Plan Review for New and Existing Public Water Systems

Baxter Call, PE

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Outline of Presentation

- Plan review (PR) process for a new Public Water System (PWS)
  - High level overview
  - Identify, confirm and inform
  - PR Workflow
  - Setbacks and Waivers
  - When to activate PWS
- PR considerations for existing PWS
  - Triggers for new PR
  - Adding disinfection to existing well source
  - Common elements in small groundwater PWS
- Questions at the end as time allows

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PR Process for a New PWS

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PR for a New PWS - Overview

- A new PWS is identified
- OHA Data Management, Compliance and Enforcement (DMCE) issues a PWS ID number
- County Health Department, Department of Agriculture, or OHA Drinking Water Services (DWS) fills out and sends inventory update to OHA DMCE.
- PWS contacts DWS engineer with questions
- PWS submits plans to OHA DWS

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PR for a New PWS – Overview Cont'd

- Well evaluation by hydrogeologist; engineer reviews plans
- Additional information may be requested
- *Optional:* Construction standards waiver application
- OHA writes PWS a letter of approval (or not)
- PWS confirms project completion (written)
- OHA sends final approval (or not)

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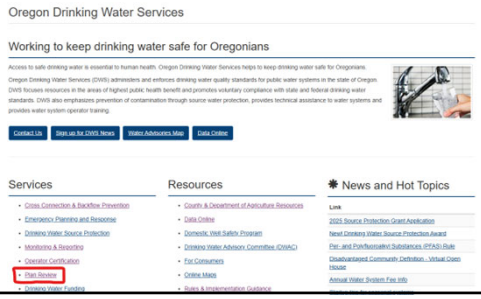
New PWS Identified – Confirm & Inform

1. Potential PWS is identified
2. Regulator confirms it is actually a PWS
   - Communicate with a responsible party, get their address/phone/email
   - Recent owner change? Is it an inactive PWS (i.e. already in SDWIS)?
   - Number of connections and users
   - Duration of use in calendar year
3. Regulator provides PWS with the relevant PR information packet(s):
   - Well
   - Distribution
   - Storage
   - Treatment

   Located on OHA DWS webpage:
4. PWS initiates PR with fee



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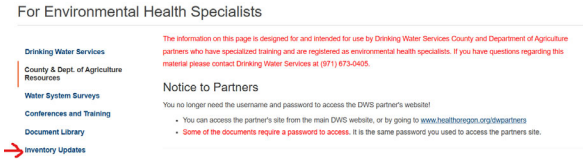
New PWS Identified - Workflow

5. Regulator/PR engineer fill out forms for Inventory Update – Send to compliance.dw@odhsoha.oregon.gov
   - Water System Information
   - Entry Structure Form
   - Entry Structure Diagram (may not be possible until after site visit)
   - Source Information (not possible until source installed)



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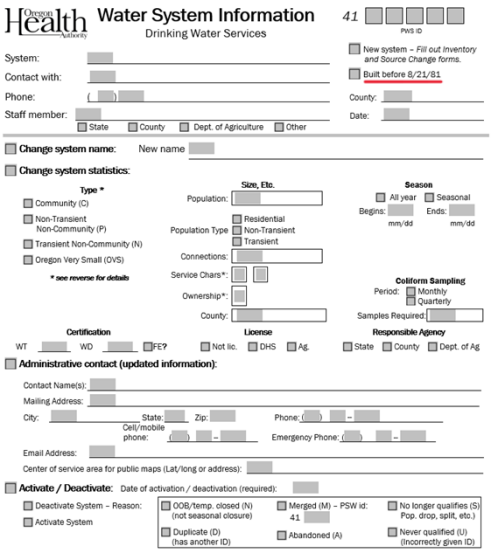
New PWS Identified - Workflow



Determining System Type

Pop/ Daily Use	Number of Connections	≥25 Same Daily Users	≥25Year Round Residents	System Type
<10	<4	No	No	*Not a System*
10-24	4-14	-	-	Oregon Very Small
25+	-	No	No	Transient Non-Community
25+	-	Yes	No	Non-Transient Non-Community
25+	15+	Yes	Yes	Community

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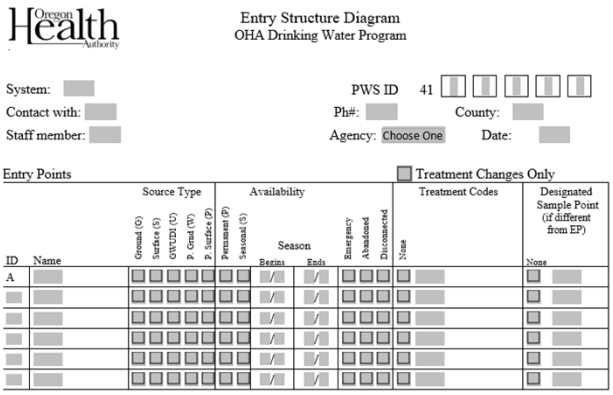
New PWS Identified - Workflow



Oregon Health Authority

Entry Structure Diagram
OHA Drinking Water Program

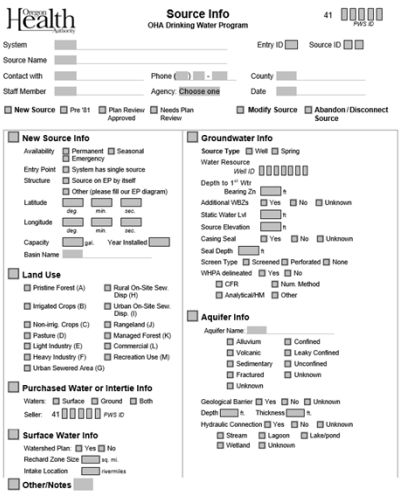
System:
Contact with:
Staff member:

PWS ID 41
Ph#:
County:
Agency: Choose One
Date:

Entry Points

☐ Treatment Changes Only

ID	Name	Source Type: Ground (G)	Surface (S)	GWUDI (U)	P. Grnd (W)	P. Surface (P)	Availability: Permanent (P)	Seasonal (S)	Season: Begins	Ends	Emergency	Abandoned	Disconnected	Treatment Codes: None	Designated Sample Point (if different from EP): None
A															



Oregon Health Authority

Source Info
OHA Drinking Water Program

41 PWS ID

System
Source Name
Contact with
Staff Member
Entry ID
Source ID
Phone
County
Agency: Choose one
Date

☐ New Source ☐ Pre '81 ☐ Plan Review Approved ☐ Needs Plan Review ☐ Modify Source ☐ Abandon / Disconnect Source

New Source Info
Availability: Permanent, Seasonal, Emergency
Entry Point: System has single source
Structure: Source on EP by itself; Other (please fill out EP diagram)
Latitude: deg. min. sec.
Longitude: deg. min. sec.
Capacity: gal. Year Installed
Basin Name

Land Use
Pristine Forest (A); Rural On-Site Sew. Disp (H)
Irrigated Crops (B); Urban On-Site Sew. Disp. (I)
Non-irrig. Crops (C); Rangeland (J)
Pasture (D); Managed Forest (K)
Light Industry (E); Commercial (L)
Heavy Industry (F); Recreation Use (M)
Urban Severed Area (G)

Purchased Water or Intertie Info
Waters: Surface, Ground, Both
Seller: 41 PWS ID

Surface Water Info
Watershed Plan: Yes, No
Recharg Zone Size: sq. mi.
Intake Location: nearmiles

Other/Notes

Groundwater Info
Source Type: Well, Spring
Water Resource
Well ID
Depth to 1st Wtr
Bearing Zn: ft
Additional WBZs: Yes, No, Unknown
Static Water Lvl: ft
Source Elevation: ft
Casing Seal: Yes, No, Unknown
Seal Depth: ft
Screen Type: Screened, Perforated, None
WHPA delineated: Yes, No
CFR
Num. Method
Analytical/HM
Other

Aquifer Info
Aquifer Name:
Alluvium, Confined
Volcanic, Leaky Confined
Sedimentary, Unconfined
Fractured, Unknown
Unknown
Geological Barrier: Yes, No, Unknown
Depth: ft. Thickness: ft.
Hydraulic Connection: Yes, No, Unknown
Stream, Lagoon, Lake/pond
Wetland, Unknown

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New PWS Identified - Workflow

6. Forms for Inventory Update
   - Water System Information
   - Entry Structure Form
   - Entry Structure Diagram (may not be possible until after site visit)
   - Source Information (not possible until source installed)

Food for Thought:

Do you think it is the PR engineer's responsibility to fill out these forms each time? If so, why? Does first contact make more sense?

Presentation later this morning on Survey 123 – Does this change the workflow/responsibilities for the Inventory Update process?

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New PWS Identified - Workflow

7. PR engineer contacts DWS regional geologist
8. PR engineer submits well evaluation request

Evaluation Request for Plan Review, GWUDI Review, Setback Waivers, & Initial Monitoring Reductions

OHA-DWP

* Items in **bold** are required or form will be returned

Background Information: Analysis completed by Hydrogeologist? ☐

Name of System: ____ **PWS ID #**: ____
Well Name: ____ **County**: ____
Plan Review#: ____ Date well log sent to Springfield: ____
Requested by: ____ **Entry Point/Source ID**: ____
Surface water w/i 500 ft[1]: ☐ Yes ☐ No

[1]For all but monitoring reduction requests.

Nature of Request:

☐ Request for Proposed Well Construction review/suggestions
Township: ____ **Range**: ____ **Section**: ____
Or Lat: ____ **Long**: ____ (☐ Earthtools.org ☐ Terraserver-USA.com ☐ Submitted Plans)
Or Property Address: ____

☐ Request for As Built Well/Spring Construction for Plan Review (i.e., well construction and aquifer nature) review

☐ Request for Construction Setback Waiver (i.e., well construction and aquifer nature) review
☐ Septic, sewer, or other fecal contaminant source. Describe: ____
☐ Fuel/chemical storage tank and/or associated piping. Describe: ____
☐ Other. Describe: ____
Distance to hazard(s) causing sanitary setback violation within 100 ft: ____

☐ Request for GWUDI review
Distance to surface water = ____

☐ Request for DBP monitoring reduction review
Other well ID#s: ____
Distance to other wells: ____

☐ Request for initial chemical monitoring reduction review
Other well ID#s: ____
Distance to other wells: ____
☐ Well under consideration on New Entry Point
☐ Well under consideration on Existing Entry Point

For all but Proposed Well Construction Request, provide 1) copy of well log or 2) one of the following and Date Well Completed:

County Well ID: ____ Well Tag: L____ Start Card: ____

Date Well Completed: ____

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New PWS Identified - Workflow

9. PR engineer writes initial letter within 30 days
   - Site Plan Approval,
   - Site Plan Evaluation,
   - Conditional Approval, or
   - Preliminary Approval

Plan Review Records

Plan ID	Project Name	Date All Received	Request for Additional Info	Site Plan Evaluation/ Approval	Conditional Approval	Preliminary Approval	Date Abandoned	Final Approval	Plan Not Approved	Waivers	Reviewer
108-2017	Master Plan	08/31/2017						10/06/2017			JM
159-2015	Clearwell maintenance	10/01/2015			10/02/2015		03/12/2021				JM
36-2014	Raw Water Transmission Main	02/18/2014				02/18/2014		12/10/2015			JM
58-2013	Siletz River Intake	04/23/2013				02/11/2014		09/14/2016			JM
17-2013	Tracer Study	01/28/2013				02/08/2013		07/26/2013			DH
93-2010	old Master Plan	06/09/2010						07/15/2010			FK
194-2003	Old Master Plan	02/01/2006						06/08/2007			TC
170-2003	Willow Creek Storage-Waterline	08/15/2003			08/15/2003			05/23/2006			TC
268-1999	WTP Improvements	09/24/1999			10/06/1999	06/05/2000		07/13/2001			MW
211-1997	Toledo Industrial Park	09/10/1997				10/02/1997		10/29/1997			MG
35-1997	Toledo Industrial Park	02/21/1997			03/31/1997			10/22/1997			MG
78-2013	Phase 1 - Skyline Drive 1.9 MG Water Storage Tank					07/26/2013		07/01/2024 (PDF)			JM
206-1997	Wright Creek waterline ext				10/02/1997		06/20/2000				MG

10. PR engineer responsible for following up with PWS, consultant, well driller.
11. PR engineer writes final letter
    - Final approval (or not)

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New wells and DWS/Oregon Water Resources Department (OWRD)

Hazard	OWRD Setback (OAR 690-210-0030)	DWS Setbacks (OAR 333-061-0050(2))
Septic Tank	50 ft	50 ft
Septic drainline or sewage sludge disposal	100 ft	100 ft
Closed sewage or storm drain system	50 ft	**100 ft – pressure sewer** 50 ft – gravity sewer
Confined animal feeding/holding; or animal waste holding	50 ft	**100 ft**
Commercial fuel storage tank	50 ft	**100 ft**
Residential fuel storage	25 ft	**100 ft**
Hazardous waste storage, disposal, or treatment facility	500 ft	100 ft

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New Wells that Violate Setbacks

1. PR engineer communicates with PWS
   a) Encourage PWS to meet requirements → Site Plan Approval Letter

2. When requirements cannot be met → Site Plan Not Approved Letter
   a. PWS applies for construction standards waiver (available on DWS website)
   b. Source evaluation for sensitivity by DWS hydrogeologist
      a. Adequate construction in confined aquifer → PR Coordinator review → PR manager review → Waiver Approval
      b. Highly sensitive source → "Unapproved"

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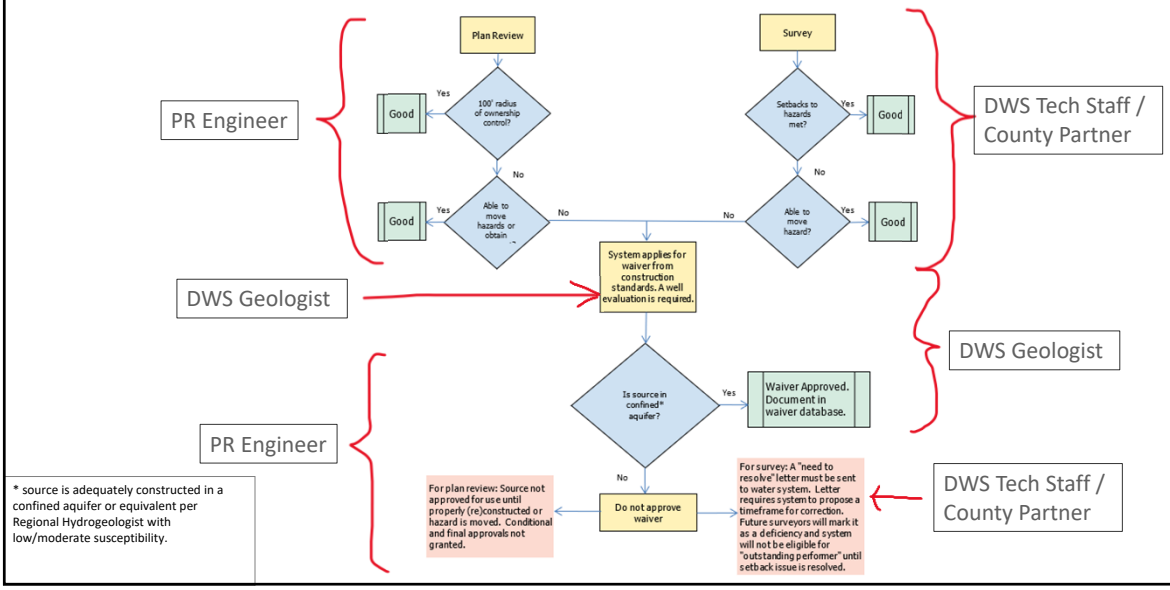
Setback Evaluation and Waiver Process



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New PWS Identified - When to Activate?

Food for Thought:

What constitutes an "active" system?

- When construction is complete?
- When PR final approval has been issued?
- Once the PWS is delivering water to customers?

Timing and Communication:

1. DWS Tech Staff or PR engineer fills out new PWS capacity assessment form
2. Regulator initiates chemical and bacteriological sampling schedules
   - PR engineer generally includes chemical sampling requirements in final approval letter
3. Regulator conducts water system survey within first year of operation

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PR Considerations for existing PWS

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Existing PWS – Triggers for PR

Proactive

- PWS contacts regulator or DWS about new project
- PWS applies for DWSRF funding for infrastructure improvements

Reactive

- Regulator discovers major modification during water system survey
- Regulator/DMCE notices chlorine residual reported on routine coliform sample results

Prescriptive

- DWS requires treatment addition
  - GW 4.0-log disinfection
  - GWUDI determination
  - Untreated surface water source discovered
  - Corrosion control

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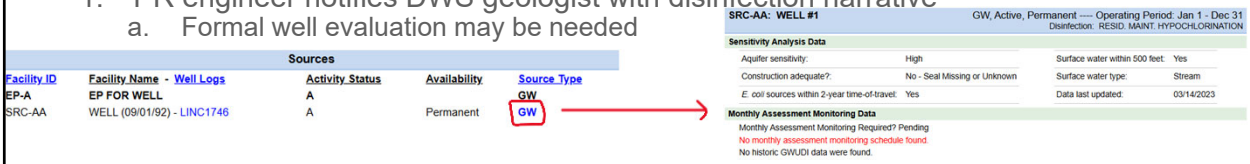
Adding Disinfection to Existing Well

1. PR engineer notifies DWS geologist with disinfection narrative
   a. Formal well evaluation may be needed



Sources

Facility ID	Facility Name - Well Logs	Activity Status	Availability	Source Type
EP-A	EP FOR WELL	A		GW
SRC-AA	WELL (09/01/92) - LINC1746	A	Permanent	GW

SRC-AA: WELL #1 — GW, Active, Permanent — Operating Period: Jan 1 - Dec 31
Disinfection: RESID. MAINT. HYPOCHLORINATION

Sensitivity Analysis Data

Aquifer sensitivity:	High	Surface water within 500 feet:	Yes
Construction adequate?:	No - Seal Missing or Unknown	Surface water type:	Stream
E. coli sources within 2-year time-of-travel:	Yes	Data last updated:	03/14/2023

Monthly Assessment Monitoring Data

Monthly Assessment Monitoring Required? Pending
No monthly assessment monitoring schedule found.
No historic GWUDI data were found.

2. DWS geologist reviews available information and makes recommendation
   a. A well that is inadequately constructed must be upgraded to meet construction standards before disinfection may be installed when *E. Coli* has been confirmed
   b. Monthly assessment monitoring may be required
3. PR engineer communicates testing requirements in PR approval letter
4. DWS geologist updates groundwater source database and requests sample schedule once treatment has been installed

Other considerations:

- New or increased disinfection byproduct (DBP) sampling
- Chlorine residual monitoring
- Two 6-month demonstration rounds of lead and copper (L&C) sampling

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Common Elements in Small Groundwater PWS

<u>Old Wells</u>

- Original construction pre-1981 **may not** require PR
- PWS modification to pre-1981 well **may** require PR
  - Deepening
  - Extending casing above ground
- PWS correcting significant deficiencies noted during WSS **does** require PR, if correction can be considered a "major modification"
  - Major modification examples:
    - Replacing casing seal
    - Raising wellhead to protect from flooding
  - Not considered major modifications:
    - No raw water sample tap
    - No screen on existing well vent

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Common Elements in Small Groundwater PWS

Waterlines

All water systems have them, but they do not necessarily require PR.

- OAR 333-061-0050(8)(c) – In community PWS, distribution mains located in public roadways or easements, and from the distribution main to the property line or service meter are subject to PR.
- OAR 333-061-0050(8)(d) – In all PWS where the system facilities and the premises being served are both on the same parcel(s) of property, requirements relating to pipe materials and pipe installation shall comply with the State Plumbing Code.

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Common Elements in Small Groundwater PWS

UV Disinfection

- OAR 333-061-0050(5)(l) At non-Community water systems using only groundwater and having minimal distribution systems, water suppliers may use UV as the only disinfectant when total coliforms but **no *E. Coli*** have been detected in the source water.
  - UV reactor must meet NSF Standard 55 Class A
  - Still need to go through PR
- PWS adding UV "for kicks" does not need PR
- PWS seeking disinfection credit for pathogen inactivation (i.e. *E. Coli* confirmed) are required to select a UV reactor that has gone through validation testing and is capable of achieving specific UV dose.

(Other reactors not on this list may meet the criteria. Contact DWS for details on verfications for reactors not listed.)

Manufacturer	Model	Log_{10} Inactivation Credit **			Max. Flow (gpm)
		Crypto.	*Giardia*	Virus	
Neotech	D438	3.5	3.5	0	435
Trojan	UVSwiftSC™ D12	3.5+	3.5+	4.0+	3,000
	UVSwiftSC™ B03	3.5	3.5	0	132
	UVSwift™ 2L12	3.5 *	3.5 *	0	4,500
	UVSwift™ 4L12	3.5 *	3.5 *	0	4,500
Viqua	Pro50/SV50/Sterilight50	3.5	3.5	0	70
	Pro50/SV50/Sterilight50	3.0	3.0	0	80
	Pro24-186	5.5+	5.5+	4.0	24
Calgon	Sentinel 24" 9-lamp	4.0	4.0	0	19,600
Berson/Nuvonics	Amaline 100b	3.5+	3.5+	0	890
	Amaline 300b	3.5+	3.5+	0	2,660
atg	UV SP-25-6	3.0	3.0	0	495
	Spektron 250e	4.0	4.0	0	7,300
				3.0	0	387
				3.0	0	1,760
				4.0	0	4,650

Table 32

UV Dose Table for *Cryptosporidium*, *Giardia lamblia*, and Virus Inactivation Credit

Log Credit	*Cryptosporidium* UV dose (mJ/cm^2)	*Giardia Lamblia* UV dose (mJ/cm^2)	Virus UV dose (mJ/cm^2)
0.5	1.6	1.5	39
1.0	2.5	2.1	58
1.5	3.9	3.0	79
2.0	5.8	5.2	100
2.5	8.5	7.7	121
3.0	12	11	143
3.5	15	15	163
4.0	22	22	186

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Thank you!

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Regional Engineer – Region 2
Oregon Health Authority – Drinking Water Services

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