

DIVISION 502

WILLAMETTE BASIN PROGRAM

690-502-0010

Definitions

(12) "Irrigation Use" means the application of water to crops or plants by artificial means to promote growth or nourish plants.

690-502-0040

General Provisions

(7) Conservation: The Department shall require that special conservation and water use efficiency conditions be employed when permitting the use of water from the Columbia River Basalt Group, low-yield aquifers and water quality limited streams.

690-502-0160

Groundwater Classifications and Conditions

(1) Use of groundwater from the basalt aquifer within the Cooper-Bull Mountain Critical Groundwater Area shall be as described in the State Engineer's order designating the Cooper-Bull Mountain Critical Groundwater Area dated May 17, 1974.

(2) Groundwater Classification: The groundwater resources of the Willamette Basin are classified for domestic, livestock, **irrigation**, municipal, industrial, agricultural, commercial, power, mining, recreation, fish life, wildlife, pollution abatement, wetland enhancement and statutorily exempt groundwater uses except as described in OAR 690-502-0170 to 690-502-0210.

PUBLIC INTEREST REVIEW FOR GROUNDWATER APPLICATIONS

TO: Water Rights Section Date 5/17/2017
 FROM: Groundwater Section Jen Woody/Joe Kemper
Reviewer's Name
 SUBJECT: Application G- 18405 Supersedes review of 4/27/2017
Date of Review(s)

PUBLIC INTEREST PRESUMPTION; GROUNDWATER

OAR 690-310-130 (1) *The Department shall presume that a proposed groundwater use will ensure the preservation of the public welfare, safety and health as described in ORS 537.525. Department staff review groundwater applications under OAR 690-310-140 to determine whether the presumption is established. OAR 690-310-140 allows the proposed use be modified or conditioned to meet the presumption criteria. This review is based upon available information and agency policies in place at the time of evaluation.*

A. GENERAL INFORMATION: Applicant's Name: Matthew and Amy Roloff County: Washington

A1. Applicant(s) seek(s) 0.99 cfs from 2 well(s) in the Willamette Basin,
Tualatin River subbasin

A2. Proposed use Irrigation Seasonality: March 1 through October 31

A3. Well and aquifer data (attach and number logs for existing wells; mark proposed wells as such under logid):

Well	Logid	Applicant's Well #	Proposed Aquifer*	Proposed Rate(cfs)	Location (T/R-S QQ-Q)	Location, metes and bounds, e.g. 2250' N, 1200' E fr NW cor S 36
1	Proposed	1	CRBG	0.99	T1N/R2W-S3 NW ¼ SW ¼	2380' N, 510' E fr SW cor S 3
2	Proposed	2	CRBG	0.99	T1N/R2W-S3 NW ¼ SW ¼	2480' N, 765' E fr SW cor S 3
3						
4						
5						

* Alluvium, CRB, Bedrock

Well	Well Elev ft msl	First Water ft bls	SWL ft bls	SWL Date	Well Depth (ft)	Seal Interval (ft)	Casing Intervals (ft)	Liner Intervals (ft)	Perforations Or Screens (ft)	Well Yield (gpm)	Draw Down (ft)	Test Type
1	300	NA	NA	NA	250	0-125	0-125	TBD	TBD	NA	NA	NA
2	295	NA	NA	NA	250	0-125	0-125	TBD	TBD	NA	NA	NA

Use data from application for proposed wells.

A4. **Comments:** The following evaluations are based upon the proposed well construction above.

A5. **Provisions of the Willamette Basin rules relative to the development, classification and/or management of groundwater hydraulically connected to surface water are, or are not, activated by this application.**
 (Not all basin rules contain such provisions.)

Comments: 690-502-0240 classifies use from unconfined alluvial aquifers. This application proposes use from a confined aquifer in the CRBG, so this rule is not activated.

A6. **Well(s) # _____, _____, _____, _____, _____, tap(s) an aquifer limited by an administrative restriction.**

Name of administrative area: _____

Comments: N/A

B. GROUNDWATER AVAILABILITY CONSIDERATIONS, OAR 690-310-130, 400-010, 410-0070

B1. **Based upon available data**, I have determined that groundwater* for the proposed use:

- a. is over appropriated, is not over appropriated, or **cannot be determined to be** over appropriated during any period of the proposed use. * This finding is limited to the groundwater portion of the over-appropriation determination as prescribed in OAR 690-310-130;
- b. **will not** or **will** likely be available in the amounts requested without injury to prior water rights. * This finding is limited to the groundwater portion of the injury determination as prescribed in OAR 690-310-130;
- c. **will not** or **will** likely to be available within the capacity of the groundwater resource; or
- d. **will, if properly conditioned**, avoid injury to existing groundwater rights or to the groundwater resource:
- i. The permit should contain condition #(s) 7i and Large Water Use Reporting;
 - ii. The permit should be conditioned as indicated in item 2 below.
 - iii. The permit should contain special condition(s) as indicated in item 3 below;

- B2. a. **Condition** to allow groundwater production from no deeper than _____ ft. below land surface;
- b. **Condition** to allow groundwater production from no shallower than _____ ft. below land surface;
- c. **Condition** to allow groundwater production only from the a single aquifer in the CRBG
- d. **Well reconstruction** is necessary to accomplish one or more of the above conditions. The problems that are likely to occur with this use and without reconstructing are cited below. Without reconstruction, I recommend withholding issuance of the permit until evidence of well reconstruction is filed with the Department and approved by the Groundwater Section.

Describe injury –as related to water availability– that is likely to occur without well reconstruction (interference w/ senior water rights, not within the capacity of the resource, etc): _____

B3. **Groundwater availability remarks:** The applicant's proposed wells will produce from one or more water-bearing zones in the Columbia River Basalt Group (CRBG), a series of lava flows with a composite thickness that ranges from 600 to 700 feet in this area (Conlon et al., 2005). Each basalt flow is characterized by a series of internal features, including a thin rubble zone at the contact between flows and a thick, dense, low porosity and low permeability interior zone. In some cases, sedimentary layers were deposited during the time between basalt flow emplacements. A flow top, sedimentary interbed and flow bottom are collectively referred to as an interflow zone. Unconfined groundwater occurs near the weathered top of the basalts, but most water occurs in interflow zones at the contacts between lava flows. CRBG flow features result in a series of stacked, thin aquifers that are confined by dense flow interiors. The low permeability of the basalt flow interiors usually results in little connection between stacked aquifers, which generally results in tabular aquifers with unique water level heads. These tabular aquifers typically have high transmissivity and low storativity, making them vulnerable to excessive drawdown (Reidel et al., 2002).

A survey of water levels in the vicinity show that shallow basalt wells have shallow water levels and deep basalt wells have deeper water levels (see Figures 2 & 3). These shallower basalt wells are located primarily in the uplands and do show relatively stable water levels. The proposed well construction would likely access the same water bearing zone. However, a survey of adjacent well logs of similar depths show that the proposed rate of 450 gpm from either well is an order of magnitude greater than mean well yields in the area. Median yield for wells for wells between 150 and 450 ft deep within T1N/R2W-S(1-12) and T2N/R2W-S(31-36) is 20.5 gpm (see Figure 4). At closer range, median yield for wells between 150 and 450 ft deep within T1N/R2W-S(3-4) is 30.0 gpm (see Figure 5). For this reason, monitoring and reporting of water levels and water use is required to assure the proposed use is sustainable.

C. GROUNDWATER/SURFACE WATER CONSIDERATIONS, OAR 690-09-040

C1. **690-09-040 (1):** Evaluation of aquifer confinement:

Well	Aquifer or Proposed Aquifer	Confined	Unconfined
1	Columbia River Basalt Group Aquifer	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2	Columbia River Basalt Group Aquifer	<input checked="" type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>

Basis for aquifer confinement evaluation: General experience indicates that most aquifers in the CRBG are confined. SWLs in adjacent wells are above water bearing zones, indicating confined conditions.

C2. **690-09-040 (2) (3):** Evaluation of distance to, and hydraulic connection with, surface water sources. All wells located a horizontal distance less than ¼ mile from a surface water source that produce water from an unconfined aquifer shall be assumed to be hydraulically connected to the surface water source. Include in this table any streams located beyond one mile that are evaluated for PSI.

Well	SW #	Surface Water Name	GW Elev ft msl	SW Elev ft msl	Distance (ft)	Hydraulically Connected?			Potential for Subst. Interfer. Assumed?	
						YES	NO	ASSUMED	YES	NO
1	1	Unnamed Tributary to Storey Creek (West)	175	175	10500	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2	1	Unnamed Tributary to Storey Creek (West)	170	170	11500	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1	2	Waibel Creek	175	175	11450	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2	2	Waibel Creek	170	170	12800	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
						<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
						<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
						<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Basis for aquifer hydraulic connection evaluation: Adjacent streams incise more than 100 feet into CRBG, creating potential hydraulic connection between basalt interflow zones and surface water. Because static water level at the proposed wells is unknown, hydraulic connection is evaluated from the elevation of the bottom of proposed seal as it coincides with the land surface along the given stream reach. If Well 1 and 2 are cased and sealed as proposed, hydraulic connection between the basalt aquifer and the local stream network is likely to occur at greater than 1 mile.

Water Availability Basin the well(s) are located within: 30201003 MCKAY CR > DAIRY CR - AT MOUTH WILLAMETTE BASIN

C3a. **690-09-040 (4):** Evaluation of stream impacts for each well that has been determined or assumed to be hydraulically connected and less than 1 mile from a surface water source. Limit evaluation to instream rights and minimum stream flows that are pertinent to that surface water source, and not lower SW sources to which the stream under evaluation is tributary. Compare the requested rate against the 1% of 80% natural flow for the pertinent Water Availability Basin (WAB). If Q is not distributed by well, use full rate for each well. Any checked box indicates the well is assumed to have the potential to cause PSI.

Well	SW #	Well < ¼ mile?	Qw > 5 cfs?	Instream Water Right ID	Instream Water Right Q (cfs)	Qw > 1% ISWR?	80% Natural Flow (cfs)	Qw > 1% of 80% Natural Flow?	Interference @ 30 days (%)	Potential for Subst. Interfer. Assumed?
		<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>

C3b. **690-09-040 (4):** Evaluation of stream impacts by total appropriation for all wells determined or assumed to be **hydraulically connected and less than 1 mile** from a surface water source. **Complete only if Q is distributed among wells.** Otherwise same evaluation and limitations apply as in C3a above.

SW #	Qw > 5 cfs?	Instream Water Right ID	Instream Water Right Q (cfs)	Qw > 1% ISWR?	80% Natural Flow (cfs)	Qw > 1% of 80% Natural Flow?	Interference @ 30 days (%)	Potential for Subst. Interfer. Assumed?
	<input type="checkbox"/>			<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
	<input type="checkbox"/>			<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
	<input type="checkbox"/>			<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
	<input type="checkbox"/>			<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>

Comments: Assumed hydraulic connection is outside of one mile from proposed POAs. Therefore PSI is not triggered by OAR 690-09-040 (4).

C4a. **690-09-040 (5):** Estimated impacts on **hydraulically connected surface water sources greater than one mile** as a percentage of the proposed pumping rate. Limit evaluation to the effects that will occur up to one year after pumping begins. This table encompasses the considerations required by 09-040 (5)(a), (b), (c) and (d), which are not included on this form. Use additional sheets if calculated flows from more than one WAB are required.

Non-Distributed Wells													
Well	SW#	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													
Distributed Wells													
Well	SW#	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													
(A) = Total Interf.													
(B) = 80 % Nat. Q													
(C) = 1 % Nat. Q													
(D) = (A) > (C)		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
(E) = (A / B) x 100		%	%	%	%	%	%	%	%	%	%	%	%

(A) = total interference as CFS; (B) = WAB calculated natural flow at 80% exceed. as CFS; (C) = 1% of calculated natural flow at 80% exceed. as CFS; (D) = highlight the checkmark for each month where (A) is greater than (C); (E) = total interference divided by 80% flow as percentage.

Basis for impact evaluation: There is no appropriate model to estimate streamflow depletion from pumping in CRBG interflow zones that are incised by streams or discharge to point sources such as springs. Therefore, the percentage of interference is not calculated.

C4b. **690-09-040 (5) (b) The potential to impair or detrimentally affect the public interest is to be determined by the Water Rights Section.**

- C5. **If properly conditioned**, the surface water source(s) can be adequately protected from interference, and/or groundwater use under this permit can be regulated if it is found to substantially interfere with surface water:
 - i. The permit should contain condition #(s) _____;
 - ii. The permit should contain special condition(s) as indicated in "Remarks" below;

C6. **SW / GW Remarks and Conditions:** None.

References Used:

Conlon, T.D., Wozniak, K.C., Woodcock, D., Herrera, N.B., Fisher, B.J., Morgan, D.S., Lee, K.K., and Hinkle, S.R., 2005, Ground-water hydrology of the Willamette Basin, Oregon: U.S. Geological Survey Scientific Investigations Report 2005-5168.

Reidel, S.P., Johnson, V.G., and Spane, F.A., 2002, Natural gas storage in basalt aquifers of the Columbia Basin, Pacific Northwest USA—A guide to site characterization: Richland, Wash., Pacific Northwest National Laboratory, 277 p.

US Geological Survey Topographic Map, Forest Grove Quadrangle.

OWRD water level database, includes reported water levels, accessed 4/27/2017.

D. WELL CONSTRUCTION, OAR 690-200

D1. Well #: NA Logid: _____

D2. **THE WELL does not appear to meet current well construction standards based upon:**

- a. review of the well log;
- b. field inspection by _____;
- c. report of CWRE _____;
- d. other: (specify) _____

D3. **THE WELL construction deficiency or other comment is described as follows:** _____

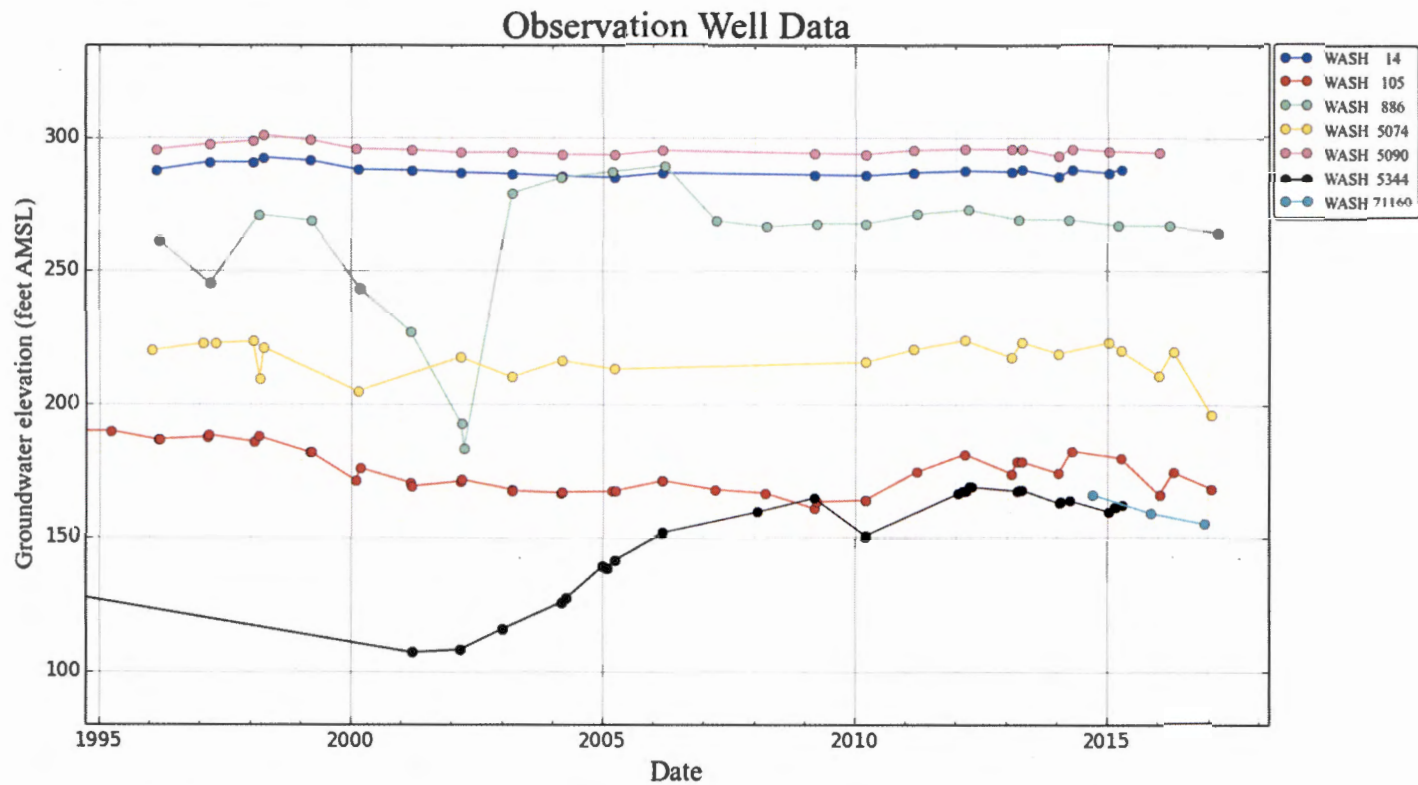
D4. **Route to the Well Construction and Compliance Section for a review of existing well construction.**

Figure 1. Water Availability Tables

WATER AVAILABILITY TABLE															
Watershed ID #: 30201003		MCKAY CR > DAIRY CR - AT MOUTH										Exceedance Level: 80			
Time: 11:01 AM		Basin: WILLAMETTE										Date: 04/21/2017			
# Watershed	Nest ID Number	Stream Name	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	STOR
1	181	WILLAMETTE R > COLUMBIA R - AT MOUTH	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
2	175	TUALATIN R > WILLAMETTE R - AT MOUTH	YES	YES	YES	YES	NO	NO	NO	NO	NO	NO	NO	NO	YES
3	30201006	TUALATIN R > WILLAMETTE R - AT GAGE 14207500	YES	YES	YES	YES	NO	NO	NO	NO	NO	NO	NO	NO	YES
4	30201013	TUALATIN R > WILLAMETTE R - AT GAGE 14206500	YES	YES	YES	YES	NO	NO	NO	NO	NO	NO	NO	NO	YES
5	30201002	DAIRY CR > TUALATIN R - AT MOUTH	YES	YES	YES	YES	NO	NO	NO	NO	NO	NO	NO	NO	YES
6	30201003	MCKAY CR > DAIRY CR - AT MOUTH	YES	YES	YES	YES	NO	NO	NO	NO	NO	NO	NO	NO	YES

DETAILED REPORT ON THE WATER AVAILABILITY CALCULATION							
Watershed ID #: 30201003		MCKAY CR > DAIRY CR - AT MOUTH					Exceedance Level: 80
Time: 11:00 AM		Basin: WILLAMETTE					Date: 04/21/2017
Month	Natural Stream Flow	Consumptive Use and Storage	Expected Stream Flow	Reserved Stream Flow	Instream Requirements	Net water Available	
Monthly values are in cfs. Storage is the annual amount at 50% exceedance in ac-ft.							
JAN	99.10	4.06	95.00	0.00	0.00	95.00	
FEB	129.00	4.33	125.00	0.00	0.00	125.00	
MAR	103.00	3.77	99.20	0.00	0.00	99.20	
APR	56.00	3.36	52.60	0.00	0.00	52.60	
MAY	25.50	3.56	21.90	0.00	0.00	21.90	
JUN	13.50	4.43	9.07	0.00	0.00	9.07	
JUL	5.05	6.18	-1.13	0.00	0.00	-1.13	
AUG	4.61	5.29	-0.68	0.00	0.00	-0.68	
SEP	4.36	2.80	1.56	0.00	0.00	1.56	
OCT	6.38	0.36	6.02	0.00	0.00	6.02	
NOV	9.48	0.46	9.02	0.00	0.00	9.02	
DEC	63.90	4.03	59.90	0.00	0.00	59.90	
ANN	72,300	2,580	69,800	0	0	69,800	

Figure 3. Water-Level Trends in Nearby Wells



Note: WASH 5344 is located approximately two miles south of the proposed POAs and is not depicted in Figure 2.

Figure 4. Distribution of well yields in T1N/R2W-S(1-12) and T2N/R2W-S(31-36):

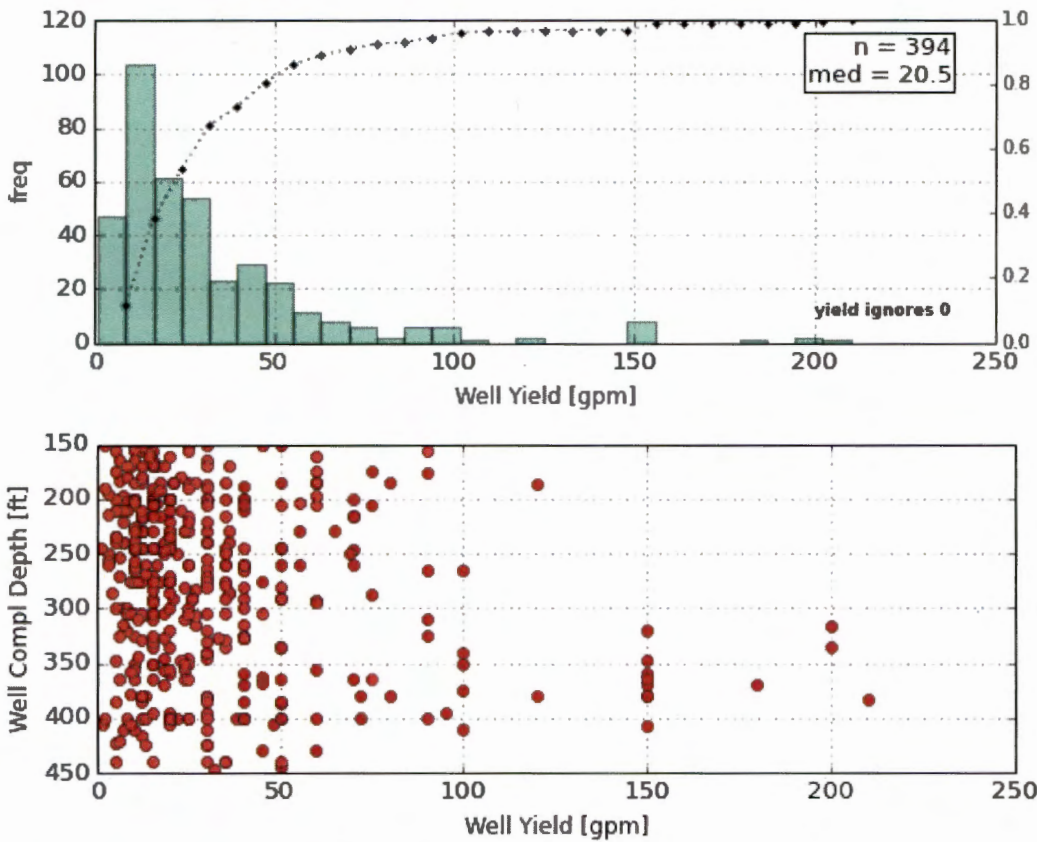


Figure 5. Distribution of well yields in T1N/R2W-S(3-4):

