

RECEIVED
 MULT 1333
 SEP 29 1993

CORRECTED COPY

WATER RESOURCES DEPT.
 SALEM, OREGON

City of Portland-Bureau of Water Works

1W/3E-24ca
 Mult

No. 8307

(12) WELL LOG:

<u>Material</u>	<u>From</u>	<u>To</u>
Clay, brown, silty	0	3
Boulders, and clay, brown, silty	3	8
Cobbles, gravel & clay, brown	8	12
Cobbles & gravel, loose, w/ occasional boulders & sand	12	71
Gravel & cobbles, cemented w/ occasional boulders & sand	71	87
Gravel & cobbles, cemented	87	92
Gravel, cobbles & boulders, cemented w/ sandstone, dark green	92	103
Gravel & cobbles, cemented	103	124
Boulders & gravel, cemented	124	144
Gravel & cobbles, cemented w/ some sand	144	156
Cobbles & gravel, loose	156	161
Gravel & sand, cemented	161	163
Gravel & cobbles, loose	163	164
Cobbles, boulders, gravel, cemented	164	167
Clay, grey, gritty	167	169
Sandstone, black, fine, hard	169	175
Sandstone, black, medium, medium hard	175	182
Clay, grey-green	182	199
Sand, fine w/ some grey clay	199	207
Clay, grey	207	216
Clay, grey w/ dark green sand strata	216	221
Sand, green, medium, some cementation	221	223
Clay, grey, silty	223	227
Clay, green w/ some claystone	227	231
Clay, green w/ some sandstone & sand	231	233
Sand, grey, medium fine	233	236
Clay, greenish-grey	236	237
Sand, grey, medium fine w/ grey clay	237	240
Clay, blue-grey	240	246
Clay, blue-grey, sticky	246	255
Clay, blue-grey w/ some claystone	255	260
Clay, multi-colored	260	266
Claystone, black	266	268
Sandstone, black, fine	268	271
Sandstone, black, fine w/ cobbles & gravel	271	273
Sandstone, black, fine w/ occasional grey clay	273	282
Clay, brown	282	285
Claystone, grey & sandstone & clay	285	287
Clay, blue-grey	287	290
Clay, grey w/ sandstone lenses	290	292
Clay, grey turning to claystone	292	295
Sandstone, black-green, w/ clay, grey-green	295	304
Sandstone, medium, black	304	323
Sandstone, fine, black	323	327
Sandstone, medium coarse, black	327	335

In/3E-24ca
Mult

City of Portland-Bureau of Water Works

No. 8307

(12) WELL LOG: (Cont'd)

<u>Material</u>	<u>From</u>	<u>To</u>
Sandstone, medium coarse, black w/ some gravel	335	340
Gravel & sand, fine, green, cemented	340	356
Sand, grey, fine, loose	356	358
Gravel & sand, fine, green, cemented	358	367
Sand, greenish grey, medium fine, loose	367	370
Gravel & sand, fine, green, cemented	370	376
Gravel, cemented w/claystone	376	378
Gravel & sand, medium coarse, some cemented	378	401
Clay, grey	401	412
Clay, brown & grey	412	423
Siltstone, blue-green	423	429
Clay, grey	429	432
Sand, grey, medium fine	432	434
Sand, grey, fine-cemented	434	448
Sand, black, coarse, slightly cemented	448	460
Gravel & sand, green, cemented	460	486
Sand, black, medium	486	495
Gravel & sand, fine, grey	495	504
Gravel & sand, green, cemented	504	507
Gravel & sand, medium fine, grey	507	556
Clay, greenish-grey	556	560

1/3E-24ca
Mult.

City of Portland-Bureau of Water Works

No. 8307

(5) CASING INSTALLED:

22" Diam. from +1.0 ft. to 229.0 ft. Gauge .375
 18" Diam. from 10.0 ft. to 430.0 ft. Gauge .375
 12" Diam. from 409.6 ft. to 419.4 ft. Gauge .375, S.S.,
 from 420.4 ft. to 439.6 ft. Gauge .375, S.S.,
 from 549.6 ft. to 559.6 ft. Gauge .188, S.S.

The top of the upper 12" S.S. pipe includes two neoprene packers and the bottom of the lower 12" S.S. pipe is equipped with a plate and bail. There is a special slip packer assembly located on top of the screen assembly to seal between the screen assembly and the 18" casing.

An 8" valve assembly was installed at 5 ft. below ground off the 22" casing.

(9) CONSTRUCTION:

The well was drilled 26" diameter from 0' to 34'
 drilled 22" diameter from 34' to 71'
 underreamed to 26" diameter from 71' to 130'
 drilled 22" diameter from 130' to 165'
 underreamed to 26" diameter from 165' to 176'
 drilled 22" diameter from 176' to 209'
 underreamed to 26" diameter from 209' to 230'
 drilled 21" diameter from 230' to 244'
 drilled 18" diameter from 244' to 301'
 underreamed to 22" diameter from 301' to 430'
 drilled 17" diameter from 430' to 511'
 drilled 16" diameter from 511' to 560'

Pea gravel was placed from 0 ft. to 7 ft. between the 22" casing and the bore hole.

8 cubic yards of 5 sack readi-mix were placed between the 22" casing and the eroded bore hole (the upper bore hole was eroded out to a minimum 3" clearance around the 22" casing) from 7 ft. to 19 ft.

841 sacks of Type III cement grout were placed from 19 ft. to 34 ft. between the 22" casing and the bore hole.

100 sacks of Type III cement grout were placed in the 26" diameter underreamed hole and the 22" casing then driven through the grout to seal the 22" casing to the bore hole from 209 ft. to 229 ft.

80 sacks of Type III cement grout were placed in the 22" diameter underreamed hole and the 18" casing then driven through the grout to seal the 18" casing to the bore hole from 410 ft. to 430 ft.

3 sacks of Type III cement grout were placed from 10 ft. to 12 ft. between the 18" and 22" casings on top of an "O" ring assembly.

#12-20 sand pack was placed between the 12" screen/S.S. pipe section and the 16" bore hole/18" casing from 414 ft. to 560 ft.

IN/3e-24ca
Mitt

Water Resources Department

MILL CREEK OFFICE PARK

555 13th STREET N.E., SALEM, OREGON 97310

PHONE 378-8455

RECEIVED

AUG 11 1983

WATER RESOURCES DEPT.
SALEM, OREGON

May 24, 1978

Milo Schneider
Schneider Equipment, Inc.
21881 River Road N.E.
St. Paul, Oregon 97137

*City of Portland
Bureau of Water
Works*

Dear Mr. Schneider:

Please accept my apologies for the delay in responding to your recent letter requesting special standards for the use of concrete instead of cement grout as a sealing material in large diameter wells that provide excessive space between the drill hole wall and the outside casing of the well. You are hereby granted special permission to use concrete instead of neat cement with the following provisions and conditions:

- 1) Concrete shall consist of clean, hard, durable aggregate, and not less than five sacks of Portland cement per cubic yard of concrete. Maximum diameter of the aggregate shall not exceed 3/4 of an inch in diameter.
- 2) If the well bore hole to be sealed is not dry, concrete shall be pumped from the bottom of the seal zone upward in one continuous operation to land surface.
- 3) In the event that the well bore annular space to be sealed is dry, concrete shall be placed through a tremie pipe to prevent segregation of the aggregate and cement mixture and to prevent bridging.
- 4) The space between the sealing surfaces of all casings and between all casings and the bore hole shall exceed 3-inches or more.

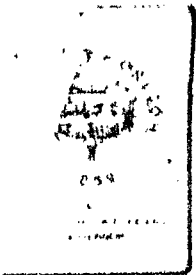
Special standards to construct a well as described above shall be considered to apply to all wells constructed in such a manner. Please refer to these special standards on the well reports of all well constructed in this manner.

Sincerely,

William B. McCall
WILLIAM B. MCCALL
Hydrogeologist

WBM:clh

cc: Clifton R. King, Watermaster, District #16



Water Resources Department

MILL CREEK OFFICE PARK

555 13th STREET N.E., SALEM, OREGON 97310

PHONE 378-2907

OR
1-800-452-7813
(message line)

*Production
L. L. L.
1/8/83*
RECEIVED
AUG 11 1983
WATER RESOURCES DEPT.
SALEM, OREGON
*IN/3E-24ca
Mull*

June 10, 1982

William Hoffstetter
Bureau of Water Works
1800 Southwest 6th
Portland, OR 97392

Dear Bill:

I apologize for the delay in responding to your request for special standards dated April 14, 1982, and updated May 7, 1982.

As you know, special standards must be issued to the drilling contractor. However, I will give tentative approval to the design outlined so that bids may be obtained. It will then be necessary for the contractor to request the identical special standards specifying the locations of the well(s) where these techniques are to be used.

To reiterate: 1) a 20-foot seal will be approved in the confining stratum overlying each confined water bearing zone; and 2) the neoprene/concrete seal between the inner and outer casings as shown in the drawing included with your May 7, 1982 request will be approved.

If I can be of further assistance, please call. I'll try to be more prompt!

Sincerely,

Fredrick G. Lissner

FREDERICK G. LISSNER
Hydrogeologist

FGLwpc
1151B



CITY OF
MULT 1335
PORTLAND, OREGON

BUREAU OF WATER WORKS

Francis J. Ivancie, Mayor
Carl Geibel, Administrator
1800 S.W. 6th
Portland, Oregon 97201
(503) 248-4178

April 14, 1982

IN 3E-24 ca
RECEIVED *Mult.*

AUG 11 1983

**WATER RESOURCES DEPT.
SALEM, OREGON**

State of Oregon
Department of Water Resources
555 13th Street N.E.
Salem, OR 97310

Attention: Mr. William McCall

Subject: Request for SPECIAL STANDARDS for the EAST WELL FIELD
PRODUCTION WELLS -- PHASE IV of the City of Portland

Gentlemen:

Enclosed herewith are specifications titled "East Well Field Production Wells - Phase IV" and Plan No. 1-G-154 which are proposed to serve as the contract documents for the three production wells of the City of Portland's Groundwater Development Program. The manner in which these wells are proposed to be constructed is believed to not conform with all the provisions of the "General Standards for the Construction and Maintenance of Water Wells in Oregon" and Special Standards are requested for those items which are not in conformance with the General Standards.

The Special Standards requested are the same as were granted by the State for Phase I and II of this development by letters dated March 20, 1979 and August 6, 1980.

The proposed production wells, specifically Types I and II on Sheet 2 of Plan 1-G-154, are required by the attached specifications to have a minimum grout seal above a confined aquifer of 20 feet instead of the 30 feet required in the General Standards. This has been done because of the following circumstances:

1. The confining layers above both confined aquifers are not cemented formations, but are instead compacted silts and fine sands which are subject to erosion.
2. The confined aquifers have sufficient head to flow when unrestrained, and the lower aquifer is capable of flows in excess of 500 gpm at the ground surface.
3. The head difference between the two confined aquifers is sufficient to generate considerable flow between the two aquifers if a path for such a flow is created.

4. The confining layers have been found by previous investigations by the City to vary considerably in thickness and they may not be 30 feet thick at all locations.

Given the above characteristics, it is believed that if the contractor were to drill into one of the confined aquifers while drilling the hole for the subsurface seal, sufficient flow would be created outside the well casing to severely erode the confining layer and inhibit the placement of cement grout as a seal. Placement of only 20 feet of grout seal against the confining layer will significantly reduce the likelihood that the lower aquifer will be encountered prior to placement of the grout seal and a Special Standard is requested which will permit the use of 20-foot sub-surface seal.

The requirement for a 30-foot sub-surface grout seal above the confined aquifers could be met by extending the seal into the overlying aquifer. However, the overlying aquifers are not sufficiently consolidated or cemented to stand open hole if drilled by cable tool or air rotary drills. Additionally, these aquifers are sufficiently permeable that grout would flow out into the aquifer and it is unlikely that any such seal will be successful.

The Water Bureau requests a second Special Standard which will permit use of a mechanical-type watertight seal to be placed between the 22-inch outer casings and the 18-inch inner casings of Type I wells. This type of seal is proposed for use because placement of a cement grout seal between two casings so close in size would be very difficult. Additionally, if the grout seal were to leak, it would be extremely difficult, if not impossible, to repair. However, if the mechanical seal were to leak, it could be removed, repaired, and reinstalled.

The seal between the 18 and 22-inch casings could be made by extending the inner casing to the ground surface and welding a plate between the casings. However, the inner casing has been terminated below ground in order to increase the area available in the top of the well for special piping and other specialized equipment required to monitor and safeguard the well.

If there are any questions concerning this communication or other Special Standards required for the proposed wells, please notify Bill Hoffstetter at the above address, or by phone at 254-3678, and the Bureau will furnish whatever additional information or requests are required.

Sincerely,

C. Goebel, Administrator


William F. Hoffstetter
Engineer III

WFH:ls

Enclosures

cc: P. Norseth

Ralph H. Jackson, Water Resources Dept.

Al Smyth, Health Divn., Human Resources Dept.



CITY OF MULT 1335

PORTLAND, OREGON

BUREAU OF WATER WORKS

Francis J. Henkle, Mayor
Carl Goebel, Administrator
1800 S.W. 6th
Portland, Oregon 97201
(503) 248-4178

*Production Wells
Ph IV*

RECEIVED

AUG 11 1983

WATER RESOURCES DEPT.
SALEM, OREGON

*1/1/3E-2400
Mult*

May 7, 1982

Mr. Fred Lissner
Oregon Water Resources Dept.
555 13th Street N.E.
Salem, Oregon 97310

Dear Mr. Lissner:

Enclosed is a drawing of a typical water tight seal used between the 18" and 22" casings on Type 1, Phase II production wells. We anticipate the use of a similar seal on the Type 1, Phase IV production wells.

Sincerely,
Carl Goebel, Administrator

Bill Hoffstetter
Bill Hoffstetter
Engineer III

BH:rjm

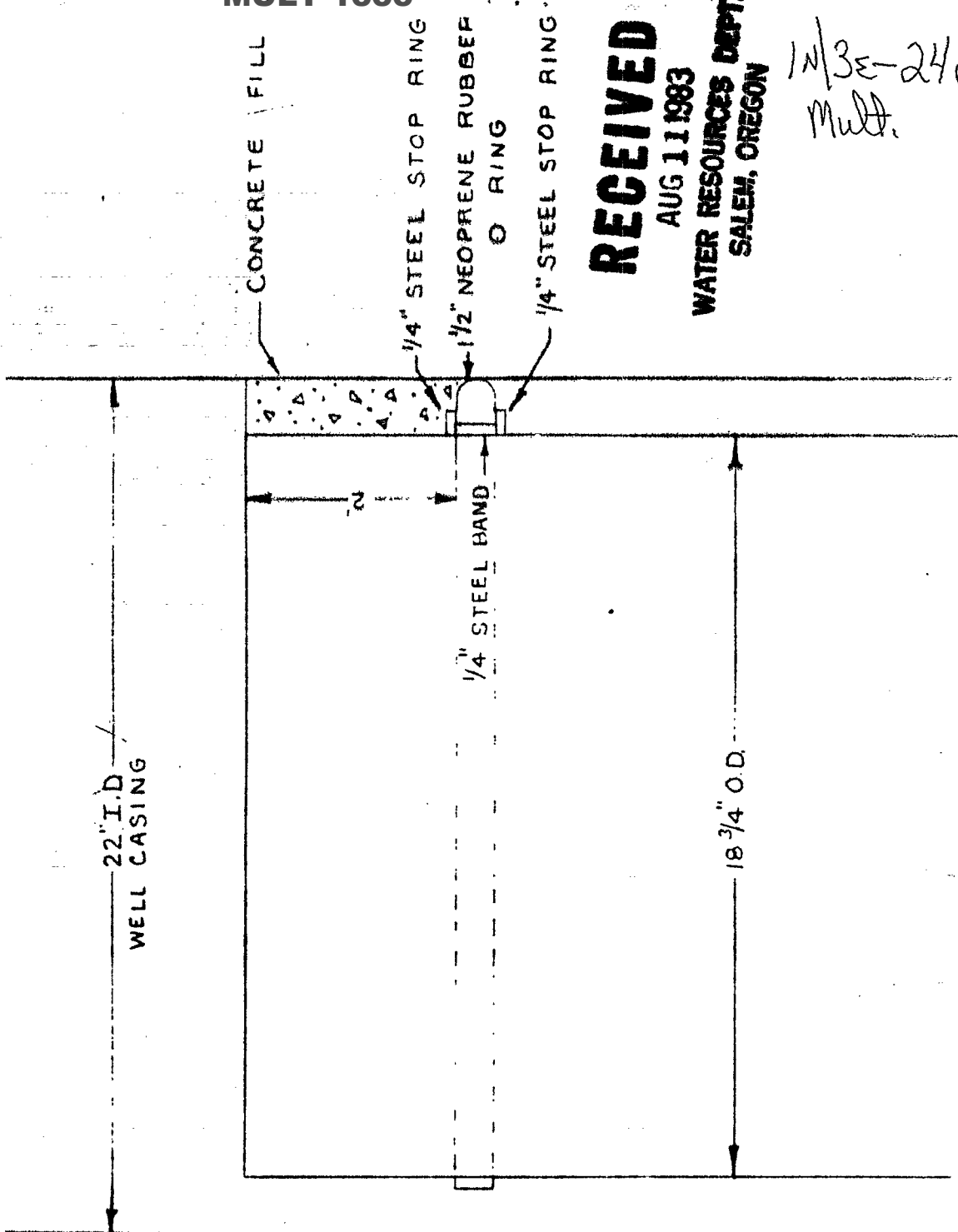
Enclosure

cc: P. Norseth
B. Willis

TYPICAL WATER TIGHT SEAL
 USED BETWEEN 8" & 2" CASINGS
 ON PHASE II PRODUCTION WELLS

SCALE
 HORIZ = 4"
 VERT AS SHOWN

MULT 1335



RECEIVED

AUG 11 1983

WATER RESOURCES DEPT.
 SALEM, OREGON

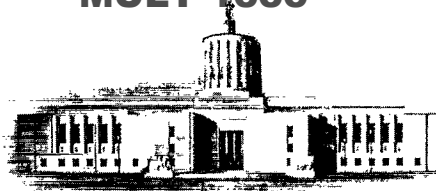
1/2/3E-24ca
 Mult.

MULT 1335

1N/3-25A
Multnomah

COMMISSIONERS

M. K. McIVER, CHAIRMAN
PORTLAND
KENNETH N. FRIDLEY, MEMBER
WASCO
GLENN L. JACKSON, MEMBER
MEDFORD
FLOYD QUERY, SECRETARY
SALEM



W. C. WILLIAMS
STATE HIGHWAY ENGINEER
FORREST COOPER
DEPUTY STATE HWY. ENGR.
LEONARD I. LINDAS
CHIEF COUNSEL

STATE OF OREGON
STATE HIGHWAY DEPARTMENT
SALEM

June 2, 1961

Mr. Lewis A. Stanley
170 12th Street, S.E.
Salem, Oregon

Water Well Report
Lewis and Clark State Park
Multnomah County

RECEIVED
JUN 6 1961
STATE ENGINEER
SALEM, OREGON

Dear Mr. Stanley:

Attached is a "Water Well Report" reporting a well drilled in Lewis and Clark State Park, located near Troutdale in Multnomah County.

Very truly yours,

L. V. Koons
Deputy State Parks Superintendent

attach.

MULT 1335

June 16, 1961

L. V. Koons
Deputy State Parks Superintendent
State Highway Department
Salem, Oregon

Dear Mr. Koons:

This will acknowledge receipt of the water well report for the well drilled in Lewis and Clark State Park, located near Troutdale in Multnomah County.

Very truly yours,

LEWIS A. STANLEY
State Engineer

Jack E. Soeva
Geologist

JES:mb