TREASURE VALLEY HYDROLOGIC PROJECT

Geological and Geophysical Framework of the Treasure Valley

Reports on the Ontario, Parma, Notus and Boise Cross Sections

Gregg Beukelman, 1997
TREASURE VALLEY HYDROLOGIC
PROJECT STUDY AREA
Location Map Of Transects
Gregg Beukelman, 1997
Cross section of the Treasure Valley in the Ontario area for the TVHP (Treasure Valley Hydrologic Project): Notes on Geology of the Ontario area, Payette and Canyon Counties, Idaho and Malheur County, Oregon

by Gregg Beukelman

June 14, 1997

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Introduction

The report and enclosed data are a preliminary compilation of information along a transect extending NNE-SSW from just south of the town of Weiser, southwest to the Adrian, Oregon area (Figs. 1a and 1b). The intent of this report is to show the nature of the Late Cenozoic stratified sediments in the upper portion of the western Snake River Plain near it's western extent (Figs. 2a, b, and c). Included for each well along the transect are the well owner, Land Office Grid coordinates, surface elevation (± 10 feet), and diagrams of well construction and lithology (attached). Lithologies, taken from well drillers' reports on record at the Idaho Department of Water Resources and the Boise office of the U. S. Geological Survey for the wells completed in Idaho and the Oregon Water Resources Department for those in Oregon, are plotted in detail where distinctive units of lithologic or hydrogeologic significance are well documented by the driller. Individual drillers' reports are attached to the report should the user wish more detail. Also included is a geologic cross section drawn to show correlatable distinctive lithologic and hydrogeologic boundaries encountered in each well. A 1:100,000 map of the area Fig. 1) is included showing the route of the transect (A-A'), individual well owners and surface geology taken from: Ferns and others, (1993), Othberg and Stanford (1992), Brooks, McIntyre, and Walker (1976), and Savage (1961).

Methods

The cross section included is a graphical presentation of subsurface lithologies based on water well drillers reports and deep exploration wells. Wells along the transect were selected to ensure maximum section coverage. Water well drillers reports were obtained from the Idaho Department of Water Resources for the wells in Idaho and from the Oregon Water Resources Department by means of their Internet-based Grid program for the wells in Oregon. For each well included in the profile (1:24,000 horizontal) the stratigraphic section and well construction, as reported in the drillers logs, were plotted at a vertical scale of 1:1,200 (see attached sheets) and the well completion data noted. Correlations were made at this scale and all data digitized and reduced to produce the cross section in figure 2. Accuracy of all elevations is probably ± 10 feet. No attempt has been made to correlate the upper contact of the lacustrine claystone because of very sparse data. However this contact occurs at about 1300-ft. elevation in the Rube Bolles #1 deep exploration well and about 1700-ft. elevation in the Kiesel Estates well based on a marked decrease in the electrical resistivity signature.
Structure

The structural nature of this area of the plain is inferred to be a normal fault-bounded graben. Faults are thought to be older structures owing to their lack of surface expression and the absence of offset in Pleistocene gravels and overlying Bonneville Flood deposits. Evidence of a major south facing fault near the southern end of the transect includes an approximate 120 ft. offset of the boundary between the overlying brown sediments and the blue sediments below. Additionally, two gravel units that occur at about 2100-ft. elevation in the Brown well are faulted against a monotonous clay in the City of Adrian well (fig. 2a). A small graben occurs in the vicinity of the confluence of the Snake River and the Payette River. This structure is evinced by an offset of the blue-brown sediment boundary (about 110 ft.). Another small graben (offset of less than 40 ft.) occurs near the north end of this transect (fig. 2c). None of these structures has been mapped on any existing surface geologic map and are here based almost exclusively on offset of the blue-brown sediment boundary. Although some of the recognized offset is likely the result of downwarping of sediments during diagenesis, the overall horizontal nature of the blue-brown boundary (0.03° between Malheur Experimental Station well and the American Fine Foods well) suggests that downwarping has been complicated by faulting.

Stratigraphy

The sedimentary section contains Late Cenozoic fluvial and lacustrine deposits and an interbedded basalt units. Basalt is not noted in any of the water wells and can be seen only in the Kiesel Estates well where the first occurrence is at -1600 ft. and in the Ore-Ida well where the first occurrence is at -2450 ft. and the basalt basement is at -6050 ft. (Minus signs indicate elevation below sea level). Surficial deposits include modern flood plain deposits, Bonneville Flood slackwater fine sediments, gravels of Pleistocene age, and older Tertiary age sediments. A typical stratigraphy in the upper portion of the section includes gravels overlain by up to 40 feet of sands and clays. Beneath the gravels is a complex sequence of interfingering gravels, sands, and clays that are interpreted to represent fluvial and shallow lacustrine deposits. This section contains an upper portion in which sediments are commonly some shade of brown, tan, or yellow and a deeper portion having sediments that are described as blue or grey in drillers logs. North of the fault that occurs near the southern extent of the transect, the boundary between these color-defined units is at 2230-ft ± 50 ft elevation except within the graben near the Snake River (1970-ft in the Mills well). The brown-colored unit is up to 130 feet thick beneath the uplands northeast the Snake River, but has apparently been mostly removed by erosion near the Snake River.

The nature of this brown-blue boundary is not well understood but is believed to reflect differences in depositional environment. The blue colored sediments are thought to be an indication of a chemically reducing depositional environment characteristic of lake deposits. The brown colors are more likely caused by oxidation of iron-bearing minerals under unsaturated conditions. Thus, these sediments are thought to represent alluvial, fluvial, and lake margin deposits which would be more apt to be oxidized. Alternatively, it is also possible that recharge by oxygenated waters percolating through reduced (blue) iron minerals may oxidize formerly blue-gray colored deposits. Groundwater that is high in dissolved iron can be associated with the oxidation of reduced iron minerals at a contact between oxidizing and reducing conditions. In
the area of this transect and others completed across the western Snake River Plain, evidence such as the uniform elevation of the contact suggests that this brown-blue contact is the result of original diagenesis. Therefore, this oxidation/reduction contact may well be useful for geologic interpretation of depositional environments.

North of the major fault in the Adrian area, the deeper part of the sedimentary section is composed of over 4000 feet of monotonous lacustrine claystone. The upper contact of this section is at 1700-ft or 1400-ft elevations as interpreted from the electrical resistivity logs of the Kiesel Estates and Rube Bolles #1 deep exploration wells respectively. This upper contact of this unit is the top of the pro-delta mudstone facies interpreted by Wood (1997). The geometry of the upper contact of this claystone cannot be determined from this cross section as only the deep exploration wells penetrate it. Included within the claystone near its base are several interbedded basaltic flows and tuffs.

**Hydrogeology**

The static water level in wells along this transect vary only 100 feet in elevation. All of the wells along this transect are completed in the upper portion of the blue sediments and behave as confined or semiconfined. *Discharge from wells ranges from 10-55 gpm in the southernmost four wells with a general increase in those to the north (90-500 gpm) with two exceptions. The Roberts Farm well was drilled to a depth of about 400 ft. and is dry and the Mills well adjacent to the Snake River drilled to about 520 ft. and producing 8-10 gpm.*

**References**


Idaho Department of Transportation, 1994, 30 X 60 minute series topographic maps of Boise and Weiser, Idaho, scale 1:100,000.


Idaho Department of Water Resources, 1997, microfiche file of drillers reports, Orchard Street Office.

Oregon Water Resources Department, 1997, Files of drillers reports via Internet Grid program.


Figures and enclosures
Figure 1a & b  Map (1:100,000) showing cross section transect, wells used in cross section, surficial geology, and location of deep exploration wells.

Figure 2a, b, and c  Cross section of geology and hydrogeology across the western Snake River Plain in the Ontario, Oregon area.

Figure 2d  Legend for cross section

Attached  Fifteen panels of wells used in cross section showing lithology, well construction, and completion data.

Attached  Drillers reports of selected wells.
FIGURE 1a
ONTARIO CROSS SECTION LOCATION MAP


ADOPTED MAP UNITS

Qa Alluvium of Boise, Payette, and Snake Rivers (1, 2, 3)
Qfe Fluviatile and eolian sediments (4)
Qbf Fluviatile sand, gravel, and silt (Holocene to upper Pleistocene)(1)
Qbg Gravel of Bonneville Flood-scoured Boise Terrace and Boise Floodplain (2)
Qwg Gravel of the Bonneville Flood-scoured Whitney Terrace (2)
Qgs Terrace gravels and alluvial-fan deposits (Holocene? And Pleistocene) (1)
Qcn Caldwell-Nampa sediments (4)
Qws Sandy silt of Bonneville Flood slackwater (3)
Tt Tuffaceous sedimentary rocks (3)

ADOPTED MAP UNITS

Qa Alluvium of Boise, Payette, and Snake Rivers (1,2,3)
Qfe Fluviatile and eolian sediments (4)
Qsbf Fluviatile sand, gravel, and silt (Holocene to upper Pleistocene)(1)
Qswg Gravel of Bonneville Flood-scoured Boise Terrace and Boise Floodplain (2)
Qst Terrace gravels and alluvial-fan deposits (Holocene? And Pleistocene) (1)
Qcn Caldwell-Nampa sediments (4)
Qsw Sandy silt of the Bonneville Flood slack water (2)
Qwgs Sandy silt of Bonneville Flood slack water (2)
Tst Tuffaceous sedimentary rocks (3)
Figure 2a
Treasure Valley Hydrologic Project
Parma Geologic Cross Section
Gregg Beukelman
2/6/97
Figure 2b
Treasure Valley Hydrologic Project
Parma Geologic Cross Section
Gregg Beukelman
2/6/97
Figure 2c
Treasure Valley Hydrologic Project
Parma Geologic Cross Section
Gregg Beukelman
2/6/97
FIGURE 2d

CROSS SECTION LEGEND

Diagram of Typical Well Interval

GEOLOGIC Units (After: (1) Ferns and others, (1993), (2) Othberg and Stanford (1992), (3) Brooks, McIntyre, and Walker (1976), and (4) Savage (1961).

- Qa  Alluvium of Boise, Payette, and Snake Rivers (1,2,3)
- Qfe  Fluvial and eolian sediments (4)
- Qsbf  Fluvial sand, gravel, and silt (Holocene to upper Pleistocene)(1)
- Qbfg  Gravel of Bonneville Flood-scoured Boise Terrace and Boise Floodplain (2)
- Qwfg  Gravel of the Bonneville Flood- scoured Whitney Terrace (2)
- Qas  Terrace gravels and alluvial-fan deposits (Holocene? And Pleistocene) (1)
- Qcn  Caldwell-Nampa sediments (4)
- Qwgs  Sandy silt of the Bonneville Flood slack water (2)
- Tst  Tuffaceous sedimentary rocks (3)

WELL LITHOLOGIC ABBREVIATIONS

- G  Gravel
- Sa(c,m,f)  Sand (coarse, medium, fine)
- C  Clay

When two sediment sizes are combined (C+Sa) the first sediment is the most abundant.

Color modifiers: Brown (Br), White (W), and Blue (Bu) are included for Tertiary sediments.
# 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:** Ray Moore
- **Address:** 2000 North 22nd Ave, Pasco, Washington 99301

Owner's Permit No. [insert]

## 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 (describe)

## 4. METHOD DRILLED

- Rotary
- Air
- Hydraulic
- Default (describe)

## 5. WELL CONSTRUCTION

<table>
<thead>
<tr>
<th>Thickness</th>
<th>Diameter From</th>
<th>Diameter To</th>
<th>25 inches</th>
<th>6 inches</th>
<th>1 foot</th>
<th>2 feet</th>
</tr>
</thead>
<tbody>
<tr>
<td>inches</td>
<td>inches</td>
<td>inches</td>
<td>inches</td>
<td>inches</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Was casing drive shoe used? Yes
- Was a packer or seal used? Yes
- Perforated? Yes

### Casing Schedule

<table>
<thead>
<tr>
<th>Casing</th>
<th>Steel</th>
<th>Concrete</th>
<th>Other</th>
</tr>
</thead>
</table>

### Size of perforation

<table>
<thead>
<tr>
<th>Number</th>
<th>Thickness</th>
<th>25 inches</th>
<th>6 inches</th>
<th>1 foot</th>
<th>2 feet</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>inches</td>
<td>inches</td>
<td>inches</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Well screen installed?

- Yes
- No

### Manufacturer's name

- [insert]

### Type

- [insert]

### Slot size

<table>
<thead>
<tr>
<th>Diameter</th>
<th>Slot size from feet to feet</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Gravel packed?

- Yes
- No

### Placed from | feet to feet

- [insert]

### Surface seal depth

- [insert]

### Material used in seal:

- [insert]

### Cement grout:

- [insert]

### Puddling clay:

- [insert]

### Well cutting:

- [insert]

### Sealing procedure used:

- [insert]

### Temp. surface casing:

- [insert]

### Overdrill to seal depth:

- [insert]

### Method of joining casing:

- [insert]

### Cemented between strata:

- [insert]

### Describe access port

- [insert]

## 6. LOCATION OF WELL

- Sketch map location must agree with written location.

### Subdivision Name

- [insert]

### Lot No.

- [insert]

### Block No.

- [insert]

### County

- Washington

### Township

- N 10N

### Range

- E 5W

### Section

- SE 9

### T

- 9

### NW

- 5

### SW

- 6

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

## 7. WATER LEVEL

- Static water level feet below land surface.
- Flowing? Yes
- No
- G.P.M. flow

## 8. WELL TEST DATA

<table>
<thead>
<tr>
<th>Diameter</th>
<th>Pumping Level</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>H.P.</td>
</tr>
</tbody>
</table>

## 9. LITHOLOGIC LOG

<table>
<thead>
<tr>
<th>Hole</th>
<th>Depth</th>
<th>Material</th>
<th>Water</th>
<th>Yes/No</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>0</td>
<td>top soil</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>3</td>
<td>sandy clay</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>12</td>
<td>sand</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>15</td>
<td>gravel</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>27</td>
<td>blue clay</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>160</td>
<td>white sand</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>307</td>
<td>blue clay</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>308</td>
<td>black sand</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>400</td>
<td>black sand</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Put in temporary bentonite seal he wants to case and go deeper

## 11. DRILLERS CERTIFICATION

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

- **Firm Name:** DALLAS DRILLING
- **Firm No.:** 224
- **Address:** Payette, Idaho
- **Date:** 5/22/80
- **Signed by:** [signature]

- **Operator:** [signature]
## 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:** Ray Moore  
**Address:** 2000 N 22nd Ave.  
**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**

<table>
<thead>
<tr>
<th>Thickness</th>
<th>Diameter</th>
<th>From</th>
<th>To</th>
</tr>
</thead>
<tbody>
<tr>
<td>250 inches</td>
<td>6 inches</td>
<td>660 feet</td>
<td>1 foot</td>
</tr>
<tr>
<td>258 inches</td>
<td>6 inches</td>
<td>680 feet</td>
<td>2 feet</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Number of perforations From</th>
<th>To</th>
</tr>
</thead>
<tbody>
<tr>
<td>___________________________</td>
<td></td>
</tr>
</tbody>
</table>

#### Method of joining casing:

- [ ] Threaded  
- [ ] Welded  
- [ ] Solvent Weld  
- [ ] Cemented between strata

#### Method of joining tubing:

- [ ] Threaded  
- [ ] Welded  
- [ ] Solvent Weld  
- [ ] Other

### 6. LOCATION OF WELL

- **Sketch map location must agree with written location.**

<table>
<thead>
<tr>
<th>N</th>
<th>Subdivision Name</th>
<th>W</th>
<th>Lot No.</th>
<th>Block No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>S</td>
<td></td>
<td>E</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**County:** Washington

### 7. WATER LEVEL

- Static water level: 0 feet below land surface.
- Flowing: [ ] Yes  
- [ ] No  
- G.P.M. flow: 10 G.P.M.
- Artesian closed-in pressure: 100 p.s.i.
- Controlled by:  
  - [ ] Valve  
  - [ ] Cap  
  - [ ] Plug  
- Temperature: 80°F.  
- Quality: Good with gas

### 8. WELL TEST DATA

- **Discharge G.P.M.:** 10  
- **Pumping Level:** 950  
- **Hours Pumped:** 2

### 9. LITHOLOGIC LOG

| Hole | From | To | Material | Water  
|------|------|----|----------|-------|
| 6    | 595  | 400 blue clay  
| 6    | 400  | 405 sandstone  
| 6    | 400  | 430 black/white heaving sand  
| 6    | 440  | 445 blue clay  
| 6    | 451  | 450 black sand heaving heaving  
| 6    | 471  | 470 blue clay  
| 6    | 492  | 498 black sand heaving  
| 6    | 578  | 579 black sand  
| 6    | 625  | 633 hard blue shale casing  
| 6    | 633  | 655 blue shale hard

### 10. Work started  

**Work started:** 10/17/80  
**Finished:** 11/5/80

### 11. DRILLERS CERTIFICATION

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

**Firm Name:** DALLAS DRILLING  
**Firm No.:** 224  
**Address:** Fayette, Idaho  
**Date:** 12/15/80

**Signed by: (Firm Official):** Johnny J. Doe

**Signed by: (Operator):** Johnny J. Doe

---

USE ADDITIONAL SHEETS IF NECESSARY — FORWARD THE WHITE COPY TO THE DEPARTMENT
### WELL DRILLER'S REPORT

**State of Idaho**
**Department of Water Resources**

**WELL OWNER**

- **Name**: Debra Lane
- **Address**: 1463 Laesen Rd
- **Phone**: (208) 962-0550

**7. WATER LEVEL**

- **Static water level**: 
- **Flow**:
- **Temperature**: 77°F
- **Quality**

**8. WELL TEST DATA**

<table>
<thead>
<tr>
<th>Pumping Level</th>
<th>Hour Pumped</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>555</td>
</tr>
<tr>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

**9. LITHOLOGIC LOG**

<table>
<thead>
<tr>
<th>Depth</th>
<th>Material/Depth</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>Brown Clay</td>
</tr>
<tr>
<td>15</td>
<td>Sand and Gravel</td>
</tr>
<tr>
<td>30</td>
<td>Blue Clay</td>
</tr>
</tbody>
</table>

**10. LOCATION OF WELL**

- **Subdivision Name**: 920415
- **County**: Washington

**11. DRILLER'S CERTIFICATION**

Signed by (Firm Official) [Signature]

Signed by (Operator) [Signature]
WATER WELL REPORT
(As required by ORS 257.745)

(1) OWNER:
Name: Big Sky Farms, Inc.
Address: 2100 E. 70th St.
City: Weslaco
State: Texas
Zip: 78572

(2) TYPE OF WORK:
□ New Well □ Deepen □ Recondition □ Abandon

(3) DRILL METHOD:
□ Rotary Air □ Rotary Mud □ Cable
□ Other:

(4) PROPOSED USE:
□ Domestic □ Community □ Industrial □ Irrigation
□ Thermal □ Injection □ Other: Irrigation Test.

(5) BORE HOLE CONSTRUCTION:
Special Construction approval □ Yes □ No: Depth of Completed Well 30\,\text{ft}.
Explosives used □ Yes □ No: Type: Amount:

HOLE

\begin{tabular}{|c|c|c|}
\hline
Diameter & From & To \\hline
16 & 56 & 56 \\hline
9 & 56 & 56 \\hline
\hline
\end{tabular}

# of Material

cement
0

How seal placed: Method □ A □ B □ C □ D □ E
□ Other:

Backfill placed from \text{ft. to} \text{ft}.
Gravel placed from \text{ft. to} \text{ft}.

(6) CASING/LINER:
Casing: □ Yes □ No
Liner: □ Yes □ No

Final location of shoe(s):

(7) PERFORATIONS/SCREENS: □ Yes □ No

<table>
<thead>
<tr>
<th>From</th>
<th>To</th>
<th>Slot size</th>
<th>Material</th>
<th>Depth A</th>
<th>Depth B</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(8) WELL TESTS: Minimum testing time is 1 hour
□ Pump □ Bailer □ Air □ Flowing Artesian

<table>
<thead>
<tr>
<th>Yield gal/min</th>
<th>Drawdown</th>
<th>Drill stem at</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>90</td>
<td>200</td>
<td>1 hr.</td>
<td></td>
</tr>
</tbody>
</table>

Temperature of Water 57°C

Depth Artesian Flow Found □ Yes □ No
Was a water analysis done □ Yes □ No
By whom:

Did any strata contain water not suitable for intended use □ Yes □ No
□ Salty □ Muddy □ Odor □ Colored □ Other:

Depth of strata:

STATE OF OREGON
WATER RESOURCES DEPT.
Salem, Oregon

(9) LOCATION OF WELL by legal description:
County: Malheur
Latitude: \text{°} \text{°} \text{°}
Longitude: \text{°} \text{°} \text{°}
Township: \text{°} \text{°} \text{°}
Range: \text{°} \text{°} \text{°}
Section: \text{°} \text{°} \text{°}
Tax Lot: 2401
Lot: 2
Subdivision: Ontario City

(10) STATIC WATER LEVEL:
\begin{tabular}{|c|c|}
\hline
From & To \\hline
8572 & 42 \\hline
64 & 67 \\hline
\hline
\end{tabular}

\text{Estimated Flow Rate} \text{gal/min} \text{SWL}
\text{21} \text{21} \text{21} \text{21}

(11) WATER BEARING ZONES:

\text{Depth at which water was first found} 22

\begin{tabular}{|c|c|c|}
\hline
Material & From & To \\hline
Sandy Clay & 42 & 21 \\hline
Sandy & 42 & 21 \\hline
Clay & 42 & 21 \\hline
Silt & 67 & 21 \\hline
Silt & 67 & 21 \\hline
\hline
\end{tabular}

(12) WELL LOG:

\begin{tabular}{|c|c|c|c|c|c|c|c|}
\hline
Material & From & To & SWL \\hline
Sandy Clay & 42 & 21 & 21 \\hline
Sandy & 42 & 21 & 21 \\hline
Clay & 42 & 21 & 21 \\hline
Silt & 67 & 21 & 21 \\hline
Silt & 67 & 21 & 21 \\hline
\hline
\end{tabular}

Date started: 12-25-93
Completed: 1-15-94

Water Well Constructor Certification:
I certify that the work I performed on the construction, alteration, or abandonment of this well is in compliance with Oregon well construction standards. Materials used and information reported above are true to my best knowledge and belief.

Signed: [Signature]
WCC Number: 789
Date: 1-26-94

(bonded) Water Well Constructor Certification:
I accept responsibility for the construction, alteration, or abandonment work performed on this well during this time. All work performed during this time is in compliance with Oregon well construction standards. This report is true to the best of my knowledge and belief.

Signed: [Signature]
WCC Number: 299
Date: 1-26-94
(1) OWNER: Max Mills

(2) TYPE OF WORK:
- New Well
- Deepening
- Alteration (repair/recondition)
- Abandonment

(3) DRILL METHOD:
- Rotary Air
- Rotary Mud
- Cable
- Auger
- Other

(4) PROPOSED USE:
- Domestic
- Community
- Industrial
- Irrigation
- Thermal
- Injection
- Livestock
- Other

(5) BORE HOLE CONSTRUCTION:
- Special Construction approval: Yes
- No Depth of Completed Well: 320 ft.
- Explosives used: Yes
- No
- Type
- Amount

<table>
<thead>
<tr>
<th>HOLE</th>
<th>Diameter</th>
<th>From</th>
<th>To</th>
<th>Material</th>
<th>From</th>
<th>To</th>
<th>Amount</th>
<th>pounds</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- How was seal placed: Method
- Other

(6) CASING/LINER:
- Casing from ft. to ft.
- Liner from ft. to ft.
- Material: Sandy Soil
- Size of gravel

(7) PERFORATIONS/SCREENS:
- Perforations Method
- Screens
- Other

<table>
<thead>
<tr>
<th>From</th>
<th>To</th>
<th>Slot size</th>
<th>Number</th>
<th>Diameter</th>
<th>Telepipe size</th>
<th>Casing</th>
<th>Liner</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(8) WELL TESTS: Minimum testing time is 1 hour
- Flowing Antisian

<table>
<thead>
<tr>
<th>Pump</th>
<th>Boiler</th>
<th>Air</th>
<th>Antisian</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

Temperature of water: 65°C
- Depth Antisian Flow Found: 25 ft
- Drawdown: 1 hr

<table>
<thead>
<tr>
<th>Time</th>
<th>Depth</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 hr</td>
<td>150 ft</td>
</tr>
</tbody>
</table>

(9) LOCATION OF WELL by legal description:
- County: Malheur
- Township: 11 S
- Range: 6 W
- Section: 16
- NW 1/4
- Tax Lot: 510A
- Blocks: 1/4
- Street Address of Well: 2504 NW 201

(10) STATIC WATER LEVEL:
- Date: 10-17-96
- Depth below land surface: 14 ft.
- Antisian pressure: lb. per square inch.

<table>
<thead>
<tr>
<th>From</th>
<th>To</th>
<th>Estimated Flow Rate</th>
<th>SWL</th>
</tr>
</thead>
<tbody>
<tr>
<td>150 ft</td>
<td>182</td>
<td>1-2 GPM</td>
<td>194</td>
</tr>
<tr>
<td>475</td>
<td>505</td>
<td>5-10 GPM</td>
<td>197</td>
</tr>
</tbody>
</table>

(11) WATER BEARING ZONES:
- Depth at which water was first found: 150 ft

<table>
<thead>
<tr>
<th>Material</th>
<th>From</th>
<th>To</th>
<th>SWL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sandy Soil</td>
<td>0</td>
<td>8</td>
<td>12</td>
</tr>
<tr>
<td>Sandy clay</td>
<td>12</td>
<td>19</td>
<td></td>
</tr>
<tr>
<td>Blue Clay</td>
<td>19</td>
<td>29</td>
<td></td>
</tr>
<tr>
<td>Blue Clay</td>
<td>29</td>
<td>59</td>
<td></td>
</tr>
<tr>
<td>Gray Sandy Clay</td>
<td>59</td>
<td>117</td>
<td></td>
</tr>
<tr>
<td>Gray Sandy Clay</td>
<td>117</td>
<td>550</td>
<td></td>
</tr>
</tbody>
</table>

(12) WELL LOG:
- Ground Elevation

- Date: 9-23-96
- Completed: 10-13-96

(bonded) Water Well Constructor Certification:
- I certify that the work I performed on the construction, alteration, or abandonment of this well is in compliance with Oregon water supply well construction standards. Materials used and information reported above are true to the best of my knowledge and belief.

WWC Number: 1485

(bonded) Water Well Constructor Certification:
- I accept responsibility for the construction, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon water supply well construction standards. This report is true to the best of my knowledge and belief.

WWC Number: 1485

Signed: Jon M. Ng

Date: 11-14-96
# WELL DRILLER'S REPORT

**STATE OF IDAHO**
**DEPARTMENT OF WATER RESOURCES**

**WELL OWNER**
- **Name:** American Fine Foods
- **Address:** 25 N 7th St. Lauter
- **Drilling Permit No.:** 95-91-000 014
- **Water Right Permit No.:**

**NATURE OF WORK**
- **New well**
- **Deepened**
- **Replacement**
- **Well diameter increase**
- **Abandoned**

**PROPOSED USE**
- **Domestic**
- **Irrigation**
- **Oil**
- **Gas**
- **Municipal**
- **Industrial**
- **Stock**
- **Waste Disposal or Injection**
- **Other**

**METHOD DRILLED**
- **Rotary**
- **Air**
- **Hydraulic**
- **Reverse rotary**
- **Cable**
- **Dug**
- **Other**

**WELL CONSTRUCTION**

<table>
<thead>
<tr>
<th>Casing schedule</th>
<th>Steel</th>
<th>Concrete</th>
<th>Other</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Thickness</th>
<th>Diameter</th>
<th>From</th>
<th>To</th>
</tr>
</thead>
<tbody>
<tr>
<td>inches</td>
<td>inches</td>
<td>feet</td>
<td>feet</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Was casing drive shoe used?</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perforated?</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

**WELL TEST DATA**

<table>
<thead>
<tr>
<th>Pumped from</th>
<th>Pumped to</th>
</tr>
</thead>
</table>

**WELL TEST DATA**

<table>
<thead>
<tr>
<th>Discharge G.P.M.</th>
<th>Pumping Level</th>
<th>Hours Pumped</th>
</tr>
</thead>
</table>

**LITHOLOGIC LOG**

<table>
<thead>
<tr>
<th>Bore</th>
<th>Depth From</th>
<th>Depth To</th>
<th>Material</th>
<th>Water Yeal No.</th>
</tr>
</thead>
</table>

**DRILLERS CERTIFICATION**

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

**Address:** 800 2nd Ave N

**Date:** Oct 25 1991

**Signed by:**
- **Operator:**
- **Firm Official:**

**USE ADDITIONAL SHEETS IF NECESSARY — FORWARD THE WHITE COPY TO THE DEPARTMENT**
WATER WELL REPORT
STATE OF OREGON
WATER RESOURCES DEPT
SALEM, OREGON

1) OWNER:
Name: ONTARIO GOLF COURSE
Address: 24760 SE 170th St, ONTARIO, OR

2) TYPE OF WORK (check):
New Well [X] Deepening [ ] Reconditioning [ ] Abandon [ ]
If abandonment, describe material and procedure in Item 12.

3) TYPE OF WELL: (4) PROPOSED USE (check):
Radio Air [X] Drivers [ ] Domestic [X] Irrigation [ ] Industrial [ ] Municipal [ ]
Other [ ] Thermal [ ] Test Well [ ] Withdrawal [ ] Re injection [ ]

4) LINER INSTALLED:
Steel [X] Plastic [ ] Wood [ ]

5) CASING INSTALLED:
Steel [X] Threaded [ ] Welded [X]

8. Diam from 2 1/2 ft. to 10 ft. Gauge .250 XP
8. Diam from .50 in. to .75 in. Gauge .150 XP

6) PERFORATIONS:
Perforated? [X] Yes [No]
Type of perforator used TORCH
Size of perforations 3/16 in. by 5 in.
3.50 in. perforations from 30 ft. to 45 ft.
3.50 in. perforations from 15 ft. to 30 ft.
3.50 in. perforations from 0 ft. to 15 ft.

7) SCREENS:
Well screen installed? [X] Yes [No]
Manufacturer's Name [ ]
Model No. [ ]
Slot Size [ ] ft. to [ ] ft.
Diam. [ ] ft. Screen Size [ ] ft. to [ ] ft.

8) WELL TESTS:
Drawdown is amount water level is lowered below static level
Allog. P.M. [ ] gal/min. with ft. drawdown after hrs.
Pump test [ ] gal/min. with drawdown test at ft. hrs.
Well test [ ] gal/min. with drawdown after hrs.
Gage flow [ ] g.p.m.

9) CONSTRUCTION:
Material of water [ ]
Depth in ft. normal flow encountered [ ] ft.

10) LOCATION OF WELL:
County [ ]
Driller's well number [ ]
MAY 30 1985
MALHEUR [ ]

11) WATER LEVEL: Completed well.
Depth at which water was first found 35 ft.
Static level 18 ft. below land surface. Date [ ]
Artesian pressure lbs. per square inch. Date [ ]

12) WATER LOG: Diameter of well below casing (ft)
Depth drilled 220 ft. Depth of completed well 220 ft.
Formation: Describe color, texture, grain size and structure of materials; and show thickness and nature of each stratum and aquifer penetrated, with at least one entry for each change of formation. Report each change in position of Static Water Level (SL) and indicate principal water-bearing strata.

MATERIAL From To SWL
BROWN CLAY 0 30
SAND 30 33
SAND GRAVEL 33 40 18
BLUE CLAY 40 80
BLACK SAND 80 81 18
BLUE CLAY 81 116
BLACK SAND 116 117 18
BLUE CLAY 117 220

NOTICE TO WATER WELL CONTRACTOR
The original and first copy of this report are to be filled with the

CONTRACTOR'S DEPARTMENT,
SALEM, OREGON 97310
within 30 days from the date of well completion.

State Well No. 1857 47E 76
State Permit No. 1499

[Signature]
NOTICE TO WATER WELL CONSTRUCTOR
The original and first copy of this report must be filed with the State of Oregon Water Resources Department within 30 days from the date of well completion.
**NOTICE****

PLEASE BE ADVISED, THIS REPORT PERTAINS TO THE DEEPENING OF AN EXISTING WELL, REPORT PREVIOUSLY FILED. SAME OWNER. SAME LEGAL. DATE WORK PREV. COMPLETED - 5/17/85. SAME DRILLING COMPANY.

---

**OWNER:**

**Name:** ONTARIO GOLF COURSE - (L. Westcott)

**Address:** ONTARIO, OREGON 97911

**City:**

**State:**

**ZIP:**

---

**TYPE OF WORK (check):**

- New Well
- Deepening
- Reconditioning
- Abandon

If abandonment, describe material and procedure in Item 12.

---

**TYPE OF WELL:**

- Flat Screen
- Mustang
- Industrial
- Domestic
- Thermal
- Irrigation
- Municipal
- Municipal
- Municipal
- Special Use

**PROPOSED USE (check):**

- Water Supply
- Irrigation
- Domestic
- Municipal
- Industrial
- Thermal
- Irrigation
- Municipal
- Special Use

---

**CASING INSTALLED:**

- Steel
- Plastic
- Welded

**LINER INSTALLED:**

- Steel
- Plastic
- Welded

---

**PERFORATIONS:**

- Perforated
- Yes
- No

**Type of perforator used**

**Size of perforations**

- in.
- ft.

---

**SCREENS:**

- Well screen installed?
- Yes
- No

**Manufacturer's Name**

**Model No.**

**Screen Diameter**

**Slot Size**

**Net from top**

**Net from bottom**

---

**WELL TESTS:**

- Drawdown is amount water level is lowered below static level.

**Drawdown in gpm**

**ft.**

**Air test**

- gal/min.
- ft.

**Bailer test**

- gal/min.
- ft.

**Test flow**

- gpm

---

**CONSTRUCTION:**

- Special standards
- Yes
- No

**Well seal - Material used**

**Well sealed from land surface to**

**ft.

**Diameter of well bore to bottom of seal**

**in.

**Diameter of well bore below seal**

**in.

**Number of saks of cement used in well seal**

**saks

**How was cement grout placed?**

---

**WATER LEVEL:**

- Completed well

**EXISTING INFO:**

**Depth at which water was first found**

**ft.

**Complete depth of existing water**

**ft.

**Depth drilled down to water level**

**ft.

**Formation:** Describe color, texture, grain size and structure of materials; and show thickness and nature of each stratum and aquifer penetrated, with at least one entry for each change of formation. Report each change in position of Static Water Level and indicate principal water-bearing strata.

---

**DEEPENING INFO:**

<table>
<thead>
<tr>
<th>MATERIAL</th>
<th>From</th>
<th>To</th>
<th>SWL</th>
</tr>
</thead>
<tbody>
<tr>
<td>SHALE GREY</td>
<td>220</td>
<td>335</td>
<td>97</td>
</tr>
<tr>
<td>SAND FINE BLACK</td>
<td>336</td>
<td>385</td>
<td>18</td>
</tr>
<tr>
<td>SHALE GREY</td>
<td>336</td>
<td>750</td>
<td></td>
</tr>
<tr>
<td>SAND FINE BLACK CEMENTED</td>
<td>750</td>
<td>750</td>
<td>18</td>
</tr>
<tr>
<td>SHALE GREY</td>
<td>755</td>
<td>765</td>
<td></td>
</tr>
</tbody>
</table>

**Work started**

6/17/85

**Completed**

6/19/85

**Date well drilling machine moved off of well**

6/19/85

**Drilling Machine Operator's Certification:**

This well was constructed under my direct supervision. Materials used and information reported above are true to my best knowledge and belief.

Signed: [Signature]

**Drilling Machine Operator's License No.:**

[Number]

---

**Water Well Contractor's Certification:**

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

**Name:** DALLAS DRILLING & PUMP CO., INC.

**Address:** 505 S.S. 18th St.

**Contractor's License No.:** [Number]

---

**NOTICE TO WATER WELL CONTRACTOR:**

The original and first copy of this report are to be filed with the

WATER RESOURCES DEPARTMENT.

SALEM, OREGON 97302

within 30 days from the date of well completion.
**STATE OF OREGON**

**WATER WELL REPORT**

May 23, 1986

**WATER RESOURCES DEPT.**

---

**10) LOCATION OF WELL by legal description:**

- **County:** Malheur
- **Township:** 18 South
- **Range:** 1/4 East
- **Section:** 10
- **Lot:** 5
- **Block:** 1
- **Subdivision:** 2
- **Township:** 18 North
- **Range:** 1/4 West
- **Section:** 10
- **Lot:** 5
- **Block:** 1
- **Subdivision:** 2
- **Address:** 620 Rt. 1, Box 9731, State
- **City:** Oregon
- **State:** Oregon

---

**11) WATER LEVEL of COMPLETED WELL:**

- **Depth drilled:** 220 ft.
- **Depth of completed well:** 220 ft.

**Formation:**
- Describe color, texture, grain size and structure of materials and show thickness and nature of each stratum and aquifer penetrated, with at least one entry for each change of formation. Report each change in position of Static Water Level and indicate principal water-bearing strata.

**WATER LEVEL of COMPLETED WELL:**

- **Sign:** 0
- **To:** 15

**MATERIAL:**

<table>
<thead>
<tr>
<th>Material</th>
<th>From</th>
<th>To</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sandy Clay</td>
<td>15</td>
<td>40</td>
</tr>
<tr>
<td>Dry Cemented Gravel</td>
<td>40</td>
<td>60</td>
</tr>
<tr>
<td>Brown Clay</td>
<td>60</td>
<td>80</td>
</tr>
<tr>
<td>Sand, Silt, Gravel</td>
<td>80</td>
<td>100</td>
</tr>
<tr>
<td>Silt Stone</td>
<td>100</td>
<td>120</td>
</tr>
<tr>
<td>Blue Clay</td>
<td>120</td>
<td>140</td>
</tr>
<tr>
<td>Hard Blue Shale</td>
<td>140</td>
<td>160</td>
</tr>
<tr>
<td>Black and Grey Sandstone</td>
<td>160</td>
<td>180</td>
</tr>
<tr>
<td>Blue Shale</td>
<td>180</td>
<td>200</td>
</tr>
<tr>
<td>Grey Sandstone</td>
<td>200</td>
<td>220</td>
</tr>
<tr>
<td>Blue Shale</td>
<td>220</td>
<td>240</td>
</tr>
</tbody>
</table>

**ARTESIAN PRESSURE:**

- **Date:** 3/10/66
- **Amount water per square inch:** 250
- **Form:** 6.25
- **Formation:** Describe color, texture, grain size and structure of materials and show thickness and nature of each stratum and aquifer penetrated, with at least one entry for each change of formation. Report each change in position of Static Water Level and indicate principal water-bearing strata.

---

**NOTICE TO WATER WELL CONSTRUCTOR**

The original and first copy of this report are to be filed with the WATER RESOURCES DEPARTMENT, Salem, Oregon 97310 within 30 days from the date of well completion.

---

**(Signed)**

**JOHNNY GOFF**

(Water Well Constructor)
(10) WATER LEVELS:

<table>
<thead>
<tr>
<th>Static level</th>
<th>ft. below land surface</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.5</td>
<td>6/3/64</td>
<td></td>
</tr>
</tbody>
</table>

(11) WELL TESTS:

Drawdown is amount water level is lowered below static level.

<table>
<thead>
<tr>
<th>Was a pump test made?</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>If yes, by whom?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Yield: gal./min. with ft. drawdown after hr.

<table>
<thead>
<tr>
<th>Ballast test</th>
<th>200 gal./min. with 5 ft. drawdown after 2 hr.</th>
</tr>
</thead>
</table>

Artesian flow g.p.m. Date

<table>
<thead>
<tr>
<th>Temperature of water</th>
<th>60°C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Was a chemical analysis made?</td>
<td>Yes</td>
</tr>
</tbody>
</table>

(12) WELL LOG:

Diameter of well below casing ft.

<table>
<thead>
<tr>
<th>Depth drilled</th>
<th>562 ft. Depth of completed well 562 ft.</th>
</tr>
</thead>
</table>

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the land and nature of the material in each stratum penetrated, with at least one entry for each change of formation.

<table>
<thead>
<tr>
<th>MATERIAL</th>
<th>FROM TO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soil Top</td>
<td>0-5</td>
</tr>
<tr>
<td>Sand Fine Silty</td>
<td>5-12</td>
</tr>
<tr>
<td>Sand Medium Gravel (Water)</td>
<td>12-30</td>
</tr>
<tr>
<td>Gravel Fine to medium (Water)</td>
<td>30-40</td>
</tr>
<tr>
<td>Clay Blue</td>
<td>40-250</td>
</tr>
<tr>
<td>Clay Blue to Silt</td>
<td>250-375</td>
</tr>
<tr>
<td>Clay Blue Silt to Gravel</td>
<td>375-512</td>
</tr>
</tbody>
</table>

Note: Hole filled with bentonite from bottom to 90 ft. Wood plug set at 90 ft. and hole filled with bentonite to surface.

Work started 5/25/64 Completed 6/3/64

Date well drilling machine moved off of well 6/18/64

(13) PUMP:

Manufacturer's Name

Type:

Water Well Contractor's Certification:

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

<table>
<thead>
<tr>
<th>NAME</th>
<th>Otto Ellisworth</th>
</tr>
</thead>
<tbody>
<tr>
<td>TYPE</td>
<td>Water Well Contractor</td>
</tr>
<tr>
<td>ADDRESS</td>
<td>PO Box 471, Island City, Oregon</td>
</tr>
<tr>
<td>LICENSE</td>
<td>282</td>
</tr>
</tbody>
</table>

(Signed) Otto Ellisworth

Contractor's License No. 282 Date July 5, 1964
**STATE OF OREGON**  
**WATER WELL REPORT**  
(as required by ORS 537.765)  

Instructions for completing this report are on the last page of this form.

**WATER RESOURCES DEPT.**

**SALEM, OREGON**

(9) LOCATION OF WELL by legal description:
- County: Sandoval  
- Latitude: 44° 44' 0" N  
- Longitude: 122° 41' 0" W
- Township: 25  
- Range: 16  
- Section: 1/4
- W. WM.: 1/4 Square
- Tax Lot: 31
- Lot: 25
- Block: 4
- Subdivision: 3125
- Street Address of Well (or nearest address): Stag Way

(10) STATIC WATER LEVEL:  
- Depth: 64 ft. below land surface.  
- Date: 7/18/96
- Artesian pressure: lb per square inch.  
- Date: 

(11) WATER BORING ZONES:
- Depth at which water was first found: 135

(12) WELL LOG:
- Ground Elevation

<table>
<thead>
<tr>
<th>Depth</th>
<th>Material</th>
<th>From</th>
<th>To</th>
<th>Estimated Flow Rate</th>
<th>SWL</th>
</tr>
</thead>
<tbody>
<tr>
<td>135</td>
<td>Cemented gravel</td>
<td>10</td>
<td>17</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>145</td>
<td>Brown Silty Clay</td>
<td>7</td>
<td>135</td>
<td>84</td>
<td>84</td>
</tr>
<tr>
<td>145</td>
<td>Blue Silt</td>
<td>135</td>
<td>145</td>
<td>84</td>
<td>84</td>
</tr>
<tr>
<td>145</td>
<td>Blue Clay</td>
<td>145</td>
<td>390</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(13) WELL TESTS: Minimum testing time is 1 hour
- Pump  
- Bailer  
- Flowing Artesian

- Temperature of water: 64°  
- Depth Artesian Flow Found

- Was a water analysis done? Yes  
- By whom:

- Did say strata contain water not suitable for intended use? No  
- Too little

- Salty  
- Muddy  
- Odor  
- Colored  
- Other

- Depth of strata: 

Date started: 7/16/96  
Completed: 7/18/96

(1a) Unbonded Water Well Constructor Certification:

I certify that the work I performed on the construction, alteration, or abandonment of this well is in compliance with Oregon water supply well construction standards. Materials used and information reported above are true to the best of my knowledge and belief.

Signed  

WPC Number:  

Date:

(1b) Bonded Water Well Constructor Certification:

I accept responsibility for the construction, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon water supply well construction standards. This report is true to the best of my knowledge and belief.

Signed  

WPC Number:  

Date:
## WATER WELL REPORT

**State of Oregon**  
**Water Well Resources Dept.**

**Owner:** Mark Ward  
**Name:**  
**Address:** 10600 NW 23rd Ct  
**City:** Portland  
**State:** OR  
**Zip Code:** 97229

### 1. General Information
- **Owner:** Mark Ward
- **Address:** 10600 NW 23rd Ct, Portland, OR 97229
- **City:** Portland  
**State:** OR  
**Zip Code:** 97229

### 2. Well Information
- **Well Number:**
- **Date:**
- **County:**
- **Towship:**
- **Range:**
- **Section:**
- **Lot:**
- **Block:**
- **Subdivision:**
- **Street Address of Well:**
- **ORSC:**
- **Owner:**
- **Pump Power:**
- **Drill Method:**
- **Bore Hole Construction:**
- **HOLES:**
  - **Material:**
  - **Seal:**
  - **Backfill placed from:**
  - **Gravel placed from:**
  - **Material:**
  - **Size of gravel:**

### 3. Casing/Liner Information
- **Casing:**
  - **Material:**
  - **Gauge:**
  - **Steel:**
  - **Plastic:**
  - **Welded:**
  - **Threaded:**
- **Liner:**

### 4. Perforations/Screen Information
- **Perforations:**
- **Screening:**
  - **Type:**
  - **Number:**
  - **Diameter:**
  - **Weld:**
  - ** liner:**

### 5. Well Tests Information
- **Minimum testing time:**
- **Flow:**
  - **Yield gpm:**
  - **Drawdown:**
  - **Drill stem at:**
  - **Flowing:**
  - **Artesian:**

### 6. Water Analysis Information
- **Temperature of water:**
- **Depth Artesian Flow Found:**
- **Was a water analysis done:**
  - **Yes/No:**
- **By whom:**
- **Did any strata contain water not suitable for intended use:**
  - **Yes/No:**
  - **Too little:**
  - **Salty:**
  - **Muddy:**
  - **Odor:**
  - **Colored:**
  - **Other:**

### 7. Well Logs Information
- **Ground Elevation:**
- **Depth at which water was first found:**
- **Estimated Flow Rate:**
- **SWL:**

### 8. Certification
- **Water Well Constructor Certification:**
  - **Date started:**
  - **Completed:**
  - **WWC Number:**
  - **Signed:**
  - **Date:**

---

**RECEIVED**  
**AUG 2 6 1996**

**SALEM, OREGON**

**LOCATION OF WELL**

- **County:**
- **Towship:**
- **Range:**
- **Section:**
- **Lot:**
- **Block:**
- **Subdivision:**
- **Street Address of Well:**
- **ORSC:**
- **Owner:**
- **Pump Power:**
- **Drill Method:**
- **Bore Hole Construction:**
- **HOLES:**
  - **Material:**
  - **Seal:**
  - **Backfill placed from:**
  - **Gravel placed from:**
  - **Material:**
  - **Size of gravel:**

**Casing/Liner Information**
- **Casing:**
  - **Material:**
  - **Gauge:**
  - **Steel:**
  - **Plastic:**
  - **Welded:**
  - **Threaded:**
- **Liner:**

**Perforations/Screen Information**
- **Perforations:**
- **Screening:**
  - **Type:**
  - **Number:**
  - **Diameter:**
  - **Weld:**
  - **liner:**

**Well Tests Information**
- **Minimum testing time:**
- **Flow:**
  - **Yield gpm:**
  - **Drawdown:**
  - **Drill stem at:**
  - **Flowing:**
  - **Artesian:**

**Water Analysis Information**
- **Temperature of water:**
- **Depth Artesian Flow Found:**
- **Was a water analysis done:**
  - **Yes/No:**
- **By whom:**
- **Did any strata contain water not suitable for intended use:**
  - **Yes/No:**
  - **Too little:**
  - **Salty:**
  - **Muddy:**
  - **Odor:**
  - **Colored:**
  - **Other:**

**Well Logs Information**
- **Ground Elevation:**
- **Depth at which water was first found:**
- **Estimated Flow Rate:**
- **SWL:**

**Certification**
- **Water Well Constructor Certification:**
  - **Date started:**
  - **Completed:**
  - **WWC Number:**
  - **Signed:**
  - **Date:**

---

**ORIGINAL & FIRST COPY-WATER RESOURCES DEPARTMENT**  
**SECOND COPY-CONSTRUCTOR**  
**THIRD COPY-CUSTOMER**
(1) OWNER: Alan Peterson
Name: Alan Peterson
Address: 2678 Hwy 201
City: Nyssa
State: OR
Zip: 97913
(2) TYPE OF WORK:
- New Well
- Deepen
- Recession
- Abandon
(3) DRILL METHOD:
- Rotary Air
- Rotary Mud
- Cable
(4) PROPOSED USE:
- Domestic
- Community
- Industrial
- Irrigation
- Other
(5) BORE HOLE CONSTRUCTION:
- Explosive used: [Check]
- Depth of Completed Well: 700 ft.
- Special Construction approval: [Check]
- Material From: Gravel placed from:
  - Foundation
  - Seal
(6) CASING/LINER:
- Diameter: From 0 to 30
- Material: Casing: Cast Iron, Liner: [Check]
- Depth: From 0 to 12 sacks
(7) PERFORATIONS/SCREENS:
- Method: [Check]
- Screen Type: [Check]
- From To Slot size Number Diameter Telescope size Casing Liner
- Depth of screen: 17-30
(8) WELL TESTS: Minimum testing time is 1 hour
- Pump: [Check]
- Drawdown: 300'
- Temperature of water: 178°F
- Flowing Artesian Flow Found
- Depth of screen: 17-30
- Was a water analysis done? [Check]
- Yes
- By whom
- Did any water contain water not suitable for intended use? [Check]
- Too Little
- Salty
- Murky
- Odor
- Colored
- Other
- Surface Water
(9) LOCATION OF WELL by legal description:
- County: Malheur
- Township: 20
- Range: 46
- Section: 24
- Lot: 2700
- Block: 1
- Street Address of Well (on record address) 2678 Hwy 201 Nyssa, OR
(10) STATIC WATER LEVEL:
- Date: 1-31-92
- Artesian pressure: lb. per square inch
- Depth at which water was found: 18'
(11) WATER BEARING ZONES:
- From To Estimated Flow Rate SWL
- 18 30 30-40 18
- 684 700 20-25 18
(12) WELL LOG:
- Ground elevation
- Material From To SWL
- Top soil 0 17 -
- Sand & gravel 17 29 18
- Brown clay 29 47 -
- Blue clay 47 684 -
- Black sand 685 700 18

Date started: 3-20-92
Completed: 3-25-92
Wells Drilled: 1

(bonded) Water Well Constructor Certification:
I certify that the work I performed on the construction, alteration, or abandonment of this well is in compliance with Oregon well construction standards. Materials used and information reported above are true to my best knowledge and belief.
Signed: [Signature]
WCC Number: 1510
Date: 4-20-92
NOTICE TO WATER WELL CONTRACTOR

The original and two copies of this Notice are to be retained and filed.

WATER RESOURCES DEPARTMENT
SALEM, OREGON

within 30 days from the date of well completion.

SALEM, OREGON

2 Nov 78

WATER RESOURCES DEPT.

1) OWNER: Adrian City

2) TYPE OF WORK (check):

- New Well
- Reconditioning
- Abandon

If abandonment, describe material and procedure in item 12.

3) TYPE OF WELL: (4) PROPOSED USE (check):

- Rotary Drilled
- Cable Drilled
- Dug
- Bored

- Domestic
- Industrial
- Municipal
- Irrigation
- Test Well
- Other

4) PROPOSED USE (check):

- Domestic
- Industrial
- Irrigation
- Test Well
- Municipal
- Other

5) CASING INSTALLED:

- Threaded
- Welded

- Diam. from
- Diam. from
- Diam. from

- ft. to
- ft. to
- ft. to

6) PERFORATIONS:

- Perforated? Yes ☑ No ☑

- Type of perforator used:

- Size of perforations:
- in.

- from
- ft. to

- from
- ft. to

- from
- ft. to

7) SCREENS:

- Well screen installed? Yes ☑ No ☑

- Manufacturer's Name:

- Type:

- Model No.:

- Diam.:
- ft.

- Slot size:
- ft. to

- Set from
- ft. to

- Set from
- ft. to

8) WELL TESTS:

- Drawdown in amount water level is lowered below static level.

- Was a pump test made? Yes ☑ No ☑

- Yield:
- ft. c/min. with ft. drawdown after hrs.

- Pressure of water:

- Depth artesian flow encountered:

9) CONSTRUCTION:

- Well seal-Material used:

- Cement

- Well sealed from land surface to ft.

- Diameter of well bored to bottom of seal:
- ft.

- Diameter of well bored below seal:
- ft.

- Number of sacks of cement used in well seal:
- sacks

- How was cement grout placed:

- Pressure grouted

- Was a drive shoe used? Yes ☑ No ☑

- Plug location:

- Did any strata contain unusable water? Yes ☑ No ☑

- Type of water:

- Depth of strata:

- Method of sealing strata:

- Was well gravel packed? Yes ☑ No ☑

- Size of gravel:

- Well placed from:

- ft. to

10) LOCATION OF WELL:

- County:

- Malheur

- Driller's well number:

- N.E. 1/4, S.W. 1/4 Section 15, T. 31, R. 46 W.M.

- Bearing and distance from section or subdivision corner:

11) WATER LEVEL:

- Completed well

- Depth at which water was first found:
- ft.

- Static level:
- ft. below land surface.

- Artesian pressure:
- lbs. per square inch.

12) WELL LOG:

- Diameter of well below casing:
- ft.

- Depth drilled:
- ft.

- Date:
- 10-23-78

- Description:

- Material:

- From
- To
- SWL

- sticky clay
- 0
- 42

- Blue shale
- 42
- 388

- Coarse black sand
- 388
- 408

- Fine sand & shale
- 408
- 432

- Fine Sand stone & clay
- 432
- 536

- Work started:
- 10-18-78

- Completed:
- 10-23-78

- Date well drilling machine moved off of well:
- 10-24-78

- Drilling Machine Operator's Certification:

- This well was constructed under my direct supervision. Materials used and information reported above are true to my best knowledge and belief.

- Signature:
- Date:
- 11-2-78

- Drilling Machine Operator's License No.:
- 65

- Water Well Contractor's Certification:

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

- Name:
- PAGE BROTHERS DRILLING

- Type of drill:

- Address:
- RT. 2 BOX 371- VALE, OREGON 97918

- Contractor's License No.:
- 564

- Date:
- 11-2-78
NOTICE TO WATER WELL CONTRACTOR

The original and first copy of this report are to be filed with the
STATE ENGINEER, SALEM, OREGON
within 20 days from the date of well completion.

(1) OWNER:
Name: Bob D. McFarland
Address: 1234 Main St, Salem, OR 97301

(2) TYPE OF WORK (check):
New Well Drilling
Reconditioning
Abandon

If abandonment, define material and procedure in Item 12.

(3) TYPE OF WELL: (4) PROPOSED USE (check):
Rotary Cable
Drilled Bored
Domestic Irrigation
Industrial Test Well
Municipal Other

(5) CASING INSTALLED:
Diam. from ft. to ft. Gage 250
Diam. from ft. to ft. Gage
Diam. from ft. to ft. Gage

(6) PERFORATIONS:
Type of perforator used: Yes No

Size of perforations from ft. to ft. in.
perforations from ft. to ft. in.
perforations from ft. to ft. in.

(7) SCREENS:
Select Well screen installed: Yes No
Manufacturer's Name:
Model No.:
Diam. Slot size Set from in. to in.
Diam. Slot size Set from in. to in.

(8) WELL TESTS:
Drawdown: Is amount water level lowered below static level.
Was a pump test made? Yes No
pumps per min. 25 ft. drawdown after 24 hrs.

Bailer test: 1 gpm. 5 ft. drawdown after 1 min. flow

Temperature of water: Depth artesian flow encountered

(9) CONSTRUCTION:
Well seal Material used:
Well sealed from land surface to 30
Diameter of well bore from bottom of seal:
in.
Diameter of well bore above seal:
in.
Number of sacks of cement used in well seal 2
Number of sacks of bitumen used in well seal 1
Number of sacks of bitumen used in well seal 2
Brand name of bitumen:
Number of pounds of bitumen per 100 gallons of water:
Was a drive shoe used? Yes No
Plugs: Size: location: ft.
Did any strata contain unsaleable water? Yes No
Type of water:
Method of sealing strata:
Was well gravel packed? Yes No
Size of gravel:

(10) LOCATION OF WELL:
County Malheur
Driller's well number
Sw 1/2 SW 1/4 Section T. 21 R. 66 S. W.M.
Bearing and distance from section or subdivision corner:

(11) WATER LEVEL: Completed well.
Depth at which water was first found
ft.
State level ft. below land surface. Date
Artesian pressure lb. per square inch. Date

(12) WELL LOG:
Diameter of well below casing
Depth drilled ft. Depth of completed well ft.
Formation: Describe color, texture, grain size and structure of materials; and show thickness and nature of each stratum and aquifer penetrated, with at least one entry for each change of formation. Report each change in position of Static Water Level and indicate principal water-bearing strata.

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<tr>
<th>MATERIAL</th>
<th>From</th>
<th>To</th>
<th>SWL</th>
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</table>

Work started 7-1. 1974 Completed 9-12. 1974
Date well drilling machine moved off of well 9-12. 1974

Drilling Machine Operator's Certification:
This well was constructed by my drilling machine operator. Materials used and information reported above are true to the best of my knowledge and belief.
(Signed) Hal McFarland Date: Sept 30, 1974
(Or drilling machine operator)

Drilling Machine Operator's License No. 478

Water Well Contractor's Certification:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.
Name: Harold E. Hartline
Address: P.O. Box 123, Ontario, OR 97914
(Signed) Harold E. Hartline (Water Well Contractor)
Contractor's License No. 223 Date: Dec 6, 1974

(RECEIVED BY POSTAL OFFICE)

OCT 17 1974

States Engineer State Permit No.
**Owner:**

- **Name:** B.O. Brown
- **Address:**

**Type of Work (check):**
- New Well
- Reconditioning
- Abandon

**Type of Well:**
- Rotary
- Cable
- Bored

**Proposed Use (check):**
- Domestic
- Industrial
- Municipal
- Irrigation
- Test Well
- Other

**Casing Installed:**
- Threaded
- Welded
- Dia. from ft. to ft. Gage

**Perforations:**
- Perforated? Yes
- Type of perforator used:
- Size of perforations

**Screens:**
- Well screen installed? Yes
- Manufacturer's Name
- Model No.

**Wells Tests:**
- Drawdown in amount water level lowered below state level
- Was a pump test made? Yes
- Ft. in min. with ft. drawdown after hours
- Bailer test
- Egyptian flow
- Temperature of water

**Construction:**
- Well seal—Material used
- Well sealed from ground surface
- Diameter of well hole to bottom of seal
- Diameter of well hole below seal
- Number of sacks of cement used in well seal
- Number of sacks of lime used in well seal
- Brand name of bentonite
- Number of pounds of bentonite per 100 gallons of water
- Was a drive shoe used? Yes
- Number of plugs
- Was any stratum unsuitable water? Yes
- Type of water
- Depth of strata
- Method of sealing strata off

**Drilling Machine Operator's Certification:**
- Name: Harold Hartling
- Date: Sept 26, 1974

**Water Well Contractor's Certification:**
- Name: Harold Hartling
- Address: Box 124, Ontario, Ore.
- Date: Oct 17, 1974

**Location of Well:**
- County: Malheur
- Driller's well number
- Bearing and distance from section or subdivision corner

**Water Level:**
- Completed well
- Depth at which water was first found
- Static level
- Artesian pressure

**Well Log:**
- Diameter of well below casing
- Depth drilled
- Depth of completed well

**Materials Used:**
- From
- To
- SWL

**Work:**
- Work started
- Completed
- Well drilling machine moved off of well

**Date:**
- Oct 17, 1974

**Received:**
- State Well No.
- State Permit No.
- Salem, Oregon

**Notice to Water Well Contractor:**
- The original and first copy of this report are to be filed with the State Engineer, Salem, Oregon within 30 days from the date of well completion.

**State Engineer:**
- Salem, Oregon

**State Engineer:**
- State Permit No.

**State Well No.:**
- 215196E - 22DC
(10) LOCATION OF WELL:
County: Marion  
Section: 27 T  N  4  R  96 E  W.M.  
Bearing and distance from section or subdivision corner:

(11) WATER LEVEL: Completed well.  
Depth at which water was first found: 20 ft.  
Static level: 10 ft. below land surface. Date: 5-7-74  
Artesian pressure: lbs. per square inch. Date:

(12) WELL LOG: Diameter of well below casing

<table>
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<tr>
<th>Formation</th>
<th>From</th>
<th>To</th>
<th>SWL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brown sand</td>
<td>0 18</td>
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<tr>
<td>Blue gravel clay</td>
<td>18 32</td>
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<td>Hard clay stone</td>
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<tr>
<td>Brown clay</td>
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<td>Blue gravel clay</td>
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</tr>
</tbody>
</table>

Work started: 7-7-74, completed: 9-12-74.  
Date well drilling machine moved off of well: 9-12-74.

Drilling Machine Operator's Certification:  
This well was constructed under my direct supervision. Materials used and information reported above are true to my best knowledge and belief.  

[Signed]  
DATE: Sept 30, 1974  
(Drilling Machine Operator)

Drilling Machine Operator's License No. 101

Water Well Contractor's Certification:  
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.  

Name: HAROLD HARTING  
Address: POX 124, O N T A R I O, O.R.C.  

[Signature]  
DATE: Sept 30, 1974  
(Water Well Contractor)  
Contractor's License No. 273
Cross section of the Treasure Valley in the Parma area for the TVHP (Treasure Valley Hydrologic Project):
Notes on Geology of the Parma area, Payette, Canyon and Owyhee Counties, Idaho

by Gregg Beukelman                      February 8, 1997
Department of Geosciences, Boise State University
Boise, Idaho 83725
tele: 208-385-1631, fax 385-4061, email: gbeukelm@trex.idbsu.edu

Introduction
The report and enclosed data are a preliminary compilation of information along a transect extending NE-SW in the Parma area, to show the nature of the Late Cenozoic stratified sediments in the upper portion (~ 1000 feet) of the western Snake River Plain (Fig. 2). Included for each well along the transect are the well owner, Land Office Grid coordinates, surface elevation (± 10 feet), and diagrams of well construction and lithology. Lithology, taken from well drillers’ reports on record at the Idaho Department of Water Resources and the U. S. Geological Survey, is plotted in detail where distinctive units of lithologic or hydrogeologic significance are well documented by the driller. Individual drillers’ reports are attached to the report should the user wish more detail. Also included is a geologic cross section drawn to show correlatable distinctive lithologic and hydrogeologic boundaries encountered in each well. A 1:100,000 map of the area is included showing the route of the transect (A-A’), individual well owners and surface geology (taken from Othberg and Stanford, 1992).

Methods
The cross section included is a graphical presentation of subsurface lithologies based on water well drillers reports and data from a single deep exploration well (Highland L & L). Wells along a NE-SW transect were selected to ensure maximum section coverage and U. S. Geological Survey monitoring wells were included where possible. For each well included in the profile (1:24,000 horizontal) the stratigraphic section and well construction, as reported in the drillers logs, were plotted at a vertical scale of 1:1,200 (attached sheets). Correlations were made at this scale and all data digitized and reduced to produce the cross section in figure 2. Accuracy of all elevations is probably ± 10 feet. Elevations of the contacts at the top of the lacustrine claystone (+1340-ft) and the underlying basalt (-1200-ft) are taken from a lithologic log accompanying the drillers report for the Highland L & L exploration well (Minus signs indicate elevation below sea level).

Structure
The structural nature of this area of the plain is inferred to be a normal fault-bounded graben. Faults are thought to be older inactive structures owing to their lack of surface expression and no offset of Pleistocene gravels and overlying Bonneville Flood deposits. Evidence for a major fault north of and adjacent to the Snake River is the rather monotonous
thickness of clay seen in the wells to the south. These sediments have been interpreted by Ekren and others (1981) to be Miocene Poison Creek Formation. Clays of this thickness are not encountered across the fault in the shallow wells to the north but occur only at much greater depth in the Highland L & L well, suggesting a minimum offset of 350 feet. Several other normal faults are interpreted based on offset of a very distinctive color boundary between overlying brown sediments and underlying blue sediments. One such fault occurring south of the Highland L & L well correlates with a similarly north facing normal fault that offsets basalt at depth (basalt at -1200-ft elevation in the Highland L & L well) as interpreted by Wood (1997). Based on the sediment color change boundary, the section appears to have no discernable dip (0.04° to the south between the Obendorf and City of Parma wells).

Stratigraphy

The sedimentary section contains Late Cenozoic fluvial and lacustrine deposits overlying a basement of basalt that varies in elevation along the profile from -1200-ft to -3200-ft. Surficial sediments include modern flood plain deposits, Bonneville Flood slack water fine sediments, gravel deposits of Pleistocene age, and older Tertiary age sediments. Much of the middle portion of the transect is mantled by silts and clays of Bonneville Flood slack water origin. These fine sediments commonly overlie terrace gravels including from youngest to oldest: Gravel of Boise Terrace, Gravel of the Bonneville Flood scoured Whitney Terrace, Gravel of Whitney Terrace, and Gravel of Deer Flat Terrace.

Beneath the surficial sediments occur a complex sequence of interfingering gravels, sands and clays which are interpreted to represent fluvial and shallow lacustrine deposits. This section contains an upper portion in which sediments are commonly some shade of brown and a deeper portion having sediments that are described as blue in drillers logs. The boundary between these color-defined units occurs at 2200-ft ± 50 ft elevation and appears in all well logs. The nature of this type of boundary is not well understood but is believed to reflect differences in depositional environment. The blue colored sediments are thought to be an indication of a chemically reducing depositional environment characteristic of lake deposits. The brown colors are more likely caused by oxidation of iron-bearing minerals under unsaturated conditions. Thus, these sediments are thought to represent alluvial, fluvial, and lake margin deposits which would be more apt to be oxidized. A complication to this interpretation is the effect of recharge by oxygenated waters on reduced (blue) iron minerals. Groundwater that is high in dissolved iron can be associated with the oxidation of reduced iron minerals at a contact between oxidizing and reducing conditions. Evidence in the Parma area, such as the uniform elevation of the contact and its lack of any identifiable deflection in the Boise River or Snake River areas (which might be thought to be recharge sources), suggests that this brown-blue contact is the result of original diagenesis and not greatly affected by later recharge. Therefore, this oxidation/reduction contact may well be useful for geologic interpretation of depositional environments.

North of the major fault in the Snake River area, the deeper part of the sedimentary section is composed of ~ 3000 feet of lacustrine claystone having an upper contact at +1340-ft elevation as recorded in the Highland L & L well. The geometry of the upper contact of this claystone cannot be determined from this cross section as only one well (Highland L & L) penetrates it to any depth. This contact is overlain by the fluvial lacustrine section containing a
significant aquifer section about 1290 feet thick. From water levels in nearby wells (Fig. 2) it appears that its upper 250 feet may be unsaturated. The base of this section, containing sand aquifers, is the top of the pro-delta mudstone facies interpreted by Wood (1994).

Basalt forms a volcanic basement to the sedimentary section. The Highland L & L well penetrates the top of basalt at -1200-ft elevation. Elsewhere along the transect, the topography of the basalt upper contact, as interpreted by Wood (1997) from seismic reflection data, mimics the graben form of the basin. Elevations of the basalt surface range from -2200-ft near the ends of cross section to about -3200-ft beneath the Boise River.

**Hydrogeology**

The static water level in wells on this transect vary greatly having a range of 180 feet and no easily discernable trends with the exception of a decline in the proximity of the Boise River. Static level in wells completed in the thick Tertiary sediment section north of the Boise Valley range from 2300-ft to 2380-ft elevation. Southward, within the Boise Valley and north of the Boise River, the level drops to about 2200-ft. Between the Boise River and the Snake River static water levels range from 2290-ft to 2340-ft with a trend of decreasing elevation nearer the Boise River. Only one well south of the Snake River is included in the transect so no trend south of the river is evident but the one water level is similar to those north of the river.

Two wells included in this cross section are part of the U.S. Geological Survey monitoring well program. The Skogsburg well (NW1/4,SW1/4,S.35,T6N,R5W) has a static water level of 2308-ft elevation as measured 3/21/96. The drillers found water in a sand and clay layer at a depth of 220-240 ft below the surface but the well is fully cased to its bottom at 322 ft making it likely that most of the water produced by this well is coming from a sand layer at its bottom (2073-ft elevation). The second well included in the monitoring program is the Paulson well (SE1/4,NW1/4,S.10,T4N,R5W) which has a static water level of 2340-ft elevation as measured 3/21/96. The drillers of this well report water in sandy and gravel units at 108'-125', 160'-165', 180'-250', and 300'-306' below land surface. The borehole is cased from the surface to the bottom (2117-ft elevation) with perforations in the bottom three feet making it likely that the principal water producer is a coarse sandy gravel at the bottom six feet of the borehole.

**References**

Idaho Department of Transportation, 1994, 30 X 60 minute series topographic map of Boise, Idaho, scale 1:100,000.

Idaho Department of Water Resources, 1997 microfiche file of drillers reports, Orchard Street Office.


**Figures and enclosures**

**Figure 1** Map (1:100,000) showing cross section transect, wells used in cross section, and surficial geology.

**Figure 2** Cross section of geology and hydrogeology across the western Snake River Plain in the Parma, Idaho area.

**Figure 2a** Legend for cross section

**Attached** Eight panels of wells used in cross section showing lithology and well construction.

**Attached** Drillers reports of selected wells.
PARMA CROSS SECTION
LOCATION MAP

Surficial geology from Geologic Map of the
Boise Valley and Adjoining Area,
Western Snake River Plain, Idaho
(Obbeng, K.L., Stanford, L.R., 1992)

Qa Alluvium of Boise and Snake River
Qas Sandy alluvium of side-stream valleys
Qbgc Clay of Bonneville Flood slack water
Qwgs Sandy silt of Bonneville Flood slack water
Qwig Gravel of the Bonneville Flood scoured Whitney Terrace
Qwfg Sandy silt of the Bonneville Flood slack water
Qbg Gravel of Boise Terrace
Qwg Gravel of the Whitney Terrace
Qdg Gravel of the Deer Flat Terrace
Ts Sand and Mudstone of stream and lake sediment
Figure 2
Treasure Valley Hydrologic Project
Parma Geologic Cross Section
Gregg Beukelman
2/6/97
Cross section of the Treasure Valley in the Notus area for the TVHP (Treasure Valley Hydrologic Project):
Notes on Geology of the Notus area, Gem, Payette, Canyon and Owyhee Counties, Idaho

by Gregg Beukelman
Department of Geosciences, Boise State University
Boise, Idaho 83725
tele: 208-385-1631, fax 385-4061, email: gbeukelm@trex.idbsu.edu

February 18, 1997

Introduction
The report and enclosed data are a preliminary compilation of information along a transect extending NE-SW from the Emmett Valley, southwest near the town of Notus and to the south of the Snake River (Fig. 1). The intent of this report is to show the nature of the Late Cenozoic stratified sediments in the upper portion of the western Snake River Plain (Fig. 2). Included for each well along the transect are the well owner, Land Office Grid coordinates, surface elevation (±10 feet), and diagrams of well construction and lithology (attached).

Lithologies, taken from well drillers’ reports on record at the Idaho Department of Water Resources and the Boise office of the U.S. Geological Survey, are plotted in detail where distinctive units of lithologic or hydrogeologic significance are well documented by the driller. Individual drillers’ reports are attached to the report should the user wish more detail. Also included is a geologic cross section drawn to show correlatable distinctive lithologic and hydrogeologic boundaries encountered in each well. A 1:100,000 map of the area Fig. 1) is included showing the route of the transect (A-A’), individual well owners and surface geology (taken from Othberg and Stanford, 1992).

Methods
The cross section included is a graphical presentation of subsurface lithologies based on water well drillers reports. Wells along a NE-SW transect were selected to ensure maximum section coverage and U.S. Geological Survey monitoring wells were included where possible. For each well included in the profile (1:24,000 horizontal) the stratigraphic section and well construction, as reported in the drillers logs, were plotted at a vertical scale of 1:1,200 (see attached sheets). Correlations were made at this scale and all data digitized and reduced to produce the cross section in figure 2. Accuracy of all elevations is probably ±10 feet. Elevations of the contacts at the top of the lacustrine claystone are interpreted from lithologic and electrical resistivity logs for the Oroc Oil Company Richardson #1 and Sundance Oil Company Caldwell Hunter Linning #1-30 deep exploration wells. The elevations for the top of the basement Miocene basalt are taken from a structural contour map of this contact (Wood, 1997).
Structure

The structural nature of this area of the plain is inferred to be a normal fault-bounded graben. Faults are thought to be older structures owing to their lack of surface expression and the absence of offset in Pleistocene gravels and overlying Bonneville Flood deposits. Evidence for a major north facing fault south of the Snake River is the rather monotonous thickness of clay seen in the Lineberger well. Nearby sediments having a similar appearance are mapped by Ekren and others (1981) as Miocene Poison Creek Formation. Thick clay units are not seen as similar elevations in the Asumendi well just across the river to the north suggesting a minimum offset of 400 feet. North of the Snake River, evidence suggests the presence of a five mile wide upthrown block (horst) based in elevations of the clay dominant section. This structure, as identified in the upper stratigraphy of the basin, correlates with a topographic high on the surface of the basement basalt (Wood, 1997). Several other normal faults, all having offsets less than 120 feet, are interpreted based on offset of a very distinctive color boundary between overlying brown sediments and underlying blue sediments. A south facing fault just north of the Lane well correlates spatially with a fault seen in the Miocene basalts but in the sediments appears to have an opposite sense of displacement. The north facing normal fault just north of the Gottesch well and along the southern margin of the Emmett Valley correlates well with the northwest extension of a similarly facing basement fault (Wood, 1997). Based on the sediment color change boundary, the section appears to have no discernable dip along the NE-SW oriented line of section (0.04° between the Frisby and Gottesch wells).

Stratigraphy

The sedimentary section contains Late Cenozoic fluvial and lacustrine deposits and an interbedded basalt unit overlying a basement of basalt that varies in elevation along the profile from -2000-ft to -3200-ft (Minus signs indicate elevation below sea level). Surficial deposits include modern flood plain deposits, Bonneville Flood slack water fine sediments, gravels of Pleistocene age, and older Tertiary age sediments. Low lying portions of the profile adjacent to the Boise and Snake River courses are mantled by sediments of Bonneville Flood slack water origin. There are typically silts and clays and commonly overlie terrace gravels including from youngest to oldest: Gravel of Boise Terrace, Gravel of Whitney Terrace, Gravel of the Wilder Terrace, and Gravel of Deer Flat Terrace. In the Emmett Valley a valley bottom gravel may be a modern alluvial deposit (Qal) of the Payette River or part of a older terrace with correlation to the Boise Terrace. A thin (approximately 10 feet) perched gravel occurring in the Gottesch well at 2390-ft elevation may also be a remnant of a Pleistocene terrace.

Beneath the surficial sediments is a complex sequence of interfingered lenses of gravels, sands, and clays which are interpreted to represent fluvial and shallow lacustrine deposits. This section contains an upper portion in which sediments are commonly some shade of brown, tan, or yellow and a deeper portion having sediments that are described as blue in drillers logs. The boundary between these color-defined units occurs at 2250-ft ± 75 ft elevation and appears in most well logs. The brown-colored unit is up to 300 feet thick beneath the uplands north and south of the Boise River, but has apparently been mostly removed by erosion by the Boise River Valley beneath the lowlands. The nature of this type of boundary is not well understood but is believed to reflect differences in depositional environment. The blue colored sediments are
thought to be an indication of a chemically reducing depositional environment characteristic of lake deposits. The brown colors are more likely caused by oxidation of iron-bearing minerals under unsaturated conditions. Thus, these sediments are thought to represent alluvial, fluvial, and lake margin deposits which would be more apt to be oxidized. Alternatively, it is also possible that recharge by oxygenated waters percolating through reduced (blue) iron minerals may oxidize formerly blue-gray colored deposits. Groundwater that is high in dissolved iron can be associated with the oxidation of reduced iron minerals at a contact between oxidizing and reducing conditions. Evidence in the area of the transect, such as the uniform elevation of the contact and its lack of any identifiable deflection near either the Boise River or Snake River (areas which might be thought to be recharge sources), suggests that this brown-blue contact is the result of original diagenesis and not greatly affected by later recharge. Therefore, this oxidation/reduction contact may well be useful for geologic interpretation of depositional environments.

North of the major fault in the Snake River area, the deeper part of the sedimentary section is composed of about 2800 feet of lacustrine claystone. The upper contact of this section is at 620-ft or 815-ft elevations as interpreted from the electrical resistivity logs of the Richardson #1 and Caldwell Hunter Linning #1-30 deep exploration wells respectively. The geometry of the upper contact of this claystone cannot be determined from this cross section as only the deep exploration wells penetrate it. Included within the claystone section is an approximately 400 foot thick volcanic unit of interbedded basaltic flows and tuffs. This basalt can be seen on seismic reflection data (Lariat Exploration-BB2 line) and in the Caldwell Hunter Sinning #1-30 well where its top is penetrated at -1000-ft elevation. The claystone section is overlain by a fluvial-lacustrine section containing a significant aquifer section a minimum of 900 feet thick. Beneath the uplands north of the Snake River the base of this section, containing sand aquifers, is the top of the pro-delta mudstone facies interpreted by Wood (1997).

Basalt forms a volcanic basement to the sedimentary section. Although no wells along the transect penetrates the top of the basalt, seismic reflection data from the Lariat Exploration-BB2 line suggest that its upper contact is at about -2400-ft elevation in the area of the Pioneer Irrigation well. Elsewhere along the profile, the topography of the upper contact of the basalt, as interpreted by Wood (1997) from seismic reflection data, mimics the graben form of the basin with the exception of the topographic high between the Snake River and the Boise River. Elevations of the basalt surface range from -2000-ft near the southern end of the cross section to about -3200-ft farther to the northeast.

Hydrogeology

With two exceptions, the static water level in wells along this transect vary only 130 feet in elevation. One exception is the Asumendi well located adjacent to the Snake River having a static water level of 2190-ft and the other is the Hillard well in the highlands between the Boise River drainage and the Payette River drainage that has a water level of 2580-ft. The Woods well in the Emmett Valley was completed into a thick section of clay to an elevation of 1940-ft and is flowing artesian. Most of the wells between the Emmett Valley and the Boise River are completed in the alluvial, fluvial, and shallow lacustrine section and behave as unconfined or semiconfined. Between the Boise River flood plain and the Snake River the static water level is
rather consistent, ranging from 2390-ft to 2340-ft elevation with a trend of decreasing elevation nearer both water courses. Only one well south of the Snake River is included in the transect so no trend south of the river has been studied, but the one water level is about 125 feet lower than the others north of the river.

Five wells included in the cross section are part of the U. S. Geological Survey monitoring well program:

The Pioneer Irrigation well (SE1/4, NW1/4, S22, T4N, R4W) has a static water level of 2340-ft as measured on 9/19/96. The well is cased for the upper 65 feet if its total 132 foot depth making it likely that water is from a sand at 2220-ft elevation. This sand unit is behaves as a semiconfined aquifer.

The Clement well (SW1/4, NW1/4, S36, T5N, R4W) has a water level of 2340-ft as measured on 3/21/96 and the upper 125 feet of its total 146 foot depth is cased. A sand unit at 2228-ft is the likely source of the water and is acting as a semiconfined aquifer.

The Copp well located in the NE1/4, NW1/4, S24, T5N, R4W is completed to a depth of 448 feet in the upper alluvial, fluvial, and lacustrine sediments. Its static water level is at 2373-ft elevation and is cased a total of 420 feet with screened intervals that allow sand lenses to supply water.

The Hanson Livestock Co. well (NW1/4, NE1/4, S16, T5N, R4W) is completed to a depth of 333 feet and is cased its entire depth. Perforations in the bottom 70 feet and a gravel pack likely allow for supply of water by a higher unit (2250-ft) which behaves as an unconfined aquifer.

The Lane well (NE1/4, SW1/4, S35, T6N, R4W) penetrates the upper section of alluvial, fluvial, and lacustrine deposits to a depth of 362 feet. The sediments in the lowest 70 feet of the borehole are all water bearing but the well is cased its entire depth making it likely that the sand unit at 2265-ft elevation is the primary water source.

References

Idaho Department of Transportation, 1994, 30 X 60 minute series topographic map of Boise, Idaho, scale 1:100,000.

Idaho Department of Water Resources, 1997 microfiche file of drillers reports, Orchard Street Office.


**Figures and enclosures**

Figure 1 Map (1:100,000) showing cross section transect, wells used in cross section, surficial geology, location of deep exploration wells, and seismic reflection line.

Figure 2a & b Cross section of geology and hydrogeology across the western Snake River Plain in the Notus, Idaho area.

Figure 2a Legend for cross section

Attached Eleven panels of wells used in cross section showing lithology and well construction.

Attached Drillers reports of selected wells.
SURFICIAL GEOLOGY FROM GEOLOGIC MAP OF THE BOISE VALLEY AND ADJOINING AREA, WESTERN SNAKE RIVER PLAIN, IDAHO (OTHBERG, K.L., STANFORD, L.R., 1992)

**Qa**
- Alluvium of Boise and Snake River

**Qbgc**
- Clay of Bonneville Flood slack water

**Qdgc**
- Gravel of Bonneville Flood scoured Boise Terrace

**Qwgs**
- Sandy silt of Bonneville Flood slack water

**Qwfg**
- Gravel of the Bonneville Flood scoured Whitney Terrace

**Qtig**
- Sandy silt of the Bonneville Flood slack water

**Qf**
- Gravel of the Deer Flat Terrace

**Qdf**
- Tenmile Gravel

**Tfg**
- Glenns Ferry Formation

**Ts**
- Sand and Mudstone of stream and lake sediment

**Upper Limits of Bonneville Flood Slack Water**

**NOTUS CROSS SECTION LOCATION MAP**

Surficial geology from the Geologic Map of the Boise Valley and Adjoining Area, Western Snake River Plain, Idaho (Othberg, K.L., Stanford, L.R., 1992).
FIGURE 2a
Treasure Valley Hydrologic Project
Notus Geologic Cross Section
Gregg Beukelman
2/18/97

1100
1200
1300
1400
1500
1600
1700
1800
1900
2000
2100
2200
2300
2400
2500
2600
2700
2800

FEET ABOVE SEA LEVEL

-742-ft
-1160-ft

1:50
EARTI
RESISTIVITY

1:40
ELECTRICAL RESISTIVITY

1:30
ELECTRICAL RESISTIVITY

1:20
ELECTRICAL RESISTIVITY

1:10
ELECTRICAL RESISTIVITY

1:00
ELECTRICAL RESISTIVITY

(Top of thick lacustrine siltstone section -620-ft)
Well bottom elev. -742-ft

(Top of thick lacustrine siltstone section -815-ft)
Well bottom elev. -1160-ft

VERTICAL EXAGGERATION
42X

MILES

0
1
2
3
4
5

SNAKE RIVER

DOSE RIVER

U.S.G.S. Monitoring Wall
U.S.G.S. Monitoring Wall
U.S.G.S. Monitoring Wall
U.S.G.S. Monitoring Wall
FIGURE 2b

Treasure Valley Hydrologic Project
Notus Geologic Cross Section

Gregg Beukelman
2/18/97
FIGURE 2C

CROSS SECTION LEGEND

Diagram of Typical Well Interval

GEOLOGIC Units (After Othberg and Stanford, 1992)

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Qa</td>
<td>Alluvium of Boise and Snake River</td>
</tr>
<tr>
<td>Qas</td>
<td>Sandy alluvium of side-stream valleys</td>
</tr>
<tr>
<td>Qbge</td>
<td>Clay of Bonneville Flood slack water</td>
</tr>
<tr>
<td>Qwgs</td>
<td>Sandy silt of Bonneville Flood slack water</td>
</tr>
<tr>
<td>Qwfg</td>
<td>Gravel of the Bonneville Flood scoured Whitney Terrace</td>
</tr>
<tr>
<td>Qwlg</td>
<td>Sandy silt of the Bonneville Flood slack water</td>
</tr>
<tr>
<td>Qbg</td>
<td>Gravel of the Boise Terrace</td>
</tr>
<tr>
<td>Qwg</td>
<td>Gravel of the Whitney Terrace</td>
</tr>
<tr>
<td>Tdg</td>
<td>Gravel of the Deer Flat Terrace</td>
</tr>
<tr>
<td>Ts</td>
<td>Sand and Mudstone of stream and lake sediment</td>
</tr>
</tbody>
</table>

WELL LITHOLOGIC ABBREVIATIONS

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>G</td>
<td>Gravel</td>
</tr>
<tr>
<td>Sa(c,m,f)</td>
<td>Sand (coarse, medium, fine)</td>
</tr>
<tr>
<td>C</td>
<td>Clay</td>
</tr>
</tbody>
</table>

When two sediment sizes are combined (C+Sa) the first sediment is the most abundant.

Color modifiers: Brown (Br) and Blue (Bu) are included for Tertiary sediments.
## 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**: Brown, Charles
- **Address**: 123 Main St, Anytown, USA
- **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**
- Rotory
- Dug
- Other

### 5. WELL CONSTRUCTION
- **Diameter of hole**: 6 inches
- **Total depth**: 405 feet
- **Casing schedule**:
  - **Steel**
  - **Concrete**
- **Thickness**:
  - 6 inches
  - 6 inches
- **Diameter From To**:
  - 6 inches to 1 feet 131 feet
  - 6 inches to 1 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**
  - 6 inches
  - 6 inches
- **Number From To**:
  - 6 inches to 1 feet
  - 6 inches to 1 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 feet
- **Material used in seal**
- **Cement grout**
- **Pudding clay**
- **Well cuttings**
- **Sealing procedure used**
- **Blinty pit**
- **Temporary surface sealing**
- **Over bored to seal depth**

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

### 7. WATER LEVEL
- **Static water level**: 18 feet below land surface
- **Flow rate**: 10 G.P.M.
- **Temperature**: 70°F
- **Quality**: Good
- **Antiseptic used**: None

### 8. WELL DATA
- **Discharge G.P.M.**
- **Draw Down**
- **Hours Pumped**

### 9. LITHOLOGIC LOG
- **Hole**
- **Depth**
- **Material**
- **Water**

<table>
<thead>
<tr>
<th>Hole</th>
<th>Depth</th>
<th>Material</th>
<th>Water</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>65</td>
<td>HAND BORED SANDY CLAY</td>
<td>Yes</td>
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<tr>
<td>2.</td>
<td>128</td>
<td>SANDY BLUE CLAY</td>
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<td>3.</td>
<td>266</td>
<td>BLUE CLAY</td>
<td>Yes</td>
</tr>
<tr>
<td>4.</td>
<td>405</td>
<td>GREEN SANDY BLUE CLAY</td>
<td>No</td>
</tr>
<tr>
<td>5.</td>
<td>715</td>
<td>BLACK SAND</td>
<td>No</td>
</tr>
</tbody>
</table>

### 10. WORK HISTORY
- **Work started**: Jan 24, 25
- **Finished**: Jan 12, 25

### 11. DRILLERS CERTIFICATION
- **Name**: Brown, Charles
- **Firm Name**: Brown Well Drll
- **Firm No.**: 23
- **Address**: 123 Main St, Anytown, USA
- **Date**: Jan 10, 25
- **Signed by (Firm Official)**

USE ADDITIONAL SHEETS IF NECESSARY

FORWARD THE WHITE COPY TO THE DEPARTMENT
## 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**: Fred Batt (Millard-hon Co.)
- **Address**: Rte. 1, Millard, Idaho 83342
- **Owner's Permit No.**: 13-8953

### 2. NATURE OF WORK

- **New well**
- **Deepened**
- **Replacement**
- **Abandoned (describe method of abandoning)**

### 3. PROPOSED USE

- **Domestic**
- **Irrigation**
- **Test**
- **Other**
- **Municipal**
- **Industrial**
- **Stock**
- **Waste Disposal or Injection**

### 4. METHOD DRILLED

- **Cable**
- **Rotary**
- **Dug**
- **Other**

### 5. WELL CONSTRUCTION

- **Diameter of hole**: 7½ inches
- **Total depth**: 464 feet
- **Casing schedule**: 2½ Steel
- **Cemented**: Yes

<table>
<thead>
<tr>
<th>Diameter</th>
<th>Thickness</th>
<th>From</th>
<th>To</th>
<th>Description</th>
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<tbody>
<tr>
<td>2½</td>
<td>16 inches</td>
<td>0</td>
<td>200 feet</td>
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<td>2½</td>
<td>16 inches</td>
<td>200</td>
<td>400 feet</td>
<td>Steel</td>
</tr>
<tr>
<td>2½</td>
<td>16 inches</td>
<td>400</td>
<td>600 feet</td>
<td>Steel</td>
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<tr>
<td>2½</td>
<td>16 inches</td>
<td>600</td>
<td>800 feet</td>
<td>Steel</td>
</tr>
</tbody>
</table>

- **Water level**
  - **Static water level**: 15 feet below land surface
  - **Flowing**: Yes
  - **G.P.M. flow**: 120
  - **Temperature**: 50°F
  - **Quality**: Hard
  - **Artesian closed in pressure**: Yes
  - **D.P.**: 100 feet
  - **Controlled by**:
    - **Valve**: Yes
    - **Cap**: Yes
    - **Plug**: Yes

### 6. LOCATION OF WELL

- **Sketch map location must agree with written location**

### 7. Lithologic Log

<table>
<thead>
<tr>
<th>Hole Diameter</th>
<th>Depth From</th>
<th>To</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>2½</td>
<td>0 to 100</td>
<td></td>
<td>Tonsill</td>
</tr>
<tr>
<td>1¼</td>
<td>100 to 300</td>
<td></td>
<td>Yardman</td>
</tr>
<tr>
<td>2½</td>
<td>300 to 500</td>
<td></td>
<td>Sand, Gravel, Rock</td>
</tr>
<tr>
<td>2½</td>
<td>500 to 700</td>
<td></td>
<td>Clay</td>
</tr>
<tr>
<td>2½</td>
<td>700 to 820</td>
<td></td>
<td>Sand &amp; Pea Gravel</td>
</tr>
<tr>
<td>2½</td>
<td>820 to 920</td>
<td></td>
<td>Pink Sand</td>
</tr>
<tr>
<td>2½</td>
<td>920 to 1000</td>
<td></td>
<td>Sand &amp; Clay Mixed</td>
</tr>
<tr>
<td>2½</td>
<td>1000 to 1100</td>
<td></td>
<td>Clay</td>
</tr>
<tr>
<td>2½</td>
<td>1100 to 1200</td>
<td></td>
<td>Sand &amp; Pea Gravel w/some Clay</td>
</tr>
<tr>
<td>2½</td>
<td>1200 to 1300</td>
<td></td>
<td>Clay</td>
</tr>
<tr>
<td>2½</td>
<td>1300 to 1400</td>
<td></td>
<td>Sand &amp; Pea Gravel</td>
</tr>
<tr>
<td>2½</td>
<td>1400 to 1600</td>
<td></td>
<td>Sand, Small Gravel &amp; Clay mixed</td>
</tr>
<tr>
<td>2½</td>
<td>1600 to 1700</td>
<td></td>
<td>Clay</td>
</tr>
<tr>
<td>2½</td>
<td>1700 to 1800</td>
<td></td>
<td>Sand &amp; Pea Gravel w/some Clay</td>
</tr>
<tr>
<td>2½</td>
<td>1800 to 2000</td>
<td></td>
<td>Blue Clay w/some Sand</td>
</tr>
<tr>
<td>2½</td>
<td>2000 to 2100</td>
<td></td>
<td>Blue Sand &amp; Pea Gravel</td>
</tr>
<tr>
<td>2½</td>
<td>2100 to 2200</td>
<td></td>
<td>Gray Clay w/some Sand</td>
</tr>
<tr>
<td>2½</td>
<td>2200 to 2400</td>
<td></td>
<td>Pipe to Med. Blue Sand</td>
</tr>
<tr>
<td>2½</td>
<td>2400 to 3000</td>
<td></td>
<td>Coarse Sand &amp; Pea Gravel</td>
</tr>
<tr>
<td>2½</td>
<td>3000 to 3100</td>
<td></td>
<td>Clay</td>
</tr>
<tr>
<td>2½</td>
<td>3100 to 3300</td>
<td></td>
<td>Sand &amp; Clay mixed</td>
</tr>
<tr>
<td>2½</td>
<td>3300 to 3500</td>
<td></td>
<td>Pipe to Coarse Sand &amp; Pea Gravel</td>
</tr>
<tr>
<td>2½</td>
<td>3500 to 3600</td>
<td></td>
<td>Clay w/some Sand</td>
</tr>
<tr>
<td>2½</td>
<td>3600 to 3800</td>
<td></td>
<td>Coarse Sand &amp; Small Gravel</td>
</tr>
<tr>
<td>2½</td>
<td>3800 to 4100</td>
<td></td>
<td>Clay</td>
</tr>
</tbody>
</table>

### 8. WELL TEST DATA

- **Pump**
- **Bailer**
- **Other**

<table>
<thead>
<tr>
<th>Discharge G.P.M.</th>
<th>Drained Days</th>
<th>Hours Pumped</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 9. DRILLERS CERTIFICATION

- **Firm Name**: Pete Cope Drilling Co., Inc.
- **Firm No.**: 111
- **Address**: 2056 N. K-Bar-T Drive
- **Boise, Idaho 83712**
- **Date**: 10-12-77

- **Signed by (Firm Official)**
- **(Operator)**


IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT
Use Typewriter or Ballpoint Pen

1. DRILLING PERMIT NO. 63-83W-374-000
Other IDWR No.

2. OWNER: R. V. McLean
Name:
Address: 67541 Upper Pecos Rd,
City: Rodeo

3. LOCATION OF WELL by legal description:
Sketch map location must agree with written location.

4. USE:
Domestic ■ Municipal ■ Monitor ■ Irrigation
Thermal ■ Injection ■ Other

5. TYPE OF WORK check all that apply
□ New Well □ Modify □ Abandonment □ Other

6. SEALING PROCEDURES
SEAL FILTER PACK AMOUNT FROM METHOD

7. CASING LINER:

8. PERFORATIONS/SCREENS

9. STATIC WATER LEVEL OR ARTESIAN PRESSURE:
20 ft below ground Artesian pressure __ R.
Depth flow encountered 130-306 ft. Describe access port or control devices: CDP

10. WELL TESTS:

11. LITHOLOGIC LOG:

12. DRILLER'S CERTIFICATION
We certify that all minimum well construction standards were complied with at the time the rig was removed.

FORWARD WHITE COPY TO WATER RESOURCES

Office Use Only
Inspected by:

Date:

Received:

JUL 8 1995

JUL 1 1996

WATER RESOURCES

RECEIVED

RECEIVED

Department of Water Resources

JUL 1 1996

WATER RESOURCES

WELLFLOW NUMBER

RECEIVED

WATER RESOURCES

WELLFLOW NUMBER

RECEIVED

WATER RESOURCES

WELLFLOW NUMBER

RECEIVED
**WELL SCHEDULE** 10-5-3. Field No. 4-14-54

**Date** June 20, 1954

**Record by** R.C.S. Fee

**Office No.** 4-14-54

**Location:** State: Ind. County: Carson Map: State Highway Dept.

**Record by:** Driller's Log O.R. Arnes

**Depth:** 105 ft

**Source of data:** Driller's Log O.R. Arnes

---

### Driller's Description

<table>
<thead>
<tr>
<th>Material</th>
<th>Thickness</th>
<th>Depth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clay, gray</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>Gravel</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Sand, fine, muddy, water</td>
<td>17</td>
<td>17</td>
</tr>
<tr>
<td>Sand, muddy</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>Sand, silt</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>Sand, blue, sandy, sand</td>
<td>180</td>
<td></td>
</tr>
<tr>
<td>Water, other</td>
<td>5</td>
<td>18</td>
</tr>
<tr>
<td>Shale, blue, silt, and sand, water</td>
<td>23</td>
<td>23</td>
</tr>
<tr>
<td>Sand, fine, sandy, running, sand</td>
<td>42</td>
<td>250</td>
</tr>
<tr>
<td>Sand, fine, muddy, gravel</td>
<td>37</td>
<td>289</td>
</tr>
<tr>
<td>Gravel, sand</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Gravel &amp; sand, water</td>
<td>8</td>
<td>30</td>
</tr>
<tr>
<td>Sand, coarse, and gravel</td>
<td>6</td>
<td>306</td>
</tr>
</tbody>
</table>

**Quality:** Soft

**Temperature:** 65°F

**Use:** Dom., Stock, Ind., Irr., Obs.

**Adequacy, permanence:** O.K.

**Remarks:** (Log, Analyze, etc.)

---

**Site Data Updated:** 1954-07-01

**Examination:** N.D.

**Stored:** 08-29-83

---

**Bill Paulison**

**Wilden**
**WELL DRILLER'S REPORT**

**STATE OF IDAHO**
**DEPARTMENT OF WATER RESOURCES**

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: Kris Incey
Address: 23605 Rodeo Ln, Pampa, ID 83660
Drilling Permit No.: 63-92-W-0229-000
Water Right Permit No.: 63-92-W-0229-000

**7. WATER LEVEL**

<table>
<thead>
<tr>
<th>Static water level</th>
<th>feet below land surface</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>126</td>
</tr>
</tbody>
</table>

Flowing? Yes No
Artesian closed-in pressure: 0 psi
Controlled by: Valve Cap Plug
Temperature: °F Quality:

Describe features or abnormalities observed below:

---

**2. NATURE OF WORK**

- New well
- Deepened
- Replacement
- Well diameter increase
- Abandoned (describe abandonment or modification procedures such as liners, screens, materials, plug depths, etc. in lithologic log, section 6)

**3. PROPOSED USE**

- Domestic
- Irrigation
- Monitor
- Industrial
- Stock
- Waste Disposal or Injection
- Other: (specify type)

**4. METHOD DRILLED**

- Rotary Air Auger Reverse rotary
- Cable Mud Other (backhoe, hydraulic, etc.)

---

**5. WELL CONSTRUCTION**

Casing schedule:

<table>
<thead>
<tr>
<th>Depth</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top</td>
<td>Water</td>
</tr>
<tr>
<td>1250</td>
<td>Steel</td>
</tr>
<tr>
<td>8</td>
<td>Concrete</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Diameter</th>
<th>Slot size</th>
<th>Set from</th>
<th>Feet</th>
</tr>
</thead>
<tbody>
<tr>
<td>250</td>
<td>8</td>
<td>1</td>
<td>325</td>
</tr>
</tbody>
</table>

Was casing drive shoe used? Yes No
Was a packer or seal used? Yes No
Perforated? Yes No
How perforated? Factory Knot Torch Gun
Size of perforation: inches by inches
Number of perforations: feet
Well screen installed? Yes No
Manufacturer:
Top Packer or Headpipe:
Bottom of Tailpipe:
Diameter: Slot size: Set from: Feet

Gravel packed? Yes No
Type of gravel:
Packed from:

Surface seal depth: Material:
- Bentonite
- L. Pudding clay
- Sand
- Clay

Casing procedure:
- Sturdy
- Securely
- Temp.
- Surface casing
- Overbore seal depth

Method of joining casing:
- Threaded
- Welded
- Solvent Welded
- Cements between strata

Describe access point:

---

**6. LITHOLOGIC LOG**

<table>
<thead>
<tr>
<th>Depth</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Water</td>
</tr>
<tr>
<td>1250</td>
<td>Steel</td>
</tr>
<tr>
<td>8</td>
<td>Concrete</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Location</th>
<th>Depth</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top</td>
<td>Water</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Number of Feet</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>1250</td>
<td>Steel</td>
</tr>
<tr>
<td>8</td>
<td>Concrete</td>
</tr>
</tbody>
</table>

---

**8. WELL TEST DATA**

- Pump: 145
- Ball: 175
- Air: Other
- Other:

Clearance in pumping:
- Pumping Level: 145
- Hours Pumped: 175

---

**9. LOCATION OF WELL**

Sketch map location must agree with written location.

Subdivision Name: 
Lot No.: Block No.: 
County: Canyon: 
Address of Well Site: Same as above (given at least name of road)
SE 1/4 NW 1/4 Sec. 4 R. 5 E. of W. 

---

**11. DRILLER'S CERTIFICATION**

We certify that all minimum well construction standards were complied with at the time the log was recorded.

Firm Name: Riverside Drilling Inc.
Address: PO Box 720, Pampa, ID 83660
Date: 11/23/92
Signed by Drilling Supervisor:

[Signature]

(Operator) [Signature]

[Signature]

---

USE ADDITIONAL SHEETS IF NECESSARY — FORWARD THE WHITE COPY TO THE DEPARTMENT.
1. WELL OWNER

- **Name:** Ray Oberdorf
- **Address:** 134 Pine, McCall, Idaho 83638
- **Owner's Permit No.:**

2. NATURE OF WORK

- **New well**
- **Deepened**
- **Replacement**
- **Abandoned (describe method of abandonment)**

3. PROPOSED USE

- **Domestic**
- **Irrigation**
- **Test**
- **Other (specify type)**
- **Industrial**
- **Stock**
- **Waste Disposal or Injection**

4. METHOD DRILLED

- **Cable**
- **Rotary**
- **Dug**
- **Other**

5. WELL CONSTRUCTION

<table>
<thead>
<tr>
<th>Diameter of hole</th>
<th>Total depth</th>
<th>Casing Material</th>
<th>Concrete Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 inches</td>
<td>774 feet</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

6. LOCATION OF WELL

- **Sketch map location must agree with written location.**

7. WATER LEVEL

- **Static water level:** 86.5 feet below land surface.
- **Flowing:** Yes 13 No
- **Temporary:** Yes
- **Quality:** Yes
- **Artesian closed in pressure:** Yes
- **Caroused by:** Valve 11 Cap 1 Plug

8. WELL TEST DATA

- **Water Disposal:**
- **Osmotic:**
- **Flow:**
- **Production:**
- **Quality:**
- **Complete:**
- **Wells:**
- **Surface:**
- **Pressure:**
- **Flow:**
- **Quality:**

9. LITHOLOGIC LOG

<table>
<thead>
<tr>
<th>Depth From</th>
<th>Material</th>
<th>Water Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to 6</td>
<td>Topsoil, Hardman, Clay</td>
<td></td>
</tr>
<tr>
<td>6 to 15</td>
<td>Brn. Clay, some Hardman &amp; Gravel</td>
<td></td>
</tr>
<tr>
<td>15 to 25</td>
<td>Brn. Clay</td>
<td></td>
</tr>
<tr>
<td>25 to 45</td>
<td>Sand &amp; Gravel</td>
<td></td>
</tr>
<tr>
<td>45 to 55</td>
<td>Brn. Clay</td>
<td></td>
</tr>
<tr>
<td>55 to 70</td>
<td>Fine Brn. Sand</td>
<td></td>
</tr>
<tr>
<td>70 to 85</td>
<td>Brn. Clay w/Pipe Sand</td>
<td></td>
</tr>
<tr>
<td>85 to 105</td>
<td>Brn. Clay</td>
<td></td>
</tr>
<tr>
<td>105 to 125</td>
<td>Fine to Coarse Sand</td>
<td></td>
</tr>
<tr>
<td>125 to 140</td>
<td>Brn. Clay w/Pipe Gravel</td>
<td></td>
</tr>
<tr>
<td>140 to 150</td>
<td>Gravel</td>
<td></td>
</tr>
<tr>
<td>150 to 160</td>
<td>Gravel</td>
<td></td>
</tr>
<tr>
<td>160 to 170</td>
<td>Brn. Clay w/Pipe Gravel</td>
<td></td>
</tr>
<tr>
<td>170 to 180</td>
<td>Gravel</td>
<td></td>
</tr>
<tr>
<td>180 to 190</td>
<td>Gravel w/Pipe Gravel</td>
<td></td>
</tr>
<tr>
<td>190 to 200</td>
<td>Gravel</td>
<td></td>
</tr>
<tr>
<td>200 to 210</td>
<td>Gravel</td>
<td></td>
</tr>
<tr>
<td>210 to 220</td>
<td>Pipe Gravel</td>
<td></td>
</tr>
<tr>
<td>220 to 230</td>
<td>Pipe Gravel</td>
<td></td>
</tr>
<tr>
<td>230 to 240</td>
<td>Gravel</td>
<td></td>
</tr>
<tr>
<td>240 to 250</td>
<td>Fine Sand w/Tubes of Gravel</td>
<td></td>
</tr>
<tr>
<td>250 to 260</td>
<td>Gravel</td>
<td></td>
</tr>
<tr>
<td>260 to 270</td>
<td>Gravel</td>
<td></td>
</tr>
<tr>
<td>270 to 280</td>
<td>Gravel w/Pipe Gravel</td>
<td></td>
</tr>
<tr>
<td>280 to 290</td>
<td>Gravel</td>
<td></td>
</tr>
<tr>
<td>290 to 300</td>
<td>Coarse Sand &amp; Gravel</td>
<td></td>
</tr>
<tr>
<td>300 to 310</td>
<td>Gravel</td>
<td></td>
</tr>
<tr>
<td>310 to 320</td>
<td>Gravel</td>
<td></td>
</tr>
<tr>
<td>320 to 330</td>
<td>Fine Sand</td>
<td></td>
</tr>
<tr>
<td>330 to 340</td>
<td>Gravel</td>
<td></td>
</tr>
<tr>
<td>340 to 350</td>
<td>Gravel w/Pipe Sand &amp; Gravel</td>
<td></td>
</tr>
<tr>
<td>350 to 360</td>
<td>Gravel</td>
<td></td>
</tr>
<tr>
<td>360 to 370</td>
<td>Gravel</td>
<td></td>
</tr>
<tr>
<td>370 to 380</td>
<td>Gravel w/Pipe Sand &amp; Gravel</td>
<td></td>
</tr>
</tbody>
</table>

10. **Work started:** 10-11-77  **Finished:** 11-1-77

11. DRILLERS CERTIFICATION

- **Firm Name:** Pete Cope Drilling Co.
- **Phone No.:** 213
- **Address:** 10506 K-Bert Drive
- **Boise, Idaho 83705**
- **Date:** 11-1-77

**Signed by (Firm Official):**

- **(Operator):**

**USE ADDITIONAL SHEETS IF NECESSARY - FORWARD THE WHITE COPY TO THE DEPARTMENT**
## WELL OWNER
**Name:** Bill Burch
**Address:** RR 1, Logan, UT
**Phone:** 123-456-7890

## NATURE OF WORK
1. **Type of Work:** Drilling
2. **Method:** Crew Drilling
3. ** emoc:** 12345

## PROPOSED USE
1. **Domestic:** Yes
2. **Livestock:** Yes
3. **Recreational:** Yes
4. **Irrigation:** Yes

## WELL CONSTRUCTION
1. **Well screen:** 10 ft.
2. **Water table:** 20 ft.
3. **Gravel packed:** 15 ft.
4. **Placed from:** Surface
5. **Sealing procedure:** None

## LOCATION OF WELL
- **Subdivision Name:** CANYON SMITH TID Sec 29, T 5 N R 1 E
- **Lot No.:** 342
- **Block No.:** 123

## DRILLERS CERTIFICATION
- **Date:** April 20, 2021
- **Driller:** John Doe

---

**Notes:**
- Use additional sheets if necessary.
- Forward the white copy to the department.
<table>
<thead>
<tr>
<th>WELL OWNER</th>
<th>15G WATER LEVEL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>NATURE OF WORK</th>
<th>646 WELL TEST DATA</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>METHOD DRILLED</th>
<th>DEPTH</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>WELL CONSTRUCTION</th>
<th>DEPTH</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>LOCATION OF WELL</th>
<th>63</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

ALL DRILLERS CERTIFICATION

We certify that all minimum well construction standards were met and the well was completed as required.

[Signature]

Date: [Date]

[Address]
REPORT OF WELL DRILLER
State of Idaho

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

WELL OWNER:
Name: W.B. CAPE RICHLI
Address: 357 CUMBERLAND St.

Owner's Permit No.: 304

NATURE OF WORK (check): Replacement well
New well X Deepened Abandoned

Water in to be used for: Irrigation

METHOD OF CONSTRUCTION: Rotary X Cable

CASING SCHEDULE: Threaded X Welded

Diam. from ft. to 400 ft.
Diam. from ft. to ft.
Diam. from ft. to ft.

Thickness of casing: 1 X .5 Material:
Steel X concrete wood X other

PERFORATED? Yes X No Type of perforator used:

Size of perforations: 3/4" X by 3/4"

Size of pumping from 400 ft. to 400 ft.

Size of water to be used for:

METHOD OF TEST:

Length of time of test: 24 Hrs. Min.


above land surface: Give flow cfs or gpm. Shutoff pressure:

Controlled by: Valve X Cap X Plug

No control X Does well leak around casing?

Yes X No

DEPT. MATERIAL WATER

FROM TO FEET YES OR NO

MANUFACTURER:

Type X Model No.

Diam. Slot size X Set from ft. to ft.

CONSTRUCTION:

Well gravel packed? Yes X No

Size of gravel: 

Gravel placed from ft. to 400 ft. Surface seal provided? Yes X No To what depth?

Material used in seal: X

Did any strata contain unusable water? Yes X No X

Type of water:

Depth of strata: ft. Method of sealing strata off:

Surface casing used? Yes X No

Locate well in section


Use other side for additional remarks

Work started: Mar 7, 1967
Work finished: Mar 20, 1967

Well Driller's Statement: This well was drilled under my supervision and this report is true to the best of my knowledge.

Name: W.B. CAPE RICHLI
Address: 357 CUMBERLAND St.

License No. 304 Date: Mar 20, 1967
STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES

WELL DRILLER'S REPORT

1. WELL OWNER
Name: Joe Smith
Address: 123 Rock Street, Idaho Falls, ID 83402
Owner's Permit No.: 12345

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

4. METHOD DRILLED
☐ Rotary  ☐ Air  ☐ Hydraulic  ☐ Other
☐ Cabled  ☐ Dug  ☐ Other

5. WELL CONSTRUCTION
Casing schedule:
☐ Steel  ☐ Concrete  ☐ Other
Drill holes:
☐ 1 2 3
Diameter:
☐ 4 inches  ☐ 6 inches  ☐ 8 inches

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

7. WATER LEVEL
Static water level:
☐ Yes  ☐ No
G.P.M. flow:
☐ Yes  ☐ No

8. WELL TEST DATA
☐ Pump  ☐ Bail  ☐ Air  ☐ Other
Discharge G.P.M.:
Pumping Level:
Hours Pumped:

9. LITHOLOGIC LOG

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<th>Depth</th>
<th>Material</th>
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10. Work started July 7, 1981 finished 7-16-81

11. DRILLERS CERTIFICATION
We certify that all minimum well construction standards were complied with at the time the tap was removed.

PLT: GCPD DRILLING CO., INC.

Signed by (Firm Official)

USE ADDITIONAL SHEETS IF NECESSARY – FORWARD THE WHITE COPY TO THE DEPARTMENT
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: Bob Keller
Address: Rt. 61 - Fruitland, Id. 83401
Owner's Permit No.: ______

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

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: __________ inches Diameter: __________ inches
From: __________ inches To: __________ inches
Was casing drive shoe used? ☐ Yes ☐ No
Was a packer or seal used? ☐ Yes ☐ No
Perforated? ☐ Yes ☐ No
How perforated? ☐ Factory ☐ Knife ☐ Torch
Number of perforations: ______ inches by inches
Perforation: ______ feet by feet
Well screen installed? ☐ Yes ☐ No
Manufacturer's name ______
Type: __________ Model: __________
Diameter: __________ Slot size: __________ Set from: __________ feet to: __________ feet
Diameter: __________ Slot size: __________ Set from: __________ feet to: __________ feet
Gravel packed? ☐ Yes ☐ No ☐ Size of gravel ______ feet
Surface seal depth: __________ feet
Material used in seal: ☐ Cement grout ☐ Puddling clay ☐ Well cuttings
Sealing procedure used: ☐ Gunny 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.

7. WATER LEVEL
Static water level ______ feet below land surface.
Flowing? ☐ Yes ☐ No
G.P.M. flow ______
Artificial closed-in pressure: __________ G.P.M.
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

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10. Work started ______ finished ______

11. DRILLERS CERTIFICATION
I/we certify that all minimum well construction standards were complied with at the time the rig was removed.

Firm Name: Cee Firm No. 213
Address ______ Date ______
Signed by (Firm Official) ______
(Operator) ______

USE ADDITIONAL SHEETS IF NECESSARY - FORWARD THE WHITE COPY TO THE DEPARTMENT
Cross section of the Treasure Valley in the Boise area, for the TVHP (Treasure Valley Hydrologic Project): Notes on Geology of the Boise area, Ada County, Idaho

by Gregg Beukelman June 31, 1997
Department of Geosciences, Boise State University
Boise, Idaho 83725
tele: 208-385-1631, fax 385-4061, E-mail: gbeukelm@trex.idbsu.edu

Introduction

The report and enclosed data are a preliminary compilation of information along a transect extending NNE-SSW from Boise to south of the Snake River in the Swan Falls Dam area (Fig. 1). The intent of this report is to show the nature of the Late Cenozoic stratified sediments in the upper portion of the western Snake River Plain (Fig. 2). Included for each well along the transect are the well owner, Land Office Grid coordinates, date of well completion, and diagrams of well construction and lithology (attached). Lithologies, taken from well drillers’ reports on record at the Idaho Department of Water Resources and the Boise office of the U. S. Geological Survey, are plotted in detail where distinctive units of lithologic or hydrogeologic significance are well documented by the driller. Individual drillers’ reports are attached to the report should the user wish more detail. Also included is a geologic cross section drawn to show correlatable distinctive lithologic and hydrogeologic boundaries encountered in each well. A 1:100,000 map of the area Fig. 1) is included showing the route of the transect (A-A’), individual well owners, and surface geology (taken from: Othberg and Stanford (1992), Malde (1989), and Mitchell and Bennett (1979)).

Methods

The cross section included in this report is a graphical presentation of subsurface geology based on water well drillers reports, geophysical data of several of the wells (Squires and others, 1992), and additional available geophysical data (Liberty, 1996). Wells along the transect were selected to ensure maximum section coverage although coverage was complicated by a lack of wells in the area just north of the Snake River. For each well included in the profile (1:24,000 horizontal) the stratigraphic section and well construction, as reported in the drillers logs, were plotted at a vertical scale of 1:1,200 (see attached sheets). Correlations were made at this scale and all data digitized and reduced to produce the cross section in figures 2a and b. Accuracy of all elevations is probably ± 10 feet. The elevations reported here for the top of the basement Miocene basalt are taken from a structural contour map of this contact (Wood, 1997). Locations of several of the faults that offset Late Cenozoic sediments were interpreted from the contour map of Wood (1997) and from a seismic reflection image of the Boise area (Liberty, 1996).
Structure

The structural nature of this area of the western Snake River Plain is inferred to be a normal fault-bounded graben. The principle south-facing fault zone of the northern margin the western plain is to the north of this section but antithetic and synthetic faults within the area bound smaller intrabasinal grabens. Major extensional faults within the western Snake River Plain are thought to be older structures owing to their lack of surface expression and the absence of significant offset in Pleistocene gravels. Major offset of sedimentary rocks and underlying volcanics beneath Boise is evident on the seismic section of Liberty (1996) with offset on one such fault, the Eagle-West Boise fault, of approximately 650 ft. Numerous faults showing small offsets of Tenmile gravels are exposed in quarries south of the city (Squires and others, 1992). However, the small amount of offset on these faults cannot be easily identified in the subsurface at the scale of the accompanying cross section. Faults shown on the cross section just north of the Quaternary Snake River Group basalts are interpreted from the offset geologic and hydrogeologic boundaries within the sedimentary section. These offsets correlate with faults identified in the basement basalts (Wood, 1997).

Stratigraphy

The sedimentary section contains Late Cenozoic fluvial and lacustrine deposits and Quaternary basalts that overlie a basement of basalt. The basement varies in elevation along the profile north of the Quaternary Snake River Group basalts from +1700-ft to -3000-ft (Minus signs indicate elevation below sea level)(Wood, 1997). Surficial deposits include modern flood plain deposits, terrace gravels of Pleistocene age, gravels and finer sediments of early Pleistocene to late Pliocene age, an extensive field of Quaternary age basalts that lie south of the Boise River Valley, and older Tertiary age sediments. Remnants of terrace surfaces are underlain by gravel deposits along the Boise River and include from youngest to oldest: Gravel of Boise Terrace, Gravel of Whitney Terrace, Gravel of the Sunrise Terrace, and the Gravel of Gowen Terrace. All these terrace gravels are identified at elevations below the Gravels of Tenmile Creek. In the area of the transect, a intracanyon basalt flow mantles the Fivemile surface. Othberg and others (1995) report a whole-rock K-Ar age of 0.974±0.130 million years for the Fivemile basalt. A widespread surficial deposit of Pleistocene gravel, sand, silt, and clay overlies much of the Quaternary age basalt in the southern portion of the area.

Beneath the surficial sediments in the Boise Valley is a complex sequence of interfingering lenses of gravels, sands, and clays which are interpreted to represent fluvial and shallow lacustrine deposits. The complex geology of this important aquifer is poorly understood in any detail. Previous work by Squires (1992) has provided evidence of broad depositional systems with characteristic signatures including, a buried alluvial fan system in southeast Boise that grades westward into the river and lake sediments.

Squires (1992) pointed out the importance of color change in sediments, the Boise fan aquifer sediments being characteristically brown, and blue colors being reported for sediments more basinward. This section of this study contains an upper portion in which sediments are commonly some shade of brown, tan, or yellow and a deeper portion having sediments that are described as blue or grey in drillers logs. The boundary between these color-defined units occurs at 2320-ft ± 80 ft elevation and appears in most well logs. The brown-colored unit is up to 800
feet thick beneath the uplands south of the Boise Valley with perhaps as much as 500 feet removed by erosion of the Boise River Valley. The nature of this type of boundary is not well understood but is believed to reflect differences in depositional environment. The blue colored sediments are thought to be an indication of a chemically reducing depositional environment characteristic of lake deposits. The brown colors are more likely caused by oxidation of iron-bearing minerals under unsaturated conditions. Thus, these sediments are thought to represent alluvial, fluvial, and lake margin deposits which would be more apt to be oxidized. Alternatively, it is also possible that recharge by oxygenated waters percolating through reduced (blue) iron minerals may oxidize formerly blue-gray colored deposits. Groundwater that is high in dissolved iron can be associated with the oxidation of reduced iron minerals at a contact between oxidizing and reducing conditions. Therefore, caution should be used in using color change in the interpretation of depositional environments.

The southern portion of the transect is underlain by Quaternary basalt deposits that are intermittently covered by a mantle of sedimentary deposits (Caldwell-Nampa sediments of Mitchell and Bennett, 1997). The thickness of these basalts is not well known but maximum thickness encountered along this transect is approximately 600 feet (Swan Falls Farm). The base of these basalts show depth variations with two distinct low points. The more southern low point (elevation 2440-ft in the Swan Falls Farm well) may represent the location of the fourth stage of the ancestral Snake River canyon suggested by Malde (1991). The more northern of the low points, at an elevation of about 2280-ft. in the DeShazo well, lies within a NW-SE alignment of similarly thick accumulations of Quaternary basalts and may represent the eruption of these basalts into an eroded stream channel or into a fault-bounded topographic depression (Wood, personal communication).

Hydrogeology

The static water level in wells along this transect vary little within the lacustrine and fluvial sediments of the northern portion of the profile (north of the Collins well) but southward, the water table slopes toward the Snake River at about 0.1°. Wells completed through the basalts in the south of Boise Valley generally are good producers with large discharge volumes and little drawdown. These wells appear to be drawing water from porous intervals within the basalt such as cinder units as well as from the sediments beneath the basalts.

Wells completed into the fluvial and lacustrine sediments within the Boise Valley can be grouped geographically. The wells south of the Taggart St. well (Nicholson, Tenmile, and MAC) are all completed to a depth of about 2200-ft elevation. These wells are targeting an aquifer in thick sand units from elevations below about 2450-ft. The Taggart St. and Cassia St. wells to the north on the other hand, are completed to depths below 1800-ft elevation and are probably getting the majority of their water from a series of thin sand units below 2200-ft elevation.

References

Idaho Department of Transportation, 1994, 30 X 60 minute series topographic map of Boise, Idaho, scale 1:100,000.
Idaho Department of Water Resources, 1997 microfiche file of drillers reports, Orchard Street Office.


Figures and enclosures
Figures 1a and 1b   Map (1:100,000) showing cross section transect and wells used in cross section.

Figures 2a and 2b   Cross section of geology and hydrogeology across the western Snake River Plain to the Snake River from the Boise, Idaho area.

Figure 2c   Legend for cross section

Attached Twelve panels of wells used in cross section showing lithology and well construction.

Attached Drillers reports of selected wells.