCE WITH AWWA - WPCF - APHA STANDARD METHODS

IS NICHOLS COLUMBIA, MO 65201 314/442-0237

ate: April 10, 1979

lient: Bob's Home Service

ate Received: March 21, 1979

ample Collected By: Mid-Missouri Testing Laboratory

oratory

SAMPLE

'arameter	Well 8	Well 9	Well 10	Date Analyzed
1)	7.2	6.6	4.2	3/29/79
: Conductivity (μmhos)	2,400	2,900	1,600	3/23/79
	6.8	6.7	7.0	3/23/79
otential (MV)	-600	-510	-700	3/23/79
(mg/l)	<.002	<.002	<.002	3/29/79
/l)	5.9	13.8	23.9	3/23/79
s as $CaCO_3$ (mg/l)	2,242	1,947	1,145	3/23/79
e (mg/l)	30.1	10.7	16.5	3/26/79
g/l)	≤.02	≤.02	≤.02	3/27/79

Date Analyzed
3/29/79
3/23/79
3/23/79
3/23/79
3/29/79
3/29/79
3/23/79
3/26/79
3/27/79

s: ≤means less than or equal to the lowest detection limit of analytical equipment.

Approv

MID-MISSOURI TESTING LABORATORY

DETERMINATIONS MADE IN ACCORDANCE WITH AWWA - WPCF - APHA STANDARD METHODS

506 NICHOLS COLUMBIA, MO 65201 314/442-0237

Date: April 10, 1979

Client: Bob's Home Service

Date Received: March 21, 1979

Sample Collected By: Mid-Missouri Testing Laboratory

SAMPLE

Parameter	Well 15	Monitoring Well	Lake Lucern	Date Analyzed
TOC (mg/l)	16.1	4.2	8.2	3/29/79
Chromium (mg/l)			≤.02	3/27/79
Nickel (mg/l)			≤.02	3/27/79
Zinc (mg/l)			.13	3/27/79
Cadmium (mg/l)			≤.002	3/27/79
Copper (mg/l)			.17	3/27/79
Lead (mg/l)			≤.05	3/27/79
Manganese (mg/l)			.8	3/27/79
Iron (mg/l)	5.8	12	1.25	3/27/79
Specific Conductivity (mhos)	1,880	2,100	360	3/23/79
pH	6.6	7.0	6.8	3/23/79
Redox Potential (MV)	-500	-230	----	3/23/79
Arsenic (mg/l)	≤.002	≤.002	≤.002	3/29/79
COD (mg/l)	67.2	9.9		3/29/79
Hardness as CaCO$_3$ (mg/l)	1,888	1,711		3/23/79

Comments: ≤means less than or equal to the lowest detection limit of analytical equipment.

Approved _____

MID-MISSOURI TESTING LABORATORY

DETERMINATIONS MADE IN ACCORDANCE WITH AWWA - WPCF - APHA STANDARD METHODS

506 NICHOLS COLUMBIA, MO 65201 314/442-0237

Date: April 10, 1979

Client: Bob's Home Service

Date Received: March 21, 1979

Sample Collected By: Mid-Missouri Testing Laboratory

SAMPLE

Parameter	Well 15	Monitoring Well	Lake Lucern	Date Analyzed
Chloride (mg/l)	82.6	15.5		3/26/79
Fluoride (mg/l)			<.1	4/10/79

Comments: < means less than or equal to the lowest detection limit of analytical equipment.

MID-MISSOURI TESTING LABORATORY

DETERMINATIONS MADE IN ACCORDANCE WITH AWWA - WPCF - APHA STANDARD METHODS

506 NICHOLS COLUMBIA, MO 65201 314/442-0237

Date: July 17, 1979

Client: Reitz & Jens (Bob's Home Service)

Date Received: June 7, 1979

Sample Collected By: Mid-Missouri Testing Laboratory

SAMPLE

Parameter	Creek			Date Analyzed
BHC	< 3.0			7-20-79
α BHC	< 3.0			7-20-79
β BHC	< 3.0			7-20-79
[illegible]C	< 3.0			7-20-79
σ BHC	< 3.0			7-20-79
Chlordane	23			7-20-79
Heptachlor	< 3.0			7-20-79
Heptachlor Epoxide	< 6.0			7-20-79
α Chlordane	10			7-20-79
β Chlordane	13			7-20-79
Tech Chlordane	< 14			7-20-79
Dieldrin + Aldrin	< 9.0			7-20-79
Aldrin	< 3.0			7-20-79
Dieldrin	< 9.0			7-20-79
DDT + Metabolites	15			7-20-79
o,p'-DDE	< 9.0			7-20-79

Comments:
1. Results are expressed as nanograms/liter.
2. NR = Not reported.
3. < means lower than the lowest detection limit of analytical equipment.

r. Pesticide, chlorinated hydrocarbon, PCB analysis by Gary Brookhart ABC Labs, 474-8579.

Approved _____

MID-MISSOURI TESTING LABORATORY

DETERMINATIONS MADE IN ACCORDANCE WITH AWWA - WPCF - APHA STANDARD METHODS

506 NICHOLS COLUMBIA, MO 65201 314/442-0237

Date: July 17, 1979

Client: Reitz & Jens (Bob's Home Service)

Date Received: June 7, 1979

Sample Collected By: Mid-Missouri Testing Laboratory

SAMPLE

Parameter	Creek			Date Analyzed
p,p'-DDE	< 9.0			7-20-79
o,p'-DDT	< 14			7-20-79
p,p'-DDD	< 14			7-20-79
p,p'-DDT	15			7-20-79
Endrin	< 14			7-20-79
Heptachlor	< 3.0			7-20-79
Heptachlor Epoxide	< 6.0			7-20-79
Lindane	< 3.0			7-20-79
Methoxychlor	< 60			7-20-79
Toxaphene	< 150			7-20-79
PCB	< 120			7-20-79
Aroclor 1242	< 120			7-20-79
Aroclor 1016	< 120			7-20-79
Aroclor 1254	< 120			7-20-79
Aroclor 1260	< 120			7-20-79
HCB	3.2			7-20-79

Comments:
1. Results are expressed as nanograms/liter.
2. NR = Not reported.
3. < means lower than the lowest detection limit of analytical equipment.
4. Pesticide, chlorinated hydrocarbon, PCB analysis by Gary Brookhart ABC Labs, 474-8579.

Approved _____

MID-MISSOURI TESTING LABORATORY

DETERMINATIONS MADE IN ACCORDANCE WITH AWWA - WPCF - APHA STANDARD METHODS

506 NICHOLS COLUMBIA, MO 65201 314/442-0237

Date: July 17, 1979

Client: Reitz & Jens (Bob's Home Service)

Date Received: June 7, 1979

Sample Collected By: Mid-Missouri Testing Laboratory

SAMPLE

Parameter	Creek			Date Analyzed
ex	< 30			7-20-79
hlordane	49			7-20-79
l Chlorinated				
bon Residue				
ts per trillion)	90.2			7-20-79

nts:
1. Results are expressed as nanograms/liter.
2. NR = Not reported.
3. < means lower than the lowest detection limit of analytical equipment.
4. Pesticide, chlorinated hydrocarbon, PCB analysis by Gary Brookhart ABC Labs, 474-8579.

Approved _____

MID-MISSOURI TESTING LABORATORY

DETERMINATIONS MADE IN ACCORDANCE WITH AWWA – WPCF – APHA STANDARD METHODS

506 NICHOLS COLUMBIA, MO 65201 314/442-0237

Date: July 17, 1979

Client: Reitz & Jens (Bob's Home Service)

Date Received: June 7, 1979

Sample Collected By: Mid-Missouri Testing Laboratory

SAMPLE

Parameter	Well #5	Well #6	Well #7	Date Analyzed
Phenol (mg/l)	≤ .1	≤ .1	≤ .1	6-29-79
Nitrate (mg/l N)	.54	.51	.51	7-5-79
Sulfate (mg/l)	470	1000	440	6-13-79
Nitrite (mg/l)	≤ .02	≤ .02	≤ .02	6-20-79
Cyanide (mg/l)	≤ .002	≤ .002	.01	7-12-79
Arsenic (mg/l)	≤ .002	≤ .002	≤ .002	7-17-79
Barium (mg/l)	≤ .03	≤ .03	≤ .03	7-3-79
Cadmium (mg/l)	≤ .002	≤ .002	≤ .002	6-29-79
Chromium $^{+6}$ (μg/l)	2	4	≤ .07	7-3-79
Total Chromium (mg/l)	≤ .02	≤ .02	≤ .02	6-15-79
Copper (mg/l)	≤ .01	≤ .01	≤ .01	6-19-79
Lead (mg/l)	≤ .05	≤ .05	≤ .05	6-28-79
Manganese (mg/l)	≤ .01	≤ .01	≤ .01	6-29-79
Mercury (μg/l)	1	2.4	2.8	7-6-79
Nickel (mg/l)	≤ .02	≤ .02	≤ .02	6-15-79

Comments: 1. ≤ means leass than or equal to the lower detection limits of analytical equipment.

2. All metals are "total" concentrations.

Approved Robert Lau

MID-MISSOURI TESTING LABORATORY

DETERMINATIONS MADE IN ACCORDANCE WITH AWWA – WPCF – APHA STANDARD METHODS

506 NICHOLS COLUMBIA, MO 65201 314/442-0237

Date: July 17, 1979

Client: Reitz & Jens (Bob's Home Service)

Date Received: June 7, 1979

Sample Collected By: Mid-Missouri Testing Laboratory

SAMPLE

Parameter	Well #5	Well #6	Well #7	Date Analyzed
Selenium (mg/l)	≤ .002	≤ .002	≤ .002	6-21-79
Silver (mg/l)	≤ .01	≤ .01	≤ .01	6-29-79
Zinc (mg/l)	.1	.08	.09	6-28-79
Nonionic Chlorinated hydrocarbon (ng/l)	≤ 2	2	3	6-28-79

Comments: 1. ≤ means less than or equal to the lower detection limits of analytical equipment.

2. All metals are "total" concentrations.

Approved [signature]

MID-MISSOURI TESTING LABORATORY

ETERMINATIONS MADE IN ACCORDANCE WITH AWWA - WPCF - APHA STANDARD METHODS

506 NICHOLS COLUMBIA, MO 65201 314/442-0237

Date: July 17, 1979

Client: Reitz & Jens (Bob's Home Service)

Date Received: June 7, 1979

Sample Collected By: Mid-Missouri Testing Laboratory

SAMPLE

Parameter	Well #5	Well #6	Well #7	Date Analyzed
	< 2	2.0	3.0	6-28-79
BHC	< 2	2.0	3.0	6-28-79
BHC	< 2	< 2	< 2	6-28-79
HC	< 2	< 2	< 2	6-28-79
B	< 2	< 2	< 2	6-28-79
ordane	< 4	< 4	< 4	6-28-79
Heptachlor	< 2	< 2	< 2	6-28-79
Heptachlor Epoxide	< 4	< 4	< 4	6-28-79
α-Chlordane	< 4	< 4	< 4	6-28-79
β-Chlordane	< 4	< 4	< 4	6-28-79
Tech Chlordane	< 10	< 10	< 10	6-28-79
eldrin + Aldrin	< 5	< 5	< 5	6-28-79
Aldrin	< 2	< 2	< 2	6-28-79
Dieldrin	< 5	< 5	< 5	6-28-79
T + Metabolites	< 10	< 10	< 10	6-28-79
o,p'-DDE	< 5	< 5	< 5	6-28-79

mments:
1. Results are expressed as nanograms/liter.
2. NR = Not reported.
3. < means lower than the lowest detection limit of analytical equipment.

r. Pesticide, chlorinated hydrocarbon, PCB analysis by Gary Brookhart ABC Labs, 474-8579.

Approved [signature]

MID-MISSOURI TESTING LABORATORY

DETERMINATIONS MADE IN ACCORDANCE WITH AWWA – WPCF – APHA STANDARD METHODS

NICHOLS COLUMBIA, MO 65201 314/442-0237

Date: July 17, 1979

Client: Reitz & Jens (Bob's Home Service)

Date Received: June 7, 1979

Sample Collected By: Mid-Missouri Testing Laboratory

SAMPLE

Parameter	Well #5	Well #6	Well #7	Date Analyzed
,p'-DDE	< 5	< 5	< 5	6-28-79
,p'-DDT	< 10	< 10	< 10	6-28-79
,p'-DDD	< 10	< 10	< 10	6-28-79
[illegible]DT	< 10	< 10	< 10	6-28-79
[illegible]rin	< 10	< 10	< 10	6-28-79
Heptachlor	< 2	< 2	< 2	6-28-79
Heptachlor Epoxide	< 4	< 4	< 4	6-28-79
Lindane	< 2	< 2	< 2	6-28-79
Methoxychlor	< 40	< 40	< 40	6-28-79
Toxaphene	< 100	< 100	< 100	6-28-79
PCB	< 80	< 80	< 80	6-28-79
Aroclor 1242	< 80	< 80	< 80	6-28-79
Aroclor 1016	< 80	< 80	< 80	6-28-79
Aroclor 1254	< 80	< 80	< 80	6-28-79
Aroclor 1260	< 80	< 80	< 80	6-28-79
HCB	< 2	< 2	< 2	6-28-79

Comments:
1. Results are expressed as nanograms/liter.
2. NR = Not reported.
3. < means lower than the lowest detection limit of analytical equipment.
4. Pesticide, chlorinated hydrocarbon, PCB analysis by Gary Brookhart ABC Labs, 474-8579.

Approved Robert Lacy

MID-MISSOURI TESTING LABORATORY

DETERMINATIONS MADE IN ACCORDANCE WITH AWWA – WPCF – APHA STANDARD METHODS

506 NICHOLS COLUMBIA, MO 65201 314/442-0237

Date: July 17, 1979

Client: Reitz & Jens (Bob's Home Service)

Date Received: June 7, 1979

Sample Collected By: Mid-Missouri Testing Laboratory

SAMPLE

Parameter	Well #5	Well #6	Well #7	Date Analyzed
rex	< 20	< 20	< 20	6-28-79

mments:
1. Results are expressed as nanograms/liter.
2. NR = Not reported.
3. < means lower than the lowest detection limit of analytical equipment.
4. Pesticide, chlorinated hydrocarbon, PCB analysis by Gary Brookhart ABC Labs, 474-8579.

Approved Robert Kaufman

MID-MISSOURI TESTING LABORATORY

ETERMINATIONS MADE IN ACCORDANCE WITH AWWA - WPCF - APHA STANDARD METHODS

506 NICHOLS COLUMBIA, MO 65201 314/442-0237

Date: July 17, 1979

Client: Reitz & Jens (Bob's Home Service)

Date Received: June 7, 1979

Sample Collected By: Mid-Missouri Testing Laboratory

SAMPLE

Parameter	Well #8	Well #9	Well #10	Date Analyzed
	6.7	6.8	7.2	6-7-79
ox Potential (millivolts)	-740	-750	-760	6-8-79
cific Conductivity (μ mhos)	2910	2630	1750	6-19-79
( )	46.6	6.3	5.4	7-5-79
mg/l)	172	2	6	6-12-79
al Hardness (mg/l $CaCO_3$)	1931	1712	995	6-12-79
loride (mg/l)	15.5	10.9	17.0	6-12-79
al Iron (mg/l)	83	.38	2.7	6-19-79
D_5 (mg/l)	8	7	4	6-7-79
sp. Solids (mg/l)	3576	629	174	6-7-79
S (mg/l)	2680	2436	1418	6-29-79
rbidity (TU)	125	190	34	6-12-79
tractable Oil (mg/l)	48.8	3.6	4.2	6-12-79
cal Coliform (#/100 ml)	≤ 1	17	≤ 1	6-7-79
kalinity (mg/l)	534	400	306	6-8-79

mments: 1. ≤ means less than or equal to the lower detection limits of analytical equipment.

2. All metals are "total" concentrations.

Approved Robert Day

MID-MISSOURI TESTING LABORATORY

DETERMINATIONS MADE IN ACCORDANCE WITH AWWA – WPCF – APHA STANDARD METHODS

506 NICHOLS COLUMBIA, MO 65201 314/442-0237

Date: July 17, 1979

Client: Reitz & Jens (Bob's Home Service)

Date Received: June 7, 1979

Sample Collected By: Mid-Missouri Testing Laboratory

SAMPLE

Parameter	Well #8	Well #9	Well #10	Date Analyzed
enol (mg/l)	≤ .1	≤ .1	≤ .1	6-29-79
trate (mg/l N)	.38	.52	2.45	7-5-79
lfate (mg/l)	2020	1450	720	6-13-79
e (mg/l)	≤ .02	≤ .02	1.0	6-20-79
yanide (mg/l)	≤ .002	≤ .002	≤ .002	7-12-79
rsenic (mg/l)	.0343	≤ .002	≤ .002	7-17-79
arium (mg/l)	≤ .03	≤ .03	≤ .03	7-3-79
admium (mg/l)	≤ .002	≤ .002	≤ .03	6-29-79
hromium +6 (mg/l)	≤ .07	≤ .07	≤ .07	7-3-79
otal Chromium (mg/l)	.10	≤ .02	≤ .02	6-15-79
opper (mg/l)	.05	≤ .01	≤ .01	6-19-79
ead (mg/l)	≤ .05	≤ .05	≤ .05	6-28-79
anganese (mg/l)	3.2	≤ .01	≤ .01	6-29-79
ercury (µg/l)	2.0	5	1.4	7-6-79
ickel (mg/l)	.3	≤ .02	≤ .02	6-15-79

omments: 1. ≤means leass than or equal to the lower detection limits of analytical equipment.

2. All metals are "total" concentrations.

Approved Robert Lang

MID-MISSOURI TESTING LABORATORY

DETERMINATIONS MADE IN ACCORDANCE WITH AWWA – WPCF – APHA STANDARD METHODS

BY NICHOLS COLUMBIA, MO 65201 314/442-0237

Date: July 17, 1979

Client: Reitz & Jens (Bob's Home Service)

Date Received: June 7, 1979

Sample Collected By: Mid-Missouri Testing Laboratory

SAMPLE

Parameter	Well #8	Well #9	Well #10	Date Analyzed
enium (mg/l)	≤ .002	≤ .002	53	6-21-79
ver (mg/l)	≤ .01	≤ .01	≤ .01	6-29-79
c (mg/l)	.41	.18	.06	6-28-79
onic Chlorinated Hydrocarbon(ng/l)	7.4	3.6	4.2	6-28-79

mments: 1. ≤means less than or equal to the lower detection limits of analytical equipment.

2. All metals are "total" concentrations.

Approved Robert Lay

MID-MISSOURI TESTING LABORATORY

TERMINATIONS MADE IN ACCORDANCE WITH AWWA - WPCF - APHA STANDARD METHODS

506 NICHOLS COLUMBIA, MO 65201 314/442-0237

Date: July 17, 1979

Client: Reitz & Jens (Bob's Home Service)

Date Received: June 7, 1979

Sample Collected By: Mid-Missouri Testing Laboratory

SAMPLE

Parameter	Well #8	Well #9	Well #10	Date Analyzed
	< 2	< 2	< 3	6-28-79
HC	< 2	< 2	< 2	6-28-79
HC	< 2	< 2	< 2	6-28-79
HC	< 2	< 2	< 2	6-28-79
B.	< 2	< 2	< 2	6-28-79
ordane	< 4	< 4	< 4	6-28-79
Heptachlor	< 4	< 4	< 2	6-28-79
Heptachlor Epoxide	< 4	< 4	< 4	6-28-79
Chlordane	< 4	< 4	< 4	6-28-79
Chlordane	< 4	< 4	< 4	6-28-79
Tech Chlordane	< 10	< 10	< 10	6-28-79
ldrin + Aldrin	< 5	< 5	< 5	6-28-79
ldrin	< 2	< 2	< 2	6-28-79
ieldrin	< 5	< 5	< 5	6-28-79
+ Metabolites	< 10	< 10	< 10	6-28-79
,p'-DDE	< 5	< 5	< 5	6-28-79

ments:
1. Results are expressed as nanograms/liter.
2. NR = Not reported.
3. < means lower than the lowest detection limit of analytical equipment.

r. Pesticide, chlorinated hydrocarbon, PCB analysis by Gary Brookhart ABC Labs, 474-8579.

Approved Robert Lee

MID-MISSOURI TESTING LABORATORY

DETERMINATIONS MADE IN ACCORDANCE WITH AWWA - WPCF - APHA STANDARD METHODS

506 NICHOLS COLUMBIA, MO 65201 314/442-0237

Date: July 17, 1979

Client: Reitz & Jens (Bob's Home Service)

Date Received: June 7, 1979

Sample Collected By: Mid-Missouri Testing Laboratory

SAMPLE

Parameter	Well #8	Well #9	Well #10	Date Analyzed
,p'-DDE	< 5	< 5	< 5	6-28-79
,p'-DDT	< 10	< 10	< 10	6-28-79
,p'-DDD	< 10	< 10	< 10	6-28-79
.p' DDT	< 10	< 10	< 10	6-28-79
[illegible]	< 10	< 10	< 10	6-28-79
Heptachlor	< 2	< 2	< 2	6-28-79
Heptachlor Epoxide	< 4	< 4	< 4	6-28-79
Lindane	< 2	< 2	< 2	6-28-79
Methoxychlor	< 40	< 40	< 40	6-28-79
Toxaphene	< 100	< 100	< 100	6-28-79
PCB	< 80	< 80	< 80	6-28-79
Aroclor 1242	< 80	< 80	< 80	6-28-79
Aroclor 1016	< 80	< 80	< 80	6-28-79
Aroclor 1254	< 80	< 80	< 80	6-28-79
Aroclor 1260	< 80	< 80	< 80	6-28-79
HCB	7.4	3.6	4.2	6-28-79

Comments:
1. Results are expressed as nanograms/liter.
2. NR = Not reported.
3. < means lower than the lowest detection limit of analytical equipment.
4. Pesticide, chlorinated hydrocarbon, PCB analysis by Gary Brookhart ABC Labs, 474-8579.

Approved [signature]

MID-MISSOURI TESTING LABORATORY

DETERMINATIONS MADE IN ACCORDANCE WITH AWWA - WPCF - APHA STANDARD METHODS

506 NICHOLS COLUMBIA, MO 65201 314/442-0237

Date: July 17, 1979

Client: Reitz & Jens (Bob's Home Service)

Date Received: June 7, 1979

Sample Collected By: Mid-Missouri Testing Laboratory

SAMPLE

Parameter	Well #8	Well #9	Well #10	Date Analyzed
Mirex	< 20	< 20	< 20	6-28-79

Comments:
1. Results are expressed as nanograms/liter.
2. NR = Not reported.
3. < means lower than the lowest detection limit of analytical equipment.
4. Pesticide, chlorinated hydrocarbon, PCB analysis by Gary Brookhart ABC Labs, 474-8579.

Approved Robert Lau[illegible]

MID-MISSOURI TESTING LABORATORY

DETERMINATIONS MADE IN ACCORDANCE WITH AWWA – WPCF – APHA STANDARD METHODS

506 NICHOLS COLUMBIA, MO 65201 314/442-0237

Date: July 17, 1979

Client: Reitz & Jens (Bob's Home Service)

Date Received: June 7, 1979

Sample Collected By: Mid-Missouri Testing Laboratory

SAMPLE

Parameter	Well #11	Well #12	Well #13	Date Analyzed
	7.0	6.7	3.5	6-7-79
dox Potential (millivolts)	-750	-720	-480	6-8-79
ecific Conductivity (μ mhos)	2450	3500	600	6-19-79
)C (mg/l)	9.6	11.1	12.1	7-5-79
)D (mg/l)	69	29	98	6-12-79
otal Hardness (mg/l $CaCO_3$)	1391	2108	171	6-12-79
nloride (mg/l)	8.0	210	75	6-12-79
otal Iron (mg/l)	180	45	330	6-19-79
OD_5 (mg/l)	8	9	8	6-7-79
usp. Solids (mg/l)	880	1459	15,610	6-7-79
DS (mg/l)	1151	3113	962	6-29-79
urbidity (TU)	220	255	60	6-12-79
xtractable Oil (mg/l)	5.6	5.2	≤ .1	6-12-79
ecal Coliform (#/100 ml)	≤ 1	≤ 1	10	6-7-79
lkalinity (mg/l)	250	380	——	6-8-79

omments: 1. ≤ means less than or equal to the lower detection limits of analytical equipment.

2. All metals are "total" concentrations.

Approved [signature]

MID-MISSOURI TESTING LABORATORY

DETERMINATIONS MADE IN ACCORDANCE WITH AWWA - WPCF - APHA STANDARD METHODS

506 NICHOLS COLUMBIA, MO 65201 314/442-0237

Date: July 17, 1979

Client: Reitz & Jens (Bob's Home Service)

Date Received: June 7, 1979

Sample Collected By: Mid-Missouri Testing Laboratory

SAMPLE

Parameter	Well #11	Well #12	Well #13	Date Analyzed
enol (mg/l)	≤ .1	≤ .1	≤ .1	6-29-79
trate (mg/l N)	.60	.70	.66	7-5-79
lfate (mg/l)	1350	2000	200	6-13-79
[illegible] (mg/l)	.2	≤ .02	.6	6-20-79
a...de (mg/l)	≤ .002	≤ .002	≤ .002	7-13-79
rsenic (mg/l)	≤ .002	≤ .0285	≤ .0314	7-17-79
arium (mg/l)	≤ .03	≤ .03	10	7-3-79
admium (mg/l)	≤ .002	≤ .002	≤ .002	6-29-79
hromium^{+6} (mg/l)	≤ .07	≤ .07	≤ .07	7-3-79
otal Chromium (mg/l)	.18	.04	.68	6-15-79
opper (mg/l)	.15	≤ .01	.34	6-19-79
ead (mg/l)	≤ .05	≤ .05	≤ .05	6-28-79
anganese (mg/l)	4.0	≤ .01	4.0	6-29-79
ercury (mg/l)	1.1	1.8	1.4	7-6-79
ickel (mg/l)	.3	.07	.65	6-15-79

mments: 1. ≤ means leass than or equal to the lower detection limits of analytical equipment.

2. All metals are "total" concentrations.

Approved [signature]

MID-MISSOURI TESTING LABORATORY

ETERMINATIONS MADE IN ACCORDANCE WITH AWWA - WPCF - APHA STANDARD METHODS

506 NICHOLS COLUMBIA, MO 65201 314/442-0237

Date: July 17, 1979

Client: Reitz & Jens (Bob's Home Service)

Date Received: June 7, 1979

Sample Collected By: Mid-Missouri Testing Laboratory

SAMPLE

Parameter	Well #11	Well #12	Well #13	Date Analyzed
lenium (mg/l)	≤ .002	≤ .002	≤ .002	6-21-79
lver (mg/l)	≤ .01	≤ .01	≤ .01	6-29-79
nc (mg/l)	.76	.28	1.33	6-28-79
Chlorinated Hydrocarbon (ng/l)	17.8	Not enough samp.	10	6-28-79

omments: 1. ≤means less than or equal to the lower detection limits of analytical equipment.

2. All metals are "total" concentrations.

Approved Robert Lang

MID-MISSOURI TESTING LABORATORY

DETERMINATIONS MADE IN ACCORDANCE WITH AWWA - WPCF - APHA STANDARD METHODS

508 NICHOLS COLUMBIA, MO 65201 314/442-0237

Date: July 17, 1979

Client: Reitz & Jens (Bob's Home Service)

Date Received: June 7, 1979

Sample Collected By: Mid-Missouri Testing Laboratory

SAMPLE

Parameter	Monitor Well	Creek 6-14-79	Wash Well	Date Analyzed
H	6.9	7.2		6-7-79
edox Potential (millivolts)	-750	-750		6-8-79
pecific Conductivity (μ mhos)	2420	421		6-19-79
C (mg/l)	12.2	12.1		7-5-79
COD (mg/l)	2	12		6-12-79
Total Hardness (mg/l $CaCO_3$)	1477	222.6		6-12-79
Chloride (mg/l)	10.5	354.5		6-12-79
Total Iron (mg/l)	15	.28		6-19-79
BOD_5 (mg/l)	6	2		6-7-79
Susp. Solids (mg/l)	104	15		6-7-79
TDS (mg/l)	2076	256		6-29-79
Turbidity (TU)	66	8		6-12-79
Extractable Oil (mg/l)	7.4	1.2		6-12-79
Fecal Coliform (#/100 ml)	≤ 1	≤ 1		6-7-79
Alkalinity (mg/l)	384	132		6-8-79

Comments: 1. ≤ means less than or equal to the lower detection limits of analytical equipment.

2. All metals are "total" concentrations.

Approved Robert Lay

MID-MISSOURI TESTING LABORATORY

DETERMINATIONS MADE IN ACCORDANCE WITH AWWA - WPCF - APHA STANDARD METHODS

506 NICHOLS COLUMBIA, MO 65201 314/442-0237

Date: July 17, 1979

Client: Reitz & Jens (Bob's Home Service)

Date Received: June 7, 1979

Sample Collected By: Mid-Missouri Testing Laboratory

SAMPLE

Parameter	Monitor Well	Creek 6-14-79	Wash Well	Date Analyzed
enol (mg/l)	≤ .1	≤ .1		6-29-79
trate (mg/l N)	.56	.30		7-5-79
lfate (mg/l)	1250	1.7		6-13-79
(mg/l)	≤ .02	≤ .02		6-20-79
anide (mg/l)	≤ .002	≤ .002		
rsenic (mg/l)	≤ .002	≤ .002		
rium (mg/l)	≤ .03	≤ .03		7-3-79
admium (mg/l)	≤ .002	≤ .002		6-29-79
hromium (mg/l)	≤ .07	≤ .07		7-3-79
otal Chromium (mg/l)	≤ .02	≤ .02		6-15-79
opper (mg/l)	.03	≤ .01		6-19-79
ead (mg/l)	≤ .05	≤ .05		6-28-79
anganese (mg/l)	≤ .01	≤ .01		6-29-79
ercury (mg/l)	1.3	≤ .2		6-29-79
ickel (mg/l)	≤ .02	≤ .02		6-29-79

omments: 1. ≤ means leass than or equal to the lower detection limits of analytical equipment.

2. All metals are "total" concentrations.

Approved Robert Lay

MID MISSOURI TESTING LABORATORY

DETERMINATIONS MADE IN ACCORDANCE WITH AWWA - WPCF - APHA STANDARD METHODS

508 NICHOLS COLUMBIA, MO 65201 314/442-0237

Date: July 17, 1979

Client: Reitz & Jens (Bob's Home Service)

Date Received: June 7, 1979

Sample Collected By: Mid-Missouri Testing Laboratory

SAMPLE

Parameter	Monitor Well	Creek 6-14-79	Wash Well	Date Analyzed
elenium (mg/l)	≤ .002	≤ .002		6-21-79
ilver (mg/l)	≤ .01	≤ .01		6-29-79
inc (mg/l)	.12	.12		6-28-79
onionic Chlorinated Hydrocarbon (ng/l)	11			

Comments: 1. ≤means less than or equal to the lower detection limits of analytical equipment.

2. All metals are "total" concentrations.

Approved [signature]

MID-MISSOURI TESTING LABORATORY

DETERMINATIONS MADE IN ACCORDANCE WITH AWWA - WPCF - APHA STANDARD METHODS

NICHOLS COLUMBIA, MO 65201 314/442-0237

Date: July 17, 1979

Client: Reitz & Jens (Bob's Home Service)

Date Received: June 7, 1979

Sample Collected By: Mid-Missouri Testing Laboratory

SAMPLE

Parameter	Well #11	Well #13	Monitor Well	Date Analyzed
HC	11	< 2	< 2	6-28-79
α BHC	11	< 2	< 2	6-28-79
β BHC	< 2	< 2	< 2	6-28-79
γ [illegible]	< 2	< 2	< 2	6-28-79
δ HC	< 2	< 2	< 2	6-28-79
Chlordane	< 4	< 4	< 4	6-28-79
Heptachlor	< 2	< 2	< 2	6-28-79
Heptachlor Epoxide	< 4	< 4	< 4	6-28-79
α Chlordane	< 4	< 4	< 4	6-28-79
β Chlordane	< 4	< 4	< 4	6-28-79
Tech Chlordane	< 10	< 10	< 10	6-28-79
Dieldrin + Aldrin	6.8	< 5	< 5	6-28-79
Aldrin	< 2	< 2	< 2	6-28-79
Dieldrin	6.8	< 5	< 5	6-28-79
DDT + Metabolites	< 10	< 10	11	6-28-79
o,p'-DDE	< 5	< 5	< 5	6-28-79

Comments:
1. Results are expressed as nanograms/liter.
2. NR = Not reported.
3. < means lower than the lowest detection limit of analytical equipment.
r. Pesticide, chlorinated hydrocarbon, PCB analysis by Gary Brookhart ABC Labs, 474-8579.

Approved [signature]

MID-MISSOURI TESTING LABORATORY

D. ERMINATIONS MADE IN ACCORDANCE WITH AWWA – WPCF – APHA STANDARD METHODS

506 NICHOLS COLUMBIA, MO 65201 314/442-0237

Date: July 17, 1979

Client: Reitz & Jens (Bob's Home Service)

Date Received: June 7, 1979

Sample Collected By: Mid-Missouri Testing Laboratory

SAMPLE

Parameter	Well #11	Well #13	Monitor Well	Date Analyzed
-DDE	< 5	< 5	< 5	6-28-79
-DDT	< 10	< 10	< 10	6-28-79
-DDD	< 10	< 10	< 10	6-28-79
	< 10	< 10	< 10	6-28-79
in	< 10	< 10	< 10	6-28-79
achlor	< 2	< 2	< 2	6-28-79
achlor Epoxide	< 4	< 4	< 4	6-28-79
dane	< 2	< 2	< 2	6-28-79
hoxychlor	< 40	< 40	< 40	6-28-79
aphene	< 100	< 100	< 100	6-28-79
	< 80	< 80	< 80	6-28-79
roclor 1242	< 80	< 80	< 80	6-28-79
roclor 1016	< 80	< 80	< 80	6-28-79
roclor 1254	< 80	< 80	< 80	6-28-79
roclor 1260	< 80	< 80	< 80	6-28-79
	< 2	< 10	< 2	6-28-79

ments:
1. Results are expressed as nanograms/liter.
2. NR = Not reported.
3. < means lower than the lowest detection limit of analytical equipment.
4. Pesticide, chlorinated hydrocarbon, PCB analysis by Gary Brookhart ABC Labs, 474-8579.

Approved _____

MID-MISSOURI TESTING LABORATORY

DETERMINATIONS MADE IN ACCORDANCE WITH AWWA - WPCF - APHA STANDARD METHODS

506 NICHOLS COLUMBIA, MO 65201 314/442-0237

Date: July 17, 1979

Client: Reitz & Jens (Bob's Home Service)

Date Received: June 7, 1979

Sample Collected By: Mid-Missouri Testing Laboratory

SAMPLE

Parameter	Well #11	Well #13	Monitor Well	Date Analyzed
:ex	< 20	< 20	< 20	6-28-79

nments:
1. Results are expressed as nanograms/liter.
2. NR = Not reported.
3. < means lower than the lowest detection limit of analytical equipment.
4. Pesticide, chlorinated hydrocarbon, PCB analysis by Gary Brookhart ABC Labs, 474-8579.

Approved _____

MID-MISSOURI TESTING LABORATORY

DETERMINATIONS MADE IN ACCORDANCE WITH AWWA - WPCF - APHA STANDARD METHODS

506 NICHOLS COLUMBIA, MO 65201 314/442-0237

July 17, 1979

Re: Analytical Monitoring—Bob's Home Service

ANALYTICAL METHODS

Paramater	Method	Special Conditions
pH	Electrode	
Redox Potential (millivolts)	Electrode	
Specific Conductivity (μmhos)	Electrode	
TOC (mg/l)	Combustion	
COD (mg/l)	Dichromate reflux	
Total Hardness (mg/l $CaCO_3$)	E.D.T.A. Titration	
Chloride (mg/l)	Silver Nitrate	
Total Iron (mg/l)	Digestion—AA	
BOD	Winkler—Azide modification	
Suspended Solids (mg/l)	Glass fiber filtration 103°C	Samples were agitated before analysis.
TDS (mg/l)	Gravimetric 103°C	
Turbidity (TU)	Nephelometric	Samples were agitated, allowed to settle 15 minutes, and superatant turbidity was analyzed.
Extractable Oil (mg/l)	Trifluoro-gravimetric	
Fecal Coliform (#/100 ml)	Membrane filter	
Alkalinity (mg/l)	Electrometric titration (4.5)	
Phenol (mg/l)	Colorimetric	
Nitrate (mg/l N)	Brucine sulfate	
Sulfate (mg/l)	Turbidimetric	
Fluoride (mg/l)	Electrode	
Cyanide (mg/l)	Distillation, pyridine colorimetric	
Arsenic (mg/l)	Digestion—silver diethyldithiocarbamate	
Barium (mg/l)	Digestion--AA	
Cadmium (mg/l)	Digestion--AA	
Chromium^{+6} (mg/l)	Colorimetric (diphenylcarbazide)	

MID-MISSOURI TESTING LABORATORY
DETERMINATIONS MADE IN ACCORDANCE WITH AWWA - WPCF - APHA STANDARD METHODS
508 NICHOLS COLUMBIA, MO 65201 314/442-0237

July 17, 1979

Re: Analytical Monitoring—Bob's Home Service

ANALYTICAL METHODS, continued

Paramater	Method	Special Conditions
Total Chromium (mg/l)	Digestion—AA	
Copper (mg/l)	Digestion—AA	
Lead (mg/l)	Digestion—AA	
Manganese (mg/l)	Digestion—AA	
Mercury (mg/l)	Flameless AA	
Nickel (mg/l)	Digestion—AA	
Selenium (mg/l)	Diamobenzidine—colorimetric	
Silver (mg/l)	Digestion—AA	
Zinc (mg/l)	Digestion—AA	
Chlorinated Hydrocarbons and Pesticides (mg/l)	Gas chromatograph scan	
PCB's (mg/l)	Gas chromatograph scan	

Sample preservation was in accordance with EPA Methods for Chemical Analysis of Water and Wastes, 1974.

MID-MISSOURI TESTING
LABORATORY

WRIGHT CITY
BOB'S HOME SERVICE

July 17, 197[illegible]

Well #	A Initial Depth	B Elev. Top of Pipe	B-A Elev. Water Before Bailing	Depth After Bailing	Depth After 24-hr. Recovery	Number of Bails	Recov[illegible]
1	32.2'	806.21	774.01	32.2	32.2	Mud	----
2	35.5'	795.95	760.45	35.5	35.5	Dry	----
3	38.8'	778.30	739.5	38.8	38.8	Dry	----
4	37.6'	771.9	734.3	37.8'	37.7	<1	.1
5	7.7'	758.35	750.65	26'	22.8	10	3.[illegible]
6	10.3'	765.95	755.65	35.7'	31.5	20	4.2
7	10.6'	765.15	754.55	35.5'	26.5	13	9
8	22.8'	760.60	737.8	37'	34	11	3
9	20.5'	757.35	736.85	37.5'	32.8'	7.5	4.7
10	9.9'	765.1	755.2	31.7'	10'	20	21.7
11	18.5	778.4	759.9	38'	18.8'	9.5	19.2
12	32.5'	791.8	759.3	34.2'	33.8'	2	.4
13	9.3'	798.55	789.25	17.7'	12.3'	11	5.4
14	39.3'	804.1	764.8	39.3	39.3'	Dry	----
15	37.6'	809.4	771.8	37.8'	37.8'	<1	0
16	39.8'	814.1	774.3	39.8'	39.8'	Dry	----
Monitor Well	72.3'	755.1	682.8	113.8'	74'	Pump	39.8

MID-MISSOURI TESTING LABORATORY

DETERMINATIONS MADE IN ACCORDANCE WITH AWWA - WPCF - APHA STANDARD METHODS

506 NICHOLS COLUMBIA, MO 65201 314/442-0237

Date: October 19, 1979

Client: Bob's Home Service

Date Received:

Sample Collected By: Mid-Missouri Testing Laboratory

RETZ & JENS

SAMPLE

Parameter	Pond #1	Pond #2	Wash Well	Date Analyzed
BHC	9.5	5.9	<5	10-19-79
α BHC	9.5	5.9	<1	10-19-79
β BHC	<4	<4	<1	10-19-79
γ [illegible]	<4	<4	<1	10-19-79
δ BHC	<4	<4	<1	10-19-79
Chlordane	<8	<8	<10	10-19-79
Heptachlor	<4	-	<5	10-19-79
Heptachlor Epoxide	*	*	<10	10-19-79
α Chlordane	<8	<8	<10	10-19-79
β Chlordane	<8	<8	<10	10-19-79
Tech Chlordane	<30	<30	<30	10-19-79
Dieldrin + Aldrin	<10	<10	<15	10-19-79
Aldrin	<4	4.0	<5	10-19-79
Dieldrin	<10	<10	<5	10-19-79
DDT + Metabolites	<20	66	<30	10-19-79
o,p'-DDE	<10	<30**	<15	10-19-79

Comments: 1. Results are expressed as nanograms/liter.
2. NR = Not reported.
3. < means lower than the lowest detection limit of analytical equipment.
4. Pesticide, chlorinated hydrocarbon, PCB analysis by Gary Brookhart ABC Labs, 474-8579.

* Occluded by unidentified peak **Response not quantitated to expedite delivery of report

Approved Robert Lang

MID-MISSOURI TESTING LABORATORY

DETERMINATIONS MADE IN ACCORDANCE WITH AWWA - WPCF - APHA STANDARD METHODS

BOB NICHOLS COLUMBIA, MO 65201 314/442 0237

Date: October 19, 1979
Client: Bob's Home Service
Date Received:
Sample Collected By: Mid-Missouri Testing Laboratory

SAMPLE

Parameter	Pond #1	Pond #2	Wash Well	Date Analyzed
p'-DDE	11	66	< 15	10-19-79
p'-DDT	< 20	< 20	< 30	10-19-79
p'-DDD	< 20	< 20	< 30	10-19-79
[illegible]	< 20	< 20	< 30	10-19-79
drin	< 20	< 20	< 30	10-19-79
ptachlor	< 4	2.1	< 5	10-19-79
ptachlor Epoxide	*	*	< 10	10-19-79
ndane	< 4	< 4	< 5	10-19-79
thoxychlor	< 40	< 80	< 100	10-19-79
oxaphene	< 150	< 150	< 250	10-19-79
CB	< 150	< 150	< 200	10-19-79
Aroclor 1242	< 150	< 150	< 200	10-19-79
Aroclor 1016	< 150	< 150	< 200	10-19-79
Aroclor 1254	< 150	< 150	< 200	10-19-79
Aroclor 1260	< 150	< 150	< 200	10-19-79
CB	< 4	< 4	< 5	10-19-79

omments:
1. Results are expressed as nanograms/liter.
2. NR - Not reported.
3. < means lower than the lowest detection limit of analytical equipment.
4. Pesticide, chlorinated hydrocarbon, PCB analysis by Gary Brookhart ABC Labs, 474-8579.

* Occluded by unidentified peak

**Response not quantitated to expedite delivery of report

Approved Robert Lamp

MID-MISSOURI TESTING LABORATORY

DETERMINATIONS MADE IN ACCORDANCE WITH AWWA - WPCF - APHA STANDARD METHODS

506 NICHOLS COLUMBIA, MO 65201 314/442 0237

Date: October 19, 1979

Client: Bob's Home Service

Date Received:

Sample Collected By: Mid-Missouri Testing Laboratory

SAMPLE

Parameter	Pond #1	Pond #2	Wash Well	Date Analyzed
Mirex	< 40	< 40	< 50	10-19-79
Total Chorinated Hydrocarbons	20.5	78		10-19-79

Comments:
1. Results are expressed as nanograms/liter.
2. NR = Not reported.
3. < means lower than the lowest detection limit of analytical equipment.
4. Pesticide, chlorinated hydrocarbon, PCB analysis by Gary Brookhart ABC Labs, 474-8579.

Approved Robert Lang

COPY

MID-MISSOURI TESTING LABORATORY

DETERMINATIONS MADE IN ACCORDANCE WITH AWWA - WPCF - APHA STANDARD METHODS

506 NICHOLS COLUMBIA, MO 65201 314/442-0237

Date: December 4, 1979
Client: Bob's Home Service
Date Received: November 19, 1979
Sample Collected By: Mid-Missouri Testing Laboratory

SAMPLE

Parameter	Well #4	Well #5	Well #6	Date Analyzed
pH	6.9	6.6	6.6	11-19-79
Redox-Potential (mv)	-40	-30	-20	11-19-79
Specific Conductivity (μmhos)	2,860	2,200	1,990	11-19-79
Total Organic Carbon (mg/l)	96.1	15.7	26.9	11-27-79
Chemical Oxygen Demand (mg/l)	2	5	12	11-29-79
Chlorides (mg/l)	9	15.5	13	11-26-79
Hardness (mg/l as $CACO_3$)	2,254	1,764	1,411	11-27-79
Iron (mg/l)	.8	.7	.3	11-30-79
Arsenic (mg/l)	≤.002	≤.002	≤.002	11-21-79

Approved Robert Lay

MID-MISSOURI TESTING LABORATORY

DETERMINATIONS MADE IN ACCORDANCE WITH AWWA - WPCF - APHA STANDARD METHODS

506 NICHOLS COLUMBIA, MO 65201 314/442-0237

Date: December 4, 1979
Client: Bob's Home Service
Date Received: November 19, 1979
Sample Collected By: Mid-Missouri Testing Laboratory

SAMPLE

Parameter	Well #7	Well #8	Well #9	Date Analyzed
pH	6.7	6.7	6.9	11-19-79
Redox-Potential (mv)	-30	-15	-15	11-19-79
Specific Conductivity (μmhos)	1,800	2,410	2,490	11-19-79
Total Organic Carbon (mg/l)	8.2	17.6	16.7	11-26-79
Chemical Oxygen Demand (mg/l)	10	9	2	11-29-79
Chlorides (mg/l)	20	13.5	10.5	11-26-79
Hardness (mg/l as $CACO_3$)	1,215	1,921	1,685	11-26-79
Iron (mg/l)	1.3	.3	1.3	11-30-79
Arsenic (mg/l)	≤.002	≤.002	≤ .002	11-21-79

Approved Robert Lang

MID-MISSOURI TESTING LABORATORY

DETERMINATIONS MADE IN ACCORDANCE WITH AWWA – WPCF – APHA STANDARD METHODS

506 NICHOLS COLUMBIA, MO 65201 314/442-0237

Date: December 4, 1979

Client: Bob's Home Service

Date Received: November 19, 1979

Sample Collected By: Mid-Missouri Testing Laboratory

SAMPLE

Parameter	Well #10	Well #11	Well #12	Date Analyzed
H	7.1	7.1	6.9	11-19-79
edox-Potential (mv)	-30	-20	-30	11-19-79
pecific Conductivity (μmhos)	1,500	2,300	1,900	11-19-79
al Organic Carbon (mg/l)	7.0	22.9	27.4	11-27-79
Chemical Oxygen Demand (mg/l)	≤.1	20	25	11-29-79
Chlorides (mg/l)	15	8	176	11-26-79
Hardness (mg/l as $CACO_3$)	921	1,607	2,078	11-27-79
Iron (mg/l)	.1	.1	.1	11-30-79
Arsenic (mg/l)	≤.002	≤.002	≤.002	11-21-79

Approved _____

MID-MISSOURI TESTING LABORATORY

DETERMINATIONS MADE IN ACCORDANCE WITH AWWA – WPCF – APHA STANDARD METHODS

506 NICHOLS COLUMBIA, MO 65201 314/442-0237

Date: December 4, 1979

Client: Bob's Home Service

Date Received: November 19, 1979

Sample Collected By: Mid-Missouri Testing Laboratory

SAMPLE

Parameter	Well #13	Wash Well	Monitor Well	Date Analyzed
pH	6.3	6.9	7.2	11-19-79
Redox-Potential (mv)	-30	-95	-50	11-19-79
Specific Conductivity (μmhos)	408	2,200	2,000	11-19-79
Total Organic Carbon (mg/l)	19.4	46.5	33.4	11-27-79
Chemical Oxygen Demand (mg/l)	28	16	21	11-29-79
Chlorides (mg/l)	60	7	8	11-26-79
Hardness (mg/l as $CACO_3$	298	1,708	2,254	11-20-79
Iron (mg/l)	.3	38.0	.3	11-30-79
Arsenic (mg/l)	≤.002	≤.002	≤ .002	11-21-79

Approved Robert Lang

MID-MISSOURI TESTING LABORATORY

DETERMINATIONS MADE IN ACCORDANCE WITH AWWA - WPCF - APHA STANDARD METHODS

506 NICHOLS COLUMBIA, MO 65201 314/442-0237

Date: December 4, 1979

Client: Bob's Home Service

Date Received: November 19, 1979

Sample Collected By: Mid-Missouri Testing Laboratory

SAMPLE

Parameter	Pond #1	Pond #2		Date Analyzed
pH	7.0	8.5		11-19-79
Redox-Potential (mv)	-110	-180		11-19-79
Specific Conductivity (Amhos)	650	1,750		11-19-79
Total Organic Carbon (mg/l)	187.4	72.8		11-27-79
Chemical Oxygen Demand (mg/l)	545	145		11-29-79
Chlorides (mg/l)	17.5	425		11-26-79
Hardness (mg/l as $CACO_3$)	395.2	528.3		11-26-79
Iron (mg/l)	4.5	.4		11-30-79
Arsenic (mg/l)	$\leq$.002	.0286		11-21-79

Approved Robert Lamp

MID-MISSOURI TESTING LABORATORY

DETERMINATIONS MADE IN ACCORDANCE WITH AWWA - WPCF - APHA STANDARD METHODS

506 NICHOLS COLUMBIA, MO 65201 314/442-0237

Date: December 4, 1979

Client: Bob's Home Service

Date Received: November 19, 1979

Sample Collected By: Mid-Missouri Testing Laboratory

SAMPLE

Parameter	Lake			Date Analyzed
	7.5			11-19-79
Redox-Potential (mv)	-130			11-19-79
Specific Conductivity (μmhos)	190			11-19-79
Total Organic Carbon (mg/l)	16.3			11-27-79
Chemical Oxygen Demand (mg/l)	31			11-29-79
Chlorides (mg/l)	3.5			11-26-79
Hardness (mg/l as $CACO_3$)	141.4			11-20-79
Iron	.1			11-30-79
Arsenic (mg/l)	≤.002			11-21-79

Approved Robert Lamp

MID-MISSOURI TESTING
LABORATORY

WRIGHT CITY
BOB'S HOME SERVICE

December 4, 1979

Well #	A Initial Depth	B Elev. Top of Pipe	B-A Elev. Water Before Bailing	Depth After Bailing	Depth After 24-hr. Recovery	Number of Bails	Recovery
1	32.2	806.21	774.01	32.2	32.2	Mud	----
2	35.75	795.95	760.20	35.75	35.75	Dry	----
3	37.5	778.30	740.80	37.5	37.5	Dry	----
4	37.2	771.90	734.20	37.7	37.7	<1	.5
5	15.3	758.35	743.05	31.9	26.5	11	5.4
6	15.4	765.95	750.55	31.6	29	17	2.6
7	27.0	765.15	733.15	36.6	35.1	10	1.5
8	27.1	760.60	733.5	34.7	31.7	4	3
9	23.25	757.35	734.10	26.8	25.7	3	1.1
10	13.8	765.10	751.30	31.6	13	20	18.6
11	20.25	778.40	758.15	29.25	20.75	5	8.5
12	32.5	791.80	759.30	34.3	33.8	2	5
13	11.8	798.55	786.75	14.4	13.1	4	1.3
14	39.75	804.10	764.35	39.75	39.75	Mud	----
15	37	809.40	772.40	37	37	Mud	----
16	39.8	814.1	774.30	39.8	39.8	Dry	----
Monitor Well	66	755.10	689.10	100	69	Pumped	31

Date	Well	mg/L Arsenic	mg/L Sus Solids	Arsenic % in Solids	Fluoride
June 7-79	8	0.0343	3576	0.001	<0.02
June 7-79	12	0.0285	1459	0.00195	<0.02
June 7-79	13	0.0314	15610	0.0002	0.6
July 11-80	3	0.265	25500	0.0010	?
July 11-80	12	0.026	2065	0.00125	?
June 12-80	3	0.177	NS	?	<0.2
June 12-80	12	0.234	NS	?	<0.2

Well #1, 2, 16 always dry
Well #5, 6, 15 no problems with

Well #3

June 12, 80	Nitrate 3.2 PPM (10x)
	Arsenic 177 PPB (<14 Avs)
July 11, 80	Diss As <14 PPB
	Total As 265 PPB
	Sus Solids 25500 mg/L

Well #4

Mar. 13, 80	Arsenic 45.7 PPB
Apr. 21, 80	Arsenic 25.7 PPB

Well #7

June 15, 78	Selenium 130 PPB (<2 Avg.)
July 17, 79	Fecal Coliform 290 (<1 Avg)

Well #8

July 17, 79	Copper 50 PPB (<10 Avg)
	Arsenic 34 PPB (<2 Avg)
	Sus Solids 3576 PPM

Well #9

June 12, 80	Nitrate 4.9 PPM (10X)

Well #10

July 17, 79	Selenium 53 PPB (<2 Avg)
June 12 80	Selenium 42 PPB (<2 Avg)
July 17, 79	Nitrate 2.45 PPM (5X)
Aug. 16, 77	Fluoride 600 PPB (<20 Avg)
Nov. 16, 77	Fluoride 710 PPB (<20 Avg)
June 15, 78	Fluoride 400 PPB (<20 Avg)
July 17, 79	Fluoride 1000 PPB (<20 Avg)
July 17, 79	Cadmium 30 PPB (<2)

Well #11

June 12, 80	Selenium 14 PPB (<2)
June 12, 80	Nitrate 2.7PPM (5X)
Aug. 16, 77	Fluoride 600 PPB (<20)
Nov. 16,77	Fluoride 590
June 15, 78	Fluoride 150
July 17, 79	Fluoride 200
July 17, 79	Copper 150 PPB (<10)
July 17, 79	Chrom (Total) 180 PPB (<20)
Mar. 13, 80	Arsenic 17.1 PPB (<14)

Well #12				
	Apr. 1, 78	Chloride	154 PPM	(10X)
	Sept. 14, 78	Chloride	262.2 PPM	(10X)
	Dec. 6, 78	Chloride	244.4 PPM	(10x)
	Mar. 21, 79	Chloride	213.7 PPM	(10x)
	July 17, 79	Chloride	210 PPM	(10x)
	Sept. 12, 79	Chloride	185 PPM	(10x)
	Nov. 19, 79	Chloride	176 PPM	(10x)
	Mar. 13, 80	Chloride	175.1 PPM	(10x)
	June 12, 80	Chloride	395 PPM	(10x)
	July 17, 79	Arsenic	28 PPB	(<2)
	Sept. 12, 79	Arsenic	23 PPB	(<2)
	Mar. 13, 80	Arsenic	7144 PPB	(<2)
	June 12, 80	Arsenic	234 PPB	(<2)
Well #13				
	Mar. 24, 78	Hardness	195 PPM	(10xLess)
	June 15, 78	Hardness	450 PPM	(10xLess)
	Sept. 14, 78	Hardness	616 PPM	(10xLess)
	Dec. 6, 78	Hardness	574 PPM	(10xLess)
	Mar. 21, 79	Hardness	425PPM	(10xLess)
	July 17, 79	Hardness	171 PPM	(10xLess)
	Sept. 12, 79	Hardness	244 PPM	(10xLess)
	Nov. 19, 79	Hardness	298 PPM	(10xLess)
	Mar. 13, 80	Hardness	310 PPM	(10xLess)
	Jan. 12, 80	Hardness	392 PPM	(10xLess)
	Aug. 16, 77	Fluoride	440 PPB	(5x)
	Nov. 16, 77	Fluoride	550 PPB	(5x)
	July 17, 79	Fluoride	600 PPB	(10x) (<20)
Well #13				
	July 17,79	Copper	340 PPB	(<10)
	July 17, 79	Chromium	680 PPB	(<20)
	July 17, 79	Barium	10,000 PPB	(<30)
	July 17, 79	Arsenic	31 PPB	(<2)
Well #14				
	June 12, 80	Nitrate	4.0 PPM	(10x)

Selenium (PPB)			
June 15, 78	Well 7	130	
July 17, 79	Well 10	[illegible]	
June 12, 80	Well 10	[illegible]	
June 12, 80	Well 11	14	
Nitrate			
July 17, 79	Well 10	[illegible]	(5x)
June 12, 80	Well [illegible]	[illegible]	(5x)
June 12, 80	Well [illegible]	[illegible]	(5x)
June 12, 80	Well [illegible]	[illegible]	(5x)
June 1[illegible], 80	Well [illegible]	[illegible]	(5x)
Fluoride			
Aug. 16, 77	Well 10	600	(2-5x)
Aug. 16, 77	Well 10	600	(2-5x)
Aug. 16, 77	Well 1[illegible]	440	(2-5x)
Nov. 16, 77	Well 10	710	(2-5x)
Nov. 16, 77	Well 11	590	(2-5x)
Nov. 16, 77	Well 1[illegible]	550	(2-5x)
June 15, 78	Well 10	400	(2-20)
	Well 11	150	
July 17, 79	Well 10	1000	(2-20)
	Well 11	[illegible]	
	Well 1[illegible]	600	
Copper			
[illegible]	Well -	[illegible] PPB	[illegible]
	Well [illegible]	[illegible]	
	Well [illegible]	[illegible]	
Chromium			
July 17, 79	Well 8	100	
	Well 11	190	
	Well 1[illegible]	680	
Cadmium			
[illegible]	[illegible]	[illegible]	[illegible]
Barium			
July 17, 79	Well [illegible]	10,000	[illegible]
Arsenic			
July 17, 79	Well 8	34PPB	(?)
	Well 12	28	
	Well 13	31	
Sept. 12, 79	Well 12	23	
Mar. 1[illegible], 80	Well 4	45.[illegible]	(.01)

	Well [illegible]	[illegible]
	Well [illegible]	[illegible]
Apr. 21, 80	Well 4	25.7
June 12, 80	Well 3	177
	Well 12	234

#1889

MID-MISSOURI TESTING LABORATORY

DETERMINATIONS MADE IN ACCORDANCE WITH AWWA - WPCF - APHA STANDARD METHODS

506 NICHOLS COLUMBIA, MO 65201 314/442-0237

Date: April 7, 1980

Client: Bob's Home Service

Date Received: March 13, 1980

Sample Collected By: Mid-Missouri Testing Laboratory

SAMPLE

Parameter	Well #4	Well #5	Well #6	Date Analyzed
pH	6.9	6.9	6.8	3/13/80
Redox Potential (millivolts)	449	444	439	3/31/80
Specific Conductivity (μmhos)	2030	1025	1600	3/13/80
COD (mg/l)	8	≤ 4	18	3/17/80
Chloride (mg/l)	7.5	14.0	11.0	3/17/80
Hardness (mg/l as $CaCO_3$)	2288	1137	1499	3/17/80
Total Iron (mg/l)	2.2	5.0	1.3	3/18/80
Arsenic (μg/l)	45.7	≤14	≤14	3/26/80
TOC (mg/l)	135	33	71	3/13/80

Approved Gregory F. Mattli

MID-MISSOURI TESTING LABORATORY

DETERMINATIONS MADE IN ACCORDANCE WITH AWWA - WPCF - APHA STANDARD METHODS

600 NICHOLS COLUMBIA, MO 65201 314/442-0237

Date: April 7, 1980

Client: Bob's Home Service

Date Received: March 13, 1980

Sample Collected By: Mid-Missouri Testing Laboratory

Parameter	SAMPLE Well #7	Well #8	Well #9	Date Analyzed
pH	6.9	6.7	6.6	3/13/80
Redox Potential (millivolts)	439	454	449	3/31/80
Specific Conductivity(μmhos)	1012	1900	995	3/13/80
COD (mg/l)	≤ 4	≤ 4	8	3/18/80
Chloride (mg/l)	18.0	10.5	7.0	3/17/80
Hardness (mg/l as $CaCO_3$)	1441	1891	1686	3/17/80
Total Iron (mg/l)	2.0	0.6	0.10	3/18/80
Arsenic (μg/l)	≤ 14	≤ 14	≤ 14	3/25/80
TOC (mg/l)	57	61	54	3/13/80

Approved Gregory F. Mattil

MID-MISSOURI TESTING LABORATORY

DETERMINATIONS MADE IN ACCORDANCE WITH AWWA - WPCF - APHA STANDARD METHODS

506 NICHOLS COLUMBIA, MO 65201 314/442-0237

Date: April 7, 1980

Client: Bob's Home Service

Date Received: March 13, 1980

Sample Collected By: Mid-Missouri Testing Laboratory

SAMPLE

Parameter	Well #10	Well #11	Well #13	Date Analyzed
pH	7.4	6.8	6.8	3/13/80
Redox Potential (millivolts)	439	449	429	3/31/80
Specific Conductivity (umhos)	690	998	410	3/13/80
COD (mg/l)	≤ 4	8	26	3/19/80
Chloride (mg/l)	14.5	7.0	14.5	3/17/80
Hardness (mg/l as $CaCO_3$)	1049	1715	310	3/17/80
Total Iron (mg/l)	5.3	1.0	4.3	3/18/80
Arsenic (ug/l)	≤ 14	17.1	≤ 14	3/25/80
TOC (mg/l)	33	47	52	3/13/80

Approved Gregory P. Matt

MID-MISSOURI TESTING LABORATORY

DETERMINATIONS MADE IN ACCORDANCE WITH AWWA - WPCF - APHA STANDARD METHODS

506 NICHOLS COLUMBIA, MO 65201 314/442-0237

Date: April 7, 1980

Client: Bob's Home Service

Date Received: March 13, 1980

Sample Collected By: Mid-Missouri Testing Laboratory

SAMPLE

Parameter	Well #15	Creek Old Area		Date Analyzed
pH	6.9	7.8		3/13/80
Redox Potential (millivolts)	439	449		3/31/80
Specific Conductance (μmhos)	1750	310		3/13/80
COD (mg/l)	27	22		3/20/80
Chloride (mg/l)	61.5	22.5		3/13/80
Hardness (mg/l as $CaCO_3$)	1568	188		3/17/80
Total Iron (mg/l)	19.0	1.4		3/18/80
Arsenic (μg/l)	≤ 14	≤ 14		3/27/80
TOC (mg/l)	57	32		3/13/80

Approved Gregory P. Matli

MID-MISSOURI TESTING LABORATORY

DETERMINATIONS MADE IN ACCORDANCE WITH AWWA - WPCF - APHA STANDARD METHODS

506 NICHOLS COLUMBIA, MO 65201 314/442-0237

Date: April 6, 1980

Client: Bob's Home Service

Date Received: March 20, 1980

Sample Collected By: Mid-Missouri Testing Laboratory

SAMPLE

Parameter	Well #12	Monitor Well	Wash Well	Date Analyzed
pH	6.8	6.7	7.1	3/20/80
Redox Potential (millivolts)	414	399	389	3/31/80
Specific Conductance (μmhos)	2550	1200	1650	3/24/80
COD (mg/l)	18	26	16	3/21/80
[illegible]ide (mg/l)	175.1	21.9	11.0	3/28/80
Hardness (mg/l as $CaCO_3$)	2150	950	1344	3/28/80
Total Iron (mg/l)	1.3	7.0	17.5	3/27/80
Arsenic (μg/l)	71.4	≤ 14	14.3	3/25/80
TOC (mg/l)	31	26	56	

Approved Gregory F. Mattl

MID-MISSOURI TESTING LABORATORY

DETERMINATIONS MADE IN ACCORDANCE WITH AWWA - WPCF - APHA STANDARD METHODS

506 NICHOLS COLUMBIA, MO 65201 314/442 0237

April 10, 1980

Mr. Dave Murray
Reitz and Jens, Inc.
111 S. Meramac
St. Louis, Missouri 63103

Dear Mr. Murray:

Please find enclosed analytical results of the March, 1980, sampling at Bob's Home Service landfill.

Analytical results include the typical quarterly parameters on the monitoring well, wash well, Lake Lucerne, creek, and wells 1 through 16 containing water; in addition to annual parameters on wells 18 and 20 and the creek in their vicinity.

All samples were collected on March 13 with the exception of the monitoring well, wash well, Lake Lucerne, and well 12 which were picked up on March 20.

As I mentioned in our phone conversation of March 8, regretably the final water level depth was either not measured or not recorded for wells 18, 20, and the monitoring well. Please accept my apologies for this oversight.

If I may provide additional information regarding this submittal please advise.

Sincerely,

Gregory P. Mattli

Gregory P. Mattli
Laboratory Director

GPM/sjs

enclosures

cc Mr. Mike Gill

MID-MISSOURI TESTING
LABORATORY

WRIGHT CITY
BOB'S HOME SERVICE

April 7, 1980

Well #	A Initial Depth	B Elev. Top of Pipe	B-A Elev. Water Before Bailing	Depth After Bailing	Depth After 24-hr. Recovery	Number of Bails	Recovery
1	32.2	806.2	774.0	32.2	32.2	Dry	--
2	35.5	795.9	760.4	35.5	35.5	Dry	--
3	37.0	778.3	741.3	37.0	37.0	Dry	--
4	37.0	771.9	734.9	38.0	37.5	1	0.5
5	12.0	758.3	746.3	34.0	30.0	16	4.0
6	15.0	765.9	750.9	36.5	31.3	18	5.2
7	14.5	765.1	750.6	36.0	31.7	17	4.3
8	25.8	760.6	734.8	37.0	33.2	10	3.8
9	19.0	747.3	738.3	37.5	34.0	16	3.5
10	10.0	765.1	755.1	36.7	9.6	26	27.1
11	20.0	778.4	758.4	35.5	10.0	14	25.5
12	33.0	791.8	758.8	35.0	34.5	Dry	0.5
13	5.5	798.5	793.0	13.5	6.7	4	6.8
14	39.3	804.1	764.8	39.3	39.3	Dry	--
15	36.9	809.4	772.5	39.1	38.7	3	0.4
16	40.0	814.1	774.1	40.0	40.0	Dry	--
17	53.5	--	--	53.5	53.5	Dry	--
18	36.5	--	--	50.0	NM	21	NM
19	54.0	--	--	54.0	54.0	Dry	--
20	18.2	--	--	48.5	NM	44	NM
21	54.8	--	--	54.8	54.8	Dry	--

MID-MISSOURI TESTING
LABORATORY

WRIGHT CITY
BOB'S HOME SERVICE

April 7, 1980

Well #	A Initial Depth	B Elev. Top of Pipe	B-A Elev. Water Before Bailing	Depth After Bailing	Depth After 24-hr. Recovery	Number of Bails	Recovery
22	53.0	--	--	53.0	53.0	Dry	--
Monitor Well	66.0	755.1	689.0	NM	NM	--	NM

NM - indicates depth not measured.

REITZ & JENS, INC.
CONSULTING ENGINEERS
111 SOUTH MERAMEC AVENUE
ST. LOUIS, MISSOURI 63105
(314) 727-0403

HENRY M. REITZ, PRESIDENT
TIFFEL W. JENS, SENIOR VICE PRESIDENT
JOHN J. BAILEY, JR., VICE PRES., CHIEF ENG.
DAVID E. MURRAY, VICE PRESIDENT
DONALD S. ESKRIDGE, SECRETARY

SOIL MECHANICS-FOUNDATIONS
HYDROLOGY-HYDRAULICS
RESOURCE RECLAMATION
DRAINAGE-PAVEMENTS
LAND DEVELOPMENT
WATER RESOURCES
SOLID WASTE

May 6, 1980

Mr. Robert M. Robinson, Director
Solid Waste Management Program
Mo. DNR
Box 1368
Jefferson City, MO 65102

Re: BHS, Inc., Quarterly Monitoring Report

Dear Mr. Robinson:

Attached, for your information and file, are copies of test reports taken at BHS, Inc. on April 21, 1980 by Mid-Missouri Testing Laboratory.

Samples were taken from Wells Nos. 4, 11 and 12 and tested for arsenic for comparison with the results obtained from the March 13, 1980 samples as reported on the first Quarterly Monitoring Report.

If there are any questions, please call.

Very truly yours,

David E. Murray

DAVID E. MURRAY

Encl.
DEM/rs
cc: BHS, Inc.
St. Louis Office, Mo. DNR

MID-MISSOURI TESTING LABORATORY

DETERMINATIONS MADE IN ACCORDANCE WITH AWWA - WPCF - APHA STANDARD METHODS

506 NICHOLS COLUMBIA, MO 65201 314/442 0237

RECEIVED MAY 5 1980

May 1, 1980

Mr. Dave Murray
Reitz & Jens, Inc.
111 S. Meramec Ave.
St. Louis, MO 63105

Dear Dave:

At the request of Mike Gill, we picked up a new set of samples from wells 4, 11, and 12 on April 21, 1980. We measured these samples for arsenic and the results are enclosed. As you can see, no arsenic was detected in wells 11 and 12 and a low level in well 4, contrary to the results of our March 13, 1980 sampling.

We, also, re-ran the well 12 March 13, 1980 sample and found arsenic to be below the detectable limit. The best explanation I can offer at this time is the possibility of sulfide interference in the initial analysis.

I am sorry for any inconvenience this may have caused.

Sincerely,

Gregory P. Mattli

Gregory P. Mattli
Laboratory Director

GPM:jb

Enclosure

cc Mike Gill

MID-MISSOURI TESTING LABORATORY

DETERMINATIONS MADE IN ACCORDANCE WITH AWWA - WPCF - APHA STANDARD METHODS

506 NICHOLS COLUMBIA, MO 65201 314/442-0237

RECEIVED MAY 5 1980

Date: April 28, 1980

Client: Bob's Home Service

Date Received: 4/21/80

Sample Collected By: Mid-Missouri Testing Laboratory

SAMPLE

Parameter	Well #4	Well #11	Well #12	Date Analyzed
Arsenic µg/l	25.7	≤14	≤14	4/23

Approved _____

MID-MISSOURI TESTING LABORATORY

DETERMINATIONS MADE IN ACCORDANCE WITH AWWA - WPCF - APHA STANDARD METHODS

506 NICHOLS COLUMBIA, MO 65201 314/442-0237

July 9, 1980

Reitz and Jens, Inc.
Attn: Mr. Dave Murray
1040 North Lindberg
St. Louis, Missouri 63132

Dear Mr. Murray:

Please find enclosed analytical results of the Bob's Home Service monitoring well samples collected on June 12, 1980. No samples were collected from wells 1, 2, 4, 14, and 16 because they were dry. Insufficient sample was available from wells 3, 8, 9, 12, 13, and 15 to allow complete analysis. Also, please note that the monitoring well sample was picked up June 13 due to malfunction of the pump on the 12th.

Please accept my apologies for being tardy with this report. I was unaware of the strict 15th of the month deadline. Future samples will be collected at the beginning of the month to facilitate meeting the report deadline.

If I may provide additional information regarding this submittal please advise.

Sincerely,

Gregory P. Mattli

Gregory P. Mattli
Laboratory Director

cc Mr. Mike Gill

MID-MISSOURI TESTING LABORATORY

DETERMINATIONS MADE IN ACCORDANCE WITH AWWA - WPCF - APHA STANDARD METHODS

506 NICHOLS COLUMBIA, MO 65201 314/442-0237

July 9, 1980
Re: Analytical Monitoring - Bob's Home Service

ANALYTICAL METHODS, continued

Paramater	Method	Special Conditions
Total Chromium (mg/l)	Digestion--AA	
Copper (mg/l)	Digestion--AA	
Lead (mg/l)	Digestion--AA	
Manganese (mg/l)	Digestion--AA	
Mercury (mg/l)	Flameless AA	
Nickel (mg/l)	Digestion--AA	
Selenium (mg/l)	Diamobenzidine--colorimetric	
Silver (mg/l)	Digestion--AA	
Zinc (mg/l)	Digestion--AA	
Chlorinated Hydrocarbons and Pesticides (mg/l)	Gas chromatograph scan	
PCB's (mg/l)	Gas chromatograph scan	

Sample preservation was in accordance with EPA Methods for Chemical Analysis of Water and Wastes, 1979.

MID-MISSOURI TESTING LABORATORY

DETERMINATIONS MADE IN ACCORDANCE WITH AWWA - WPCF - APHA STANDARD METHODS

BOB NICHOLS COLUMBIA, MO 65201 314/442 0237

Date: July 9, 1980

Client: Reitz & Jens (Bob's Home Service)

Date Received: June 12, 1980 (Monitor Well sampled June 13, 1980)

Sample Collected By: Mid-Missouri Testing Laboratory

SAMPLE

Parameter	Monitor Well	Wash Well	Creek				Date Analyzed
pH	6.5	7.0	7.1				6/12
Redox Potential (millivolts)	390	399	394				7/13
Specific Conductivity (μmhos)	1600	1500	350				6/18
TOC (mg/l)	8.9	7.3	26.6				6/24
COD (mg/l)	82	≤4	14				7/6
Total Hardness (mg/l $CaCO_3$)	1402	1422	267				7/2
Chloride (mg/l)	7.5	7.5	7.0				6/18
Total Iron (mg/l)	24.0	37.5	0.40				7/3
BOD_5 (mg/l)	11	3	3				6/12
Suspended Solids (m/gl)	826	48	≤1.0				7/1
TDS (mg/l)	2308	2146	360				7/1
Turbidity (TU)	160	100	7				7/1
Extractable Oil (mg/l)	0.6	2.0	5.4				6/25
Fecal Coliform (#100 ml)	1000	50	100				6/12
Alkalinity (mg/l) $CaCO_3$	404	359	217				6/24
Phenol (mg/l)	≤.001	≤.001	≤.001				7/7

Comments: 1. ≤ means less than or equal to the lower detection limits of analytical equipment.

2. All metals are "total" concentrations.

* Quantity of sample insufficient to perform test.

Approved _____

MID-MISSOURI TESTING LABORATORY

DETERMINATIONS MADE IN ACCORDANCE WITH AWWA - WPCF - APHA STANDARD METHODS

LOB NICHOLS COLUMBIA, MO 65201 314/442-0237

Date: July 9, 1980

Client: Reitz & Jens (Bob's Home Service)

Date Received: June 12, 1980 (Monitor Well sampled June 13, 1980)

Sample Collected By: Mid-Missouri Testing Laboratory

SAMPLE

Parameter	Monitor Well	Wash Well	Creek				Date Analyzed
Nitrate (mg/l N)	≤0.1	≤0.1	≤0.1				7/2
Sulfate (mg/l)	1325	850	100				7/3
Fluoride (mg/l)	≤0.2	≤0.2	≤0.2				7/8
Cyanide (mg/l)	≤.002	≤.002	≤.002				7/9
Arsenic (mg/l)	≤.014	≤.014	≤.014				7/3
Barium (mg/l)	≤0.1	≤0.1	≤0.1				6/23
Cadmium (mg/l)	≤0.01	≤0.01	≤0.01				6/23
Chromium +6 (mg/l)	≤.002	≤.002	≤.002				7/7
Total Chromium (mg/l)	≤0.02	≤0.02	≤0.02				6/20
Copper (mg/l)	0.05	0.02	≤0.01				6/25
Lead (mg/l)	≤0.1	≤0.1	≤0.1				6/25
Manganese (mg/l)	0.77	0.25	0.08				7/2
Mercury (mg/l)	≤.001	≤.001	≤.001				7/2
Nickel (mg/l)	≤0.02	≤0.02	≤0.02				6/23
Selenium (mg/l)	≤.002	≤.002	≤.002				7/7
Silver (mg/l)	≤0.01	≤0.01	≤0.01				6/23
Zinc (mg/l)	0.46	5.00	0.17				6/23

Comments:
1. ≤ means less than or equal to the lower detection limits of analytical equipment.
2. All metals are "total" concentrations.

* Quantity of sample insufficient to perform test.

Approved Gregory F. Matthi

MID-MISSOURI TESTING LABORATORY

DETERMINATIONS MADE IN ACCORDANCE WITH AWWA – WPCF – APHA STANDARD METHODS

BOB NICHOLS COLUMBIA, MO 65201 314/442-0237

Date: July 9, 1980

Client: Reitz & Jens (Bob's Home Service)

Date Received: June 12, 1980 (Monitor Well sampled on June 13, 1980)

Sample Collected By: Mid-Missouri Testing Laboratory

SAMPLE

Parameter	Monitor Well ++	Wash Well	Creek				Date Analyzed
BHC	<40 +	< 4.0	< 4.0				7/8
α BHC	<40 +	< 4.0	< 4.0				7/8
β BHC	<40 +	< 4.0	< 4.0				7/8
γ BHC	<40 +	< 4.0	< 4.0				7/8
δ BHC	<40 +	< 4.0	< 4.0				7/8
Chlordane	<47 +	< 9.0	< 9.0				7/8
Heptachlor	< 23 +	< 4.0	< 4.0				7/8
Heptachlor Epoxide	< 7.0	< 7.0	< 7.0				7/8
α Chlordane	<47 +	< 9.0	< 9.0				7/8
β Chlordane	<47 +	< 9.0	< 9.0				7/8
Tech Chlordane	< 100 +	< 23	< 23				7/8
Dieldrin + Aldrin	< 26 +	< 10	< 10				7/8
Aldrin	< 26 +	< 5.0	< 5.0				7/8
Dieldrin	< 10	< 10	< 10				7/8
DDT + Metabolites	< 50	110	< 50				7/8
o,p'-DDE	< 10	< 10	< 10				7/8

Comments:
1. Results are expressed as nanograms/liter.
2. < means lower than the lowest detection limit of analytical equipment.
3. Pesticide, chlorinated hydrocarbon, PCB analysis by ABC Laboratories, Inc. Columbia, Missouri.

++ Unidentified peak; detention time 6.09 minutes from injection time.

\+ Minimum detection amount raised due to sample interference.

Approved Gregory L. Martin

MID-MISSOURI TESTING LABORATORY

DETERMINATIONS MADE IN ACCORDANCE WITH AWWA - WPCF - APHA STANDARD METHODS

600 NICHOLS COLUMBIA, MO 65201 314/442-0237

Date: July 9, 1980

Client: Reitz & Jens (Bob's Home Service)

Date Received: June 12, 1980 (Monitor Well sampled on June 13, 1980)

Sample Collected By: Mid-Missouri Testing Laboratory

SAMPLE

Parameter	Monitor Well ++	Wash Well	Creek				Date Analyzed
p,p'-DDE	< 10	110	< 10				7/8
o,p'-DDT	< 50	< 50	< 50				7/8
p,p'-DDD	< 50	< 50	< 50				7/8
p,p'-DDT	< 50	< 50	< 50				7/8
Endrin	< 28	< 28	< 28				7/8
Heptachlor	< 23+	< 4.0	< 4.0				7/8
Heptachlor Epoxide	< 7.0	< 7.0	< 7.0				7/8
Lindane	< 4.0	< 4.0	< 4.0				7/8
Methoxychlor	< 120	< 120	< 120				7/8
Toxaphene	< 300	< 300	< 300				7/8
PCB	< 240	< 240	< 240				7/8
Aroclor 1242	< 240	< 240	< 240				7/8
Aroclor 1016	< 240	< 240	< 240				7/8
Aroclor 1254	< 240	< 240	< 240				7/8
Aroclor 1260	< 240	< 240	< 240				7/8
HCB	< 25+	< 4.0	< 4.0				7/8
Mirex	< 32	< 32	< 32				7/8

Comments:
1. Results are expressed as nanograms/liter.
2. < means lower than the lowest detection limit of analytical equipment.
3. Pesticide, chlorinated hydrocarbon, PCB analysis by ABC Laboratories, Inc. Columbia, Missouri.

++ Unidentified peak; detention time 6.09 minutes from injection time.

\+ Minimum detection amount raised due to sample interference.

Approved Gregory J. Matth

MID-MISSOURI TESTING LABORATORY

DETERMINATIONS MADE IN ACCORDANCE WITH AWWA - WPCF - APHA STANDARD METHODS

608 NICHOLS COLUMBIA, MO 65201 314/442-0237

July 9, 1980

Re: Analytical Monitoring - Bob's Home Service

ANALYTICAL METHODS

Paramater	Method	Special Conditions
pH	Electrode	
Redox Potential (millivolts)	Electrode	
Specific Conductivity (μmhos)	Electrode	
TOC (mg/l)	Combustion	
COD (mg/l)	Dichromate reflux	
Total Hardness (mg/l $CaCO_3$)	E.D.T.A. Titration	
Chloride (mg/l)	Silver Nitrate	
Total Iron (mg/l)	Digestion--AA	
BOD	Winkler--Azide modification	
Suspended Solids (mg/l)	Glass fiber filtration 103°C	Samples were agitated before analysis.
TDS (mg/l)	Gravimetric 103°C	
Turbidity (TU)	Nephelometric	Samples were agitated, allowed to settle 15 minutes, and superatant turbidity was analyzed.
Extractable Oil (mg/l)	Trifluoro-gravimetric	
Fecal Coliform (#/100 ml)	Membrane filter	
Alkalinity (mg/l)	Electrometric titration (4.5)	
Phenol (mg/l)	Colorimetric	
Nitrate (mg/l N)	Brucine sulfate	
Sulfate (mg/l)	Turbidimetric	
Fluoride (mg/l)	Electrode	
Cyanide (mg/l)	Distillation, pyridine colorimetric	
Arsenic (mg/l)	Digestion--silver diethyldithiocarbamate	
Barium (mg/l)	Digestion--AA	
Cadmium (mg/l)	Digestion--AA	
Chromium^{+6} (mg/l)	Colorimetric (diphenylcarbazide)	

#2149

MID-MISSOURI TESTING LABORATORY

DETERMINATIONS MADE IN ACCORDANCE WITH AWWA - WPCF - APHA STANDARD METHODS

BOB NICHOLS COLUMBIA, MO 65201 314/442-0237

Date: July 22, 1980

Client: Bob's Home Service

Date Received: July 11, 1980

Sample Collected By: Mid-Missouri Testing Laboratory

SAMPLE

Parameter	Well 3	Well 12		Date Analyzed
Total Arsenic mg/l	0.265	0.026		7/21
Dissolved Arsenic mg/l	≤.014	≤.014		7/14
[illegible]nded Solids mg/l	25500	2065		7/18
[illegible]enic				
	0.001 %	0.00125		

All samples were completely mixed.

Approved [illegible]

MID-MISSOURI TESTING LABORATORY

DETERMINATIONS MADE IN ACCORDANCE WITH AWWA – WPCF – APHA STANDARD METHODS

BOB NICHOLS COLUMBIA, MO 65201 314/442-0737

Date: July 9, 1980

Client: Reitz & Jens (Bob's Home Service)

Date Received: July 12, 1980

Sample Collected By: Mid-Missouri Testing Laboratory

SAMPLE

Parameter	Well #3	Well #5	Well #6	Well #7	Well #8	Well #9	Date Analyzed
pH	7.2	6.7	6.7	6.8	6.6	6.6	6/12
Redox Potential (millivolts)	409	409	414	404	389	384	7/3
Specific Conductivity (μmhos)	2200	1300	1450	1150	1900	1700	6/18
TOC (mg/l)	*	13.1	32.4	20.9	36.1	22.5	6/24
COD (mg/l)	36	16	14	18	≤4	10	6/18
Total Hardness (mg/l $CaCO_3$)	2020	1088	1176	931	2010	784	7/2
Chloride (mg/l)	25.0	13.5	12.0	20.5	13.5	7.0	6/18
Total Iron (mg/l)	2.20	3.20	1.80	1.00	≤.02	7.40	7/3
BOD_5 (mg/l)	*	2	1	2	1	2	6/12
Suspended Solids (m/gl)	*	184	81	202	277	935	7/1
TDS (mg/l)	*	1682	1746	1304	2831	2437	7/1
Turbidity (TU)	98	29	22	86	34	180	7/1
Extractable Oil (mg/l)	*	7.2	4.0	4.8	2.8	1.8	6/24
Fecal Coliform (#100 ml)	*	≤1	≤1	≤1	≤1	≤1	6/12
Alkalinity (mg/l) $CaCO_3$	356	389	407	406	412	395	6/24
Phenol (mg/l)	≤.001	≤.001	≤.001	≤.001	≤.001	≤.001	7/7

Comments: 1. ≤ means less than or equal to the lower detection limits of analytical equipment.

2. All metals are "total" concentrations.

* Quantity of sample insufficient to perform test.

Approved Gregory P. Matth

MID-MISSOURI TESTING LABORATORY

DETERMINATIONS MADE IN ACCORDANCE WITH AWWA - WPCF - APHA STANDARD METHODS

BOB NICHOLS COLUMBIA, MO 65201 314/442-0237

Date: July 9, 1980

Client: Reitz & Jens (Bob's Home Service)

Date Received: June 12, 1980

Sample Collected By: Mid-Missouri Testing Laboratory

SAMPLE

Parameter	Well #3	Well #5	Well #6	Well #7	Well #8	Well #9	Date Analyzed
Nitrate (mg/l N)	3.2	0.3	0.6	0.3	0.2	0.4	7/2
Sulfate (mg/l)	2200	650	700	550	1225	1200	7/3
Fluoride (mg/l)	≤0.2	≤0.2	≤0.2	≤0.2	≤0.2	≤0.2	7/8
Cyanide (mg/l)	*	≤.002	≤.002	≤.002	≤.002	≤.002	7/9
Arsenic (mg/l)	0.177	≤.014	≤.014	≤.014	≤.014	≤.014	7/3
Barium (mg/l)	≤0.1	≤0.1	≤0.1	≤0.1	≤0.1	≤0.1	6/23
Cadmium (mg/l)	≤0.01	≤0.01	≤0.01	≤0.01	≤0.01	≤0.01	6/23
Chromium +6 (mg/l)	≤.002	≤.002	≤.002	≤.002	≤.002	≤.002	7/7
Total Chromium (mg/l)	≤ .02	≤0.02	≤0.02	≤0.02	≤0.02	≤0.02	6/20
Copper (mg/l)	≤0.01	≤0.01	≤0.01	≤0.01	≤0.01	≤0.01	6/20
Lead (mg/l)	≤0.1	≤0.1	≤0.1	≤0.1	≤0.1	≤0.1	6/25
Manganese (mg/l)	0.16	0.88	1.09	0.33	0.10	0.72	7/2
Mercury (mg/l)	≤.001	.002	≤.001	≤.001	≤.001	≤.001	6/30
Nickel (mg/l)	≤0.02	≤0.02	≤0.02	≤0.02	≤0.02	≤0.02	6/23
Selenium (mg/l)	*	≤.002	≤.002	≤.002	≤.002	≤.002	7/7
Silver (mg/l)	≤0.01	≤0.01	≤0.01	≤0.01	≤0.01	≤0.01	6/23
Zinc (mg/l)	0.05	0.10	0.08	0.24	0.07	0.09	6/23

Comments:
1. ≤ means less than or equal to the lower detection limits of analytical equipment.
2. All metals are "total" concentrations.

* Quantity of sample insufficient to perform test.

Approved _____

MID-MISSOURI TESTING LABORATORY

DETERMINATIONS MADE IN ACCORDANCE WITH AWWA - WPCF - APHA STANDARD METHODS

BOB NICHOLS COLUMBIA, MO 65201 314/442-0237

Date: July 9, 1980

Client: Reitz & Jens (Bob's Home Service)

Date Received: June 12, 1980

Sample Collected By: Mid-Missouri Testing Laboratory

SAMPLE

Parameter	Well #5	Well #6	Well #7				Date Analyzed
BHC	<4.0	<4.0	<4.0				7/8
α BHC	<4.0	<4.0	<4.0				7/8
β BHC	<4.0	<4.0	<4.0				7/8
γ BHC	<4.0	<4.0	<4.0				7/8
δ BHC	<4.0	<4.0	<4.0				7/8
Chlordane	<9.0	<9.0	<9.0				7/8
Heptachlor	<4.0	<4.0	<4.0				7/8
Heptachlor Epoxide	<7.0	<7.0	<7.0				7/8
α Chlordane	<9.0	<9.0	<9.0				7/8
β Chlordane	<9.0	<9.0	<9.0				7/8
Tech Chlordane	<23	<23	<23				7/8
Dieldrin + Aldrin	<10	<10	<10				7/8
Aldrin	<5.0	<5.0	<5.0				7/8
Dieldrin	<10	<10	<10				7/8
DDT + Metabolites	<50	<50	<50				7/8
o,p'-DDE	<10	<10	<10				7/8

Comments:
1. Results are expressed as nanograms/liter.
2. < means lower than the lowest detection limit of analytical equipment.
3. Pesticide, chlorinated hydrocarbon, PCB analysis by ABC Laboratories, Inc. Columbia, Missouri.

Approved Gregory P. Matth

MID-MISSOURI TESTING LABORATORY

DETERMINATIONS MADE IN ACCORDANCE WITH AWWA - WPCF - APHA STANDARD METHODS

608 NICHOLS COLUMBIA, MO 65201 314/442-0237

Date: July 9, 1980

Client: Reitz & Jens (Bob's Home Service)

Date Received: June 12, 1980

Sample Collected By: Mid-Missouri Testing Laboratory

SAMPLE

Parameter	Well #5	Well #6	Well #7				Date Analyzed
p,p'-DDE	< 10	< 10	< 10				7/8
o,p'-DDT	< 50	< 50	< 50				7/8
p,p'-DDD	< 50	< 50	< 50				7/8
p,p'-DDT	< 50	< 50	< 50				7/8
[illegible]rin	< 28	< 28	< 28				7/8
[illegible]ptachlor	< 4.0	< 4.0	< 4.0				7/8
Heptachlor Epoxide	< 7.0	< 7.0	< 7.0				7/8
Lindane	< 4.0	< 4.0	< 4.0				7/8
Methoxychlor	< 120	< 120	< 120				7/8
Toxaphene	< 300	< 300	< 300				7/8
PCB	< 240	< 240	< 240				7/8
Aroclor 1242	< 240	< 240	< 240				7/8
Aroclor 1016	< 240	< 240	< 240				7/8
Aroclor 1254	< 240	< 240	< 240				7/8
Aroclor 1260	< 240	< 240	< 240				7/8
HCB	< 4.0	< 4.0	< 4.0				7/8
Mirex	< 32	< 32	< 32				7/8

Comments:
1. Results are expressed as nanograms/liter.
2. < means lower than the lowest detection limit of analytical equipment.
3. Pesticide, chlorinated hydrocarbon, PCB analysis by ABC Laboratories, Inc. Columbia, Missouri.

Approved [illegible]

MID-MISSOURI TESTING LABORATORY

DETERMINATIONS MADE IN ACCORDANCE WITH AWWA - WPCF - APHA STANDARD METHODS

BOB NICHOLS COLUMBIA, MO 65201 314/442-0737

Date: July 9, 1980

Client: Reitz & Jens (Bob's Home Service)

Date Received: June 12, 1980

Sample Collected By: Mid-Missouri Testing Laboratory

SAMPLE

Parameter	Well #10	Well #11	Well #12	Well #13	Well #15		Date Analyzed
pH	6.9	6.8	6.9	6.5	7.2		6/12
Redox Potential (millivolts)	379	384	389	384	374		7/3
Specific Conductivity (μmhos)	1150	1800	2500	600	1900		6/18
TOC (mg/l)	25.1	37.5	30.5	26.8	*		6/24
COD (mg/l)	6	10	≤4	52	27		6/20
Total Hardness (mg/l $CaCO_3$)	941	1814	*	392	*		7/2
Chloride (mg/l)	15.5	6.5	395	23.5	85		6/18
Total Iron (mg/l)	6.20	5.05	1.12	17.0	11.3		7/3
BOD_5 (mg/l)	3	2	1	17	*		6/12
Suspended Solids (m/gl)	62	116	*	917	*		7/3
TDS (mg/l)	1450	2760	*	622	*		7/3
Turbidity (TU)	13	28	100	120	90		7/1
Extractable Oil (mg/l)	6.2	6.8	≤0.1	2.8	*		6/25
Fecal Coliform (#100 ml)	≤1	≤1	10	10	*		6/12
Alkalinity (mg/l) $CaCO_3$	290	313	329	331	472		6/24
Phenol (mg/l)	≤.001	≤.001	≤.001	≤.001	≤.001		7/7

Comments:
1. ≤ means less than or equal to the lower detection limits of analytical equipment.
2. All metals are "total" concentrations.

* Quantity of sample insufficient to perform test.

Approved Gregory R. Mattle

MID-MISSOURI TESTING LABORATORY

DETERMINATIONS MADE IN ACCORDANCE WITH AWWA - WPCF - APHA STANDARD METHODS

600 NICHOLS COLUMBIA, MO 05201 314/442-0237

Date: July 9, 1980

Client: Reitz & Jens (Bob's Home Service)

Date Received: June 12, 1980

Sample Collected By: Mid-Missouri Testing Laboratory

SAMPLE

Parameter	Well #10	Well #11	Well #12	Well #13	Well #15		Date Analyzed
Nitrate (mg/l N)	4.9	0.4	2.7	0.3	4.0		7/2
Sulfate (mg/l)	530	1200	1600	220	1300		7/3
Fluoride (mg/l)	≤0.2	≤0.2	≤0.2	≤0.2	≤0.2		7/8
Cyanide (mg/l)	≤.002	≤.002	≤.002	≤.002	*		7/9
Arsenic (mg/l)	≤.014	≤.014	.234	≤.014	≤.014		7/3
Barium (mg/l)	≤0.1	≤0.1	≤0.1	≤0.1	≤0.1		6/23
Cadmium (mg/l)	≤0.01	≤0.01	≤0.01	≤0.01	≤0.01		6/23
Chromium +6 (mg/l)	≤.002	≤.002	≤.002	≤.002	≤.002		7/7
Total Chromium (mg/l)	≤0.02	≤0.02	≤0.02	≤0.02	≤0.02		6/20
Copper (mg/l)	≤0.01	≤0.01	≤0.01	≤0.01	≤0.01		6/20
Lead (mg/l)	≤0.1	≤0.1	≤0.1	≤0.1	≤0.1		6/25
Manganese (mg/l)	0.06	0.28	0.15	2.30	0.23		7/2
Mercury (mg/l)	≤.001	≤.001	≤.001	.002	≤.001		7/8
Nickel (mg/l)	0.17	≤0.02	≤ 0.02	≤0.02	≤0.02		6/23
Selenium (mg/l)	.042	.014	*	≤.002	*		7/7
Silver (mg/l)	≤ 0.01	≤0.01	≤ 0.01	≤0.01	≤0.01		6/23
Zinc (mg/l)	0.35	0.20	0.04	0.14	0.12		6/23

Comments: 1. ≤ means less than or equal to the lower detection limits of analytical equipment.

2. All metals are "total" concentrations.

* Quantity of sample insufficient to perform test.

Approved [signature]

MID-MISSOURI TESTING LABORATORY

DETERMINATIONS MADE IN ACCORDANCE WITH AWWA - WPCF - APHA STANDARD METHODS

BOB NICHOLS COLUMBIA, MO 65201 314/442 0737

Date: July 9, 1980

Client: Reitz & Jens (Bob's Home Service)

Date Received: June 12, 1980

Sample Collected By: Mid-Missouri Testing Laboratory

SAMPLE

Parameter	Well #10	Well #11					Date Analyzed
BHC	< 4.0	< 4.0					7/8
α BHC	< 4.0	< 4.0					7/8
β BHC	< 4.0	< 4.0					7/8
γ BHC	< 4.0	< 4.0					7/8
δ BHC	< 4.0	< 4.0					7/8
Chlordane	< 9.0	< 9.0					7/8
Heptachlor	< 4.0	< 4.0					7/8
Heptachlor Epoxide	< 7.0	< 7.0					7/8
α Chlordane	< 9.0	< 9.0					7/8
β Chlordane	< 9.0	< 9.0					7/8
Tech Chlordane	< 23	< 23					7/8
Dieldrin + Aldrin	< 10	< 10					7/8
Aldrin	< 5.0	< 5.0					7/8
Dieldrin	< 10	< 10					7/8
DDT + Metabolites	< 50	< 50					7/8
o,p'-DDE	< 10	< 10					7/8

Comments:
1. Results are expressed as nanograms/liter.
2. < means lower than the lowest detection limit of analytical equipment.
3. Pesticide, chlorinated hydrocarbon, PCB analysis by ABC Laboratories, Inc. Columbia, Missouri.

Approved Gregory F. Mattle

MID-MISSOURI TESTING LABORATORY

DETERMINATIONS MADE IN ACCORDANCE WITH AWWA – WPCF – APHA STANDARD METHODS

BOB NICHOLS COLUMBIA, MO 65201 314/442-0237

Date: July 9, 1980

Client: Reitz & Jens (Bob's Home Service)

Date Received: June 12, 19[illegible]

Sample Collected By: Mid-Missouri Testing Laboratory

SAMPLE

Parameter	Well #10	Well #11					Date Analyzed
p,p'-DDE	<10	<10					7/8
o,p'-DDT	<50	<50					7/8
p,p'-DDD	<50	<50					7/8
p,p'-DDT	<50	<50					7/8
Endrin	<28	<28					7/8
Heptachlor	<4.0	<4.0					7/8
Heptachlor Epoxide	<7.0	<7.0					7/8
Lindane	<4.0	<4.0					7/8
Methoxychlor	<120	<120					7/8
Toxaphene	<300	<300					7/8
PCB	<240	<240					7/8
Aroclor 1242	<240	<240					7/8
Aroclor 1016	<240	<240					7/8
Aroclor 1254	<240	<240					7/8
Aroclor 1260	<240	<240					7/8
HCB	<4.0	<4.0					7/8
Mirex	<32	<32					7/8

Comments:
1. Results are expressed as nanograms/liter.
2. < means lower than the lowest detection limit of analytical equipment.
3. Pesticide, chlorinated hydrocarbon, PCB analysis by ABC Laboratories, Inc. Columbia, Missouri.

Approved [illegible] Mattl

MID-MISSOURI TESTING
LABORATORY

WRIGHT CITY
BOB'S HOME SERVICE

JULY 9, 19[illegible]

Well #	A Initial Depth	B Elev. Top of Pipe	B-A Elev. Water Before Bailing	Depth After Bailing	Depth After 24-hr Recovery	Number of Bails	Recovery
1	32.2'	806.2	774.0	32.2	32.2	Mud	----
2	35.5'	795.9	760.4	35.5	35.5	Mud	----
3	36.5'	778.3	741.8	36.8	36.5	<1	0.3
4	38.3'	771.9	733.6	38.5	38.4	<1	0.1
5	12.7'	758.4	745.7	34.1	27.7	18	6.4
6	10.7'	765.9	755.2	36.3	32.2	21	4.1
7	13.5'	765.2	751.7	37.0	32.9	19	4.1
8	27.5'	760.6	733.1	37.5	35.2	8	2.3
9	29.7'	757.4	727.7	37.7	36.2	6	1.5
10	10.1'	765.1	755.0	36.5	10.2	26	26.3
11	18.8'	778.4	759.6	35.5	19.3	16	6.2
12	33.5'	791.8	758.3	34.8	34.5	1	0.3
13	10.0'	798.5	788.5	14.3	10.9	2	3.4
14	39.5'	804.1	764.6	39.5	39.5	Dry	----
15	38.3'	809.4	771.1	39.1	39.1	<1	----
16	39.7'	814.1	774.4	39.7	39.7	Mud	----
Monitor	67.5'	755.1	687.6	80.6	67.5	Pump	13.1

Analytical Chemistry - Research - Field Studies

3363 Parker Spur
Florissant, MO 63033

Phone
1-314-921-4488

ENVIRONMENTAL
ANALYSIS
INC.

Date: September 17, 19
Report No: 6666

Mr. Mike Gill
BOB'S HOME SERVICE
RR#1, Box 116 F
Wright City, Missouri 63390

REPORT OF ANALYSIS

Subject: Analysis of samples in accordance with "Standard Methods for the Examination of Water and Wastewater", 14th Edition, 1975.

Sample Identification: Samples marked #3 after 15 gallons, #3 after 30 gallons, #12 after 15 gallons, #12 after 30 gallons, #12 after 45 gallons, #3 after 45 gallons, #2, #3, #4, #5, #6, #7, #8, #9, #10, #11, #12, #13, and #15.

Results of Analysis:

	mg As/l (diss.)*	mg As/l (total)*	mg As/l (susp.)	mg/l Sus. Sol.	%As w/w in Solid
(after 15 gal.) #3	0.006	0.154	0.148	3508	0.0042
(after 30 gal.) #3	0.005	0.171	0.166	2678	0.0062
(after 45 gal.) #3	0.003	0.259	0.256	3986	0.0064
(after 15 gal.) #12	0.002	0.912	0.910	13302	0.0068
(after 30 gal.) #12	0.002	0.256	0.254	3324	0.0076
(after 45 gal.) #12	0.002	0.232	0.230	3214	0.0071
#2	0.001	1.53	1.53	28240	0.0054

Analytical Chemistry - Research - Field Studies

3363 Parker Spur
Florissant, MO 63033

Phone
1-314-921-4488

ENVIRONMENTAL
ANALYSIS
INC.

September 18, 1986
Report No. 6666

	mg As/l (diss.)	mg As/l (total)	mg As/l (susp.)	mg/l Sus. Sol.	%As w/w in solids
#3	0.007	0.369	0.362	6098	0.0059
#4	0.005	0.445	0.441	15196	0.0029
#5	0.006	0.207	0.201	3170	0.0063
#6	<0.001	0.068	0.068	1474	0.0046
#7	0.002	0.256	0.254	4380	0.0058
#8	0.002	0.012	0.010	698	0.0014
#9	0.001	0.064	0.063	1450	0.0041
#10	<0.001	0.281	0.281	4336	0.0064
#11	0.001	0.185	0.184	2216	0.0083
#12	0.001	0.119	0.118	1756	0.0067
#13	0.001	0.333	0.332	3644	0.0091
#15	0.001	0.288	0.287	4124	0.0069

Analytical Chemistry - Research - Field Studies

3363 Parker Spur
Florissant, MO 63033

Phone
1-314-921-4488

ENVIRONMENTAL
ANALYSIS
INC.

September 18, 1980
Report No. 6666

	ug As/g (total)*	%As w/w in solids
Solid Sample from #3	42.7	0.00427
East Field	13.8	0.00138
Old Landfill	28.7	0.00287
West Field South of Barn	37.5	0.00375

* The results reported are averages of duplicate and/or triplicate determinations. Analysis was performed using a Graphite Furnace with an Atomic Absorption Spectrophotometer.

Respectfully submitted,

E. H. Perrin
President, EAI

MID-MISSOURI TESTING LABORATORY

DETERMINATIONS MADE IN ACCORDANCE WITH AWWA - WPCF - APHA STANDARD METHODS

506 NICHOLS COLUMBIA, MO 65201 314/442-0237

September 24, 1980

Mr. David E. Murray
Reitz and Jens, Inc.
1040 North Lindbergh
St. Louis, Missouri 63132

Dear Mr. Murray:

Please find enclosed the Bob's Home Service well level results from the September, 1980, quarterly monitoring. We have corrected the well elevations as per the new survey.

If we may be of further service, please advise.

Sincerely,

Gregory P. Mattli

Gregory P. Mattli
Laboratory Director

GPM/kc

Enclosure

cc: Mike Gill, Bob's Home Service

MID-MISSOURI TESTING LABORATORY

WRI[illegible] CITY
BOB'S HO[illegible] SERVICE

Septem[illegible]

Well #	A Initial Depth feet	B Elev. Top of Pipe feet	B-A Elev. Water Before Baffling feet	C Depth After Baffling feet	D Depth After 24-hr Recovery feet	E Number of Bails*	C-D Recovery feet
1	32.1	807.4	775.3	32.1	32.1	0	--
2	35.3	795.4	760.1	35.3	35.3	0	--
3	35.0	779.8	744.8	37.4	37.0	4	0.4
4	38.3	772.6	734.3	38.5	38.4	<1	0.1
5	18.1	767.0	748.9	33.8	30.5	30	3.3
6	14.6	768.0	753.4	36.7	32.5	39	4.2
7	20.7	765.8	745.1	38.0	33.2	28	4.8
8	27.2	762.2	735.0	37.3	35.1	20	2.2
9	28.2	759.7	731.5	37.3	36.0	25	1.3
10	11.5	766.0	754.5	35.4	11.5	40	23.9
11	19.4	779.8	760.4	35.7	19.8	25	25.9
12	32.4	792.4	760.0	35.8	35.0	3	0.8
13	13.1	796.8	783.7	14.8	13.6	1	1.2
14	39.6	804.7	765.1	39.6	39.6	0	--
15	38.2	810.1	771.9	39.6	39.1	<1	0.5
16	39.7	814.3	774.6	39.7	39.7	0	--
Monitor	68.5	755.1	686.6	**	70.5	pump	**

* Bob's Home Service bailer was used to bail wells.
** Well Depth and recovery not determined due to pump malfunction.

#2282

MID-MISSOURI TESTING LABORATORY

DETERMINATIONS MADE IN ACCORDANCE WITH AWWA - WPCF - APHA STANDARD METHODS

806 NICHOLS COLUMBIA, MO 65201 314/442-0237

Date: September 18, 1980

Client: Bob's Home Service

Date Received: September 3, 1980

Sample Collected By: Mid-Missouri Testing Laboratory

SAMPLE

Parameter	Well #3	Well #5	Well #6	Well #7	Well #8	Well #9	Date Analyzed
pH	6.8	6.7	6.5	6.6	6.6	6.5	9/4/80
Redox Potential Millivolts	434	404	414	414	424	414	9/4/80
Specific Conductivity µmhos	2950	1750	1600	1600	2550	2450	9/4/80
COD mg/l	10	≤4	≤4	6	13	≤4	9/5/80
[illegible]oride mg/l	14.0	13.5	14.0	17.0	13.5	9.5	9/5/80
Total Hardness mg/l as $CaCO_3$	2200	1150	1030	1100	1840	1800	9/4/80
Total Iron mg/l	14.4	9.55	1.62	1.01	3.21	4.25	9/9/80
Total Arsenic µg/l	≤14	≤14	≤14	≤14	≤14	≤14	9/12/80
TOC mg/l	30.8	42.1	26.9	43.6	14.9	28.3	9/4/80

Approved Denise McDonald

MID-MISSOURI TESTING LABORATORY

DETERMINATIONS MADE IN ACCORDANCE WITH AWWA - WPCF - APHA STANDARD METHODS

206 NICHOLS COLUMBIA, MO 65201 314/442-0237

Date: September 18, 1980

Client: Bob's Home Service

Date Received: September 3, 1980

Sample Collected By: Mid-Missouri Testing Laboratory

SAMPLE

Parameter	Well #10	Well #11	Well #12	Well #13	Well #15		Date Analyzed
pH	6.8	6.5	6.6	5.7	7.1		9/4/80
Redox Potential Millivolts	414	424	404	429	394		9/4/80
Specific Conductivity µmhos	1600	2750	3200	440	2550		9/4/80
COD mg/l	≤4	10	29	44	*		9/8/80
Chloride mg/l	15.0	9.5	167	54.0	58.0		9/5/80
Total Hardness mg/l as $CaCO_3$	970	1880	2100	207	1640		9/4/80
Total Iron mg/l	0.73	0.29	11.6	70.0	3.22		9/9/80
Total Arsenic µg/l	≤ 14	≤ 14	≤ 14	25	100		9/15/80
TOC mg/l	33.7	14.9	47.6	65.7	17.8		9/4/80

* Quantity of sample insufficient to perform test.

Approved Denise McDonald

MID-MISSOURI TESTING LABORATORY

DETERMINATIONS MADE IN ACCORDANCE WITH AWWA - WPCF - APHA STANDARD METHODS

506 NICHOLS COLUMBIA, MO 65201 314/442-0237

Date: September 18, 1980

Client: Bob's Home Service

Date Received: September 3, 1980

Sample Collected By: Mid-Missouri Testing Laboratory

SAMPLE

Parameter	Monitor Well	Wash Well	Creek				Date Analyzed
pH	6.8	6.7	7.2				9/4/80
Redox Potential Millivolts	374	404	419				9/4/80
Specific Conductivity µmhos	1850	2000	165				9/4/80
COD mg/l	18	18	20				9/9/80
Chloride mg/l	8.5	8.0	≤0.5				9/5/80
Total Hardness mg/l as $CaCO_3$	1340	1400	108				9/4/80
Total Iron mg/l	1.36	65.0	8.85				9/9/80
Total Arsenic µg/l	≤ 14	≤ 14	≤ 14				9/15/80
TOC mg/l	35.7	43.6	24.7				9/4/80

Approved Venise McDonald

MID-MISSOURI TESTING LABORATORY

DETERMINATIONS MADE IN ACCORDANCE WITH AWWA - WPCF APHA STANDARD METHODS

506 NICHOLS COLUMBIA, MO 65201 314/442-0237

Date: September 18, 1980

Client: Bob's Home Service

Date Received: September 3, 1980

Sample Collected By: Mid-Missouri Testing Laboratory

SAMPLE

Parameter	Lake Lucern			Date Analyzed
pH	7.3			9/4/80
Redox Potential Millivolts	409			9/4/80
Specific Conductance µmhos	220			9/4/80
COD mg/l	16			9/9/80
Chloride mg/l	3.5			9/5/80
Total Hardness mg/l as $CaCO_3$	140			9/4/80
Total Iron mg/l	2.53			9/9/80
Total Arsenic µg/l	≤ 14			9/15/80
TOC mg/l	32.5			9/4/80
Fluoride mg/l	≤ 0.2			9/10/80
Total Cadmium mg/l	≤ 0.01			9/10/80
Total Chromium mg/l	≤ 0.02			9/8/80
Total Copper mg/l	≤ 0.01			9/10/80
Total Lead mg/l	≤ 0.1			9/11/80
Total Manganese mg/l	2.23			9/10/80
Total Nickel mg/l	≤ 0.02			9/8/80
Total Zinc mg/l	0.10			9/10/80

Approved Denise McDonald

MID-MISSOURI TESTING LABORATORY

DETERMINATIONS MADE IN ACCORDANCE WITH AWWA - WPCF - APHA STANDARD METHODS

506 NICHOLS COLUMBIA, MO 65201 314/442-0237

December 18, 1980

Mr. David Murray
Reitz and Jens, Inc.
1040 North Lindbergh
St. Louis, Missouri 63132

Dear Mr. Murray:

Please find enclosed results of December, 1980, Bob's Home Service sample collection and analysis.

Complete analysis was performed on samples from wells #3, 5,6,7,8,9,10,11,12, and 15 in addition to the monitoring well, wash well, and creek sites.

If we may be of further service, please advise.

Sincerely,

Gregory P. Mattli

Gregory P. Mattli
Laboratory Director

Enclosure

cc: Mike Gill

MID-MISSOURI TESTING LABORATORY

DETERMINATIONS MADE IN ACCORDANCE WITH AWWA - WPCF APHA STANDARD METHODS

500 NICHOLS COLUMBIA MO 65201 314/442 0237

Date: December 18, 1980

Client: [illegible]

Date Received: December 4, 1980

Sample Collected By: Mid-Missouri Testing Laboratory

SAMPLE

Parameter	Lake Lucern			Date Analyzed
pH	7.7			12/4
Redox Potential Millivolts	385			12/11
Specific Conductance µmhos	150			12/4
C[illegible] mg/l	14			12/9
[illegible]oride mg/l	3.5			12/10
Total Hardness mg/l	110			12/11
Total Iron mg/l	0.56			12/11
Total Arsenic µg/l	≤ 14			12/12
TOC mg/l	5.9			12/11
Fluoride mg/l	≤ 0.2			12/11
Total Cadmium mg/l	≤ 0.01			12/16
Total [illegible] mg/l	0.03			12/11
Total Copper mg/l	≤ 0.01			12/10
Total Lead mg/l	≤ 0.1			12/16
Total Manganese mg/l	0.42			12/10
Total [illegible] mg/l	≤ 0.02			12/11
Total [illegible] mg/l	0.20			12/17

Approved Gregory K. Moll

MID-MISSOURI TESTING LABORATORY

DETERMINATIONS MADE IN ACCORDANCE WITH AWWA - WPCF - APHA STANDARD METHODS

500 NICHOLS COLUMBIA, MO 65201 314.442.0237

Date: December 18, 1980

Client: Bob's Home Service

Date Received: December 4, 1980

Sample Collected By: Mid-Missouri Testing Laboratory

SAMPLE

Parameter	Wash Well	Monitor Well	Creek				Date Analyzed
pH	7.0	7.2	7.2				12/4
Redox Potential Millivolts	395	387	403				12/11
Specific Conductivity µmhos	2800	1500	270				12/4
COD mg/l	≤ 4	55	35				12/11
Chloride mg/l	5.0	9.0	5.0				12/10
Total Hardness mg/l as $CaCO_3$	1390	1120	185				12/11
Total Iron mg/l	13.6	11.7	2.46				12/11
Total Arsenic µg/l	≤ 14	≤14	≤ 14				12/15
TOC mg/l	20.7	30.3	18.9				12/11

Approved Gregory V. Mattl

#2479

MID-MISSOURI TESTING LABORATORY

DETERMINATIONS MADE IN ACCORDANCE WITH AWWA - WPCF - APHA STANDARD METHODS

500 NICHOLS COLUMBIA, MO 65201 314/442-0237

Date: December 18, 1980

Client: Bob's Home Service

Date Received: December 4, 1980

Sample Collected By: Mid-Missouri Testing Laboratory

Parameter	#3	#5	#6	#7	#8		Date Analyzed
pH	6.9	6.9	6.8	6.7	6.7		12/4
Redox Potential Millivolts	386	421	387	390	390		12/11
Specific Conductivity umhos	2220	1510	1370	1600	2200		12/4
COD mg/l	12	18	10	6	12		12/9
Chloride mg/l	13.5	12.0	14.0	15.5	11.5		12/10
Total Hardness mg/l as $CaCO_3$	1850	1180	990	1280	1850		12/11
Total Iron mg/l	25.3	1.49	0.60	1.73	0.64		12/11
Total Arsenic mg/l	≤14	≤14	≤14	≤14	≤14		12/12
TOC mg/l	29.3	44.5	56.0	49.5	57.4		12/11

Approved: Gregory P. Mattle

MID-MISSOURI TESTING LABORATORY

DETERMINATIONS MADE IN ACCORDANCE WITH AWWA - WPCF - APHA STANDARD METHODS

1506 NICHOLS COLUMBIA MO 65201 314/442-0737

Date: December 18, 1980

Client: Bob's Home Service

Date Received: December 4, 1980

Sample Collected By: Mid-Missouri Testing Laboratory

SAMPLE

Parameter	#9	#10	#11	#12	#15		Date Analyzed
H	6.8	7.0	6.8	6.8	6.9		12/4
edox Potential Millivolts	406	383	398	407	410		12/11
pecific Conductivity umhos	2100	1400	2300	2500	2200		12/4
OD mg/l	8	8	<4	25	14		12/10
h[illegible]de mg/l	7.5	16.0	8.5	346	56.0		12/10
otal Hardness mg/l as $CaCO_3$	1700	1010	1880	1730	1575		12/11
Total Iron mg/l	0.73	1.52	2.57	1.06	11.9		12/11
Total Arsenic mg/l	≤14	≤14	≤14	≤14	≤14		12/15
DC mg/l	47.2	42.5	26.2	45.9	27.6		12/11

Gregory P. Matth

[illegible] CITY

[illegible]-MISSOURI TESTING LABORATORY — BOB'S HOME SERVICE — December 4, 1980

Well #	A Initial Depth feet	B Elev. Top of Pipe feet	B-A Elev. Water Before Bailing feet	C Depth After Bailing feet	D Depth After 24-hr Recovery feet	Bailing Number of Pails	C-D Recovery feet
1	[illegible]	807.4	772.9	--	34.[illegible]	0	--
2	35.6	795.4	759.8	--	35.[illegible]	[illegible]	--
3	35.2	779.8	744.6	38.7	35.[illegible]	[illegible]	[illegible]
4	39.2	772.6	733.4	--	39.[illegible]	0	--
5	17.8	766.7[illegible]	745.2	32.7	30.1	13	[illegible]
6	15.2	768.0	752.7	37.4	33.[illegible]	22	[illegible]
7	29.3	765.8	737.5	37.7	35.1	[illegible]	2.6
8	29.5	762.2	732.7	38.5	34.[illegible]	9	4.5
9	27.0	759.7	732.7	37.6	35.8	10	1.8
10	18.6	766.0	747.4	35.6	18.[illegible]	18	16.8
11	29.9	779.8	738.9	34.7	31.2	15	[illegible]
12	31.1	792.4	761.3	33.5	32.[illegible]	3	[illegible]
13	14.8	796.8	782.0	--	14.8		--
14	39.8	804.7	764.9	--	39.8	0	--
15	38.3	810.1	771.8	39.1	38.3	1	[illegible]
16	[illegible]	814.3	774.5	--	39.8	[illegible]	--
Monitor	70.0	755.1	685.1	73.8	71.[illegible]	Pumped	[illegible]

Elev. September 4, 1980, is recorded as 767.0. Well has been shortened by 4'.

BOB'S HOME SERVICE, INC.

Groundwater Elevations

PIEZOMETER NUMBER	SURFACE ELEVATION	PIEZOMETER BOTTOM ELEV.	3/26/77 ELEV.	4/7/77 ELEV.	4/15/77 ELEV.	5/2/77 ELEV.	5/21/77 ELEV.	8/15/77 ELEV.
1	802.9	773.66	Dry	784.66	781.17	780.51	778.33	Dry
2	790.5	760.00	"	Dry	Dry	Dry	Dry	Dry
3	776.7	739.19	"	"	"	"	"	Dry
4	770.0	733.13	"	"	"	"	"	Dry
5	756.2	721.31	"	"	"	722.71	726.00	728.15
6	761.2	726.17	"	729.59	732.73	738.29	742.99	751.25
7	759.9	725.73	"	731.46	734.91	741.69	745.80	746.85
8	756.0	721.0	724.35	727.52	729.72	732.64	734.40	735.90
9	752.5	717.46	Dry	Dry	Dry	717.72	723.48	733.55
10	761.2	725.30	752.10	752.10	751.80	751.76	752.45	751.50
11	775.1	739.70	754.90	756.92	755.93	756.07	755.78	755.70
12	786.7	755.42	Dry	Dry	Dry	Dry	Dry	Dry
13	793.9	759.25	766.75	777.59	776.70	777.68	777.55	778.35
14	798.5	763.62	Dry	Dry	Dry	Dry	Dry	Dry
15	804.4	769.31	"	"	"	"	"	Dry
16	808.4	774.07	"	"	"	"	"	Dry
Mon. Well	753.5	627.7	682.50			681.36	683.00	

REITZ & JENS, INC.
September 1977

BOB'S HOME SERVICE, INC.

Groundwater Elevations

PIEZOMETER NUMBER	SURFACE ELEVATION	PIEZOMETER BOTTOM ELEV.	11/16/78 Elev.	2/24/78 Elev.	4/1/78 Elev.
1	802.9	773.66	mud	mud	mud
2	790.9	760.00	dry	dry	dry
3	776.7	739.19	dry	dry	dry
4	770.0	733.13	dry	wet*	wet*
5	756.2	721.31	736.5*	740.8	
6	761.2	726.17	749.3	753.7	
7	759.9	725.73	740.5	752.8	
8	756.0	721.0	735.8	738.5	
9	752.5	717.46	732.2	735.7	
10	761.2	725.30	753.6	752.7	
11	775.1	739.70	756.6	755.8	
12	786.7	755.42	dry	756.0*	756.7
13	793.9	759.25	789.7	793.7	
14	798.5	763.62	dry	764.2*	wet*
15	804.4	769.31	772.0*	771.5*	770.8
16	808.4	774.07	dry	dry	dry
Mon. Well	735.5	627.7	684.6	681.9	

*Not enough for sample.

REITZ & JENS, INC.
April 1978

$X_{78} = 7.2 \mid 1964 \mid 32.0 \mid 1$

Monitoring Well

dF: 9

Parameter \ Date	04-77	06-77	08-77	03-78	6-78	9-78	12-78	3-79	6-79	9-79	11-79	3-80	6-80	9-80	12-80	$\bar{x}$ 80	$\bar{s}$ 80	$t_{(7.2-80)}$
Ph	7.20	7.2	7.2	8.2	6.9	6.4	7.1	7.0	7.2	6.9	7.2	6.7	6.5	6.8	7.2	6.8	.29	1.35
ecific Conductance	umhos 2010	2200	2000	1936	1600	2500	1500	2100	421	2320	2000	1200	1600	1850	1500	1537.5	268.9	2.13
COD			7 ppm	4	14	73	70	4.2	12.1	14.3	33.4	26	8.9	55.7	30.3	25.2	11.6	1.19
TOX																		
Chloride				8 ppm	15.9	2584	19.2	15.5	354.5	7.5	8	21.9	7.5	8.5	9.0			
Iron	620 ppb	[illegible]	30	210	3907	20000	97500	12000	280	590	300	7000	24000	1360	11700			
Manganese			2.04 ppm		1.2				<.01				.77					
Phenols	[illegible]	[illegible]			<1				<100				<1					
Sodium																		
Sulfate	[illegible] ppm	1230			960				1250				1325					
Arsenic	216 ppb	<5	2	1	<2	<2	<2	<2	<2	<2	<2	<14	<14	<14	<14			
Barium	1120 ppb	104			100				<30				<100					
Cadmium	[illegible] ppb	<2	<10		<2				<2				<10					
Chromium	70 ppb	7.5	<10		<20				<20				<20					
Fluoride	[illegible] ppm	.242	0.58		<.02				<.02				<.2					
Lead	[illegible] ppb	<5	60		<50				<50				<100					
Mercury	<2 ppb	<2			<.2				1.3				<1					
Nitrate (as N)	<.1 ppm	.330			.02				.56				<.1					
Selenium	<5 ppb	8.3			<2				<2				<2					
Silver	<2 ppb	<2			<10				<10				<10					
Endrin	<.02 ppm				<.005 ppb				<.01				<.028					
Lindane	<.02 ppm	<.01 ppb			.004				<.002				<.004					
Methoxychlor		<1 ppb			<.04				<.04				<.120					
Toxaphene		<.1 ppb			<.1				<.1				<.3					
2,4,-D																		
2,4,5-TP Silvex	[illegible]																	
Turbidity					6 TU				8				160					
Coliform					0				0				1000					
				1010	1027	691.0	684	681.1	682.8	679.1	688.1	689.0	687.6	686.6	685.1			

CHAIN OF CUSTODY RECORD

ENVIRONMENTAL PROTECTION AGENCY REGION VII

WORK LEADER (PRINT)	NAME OF SURVEY OR ACTIVITY	DATE OF COLLECTION (DAY MONTH YEAR)	SHEET of

DESCRIPTION OF SHIPMENT

VOUCHER OR RECEIPT NO

___ PIECE(S) CONSISTING OF ____ BOX(S)

___ ICE CHEST(S); OTHER _____

CONTENTS OF SHIPMENT

LABORATORY SAMPLE NO.	TYPES OF CONTAINERS: CUBITAINER	GLASS JAR	DO BOTTLE	BIO. BOTTLE	LABORATORY SAMPLE NO.	TYPES OF CONTAINERS: CUBITAINER	GLASS JAR	DO BOTTLE	BIO. BOTTLE
	NO. OF CONTAINERS PER LAB NO.					NO. OF CONTAINERS PER LAB NO.			
[illegible]		[illegible]			[illegible]				
		[illegible]		[illegible]	[illegible]				
[illegible]	3	[illegible]		[illegible]	[illegible]				
[illegible]	3	1		[illegible]	[illegible]				
[illegible]		[illegible]			[illegible]	[illegible]			
[illegible]	3	[illegible]		2	[illegible]	[illegible]			
[illegible]	[illegible]	[illegible]		2	[illegible]	[illegible]	[illegible]		
[illegible]		[illegible]			[illegible]				
[illegible]				[illegible]	[illegible]	[illegible]			
[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]			
[illegible]				[illegible]	[illegible]				
[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]			
[illegible]				[illegible]	[illegible]				

PERSONNEL CUSTODY RECORD

RELINQUISHED BY (SAMPLER)	RECEIVED BY	DATE	TIME	REASON FOR CHANGE OF CUSTODY
[illegible] SEALED UNSEALED	[illegible] SEALED UNSEALED	[illegible]	[illegible]	[illegible]
RELINQUISHED BY SEALED UNSEALED	RECEIVED BY SEALED UNSEALED	DATE	TIME	REASON FOR CHANGE OF CUSTODY
RELINQUISHED BY SEALED UNSEALED	RECEIVED BY SEALED UNSEALED	DATE	TIME	REASON FOR CHANGE OF CUSTODY
RELINQUISHED BY SEALED UNSEALED	RECEIVED BY SEALED UNSEALED	DATE	TIME	REASON FOR CHANGE OF CUSTODY
RELINQUISHED BY SEALED UNSEALED	RECEIVED BY SEALED UNSEALED	DATE	TIME	REASON FOR CHANGE OF CUSTODY
RELINQUISHED BY SEALED UNSEALED	RECEIVED BY SEALED UNSEALED	DATE	TIME	REASON FOR CHANGE OF CUSTODY
RELINQUISHED BY SEALED UNSEALED	RECEIVED BY SEALED UNSEALED	DATE	TIME	REASON FOR CHANGE OF CUSTODY

7-EPA-9262 (5/75)

EPA, Region VII
25 Funston Road
Kansas City, Kansas 66115

Receipt for Environmental Samples

From: Facility Name Ross Home Service
Address PO Box 116F
City Wright City MO
Permit Number
Responsible Official and Title Mike Gill, Site Manager

Laboratory Sample No.	Types of Containers: Cubitainer	Glass Jar	DO Bottle	Bio ~~Bottle~~ VOA	Description of Samples
	No. of Containers per Lab No.				
~~AA2402-~~ ~~A2402~~					
AAC403	3	1 gal	0	2	Piezometer well 12
AAC404	3	1 gal	0	2	Piezometer well 10
AAC405	0	1 pt	0	0	[illegible]
AAC406	3	1 gal	0	2	Rest holding pond
AAC407	3	1 gal	0	2	downstream [illegible]
AAC408		1 pt			[illegible]
AAC409		1/2 gal		2	Piezometer well 8
AAC410	3	1 gal	0	2	Piezometer well 5
AAC411	3	1 gal	0	2	upstream [illegible]
AAC412	3	1 gal	0	2	monitoring well
AAC413	3	1 gal	0	2	old well

Acknowledgement

The undersigned acknowledge receipts for the above described samples pursuant to:

- [x] Section 3007(a) of the Recource Conservation and Recovery Act, 42USC6927CAL
- [ ] Section 308(a)(b) of the Clean Water Act
- [ ] Section 117(a)(2) of the Clean Air Act
- [ ] Other (Specify)

Duplicate samples were/were not requested by the responsible facility representative.
Duplicate samples were/were not provided to the responsible facility representative. or his designated agent.

Signature and Title of Responsible Facility Official

[illegible] Signature — Secretary Title

Date of Signing

Name and Title of Person Collecting Samples

[illegible] Signature of Collector

FIELD SHEET

ENVIRONMENTAL PROTECTION AGENCY – REGION VII

SURVEILLANCE AND ANALYSIS DIVISION, 25 FUNSTON ROAD, KANSAS CITY, KANSAS 66115

STATION IDENTIFICATION

SURVEY NO _____ SURVEY LEADER ZIRSCHKY STORET NO _____

DESCRIPTION BOB'S HOME SERVICE, Private well #1

GRAB SAMPLE DATA

FLOW	TEMP °C AIR 00020	TEMP °C WATER 00010	PH	DO	FECAL COLI	OIL & GREASE	OTHER	
☐ 00059 (GPM) ☐ 00061 (CFS)						-		

COLLECTION DATE YR 81 MO APR DAY 10 TIME 1300 SAMPLER NAME CODE 307 LAB NO AA0471

	10°F	13.5°C	00400					

COLLECTION DATE YR ___ MO ___ DAY ___ TIME ___ SAMPLER NAME CODE ___ LAB NO ___

COLLECTION DATE YR ___ MO ___ DAY ___ TIME ___ SAMPLER NAME CODE ___ LAB NO ___

COLLECTION DATE YR ___ MO ___ DAY ___ TIME ___ SAMPLER NAME CODE ___ LAB NO ___

COMPOSITE SAMPLE DATA

BEGIN DATE YR ___ MO ___ DAY ___ TIME ___ LAB NO ___

END DATE YR ___ MO ___ DAY ___ TIME ___ EQUIPMENT CODE ___

FLOW RATE ___ 50050 MGD ___ 50053 1000's OF GAL DURING COMPOSITE PERIOD SAMPLER NAME CODE ___

WATER CHEMISTRY

LAB NO ___

SAMPLE CONTAINER	TAG COLOR	PRESERVATIVE	LABORATORY MOBILE	LABORATORY REGION	ANALYSES
1 gallon jug	purple white	~~27~~ 4°C		X	extractables (B/N, A), ICP scan/metals
1 pt jar	green	NaOH			cyanide
1 pt jar	red	$CuSO_4 + H_3PO_4$			$CuSO_4 + H_3PO_4$ phenol
2 VOA'S	green	4°C			

CONTACT JOHN ZIRSCHKY SAMPLE ☐ YES SPLIT ☒ NO

REMARKS well reported to be 305 feet deep, ~~taken~~ sample taken from tap near kitchen. Well was flushed for approx 3 minutes at full opening prior to sampling spec. cond 700 umhos

7 EPA 9263.10 (5)

GSA NC 70-1090

FIELD SHEET

ENVIRONMENTAL PROTECTION AGENCY – REGION VII

SURVEILLANCE AND ANALYSIS DIVISION, 25 FUNSTON ROAD, KANSAS CITY, KANSAS 65115

STATION IDENTIFICATION

SURVEY NO _____ SURVEY LEADER ZIRSCHKY STORET NO _____

DESCRIPTION BOB'S HOME SERVICE, Private residence #2

GRAB SAMPLE DATA

FLOW	TEMP °C		PH	DO	FECAL COLI	OIL & GREASE	OTHER	OTHER
☐ 00059 (GPM) ☐ 00061 (CFS)	AIR 00020	WATER 00010						

COLLECTION DATE YR 81 11 DAY March TIME 1300 hrs SAMPLER NAME CODE 307 LAB NO AA0402

			00400					

COLLECTION DATE YR ____ MO ____ DAY ____ TIME ____ SAMPLER NAME CODE ____ LAB NO ____

COLLECTION DATE YR ____ MO ____ DAY ____ TIME ____ SAMPLER NAME CODE ____ LAB NO ____

COLLECTION DATE YR ____ MO ____ DAY ____ TIME ____ SAMPLER NAME CODE ____ LAB NO ____

COMPOSITE SAMPLE DATA

BEGIN DATE YR ____ MO ____ DAY ____ TIME ____ LAB NO AA0402

END DATE YR ____ MO ____ DAY ____ TIME ____ EQUIPMENT CODE ____

FLOW RATE ____ 50050 MGD ____ 50057 1000's OF GAL DURING COMPOSITE PERIOD SAMPLER NAME CODE ____

WATER CHEMISTRY

LAB NO ____

SAMPLE CONTAINER	TAG COLOR	PRESERVATIVE	LABORATORY MOBILE	LABORATORY REGION	ANALYSES
1 gal glass jug	purple white	none		X	extractable org's ICP/Hg
1 pt glass jar	green	NaOH		X	Cyanide
1 pt glass jar	red	$CuSO_4 + H_3PO_4$		X	Phenols
2 VOA's	green				volatiles

CONTACT _____ SAMPLE ☐ YES SPLIT ☒ NO

REMARKS water was clear. Sample collected from household logs

7 EPA 9263 16 (75) GSA HC 78 16 95

FIELD SHEET

ENVIRONMENTAL PROTECTION AGENCY – REGION VII

SURVEILLANCE AND ANALYSIS DIVISION, 25 FUNSTON ROAD, KANSAS CITY, KANSAS 65115

STATION IDENTIFICATION

SURVEY NO _____ SURVEY LEADER ZIRSCHKY STORET NO _____

DESCRIPTION BOB'S HOME SERVICE

Pizwell #12

GRAB SAMPLE DATA

FLOW	TEMP °C		PH	DO	FECAL COLI	OIL & GREASE	OTHER	
☐ 00059 (GPM) ☐ 00061 (CFS)	AIR 00020	WATER 00010				-		

COLLECTION DATE YR 81 MO 03 DAY 11 TIME 0900 SAMPLER NAME CODE 181 LAB NO AA04-3

00400

COLLECTION DATE YR ___ MO ___ DAY ___ TIME ___ SAMPLER NAME CODE ___ LAB NO ___

COLLECTION DATE YR ___ MO ___ DAY ___ TIME ___ SAMPLER NAME CODE ___ LAB NO ___

COLLECTION DATE YR ___ MO ___ DAY ___ TIME ___ SAMPLER NAME CODE ___ LAB NO ___

COMPOSITE SAMPLE DATA

BEGIN DATE YR ___ MO ___ DAY ___ TIME ___ LAB NO ___

END DATE YR ___ MO ___ DAY ___ TIME ___ EQUIPMENT CODE ___

FLOW RATE ___ 50050 MGD ___ 50053 1000's OF GAL DURING COMPOSITE PERIOD SAMPLER NAME CODE ___

WATER CHEMISTRY

LAB NO AA0403

SAMPLE CONTAINER	TAG COLOR	PRESERVATIVE	LABORATORY MOBILE	LABORATORY REGION	ANALYSES
1 gal jug	purple			X	B/N, A, Pest
2 40ml vials	green			X	VOA
1 1 liter cubi	white	none		X	Met
1 1 liter cub.	green	NaOH		X	cyanide
1 1 liter cubi	Red.	CuSO4 + H3PO4		X	phenolics

CONTACT ___ SAMPLE ☐ YES SPLIT ☒ NO ___

REMARKS 3R

light brown mirky water

EPA 9263.10-75

FIELD SHEET
ENVIRONMENTAL PROTECTION AGENCY – REGION VII
SURVEILLANCE AND ANALYSIS DIVISION, 25 FUNSTON ROAD, KANSAS CITY, KANSAS 66115

STATION IDENTIFICATION

SURVEY NO _____ SURVEY LEADER ZIRSCHKY STORET NO _____

DESCRIPTION BOB'S HOME SERVICE
P Well #10

GRAB SAMPLE DATA

FLOW	TEMP °C AIR 00020	TEMP °C WATER 00010	PH	DO	FECAL COLI	OIL & GREASE	OTHER	
☐ CC039 (GPM) ☐ CC061 (CFS)			X				Conductivity	42
COLLECTION DATE YR 81 MO 03 DAY 11 TIME 1000 SAMPLER NAME CODE 181 LAB NO AA0404								
		11	00400 7				1800	
COLLECTION DATE YR ___ MO ___ DAY ___ TIME ___ SAMPLER NAME CODE ___ LAB NO ___								
COLLECTION DATE YR ___ MO ___ DAY ___ TIME ___ SAMPLER NAME CODE ___ LAB NO ___								
COLLECTION DATE YR ___ MO ___ DAY ___ TIME ___ SAMPLER NAME CODE ___ LAB NO ___								

COMPOSITE SAMPLE DATA

BEGIN DATE YR ___ MO ___ DAY ___ TIME ___ LAB NO ___

END DATE YR ___ MO ___ DAY ___ TIME ___ EQUIPMENT CODE ___

FLOW RATE ___ (50050) MGD ___ (50052) 1000's OF GAL DURING COMPOSITE PERIOD SAMPLER NAME CODE ___

WATER CHEMISTRY

LAB NO AA0404

SAMPLE CONTAINER	TAG COLOR	PRESERVATIVE	LABORATORY MOBILE	LABORATORY REGION	ANALYSES
1 gal jug	purple				B/N, A, Pest
2 40ml vials	green				VOA
1 1 Liter cubi	white	none			Mer
1 1 Liter cubi	green	NaOH			Cyanide
1 1 Liter cubi	red	$CuSO_4 + H_3PO_4$			Phenolics

CONTACT ___ SAMPLE ☐ YES SPLIT ☒ NO ___

REMARKS 3R
clear water, pH measured with Fisher Alkacid Full Range, Hkz. (pH paper). Conductivity measured with Graphic Controls Corp. Model pHM 7800 meter.

FIELD SHEET

ENVIRONMENTAL PROTECTION AGENCY – REGION VII

SURVEILLANCE AND ANALYSIS DIVISION, 25 FUNSTON ROAD, KANSAS CITY, KANSAS 65115

STATION IDENTIFICATION

SURVEY NO _____ SURVEY LEADER ZIRSCHKY STORET NO _____

DESCRIPTION BOB'S HOME SERVICE

Greatlakes Container

GRAB SAMPLE DATA

FLOW	TEMP °C		PH	DO	FECAL COLI	OIL & GREASE	OTHER	OTHER
00059 (GPM) 00061 (CFS)	AIR 00020	WATER 00010						

COLLECTION DATE YR 81 03 DAY 11 TIME 1525 SAMPLER NAME CODE 181 LAB NO AA0405

00400

COLLECTION DATE YR ____ MO ____ DAY ____ TIME ____ SAMPLER NAME CODE ____ LAB NO ____

COLLECTION DATE YR ____ MO ____ DAY ____ TIME ____ SAMPLER NAME CODE ____ LAB NO ____

COLLECTION DATE YR ____ MO ____ DAY ____ TIME ____ SAMPLER NAME CODE ____ LAB NO ____

COMPOSITE SAMPLE DATA

BEGIN DATE YR ____ MO ____ DAY ____ TIME ____ LAB NO ____

END DATE YR ____ MO ____ DAY ____ TIME ____ EQUIPMENT CODE ____

FLOW RATE ____ 50050 MGD ____ 50052 1000's OF GAL DURING COMPOSITE PERIOD SAMPLER NAME CODE ____

WATER CHEMISTRY

LAB NO AA0405

SAMPLE CONTAINER	TAG COLOR	PRESERVATIVE	LABORATORY MOBILE	LABORATORY REGION	ANALYSES
one	purple	none		X	B/N, A, Pest
One Pint Jar	white	none		X	Met

CONTACT _____ SAMPLE ☐ YES SPLIT ☒ NO

REMARKS 3H collected with SS spoon, Bulk load in drop box

cyanide & reactivity test requested by phone on 3-20-81 from. ~~E Kensley~~ R. Kloepfer

GSA KC 1 95

FIELD SHEET

ENVIRONMENTAL PROTECTION AGENCY – REGION VII

SURVEILLANCE AND ANALYSIS DIVISION, 25 FUNSTON ROAD, KANSAS CITY, KANSAS 65115

STATION IDENTIFICATION

SURVEY NO _____ SURVEY LEADER ZIRSCHKY STORET NO _____

DESCRIPTION BOB'S HOME SERVICE, East holding pond

GRAB SAMPLE DATA

FLOW	TEMP °C		PH	DO	FECAL COLI	OIL & GREASE	OTHER	
☐ 00059 (GPM) ☐ 00061 (CFS)	AIR 00020	WATER 00010						

COLLECTION DATE YR 81 Mar DAY 12 TIME 900/pm SAMPLER NAME CODE 307 LAB NO AA0406

00400

COLLECTION DATE YR ____ MO ____ DAY ____ TIME ____ SAMPLER NAME CODE ____ LAB NO ____

COLLECTION DATE YR ____ MO ____ DAY ____ TIME ____ SAMPLER NAME CODE ____ LAB NO ____

COLLECTION DATE YR ____ MO ____ DAY ____ TIME ____ SAMPLER NAME CODE ____ LAB NO ____

COMPOSITE SAMPLE DATA

BEGIN DATE YR ____ MO ____ DAY ____ TIME ____ LAB NO AA0406

END DATE YR ____ MO ____ DAY ____ TIME ____ EQUIPMENT CODE ____

FLOW RATE ____ 50050 MGD ____ 50052 1000's OF GAL DURING COMPOSITE PERIOD SAMPLER NAME CODE ____

WATER CHEMISTRY

LAB NO ____

SAMPLE CONTAINER	TAG COLOR	PRESERVATIVE	LABORATORY MOBILE	LABORATORY REGION	ANALYSES
1 gal jug	purple			X	extractable
1 cubit	white			X	ICP / Hg
1 cubit	green	NaOH		X	cyanide
1 cubit	red ~~green~~	$CuSO_4 + H_3PO_4$		X	~~volatile~~ Phenol
2 VOA's	green			X	volatile organic

CONTACT _____ SAMPLE ☐ YES SPLIT ☒ NO

REMARKS ~~[illegible]~~ water was clear & had frogs swimming in it

7 EPA 9263 16 751 GSA-MC 18 1695

FIELD SHEET

ENVIRONMENTAL PROTECTION AGENCY – REGION VII

SURVEILLANCE AND ANALYSIS DIVISION, 25 FUNSTON ROAD, KANSAS CITY, KANSAS 65115

STATION IDENTIFICATION

SURVEY NO _____ SURVEY LEADER ZIRSCHKY STORET NO _____

DESCRIPTION BOB'S HOME SERVICE, Downstream creek sample

GRAB SAMPLE DATA

FLOW	TEMP °C		PH	DO	FECAL COLI	OIL & GREASE	CYNIDE	
☐ 00059 (GPM) ☐ 00061 (CFS)	AIR 00020	WATER 00010						
COLLECTION DATE YR 81 MO Mar DAY 12 TIME 950hr SAMPLER NAME CODE 307 LAB NO AA0407								
			00400					
COLLECTION DATE YR ___ MO ___ DAY ___ TIME ___ SAMPLER NAME CODE ___ LAB NO ___								
COLLECTION DATE YR ___ MO ___ DAY ___ TIME ___ SAMPLER NAME CODE ___ LAB NO ___								
COLLECTION DATE YR ___ MO ___ DAY ___ TIME ___ SAMPLER NAME CODE ___ LAB NO ___								

COMPOSITE SAMPLE DATA

BEGIN DATE YR ___ MO ___ DAY ___ TIME ___ LAB NO ___

END DATE YR ___ MO ___ DAY ___ TIME ___ EQUIPMENT CODE ___

FLOW RATE ___ 50050 MGD ___ 50052 1000's OF GAL DURING COMPOSITE PERIOD SAMPLER NAME CODE ___

WATER CHEMISTRY

LAB NO AA0406

SAMPLE CONTAINER	TAG COLOR	PRESERVATIVE	LABORATORY MOBILE	LABORATORY REGION	ANALYSES
1 gal glass jug	purple			X	extractables
1 cubit	~~purple~~ green			X	cyanide
1 cubit	white			X	p/CP/Hg
1 cubit	red			X	phenols
2 VOA's	green			X	volatiles

CONTACT ___ SAMPLE ☐ YES SPLIT ☒ NO

REMARKS Sample point located near fallen log approximately 50-60 feet north of green barbed wire fence post. surface of water in creek was frozen.

EPA 9263.16/75

GSA NC 18 1/75

FIELD SHEET

ENVIRONMENTAL PROTECTION AGENCY — REGION VII

SURVEILLANCE AND ANALYSIS DIVISION, 25 FUNSTON ROAD, KANSAS CITY, KANSAS 65115

STATION IDENTIFICATION

SURVEY NO _____ SURVEY LEADER ZIRSCHKY STORET NO _____

DESCRIPTION BOB'S HOME SERVICE, Litton sludge sample

GRAB SAMPLE DATA

FLOW	TEMP °C		PH	DO	FECAL COLI	OIL & GREASE	OTHER	OTHER
☐ 00059 (GPM) ☐ 00061 (CFS)	AIR 00020	WATER 00010						

COLLECTION DATE YR 81 MAR DAY 12 TIME 1300 hrs SAMPLER NAME CODE _____ LAB NO AA0408

			00400					

COLLECTION DATE YR ____ MO ____ DAY ____ TIME ____ SAMPLER NAME CODE ____ LAB NO ____

COLLECTION DATE YR ____ MO ____ DAY ____ TIME ____ SAMPLER NAME CODE ____ LAB NO ____

COLLECTION DATE YR ____ MO ____ DAY ____ TIME ____ SAMPLER NAME CODE ____ LAB NO ____

COMPOSITE SAMPLE DATA

BEGIN DATE YR ____ MO ____ DAY ____ TIME ____ LAB NO ____

END DATE YR ____ MO ____ DAY ____ TIME ____ EQUIPMENT CODE ____

FLOW RATE ____ 50050 MGD ____ 50052 1000's OF GAL DURING COMPOSITE PERIOD SAMPLER NAME CODE ____

WATER CHEMISTRY

LAB NO AA0408

SAMPLE CONTAINER	TAG COLOR	PRESERVATIVE	LABORATORY MOBILE	LABORATORY REGION	ANALYSES
1 pint glass jar	purple white	~~extractable organ~~			ICP/Hg; extractable organ ~~[illegible]~~
	green	none			cyanides

CONTACT _____ SAMPLE ☐ YES SPLIT ☒ NO

REMARKS 3H

reactivity requested by phone 3-20-81 from R. Kloepfer

7 EPA 9263 (6 75) GSA MC 78 1695

FIELD SHEET

ENVIRONMENTAL PROTECTION AGENCY – REGION VII

SURVEILLANCE AND ANALYSIS DIVISION, 25 FUNSTON ROAD, KANSAS CITY, KANSAS 65115

STATION IDENTIFICATION

SURVEY NO _____ SURVEY LEADER ZIRSCHKY STORET NO _____

DESCRIPTION BOB'S HOME SERVICE
P. Well #8

GRAB SAMPLE DATA

FLOW	TEMP °C AIR	TEMP °C WATER	PH	DO	FECAL COLI	OIL & GREASE	OTHER	OTHER
☐ 00059 (GPM) ☐ 00061 (CFS)	00020	00010						

COLLECTION DATE YR 81 03 DAY 11 TIME 0700 SAMPLER NAME CODE 181 LAB NO AA0409

			00400				

COLLECTION DATE YR ____ MO ____ DAY ____ TIME ____ SAMPLER NAME CODE ____ LAB NO ____

COLLECTION DATE YR ____ MO ____ DAY ____ TIME ____ SAMPLER NAME CODE ____ LAB NO ____

COLLECTION DATE YR ____ MO ____ DAY ____ TIME ____ SAMPLER NAME CODE ____ LAB NO ____

COMPOSITE SAMPLE DATA

BEGIN DATE YR ____ MO ____ DAY ____ TIME ____ LAB NO ____

END DATE YR ____ MO ____ DAY ____ TIME ____ EQUIPMENT CODE ____

FLOW RATE ____ 50050 MGD ____ 50052 1000's OF GAL DURING COMPOSITE PERIOD SAMPLER NAME CODE ____

WATER CHEMISTRY LAB NO AA0409

SAMPLE CONTAINER	TAG COLOR	PRESERVATIVE	LABORATORY MOBILE	LABORATORY REGION	ANALYSES
1gal jug ~~purple~~	white purple			X	ICP, Hg B/N, A, Pest
2 40ml vials	green			X	VOA
~~1 1Liter cub.~~	white	~~none~~		X	~~Met~~
~~1 1Liter cub.~~	~~red~~	~~$CuSO_4$ – H_3PO_4~~		X	Phenolics
~~1 1Liter cub.~~	~~green~~	~~NaOH~~		X	Cyanide

CONTACT _____ SAMPLE ☐ YES SPLIT ☒ NO

REMARKS 3R insufficient volume in well for complete sample
water grey & murky

7 EPA 9263 (6/75)

FIELD SHEET

ENVIRONMENTAL PROTECTION AGENCY – REGION VII

SURVEILLANCE AND ANALYSIS DIVISION, 25 FUNSTON ROAD, KANSAS CITY, KANSAS 65115

STATION IDENTIFICATION

SURVEY NO _____ SURVEY LEADER ZIRSCHKY STORET NO _____

DESCRIPTION BOB'S HOME SERVICE

f well #5

GRAB SAMPLE DATA

FLOW	TEMP °C		PH	DO	FECAL COLI	OIL & GREASE	OTHER	OTHER
☐ 00059 (GPM) ☐ 00061 (CFS)	AIR 00020	WATER 00010	X				Conduct. µmho	

COLLECTION DATE	YR	MO	DAY	TIME	SAMPLER NAME CODE	LAB NO
	81	03	11	0945	181	AA0410

		11.5	00400 6.8				1950

Change to 12, JJ

COLLECTION DATE	YR	MO	DAY	TIME	SAMPLER NAME CODE	LAB NO

COLLECTION DATE	YR	MO	DAY	TIME	SAMPLER NAME CODE	LAB NO

COLLECTION DATE	YR	MO	DAY	TIME	SAMPLER NAME CODE	LAB NO

COMPOSITE SAMPLE DATA

BEGIN DATE YR _____ MO _____ DAY _____ TIME _____ LAB NO _____

END DATE YR _____ MO _____ DAY _____ TIME _____ EQUIPMENT CODE _____

FLOW RATE _____ 50050 MGD _____ 50051 1000's OF GAL DURING COMPOSITE PERIOD SAMPLER NAME CODE _____

WATER CHEMISTRY

LAB NO AA0410

SAMPLE CONTAINER	TAG COLOR	PRESERVATIVE	LABORATORY MOBILE	LABORATORY REGION	ANALYSES
1 gallon jug	purple				B/N, A, Pest.
2 40 ml vials	green				VOA
1 1 Liter cubi	white	none			Met
1 1 Liter cubi	red	$CuSO_4 + H_3PO_4$			Phenolics
1 1 Liter cubi	green	NaOH			Cyanide

CONTACT _____ SAMPLE ☐ YES SPLIT ☒ NO _____

REMARKS 3R

date above is incorrect, well was sampled on 3-12-81

7 EPA 9263 (6-75) GSA #. 78-169

FIELD SHEET

ENVIRONMENTAL PROTECTION AGENCY – REGION VII

SURVEILLANCE AND ANALYSIS DIVISION, 25 FUNSTON ROAD, KANSAS CITY, KANSAS 65115

STATION IDENTIFICATION

SURVEY NO _____ SURVEY LEADER ZIRSCHKY STORET NO _____

DESCRIPTION BOB'S HOME SERVICE

Creek upstream

GRAB SAMPLE DATA

FLOW	TEMP °C AIR	TEMP °C WATER	PH	DO	FECAL COLI	OIL & GREASE	OTHER	OTHER
☐ 00059 (GPM) ☐ 00061 (CFS)	00020	00010	X				Cond 4	

COLLECTION DATE	YR	MO	DAY	TIME	SAMPLER NAME CODE	LAB NO
	81	03	12	1130	131	AA0411
	5	00400 7				340

COLLECTION DATE	YR	MO	DAY	TIME	SAMPLER NAME CODE	LAB NO

COLLECTION DATE	YR	MO	DAY	TIME	SAMPLER NAME CODE	LAB NO

COLLECTION DATE	YR	MO	DAY	TIME	SAMPLER NAME CODE	LAB NO

COMPOSITE SAMPLE DATA

BEGIN DATE YR _____ MO _____ DAY _____ TIME _____ LAB NO _____

END DATE YR _____ MO _____ DAY _____ TIME _____ EQUIPMENT CODE _____

FLOW RATE _____ 50050 MGD _____ 50052 1000's OF GAL DURING COMPOSITE PERIOD SAMPLER NAME CODE _____

WATER CHEMISTRY LAB NO AA0411

SAMPLE CONTAINER	TAG COLOR	PRESERVATIVE	LABORATORY MOBILE	LABORATORY REGION	ANALYSES
1 gallon jug	purple				B/N, A, Pest
2 40ml vials	green				VOA
1 1Liter cubi	white	none			Met
1 1Liter cubi	red	$CuSO_4 + H_3PO_4$			phenolics
1 1Liter cubi	green	NaOH			cyanide

CONTACT _____ SAMPLE ☐ YES SPLIT ☒ NO

REMARKS 3R, sample collected about 50' southwest of where creek crosses upstream road

FIELD SHEET

ENVIRONMENTAL PROTECTION AGENCY – REGION VII

SURVEILLANCE AND ANALYSIS DIVISION, 25 FUNSTON ROAD, KANSAS CITY, KANSAS 66115

STATION IDENTIFICATION

SURVEY NO _____ SURVEY LEADER ZIRSCHKY STORET NO _____

DESCRIPTION BOB'S HOME SERVICE

Monitoring Well

GRAB SAMPLE DATA

FLOW	TEMP °C AIR 00020	TEMP °C WATER 00010	PH	DO	FECAL COLI	OIL & GREASE	OTHER	CHIP
☐ 00059 (GPM) ☐ 00061 (CFS)							Cond. 4U	
COLLECTION DATE YR 81 MO 03 DAY 12 TIME 1445 SAMPLER NAME CODE 181 LAB NO AA0412								
			00400 5.7				1900	
COLLECTION DATE YR ___ MO ___ DAY ___ TIME ___ SAMPLER NAME CODE ___ LAB NO ___								
COLLECTION DATE YR ___ MO ___ DAY ___ TIME ___ SAMPLER NAME CODE ___ LAB NO ___								
COLLECTION DATE YR ___ MO ___ DAY ___ TIME ___ SAMPLER NAME CODE ___ LAB NO ___								

COMPOSITE SAMPLE DATA

BEGIN DATE YR ___ MO ___ DAY ___ TIME ___ LAB NO ___

END DATE YR ___ MO ___ DAY ___ TIME ___ EQUIPMENT CODE ___

FLOW RATE ___ 50050 MGD ___ 50052 1000's OF GAL DURING COMPOSITE PERIOD SAMPLER NAME CODE ___

WATER CHEMISTRY

LAB NO AA0412

SAMPLE CONTAINER	TAG COLOR	PRESERVATIVE	LABORATORY MOBILE	LABORATORY REGION	ANALYSES
1 gal jug	purple				B/N, A, Pest
2 40ml vials	green				VOA
1 1Liter cub.	white	none			Met
1 1Liter cub.	green	NaOH			Cyanide
1 1Liter cub.	red	$CuSO_4 + H_3PO_4$			Phenolics

CONTACT ___ SAMPLE ☐ YES SPLIT ☒ NO

REMARKS 3R, mw at northeast corner of B/S

7 EPA 9263 16 751

GSA R. 10 1 M

FIELD SHEET

ENVIRONMENTAL PROTECTION AGENCY – REGION VII

SURVEILLANCE AND ANALYSIS DIVISION, 25 FUNSTON ROAD, KANSAS CITY, KANSAS 65115

STATION IDENTIFICATION

SURVEY NO _____ SURVEY LEADER ZIRSCHKY STORET NO _____

DESCRIPTION BOB'S HOME SERVICE

Old well

GRAB SAMPLE DATA

FLOW	TEMP °C AIR	TEMP °C WATER	PH	DO	FECAL COLI	OIL & GREASE	OTHER	OTHER
☐ 00059 (GPM) ☐ 00061 (CFS)	00020	00010	X				Cond. µv	

COLLECTION DATE YR 81 MO 03 DAY 12 TIME 1530 SAMPLER NAME CODE _____ LAB NO AA0413

		9	00400 6				1850	

COLLECTION DATE YR _____ MO _____ DAY _____ TIME _____ SAMPLER NAME CODE _____ LAB NO _____

COLLECTION DATE YR _____ MO _____ DAY _____ TIME _____ SAMPLER NAME CODE _____ LAB NO _____

COLLECTION DATE YR _____ MO _____ DAY _____ TIME _____ SAMPLER NAME CODE _____ LAB NO _____

COMPOSITE SAMPLE DATA

BEGIN DATE YR _____ MO _____ DAY _____ TIME _____ LAB NO _____

END DATE YR _____ MO _____ DAY _____ TIME _____ EQUIPMENT CODE _____

FLOW RATE _____ 50050 MGD _____ 50052 1000 s OF GAL DURING COMPOSITE PERIOD SAMPLER NAME CODE _____

WATER CHEMISTRY LAB NO AA0413

SAMPLE CONTAINER	TAG COLOR	PRESERVATIVE	LABORATORY MOBILE	LABORATORY REGION	ANALYSES
1 gallon jug	purple				B/N, A, Pest
2 40 ml vials	green				VOA
1 1 Liter cubi	white	none			Met
1 1 Liter cubi	red	$CuSO_4 + H_3PO_4$			phenolics
1 1 Liter Cubi	green	$NaOH$			cyanide

CONTACT _____ SAMPLE ☐ YES SPLIT ☒ NO _____

REMARKS 3R

7 EPA 9263 (6/75) GSA KC 78 1695

FIELD SHEET

ENVIRONMENTAL PROTECTION AGENCY – REGION VII

SURVEILLANCE AND ANALYSIS DIVISION, 25 FUNSTON ROAD, KANSAS CITY, KANSAS 65115

STATION IDENTIFICATION

SURVEY NO _____ SURVEY LEADER ZIRSCHKY STORET NO _____

DESCRIPTION BOB'S HOME SERVICE

VOA Blank

GRAB SAMPLE DATA

FLOW	TEMP °C AIR	TEMP °C WATER	PH	DO	FECAL COLI	OIL & GREASE	OTHER	OTHER
☐ 00059 (GPM) ☐ 00061 (CFS)	00020	00010						

COLLECTION DATE YR 81 MO 03 DAY 12 TIME 1615 SAMPLER NAME CODE 181 LAB NO AA0414

00400

COLLECTION DATE YR ____ MO ____ DAY ____ TIME ____ SAMPLER NAME CODE ____ LAB NO ____

COLLECTION DATE YR ____ MO ____ DAY ____ TIME ____ SAMPLER NAME CODE ____ LAB NO ____

COLLECTION DATE YR ____ MO ____ DAY ____ TIME ____ SAMPLER NAME CODE ____ LAB NO ____

COMPOSITE SAMPLE DATA

BEGIN DATE YR ____ MO ____ DAY ____ TIME ____ LAB NO ____

END DATE YR ____ MO ____ DAY ____ TIME ____ EQUIPMENT CODE ____

FLOW RATE ____ 50050 MGD ____ 50052 1000's OF GAL DURING COMPOSITE PERIOD SAMPLER NAME CODE ____

WATER CHEMISTRY

LAB NO ____

SAMPLE CONTAINER	TAG COLOR	PRESERVATIVE	LABORATORY MOBILE	LABORATORY REGION	ANALYSES
2 40ml vials	green			X	VOA

CONTACT _____ SAMPLE ☐ YES SPLIT ☒ NO

REMARKS _____

7 EPA 9263 (6-75)

GSA HC 76-...

T013-P01-603-004

FIELD INVESTIGATIONS OF UNCONTROLLED HAZARDOUS WASTE SITES

FIT PROJECT

TASK REPORT TO THE ENVIRONMENTAL PROTECTION AGENCY CONTRACT NO. 68-01-6056

BOBS HOME SERVICE
Wright City, Missouri

Sample Report
TDD F7-8102-7A
August 28, 1981

Prepared By: Region VII FIT

ecology and environment, inc.

International Specialists in the Environmental Sciences

063100

INDEX

	PAGES
I. Introduction	1
2. Summary of Data	3
2.1 Field Measurements	3
2.2 Extractable Organics	3
2.2.1 Acid Fraction	3
2.2.2 Pesticide Fraction	6
2.2.3 Base/Neutral Fraction	6
2.3 Volatile Organics	7
2.4 Metals	7
2.5 Cyanide and Mercury	9
3. Comparison of Related Samples	10
3.1 BHS Creek; upstream vs. downstream	10
3.2 BHS monitoring well vs. old well	12
3.3 Piezometer wells	13
3.4 Private wells	14
4. Comparison of Past Monitoring Data	17
5. Incoming Waste Analysis	22
5.1 BHS Incoming waste analysis plan	22
5.2 Sample number AA0405 - Greatlakes Containers	22
5.3 Sample number AA0408 - Litton Sludge	23
6. Summary	28
7. References	31
8. Attachments	32

LIST OF TABLES

		Page
Table 1 :	List of Samples Taken During the March 10-12, 1981 Inspection of Bob's Home Service.	4
Table 2 :	Bob's Home Service Field Measurements.	5
Table 3 :	Concentration of metals found in samples taken from Bob's Home Service March 10-12, 1981.	8
Table 4 :	Comparison of BHS Creek Samples from Bob's Home Service.	11
Table 5 :	Comparison of Monitoring Well and Old Well Samples from Bob's Home Service.	13
Table 6 :	Comparison of Piezometer Well Samples from Bob's Home Service.	15
Table 7 :	Comparison of Private Well Samples from Bob's Home Service.	16
Table 8 :	Summary of BHS Monitoring Well Data.	18
Table 9 :	Summary of BHS Piezometer Well 5 Data.	18
Table 10:	Summary of BHS Piezometer Well 8 Data.	20
Table 11:	Summary of Piezometer Well 10 Data.	20
Table 12:	Summary of BHS Piezometer Well 12 Data.	21
Table 13:	Summary of Analysis Conducted on Waste from Greatlakes Containers Corporation.	24
Table 14:	Summary of Substances Detected in Greatlakes Containers Corporation Waste by EPA.	25
Table 15:	Summary of Analysis Conducted on Litton Systems Waste.	26

SECTION 1

INTRODUCTION

On March 10-12, 1981, a joint uncontrolled hazardous waste site (UHWS) and Resource Conservation and Recovery Act (RCRA) inspection was conducted at Bob's Home Service, Wright City, Missouri under TDD F-7-8102-7. During this inspection, several samples were taken from the area surrounding the active disposal site. The objectives of this sampling effort were as follows:

1) to determine if any leachate was migrating from the disposal area,
2) compare the sample data from this inspection with past monitoring data to identify any significant declines in the water quality, and
3) to evaluate the effectiveness of the monitoring system employed by Bob's Home Service, (BHS).

Samples of incoming waste were also collected during the March, 1981 inspection. These samples were collected to determine the accuracy of the analytical results provided by the waste generator to BHS and to evaluate the incoming waste screening system used by BHS.

This report presents a review of the analytical data generated during the March, 1981 sampling effort. The analysis includes the following:

1) A brief description of the sampling data, including a summary of all the compounds detected in the samples.
2) A comparison of samples taken from related areas. For example, the upstream vs. downstream sample results from the BHS creek were compared.

3) A comparison of the samples taken in March, 1981 to the past monitoring data collected by BHS.

4) A brief description of the incoming waste samples, and a comparison of the analysis of these wastes to the analyses of the wastes provided by the waste generators.

SECTION 2

DATA SUMMARY

A brief summary of all of the compounds identified in the water samples collected at Bob's Home Service is presented in this section. A total of 11 water samples were taken from the site. Table 1 provides a brief description of the location of each sample, and Figure 1 shows the location of the sampling points in relation to the disposal area. A more thorough description of the sampling locations, collection methodologies, and techniques can be found in the May 8, 1981 BHS site inspection report (TDD F-7-8102-7). All the water samples were analyzed for extractable organics, metals, mercury, and cyanides. Copies of the sample field sheets are included in the attachments to this report.

2.1 Field Measurements

Measurements for temperature, pH and specific conductivity were taken in the field for several of the water samples. The pH measurements were obtained using a Fisher Alkacid Full Range pH Kit, and the specific conductivity was measured using a Graphic Controls Corporation Model PHM 7800 conductivity meter. Table 2 lists the field measurements taken, and includes a brief description of each sample.

2.2 Extractable Organics

2.2.1 Acid Fraction

The acid fraction consists of a group of eleven priority pollutant phenolic compounds. Analysis of the water samples taken at BHS did not

Table 1: List of Samples Taken During the March 10-12, 1981 Inspection of Bob's Home Service.

Sample Number	Description
AA0401	Resident Well #1 (pw1)
AA0402	Resident Well #2 (pw2)
AA0403	Piezometer Well #12
AA0404	Piezometer Well #10
AA0405	Great Lakes Containers Sludge
AA0406	East Holding Lagoon
AA0407	BHS Creek Downstream
AA0408	Litton Sludge
AA0409	Piezometer Well #8
AA0410	Piezometer Well #5
AA0411	BHS Creek Upstream
AA0412	BHS Monitoring Well (mw)
AA0413	BHS Old Well (ow)

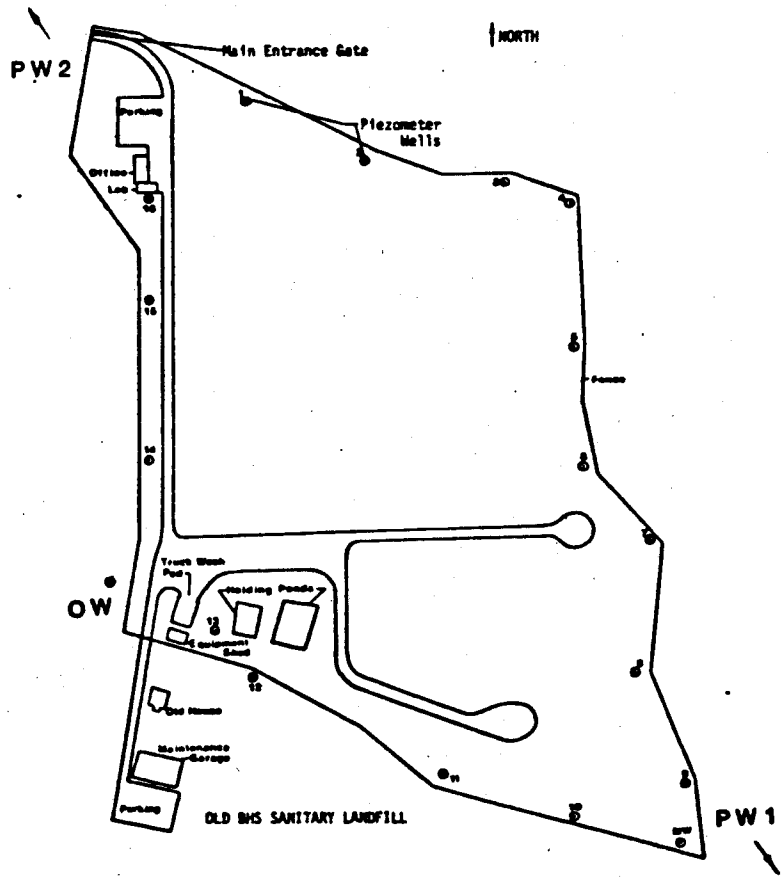

Figure 1. Location of Bob's Home Service Sampling Points

Table 2: Bob's Home Service Field Measurements

Sample Number	Sample Description	pH	Specific Conductivity (umhos)	Physical Appearance
AA0401	Residence Well #1	7.0	700	clear
AA0402	Residence Well #2	7.0	1300	clear
AA0403	Piezometer Well #12	NS	NS	muddy
AA0404	Piezometer Well #10	7.0	2000	slightly cloudy
AA0409	Piezometer Well #8	NS	NS	cloudy
AA0410	Piezometer Well #5	6.8	1950	slightly cloudy
AA0412	BHS Monitoring Well	5.7	1900	clear
AA0413	BHS Old Well	6.0	1850	clear

NS: Insufficient amount of sample was obtained to conduct field measurements.

detect any of the compounds included in the acid fraction above the detection limits of the analytical equipment used. The detection limit varies for each of the compounds in the fraction, but is generally around 1.0 part per trillion.

2.2.2 Pesticide Fraction

The pesticide fraction consists of a group of 26 priority pollutant pesticide compounds. None of the pesticide compounds were found in any of the water samples from BHS above the detection limits of the analytical equipment used.

2.2.3 Base/Neutral Fraction

Of the 46 organic priority pollutant compounds included in the base/neutral fraction of the extractable organics analysis, only one compound was detected. Bis-(2-ethylhexyl)phthalate was found in sample number AA0407 (downstream creek sample) at a concentration of 38 micrograms per liter (ug/l). This compound was not detected in any of the other samples, including the upstream sample or the piezometer well samples.

Bis-(2-ethylhexyl)phthalate is a member of a group of phthalate esters which have been used as plasticizers, particularly in polyvinyl chloride plastics. Bis-(2-ethylhexyl)phthalate is reported to be widely distributed in the environment, having been found in well water, oil, soil, plants, fish, animals, and humans. Phthalate ester residues have been correlated with drainage from industrial and heavily populated areas, but may also be biosynthesized and occur naturally in certain plants (1). It has also been reported by EPA laboratory personnel that bis-(2-ethylhexyl) phthalate is frequently found in blank samples due to laboratory contamination (2).

The U. S. Environmental Protection Agency has established a criterion of 3 ug/l for phthalate esters to protect freshwater aquatic life. No data was found concerning the acute toxicity for bis-(2-ethylhexyl)phthalate specifically, but other phthalate esters have been shown to have 96-hour LC_{50} (lethal concentration to 50% of a specified population over a given period of time) of 1.3 mg/l for the fathead minnow, Pimephales promelas (3). Certain aquatic organisms have also been shown to have the ability to accumulate phthalate esters.

2.3 Volatile Organics

The volatile organics consist of a group of 31 purgeable priority pollutant compounds. One of the volatile organic compounds was detected in two separate samples. 1,1,2,2-tetrachloroethane was detected at concentrations of 3 ug/l and 2 ug/l in sample numbers AA0402 (residence well #2) and AA0412 (BHS monitoring well), respectively.

1,1,2,2-tetrachloroethane is a nonflammable solvent for fats, oils, waxes. resins and rubbers. It is used in the manufacturing of paints, varnishes and rust removers (4). Acute toxicity data indicates that 1,1,2,2-tetrachloroethane has an LC_{LO}-rat (lowest reported lethal dose for a specified population) of 1,000 ppm for 4 hours, and an oral LD_{50}-rat of 200 mg/kg (5).

2.4 Metals

Several metals were detected in the water samples. Table 3 summarizes the concentrations of the metals found and the maximum standard for domestic drinking water as specified by EPA. From Table 3, it can be seen that only iron and manganese are present in the samples above the drinking

TABLE 3: Concentration of metals found in samples taken from Bob's Home Service March 10-12, 1981.

Metals	Drinking Water Standard*	SAMPLE NUMBER AA0401	AA0402	AA0403	AA0404	AA0406	AA0407	AA0409	AA0410	AA0411	AA0421	AA0413
Aluminum (ug/l)	--	33	100	10,100	857	101	640	2,980	3,280	98	2,970	142
Barium (ug/l)	1,000	54	36	113	31	67	77	84	83	51	58	26
Cadmium (ug/l)	10	<2	<2	<2	<3	<2	<2	<2	<2	<2	<2	<2
Chromium (ug/l)	50	<5	<5	21	<5	<5	<5	13	7	<5	8	<5
Copper (ug/l)	1,000	<2	<2	26	4	5	<2	11	7	6	34	<2
Iron (ug/l)	300	1,870**	6,310	22,600	1,170	328	687	6,000	6,050	162	27,000	9,350
Manganese (ug/l)	50	29	25	866	60	54	126	451	752	61	661	283
Nickel (ug/l)	--	<10	<10	38	77	<10	<10	37	17	<10	17	<10
Lead (ug/l)	50	<50	<50	<50	55	<50	<50	<50	<50	<50	73	<50
Calcium (mg/l)	--	90	170	499	263	61	52	395	343	50	323	308
Magnesium (mg/l)	--	31	73	170	89	20	9	107	94	6	119	107
Sodium (mg/l)	--	12	38	149	45	54	10	35	27	5	44	38
Zinc (ug/l)	5,000	1,170	488	93	105	<20	<20	<20	<20	34	258	65

*Adapted from Quality Criteria For Water, U. S. Environmental Protection Agency, July, 1976
**Values underlined exceed the Drinking Water Standard

water standards. Iron is a major constituent of many soils, particularly clay soils. The soil surrounding the disposal area at BHS are characterized as stabilized Kaolinitic clay soils. These soils commonly have high levels of aluminum, silicon, and iron (6). Iron, however, is also a major constituent of landfill leachate (7).

Although the iron and manganese concentrations found in the groundwater surrounding BHS are in excess of the drinking water standards, the high concentrations of these metals should not be toxic to humans. The drinking water standard of 0.3 mg/l for iron is based on the fact that iron can produce an objectionable taste in beverages and can stain laundered clothes and plumbing fixtures. The drinking water criterion for manganese, 50 ug/l, is also based on aesthetic rather than toxicological effects. Manganese, like iron, can produce an objectionable taste and stain laundered clothes.

2.5 Cyanide and Mercury

Analytical tests were run for total cyanides and mercury on all the samples taken during the March inspection. None of the samples showed concentrations of cyanide above 3 ug/l, the detection limit for cyanide. Mercury, however, was detected in AA0413 (BHS old well) at 0.7 ug/l. Mercury was not detected (detection limit - 0.2 ug/l) in any of the other samples.

SECTION 3

DATA ANALYSIS

This section contains a brief comparison of samples taken from related areas of BHS. Comparisons will be made between three sets of sampling points;

1) BHS Creek; upstream vs. downstream,
2) Monitoring well vs. Old well,
3) Piezometer wells 5, 8, 10 and 12.

The purpose of this section is to determine if samples taken from areas located downgradient from the active disposal area show any evidence of being adversly affected by contaminants from the site. A brief discussion of the private well monitoring data is also presented.

3.1 BHS Creek; upstream vs. downstream

Two stream samples were taken from the BHS creek during the March, 1981 inspection. The location of these sampling points is indicated on Figure 1. Table 4 lists the compounds found in each of the samples and their respective concentrations.

Sample number AA0407 taken downstream from the active disposal area shows a higher concentration of several metals. The greatest increase occurs in aluminum, iron, and manganese. Leachate migration from BHS could be causing this increase; however, because these three metals are major constituents of the soil in the area, this increase could also be due to increased soil weathering as a result of removal of the vegetative cover in the area. Also, these metals could be leaching into the creek from the old solid waste disposal area previously operated by BHS.

Table 4: Comparison of BHS Creek Samples From Bobs Home Service

	Sample #AA0411 Upstream Sample	Sample #AA0407 Downstream Sample
Aluminum (ug/l)	98	640
Barium (ug/l)	51	77
Iron (ug/l)	162	687
Manganese (ug/l)	61	126
Calcium (mg/l)	50	52
Sodium (mg/l)	5	10
Copper (ug/l)	6	<5
Zinc (ug/l)	34	<20
Magnesium (mg/l)	6	9
Phenolics (ug/l)	13.0	8.0
Bis-(2-Ethylhexyl)Phthalate, (ug/l)	<9.3	38.0

One other compound was identified in the downstream sample and not the upstream sample. Bis-(2-ethylhexyl) phthalate was detected in the downstream sample at a concentration of 38 ug/l. The source of this compound cannot be determined without further investigation, however, a few possible sources for this compound are listed below:

1) Bis-(2-ethylhexyl) phthalate is commonly found in blank samples, and detection in sample number AA0407 could be due to laboratory contamination.

2) Bis-(2-ethylhexyl) phthalate could be leaching from either the active portions of BHS or the old disposal area.

3.2 BHS Monitoring Well vs. Old Well

The BHS monitoring well is located at the southeast corner of the active disposal area. It is approximately 150 feet deep, extending 10 feet into bedrock. The BHS old well is located at the southwest corner of the site, upgradient from the active area. It is approximately the same depth as the monitoring well, also extending approximately 10 feet into bedrock. These two wells have been identified by BHS to be used in their RCRA groundwater monitoring system. A more thorough description of these wells can be found in the May 8, 1981 BHS site inspection report.

A total of 13 priority pollutants were identified in the two well samples. Of the 13 substances identified, 11 were metals. Table 5 lists all the substances found and the respective concentrations. Sample Number AA0412 taken from the monitoring well shows a greater concentration of each of these compounds. This increase is very small for some metals, with the greatest increase in aluminum and iron. Also, four metals were detected in the monitoring well which were not detected in the old well. These four metals were chromium, copper, nickel, and lead. 1,1,2,2-tetrachloroethane was also detected in the monitoring well, but not in the old well. Subsurface leachate migration may, therefore, be occurring.

Table 5: Comparison of Monitoring Well and Old Well Samples from Bob's Home Service.

	Sample #AA0412 Monitoring Well	Sample #AA0413 Old Well
Aluminium (ug/l)	2,970	142
Barium (ug/l)	58	26
Iron (ug/l)	27,000	9,350
Manganese (ug/l)	661	283
Zinc (ug/l)	258	65
Calcium (mg/l)	323	308
Magnesium (mg/l)	119	107
Sodium (mg/l)	44	38
Chromium (ug/l)	8	<5
Copper (ug/l)	34	<2
Nickel (ug/l)	17	<10
Lead (ug/l)	73	<50
Phenolics (ug/l)	19.0	10.0
1,2,2,2 Tetrachloroethane (ug/l)	2	<1

3.3 Piezometer Wells

A total of four piezometer wells were sampled during the March 10-12, 1981 inspection. All these wells are located around the perimeter of the active disposal area and extend approximately 35 feet below the surface. A more thorough description of the piezometer wells can be found in the May 8, 1981 BHS site inspection report.

No extractable or volatile organics were detected in any of the piezometer wells. Thirteen of the priority pollutant metals, however, were detected in one or more of these wells, and phenolics were detected in one of the wells. Table 6 lists all the substances identified and the respective concentrations found in each well. Most of the metal concentrations were not significantly different between wells. Aluminum and iron were, however, significantly higher in well number 12. This well is believed to be contaminated, as discussed in the May, 1981 BHS inspection report. Lead and cadmium were only detected in well number 10, and total phenolics were detected only in well number 5.

3.4 Private wells; Number 1 and Number 2

Two private wells were sampled during the March 10-12, 1981 inspection. The location of these wells are shown in Figure 2. Private well number 1 (AA0401) was estimated by the owner to be approximately 325 feet deep and is located approximately one-half mile southeast of the disposal area. Private well Number 2 (AA0402) is located approximately one-quarter mile northwest of the site, and is 404 feet deep. Table 7 summarizes the substances detected in each of the wells and the concentrations. Nine metals were detectable in both of the wells. The concentrations of these metals varied between the wells, but do not appear to be significantly different. 1,1,2,2-tetrachloroethane was also detected in private well number 1. The source of this compound has not been determined.

Table 6: Comparison of Piezometer Well Samples from Bob's Home Service.

	Sample #AA0403 (p-well #12)	Sample #AA0404 (p-well #10)	Sample #AA0409 (p-well #8)	Sample #AA0410 (p-well #5)
Aluminum (ug/l)	10,100	857	2,980	3,280
Barium (ug/l)	113	31	84	83
Chromium (ug/l)	21	<5	13	7
Copper (ug/l)	26	4	11	7
Iron (ug/l)	22,600	1,170	6,000	3,050
Manganese(ug/l)	866	60	451	752
Nickel (ug/l)	38	77	37	17
Lead (ug/l)	<50	55	<50	<50
Zinc (ug/l)	93	105	<20	<20
Calcium (ug/l)	499	263	395	343
Magnesium(ug/l)	170	89	107	94
Sodium (ug/l)	149	45	35	27
Cadmium (µg/l)	<2	3	<2	<2
Phenolics(ug/l)	<5	<5	NA	11

N.A. - not analyzed

Table 7: Comparison of Private Well Samples from Bob's Home Service.

Parameter	AA0401 (private well 1)	AA0402 (private well 2)
Alumnium (ug/l)	33	100
Barium (ug/l)	54	36
Iron (ug/l)	1870	6310
Manganese (ug/l)	29	25
Zinc (ug/l)	1170	488
Calcium (mg/l)	90	170
Magnesium (mg/l)	31	73
Sodium (mg/l)	12	38
1,1,2,2 tetrachloroethane (ug/l)	<1	3

SECTION 4
COMPARISON OF PAST MONITORING DATA

Since 1977, Bob's Home Service has monitored the quality of the groundwater surrounding the disposal site. Although indicator parameters are analyzed for on a quarterly basis, a more extensive analysis is conducted annually. Following is a comparison of the data generated by the annual monitoring of the groundwater to well samples taken during the March 10-12, 1981 inspection. Only substances that were analyzed for each year and were detectable are included in the comparison. A chart is included for each of the piezometer wells and the monitoring well, followed by a noting of any significant changes in the data.

Bob's Home Service has employed an independent laboratory to conduct the annual analysis. In 1977, the analysis was conducted by Industrial Testing Laboratories, Inc., St. Louis, Missouri. The 1978-1980 samples were analyzed by Missouri Testing Laboratories, Columbia, Missouri. Samples collected during the March, 1981 inspection were analyzed for by the Region VII laboratory of the Environmental Protection Agency.

The data from the BHS monitoring well shows a steady increase in the concentration of iron (Table 8). As iron is a major component of leachate, leachate contamination of this well may be occurring. None of the other metals, however, show a similar increase, as might be expected if leachate migration was occurring. Thus, the increase could be due to other factors, such as microbiological concentration of iron in the well. Iron bacteria have often been found and have caused the accumulation of iron in the wells. (8). A positive determination of the cause of the steady increase in iron can not be made based upon this data.

Table 8. Summary of BHS Monitoring Well Data*

	1977	1978	1979	1980	1981(EPA)
Cadmium	< 0.01	< 0.002	< 0.002	< 0.01	< 0.002
Chromium	< 0.01	< 0.02	< 0.02	< 0.02	0.008
Copper	0.01	0.025	0.03	0.05	0.034
Iron	0.08	3.9	15.0	24.0	27.0
Lead	0.06	< 0.05	< 0.05	< 0.1	0.073
Manganese	2.04	1.2	< 0.01	0.77	0.661
Nickel	0.03	0.12	< 0.02	< 0.02	0.017
Zinc	2.9	0.45	0.12	0.46	0.258
Barium		0.1	< 0.03	< 0.01	0.058

Table 9. Summary of BHS Piezometer Well 5 Data*

	1977	1978	1979	1980	1981(EPA)
Cadmium	< 0.01	< 0.002	< 0.002	< 0.01	< 0.002
Chromium	< 0.01	< 0.02	< 0.02	< 0.02	0.007
Copper	0.01	< 0.01	< 0.01	< 0.01	0.007
Iron	0.09	3.1	1.7	3.2	3.05
Lead	0.07	< 0.05	< 0.05	< 0.1	< 0.05
Manganese	2.79	1.6	< 0.01	0.88	0.752
Nickel	0.04	0.04	< 0.02	< 0.02	0.017
Zinc	0.03	< 0.005	0.1	0.1	< 0.02
Barium		0.77	< 0.03	< 0.1	0.083

*All concentrations expressed as milligrams per liter

Piezometer wells 5,8, and 10 show no positive indication of contamination. No steady increases in any of the metals were found in any of these wells (Tables 9-12). High metal values were found in piezometer well 8 in 1979; however, these high values may have been the result of an analytical error.

Piezometer well 12, on the other hand, shows very high concentrations of iron. This well is believed to have been contaminated by leachate from either the active or old BHS disposal areas. The May 8, 1981 BHS inspection report should be referenced for a discussion of the possible contamination of this well.

Table 10. Summary of BHS Piezometer Well 8 Data *

	1977	1978	1979	1980	1981(EPA)
Cadmium	<0.01	<0.002	<0.002	<0.01	<0.002
Chromium	<0.01	<0.02	0.10	<0.02	0.013
Copper	0.01	<0.01	0.05	<0.01	0.011
Iron	0.11	2.5	83.0	0.2	6.0
Lead	0.06	<0.05	<0.05	<0.1	<0.05
Manganese	1.76	0.4	3.2	0.1	0.451
Nickel	0.04	0.04	0.3	<0.02	0.037
Zinc	0.02	<0.005	0.41	0.07	<0.02
Barium		0.19	<0.03	<0.1	0.084

Table 11. Summary of Piezometer Well 10 Data*

	1977	1978	1979	1980	1981(EPA)
Cadmium	<0.01	<0.002	<0.03	<0.01	0.003
Chromium	<0.01	<0.02	<0.02	<0.02	<0.005
Copper	0.01	<0.01	<0.01	<0.01	0.004
Iron	0.07	1.4	2.7	6.2	1.17
Lead	0.06	<0.05	<0.05	<0.01	0.056
Manganese	0.31	0.1	<0.01	0.06	0.06
Nickel	0.2	0.3	<0.02	0.17	0.077
Zinc	0.02	<0.005	0.06	0.35	0.105
Barium		<0.03	<0.03	<0.1	0.031

* All concentrations expressed as milligrams per liter.

Table 12. Summary of BHS Piezometer Well 12 Data*

	1977	1978	1979	1980	1981(EPA)
Cadmium	No sample	No sample	<0.002	<0.01	<0.002
Chromium			0.04	<0.02	0.021
Copper			<0.01	<0.01	0.026
Iron			45.0	17.0	22.6
Lead			<0.05	<0.1	<0.05
Manganese			<0.01	0.15	0.866
Nickel			0.07	<0.02	0.038
Zinc			0.28	0.04	0.093
Barium			<0.03	<0.1	0.113

* All concentrations expressed as milligrams per liter

SECTION 5
INCOMING WASTE ANALYSIS

5.1 BHS Incoming Waste Analysis Plan

Bob's Home Service's waste analysis plan requires all incoming waste to be accompanied by a generator's manifest. This manifest is required to contain a physical description of the waste including pH, specific gravity, and percent volatile at 100°C and 600°C. Also required on the manifest are:

- name, address and telephone number of the generator,
- generator's identification number,
- waste stream identification number,
- a brief description of the generation process,
- a listing of the major hazardous components and their corresponding concentrations.

Bob's Home Service's waste analysis plan requires BHS to conduct four tests on all incoming waste: pH, specific gravity and percent volatiles at 100°C and 600°C. The results of these tests are compared to the information on the generators manifest. If any discrepancies are identified, then a sample of the waste is sent to an independent laboratory for further analysis. If further analysis indicates that the generators information is not accurate, then the waste is returned to the generator.

5.2 Sample Number AA0405 - Greatlakes Containers

Sample number AA0405 was taken from incoming waste generated by Greatlakes Containers Corporation, St. Louis, Missouri, (GLC). GLC described the waste as a mixture of oven sludge, dust and wash sludge from a container reclaiming operation. The manifest accompanying the waste included a listing of the wastes major hazardous components and their concentrations, the pH and specific gravity of the waste, and the percent volatile at 550°C.

Table 13 summarizes the information contained on the manifest and also includes the results of tests conducted on the waste by Bob's Home Service (BHS) and the Environmental Protection Agency, Region VII laboratory, (EPA).

From the information in Table 13, the following points should be noted:

1. Greatlakes Containers did not include on their manifest the percent volatiles at 100°C and 600°C as required by Bob's Home Service; therefore, Bob's Home Service accepted the waste on the basis of pH and specific gravity.

2. Greatlakes Containers, (GLC), reported no barium in the waste, while the EPA detected 335 mg/kg of barium.

3. EPA detected no cyanides in the waste while GLC reported 330 ppm.

4. EPA detected no phenolics in the waste while GLC reported 26.4 ppm.

Analysis of the sludge by the Environmental Protection Agency was much more extensive than either GLC or BHS and several additional substances were identified in the sludge. These substances and their respective concentrations are listed in Table 14. Thus, the analyses conducted by GLC were not sufficient to adequately characterize their waste. The BHS waste screening procedures also do not appear adequate to detect any descrepancies in the GLC waste characteristics.

5.3 Sample Number AA0408 - Litton Sludge

The manifest accompanying this waste described it as a black, non-transparent sludge with an ammonical odor from the wastewater treatment works of Litton Systems Incorporated; Springfield, Missouri. Information on the manifest included the four tests required by BHS and listed the major components of the sludge as chromium, cyanide, copper, nickel and zinc. Table 15 is a summary of the information on the manifest and the corresponding values for tests conducted by BHS and EPA on samples of the sludge taken on March 12, 1981.

Table 13: Summary of Analysis Conducted on Waste from Greatlakes Containers Corporation

Parameter	GLC	BHS	EPA
pH	11.4	8.3	-
specific gravity	0.81 gm/ml	1.6 gm/ml	-
% Volatile-100°C	-	16%	-
% Volatile-550°C	48.9%	-	-
% Volatile-600°C	-	43%	-
Arsenic	0.04 mg/l	-	<50 mg/kg
Barium	None	-	335 mg/kg
Cadmium	3.3 mg/l	-	24.6 mg/kg
Chromium	10.35 mg/l	-	348 mg/kg
Lead	127.2 mg/l	-	4110 mg/kg
Mercury	0.006 mg/l	-	0.5 mg/kg
Cyanides	330 ppm	-	<1 mg/kg
Phenols	26.4 ppm	-	None detected

GLC - information from Greatlakes Container waste manifest

BHS - analyses conducted by Bobs Home Service on waste received from Greatlakes containers

EPA - analyses conducted by the Environmental Protection Agency, Region VII laboratory on waste received by BHS from GLC.

Table 14: Summary of Substances Detected in Greatlakes Containers Corporation Waste by EPA.

Substance	Concentration
Phenanthrene	1500 mg/kg
Fluoranthene	850 mg/kg
Pyrene	710 mg/kg
Butyl-benzyl-phthalate	400 mg/kg
Bis-(2-ethylhexyl)phthalate	450 mg/kg
Chrysene	240 mg/kg
Benzo(A)pyrene	380 mg/kg
Napthalene	970 mg/kg
Acenapthene	520 mg/kg
Fluorene	560 mg/kg
Copper	145 mg/kg
Iron	9560 mg/kg
Manganese	17500 mg/kg
Nickel	20.1 mg/kg

Table 15. Summary of Analysis Conducted on Litton Systems Waste.

Parameter	Litton	BHS	EPA
pH	10	8.9	-
specific gravity	1.072 gm/ml	1.3 gm/ml	-
% Volatile-100°C	77.7%	45%	-
% Volatile-600°C	87.9%	65%	-
Chromium	1980 ppm	-	11,000 ppm
Copper	2900 ppm	-	122,000 ppm
Cyanide	4 ppm	-	39 ppm
Nickel	270 ppm	-	404 ppm
Zinc	120 ppm	-	517 ppm
bis-(2-ethylhexyl)phthalate	-	-	17,400 ppm

GLC - information from Greatlakes Container waste manifest

BHS - analyses conducted by Bobs Home Service on waste received from Greatlakes containers

EPA - analyses conducted by the Environmental Protection Agency Region VII laboratory on waste received by BHS from GLC.

Bob's Home Service's analyses agree reasonably well with the corresponding values on the generators manifest. Higher concentrations of cyanide and metals, however, were found by the EPA Region VII laboratory. In addition, bis-(2-ethylhexyl) phthalate was found to be a significant component of this waste.

Summary

As discussed in the May 8, 1981 BHS site inspection report, the BHS waste screening procedures do not appear adequate and should be revised. The wastes from Great Lakes Container Corporation (GLC) appear to differ significantly from the waste characteristics provided by GLC. Some differences were also apparent in the waste characteristics from Litton Systems, Inc.

6. SUMMARY

On March 10-12, 1981 a joint uncontrolled hazardous waste site, (UHWS) and Resource Conservation and Recovery Act, (RCRA) inspection was conducted at Bob's Home Service, Wright City, Missouri. Samples taken during this inspection were analyzed for extractable organics, metals, and cyanides by the Region 7 laboratory of the Environmental Protection Agency. This report is a summary of the data generated by the March, 1981 samples.

A general review of the sample data indicates that none of the sample points surrounding the disposal area have been contaminated. However, in most of the wells sampled, only the concentrations of iron and manganese exceeded the national drinking water criterion. These high iron and manganese levels are probably characteristic of the area, although some leachate migration may be occurring. Two nonmetal priority pollutant compounds were detected in at least one of the water samples. Bis-(2-ethyhhexyl) phthalate was detected in the BHS downstream creek sample, and 1,1,2,2 tetrachloroethane was detected in both the BHS monitoring well and the private well 2. The source of these compounds cannot be determined without further investigations.

Data generated during the March, 1981 inspection also indicates that sampling points located downgradient from the disposal area were not significantly different from the related sample point located upgradient from the site. Only the BHS downstream creek sample showed higher concentrations of contaminants than the related upstream sample. Several possible sources for this increase exist, including natural soil weathering and leachate migration. A further investigation of BHS would be necessary to positively identify the source of this increase.

Comparing the March, 1981 data to data collected by Bob's Home Service

since 1977 indicates that no significant deterioration of the groundwater has occurred; however, several one-time anamolies were identified. For example, in 1979 piezometer well number 8 showed a significant increase in iron and relatively high levels of several other metals. The cause of this increase is unknown and no evidence of investigations into the cause were found. BHS should use past monitoring data to establish mean concentrations and standard deviations for each parameter, so future anomolies will be more readily identified and investigated.

The waste analysis plan used by BHS appears to have several deficiencies as descrepancies in the waste characteristics were found. First, generators are apparently required to submit only one waste analysis to obtain a disposal authorization, unless the Missouri Department of Natural Resources specifically requests a greater number of analysis. The results of one analysis are not sufficient to determine the variability of the waste characteristics. A minimum of three samples should be analyzed by the generator prior to obtaining a disposal authorization.

Once a disposal authorization has been issued for a waste, BHS should accept only those wastes that are accompanied by a generators manifest containing the information required by BHS. This information includes the generators results of four indicators tests that are also conducted by BHS upon receipt of the waste. BHS could then make a more thorough comparison to ensure that the generator has analyzed a representative sample of their waste. BHS should also develop and maintain a statistical data base of the results of their incoming waste analysis. By doing so, BHS could better determine if the characteristics of a particular waste shipment differ significantly from previous wastes received from the generator. This

information could also be used to determine the frequency at which BHS should require the generator to repeat their sample analysis. A highly variable waste, for example, should be analyzed for more frequently than a waste with a low variability.

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ATTACHMENTS

STATION IDENTIFICATION

SURVEY NO _____ SURVEY LEADER ZIRSCHKY STORET NO _____

DESCRIPTION BOB'S HOME SERVICE, Private well #1.

GRAB SAMPLE DATA

FLOW	TEMP °C AIR	TEMP °C WATER	PH	DO	FECAL COLI	OIL & GREASE	OTHER	OTHER
☐ 00059 (GPM) ☐ 00061 (CFS)	00020	00010						

COLLECTION DATE YR 81 MAR DAY 10 TIME 1300 SAMPLER NAME CODE 307 LAB NO AA0401

	~~[illegible]~~ 10°F	13.5°C	00400					

COLLECTION DATE YR ____ MO ____ DAY ____ TIME ____ SAMPLER NAME CODE ____ LAB NO ____

COLLECTION DATE YR ____ MO ____ DAY ____ TIME ____ SAMPLER NAME CODE ____ LAB NO ____

COLLECTION DATE YR ____ MO ____ DAY ____ TIME ____ SAMPLER NAME CODE ____ LAB NO ____

COMPOSITE SAMPLE DATA

BEGIN DATE YR ____ MO ____ DAY ____ TIME ____ LAB NO ____

END DATE YR ____ MO ____ DAY ____ TIME ____ EQUIPMENT CODE ____

FLOW RATE ____ 50050 MGD ____ 50052 1000's OF GAL DURING COMPOSITE PERIOD SAMPLER NAME CODE ____

WATER CHEMISTRY

LAB NO ____

SAMPLE CONTAINER	TAG COLOR	PRESERVATIVE	LABORATORY MOBILE	LABORATORY REGION	ANALYSES
1 gallon jug	purple white	~~[illegible]~~ 4°C		X	extractables (B/N, ICP scan/metals
1 pt jar	green	NaOH			cyanide
1 pt jar	red	$CuSO_4 + H_3PO_4$			~~$CuSO_4 + H_3PO_4$~~ phenol
2 VOA'S	green	4°C			

CONTACT JOHN ZIRSCHKY SAMPLE ☐ YES SPLIT ☒ NO

REMARKS well reportede to be 325 feet deep, ~~taken~~ sample taken from tap near kitchen. Well was flushed for approx 3 minutes at full opening prior to sampling spec. cond 700 umhos

SURVEILLANCE AND ANALYSIS DIVISION, 25 FUNSTON ROAD, KANSAS CITY, KANSAS 66115

STATION IDENTIFICATION

SURVEY NO _____ SURVEY LEADER ZIRSCHKY STORET NO _____

DESCRIPTION BOB'S HOME SERVICE, Private residence #2

GRAB SAMPLE DATA

FLOW	TEMP °C		PH	DO	FECAL COLI	OIL & GREASE	OTHER	OTHER
☐ 00059 (GPM) ☐ 00061 (CFS)	AIR 00020	WATER 00010						
COLLECTION DATE YR 81 MO 11 DAY March TIME 1300hrs						SAMPLER NAME CODE 307		LAB NO AA0402
			00400					
COLLECTION DATE YR ____ MO ____ DAY ____ TIME ____						SAMPLER NAME CODE ____		LAB NO ____
COLLECTION DATE YR ____ MO ____ DAY ____ TIME ____						SAMPLER NAME CODE ____		LAB NO ____
COLLECTION DATE YR ____ MO ____ DAY ____ TIME ____						SAMPLER NAME CODE ____		LAB NO ____

COMPOSITE SAMPLE DATA

BEGIN DATE YR ____ MO ____ DAY ____ TIME ____ LAB NO AA0402

END DATE YR ____ MO ____ DAY ____ TIME ____ EQUIPMENT CODE ____

FLOW RATE ____ 50050 MGD ____ 50057 1000's OF GAL DURING COMPOSITE PERIOD SAMPLER NAME CODE ____

WATER CHEMISTRY

LAB NO ____

SAMPLE CONTAINER	TAG COLOR	PRESERVATIVE	LABORATORY MOBILE	LABORATORY REGION	ANALYSES
1 gal glass jug	purple white	none		X	extractable org (c ICP/Mg
1pt glass jar	green	NaOH		X	Cyanide
1pt glass jar	red	$CuSO_4 + H_3PO_4$		X	Phenols
2 VOA's	green				volatiles

CONTACT ____ SAMPLE ☐ YES SPLIT ☒ NO

REMARKS water was clear. Sample collected from household tap

7-EPA 9263 (6/75) QSA-RC-78-16

...ECTION AGENCY — REGION VII
... ANALYSIS DIVISION, 25 FUNSTON ROAD, KANSAS CITY, KANSAS 65115

STATION IDENTIFICATION

SURVEY NO _____ SURVEY LEADER ZIRSCHKY STORET NO _____

DESCRIPTION BOB'S HOME SERVICE

Pizwell #12

GRAB SAMPLE DATA

FLOW	TEMP °C		PH	DO	FECAL COLI	OIL & GREASE	OTHER	OTHER
☐ 00059 (GPM) ☐ 00061 (CFS)	AIR 00020	WATER 00010						

COLLECTION DATE YR 81 MO 03 DAY 11 TIME 0900 SAMPLER NAME CODE 181 LAB NO AA0403

			00400					

COLLECTION DATE YR ____ MO ____ DAY ____ TIME ____ SAMPLER NAME CODE ____ LAB NO ____

COLLECTION DATE YR ____ MO ____ DAY ____ TIME ____ SAMPLER NAME CODE ____ LAB NO ____

COLLECTION DATE YR ____ MO ____ DAY ____ TIME ____ SAMPLER NAME CODE ____ LAB NO ____

COMPOSITE SAMPLE DATA

BEGIN DATE YR ____ MO ____ DAY ____ TIME ____ LAB NO ____

END DATE YR ____ MO ____ DAY ____ TIME ____ EQUIPMENT CODE ____

FLOW RATE ____ 50050 MGD ____ 50052 1000's OF GAL DURING COMPOSITE PERIOD SAMPLER NAME CODE ____

WATER CHEMISTRY LAB NO AA0403

SAMPLE CONTAINER	TAG COLOR	PRESERVATIVE	LABORATORY MOBILE	LABORATORY REGION	ANALYSES
1 gal jug	purple			X	B/N, A, Pest
2 40ml vials	green			X	VOA
1 1 liter cubi	white	none		X	Met
1 1 liter cubi	green	NaOH		X	cyanide
1 1 liter cubi	Red	$CuSO_4 + H_3PO_4$		X	phenolics

CONTACT _____ SAMPLE ☐ YES SPLIT ☒ NO

REMARKS 3R

light brown mirky water

...63 16 75) GSA-KC-78 3605

STATION IDENTIFICATION

SURVEY NO _____ SURVEY LEADER ZIRSCHKY STORET NO _____

DESCRIPTION BOB'S HOME SERVICE

P Well #10

GRAB SAMPLE DATA

FLOW	TEMP °C		PH	DO	FECAL COLI	OIL & GREASE	OTHER	OTHER
☐ 00059 (GPM) ☐ 00061 (CFS)	AIR 00020	WATER 00010	X				Conductivity	HU

COLLECTION DATE YR 81 MO 03 DAY 11 TIME 1000 SAMPLER NAME CODE 181 LAB NO AA0404

		11	00400 7				1800	

COLLECTION DATE YR ____ MO ____ DAY ____ TIME ____ SAMPLER NAME CODE ____ LAB NO ____

COLLECTION DATE YR ____ MO ____ DAY ____ TIME ____ SAMPLER NAME CODE ____ LAB NO ____

COLLECTION DATE YR ____ MO ____ DAY ____ TIME ____ SAMPLER NAME CODE ____ LAB NO ____

COMPOSITE SAMPLE DATA

BEGIN DATE YR ____ MO ____ DAY ____ TIME ____ LAB NO ____

END DATE YR ____ MO ____ DAY ____ TIME ____ EQUIPMENT CODE ____

FLOW RATE ____ 50050 MGD ____ 50052 1000 s OF GAL DURING COMPOSITE PERIOD SAMPLER NAME CODE ____

WATER CHEMISTRY

LAB NO AA0404

SAMPLE CONTAINER	TAG COLOR	PRESERVATIVE	LABORATORY MOBILE	LABORATORY REGION	ANALYSES
1 gal jug	purple				B/N, A, Pest
2 40ml vials	green				VOA
1 1 Liter cubi	white	none			Met
1 1 Liter cubi	green	NaOH			Cyanide
1 1 Liter cubi	red	$CuSO_4 + H_3PO_4$			Phenolics

CONTACT _____ SAMPLE ☐ YES SPLIT ☒ NO _____

REMARKS 3R

clear water. pH measured with Fisher Alkacid Full Range pH Kit. (pH paper). Conductivity measured with Graphic Controls Corp. Model pHM 7800 meter.

SURVEILLAN AND ANALYSIS DIVISION, 25 FUNS' V ROAD, KANSAS CITY, KANSAS 651

STATION IDENTIFICATION

SURVEY NO _____ SURVEY LEADER ZIRSCHKY STORET NO _____

DESCRIPTION BOB'S HOME SERVICE

Great lakes Container

GRAB SAMPLE DATA

FLOW	TEMP °C		PH	DO	FECAL COLI	OIL & GREASE	OTHER	OT
☐ 00059 (GPM) ☐ 00061 (CFS)	AIR 00020	WATER 00010						
COLLECTION DATE YR 81 MO 03 DAY 11 TIME 1525 SAMPLER NAME CODE 181 LAB NO AA0405								
			00400					
COLLECTION DATE YR ____ MO ____ DAY ____ TIME ____ SAMPLER NAME CODE ____ LAB NO ____								
COLLECTION DATE YR ____ MO ____ DAY ____ TIME ____ SAMPLER NAME CODE ____ LAB NO ____								
COLLECTION DATE YR ____ MO ____ DAY ____ TIME ____ SAMPLER NAME CODE ____ LAB NO ____								

COMPOSITE SAMPLE DATA

BEGIN DATE YR ____ MO ____ DAY ____ TIME ____ LAB NO ____

END DATE YR ____ MO ____ DAY ____ TIME ____ EQUIPMENT CODE ____

FLOW RATE ____ (50050) MGD ____ (50052) 1000 s OF GAL DURING COMPOSITE PERIOD SAMPLER NAME CODE ____

WATER CHEMISTRY

LAB NO AA040

SAMPLE CONTAINER	TAG COLOR	PRESERVATIVE	LABORATORY MOBILE	LABORATORY REGION	ANALYSES
One	purple	none		X	B/N, A, Pest
One Pint Jar	white	none		X	Met

CONTACT ____ SAMPLE ☐ YES SPLIT ☒ NO ____

REMARKS 3H collected with SS spoon, Bulk load in drop box

7-EPA 9263 (6/75)

SURVEILLANCE AND ANALYSIS DIVISION, 25 FUNSTON ROAD, KANSAS CITY, KANSAS 66115

STATION IDENTIFICATION

SURVEY NO _____ SURVEY LEADER ZIRSCHKY STORET NO _____

DESCRIPTION BOB'S HOME SERVICE, East holding pond

GRAB SAMPLE DATA

FLOW	TEMP °C AIR	TEMP °C WATER	PH	DO	FECAL COLI	OIL & GREASE	OTHER	OTHER
☐ 00059 (GPM) ☐ 00061 (CFS)	00020	00010						

COLLECTION DATE YR 81 Mar 00400 DAY 12 TIME 900hrs SAMPLER NAME CODE 307 LAB NO AA0406

COLLECTION DATE YR ____ MO ____ DAY ____ TIME ____ SAMPLER NAME CODE ____ LAB NO ____

COLLECTION DATE YR ____ MO ____ DAY ____ TIME ____ SAMPLER NAME CODE ____ LAB NO ____

COLLECTION DATE YR ____ MO ____ DAY ____ TIME ____ SAMPLER NAME CODE ____ LAB NO ____

COMPOSITE SAMPLE DATA

BEGIN DATE YR ____ MO ____ DAY ____ TIME ____ LAB NO AA0406

END DATE YR ____ MO ____ DAY ____ TIME ____ EQUIPMENT CODE ____

FLOW RATE ____ 50050 MGD ____ 50052 1000's OF GAL DURING COMPOSITE PERIOD SAMPLER NAME CODE ____

WATER CHEMISTRY

LAB NO ____

SAMPLE CONTAINER	TAG COLOR	PRESERVATIVE	LABORATORY MOBILE	LABORATORY REGION	ANALYSES
1 gal jug	ample			X	extractable
1 cubit	white			X	KP / Hg
1 cubit	green	NaOH		X	cyanide
1 cubit	red ~~green~~	$CuSO_4 + H_3PO_4$		X	~~volatile~~ Pheno
2 VOA's	green			X	volatile organics

CONTACT _____ SAMPLE ☐ YES SPLIT ☒ NO

REMARKS ~~[illegible]~~ water was clear & had frogs swimming in it

7-EPA 9263 (6/75) GSA-KC-78-36

ENVIRONMENTAL PROTECTION AGENCY

SURVEILLANCE AND ANALYSIS DIVISION, 25 FUNSTON ROAD, KANSAS CITY, KANSAS 65115

STATION IDENTIFICATION

SURVEY NO _____ SURVEY LEADER ZIRSCHKY STORET NO _____

DESCRIPTION BOB'S HOME SERVICE, downstream creek sample

GRAB SAMPLE DATA

FLOW	TEMP °C AIR	TEMP °C WATER	PH	DO	FECAL COLI	OIL & GREASE	OTHER	OTHER
☐ 00059 (GPM) ☐ 00061 (CFS)	00020	00010						
COLLECTION DATE YR 81 MO Mar DAY 12 TIME 950hrs SAMPLER NAME CODE 307 LAB NO AA0407								
			00400					
COLLECTION DATE YR ___ MO ___ DAY ___ TIME ___ SAMPLER NAME CODE ___ LAB NO ___								
COLLECTION DATE YR ___ MO ___ DAY ___ TIME ___ SAMPLER NAME CODE ___ LAB NO ___								
COLLECTION DATE YR ___ MO ___ DAY ___ TIME ___ SAMPLER NAME CODE ___ LAB NO ___								

COMPOSITE SAMPLE DATA

BEGIN DATE YR ___ MO ___ DAY ___ TIME ___ LAB NO ___

END DATE YR ___ MO ___ DAY ___ TIME ___ EQUIPMENT CODE ___

FLOW RATE ___ (50050) MGD ___ (50053) 1000 s OF GAL DURING COMPOSITE PERIOD SAMPLER NAME CODE ___

WATER CHEMISTRY

LAB NO AA0406

SAMPLE CONTAINER	TAG COLOR	PRESERVATIVE	LABORATORY MOBILE	LABORATORY REGION	ANALYSES
1 gal glass jug	purple			X	extractables
1 qubit	~~purple~~ green			X	cyanide
1 qubit	white			X	p ICP/Hg
1 qubit	red			X	phenols
2 VOA's	green			X	volatiles

CONTACT ___ SAMPLE ☐ YES SPLIT ☒ NO ___

REMARKS Sample point located near fallen log approximately 50-60 feet north of green barbed wire fence post.

SURVEILLANCE AND ANALYSIS DIVISION, 25 FUNSTON ROAD, KANSAS CITY, KANSAS 65115

STATION IDENTIFICATION

SURVEY NO _____ SURVEY LEADER ZIRSCHKY STORET NO _____

DESCRIPTION BOB'S HOME SERVICE, Litton sludge sample

GRAB SAMPLE DATA

FLOW	TEMP °C		PH	DO	FECAL COLI	OIL & GREASE	OTHER	OTHER
☐ 00059 (GPM) ☐ 00061 (CFS)	AIR 00020	WATER 00010						

COLLECTION DATE YR 81 MAR DAY 12 TIME 1300hrs SAMPLER NAME CODE _____ LAB NO AA0408

			00400					

COLLECTION DATE YR _____ MO _____ DAY _____ TIME _____ SAMPLER NAME CODE _____ LAB NO _____

COLLECTION DATE YR _____ MO _____ DAY _____ TIME _____ SAMPLER NAME CODE _____ LAB NO _____

COLLECTION DATE YR _____ MO _____ DAY _____ TIME _____ SAMPLER NAME CODE _____ LAB NO _____

COMPOSITE SAMPLE DATA

BEGIN DATE YR _____ MO _____ DAY _____ TIME _____ LAB NO _____

END DATE YR _____ MO _____ DAY _____ TIME _____ EQUIPMENT CODE _____

FLOW RATE _____ 50050 MGD _____ 50052 1000's OF GAL DURING COMPOSITE PERIOD SAMPLER NAME CODE _____

WATER CHEMISTRY

LAB NO AA0408

SAMPLE CONTAINER	TAG COLOR	PRESERVATIVE	LABORATORY MOBILE	LABORATORY REGION	ANALYSES
1 pint glass jar	purple white	~~extractable organ~~			ICP/Hg; extractable org ~~[illegible]~~
	green	none			cyanides

CONTACT _____ SAMPLE ☐ YES SPLIT ☒ NO _____

REMARKS 3H

F-EPA-9263 (6/75) BSA-KC-78-31

ENVIRONMENTAL PROTECTION AGENCY — REGION VII
SURVEILLANCE AND ANALYSIS DIVISION, 25 FUNSTON ROAD, KANSAS CITY, KANSAS 65115

STATION IDENTIFICATION

SURVEY NO _____ SURVEY LEADER ZIRSCHKY STORET NO _____

DESCRIPTION BOB'S HOME SERVICE
P. Well #8

GRAB SAMPLE DATA

FLOW	TEMP °C		PH	DO	FECAL COLI	OIL & GREASE	OTHER	OTHER
☐ 00059 (GPM) ☐ 00061 (CFS)	AIR 00020	WATER 00010						

COLLECTION DATE YR 81 MO 03 DAY 11 TIME 0900 SAMPLER NAME CODE 181 LAB NO AA0409

00400

COLLECTION DATE YR ____ MO ____ DAY ____ TIME ____ SAMPLER NAME CODE ____ LAB NO ____

COLLECTION DATE YR ____ MO ____ DAY ____ TIME ____ SAMPLER NAME CODE ____ LAB NO ____

COLLECTION DATE YR ____ MO ____ DAY ____ TIME ____ SAMPLER NAME CODE ____ LAB NO ____

COMPOSITE SAMPLE DATA

BEGIN DATE YR ____ MO ____ DAY ____ TIME ____ LAB NO ____

END DATE YR ____ MO ____ DAY ____ TIME ____ EQUIPMENT CODE ____

FLOW RATE ____ 50050 MGD ____ 50052 1000 s OF GAL DURING COMPOSITE PERIOD SAMPLER NAME CODE ____

WATER CHEMISTRY LAB NO AA0409

SAMPLE CONTAINER	TAG COLOR	PRESERVATIVE	LABORATORY MOBILE	LABORATORY REGION	ANALYSES
1gal jug ~~purple~~	white purple			X	ICP, Hg B/N, A, Pest
2 40 ml vials	green			X	VOA
~~1 1liter cub.~~	white	~~none~~		X	~~Met~~
~~1 1liter cub.~~	~~red~~	~~$CuSO_4 - H_3PO_4$~~		X	~~Phenolics~~
~~1 1liter cub.~~	~~green~~	~~NaOH~~		X	~~Cyanide~~

CONTACT _____ SAMPLE ☐ YES SPLIT ☒ NO

REMARKS 3R insufficient volume in well for complete sample
water grey & murky

F-EPA 9263 (6/75) GSA-KC-78-16R

SURVEILLANCE AND ANALYSIS DIVISION, 25 FUNSTON ROAD, KANSAS CITY, KANSAS 65115

STATION IDENTIFICATION

SURVEY NO _____ SURVEY LEADER ZIRSCHKY STORET NO _____

DESCRIPTION BOB'S HOME SERVICE

P well #5

GRAB SAMPLE DATA

FLOW	TEMP °C AIR 00020	TEMP °C WATER 00010	PH	DO	FECAL COLI	OIL & GREASE	OTHER	OTHER
☐ 00059 (GPM) ☐ 00061 (CFS)			X				Conduct. µmho	

COLLECTION DATE YR 81 03 DAY 11 TIME 0945 SAMPLER NAME CODE 181 LAB NO AA0410

		11.5	00400 6.8				1950	

COLLECTION DATE YR ____ MO ____ DAY ____ TIME ____ SAMPLER NAME CODE ____ LAB NO ____

COLLECTION DATE YR ____ MO ____ DAY ____ TIME ____ SAMPLER NAME CODE ____ LAB NO ____

COLLECTION DATE YR ____ MO ____ DAY ____ TIME ____ SAMPLER NAME CODE ____ LAB NO ____

COMPOSITE SAMPLE DATA

BEGIN DATE YR ____ MO ____ DAY ____ TIME ____ LAB NO ____

END DATE YR ____ MO ____ DAY ____ TIME ____ EQUIPMENT CODE ____

FLOW RATE ____ 50050 MGD ____ 50052 1000 s OF GAL DURING COMPOSITE PERIOD SAMPLER NAME CODE ____

WATER CHEMISTRY

LAB NO AA0410

SAMPLE CONTAINER	TAG COLOR	PRESERVATIVE	LABORATORY MOBILE	LABORATORY REGION	ANALYSES
1 galbn jug	purple				B/N, A, Pest.
2 40 ml vials	green				VOA
1 1 Liter cubi	white	none			Met
1 1 Liter cubi	red	$CuSO_4 + H_3PO_4$			Phenolics
1 1 Liter cubi	green	NaOH			Cyanide

CONTACT _____ SAMPLE ☐ YES SPLIT ☒ NO _____

REMARKS 3R

7-EPA 9263 (6/75) OSA-KC-70-1696

ENVIRONMENTAL PROTECTION AGENCY — REGION VII

SURVEILLANCE AND ANALYSIS DIVISION, 25 FUNSTON ROAD, KANSAS CITY, KANSAS 65115

STATION IDENTIFICATION

SURVEY NO _____ SURVEY LEADER ZIRSCHKY STORET NO _____

DESCRIPTION BOB'S HOME SERVICE

creek upstream

GRAB SAMPLE DATA

FLOW	TEMP °C AIR	TEMP °C WATER	PH	DO	FECAL COLI	OIL & GREASE	OTHER	OTHER
☐ 00059 (GPM) ☐ 00061 (CFS)	00020	00010					Cond 4	

COLLECTION DATE YR 81 MO 03 DAY 12 TIME 1130 SAMPLER NAME CODE [illegible] LAB NO AA0411

		5	00400 7				390	

COLLECTION DATE YR ____ MO ____ DAY ____ TIME ____ SAMPLER NAME CODE ____ LAB NO ____

COLLECTION DATE YR ____ MO ____ DAY ____ TIME ____ SAMPLER NAME CODE ____ LAB NO ____

COLLECTION DATE YR ____ MO ____ DAY ____ TIME ____ SAMPLER NAME CODE ____ LAB NO ____

COMPOSITE SAMPLE DATA

BEGIN DATE YR ____ MO ____ DAY ____ TIME ____ LAB NO ____

END DATE YR ____ MO ____ DAY ____ TIME ____ EQUIPMENT CODE ____

FLOW RATE ____ 50050 MGD ____ 50057 1000 s OF GAL DURING COMPOSITE PERIOD SAMPLER NAME CODE ____

WATER CHEMISTRY LAB NO AA0411

SAMPLE CONTAINER	TAG COLOR	PRESERVATIVE	LABORATORY MOBILE	LABORATORY REGION	ANALYSES
1 gallon jug	purple				B/N, A, Pest
2 40ml vials	green				VOA
1 1Liter cubi	white	none			Met
1 1Liter cubi	red	$CuSO_4 + H_3PO_4$			phenolics
1 1Liter cubi	green	NaOH			cyanide

CONTACT _____ SAMPLE ☐ YES SPLIT ☒ NO

REMARKS 3h, sample collected about 50' southwest of where creek crosses upstream road

SURVEILLANCE AND ANALYSIS DIVISION, 25 FUNSTON ROAD, KANSAS CITY, KANSAS 65115

STATION IDENTIFICATION

SURVEY NO _____ SURVEY LEADER ZIRSCHKY STORET NO _____

DESCRIPTION BOB'S HOME SERVICE

Monizoring Well

GRAB SAMPLE DATA

FLOW	TEMP °C AIR	TEMP °C WATER	PH	DO	FECAL COLI	OIL & GREASE	OTHER	OTHER
☐ 00059 (GPM) ☐ 00061 (CFS)	00020	00010					Condi 4U	

COLLECTION DATE YR 81 MO 03 DAY 12 TIME 1445 SAMPLER NAME CODE 181 LAB NO AA0412

			00400 5.7				1900	

COLLECTION DATE YR ____ MO ____ DAY ____ TIME ____ SAMPLER NAME CODE ____ LAB NO ____

COLLECTION DATE YR ____ MO ____ DAY ____ TIME ____ SAMPLER NAME CODE ____ LAB NO ____

COLLECTION DATE YR ____ MO ____ DAY ____ TIME ____ SAMPLER NAME CODE ____ LAB NO ____

COMPOSITE SAMPLE DATA

BEGIN DATE YR ____ MO ____ DAY ____ TIME ____ LAB NO ____

END DATE YR ____ MO ____ DAY ____ TIME ____ EQUIPMENT CODE ____

FLOW RATE ____ 50050 MGD ____ 50052 1000 s OF GAL DURING COMPOSITE PERIOD SAMPLER NAME CODE ____

WATER CHEMISTRY LAB NO AA0412

SAMPLE CONTAINER	TAG COLOR	PRESERVATIVE	LABORATORY MOBILE	LABORATORY REGION	ANALYSES
1 gal jug	purple				B/N, A, Pest
2 40ml vials	green				VOA
1 1Lizer cub	white	none			Met
1 1Lizer cub	green	NaOH			Cyanide
1 1Lizer cub	red	$CuSO_4 + H_3PO_4$			Phenolics

CONTACT _____ SAMPLE ☐ YES SPLIT ☒ NO

REMARKS SR, MW at southeast corner of BHS

7-EPA-9263 (6/75) GSA-KC-78-1695

ENVIRONMENTAL PROTECTION AGENCY — REGION VII

SURVEILLANCE AND ANALYSIS DIVISION, 25 FUNSTON ROAD, KANSAS CITY, KANSAS 65115

STATION IDENTIFICATION

SURVEY NO _____ SURVEY LEADER ZIRSCHKY STORET NO _____

DESCRIPTION BOB'S HOME SERVICE

Old well

GRAB SAMPLE DATA

FLOW	TEMP °C		PH	DO	FECAL COLI	OIL & GREASE	OTHER	OTHER
☐ 00059 (GPM) ☐ 00061 (CFS)	AIR 00020	WATER 00010	X				Cond. µ℧	
COLLECTION DATE YR 81 MO 03 DAY 12 TIME 1530						SAMPLER NAME CODE	LAB NO AA0413	
		9	00400 6				1850	
COLLECTION DATE YR ___ MO ___ DAY ___ TIME ___						SAMPLER NAME CODE	LAB NO	
COLLECTION DATE YR ___ MO ___ DAY ___ TIME ___						SAMPLER NAME CODE	LAB NO	
COLLECTION DATE YR ___ MO ___ DAY ___ TIME ___						SAMPLER NAME CODE	LAB NO	

COMPOSITE SAMPLE DATA

BEGIN DATE YR ___ MO ___ DAY ___ TIME ___ LAB NO ___

END DATE YR ___ MO ___ DAY ___ TIME ___ EQUIPMENT CODE ___

FLOW RATE ___ (50050) MOD ___ (50052) 1000's OF GAL DURING COMPOSITE PERIOD SAMPLER NAME CODE ___

WATER CHEMISTRY

LAB NO AA0413

SAMPLE CONTAINER	TAG COLOR	PRESERVATIVE	LABORATORY MOBILE	LABORATORY REGION	ANALYSES
1 gallon jug	purple				B/N, A, Pest
2 40ml vials	green				VOA
1 1 Liter cubi	white	none			Met
1 1 Liter Cubi	red	$CuSO_4 + H_3PO_4$			phenolics
1 1 Liter Cubi	green	NaOH			cyanide

CONTACT ___ SAMPLE ☐ YES SPLIT ☒ NO ___

REMARKS 3R

7-EPA-9263 (8/75) GSA-KC-78-3696