AD-A169 416 INSTALLATION RESTORATION PROGRAM PHASE II 1/3
CONFIRMATION/QUANTIFICATION STAGE I(U) DAMES AND MOORE
PARK RIDGE IL 24 FEB 86 F33615-83-D-4002

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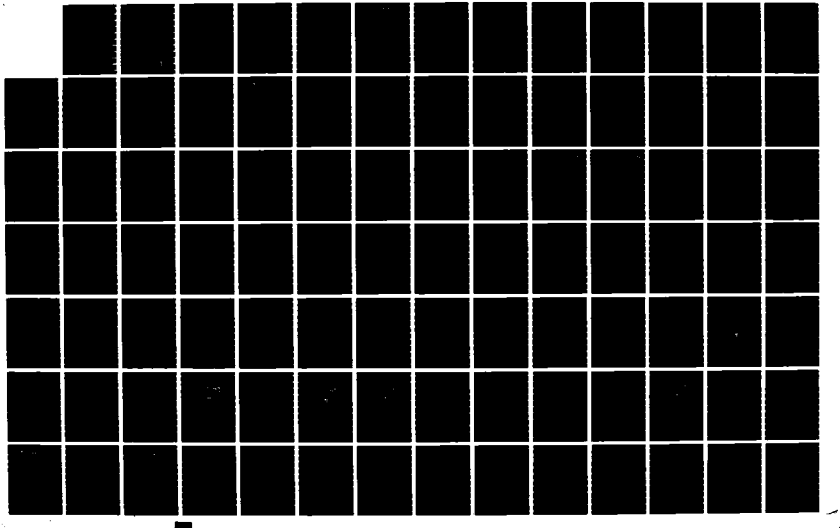

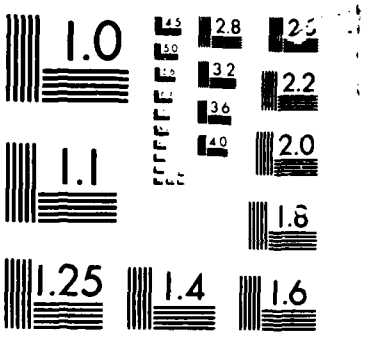
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INSTALLATION RESTORATION PROGRAM
PHASE II - CONFIRMATION/QUANTIFICATION
STAGE 1

MOUNTAIN HOME AIR FORCE BASE
MOUNTAIN HOME, IDAHO

DAMES & MOORE
1550 NORTHWEST HIGHWAY
PARK RIDGE, ILLINOIS 60068

FEBRUARY 24, 1986

FINAL REPORT

APPROVED FOR PUBLIC RELEASE
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PREPARED FOR
TACTICAL AIR COMMAND
LANGLEY AIR FORCE BASE, VIRGINIA

UNITED STATES AIR FORCE
OCCUPATIONAL & ENVIRONMENTAL HEALTH LABORATORY (USAFOEHL)
TECHNICAL SERVICES DIVISION (TS)
BROOKS AIR FORCE BASE, TEXAS 78235-5501

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PHASE II - CONFIRMATION/QUANTIFICATION
STAGE 1

FINAL REPORT

FOR

MOUNTAIN HOME AIR FORCE BASE
MOUNTAIN HOME, IDAHO

TACTICAL AIR COMMAND
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PREPARED BY

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USAF CONTRACT NO. F33615-83-D-4002, DELIVERY ORDER NO. 0009

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Unclassified
SECURITY CLASSIFICATION OF THIS PAGE

AD-A169 416

REPORT DOCUMENTATION PAGE

1a. REPORT SECURITY CLASSIFICATION Unclassified	1b RESTRICTIVE MARKINGS None
2a. SECURITY CLASSIFICATION AUTHORITY Not applicable	3 DISTRIBUTION / AVAILABILITY OF REPORT Approved for Public Release
2b DECLASSIFICATION / DOWNGRADING SCHEDULE Not applicable	Distribution Unlimited
4. PERFORMING ORGANIZATION REPORT NUMBER(S) Not applicable	5. MONITORING ORGANIZATION REPORT NUMBER(S) Not applicable
6a NAME OF PERFORMING ORGANIZATION Dames & Moore 6b OFFICE SYMBOL (If applicable)	7a NAME OF MONITORING ORGANIZATION U.S. Air Force Occupational and Environmental Health Laboratory/TS
6c. ADDRESS (City, State, and ZIP Code) 1550 Northwest Highway Park Ridge, IL 60068	7b ADDRESS (City, State, and ZIP Code) Brooks Air Force Base San Antonio, TX 78235-5501
8a. NAME OF FUNDING / SPONSORING ORGANIZATION USAFOEHL 8b OFFICE SYMBOL (If applicable) TS	9 PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER F33615-83-D-4002/0009
8c. ADDRESS (City, State, and ZIP Code) Brooks Air Force Base San Antonio, TX 78235-5501	10 SOURCE OF FUNDING NUMBERS PROGRAM ELEMENT NO. / PROJECT NO. / TASK NO / WORK UNIT ACCESSION NO

11 TITLE (Include Security Classification)
IRP Phase II, Stage 1, Mountain Home Air Force Base, Idaho

12 PERSONAL AUTHOR(S)
Dames & Moore

13a TYPE OF REPORT	13b. TIME COVERED	14. DATE OF REPORT (Year, Month, Day)	15 PAGE COUNT
Final	FROM 01/84 TO 09/84	86 February 24	55

16 SUPPLEMENTARY NOTATION

17 COSATI CODES			18 SUBJECT TERMS (Continue on reverse if necessary and identify by block number)
FIELD	GROUP	SUB-GROUP	

19 ABSTRACT (Continue on reverse if necessary and identify by block number)

As part of the USAF Installation Restoration Program (IRP), five sites on Mountain Home Air Force Base, Idaho, were investigated to determine the presence of hazardous material contamination resulting from past handling and disposal practices. The five sites investigated were the Lagoon Landfill, "B" Street Landfill, the fire training area, a fuel hydrant system leak area, and the Entomology Shop yard. Investigations consisted of monitor well installations at the two landfills and soil borings at the other three sites. Ground water and soil samples were subjected to chemical analyses for screening level parameters. Indication of low-level contamination was found in the ground water below both landfills and in the soils of the fire training area. Additional sampling and analyses are recommended to define the nature of the contamination at those sites.

20 DISTRIBUTION / AVAILABILITY OF ABSTRACT	21 ABSTRACT SECURITY CLASSIFICATION
☒ UNCLASSIFIED/UNLIMITED ☐ SAME AS RPT ☐ DTIC USERS	Unclassified
22a NAME OF RESPONSIBLE INDIVIDUAL Joan K. Yu	22b TELEPHONE (Include Area Code) 512 536-2158
	22c OFFICE SYMBOL USAFOEHL TS

DD FORM 1473, 84 MAR — 83 APR edition may be used until exhausted. All other editions are obsolete.

SECURITY CLASSIFICATION OF THIS PAGE
Unclassified

PREFACE

As part of the U.S. Air Force Installation Restoration Program (IRP), investigations were undertaken at five sites on Mountain Home Air Force Base, Idaho, to determine whether hazardous material contamination is present. This report, prepared by Dames & Moore under Contract No. F33615-83-D-4002, Order 0009, presents the results of the Phase II, Stage 1 IRP investigations. The period of work reported on herein was January through September 1984. The field investigations were directed by Dr. Kenneth J. Stimpfl and were undertaken under the technical management of Mr. George W. Condrat. Field work was undertaken by Mr. Steven B. Johnson. Maj. George New and Dr. John Yu, Technical Services Division, USAF Occupational and Environmental Health Laboratory (OEHL), were the technical monitors.

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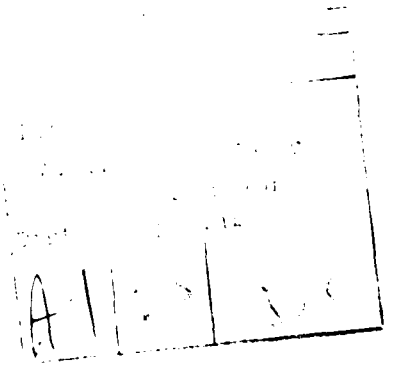

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SUMMARY

Mountain Home Air Force Base (AFB) is located approximately 10 miles southwest of Mountain Home, Idaho. It is situated on the Mountain Home Plateau, which is a rolling upland plain underlain by over 10,000 feet of volcanic and sedimentary rock. The base has been in operation since 1943 and currently houses tactical fighter squadrons that use the F-111A and the EF-111A aircraft.

The Phase II, Stage 1 field evaluation of the Installation Restoration Program (IRP) consisted of investigations at the following five sites:

Site 1 - Lagoon landfill,
Site 2 - "B" Street landfill,
Site 8 - Existing fire department training area,
Site 11 - Fuel hydrant system leak/spill area, and
Site 12 - Entomology shop yard.

The field investigation consisted of the following activities:

- Installation and sampling of a monitor well at Site 1 and Site 2;
- Sampling of base wells MH-1, MH-3, MH-4, MH-5, MH-6, and MH-7, and the east and west wastewater lagoons at Site 1;
- Drilling and sampling three borings at Site 8;
- Drilling and sampling three borings at Site 11; and
- Drilling and sampling three borings at Site 12.

The ground water samples were analyzed for 16 pesticides, 5 trace metals, oil and grease, phenol, total organic carbon (TOC), and total organic halogens (TOX). The soil samples from Sites 8 and 11 were analyzed for moisture content, TOX, TOC, oil and grease, phenol, and lead. The soil samples from Site 12 were analyzed for moisture content and 16 pesticides by EP toxicity test extraction.

Ground water is available from the Bruneau and Glenns Ferry Formations beneath the site, although all the base wells and monitor wells are completed in the Bruneau Formation. Both formations contain highly permeable layers of fractured and porous basalt and coarse sand and gravel. The formations behave as a single aquifer in which ground water is present under unconfined conditions. Ground water quality is suitable for most purposes, although the concentrations of total dissolved solids have been increasing in water from base wells MH-2, MH-3, and MH-4 since about 1960 and had increased in old base well MH-1 until it was replaced in 1974. The source of the dissolved solids is either upward flow from the Glenns Ferry Formation, which contains slightly lower quality water than the Bruneau Formation, or downward migration of contaminants such as nitrate, chlorides, and sulfates. Regional ground water flow is generally toward the south, where it eventually discharges into the Snake River.

The ground water analyses showed evidence of organic ground water contamination based on TOX concentrations in one base well and both monitor well samples. Halogenated organic compounds (TOX) are present in ground water beneath the entire base, but levels in the range of 0.059 to 0.086 milligrams per liter (mg/L) are believed to represent background levels. In contrast, TOC concentrations were too low to interpret them conclusively as either background or contaminated conditions. Although there is evidence that the waste disposal sites are the sources, it is possible that contaminants also originate from off-site sources. Insignificant levels of contaminants were found in soil samples from Site 11, where several thousand gallons of jet fuel were spilled in the late 1950s. Relatively high concentrations of TOX, TOC, and oil and grease were detected at Site 8, the fire department training area. The greatest contamination was within the bermed area in which jet fuel is pooled before it is burned for training exercises. Seven of the 16 pesticides included in the analyses were detected in EP toxicity test extracts of soil samples from Site 12, adjacent to the entomology shop building. Dieldrin was found in all the samples, and DDD was found in all but one of the samples. The remaining 5 pesticides were detected in 1 or 2 samples each. Only samples from the upper 1 foot of soil were analyzed, so it is not known how deep the pesticides are distributed. Similarly, the areal extent cannot be estimated based on Phase II, Stage 1 results. The pesticide concentrations in the EP toxicity test extracts were very low.

The Phase II, Stage 1 conclusions are as follows:

1. Evidence of ground water contamination was identified by the presence of TOX (total organic halogens) in one base well and one monitor well. The concentrations in both were 0.12 mg/L. No pesticides were detected in the monitor well samples, so the organic halogens may be due to solvents, herbicides, or other organic contaminants. TOC (total organic carbon) concentrations were too low to conclusively indicate background or contaminated conditions. The magnitude and associated health risk cannot be assessed until the individual compounds contributing to TOX are known.

2. High TOX concentrations and seven pesticides were detected in the lagoon samples, indicating that the lagoons may be a source of the ground water contaminants. The highest concentrations of TOX in the ground water samples were 0.12 mg/L from Monitor Well 1 (MW-1), which was completed beneath the lagoon landfill, and 0.12 mg/L from base well MH-3.

3. No significant contamination was found at Site 11.

4. Evidence of contamination was identified at Site 8; however, the depth of contamination could not be determined from Phase II, Stage 1 results.

Because hazardous wastes may be migrating from the site through infiltration of jet fuel, there is a potential that it may be a source of organic contaminants that could eventually reach the ground water.

5. Soil adjacent to the entomology shop (Site 12) has been contaminated with pesticides to a depth of at least 1 foot, although the areal extent could not be estimated from Phase II, Stage 1 results. Based on chemical analyses of EP toxicity test extractions of soil samples, the contamination is extremely low and does not warrant further investigation.

The following summarizes our recommendations and the rationale for further activities:

Sites	Recommended Action	Rationale
1 and 2, base wells	Develop an accurate ground water elevation map by surveying elevation and location of base wells and monitor wells. Based on the results of the survey, determine whether Monitor Well 2 (MW-2) is upgradient or downgradient of the "B" Street landfill. If MW-2 is downgradient, no further work should be done at Site 2. If MW-2 is determined to be upgradient of the landfill, three additional monitor wells should be installed downgradient. If the results of the survey do not clearly indicate whether MW-2 is upgradient or downgradient, install one well upgradient and three wells downgradient as defined by the ground water elevation map. At Site 1, install four monitor wells. Place one well upgradient and three wells downgradient. Sample the eight new wells; operating base wells MH-1, MH-3, and MH-5; MW-1 and MW-2 (if needed); and the two lagoons; measure pH, specific conductance, and temperature; and analyze the samples for USEPA 601 and 602 parameters, major cations and anions, and cadmium.	To characterize the organic and inorganic content of ground water beneath the base and define the ground water flow system.

Sites	Recommended Action	Rationale
8	Drill and sample one background boring and two additional borings to depths at which soil samples do not emit organic vapors. Analyze soil samples for volatile and semivolatile organics, oil and grease, and moisture content.	To estimate the vertical extent of contamination and determine whether the site is a potential source of ground water contamination.

I. INTRODUCTION

A. BACKGROUND

The Department of Defense (DOD) initiated the Installation Restoration Program (IRP) in 1976 to investigate and mitigate any environmental contamination which may be present at DOD facilities as a result of handling or disposing hazardous materials. IRP was revised in 1981 and reissued as the Defense Environmental Quality Program Policy Memorandum (DEQPPM) 81-5. The Air Force implemented DEQPPM 81-5 in 1982 as a four-phased program:

Phase I Problem Identification/Records Search
Phase II Problem Confirmation and Quantification
- o Presurvey
- o Field Evaluation - several stages as warranted

Phase III Technology Base Development
Phase IV Corrective Action

Phase I was completed by CH2M Hill (1983), and the Phase II Presurvey was completed by Dames & Moore (1983). Dames & Moore has been retained by the Air Force under Contract Number F33615-83-D-4002 to conduct Phase II, Stage 1, Field Evaluation, at Mountain Home Air Force Base (AFB) near Mountain Home, Idaho.

This report presents the results of Dames & Moore's field and laboratory investigations in the vicinity of waste disposal and hazardous material handling areas at Mountain Home AFB.

B. PURPOSE AND SCOPE

The purposes of the field evaluation portion of Phase II of the IRP were as follows:

1. Determine whether environmental contamination has resulted from material handling or waste disposal practices at Mountain Home AFB;

2. If contamination is found, provide estimates of the magnitude and extent of the contamination; and

3. Identify any additional investigations and their attendant costs necessary to identify the magnitude, extent, and direction of movement of discovered contaminants.

The scope of work as outlined for Phase II, Stage 1 of the IRP consisted of the following activities:

1. Drilling, sampling, and geologically logging one boring to a depth of 402 feet at the lagoon landfill (Site 1) and one boring to a depth of 410 feet in the "B" Street landfill (Site 2).

2. Installing and developing a monitor well in each boring.

3. Sampling the two monitor wells; base wells MH-1, MH-3, MH-4, MH-5, MH-6, and MH-7; and the east and west wastewater lagoons.

4. Analyzing the ground water and lagoon samples for 25 parameters, including trace metals, pesticides, and others.

5. Drilling, soil sampling, and geologically logging three borings at the existing fire department training area (Site 8), three borings at the fuel hydrant system leak/spill area (Site 11) and three borings at the entomology shop yard (Site 12).

6. Analyzing selected soil samples from each site for specific constituents, including total organic halogens (TOX), total organic carbon (TOC), oil and grease, metals, phenols, and pesticides.

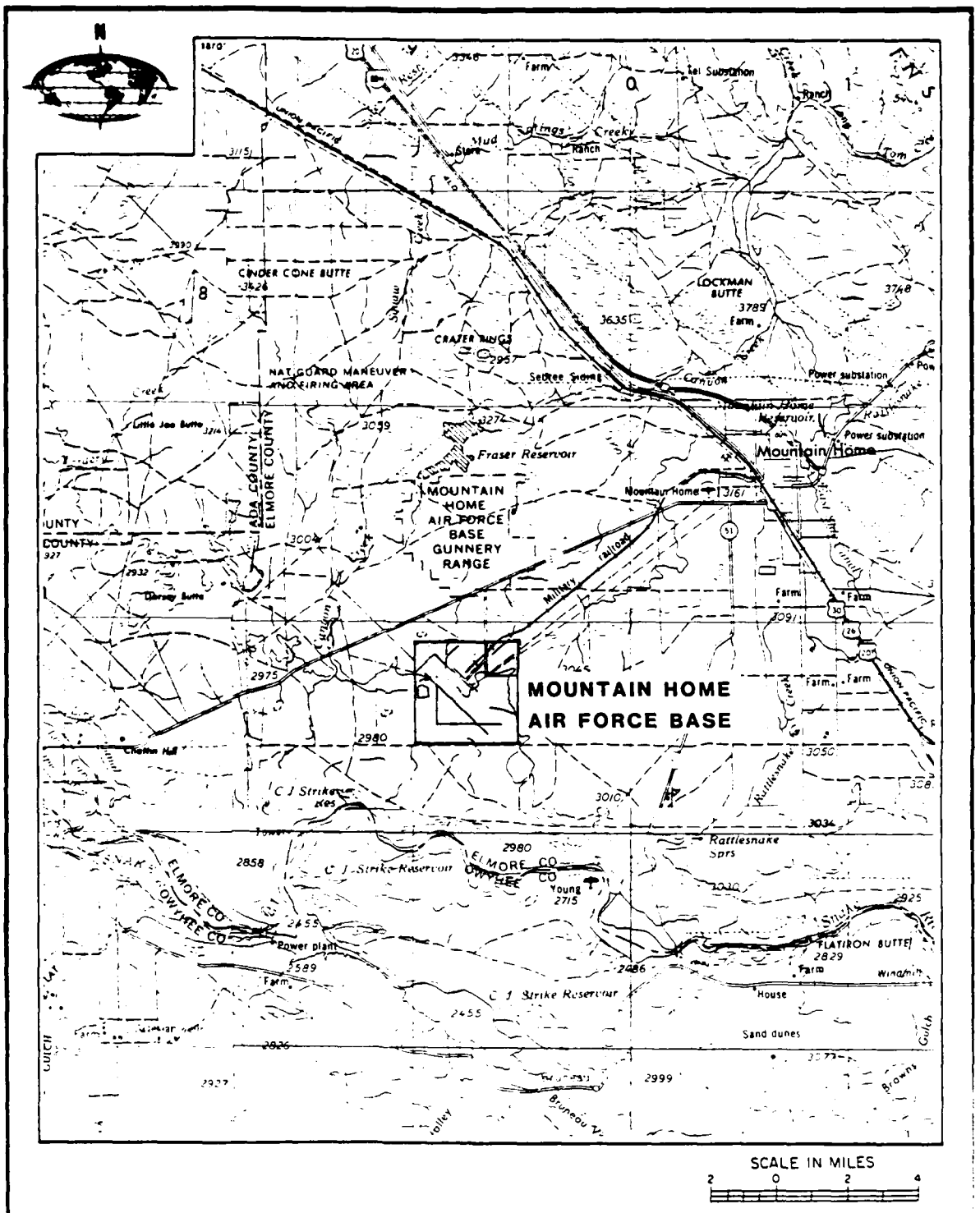
7. Preparing this report, which presents our findings and recommendations.

Field work began on 26 March 84 and was completed on 14 April 84.

C. BRIEF HISTORY OF MOUNTAIN HOME AFB AND WASTE DISPOSAL OPERATIONS

Mountain Home AFB is located about 10 miles southwest of Mountain Home, Idaho (see Plate 1). It was established in 1943 and served as a base for several different bombardment groups until it was deactivated in the fall of 1945. The base served as a Strategic Air Command base between 1948 and 1950 and later between 1953 and 1965. The Tactical Air Command has controlled the base since 1965. The current mission of the base is to develop and maintain tactical fighter squadrons. The principal aircraft flown at the base are the F-111A and the EF-111A.

Hazardous wastes and chemicals have been used and generated at Mountain Home AFB since 1943 for aircraft maintenance and other industrial operations. These activities generated between 20,000 to 40,000 gallons per year of waste oils, fuels, solvents, paints, and paint thinners (CH2M Hill, 1983). Other wastes generated by the base include sanitary sewage and refuse. In the past, the hazardous wastes have been disposed of by one or more of the following methods:



VICINITY MAP

REFERENCES

U.S.G.S. 1:250,000 SERIES MAPS ENTITLED

1) "BOISE, IDAHO - OREGON" - 1981,
2) "HAILEY, IDAHO" - 1970,
3) "JORDAN VALLEY, OREGON - IDAHO" - 1970, AND
4) "TWIN FALLS, IDAHO" - 1971.

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PLATE 1

- o Incineration through fire department training exercises;
- o Dumping at the lagoo 'andfill or "B" Street landfill; and/or
- o Discharging to the sanitary sewer, road oiling, or collection and removal by a contractor.

Since 1969, the wastes have been collected by a contractor or sent to the Defense Property Disposal Office for sale.

D. DESCRIPTION OF SITES

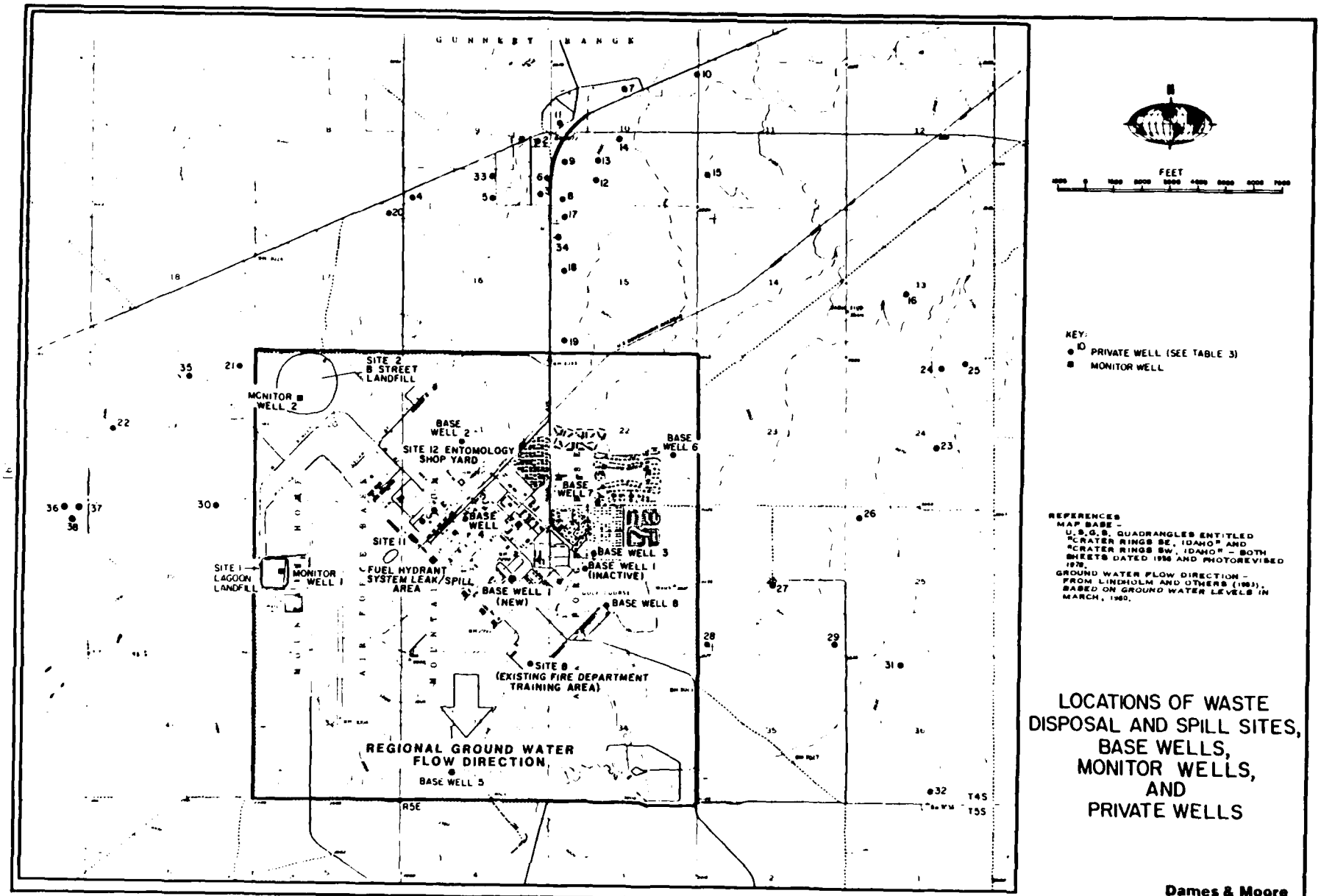
CH2M Hill (1983) identified 17 sites where hazardous materials had been handled, spilled, or disposed of within Mountain Home AFB. The following sites received the highest ratings for environmental impact and were investigated during Phase II, Stage 1:

1. Lagoon landfill (Site 1),
2. "B" Street landfill (Site 2),
3. Existing fire department training area (Site 8),
4. Fuel hydrant system leak/spill area (Site 11), and
5. Entomology shop yard (Site 12).

The sites investigated during Phase II, Stage 1 are shown in Plate 2, and each site is described below.

1. Site 1 - Lagoon Landfill

The lagoon landfill is located on the west side of the base at the site of the current wastewater lagoons. This site served as the main base sanitary landfill between 1952 and 1956, and the wastewater lagoons were constructed in 1961 and 1962. The landfill received general refuse, which was burned, and about six drums per month of mineral oils, hydraulic fluids, engine oils, and solvents such as trichloroethylene and carbon tetrachloride. Their potential for environmental impact is considered high due to the possibility for infiltration from the wastewater lagoons to leach hazardous contaminants from the underlying landfill.



LOCATIONS OF WASTE DISPOSAL AND SPILL SITES, BASE WELLS, MONITOR WELLS, AND PRIVATE WELLS

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PLATE 2

The wastewater treatment system now located at Site 1 consists of four oxidation lagoons occupying a total of 72.8 acres with an average water depth of 3.5 to 4 feet. Currently, daily flow to the treatment system averages about 800,000 gallons of sewage. Oil/water separators collect waste oils and lubricants from the industrial shop discharges. Water and sediments from the oil/water separators are disposed of at the "B" Street landfill (Site 2). Disposal of the wastewater effluent is by evaporation and percolation from the lagoons. Under normal conditions, no effluent leaves the base, so no National Pollutant Discharge Elimination System (NPDES) permit is required. Overflow from the lagoons is captured in two infiltration ponds. According to CH2M Hill (1983), measurements of biochemical oxygen demand (BOD_5), nitrate, nitrogen, total Kjeldahl nitrogen, oil and grease, total phosphorous, pH, and chromium in the effluent show that the treatment system operates well. Further, no chromium was detected in the lagoon influent or effluent.

2. Site 2 - "B" Street Landfill

The "B" Street landfill is located in the northwest corner of the base and served as the main base sanitary landfill between 1956 and 1969, when the existing landfill went into operation. Materials dumped at the landfill included general refuse such as garbage, concrete, rubble, fill, empty drums, and trees, and industrial wastes such as waste oils, fly ash from the heat plant, solvents, jet fuel, tank-cleaning sludge, and possibly up to 20 drums of DDT. Refuse and wastes were placed in trenches 12 to 14 feet deep and either burned or covered with fill. Currently, the site is covered by small piles of dirt fill, concrete, rubble, empty drums, and refuse. Some of the shallow trenches are still visible. The potential for environmental impact at Site 2 is based on the suspected presence of hazardous wastes in the landfill.

3. Site 8 - Existing Fire Department Training Area

Site 8 is located about 1,000 feet southeast of the end of the flight line and has been used as a training site for the fire department since 1962. The site consists of two buildings and a burn area in which a steel aircraft skeleton is encircled by low earthen berms. Prior to 1975, waste fuel, oils, and lubricants were burned in the fire department exercises, but thereafter only jet fuel (JP-4) has been used. Exercises are currently conducted one to three times per month and consume 300 to 500 gallons of fuel for each fire. Although most of the fuel is probably consumed by the fire, the potential for environmental impact at this site is based on the portion of the fuel remaining in the soil.

4. Site 11 - Fuel Hydrant System Leak/Spill Area

Site 11 is located on the flight line between the No. 3 and No. 4 jet fuel hydrant stations. As much as 64,000 gallons of jet fuel were spilled in the vicinity of Site 11 in two incidents in the late 1950s. The potential for environmental impact is based on the possibility that fuel may still remain below the ground surface.

5. Site 12 - Entomology Shop Yard

Site 12 is located immediately northwest of the entomology shop, Building No. 2206. Pesticide (insecticides, herbicides, and rodenticides) application equipment has been filled and cleaned in this building since the late 1960s. Prior to about 1981, wash water was allowed to drain outside the building on the ground surface. Currently, the wash water is collected in an underground tank and analyzed before disposal. Past soil samples from this site have yielded low concentrations of several pesticides, including DDT. The potential for environmental impact is based on the presence of pesticides at the site.

E. IDENTIFICATION OF POLLUTANTS SAMPLED

Chemical analyses of ground water and soil samples included some or all of the parameters listed in Table 1. Ground water samples from the monitor wells and the base wells were analyzed for all the parameters in Table 1 plus field measurements of pH, specific conductance, and temperature. Soil samples from Site 8 were analyzed for TOX, TOC, oil and grease, total metals, and phenols. Soil samples from Site 11 were analyzed for TOX, TOC, oil and grease, and heavy metals. Soil samples from Site 12 were analyzed only for insecticides using EP toxicity extraction.

F. IDENTIFICATION OF THE FIELD TEAM

The field work required for Phase II, Stage 1 was completed by Mr. Steven Johnson, Staff Hydrologist, who supervised both the monitor well installation and soil sampling activities. Appendix F contains a description of his qualifications.

TABLE 1

PARAMETERS, LIMITS OF DETECTION FOR SOIL AND GROUND WATER ANALYSES, AND WATER QUALITY STANDARDS

Constituent	Limit of Detection, Soil	Limit of Detection, Water (µg/L)	Public Drinking Water Standard (µg/L)
Pesticides*			
Aldrin	0.01 µg/L	0.005	
p,p'-DDT	0.05 µg/L	0.02	
o,p-DDT	0.05 µg/L	0.02	
DDD	0.02 µg/L	0.01	
DDE	0.02 µg/L	0.01	
Dieldrin	0.01 µg/L	0.005	
Endrin	0.01 µg/L	0.005	0.2
Heptachlor	0.01 µg/L	0.005	
Heptachlor Epoxide	0.01 µg/L	0.005	
Lindane	0.01 µg/L	0.005	4.
Methoxychlor	0.1 µg/L	0.1	100.
Chlordane	0.2 µg/L	0.2	
Toxaphene	1.0 µg/L	1.	5.
alpha-BHC	0.01 µg/L	0.005	
beta-BHC	0.01 µg/L	0.01	
delta-BHC	0.01 µg/L	0.005	
Heavy Metals			
Cadmium	NA	10	10.
Chromium	NA	5	50.
Lead	10 µg/g	10	50.
Nickel	NA	60	
Silver	NA	10	50.
Others			
Oil and Grease	0.06 mg/g	400	
Phenol	5 µg/g	10	
Total Organic Carbon	0.01 mg/g	1000	
Total Organic Halogens	5 µg/g	10	

*Pesticides extracted from soil using EP toxicity extraction procedure; detection limit is for extract.

NOTE: NA = Not analyzed
mg/g = milligrams per gram
µg/L = micrograms per liter
µg/g = micrograms per gram

II. ENVIRONMENTAL SETTING

A. GEOGRAPHIC LOCATION

Mountain Home AFB occupies about 5,800 acres in Elmore County, Idaho on a plateau about 2 miles north of the Snake River (see Plate 1). The base is about 10 miles southwest of the city of Mountain Home and about 50 miles southeast of Boise.

The base is located on the Mountain Home Plateau, which is a rolling upland plain with occasional volcanic cones or buttes rising several tens to a few hundred feet above the plain. The elevation of the plain ranges from 2,700 feet to about 3,200 feet and is about 3,000 feet in the vicinity of the base (Mundorff et al., 1964). The surface of the plain rises 300 to 500 feet above the Snake River, which flows along the southern edge of the plateau.

The Mountain Home Plateau is drained by several intermittent streams that are tributaries of the Snake River. Canyon Creek is an intermittent stream closest to the base and receives stormwater that is occasionally discharged from a dam along the north side of the west wastewater lagoon.

The average annual precipitation at the base is about 8 inches and falls principally in the winter and spring. Mean monthly temperatures range from 30°F in January to 76°F in July. Annual average lake evaporation in the vicinity of the base is about 35 inches (CH2M Hill, 1983). Therefore, the potential of local precipitation infiltrating directly into the aquifer is small.

B. REGIONAL GEOLOGY AND HYDROGEOLOGY

The Mountain Home Plateau is underlain by over 10,000 feet of volcanic and sedimentary rock, which was deposited upon the Idaho Batholith. The Idaho Batholith is composed of silicic volcanic rocks and forms a trough in which the overlying sediments and volcanic rocks were deposited. In ascending order, the formations overlying the Idaho Batholith include the Miocene Age Idavada Volcanics, consisting of about 2,000 feet of silicic volcanic rocks. Next in the sequence is the Idaho Group, ranging in age from Pleistocene to Pliocene and consisting of the Glenns Ferry Formation and the Bruneau Formation. These two formations consist of basalt flows interbedded with layers of silt and sand that were deposited during interflow periods. Overlying the Idaho Group is basalt of the Snake River Group, which is Holocene and Pleistocene in age, and unconsolidated alluvial deposits, for a total thickness of about 900 feet. The basalt of the Snake River Group consists of up to 550 feet of several basalt flows, which originated from volcanic sources as much as 60 miles east of the base (Malde et al., 1963). Bedrock beneath the plateau is mantled by a thin layer of eolian sand and silt.

All of the formations underlying the Mountain Home plateau yield varying amounts of ground water. The most important aquifers are the Bruneau and Glenns Ferry Formations of the Idaho Group, which comprise a regional deep aquifer. Also present in some areas is a localized shallow aquifer comprised of alluvium in which the saturated thickness is adequate to yield a usable amount of water to wells.

Both the Bruneau and Glenns Ferry Formations contain highly permeable layers of fractured and porous basalt and coarse sand and gravel. Well yields range up to 350 gallons per minute (gpm) from the Glenns Ferry and up to 3,500 gpm from the Bruneau (Young, 1977). Depth to ground water is generally 200 to 400 feet below ground (Norton et al., 1982). Ground water quality in the regional aquifer is suitable for most purposes. Specific conductance is generally less than 500 µmhos/cm with low hardness and low concentrations of major ions such as calcium, magnesium, potassium, sulfate, and nitrate (Parliman, 1982). Regional ground water flows toward the south and discharges into the Snake River, often in the form of springs or seeps emanating from the steep margins of the plateau. Two large springs, Halls Ferry Springs and Weatherby Springs, issue from the Bruneau Formation at points in the Snake River Canyon directly south of the base.

The main body of shallow ground water in the vicinity of the base underlies the city of Mountain Home. The perched ground water is maintained by leakage from the Mountain Home Reservoir and water distribution canals and from infiltration from Rattlesnake Creek and Canyon Creek. Depth to water is highly variable, ranging from less than 10 feet to more than 100 feet. Shallow ground water flows southward and eventually recharges the deeper, regional aquifer (Norton et al., 1982).

The principal recharge area for the aquifer underlying the Mountain Home Plateau is in the mountains north of the Plateau, where precipitation infiltrates directly into rock outcrops. Recharge from the plateau's surface is very limited because of the low annual precipitation, relatively high evaporation rate, and the deep water table. A small amount of recharge is provided by deep percolation of intermittent stream flow and excess irrigation water.

C. GENERAL BASE HYDROGEOLOGY

The volcanic rocks and alluvial deposits in the vicinity of Mountain Home AFB generally behave as a single unconfined aquifer. However, locally confined conditions may occur due to the presence of discontinuous layers of slowly permeable materials. Ground water in the base vicinity is available mainly from the fractures, cinder zones, and interflow zones in the basalts of the Bruneau Formation, in which the depth to water ranges up to several hundred feet below ground. All of the base wells and private wells located within 2 miles of the base are completed in the

Bruneau Formation (see Tables 2 and 3). Ground water is also available from saturated gravel aquifers in stream channels and from the Glenns Ferry Formation.

Ground water levels were measured in areas near the base in 1976 (Young, 1977), 1980 (Lindholm, 1983), and 1981 (Norton et al., 1982). Depth to water ranged from 300 feet to more than 600 feet below ground or from elevation 2800 near Mountain Home to 2650 beneath the base. The water table in these years sloped toward the south, southwest, and west and showed significant cones of depression centered beneath Mountain Home, the Cinder Cone Butte area, and an area immediately east of the base. In 1981, the latter cone of depression contributed an easterly component to ground water flow causing the water table to slope to the southeast at a rate of about 30 feet per mile.

Hydrographs shown by Norton et al. (1982) show that ground water levels have been declining at 2 to 4 feet per year since 1967. The decline is due to excessive pumping and below average recharge to the aquifer. As of 1980, about 600 acre-feet per year (ac-ft/yr) was being mined from the regional aquifer beneath the Mountain Home Plateau, and currently approved ground water permits would increase the deficit to 28,100 ac-ft/yr when they are developed. In addition to excessive withdrawals, recharge decreased below normal between 1974 and 1980. Although precipitation was above normal at Mountain Home during that period, it was below normal in the mountains east of the plateau, where the regional aquifer is recharged by precipitation falling on rock outcrops. Precipitation falling on the plateau is a less important source of recharge.

The pumping rates of base wells and private wells within 2 miles of the base indicate that the regional aquifer is highly transmissive. The specific capacity of a well is the rate of discharge in gallons per minute produced by the well per foot of drawdown (gpm/ft) and is proportional to the transmissivity of the aquifer. Specific capacities of the base wells are listed in Table 2 and ranged from 50 to 257 gpm/ft. Specific capacities reported for private wells ranged from 40 to 412 gpm/ft (see Table 3). Using the method of Theis (1963) for converting specific capacity to transmissivity and a storage coefficient of 0.03 from Mundorff et al. (1964), the transmissivity ranges from 65,000 to 650,000 gallons per day per foot (gpd/ft). These values are within the range of transmissivities reported by Mundorff et al. (1964) from pumping tests in wells in other areas of the Snake River Plain aquifer. Their values ranged from a few thousand to tens of millions of gallons per day per foot.

TABLE 2

BASE WELL CONSTRUCTION DETAILS

Well No.	USGS No.	Local Identifier No.	Date Constructed	Hole Size (in.)	Casing Size (in.)	Depth (ft)	Depth to Water/Date (ft)	1967 Depth to Water (ft)	Well Yield (gpm)	Specific Capacity (gpm/ft)
MH-1 inactive	50	04S 05E 21 CAD1	1942	12	8	409	331/1942	331	--	150
MH-1 new	56	04S 05E 28 DAB1	1974	22	16	450	319/1974	--	1,600	--
MH-2	53	04S 05E 27 BCD1	1943	12	8	588	316/1953	316	750	--
MH-3	54	04S 05E 21 BDB1	1943	12	8	425	330/1943	330	750	--
MH-4	55	04S 05E 28 BAD1	1955	24	18	379	309/1955	326	1,800	257
MH-5	57	04S 05E 33 CDC1	1953	8	6	425	326/1953	335	16	--
MH-6	51	04S 05E 22 DAC1	1962	20	16	610	347/1962	347	600	164
MH-7	--	--	1983	16	16	505	341/1983	--	1,250	50
MH-8	--	04S 05E 27 CAA1	1983	16-24	14-20	540	368/1983	--	1,500	150

Source: USAF, Base Civil Engineer in CH2M Hill (1983) with modifications.

TABLE 3

INVENTORY OF WELLS WITHIN 2 MILES OF MOUNTAIN HOME AFB

Map No.	Owner	Depth	T	R	Section	Quarter	Quarter	Year Installed	Water Level at Installation[a]	Length of Surface Seal[a]	Specific Capacity (gpm/ft)	USGS Identifier	Use
1	Streeter	500	4S	5E	9	NE	SE	1972	375	10	NA		D
2	Covey	417	4S	5E	9	NE	SE	1972	359	46	NA		D
3	Strickland	410	4S	5E	9	SE	SE	1972	361	20	NA		D
4	Schiffaner	500	4S	5E	9	SW	SW	1973	350	21	NA		D
5	Parker	432	4S	5E	9	SW	SE	1974	361	20	NA		D
6	La Foy	525	4S	5E	9	NE	SE	1981	360	18	NA		D
7	Maupin	475	4S	5E	10	NW	NE	1983	360	19	NA		D
8	Locker	530	4S	5E	10	SW	SW	1979	396	19	NA		D
9	Strasters	520	4S	5E	10	NW	SW	1977	395	19	NA		D
10	Bems	475	4S	5E	10	NE	NE	1976	370	18	NA		D
11	Streeter	510	4S	5E	10	SW	NW	1975	378	18	NA		D
12	Hernandez	570	4S	5E	10	NE	SW	1974	386	NA	NA		D
13	Streeter	706	4S	5E	10	NW	SW	1967	378	None	40	4S-5E-10CAC1	I
14	Streeter	506	4S	5E	10	NE	SW	1971	378	20	NA		D
15	Streeter	735	4S	5E	11	SW	SW	1968	372	None	NA	4S-5E-10DDA1	I
16	Reddekopp	578	4S	5E	13	NE	SW	1966	387	10	NA		I
17	LDS Church	500	4S	5E	15	NW	NW	1978	385	10	NA		D
18	Pettingill	450	4S	5E	15	SW	NW	1972	370	20	NA		D
19	Mereen	660	4S	5E	15	SW	SW	1971	360	NA	NA		I
20	Neilson	500	4S	5E	17	NE	NE	1974	352	20	NA		D
21	Fisher	455	4S	5E	19	NE	NE	1979	327	18	NA		D
22	Fisher	490	4S	5E	19	NW	SW	1967	323	NA	NA	4S-5E-19CBA1	I
23	Ramsey	543	4S	5E	24	NW	SE	1966	377	None	NA		I
24	Johnson	625	4S	5E	24	NW	NE	1967	385	10	NA		I
25	Reddekopp	550	4S	5E	24	NE	NE	1966	388	None	NA	4S-5E-24AAB1	D
26	Hickey	530	4S	5E	25	NW	NW	1964	366	None	NA	4S-5E-25BBC1	I
27	Peterman	401	4S	5E	26	NE	SW	1974	366	18	24		D
28	Brooks	525	4S	5E	26	SW	SW	1966	370	None	NA		I
29	Brooks	500	4S	5E	26	SE	SE	1969	359	20	NA		I
30	Fisher	437	4S	5E	30	NE	NE	1967	296	None	412		I
31	Holstein Heifers	645	4S	5E	36	NE	NW	1979	382	18	NA		I
32	Brooks	416	4S	5E	36	SW	SE	1966	315	24	NA		NA
33		500	4S	5E	9	SW	SE	1976[b]	365[b]	NA	NA	4S-5E-09DCB1	D
34		500	4S	5E	15	NW	NW	1976[b]	387[b]	NA	NA	4S-5E-15BBC1	D
35		485	4S	5E	19	NW	NE	1976[b]	336[b]	NA	250	4S-5E-19ABC1	I
36	Brandt	430	4S	4E	25	NE	NE	1981	320	50	NA		D
37	Brandt	410	4S	4E	25	NE	NE	1982	327	72	NA		I
38	Brandt	445	4S	4E	25	NE	NE	1982	331	74	NA		I

[a]Depth in feet below ground surface

[b]Indicates date water level was measured

NA = Not available; I = Irrigation; D = Domestic.

Well locations are shown in Plate 2.

Sources: Idaho Department of Water Resources; Young (1977); Norton et al. (1982); Parliman (1982)

Ground water quality in the regional aquifer is high enough for most purposes. Table 4 lists chemical analyses from the base wells that were sampled in 1980. The USEPA primary and secondary drinking water standards are also listed for comparison. With the exception of MH-3, concentrations of all the constituents meet both sets of standards.

However, ground water quality has deteriorated since the initial base wells were installed in 1948. CH2M Hill (1982) noted that concentrations of nitrate, chloride, and sulfate in the former MH-1 steadily increased between 1960 and 1974, when the well was removed from service. Base wells MH-2, MH-3, MH-4, and MH-5 have also yielded increasing concentrations of nitrate, sulfate, and chloride since about 1960. The concentrations of those constituents in MH-6 have risen only slightly since 1964. Plate 3 shows the increase of specific conductance, which is a collective measurement of the dissolved ion concentration, in base well water since 1948.

Chemical analyses for base well water reported by Parliman (1982) show that all the principal cations and anions in the analyses except iron, manganese, phosphorus, and silica have increased in concentration since 1960. There are two primary sources for the ions: deep percolation of contaminants from the ground surface and mixing of ground water from the Glenns Ferry Formation with ground water in the Bruneau Formation.

The Glenns Ferry Formation yields lower quality ground water than the Bruneau Formation because it consists of lacustrine, fluvial, and floodplain sediments (Ralston and Chapman, 1968). Soluble ionic compounds were concentrated in the sediments during deposition by evaporation and subsequently leached by ground water. In contrast, the Bruneau Formation consists primarily of resistant basalt, which contributes relatively few ions to solution. Table 5 compares the quality of water from two wells completed in the Glenns Ferry Formation with the pre-1958 ground water quality determined by the average of seven analyses of water from MH-3. The MH-3 analyses represent the ground water quality in the Bruneau Formation before it began deteriorating in about 1960 and are similar to pre-1958 analyses from other base wells. Ground water from the Glenns Ferry Formation contains significantly higher concentrations of chloride, sulfate, calcium, sodium, zinc, and other major ions than the MH-3 analyses. However, concentrations of nitrate, iron, manganese, and phosphorus are similar in the two sets of analyses.

TABLE 4

CHEMICAL ANALYSES OF BASE WELLS MH-1, MH-3, MH-5 AND MH-6 IN 1980

Parameter	USEPA Primary (P) and Secondary (S) Drinking Water Standards	MH-1*	MH-3	MH-5	MH-6
Arsenic	0.05(P)	0.001	0.001	0.001	0.002
Alkalinity (as $CaCO_3$)		130	120	76	60
Bicarbonate (as HCO_3)		150	130	93	63
Calcium		60	130	59	33
Carbonate (as CO_3)		5	7	ND	5
Chloride	250(S)	49	110	55	26
Fluoride	1.4 to 2.4(P)	1.1	0.1	0.1	0.1
Hardness		230	510	210	120
Iron	0.3(S)	0.01	NA	< 0.01	0.02
Magnesium		19	46	16	8.4
Manganese	0.05(S)	0.001	NA	< 0.001	< 0.001
Nitrate + Nitrite (as N)	10(P)	10	26	9.3	2.5
pH	6.5 to 8.5 (S)	8.4	8.2	8.6	
Phosphorus		0.04	0.04	0.02	
Potassium		9	6.8	6.5	
Selenium	0.01(P)	NA	ND	NA	NA
Silica		38	40	38	40
Sodium		24	41	24	18
Specific Conductance (µmhos/cm)		591	1,200	579	364
Sulfate	250(S)	83	240	90	66
Temperature (°C)		18.5	17.5	15	20
Total Dissolved Solids	500(S)	368	584	421	237
Zinc	5(S)	0.01	NA	0.39	< 0.003

*New MH-1 installed in 1974.

All concentrations in milligrams per liter unless otherwise specified.

Wells were sampled on 18 or 19 November 80.

NA = Not analyzed; ND = None detected.

Source: Parliman (1982).

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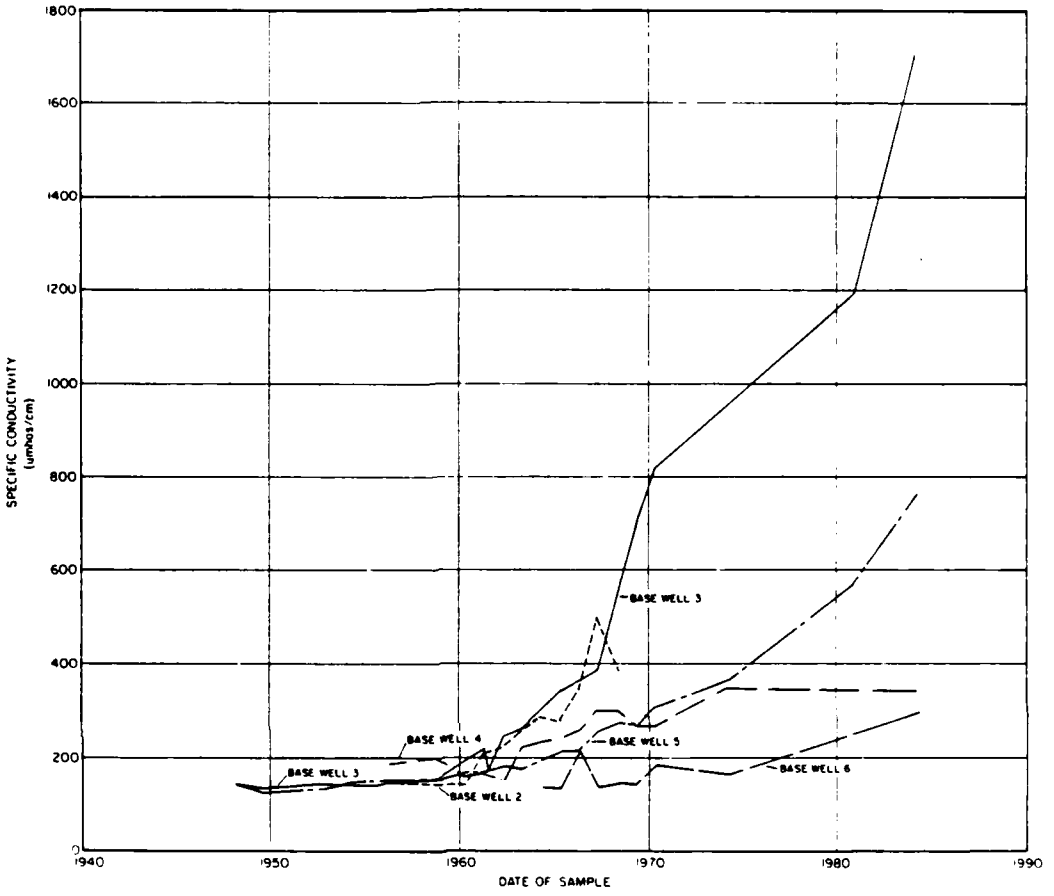

SPECIFIC CONDUCTIVITY OF BASE WELL WATER

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PLATE 3

TABLE 5

COMPARISON OF CHEMICAL ANALYSES OF GROUND WATER FROM THE GLENNS FERRY FORMATION AND THE BRUNEAU FORMATION

Parameter	Glenns Ferry Formation[a] Well No. 04S 02E 25DAD1	Glenns Ferry Formation[a] Well No. 04S 03E 35BCA1	Bruneau Formation Base Well MH-3 Average of Pre-1958 Analyses
Arsenic	0.007	0.018	NA
Alkalinity (as $CaCO_3$)	320	170	60
Bicarbonate (as HCO_3)	390	210	73
Calcium	68	64	12
Carbonate (as CO_3)	ND	ND	NA
Chloride	28	22	3.1
Fluoride	0.9	0.3	0.2
Hardness	310	220	46
Iron	< 0.01	NA	0.03
Magnesium	35	14	3.9
Manganese	< 0.001	NA	NA
Nitrate + Nitrite (as N)	1.1	0.92	1.5[b]
pH	7.2	7.5	7.8
Phosphorus	0.03	0.03	NA
Potassium	12	9.7	3.0
Selenium	NA	0.001	NA
Silica	67	45	41
Sodium	34	35	10
Specific Conductance (µmhos/cm)	788	601	142
Sulfate	61	85	6.5
Temperature (°C)	18	18	17.2
Total Dissolved Solids	499	378	116
Zinc	0.49	NA	NA
Date of Sampling	24 Sep 80	19 Aug 80	15 Jan 48 - 24 Apr 56 (7 Analyses)

[a]The two wells in the Glenns Ferry Formation listed are located approximately 22 to 25 miles west-southwest of the base.

[b]Expressed as total nitrate (as N)

All concentrations in milligrams per liter unless otherwise specified.

NA = Not analyzed; ND = None detected

Source: Parliman (1982)

Table 6 was prepared to show the amount of dissolved material represented by the increase in concentrations of some of the parameters in the base well analyses between about 1960 and 1980. The 1980 concentration of each parameter was estimated by averaging the concentrations in Table 4, and the MH-3 analyses in Table 5 were the source of the 1958 concentrations. Other assumptions are given in Table 6. The estimates show that several hundred tons of each constituent have been added to ground water in the Bruneau Formation to account for the increases between 1958 and 1980. Chloride concentration in the Glenns Ferry Formation is not high enough to account for the entire increase, although there could be locally higher concentrations than shown by the two analyses in Table 5. In the base vicinity, road and runway salting are likely sources of chloride. The principal feedlots (Simplot), which are also potential sources of chloride, are downgradient from the base at the base of the Snake River bluffs. Increases in sulfate, calcium, and sodium may be due to mixing with water from the Glenns Ferry Formation, although deep percolation of excess irrigation water is suggested from analyses of MH-3, which is much higher in many constituents than waters from the Glenns Ferry Formation. In general, pre-1958 concentrations of nitrate in the Bruneau Formation and current concentrations of nitrate in the Glenns Ferry Formation are similar, suggesting deep percolation of fertilizers and excess irrigation water to the Bruneau Formation.

Although no current ground water levels from the Glenns Ferry Formation are available, it is possible that the water level in the Bruneau Formation could decline below the water level in the Glenns Ferry Formation and consequently induce an upward gradient between the formations. Upward flow from the Glenns Ferry Formation into the Bruneau Formation could follow fractures or other permeable zones in the basalt. Another alternative is that upward flow only occurs as a result of drawdown when particular base wells such as MH-2, MH-3, or MH-5 are in operation. The constantly declining water levels would induce an increasing amount of upward flow from the Glenns Ferry Formation.

D. SITE-SPECIFIC GEOLOGY AND HYDROLOGY

This section presents the results of surface and subsurface investigations conducted during Phase II, Stage 1 at Sites 1, 2, 8, 11, and 12 at Mountain Home AFB. The field program is described in Section III, and the results of the chemical analyses are presented in Section IV. Monitor well and boring logs are presented in Appendix A.

TABLE 6

ESTIMATED AMOUNTS OF MATERIALS ADDED TO GROUND WATER OF THE BRUNEAU FORMATION, 1958-1980

Parameter	1958 Concentration (mg/L)	1980 Concentration* (mg/L)	Increase 1958 to 1980 (mg/L)	Increase in Tons of Dissolved Material	Glenns Ferry Formation Concentration (mg/L)	Possible Sources
Chloride	3.1	60	57	600	22-28	Glenns Ferry Fm., road salting, septic tanks, feedlots
Sulfate	6.5	120	114	1,100	61-85	Glenns Ferry Fm., excess irrigation water
Calcium	12	70	58	570	64-68	Glenns Ferry Fm., excess irrigation water
Sodium	10	27	17	170	34-35	Glenns Ferry Fm., road salting, excess irrigation water
Nitrate	1.5	12	10	100	0.92-1.1	Fertilization, excess irrigation water, feedlots, septic tanks

Assumptions:
- Source of analyses: 1958, Table 5; 1980, Table 4 (average of all wells).
- Aquifer area: 9 square miles
- Saturated thickness: 125 feet
- Porosity: 0.01
- Volume of ground water represented by water analyses: 9×10^9 liters.

*Concentrations taken as an average of base wells MH-1, MH-3, MH-5, and MH-6 sampled in November 1980.

1. Site 1 - Lagoon Landfill

Site 1, known as the lagoon landfill, served as the main base landfill between 1952 and 1956, but has since been covered by the east and west wastewater lagoons (see Plate 2). One monitor well (MW-1) was installed at the midpoint of the dike between the two lagoons, which is the approximate center of the original landfill, as shown in Plate 4.

The subsurface profile at Site 1 consists of 24 feet of brown silty fine to coarse sand underlain by black vesicular basalt with fine-grained crystals of olivine and plagioclase, which was present to the completion depth of 402 feet. The basalt weathers to dark reddish brown and contains occasional layers of cinders or broken interflow zones. The depth to ground water was about 333 feet below ground.

2. Site 2 - "B" Street Landfill

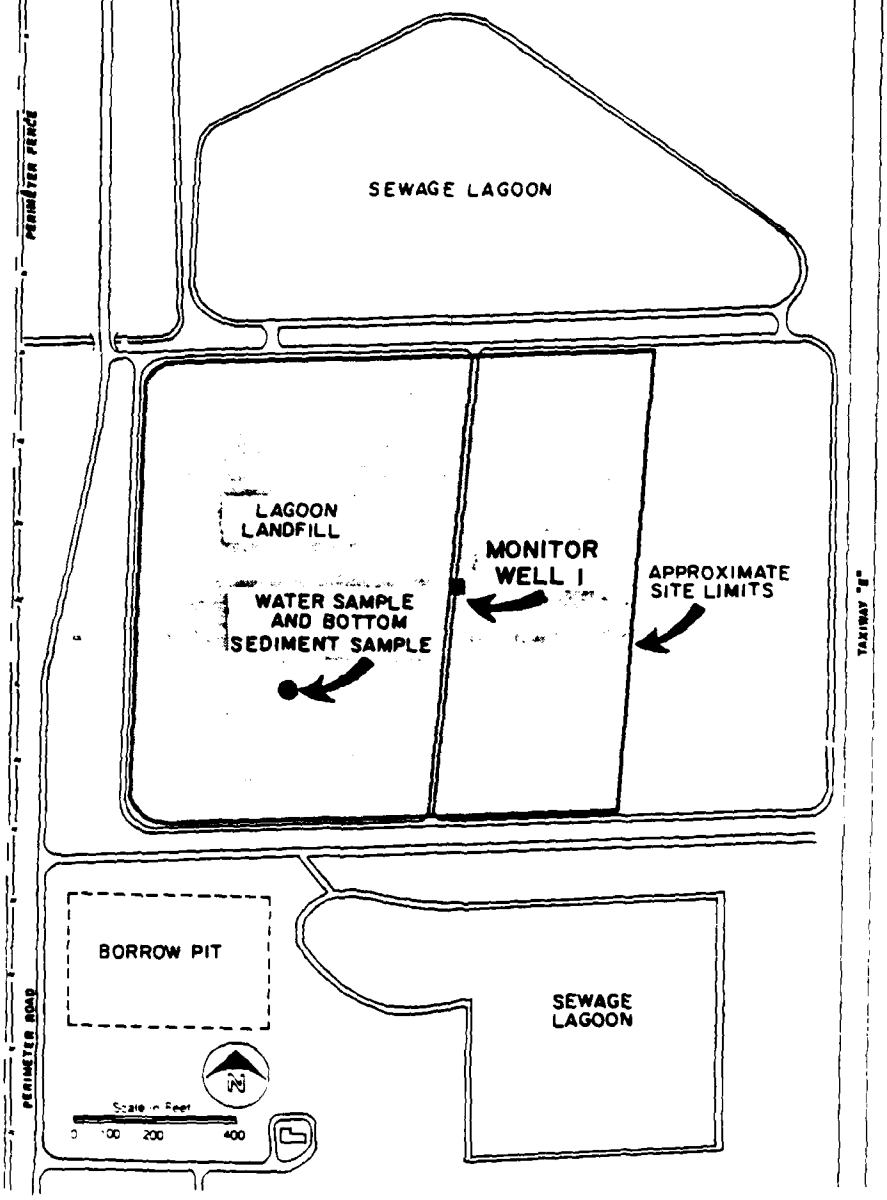
Site 2 is the "B" Street landfill and served as the main base sanitary landfill between 1956 and 1969. One monitor well (MW-2) was installed near the southwest side of Site 2 (Plate 5), where, based on the regional gradient, it would be approximately downgradient from the former landfill. Water level measurements taken in April of 1984 indicate that local pumpage may have locally reversed the gradient. A survey of well elevations and depth to water will be required to accurately determine the direction of ground water flow.

The subsurface profile beneath Site 2 consists of 18 feet of brown sandy silt with basalt fragments and caliche underlain by black vesicular basalt with fine-grained crystals of olivine and plagioclase, which extended to the completion depth of 410 feet. The basalt weathers dark reddish brown and contains occasional layers of cinders or broken interflow zones. The depth to ground water was about 354 feet below ground.

3. Site 8 - Existing Fire Department Training Area

Site 8 is the current fire department training area. Three borings were drilled at the site. Borings DM-4 and DM-5 were drilled outside the bermed area, and Boring DM-6 was drilled inside the bermed area (Plate 6).

The ground surface at Site 8 consists of brown fine to coarse sand and gravel, which extends to a depth of about 6 inches. Gray silt with some fine sand and occasional caliche and gravel extended from the surficial unit to about 4 feet below ground. Brown silty, slightly to moderately calichefied, fine sand with occasional coarse sand or gravel was found between about 4 and 7 feet below ground. All three borings were terminated at 10.5 feet in brown fine to medium sand.



LOCATION OF MONITOR WELL
AT SITE 1

REFERENCE: BASE MAP FROM CH2M HILL (1983)

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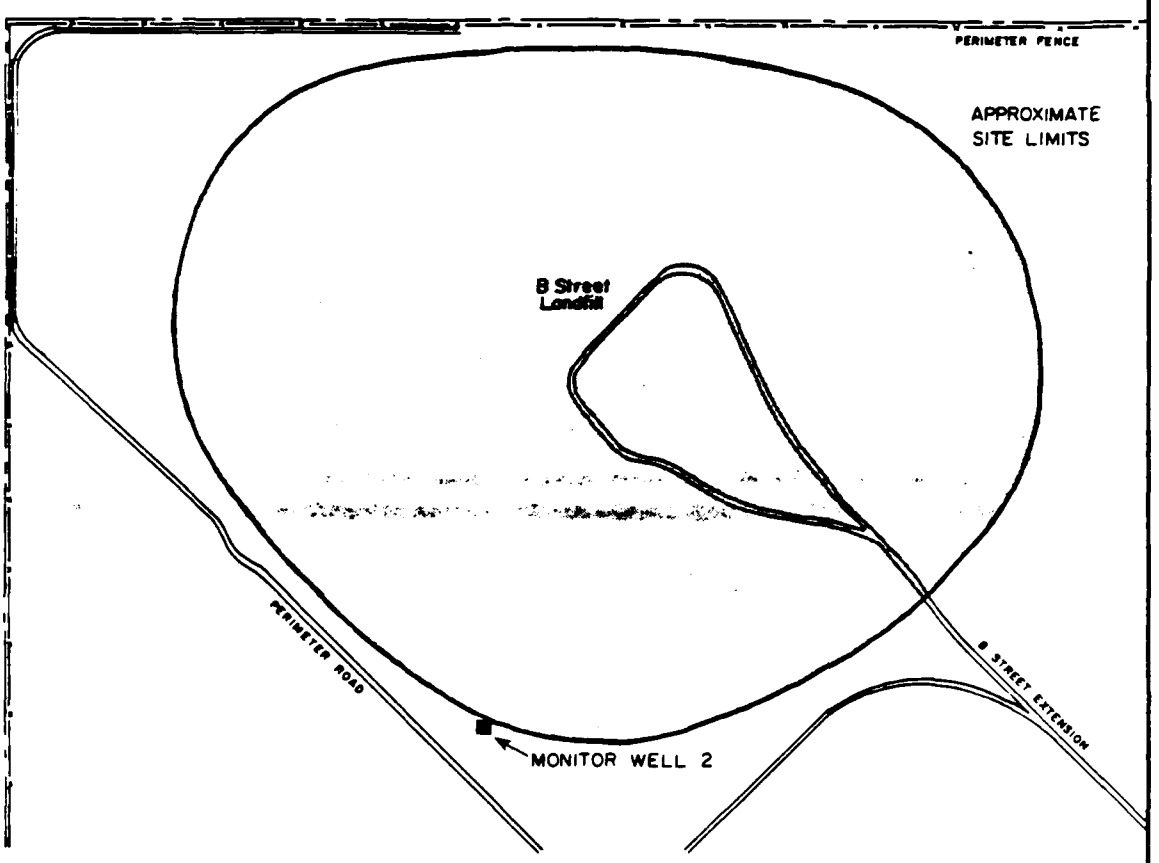
PLATE 4



LOCATION OF MONITOR WELL
AT SITE 2

REFERENCE: BASE MAP FROM [illegible] HILL (1983)

Dames & Moore

PLATE 5

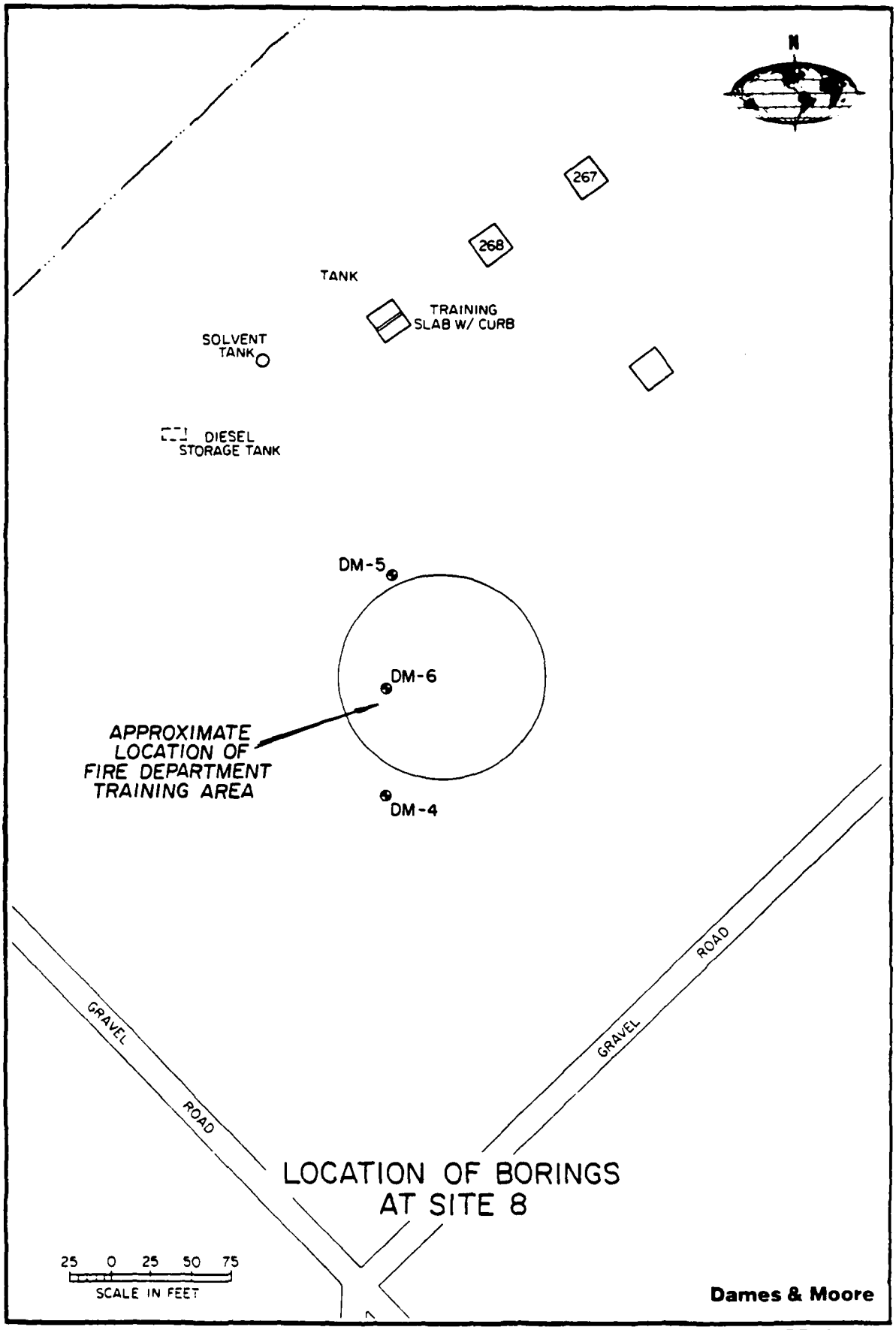


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PLATE 6

The moisture content of the analyzed soil samples ranged from 2.2 percent to 15 percent. The concentrations of organic vapors measured by the HNU (photo-ionization detector) ranged from less than 1 to 195 ppm in all the borings. Hydrocarbon and septic-like odors were detected to a depth of about 8 feet below ground in all the borings. Odors were very strong inside the bermed area at Boring DM-6 but less noticeable at DM-4 and DM-5.

4. Site 11 - Fuel Hydrant System Leak/Spill Area

Several thousands of gallons of jet fuel were spilled in the 1950s at Site 11. Three borings (DM-1, DM-2, and DM-3) were drilled at the site along a line extending southwest from the flight line, midway between fuel hydrants 3 and 4 (Plate 7). Boring DM-1 is about 100 feet from the edge of the taxiway, and Borings DM-2 and DM-3 are at 50-foot intervals from DM-1.

The ground surface at Site 11 consists of sparse grass and brown fine sandy silt. The silt extended to the termination depth of 10.5 feet in DM-2 and to 9.6 feet in DM-3 except for a 1.5-foot sand layer at 7 feet below ground in DM-3. Basalt was encountered at 2.6 feet in DM-1, although it is unknown whether it was a large boulder or bedrock.

HNU readings from the borehole ranged from less than 1 to about 20 ppm, although no odors were detected. The moisture content of the soil samples ranged from 2.2 to 15 percent.

5. Site 12 - Entomology Shop Yard

Site 12 is the driveway area adjacent to the northwest side of the entomology shop (Building 2206). Borings DM-7, DM-8, and DM-9 were drilled at 10-foot intervals in a line perpendicular to the building (Plate 8).

The soil at Site 12 consisted of brown, fine sandy silt with trace clay and gravel to a depth of 2.5 to 5 feet below ground, underlain by brown, silty fine sand to the completion depth of all the borings (6.5 feet). A single HNU reading of 80 ppm was noted at a depth of about 1 foot in DM-9. All the other readings were 5 or less, and no unusual odors were detected. Moisture contents ranged from 4.6 to 14 percent.

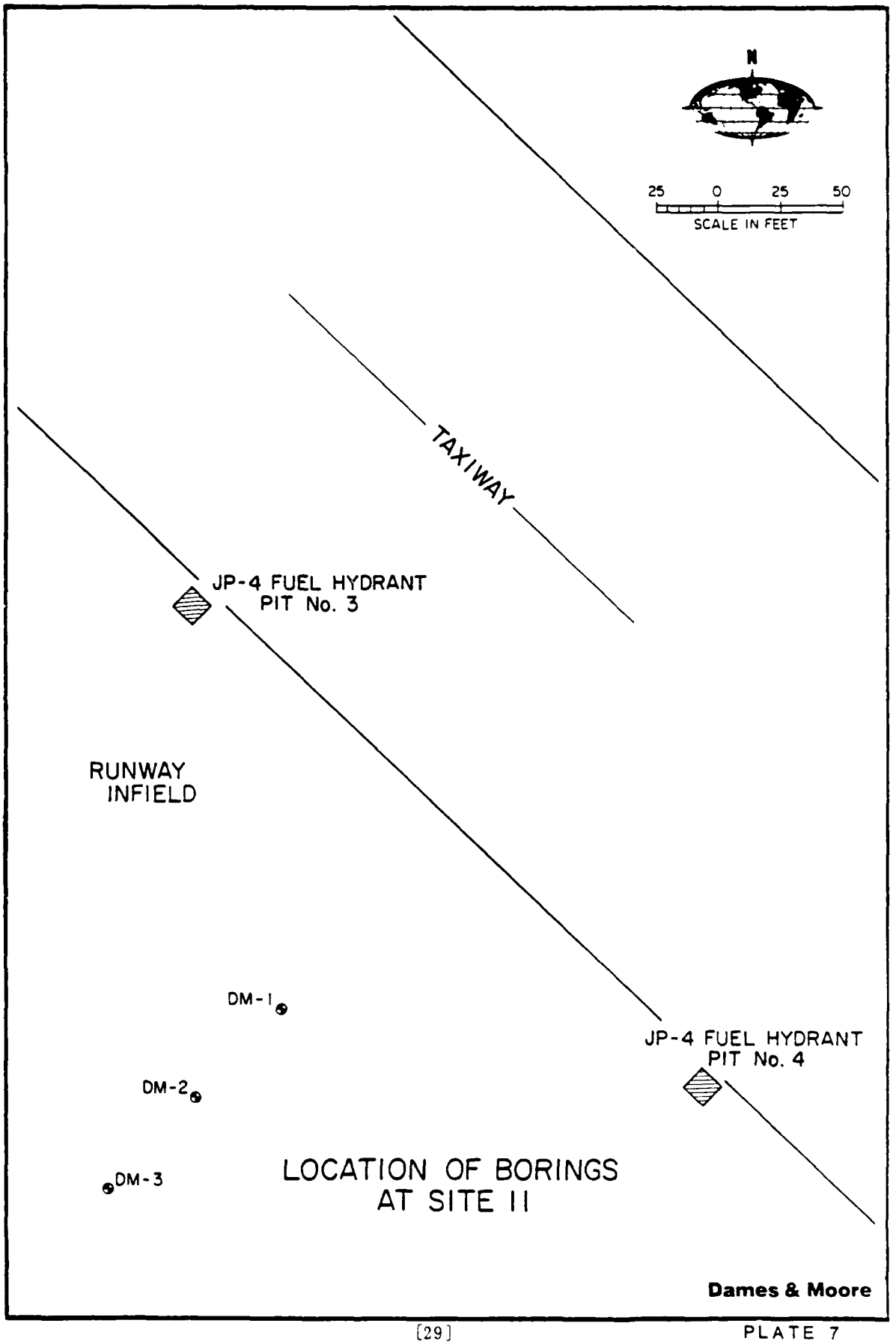

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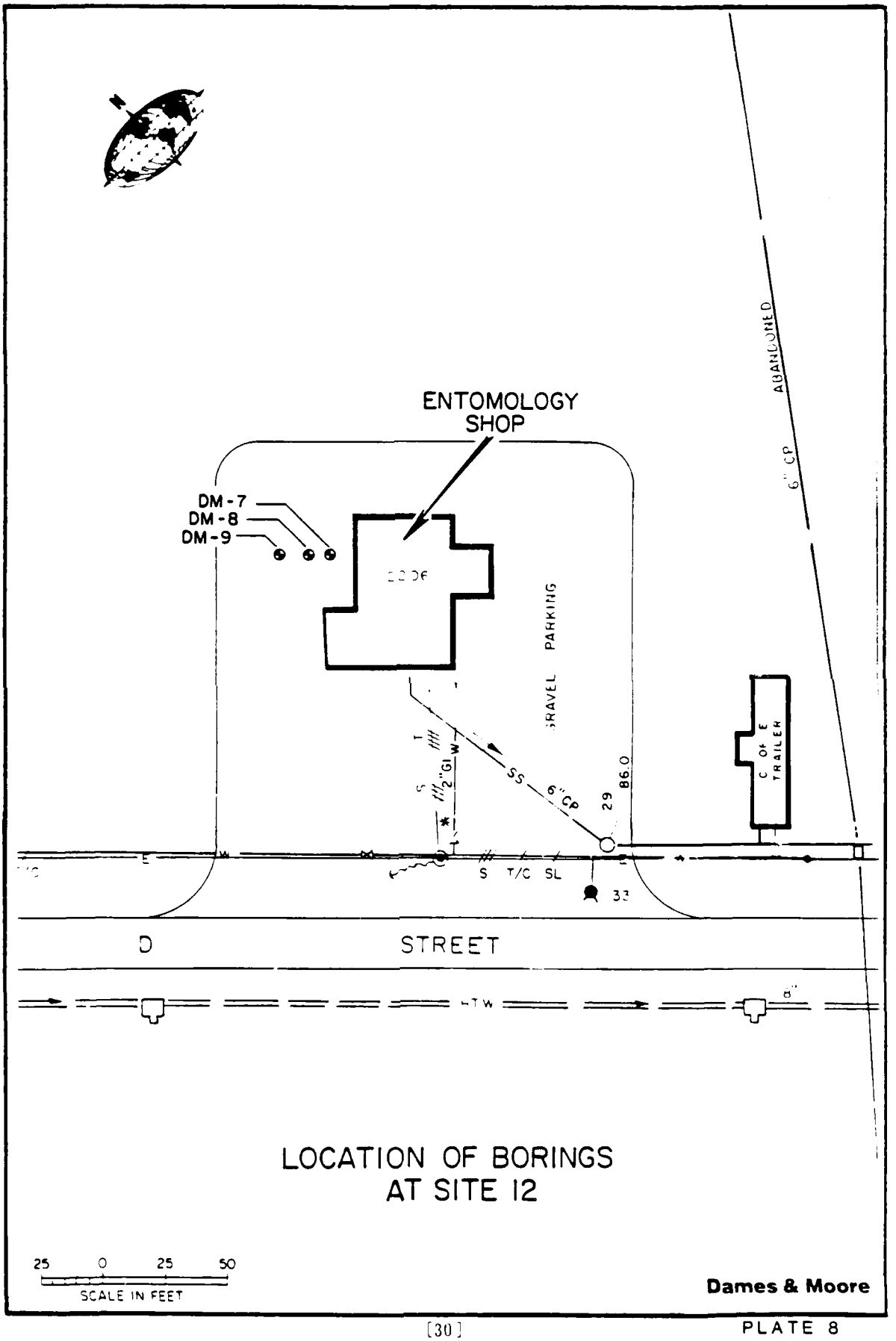
PLATE 7



LOCATION OF BORINGS
AT SITE 12

PLATE 8

E. HISTORIC GROUND WATER PROBLEMS

Ground water in the vicinity of Mountain Home AFB provides water for domestic use and irrigation. However, steadily declining water levels may decrease the availability of ground water in the future.

As discussed previously, ground water is currently mined at a rate of about 600 ac-ft/yr, and the overdraft would increase to 28,108 ac-ft/yr when all the outstanding ground water permits for irrigation are developed. If all the ground water applications currently pending are developed, the overdraft would be about 48,000 ac-ft/yr (Norton et al., 1982).

The overdrafts have caused constantly declining ground water levels in the vicinity of the base. Water level records are available from one well immediately northwest of the base (4S-5E-19CBA1) and two wells located about a mile east of the base (4S-5E-25BBC1 and 4S-5E-24AAB1) (Young, 1977; Norton et al., 1982). Water levels in all three wells have declined between 2 and 4 feet per year since 1967. Since 1976, ground water levels have declined as much as 45 feet in an area immediately east of the base (Norton et al., 1982).

Both state and federal agencies have responded to the declining water levels in the Snake River Basin. On May 7, 1981, the Idaho Department of Water Resources designated a 128-square-mile area about 6 miles north of the base as the Cinder Cone Butte critical ground water area (CGWA). Ground water levels in that area declined as much as 35 feet between 1976 and 1981 (Norton et al., 1982).

F. LOCATIONS OF WELLS ON AND OFF BASE

Drilling logs and well construction information were collected for the base production wells and for private wells located within 2 miles of the base. Plate 2 shows the locations of the base wells and private wells, and they are summarized in Tables 2 and 3, respectively. The sources of the well information included logs filed with the Idaho Department of Water Resources, Young (1977), Norton et al. (1982), and Parliman (1982).

The private well inventory consisted of 35 wells located within a radius of 2 miles of the base. The wells ranged in depth from about 400 to 735 feet and are used for either domestic or irrigation water supplies. Generally a 6-to 20-inch diameter borehole was drilled and up to about 25 feet of surface casing was installed. Most of the wells were completed as open holes below the surface casing, and only the largest production wells were cased or screened to the bottom of the borehole. The water level at installation ranged from 300 to 400 feet below ground. Pumping test results were available for only four wells, which yielded specific

capacities of 24 to and 412 gpm/ft. The wells were completed primarily in black or red basalt, presumably from the Bruneau Formation.

There are currently seven base wells in operation, and MH-8 was under construction. The wells range in depth between 400 and 610 feet and were installed periodically since 1943. The borehole for the wells ranged from 8 to 24 inches, and the entire length of the borehole was cased. A portion of the casing was perforated either at the factory or in the field with a torch. Water levels at installation ranged from about 309 to 331 feet below ground. Current water levels are listed in Table 7 and range from 320 to 368 feet below ground.

TABLE 7

WATER QUALITY PARAMETERS MEASURED IN THE FIELD

Well	Sampling Date	pH	Specific Conductivity (μmhos/cm)	Temperature (°C)	Casing Volumes Pumped	Depth to Water (feet)
MW-1	11 Apr 84	7.95	1300	14	6	332.9
MW-2	11 Apr 84	8.48	210	18	5.5	353.6
MH-1	10 Apr 84	7.91	600	18	6	336
MH-3	10 Apr 84	7.80	1700	16	18	354
MH-4	10 Apr 84	8.19	350	16	6	335
MH-5	10 Apr 84	8.19	770	16	3	not accessible
MH-6	10 Apr 84	8.46	300	19	3	368
MH-7	10 Apr 84	8.22	330	17	6	320
East Lagoon	11 Apr 84	7.87	680	10	-	-
West Lagoon	11 Apr 84	9.46	500	10	-	-

III. FIELD PROGRAM

A. DEVELOPMENT

The field program was developed based on previous phases of the IRP. During Phase I, the sites at which hazardous materials were handled were identified, and the sites with the highest potential environmental impact were selected. A field program to confirm the site selections was then developed in Phase I and evaluated during the Phase II Presurvey.

The Phase II, Stage 1 program consisted of the following activities:

1. Installation and sampling of a monitor well at Site 1, the lagoon landfill, and one at Site 2, the "B" Street landfill.

2. Sampling of base supply wells MH-1, MH-3, MH-4, MH-5, MH-6, and MH-7.

3. Drilling, geologically logging, and sampling three borings at Site 8, three borings at Site 11, and three borings at Site 12 to depths of between 2.7 and 10.5 feet.

4. Sampling the east and west wastewater lagoons.

B. IMPLEMENTATION

1. Monitor Well Installation

The monitor wells were drilled by Elsing Drilling, Inc. from Twin Falls, Idaho using air-rotary techniques. Initially, a 12-inch boring was drilled to 49 feet, and 50 feet of 8-5/8-inch steel surface casing was cemented into the borehole. An 8-inch borehole was then drilled to the completion depth. Cutting samples were collected at 5-foot intervals and logged in the field by an experienced Dames & Moore geohydrologist. Air exhausted from the borehole was monitored for organic and explosive vapors using an HNU photoionization detector and an explosimeter. At Site 1, cuttings from MW-1 were collected in 55-gallon drums or loaded onto the back of a truck and placed in a plastic-lined trench near MW-2 at Site 2. Cuttings from MW-2 were discharged directly into a plastic-lined pit, and both piles of cuttings were covered with a plastic sheet following completion of the drilling. The cuttings did not appear to contain hazardous constituents based on visual inspection and low-level readings on the photoionization detector.

The well casing consisted of 4-inch diameter Schedule 80 PVC pipe and well screen with 0.040-inch machine-cut slots. Construction details are listed in Table 8. The casing and screen sections were connected with threaded joints to avoid using PVC solvent. Pea gravel was placed with a tremie pipe within the annulus of the borehole up to about 10 feet above the top of the screen. About 9 feet of sand with grain sizes falling between sieve sizes #8 and #120 and about 2 feet of bentonite pellets were placed on top of the pea gravel to prevent grout from invading the gravel pack. The remaining annular space was filled with a cement grout (MW-2) or two intervals of grout separated by an interval of pea gravel (MW-1). The monitor well installations were completed with a concrete pad, PVC slip-cap on the well casings, and a steel lockable cap on the surface casing. MW-1 was completed at ground surface to allow for vehicular traffic on the dike.

The wells were developed by air-lift pumping until the discharge was clear of sand. MW-1 yielded about 60 gallons per minute (gpm), and MW-2 yielded about 15 gpm. These yields were measured by directing the discharge to a location where the flow was measured with a bucket and timer. The discharge from both wells cleared up after less than an hour of pumping.

2. Monitor Well Sampling

Prior to sampling, at least three casing volumes of water were bailed from each monitor well using a PVC bailer. The PVC bailer was double rinsed with distilled water prior to bailing each well. The sample jars were filled using a Teflon bailer after the specific conductance and pH of bailed water had stabilized. The Teflon bailer was double rinsed with distilled water and was then single rinsed with well water prior to bailing the samples. The samples were placed in an insulated cooler with ice and delivered to the analytical laboratory, UBTL Inc. in Salt Lake City, within 24 hours of sampling. Table 9 lists the parameters and preservatives.

Measurements of the depth to water, pH, specific conductance, and temperature were taken in the field and are listed in Table 7. The depth to water was measured with an electric tape. Measurements of pH and temperature were made with a Hach Model 19000 temperature-compensated digital pH meter equipped with a combination electrode. The meter was calibrated using pH 7 and 10 buffers. Specific conductance measurements were made with a Markson Science Model 10-B temperature-compensated conductivity meter and are reported at 25°C. The portion of the sample to be analyzed for metals was filtered through a 0.45-micron membrane in the field with a barrel-shaped pressure filter.

TABLE 8

MONITOR WELL CONSTRUCTION DETAILS

Item	MW-1	MW-2
Depth of borehole (feet below ground)	402	410
Screened interval	321 to 381*	344 to 404
Gravel pack	310 to 401	316 to 410
Fine sand seal	301 to 310	304 to 316
Bentonite seal	299 to 301	302 to 304
Cement grout	252 to 299 0 to 173	0 to 302
Gravel and sand fill	173 to 252	None
North state plane coordinate (estimated)	503,700	509,800
East state plane coordinate (estimated)	462,400	442,300
Ground surface elevation (estimated)	2990	3010
Depth to water (11 Apr 84)	332.9	353.6

*Non-slotted PVC pipe was installed from 381 to 401 feet in order to locate the screened interval across the water table.

TABLE 9

PARAMETERS AND PRESERVATIVES FOR WATER AND SOIL ANALYSES

Parameter	Preservative	Container[a]	Maximum Holding Time	Sample Volume (ml)	Analytical Method[b]
Ground Water Samples					
Oil and grease	Cool H_2SO_4 or HCl to pH<2	G	24 hours	1,000	EPA 413.2
Metals	Filter on-site HNO_3 to pH<2	P,G	6 months	250	EPA 206.2 (arsenic) EPA 213.1 (cadmium) EPA 218.2 (chromium) EPA 220.1 (copper) EPA 239.2 (lead) EPA 245.1 (mercury) EPA 249.2 (nickel) EPA 270.2 (selenium) EPA 272.1 (silver) EPA 289.1 (zinc)
Phenol	Cool, 4°C H_2SO_4 to pH<2	G	28 days	1,000	EPA 420.2
Pesticides	Cool, 4°C	G, Teflon cap	7 days	1,000	EPA 608
Total organic carbon	Cool, 4°C H_2SO_4 or HCl to pH<2	G	28 days	25	EPA 415.1
Total organic halogens	Cool, 4°C	G, Teflon cap	24 hours	40	EPA 9020
Soil Samples					
Oil and grease	Freeze	G	none	500g	EPA 413.2
Total organic carbon	Freeze	G	none	500g	EPA 415.1
Total organic halogens	Freeze	G	none	500g	EPA 9020
Phenol	Freeze	G	none	500g	EPA 420.2
Pesticides	Freeze	G	none	500g	EPA 608
Metals	Freeze	G	none	500g	EPA 206.2 (arsenic) EPA 213.1 (cadmium) EPA 218.2 (chromium) EPA 220.1 (copper) EPA 239.2 (lead) EPA 245.1 (mercury) EPA 249.2 (nickel) EPA 270.2 (selenium) EPA 272.1 (silver) EPA 289.1 (zinc)

[a] G = Glass, P = Plastic

[b] From Methods for Chemical Analysis of Water and Wastes (USEPA, 1978); Methods for Organic Chemical Analysis of Municipal and Industrial Wastewater (USEPA, 1982); and Test Methods for Evaluating Solid Waste (USEPA, 1982).

3. Base Well Sampling

Base wells MH-1, MH-3, MH-4, MH-5, MH-6, and MH-7 were sampled during Phase II, Stage 1. Prior to sampling, the depth to water was measured, where possible, with the built-in air line and direct reading gauge. The pump was then started and samples were collected after at least three casing volumes had been discharged from the well. The sample bottles were filled from a spigot on the discharge line. Measurements of pH, specific conductance, and temperature are listed in Table 7. The sample bottles were placed in an insulated cooler with ice and delivered by air freight to UBTL within 24 hours of sampling. MH-7 was sampled in place of MH-2, which was inoperative.

4. Wastewater Lagoon Sampling

Grab samples from the east and west wastewater lagoons were collected in a large plastic container and then poured into the individual sample bottles. The sample bottles were placed in an insulated cooler with ice and delivered by air freight to UBTL within 24 hours of sampling. Measurements of pH, specific conductance, and temperature were made in the field as described above and are listed in Table 7.

5. Collection of Soil Samples

Soil borings were drilled by Erickson-Ford Company of Boise, Idaho, using hollow-stem auger techniques. The borings were drilled to the sampling depth using the augers, and the sample was collected using the Dames & Moore Type "U" split-barrel sampler. The sampler was driven 18 inches or to refusal with a 140-pound hammer, and the soil sample was retained in 2.5-inch diameter by 1-inch brass rings. A portion of the soil retained in each of the brass rings was scraped into the sample jar. The brass rings were cleaned with detergent, water, and acetone between samples, and the sampler parts and hollow-stem augers were cleaned with soap and hot water between borings. The soil samples were placed in an insulated cooler with ice and delivered to UBTL within 72 hours after sampling. The boreholes were backfilled with powdered bentonite to within a foot of the ground surface. The remainder of the boreholes was filled with concrete along with a small round steel marker attached to a 3-foot piece of rebar. Organic or explosive vapors emanating from the boreholes were measured at each sampling interval with an HNU photoionization detector and an explosimeter. The measurements are listed on the boring logs in Appendix A. The soil samples that yielded the highest readings were subsequently submitted for analysis in quantities prescribed by the scope of work.

IV. DISCUSSION OF RESULTS AND SIGNIFICANCE OF FINDINGS

A. DISCUSSION OF RESULTS

This section presents a discussion of the chemical analyses of ground water and soil samples collected during field investigations at the sites shown in Plate 2. The second part of this section discusses the significance of the results.

The standards with which the results of the chemical analyses are compared are the primary drinking water standards.

1. Site 1 - Lagoon Landfill

The field investigation at Site 1 consisted of installing and sampling a monitor well and sampling the east and west lagoons. The field investigation is described in Section 3.0, and the complete analyses are presented in Appendices B and D.

The parameters detected in the monitor well (MW-1) sample included lead, cadmium, TOX, and TOC. The lead concentration met, but the cadmium concentrations exceeded the primary drinking water standards. Although there are no standards for TOX and TOC, the concentrations of those parameters were low (see Table 10). Despite the low concentration of TOX, it is higher than background suggested by the levels in the base wells, and it indicates that some halogenated wastes may be present in the ground water. Because none of the pesticides were detected in MW-1, the organic halogens may include chlorinated solvents, which have been used at the base.

Heptachlor, delta-BHC, and silver were detected in the east lagoon sample, and TOX, TOC, and oil and grease were detected in both the lagoon samples. Standards exist only for silver, and the concentration found in the east lagoon is below that standard. The TOX concentrations in the lagoons were elevated well above the background levels suggested by the base wells.

2. Site 2 - "B" Street Landfill

The field investigation at Site 2 consisted of installing and sampling the monitor well (MW-2). The field investigation is described in Section 3.0, and the complete analyses are presented in Appendices B and D.

The only detectable parameter in the MW-2 sample was TOX, which is present at a level that is equivalent to the background levels found in base water wells (see Table 10).

TABLE 10

SUMMARY OF CONSTITUENTS ABOVE DETECTION LIMITS IN GROUND WATER AND LAGOON WATER ANALYSES

Constituent	Monitor Well		Base Well						West Lagoon	East Lagoon
	MW-1	MW-2	MH-1	MH-3	MH-4	MH-5	MH-6	MH-7		
Pesticides (µg/L)										
Heptachlor	ND	ND	NA	NA	NA	NA	NA	NA	ND	0.007
delta-BHC	ND	ND	NA	NA	NA	NA	NA	NA	ND	0.08
Metals (µg/L)										
Lead	10	ND	NA	NA	NA	NA	NA	NA	ND	ND
Cadmium	20	ND	NA	NA	NA	NA	NA	NA	ND	ND
Silver	ND	ND	NA	NA	NA	NA	NA	NA	ND	10
Others (mg/L)										
TOX	0.12	0.055	0.082	0.12	0.065	0.086	0.059	0.062	1.5	1.9
TOC	4.0	ND	2.0	6.0	ND	2.0	ND	ND	20.	53.
Oil & Grease	ND	ND	0.5	ND	ND	ND	ND	ND	1.6	7.4
Phenol	ND	ND	NA	NA	NA	NA	NA	NA	ND	ND

Notes:
(1) Those constituents not listed above were present at concentrations less than detection limits.
(2) Table 1 lists all the constituents analyzed, detection limits, and water quality criteria.
(3) ND = None detected; NA = Not analyzed

3. Results of Base Well Sampling

Ground water samples were collected and analyzed from six base wells: MH-1, MH-3, MH-4, MH-5, MH-6, and MH-7. The base wells are located throughout the base, as shown in Plate 2. Sampling methods are given in Section III, and the complete analyses are listed in Appendix D.

Base well samples were analyzed for TOX, TOC, and oil and grease. TOX was detected in all six base well samples, TOC in three samples, and oil and grease in one base well sample (see Table 10). No water quality criteria have been established for these parameters, although all were present at low concentrations. The TOX concentrations ranged from 0.059 to 0.12 mg/L, with well MH-3 being the highest of the six wells. In the other five wells, TOX ranged from 0.059 to 0.086 mg/L.

4. Reliability of the Ground Water and Surface Water Analyses

The ground water quality analyses are considered to be reliable by virtue of the well construction and sampling measures taken in the field to insure that the samples were representative; by virtue of quality control procedures in the laboratory; and because of the monitor well locations.

The monitor wells were screened above and below the water table where low density organic contaminants would be concentrated. After the monitor wells were installed, they were thoroughly developed by air-lift pumping to remove all effects of drilling and installation and to improve the flow of ground water into the wells. Pumping was continued until the specific conductance of the well water stabilized and the discharge was clear of sediment. At least three casing volumes of water were removed from the monitor wells and the base wells prior to sampling to insure that the samples were representative of ground water in the formation. The monitor well samples were collected with a Teflon bailer to minimize agitation and consequent aeration of the sample, which could volatilize organic chemicals. The Teflon bailer does not absorb any chemicals from the sample and, therefore, prevents any adverse affects of sample chemistry and cross-contamination of subsequent samples.

The monitor wells were installed at locations where they would most likely intercept contaminants from the two waste sites. MW-1 was installed in a dike between the east and west lagoons, which coincides with the approximate center of the former landfill. Based on available site hydrogeologic data, MW-2 was installed at a location thought to be downgradient from the "B" Street landfill. However, it is possible that the ground water gradient may have been altered due to pumping of base wells.

The laboratory quality control (QC) program is described in detail in Appendix B. In general, analyses of duplicate and spiked samples were satisfactory. Analyses of method blanks were also acceptable.

5. Background Concentrations

No historic background concentrations of organic parameters or pesticides are available for ground water beneath Mountain Home AFB, but some information exists for concentrations of inorganic constituents. Ground water used at the base is obtained from the Bruneau Formation. As discussed in Section II.C, ground water quality in that formation has deteriorated somewhat since about 1960. The ground water quality prior to 1960 is approximated by the concentrations listed in Table 5, which are based on analyses of MH-3 samples prior to 1958. Current background conditions are shown by the analyses in Table 4, which are based on samples from MH-1, MH-3, MH-5, and MH-6 obtained in 1980. Despite the deterioration, concentrations of all the constituents from all the wells, except MH-3, meet the primary and secondary drinking water standards. Concentrations of nitrate-nitrogen and total dissolved solids in MH-3 samples exceed the primary and secondary drinking water standards.

No historic analyses of the organic content of ground water beneath the base were available, and the absence of any water quality criteria for TOX and TOC precludes any regulatory basis for comparing the concentrations obtained from water and soil samples. However, the following information provides some basis for interpreting the quality of water and soil indicated by TOX and TOC measurements.

TOC is a measure of the organic carbon in a sample, regardless of whether the source is natural or man-made. Organic carbon in uncontaminated ground water is derived from humic and fulvic acids dissolved from sediments, dissolution of carbonates containing organic carbon, and other dissolved organic materials. Background concentrations are typically less than 10 mg/L, especially in an aquifer such as the Snake River Plain aquifer, in which ground water would be relatively aerated and oxidizing conditions probably prevail. In an aquifer in which there is little ground water movement, organic-rich aquifer material, and relatively anaerobic or reducing conditions, TOC concentrations could be expected to range up to 100 mg/L. Industrial wastes may contain as much as 200,000 mg/L, and consequently, highly contaminated ground water may yield any concentration including several thousand milligrams per liter of TOC.

All soils contain varying fractions of organic materials that, in turn, contain different concentrations of organic carbon. The organic carbon analyses for the Mountain Home samples were performed on soil slurried with water and analyzed using the TOC methodology (USEPA Method 415.1) for water. No TOC methodology for solid samples has been approved by USEPA to date. The Mountain Home soil analyses will be evaluated only on a relative basis, especially because no background samples were specified by the Phase II, Stage 1 scope of work.

TOX is a measure of organic halogens containing chlorine, bromine, and iodine that can be adsorbed by activated carbon. The same methodology (USEPA Method 9020) was used for both soil and water analyses. A water extract was taken from the soil samples according to USEPA methods (USEPA, 1982). Chlorinated and brominated organic chemicals are not naturally produced, but are manufactured chemicals such as pesticides, PCBs, PBBs, and solvents. Therefore, virtually any concentration of TOX is an indication of organic contamination.

B. SIGNIFICANCE OF FINDINGS

Based on the results described in the previous section, this section will estimate, to the degree possible, the extent of contamination at each site and the risk to human health, if any, that the contamination poses.

1. Extent of Contamination at Site 1 - Lagoon Landfill

The ground water analyses from Site 1 show evidence of organic contamination. The concentration of TOC is probably at background levels, but the TOX concentration, approximately 50 percent higher than background from base wells, indicates that some contamination has occurred. Although the cadmium concentration in the MW-1 sample exceeded the primary drinking water standard, it is unlikely that it represents contamination by base activities. The insignificant concentrations of lead, chromium, and other inorganic constituents, which may indicate inorganic contamination, suggests that the cadmium is from a natural source or is a laboratory error. Unfortunately, no other cadmium analyses could be located from area wells for comparison. Resampling and analysis for cadmium is warranted. The extent of ground water contamination beneath Site 1 cannot be estimated from one well.

The presence of elevated heptachlor, delta-BHC, TOX, and TOC in the lagoon samples indicates that organic contaminants are present in the lagoons. The oil and grease in the lagoon samples may account for most of the TOC, and the detected pesticides and solvents may be the source of the TOX. Because of the high TOX concentrations and the presence of two pesticides, the lagoons may be the source of the contaminants that are responsible for the organic halogens detected in the MW-1 sample.

2. Extent of Contamination at Site 2 - "B" Street Landfill

TOX was detected in concentrations equal to the background levels found in the base supply wells. However, it is not known whether MW-2 was actually installed downgradient of the landfill, since localized changes in the water table may have occurred due to base well pumping.

3. Extent of Contamination Indicated by Base Well Samples

The TOX concentrations in the base well (and monitor well) samples indicate that some halogenated organic compounds are present in ground water beneath the entire base. The concentrations ranged from 0.059 to 0.086 mg/L in all the base well samples except MH-3, which contained 0.12 mg/L. In contrast, the TOC concentrations are too low to indicate conclusively the presence of contaminants. The magnitude of the contamination is difficult to evaluate because many different organic compounds contribute to TOX, and each compound has its own degree of health risk.

The highest TOX concentrations were in the MH-3 and monitor well samples. MH-3 has a history of deteriorating water quality (see Section II.C) due to additions of inorganic salts infiltrating downward from surface sources or migrating upward from the Glenns Ferry Formation. The presence of organic contaminants in the MH-3 sample indicates that there may be a pathway for contaminants to travel from the ground surface to the water table. The existence of a pathway is also suggested by the relatively high TOX concentrations in the monitor well samples. Contaminants may be infiltrating from the "B" Street landfill, lagoons, the former lagoon landfill, road salting, or irrigation.

The Phase II, Stage 1 results suggest that base waste disposal areas are the source of the organic contaminants, although there may also be off-base sources. The sample from MH-6, which is approximately upgradient of all the waste disposal areas, contained 0.059 mg/L of TOX, slightly less than the downgradient sample from MH-5 (0.086 mg/L). The MH-6 sample also contained the lowest concentration of TOX of all the samples. These observations suggest that organic contaminants are being added to ground water as it passes beneath the base. However, the halogenated compounds in the MH-6 sample may have originated from pesticides, herbicides, solvents, or other organic chemicals used north of the base, although until local ground water flow directions beneath the base are better known, it is conceivable that contaminants from the "B" Street landfill could be intercepted by MH-6. The regional ground water flow direction is south, but local variations would be created when the base wells are in operation. Identification of the individual organic compounds will also help to determine whether base or off-base sources are responsible for the observed contamination.

4. Extent of Contamination at Site 8 - Existing Fire Department Training Area

Site 8 is the existing fire department training area where jet fuel is currently burned for fire training exercises. The results of the soil analyses are listed in Table 11.

Phenol and lead concentrations were relatively uniform, but there was wide variation among the concentrations of TOX, TOC, and oil and grease. The variation is due to the unpredictable mixture of the combustion products of waste fuel, oils, lubricants, and jet fuel that has accumulated. However, the concentrations of all three parameters generally decrease with depth. Oil and grease and TOC appear to be at background levels at about 7.5 feet. The background value for TOX is unknown, but a comparison of the TOX concentrations from Site 11 and Site 8 soil samples indicate that the maximum background concentration is probably about 250 micrograms per liter (µg/L). On this basis, the TOX measurements at 7.5 to 9 feet in DM-5 do not indicate any contamination, although contamination may be present at 9 to 10.5 feet in Boring DM-6. Boring DM-6 was drilled within the bermed area in which jet fuel pools before it is burned during fire training exercises and, consequently, yielded the highest degree of contamination compared with samples from the other two borings.

The extent of contamination appears to be concentrated in the upper 7.5 feet of soil, except beneath the bermed area, where it extends more than 10.5 feet below the ground surface. It is not possible at this time to estimate how much deeper the contamination may extend beneath the bermed area.

The threat to human health posed by contaminants at Site 8 is low under normal conditions. These contaminants enter the human body principally through inhalation, either as vapor or as particulate matter in aerosols. Under dust-free conditions and short-term exposures to the site, the degree of hazard is diminished by the volatility of the contaminants. Dispersion of the contaminants in the atmosphere would maintain a low degree of hazard. When exposure times amount to several hours or direct contact with site materials is necessary, the degree of hazard rises proportionately, and the threat to human health can only be evaluated by direct measurements of organic and explosive vapors. The degree of hazard would also be much greater under dusty conditions for any exposure time.

TABLE 11

SUMMARY OF CONSTITUENTS ABOVE DETECTION LIMITS IN SOIL ANALYSES

Boring Number	Sample Number	Sample Depth (ft)	Moisture Content (%)	TOX[a] (µg/L)	TOC (mg/g)	Oil & Grease (mg/g)	Phenol (µg/g)	Lead (µg/g)
Site 8								
DM-4	1	0 - 1.5	8.4	670	11	29	ND	33
	4	4.5 - 6	10	790	2.4	8.0	ND	23
DM-5	2	1.5 - 3	8.4	890	9.9	67	ND	39
	6	7.5 - 9	6.9	250	0.27	0.48	ND	24
DM-6	3	3 - 4.5	12	4,700	3.9	0.09	ND	27
	7	9 - 10.5	3.0	490	0.12	ND	ND	13
Site 11								
DM-1	1	0 - 1.5	14	310	3.5	ND	NA	28
	2	1.5 - 2.5	2.2	400	0.93	ND	NA	41
DM-2	3	3 - 4.5	10	250	0.72	0.08	NA	37
	7	9 - 10.5	14	250	3.9	ND	NA	25
DM-3	2	1.5 - 3	15	570	5.6	ND	NA	26
	4	4.5 - 6	10	660	0.65	0.10	NA	41

Boring Number	Sample Number	Sample Depth (ft)	Moisture Content (%)	Pesticides (µg/L)[c] p,p'-DDT	DDD	Dieldrin	Endrin	Heptachlor Epoxide	Lindane	Chlordane
Site 12										
DM-7	1	0 - 0.5	8.1	ND	0.09	0.03	ND	ND	ND	ND
	2	0.5 - 1	14	ND	0.64	0.09	ND	ND	ND	<1[b]
DM-8	1	0 - 0.5	13	2.4	1.3	0.06	ND	ND	ND	ND
	2	0.5 - 1	13	ND	1.3	0.09	0.03	ND	ND	ND
DM-9	1	0 - 0.5	4.6	ND	0.05	0.07	ND	0.07	0.05	ND
	2	0.5 - 1	9.0	ND	ND	0.01	ND	ND	0.01	ND

[a]Concentration in water extract.

[b]Detection limit raised because of interferences.

[c]Concentration in EP toxicity test extract of soil samples.

Notes: (1) Concentrations are on a wet weight or as received basis.

(2) ND = none detected; NA = not analyzed

5. Extent of Contamination at Site 11 - Fuel Hydrant System Leak/Spill Area

Two jet fuel spills occurred at Site 11 in the late 1950s. Table 11 lists the contaminants that were detected in the soil samples from Site 11.

TOX concentrations ranged up to 660 µg/L, and TOC concentrations ranged up to 5.6 milligrams per gram (mg/g) in soil samples from Site 11. Lead concentrations were relatively uniform, ranging from 25 to 41 micrograms per gram (µg/g). Oil and grease was detected in only two samples and in insignificant concentrations. Concentrations of all three parameters generally decreased with depth. Shallow soil samples probably contain trace amounts of organic contaminants remaining from the jet fuel spills, although the low concentrations represent little or no significant contamination.

The threat to human health posed by contaminants at Site 11 is insignificant. Under normal conditions, the site is isolated by the flight line and apron, so there is little reason for any exposure to the site. However, under dusty conditions or when direct contact with site materials is necessary, the degree of hazard will rise slightly.

6. Extent of Contamination at Site 12 - Entomology Shop Yard

Site 12 is the entomology shop yard where pesticides and rinse water containing pesticides were drained. Analyses of soil samples obtained at Site 12 are listed in Table 11.

Of the 16 pesticides in the analyses, seven were detected in EP toxicity test extractions of one or more soil samples from Site 12. The detected pesticides included p,p'-DDT, DDD, dieldrin, endrin, heptachlor epoxide, lindane, and chlordane. The concentrations range up to 2.4 µg/L of p,p'-DDT, although most of the concentrations were less than 0.1 µg/L. Dieldrin was detected in all six samples, while DDD was detected in five of the six samples, and the remaining five pesticides were detected in one or two samples each. The concentrations for endrin and lindane were far below the RCRA standard for EP toxicity (40 CFR 261.24).

The extent of contamination extends at least 1 foot below ground surface and includes the area in the vicinity of the borings, the furthest of which is located 30 feet northwest of the entomology shop (Building No. 2206). It is unknown how deep the pesticides may be present because only the upper 1 foot of soil was analyzed.

The threat to human health posed by pesticides at Site 12 is very low under normal conditions. The pesticides could be expected to enter the human body

principally through inhalation or as particulate matter attached to aerosols. Under dust-free conditions, the degree of hazard is diminished because the pesticides are typically strongly absorbed by soil particles. Under dusty conditions or when direct contact with the shop yard soil is necessary, the degree of hazard rises proportionately, and protection such as particulate filters or gloves may be advised.

V. ALTERNATIVE MEASURES AND CONCLUSIONS

A. ALTERNATIVE MEASURES

This section describes several alternatives for further investigating the existence of ground water contamination at Mountain Home AFB. The alternatives include annual sampling of the base wells and monitor wells, additional soil sampling at Sites 8 and 12, and other ground water investigation techniques.

The results of Phase II, Stage 1, along with existing information, revealed evidence of organic ground water contamination. However, neither the magnitude of the contamination nor the sources of the contaminants can be properly evaluated without knowing the individual organic compounds that contributed to the observed TOX concentrations. All the operating base wells and monitor wells could be resampled and analyzed for the organic parameters in USEPA Methods 601, 602, and 608. These parameters include the halogenated compounds for which there are USEPA-validated analytical methodologies. The samples could also be analyzed for all the major cations and anions to accurately assess the ground water quality beneath the base. Tracing the changes in composition of ground water from different areas beneath the base would show the effects of mixing of various waters, and would indicate the impacts of the various base facilities and disposal areas on ground water quality. One or more of the anions such as chloride or sulfate may serve as an accurate contamination indicator. The cations, along with the anions, generally define a "fingerprint" of a particular ground water type that can be recognized among different samples. Comparison of the ground water analyses can also show the occurrence of mixing of ground water from the Bruneau and Glenns Ferry Formations or the addition of contaminants to the ground water system from the lagoons.

The sources of the observed organic contamination are difficult to identify without detailed knowledge of the ground water surface beneath the base. Although the regional gradient is south, local variations, which would affect the directions of contaminant migration, are created when the base wells are in operation. When the base wells and monitor wells are resampled, ground water levels could be measured and carefully converted to elevations. To accomplish this, the monitor well and base well elevations would have to be surveyed, and the depths to water in the base wells would have to be accurately converted to elevations. Installation of monitor wells to determined background conditions should be deferred until after confirmation of Phase II, Stage 1 results and definition of local gradients based on surveyed water levels.

Soil samples from Site 8 contained the highest concentrations of contaminants of all three sites. Samples from Boring DM-6, which was drilled within the bermed area, yielded contaminants at depths of 9 to 10.5 feet. Two additional borings could be drilled within the bermed area at Site 8 to define the vertical extent of contamination. Soil samples could be collected at 2-foot intervals until there is no visual or olfactory evidence of contamination. The presence of contaminants could also be detected using a photoionization detector, and the boring could be continued until the sample yields background readings. Two samples from each hole, the deepest sample in which contamination is suspected and the sample in which no contamination was detected, would be submitted for analysis of volatile and semi-volatile organics, oil and grease, and moisture content. In order to better evaluate these analyses, a third boring could be drilled in a nearby area in which no fire training has ever been conducted. This boring would be drilled to the depth at which no contamination was detected beneath the bermed area, and four samples would be submitted for analyses of the same parameters as the samples from the fire training area. Results of the soil analyses would be used to define the vertical extent and magnitude of soil contamination at Site 8.

Soil samples from Site 12 yielded evidence of low-level pesticide contamination, which could pose a potential health hazard under dusty conditions because of the vehicular traffic and human activities in the vicinity of Building 2206. Although four soil samples each were collected from Borings DM-7, DM-8, and DM-9, only the two samples from 0 to 1 foot were analyzed for pesticides. In order to determine the vertical and areal extent of the pesticide contamination, additional borings located adjacent to Building 2206 could be drilled and sampled.

Borehole geophysical methods such as resistivity, self potential, density, and gamma radiation are often used to characterize geologic and hydrologic conditions. However, they would not yield significantly more subsurface information than that collected during the drilling and sampling carried out for Phase II. Like surficial geophysical methods, borehole methods yield the most information from sediments with contrasting properties such as composition, grain size, moisture content, density, or degree of consolidation. However, the severity of fracturing, which provides an indication of the ability of contaminants to migrate through the basalt, can be measured with geophysical techniques. This information would be useful when deciding whether a particular site is contributing contaminants to ground water.

Unsaturated zone monitoring is a method of investigation that is used to characterize the quality of water in the soil pores above the water table. The sample is collected in a lysimeter that is buried at some depth beneath the area of investigation. A lysimeter is a porous ceramic container with separate sampling vacuum hoses attached to it. Soil water is collected by evacuating the lysimeter

and then pressuring it to retrieve the sample. If the soil moisture content is low, up to several days may be required for soil water to seep into the lysimeter. Lysimeters are useful because they provide samples of downward infiltrating water before it reaches the water table. They can also be used to isolate sources of ground water contamination. Their usefulness at Mountain Home AFB is diminished because of the low soil moisture content.

B. CONCLUSIONS

This section contains a summary of the conclusions reached after completion of Phase II, Stage 1. Recommendations for the next phase of IRP are given in the following paragraphs, and attendant costs are presented under separate cover in Appendix J.

Mountain Home AFB is located on the Mountain Home Plateau about 10 miles southwest of the city of Mountain Home. The Mountain Home Plateau is a rolling upland plain with occasional volcanic cones or buttes rising several tens to a few hundred feet above the plain. The plateau is underlain by over 10,000 feet of volcanic and sedimentary rock, of which the important formations are, in ascending order, the Idavada volcanics, the Glenns Ferry Formation, and the Bruneau Formation. Ground water occurs in all of the formations underlying the plateau, although the principal source of ground water for the base is the Bruneau Formation.

Seventeen sites were identified within the base at which hazardous wastes were either handled or disposed of. The purpose of Phase II, Stage 1 was to investigate five of these sites selected through HARM rating in the Phase I study and to determine the extent of environmental contamination. The Phase II, Stage 1 field program consisted of soil sampling at three of the sites, installation and sampling of a monitor well at each of the remaining two sites, and the sampling of six base wells and two wastewater lagoons.

Evidence of organic ground water contamination was indicated by the analyses of samples from MW-1 and one base well. Of the inorganic parameters, only cadmium in the MW-1 sample exceeded the primary drinking water standard, although the absence of other trace metals suggests that the cadmium is from a natural source rather than from base activities. The well should be resampled and analyzed for cadmium. Concentrations of TOX were highest in the MW-1 and MH-3 samples (0.12 mg/L) and were relatively uniform in the remaining base well samples (0.055 to 0.086 mg/L). Although there are indications that the waste disposal areas are the sources of the organics, there also may be an off-base, upgradient source for the contaminants. The extent of contamination includes the western portion of the base, but the magnitude cannot be estimated without knowing the individual compounds

that contributed to the TOX concentrations and their corresponding health risks. TOC concentrations were too low to conclusively indicate either background or contaminated conditions. Traces of two pesticides were detected in the lagoon samples, along with high concentrations of TOX, suggesting that the lagoons or the former landfill underlying the lagoon may have a detrimental effect on the underlying ground water.

Evidence of soil contamination was found as deep as 10.5 feet beneath Site 8, which is the existing fire department training area. The most persistent contamination was found beneath the bermed area in which jet fuel is pooled before it is burned during the fire training exercises. The presence of contamination was shown by relatively high TOX and TOC concentrations. Samples from Borings DM-4 and DM-5, which were drilled outside the bermed areas, contained background concentrations of TOC and TOX at depths of 7.5 to 9 feet. However, evidence of contamination was present in the deepest sample from Boring DM-6, which was drilled inside the bermed area, and it is not possible to estimate how much deeper the contamination may extend.

TOX and TOC analyses of soil samples from Site 11 indicate that little, if any, contamination remains from the jet fuel that was spilled in the late 1950s. Shallow soil samples contained trace amounts of organic contaminants, although the low concentrations represent little or no significant contamination.

Site 12 is the entomology shop yard where pesticides and rinse water containing pesticides were drained. Of the 16 pesticides in the analyses, seven were detected in EP toxicity extractions from one or more soil samples at concentrations up to 2.4 µg/L, although most of the concentrations were less than 0.1 µg/L. Dieldrin and DDD were detected in most or all of the samples. The results of the pesticide analysis must be studied in light of the poor recoveries on spiked soil samples. Table B-2 in Appendix B shows recovery rates between 40 and less than 10 percent on the soil samples. These poor recovery rates indicate that pesticide concentrations may be an order of magnitude higher than those reported. These adjusted concentrations do not appear to cause any human health risk, because the original values are low.

The threat to human health posed by contaminants at Sites 8, 11, and 12 varies with each site. The health risk at Site 11 is insignificant because of the isolated location and low concentrations of contaminants in the soil. At Site 8, the health risk is low except when dusty conditions prevail, when exposure times amount to several hours, or when direct contact with site materials is necessary. The health risk at Site 12 is judged to be extremely low and insignificant.

VI. RECOMMENDATIONS

The recommendations presented in this section have five primary purposes:

1. Identify those sites where further action is deemed warranted;
2. Confirm and identify the organic contaminants in ground water beneath the base;
3. Further investigate the depth of suspected soil contamination at Site 8;
4. Aid in identifying the sources of the contaminants; and
5. Verify cadmium results.

Various alternative measures for achieving these purposes, along with a detailed discussion of the information that would be obtained, are presented in Section V. The following are our recommendations for sites requiring no further action and sites warranting further investigation.

A. SITES WHERE FURTHER ACTIONS ARE DEEMED UNWARRANTED

No indication of residual fuel was found in our investigation of Site 11. The actual amount of fuel that was lost is not known, nor is the percentage that washed away with surface flow. It has been indicated that as much spilled fuel as possible was pumped out of the area (CH2M Hill, 1983). In the 25 years or more since the fuel spillage and leakage occurred, it is probable that the last fuel has evaporated or decayed by biochemical transformation. It is highly unlikely that any fuel that entered basalt could now be found and recovered. Based on the results of sampling and analysis of soils, it is recommended that Site 11, the fuel hydrant system leak/spill area, not be considered for further actions.

The results of chemical analyses of EP toxicity test extracts of soil samples from Site 12, the entomology shop yard, have been analyzed taking into consideration the poor recoveries on spiked soil samples. The pesticide quantities are estimated to be in the range where there is little threat to human health. It is recommended that this site not be considered for further investigation.

B. SITES WARRANTING FURTHER INVESTIGATION

It is recommended that an accurate water level survey of all the base wells and the two monitor wells be conducted in order to define the local ground water flow directions. To accomplish this, the monitor well elevations must be surveyed, and the depth to water in the base wells and monitor wells must be carefully measured and accurately converted to elevation. The resulting elevations will help

to evaluate the direction of migration of contaminants beneath the base and enable a more accurate placement of additional monitor wells and background wells. After completion of the survey, it is recommended that four monitor wells be installed at Site 1, one upgradient and three downgradient. The results of the water level survey should be studied to determine whether MW-2 at Site 2 was placed downgradient of the landfill. If MW-2 is downgradient of the landfill, no further action should be taken at this site. If MW-2 is determined to be upgradient of the landfill, three additional monitor wells should be installed downgradient. If it cannot be determined whether MW-2 is upgradient or downgradient, install one upgradient monitor well and three downgradient monitor wells as defined by the water level survey.

After installation of the monitor wells, it is recommended that ground water from the new wells, the two existing monitor wells (MW-1 and MW-2), operating base wells (MH-1, MH-3, and MH-5), and the two lagoons be resampled and analyzed for pH, specific conductance, major cations and anions, and the organic parameters in USEPA Methods 601 and 602 (Table 12). These parameters will characterize the organic content of the ground water and lagoon contents and will identify the compounds that contributed the organic halogens observed in the Phase II, Stage 1 analyses. Resampling is necessary to confirm the presence of organic contamination indicated by TOX concentrations in Phase II, Stage 1 and to identify the individual compounds that contributed to the TOX. Identification of the compounds will help to determine the source of the contaminants and to assess the health risk associated with the contaminants.

It is also recommended that the depth of the contamination indicated at Site 8, the existing fire department training area, be determined. The purpose of the additional borings is to determine whether the hazardous materials at the fire training area have migrated deep enough to constitute a potential source of contamination of the ground water. Two borings would be drilled within the bermed area, and soil samples would be collected at 2-foot intervals until a photoionization detector measures background levels of organic vapors emanating from the samples. To confirm the absence of organic contaminants, the deepest two samples from each of the borings would be analyzed for volatile and semi-volatile organics, oil and grease, and moisture content. To aid in interpreting the results from these two borings, a third boring would be drilled at the periphery of the fire training area, which has not been affected by activities at the site. The background boring would be drilled to the same depth as the bermed area borings, and four samples from various depths would be analyzed for volatile and semi-volatile organics, oil and grease, and moisture content.

Other alternatives discussed previously are not justified at present, in our opinion, and are not recommended at this time.

TABLE 12

PARAMETERS TO BE MEASURED FOR IRP PHASE II, STAGE 2 STUDY

EPA 601	EPA 602
Bromodichloromethane	Benzene
Bromoform	Chlorobenzene
Bromomethane	1,2-Dichlorobenzene
Carbon tetrachloride	1,3-Dichlorobenzene
Chlorobenzene	1,4-Dichlorobenzene
Chloroethane	Ethylbenzene
2-Chloroethylvinyl ether	Toluene
Chloroform	
Chloromethane	Major Cations and Anions
Dibromochloromethane	
1,2-Dichlorobenzene	
1,3-Dichlorobenzene	Calcium
1,4-Dichlorobenzene	Magnesium
Dichlorodifluoromethane	Potassium
1,1-Dichloroethane	Sodium
1,2-Dichloroethane	Sulfate
1,1-Dichloroethene	Chloride
trans-1,2-Dichloroethane	Fluoride
1,2-Dichloropropane	Bicarbonate
cis-1,3-Dichloropropene	Carbonate
trans-1,3-Dichloropropene	Nitrate Nitrogen
Methylene chloride	
1,1,2,2-Tetrachloroethane	Others
Tetrachloroethene	
1,1,1-Trichloroethane	pH[a]
1,1,2-Trichloroethane	Specific conductivity[a]
Trichloroethene	Cadmium
Trichlorofluoromethane	Water level[b]
Vinyl chloride	Temperature[b]

[a]Indicates measurement to be made in field and in laboratory.

[b]Indicates measurement to be made in field.

APPENDIX A

LOGS OF MONITOR WELLS, BORINGS AND PRIVATE WELLS

MAJOR DIVISIONS			GRAPH SYMBOL	LETTER SYMBOL	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS — MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	GRAVEL AND GRAVELLY SOILS — MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
				GP	POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES
	SAND AND SANDY SOILS — MORE THAN 50% OF COARSE FRACTION PASSING NO. 4 SIEVE	CLEAN SAND (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
				SP	POORLY-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND-SILT MIXTURES
				SC	CLAYEY SANDS, SAND-CLAY MIXTURES
FINE GRAINED SOILS — MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS.

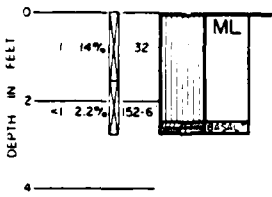
SOIL CLASSIFICATION CHART

UNIFIED SOIL CLASSIFICATION SYSTEM

Dames & Moore

PLATE A

BORING DM-1



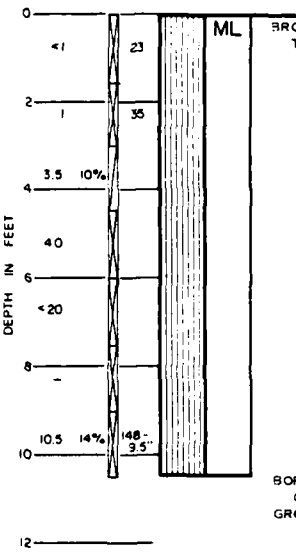
BROWN FINE SANDY SILT WITH TRACE ROOTS

GRADES WITH TRACE TO SOME COARSE GRAVEL

BASALT, BLACK, VESICULAR

BORING COMPLETED AT 2.7 FEET ON 4-12-84.
GROUND WATER WAS NOT ENCOUNTERED.

BORING DM-2



BROWN FINE SANDY SILT WITH TRACE TO SOME ROOTS

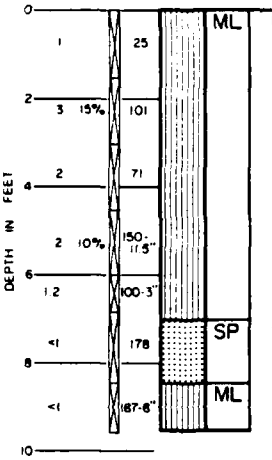
GRADES WITH TRACE GRAVEL

GRADES WITH TRACE SAND AND GRAVEL-SIZED BASALT FRAGMENTS AND SOME CALCITE

GRADES MODERATELY CALICHEFIED

BORING COMPLETED AT 10.5 FEET ON 4-13-84.
GROUND WATER WAS NOT ENCOUNTERED

BORING DM-3



BROWN FINE SANDY SILT WITH ROOTS

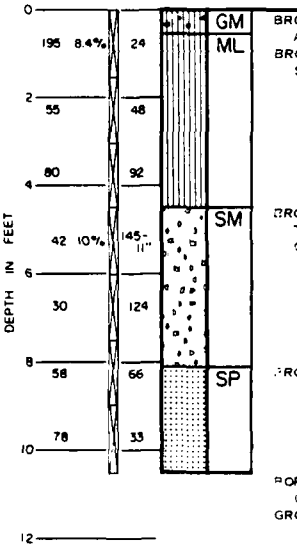
GRADES WITH CALICHE AND TRACE FINE GRAVEL

BROWN MEDIUM TO COARSE SAND WITH FINE GRAVEL

BROWN FINE SANDY SILT, MODERATELY CALICHEFIED

BORING COMPLETED AT 9.6 FEET ON 4-13-84.
GROUND WATER WAS NOT ENCOUNTERED.

BORING DM-4



BROWN FINE TO COARSE SAND AND FINE AND COARSE GRAVEL

BROWNISH-GRAY SILT WITH SOME FINE SAND AND ODOR OF HYDROCARBONS

GRADES MODERATELY CALICHEFIED

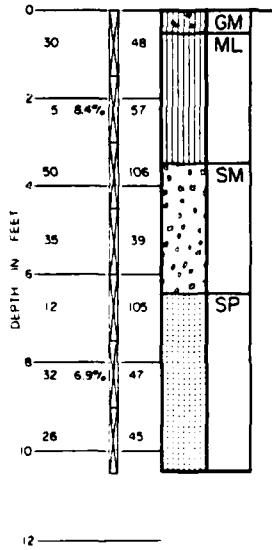
BROWN SILTY FINE TO COARSE SAND WITH TRACE FINE GRAVEL, MODERATELY CALICHEFIED

GRADES WITHOUT CALICHE AND WITH TRACE FREE MOISTURE OR FUEL

BROWN FINE TO MEDIUM SAND

BORING COMPLETED AT 10.5 FEET ON 4-13-84.
GROUND WATER WAS NOT ENCOUNTERED.

BORING DM-5



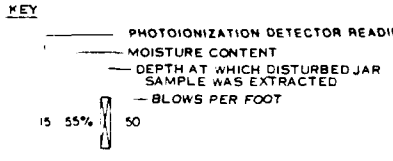
BROWN FINE TO COARSE SAND AND FINE AND COARSE GRAVEL
GRAY SILT WITH SOME FINE SAND AND SEPTIC ODOR

LIGHT BROWN SILTY FINE SAND, SLIGHTLY CALICHEFIED

BROWN FINE TO MEDIUM SAND WITH TRACE SILT

BORING COMPLETED AT 10.5 FEET ON 4-13-84.
GROUND WATER WAS NOT ENCOUNTERED

KEY



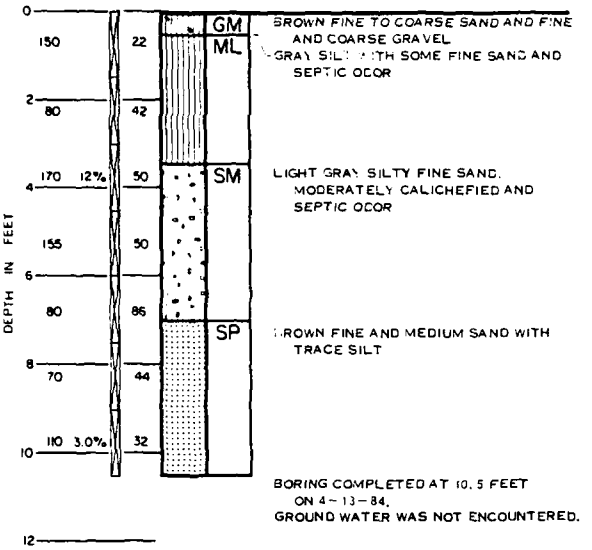
LOG OF BORINGS

SEE PLATE A FOR EXPLANATION OF SOIL SYMBOLS AND UNIFIED SOIL CLASSIFICATION SYSTEM

Dames & Moore

PLATE A-1

BORING DM-6



BROWN FINE TO COARSE SAND AND FINE AND COARSE GRAVEL

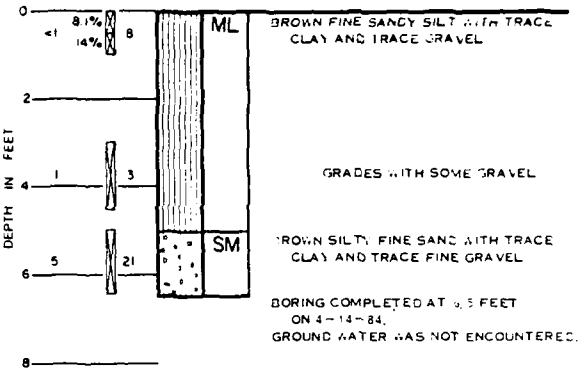
GRAY SILT WITH SOME FINE SAND AND SEPTIC ODOR

LIGHT GRAY SILTY FINE SAND, MODERATELY CALICHEFIED AND SEPTIC ODOR

BROWN FINE AND MEDIUM SAND WITH TRACE SILT

BORING COMPLETED AT 10.5 FEET ON 4-13-84. GROUND WATER WAS NOT ENCOUNTERED.

BORING DM-7



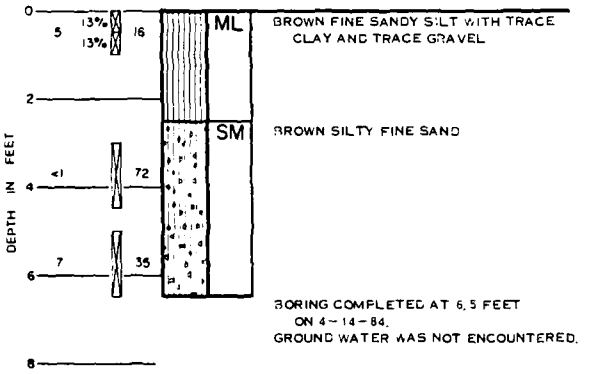
BROWN FINE SANDY SILT WITH TRACE CLAY AND TRACE GRAVEL

GRADES WITH SOME GRAVEL

BROWN SILTY FINE SAND WITH TRACE CLAY AND TRACE FINE GRAVEL

BORING COMPLETED AT 6.5 FEET ON 4-14-84. GROUND WATER WAS NOT ENCOUNTERED.

BORING DM-8

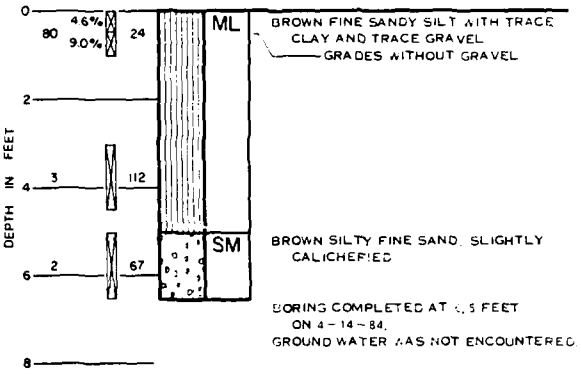


BROWN FINE SANDY SILT WITH TRACE CLAY AND TRACE GRAVEL

BROWN SILTY FINE SAND

BORING COMPLETED AT 6.5 FEET ON 4-14-84. GROUND WATER WAS NOT ENCOUNTERED.

BORING DM-9



BROWN FINE SANDY SILT WITH TRACE CLAY AND TRACE GRAVEL

GRADES WITHOUT GRAVEL

BROWN SILTY FINE SAND, SLIGHTLY CALICHEFIED

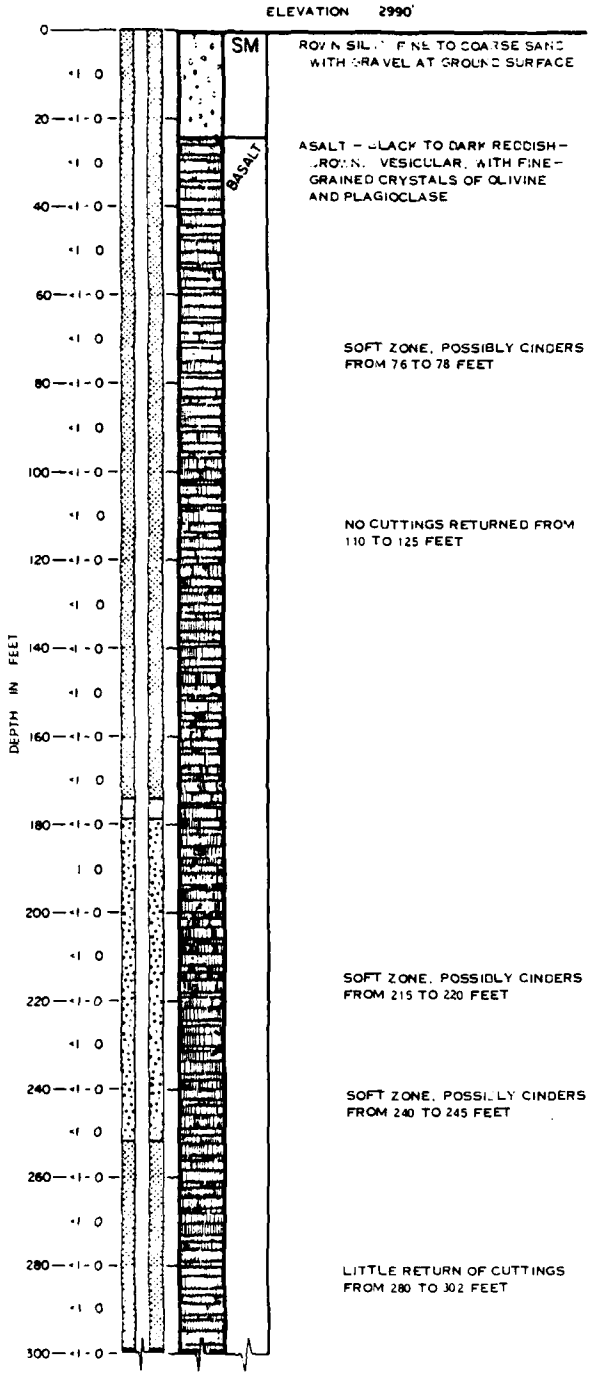
BORING COMPLETED AT 6.5 FEET ON 4-14-84. GROUND WATER WAS NOT ENCOUNTERED.

LOG OF BORINGS

Dames & Moore

PLATE A-2

BORING W-1



BROWN SILT, FINE TO COARSE SAND WITH GRAVEL AT GROUND SURFACE

BASALT – BLACK TO DARK REDDISH-BROWN, VESICULAR, WITH FINE-GRAINED CRYSTALS OF OLIVINE AND PLAGIOCLASE

SOFT ZONE, POSSIBLY CINDERS FROM 76 TO 78 FEET

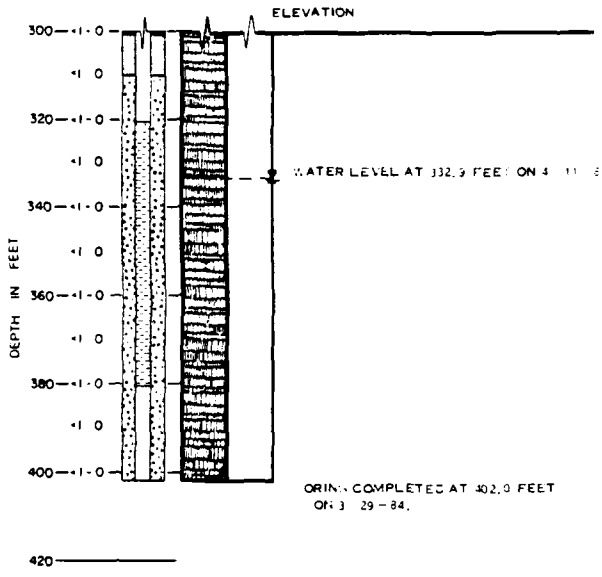
NO CUTTINGS RETURNED FROM 110 TO 125 FEET

SOFT ZONE, POSSIBLY CINDERS FROM 215 TO 220 FEET

SOFT ZONE, POSSIBLY CINDERS FROM 240 TO 245 FEET

LITTLE RETURN OF CUTTINGS FROM 280 TO 302 FEET

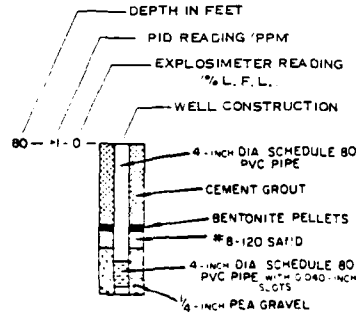
BORING W-1 (CONTINUED)



WATER LEVEL AT 332.9 FEET ON 4-11-84

ORING COMPLETED AT 402.0 FEET ON 3-29-84.

KEY



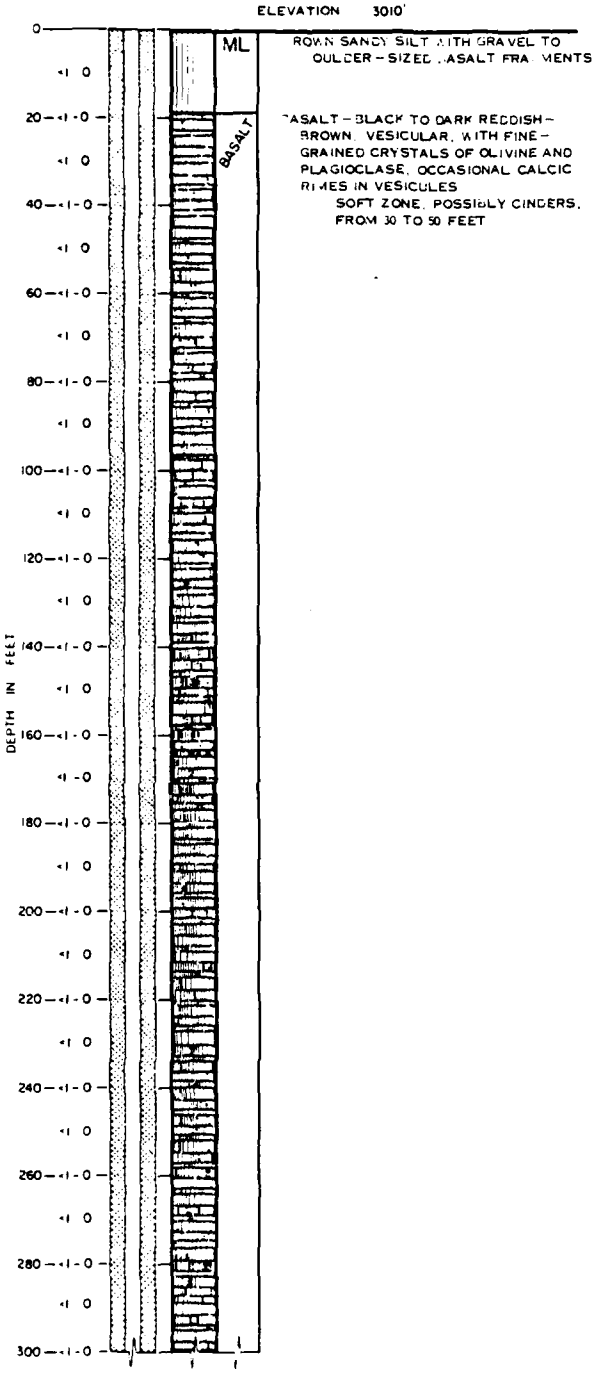
NOTE –
CUTTING SAMPLES WERE OBTAINED AT 5-FOOT INTERVALS UNLESS OTHERWISE INDICATED.

LOG OF BORINGS

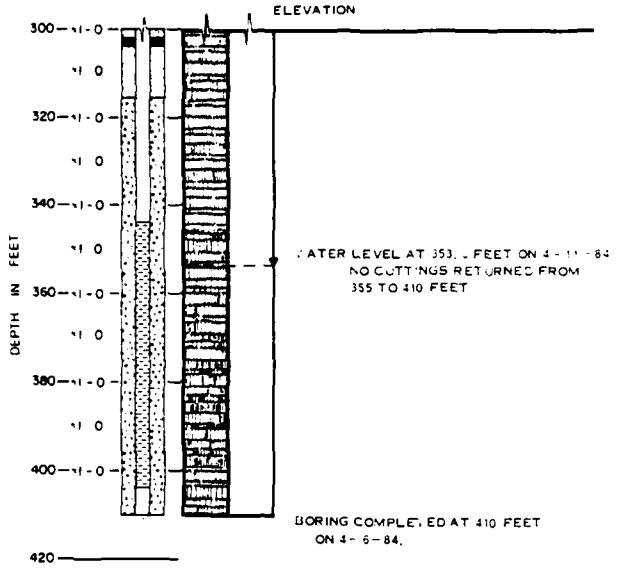
Dames & Moore

PLATE A-3

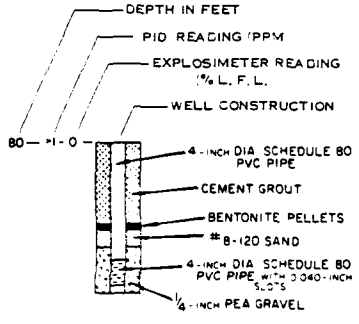
BORING W-2



BORING W-2 (CONTINUED)



KEY



NOTE-
CUTTING SAMPLES WERE OBTAINED AT 5-FOOT INTERVALS UNLESS OTHERWISE INDICATED.

LOG OF BORINGS

Dames & Moore

PLATE A-4

Copied From Data From A.F.B. USAF WELL #1 (OLD)
BY RALSTON 9-14-67

REPORT OF WELL DRILLER
State of Idaho

State law required that this report shall be filed with the State Reclamation Engineer within 30 days after completion or abandonment of the well. None

WELL OWNER:
Name Mountain Home AFB #1
Address Mountain Home

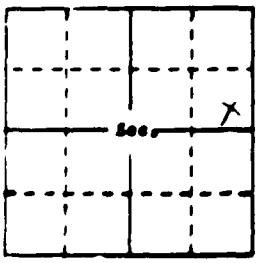
Owner's Permit No.
NATURE OF WORK (check): Replacement well ☐
New well ☒ Deepened ☐ Abandoned ☐
Water is to be used for:
METHOD OF CONSTRUCTION: Rotary ☐ Cable ☐
Dug ☐ Other
(explain)
CASING SCHEDULE: Threaded — Welded —
8 "Diam. from 0 ft. to 6.6 ft.
"Diam. from ft. to ft.
"Diam. from ft. to ft.
"Diam. from ft. to ft.
Thickness of casing: Material:
Steel ☒ concrete ☐ wood ☐ other ☐
(explain)
PERFORATED? Yes ☒ No ☐ Type of perforator used:

Size of perforations: " by "
perforations from 330 ft. to 345 ft.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.
WAS SCREEN INSTALLED? Yes ☐ No ☒
Manufacturer's name
Type Model No.
Diam. Slot size Set from ft. to ft.
Diam. Slot size Set from ft. to ft.
CONSTRUCTION: Well gravel packed? Yes ☐
No. ☒ size of gravel Gravel placed from ft. to ft. Surface seal provided? Yes ☐ No ☐ To what depth? ft. Material used in seal:

Did any strata contain unusable water? Yes ☐
No. ☐ Type of water: ?
Depth of strata ft. Method of sealing strata off:

Surface casing used? Yes ☐ ? No. ☐
Cemented in place? Yes ☐ No ☐

Locate well in section



LOCATION OF WELL: County ? ?
SE ¼ NE ¼ Sec. 27 T. 4 N/S R. 5 ?

Size of drilled hole: 12" Total Depth of well: 400 Static water level below ground: 93 (1942) Flowing water Pump. — ? Test delivery: 300 gpm or — cfs Pump? ☒ Bail ☐
Size of pump and motor used to make test: CONTINUOUS OPERATION
Length of time of test: hrs, min.
Drawdown: 2' ft. Artesian pressure: ft. above land surface Give flow cfs or gpm. Shutoff pressure:
Controlled by: Valve ☐ Cap ☐ Plug ☐
No control ☐ Does well leak around casing? Yes ☐ No ☐

DEPTH FROM FEET	DEPTH TO FEET	MATERIAL	WATER YES OR NO
0	2	TOP Soil	Struck at
	15	HARDPAN CLAY	Water rose
	23	LAVA ROCK	to level
	30	CLAY & SAND	
	36	HARD LAVA	
	40	BROWN CLAY	
	66	RED LAVA	
	75	LIGHT RED LAVA	
	100	GREY LAVA	
	115	RED CLAY	
	131	CINDERS	
	174	BROWN CLAY	
	195	RED CLAY	
	198	BASE LAVA	
	155	BROWN CLAY	
	190	BLUE LAVA	
	210	BROWN LAVA	
	224	BLUE GREY LAVA	
	228	BROWN LAVA	
	255	GREY LAVA	
	263	RED CLAY	
	283	BROWN LAVA	
	304	RED SHALE	
	330	GREY LAVA	
	345	BLACK LAVA	PERF.
	372	RED LAVA	
	395	BLACK LAVA	
	404	CLAY	
	409	BLACK LAVA	

Work started: 6 1942
Work finished:
Well Driller's Statement: This well was drilled under my supervision and this report is true to the best of my knowledge.
Name ?
Address: ?
Signed by:
License No. ? Date: ?

See other side for additional remarks USGS

USAF WELL #1 (NEW)

State of Idaho
Department of Water Resources

WELL DRILLER'S REPORT

1. WELL OWNER
Name U.S. Government Air Force
Address Ft. Ford AFB Ft. Ford, Idaho
Owner's Permit No.

2. NATURE OF WORK
☐ New well ☐ Deepened ☒ Replacement
☐ Abandoned (describe method of abandoning)

3. PROPOSED USE
☐ Domestic ☐ Irrigation ☐ Test ☐ Other (specify type)
☒ Municipal ☐ Industrial ☐ Stock ☐ Waste Disposal or Injection

4. METHOD DRILLED
☒ Cable ☐ Rotary ☐ Dug ☐ Other

5. WELL CONSTRUCTION
Diameter of hole 16 inches Total depth 604 feet
Casing installed: ☒ Steel ☐ Concrete

Thickness	Diameter	From	To
335 inches	16 inches	+0150 feet	400 feet
inches	inches	feet	feet
inches	inches	feet	feet
inches	inches	feet	feet
inches	inches	feet	feet

Was casing driven or used? ☐ Yes ☒ No
Was packer or rest used? ☐ Yes ☒ No
Perforated? ☒ Yes ☐ No
How perforated? ☒ Factory ☐ Knife ☐ Torch
Size of perforation 3/16 inches by 3 inches

Number	From	To
1,060 perforations	337 feet	400 feet
perforations	feet	feet
perforations	feet	feet

Was screen installed? ☐ Yes ☒ No
Manufacturer's name
Type Model No.
Diameter Slot size Set from feet to feet
Diameter Slot size Set from feet to feet

Gravel packed? ☐ Yes ☒ No Size of gravel
Placed from feet to feet

Surface seal depth 22 Material used in seal ☒ Cement grout
☐ Puddling clay ☐ Well cuttings
Sacking pressure used ☐ Slurry pit ☐ Temporary surface containment
☒ Overburn to seal depth

6. LOCATION OF WELL
Sketch map location must agree with written location.

Subdivision Name
Lot No. Block No.
County
NE ¼ SE ¼ Sec. 23 T. 4 ☐ N ☐ S R. 5 ☐ E ☐ W

7. WATER LEVEL
Static water level 319 feet below land surface
Flowing? ☐ Yes ☒ No G.P.M. flow
Temperature °F. Quality
Artesian closed in pressure p.s.i.
Controlled by ☐ Valve ☐ Cap ☐ Plug

8. WELL TEST DATA
Turbine SWL 321' from pump base
☒ Pump ☐ Bailer ☐ Other

Discharge G.P.M.	Drawdown	Time
1,950	20'	
1,800	18'	

9. LITHOLOGIC LOG

Note Diam.	Depth From	Depth To	Material	Water Yes	Water No
24	0	5	topsoil		X
24	5	22	gray basalt		X
20	22	85	reddish brown basalt		X
	85	155	black basalt		X
	155	210	reddish brown basalt		X
	210	290	black with streaks of [illegible]		X
	290	300	very hard black basalt		X
	300	305	red cinder		X
	305	314	hard black basalt		X
	314	323	red & black cinders		X
	323	330	very hard black basalt		X
	330	360	black & reddish brown basalt		X
	360	400	very hard black basalt		X
16	400	410	very hard black basalt		X
	410	440	decomposed gray basalt mixed with clay		X
	440	465	dark gray basalt & clay (sandy soil)		X
	465	516	very hard gray basalt		X
	516	563	dark gray basalt [illegible]		X
	563	575	very hard black basalt [illegible]		X
	575	590	black basalt & [illegible]		X
	590	590	black basalt & [illegible]		X
			cinder [illegible]		X
	590	602	black basalt [illegible]		X
	602	604	[illegible]		X

10. Work started 9/20/72 Finished

11. DRILLER'S CERTIFICATE
Firm Name U.S. [illegible]
Address 3000 [illegible]
Signed by (Pres. or Mgr.)
and
(Driller)

USE ALL APPLICABLE SPACES. RETURN THIS WHITE COPY TO THE DEPARTMENT

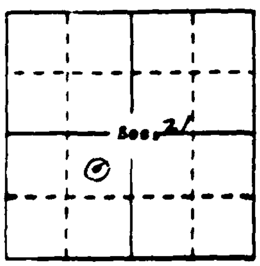
REPORT OF WELL DRILLER
State of Idaho

None

State law requires that this report shall be filed with the State Reclamation Engineer within 30 days after completion or abandonment of the well.

WELL OWNER:
Name Mountain Home AFB # 2
Address Mt Home Idaho
elevation 2993 msl
Owner's Permit No.
NATURE OF WORK (check): Replacement well ☐
New well ☒ Deepened ☐ Abandoned ☐
Water is to be used for: domestic use
METHOD OF CONSTRUCTION: Rotary ☐ Cable ☒
Dug ☐ Other ______ (explain)
CASING SCHEDULE: Threaded — Welded —
8" "Diam. from 0 ft. to 425' ft.
"Diam. from ___ ft. to ___ ft.
"Diam. from ___ ft. to ___ ft.
"Diam. from ___ ft. to ___ ft.
Thickness of casing: ______ Material:
Steel ☐ concrete ☐ wood ☐ other ☐
(explain)
PERFORATED? Yes ☐ No ☐ Type of perforator used:
Size of perforations: ___" by ___"
___ perforations from 299 ft. to 369 ft.
___ perforations from 379 ft. to 425 ft.
___ perforations from ___ ft. to ___ ft.
___ perforations from ___ ft. to ___ ft.
WAS SCREEN INSTALLED? Yes ☐ No ☐
Manufacturer's name
Type ___ Model No.
Diam. ___ Slot size ___ Set from ___ ft. to ___ ft.
Diam. ___ Slot size ___ Set from ___ ft. to ___ ft.
CONSTRUCTION: Well gravel packed? Yes ☐ No. ☐ size of gravel ___ Gravel placed from ___ ft. to ___ ft. Surface seal provided? Yes ☐ No ☐ To what depth? ___ ft. Material used in seal:
Did any strata contain unusable water? Yes ☐ No. ☐ Type of water:
Depth of strata ___ ft. Method of sealing strata off:
Surface casing used? Yes ☐ No. ☐
Cemented in place? Yes ☐ No ☐

Locate well in section



LOCATION OF WELL: County Elmore
No ¼ So ¼ Sec. 21 T. 4 N/S R. 5 E/W

Size of drilled hole: 12" Total depth of well: 588 Standing water level below ground: 316 Temp. ___ Fahr. Test delivery: 750 gpm or ___ cfs Pump? ☒ Bail ☐
Size of pump and motor used to make test:
Length of time of test: ___ Hrs. ___ Min.
Drawdown: 6 ft. Artesian pressure: ft. above land surface — Give flow — cfs or ___ gpm. Shutoff pressure:
Controlled by: Valve ☐ Cap ☐ Plug ☐
No control ☐ Does well leak around casing?
Yes ☐ No ☐

DEPTH FROM FEET	DEPTH TO FEET	MATERIAL	WATER YES OR NO
0	30	Black basalt	No
30	109	Black & gray basalt	No
109	413	black basalt	Yes
413	588	Baked clay - red cinders	No
		& blue slate	
		Copied from AFB data	
		dwg # MH200: 2725-65	
		9-14-67 J. L. C.	

Work started:
Work finished: 10-14-53
Well Driller's Statement: This well was drilled under my supervision and this report is true to the best of my knowledge.
Name:
Address:
Signed by:
License No. ______ Date:

Use other side for additional remarks

USGS

REPORT OF WELL DRILLER
State of Idaho

State law requires that this report shall be filed with the State Reclamation Engineer within 30 days after completion or abandonment of the well.

WELL OWNER:
Name MT Home AFB #3
Address MT Home Idaho

Owner's Permit No.
NATURE OF WORK (check): Replacement well ☐
New well ☒ Deepened ☐ Abandoned ☐
Water is to be used for: domestic
METHOD OF CONSTRUCTION: Rotary ☐ Cable ☒
Dug ☐ Other
(explain)
CASING SCHEDULE: Threaded — Welded —
8" "Diam. from 0 ft. to 7 ft.
"Diam. from ft. to ft.
"Diam. from ft. to ft.
"Diam. from ft. to ft.
Thickness of casing: Material:
Steel ☐ concrete ☐ wood ☐ other ☐
(explain)
PERFORATED? Yes ☐ No ☐ Type of perforator used:

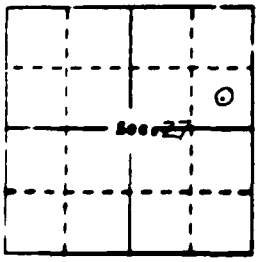
Size of perforations: " by "
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.
WAS SCREEN INSTALLED? Yes ☐ No ☐
Manufacturer's name
Type Model No.
Diam. Slot size Set from ft. to ft.
Diam. Slot size Set from ft. to ft.

CONSTRUCTION: Well gravel packed? Yes ☐ No ☐ Size of gravel Gravel placed from ft. to ft. Surface seal provided? Yes ☐ No ☐ To what depth? ft. Material used in seal:

Did any strata contain unusable water? Yes ☐ No ☐ Type of water:
Depth of strata ft. Method of sealing strata off:

Surface casing used? Yes ☐ No ☐
Cemented in place? Yes ☐ No ☐

Locate well in section



LOCATION OF WELL: County
SE ¼ NE ¼ Sec. 27 T. 4 N/S R. 5 E/W

Size of drilled hole: 12" Depth of well: 425' Standing water level below ground: 330' Temp. Tahr. ° Test delivery: 750 gpm or cfs Pump? ☒ Bail ☐
Size of pump and motor used to make test:
Length of time of test: Hrs. Min.
Drawdown: 0 ft. Artesian pressure: ft. above land surface Give flow cfs or gpm. Shutoff pressure:
Controlled by: Valve ☐ Cap ☐ Plug ☐
No control ☐ Does well leak around casing? Yes ☐ No ☐

DEPTH FROM	DEPTH TO	MATERIAL	WATER YES OR NO
		Data copied from AFB data 7-14-67	

Work started:
Work finished:
Well Driller's Statement: This well was drilled under my supervision and this report is true to the best of my knowledge.
Name:
Address:
Signed by:
License No. Date:

See other side for additional remarks **USGS**

WELL LOG AND REPORT TO THE STATE RECLAMATION ENGINEER OF IDAHO

Log No. _____
Sec. _____, T. _____, R. _____
Well No. _____
Permit No. _____
DO NOT FILL IN

Owner U. S. Air FORCE BASE well #4 Address Mountain Home, Idaho
Driller Orval Harden Address Boise, Idaho Lic. No. 1
Location of Well Adjoining water tower at Air Base ¼ ¼ ¼ Sec. 21 T. 4 N. R. 5 E. Elmore County,
and _____ feet N/S, and _____ feet E/W from _____ Corner of _____ ¼ _____ ¼ Sec. _____
Size of Drilled Hole 24" Total depth of Well 378' 6"
Give depth of standing water from surface 308' 9" Water Temp. _____ Temperature
Inverted cone of water table depression
Infiltration test
On pumping test delivery was 1500 g.p.m. or _____ c.f.s. Drawdown was 281' 9" feet
Size of pump and motor used to make the test Supply from water tower and Spurling flow meter
Length of time pumped during check was 81 hours hr. _____ minutes
If flowing well, give flow in c.f.s. _____ or g.p.m. _____ and shut in pressure _____
If flowing well, describe control works _____
(TYPE AND SIZE OF VALVE, ETC.)
Water will be used for Air base supply Weight of casing per linear foot 75 pounds
Thickness of casing 5/16" Casing material steel
(I.E., PIPE, CONCRETE, WOOD)
Diameter, length and location of casing 18" O. D., 378' 6" cased top to bottom
(CASING 12" OR DIAMETER AND UNDER GIVE INSIDE DIAMETER; CASING OVER 12" IN DIAMETER GIVE OUTSIDE DIAMETER.)
Number and size of perforations 3/8"x3" slots Slot in a row, horizontal rows spaced _____ on center
Located 323' 6" feet to 373'6" feet from surface of ground. 323' 6 373'6"
Other perforations 5' Solid CASing below 50' as perforated
Date of commencement of well April 20, 1955 Date of completion of well Oct. 18, 1955
Type of well rig Cable tools

CASING RECORD

DIAM CASING	FROM FEET	TO FEET	LENGTH	REMARKS — SEALS, GROUTING, ETC
18"	0	378'6"	378'6"	Open bottom

GENERAL INFORMATION—Pumping Test, Quality of Water, Etc.

TE 2 28 4N 5E

WELL LOG

From Feet	To Feet	Type of Material	Drilling Time Hrs.	Drilling Time Min.	Water-bearing Formation Yes or No	Casing Perforated Yes or No
0' 0"	19'	Top soil and yellow clay subsoil				
19'	21	Grey basalt medium hard				
21	42	Grey basalt very hard and dense				
42	50	Grey basalt streaks of red				
50	59	Grey basalt, creviced, medium hard				
59	90	Greyish red basalt, crevices, med. hard				
90	103	Grey basalt, very hard				
103	105	Grey basalt, reddish streaks				
106	109	Grey basalt, with layers of cinders				
109	110	Grey vesicular basalt				
110	114	Grey basalt with cinder filled crevices				
114	120	Grey basalt, creviced				
120	139	Grey basalt with phenocrystals of diorite?				
139	172	Reddish grey basalt and cinder layers				
172	174	Reddish grey basalt and gravelly clay				
174	185	reddish grey basalt				
185	190	Cinders				
190	204	Reddish grey basalt				
		If more space is required use Sheet No. 2				

WELL DRILLERS STATEMENT

This well was drilled under my jurisdiction and the above information is true and correct to the best of my knowledge and belief

Signed [illegible]

By

Dated March 2, 1956

License No. 1

SHEET NO. 2

Well Driller Orval Harden

Well Location Mt. Home Air Base

WELL LOG

From Feet	To Feet	Type of Material	Drilling Time Hrs.	Drilling Time Min.	Water Bearing Formation Am. Yes or No	Casing Perforated Am. Yes or No
204'	240'	Grey basalt				
240	247	Reddish grey basalt				
247	280	Grey basalt				
280	290	Stringers of reddish grey basalt and lava tuff?				
290	320	Grey basalt, extra large crevice at 293'				
320	326	Grey basalt, very hard				
326	338	Cemented red cinders				
338	378'6"	Grey basalt, creviced 340 to 351				
		" 364 to 378				

First water encountered at 342', static water level 309' 8"

Average speed of drilling was from 3' to 10' of crooked hole per day. In order to make straight hole it was necessary to use over one ton of dynamite to shoot the walls straight. Every known method of drilling straight hole with the use of cable tools was tried to no avail. All formation lay at a high angle with alternate layers of hard and softer material.

SE S 28 45 5E

REPORT OF WELL DRILLER
State of Idaho

None

State law requires that this report shall be filed with the State Reclamation Engineer within 30 days after completion or abandonment of the well.

WELL OWNER:
Name USAFB #5
Address NAT Arco Idaho

Owner's Permit No.
NATURE OF WORK (check): Replacement well ☐
New well ☒ Deepened ☐ Abandoned ☐
Water is to be used for:
METHOD OF CONSTRUCTION: Rotary ☐ Cable ☒
Dug ☐ Other (explain)
CASING SCHEDULE: Threaded ☐ Welded ☐
"Diam. from ft. to ft.
"Diam. from ft. to ft.
"Diam. from ft. to ft.
"Diam. from ft. to ft.
Thickness of casing: Material:
Steel ☐ concrete ☐ wood ☐ other ☐

(explain)
PERFORATED? Yes ☐ No ☐ Type of perforator used:

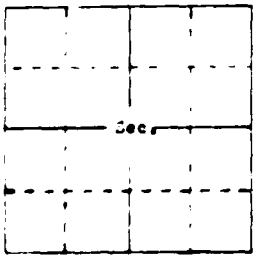
Size of perforations: " by "
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.
WAS SCREEN INSTALLED? Yes ☐ No ☐
Manufacturer's name
Type Model No.
Diam. Slot size Set from ft. to ft.
Diam. Slot size Set from ft. to ft.

CONSTRUCTION: Well gravel packed? Yes ☐
No. ☐ size of gravel Gravel placed from ft. to ft. Surface seal provided? Yes ☐ No ☐ To what depth?
ft. Material used in seal:

Did any strata contain unusable water? Yes ☐
No. ☐ Type of water:
Depth of strata ft. Method of sealing strata off:

Surface casing used? Yes ☐ No. ☐
Cemented in place? Yes ☐ No ☐

Locate well in section



LOCATION OF WELL County
¼ ¼ Sec. 28 T. 4 N. S. R. 5 E. W.

Use other side for additional remarks

Size of drilled hole: Total depth of well: 422 Standing water level below ground: 326 Temp. Fahr. ° Test delivery: gpm or cfs Pump? ☐ Bail ☐
Size of pump and motor used to make test:

Length of time of test: Hrs. Min.
Drawdown: ft. Artesian pressure: ft. above land surface Give flow cfs or gpm. Shutoff pressure:
Controlled by: Valve ☐ Cap ☐ Plug ☐
No control ☐ Does well leak around casing? Yes ☐ No ☐

DEPTH FROM FEET	DEPTH TO FEET	MATERIAL	WATER YES OR NO
0	26	Topsoil	No
26	258	basalt	
258	262	baked clay	
262	277	Fossiliferous clay	
277	330	brown clay (hard)	
330	348	Brown Rock	Yes
348	393	Fissured basalt	Yes
393	398	Bentonite	No
398	411	Gray Shale	No
411	422	Arco basalt	No
		Copied from USGS files	
		5-21-47 LLC	

Work started 1943 ?
Work finished 1943 ?
Well Driller's Statement: This well was drilled under my supervision and this report is true to the best of my knowledge.
Name
Address
Signed by LLC
License No. Date

USGS

9S-5E-47 6-1-2017

COPIED FROM A.F.B. DATA BY RALSTON 9-14-67

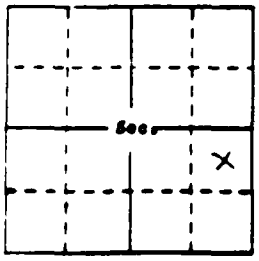
Kunkel Linder

REPORT OF WELL DRILLER
State of Idaho

State law requires that this report shall be filed with the State Reclamation Engineer within 30 days after completion or abandonment of the well.

WELL OWNER:
Name MOUNTAIN HOME A.F.B. ADC 6
Address MOUNTAIN HOME
Owner's Permit No.
NATURE OF WORK (check): Replacement well ☐
New well ☒ Deepened ☐ Abandoned ☐
Water is to be used for:
METHOD OF CONSTRUCTION: Rotary ☐ Cable ☒
Dug ☐ Other (explain)
CASING SCHEDULE: Threaded — Welded —
18" Diam. from 0 ft. to 430 ft.
10" Diam. from 425 ft. to 610 ft.
"Diam. from ft. to ft.
"Diam. from ft. to ft.
Thickness of casing: Material:
Steel ☒ concrete ☐ wood ☐ other ☐
PERFORATED? Yes ☒ No ☐ Type of perforator used: (explain)
Size of perforations: " by "
perforations from 425 ft. to 610 ft.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.
WAS SCREEN INSTALLED? Yes ☐ No ☒
Manufacturer's name
Type Model No.
Diam. Slot size Set from ft. to ft.
Diam. Slot size Set from ft. to ft.
CONSTRUCTION: Well gravel packed? Yes ☐ No. ☐ size of gravel Gravel placed from ft. to ft. Surface seal provided? Yes ☐ No ☐ To what depth? ft. Material used in seal:
Did any strata contain unusable water? Yes ☐ No. ☐ Type of water:
Depth of strata ft. Method of sealing strata off:
Surface casing used? Yes ☐ No. ☐
Cemented in place? Yes ☐ No ☐

Locate well in section



LOCATION OF WELL: County ELMORE
NE ¼ SE ¼ Sec. 22 T. 4 N R. 5 E

Use other side for additional remarks

Size of drilled hole: 20" Total depth of well: 610 Standing water level below ground: 347 Temp. Fahr. ° Test delivery: 2720 gpm or cfs Pump? ☒ Bail ☐
Size of pump and motor used to make test: CENTRIFUGAL PUMP
Length of time of test: Hrs. Min.
Drawdown: 14' ft. Artesian pressure: ft. above land surface Give flow cfs or gpm. Shutoff pressure:
Controlled by: Valve ☐ Cap ☐ Plug ☐ No control ☐ Does well leak around casing? Yes ☐ No ☐

DEPTH FROM FEET	DEPTH TO FEET	MATERIAL	WATER YES OR NO
0	4	S... SURFACE	
	12	BROWN ROCK WATER	YES
	37	GREY LAVA WATER	YES
	49	BLACK LAVA	
	60	BLACK LAVA - BOULDERS HARD	
	62	RED CINDERS	
	75	BLACK LAVA	
	77	GREY LAVA	
	87	BLACK LAVA [illegible] HARD	
	92	RED LAVA	
	99	RED & BLACK CINDERS	
	155	BROWN & BLACK LAVA	
	165	RED & BLACK LAVA	
	175	BROWN & BLACK LAVA	
	185	BROWN & RED LAVA	
	205	RED LAVA	
	215	BLACK LAVA	
	225	BLACK & RED LAVA	
	233	BROWN LAVA	
	239	LAVA	
	243	RED LAVA	
	288	RED & BLACK LAVA	
	305	BLACK LAVA	
	335	[illegible] LAVA (HARD)	
	349	[illegible] LAVA	
	367	BLACK LAVA	
	375	RED LAVA	
	378	HARD [illegible] LAVA	
	385	SOFT BROWN & BROWISH LAVA	
	417	BLACK BROKEN	
	431	GREY & BLACK BROKEN	
	441	BLACK LAVA	
	450	RED CINDERS (DUST SWIRLING)	
	456	BROKEN LAVA	
	475	GREY & BLACK LAVA	
	493	BLACK LAVA	
	503	RED LAVA	
	560	GREY LAVA	

Work started: 8/24/67
Work finished:
Well Driller's Statement: This well was drilled under my supervision and this report is true to the best of my knowledge.
Name:
Address:
Signed by:
License No. Date:

USGS

560 BLACK LAVA & SAND STONE
575 GRAVEL & GRAVEL
610 SAND & GRAVEL

USAF WELL #7

Form 238-7
1/78

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES

USE TYPEWRITER OR BALLPOINT PEN

WELL DRILLER'S REPORT

State law requires that this report be filed with the Director, Department of Water Resources within 30 days after the completion or abandonment of the well.

1 WELL OWNER

Name U S Air Force

Address Mountain Home AFB, Idaho

Owner's Permit No 61-7224

2 NATURE OF WORK

☐ New well ☐ Deepened ☒ Replacement
☐ Abandoned (describe method of abandoning)

3 PROPOSED USE

☐ Domestic ☐ Irrigation ☐ Test ☒ Municipal
☐ Industrial ☐ Stock ☐ Waste Disposal or Injection
☐ Other (specify type)

4 METHOD DRILLED

☒ Rotary ☐ Air ☐ Hydraulic ☐ Reverse rotary
☒ Cable ☐ Dug ☐ Other

5 WELL CONSTRUCTION

Casing schedule: ☒ Steel ☐ Concrete ☐ Other

Thickness		Diameter		From		To	
.280	inches	20	inches	2	feet	18	feet
.250	inches	16	inches	2	feet	480	feet
	inches		inches		feet		feet
	inches		inches		feet		feet

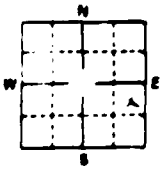
Was casing drive shoe used? ☐ Yes ☒ No
Was a packer or seal used? ☐ Yes ☒ No
Perforated? ☒ Yes ☐ No
How perforated? ☒ Factory ☐ Knife ☐ Torch
Size of perforation 3 inches by 1/8 inches

Number		From		To	
4,480	perforations	340	feet	480	feet
	perforations		feet		feet
	perforations		feet		feet

Well screen installed? ☐ Yes ☒ No
Manufacturer's name
Type Model No.
Diameter ___ Slot size ___ Set from ___ feet to ___ feet
Diameter ___ Slot size ___ Set from ___ feet to ___ feet
Gravel packed? ☐ Yes ☒ No ☐ Size of gravel
Placed from ___ feet to ___ feet
Surface seal depth 18 Material used in seal ☒ Cement grout ☐ Puddling clay ☐ Well cuttings
Seating procedure used ☐ Slurry pit ☐ Temp. surface casing ☒ Overbore to seal depth
Method of joining casing ☐ Threaded ☒ Welded ☐ Solvent Weld ☐ Cemented between strata
Describe access port 2" pipe with threaded cap

6 LOCATION OF WELL

Sketch map location must agree with written location



Subdivision Name
Lot No Block No
County Elmore
NW ¼ SE ¼ Sec 28 T 4 S R 5 E

7 WATER LEVEL

Static water level 341 feet below land surface
Flowing? ☐ Yes ☒ No G P M flow
Artesian shut-in pressure P.S.I.
Controlled by ☐ Valve ☐ Cap ☐ Plug
Temperature 65 °F Quality

8 WELL TEST DATA

☒ Pump ☐ Bailer ☐ Air ☐ Other

Diameter G P M	Pumping Level	Hours Pumped
1795	379	2
2000	394	½

9 LITHOLOGIC LOG

Hole Diam	Depth From	Depth To	Material	Water Yes	Water No
20	0	1	topsoil & chunks of lava		X
	1	8	hardpan		X
	8	28	very hard black basalt		X
	28	31	brown clay & very broken black basalt		X
	31	50	very hard black basalt		X
	50	52	very broken reddish black basalt		X
	52	160	very hard black basalt &streaks of cinders		X
	160	325	very hard black basalt		X
	325	331	hard reddish basalt		X
	331	345	hard black basalt		X
	345	350	very broken reddish black basalt & cinders	X	
	350	400	hard black basalt	X	
12	400	495	softer broken black basalt	X	
	495	505	blue clay & cinders		X

10. Work started 9/30/82 Finished 2/11/83

11. DRILLERS CERTIFICATION

I/We certify that all minimum well construction standards were complied with at the time the rig was removed

Firm Name D.E. Stevens & Sons Firm No 153
Address 3709 Hawthorne Drive Date 2/15/83
Signed by (Firm Official) [signature]
and
(Operator) [signature]

USE ADDITIONAL SHEETS IF NECESSARY – FORWARD THE WHITE COPY TO THE DEPARTMENT

USAF WELL #8

Form 238-7
9/82

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES

USE TYPEWRITER OR BALLPOINT PEN

WELL DRILLER'S REPORT

State law requires that this report be filed with the Director, Department of Water Resources within 30 days after the completion or abandonment of the well.

RECEIVED DEC [illegible] 1993 Department of Water Resources

1. WELL OWNER

Name: Mountain Home AFB Golf Course
Address: 366 CSG-DEE
Owner's Permit No.: 612-217

2. NATURE OF WORK

☒ New well ☐ Deepened ☐ Replacement
☐ Abandoned (describe abandonment procedures such as materials, plug depths, etc. in lithologic log)

3. PROPOSED USE

☐ Domestic ☒ Irrigation ☐ Test ☐ Municipal
☐ Industrial ☐ Stock ☐ Waste Disposal or Injection
☐ Other ______ (specify type)

4. METHOD DRILLED

☐ Rotary ☐ Air ☐ Hydraulic ☐ Reverse rotary
☒ Cable ☐ Dug ☐ Other ______

5. WELL CONSTRUCTION

Casing schedule: ☒ Steel ☐ Concrete ☐ Other ______

Thickness	Diameter	From	To
.250 inches	20 inches	+ 0 feet	10 feet
.250 inches	16 inches	plus2 feet	25 feet
.250 inches	14 inches	plus2 feet	500 feet
inches	inches	feet	feet

Was casing drive shoe used? ☐ Yes ☒ No
Was a packer or seal used? ☐ Yes ☒ No
Perforated? ☒ Yes ☐ No
How perforated? ☒ Factory ☐ Knife ☐ Torch
Size of perforation 3/8 inches by 3 inches

Number		From	To
1200	perforations	415 feet	475 feet
	perforations	feet	feet
	perforations	feet	feet

Well screen installed? ☐ Yes ☒ No
Manufacturer's name ______
Type ______ Model No. ______
Diameter ___ Slot size ___ Set from ___ feet to ___ feet
Diameter ___ Slot size ___ Set from ___ feet to ___ feet
Gravel packed? ☐ Yes ☒ No ☐ Size of gravel ______
Placed from ______ feet to ______ feet
Surface seal depth 25 Material used in seal: ☒ Cement grout ☐ Bentonite ☐ Puddling clay ☐ ______
Sealing procedure used: ☐ Slurry pit ☐ Temp. surface casing ☒ Overbore to seal depth
Method of joining casing: ☐ Threaded ☒ Welded ☐ Solvent Weld ☐ Cemented between strata
Describe access port: Through well cap

6. LOCATION OF WELL

Sketch map location must agree with written location.

Subdivision Name ______
Lot No. ___ Block No. ______

County: Elmore
N/E ¼ S/4 ¼ Sec. 21, T. 4 N/S, R. 5 E/W

7. WATER LEVEL

Static water level 363 feet below land surface
Flowing? ☐ Yes ☒ No G.P.M. flow ______
Artesian closed-in pressure ______ p.s.i.
Controlled by: ☐ Valve ☐ Cap ☐ Plug
Temperature ___ °F. Quality ______
Describe artesian or temperature zones below

8. WELL TEST DATA

☒ Pump ☐ Bailer ☐ Air ☐ Other ______

Discharge G.P.M.	Pumping Level	Hours Pumped
750	37[illegible]	1 hr.
1500	37[illegible]	1½ hr.
~~1100~~	~~370~~	~~1½ hr~~

9. LITHOLOGIC LOG

Bore Diam.	Depth From	Depth To	Material	Water Yes	Water No
24	0	3	Hard pan and broken rock		X
24	3	10	Broken rock and pours rock		X
20	10	36	Porus rock		X
20	36	90	Red cinders		X
20	90	110	Black solid rock		X
20	110	115	Red cinders (caving)		X
20	115	165	Black solid rock		X
20	165	171	Red colored cinders		X
20	171	250	Black basalt		X
20	250	255	Red cinders		X
20	255	325	Black basalt		X
20	325	330	Very broken basalt (caving)		X
20	330	375	Black basalt		X
20	375	380	Red cinders and black basalt	X	
20	380	435	Very hard solid basalt		X
20	435	475	Broken basalt	X	
20	475	500	Solid basalt		X
13	500	506	Solid basalt		X
13	506	508	Broken basalt and black cinder	X	
13	508	539	Solid basalt		X
13	539	540	Blue clay		X

10.

Work started 9/1/93 Finished 12/1/93

11. DRILLERS CERTIFICATION

I/We certify that all minimum well construction standards were complied with at the time the rig was removed.

Firm Name: H. R. Clevens & Sons Firm No. 151
Address: 3729 Hawthorne Drive Date 12/1/93
Signed by (Firm Official) [signature]
and
(Operator) [signature]

USE ADDITIONAL SHEETS IF NECESSARY — FORWARD THE WHITE COPY TO THE DEPARTMENT

No. 1*

State of Idaho
Department of Reclamation

WELL DRILLER'S REPORT

State law requires that this report be filed with the State Reclamation Engineer within 30 days after completion or abandonment of the well.

RECEIVED
MAY 3

1. WELL OWNER

Name Jack Streater

Address Mountain Home, Idaho

Owner's Permit No. _____

2. WATER LEVEL

Static water level 375 feet below land surface

Flowing: ☐ Yes ☒ No G.P.M. flow _____

Temperature _____ °F. Quality _____

Artesian closed-in pressure _____ psi

Controlled by ☐ Valve ☐ Cap ☐ Plug

3. NATURE OF WORK

☒ New well ☐ Deepened ☐ Replacement

☐ Abandoned (describe method of abandoning)

_____

8. WELL TEST DATA

☐ Pump ☒ Bailer ☐ Other

Discharge G.P.M.	Draw Down	Hours Pumped

5. PROPOSED USE

☐ Domestic ☐ Irrigation ☐ Test

☐ Municipal ☐ Industrial ☐ Stock

9. LITHOLOGIC LOG

Note Stem.	Depth From	Depth To	Material	Water Yes	Water No
10	0	4	Soil and lava rocks.		
	4	50	Gray lava.		
	50	52	Red clay and cinders.		
	52	60	Red lava.		
	60	68	Brown lava.		
	68	78	Black lava.		
	78	100	Brown lava.		
	100	113	Gray lava.		
	113	116	Red cinders.		
	116	125	Red lava.		
	125	147	Brown lava.		
	147	160	Gray lava.		
	160	170	Lost mud.		
	170	260	Brown lava.		
	260	302	Gray lava.		
	302	315	Brown clay.		
	315	335	Gray lava.		
	335	360	Lost mud.		
	360	380	Brown lava.		
	380	405	Gray lava.	X	
	405	415	Brown lava.	X	
	415	427	Brown cinders and clay.	X	
	427	430	Brown lava.	X	
	430	500	Black lava.	X	

4. METHOD DRILLED

☒ Cable ☐ Rotary ☐ Dug ☐ Other

7. WELL CONSTRUCTION

Diameter of hole 10 inches Total depth 500 feet

Casing schedule: ☒ Steel ☐ Concrete

Thickness	Diameter	From	To
.275 inches	10 inches	0 & 12" feet	10 feet
_____ inches	_____ inches	_____ feet	_____ feet
_____ inches	_____ inches	_____ feet	_____ feet
_____ inches	_____ inches	_____ feet	_____ feet
_____ inches	_____ inches	_____ feet	_____ feet

Was a packer or seal used? ☐ Yes ☒ No

Perforated? ☐ Yes ☐ No

How perforated? ☐ Factory ☐ Knife ☐ Torch

Size of perforations _____ inches by _____ inches

Number	From	To
_____ perforations	_____ feet	_____ feet
_____ perforations	_____ feet	_____ feet
_____ perforations	_____ feet	_____ feet

Well screen installed? ☐ Yes ☒ No

Manufacturer's name _____

Type: _____ Model No. _____

Diameter ___ Slot size ___ Set from _____ feet to _____ feet

Diameter ___ Slot size ___ Set from _____ feet to _____ feet

Gravel packed? ☐ Yes ☒ No Size of gravel _____

Placed from _____ feet to _____ feet

Surface seal? ☒ Yes ☐ No To what depth 40 feet

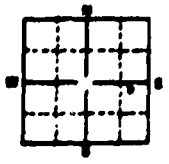
Material used in seal ☒ Cement grout ☒ Puddling clay

10.

Work started 1/31/72 Finished 2/10/72

6. LOCATION OF WELL

Sketch map location must agree with written location.



County Elmore

NE ¼ SE ¼ Sec. 9 T. 4 S. R. 5 E.

11. DRILLER'S CERTIFICATION

This well was drilled under my supervision and this report is true to the best of my knowledge.

Driller's or Firm's Name _____ Number _____

Address _____

Signed _____ Date 5/2/72

USE ADDITIONAL SHEETS IF NECESSARY

* Number corresponds with Map No. on Table 3 and Plate 2

USE TYPEWRITER OR BALLPOINT PEN

State of Idaho
Department of Water Administration

WELL DRILLER'S REPORT

State law requires that this report be filed with the State Reclamation Engineer within 30 days after completion or abandonment of the well.

1. WELL OWNER

Name ELMER COVEY - PAGE 1 OF 2 PAGES

Address MOUNTAIN HOME, IDAHO

Owner's Permit No. _____

2. NATURE OF WORK

☒ New well ☐ Deepened ☐ Replacement

☐ Abandoned (describe method of abandoning)

3. PROPOSED USE

☒ Domestic ☐ Irrigation ☐ Test

☐ Municipal ☐ Industrial ☐ Stock

4. METHOD DRILLED

☒ Cable ☐ Rotary ☐ Dug ☐ Other

5. WELL CONSTRUCTION

Diameter of hole 8 1/2 inches Total depth 417 feet

Casing schedule: ☒ Steel ☐ Concrete

Thickness	Diameter	From	To
0.250 inches	6 5/8 inches	PLUS feet	_____ feet
_____ inches	_____ inches	2.5 feet	45.8 feet
_____ inches	_____ inches	_____ feet	_____ feet
_____ inches	_____ inches	_____ feet	_____ feet
_____ inches	_____ inches	_____ feet	_____ feet

Was a packer or seal used? ☐ Yes ☒ No

Perforated? ☐ Yes ☒ No

How perforated? ☐ Factory ☐ Knife ☐ Torch

Size of perforation _____ inches by _____ inches

Number	From	To
_____ perforations	_____ feet	_____ feet
_____ perforations	_____ feet	_____ feet
_____ perforations	_____ feet	_____ feet

Well screen installed? ☐ Yes ☒ No

Manufacturer's name _____

Type _____ Model No. _____

Diameter __ Slot size __ Set from _____ feet to _____ feet

Diameter __ Slot size __ Set from _____ feet to _____ feet

Gravel packed? ☐ Yes ☒ No Size of gravel _____

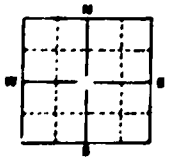
Placed from _____ feet to _____ feet

Surface seal? ☒ Yes ☐ No To what depth 45.8 feet

Material used in seal ☒ Cement grout ☐ Puddling clay

6. LOCATION OF WELL

Sketch map location must agree with written location.



County ELMORE

NE ¼ SE ¼ Sec. 9 T. 4S R. 5E

7. WATER LEVEL

Static water level 358.9 feet below land surface

Flowing? ☐ Yes ☒ No G.P.M. flow _____

Est. Temperature 60 °F. Quality GOOD

Artesian closed-in pressure _____ p.s.i.

Controlled by ☐ Valve ☐ Cap ☐ Plug

8. WELL TEST DATA

☐ Pump ☒ Bailer ☐ Other

Discharge G.P.M.	Draw Down	Hours Pumped
10	IMMEASURABLE	

9. LITHOLOGIC LOG

Hole Diam.	Depth From	Depth To	Material	Water Yes	Water No
8"	0	2	SOIL		X
TO	2	5	CALICHE		X
30"	5	25	GREY BASALT		X
	25	39	GREY BASALT BOULDERS		X
6"	39	41	GREY BASALT		X
TO	41	45	SAND & GRAVEL (CINDERS)		X
T.D.	45	46	GREY BASALT		X
	46	47	SAND & GRAVEL (CINDERS)		X
	47	53	BLACK BASALT HARD		X
	53	72	BLACK BASALT RUBBLE		X
	72	77	BLACK BASALT, CREVICED		X
	77	91	GREY BASALT, MEDIUM		X
	91	97	RED BASALT, SOFT		X
	97	108	GREY BASALT		X
	108	110	RED BASALT		X
	110	113	GREY BASALT		X
	113	136	RED RUBBLE, BOULDERS, CINDERS		X
	136	158	GREY BASALT, HARD		X
	158	173	RED-BROWN BASALT, FRACTURED		X
	173	179	GREY BASALT, MEDIUM		X
	179	180	RED CINDERS		X
	180	214	RED BASALT GRADING INTO BROWN BASALT & INCREASING HARDNESS		
	214	262	GREY BASALT, VERY HARD-MED		X
	262	264	RED CINDERS		X
	264	269	RED BASALT		X
	269	285	GREY BASALT		X
	285	287	SOFT RED BASALT		X
	287	292	GREY BASALT, HARD		X
	292	300	" " "		X
	300	305	RED SOFT		X
326	305	328	GREY, HARD		X
326	328	332	TAN, SOFT		X
	332	345	GREY, MED HARD		X
	345	350	BROWN BURNT CLAY		X
350	350	361	BROWN CLAY, SAND, GRAVEL MIX		X

10.

Work started _____ finished _____

11. DRILLER'S CERTIFICATION

This well was drilled under my supervision and this report is true to the best of my knowledge.

Driller's or Firm's Name _____ Number _____

Address _____

Signed By _____ Date _____

USE ADDITIONAL SHEETS IF NECESSARY FORWARD THE WHITE, BLUE, AND PINK COPIES TO THE DEPARTMENT

State of Idaho
Department of Water Administration

WELL DRILLER'S REPORT

State law requires that this report be filed with the State Reclamation Engineer within 30 days after completion or abandonment of the well.

1. WELL OWNER

Name WALTER DOVEY--PAGE 2 OF 2 PAGES

Address _____

Owner's Permit No. _____

2. NATURE OF WORK

☐ New well ☐ Deepened ☐ Replacement

☐ Abandoned (describe method of abandoning)

3. PROPOSED USE

☐ Domestic ☐ Irrigation ☐ Test

☐ Municipal ☐ Industrial ☐ Stock

4. METHOD DRILLED

☐ Cable ☐ Rotary ☐ Dug ☐ Other

5. WELL CONSTRUCTION

Diameter of hole _____ inches Total depth _____ feet

Casing schedule: ☐ Steel ☐ Concrete

Thickness	Diameter	From	To
_____ inches	____ inches	_____ feet	_____ feet
_____ inches	_____ inches	_____ feet	_____ feet
_____ inches	_____ inches	_____ feet	_____ feet
_____ inches	_____ inches	_____ feet	_____ feet
_____ inches	_____ inches	_____ feet	_____ feet

Was a gasket or seal used? ☐ Yes ☐ No

Perforated? ☐ Yes ☐ No

How perforated? ☐ Factory ☐ Knife ☐ Torch

Size of perforation _____ inches by _____ inches

Number	From	To
_____ perforations	_____ feet	_____ feet
_____ perforations	_____ feet	_____ feet
_____ perforations	_____ feet	_____ feet

Well screen installed? ☐ Yes ☐ No

Manufacturer's name _____

Type _____ Model No. _____

Diameter __ Slot size __ Set from _____ feet to _____ feet

Diameter __ Slot size __ Set from _____ feet to _____ feet

Gravel packed? ☐ Yes ☐ No Size of gravel _____

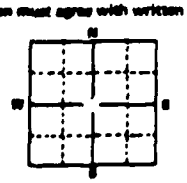
Placed from _____ feet to _____ feet

Surface seal? ☐ Yes ☐ No To what depth _____ feet

Material used in seal ☐ Cement grout ☐ Puddling clay

6. LOCATION OF WELL

Sketch map location must agree with written location.



County ELMORE

¼ ¼ ¼ Sec. 2 T. 4 ☐N ☐S R. 5 ☐E ☐W

7. WATER LEVEL

Static water level _____ feet below land surface

Flowing? ☐ Yes ☐ No G.P.M. flow _____

Temperature _____ ° F. Quality _____

Artesian closed-in pressure _____ p.s.i.

Controlled by ☐ Valve ☐ Cap ☐ Plug

8. WELL TEST DATA

☐ Pump ☐ Bailer ☐ Other

Discharge G.P.M.	Draw Down	Hours Pumped

9. LITHOLOGIC LOG

Hole Diam.	Depth From	Depth To	Material	Water Yes	Water No
	361	367	GREY BASALT, MEDIUM		X
	367	373	CREVICE, SAND & GRAVEL FILLED	X	
	373	379	GREY BASALT		X
	379	379	CREVICE	X	
	379	391	BLACK BASALT, MED HARD		X
	391	395	BRECCIA, CINDERS, GRAVEL	X	
	395	395	RED CINDERS	X	
	395	401	BLACK BASALT, RUBBLE, GRAVEL	X	
	401	410	BLACK BASALT, HARD		X
	410	412	" " FRACTURED	X	
	412	417	" " HARD	X	
	417		CREVICE	X	

10. Work started APRIL 27, 1972 finished JUNE 2ND, 1972

11. DRILLER'S CERTIFICATION

This well was drilled under my supervision and this report is true to the best of my knowledge.

MOUNTAIN HOME WELL DRILLERS 89
Driller's or Firm's Name Number

PO BOX 112, HAGERTT, IDAHO 83627
Address

Signed By Hugh Harden Date

USE ADDITIONAL SHEETS IF NECESSARY FORWARD THE WHITE, BLUE, AND PINK COPIES TO THE DEPARTMENT

USE TYPEWRITER OR BALL POINT PEN

State of Idaho
Department of Water Administration

WELL DRILLER'S REPORT

RECEIVED
Department of Water Administration

State law requires that this report be filed with the State Reclamation Engineer within 30 days after completion or abandonment of the well.

1. WELL OWNER

Name James C. Strickland
Address P.O. Box 664, Buhl, Calif 93516
Owner's Permit No. _____

2. NATURE OF WORK

☒ New well ☐ Deepened ☐ Replacement
☐ Abandoned (describe method of abandoning)

3. PROPOSED USE

☒ Domestic ☐ Irrigation ☐ Test
☐ Municipal ☐ Industrial ☐ Stock

4. METHOD DRILLED

☒ Cable ☐ Rotary ☐ Dug ☐ Other

5. WELL CONSTRUCTION

Diameter of hole 6" inches Total depth 410 feet
Casing schedule ☐ Steel ☐ Concrete

Thickness	Diameter	From	To
0.250 inches	6 5/8 inches	+1.5 feet	19.5 feet
____ inches	____ inches	____ feet	____ feet
____ inches	____ inches	____ feet	____ feet
____ inches	____ inches	____ feet	____ feet
____ inches	____ inches	____ feet	____ feet

Was a packer or seal used? ☐ Yes ☒ No
Perforated? ☐ Yes ☒ No
How perforated? ☐ Factory ☐ Knife ☐ Torch
Size of perforation ____ inches by ____ inches

Number	From	To
____ perforations	____ feet	____ feet
____ perforations	____ feet	____ feet
____ perforations	____ feet	____ feet

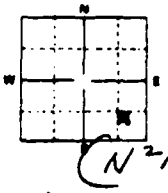
Well screen installed? ☐ Yes ☒ No
Manufacturer's name _____
Type _____ Model No. _____
Diameter __ Slot size __ Set from ____ feet to ____ feet
Diameter __ Slot size __ Set from ____ feet to ____ feet

Gravel packed? ☐ Yes ☒ No Size of gravel
Placed from _____ feet to _____ feet

Surface seal? ☒ Yes ☐ No To what depth 19.5 feet
Material used in seal ☒ Cement grout ☐ Puddling clay

6. LOCATION OF WELL

Sketch map location must agree with written location



(N½NW¼SE¼SE¼)

County ELMORE
SE ¼ SE ¼ Sec 9 T. 4S S. R 5E E.

7. WATER LEVEL

Static water level 361 feet below land surface
Flowing? ☐ Yes ☒ No G.P.M. flow _____
Temperature 62° F. Quality GOOD
Artesian closed-in pressure _____ p.s.i.
Controlled by ☐ Valve ☐ Cap ☐ Plug

8. WELL TEST DATA

☐ Pump ☐ Bailer ☐ Other

Discharge G.P.M.	Draw Down	Hours Pumped

9. LITHOLOGIC LOG

Hole Diam.	Depth From	Depth To	Material	Water Yes	Water No
6	0	2	SOIL		X
	2	20	GREY BASALT		X
	20	21	" " , BROKEN		X
	21	31	GREY BASALT		X
	31	52	" " , BROKEN		X
	52	53	GREY BASALT		X
	53	54	RED CINDERS		X
	54	57	RED PINHOLE		X
	57	65	GREY PINHOLE		X
	65	67	RUBBLE FILLED CREVICE		X
	67	72	GREY PINHOLE		X
	72	75	RED BURNT CLAY		X
	75	97	GREY BASALT, HARD		X
	97	100	RED BURNT CLAY		X
	100	107	GREY BASALT, VERY HARD		X
	107	108	CINDER & RED BASALT		X
	108	123	GREY BASALT, HARD		X
	123	126	CLAYEY RUBBLE		X
	126	139	GREY BASALT, BROKEN, VRY HD		X
	139	140	" " , RUBBLE		X
	140	183	TAN BURNT BOULDER CLAY		X
	183	220	GREY BASALT, GRAVEL FILLED FRACTURES		X
	220	248	GREY BASALT, INCREASING HD.		X
	248	263	RED PINHOLE		X
	263	278	BLACK BASALT, FRACTURED		X
	278	305	BLACK PINHOLE		X
	305	307	RED BURNT CLAY		X
	307	321	BLACK PINHOLE		X
	321	326	BROWN GRAVELLY CLAY		X
	326	338	GREY PINHOLE		X
	338	359	BROWN BURNT ON TOP BRWN CLAY		X
	359	370	GREY PINHOLE	X	
	370	373	GREY RUBBLE	X	
	373	393	RUBBLE, SAND, GRAVEL, BLACK	X	
	393	399	BLACK BASALT, VERY HARD	?	X
	399	403	" " " " , BROKEN	NO	RETU
	403	410	BLACK BASALT, VERY HARD	Y	X

10
Work started Aug 18, 1972 finished Sept 20, 1972

11. DRILLER'S CERTIFICATION

This well was drilled under my supervision and this report is true to the best of my knowledge

MTN HOME WELL DRILLERS 89
Driller's or Firm's Name Number
PO BOX 112, HAMMETT, IDAHO 83627
Address
Signed By Floyd Hardin Date Sept 24, 1972

USE ADDITIONAL SHEETS IF NECESSARY FORWARD THE WHITE, BLUE, AND PINK COPIES TO THE DEPARTMENT

State of Idaho
Department of Water Administration

WELL DRILLER'S REPORT

The law requires that this report be filed with the Director, Department of Water Administration within 30 days after the completion or abandonment of the well.

1. WELL OWNER

Name Forest Service

Address Mountain Home, Idaho

Owner's Permit No. _____

2. NATURE OF WORK

☒ New well ☐ Deepened ☐ Replacement

☐ Abandoned (describe method of abandoning)

_____

3. PROPOSED USE

☒ Domestic ☐ Irrigation ☐ Test

☐ Municipal ☐ Industrial ☐ Stock

4. METHOD DRILLED

☐ Cable ☒ Rotary ☐ Dug ☐ Other

5. WELL CONSTRUCTION

Diameter of hole 6 inches Total depth 500 feet

Casing schedule: ☒ Steel ☐ Concrete

Thickness	Diameter	From	To
5/16 inches	6 inches	+ 1 feet	21 feet
_____ inches	_____ inches	_____ feet	_____ feet
_____ inches	_____ inches	_____ feet	_____ feet
_____ inches	_____ inches	_____ feet	_____ feet
_____ inches	_____ inches	_____ feet	_____ feet

Was a packer or seal used? ☐ Yes ☒ No

Perforated? ☐ Yes ☒ No

How perforated? ☐ Factory ☐ Knife ☐ Torch

Size of perforation _____ inches by _____ inches

Number	From	To
_____ perforations	_____ feet	_____ feet
_____ perforations	_____ feet	_____ feet
_____ perforations	_____ feet	_____ feet

Well screen installed? ☐ Yes ☒ No

Manufacturer's name _____

Type _____ Model No. _____

Diameter ___ Slot size ___ Set from _____ feet to _____ feet

Diameter ___ Slot size ___ Set from _____ feet to _____ feet

Gravel packed? ☐ Yes ☒ No Size of gravel _____

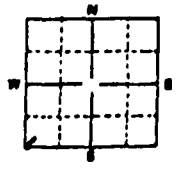
Placed from _____ feet to _____ feet

Surface seal? ☒ Yes ☐ No To what depth 21 feet

Material used in seal ☐ Cement grout ☒ Puddling clay

6. LOCATION OF WELL

Sketch map location must agree with written location.



61

County Boise

SW ¼ SW ¼ Sec. 9 T. 4 N. R. 5 E.M.

7. WATER LEVEL

Static water level at 350 feet below land surface

Flowing? ☐ Yes ☒ No G.P.M. flow _____

Temperature _____ ° F. Quality _____

Artesian closed in pressure _____ p.s.i.

Controlled by ☐ Valve ☐ Cap ☐ Plug

8. WELL TEST DATA

☐ Pump ☐ Bailer ☒ Other

Discharge G.P.M.	Draw Down	Hours Pumped

9. LITHOLOGIC LOG

Hole Diam.	Depth From	Depth To	Material	Water Yes	Water No
6	0	6	Soil		
	6	35	Clay, lava.		
	35	42	Red cinders.		
	42	75	Gray lava.		
	75	500	No return.		
			First water, 350 ft.		

10.

Work started 7/7/73 finished 7/12/73

11. DRILLER'S CERTIFICATION

This well was drilled under my supervision and this report is true to the best of my knowledge.

C. L. Hiddleston & Son 35
Driller's or Firm's Name Number

Mountain home, Idaho
Address

C. L. Hiddleston
Signed By Date

USE ADDITIONAL SHEETS IF NECESSARY FORWARD THE WHITE, BLUE, AND PINK COPIES TO THE DEPARTMENT

USE TYPEWRITER OR BALL POINT PEN

Department of Water Administration

No. 5

WELL DRILLER'S REPORT

State law requires that this report be filed with the Director, Department of Water Administration within 30 days after the completion or abandonment of the well.

1. WELL OWNER

Name Mary Parker

Address South Park, Idaho

Owner's Permit No.

2. NATURE OF WORK

☑ New well ☐ Deepened ☐ Replacement

☐ Abandoned (Describe method of abandoning)

3. PROPOSED USE

☑ Domestic ☐ Irrigation ☐ Test

☐ Municipal ☐ Industrial ☐ Stock

4. METHOD DRILLED

☑ Cable ☐ Rotary ☐ Dug ☐ Other

5. WELL CONSTRUCTION

Diameter of hole 8 inches Total depth 432 feet

Casing schedule: ☑ Steel ☐ Concrete

Thickness	Diameter	From	To
.125 inches	8 inches	1 feet	20 feet
inches	inches	feet	feet
inches	inches	feet	feet
inches	inches	feet	feet
inches	inches	feet	feet

Was a gasket used? ☐ Yes ☑ No

Perforated? ☐ Yes ☑ No

How perforated? ☐ Factory ☐ Knife ☐ Torch

Size of perforation ____ inches by ____ inches

Number	From	To
perforations	feet	feet
perforations	feet	feet
perforations	feet	feet

Well screen installed? ☐ Yes ☑ No

Manufacturer's name

Type Model No.

Diameter ___ Slot size ___ Set from ___ feet to ___ feet

Diameter ___ Slot size ___ Set from ___ feet to ___ feet

Gravel packed? ☐ Yes ☑ No Size of gravel

Placed from feet to feet

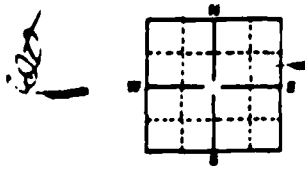
Surface seal? ☑ Yes ☐ No To what depth 20 feet

Material used in seal ☐ Cement grout ☐ Puddling clay

Redi-Mix Cement

6. LOCATION OF WELL

Sketch map location must agree with written location.



County Lincoln S 8 1/4, SW 1/4, SE 1/4, S 1/2, NE 1/4

SW ¼ SE ¼ Sec. 9 T. 6 ☐N/S, R. 5 ☐E/W

Owner Parker Subdivision (Plat)

7. WATER LEVEL

Static water level 361 feet below land surface

Flowing? ☐ Yes ☑ No G.P.M. flow

Temperature 68° F. Quality good

Artesian closed-in pressure ____ p.s.i.

Controlled by ☐ Valve ☐ Cap ☐ Plug

8. WELL TEST DATA

☐ Pump ☐ Bailer ☐ Other

Discharge G.P.M.	Draw Down	Hours Pumped

9. LITHOLOGIC LOG

Hole Diam.	Depth From	Depth To	Material	Water Yes	Water Dry
8	0	3	Top Soil + Boulders		X
	3	10	Caliche		X
	10	18	Broken Black Lava		X
	18	40	Gray Lava Sand	X	
	40	45	Sand (Community water supply)		X
	45	60	Black Pahoe Lava		X
	60	65	Red Scoria		X
	65	150	Red pumice Lava		X
	150	175	Hard Gray Lava		X
	175	180	Red Scoria		X
	180	205	Red pumice Lava		X
	205	230	Red Scoria		X
	230	265	Red pumice Lava		X
	265	285	Red Scoria Boulders		X
	285	305	Hard Gray Lava		X
	305	310	Broken Black Boulders		X
	310	340	Hard Gray Lava		X
	340	350	Yellow - Clay		X
	350	360	Hard Gray Lava		X
	360	385	Hard Gray Lava 20°	X	
	385	405	Black Broken Lava		X
	405	414	Hard Gray Lava 18°	X	
	414	432	Hard Gray Lava 17°		X

10. Work started Feb 11, 1974 finished Mar 25, 1974

11. DRILLER'S CERTIFICATION

This well was drilled under my supervision and this report is true to the best of my knowledge.

Driller's or Firm's Name [illegible] Well Drilling No. 5

Address P.O. Box 112, Shoshone, Idaho

Signed By [signature] Date 3-29-74

USE ADDITIONAL SHEETS IF NECESSARY FORWARD THE WHITE, BLUE, AND PINK COPIES TO THE DEPARTMENT

DEPARTMENT OF WATER RESOURCES

WELL DRILLER'S REPORT

State law requires that this report be filed with the Director, Department of Water Resources within 20 days after the completion or abandonment of the well.

9

1. WELL OWNER

Name CHARLES LA FOY

Address Mtn Home

Owner's Permit No. _____

2. NATURE OF WORK

☑ New well ☐ Deepened ☐ Replacement
☐ Abandoned (describe method of abandoning) _____

3. PROPOSED USE

☑ Domestic ☐ Irrigation ☐ Test ☐ Municipal
☐ Industrial ☐ Stock ☐ Waste Disposal or Injection
☐ Other _____ (specify type)

4. METHOD DRILLED

☑ Rotary ☑ Air ☐ Hydraulic ☐ Reverse rotary
☐ Cable ☐ Dug ☐ Other _____

5. WELL CONSTRUCTION

Casing schedule: ☑ Steel ☐ Concrete ☐ Other _____

Thickness	Diameter	From	To
¼ inches	6 inches	+ 1 feet	18 feet
_____ inches	_____ inches	_____ feet	_____ feet
_____ inches	_____ inches	_____ feet	_____ feet
_____ inches	_____ inches	_____ feet	_____ feet

Was casing drive shoe used? ☐ Yes ☑ No
Was a packer or seal used? ☐ Yes ☑ No
Perforated? ☐ Yes ☑ No
How perforated? ☐ Factory ☐ Knife ☐ Torch
Size of perforation _____ inches by _____ inches

Number	From	To
_____ perforations	_____ feet	_____ feet
_____ perforations	_____ feet	_____ feet
_____ perforations	_____ feet	_____ feet

Well screen installed? ☐ Yes ☑ No
Manufacturer's name _____
Type _____ Model No. _____
Diameter ___ Slot size ___ Set from _____ feet to _____ feet
Diameter ___ Slot size ___ Set from _____ feet to _____ feet
Gravel packed? ☐ Yes ☑ No ☐ Size of gravel _____
Placed from _____ feet to _____ feet
Surface seal depth 18 Material used in seal: ☐ Cement grout ☑ Puddling clay ☐ Well cuttings
Sealing procedure used: ☐ Slurry pit ☐ Temp. surface casing ☑ Overbore to seal depth
Method of joining casing: ☐ Threaded ☑ Welded ☐ Solvent Weld ☐ Cemented between strata
Describe access port _____

6. LOCATION OF WELL

Sketch map location must agree with written location.

N / W / E

Subdivision Name _____
Lot No. _____ Block No. _____
County Elmore
¼ NE ¼ SE ¼ Sec. 9 T. 4 S/N, R. 5 E/W

7. WATER LEVEL

Static water level 3 feet below land surface.
Flowing? ☐ Yes ☑ No G.P.M. flow _____
Artesian closed-in pressure _____ p.s.i.
Controlled by: ☐ Valve ☐ Cap ☐ Plug
Temperature ____ °F. Quality _____

8. WELL TEST DATA

☐ Pump ☐ Bailer ☑ Air ☐ Other _____

Discharge G.P.M.	Pumping Level	Hours Pumped

9. LITHOLOGIC LOG

Hole Diam.	Depth From	Depth To	Material	Water Yes	Water No
8	0	5	TOP SOIL		✓
8	5	11	GREY BASALT MED		✓
8	11	16	GREY BASALT FRAC		✓
8	16	22	GREY BASALT HARD		✓
6	22	24	RED BASALT MED		✓
6	24	29	BLK BASALT MED		✓
6	29	96	BRN & GREY BASALT MED		
6	96	93	BLK BASALT CINDER MED		
6	93	101	BLK BASALT MED		
6	101	112	BRN BASALT MED		
6	112	124	GREY BASALT HARD		
6	124	129	RED CINDER MED		
6	129	139	BLK CINDER MED		
6	139	525	TOTAL LOSS OF CIRCULATION		
			22 psi BACK PRESSURE AT 525		

RECEIVED
FEB 26 1982
Department of Water Resources
Western Regional Office

FEB 19 1982
Department of Water Resources

10. Work started 8/13/81 finished 9/17/81

11. DRILLERS CERTIFICATION

I/We certify that all minimum well construction standards were complied with at the time the rig was removed.

Firm Name H. DAVIDSON Firm No. 35
Address RT 1 Box 116-A Date 4-19-81
Signed by (Firm Official) _____
and
(Operator) _____

USE ADDITIONAL SHEETS IF NECESSARY — FORWARD THE WHITE COPY TO THE DEPARTMENT

Form 238 7
9 82

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES

USE TYPEWRITER OR BALLPOINT PEN

WELL DRILLER'S REPORT

State law requires that this report be filed with the Director, Department of Water Resources within 30 days after the completion or abandonment of the well.

1. WELL OWNER

Name CHARLES K. MARTIN

Address 410 A JACKSON ST. MTN HOME ID

Owner's Permit No. 1A

2. NATURE OF WORK

☒ New well ☐ Deepened ☐ Replacement
☐ Abandoned (describe abandonment procedures such as materials plug depths, etc in lithologic log)

3. PROPOSED USE

☒ Domestic ☐ Irrigation ☐ Test ☐ Municipal
☐ Industrial ☐ Stock ☐ Waste Disposal or Injection
☐ Other _____ (specify type)

4. METHOD DRILLED

☐ Rotary ☐ Air ☐ Hydraulic ☐ Reverse rotary
☒ Cable ☐ Dug ☐ Other _____

5. WELL CONSTRUCTION

Casing schedule: ☒ Steel ☐ Concrete ☐ Other _____

Thickness	Diameter	From	To
.25 inches	6 inches +	15 feet	19 feet
_____ inches	_____ inches	_____ feet	_____ feet
_____ inches	_____ inches	_____ feet	_____ feet
_____ inches	_____ inches	_____ feet	_____ feet

Was casing drive shoe used? ☐ Yes ☒ No
Was a packer or seal used? ☐ Yes ☒ No
Perforated? ☐ Yes ☒ No
How perforated? ☐ Factory ☐ Knife ☐ Torch
Size of perforation _____ inches by _____ inches

Number	From	To
_____ perforations	_____ feet	_____ feet
_____ perforations	_____ feet	_____ feet
_____ perforations	_____ feet	_____ feet

Well screen installed? ☐ Yes ☒ No
Manufacturer's name _____
Type _____ Model No. _____
Diameter ___ Slot size ___ Set from _____ feet to _____ feet
Diameter ___ Slot size ___ Set from _____ feet to _____ feet
Gravel packed? ☐ Yes ☒ No ☐ Size of gravel _____
Placed from _____ feet to _____ feet
Surface seal depth 19' Material used in seal: ☒ Cement grout ☐ Bentonite ☐ Puddling clay ☐ _____
Sealing procedure used: ☐ Slurry pit ☐ Temp. surface casing ☒ Overbore to seal depth
Method of joining casing: ☐ Threaded ☒ Welded ☐ Solvent Weld ☐ Cemented between strata
Describe access port N/A

6. LOCATION OF WELL

Sketch map location must agree with written location.

N / W / E / S

Subdivision Name _____
Lot No _____ Block No. _____

County ELMORE
NW ¼ NE ¼ Sec 10 T 4 N ☒ R 5 ☐ E W

7. WATER LEVEL

Static water level 3(?) feet below land surface.
Flowing? ☐ Yes ☒ No G.P.M. flow _____
Artesian closed in pressure _____ p.s.i.
Controlled by: ☐ Valve ☐ Cap ☐ Plug
Temperature _____ °F Quality GOOD
Describe artesian or temperature zones Below

8. WELL TEST DATA

☐ Pump ☒ Bailer ☐ Air ☐ Other _____

Discharge G.P.M	Pumping Level	Hours Pumped

9. LITHOLOGIC LOG

Bore Diam.	Depth From	Depth To	Material	Water Yes	Water No
6"	0	3	TOP SOIL		
	3	5	HARD TAN		
	5	16	SOIL		
	16	27	BROWN LAVA		
	27	30	GRAY LAVA		
	30	42	GRAY LAVA (BROKEN)		
	42	53	GRAY LAVA		
	53	71	GRAY LAVA (CRUSTY)		
	71	90	HARD GRAY LAVA		
	90	104	BROWN LAVA (BROKEN)		
	104	145	GRAY LAVA		
	145	175	BROWN LAVA (BROKEN)		
	175	199	GRAY LAVA		
	199	228	BROWN LAVA STREAKS OF RED		
	228	273	GRAY LAVA		
	273	280	RED LAVA		
	280	340	GRAY LAVA		
	340	345	BROWN CLAY		
	345	360	GRAY LAVA		
	360	373	CINDERS	✓	
	373	376	HARD GRAY LAVA		
	376	385	GRAY LAVA		
	385	435	NO CUTTINGS	✓	
	435	435	GRAY LAVA		
	435	475	NO CUTTINGS	✓	

JUL 26 1983

10.

Work started 23 MAY 83 finished 2 JUN 83

11. DRILLERS CERTIFICATION

I/We certify that all minimum well construction standards were complied with at the time the rig was removed.

Firm Name GEO. QUICK WELL DRILLING Firm No. 47
Address [illegible] Date _____
Signed by (Firm Official) _____
and
(Operator) _____

USE ADDITIONAL SHEETS IF NECESSARY — FORWARD THE WHITE COPY TO THE DEPARTMENT

Form 238 7
1-78

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES

USE TYPEWRITER OR BALLPOINT PEN

WELL DRILLER'S REPORT

State law requires that this report be filed with the Director, Department of Water Resources within 30 days after the completion or abandonment of the well.

1. WELL OWNER

Name Don Locker

Address Mtn. Home, ID 83647

Owner's Permit No. _____

2. NATURE OF WORK

☑ New well ☐ Deepened ☐ Replacement
☐ Abandoned (describe method of abandoning) _____

3. PROPOSED USE

☑ Domestic ☐ Irrigation ☐ Test ☐ Municipal
☐ Industrial ☐ Stock ☐ Waste Disposal or Injection
☐ Other _____ (specify type)

4. METHOD DRILLED

☑ Rotary ☐ Air ☐ Hydraulic ☐ Reverse rotary
☐ Cable ☐ Dug ☐ Other _____

5. WELL CONSTRUCTION

Casing schedule: ☑ Steel ☐ Concrete ☐ Other _____

Thickness	Diameter	From	To
.125 inches	6" inches	1½ feet	18½ feet
_____ inches	_____ inches	_____ feet	_____ feet
_____ inches	_____ inches	_____ feet	_____ feet
_____ inches	_____ inches	_____ feet	_____ feet

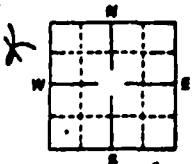
Was casing drive shoe used? ☐ Yes ☑ No
Was a packer or seal used? ☐ Yes ☑ No
Perforated? ☐ Yes ☑ No
How perforated? ☐ Factory ☐ Knife ☐ Torch
Size of perforation _____ inches by _____ inches

Number	From	To
_____ perforations	_____ feet	_____ feet
_____ perforations	_____ feet	_____ feet
_____ perforations	_____ feet	_____ feet

Well screen installed? ☐ Yes ☑ No
Manufacturer's name _____
Type _____ Model No. _____
Diameter ___ Slot size ___ Set from _____ feet to _____ feet
Diameter ___ Slot size ___ Set from _____ feet to _____ feet
Gravel packed? ☐ Yes ☑ No ☐ Size of gravel _____
Placed from _____ feet to _____ feet
Surface seal depth 18½ Material used in seal: ☑ Cement grout ☐ Puddling clay ☐ Well cuttings
Sealing procedure used: ☐ Slurry pit ☐ Temp. surface casing ☑ Overbore to seal depth
Method of joining casing: ☐ Threaded ☐ Welded ☐ Solvent Weld ☐ Cemented between strata
Describe access port _____

6. LOCATION OF WELL

Sketch map location must agree with written location.



Subdivision Name _____
Lot No. _____ Block No. _____
County Elmore
SW ¼ SW ¼ Sec. 10, T. 4S N/S, R. 5E E/W.

7. WATER LEVEL

Static water level 396 feet below land surface.
Flowing? ☐ Yes ☑ No G.P.M. flow _____
Artesian closed-in pressure _____ p.s.i.
Controlled by: ☐ Valve ☐ Cap ☐ Plug
Temperature 70 °F. Quality Good

8. WELL TEST DATA No Test

☐ Pump ☐ Bailer ☐ Air ☐ Other _____

Discharge G.P.M.	Pumping Level	Hours Pumped

9. LITHOLOGIC LOG

Hole Diam.	Depth From	Depth To	Material	Water Yes	Water No
9"	0	18½			
6"	18½	530'			
	0	9½	OVERBURDEN		✓
	9½	45	BLACK LAVA		✓
	45	47	CINDERS		✓
	47	104	BLACK LAVA		✓
	104	108	CINDERS		✓
	108	430	LAVA	✓	
	430	444	CINDERS	✓	
	444	530	LAVA	✓	

RECEIVED
SEP 25 1979
Department of Water Resources
Western Regional Office
OCT 8 1979

10. Work started 8-27-79 finished 8-29-79

11. DRILLERS CERTIFICATION

I/We certify that all minimum well construction standards were complied with at the time the rig was removed.

Firm Name Cedar Drilling Inc. Firm No. 291
Address Star Rt. 6, Box 19-E Mtn. Home, ID 83647 Date 9/19/79
Signed by (Firm Official) Bill D Lindley
and
(Operator) Bill D Lindley

USE ADDITIONAL SHEETS IF NECESSARY — FORWARD THE WHITE COPY TO THE DEPARTMENT

No. 9

USE TYPEWRITER OR BALL POINT PEN

State of Colorado
Department of Water Resources

WELL DRILLER'S REPORT

State law requires that this report be filed with the Director, Department of Water Resources within 10 days after the completion or abandonment of the well.

1 WELL OWNER
Name Paul STRASTERS
Address MT Home
Owner's permit No.

2 NATURE OF WORK
☒ New well ☐ Deepened ☐ Replacement
☐ Abandoned (describe method of abandoning)

3 PROPOSED USE
☒ Domestic ☐ Irrigation ☐ Test ☐ Other (specify type)
☐ Municipal ☐ Industrial ☐ Stock ☐ Waste Disposal or Injection

4 METHOD DRILLED
☐ Cable ☐ Rotary ☐ Dug ☐ Other

5 WELL CONSTRUCTION
Diameter of hole 6 inches. Total depth 520 feet
Casing schedule ☐ Steel ☐ Concrete

Thickness	Diameter	From	To
.155 inches	6 5/8 inches	+1 feet	19 feet
inches	inches	feet	feet
inches	inches	feet	feet
inches	inches	feet	feet
inches	inches	feet	feet

Was casing drive shoe used? ☐ Yes ☒ No
Was a packer or seal used? ☐ Yes ☒ No
Perforated? ☐ Yes ☒ No
How perforated? ☐ Factory ☐ Knife ☐ Torch
Size of perforation ____ inches by ____ inches

Number	From	To
perforations	feet	feet
perforations	feet	feet
perforations	feet	feet

Well screen installed? ☐ Yes ☒ No
Manufacturer's name
Type Model No.
Diameter Slot size Set from feet to feet
Diameter Slot size Set from feet to feet
Gravel placed? ☐ Yes ☐ No Size of gravel
Placed from feet to feet
Surface seal depth 19 Material used to seal ☐ Cement grout ☒ Native clay ☐ Other cuttings
Sealing procedure used ☐ Slurry pit ☐ Temporary surface casing ☒ Overflow to seal depth

6 LOCATION OF WELL
Sketch map location must agree with written location.

61

Subdivision name
Lot No. Block No.
County Elmore
NW ¼ SW ¼ Sec. 10 Twp. 4 S Rng. 5 E

7 WATER LEVEL
Static water level 395 feet below land surface
Flowing? Yes ☒ No GPM flow
Temperature F Quality
Artesian closed in pressure psi
Controlled by valve Cap

8 WELL TEST DATA

Pump	Bailer	Other
Discharge G.P.M.	Draw Down	Hours Pumped
		2

9 LITHOLOGIC LOG

Hole Diam.	Depth From	Depth To	Material
8	0	4	Soil - Rocks Loam
8-6	4	26	Gray Land
6	26	35	Brown Land
6	35	47	GRAY LAND
6	47	52	Weathered clay
6	52	63	Gray Land
6	63	72	Rock to Gray Clay
6	72	75	Gray Sand Rock
6	75	520	NO Return

10 Work started 7-11-77 finished 7-15-77

11 DRILLER'S CERTIFICATION
Firm name K. Wasters Drilling Firm No. 35
Address MT Home Date 2-15-77
Signed by (Firm official) Paul K. Wasters
and
Driller

USE ADDITIONAL SHEETS IF NECESSARY FORWARD THE WHITE COPY TO THE DEPARTMENT

61-7078

No. 10

USE TYPEWRITER OR BALL POINT PEN

State of Idaho
Department of Water Resources

WELL DRILLER'S REPORT

Send this report to the Director, Department of Water Resources within 20 days after the completion or abandonment of the well

1. WELL OWNER
Name Steve Beus
Address Mt Home
Owner's permit No 61-2078

2. NATURE OF WORK
☒ New well ☐ Deepened ☐ Replacement
☐ Abandoned (describe method of abandoning)

3. PROPOSED USE
☒ Domestic ☐ Irrigation ☐ Test ☐ Other (specify type)
☐ Municipal ☐ Industrial ☐ Stock ☐ Waste Disposal or Injection

4. METHOD DRILLED
☐ Cable ☒ Rotary ☐ Dug ☐ Other

5. WELL CONSTRUCTION
Diameter of hole 6 inches Total depth 475 feet
Casing schedule: ☒ Steel ☐ Concrete

Thickness	Diameter	From	To
250 inches	6⅝ inches	+ 1 feet	18 feet
____ inches	____ inches	____ feet	____ feet
____ inches	____ inches	____ feet	____ feet
____ inches	____ inches	____ feet	____ feet
____ inches	____ inches	____ feet	____ feet

Was casing drive shoe used? ☐ Yes ☒ No
Was a packer or seal used? ☐ Yes ☒ No
Perforated? ☐ Yes ☒ No
How perforated? ☐ Factory ☐ Knife ☐ Torch
Size of perforation ____ inches by ____ inches

Number	From	To
____ perforations	____ feet	____ feet
____ perforations	____ feet	____ feet
____ perforations	____ feet	____ feet

Well screen installed? ☐ Yes ☒ No
Manufacturer's name ____
Type ____ Model No. ____
Diameter ____ Slot size ____ Set from ____ feet to ____ feet
Diameter ____ Slot size ____ Set from ____ feet to ____ feet

Gravel packed? ☐ Yes ☒ No Size of gravel ____
Placed from ____ feet to ____ feet

Surface seal depth 18 Material used in seal ☐ Cement grout ☒ Puddling clay ☒ Well cuttings
Sealing procedure used ☐ Slurry pit ☐ Temporary surface casing ☒ Overflow to seal depth

6. LOCATION OF WELL
Sketch map location must agree with written location (61)

Subdivision Name ____
Lot No. ____ Block No. ____
County ELMORE
NE ¼ NE ¼ Sec. 10 T. 4 ☐N ☐S R. 5 ☐E ☐W

7. WATER LEVEL
Static water level 370 feet below land surface
Flowing? ☐ Yes ☐ No G P M flow ____
Temperature ____ ° F. Quality ____
Artesian closed in pressure ____ p.s.i.
Controlled by ☐ Valve ☐ Cap ☐ Plug

8. WELL TEST DATA
☒ Pump ☐ Bailer ☐ Other

Discharge G P M	Drawdown	Hours Pumped
30	0	2

9. LITHOLOGIC LOG

Hole Diam.	Depth From	Depth To	Material	Water Yes	Water No
8	0	3	Soil		
"	3	6	Gray Lava Broken		
6	6	19	Gray Lava		
6	19	23	Brown Lava		
	23	30	Gray Lava		
	30	47	Brown Lava		
	47	56	Red Cinders		
	56	73	Gray Lava Broken		
	73	82	Red Lava		
	82	90	Gray Lava		
	90	93	Red Lava		
	93	97	Brown Clay		
	97	112	Brown Lava		
	112	123	Gray Lava		
	123	141	Red Lava		
	141	182	Gray Lava		
	182	185	Gray Lava Cinders		
	185	207	Gray Lava		
	207	223	Red Lava Cinders		
	223	241	Red Lava		
	241	260	Brown Lava		
	260	270	Gray Lava Hard		
	270	400	NO Return	X	
	400	410	Red Lava Cinders	X	
	410	427	Gray Lava		
	427	440	Red Lava		
	440	475	Red Lava Cinders	X	

10. Work started 3/24/76 Completed 3/27/76

11. DRILLING CONTRACTOR
Firm Name Miller & Billing Firm No. 35
Address Mt Home Date 4/25/76
Signed by (Firm Official) Ron
and (Driller) Ron

USE ADDITIONAL SHEETS IF NECESSARY FORWARD THE WHITE COPY TO THE DEPARTMENT

USE TYPEWRITER OR BALL POINT PEN

State of Idaho
Department of Water Resources

WELL DRILLER'S REPORT

State law requires that this report be filed with the Director, Department of Water Resources within 30 days after the completion or abandonment of the well.

1. WELL OWNER
Name JACK STREETER
Address Mountain Home, Idaho
Owner's Permit No

2. NATURE OF WORK
☒ New well ☐ Deepened ☐ Replacement
☐ Abandoned (Describe method of abandoning)

3. PROPOSED USE
☒ Domestic ☐ Irrigation ☐ Test ☐ Other (specify type)
☐ Municipal ☐ Industrial ☐ Stock ☐ Waste Disposal or Injection

4. METHOD DRILLED
☒ Cable ☐ Rotary ☐ Dug ☐ Other

5. WELL CONSTRUCTION
Diameter of hole 6 inches Total depth 510 feet
Casing schedule: ☐ Steel ☐ Concrete

Thickness	Diameter	From	To
¼ inches	6¼ inches	0 feet	19 feet
inches	inches	feet	feet
inches	inches	feet	feet
inches	inches	feet	feet
inches	inches	feet	feet

Was casing drive shoe used? ☐ Yes ☒ No
Was a packer or seal used? ☐ Yes ☒ No
Perforated? ☐ Yes ☒ No
How perforated? ☐ Factory ☐ Knife ☐ Torch
Size of perforation ____ inches by ____ inches

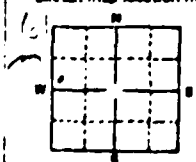
Number	From	To
perforations	feet	feet
perforations	feet	feet
perforations	feet	feet

Well screen installed? ☐ Yes ☒ No
Manufacturer's name
Type Model No.
Diameter Slot size Set from feet to feet
Diameter Slot size Set from feet to feet

Gravel packed? ☐ Yes ☒ No Size of gravel
Placed from feet to feet

Surface seal depth 18' Material used in seal ☒ Cement grout ☐ Puddling clay ☐ Well cuttings
Seating procedure used ☒ Slurry pit ☐ Temporary surface casing ☐ Overbore to seal depth

6. LOCATION OF WELL
Sketch map location must agree with written location.



Subdivision Name
Lot No. Block No.
County Elmore
SW ¼ NW ¼ Sec. 10 T. 4 N R. 5 E W

7. WATER LEVEL
Static water level 378 feet below land surface
Flowing? ☐ Yes ☒ No G.P.M. flow Bailer Tested
Temperature 62° F. Quality Good
Artesian closed-in pressure p.s.i.
Controlled by ☐ Valve ☐ Cap ☐ Plug

8. WELL TEST DATA
☐ Pump ☐ Bailer ☐ Other

Discharge G.P.M.	Draw Down	Hours Pumped

9. LITHOLOGIC LOG

Hole Diam.	Depth From	Depth To	Material	Water Yes	Water No
6"	0	2	Topsoil		
	2	2½	Hardpan Rock		
	2½	13	Gray Lava		
	13	25	Brown Lava		
	25	36	Crevicy open ground		
	36	42	Brown burnt boulder clay		
	42	53	Cinder and Bubble		
	53	77	Hard black Basalt		
	77	102	Open Ground		
	102	118	Gray Lava		
	118	151	Black Basalt		
	151	160	Black Boulders		
	60	161	Gray Basalt Crevicy		
	161	168	Brown Basalt		
	168	172	Open Ground		
	172	180	Gray Lava		
	181	182	Cinders		
	182	195	Red Basalt		
	195	197	Cinders		
	197	210	Brown Basalt		
	210	215	Very hard brown Basalt		
	215	260	Red Lava		
	260	295	Brown Lava		
	295	340	Gray Lava		
	340	378	Brown Lava		
	378	410	Brown Cinders	X	
	410	468	Gray Lava		
	468	490	Brown Lava		
	490	510	Red Cinders	X	

10. Work started Feb 10, 1975 finished Feb 27 1975

11. DRILLER'S CERTIFICATION
Firm Name Baker Well Drilling Co
Address Route 1 Mountain Home Idaho
Signed by (Firm Official) B K Taylor
and
Operator B C Baker

USE ADDITIONAL SHEETS IF NECESSARY FORWARD THE WHITE COPY TO THE DEPARTMENT

No. 12

WELL DRILLER'S REPORT

State law requires that this report be filed with the Director, Department of Water Administration within 30 days after the completion or abandonment of the well.

1 WELL OWNER

Name JOE HERNANDEZ, F.& M. BRADBURY, JACK STRICKER

Address STAR ROUTE B, MOUNTAIN HOME, IDAHO 83647

Owner's Permit No.

2 NATURE OF WORK

☒ New ☐ Replacement

3 PROPOSED USE

☒ Domestic ☐ Irrigation ☐ Test

☐ Municipal ☐ Industrial ☐ Stock

4 METHOD DRILLED

☒ Cable ☐ Rotary ☐ Dug ☐ Other

5 WELL CONSTRUCTION

Diameter of hole 6 inches Total depth 570 feet

Casing schedule ☐ Steel ☐ Concrete

Thickness	Diameter	From	To
____ inches	____ inches	____ feet	____ feet
____ inches	____ inches	____ feet	____ feet
____ inches	____ inches	____ feet	____ feet
____ inches	____ inches	____ feet	____ feet
____ inches	____ inches	____ feet	____ feet

Was a packer or seal used? ☐ Yes ☐ No

Perforated? ☐ Yes ☐ No

How perforated? ☐ Factory ☐ Knife ☐ Torch

Size of perforation ____ inches by ____ inches

Number	From	To
____ perforations	____ feet	____ feet
____ perforations	____ feet	____ feet
____ perforations	____ feet	____ feet

Well screen installed? ☐ Yes ☐ No

Manufacturer's name

Type ____ Model No.

Diameter ____ Slot size ____ Set from ____ feet to ____ feet

Diameter ____ Slot size ____ Set from ____ feet to ____ feet

Gravel packed? ☐ Yes ☐ No Size of gravel

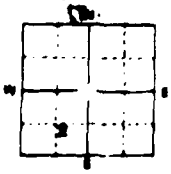
Placed from feet to feet

Surface seal? ☐ Yes ☐ No To what depth feet

Material used in seal ☐ Cement grout ☐ Puddling clay

6 LOCATION OF WELL

Sketch map location must agree with written location



County ELMORE COUNTY

NE ¼ SE ¼ Sec. 1 T. 4S R. 5E E.W.

7 WATER LEVEL

Static water level 306.5 feet below land surface

Flowing? Yes ☒ No GPM flow

Temperature F Quality GOOD

Artesian closed in pressure PSI

Controlled by ☐ Valve ☐ Cap ☐ Plug

8 WELL TEST DATA

Pump ☒ Bailer ☐ Other

Discharge GPM	Drawdown	Hours Pumped
	FT	

9 LITHOLOGIC LOG

Hole Diam.	Depth From	Depth To	Material	Water Yes	Water No
6"	506	512	GREY BASALT, VERY HARD	X	
	512	514	CREVICE, SAND FILLED	X	
	514	520	BROWN SILTSTONE-SANDSTONE-CONGLOMERATE, QUARTZ & ALL OTHER COLORED MINERALS, RED BLACK, GREY, ET.	X	
	520	550.5	BROWN - GREY BASALT	X	
	550.5	553	BROWN BASALT	X	
	553	556	GREY BASALT	X	
	556	570	BROWN, VARIEGATED BASALT	X	

10

Work started MAY 24, 1974 finished JUNE 14, 1974

11 DRILLER'S CERTIFICATION

This well was drilled under my supervision and this report is true to the best of my knowledge

MOUNTAIN HOME WELL DRILLERS
Driller's or Firm's Name

PO BOX 112, HAYMETT, IDAHO 83637
Address

Signed By HUGH HARDIN License Number

6-21-74
Date

USE ADDITIONAL SHEETS IF NECESSARY FORWARD THE WHITE, BLUE AND PINK COPIES TO THE DEPARTMENT

No. 13

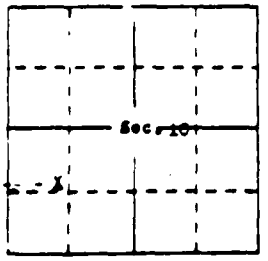
RECEIVED
JUN 3 1957
Department of Reclamation

REPORT OF WELL DRILLER
State of Idaho

State law requires that this report shall be filed with the State Reclamation Engineer within 30 days after completion or abandonment of the well.

WELL OWNER:
Name Oscar J. Streeter
Address 955 N. 10th E.
Mtn. Home, Idaho 83647
Owner's Permit No. [illegible]
NATURE OF WORK (check): Replacement well ☐
New well ☒ Deepened ☐ Abandoned ☐
Water is to be used for: Irrigation
METHOD OF CONSTRUCTION: Rotary ☐ Cable ☒
Dug ☐ Other ____ (explain)
CASING SCHEDULE: Threaded ___ Welded X
20 "Diam. from 0 ft. to 18 ft.
___ "Diam. from ___ ft. to ___ ft.
___ "Diam. from ___ ft. to ___ ft.
___ "Diam. from ___ ft. to ___ ft.
Thickness of casing: 5/16 Material:
Steel ☒ concrete ☐ wood ☐ other ☐ (explain)
PERFORATED? Yes ☐ No ☒ Type of perforator used: ____
Size of perforations: ___ " by ___ "
___ perforations from ___ ft. to ___ ft.
___ perforations from ___ ft. to ___ ft.
___ perforations from ___ ft. to ___ ft.
___ perforations from ___ ft. to ___ ft.
WAS SCREEN INSTALLED? Yes ☐ No ☒
Manufacturer's name ____
Type ____ Model No. ____
Diam. ___ Slot size ___ Set from ___ ft. to ___ ft.
Diam. ___ Slot size ___ Set from ___ ft. to ___ ft.
CONSTRUCTION: Well gravel packed? Yes ☐ No ☒ size of gravel ____ Gravel placed from ___ ft. to ___ ft. Surface seal provided? Yes ☐ No ☒ To what depth? ___ ft. Material used in seal: ____
Did any strata contain unusable water? Yes ☐ No ☒ Type of water: ____
Depth of strata ___ ft. Method of sealing strata off: ____
Surface casing used? Yes ☒ No ☐
Cemented in place? Yes ☐ No ☒

Locate well in section 10



LOCATION OF WELL: County Elmore Idaho
NW ¼ NW ¼ Sec. 10 T. 4 S. R. 1 E. B.M.

Size of drilled hole: 20" Total depth of well: 706 Standing water level below ground: 478' Temp. Fahr. ____ Test delivery: ____ gpm or ____ cfs Pump? ☐ Bail ☐
Size of pump and motor used to make test: ____
Length of time of test: ___ Hrs. ___ Min.
Drawdown: ___ ft. Artesian pressure: ___ ft. above land surface ___ Give flow ___ cfs or ___ gpm. Shutoff pressure: ____
Controlled by: Valve ☐ Cap ☐ Plug ☐ No control ☐ Does well leak around casing? Yes ☐ No ☐

DEPTH FROM FEET	DEPTH TO FEET	MATERIAL	WATER YES	WATER OR NO
0	8	Topsoil		X
8	17	Loose boulders		X
17	58	Gray lava		X
58	93	Red lava		X
93	142	Gray lava		X
142	161	Boulders		X
161	204	Brown lava		X
204	243	Cinders		X
243	278	Gray lava		X
278	317	Cinders and boulders		X
317	358	Brown lava		X
358	388	Gray lava		X
388	431	Cinders Yes - Drilling water		
431	515	Loose rock	X	
515	571	Brown lava	X	
571	612	Cinders	X	
612	651	Gray lava	X	
651	663	Sandstone, boulders and clay	X	
663	706	Brown sand		Water

[illegible] TESTED BY [illegible]
POURED OVER 1,000 G.P.M.

Work started: 3/7/57
Work finished: 5/17/57
Well Driller's Statement: This well was drilled under my supervision and this report is true to the best of my knowledge.
Name: M. B. Dailey
Address: 1208 N. 9th E. Mtn. Home, Idaho
Signed by: M. B. Dailey
License No. 57 Date: 6/6/57

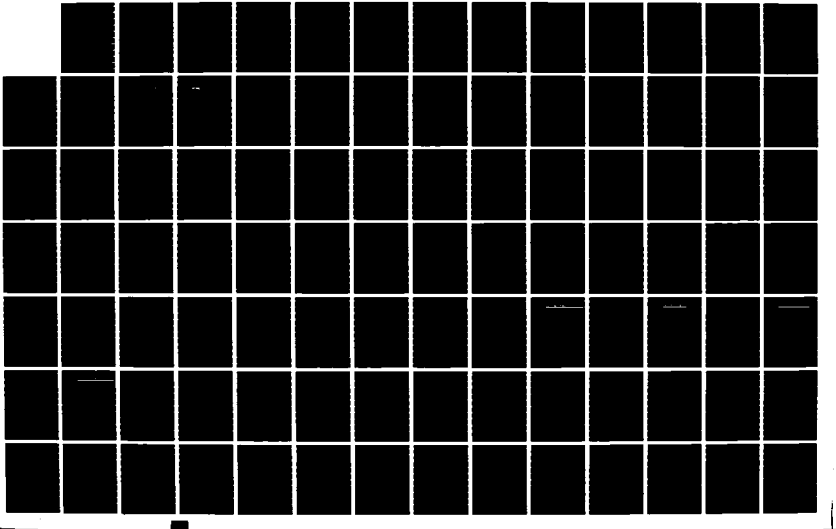
USGS

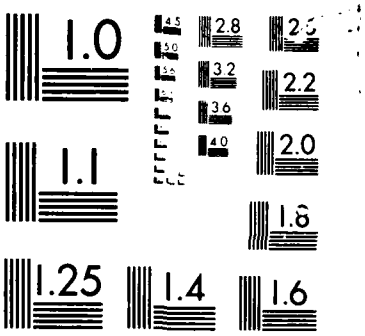
Use other side for additional remarks

Oscar J. Streeter Desert Entry No. I-015553; Marjorie M. Streeter Des. Entry No. I-015579

AD-A169 416 INSTALLATION RESTORATION PROGRAM PHASE II 2/3
CONFIRMATION/QUANTIFICATION STAGE I(U) DAMES AND MOORE
PARK RIDGE IL 24 FEB 86 F33615-83-D-4002

UNCLASSIFIED F/G 13/2 NL

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RECEIVED
JUN 13 1967
Department of Reclamation

LAYNE PUMPS, Inc.
VERTICAL TURBINE PUMPS
PHONE 733-6234 P. O. BOX 040
TWIN FALLS, IDAHO 83301

WELL TESTING REPORT AND AGREEMENT

These for all well pumps to be sold upon completion of test Stock Irrigation 25½ hp.
NAME Jack Hunter LOCATION Mt. Home, Ida. DATE 5-29-31-67
I.D. Well ——— Well Depth 515' Amount of Casing in Well ———
Static Water Level 388' Why Well Pump Sold? ——— Orifice Size ———
Rated Capacity Size ——— Discharge Pipe to Use ——— Size of Col. & Length 520' 10"

Time	Water Level Ft. from Top	B.P.M.	Orifice Reading Inches	G.P.M.	Meter Reading	Remarks — Build Operating Water? etc.
2:30 Pict	388'			400		Sandy
4:00				800		Sand
6:00				1100		Sandy
7:30				1400		Sandy
9:00	425'			1750		Sandy
12:00	435'			1750		Sandy

A maximum charge of $ ——— for installing and pulling test pump, $ ——— for one hour engine time, plus $ ——— per hour for each succeeding hour of engine time. An additional charge of $ ——— per foot for 8" column or smaller, or $ ——— per foot for 10" column will be charged for every foot over 500'.

$ ——— Pipe $ ——— Pipe $ ——— Pipe $ ——— Repair $ ———
(Column Setting) (Set Mr. Engine) (Misc. @ $ ———) (Mileage) (Total Minimum Charge)

Whereas prior for value received, I promise to pay to the order of the Layne Pumps, Inc., the above mentioned amounts, payable upon completion of well test. I also agree that if this note be placed with an attorney for collection or suit, I agree to pay a reasonable attorney's fee. If not paid at maturity, this note shall thereafter draw interest at the rate of eight (8%) per cent per annum until paid. Layne Pumps, Inc. will in no way be held liable for damage or losses to customer's well that may occur during well testing.

APPROVED BY:

——— (Owner of Well)

5-29-30 & 31-67 (Date Well Tested)

APPROVED BY:

Jimmie Brank
(Layne-Pumps, Inc.)
Dist. Manager, Mgr.

LAYNE PUMPS, Inc.

VERTICAL TURBINE PUMPS

PHONE 733-5304 P. O. BOX 668

TWIN FALLS, IDAHO 83301

WELL TESTING REPORT AND AGREEMENT

These tests will begin to be made upon completion of test Engine test 25 1/2 hr.

NAME Jack Shuster LOCATION _____ DATE 5-30-67

I.D. Well _____ Well Depth _____ Amount of Casing in Well _____

Static Water Level _____ Will Well Pump Sand? _____ Orifice Size _____

Rated Capacity Main _____ Discharge Pipe to Use _____ Size of Col. & Length _____

Time	Water Level Ft. from Top	R.P.M.	Orifice Reading Inches	G.P.M.	Meter Reading	Remarks — Sand? Operating Water? etc.
2:00				1750		Sandy
2:08	Broken shaft Coupling					
9:15	388-435			1750		Sandy
11:15	435'			1750		Sandy Cloudy
1:00	445'			1905		" "
1:45	445'			1905		" "

1:45 Shut off Engine

A minimum charge of $ _____ for installing and pulling test pump, $ _____ for one hour engine time, plus $ _____ per hour for each succeeding hour of engine time. An additional charge of $ _____ per foot for 8" column or smaller, or $ _____ per foot for 10" column will be charged for every foot over 500'.

$ _____ (Column Setting) Plus $ _____ (Set Mr. Engineer) Plus $ _____ (Hrs. @ $ _____) Plus $ _____ (Mileage) Equals $ _____ (Total Minimum Charge)

Without grace for value received, I promise to pay to the order of the Layne Pumps, Inc., the above mentioned amounts, payable upon completion of well test. I also agree that if this note be placed with an attorney for collection or suit, I agree to pay a reasonable attorney's fee. If not paid at maturity, this note shall thereafter draw interest at the rate of eight per cent (8%) per annum until paid. Layne Pumps, Inc., will in no way be held liable for damage or losses to customer's well that may occur during well testing.

APPROVED BY

Jimmie Brooks
(Owner of Well)

5-30 for 5-31-67
(Date Well Tested)

APPROVED B.

Jimmie Brooks
(Layne Pumps, Inc.)
Del Shuff, Mgr.

USGS

LAYNE PUMPS, Inc.
VERTICAL TURBINE PUMPS

RECEIVED
JUN 12 1967
Department of Reclamation

PHONE 733-6894 P. O. BOX 668
TWIN FALLS, IDAHO 83301

WELL TESTING REPORT AND AGREEMENT

Tests for all well testing to be made upon completion of test Pilot Exploration 25½ah.

NAME _____ LOCATION _____ DATE 5-31-67

ID Well _____ Well Depth _____ Amount of Casing in Well _____

Static Water Level _____ Will Well Pump Sand? _____ Orifice Size _____

Rated Capacity Max _____ Discharge Pipe to Use _____ Size of Col. & Length _____

Time	Water Level Ft. from Top	S.P.M.	Orifice Reading Inches	G.P.M.	Motor Reading	Remarks — Sand? Cleaning Water? etc.
9:30 AM	388'-445'			1905'		Cleaning
12:00	445'			1905		"
4:00	445'			1895		"
7:00	443'			1750		"
7:00 PM	Shut off Engine					

A minimum charge of $ ____ for installing and pulling test pump. $ _____ for one hour engine time, plus $ _____ per hour for each succeeding hour of engine time. An additional charge of $ _____ per foot for 6" column or smaller, or $ _____ per foot for 10" column will be charged for every foot over 200'.

$ _____ Plus $ _____ Plus $ _____ Plus $ _____ Equals $ _____
(Casing Setting) (1st Hr. Engine) (Hrs. @ $ ____) (Lifttings) (Total Minimum Charge)

Without grace for value received, I promise to pay to the order of the Layne Pumps, Inc. the above mentioned amounts, payable upon completion of well test. I also agree that if this note be placed with an attorney for collection or suit, I agree to pay a reasonable attorney's fee. If not paid at maturity, this note shall thereafter draw interest at the rate of eight per cent (8%) per annum until paid. Layne Pumps, Inc. will in no way be held liable for damage or losses to customer's well that may occur during well testing.

APPROVED BY

_____ 5-29-30 v 31-67
(Owner of Well) (Date Well Tested)

APPROVED BY

Jerome Brack
(Layne Pumps, Inc.)
Asst. Supt.

USGS

No. 14

USE TYPEWRITER OR BALL POINT PEN

State of Idaho
Department of Water Administration

WELL DRILLER'S REPORT

State law requires that this report be filed with the State Reclamation Engineer within 30 da.. after completion or abandonment of the well.

1. WELL OWNER

Name JOHN STREETER

Address 955 NORTH 10TH EAST, MOUNTAIN HOME, IDA

Owner's Permit No

2. NATURE OF WORK

■ New well ☐ Deepened ☐ Replacement

☐ Abandoned (describe method of abandoning)

3. PROPOSED USE

■ Domestic ☐ Irrigation ☐ I

☐ Municipal ☐ Industrial ☐ Stock

4. METHOD DRILLED

■ Cable ☐ Rotary ☐ Dug ☐ Other

5. WELL CONSTRUCTION

Diameter of hole 6 inches Total depth 506 feet

Casing schedule ■ Steel ☐ Concrete

Thickness	Diameter	From	To
0.250 inches	6-5/8 inches	PLUS 1 feet	20 feet
inches	inches	feet	feet
inches	inches	feet	feet
inches	inches	feet	feet
inches	inches	feet	feet

Was a packer or seal used? ☐ Yes ■ No

Perforated? ☐ Yes ■ No

How perforated? ☐ Factory ☐ Knife ☐ Torch

Size of perforation inches by inches

Number	From	To
perforations	feet	feet
perforations	feet	feet
perforations	feet	feet

Well screen installed? ☐ Yes ■ No

Manufacturer's name

Type Model No

Diameter Slot size Set from feet to feet

Diameter Slot size Set from feet to feet

Gravel packed? ☐ Yes ■ No Size of gravel

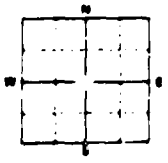
Placed from feet to feet

Surface seal? ■ Yes ☐ No To what depth 20 feet

Material used in seal ■ Cement grout ☐ Puddling clay

6. LOCATION OF WELL

Sketch map location must agree with written location



County ELMORE

NE SW -10 — Sec T 4 N/S R 5 E/W

7. WATER LEVEL

Static water level 378 feet below land surface

Flowing? ☐ Yes ■ No G.P.M. Flow

Temperature 62 °F. Quality

Artesian closed-in pressure lbs./sq.in.

Controlled by ☐ Valve ☐ Cap ☐ Plug

8. WELL TEST DATA

☐ Pump ■ Bailer ☐ Other

Discharge G.P.M.	Draw Down	Hours Pumped
10	16	

9. LITHOLOGIC LOG

Note Diam.	Depth From	Depth To	Material	Water Yes	Water No
8"	0	4	SOIL		X
	4	6	COBBLES		X
	6	19	GREY BASALT		X
6"	19	21	CINDERS		X
	21	37	GREY BASALT, FRACTURED		X
	37	41	RED CINDERS		X
	41	89	GREY BASALT, CREVICED		X
	89	93	CINDERS & TAN BAKED CLAY		X
	93	122	BLACK & GREY BASALT		X
	122	123	CINDERS		X
	123	128	GREY BASALT		X
	128	129	RED BURNT CLAY		X
	129	234	GREY BASALT, FRACTURED		X
	234	238	SCORIAE		X
	238	273	GREY BASALT		X
	273	276	REDDISH-GREY BASALT		X
	276	290	GREY BASALT		X
	290	320	RED BASALT, CINDERS 30% @320		X
	320	325	BROWN SAND & SILT		X
	325	357	GREY BASALT		X
	357	366	ORANGE CINDERS, SAND & SILT		X
	366	414	GREY BASALT		X
	414	423	GREY BASALT, FRACTURED	X	
	423	437	GREY BASALT		X
	437	467	GREY BASALT, FRACTURED	X	
	467	473	GREY BASALT, HARD		X
	473	489	GREY BASALT, SOFT	X	
	489	497	GREY , HARD		X
	497	502	GREY , SOFT	X	
	502	506	GREY , MEDIUM HARD		
			GOOD CREVICE AT 506'	X	

10

Work started JUNE 14, 1971 finished NOV. 9, 1971

11. DRILLER'S CERTIFICATION

This well was drilled under my supervision and this report is true to the best of my knowledge

MOUNTAIN HOME WELL DRILL CO 99
Driller's or Firm's Name Number

PO BOX 112, HAMMETT, IDAHO 83627
Address

Signed Haugh Harden Date NOV 22, 71

11 ADDITIONAL SHEETS IF NECESSARY FORWARD THE WHITE, BLUE, AND PINK COPIES TO THE DEPARTMENT

RECEIVED

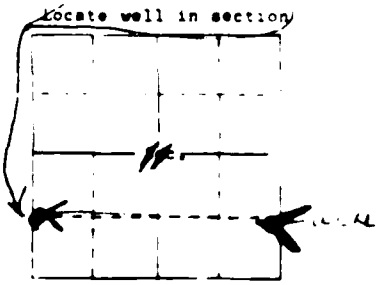
Department of Water Resources

REPORT OF WELL DRILLER
State of Idaho

State law requires that this report shall be filed with the State Reclamation Engineer within 30 days after completion or abandonment of the well.

WELL OWNER:
Name Oscar J Streeter
Address 933 N 10th E
Mtn Home Ida
Owner's Permit No. 27 35
NATURE OF WORK (check): Replacement well ☐
New well ☑ Deepened ☐ Abandoned ☐
Water is to be used for: Stock & Boats
GRAINS
METHOD OF CONSTRUCTION: Rotary ☐ Cable ☑
Dug ☐ Other ☐ (explain)
CASING SCHEDULE: Threaded ☐ Welded ☐
[redacted] "Diam. from [redacted] ft. to [redacted] ft.
20 "Diam. from 0 ft. to 76 ft.
"Diam. from ft. to ft.
"Diam. from ft. to ft.
Thickness of casing: 1/4 Material:
Steel ☑ concrete ☐ wood ☐ other ☐
(explain)
PERFORATED? Yes ☐ No ☐ Type of perforator used:
Size of perforations: " by "
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.
WAS SCREEN INSTALLED? Yes ☐ No ☐
Manufacturer's name
Type Model No.
Diam. Slot size Set from ft. to ft.
Diam. Slot size Set from ft. to ft.
CONSTRUCTION: Well gravel packed? Yes ☐
No. size of gravel Gravel placed from ft. to ft. Surface seal provided? Yes ☐ No ☐ To what depth? ft. Material used in seal:
Did any strata contain unusable water? Yes ☐
No ☐ Type of water:
Depth of strata ft. Method of sealing strata off:
Surface casing used? Yes ☐ No ☐
Cemented in place? Yes ☐ No ☐

Locate well in section



LOCATION OF WELL: County
SW ¼ SW ¼ Sec. 11 T. 4 S R. 5 E
Boise Meridian

Size of drilled hole 24+20 Total depth of well: 736 Standing water level below ground: 372 Temp. Fahr. ° Test delivery: gpm or cfs Pump? ☐ Bail ☐
Size of pump and motor used to make test:
Length of time of test: Hrs. Min.
Drawdown: ft. Artesian pressure: ft. above land surface Give flow cfs or gpm. Shutoff pressure:
Controlled by: Valve ☐ Cap ☐ Plug ☐
No control ☐ Does well leak around casing? Yes ☐ No ☑

DEPTH FROM FEET	DEPTH TO FEET	MATERIAL	WATER YES OR NO
0	6	Top Soil	
6	37	Gravel	
37	54	Boulders	
54	62	Dry Sand	
62	75	Boulders	
75	107	Brown Lava	
107	133	Gray Lava	
133	152	Red Lava	
152	184	Brown Lava	
184	267	Gray Lava	
267	288	Red Lava	
288	295	Brown Lava	
295	344	Gray Lava	
344	341	Red Lava	
341	370	Gray Lava	
370	407	Brown Lava	
407	441	Red Lava	
441	463	Gray Lava	
463	517	Black Lava	
517	565	Red Lava	
565	631	Yellow Clay	
631	791	Blue Clay	
791	795	Yellow Clay Sand & Gravel	

Work started 10-6-64
Work finished 1-1-65
Well Driller's Statement: This well was drilled under my supervision and this report is true to the best of my knowledge.
Name [redacted]
Address 315 E Main Mtn Home
Signed by [redacted]
License No. [redacted] Date 1-31-65

See other side for additional remarks

USGS

No. 16

REPORT OF WELL DRILLER
State of Idaho

RECEIVED
NOV 30 1966

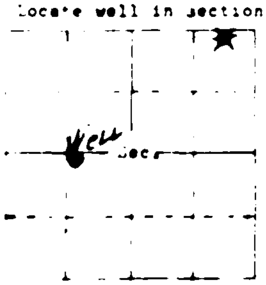
State law requires that this report shall be filed with the [illegible] Engineer within 30 days after completion or abandonment of the well.

WELL OWNER:
Name *Wayne Reddekopp*
Address *Rupert Idaho*
61-2189
Owner's Permit No.
NATURE OF WORK (check): Replacement well ☐ New well ☑ Deepened ☐ Abandoned ☐
Water is to be used for *Irrigation*
METHOD OF CONSTRUCTION: Rotary ☐ Cable ☑ Dug ☐ Other ______ (explain)
CASING SCHEDULE. Threaded ☐ Welded ☑
20"Diam. from *0* ft. to *10* ft.
____"Diam. from ____ ft. to ____ ft.
____"Diam. from ____ ft. to ____ ft.
____"Diam. from ____ ft. to ____ ft.
Thickness of casing: *.281* Material:
Steel ☑ concrete ☐ wood ☐ other ☐
(explain)
PERFORATED? Yes ☐ No ☑ Type of perforator used:
Size of perforations ____" by ____"
____ perforations from ____ ft. to ____ ft.
____ perforations from ____ ft. to ____ ft.
____ perforations from ____ ft. to ____ ft.
____ perforations from ____ ft. to ____ ft.
WAS SCREEN INSTALLED? Yes ☐ No ☐
Manufacturer's name
Type ______ Model No.
Diam. ____ Slot size ____ Set from ____ ft. to ____ ft.
Diam. ____ Slot size ____ Set from ____ ft. to ____ ft.
CONSTRUCTION. Well gravel packed? Yes ☐ No ☐ size of gravel ______ Gravel placed from ____ ft. to ____ ft. Surface seal provided? Yes ☐ No ☐ To what depth? ____ ft. Material used in seal:

Did any strata contain unusable water? Yes ☐ No ☐ Type of water
Depth of strata ____ ft. Method of sealing strata off

Surface casing used? Yes ☑ No ☐
Cemented in place? Yes ☐ No ☑

Locate well in section



[illegible] County
NE • SW • 13 • 4 • 5

Size of drilled hole: *18"* Total depth of well: *578* Standing water level below ground: *282* Temp. Fahr. ____ ° Test delivery: ____ gpm or ____ cfs Pump? ☐ Bail ☐
Size of pump and motor used to make test:

Length of time of test: ____ Hrs. ____ Min.
Drawdown: ____ ft. Artesian pressure: ft. above land surface ____ Give flow ____ cfs or ____ gpm. Shutoff pressure:
Controlled by: Valve ☐ Cap ☐ Plug ☐
No control ☐ Does well leak around casing? Yes ☐ No ☐

DEPTH FROM FEET	DEPTH TO FEET	MATERIAL	WATER YES OR NO
0	4	Top Soil	
4	10	Hard Pan	
10	40	Gray Lava	
40	61	Red "	
61	65	Gray "	
65	59	Brown "	
59	100	Brown Clay	
100	115	Gray Lava [illegible]	[illegible]
115	174	Brown Lava	
174	191	Gray "	
191	197	Brown "	
197	225	Gray Lava (Hard)	
225	246	Brown "	
246	262	Gray "	
262	272	Brown "	
272	313	Gray "	
313	321	Brown Clay	
321	369	Gray Lava	
369	378	Brown Clay	
378	394	Gray Lava (Hard)	
394	395	Brown "	
398	426	Gray " Broken	yes
426	436	Brown " "	
436	457	Black	
457	465	Creviced Black loose	
465	525	Dirty Black loose	
525	515	Mixed Rock Clay & Gravel (Gray)	
515	544	" " " (Greenish)	
544	578	Gray Clay	

Work started *August 1966*
Work finished *30 October 1966*
Well Driller's Statement: This well was drilled under my supervision and this report is true to the best of my knowledge.
Name *Verl Chesney*
Address *Burley Idaho*
Signed by *[signature]*
License No. *137* Date *[illegible]*

Use other side for additional remarks

USGS

this well was tested at 515'. It didn't produce much water. We drilled and 8" hole for culinary water then went back and deepened this one to 578'. this clay in the bottom is quite cavey. this well is to be tested again but hasn't been yet.

O. C.

USE TYPEWRITER OR BALL POINT PEN

State of Idaho
Department of Water Resources

WELL DRILLER'S REPORT

State law requires that this report be filed with the Director, Department of Water Resources within 30 days after the completion or abandonment of the well.

1. WELL OWNER

LDS.
Name Mormon church
Address 305 Airbase Ave, Mt Home
Owner's Permit No. ______

2. NATURE OF WORK

☒ New well ☐ Deepened ☐ Replacement
☐ Abandoned (describe method of abandoning)

3. PROPOSED USE

☒ Domestic ☐ Irrigation ☐ Test ☐ Other (specify type)
☐ Municipal ☐ Industrial ☐ Stock ☐ Waste Disposal or Injection

4. METHOD DRILLED

☐ Cable ☒ Rotary ☐ Dug ☐ Other

5. WELL CONSTRUCTION

Diameter of hole 6 inches Total depth 500 feet
Casing schedule: ☒ Steel ☐ Concrete

Thickness		Diameter		From		To	
.250	inches	6	inches	+1	feet	20'	feet
	inches		inches		feet		feet
	inches		inches		feet		feet
	inches		inches		feet		feet
	inches		inches		feet		feet

Was casing drive shoe used? ☐ Yes ☒ No
Was a packer or seal used? ☐ Yes ☒ No
Perforated? ☐ Yes ☒ No
How perforated? ☐ Factory ☐ Knife ☐ Torch
Size of perforation ____ inches by ____ inches

Number		From		To	
	perforations		feet		feet
	perforations		feet		feet
	perforations		feet		feet

Well screen installed? ☐ Yes ☒ No
Manufacturer's name ______
Type ______ Model No. ______
Diameter __ Slot size __ Set from ____ feet to ____ feet
Diameter __ Slot size __ Set from ____ feet to ____ feet

Gravel packed? ☐ Yes ☒ No Size of gravel ______
Placed from ____ feet to ____ feet

Surface seal depth 10' Material used in seal ☐ Cement grout ☒ Puddling clay ☒ Well cuttings
Sealing procedure used ☐ Slurry pit ☐ Temporary surface casing ☒ Overbore to seal depth

6. LOCATION OF WELL

Sketch map location must agree with written location.

Subdivision Name ______
Lot No. ______ Block No. ______
County Elmore
NW ¼ NW ¼ Sec. 15, T. 4 N, R. 5 E.

7. WATER LEVEL

Static water level 305 feet below land surface
Flowing? ☐ Yes ☒ No G.P.M. flow ______
Temperature ____ °F Quality ______
Artesian closed-in pressure ______ p.s.i.
Controlled by ☐ Valve ☐ Cap ☐ Plug

8. WELL TEST DATA

☐ Pump ☐ Bailer ☐ Other

Discharge G.P.M.	[illegible]
40	[illegible]

9. LITHOLOGIC LOG

Hole Diam.	Depth From	Depth To	Material
6	0	9	[illegible]
6	9	23	[illegible]
6	23	87	[illegible]
6	87	91	[illegible]
6	91	97	[illegible]
6	97	107	[illegible]
6	107	116	[illegible]
6	116	126	[illegible]
6	[illegible]	[illegible]	[illegible]
6	[illegible]	[illegible]	[illegible]
6	[illegible]	[illegible]	[illegible]
6	[illegible]	[illegible]	[illegible]
6	[illegible]	324	[illegible]
6	324	500	[illegible]

10.

Work started [illegible]

11. DRILLERS CERTIFICATION

Firm Name [illegible]
Address [illegible]
Signed by (Firm Official) ______
and
Driller ______

USE ADDITIONAL SHEETS IF NECESSARY — FORWARD THE WHITE COPY TO THE DEPARTMENT

USE TYPEWRITER OR BALL POINT PEN

State of Idaho
Department of Water Administration

WELL DRILLER'S REPORT

State law requires that this report be filed with the State Reclamation Engineer within 30 days after completion or abandonment of the well.

1. WELL OWNER

Name THEODORE N. PETTINGILL

Address MOUNTAIN HOME, IDAHO

Owner's Permit No.

2. NATURE OF WORK

■ New well ☐ Deepened ☐ Replacement

☐ Abandoned (describe method of abandoning)

3. PROPOSED USE

■ Domestic ☐ Irrigation ☐ Test

☐ Municipal ☐ Industrial ☐ Stock

4. METHOD DRILLED

■ Cable ☐ Rotary ☐ Dug ☐ Other

5. WELL CONSTRUCTION

Diameter of hole 6 inches Total depth 450 feet

Casing schedule ■ Steel ☐ Concrete

Thickness	Diameter	From	To
0.250 inches	6.625 inches	PLUS 1 feet	19.7 feet
inches	inches	feet	feet
inches	inches	feet	feet
inches	inches	feet	feet
inches	inches	feet	feet

Was a packer or seal used? ☐ Yes ■ No

Perforated? ☐ Yes ■ No

How perforated? ☐ Factory ☐ Knife ☐ Torch

Size of perforation inches by inches

Number	From	To
perforations	feet	feet
perforations	feet	feet
perforations	feet	feet

Well screen installed? ☐ Yes ■ No

Manufacturer's name

Type Model No

Diameter Slot size Set from feet to feet

Diameter Slot size Set from feet to feet

Gravel packed? Yes ■ No Size of gravel

Placed from feet to feet

Surface seal? ■ Yes ☐ No To what depth 19.7 feet

Material used in seal ■ Cement grout ☐ Puddling clay

6. LOCATION OF WELL

Sketch map location must agree with written location

N

W E

S

County

¼ ¼ Sec T N/S R E/W

7. WATER LEVEL

Static water level 369.7 feet below land surface

Flowing? ☐ Yes ■ No G.P.M. flow

Temperature EST 60° F. Quality GOOD

Artesian closed in pressure p.s.i.

Controlled by ☐ Valve ☐ Cap ☐ Plug

8. WELL TEST DATA

☐ Pump ■ Bailer ☐ Other

Discharge G.P.M.	Draw Down	Hours Pumped
10	LESS THAN 1 INCH	

9. LITHOLOGIC LOG PAGE 1 OF 2 PAGES

Hole Diam.	Depth From	Depth To	Material	Water Yes	Water No
8"	0	2	ROCKY SOIL		X
	2	7	BOULDERS, SILT BINDER		X
	7	19	GREY BASALT, FRACTURED		X
6"	19	25	" "		X
	25	26	CINDERS		X
	26	35	TAN, [illegible] BASALT		X
	35	42	RED BURNT CLAY		X
	42	46	CINDERS, GREY		X
	46	59	GREY BASALT, FRACTURED		X
	59	68	DENSE(HARD) GREY BASALT		X
	68	75	MEDIUM DENSE GREY BASALT		X
	75	97	" " "		X
	97	98	GREY CINDERS		X
	98	109	DENSE GREY BASALT		X
	109	111	RED BURNT CLAY		X
	111	120	GREY BASALT, MEDIUM DENSE		X
	120	122	RED BURNT CLAY		X
	122	133	GREY BASALT, MEDIUM DENSE		
	133	134	GREY CINDERS		X
	134	157	GREY BASALT, MEDIUM DENSE		X
	157	158	" " DENSE(HARD)		X
	158	162	" " VERY DENSE		X
	162	162	GREY CINDERS		X
	162	198	GREY BASALT, MEDIUM DENSE		X
	198	202	" " , VERY SOFT, SCORIAC		X
	202	213	" " , VERY DENSE		X
	213	229	GREY BASALT, MEDIUM, CINDERS AT 213, 217, 229		X
	229	242	REDDISH BROWN BASALT		X
	242	247	GREY BASALT, MEDIUM DENSE		X
	247	260	BLACK BASALT, QUITE DENSE		X
	260	262	BROWN BASALT, VERY DENSE		X
	262	278	GREY BASALT, VERY DENSE		X
	278	285	RED BURNT CLAY		X
	285	292	RED BASALT, MEDIUM DENSE		X
	292	298	" " , VERY DENSE		X
	298	302	RED BURNT CLAY		X

10

Work started finished

11 DRILLER'S CERTIFICATION

This well was drilled under my supervision and this report is true to the best of my knowledge

Driller's or Firm's Name Date

Address

Signed By Date

USE ADDITIONAL SHEETS IF NECESSARY FORWARD THE WHITE BLUE AND PINK COPIES TO THE DEPARTMENT

USE TYPEWRITER OR BALL POINT PEN

State of Idaho
Department of Water Administration

WELL DRILLER'S REPORT

State law requires that this report be filed with the State Reclamation Engineer within 30 days after completion or abandonment of the well

1. WELL OWNER

Name THEODORE H. PETTINGILL --PAGE 2

Address

Owner's Permit No

2. NATURE OF WORK

☐ New well ☐ Deepened ☐ Replacement

☐ Abandoned (describe method of abandoning)

3. PROPOSED USE

☐ Domestic ☐ Irrigation ☐ Test

☐ Municipal ☐ Industrial ☐ Stock

4. METHOD DRILLED

☐ Cable ☐ Rotary ☐ Dug ☐ Other

5. WELL CONSTRUCTION

Diameter of hole ___ inches Total depth ___ feet

Casing schedule ☐ Steel ☐ Concrete

Thickness	Diameter	From	To
___ inches	___ inches	___ feet	___ feet
___ inches	___ inches	___ feet	___ feet
___ inches	___ inches	___ feet	___ feet
___ inches	___ inches	___ feet	___ feet
___ inches	___ inches	___ feet	___ feet

Was a packer or seal used? ☐ Yes ☐ No

Perforated? ☐ Yes ☐ No

How perforated? ☐ Factory ☐ Knife ☐ Torch

Size of perforation ___ inches by ___ inches

Number	From	To
___ perforations	___ feet	___ feet
___ perforations	___ feet	___ feet
___ perforations	___ feet	___ feet

Well screen installed? ☐ Yes ☐ No

Manufacturer's name

Type Model No

Diameter Slot size Set from feet to feet

Diameter Slot size Set from feet to feet

Gravel packed? ☐ Yes ☐ No Size of gravel

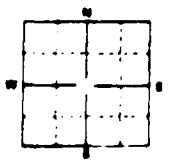
Placed from feet to feet

Surface seal? ☐ Yes ☐ No To what depth feet

Material used in seal ☐ Cement grout ☐ Puddling clay

6. LOCATION OF WELL

Sketch map location must agree with written location



County

¼ Sec T N/S R E/W

7. WATER LEVEL

Static water level ___ feet below land surface

Flowing? ☐ Yes ☐ No G.P.M. flow

Temperature ___ ° F. Quality

Artesian closed-in pressure ___ p.s.i.

Controlled by ☐ Valve ☐ Cap ☐ Plug

8. WELL TEST DATA

☐ Pump ☐ Bailer ☐ Other

Discharge G.P.M.	Draw Down	Hours Pumped

9. LITHOLOGIC LOG --PAGE 2 OF 2 PAGES

Hole Diam.	Depth From	Depth To	Material	Water Yes	Water No
6"	302	325	BLACK BASALT, DENSE		X
	325	330	" " , MEDIUM		X
	330	340	RED BURNT CLAY		X
	340	349	BROWN CLAY		X
	349	356	BROWN BASALT, MEDIUM DENSE		X
	356	365	" " , VERY DENSE		X
	365	372	GREY BASALT, VERY DENSE		X
	372	373	RED BURNT CLAY		X
	373	377	BLACK BASALT, MEDIUM DENSE		X
	377	377	BENTONITE		X
	377	380	SCORIAE, VERY SOFT	X	
	380	385	GREY BASALT, MEDIUM, FRACTURED		
	385	392	BLACK BASALT, DENSE		X
	392	397	RED SCORIAE	X	
	397	402	HARD BLACK RUBBLE, OR TALUS	X	
	402	407	HARD BLACK BASALT, DENSE		X
	407	420	SCORIAE, BLACK, RED, TAN, MIXED TOGETHER, VERY SOFT	X	
	420	427	" " , MEDIUM SOFT	X	
	427	450	GREY BASALT, INCREASING HARDNESS FROM MEDIUM SOFT TO HARD	X	X

10

Work started MAR 13, 1972 finished APRIL 26, 1972

11. DRILLER'S CERTIFICATION

This well was drilled under my supervision and this report is true to the best of my knowledge

MOUNTAIN HOME WELL DRILLERS By
Driller's or Firm's Name Number

P. O. BOX 112, HAMMETT, IDAHO 83627
Address

Signed By Hugh Henderson Jr. Agent(?)
Date

USE ADDITIONAL SHEETS IF NECESSARY FORWARD THE WHITE BLUE AND PINK COPIES TO THE DEPARTMENT

USE TYPEWRITER OR BALL POINT PEN

State of Idaho
Department of Water Administration

WELL DRILLER'S REPORT

RECEIVED No. 19

State law requires that this report be filed with the State Reclamation Engineer within 20 days after completion or abandonment of the well.

DEC 20 1971

1. WELL OWNER

Name W.T. Merson

Address N of city WT. Home Ida

Owner's Permit No.

2. NATURE OF WORK

☐ New well ☒ Deepened ☐ Replacement

☐ Abandoned (describe method of abandoning)

3. PROPOSED USE

☐ Domestic ☒ Irrigation ☐ Test

☐ Municipal ☐ Industrial ☐ Stock

4. METHOD DRILLED

☒ Cable ☐ Rotary ☐ Dug ☐ Other

5. WELL CONSTRUCTION

Diameter of hole 12 inches Total depth 695 feet

Casing schedule ☐ Steel ☐ Concrete

Thickness	Diameter	From	To
____ inches	____ inches	____ feet	____ feet
____ inches	____ inches	____ feet	____ feet
____ inches	____ inches	____ feet	____ feet
____ inches	____ inches	____ feet	____ feet
____ inches	____ inches	____ feet	____ feet

Was a packer or seal used? ☐ Yes ☐ No

Perforated? ☐ Yes ☐ No

How perforated? ☐ Factory ☐ Knife ☐ Torch

Size of perforation ____ inches by ____ inches

Number	From	To
____ perforations	____ feet	____ feet
____ perforations	____ feet	____ feet
____ perforations	____ feet	____ feet

Well screen installed? ☐ Yes ☐ No

Manufacturer's name ____

Type ____ Model No. ____

Diameter __ Slot size __ Set from ____ feet to ____ feet

Diameter __ Slot size __ Set from ____ feet to ____ feet

Gravel packed? ☐ Yes ☐ No Size of gravel ____

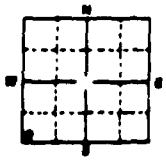
Placed from ____ feet to ____ feet

Surface seal? ☐ Yes ☐ No To what depth ____ feet

Material used in seal ☐ Cement grout ☐ Puddling clay

6. LOCATION OF WELL

Sketch map location must agree with written location.



County Gooding

SW ¼ SW ¼ Sec. 16 T. 5 S R. 15 E B.M.

7. OWNER'S LOG

Department of Water Administration

Static water level 360 feet below land surface

Flowing? ☐ Yes ☐ No G.P.M. flow ____

Temperature ____ °F. Quality ____

Artesian closed-in pressure ____ p.s.i.

Controlled by ☐ Valve ☐ Cap ☐ Plug

8. WELL TEST DATA

☐ Pump ☐ Bailer ☐ Other

Discharge G.P.M.	Draw-down	Hours Pumped

9. LITHOLOGIC LOG

Hole Diam.	Depth From	Depth To	Material	Water Was	Water Was Not
12	434	485	Tight hole		
	485	492	Tan clay		
	492	533	black lava hard	X	
	533	545	dark brown lava		
	545	563	gray lava		
	563	575	sandy clay		
	575	590	blue clay & sand		
	590	603	black lava & clay	X	
	603	625	blue clay & pea gravel		
	625	645	clay & sand	X	
	645	657	fine gray sand some clay		
	657	663	pink clay & boulders		
	663	670	bentonite & gray sand		
	670	695	gray clay clay		
			hole filled back to 660		

10.

Work started 6/17/71 Finished 6/29/71

11. DRILLER'S CERTIFICATION

This well was drilled under my supervision and this report is true to the best of my knowledge.

Dick Johnson

C.L. Middleston & Son 35

Driller or Firm's Name Number

Rt. 1 Box 610 Ml. Home Ida

Address

Signed [signature] Date 12/13/71

USE ADDITIONAL SHEETS IF NECESSARY FORWARD THE WHITE, BLUE, AND PINK COPIES TO THE DEPARTMENT

USE TYPEWRITER OR BALL POINT PEN

STATE OF IDAHO
Department of Water Administration

WELL DRILLER'S REPORT

RECEIVED
DEC 21 1974
Department of Water Resources

State law requires that this report be filed with the Director, Department of Water Administration within 30 days after the completion or abandonment of the well

1 WELL OWNER

Name Pete Nelson

Address Mt Home

Owner permit No.

2 NATURE OF WORK

[X] New well [ ] Deepened [ ] Replacement

Abandoned (describe method of abandoning)

3 PROPOSED USE

[X] Domestic [ ] Irrigation [ ] Test [ ] Other (specify type)

[ ] Municipal [ ] Industrial [ ] Stock [ ] Waste Disposal or Injection

4 METHOD DRILLED

[ ] Cable [X] Rotary [ ] Dug [ ] Other

5 WELL CONSTRUCTION

Diameter of hole 8 inches Total depth 500 feet

Casing schedule [X] Steel [ ] Concrete

Thickness	Diameter	From	To
250 inches	8 inches	1' feet	20' feet
inches	inches	feet	feet
inches	inches	feet	feet
inches	inches	feet	feet
inches	inches	feet	feet

Was a packer or seal used? [ ] Yes [X] No

Perforated? [ ] Yes [X] No

How perforated? [ ] Factory [ ] Knife [ ] Torch

Size of perforation inches by inches

Number	From	To
perforations	feet	feet
perforations	feet	feet
perforations	feet	feet

Well screen installed? [ ] Yes [X] No

Manufacturer's name

Type Model No

Diameter Slot size Set from feet to feet

Diameter Slot size Set from feet to feet

Gravel packed? [ ] Yes [X] No Size of gravel

Placed from feet to feet

Surface seal depth 20' Material used in seal [ ] Cement grout [X] Puddling clay [X] Well cuttings

Sealing procedure used [ ] Slurry pit [ ] Temporary surface casing [X] Overbore to seal depth

6 LOCATION OF WELL

Sketch map location must agree with written location (61)

Subdivision name Lot No. Block No.

County Elmore

NE ¼ NE ¼ Sec 18 T 4 [illegible] R 5 [illegible]

7 WATER LEVEL

Static water level 350' feet below land surface

Flowing? [ ] Yes [X] No GPM flow

Temperature F Quality

Artesian closed-in pressure PSI

Controlled by [ ] Valve [ ] Cap [ ] Plug

8 WELL TEST DATA

[ ] Pump [ ] Bailer [ ] Other

Discharge GPM	Drawdown	Hours Pumped
20	8	1

9 LITHOLOGIC LOG

Hole Diam	From	To	Material	Water Yes	Water No
10	0	13	Soil		
8-5	13	40	Gray Lava Rock		
8	40	65	Red Lava "		
8	65	70	Gray Lava "		
8	70	74	Red Lava		
8	74	160	Gray Lava		
8	160	180	Red Lava		
8	180	185	Gray Lava		
8	185	500	No Return		X

10 Work started 2-15-74 Finished 2-22-74

11 DRILLER'S CERTIFICATION

Firm name Middleton Drilling Firm No. 83

Address Mt Home Date 2-22-74

Signed by (Firm Official) C. L. Middleton

and

(Operator)

USE ADDITIONAL SHEETS IF NECESSARY FORWARD THE WHITE COPY TO THE DEPARTMENT

No. 21

WELL DRILLER'S REPORT

State law requires that this report be filed with the Director, Department of Water Resources within 30 days after the completion or abandonment of the well.

1. WELL OWNER

Name Wiley Fisher

Address 5051 Mtn View Dr, Boise, ID

Owner's Permit No.

2. NATURE OF WORK

☑ New well ☐ Deepened ☐ Replacement
☐ Abandoned (describe method of abandoning)

3. PROPOSED USE

☑ Domestic ☐ Irrigation ☐ Test ☐ Municipal
☐ Industrial ☐ Stock ☐ Waste Disposal or Injection
☐ Other (specify type)

4. METHOD DRILLED

☑ Rotary ☐ Air ☐ Hydraulic ☐ Reverse rotary
☐ Cable ☐ Dug ☐ Other

5. WELL CONSTRUCTION

Casing schedule: ☑ Steel ☐ Concrete ☐ Other

Thickness	Diameter	From	To
.026 inches	8 inches +	1½ feet	18½ feet
inches	inches	feet	feet
inches	inches	feet	feet
inches	inches	feet	feet

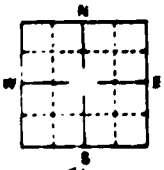
Was casing drive shoe used? ☐ Yes ☑ No
Was a packer or seal used? ☐ Yes ☑ No
Perforated? ☐ Yes ☑ No
How perforated? ☐ Factory ☐ Knife ☐ Torch
Size of perforation ____ inches by ____ inches

Number	From	To
perforations	feet	feet
perforations	feet	feet
perforations	feet	feet

Well screen installed? ☐ Yes ☑ No
Manufacturer's name
Type Model No.
Diameter Slot size Set from feet to feet
Diameter Slot size Set from feet to feet
Gravel packed? ☐ Yes ☐ No ☐ Size of gravel
Placed from feet to feet
Surface seal depth 18½ Material used in seal: ☑ Cement grout ☐ Puddling clay ☐ Well cuttings
Sealing procedure used: ☐ Slurry pit ☐ Temp. surface casing ☑ Overbore to seal depth
Method of joining casing: ☐ Threaded ☐ Welded ☐ Solvent Weld ☐ Cemented between strata
1 Piece
Describe access port

6. LOCATION OF WELL

Sketch map location must agree with written location.



S. Indian Name
Elmore County
Lot No 0 Block No.

County Elmore County
(NE ¼ NE ¼ Sec 14 T 4 N (S) R 5 E (W)

7. WATER LEVEL

Static water level 327 feet above land surface
Flowing? ☐ Yes ☑ No G.P.M. flow
Artesian closed in pressure p.s.i.
Controlled by ☐ Valve ☐ Cap ☐ Plug
Temperature 71 °F Quality Good

8. WELL TEST DATA No Test

☐ Pump ☐ Bailer ☐ Air ☐ Other

Drawdown G.P.M.	Pumping Level	Hrs. Pumped

9. LITHOLOGIC LOG

Hole Diam.	Depth From	Depth To	Material	Water Yes	Water No
16	0	18			
8	18	455			
	0	3	Topsoil		✓
	3	54	Clay Lava		✓
	54	325	Gravley Open Ground (Lost Circulation)		✓
	325	361	Broken Ground (some water) hold 10 # PSI	✓	
	361	428	Gray Lava Tight Ground 15# PSI		✓
	428	455	Cinders 90 PSI String water	✓	

RECEIVED
SEP 25 1979
Department of Water Resources
Western Regional Office

10. Work started 8/7/79 Finished 8/11/79

11. DRILLERS CERTIFICATION

I/We certify that all minimum well construction standards were complied with at the time the rig was removed.

Gayley Drilling
Firm Name Power Co. Firm No. 291
Address Star Rt B Box N-I Mountain Home ID Date 9/15/79
Signed by (Firm Official) [signature]
and
(Operator) [signature]

USE ADDITIONAL SHEETS IF NECESSARY – FORWARD THE WHITE COPY TO THE DEPARTMENT

No. 22

RECEIVED
APR 18 1967
Department of Reclamation

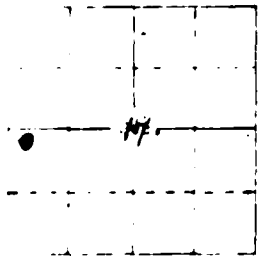
REPORT OF WELL DRILLER
State of Idaho

State law requires that this report shall be filed with the State Reclamation Engineer within 30 days after completion or abandonment of the well.

WELL OWNER:
Name W. H. Farley
Address Great Falls Montana

Owner's Permit No. G 38120
NATURE OF WORK (check): Replacement well ☐
New well: ☐ Deepened ☑ Abandoned ☐
Water is to be used for Irrigation
METHOD OF CONSTRUCTION Rotary ☐ Cable ☑
Dug ☐ Other ☐ (explain)
CASING SCHEDULE: Threaded ☐ Welded ☐
____" Diam. from ____ ft. to ____ ft.
____" Diam. from ____ ft. to ____ ft.
____" Diam. from ____ ft. to ____ ft.
____" Diam. from ____ ft. to ____ ft.
Thickness of casing: ____ Material:
Steel ☐ concrete ☐ wood ☐ other ☐
(explain)
PERFORATED? Yes ☐ No ☐ Type of perforator used ____
Size of perforations: ____ " by ____ "
____ perforations from ____ ft. to ____ ft.
____ perforations from ____ ft. to ____ ft.
____ perforations from ____ ft. to ____ ft.
____ perforations from ____ ft. to ____ ft.
WAS SCREEN INSTALLED? Yes ☐ No ☐
Manufacturer's name ____
Type ____ Model No. ____
Diam. ____ Slot size ____ Set from ____ ft. to ____ ft.
Diam. ____ Slot size ____ Set from ____ ft. to ____ ft.
CONSTRUCTION Well gravel packed? Yes ☐ No. ____ Size of gravel ____ Gravel placed from ____ ft. to ____ ft. Surface seal provided? Yes ☐ No ☐ To what depth? ____ ft. Material used in seal: ____
Did any strata contain unusable water? Yes ☐ No. ____ Type of water ____
Depth of strata ____ ft. Method of sealing strata off ____
Surface casing used? Yes ☑ No. ☐ ? ☐
Cemented in place? Yes ☐ No ☐

Locate well in section



____ County ____
NW • SW • __ 19 T. 4 __ N. __ E

Size of drilled hole: 12" Total depth of well: 476 Standing water level below ground: 329 Temp. ____ Fahr. ____ ° Test delivery: ____ gpm or ____ cfs Pump? ☐ Bail ☐
Size of pump and motor used to make test: ____
Length of time of test: ____ Hrs. ____ Min.
Drawdown: ____ ft. Artesian pressure: ____ ft. above land surface ____ Give flow ____ cfs or ____ gpm. Shutoff pressure: ____
Controlled by: Valve ☐ Cap ☐ Plug ☐
No control ☐ Does well leak around casing? Yes ☐ No ☐

DEPTH FROM FEET	DEPTH TO FEET	MATERIAL	WATER YES OR NO
432	463	gray clay	
463	469	" " hard	
469	477	" "	
477	484	soft clay	
484	49[illegible]	[illegible]	

Work started March 22 1967
Work finished March 26 1967
Well Driller's Statement: This well was drilled under my supervision and this report is true to the best of my knowledge.
Name [illegible]
Address [illegible]
Signed by [illegible]
License No. 143 Date [illegible]

Use other side for additional remarks USGS

Well Log Form 1
SR

RECEIVED
APR 1 1955
Department of Reclamation

WELL LOG AND REPORT TO THE STATE RECLAMATION ENGINEER OF IDAHO

SUBMIT WITHIN 30 DAYS AFTER COMPLETION OF WELL: SEE IDAHO STATUTES 42-238

Permit No. C 31920 Well No. ____ County Elmore

Owner M K Fisher

Address Mt Home Air Force Base

Driller C & W Co. Inc

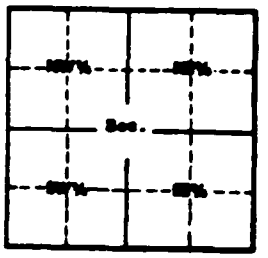
Address Mt Home

Well location NE ¼ NW ¼ Sec. 19 T. 4 S. R. 5 E. B.M.

Size of drilled hole 16"

Total depth of well 429

Locate well in section



Give depth to standing water from the ground 323 Water temp. ____ Date.

Test delivery was ____ g.p.m. or ____ s.f.s. Drawdown was 36.6 feet. Pump? A Hr 11?

Size of pump and motor used to make test 14" bias 12" column 200 cubic feet per

Length of time of test 1 hours 30 minutes.

If flowing well, give flow ____ s.f.s. or ____ g.p.m. and of shut off pressure ____

If flowing well, describe control works ____ (TYPE AND SIZE OF VALVE, ETC.)

Water will be used for Irrigation Weight of casing per lineal foot ____

Thickness of casing .375 Casing material Steel (STEEL, CONCRETE, WOOD, ETC.)

Diameter, length and location of casing 16" Surface 4' (CASING 10" OR LESS IN DIAMETER GIVE INSIDE DIAMETER; CASING OVER 10" IN DIAMETER, GIVE OUTSIDE DIAMETER)

CASING RECORD

Diam. Casing	From Feet	To Feet	Length	Remarks—cmt, grouting, etc.
16"	Surface	4		

Number and size of perforations ____ Jointed ____ feet to ____ feet from ground

Date of commencement of well 4/[illegible] Date of completion of well ____

NWSW S.19 4S 5E

DRILLED FOR L. W. FISHER

Date Started: 25 Oct 6[illegible]	Date Completed: 4 Jan 66
First Water: 323 foot	Water Stands: 323

THICKNESS OF STRATA	FORMATION	TOTAL
0-2	Topsoil	2
2-7	Boulders	5
7-28	Brown Lava	21
28-43	Red Lava	15
43-68	Brown Lava	25
68-84	Cinders (Red)	16
84-93	Gray Lava (Hard)	9
93-108	Cinders (Red)	15
108-117	Brown Lava	9
117-138	Gray Lava	21
138-154	Red Lava	16
154-166	Gray Lava (Hard)	12
166-187	Cinders	21
187-193	Gray Lava	6
193-208	Brown Lava	15
208-227	Gray Lava (Hard)	19
227-238	Broken Crevices (Gray Lava)	
238-249	Hard Crevices (Gray Lava)	11
249-263	Brown Lava	14
263-277	Gray Lava	14
277-294	Gray Lava (Crevices)	17
294-321	Gray Lava (Hard)	27
321-337	Brown Lava (First Water)	16
337-351	Cinders (Lost cuttings)	14
351-367	Cinders	16
367-385	Red Cinders	18
385-424	Black Lava	39
424-429	Brown Sandstone and Black Lava	5

NWSW 5.19 48 58

No. 22 (Cont.)

WELL LOG

From Feet	To Feet	Type of Material	[illegible]	[illegible]
0	2	Top Soil		
2	7	Boulders		
7	28	Brown lava		
28	43	Red lava		
43	68	Brown lava		
68	84	Cinders (Red)		
84	93	Gray lava (Hard)		
93	108	Cinders (Red)		
108	117	Brown lava		
117	138	Gray lava		
138	154	Red lava		
154	166	Gray lava (hard)		
166	187	Cinders		
187	193	Gray lava		
193	208	Brown lava		
208	227	Gray lava (hard)		
227	238	Gray lava - Broken Crevices		
		If more space is required use Sheet No. 2		

WELL DRILLER'S STATEMENT

This well was drilled under my supervision and the above information is complete, true and correct to the best of my knowledge and belief.

Signed [illegible]

By ____________________

License No. [illegible]

Dated 2/15/66 ______ 19___

Well Driller's Helper ____________________

Well Driller Bill Bailey
Well Location Elmore

WELL LOG

From	To	Type of Material	Drilling Time			
			Hrs.	Min.		
238	249	Hard Grey lava. Crevices				
249	263	Brown lava				
263	277	Gray lava				
277	294	Gray lava crevices				
294	321	Grey lava (Hard)				
321	337	Brown lava (first water)			4 GPM	
337	351	Cinders lost cuttings				
351	367	Cinders				
367	385	Red cinders				
385	424	Black lava				
424	429	Brown sandstone BK lava				

USGS

NWSW 5.19 4S 5E

R. Ramsey

REPORT OF WELL DRILLER
State of Idaho

State law requires that this report shall be filed with the State Reclamation Engineer within 30 days after completion or abandonment of the well.

WELL OWNER: RULON Ramsey
Name [illegible]
Address [illegible] Idaho
RUPERT Idaho
Owner's Permit No.
NATURE OF WORK (check): Replacement well ☐
New well ☑ Deepened ☐ Abandoned ☐
Water is to be used for: IRRIGATION
METHOD OF CONSTRUCTION: Rotary ☐ Cable ☑
Dug ☐ Other (explain)
CASING SCHEDULE: Threaded — Welded —
10 "Diam. from 0 ft. to 20 ft.
"Diam. from ft. to ft.
"Diam. from ft. to ft.
"Diam. from ft. to ft.
Thickness of casing: .281 Material:
Steel ☑ concrete ☐ wood ☐ other ☐

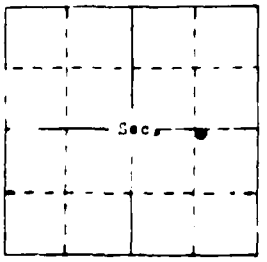
PERFORATED? Yes ☐ No ☑ Type of perforator used: (explain)
Size of perforations: " by "
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.
WAS SCREEN INSTALLED? Yes ☐ No ☑
Manufacturer's name
Type Model No.
Diam. Slot size Set from ft. to ft.
Diam. Slot size Set from ft. to ft.

CONSTRUCTION: Well gravel packed? Yes ☐
No. ☑ size of gravel Gravel placed from ft. to ft. Surface seal provided? Yes ☐ No ☐ To what depth? ft. Material used in seal:

Did any strat contain unusable water? Yes ☐
No. ☑ Type of water:
Depth of strata ft. Method of sealing strata off:

Surface casing used? Yes ☑ No. ☐
Cemented in place? Yes ☐ No ☑

Locate well in section



LOCATION OF WELL: County
NW ¼ SE ¼ Sec. 24 T. 4 N/S R. 25 E/W

Use other side for additional remarks

Size of drilled hole: 10" Total depth of well: 545 Standing water level below ground: 277 Temp. Fahr. Test delivery: gpm or cfs Pump? ☐ Bail ☐
Size of pump and motor used to make test:
Length of time of test: Hrs. Min.
Drawdown: ft. Artesian pressure: ft. above land surface Give flow cfs or gpm. Shutoff pressure:
Controlled by: Valve ☐ Cap ☐ Plug ☐
No control ☐ Does well leak around casing?
Yes ☐ No ☑

DEPTH FROM FEET	DEPTH TO FEET	MATERIAL	WATER YES OR NO
0	7	TOP SOIL	
7	20	HARD PAN	
20	28	GRAY LAVA	
28	50	RED	
50	79	GRAY	
79	90	BROWN LAVA CLAY STRIPS	
90	111	GRAY "	
111	115	BROWNISH RED	
115	142	GRAY	
142	168	BLACK SOME LOOSE ROCK	
168	225	GRAY	
225	230	BROWNISH	
230	254	GRAY	
254	258	BROWNISH RED	
258	274	GRAY CREVICEY HARD	
274	278	BROWN	
278	301	GRAY	
301	309	BROWN LAVA DIRTY CREVICES	
309	353	GRAY "	
353	363	BROWNISH RED	
363	388	GRAY	NO
388	440	BROWN SOME CREVICES	yes
440	463	" MORE CREVICES	yes
463	480	GRAY	?
480	485	BROWN DIRTY ROCK	?
485	514	BROWNISH GRAY " SOME SAND	yes?
514	543	GRAY CLAY SOME ROCK	
		SAND AND SOME SMALL GRAVELS MOSTLY CLAY OR CLAY & SAND STONE	?
		THIS IS A GOOD ROCK HOLE THE ROCK WAS NOT VERY LOOSE CREVICEY. THE ROCK WAS DIRTY UNDER THE WATER BUT IT WAS CRACKED & CREVICED AND SHOULD YIELD WATER	

Work started: 19 JUNE 1946
Work finished: 8 AUGUST 1946
Well Driller's Statement: This well was drilled under my supervision and this report is true to the best of my knowledge.
Name West Chester
Address: Pl 2 Burley Idaho
Signed by: SAME
License No. 137 Date: 21 August 1946

USGS

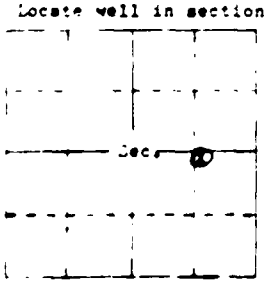
RECEIVED
SEP 29 1966

REPORT OF WELL DRILLER
State of Idaho

State law requires that this report shall be filed with the [illegible] Engineer within 30 days after completion or abandonment of the well.

WELL OWNER
Name Ralph Ramsey
Address 200 E. Baseline Rd. Rupert, Idaho
Owner's Permit No. 32740
NATURE OF WORK (check): Replacement well ☐
New well ☒ Deepened ☐ Abandoned ☐
Water is to be used for: Irrigation
METHOD OF CONSTRUCTION: Rotary ☐ Cable ☒
Dug ☐ Other ☐ (explain)
CASING SCHEDULE: Threaded ☐ Welded ☐
20 "Diam. from 0 ft. to 20 ft.
____ "Diam. from ____ ft. to ____ ft.
____ "Diam. from ____ ft. to ____ ft.
____ "Diam. from ____ ft. to ____ ft.
Thickness of casing: .281 Material:
Steel ☒ concrete ☐ wood ☐ other ☐
(explain)
PERFORATED? Yes ☐ No ☒ Type of perforator used:
Size of perforations: ____ " by ____ "
____ perforations from ____ ft. to ____ ft.
____ perforations from ____ ft. to ____ ft.
____ perforations from ____ ft. to ____ ft.
____ perforations from ____ ft. to ____ ft.
WAS SCREEN INSTALLED? Yes ☐ No ☒
Manufacturer's name
Type Model No.
Diam. Slot size Set from ft. to ft.
Diam. Slot size Set from ft. to ft.
CONSTRUCTION: Well gravel packed? Yes ☐
No. ☒ size of gravel Gravel placed from ft. to ft. Surface seal provided? Yes ☐ No ☐ To what depth? ft. Material used in seal:
Did any strata contain unusable water? Yes ☐
No. ☒ Type of water
Depth of strata ft. Method of sealing strata off
Surface casing used? Yes ☒ No. ☐
Cemented in place? Yes ☐ No ☒

Locate well in section



LOCATION OF WELL: County
¼ ¼ ¼ Sec. 24 T. 9 S. R. 24 E.

Size of drilled hole: 18 inch Total depth of well: 543 Standing water level below ground: 377 Temp. Fahr. ° Test delivery: gpm or cfs Pump? ☐ Bail ☐
Size of pump and motor used to make test:
Length of time of test: Hrs. Min.
Drawdown: ft. Artesian pressure: ft. above land surface Give flow cfs or gpm. Shutoff pressure:
Controlled by: Valve ☐ Cap ☐ Plug ☐
No control ☐ Does well leak around casing? Yes ☐ No ☐

DEPTH FROM FEET	DEPTH TO FEET	MATERIAL	WATER YES OR NO
0	7	top soil	
7	20	hard pan	
20	38	gray lava	
38	50	red lava	
50	79	gray lava	
79	90	brown lava with clay streaks	
90	111	gray lava	
111	115	brownish red lava	
115	142	gray lava	
142	164	black lava--some loose rock	
164	225	gray lava	
225	230	brownish	
230	254	gray lava	
254	258	brownish red	
258	274	gray lava --gravicey & hard	
274	278	brown	
278	301	gray lava	
301	308	brown lava--soft in crevices	
308	352	gray lava	
352	362	brownish red	
362	398	gray lava	No
398	440	brown lava--some crevices	Yes
440	465	brown lava--more crevices	Yes
465	480	gray lava	"
480	485	Brown dirty rock	"
485	514	Brownish gray--some sand	Yes
514	543	gray clay--some rock sand and some small gravels. Mostly clay or clay and sandstone. This is a good rock hole. The rock was not very loose or caxey. The rock was dirty under the water but it was cracked and crevicy and should yeild water.	

Work started 28 June, 1966
Work finished 10 August, 1966
Well Driller's Statement: This well was drilled under my supervision and this report is true to the best of my knowledge.
Name Merl Chesley
Address Burley # 2 Burley, Idaho
Signed by Merl Chesley
License No. 137 Date 2 September 1966

See other side for additional remarks

USGS

No. 24

RECEIVED
MAR 7 1967
Department of Reclamation

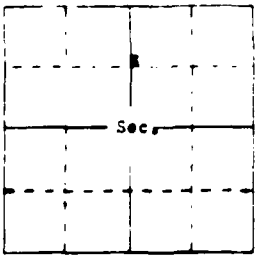
REPORT OF WELL DRILLER
State of Idaho

State law requires that this report shall be filed with the State Reclamation Engineer within 30 days after completion or abandonment of the well.

WELL OWNER:
Name Richard W. Johnson
Address Rt 3 Rupert, Idaho

Owner's Permit No. [illegible]
NATURE OF WORK (check): Replacement well ☐
New well ☒ Deepened ☐ Abandoned ☐
Water is to be used for: Irrigation
METHOD OF CONSTRUCTION: Rotary ☐ Cable ☒
Dug ☐ Other ☐ (explain)
CASING SCHEDULE: Threaded ☐ Welded ☐
22 "Diam. from 0 ft. to 10 ft.
"Diam. from ft. to ft.
"Diam. from ft. to ft.
"Diam. from ft. to ft.
Thickness of casing: 1/4" Material:
Steel ☒ concrete ☐ wood ☐ other ☐
(explain)
PERFORATED? Yes ☐ No ☒ Type of perforator used:
Size of perforations: " by "
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.
WAS SCREEN INSTALLED? Yes ☐ No ☒
Manufacturer's name
Type Model No.
Dia. Slot size Set from ft. to ft.
Dia. Slot size Set from ft. to ft.
CONSTRUCTION: Well gravel packed? Yes ☐
No. ☐ size of gravel Gravel placed from ft. to ft. Surface seal provided? Yes ☐ No ☐ To what depth?
ft. Material used in seal:
Did any strata contain unusable water? Yes ☐
No. ☒ Type of water:
Depth of strata ft. Method of sealing strata off:
Surface casing used? Yes ☒ No. ☐
Cemented in place? Yes ☒ No ☐

Locate well in section



LOCATION OF WELL: County Minidoka
¼ ¼ ¼ Sec. 24 T. 4S N/S R. 23E E/W

Size of drilled hole: 20" Total depth of well 320 ft. Standing water level below ground: 305 Temp. Fahr. ° Test delivery: gpm or cfs Pump? ☐ Bail ☐
Size of pump and motor used to make test:
Length of time of test: Hrs. Min.
Drawdown: 75 ft. Artesian pressure: ft. above land surface Give flow cfs or gpm. Shutoff pressure:
Controlled by: Valve ☐ Cap ☐ Plug ☐
No control ☐ Does well leak around casing? Yes ☐ No ☐

DEPTH FROM FEET	DEPTH TO FEET	MATERIAL	WATER YES OR NO
0	8	Clay & Lava	No
8	10	Lava & Clay	
10	20	Gray Lava	
20	30	Gray Lava	
30	40	Red Lava and ash	
40	50	"	
50	60	"	
60	70	"	
70	75	"	
75	78	Brown Clay	
78	80	Gray Lava	
80	90	"	
90	100	"	
100	110	"	
110	120	"	
120	130	"	
130	140	"	
140	150	"	
150	160	"	
160	170	"	
170	180	"	
180	190	"	
190	200	"	
200	210	"	
210	220	"	
220	230	"	
230	240	"	
240	250	"	
250	260	Red Lava and ash	
260	270	"	
270	274	"	
274	280	Gray Lava	
280	290	"	
290	295	"	
295	300	Brown Clay and Lava	
300	310	Brown Clay and Lava gravel	
310	313	Brown Clay	
313	320	Gray Lava	

Work started June 16, 1966
Work finished January 6, 1967
Well Driller's Statement: This well was drilled under my supervision and this report is true to the best of my knowledge.
Name Richard W. Johnson
Address Rt 3 Rupert, Idaho
Signed by [signature]
License No. [illegible] Date June 15, 1967

Use other side for additional remarks USGS

(Over)

320	330	Gray Lava	
330	340	"	
340	343	"	
343	350	Brown Clay	
350	360	Gray Lava	
360	370	"	
370	373	Gray Lava	Tes
373	380	Brown Lava	
380	390	Gray Hard Lava	
390	395	Gray Lava	
395	400	Red Lava Ash	
400	410	Gray Lava	
410	420	Gray Lava	
420	423	"	
423	427	Lava Gravel	
427	430	Gray Lava	
430	440	"	
440	450	"	
450	455	"	
455	460	Red Lava	
460	465	"	
465	470	Gray Lava and clay	
470	480	Gray Lava	
480	484	"	
484	488	Lava Gravel	
488	490	Gray Lava and Clay	
490	497	"	
497	500	Clay and Ash	
500	510	"	
510	520	"	
520	525	"	
525	530	Gravel and Sand	
530	540	Gray clay and Lava	
540	550	"	
550	560	"	
560	570	"	
570	580	"	
580	590	"	
590	600	"	
600	610	"	
610	620	Sand	
620	625	"	

Drilling was stopped at 530 feet and well tested dry. Drilling was resumed and well was tested at 616 and was dry. Well was drilled to 625 feet where sand caving has prevented deeper drilling without casing. Drilling was stopped February 28, 1967. Further drilling is anticipated later.

No. 25

RECEIVED
NOV 30 1966
Department

REPORT OF WELL DRILLER
State of Idaho

State law requires that this report shall be filed with the State Reclamation Engineer within 30 days after completion or abandonment of the well.

WELL OWNER
Name Wayne Reade Keep
Address Rupert Idaho

Owner's Permit No.
NATURE OF WORK (check): Replacement well ☐
New well ☑ Deepened ☐ Abandoned ☐
Water is to be used for: CULINARY
METHOD OF CONSTRUCTION: Rotary ☐ Cable ☑
Dug ☐ Other (explain)
CASING SCHEDULE: Threaded ☐ Welded ☐
8 "Diam. from 0 ft. to 6 ft.
"Diam. from ft. to ft.
"Diam. from ft. to ft.
"Diam. from ft. to ft.
Thickness of casing .250 Material:
Steel ☑ concrete ☐ wood ☐ other ☐

(explain)
PERFORATED? Yes ☐ No ☐ Type of perforator used:

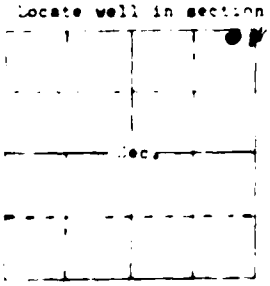
Size of perforations " by "
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.
WAS SCREEN INSTALLED? Yes ☐ No ☐
Manufacturer's name
Type Model No.
Diam. Slot size Set from ft. to ft.
Diam. Slot size Set from ft. to ft.

CONSTRUCTION: Well gravel packed? Yes ☐ No ☐ size of gravel Gravel placed from ft. to ft. Surface seal provided? Yes ☐ No ☐ To what depth? ft. Material used in seal:

Did any strata contain unusable water? Yes ☐ No ☐ Type of water
Depth of strata ft. Method of sealing strata off

Surface casing used: Yes ☑ No ☐
Cemented in place: Yes ☐ No ☑

Locate well in section



County
NE ¼ NE ¼ Sec. 24 T. 9 S. R. 25 E.

Size of drilled hole: 8" Total depth of well: 550 Standing water level below ground: 388 Temp. Fahr. ° Test delivery: gpm or cfs Pump? ☐ Bail ☐
Size of pump and motor used to make test:

Length of time of test: Hrs. Min.
Drawdown: ft. Artesian pressure: ft. above land surface Give flow cfs or gpm. Shutoff pressure:
Controlled by: Valve ☐ Cap ☐ Plug ☐
No control ☐ Does well leak around casing? Yes ☐ No ☑

DEPTH FROM FEET	DEPTH TO FEET	MATERIAL	WATER YES OR NO
0	1	TOP SOIL	
1	3	HARD PAN	
3	6	GRAY LAVA CINDER LAVA	
6	25	GRAY LAVA	
25	74	REDDISH BROWN "	
74	98	GRAY LAVA	
98	115	REDDISH "	
115	135	GRAY LAVA WITH SCATTERED ROCKS	
135	160	BLACK "	
160	194	REDDISH "	
194	210	GRAY LAVA VERY HARD	
210	230	BROWN "	
230	280	GRAY " HARD	
280	310	REDDISH BROWN "	
310	335	GRAY LAVA	
335	355	BROWN CLAY	
355	384	GRAY LAVA	
384	396	BROWN " LOOSE	
396	420	BROWN "	YES
420	446	GRAY " HARD	NO
446	474	RED "	YES
474	484	BLACK "	"
484	514	BROWN "	"
514	556	GRAY "	NO
556		ROCK CLAY & SAND	"
		GREENISH GRAY	

Work started Sept 1966
Work finished 12 Sept 1966
Well Driller's Statement: This well was drilled under my supervision and this report is true to the best of my knowledge.
Name Merl Chessley
Address Burley Idaho
Signed by Merl Chessley
License No. 197 Date Sept. 19th 1966

Use other side for additional remarks

Dear Sirs;

I was talking with Mr. Clarence Cook who owns the property now and he said you didn't have a log on this well.

As I used C.O. Coton & Sons (Wendell, Idaho) drilling on this job I turned log in to them, and it has apparently gotten lost.

This well was tested several times by Layne Pump Co. out of Twin Falls, and I don't have the data ask for on this form.

I wonder if you could get permit no. from your files?

I am real sorry about not having log in before now and if you need any further information please let me know-

Sincerely
[illegible]
Wendell, Idaho
Box 283

RECEIVED
MAR 15 1987
Department of Reclamation

No. 26

RECEIVED

REPORT OF WELL DRILLER
State of Idaho

State law requires that this report shall be filed with the State Reclamation Engineer within 30 days after completion or abandonment of the well.

WELL OWNER
Name [illegible] Brothers
Address [illegible]

Owner's Permit No. G-31392
NATURE OF WORK (check): Replacement well ___
New well ✓ Deepened ☐ Abandoned ___

Water is to be used for [illegible]

METHOD OF CONSTRUCTION Rotary ☐ Cable ✓
Dug ___ Other ___ (explain)

CASING SCHEDULE Threaded ___ Welded ___
12" Diam. from 513 ft. to 510 ft.
12" Diam. from 510 ft. to 447 ft.
20-12" Diam. from 447 ft. to 444 ft.
___ Diam. from ___ ft. to ___ ft.
Thickness of casing: 1/4" Material:
Steel ✓ concrete ☐ wood ☐ other ☐
(explain)

PERFORATED? Yes ___ No ___ Type of perforator used ___

Size of perforations ___ " by ___ "
___ perforations from ___ ft. to ___ ft.
___ perforations from ___ ft. to ___ ft.
___ perforations from ___ ft. to ___ ft.
___ perforations from ___ ft. to ___ ft.

WAS SCREEN INSTALLED? Yes ✓ No ☐
Manufacturer's name [illegible]
Type [illegible] Model No. ___
Diam. [illegible] Slot size [illegible] Set from 513 ft. to [illegible] ft.
Diam. [illegible] Slot size ___ Set from ___ ft. to ___ ft.

CONSTRUCTION: Well gravel packed? Yes ✓ No ___ Size of gravel [illegible] Gravel placed from 513 ft. to 447 ft. Surface seal provided: Yes ☐ No ✓ To what depth? ___ ft. Material used in seal ___

Did any strata contain unusable water? Yes ___ No ___ Type of water: ___
Depth of strata ___ ft. Method of sealing strata off ___

Surface casing used? Yes ✓ No ___
Cemented in place? Yes ✓ No ☐

Locate well in section

___ WELL County [illegible]
___ ___ Sec. 25 T. [illegible] R. 5 E

Size of drilled hole: 20" Total depth of well 530 Standing water level below ground: 66 Temp. Fahr. ___ Test delivery ___ gpm or ___ cfs Pump ___ Bail ___
Size of pump and motor used to make test: ___

Length of time of test ___ Hrs. ___ Min.
Drawdown ___ ft. Artesian pressure ___ ft. above land surface ___ Give flow ___ cfs or ___ gpm. Shutoff pressure ___
Controlled by: Valve ___ Cap ___ Plug ___
No control ___ Does well leak around casing? Yes ___ No ✓

DEPTH FROM (FEET)	DEPTH TO (FEET)	MATERIAL	WATER YES OR NO
0	5	[illegible]	
5	10	[illegible]	
11	31	[illegible]	
31	45	[illegible]	
49	56	[illegible]	
56	61	[illegible]	
61	95	[illegible]	
95	104	" " [illegible]	
104	110	" "	
110	138	[illegible] "	
13[illegible]	132	[illegible]	
132	139	[illegible]	
139	145	" " [illegible]	
145	164	" "	
164	170	[illegible]	
170	205	[illegible] " [illegible]	
205	215	[illegible] " "	
215	244	" "	
244	250	[illegible] "	
250	255	[illegible] "	
255	273	[illegible] "	
273	28[illegible]	[illegible]	
28[illegible]	32[illegible]	[illegible]	
32[illegible]	325	" "	
325	340	[illegible] "	
340	345	[illegible] "	
345	350	[illegible] "	
350	400	[illegible] "	
400	444	[illegible]	
444	454	[illegible]	
454	460	" " " [illegible]	
460	473	[illegible]	
473	494	[illegible]	
494	510	[illegible]	
510	530	[illegible]	

Work started [illegible] 7-1966
Work finished March 19 - 1966
Well Driller's Statement: This well was drilled under my supervision and this report is true to the best of my knowledge.
Name [illegible]
Address [illegible]
Signed by [illegible]
License No. 3[illegible] Date [illegible]

Use other side for additional remarks

USGS

USE TYPEWRITER OR BALL POINT PEN

Department of Water Administration

WELL DRILLER'S REPORT

No. 27

State law requires that this report be filed with the Director Department of Water Administration within 30 days after the completion or abandonment of the well

1 WELL OWNER

Name PETERMAN, [illegible], TERRY, & SONS

Address MOUNTAIN HOME, IDAH[illegible]

Owner's Permit No.

2. NATURE OF WORK

☒ New well ☐ Deepened ☐ Replacement

☐ Abandoned (describe method of abandoning)

3 PROPOSED USE

☒ Domestic ☐ Irrigation ☐ Test

☐ Municipal ☐ Industrial ☐ Stock

4. METHOD DRILLED

☒ Cable ☐ Rotary ☐ Dug ☐ Other

5. WELL CONSTRUCTION

Diameter of hole 6 inches Total depth 401.[illegible] feet

Casing schedule ☒ Steel ☐ Concrete

Thickness		Diameter		From		To	
0.280	inches	6 5/8	inches	+1	feet	19	feet
____	inches	____	inches	____	feet	____	feet
____	inches	____	inches	____	feet	____	feet
____	inches	____	inches	____	feet	____	feet
____	inches	____	inches	____	feet	____	feet

Was a packer or seal used? ☐ Yes ☒ No

Perforated? ☐ Yes ☒ No

How perforated? ☐ Factory ☐ Knife ☐ Torch

Size of perforation ____ inches by ____ inches

Number		From		To	
____	perforations	____	feet	____	feet
____	perforations	____	feet	____	feet
____	perforations	____	feet	____	feet

Well screen installed? ☐ Yes ☒ No

Manufacturer's name ____

Type ____ Model No. ____

Diameter ____ Slot size ____ Set from ____ feet to ____ feet

Diameter ____ Slot size ____ Set from ____ feet to ____ feet

Gravel packed? ☐ Yes ☒ No Size of gravel

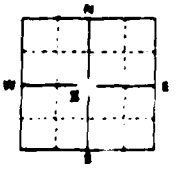
Placed from ____ feet to ____ feet

Surface seal? ☒ Yes ☐ No To what depth? 19 feet

Material used in seal ☒ Cement grout ☐ Puddling clay

6. LOCATION OF WELL

Sketch map location must agree with written location



County [illegible]

¼ ¼ ¼ Sec. 22 T 4S R 7E E

7 WATER LEVEL

Static water level 366 feet below land surface

Flowing? Yes ☒ No G P M flow

Temperature 68 [illegible] F Quality EXCELLENT

Artesian closed in pressure ____ P S I

Controlled by ☐ Valve ☐ Cap ☐ Plug

8 WELL TEST DATA

☒ Pump ☐ Bailer ☐ Other

Discharge G P M	Draw Down	Hours Pumped
12	[illegible] FT	1

9 LITHOLOGIC LOG

Hole Diam.	Depth From	Depth To	Material	Water Yes	Water No
	0	17			
6"	18	B.H.			
	0	4	SOIL AND SUBSOIL		X
	4	14	MARLPAN AND B-SALT BOULDERS		X
	14	62	GREY BASALT		X
	62	70	BROWN BURNT CLAY		X
	70	72	CINDERS		X
	72	102	GREY BASALT		X
	102	120	GREY, RED, BROWN PINHOLE		X
	120	132	GREY BASALT		X
	132	133	BROWN BURNT [illegible] (CLAY)		X
	133	167	GREY PINHOLE BASALT		X
	167	162	" " " FRACTURED		X
	162	191	GREY BASALT, HARDER W/ DEPTH		X
	191	207	" " " VERY HARD		X
	207	213	GREY-BROWN, MEDIUM HARD		X
	213	229	RED BASALT, MEDIUM HARD		X
	229	242	BROWN BASALT, VERY HARD		X
	242	252	BROWN BASALT, MEDIUM HARD		X
	252	262	BOULDERS, BROWN BURNT CLAY		X
	262	275	GREY BASALT, MEDIUM HARD		X
	275	284	BROWN BURNT CLAY		X
	284	333	GREY BASALT, SOFT PINHOLE		
			INCREASINGLY HARD W/DEPTH		
			313-322 VERY HARD		
			CREVICE, CINDERS 299-29[illegible]		X
	333	352	RED BASALT (CREVICE, CINDERS		
			PINHOLE, RUBBLE, 333-339)		X
	352	358	GREY BASALT, DENSE, HARD		X
	358	360	CREVICE CINDERS, WATER	X	
	360	401	BLACK PINHOLE BASALT		X

10. Work started FEB 13, 197[illegible] finished MARCH 11, 197[illegible]

11. DRILLER'S CERTIFICATION

This well was drilled under my supervision and this report is true to the best of my knowledge

Driller's or Firm's Name MOUNTAIN HOME WELL DRILLERS Number

Address P.O. Box [illegible], MOUNTAIN HOME, IDAHO

Signed By: [signature] Date MAR 14 197[illegible]

USE ADDITIONAL SHEETS IF NECESSARY FORWARD THE WHITE BLUE AND PINK COPIES TO THE DEPARTMENT

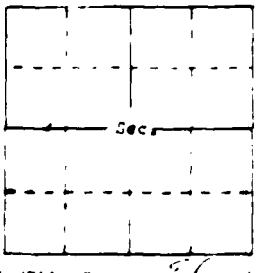
REPORT OF WELL DRILLER
State of Idaho

Department of Reclamation

State law requires that this report shall be filed with the State Reclamation Engineer within 30 days after completion or abandonment of the well.

WELL OWNER: Name M. L. Brooks
Address Near Idaho
RFD 3
Owner's Permit No. [illegible]
NATURE OF WORK (check): Replacement well ☐
New well ☒ Deepened ☐ Abandoned ☐
Water is to be used for: Irrigation
METHOD OF CONSTRUCTION: Rotary ☐ Cable ☒
Dug ☐ Other ☐ (explain)
CASING SCHEDULE: Threaded ☐ Welded ☐
18 "Diam. from 0 ft. to 31 ft.
____ "Diam. from ____ ft. to ____ ft.
____ "Diam. from ____ ft. to ____ ft.
____ "Diam. from ____ ft. to ____ ft.
Thickness of casing: .250 Material:
Steel ☒ concrete ☐ wood ☐ other ☐
(explain)
PERFORATED? Yes ☐ No ☒ Type of perforator used:
Size of perforations: ____ " by ____ "
____ perforations from ____ ft. to ____ ft.
____ perforations from ____ ft. to ____ ft.
____ perforations from ____ ft. to ____ ft.
____ perforations from ____ ft. to ____ ft.
WAS SCREEN INSTALLED? Yes ☐ No ☐
Manufacturer's name
Type Model No.
Dia. ___ Slot size ___ Set from ___ ft. to ___ ft.
Dia. ___ Slot size ___ Set from ___ ft. to ___ ft.
CONSTRUCTION: Well gravel packed? Yes ☐
No. ☐ size of gravel ____ Gravel placed from ____ ft. to ____ ft. Surface seal provided? Yes ☐ No ☐ To what depth? ____ ft. Material used in seal:
Did any strata contain unusable water? Yes ☐
No. ☐ Type of water:
Depth of strata ____ ft. Method of sealing strata off:
Surface casing used? Yes ☐ No. ☐
Cemented in place? Yes ☐ No ☐

Locate well in section



LOCATION OF WELL County Elmore
SW ¼ SW ¼ Sec. 21 T. 2 S. R. 8 E.

Size of drilled hole: 16" Total depth of well: 525' Standing water level below ground: ____ Temp. Fahr. ____ ° Test delivery: ____ gpm or ____ cfs Pump? ☐ Bail ☐
Size of pump and motor used to make test:
Length of time of test: ____ Hrs. ____ Min.
Drawdown: ____ ft. Artesian pressure: ____ ft. above land surface ____ Give flow ____ cfs or ____ gpm. Shutoff pressure:
Controlled by: Valve ☐ Cap ☐ Plug ☐
No control ☐ Does well leak around casing? Yes ☐ No ☐

DEPTH FROM FEET	DEPTH TO FEET	MATERIAL	WATER YES OR NO
0	31	Surface	
31	60	Black lava	
60	100	Grey lava	
100	120	Grey, black lava	
120	140	Gray lava	
140	185	Hard black lava	
185	197	Red lava	
197	210	Brown lava	
210	232	Black lava	
232	240	Open ground Cu rings	
240	252	Brown lava	
252	256	Red clay, cinders	
256	260	Brown lava	
260	270	Black lava	
270	275	Red lava & cinders	
275	278	Brown lava	
278	284	Red clay & cinders	
284	288	Grey lava	
288	300	Black sandy lava	
300	325	Red & brown lava	
325	360	Brown lava	
360	364	Brown clay & cinders	
364	370	Brown lava; loose	yes
370	397.5	Black porous lava	
397.5	405	Red cinders lost 99% cuttings	
405	410	Black sandy porous lava 50% cuttings lost	
410	423	Black porous sandy lava Come cuttings lost	
423	425	Hard grey lava	
425	450	Black porous sandy lava	
450	485	Black porous lava	
485	525	Brown sandy clay	

Work started: 5/ 1966
Work finished: 6/ 1966
Well Driller's Statement: This well was drilled under my supervision and this report is true to the best of my knowledge.
Name
Address
Signed by
License No. [illegible] Date 7/5/66

USGS

Use other side for additional remarks

No. 29

RECEIVED
JUN 7 1963
Department of Reclamation

REPORT OF WELL DRILLER
State of Idaho

State law requires that this report shall be filed with the State Reclamation Engineer within 30 days after completion or abandonment of the well.

WELL OWNER:
Name E.L. Bricks
Address Caldwell, Idaho

Owner's Permit No.
NATURE OF WORK (check): Replacement well ☐
New well ☒ Deepened ☐ Abandoned ☐
Water is to be used for: Irrigation
METHOD OF CONSTRUCTION: Rotary ☐ Cable ☒
Dug ☐ Other (explain)
CASING SCHEDULE: Threaded — Welded —
20 "Diam. from 0 ft. to 26 ft.
"Diam. from ft. to ft.
"Diam. from ft. to ft.
"Diam. from ft. to ft.
Thickness of casing: .250 Material:
Steel ☒ concrete ☐ wood ☐ other ☐

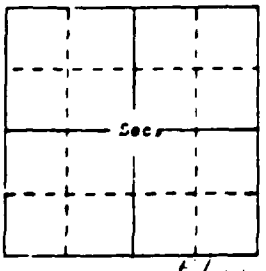
PERFORATED? Yes ☐ No ☒ Type of perforator used: (explain)
Size of perforations: " by "
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.
WAS SCREEN INSTALLED? Yes ☐ No ☐
Manufacturer's name
Type Model No.
Diam. Slot size Set from ft. to ft.
Diam. Slot size Set from ft. to ft.

CONSTRUCTION: Well gravel packed? Yes ☐ No. ☐ size of gravel Gravel placed from ft. to ft. Surface seal provided? Yes ☐ No ☐ To what depth? ft. Material used in seal:

Did any strata contain unusable water? Yes ☐ No. ☐ Type of water:
Depth of strata ft. Method of sealing strata off:

Surface casing used? Yes ☒ No. ☐
Cemented in place? Yes ☒ No ☐

Locate well in section



LOCATION OF WELL: County Ada
NW ¼ SW ¼ Sec. 26 T. 4 N/S R. 2 E/W

Size of drilled hole: 20 Total depth of well: 500 Standing water level below ground: 359 Temp. Fahr. ° Test delivery: 2000 gpm or cfs Pump? ☒ Bail ☐
Size of pump and motor used to make test:
16" Line w/ 14" Bowles Scuba Gas Motor
Length of time of test: Hrs. Min.
Drawdown: ft. Artesian pressure: ft. above land surface Give flow cfs or gpm. Shutoff pressure:
Controlled by: Valve ☐ Cap ☐ Plug ☐
No control ☐ Does well leak around casing? Yes ☐ No ☒

DEPTH FROM FEET	DEPTH TO FEET	MATERIAL	WATER YES OR NO
0	7	Surface	
7	33	Black Loam	
33	56	Reddish Brown Loam	
56	66	Grey Loam	
66	86	Dark Grey Sand	
86	95	Brown Loam	
95	116	Red Loam	
116	125	Brown Loam	
125	143	Grey Loam	
143	156	Red Loam	
156	179	Brown Loam	
179	243	Dark Grey Loam	
243	252	Red Lap + Boulders	
252	263	Brown Loam	
263	276	Grey Loam	
276	279	Red Loam	
279	285	Reddish Brown Loam	
285	315	Grey Loam	
315	329	Brown Loam	
329	442	Dark Grey Loam Lava Rock (Lava)	
442	447	Black Sandy Clay	
447	463	Black Sand, Lava, Black Clay, Seams	
463	475	Brown Clay	
475	500	Brown Sandy Clay, Sand Seams and Some Coarse Gravel	

Work started: 9/25/62
Work finished: 6/6/63
Well Driller's Statement: This well was drilled under my supervision and this report is true to the best of my knowledge.
Name: George Conley
Address: 1/2 E 5th N. Mtn Home Idaho
Signed by: George Conley
License No. 71 Date

Use other side for additional remarks

USGS

No. 30

RECEIVED
APR 18 1967
Department of Reclamation

REPORT OF WELL DRILLER
State of Idaho

State law requires that this report shall be filed with the State Reclamation Engineer within 30 days after completion or abandonment of the well.

WELL OWNER:
Name M. W. Fisher
Address Great Falls Montana

Owner's Permit No. G 33240
NATURE OF WORK (check): Replacement well ☐ New well ☑ Deepened ☐ Abandoned ☐
Water is to be used for: Irrigation
METHOD OF CONSTRUCTION: Rotary ☑ Cable ☐ Dug ☐ Other ☐ (explain)

CASING SCHEDULE: Threaded ☐ Welded ☐
16 "Diam. from +1 ft. to -134 ft.
"Diam. from ft. to ft.
"Diam. from ft. to ft.
"Diam. from ft. to ft.
Thickness of casing: 1/4" Material:
Steel ☑ concrete ☐ wood ☐ other ☐

(explain)
PERFORATED? Yes ☐ No ☑ Type of perforator used:

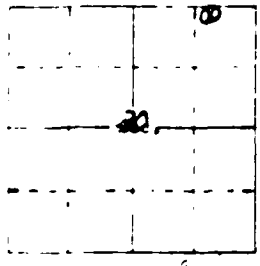
Size of perforations: " by "
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.
WAS SCREEN INSTALLED? Yes ☐ No ☑
Manufacturer's name
Type Model No.
Diam. Slot size Set from ft. to ft.
Diam. Slot size Set from ft. to ft.

CONSTRUCTION: Well gravel packed? Yes ☐ No ☑ size of gravel Gravel placed from ft. to ft. Surface seal provided? Yes ☐ No ☐ To what depth? ft. Material used in seal:

Did any strata contain unusable water? Yes ☐ No ☐ Type of water:
Depth of strata ft. Method of sealing strata off:

Surface casing used? Yes ☐ No ☑
Cemented in place? Yes ☐ No ☐

Locate well in section



County
NE¼ NE¼ Sec. 30 T. 4 N. R. 5 E.

Size of drilled hole: 9 7/8" Total depth of well: 437 Standing water level below ground: 296 Temp. Fahr. 70 ° Test delivery: 2425 gpm or cfs Pump? ☐ Bail ☐
Size of pump and motor used to make test: 10" turbine 400 HP electric motor
Length of time of test: 4 Hrs. Min.
Drawdown: 6 ft. Artesian pressure: ft. above land surface Give flow cfs or gpm. Shutoff pressure:
Controlled by: Valve ☐ Cap ☐ Plug ☐ No control ☐ Does well leak around casing? Yes ☐ No ☑

DEPTH FROM FEET	DEPTH TO FEET	MATERIAL	WATER YES OR NO
0	15	top dirt	
15	47	grey lava	
47	100	red lava "broken"	
100	118	grey lava	
118	131	grey lava "loose"	
131	191	brown lava	
191	195	cinders	
195	213	red lava	
213	215	cinders	
215	330	red lava	
230	238	grey lava "hard"	
238	243	grey lava "loose"	
243	250	brown lava	
250	257	loose rock, lost cuttings	
257	292	alternate layers of loose & solid grey lava about 3 loose & 3 solid	
292	301	brown clay	
301	313	grey lava "hard"	
313	323	loose rock and clay	
323	374	grey lava	
373	381	red lava "broken"	
381	341	red lava "hard"	
391	395	red cinders	
395	397	red lava "hard"	
397	408	red cinders	
408	412	red lava "hard"	
412	415	red lava "broken"	
415	435	grey lava	
435	437	grey sand	

Work started Jan 10, 1967
Work finished March 17, 1967
Well driller's statement: This well was drilled under my supervision and this report is true to the best of my knowledge.
Name
Address
Signed by
License No. Date

USGS

Use other side for additional remarks

Form 238-7
1/78

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES

WELL DRILLER'S REPORT

USE TYPEWRITER OR BALLPOINT PEN

No. 31

State law requires that this report be filed with the Director, Department of Water Resources within 30 days after the completion or abandonment of the well.

1. WELL OWNER

Name Holstein Heifers — c/o Burke Dudly, Fraser & Tirbet, 615 S. Central, Suite, Los Angeles CA

Address Glendale, California

Owner's Permit No. Replacement

2. NATURE OF WORK

☑ New well ☐ Deepened ☑ Replacement

☐ Abandoned (describe method of abandoning)

3. PROPOSED USE

☐ Domestic ☑ Irrigation ☐ Test ☐ Municipal

☐ Industrial ☐ Stock ☐ Waste Disposal or Injection

☐ Other ______ (specify type)

4. METHOD DRILLED

☑ Rotary ☐ Air ☐ Hydraulic ☐ Reverse rotary

☑ Cable ☐ Dug ☐ Other

5. WELL CONSTRUCTION

Casing schedule: ☑ Steel ☐ Concrete ☐ Other

Thickness		Diameter		From		To	
.925	inches	20	inches	+ 1½	feet	18	feet
	inches		inches		feet		feet
	inches		inches		feet		feet
	inches		inches		feet		feet

Was casing drive shoe used? ☐ Yes ☑ No

Was a packer or seal used? ☐ Yes ☑ No

Perforated? ☐ Yes ☑ No

How perforated? ☐ Factory ☐ Knife ☐ Torch

Size of perforation ____ inches by ____ inches

Number		From		To	
	perforations		feet		feet
	perforations		feet		feet
	perforations		feet		feet

Well screen installed? ☐ Yes ☑ No

Manufacturer's name

Type ______ Model No. ______

Diameter ___ Slot size ___ Set from ___ feet to ___ feet

Diameter ___ Slot size ___ Set from ___ feet to ___ feet

Gravel packed? ☐ Yes ☑ No ☐ Size of gravel

Placed from ______ feet to ______ feet

Surface seal depth 18' Material used in seal: ☑ Cement grout ☐ Puddling clay ☐ Well cuttings

Sealing procedure used: ☐ Slurry pit ☐ Temp. surface casing ☑ Overbore to seal depth

Method of joining casing: ☐ Threaded ☑ Welded ☐ Solvent Weld

☐ Cemented between strata

Describe access port

6. LOCATION OF WELL

Sketch map location must agree with written location.

Subdivision Name

Lot No. ____ Block No. ____

County Elmore

NE ¼ NW ¼ Sec. 36, T. 4 N, R. 5 W

7. WATER LEVEL

Static water level 382 feet below land surface

Flowing? ☐ Yes ☑ No G.P.M. flow

Artesian closed in pressure ______ p.s.i.

Controlled by ☐ Valve ☐ Cap ☐ Plug

Temperature 70 °F. Quality

8. WELL TEST DATA

☐ Pump ☐ Bailer ☐ Air ☐ Other

Discharge G.P.M.	Pumping Level	Hours Pumped

9. LITHOLOGIC LOG

Hole Diam.	Depth From	Depth To	Material	Water Yes	Water No
20	0	3	topsoil		✓
	3	15½	clinkers, boulders		✓
	15½	210	lava		✓
	210	240	lava & cinders	✓	
	240	410	lava rock	✓	
	410	425	brown clay, gravel & lava	✓	
	425	445	very sandy brown clay	✓	
	445	490	clay	✓	
	490	645	brown sandy conglomerate	✓	

10.

Work started 6-15-79 finished 11-7-79

11. DRILLERS CERTIFICATION

I/We certify that all minimum well construction standards were complied with at the time the rig was removed.

Firm Name Gailey Drilling & Pump Co. Firm No. 291

Address Star Rt. B Box 19-E Mountain Home, ID Date 11-24-79

Signed by (Firm Official) [signature]

and

(Operator) [signature]

USE ADDITIONAL SHEETS IF NECESSARY — FORWARD THE WHITE COPY TO THE DEPARTMENT

No. 32

REPORT OF WELL DRILLER
State of Idaho

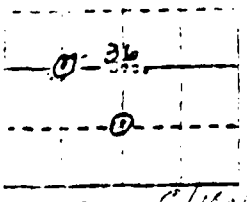
State law requires that this report shall be filed with the State Reclamation Engineer within 30 days after completion or abandonment of the well.

WELL OF:
Name Frances Brooks
Address No Boy 484
Caldwell Idaho
Owner's Permit No. G 12170
NATURE OF WORK (check): Replacement well ☐
New well ☒ Deepened ☐ Abandoned ☐
Water is to be used for:
METHOD OF CONSTRUCTION: Rotary ☐ Cable ☒
Dug ☐ Other (explain)
CASING CONDITION: Threaded ☐ Welded ☐
"Diam. from ft. to ft.
"Diam. from ft. to ft.
"Diam. from ft. to ft.
"Diam. from ft. to ft.
Thickness of casing: Material:
Steel ☒ concrete ☐ wood ☐ other ☐
PERFORATED? Yes ☐ No ☒ Type of perforator used:
Size of perforations: " by "
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.
WAS CASING SCREENED? Yes ☐ No ☐
Manufacturer's name
Type Model No.
Diam. Slot size Set from ft. to ft.
Diam. Slot size Set from ft. to ft.
CONSTRUCTION: Well gravel packed? Yes ☐ No ☐ Size of gravel Gravel placed from ft. to ft. Surface seal provided? Yes ☐ No ☐ To what depth? ft. Material used in seal:
Did any strata contain unusable water? Yes ☐ No ☒ Type of water:
Depth of strata ft. Method of sealing strata off:
Surface casing used? Yes ☐ No ☐
Cemented in place? Yes ☐ No ☐

Size of drilled hole: 20" Total depth of well: 410 Standing water level below ground: 315 Temp. Fair. ° Test delivery: gpm or cfs Pump? ☐ Bail ☐
Size of pump and motor used to make test:
Length of time of test: hrs. min.
Drawdown: ft. Artesian pressure: ft. above land surface Give flow cfs or gpm. Shut-off pressure:
Controlled by: Valve ☐ Cap ☐ Plug ☐
No control ☐ Does well leak around casing? Yes ☐ No ☐

DEPTH FROM	DEPTH TO	MATERIAL	WATER YES OR NO
0	30	tan soil	
30	160	grey lava	X
160	280	red lava	X
280	314	hard grey lava	X
314	360	red lava	X
360	395	hard gray lava	X
395	409	cinders	wet
409	416	sand brown	wet

Locate well in section



County Canyon
Sec. 36 T. 4N S. 5E W.

Work started: Mar 15 1964
Work finished: May 1 1964
Well Driller's Statement: This well was drilled under my supervision and this report is true to the best of my knowledge.
Name:
Address:
Signed by:
License No. 186 Date: Nov 11 1967

See other side for additional remarks

1592

Best Copy - no charge

Form 238-7
1-78

No. 36

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES

WELL DRILLER'S REPORT

State law requires that this report be filed with the Director, Department of Water Resources within 30 days after the completion or abandonment of the well

1. WELL OWNER

Name: Don Brandt
Address: Mt Home
Owner's Permit No.

2. NATURE OF WORK

[X] New well   [ ] Deepened   [ ] Replacement
[ ] Abandoned (describe method of abandoning)

3. PROPOSED USE

[X] Domestic   [ ] Irrigation   [ ] Test   [ ] Municipal
[ ] Industrial   [ ] Stock   [ ] Waste Disposal or Injection
[ ] Other (specify type)

4. METHOD DRILLED

[X] Rotary   [X] Air   [ ] Hydraulic   [ ] Reverse rotary
[ ] Cable   [ ] Dug   [ ] Other

5. WELL CONSTRUCTION

Casing schedule: [X] Steel   [ ] Concrete   [ ] Other

Thickness	Diameter	From	To
.250 inches	6 5/8 inches	+ 1 feet	49 feet
inches	inches	feet	feet
inches	inches	feet	feet
inches	inches	feet	feet

Was casing drive shoe used? [X] Yes [ ] No
Was a packer or seal used? [ ] Yes [X] No
Perforated? [ ] Yes [X] No
How perforated? [ ] Factory [ ] Knife [ ] Torch
Size of perforation ____ inches by ____ inches

Number		From	To
	perforations	feet	feet
	perforations	feet	feet
	perforations	feet	feet

Well screen installed? [ ] Yes [X] No
Manufacturer's name
Type   Model No.
Diameter ___ Slot size ___ Set from ___ feet to ___ feet
Diameter ___ Slot size ___ Set from ___ feet to ___ feet
Gravel packed? [ ] Yes [X] No [ ] Size of gravel
Placed from ___ feet to ___ feet
Surface seal depth 49   Material used in seal [ ] Cement grout
[X] Puddling clay   [X] Well cuttings
Sealing procedure used [ ] Slurry pit [ ] Temp. surface casing
[X] Overbore to seal depth
Method of joining casing [ ] Threaded [X] Welded [ ] Solvent Weld
[ ] Cemented between strata
Describe access port

6. LOCATION OF WELL

Sketch map location must agree with written location.

Subdivision Name

Lot No.   Block No.

County: Elmore

NE . NE . Sec. 25 , T. 4 , R. 4

7. WATER LEVEL

Static water level 320 feet below land surface
Flowing? [ ] Yes [X] No   G.P.M. flow
Artesian closed-in pressure ___ p.s.i.
Controlled by: [ ] Valve [ ] Cap [ ] Plug
Temperature ___ °F. Quality

8. WELL TEST DATA

[ ] Pump [ ] Bailer [X] Air [ ] Other

Discharge G.P.M.	Pumping Level	Hours Pumped
		1

9. LITHOLOGIC LOG

Hole Diam.	Depth From	Depth To	Material	Water Yes	Water No
8	0	2	Top Soil		
	2	11	Sand		
	11	21	Sand & Gravel		
	21	27	Clay		
	27	44	Sand & Gravel		
	44	49	Grey Lava		
6"	49	58	Gray Lava		
	58	71	Brown Lava		
	71	82	Grey Lava		
	82	90	Brown Lava		
	90	115	Grey Lava		
	115	117	Gray Cinders		
	117	139	Grey Lava		
	139	141	Brown Cinders		
	141	160	Grey Lava		
	160	168	Brown Lava		
	168	202	Grey Lava		
	202	206	Brown Lava & Cinders		
	206	208	Red Cinders		
	208	215	Brown Lava		
	215	240	Grey Lava		
	240	245	Brown Lava & Cinders		
	245	247	Grey Lava		
	247	259	Brown Lava & Cinders		
	259	264	Grey Lava		
	264	266	Red Cinders		
	266	281	Brown Lava		
	281	430	No Return	X	

FEB 1981

Department of Water Resources

10.

Work started Oct 21, 81   finished Oct 22, 81

11. DRILLERS CERTIFICATION

I/We certify that all minimum well construction standards were complied with at the time the rig was removed.

Firm Name: Hiddleston Drilling   Firm No. 35
Address: MTN Home   Date: Oct 21/81
Signed by (Firm Official): [signature]
and
(Operator): [signature]

USE ADDITIONAL SHEETS IF NECESSARY — FORWARD THE WHITE COPY TO THE DEPARTMENT

Form 738 7
1 78

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES

WELL DRILLER'S REPORT

State law requires that this report be filed with the Director, Department of Water Resources within 30 days after the completion or abandonment of the well

1 WELL OWNER
Name Don Brandt
Address Mtn Home, ID
Owner's Permit No.

7 WATER LEVEL
327 feet below land surface
Date

2 NATURE OF WORK
X New well
Abandoned

WELL TEST DATA
X Bailer Air

3 PROPOSED USE

4 METHOD DRILLED
Rotary Air Hydraulic Reverse rotary
X Cable Dug Other

5 WELL CONSTRUCTION
Casing schedule X Steel Concrete Other

Thickness	Diameter	From	To
250 inches	20 inches	1 feet	72 feet
inches	inches	feet	feet
inches	inches	feet	feet
inches	inches	feet	feet

Was casing drive shoe used? Yes ✓ No
Was a packer or seal used? Yes ✓ No
Perforated? Yes ✓ No
How perforated? Factory Knife Torch
Size of perforation inches by inches

Number	From	To
perforations	feet	feet
perforations	feet	feet
perforations	feet	feet

Well screen installed? Yes ✓ No
Manufacturer's name
Type Model No
Diameter Slot size Set from feet to feet
Diameter Slot size Set from feet to feet
Gravel packed? Yes No Size of gravel
Placed from feet to feet
Surface seal depth 72 Material used in seal Cement grout
X Puddling clay Well cuttings
Sealing procedure used Slurry pit Temp. surface casing
X Overbore to seal depth
Method of joining casing Threaded ✓ Welded Solvent Weld
Cemented between strata
Describe access port

9 LITHOLOGIC LOG

Hole Diam	Depth From	Depth To	Material	Water Yes No
24	0	45	sandy clay	
	45	66	stickey clay	
24/20	66	93	black lava	
20	93	107	red lava	
	107	120	gray lava	
	120	126	red lava	
	126	135	gray lava	
	135	181	brown lava & clay seams	
	181	195	clay & cinders	
	195	203	black lava	
	203	233	red lava	
	233	243	brown lava	
	243	250	red lava & clay	
	250	262	red lava	
	262	273	brown lava	
	273	320	hard grsy lava	
	320	335	brown lava	✓
	335	345	gray lava hard	
	345	360	cinder sandstone & boulders	✓
	360	380	brown lava cinders & clay	
	380	388	hard gray lava	
	388	405	sandy brown clay	
	405	410	sand & large gravel	✓

RECEIVED
JUN 29 1982
Department of Water Resources
Western Regional Office

10
Work started 11-11-81 finished 3-21-82

6 LOCATION OF WELL
Indicate location with an X
N
W E
S
Subdivision Name
Lot No. Block No.
Twp. 04 N Rge. 08 E Sec. 25

11 DRILLERS CERTIFICATION
I/We certify that all minimum well construction standards were complied with at the time the rig was removed
Driller Middleton Driller No. 35
Address Mtn Home Date 6/7/82
Signature of Driller or Authorized Representative

WHITE COPY TO THE DEPARTMENT

Form 238-7 1 of 2
1/78

No. 38

BALLPOINT PEN

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

State law requires that this report be filed with the Director, Department of Water Resources within 30 days after the completion or abandonment of the well.

1. WELL OWNER

Name: DON BRANDT

Address: MTN Home, ID

Owner's Permit No.

7. WATER LEVEL

331 ✓

G.P.M. flow

Temperature °F Quality

2. NATURE OF WORK

✓ New well Deepened Replacement

Abandoned (describe method of abandoning)

8. WELL TEST DATA

✓ Pump Bailer Air Other

Discharge G.P.M.	Pumping Level	Hours Pumped

3. PROPOSED USE

Domestic ✓ Irrigation Test Municipal
Industrial Stock Waste disposal or injection
Other (specify type)

4. METHOD DRILLED

✓ Rotary ✓ Air Hydraulic Reverse rotary
Cable Dug Other

9. LITHOLOGIC LOG

Hole Diam.	Depth From	Depth To	Material	Water Yes	Water No
20"	0	3	Top Soil		
	3	10	Tan Clay		
	10	25	Sand & Clay		
	25	68	Clay		
	68	72	G Lava Soft		
20"	72	76	Hard Gray Lava		
16"	76	165	Gray Lava		
	165	170	Brn Brkn Lava		
	170	173	Gray Lava		
	173	185	Brkn Gry Lava		
	185	198	Gray Lava		
	198	201	Brn Lava Brkn		
	201	205	" " Hard		
	205	236	Gry Lava		
	236	254	Brn Lava		
	254	256	Brn Lava w/ Minor Talc & Cinders		
	256	257	Gry Lava		
	257	258	Brn Lava Cinders & Talc		
	258	273	Hard Brn Lava		
	273	274	Brn Lava Cinders & Talc		
	274	277	Brn Lava		
	277	278	Brn Lava Brkn		
	278	291	" " Hard		
	291	307	Gry Lava		
	307	317	Brn Lava Clay & Cinders Brkn	✓	
	317	326	Gry Lava		
	326	327	Loose Gry & Brn Lava		
	327	331	Gry Lava		
	331	333	Loose Gry Lava		
	333	337	Brn Lava		
	337	338	" " Brkn		
	338	339	" " Firm		
	339	385	Hard Gry Lava		
	385	400	Loose Brn Cinders & Lava	✓	
	400	405	Tan Clay		
15"	405	408	Brn Lava Some Gravel		

RECEIVED
JUN 29 1982
Department of Water Resources
Western Regional Office

5. WELL CONSTRUCTION

Casing schedule: ✓ Steel Concrete Other

Thickness	Diameter	From	To
.250 inches	16 inches	1 feet	74 feet
inches	inches	feet	feet
inches	inches	feet	feet
inches	inches	feet	feet

Was casing drive shoe used? Yes ✓ No
Was a packer or seal used? Yes ✓ No
Perforated? Yes ✓ No
How perforated? Factory Knife Torch
Size of perforation ___ inches by ___ inches

Number	From	To
perforations	feet	feet
perforations	feet	feet
perforations	feet	feet

Well screen installed? Yes ✓ No
Manufacturer's name
Type Model No.
Diameter Slot size Set from feet to feet
Diameter Slot size Set from feet to feet
Gravel packed? Yes ✓ No Size of gravel
Placed from feet to feet
Surface seal depth 74 Material used in seal: Cement grout ✓ Puddling clay ✓ Well cuttings
Sealing procedure used: Slurry pit Temp. surface casing ✓ Overbore to seal depth
Method of joining casing: Threaded ✓ Welded Solvent Weld
Cemented between strata
Describe access port

10.

Work started 8 MAR 82 finished 21 MAR 82

6. LOCATION OF WELL

Sketch map location must agree with written location.

Subdivision Name

Lot No. Block No.

County

NE NE - 25 , 5 4 S 4 E

11. DRILLERS CERTIFICATION

I/We certify that all minimum well construction standards were complied with at the time the rig was removed.

Firm Name Hiddleston Drilling Firm No. 35

Address MTN Home 30A Date 22 MAR 82

Signed by (Firm Official) [signature]

and

(Operator) R Dack

USE ADDITIONAL SHEETS IF NECESSARY — FORWARD THE WHITE COPY TO THE DEPARTMENT

2 of 2

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES

WELL DRILLER'S REPORT

State law requires that this report be filed with the Director, Department of Water Resources within 30 days after the completion or abandonment of the well.

1 WELL OWNER

Name DON BRANDT
Address Mtn Home, Id.

331

2 NATURE OF WORK

New well ✓
Abandonment

3 PROPOSED USE

Domestic
Irrigation
Municipal
Industrial
Test Well
Other

4 METHOD DRILLED

Rotary ✓ Air ✓ Hydraulic Reverse Rotary
Cable Dug Other

5 WELL CONSTRUCTION

Casing schedule: Steel Concrete Other

Thickness	Diameter	From	To
inches	inches	feet	feet
inches	inches	feet	feet
inches	inches	feet	feet
inches	inches	feet	feet

Was casing drive shoe used? Yes No
Was a packer or seal used? Yes No
Perforated? Yes No
Method of perforating: Factory Knife Torch
Size of perforation inches by inches

Number	From	To
perforations	feet	feet
perforations	feet	feet
perforations	feet	feet

Well screen installed? Yes No
Manufacturer's name
Type Model No

Diameter	Slot size	Set from	feet to feet
Diameter	Slot size	Set from	feet to feet

Gravel packed: Yes No Size of gravel
Placed from feet to feet
Surface seal depth Material used in seal: Cement grout
Puddling clay Well cuttings
Sealing procedure used: Slurry pit Temp. surface casing
Overbore to seal depth
Method of joining casing: Threaded Welded Solvent Weld
Cemented between strata
Describe access port

7 WATER LEVEL & PRODUCTIVITY TEST DATA

Static Air

Depth	Time	Water Level	Pumping Rate

8 LITHOLOGIC LOG

Hole Diam	Depth From	Depth To	Material	Water Yes	Water No
16	0	413	G LAVA		
16	413	445	BRN SANDSTONE CINDERS LAVA GRAVEL (RIVER) and CONGLOMERATE	✓	

16" to 420

10

Work started 8 Nov 82 finished 11 Nov 82

6 LOCATION OF WELL

Sketch map location must agree with written location

N
W E
S

Subdivision Name
Lot No Block No

County
NE NE Sec 25 T 4 S R 4 E

11 DRILLERS CERTIFICATION

I/We certify that all minimum well construction standards were complied with at the time the rig was removed.

Firm Name Hiddleston Drlg Firm No 35
Address Mtn Home Ida. Date 22 Nov 82
Signature (Firm Official)
and
Operator

FORWARD THE WHITE COPY TO THE DEPARTMENT

APPENDIX B

LABORATORY AND FIELD QUALITY CONTROL PROGRAMS

APPENDIX B

LABORATORY QUALITY CONTROL PROGRAM

UBTL is an accredited laboratory of the American Industrial Hygiene (AIHA) Association (No. 17) and, as such, participates in an extensive interlaboratory proficiency analytical testing program sponsored by the National Institute for Occupational Safety and Health (NIOSH). In addition, UBTL is currently licensed by the Center for Disease Control (CDC) to perform chemical and clinical analyses of biological specimens and is State of Utah/USEPA approved for environmental analyses. The comprehensive internal quality control program at UBTL is detailed as follows.

INTRODUCTION

UBTL has implemented an effective system for Quality Control (QC) for samples analyzed from Mountain Home AFB. Procedures that are employed include:

1. Services of a full-time Quality Control/Quality Assurance Section.
2. Preparation of internal quality control samples.
3. Collection and evaluation of quality control data.
4. Generation of quality control charts.
5. Instrument calibration and maintenance.

SAMPLE ANALYSES

At least one blank sample and one reagent blank are included with each set of analyses and processed through the complete analytical procedure in order to detect any contamination in either collection media or reagents. In addition, duplicate analyses are accomplished on a minimum of 10 percent of all samples submitted from the field. Internal quality control samples, generated in the laboratory and containing known quantities of specified analyte(s), are run at the rate of 10 percent of the total field sample workload. At the completion of the analysis of a sample set, each chemist calculates his results and reports the results on the Analytical Report Form. Results for replicated samples and internal quality control samples are reported on the computer-generated Quality Control Data Sheet. Before the results are submitted to the Group Leader, another peer chemist analyst is assigned to check results for possible errors in the calculations. He must approve results reported on both the quality control sheet and the sample sheet. The Group Leader, after his evaluation of the data, gives the report sheets to the Quality Assurance Specialist (QAS) for his evaluation and implementation of any required action.

Specific steps are followed when any one QC sample result is determined to be out of control in connection with the analysis of a field sample set. QC charts with adjusted control limits of $\pm$ 3 standard deviations will generally be used to determine whether a result is out of control. If QC results are in control, the QAS signs off the report. It is then reviewed by the Section Head for accuracy of the results. Upon final approval of the reports by the QAS and the Section Head, the reports are sent to the sponsor.

The paperwork containing the raw data for a sample set (i.e., chart paper, computer readouts, paper tapes, calibration curves, tables of data, etc.) is collected and placed in an 8½-inch by 11-inch envelope that has been labeled with sample numbers, analyst, date, and other pertinent information. The envelopes are filed by laboratory number for possible future reference and data retrieval. Raw data for each sample analysis are therefore readily available, if needed.

QUALITY CONTROL SAMPLE DATA ANALYSIS

A record of the preparation of internal QC samples is detailed in the QC log book maintained by the QAS. As appropriate, a set of QC samples is distributed to the chemist along with each sample set at an average rate of at least 10 percent of the submitted samples. The analyses and data evaluations are performed for these QC samples, along with the submitted samples, and results are tabulated on the computer-generated Quality Control Data Sheet. At least duplicate results are reported for each internal QC sample.

QC charts are generated for each analyte through the analysis of QC sample results. Each result is divided by the theoretical value to standardize results so that data from all concentrations can be directly compared for accuracy and precision. When a control data set of N sample results has been accumulated, the following statistics are calculated: mean percent recovery, replicate standard deviation, and set standard deviation. These statistics are then used to determine accuracy and precision QC limits.

The control data set is updated after evaluation of 20 successive QC samples and includes data on the 50 most recent results. Any control sample analysis that is beyond accuracy or precision limits is not used in the subsequent determination of new limits.

EXTERNAL QUALITY CONTROL PROGRAMS

In addition to internally generated QC data, other information concerning QC is provided by the participation of UBTL in four interlaboratory QC programs: NIOSH Proficiency Analytical Testing (PAT) Program; two CDC Blood Lead QC Programs; and State of Utah Environmental Quality Control Program. The PAT Program and the CDC Blood Lead Programs involve the participation of more than 100 laboratories on a nationwide basis. The PAT Program addresses the analysis of filter samples for lead, cadmium, zinc, free silica, and asbestos and the analysis of charcoal tubes for various organic solvents.

LABORATORY DATA REDUCTION

A significant fraction of the Chemistry Department's work involves data processing. Mathematical models, based upon analysis of standard solutions or samples, are generated in order to determine the quantity of analyte present in the samples. Considerable time and effort are saved by the utilization of automated data processing procedures. Data processing by the computer can include, for example, calculations, generation of standard calibration curves, mathematical modeling of standard curves, statistical analyses, and the generation of hard copy output. Advantages intrinsic to the use of an automated system include more accurate calculations, immediate and accurate generation of data plots, fewer transcription errors, and no calculation errors after programs have been verified and documented. In general, the types of data that are processed are those derived from the following techniques: atomic absorption and flame emission spectroscopy, gas and liquid chromatography, optical absorbance spectrophotometry, specific ion electrode, fluorescence spectroscopy, and wet chemistry determinations. Similar functions are employed for QC data. In addition, the data system is utilized to store QC data, provide statistical analyses, and generate and update QC charts. The advantage of the provision for statistical analyses and the production of QC charts by automation is that the charts may be easily updated with minimal effort. QC data and any required action may, therefore, be provided on a daily basis.

REPORTING PROCEDURES

The analytical data are reported to the sponsor at the completion of each sample set. The report includes the following items:

1. A memorandum describing the sample set; the condition and appearance (i.e., homogeneity, integrity, etc.) of the samples upon receipt at UBTL; the method, equipment, and technique used in the determination; any interferences that were observed; and any unusual circumstances that may

have occurred during the analysis. [The limit(s) of detection are also reported.]

2. UBTL Analytical Report Form, including field ID number, laboratory ID number, identification of the analytes, results of each determination, limit(s) of detection, and comments.

3. Other items, such as copies of strip chart recorder output, computer printout sheets, and other raw data (to be included as required).

INSTRUMENTATION

Each major equipment item at the UBTL Chemistry Department undergoes a routine preventive maintenance check on a regular schedule. This check is accomplished by a trained engineer. In addition, performance checks are made by the analyst prior to the analysis of each set of samples. This involves the analysis of one or more standards and a comparison of the values obtained with previous results and conditions. This information is recorded in an instrumentation log.

When an instrument or apparatus malfunctions and the problem is not readily corrected, the appropriate Section Head is notified. If it is determined that a visit by the service representative is required, a service call is scheduled and the QAS is notified. Action by the service representative is recorded by the QAS in the Instrument Maintenance Log, and the appropriate customer field and service order forms are filed, by instrument, in the Instrument Maintenance Log Supplement File. In an effort to monitor and maintain instrument specifications, logs for each of the AA spectrophotometers, the gas chromatographs (GC), the X-ray defractometer (X-ray), and the mass spectrometers (MS) have been provided for the analytical chemists' use each time an analysis is performed. The AA instrumentation logs contain entries for date, analyst, lamp number (if more than one lamp is available), standard concentration (recommended in manual), reading in milliabsorbence units, and a column for when instrumental parameters differ from the recommended conditions listed in the manual. The GC, X-ray, and MS logs contain entries for date, time, analyst, set identification number, and comments on parameters or performance.

A comprehensive analytical chemistry equipment list is included at the end of this document.

TRAINING

UBTL has established a continuing program of training of current personnel with respect to QC procedures. In addition, an intensive program for the training of recently recruited personnel in both analytical methods and techniques and QC policies has been implemented. It is the responsibility of the QAS and the Laboratory Director to train all laboratory personnel.

RESULTS OF THE LABORATORY QC PROGRAM

The results of the QC analyses for ground water, surface water, and soil samples are presented in Tables B-1 and B-2.

Ground Water and Surface Water QC Analyses

The laboratory QC program for ground water and surface water included analyses of spiked and duplicate samples and a method blank for each constituent. The samples used for QC analyses included the east and west lagoon, MH-1, NW-2 samples, and distilled water. In general, the spiked recoveries were satisfactory, ranging from 85 to 110 percent, except for the lagoon samples. Spiked recoveries in the lagoon samples ranged as low as 28 percent because of interference with bacteria in the water. When distilled water was substituted for the lagoon samples, the recoveries were satisfactory. The additional analysis of the spiked distilled water samples by the laboratory demonstrated that the method specified (EPA 608) was not effective in quantifying the pesticides in the lagoon water. Analyses of duplicate samples were also satisfactory. Traces of lead and cadmium were detected in the method blanks while analyzing the west lagoon and W-2 samples. The lead, chromium, and cadmium results for those two samples have been corrected for the concentrations found in the blanks.

Soil QC Analyses

The laboratory QC program for soil samples included one or two spiked and duplicate samples and a method blank for each constituent. With the exception of the oil and grease and the pesticides, the spiked recoveries were between 87 and 110 percent. The oil and grease recovery of 125 percent was slightly higher than the accepted range. The pesticides showed recoveries of less than 10 percent when the spiked samples were analyzed using the specified method. Table B-2 shows that the laboratory analyzed additional spike samples using a sample leachate in order to show that the methodology was satisfactory. The additional testing showed recoveries in the range of 87 to 98 percent with the exception of p,p'-DDT, which was 146 percent. All of the duplicate analyses showed satisfactory reproducibility except lindane, in which there is a ten-fold difference between the duplicate

samples. None of the method blanks contained detectable concentrations of any of the constituents.

TABLE B-1

UBTL QUALITY CONTROL REPORT
Mountain Home AFB - Water Analyses

Parameter	Method	Units	Detection Limit	Spiked Sample	Initial Value	Spike Conc.	Percent Recovered	Split Sample	First Value	Second Value	Method Blank
TOX	9020 (1)	µg/L	10.	E. Lagoon	1830	1850	48.7	E. Lagoon	1950	1870	*
TOC	415.1 (2)	mg/L	1.	MH-1	3.56	1.96	102.5	E. Lagoon	50.4	55.8	*
Oil & Grease	413.2 (2)	mg/L	0.4	(4)				(4)			*
Phenol	420.2 (2)	mg/L	0.01	W-2	*	0.500	92	W-2	*	*	*
Lead	239.2 (2)	mg/L	0.01	W-2	*	0.0952	88	W-2	*	*	0.02 (5)
Nickel	249.2 (2)	mg/L	0.06	W-2	*	0.476	102	W. Lagoon	*	*	*
Chromium	218.2 (2)	mg/L	0.005	W-2	*	0.00952	85	W-2	*	*	*
Cadmium	213.1 (2)	mg/L	0.01	W-2	*	0.0952	109	W. Lagoon	*	0.01	0.07 (5)
Silver	272.1 (2)	mg/L	0.01	W-2	*	0.0952	91	W-2	*	*	*
Aldrin	608 (3)	µg/L	0.005	W. Lagoon	*	5.0	20	W-2	*	*	*
				E. Lagoon	*	5.0	22				
				Dist. H_2O	*	5.0	103				
p,p'-DDT	608 (3)	µg/L	0.02					W-2	*	*	*
o,p-DDT	608 (3)	µg/L	0.02					W-2	*	*	*
DDD	608 (3)	µg/L	0.01					W-2	*	*	*
DDE	608 (3)	µg/L	0.01	W. Lagoon	*	5.0	16	W-2	*	*	*
				E. Lagoon	*	5.0	18				
				Dist. H_2O	*	5.0	94				
Dieldrin	608 (3)	µg/L	0.005	W. Lagoon	*	5.0	36	W-2	*	*	*
				E. Lagoon	*	5.0	34				
				Dist. H_2O	*	5.0	106				
Endrin	608 (3)	µg/L	0.005	W. Lagoon	*	5.0	40	W-2	*	*	*
				E. Lagoon	*	5.0	38				
				Dist. H_2O	*	5.0	101				

TABLE B-1 (Continued)

UBTL QUALITY CONTROL REPORT
Mountain Home AFB - Water Analyses

Parameter	Method	Units	Detection Limit	Spiked Sample	Initial Value	Spike Conc.	Percent Recovered	Split Sample	First Value	Second Value	Method Blank
Heptachlor	608 (3)	µg/L	0.005	W. Lagoon	*	5.0	29	W-2	*	*	*
				E. Lagoon	0.007	5.0	28				
				Dist. H_2O	*	5.0	105				
Heptachlor Epoxide	608 (3)	µg/L	0.005					W-2	*	*	*
Lindane	608 (3)	µg/L	0.005	W. Lagoon	*	5.0	81	W-2	*	*	*
				E. Lagoon	*	5.0	90				
				Dist. H_2O	*	5.0	110				
Methoxychlor	608 (3)	µg/L	0.1					W-2	*	*	*
Chlordane	608 (3)	µg/L	0.2					W-2	*	*	*
Toxaphene	608 (3)	µg/L	1.					W-2	*	*	*
alpha-BHC	608 (3)	µg/L	0.005					W-2	*	*	*
beta-BHC	608 (3)	µg/L	0.01					W-2	*	*	*
delta-BHC	608 (3)	µg/L	0.005					W-2	*	*	*

[B-8]

(1) Test Methods for Evaluating Solid Waste, SW-846, 2nd Ed., 7-82, Modified for use on an O.I. Corp. Model 610 TOX Analyzer.
(2) Methods for Chemical Analysis of Water and Wastes, EPA-600/4-79-020, Revised 3-83.
(3) Methods for Organic Chemical Analysis of Municipal and Industrial Wastewater, EPA-600/4-82-057, 7-82.
(4) QC combined with water extracts of soil samples.
(5) Results have been blank corrected.
* Signifies "below detection limit."

TABLE B-2

UBTL QUALITY CONTROL REPORT
Mountain Home AFB - Soil Analyses (1)

Parameter	Method	Units	Detection Limit	Spiked Sample	Initial Value	Spike Conc.	Percent Recovered	Split Sample	First Value	Second Value	Method Blank
Moisture	Grav.	%	--					DM-1 Bore 1 1:1	14.2	13.5	
								DM-4 Bore 1 4:1	8.39	7.42	
								DM-9 Bore 2 9:2	9.01	9.91	
TOX	9020 (2)	µg/g	5	DM-1 Bore 1 1:1	310	20	94	DM-1 Bore 1 1:1	317	303	*
				DM-4 Bore 1 4:1	670	30	103	DM-4 Bore 1 4:1	641	622	
TOC	415.1 (3)	mg/g	0.01	DM-2 Bore 3 2:3	0.72		97	DM-4 Bore 1 4:1	11.8	9.8	*
				DM-3 Bore 4 3:4	0.65		104				

TABLE B-2 (Continued-2)

UBTL QUALITY CONTROL REPORT
Mountain Home AFB - Soil Analyses

Parameter	Method	Units	Detection Limit	Spiked Sample	Initial Value	Spike Conc.	Percent Recovered	Split Sample	First Value	Second Value	Method Blank
Oil & Grease	413.2 (3)	mg/g	0.06	DM-2 Bore 7 2:7	*	1.5	125	DM-4 Bore 1 4:1	29.2	29.5	*
				DM-3 Bore 2 3:2	*	1.5	110				
Phenol	420.2 (3)	µg/g	5	DM-4 Bore 1 4:1	*		100	DM-4 Bore 1 4:1	*	*	*
Lead	239.1 (3)	µg/g	10	DM-4 Bore 1 4:1	33		105	DM-4 Bore 1 4:1	27.4	39.1	*
Aldrin	608 (4)	µg/L	0.01	DM-9 Bore 2 9:2	*	10	< 10	DM-9 Bore 2 9:2	*	*	*
				Leach DM-9 Bore 2 9:2	*	5	88				
p,p'-DDT	608 (4)	µg/L	0.05	DM-9 Bore 2 9:2	*	5	< 10	DM-9 Bore 2 9:2	*	*	*
				Leach DM-9 Bore 2 9:2	*	5	146				

TABLE B-2 (Continued-3)

UBTL QUALITY CONTROL REPORT
Mountain Home AFB - Soil Analyses

Parameter	Method	Units	Detection Limit	Spiked Sample	Initial Value	Spike Conc.	Percent Recovered	Split Sample	First Value	Second Value	Method Blank
o,p-DDT	608 (4)	µg/L	0.05					DM-9 Bore 2 9:2	*	*	*
DDD	608 (4)	µg/L	0.02					DM-9 Bore 2 9:2	*	*	*
DDE	608 (4)	µg/L	0.02					DM-9 Bore 2 9:2	*	*	*
Dieldrin	608 (4)	µg/L	0.01	DM-9 Bore 2 9:2	0.01	10	< 10	DM-9 Bore 2 9:2	0.01	*	*
				Leach DM-9 Bore 2 9:2	0.01	5	88				
Endrin	608 (4)	µg/L	0.01	DM-9 Bore 2 9:2	*	10	< 10	DM-9 Bore 2 9:2	*	*	*
				Leach DM-9 Bore 2 9:2	*	5	98				

TABLE B-2 (Continued-4)

UBTL QUALITY CONTROL REPORT
Mountain Home AFB - Soil Analyses

Parameter	Method	Units	Detection Limit	Spiked Sample	Initial Value	Spike Conc.	Percent Recovered	Split Sample	First Value	Second Value	Method Blank
Heptachlor	608 (4)	µg/L	0.01	DM-9 Bore 2 9:2	*	10	< 10	DM-9 Bore 2 9:2	*	*	*
				Leach DM-9 Bore 2 9:2	*	5	98				
Heptachlor Epoxide	608 (4)	µg/L	0.01					DM-9 Bore 2 9:2	*	0.04	*
Lindane	608 (4)	µg/L	0.01	DM-9 Bore 2 9:2	0.06	10	< 10	DM-9 Bore 2 9:2	0.01	0.12	*
				Leach DM-9 Bore 2 9:2	0.06	5	87				
Methoxychlor	608 (4)	µg/L	0.1					DM-9 Bore 2 9:2	*	*	*
Chlordane	608 (4)	µg/L	0.2					DM-9 Bore 2 9:2	*	*	*

TABLE B-2 (Continued-5)

UBTL QUALITY CONTROL REPORT
Mountain Home AFB - Soil Analyses

Parameter	Method	Units	Detection Limit	Spiked Sample	Initial Value	Spike Conc.	Percent Recovered	Split Sample	First Value	Second Value	Method Blank
Toxaphene	608 (4)	µg/L	1.0	Leach DM-9 Bore 2 9:2	*	5	90	DM-9 Bore 2 9:2	*	*	*
alpha-BHC	608 (4)	µg/L	0.01					DM-9 Bore 2 9:2	*	*	*
beta-BHC	608 (4)	µg/L	0.01					DM-9 Bore 2 9:2	*	*	*
delta-BHC	608 (4)	µg/L	0.01					DM-9 Bore 2 9:2	*	*	*

(1) Results are not corrected for % moisture.
(2) Test Methods for Evaluating Solid Waste, SW-846, 2nd Ed., 7-82, Modified for use on an O.I. Corp. Model 610 TOX Analyzer.
(3) Methods for Chemical Analysis of Water and Wastes, EPA-600/4-79-020, Revised 3-83, Modified for use with soil samples.
(4) EP Tox extraction performed according to SW-846; water extract analyzed according to EPA Method 608; results reported in µg/L of water extract.
(5) Detection limit raised because of high background.
* Signifies "below detection limit."

FIELD INVESTIGATION QUALITY CONTROL PROGRAM

Quality control of field activities consists of following established procedures during the conduct of the work. In those cases that require the drilling of test borings, installation of piezometers or monitor wells, and taking of soil and water samples, the procedures include the preparation of records to document the compliance with these procedures. These field records include boring logs, monitor well installation records, daily field memoranda, sample shipment and test instruction forms for soil sample testing, and chain-of-custody records for all soil and water samples intended for chemical analyses. The nature of water sample tests was established in advance so that plans could be made to ship samples in an appropriate and timely manner.

The pH and specific conductivity meters used for field water quality measurements were calibrated with known standards immediately before the measurements were made. The HNU photoionization detector and explosimeter used to monitor vapors generated while drilling have internal calibration routines that were followed when the meters were turned on. A detailed description of sampling procedures is located in Section III.

APPENDIX C

CHAIN-OF-CUSTODY RECORDS

DAMES & MOORE CHAIN-OF-CUSTODY RECORD

Sample Source & Client: Mt. Home AFB, Mt. Home, ID

Project Title: Mt Home AFB, IRP Phase II

Job No.: 01016-180

Field Personnel (Signature): [signature]

Date	Time	Sample I.D. No.	Sample Type	No. of Containers	Sampling Site	Remarks
4-11-84	1330	W-1	Ground water	5		Handle all sample bottles with gloves only
↓	1500	W-2	"	10		
	1600	West Lagoon	Surface water	10		Filter and acidify one of the metals bottles
	1700	East Lagoon	"	10		
						TOC, TOX, Oil & Grease, Total Phenol, Metals (Pb, Ni, Cr, Cd, Hg) and Pesticides (Aldrin, DDT, DDD, DDE, Dieldrin, Endrin, Heptachlor, Heptachlor Epoxide, Lindane, Methoxychlor, Chlordane, Toxaphene, alpha-BHC, beta-BHC & delta BHC)

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
[signature]	4-12-84	0705							[signature]	4/12/84	1:35 PM
[signature]	4/12/84	3:00	[signature]	4/12/84	[illegible]						

DAMES & MOORE CHAIN-OF-CUSTODY RECORD

Sample Source & Client: MT. HOME AFB, MT. HOME, ID

Project Title: MT HOME AFB, IRP Phase II

Job No.: 01016-180

Field Personnel (Signature): [signature]

Date	Time	Sample I.D. No.	Sample Type	No. of Containers	Sampling Site
4-11-84	1930	W-1	Ground water	5	
↓	1500	W-2	"	10	
	1600	West Lagoon	Surface water	10	
↓	1700	East Lagoon	"	10	

Remarks

Handle all sample bottles with gloves only

Filter and acidify one of the metals bottles

TOC, TOX, Oil & Grease, Total Phenol, Metals (Pb, Ni, Cr, Cd, Ag) and Pesticides (Aldrin, DDT, DDD, DDE, Dieldrin, Endrin, Heptachlor, Heptachlor Epoxide, Lindane, Methoxychlor, Chlordane, Toxaphene, alpha-BHC, beta-BHC & delta BHC)

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
[signature]	4-12-84	0705	[signature]	4/12	[illegible]				[signature]	4/12/84	1:35 PM
[signature]	4/12/84	3:00 pm	[signature]	4/12/84	3:00 pm				[signature]	4-18-84	

DAMES & MOORE CHAIN-OF-CUSTODY RECORD

Sample Source & Client						Field Personnel (Signature)
Project Title					Job No.	
Date	Time	Sample I.D. No.	Sample Type	No. of Containers	Sampling Site	Remarks
				3		Lab Bottles
				3		
				2		analyze for
				3		TOC, TOX,
				2 (4)		O&G
						4/11/84

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
										4/11/84	11:45 AM
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time

DAMES & MOORE CHAIN-OF-CUSTODY RECORD

Sample Source & Client: U.S. Air Force, MT Home AFB, ID

Project Title: MT Home AFB IRP Phase II

Job No. 01016-186-66

Field Personnel (Signature): Stephen B. Johnson

Date	Time	Sample I.D. No.	Sample Type	No. of Containers	Sampling Site	Remarks
4-12-84	1800	*1, 2	Soil	2	DM-1	
4-12-84	1825	1, 2, 3, 4, 5, 6, 7	Soil	7	DM-2	
4-13-84	0430	1, 2, 3, 4, 5, 6	Soil	6	DM-3	
4-13-84	1410	1, 2, 3, 4, 5, 6, 7	Soil	7	DM-4	
4-13-84	1620	1, 2, 3, 4, 5, 6, 7	Soil	7	DM-5	
4-13-84	1745	1, 2, 3, 4, 5, 6, 7	Soil	7	DM-6	
4-14-84	0500	1, 2, 3, 4	Soil	4	DM-7	
4-14-84	0700	1, 2, 3, 4	Soil	4	DM-8	
4-14-84	0945	1, 2, 3, 4	Soil	4	DM-9	

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
Stephen B. Johnson	4-14-84	1446							[illegible]	4/14/84	5:50 PM
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time	Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time

APPENDIX D

ANALYTICAL REPORT SUMMARIES

TABLE D-1

UBTL ANALYTICAL REPORT
Mountain Home AFB - Water Analyses

Parameter	Method	Units	Detection Limit	W-1	W-2	West Lagoon	East Lagoon	MH-1	MH-3	MH-4	MH-5	MH-6	MH-7
TOX	9020 (1)	µg/L	10.	120	55	1500	1900	82	120	65	86	59	62
TOC	415.1 (2)	mg/L	1.	4	*	20	53	2.	6.	*	2.	*	*
Oil & Grease	413.2 (2)	mg/L	0.4	*	*	1.6	7.4	0.5	*	*	*	*	*
Phenol	420.2 (2)	mg/L	0.01	*	*	*	*						
Lead	239.2 (2)	mg/L	0.01	0.01	*	*	*						
Nickel	249.2 (2)	mg/L	0.06	*	*	*	*						
Chromium	218.2 (2)	mg/L	0.005	*	*	*	*						
Cadmium	213.1 (2)	mg/L	0.01	0.02	*	*	*						
Silver	272.1 (2)	mg/L	0.01	*	*	*	0.01						
Aldrin	608 (3)	µg/L	0.005	*	*	*	*						
p,p'-DDT	608 (3)	µg/L	0.02	*	*	*	*						
o,p-DDT	608 (3)	µg/L	0.02	*	*	*	*						
DDD	608 (3)	µg/L	0.01	*	*	*	*						
DDE	608 (3)	µg/L	0.01	*	*	*	*						
Dieldrin	608 (3)	µg/L	0.005	*	*	*	*						
Endrin	608 (3)	µg/L	0.005	*	*	*	*						
Heptachlor	608 (3)	µg/L	0.005	*	*	*	0.007						
Heptachlor Epoxide	608 (3)	µg/L	0.005	*	*	*	*						
Lindane	608 (3)	µg/L	0.005	*	*	*	*						
Methoxychlor	608 (3)	µg/L	0.1	*	*	*	*						
Chlordane	608 (3)	µg/L	0.2	*	*	*	*						
Toxaphene	608 (3)	µg/L	1.	*	*	*	*						
alpha-BHC	608 (3)	µg/L	0.005	*	*	*	*						
beta-BHC	608 (3)	µg/L	0.01	*	*	*	*						
delta-BHC	608 (3)	µg/L	0.005	*	*	*	0.08						

(1) Test Methods for Evaluating Solid Waste, SW-846, 2nd Ed., 7-82, Modified for use on an O.I. Corp. Model 610 TOX Analyzer
(2) Methods for Chemical Analysis of Water and Wastes, EPA-600/4-79-020, Revised 3-83
(3) Methods for Organic Chemical Analysis of Municipal and Industrial Wastewater, EPA-600/4-82-057, 7-82
* Signifies "below detection limit"

TABLE D-2

UBTL ANALYTICAL REPORT
Mountain Home AFB - Soil Analyses (1)

Parameter	Method	Units	Detection Limit	DM-1 Bore 1 1:1	DM-1 Bore 2 1:2	DM-2 Bore 3 2:3	DM-2 Bore 7 2:7	DM-3 Bore 2 3:2	DM-3 Bore 4 3:4	DM-4 Bore 1 4:1	DM-4 Bore 4 4:4
Moisture	Grav.	%	--	14	2.2	10	14	15	10	8.4	10
TOX	9020 (2)	µg/g	5	310	400	250	250	570	660	670	790
TOC	415.1 (3)	mg/g	0.01	3.5	0.93	0.72	3.9	5.6	0.65	11	2.4
Oil & Grease	413.2 (3)	mg/g	0.06	*	*	0.08	*	*	0.10	29	8.0
Phenol	420.2 (3)	µg/g	5							*	*
Lead	239.1 (3)	µg/g	10	28	41	37	25	26	41	33	23
Aldrin	608 (4)	µg/L	0.01								
p,p'-DDT	608 (4)	µg/L	0.05								
o,p-DDT	608 (4)	µg/L	0.05								
DDD	608 (4)	µg/L	0.02								
DDE	608 (4)	µg/L	0.02								
Dieldrin	608 (4)	µg/L	0.01								
Endrin	608 (4)	µg/L	0.01								
Heptachlor	608 (4)	µg/L	0.01								
Heptachlor Epoxide	608 (4)	µg/L	0.01								
Lindane	608 (4)	µg/L	0.01								
Methoxychlor	608 (4)	µg/L	0.1								
Chlordane	608 (4)	µg/L	0.2								
Toxaphene	608 (4)	µg/L	1.0								
alpha-BHC	608 (4)	µg/L	0.01								
beta-BHC	608 (4)	µg/L	0.01								
delta-BHC	608 (4)	µg/L	0.01								

TABLE D-2 (Continued)

UBTL ANALYTICAL REPORT
Mountain Home AFB - Soil Analyses (1)

Parameter	DM-5 Bore 2 5:2	DM-5 Bore 6 5:6	DM-6 Bore 3 6:3	DM-6 Bore 7 6:7	DM-7 Bore 1 7:1	DM-7 Bore 2 7:2	DM-8 Bore 1 8:1	DM-8 Bore 2 8:2	DM-9 Bore 1 9:1	DM-9 Bore 2 9:2
Moisture	8.4	6.9	12	3.0	8.1	14	13	13	4.6	9.0
TOX	890	250	4700	490						
TOC	9.9	0.27	3.9	0.12						
Oil & Grease	67	0.48	0.09	*						
Phenol	*	*	*	*						
Lead	39	24	27	13						
Aldrin					*	*	*	*	*	*
p,p'-DDT					*	*	2.4	*	*	*
o,p-DDT					*	*	*	*	*	*
DDD					0.09	0.64	1.3	1.3	0.05	*
DDE					*	*	*	*	*	*
Dieldrin					0.03	0.09	0.06	0.09	0.07	0.01
Endrin					*	*	*	0.03	*	*
Heptachlor					*	*	*	*	*	*
Heptachlor Epoxide					*	*	*	*	0.07	*
Lindane					*	*	*	*	0.05	0.01
Methoxychlor					*	*	*	*	*	*
Chlordane					*	<1 (5)	*	*	*	*
Toxaphene					*	*	*	*	*	*
alpha-BHC					*	*	*	*	*	*
beta-BHC					*	*	*	*	*	*
delta-BHC					*	*	*	*	*	*

(1) Results are not corrected for % moisture.
(2) Test Methods for Evaluating Solid Waste, SW-846, Second Ed., July 1982, Modified for use with an OI Corp. Model 610 TOX Analyzer.
(3) Methods for Chemical Analysis of Water and Wastes, EPA-600/4-79-020, Revised March 1983, Modified for use with soil samples.
(4) EP Tox extraction performed according to SW-846, water extract analyzed according to EPA Method 608, results reported in µg/L of water extract.
(5) Detection limit raised because of high background.
*Denotes "below detection limit."

APPENDIX E

REFERENCES

APPENDIX E

REFERENCES

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Young, H.W., 1977, Reconnaissance of Ground Water Resources in the Mountain Home Plateau Area, Southwest Idaho. U.S. Geological Survey Water Resources Investigations Open File Report 77-108, December.

APPENDIX F

BIOGRAPHIES OF KEY PERSONNEL

Curriculum Vitae

KENNETH J. STIMPFL

Title

Partner

Expertise

Environmental Analysis
Impact Assessment
Site and Route Selection
Aquatic Ecology

Experience With Firm

Principal-in-Charge/Project Director

- Site selection and evaluation study for additions to existing fossil power plants, Michigan.
- Environmental assessment, permits and hearing for a new manufacturing plant in Michigan.
- Environmental baseline studies for a fossil-fueled power plant, Michigan.
- Environmental and geohydrological assessment of inactive industrial waste site, Michigan.
- Geohydrological assessment of chemically contaminated site, Michigan.
- Environmental assessment and defense in litigation for oil well development, Michigan.
- Environmental and engineering evaluation of manufacturing plant sites in Iowa, Indiana, Missouri, Michigan, Wisconsin, and Ontario.
- Ecological assessment of potential chemical contamination in the Menominee River, Wisconsin.
- Environmental assessment, preliminary containment design, and negotiation of consent judgment with state and federal agencies for a contaminated chemical plant site, Michigan.
- Site selection study for a new fossil or nuclear power plant, Michigan.
- Preparation of a regulatory compliance plan for a proposed synfuels project, Illinois.
- Radiation survey, assessment, decontamination and health physics monitoring for NRC release of contaminated plant site, Michigan.
- Wetland assessment, development of alternative layouts and agency negotiations regarding a denied 404 permit for a dock in Wisconsin.
- Assessment of environmental enhancement potential through selective dredging of the Little Calumet River for the Chicago District, Corps of Engineers.
- Assessment of potential economic impacts from a proposed regulation to ban landfill disposal of chlorinated solvents for the Illinois Department of Energy and Natural Resources.
- Assessment of aquatic impacts and effects on low-level hydroelectric potential for a variety of proposed dam modifications on the Fox River for the Chicago District, Corps of Engineers.

Project Manager

- Aquatic ecology baseline study and impact assessment for nuclear power plant in Wisconsin, Wisconsin Electric Power Company

- Environmental baseline studies and impact assessment for copper/zinc mine in Wisconsin, Exxon Minerals Company.
- Power plant site selection study.

Past Experience

Sargent & Lundy Engineers, Chicago, Illinois

- Power plant site selection and evaluation studies in Illinois, Iowa, Wisconsin, Indiana, and Oklahoma.
- Ecological baseline studies and impact assessments for thirteen fossil and nuclear power plants.
- Impact assessment, route selection and evaluation of alternative designs for transmission line in West Virginia.
- Evaluation of alternate cooling systems for nuclear power plant.

Faculty Appointment, Indiana University

Assistant Professor of Zoology, Colorado State University

Academic Background

B.S., zoology, Northern Illinois University
M.S., zoology, Colorado State University
Ph.D., limnology, Indiana University

Professional Affiliations

Ecological Society of America; American Society of Limnology and Oceanography; Freshwater Biological Association; Societas Internationalis Limnologiae; Illinois Association of Environmental Professionals; Consulting Engineers Council of Illinois

Registration

Certified senior ecologist (Ecological Society of America)

Publications

Numerous technical reports, environmental assessments and environmental reports

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Curriculum Vitae

GEORGE W. CONDRAT

Title

Senior Engineer

Expertise

Ground Water Hydrology
Engineering Geology
Mining Engineering

Experience With Firm

Project Manager/Principal Investigator

- Ground water contamination evaluations including detailed site investigations, baseline and operational monitoring, predictive modelling and control measures.
- Numerical modelling of ground water flow and chemical contaminant transport from liquid and solid waste disposal sites.
- Preparation of computer programs for management of ground water and geologic data including storage and retrieval, statistical evaluation, plotting and contouring.
- Principal investigator for report of state-of-the-art of uranium tailings disposal.
- Preparation of environmental impact assessments.
- Principal investigator for ground water portion of preliminary safety analysis report for proposed nuclear power plant in Maryland.
- Studies of deep shaft dewatering requirements for uranium mines.
- Siting, design and preparation of environmental assessments for mining, milling, tailings disposal, deep well injection, and heap and in-situ leaching projects in Wyoming, Colorado, Utah, and New Mexico.
- Site selection, investigation and design of earth and tailings dams.
- Engineering geology, soils and geologic hazards investigations.
- Regional and site specific geologic, seismologic and tectonic studies for dams, power plants and other critical facilities.

Past Experience

Senior Officer, Sverdrup & Parcel

Officer, U.S. Army Corps of Engineers in the United States and Vietnam

Assistant Geologist, Guggenheim Exploration Company

Academic Background

Professional Degree of Geological Engineer, Colorado School of Mines
B.S., mining engineering, University of Utah
M.S. candidate, mining engineering, University of Utah

Professional Affiliations

Association of Engineering Geologists; Society of Mining Engineers of AIME; National Water Well Association; Utah Geological Association

Registration

Professional engineer, Utah, Colorado and Wyoming

Publications Coauthor, "Ground Water Contamination and Tailings Ponds" and "Depressurization of a Multilayered Artesian System for Water and Grout Control During Mine Shaft Development"

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Curriculum Vitae

RICHARD L. JONES

Title Project Hydrogeologist

Expertise Ground Water Hydrology
Geology

Experience With Firm Project Hydrogeologist

- Ground water contamination evaluations of copper mill tailings disposal facilities, including design of deep monitoring wells, direction of field data collection, and evaluations of contaminant control alternatives.
- Geologic and hydrologic evaluations of proposed uranium tailings disposal systems and ground water contamination investigations of existing uranium tailings impoundments.
- Investigations of hydrocarbon contamination of aquifers beneath major oil refineries, including monitoring well system design, assessment of the nature and extent of contamination, and design of oil recovery systems.
- Evaluations of the quantity and rate of seepage from phosphate tailings impoundments.
- Evaluation and design of dewatering systems.
- Investigations of natural water seeps and design of seepage control facilities.
- Hydrogeologic evaluation and design of industrial water supply wells.

Past Experience Project Manager/Senior Geologist, Engineering Enterprises

- Hydrogeologic exploration, evaluation and well design of municipal industrial, and irrigation water supply systems.
- Evaluation and rehabilitation of existing municipal and irrigation water well fields.
- Evaluation and assistance in acquisition of water rights for municipal and irrigation well supplies.
- Application and development of computer aquifer models to evaluate and optimize well spacing, well construction and potential aquifer yields.
- Studies of ground water quality in both polluted and unpolluted aquifers.

Academic Background B.S., geology, Utah State University
M.S. and Ph.D., geology, University of Oklahoma

Professional Affiliations American Institute of Professional Geologists; National Water Well Association; American Association for the Advancement of Science; Society of Economic Paleonotologists and Mineralogists

cont.....

Registration Certified professional geologist, American Institute of Professional Geologists

Publications Coauthor, "Proportions of Igneous, Metamorphic and Sedimentary Rocks," Geological Society of America Bulletin

Coauthor, "Separation of Quartz and Feldspar from Mudrock," Journal of Sedimentary Petrology

Senior Author, "Mineral Dispersal Patterns in the Pierre Shale," Journal of Sedimentary Petrology

Curriculum Vitae

STEVEN B. JOHNSON

Title — Staff Hydrologist

Expertise — Ground Water Hydrology

Experience With Firm — As an assistant and staff hydrologist, STEVEN B. JOHNSON has been responsible for the organization and analysis of ground and surface water data. As a principal investigator, he has conducted ground water contamination studies and operated in situ permeability apparatus. In addition, Mr. Johnson has contributed to the hydrologic analyses of siting, baseline, environmental, and final safety analysis reports for several large utilities. Some of his more pertinent experience is as follows:

- Hydrogeological investigation of industrial site, West Virginia.
- Ground water contamination study of industrial site, Michigan.
- In situ permeability study, Missouri.
- Fossil fuel power plant siting study, Wisconsin.
- Deep well sampling project, Wisconsin.
- Baseline ground water and surface water study for fossil fuel plant, Michigan.
- Baseline ground water study for nickel-zinc mine, Wisconsin.
- Nuclear final safety analysis report, ground water section, Kansas.
- Nuclear environmental report, ground water section, Kansas.
- Nuclear preliminary safety analysis report, geology section, Illinois.
- Ground water contamination study of industrial site, Ohio.
- Underground natural gas storage study, Illinois.
- Preparation of RCRA and Arizona hazardous waste permits.
- Site selection for fossil fuel power plant wastes, Wisconsin.
- Installation of ground water monitoring system for uranium tailings pond, Wyoming.
- Investigation of nitrate contamination of ground water, Oklahoma.
- Ground water investigation and RCRA compliance at refinery, New Mexico and Utah.
- Investigation of gasoline spill at service station, Utah.
- Investigation of seepage from fertilizer tailings pond, Utah.
- Conducted pumping tests at a proposed landfill site, Utah.

Academic Background	1975, B.A., Geology, Macalester College, St. Paul, Minnesota. 1977, M.S., Geology, Arizona State University, Tempe, Arizona. M.S. Thesis Topic: Delayed Yield in Unconfined Aquifers.

APPENDIX G

DAMES & MOORE HEALTH AND SAFETY PLAN

DAMES & MOORE
HEALTH AND SAFETY PLAN

Project Name and Number: Phase IIb Environmental Investigation (01016-186-07)

Project Site Location: Mountain Home Air Force Base, Idaho

Project Manager: George Condrat

On-Site Safety Officer:

Plan Preparer: Michael W. Ander

Plan Reviewer: Kim Petschek

Preparation Date: February 7, 1984

Plan Approvals:

Office Safety Coordinator

Michael W. Ander (date)

Managing Principal-in-Charge

George W. Nicholas (date)

Project Manager

George Condrat 14 Feb 1984

George Condrat (date)

I. PURPOSE

The purpose of this Plan is to assign responsibilities, establish personnel protection standards, specify mandatory operating procedures, and provide for contingencies that may arise while operations are being conducted at the site.

II. APPLICABILITY

The provisions of the Plan are mandatory for all on-site Dames & Moore employees and subcontractors engaged in hazardous material management activities including but not limited to initial site reconnaissance, preliminary field investigations, mobilization, project operations, and demobilization.

III. RESPONSIBILITIES

A. Project Manager

The PM shall direct on-site investigation and operational efforts. At the site, the PM, assisted by the on-site Safety Officer, has the primary responsibility for:

1. Assuring that appropriate personnel protective equipment is available and properly utilized by all on-site personnel.

2. Assuring that personnel are aware of the provisions of this plan, are instructed in the work practices necessary to ensure safety, and in planned procedures for dealing with emergencies.

3. Assuring that personnel are aware of the potential hazards associated with site operations (see Tables 1 and 2).

4. Monitoring the safety performance of all personnel to ensure that the required work practices are employed.

5. Correcting any work practices or conditions that may result in injury or exposure to hazardous substances.

6. Preparing any accident/incident reports (see attached Accident Report Form).

7. Assuring the completion of Plan Acceptance and Feedback forms attached herein.

B. Project Personnel

Project personnel involved in on-site investigations and operations are responsible for:

1. Taking all reasonable precautions to prevent injury to themselves and to their fellow employees.

2. Implementing Project Health and Safety Plans, and reporting to the PM for action any deviations from the anticipated conditions described in the Plan.

3. Performing only those tasks that they believe they can do safely, and immediately reporting any accidents and/or unsafe conditions to the PM.

IV. BACKGROUND

Based on preliminary site evaluations of the Mountain Home Air Force Base, there appear to be five (5) areas that may have generated significant environmental contamination over the lifetime of the facility. Although suspected contaminants have been identified, none has been quantified. However, we anticipate that only relatively low levels of contaminants will be encountered in the proposed drilling and soil and water sampling.

Site No. 1, designated as the Lagoon Landfill Site, served as a sanitary landfill for approximately 4 years, from 1952 to 1956. In 1961-62, two wastewater lagoons were built on top of the sanitary landfill. In addition to general refuse, the lagoon landfill has received POL (waste petroleum, oils, and lubricants) products at a rate of about 6 drums per month. Also, smaller amounts of trichloroethylene and carbon tetrachloride were placed in the landfill.

Site No. 2, the "B" Street Landfill, served as the main base landfill from 1956 until 1969. It accepted sanitary and industrial wastes including POL wastes and fly ash. In the early 1960s, JP-4 and AVGAS tank cleaning sludges were disposed here. Finally, 10 to 20 drums of DDT were buried here in 1969.

Site No. 8, the existing Fire Department Training Area, has been used since 1962. Practice fires were set on the ground by burning POL wastes, waste fuels, and commingled waste oils and solvents. Since 1975, only JP-4 has been used to fuel these fires, although some unauthorized dumping of POL wastes may have occurred after 1975.

Site No. 11, the Fuel Hydrant System Leak/Spill Area, is a location where two major fuel losses have occurred. The first, in the late 1950s, was a leak in an underground fuel transmission line that allowed approximately 50,000 gallons of AVGAS to escape. The second problem was a surface spill of about 14,000 gallons of AVGAS, also in the late 1950s. As a result of both spills, fuel saturation may still exist below the ground surface.

Site No. 12, the Entomology Shop Yard, is an area that has received wash water from pesticide application equipment; as a result, the soils have low concentrations of several pesticides, including DDT.

A. Dames & Moore Activity

Dames & Moore will drill soil borings at Sites 8, 11, and 12 and collect soil samples. Monitoring wells will be installed at Sites 1 and 2, and ground water samples will be collected. Water samples will also be collected from the lagoon at Site 1.

B. Suspected Hazards

Suspected hazards are presented above in as much detail as is currently available. These are: POL (waste petroleum, oils, and solvents) products, trichloroethylene, carbon tetrachloride, JP-4 fuel, AVGAS fuel, and pesticides (including DDT).

V. EMERGENCY CONTACTS AND PROCEDURES

Should any situation or unplanned occurrence require outside or support services, the appropriate contact from the following list should be made:

Agency	Person to Contact		Telephone
D&M Project Manager	G. Condrat	(office)	801-521-9255
		(home)	801-943-3633
D&M Industrial Hygiene and Safety Director	K. Petschek	(office)	914-761-6323
		(home)	212-724-6414
Police			828-2256
Fire			117
Ambulance			828-2233
Hospital			828-6274
Command Post			828-2071
Crime Stop			828-6222

In the event that an emergency develops on site, the procedures delineated herein are to be immediately followed. Emergency conditions are considered to exist if:

- Any member of the field crew is involved in an accident or experiences any adverse effects or symptoms of exposure while on scene.
- A condition is discovered that suggests the existence of a situation more hazardous than anticipated.

The following emergency procedures should be followed:

a. In the event that any member of the field crew experiences any adverse effects or symptoms of exposure while on scene, the entire field crew should immediately halt work and act according to the instructions provided by the Project Manager.

b. The discovery of any condition that would suggest the existence of a situation more hazardous than anticipated should result in the evacuation of the field team and reevaluation of the hazard and the level of protection required.

c. In the event that an accident occurs, the PM is to complete an Accident Report Form for submittal to the MPIC of the office, with a copy to the Health and Safety Program Office. The MPIC should assure that followup action is taken to correct the situation that caused the accident.

VI. HAZARD CHARACTERISTICS, MONITORING METHODS, AND PROTECTION REQUIRED

Exposure Limits and Recognition Qualities

Information concerning exposure limits and recognition qualities of the known contaminants that are suspected to be on site is presented in Table 1.

Symptoms of Overexposure, Potential Chronic Effects and First Aid Treatment

Symptoms of overexposure to the known suspected contaminants, potential chronic effects of these substances, and first aid treatment information are presented in Table 2.

Monitoring Methods, Action Levels and Protective Measures

Methods for monitoring for suspected contaminants, action levels, and protective measures to be used for various contaminant concentration levels are presented in Table 3.

Protective Equipment Required for On-Site Activities

The protective equipment required may vary, depending on the concentrations and dispersion of contaminants encountered during each phase of the work. Table 4 specifies protective equipment required for each on-site activity.

FORM #IHST-1

REVIEW RECEIPT

PROJECT HEALTH AND SAFETY PLAN

Instructions: This form is to be completed by each person to work on the site and returned to the Program Director-Industrial Hygiene and Safety.

Job No. 01016-186-07

Project: Mountain Home Air Force Base, Idaho

Rev. No. 0 Date 02/07/84

I represent that I have read and understand the contents of the above plan and agree to perform my work in accordance with it.

George W. Conduit
Signed

14 Feb 1984
Date

TABLE 1

EXPOSURE LIMITS AND RECOGNITION QUALITIES

Compound	Exposure Standard[a]	IDLH[b] Level	Recognition Qualities		
			Color	Odor	State
CCl_4 (carbon tetrachloride)	5 ppm	300 ppm	Colorless	Ether-like odor	Liquid
DDT	1 mg/m^3	N.A.	Colorless	Weak, chemical odor	Solid
TCE (trichloroethylene)	50 ppm	1000 ppm	Colorless	Soft, solventy, etheral, chloroform-like	Gas

[a]OSHA permissible exposure limit or ACGIH Threshold Limit Value.

[b]IDLH = immediately dangerous to life or health.

TABLE 2

SYMPTOMS OF OVEREXPOSURE, POTENTIAL CHRONIC EFFECTS AND FIRST AID TREATMENT

Compound	Symptoms of Overexposure			Potential Chronic Effects
	Eye	Skin	Inhalation/Ingestion	
CCl_4	---	Irritation	Nausea, vomiting, dizziness, drowsiness, headache.	Liver and kidney damage, suspected liver carcinogen.
DDT	Irritation	Irritation	Tingling of tongue, lips, and face, dizziness, headache, fatigue, convulsions, sense of apprehension, vomiting.	Suspected liver carcinogen.
TCE	Irritation	Irritation	Drowsiness, dizziness, tremor, loss of coordination, mental confusion, vomiting, abdominal cramps.	Suspected carcinogen, liver and kidney damage, cardiac arrhythmias.

General First Aid Treatment

Eye	Irrigate immediately
Skin	Soap wash promptly
Inhalation	Move to fresh air
Ingestion	Get medical attention

TABLE 3

HAZARD MONITORING METHOD, ACTION LEVELS, AND PROTECTIVE MEASURES

Hazard	Monitoring Method	Action Level	Protective Measures
Explosive atmosphere	Explosimeter or combustible gas meter	<10% LEL*	Continue working.
		10 - 25% LEL	Continue working with continuous monitoring.
		>25% LEL	EVACUATE the area; EXPLOSION HAZARD.
Toxic atmosphere	HNU continuous recorder	>5 units	Don respirator. See Table 1 for exposure standards.

*Lower Explosive Limit (LEL) for TCE = 12.5%.

TABLE 4

PROTECTIVE EQUIPMENT

Level	Protective Equipment	Criteria for Use
C	Full-face respirator with air-purifying cartridges for gas/dusts Disposable coveralls Rubber boots Hard hat with splash shield or safety glasses/goggles Nitrile gloves	When drilling or sampling where dusts become airborne, when organic odors are noticeable, or as indicated by HNU.
D	Rubber boots Disposable coveralls (optional) Nitrile gloves Safety glasses or goggles Hard hat	During sampling activities other than those mentioned above

ATTACHMENT 1

PROTECTIVE EQUIPMENT

I. INTRODUCTION

When field investigation activities are conducted where atmospheric contamination is known or suspected to exist, where there is a potential for the generation of vapors or gases, or where direct contact with toxic substances may occur, equipment to protect personnel must be worn. Respirators are used to protect against inhalation and ingestion of atmospheric contaminants. Protective clothing is worn to protect against contact with and possible absorption of chemicals through the skin. In addition to protective clothing and respiratory protection, safe work practices must be followed. Good personal hygiene practice prevents ingestion of toxic materials.

Personnel equipment to be used has been divided into two categories commensurate with the degree of protection required, namely Levels C and D protection.

II. LEVELS OF PROTECTION

A. Level C

1. Personal Protective Equipment

- o Air-purifying respirator (MSHA/NIOSH approved)
- o Disposable chemical resistant coveralls
- o Gloves, outer, working gloves
- o Gloves, inner, chemical resistant
- o Boots, steel toe and shank
- o Hard hat (face shield)
- o Rubber boots, outer, chemical resistant (disposable)

2. Criteria for Selection

a. Air concentrations of identified substances are such that reduction to at or below the substance's exposure limit is necessary and the concentration is within the service limit of the cartridge.

b. Atmospheric contaminant concentrations do not exceed the Immediately Dangerous to Life or Health (IDHL) levels.

c. Contaminant exposure to unprotected areas (head and neck) are within skin exposure guidelines, or dermal hazards do not exist.

d. Job functions have been determined not to require a higher level of protection.

B. Level D

1. Personal Protective Equipment

- o Coveralls
- o Boots/shoes, safety or chemical resistant, steel toe and shank
- o Boots, outer (chemical resistant disposables)
- o Hard hat (face shield)
- o Gloves

2. Criteria for Selection

a. No indication of any atmospheric hazards.

b. Work function precludes dusting, splashes, immersion, or potential for exposure to any chemicals.

3. Guidance on Selection Criteria

a. Level D protection is primarily a work uniform and should not be worn in any area where the potential for contamination exists.

b. In situations where respiratory protection is not necessary, but site activities are needed, chemical resistant garments — high quality or disposable — must be worn.

III. RESPIRATORY PROTECTION

The following procedures should be used for respiratory protection:

A. Inspect all washers, diaphragms, and facepiece-to-face seal area for any tears, pinholes, deformation, or brittleness. Should any of these exist, use a different respirator.

B. Place the respirator on the face, tighten and use both a positive and a negative pressure test, prior to entering the site, to assure a proper fit. Checking for proper fit involves the following:

1. Negative Pressure Test

Close off the inlet opening of the cartridge or the breathing tube by covering it with the palm of the hand or by replacing the tap seal. Gently inhale so that the facepiece collapses slightly, and hold the breath for 10 seconds. If the facepiece remains in its slightly collapsed condition and no inward leakage of air is detected, the tightness of the respirator is satisfactory.

2. Positive Pressure Test

Remove the exhalation valve cover. Close off the exhalation valve with the palm of the hand. Exhale gently so that a slight positive

pressure is built up in the facepiece. If no outward leakage of air is detected at the periphery of the facepiece, the face fit is satisfactory. (Note: With certain devices, removal of the exhaust valve cover is very difficult, making the test almost impossible to perform.)

ATTACHMENT 2

DAMES & MOORE STANDARD OPERATING PROCEDURES

WORK PRACTICES

1. Smoking, eating, drinking, and chewing tobacco are prohibited in the contaminated or potentially contaminated area.

2. Avoid contact with potentially contaminated substances. Do not walk through puddles, pools, mud, etc. Avoid, whenever possible, kneeling on the ground, leaning or sitting on equipment or ground. Do not place monitoring equipment on potentially contaminated surface (i.e., ground, etc.).

3. All field crew members should make use of their senses (all senses) to alert them to potentially dangerous situations (i.e., presence of strong and irritating or nauseating odors).

4. Prevent, to the extent possible, spillages. In the event that a spillage occurs, contain liquid if possible.

5. Prevent splashing of the contaminated materials.

6. Field crew members shall be familiar with the physical characteristics of investigations, including:

   - o wind direction
   - o accessibility to associates, equipment, vehicles
   - o communication
   - o hot zone (areas of known or suspected contamination)
   - o site access
   - o nearest water sources

7. The number of personnel and equipment in the contaminated area should be minimized consistent with site operations.

8. All wastes generated during D&M and/or subcontractor activities on site should be disposed of as directed by the Field Activity Leader.

HALF-FACE RESPIRATORS

INSPECTION PROCEDURE

1. Look for breaks or tears in the headband material. Also stretch to check the elasticity.

2. Make sure all headbands, fasteners, and adjusters are in place and not bent.

3. Check the facepiece for dirt, cracks, tears, or holes. The rubber should be flexible, not stiff.

4. Look at the shape of the facepiece for possible distortion that may occur if the respirator is not protected during storage.

5. Check the exhalation valve located near the chin between the cartridges by the following:

   - Unsnap the cover;

   - Lift the valve and inspect the seat and valve for cracks, tears, dirt, and distortion; and

   - Replace the cover. It should spin freely.

6. Check both inhalation valves (inside the cartridge holders). Look for same signs as above.

7. Check the yoke for cracks.

8. Make sure the cartridge holders are clean. Make sure the gaskets are in place and the threads are not worn. Also look for cracks and other damage.

9. Check the cartridges for dents or other damage, especially in the threaded part.

DONNING PROCEDURE

1. Screw the cartridge into the holder hand-tight so there is a good seal with the gasket in the bottom of the holder, but don't force it. If the cartridge won't go in easily, back it out and try again.

   Always use cartridges made by the same manufacturer who made the respirator.

2. Place the facepiece over the bridge of your nose and swing the bottom in so that it rests against your chin.

3. Hold the respirator in place and fasten the top strap over the crown of your head.

4. Fit the respirator on your face and fasten the strap around your neck. Don't twist the straps. Use the metal slide to tighten or loosen the fit, but not too tight.

5. Test the fit by:

   - Lightly covering the exhalation valve with the palm of your hand. Exhale. If there is a leak, you will feel the air on your face.

   - Covering the cartridges with the palms of your hands. Again, don't press too hard. Inhale. The facepiece should collapse against your face.

   - If there is a leak with either test, adjust the headbands or reposition the facepiece and test until no leakage is detected.

SANITIZING PROCEDURE

1. Remove all cartridges, plugs, or seals not affixed to their seats.

2. Remove elastic headbands.

3. Remove exhalation cover.

4. Remove speaking diaphragm or speaking diaphragm/exhalation valve assembly.

5. Remove inhalation valves.

6. Wash facepiece and breathing tube in cleaner/sanitizer powder mixed with warm water, preferably at 120° to 140°F. Wash components separately from the facemask, as necessary. Remove heavy soil from surfaces with a hand brush.

7. Remove all parts from the wash water and rinse twice in clean warm water.

8. Air dry parts in a designated clean area.

9. Wipe facepieces, valves, and seats with a damp lint-free cloth to remove any remaining soap or other foreign materials.

PLAN FEEDBACK FORM

Problems with plan requirements:

Unexpected situations encountered:

Recommendations for future revisions:

PLEASE RETURN TO THE FIRMWIDE HEALTH AND SAFETY OFFICE - WP

ACCIDENT REPORT FORM

SUPERVISOR'S REPORT OF ACCIDENT	DO NOT USE FOR MOTOR VEHICLE OR AIRCRAFT ACCIDENTS
TO	FROM TELEPHONE (include area code)
NAME OF INJURED OR ILL EMPLOYEE	
DATE OF ACCIDENT / TIME OF ACCIDENT	EXACT LOCATION OF ACCIDENT
NARRATIVE DESCRIPTION OF ACCIDENT	
NATURE OF ILLNESS OR INJURY AND PART OF BODY INVOLVED	LOST TIME YES ☐ NO ☐
PROBABLE DISABILITY (check one)	
FATAL ☐ / LOST WORK DAY WITH ___ DAYS AWAY FROM WORK ☐ / LOST WORK DAY WITH ___ DAYS OF RESTRICTED ACTIVITY ☐ / NO LOST WORK DAY ☐ / FIRST AID ONLY ☐	
CORRECTIVE ACTION TAKEN BY REPORTING UNIT	
CORRECTIVE ACTION THAT REMAINS TO BE TAKEN (by whom and by when)	
NAME OF SUPERVISOR	TITLE
SIGNATURE	DATE

Photoionization Detector

1. Before attaching the probe, check the function switch on the control panel to make sure it is in the off position.

2. Attach the probe by plugging in the 12 pin plug to the interface on the readout module.

3. Turn the six position function switch to the battery check position. The needle on the meter should read within or above the green battery arc on the scale. If not, recharge the battery. If the red indicator comes on, the battery should be recharged.

4. Turn the function switch to any range setting. Look into the end of the probe briefly to see if the lamp is on. If it is on, it will give a purple glow. Do not stare into the probe for any length of time as UV light can damage your eyes. The instrument is now ready for operation.

5. To zero the instrument, turn the function switch to the standby position and rotate the zero potentiometer until the meter reads zero. Clockwise rotation of the span pot produces a downscale deflection while counterclockwise rotations yields an upscale deflection. Note: No zero gas is needed since this is an electronic zero adjustment. If the span adjustment setting is changed after the zero is set, the zero should be rechecked and adjusted, if necessary. Wait 15 to 20 seconds to ensure that the zero reading is stable. If necessary, readjust the zero.

6. Turn function switch to the 0-20, 0-200, or 0-2000 position.

7. Place probe in the atmosphere to be monitored if the needle moves to the upper limit of the scale change the function switch to the next position.

Combustible Gas Indicators (CGIs)/Explosimeters

In addition to the instructions found below, all CGIs should be calibrated prior to use, in a noncontaminated, fresh air environment. Furthermore, units incorporating an aspirator bulb or other air-drawing device should be checked for leaks in the folling manner:

- Attach all hoses, probes, and other air-drawing devices to CGI

- Place a finger over probe or hose end.

- Operate pump or squeeze aspirator bulb.

In a leak-free system, bulb remains collapsed or pump labors. In a leaking system, bulb regains its shape or pump does not labor.

a. MSA Explosimeter Combustible Gas Indicator

1. Turn Explosimeter on by lifting end of "On-Off" bar on "Rheostat" knob and rotating "Rheostat" knob clockwise 1/4 turn.

2. Flush instrument with fresh air by squeezing and releasing aspirator bulb about five times.

3. Rotate "Rheostat" knob until meter needle rests at zero. (Avoid large clockwise rotation, which sends large current through filament, perhaps shortening its useful life).

4. To sample, place hose or probe end in atmosphere to be measured and operate aspirator bulb about five times.

5. Read percent of lower explosive limit (LEL) as meter needle fluctuates from a steady-state level to a higher level each time the aspirator bulb is flexed. The steady-stater reading indicates the "true" value.

6. Turn Explosimeter off by lifting end of "On-Off" bar on "Rheostat" knob and rotating it counterclockwise until it "clicks". "On-off" bar retracts into "Rheostat" knob.

b. Bacharach Oxygen/Combustible Gas Indicator, Model GPK

1. Rotate "Function" switch clockwise to "Volt Test" position. To avoid decalibration, all knobs must be pulled and rotated at the same time. Motor starts and the "% Oxygen" and "Sniffer" move up scale.

2. Rotate "Volt Adj" knob to bring "Gas Detector" needle over green arrow.

3. Turn "Function" switch clockwise to "On". The "% Oxygen" needle should rise to about 20.8% and "Gas Detector" needle should drop to about zero.

4. Rotate "Oxy Cal" knob to adjust "% Oxygen" needle to black "Calibrate" line.

5. Rotate "Zero Adj" knob to adjust "Gas Detector" needle to zero.

6. Momentarily place finger over hose or thread "Air Intake" nipple and observe the pump working.

7. To sample, place hose end and probe in atmosphere to be measured. Within 30 seconds, steady-state readings are indicated on "% Oxygen" and "Gas Detector" scales.

8. Rotate "Function" switch counterclockwise to "Off".

APPENDIX H

SCOPE OF WORK

STAGED

7 Dec 83

INSTALLATION RESTORATION PROGRAM
PHASE II TASK DESCRIPTION
MOUNTAIN HOME AFB ID

I. DESCRIPTION OF WORK

The purpose of this task is to determine if environmental contamination has resulted from waste disposal practices, fuel spills, pesticide contamination and fire training activities at Mt Home AFB ID; to provide estimates of the magnitude and extent of contamination, should contamination be found; to identify potential environmental consequences of migrating pollutants; to identify any additional investigations and their attendant costs necessary to identify the magnitude, extent and direction of movement of discovered contaminants.

Ambient air monitoring of hazardous and/or toxic material for the protection of contractor and Air Force personnel shall be accomplished when necessary, especially during the drilling operation.

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

A. General

1. Collect and analyze one sample from each of the existing wells (production or otherwise). A maximum of 6 wells shall be sampled. If the well(s) cannot be sampled due to well development, well characteristics (and or other reason), the contractor shall indicate the reason(s) in the report pecified in Item VI below.

a. The U.S. Air Force shall provide to the contractor well logs and other pertinent wells records and information to determine that samples collected are representative.

b. All water samples collected in A.1. above shall analyzed for oil and grease IR Method (EPA Method 413.2), total organic carbons (EPA Method 415.1) and total organic halogens (EPA Method 9020). Required detection limits for above analysis are specified in Atch 1.

2. The areal extent of each site shall be determined by reviewing available aerial photos of the base, and by field reconnaissance.

3. Each location where surface water, sediment, or core samples are collected shall be marked with a permanent marker (where practical), and the location recorded on a project map for the site.

4. All the water samples collected from each well and the lagoon locations shall be analyzed on site for pH, temperature, and specific conductance. Sampling, maximum holding time, and preservation of the samples will strictly comply with the following references: Standard Methods for the Examination of Water and Wastewater, 15th Ed. (1980); ASTM, Part 31 (1980); and methods for Chemical Analysis of Water and Wastes, EPA Manual 600/4-79-020 (1979).

5. All the water and soil samples shall be analyzed in the laboratory for the parameters specified by site in Atch 2. Minimum detection limits for analyses are shown in Attachment 1.

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

1. Lagoon Landfill (Site 1)

a. Complete and sample a monitor well to the main water table below the site. Drill to a depth of about 50 feet below the water table and screen from about 10 feet above the water table to the bottom of the well, with an estimated depth to be approximately 450 feet. The upper 50 feet of the initial boring shall be grouted and cased prior to drilling below that level. It is proposed to drill a 12-inch hole to 50 feet, set 8-5/8 inch OD steel casing to 50 feet, and grout to the ground surface. The grout shall consist of neat cement or sand-cement with the addition of up to 4 percent bentonite. If severe formation losses occur, lost circulation materials or bentonite shall be used for the remaining grouting. After the grout has set, an 8-inch hole shall be advanced to the total depth of the well. A four-inch diameter, flush-threaded Schedule 80 PVC blank pipe and PVC saw-cut screen shall then be lowered into the well. The plastic casing and screen shall be joined with threaded joints, and no adhesive compounds or solvents will be used. A sand pack shall then be tremied into place around the annulus of the screen. The sand pack material shall consist of a clean, washed quartzose sand. Three feet of bentonite pellets shall then be placed on the 8-inch diameter steel pipe to protect the inner PVC casing. The well shall be cleaned and developed by pumping or bailing.

b. A geologic log shall be prepared for the boring based upon cutting samples and drilling characteristics.

c. One water sample shall be collected from the well. A minimum of three times the volume of standing water in the well shall be removed prior to taking samples. The static water level in the well shall be measured.

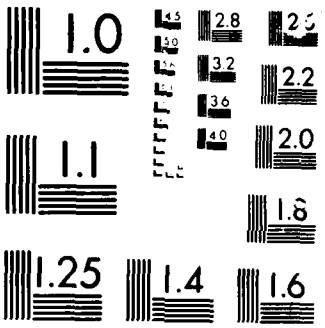
d. One water sample shall be collected from sewage lagoon 2.

2. B Street Landfill (Site 2)

a. Drill a single well to the main water table near the southern perimeter of the B Street Landfill. The work effort shall be as defined in I.B.1 (Site 1) above.

AD-A169 416 INSTALLATION RESTORATION PROGRAM PHASE II 3/3
CONFIRMATION/QUANTIFICATION STAGE I(U) DAMES AND MOORE
PARK RIDGE IL 24 FEB 86 F33615-83-D-4002

UNCLASSIFIED F/G 13/2 NL


1.0
1.1
1.25
1.4
1.6
1.8
2.0
2.2
2.8
3.2
3.6
4.0

b. Collect one ground water sample.

3. Existing Fire Dept Training Area (Site 8)

a. Drill and sample three borings to depths of 10 feet or refusal, whichever is shallower, using hollow stem auger techniques.

b. Samples shall be taken utilizing split spoon sampling techniques at intervals of approximately 18 inches from the ground surface to the total depth of the boring.

c. Upon completion, each borehole shall be backfilled with granular bentonite to within 1 foot of the ground surface. The upper 1 foot of borehole shall be backfilled with natural soil.

d. Based upon visual inspection and HNU readings, two samples from each boring, one in the upper half of the boring and one in the lower portion, shall be selected for laboratory analysis.

e. All soil samples shall be shipped under refrigeration to the chemical laboratory for possible subsequent analysis. Soil samples not selected for analysis shall be frozen and archived for a period of 6 months. Soil samples shall be analyzed for the parameters listed in Atch 2.

4. Fuel Hydrant System Leak/Spill Area (Site 11)

a. Drill and sample three borings to depth of 10 feet or refusal, whichever is shallower, using hollow auger techniques. The work effort shall be as defined in I.B.3. (Site 8) above.

b. All borings shall be drilled into soil southwest of the aircraft apron.

5. Entomology Shop Yard (Site 12)

a. Drill and sample three shallow borings to depths of approximately 5 feet.

b. Obtain two soil samples from each boring over the intervals of 0 to 0.5 foot in depth and 1.0 to 1.5 feet in depth.

c. Obtain additional soil samples at depths of 3 and 5 feet.

d. The borings shall be located at 10, 20, and 30 feet from the northwest wall of the Entomology Shop building.

e. Two shallow soil samples (over the intervals of 0-0.5 feet and 1.0-1.5 feet) from each boring shall be analyzed for pesticides as listed in Atch 1.

f. The two deeper samples (at depths of 3 and 5 feet) from each hole will be stored for potential future analysis.

C. Well Installation and Cleanup

The well and boring area shall be cleaned following the completion of each well or boring. Drill cuttings shall be removed and the general area cleaned. If hazardous waste is generated in the process of well installation the contractor shall be responsible for proper containerization (according to local Civil Engineering Office requirements) for eventual government disposal. Disposal of drill cuttings are not the responsibility of the contractor. the well. Drill cuttings shall be removed and the general area cleaned.

D. Data Review

Results of sampling and analysis shall be tabulated and incoporated in the Informal Technical Information report (Atch 1, Seq 3 and Atch 3, Seq 2 as specified in VI below) and forwarded to USAF OEHL/CVT for review.

E. Report Preparation

1. A draft final report delineating the findings of this field investigation shall be prepared and forwarded to the USAF OEHL as specified in Item VI below. The report shall include a discussion of the regional hydrogeology, well logs of all project wells, data from water level surveys, water quality analysis results, available geohydrologic cross sections, groundwater surface and gradient vector maps, vertical and horizontal flow vectors and Laboratory quality assurance information. The report shall follow the USAF OEHL supplied format (mailed under separate cover).

2. Estimates shall be made of the magnitude, extent and direction of movement of contaminants discovered. Potential environmental consequences of discovered contamination must be identified. Where survey data are insufficient to properly determine or estimate the magnitude, extent and direction of movement of discovered contaminants, specific recommendations, fully justified, shall be made for additional efforts required to properly evalnate contamination migration and included in a separately bound appendix to the draft final report (see F below).

F. Cost Estimates

The contractor shall provide estimates for all additional work recommended to permit proper determination of contaminants. The recommendations provided shall include all efforts required to determine the magnitude and direction of movement of discovered contaminants along with an estimate of the time required to accomplish the proposed effort. This information shall be provided in a separately bound appendix to the draft final report.

II. SITE LOCATION AND DATES:

Mt Home AFB ID
Building, Time and Dates to be established

III. BASE SUPPORT: None

IV. GOVERNMENT FURNISHED PROPERTY: None

V. GOVERNMENT POINTS OF CONTACT:

1. Capt Bob Sarvaideo
USAF OEHL/CVT
Brooks AFB TX 78235
(512) 536-3667
AV 240-3667

2. Capt Gene Killan
USAF Hosp/SGPB
Mt Home AFB ID 83648
(208) 828-6026
AV 857-6026

3. Col Jerry Dougherty
HQ TAC/SGPAE
Langley AFB VA 23665
(804) 764-5035
AV 432-2180

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

Sequence No.	Block 10	Block 11	Block 12	Block 13	Block 14
Atch 1					
4	ONE/R	5.5 MAC	6 MAC	9 MAC	*
3	ONE/T	**	**		
Atch 3					
2	ONE/T	**	**		

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

**Upon completion of analysis.

VII. The ceiling price of Items 0001 and 0002, as contemplated by the payments clause, is $

1

RECOMMENDED LEVELS OF DETECTION (PER USAF OEHL/SA)
(19 Aug 1983)

GENERAL ORGANICS: Detection limits are for water unless shown otherwise:

	ORGANIC ANALYTE	DETECTION LIMIT (µg/L)
	Chemical Oxygen Demand	5000
	Hydrazine	10
	Oil and Grease (IR)	100 (100 µg/g, soil)
	Polychlorinated Biphenyls	0.25 (1 µg/g, soil*)
	Phenol	1
***	Total Organic Carbons(TOC)	1000
***	Total Organic Halogen(TOX)	5 (5 µg/g, soil)
	Volatile Organic Compounds(VOC)	**

*Identify type if possible.

**Per EPA Method 503.1, 601 and 602. Report in µg/g for soils.

***Detection levels for TOC and TOX must be 3 times the noise level of the instrument. Laboratory distilled water must show no response. If so, corrections of positive results must be made.

INORGANICS: Detection limits are for water unless shown otherwise:

INORGANIC ANALYTE	DETECTION LIMIT (µg/L)
Arsenic	10
Boron	100
Cadmium	10
Chloride	1000
Copper	50
Chromium	50 (5 µg/g, soil)
Cyanide	10
Iron (total)	100
Lead	20 (2 µg/g, soil)
Manganese	50
Mercury	1
Nickel	100
Nitrates	100
Silver	10
Sodium	1000
Specific Conductance	1*
Sulfate	1000
Total Dissolved Solids	1000
Zinc	50

*Concentration is in micromhos

PESTICIDES: Analyze samples for chlorinated hydrocarbon and organophosphate pesticides. Detection limits are for water unless shown otherwise:

PESTICIDE ANALYTE	CONC (µg/L)
Aldrin	0.02
DDT isomer	0.02
Dieldrin	0.02
Endrin	0.02
Heptachlor	0.02
Heptachlor epoxide	0.02
Lindane	0.01
Methoxychlor	0.20
Diazinon	0.02
Malathion	0.10
Parathion	0.02
Toxaphene	1.00
2,4-D	0.06
2,4,5-T	0.06
2,4,5-TP silvex	0.06
Chlordane	0.20
alpha-BHC	0.02
beta-BHC	0.02
delta-BHC	0.02

For soils, use the detection levels shown above, but report values as micrograms pesticide per gram of soil.

TABLE 1

PROPOSED PHASE IIb ANALYSES

	FIELD MEASUREMENTS[a]	TOX, TOC, AND OIL AND GREASE	HEAVY METALS	PHENOLS	PESTICIDES[b]	REMARKS
Surface Water Sampling						
Lagoon Landfill (Site 1) and Sewage Lagoon 2	X	X	X[c]	X	X	2 samples
Monitoring Wells						
Lagoon Landfill (Site 1)	X	X	X[c]	X	X	1 sample
B Street Landfill (Site 2)	X	X	X[c]	X	X	1 sample
Soil Sampling						
Existing Fire Department Training Area (Site 8)		X	X[d]	X		6 samples (3 locations, 2 depths)
Fire Hydrant System Leak/Spill Area (Site 11)		X	X[d]			6 samples (3 locations, 2 depths)
Entomology Shop Yard (Site 12)					X[e]	6 samples (3 locations, 2 depths)

[a]Field measurements consist of pH, temperature, and conductivity.

[b]Pesticides consist of aldrin, DDD, DDE, dieldrin, endrin, heptachlor, heptachlor epoxide, lindane, DDT, methoxychlor, chlordane, alpha-BHC, beta-BHC, delta-BHC, and toxaphene.

[c]The following heavy metals will be analyzed: lead, nickel, chromium, cadmium, and silver.

[d]Total lead only, by nitric acid digestion.

[e]EP toxicity extraction.

APPENDIX I

DEFINITIONS, NOMENCLATURE, AND UNITS OF MEASUREMENT

APPENDIX I

DEFINITIONS, NOMENCLATURE, AND UNITS OF MEASUREMENT

ac-ft/yr	Acre-feet per year
AFB	Air Force Base
alluvium	Unconsolidated sediments deposited during comparatively recent geologic time by a stream or other body of running water.
aquifer	A geologic formation, group of formations, or part of a formation that is capable of yielding water to a well or spring.
aromatic	Designating cyclic organic compounds characterized by a high degree of stability in spite of their apparent unsaturated bonds and best exemplified by benzene and related structures, but also evident in other compounds.
artesian	Ground water confined under hydrostatic pressure.
as N	As weight of nitrogen
AVGAS	Aviation gasoline
caliche	An opaque, reddish brown to buff or white calcareous material of secondary accumulation (in place), commonly found in layers on, near, or within the surface of stony soils of arid and semiarid regions, but also occurring as a subsoil deposit in subhumid climates. The cementing material is essentially calcium carbonate, but may contain magnesium carbonate, silica, or gypsum.
CGWA	Critical ground water area
cm/sec	Centimeter(s) per second
DEQPPM	Defense Environmental Quality Program Policy Memorandum
DOD	Department of Defense
downgradient	In the direction of decreasing hydraulic static head; the direction in which ground water flows.
effluent	A liquid waste discharge from a manufacturing or treatment process, in its natural state, or partially or completely treated, that discharges into the environment.
°F	Degrees Fahrenheit
ft	Foot, feet

gpd/ft	Gallon(s) per day per foot
gpm	Gallon(s) per minute
gpm/ft	Gallon(s) per minute per foot of drawdown
HNU	A type of photoionization detector for measurement of organic vapors
hydraulic gradient	In an aquifer, the rate of change of pressure head per unit of distance of flow at a given point and in a given direction.
in.	Inch, inches
IRP	Installation Restoration Program
mg/g	Milligram(s) per gram
mg/L	Milligram(s) per liter
ml	Milliliter(s)
µg/g	Microgram(s) per gram
µg/L	Microgram(s) per liter
MOGAS	Motor gasoline
monitor well	A well used to measure ground water levels and to obtain samples.
No.	Number
NPDES	National Pollutant Discharge Elimination System
OEHL	Occupational and Environmental Health Laboratory
pH	Negative logarithm of hydrogen ion concentration; measurement of acids and bases.
PDWS	Primary drinking water standard(s)
percolation	Movement of moisture by gravity or hydrostatic pressure through interstices of unsaturated rock or soil.
permeability	The property or capacity of a porous rock, sediment, or soil for transmitting a fluid without impairment of the structure of the medium; it is a measure of the relative ease of fluid flow under unequal pressure.
phenols	Any of various acidic compounds analogous to phenol and regarded as hydroxyl derivatives of aromatic hydrocarbons.

Pleistocene	An epoch of geologic time thought to have covered the span between 1.6 million and 10,000 years ago.
POL	Petroleum, oil and lubricants
porosity	The property of a rock, soil, or other material of containing interstices.
potentiometric surface	An imaginary surface representing the static head of ground water and defined by the level to which water will rise in a well.
Precambrian age	Geologic time before the beginning of the Paleozoic; it is equivalent to about 90 percent of geologic time and ended approximately 570 million years ago.
PVC	Polyvinyl chloride
QC	Quality control
RCRA	Resource Conservation and Recovery Act
specific capacity	The rate of discharge of a water well per unit of drawdown, commonly expressed as gallons per minute per foot.
specific conductivity	With reference to the movement of water in soil, a factor expressing the volume of transported water per unit of time in a given area.
STP	Sewage treatment plant
TAC	Tactical Air Command
TDS	Total dissolved solids
Tertiary	The first period of the Cenozoic era, thought to have covered the span of time between 66 and 3 to 2 million years ago.
TOC	Total organic carbon
TOX	Total organic halogens
transmissivity	The rate at which water is transmitted through a unit width under a unit hydraulic gradient.
USAF	United States Air Force
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
water table	That surface of a body of unconfined ground water at which the pressure is equal to that of the atmosphere.

END

DTIC

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