

Appendix X

PW-1 Washington State Water Well Report

PART II: Well Construction and Source Information

1) Date well originally constructed: 11 /20 /09 month/day/year

last reconstruction: / / month/day/year

Information unavailable

2) Well driller: Boart Longyear

Well driller unknown

3) Type of well: ___ Drilled: rotary bored cable (percussion) Dug

___ other: spring(s) lateral collector (Ranney)

driven jetted other: _____

4) Well report available Yes (attach copy to form) No

5) Average pumping rate: 3800 (planned) (gallons/min)

Source of information Preliminary Engineering Report

If not documented, how was pumping rate determined? Designed pump rate based on pump test results (Preliminary Engineering Report)

Pumping rate unknown

6) Is this source treated?

If so, what type of treatment:

disinfection filtration carbon filter air stripper other

Purpose of treatment (describe materials to be removed or controlled by treatment):

Reduce iron and manganese adjust pH (corrosion control) and maintain disinfection residual in distribution system

7) If source is chlorinated, is a chlorine residual maintained: Yes No

Residual level: _____ (At the point closest to the source.)

System has not yet been installed.

PART III: Hydrogeologic Information

1) Depth to top of open interval: [check one]

<20 ft 20-50ft 50-100ft 100-200ft >200ft

information unavailable

2) Depth to ground water (static water level):

<20ft 20-50ft 50-100ft >100ft

flowing well/spring (artesian)

How was water level determined?

well log X other Water level probe

depth to ground water unknown

3) If source is a flowing well or spring, what is the confining pressure:

_____ psi (pounds per square inch) **or**

_____ feet above wellhead

4) If source is a flowing well or spring, is there a surface impoundment, reservoir, or catchment associated with this source: Yes No

5) Wellhead elevation (height above mean sea level): **15.2** feet

How was elevation determined? topographic map Drilling/Well Log altimeter

other: Surveyed

information unavailable

6) Confining layers: (This can be completed only for those sources with a drilling log, well log or geologic report describing subsurface conditions. Please refer to assistance package for example.)

X evidence of a confining layer in well log

_____ no evidence of a confining layer in well log

If there is evidence of a confining layer, is the depth to ground water more than 20 feet above the **bottom** of the **lowest confining layer**? Yes No

information unavailable

7) Sanitary setback:

< 100ft* 100-120ft 120-200 ft >200ft

* If less than 100ft, describe the site conditions:

8) Wellhead construction:

wellhead enclosed in a wellhouse (**Small wellhouse planned**)

controlled access (describe): **Entire wellfield site will be fenced**

other uses for wellhouse (describe): _____

no wellhead control

9) Surface seal: **150 feet**

18 ft

<18 ft (no Department of Ecology approval)

<18 ft (Approved by Ecology, include documentation)

depth of seal unknown

no surface seal

10) Annual rainfall (inches per year):

<10 in/yr 10-25 in/yr >25 in/yr

PART IV: Mapping Your Ground Water Resource

1) Annual volume of water pumped: 758 million gallons

PW-1 will be one of four wells in the wellfield that will supply the City of Longview and Beacon Hill Sewer District (formally Cowlitz Co. PUD). The average daily demand in 2029 is estimated to be 8.33 MGD (3,033,000,000 million gallons per year). Assuming this well will produce 25% of the annual flow, it would pump 758 million gallons per year.

How was this determined?

meter

estimated: pumping rate (_____)

pump capacity (_____)

other: _____

2) "Calculated Fixed Radius" estimate of ground water movement:
(see Instruction Packet)

Not applicable – see attached figure for hydrogeologic map. Data included in Section One of Preliminary Design Report

6-month ground water travel time: _____ feet

1-year ground water travel time: _____ feet

5-year ground water travel time: _____ feet

10-year ground water travel time: _____ feet

Information available on length of screened/open interval?

Yes No

Length of screened/open interval: _____ feet

3) Is there a river, lake, pond, stream, or other obvious surface water body within the 6- month time of travel boundary?

Yes No (mark and identify on map)

4) Is there a stormwater and/or wastewater facility, treatment lagoon, or holding pond located within the 6-month time of travel boundary?

Yes No (mark and identify on map)

Comments: Drainage canal network is located above the confining layer within the 6 month time of travel boundary

PART V: Assessment of Water Quality

1) Regional sources of risk to ground water:

Please indicate if any of the following are present within a circular area around your water source having a radius up to and including the five-year ground water travel time. If you do not know if one of the following is present, mark the “unknown” space.

	<u>6-month</u>	<u>1-year</u>	<u>5-year</u>	<u>unknown</u>
• likely pesticide application	X (more than 20 years ago) _____			
• stormwater injection wells	_____	_____	_____	_____
• other injection wells	_____	_____	_____	_____
• abandoned ground water well	_____	_____	_____	_____
• landfills, dumps, disposal areas	X (above the confining layer) _____			
• known hazardous materials clean-up site	X (above the confining layer) _____			
• water system(s) with known quality problems	_____	_____	_____	_____
• population density >1 house/acre	_____	_____	_____	_____
• residences commonly have septic tanks	_____	_____	_____	_____
• Wastewater treatment lagoons	_____	_____	_____	_____
• sites used for land application of waste	_____	_____	_____	_____

Mark and identify on map any of the risks listed above which are located within the 6-month time of travel boundary. (Please include a map of the wellhead and time of travel areas with this form. Please locate and mark any of the following.)

If other recorded or potential sources of ground water contamination exist within the ten-year time of travel circular zone around your water supply, please describe:

No recorded or potential sources of ground water contamination exist in the gravel aquifer.

There have been ground water contamination detections in the shallow aquifer above the confining layer at Weyerhaeuser (mercury), Chinook Ventures (fluoride and cyanide), and Flexible Foam Products (formerly Prudential Steel)(VOCs). Remedial action is underway at Weyerhaeuser, and the Chinook Ventures site is undergoing remedial investigation/feasibility study. The Department of Ecology has issued a letter of No Further Action for the Flexible Foam Products site.

2) **Source-specific water quality records:** For each type of test below, **mark the row that applies to the sample results for this source.** Consider all the sample results from the past 12 years. (MCLs are noted next to the specific test or listed in assistance package.)

A. Nitrate: (Nitrate MCL = 10 mg/l)

Results greater than MCL _____
<2 mg/liter nitrate **X** _____
2-5 mg/liter nitrate _____
<5 mg/liter nitrate _____
Nitrate sampling records unavailable _____

B. VOCs: (VOC detection level is 0.5 ug/l or 0.0005 mg/l)

Results greater than MCL or SAL _____
VOCs detected at least once _____
VOCs never detected **X** _____
VOC sampling records unavailable _____

C. EDB/DBCP:

(EDB MCL = 0.05 ug/l or 0.00005 mg/l. DBCP MCL = 0.2 ug/l or 0.0002 mg/l.)

EDB/DBCP detected below MCL at least once _____
EDB/DBCP detected above MCL at least once _____
EDB/DBCP never detected **X** _____
EDB/DBCP tests required but not yet completed _____
EDB/DBCP tests not required _____

D. Other SOCs (Pesticides):

Other SOCs detected
(pesticides and other synthetic organic chemicals) _____
Other SOC tests performed but none detected
(list test methods in comments) **X** _____
Other SOC tests not performed _____

If any SOCs in addition to EDB/DBCP were detected, please identify and date. If other SOC tests were performed, but no SOCs detected, list test methods here:

Samples were taken from PW-1 before and after the 36 day pump test, and analyzed for the complete drinking water package with no detections of VOCs or SOCs.

E. Bacterial contamination:

Any bacterial detection(s) in the past 3 years in samples taken from the source (not distribution sampling records)? **na.**_____

Has source (in past 3 years) had a bacteriological contamination problem found in distribution samples that was attributed to the source? **na**_____

Source sampling records for bacteria unavailable _____

Coliform bacteria was not present in the sample collected at the conclusion of the pump test.

PART VI: Geographic or Hydrologic Factors Contributing to a Non-Circular Zone of Contribution

The following questions will help identify those ground water systems which may not be accurately represented by the calculated fixed radius (CFR) method described in Part IV. For these sources, the CFR areas should be used as a preliminary delineation of the critical time of travel zones for that source. As a system develops its Wellhead Protection Plan for these sources, a more detailed delineation method should be considered.

1) Is there evidence of obvious hydrologic boundaries within the 10-year time of travel zone of the CFR? (Does the largest circle extend over a stream, river, lake, up a steep hillside, and/or over a mountain or ridge?)

Yes No

Describe with references to map produced in Part IV:

Please refer to Section One of the Preliminary Design Report

2) Aquifer Material: **Gravel**

A) Does the drilling log, well log or other geologic/engineering reports identify that the well is located in an area where the underground conditions are identified as fractured rock and/or basalt terrain?

Yes No

B) Does the drilling log, well log or other geologic/engineering reports indicate that the well is located in an area where the underground conditions are primarily identified as coarse sand and gravel?

Yes No

3) Is the source located in an aquifer with a high horizontal flow rate? (These can include sources located on flood plains of large rivers, artesian wells with high water pressure, and/or shallow flowing wells and springs.)

Yes No

4) Are there other high capacity wells (agricultural, municipal and/or industrial) located within the CFRs?

a) Presence of ground water extraction wells removing more than approximately 500 gal/min within...

	YES	NO	unknown
<6-month travel time	X (city plans 3 additional wells in wellfield)	_____	_____
6 month—1 year travel time	X	_____	_____
1—5 year travel time	X	_____	_____
5—10 year travel time	_____	_____	_____

b) Presence of ground water recharge wells (dry wells) or heavy irrigation within...

	YES	NO	unknown
<1-year travel time	_____	X	_____
1—5 year travel time	_____	X	_____
5—10 year travel time	_____	X	_____

Please identify or describe additional hydrologic or geographic conditions that you believe may affect the shape of the zone of contribution for this source. Where possible, reference them to locations on the map produced in Part IV.

Groundwater modeling was conducted to evaluate the sustainability of long-term pumping from the deep gravel aquifer for the Mint Farm Wellfield. Drawdown at the wellfield in the simulation scenario was approximately 6 feet, which is small compared to the approximately 150-foot gravel aquifer thickness. The source of water to the wellfield was found to be over 99 percent from the Columbia River, transmitted through the gravel aquifer. Source water enters the aquifer at locations where the Columbia River channel intersects the gravel unit west of the Mint Farm site.

FORM COMPLETED BY:

Print Name

Date

Signature

Attach: **Capture Zone Base Map (figure 5 from PDR2)**
Well log
Section 1 of Preliminary Design Report 2