



August 9, 2011

Ms. Jen Woody
Hydrogeologist
Oregon Water Resources Department
725 Summer Street NE, Suite A
Salem Oregon 97301

RECEIVED

AUG 19 2011

WATER RESOURCES DEPT
SALEM, OREGON

Subject: Request for a 5-Year Time Extension for ASR Limited License #003

Dear Jen:

On behalf of Clackamas River Water (CRW), this letter requests a 5-year time extension for Aquifer Storage and Recovery (ASR) Limited License #003. The current ASR Limited License #003 authorizing ASR testing at six wells completed in the Columbia River Basalt Group (CRBG) aquifer will expire in October 10, 2011. We understand that certain criteria must be met in order to grant an extension; a discussion of those points is provided below:

Rationale for Time Extension

CRW requests an extension of time for their limited license to continue to explore the feasibility of ASR in and around CRW's service area. CRW owns one operational ASR well: CRW-1. However, since the previous limited license renewal in 2006, no injection has occurred at CRW-1. The volume of residual stored water at the end of 2002 pilot testing (last storage event) was 11.71 million gallons (MG). During years 2006 and 2007, the residual stored water was recovered using CRW-1, which is located on Redland Road (Figure 1). After the ASR storage account was depleted in 2007, CRW continued to pump native groundwater at CRW-1 under Oregon Water Resources Department (Department) Permit #G67728.

Although CRW has not stored water in CRW-1 since 2002, CRW is still interested in pursuing ASR pilot testing to augment its peak season supply and to improve the quality of the water withdrawn from the CRBG aquifer. Consequently, CRW is requesting more time for testing to determine the feasibility of using ASR prior to applying for an ASR permit. Results of previous ASR testing at CRW-1 and a more detailed rationale for a time extension request is discussed below.

Results of Previous ASR Testing at CRW-1

To date, the only full scale cycle tests conducted under ASR Limited License #003 occurred at CRW-1 from November to December 2001 (Cycle Test #1) and from December 2001 to November 2002 (Cycle Test #2). Cycle Test #1 was conducted as an initial, relatively short

RECEIVED

AUG 10 2011

WATER RESOURCES DEPT
SALEM, OREGON

Request for Extension to ASR Limited License #003

Page 2

August 9, 2011

duration cycle test to evaluate system operation for Cycle Test #2 (the longer cycle test). During Cycle Test #2, approximately 130 MG of water were injected at an average rate of 670 gallons per minute (gpm) for 122 days. The long-term injection specific capacity of CRW-1 during Cycle Test #2 was 6.1 gpm/foot. The water was stored for 62 days and then 104 MG were recovered at an average rate of 793 gpm, leaving 11.71 MG of recoverable storage. The long-term pumping specific capacity of CRW-1 during Cycle Test #2 was 4.8 gpm/foot. During the cycle tests, a network of seven observation wells was monitored to assess aquifer hydraulic properties.

The primary observations and conclusions based on Cycle Test #2 were as follows:

- Storage of approximately 230 MG at CRW-1 is achievable without substantial loss of water;
- The aquifer is confined and bounded by faults to the northwest, northeast, and southeast;
- Water levels at an observation well located about 3,000 feet northwest of CRW-1 (Rossman landfill MW-1) increased 9.25 feet during the injection period, to about 6 feet below ground surface (bgs);
- Water quality of recovered water complied with the requirements of the limited license conditions; however, the quality of the recovered water diminished relatively early in the recovery period. At 50% to 75% recovery, the recovered water quality was similar to CRBG native groundwater; and
- To recover more than 50% to 75% of stored water, a mixing zone that separates the injected water from the native groundwater may need to be developed. The mixing zone would act as a "buffer" and could be developed by injecting a greater volume of water than is recovered during successive ASR cycles.

Purpose of ASR LL #003 Extension

One of CRW's primary goals of ASR pilot testing is to improve the existing groundwater quality using recharge. During this limited license 5-year period, CRW plans to evaluate ASR storage options to determine if a "buffer" of high quality source water would allow for recovering a higher percentage of stored water with acceptable water quality. Testing likely will include several small scale cycle tests where a significant quantity of stored water is retained in the aquifer to provide a "buffer" for subsequent ASR cycles. Real-time water quality monitoring, as well as collection of water quality samples for laboratory analysis, will be completed to assess mixing trends from injection of source water through recovery of the stored water and to identify ASR storage options that improve the recoverability of injected water with respect to water quality.

Amount of Time Requested

Because CRW has not fully developed its ASR wells or evaluated potential ASR storage options to improve water quality using recharge, CRW would like to request a 5-year

RECEIVED

AUG 10 2011

WATER RESOURCES DEPT
SALEM, OREGON

Request for Extension to ASR Limited License #003
Page 3
August 9, 2011

extension to the ASR Limited License #003. Through the extension of its ASR limited license, CRW's ASR program will be better defined before applying for an ASR permit. Consequently, CRW would like to request a 5-year extension to ASR Limited License #003.

Compliance with the Terms and Conditions of the Current Limited License

Several terms and conditions are defined in ASR Limited License #003, such as notice prior to injection and recovery and keeping a record of use. CRW has complied with the terms of their limited license and they have worked in good faith to report ASR pilot testing data to the Department on a regular basis. CRW has never received a notice from the Department that they are out of compliance with the terms of the license. Specifically, the following has been completed to comply with the terms and conditions of the license:

- The maximum recovery rate was less than 12,000 gpm, which complies with the terms of the license. No injection took place during the last 5-year extension period.
- Condition 1 - This letter requests an extension.
- Condition 2 - CRW has not injected water under ASR Limited License #003 since 2002. Notice of intent to recover water was given to the watermaster before recovering the residual 11.71 MG of water that remained in storage.
- Condition 3 - CRW has kept record of the injection and recovery volumes and has reported the data to the Department in the year-end ASR reports.
- Condition 4 - No proposed modifications to the limited license have been requested.
- Condition 5 - CRW understands that the limited license does not receive a priority date like a water right.
- Condition 6 - CRW completed a UIC registration with the original ASR limited license (UIC Number 11958) and has complied with all state and local permits with regard to injecting, recovering, and pumping to waste.
- Condition 7 - The Department received an ASR work plan prior to pilot testing. Additionally, Oregon State Department of Human Services Drinking Water Program (DHS-DWP) approved the well modifications to CRW-1 that were required to bring the well into compliance with state well construction standards.
- Condition 8 - During Cycle Test #1 (year 2001) and Cycle Test #2 (year 2001 through 2002), injection, storage, and recovery samples were collected for analysis. All samples collected for analysis complied with Safe Drinking Water Act (SDWA) regulations and no constituents in the injection water were above 50% of the maximum contaminant level (MCL).
- Condition 9 - Because no additional cycle tests took place under the last 5-year period of this limited license (2006 through 2011), water quality samples were not collected. However, when cycle testing is resumed, CRW intends to collect water

RECEIVED

AUG 10 2011

WATER RESOURCES DEPT
SALEM, OREGON

Request for Extension to ASR Limited License #003
Page 4
August 9, 2011

quality samples in compliance with the terms outlined in their limited license and to ensure that the water delivered to its customers meets all federal and state drinking water standards.

- Condition 10 – Because no additional cycle tests took place under the last 5-year period of this limited license (2006 through 2011), a monitoring plan was not necessary to measure the response due to ASR activities. However, CRW will maintain a detailed monitoring plan to measure the response in the regional aquifer due to ASR activities. If changes in the points of monitoring are proposed (new points added and others dropped based on data trends), the Department will be notified of the changes.
- Condition 11 –DHS-DWP approved the well modifications to CRW-1 that were required to bring the well into compliance with state well construction standards. The well modifications were submitted to the Department for approval.
- Condition 12 – CRW has recovered up to 95% of the stored volume each year. However, using their existing groundwater permit, CRW pumped native groundwater after the ASR account was depleted in 2007. Yearly reporting to the Department has documented the amount of recovered water; both ASR water and native groundwater.
- Condition 13 – Yearly ASR reports have been submitted to the Department since the start of ASR pilot testing.
- Condition 14 – No injuries to existing groundwater users have been reported since the start of ASR activities.
- Condition 15 – CRW has used the recovered water in accordance with the diversion authorization or for non-municipal use for the purposes of ASR testing as outlined in the limited license.
- Condition 16 – Because no additional cycle tests took place under the 5-year period of this limited license (2006 through 2011), CRW has not met with the Department to review the status of its ASR project.
- Condition 17 - The Department has not suggested additional conditions to the limited license since its issue date.
- Condition 18 – Because no additional cycle tests took place under the 5-year period of this limited license (2006 through 2011), CRW has not actively kept the public informed of the ASR program. However, when cycle testing is resumed, CRW intends to keep the public informed of the ASR program through their Consumer Confidence Report and through other presentations, publications, and community meetings, as needed.
- Condition 19 – No adverse effects have been observed due to ASR testing.

RECEIVED

AUG 10 2011

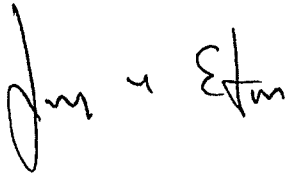
WATER RESOURCES DEPT
SALEM, OREGON

Request for Extension to ASR Limited License #003
Page 5
August 9, 2011

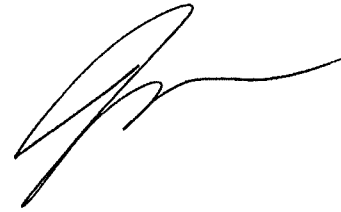
- Condition 20 - Yearly running accounts of the amount of the residual stored ASR water were submitted to the Department.

Thank you for considering this request and please do not hesitate to call us at 503 239-8799 if you have questions.

Regards,



Larry Eaton, RG
Principal Hydrogeologist
GSI Water Solutions, Inc.



Jason Melady, RG, CWRE
Project Hydrogeologist
GSI Water Solutions, Inc.

Cc Lee Moore, Sr., Rob Cummings, Bob George, and Gordon McGhee -- Clackamas River Water

FIGURE 1
ASR Limited License #003
General Location Map
 Clackamas River Water District

LEGEND

Well Location Described in Limited License #003

- Existing Operational ASR Well
- Potential Future ASR Well Location

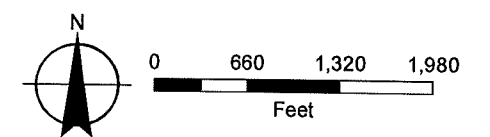
Other Data

- ⊕ Clackamas River Water District Boundary
- Streets
- ~ Watercourses
- Waterbodies

RECEIVED

AUG 10 2011

WATER RESOURCES DEPT
 SALEM, OREGON



MAP NOTES:
 Date: August 1, 2011
 Data Sources: OWRD, METRO RLIS

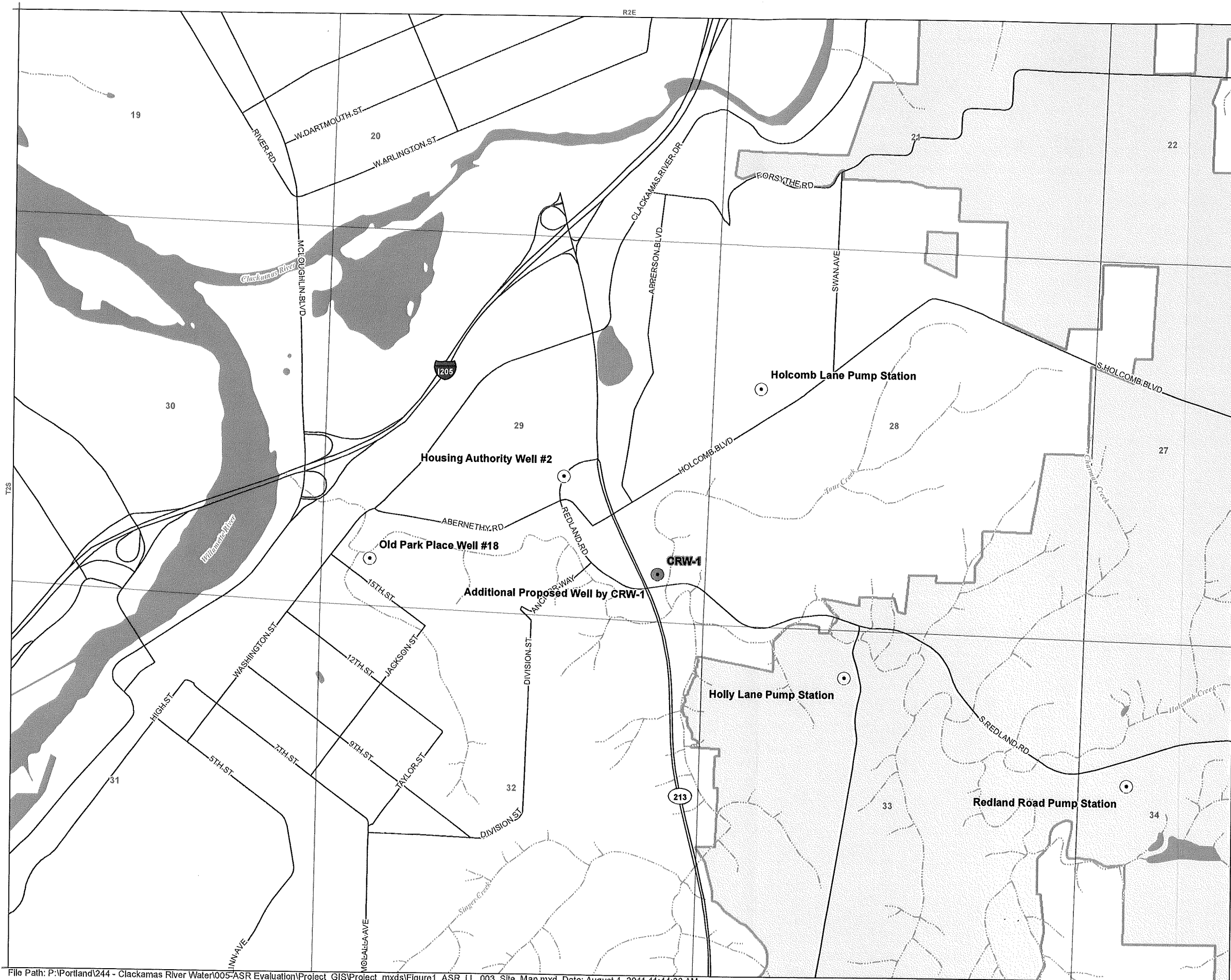
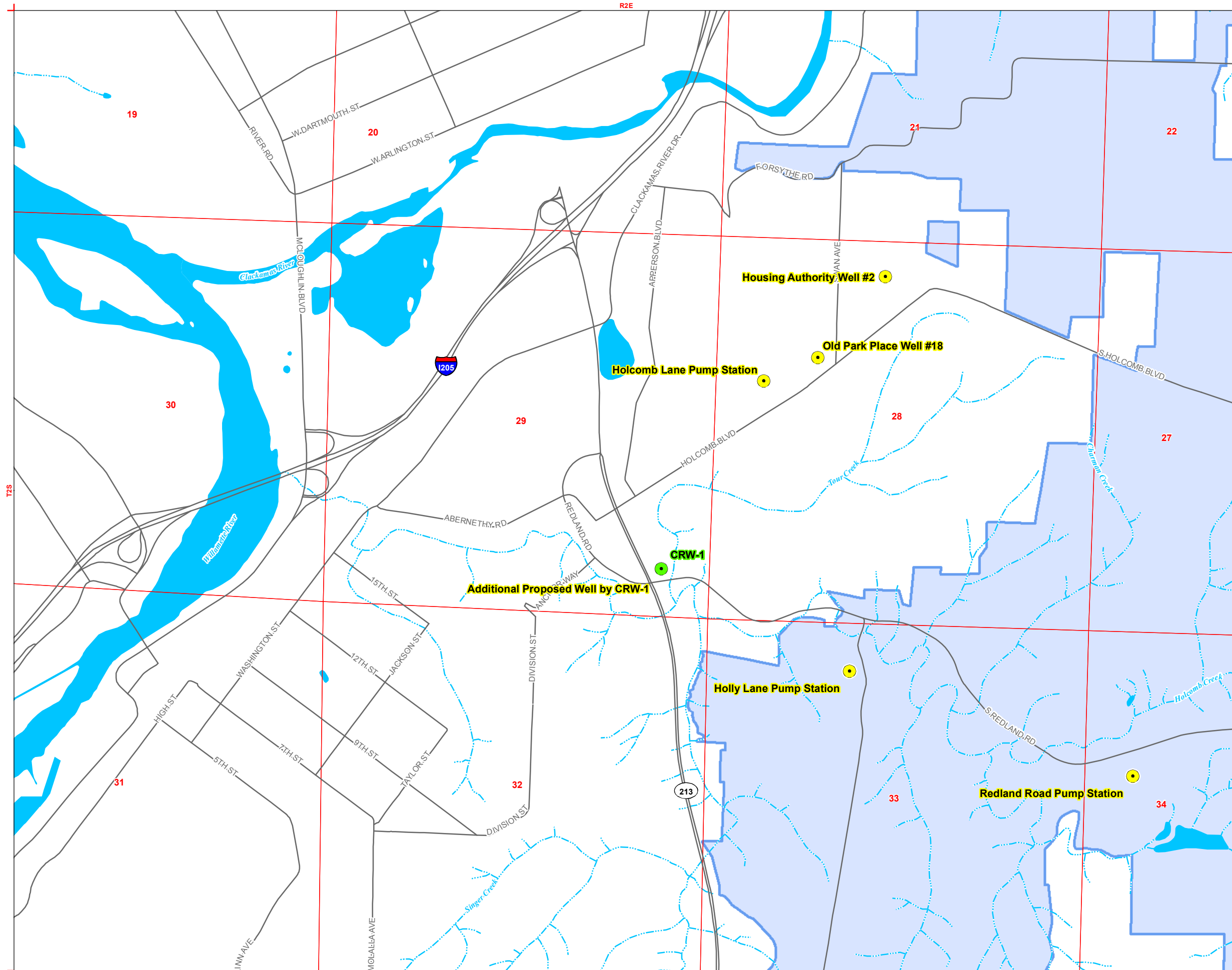


FIGURE 1
ASR Limited License #003
General Location Map
 Clackamas River Water District



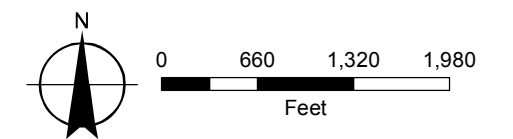
LEGEND

Well Location Described in Limited License #003

- Existing Operational ASR Well
- Potential Future ASR Well Location

Other Data

- ▣ Clackamas River Water District Boundary
- Streets
- Watercourses
- Waterbodies



MAP NOTES:
 Date: September 12, 2011
 Data Sources: OWRD, METRO RLIS



This page to be completed by the local Watermaster

WATER AVAILABILITY REPORT-SURFACE WATER APPLICATION

Name of Applicant Clack River Water Application Number ^{ASR} LL-003

1. To your knowledge, has the stream or basin that is the source for this application ever been regulated for prior rights?

Yes No

If yes, please explain.

2. Has the stream or basin that is the source for this application ever been regulated for minimum streamflows?

Yes No

If yes, please explain.

Historical data does show that the river has dropped below the ISWR in the past. Due to this, and the condition of using water between Nov 1 and June 30 should be carried forward on the renewal.

3. Do you observe this stream system during regular field work?

Yes No

If yes, what are your observations for the stream.

ref conditioned (above) water is available for the proposed use.

4. Based on your observations, would there be water available in the quantity and at times needed to supply the development proposed by this application?

Yes No Don't know-

What would you recommend for conditions on a permit that may be issued approving this application?

See above.

5. Are there any other recommendations that you would like to make?

None

Signature Mitchell McLeod WM District# 20 Date 10-11-11



October 7, 2011

Ms. Jen Woody
Hydrogeologist
Oregon Water Resources Department
725 Summer Street NE, Suite A
Salem Oregon 97301

Subject: Supplemental Information -- Request for a 5-Year Time Extension for ASR
Limited License #003

Dear Jen:

On behalf of Clackamas River Water (CRW), this letter provides supplemental information to the Aquifer Storage and Recovery (ASR) limited license renewal application submitted August 9, 2011. During agency review of the ASR limited license renewal, Oregon Health Authority Drinking Water Program (OHA-DWP) requested discussion of potential impacts to ASR injection source water with specific regard to lead. In their review, OHA-DWP noted that CRW is under a Bilateral Compliance Agreement dated February 17, 2011 (see attached) resulting from water quality analysis indicating the presence lead above the action level (AL) within the CRW-Clairmont¹ distribution system. This letter provides a discussion of lead in the context of ASR injection source water.

In 2007, CRW began using their ASR well (CRW-1) to pump native groundwater (authorized by permit G-6228/G-6728) to supplement their supply from South Fork Water Board (SFWB) and began to observe AL exceedences for lead in the CRW-Clairmont distribution system water quality samples. As a result of these lead AL exceedences, OHA-DWP and CRW entered into a Bilateral Compliance Agreement, which outlined a list of required activities to identify operational changes, including possible corrosion control treatment, intended to reduce lead concentrations and attain compliance with the AL for lead.

The source of the increase in distribution system lead concentrations appears to be related to groundwater and/or mixing of groundwater with water from SFWB in CRW-Clairmont's distribution system. A recent bench testing evaluation completed on behalf of CRW indicates that water from SFWB does not appear to cause lead to be released from distribution piping. Bench testing with groundwater from the CRW-1 well and various mixtures of groundwater and water from SFWB did appear to cause an increase in lead concentrations, specifically with lead/copper galvanic testing coupons. Based on the timing of observed lead concentrations in CRW-Clairmont's distribution system with the initiation

¹ CRW-Clairmont is also referred to as CRW Southern Service Area and was formerly known as Clairmont Water District.

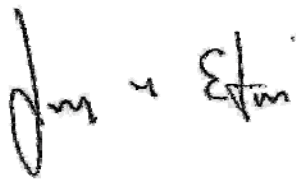
of groundwater use in 2007, coupled with observations from the bench testing corroborates that use of groundwater and mixes of groundwater with SFWB water in copper piping with lead solder are the source of the increase in distribution system lead concentrations. As such, water directly from SFWB does not appear to contribute to increased distribution system lead concentrations.

Because ASR source water is obtained directly from SFWB and is not mixed with groundwater in the distribution system during ASR injection, lead leaching should not be an issue. CRW-Clairmont receives source water for ASR injection through an inertie connection with SFWB near the SFWB treatment plant on the northern end of CRW-Clairmont's distribution system. During ASR injection, treated drinking water from SFWB is conveyed to CRW's ASR facility on Redland Road, approximate 1 mile from SFWB's treatment plant. Operationally, when injection is occurring at the ASR well, native groundwater pumping cannot occur and therefore groundwater and ASR source water will not be mixing in distribution system piping. Because the noted lead issues appear to be related to groundwater and/or mixed groundwater with SFWB water in distribution piping, lead leaching in conveyance piping from SFWB to the ASR well during ASR injection is not an issue. Additionally, lead has not been detected in any ASR injection source water samples collected to date. Although not an issue, it is anticipated that lead analysis (along with other analyses) will be completed for ASR source water prior to any future ASR cycle testing, as required by ASR limited license #003.

CRW is currently evaluating water treatment options for periods when groundwater and groundwater/SFWB mixtures are distributed to CRW-Clairmont customers. The selected water treatment would be utilized for corrosion control when stored ASR water is recovered for distribution to CRW-Clairmont customers.

Please do not hesitate to call us at 503 239-8799 if you have questions.

Regards,



Larry Eaton, RG
Principal Hydrogeologist
GSI Water Solutions, Inc.



Jason Melady, RG, CWRE
Project Hydrogeologist
GSI Water Solutions, Inc.

Attached:
February 17, 2011 Bilateral Compliance Agreement between the OHA and CRW

Cc:
Rob Cummings -- Clackamas River Water,
Tom Pattee - Oregon Health Authority Drinking Water Program

BEFORE THE STATE OF OREGON
OREGON HEALTH AUTHORITY
OFFICE OF ENVIRONMENTAL PUBLIC HEALTH

In the Matter of

Clackamas River Water - Clairmont,
PWS OR4100594

BILATERAL COMPLIANCE AGREEMENT

Clackamas River Water (CRW) is a water supplier as defined in Oregon Revised Statute (ORS) 448.115(12) and Oregon Administrative Rule (OAR) 333-061-0020(211), and owns and operates Clackamas River Water - Clairmont, which is a community public water system serving over 10,000 people and subject to regulation under ORS 448.115 to 448.290 and OAR 333-061-0005 to 333-061-0290.

Pursuant to its authority under ORS 448.150, the Oregon Health Authority, Public Health Division, Office of Environmental Public Health, Drinking Water Program (Program) has reviewed the operation of the CRW - Clairmont water system.

This agreement is entered into between the Program and CRW for the purpose of acknowledging that sampling results indicate that water provided by CRW- Clairmont exceeds the action level (AL) for lead as specified in OAR 333-061-0030(1). Additionally, the purpose of this agreement is to establish a commitment by CRW to install optimal corrosion control for CRW- Clairmont and to demonstrate compliance with the AL for lead.

FINDINGS OF FACT

- In 2007 CRW brought a new groundwater source online to provide additional water supply, but the new water source resulted in unintended changes to water chemistry which may have contributed to lead levels exceeding the AL.
- Twenty-eight water samples collected from sites within CRW- Clairmont on August 27, 2008 indicated a lead concentration of 0.0360 mg/L when calculated as prescribed by OAR 333-061-0030(1)(c). This exceeds the AL for lead of 0.015 mg/L.
- Seventy-six water samples collected from sites within CRW- Clairmont on September 10, 2009 indicated a lead concentration of 0.0230 mg/L when calculated as prescribed by OAR 333-061-0030(1)(c). This exceeds the AL for lead of 0.015 mg/L.

AGREEMENT

The Program has determined that CRW must install optimal corrosion control to effectively prevent lead from exceeding the AL within CRW - Clairmont.

Upon completion of the activities described below, if taken within the time specified in this Agreement, CRW will have fully satisfied the terms of this agreement.

- Agreement Activity No. 1: CRW will submit a written recommendation to the Program, with any applicable supporting data and documentation no later than August 1, 2011. The recommendation will identify what specific infrastructure or operational changes are necessary related to the water treatment and distribution systems of CRW- Clairmont, and when CRW will complete the necessary changes in order to comply with the AL for lead.
- Agreement Activity No. 2: CRW will submit plans to the Program no later than April 30, 2012 for making the necessary infrastructure or operational changes related to the water treatment and distribution systems in order to comply with the AL for lead. The plans shall meet all the applicable requirements of OAR 333-061-0060, and have sufficient detail to completely and clearly illustrate what is to be constructed.
 - Plan review materials will be submitted to: Marsha Fox, DHS – Drinking Water Program, PO Box 14450, Portland, OR 97293-0450.

- Agreement Activity No. 3: CRW will complete construction and installation of the project approved in accordance with Agreement Activity No. 2 no later than September 30, 2012. Any related physical or infrastructure changes at CRW-Clairmont will meet the applicable construction standards specified in OAR 333-061-0050.
- Agreement Activity No. 4: CRW will collect samples for lead and copper at CRW-Clairmont no later than December 31, 2012. Specifically:
 - CRW will collect samples for lead and copper in tap water from at least sixty (60) sites in accordance with OAR 333-061-0036(2)(c); and
 - CRW will collect samples for water quality parameters in accordance with OAR 333-061-0036(2)(c)(F)(iv).
- Agreement Activity No. 5: All sampling results collected as prescribed by Agreement Activity No. 4 will be submitted to the Program no later than January 10, 2013, and must show that lead concentrations are below the action level as specified in OAR 333-061-0030(1).
- Agreement Activity No. 6: CRW will collect samples for lead and copper at CRW-Clairmont between January 1, 2013 and June 30, 2013. Specifically:
 - CRW will collect samples for lead and copper in tap water from at least sixty (60) sites in accordance with OAR 333-061-0036(2)(c); and
 - CRW will collect samples for water quality parameters in accordance with OAR 333-061-0036(2)(c)(F)(iv).
- Agreement Activity No. 7: All sampling results collected as prescribed by Agreement Activity No. 6 will be submitted to the Program no later than July 10, 2013, and must show that lead concentrations are below the action level as specified in OAR 333-061-0030(1).
- Agreement Activity No. 8: CRW will continue to regularly publish public education materials in accordance with OAR 333-061-0034(5)(c)(C) until the completion of all other activities specified in this agreement.

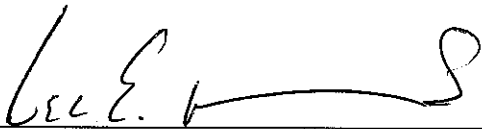
GENERAL PROVISIONS

This Agreement does not constitute a waiver, suspension or modification of the requirements of the Oregon Drinking Water Quality Act; ORS 448.115 to 448.285 and administrative rules OAR 333-061-0050 to 333-061-0290, which remain in full force and effect.

This Order does not relieve CRW of any responsibilities or liabilities established pursuant to any applicable federal, state, or local law or regulation.

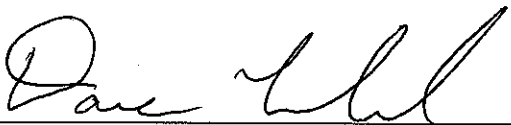
The Program has determined that formal enforcement action is not warranted at this time, and so long as CRW complies with the actions and deadlines hereto agreed upon, the Program will forgo any additional enforcement action which could include the assessment of civil penalties as prescribed by OAR 333-061-0090.

Dated this 17TH day of FEBRUARY, 2011.



Lee E. Moore, Sr.
General Manager
Clackamas River Water

Dated this 18th day of FEBRUARY, 2011.



Dave Leland
Manager
Oregon Health Authority, Drinking Water Program

cc: Pete Farrelly, DHS-DWP
Chris Hughes, DHS-DWP
Gordon McGhee, Clackamas River Water